

OPERATING NOTES

DO NOT REMOVE FROM CONSOLE

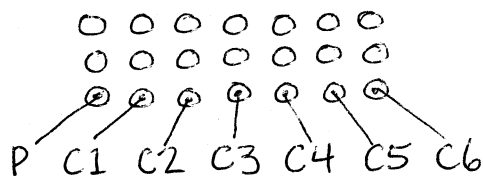
# TREE : COMPUTES CHECK BITS & PARITY

- ① 'CLEAR' & 'LOAD' TO SELF-LOAD PROGRAM
- ② AT HTR SPECIFY WORD TO BE CHECKED AS FOLLOWS:  
TYPE 54 DATA BITS INTO U

SET IL FOR TAG

{	NONE FOR NO TAG
	IL1 FOR TAG 1
	IL2 FOR TAG 2
	IL3 FOR TAG 3

- ③ 'CONTINUE'
- ④ AT HTR PARITY & CHECK BITS ARE DISPLAYED IN  
LAST 7 TRIADS OF U AS FOLLOWS:



- ⑤ RETURN TO STEP ② TO PROCESS ANOTHER WORD

		ORG	100		1
		REM	COMPUTE CHK BITS AND PARITY		2
					3
START	T4	HTR	CC,U→T7		4
	I	IF(TG1)TRA	TA3,U→B2		5
		IF(TG2)TRA	TA3,B2+1		6
		IF(TG3)TRA	TA3,B2+1		7
		SB2	Z		10
TAG	Z	SBI	6,U→T4		11
					12
NEXT	T7	AND	WMASK+B1=1,U→R		13
	P2	AND	TMASK+B1=1		14
	Z	SYD→	R,B1-1		15
		BCT	d54		16
		IF(ODD)TRA	TEST		17
	P1	IMP	a3,U→B3		20
	I	LUL	B3		21
		ORU→	T4		22
TEST	P1	IF(NZF)TRA	NEXT		23
	T4	SYD	T7		24
		SYD	a32,U→R		25
	Z	BCT	d54		26
		IF(EVN)TRA	START		27
	I	LUL	d13		30
		ORU→	T4		31
		TRA	START		32
WMASK		OCT	00 00 00 00 17 77 77 77 77		33
		OCT	00 01 77 77 60 00 01 77 77		34
		OCT	03 76 00 77 60 07 76 00 37		35
		OCT	34 36 17 03 61 70 36 07 41		36
		OCT	55 46 63 14 66 31 46 31 46		37
		OCT	64 53 25 25 32 52 52 52 52		38
TMASK		OCT	3		39
		OCT	3		40
		OCT	3		41
		OCT	3		42
		OCT	1		43
		OCT	2		44
	Z	TRA	START,U→T4		45
		END			46
					47
					48
					49
					50
					51
					52
					53
					54
					55
					56
					57

COMPUTE CHK BITS AND PARITY

START	100	04	00000	07	4001	00000	
	101	20	01001	42	4000	00105	TAG
	102	01	01002	22	4000	00105	TAG
	103	01	01003	22	4000	00105	TAG
	104	01	40002	00	4000	00000	
TAG	105	00	40001	04	4000	00006	
NEXT	106	07	50314	02	0002	00125	WMASK - 1
	107	42	50314	00	0002	00133	TMASK - 1
	110	01	53221	61	0000	00002	
	111	00	46000	00	4000	00066	
	112	01	01060	00	4000	00116	TEST
	113	41	10220	43	4000	00003	
	114	20	45020	00	4010	00000	
	115	01	50011	00	0000	00004	
TEST	116	41	01050	00	4000	00106	NEXT
	117	04	53220	00	0000	00007	
	120	01	53220	02	4004	00000	
	121	00	46000	00	4000	00066	
	122	01	01020	00	4000	00100	START
	123	20	45020	00	4000	00022	
	124	01	50011	00	0000	00004	
	125	01	01000	00	4000	00100	START
WMASK	126	00	00000	01	7777	77777	
	127	00	01777	76	0000	17777	
	130	03	76007	76	0077	60037	
	131	34	26170	36	1703	60741	
	132	55	46631	46	6314	63146	
	133	66	53252	53	2525	25252	
TMASK	134	00	00000	00	0000	00003	
	135	00	00000	00	0000	00003	
	136	00	00000	00	0000	00003	
	137	00	00000	00	0000	00003	
	140	00	00000	00	0000	00001	
	141	00	00000	00	0000	00002	
	142	00	01000	04	4000	00100	START

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316	START	0	100	3	60000000000000	0
317	TAG	0	105	3	13000000000000	0
320	NEXT	0	106	3	14000000000000	0
321	WMASK	0	126	3	35000000000000	0
322	TMASK	0	134	3	51000000000000	0
323	TEST	0	116	3	24000000000000	0

260		ORG			1
		SLN	a00002		2
		LT7	100000220000000261		3
	T7	TSR	a*126,U+T6		4
	T6	BAU	a262		5
		TSR	a*126,U+T7		6
		SBI	a10000		7
LA		CLA→	a*261,B1=1		10
	B1	IF(PNZ)TRA	aLA		11
	Z	50540	261,U+32		12
		50550	262		13
					14
					15
TEST		SBI	a10000		16
LB	*T4	IF(ZER)SKP	*T4,B1=1		17
		TSR	aERROR		20
	B1	IF(PNZ)TRA	aL3		21
	I	ADD→	T5		22
		SBI,ERM	a10000		23
LC	*T4	AB1	a77776,U+*T5		24
	-I	ADD→	T5		25
		SBI	a10000		26
LD	*T5	IF(ZER)SKP	*T4,B1=1		27
		TSR	aERROR,B2+1		30
	B1	IF(PNZ)TRA	aLD		31
	I	SBI,ERM	a10000,U+B1		32
LE	Z	STO	a*T5,B2=1		33
		TRA	aTEST		34
					35
ERROR		STO	aUP,B1+1		36
	B1	STO	aBP,B1=1		37
		CLA	B2+4		40
		STO	aTP		41
		CLA	000034000000000000		42
		BAU	aBP,U+T7		43
	Z	LT4	T4,U+82		44
		LT5	T5		45
	PF	TSR	a*126,U+83		46
		50540	T4		47
	B3	50550	T5,U+CC		50
					51
BP		UCT	0		52
UP		UCT	0		53
TP		UCT	0		54
					55
		END			56
					57

TEST \*Ti in F1 and F3.

Load Spinel, load program, execute 260.

Prints if failure occurs.

	1	01	42000	00	4000	00002	
	2	01	F0470	00	0001	00045	*0000A
	3	07	40000	06	4400	00126	
	4	06	20100	00	4000	00262	
	5	01	40000	07	4400	00126	
	6	01	40001	00	4000	10000	
LA	7	01	21701	61	4400	00261	
	10	41	05150	00	4001	77775	LA
	11	00	F0540	42	0000	00261	
	12	01	50550	00	0000	00262	
TEST	13	01	40001	00	4000	10000	
LB	14	04	02010	61	0400	00004	
	15	01	40000	00	4001	00014	ERROR
	16	41	05150	00	4001	77774	LB
	17	20	10001	00	0000	00005	
	20	01	40021	00	4000	10000	
LC	21	04	41001	05	4000	77776	
	22	30	10001	00	0000	00005	
	23	01	40001	00	4000	10000	
LD	24	05	02010	61	0400	00004	
	25	01	40000	22	4001	00004	ERROR
	26	41	05150	00	4001	77774	LD
	27	20	40022	41	4000	10000	
LE	30	00	20001	62	4400	00005	
	31	01	01000	00	4001	77760	TEST
ERROR	32	01	20001	21	4001	00013	UP
	33	41	20001	61	4001	00011	BP
	34	01	21700	00	0004	00004	
	35	01	20001	00	4001	00011	TP
	36	01	21700	00	0001	00012	*0000B
	37	01	20100	07	4001	00005	BP
	40	00	F0440	42	0000	00004	
	41	01	50450	00	0000	00005	
	42	47	40000	43	4400	00126	
	43	01	50540	00	0000	00004	
	44	43	50550	40	0000	00005	
BP	45	00	00000	00	0000	00000	
UP	46	00	00000	00	0000	00000	
TP	47	00	00000	00	0000	00000	
*****							
*0000A	50	10	00002	20	0000	00261	
*0000B	51	00	00340	00	0000	00000	

314	*0000A	0	50	1	5500000000000000	0
315	LA	0	7	1	1000000000000000	0
316	TEST	0	13	1	1400000000000000	0
317	LB	0	14	1	1500000000000000	0
320	ERROR	0	32	1	3300000000000000	0
321	LC	0	21	3	2200000000000000	0
322	LD	0	24	1	2500000000000000	0
323	LE	0	30	3	3100000000000000	0
324	UP	0	46	1	5100000000000000	0
325	BP	0	45	1	4700000000000000	0
326	TP	0	47	1	5300000000000000	0



# WORST PATTERN TEST FOR AMPLEX MEMORY

AMPLEX WORST PATTERN

THE PROGRAM IS SELF-LOADING TO ADDRESS 50000  
AND TESTS ADDRESSES 10 - 37777.

TO OPERATE:

1° LOAD PROGRAM A 'HTR' OCCURS IMMEDIATELY  
AFTER THE TAPE IS READ

2° TYPE ~~THE~~ PATTERN INTO:

T4 , B4  
T5 , B5

B4, B5 SHOULD BE 0, 1, 2, OR 3, ~~OR 4~~ AND SPECIFY THE  
TAG TO BE USED WITH (T4), (T5) RESPECTIVELY.

TURN ON SL<sup>5</sup> FOR WRITING.

SELECT CORE BANK(S) TO BE CHECKED

SL <sup>1</sup>	1 <sup>st</sup> 4K	SL <sup>3</sup>	3 <sup>rd</sup> 4K
SL <sup>2</sup>	2 <sup>nd</sup> 4K	SL <sup>4</sup>	4 <sup>th</sup> 4K

3. PUSH CONTINUE. THE PATTERN IN "T, B, 4, 5" WILL  
BE WRITTEN IN ADDRESSES 10 - 37777 IF SL<sup>5</sup> IS ON.  
AFTER WRITING SL<sup>5</sup> IS TURNED OFF AND  
THOSE PORTIONS OF THE MEMORY SELECTED BY SL 1-4  
ARE CHECKED. IF AN ERROR IS FOUND, SL<sup>5</sup> IS  
TURNED ON AND AN ERROR MESSAGE IS PRINTED,  
GIVING:

"BAD" WORD (BINARY)	TAG	ID	ADDRESS
←—————→	XXX	4	BINARY
1 - 54	↑↑↑	02	
	T1 T2 T3	5	
		<del>6</del>	

AFTER CHECKING THE PROGRAM RETURNS TO  
THE HALT OF 1°



		ORG	50000	1
AMPEX		HTR	aBCYCLE	2
BCYCLE		IF(SLN)SKP	a02000,R-Z	3
		TRA	aCHECK	4
WRITE	B4	LRS	aP2	5
	P	ORU	STORE4,R-Z	6
		STO	aS4	7
	B5	LRS	aP2	10
	P	ORU	STORE5	11
		STO	aS5	12
		SB1	aFWRD	13
WLOUP	B1	AND	a00302,U-R	14
	Z	BCT	a10	15
		IF(ODD)TRA	aCC+1	16
S4	T4	STO	aB1,CC+1	17
S5	T5	STO	aB1	20
	P1	IF(ZER)SKP	aLWRD	21
		TRA	aWLOUP,B1+1	22
CHECK		STX	a00005	23
		SLF	a02000	24
		IF(SLF)SKP	a02000	25
		TRA	aWRITE	26
		ILF	a77777	27
	I	LUR	aB4+77760,U-B2	30
	I	LUR	aB5+77760,U-B3	31
Q1		IF(SLN)SKP	a40000	32
		TRA	aQ2	33
		SB1	aFWRD	34
		SB6	aQLW1	35
		TSR	aCHECKS	36
Q2		IF(SLN)SKP	a20000	37
		TRA	aQ3	40
		SB1	aQLW1+1	41
		SB6	aQLW2	42
		TSR	aCHECKS	43
Q3		IF(SLN)SKP	a10000	44
		TRA	aQ4	45
		SB1	aQLW2+1	46
		SB6	aQLW3	47
		TSR	aCHECKS	50
Q4		IF(SLN)SKP	a04000	51
		TRA	aAMPEX	52
		SB1	aQLW3+1	53
		SB6	aLWRD	54
		TSR	aCHECKS	55
		TRA	aAMPEX	56
				60
CHECKS		LT6	B1	61
	B1	AND	a00302,U-R	62
	Z	BCT	a10	63
		IF(ODD)TRA	aMTB5,R-Z	64
	T4	IF(NUL)SKP	T5	65
		TRA	aEPRN	66
	B2	IF(NUL)JMP	IL	67
		TRA	aEPRN	70
MTB5	T5	IF(NUL)SKP	T5	71
		TRA	aEPRN	72
	B3	IF(NUL)SKP	IL	73

ECHECK		TRA	aEPRN	74
		ILF	a77777	75
	B1	IF(ZER)SKP	aB3	76
		TRA	aCHECKS,B1+1	77
		TRA	aPF	100
				101
				102
EPRN	P1	STO	aSVB1	103
	B2	STO	aSVB2	104
		SLN	a02000	105
	I	SB2,ERM	a20,U+B1	106
	Z	STO	aB1+PM=1,B2=1	107
	T6	STO	aPM+2	110
		CPL→	aP1,R+Z	111
	Z	BAU	SVB1,U+B1	112
		STO	aPM+3	113
	-U	RPA	PM+1,R+Z	114
		CLA	IL	115
		LRS	a+21	116
	R	BEU	Z,U→P	117
		GRU→	PM+3	120
	R	SYD	MASK	121
		GRU→	PM+1,R+Z	122
	I	LRS	a33,R+T6	123
	B1	AND	a00302,U→R	124
	Z	BCT	a10	125
		IF(ODD)TRA	aCC+1	126
	T6	STO	aPM+11,CC+1	127
	T6	STO	PM+13	130
		CLA	SV32,U+B2	131
		PRO	aP4	132
		TRA	aECHECK	133
				134
FWRU		EQU	00010	135
LWRU		EQU	37777	136
QLW1		EQJ	07777	137
QLW2		EQU	17777	140
QLW3		EQU	27777	141
PM		EQU	51000	142
				143
STOKE4	T4	STO	aB1,CC+1	144
STOKE5	T5	STO	aB1	145
				146
MASK		OCT	007000000000000000	147
SVB1		OCT	0	150
SVB2		OCT	0	151
		TRA	aAMPEX	152
				153
		END		154
				155

311	AMPEX	0	50000	0	2000000000000000	0
312	BCYCLE	0	50001	0	3000000000000000	0
313	CHECK	0	50021	0	2300000000000000	0
314	WRITE	0	50003	0	5000000000000000	0
315	STORE4	0	50126	0	1360000000000000	0
316	S4	0	50015	0	1700000000000000	0
317	STORE5	0	50127	0	1370000000000000	0
320	S5	0	50016	0	2000000000000000	0
321	FWRD	0	10	0	1300000000000000	2
322	WLOOP	0	50012	0	1400000000000000	0
323	LWRD	0	37777	0	1310000000000000	2
324	Q1	0	50030	0	3200000000000000	0
325	Q2	0	50035	0	3700000000000000	0
326	QLW1	0	7777	0	1320000000000000	2
327	CHECKS	0	50055	0	5700000000000000	0
330	Q3	0	50042	0	4400000000000000	0
331	QLW2	0	17777	0	1330000000000000	2
332	Q4	0	50047	0	5100000000000000	0
333	QLW3	0	27777	0	1340000000000000	2
334	MTB5	0	50065	0	6700000000000000	0
335	EPRN	0	50075	0	7700000000000000	0
336	ECHECK	0	50071	0	7300000000000000	0
337	SVB1	0	50121	0	1430000000000000	0
340	SVB2	0	50122	0	1450000000000000	0
341	PM	0	51000	0	1350000000000000	2
342	MASK	0	50130	0	1410000000000000	0

AMPEX	50000	01	00000	00	4000	50001	BCYCLE
BCYCLE	50001	01	02030	10	4000	02000	
	50002	01	01000	00	4000	50021	CHECK
WRITE	50003	44	45015	00	4000	00022	
	50004	02	50010	10	0000	50126	STORE4
	50005	01	20001	00	4000	50015	S4
	50006	45	45015	00	4000	00022	
	50007	02	50010	00	0000	50127	STORE5
	50010	01	20001	00	4000	50016	S5
	50011	01	40001	00	4000	00010	FWRD
WLOOP	50012	41	50314	02	4000	00302	
	50013	00	46000	00	4000	00010	
	50014	01	01060	00	4001	00001	
S4	50015	04	20001	20	4002	00000	
S5	50016	05	20001	00	4002	00000	
	50017	41	02010	00	4000	37777	LWRD
	50020	01	01000	21	4000	50012	WLOOP
CHECK	50021	01	43005	00	4000	00005	
	50022	01	42004	00	4000	02000	
	50023	01	02070	00	4000	02000	
	50024	01	01000	00	4000	50003	WRITE
	50025	01	42005	00	4000	77777	
	50026	20	45010	42	4020	77760	
	50027	20	45010	43	4040	77760	
Q1	50030	01	02030	00	4000	40000	
	50031	01	01000	00	4000	50035	Q2
	50032	01	40001	00	4000	00010	FWRD
	50033	01	40006	00	4000	07777	QLW1
	50034	01	40000	00	4000	50055	CHECKS
Q2	50035	01	02030	00	4000	20000	
	50036	01	01000	00	4000	50042	Q3
	50037	01	40001	00	4000	10000	QLW1 + 1
	50040	01	40004	00	4000	17777	QLW2
	50041	01	40000	00	4000	50055	CHECKS
Q3	50042	01	02030	00	4000	10000	
	50043	01	01000	00	4000	50047	Q4
	50044	01	40001	00	4000	20000	QLW2 + 1
	50045	01	40006	00	4000	27777	QLW3

	50046	01	40000	00	4000	50055	CHECKS		
Q4	50047	01	02030	00	4000	04000			
	50050	01	01000	00	4000	50000	AMPEX		
	50051	01	40001	00	4000	30000	QLW3	+	1
	50052	01	40006	00	4000	37777	LWRD		
	50053	01	40000	00	4000	50055	CHECKS		
	50054	01	01000	00	4000	50000	AMPEX		
CHECKS	50055	01	50460	00	0002	00000			
	50056	41	50314	02	4000	00302			
	50057	00	46000	00	4000	00010			
	50060	01	01060	10	4000	50065	MTB5		
	50061	04	02040	00	0000	00006			
	50062	01	01000	00	4000	50075	EPRN		
	50063	42	03040	00	0000	77771			
	50064	01	01000	00	4000	50075	EPRN		
MTB5	50065	05	02040	00	0000	00006			
	50066	01	01000	00	4000	50075	EPRN		
	50067	43	02040	00	0000	77771			
	50070	01	01000	00	4000	50075	EPRN		
ECHECK	50071	01	42000	00	4000	77777			
	50072	41	02010	00	4100	00000			
	50073	01	01000	21	4000	50055	CHECKS		
	50074	01	01000	00	4200	00000			
EPRN	50075	41	20001	00	4000	50131	SVB1		
	50076	42	20001	00	4000	50132	SVB2		
	50077	01	42000	00	4000	02000			
	50100	20	40022	41	4000	00020			
	50101	00	20001	62	4002	50777	PM	-	1
	50102	06	20001	00	4000	51002	PM	+	2
	50103	01	50101	10	4000	51000	PM		
	50104	00	20100	41	0000	50131	SVB1		
	50105	01	20001	00	4000	51003	PM	+	3
	50106	11	21601	10	0000	51001	PM	+	1
	50107	01	21700	00	0000	77771			
	50110	01	45015	00	4000	00025			
	50111	02	21000	02	0000	00000			
	50112	01	50011	00	0000	51003	PM	+	3
	50113	02	53220	00	0000	50130	MASK		
	50114	01	50011	10	0000	51001	PM	+	1
	50115	20	45015	16	4000	00033			
	50116	41	50314	02	4000	00302			
	50117	00	46000	00	4000	00010			
	50120	01	01060	00	4001	00001			
	50121	06	20001	20	4000	51011	PM	+	11
	50122	06	20001	00	4000	51013	PM	+	13
	50123	01	21700	42	0000	50132	SVB2		
	50124	01	61310	00	4000	51000	PM		
	50125	01	01000	00	4000	50071	ECHECK		
STORE	450126	04	20001	20	4002	00000			
STORE	550127	05	20001	00	4002	00000			
MASK	50130	00	70000	00	0000	00000			
SVB1	50131	00	00000	00	0000	00000			
SVB2	50132	00	00000	00	0000	00000			
	50133	01	01000	00	4000	50000	AMPEX		

Upon loading it clears bank IV to null words.

Then 100,000<sub>oct</sub> times enters a randomly generated word in a location which is randomly chosen, except that choice is limited to locations whose addresses do not contain a 200 bit. At the same time it enters either the same word or its complement in the location addressed 200 higher.

When that has been done, it chooses locations randomly, with the provision that the 200 bit be off. Then it compares that word to the word 200 locations higher. Unless that word is either the complement or the copy of the word in the lower location, it prints the location of the lower of the pair at the right-hand margin of the page and, at the left, the symmetric sum or difference, from which the number of the offending bit may follow. Having chosen 100,000<sub>oct</sub> location pairs to test, it returns to entering random words.

W/R Revised 3/29/65 to operate with electrostatic memory in the fourth bank. Self loading.

There are four nearly identical programs, all loaded into memory at one time but executed in a cycle separated by repeat mode printer delays.

1. Tests null words 16 to 1024 times by writing their neighbors in the repeat mode.
2. Tests full words 16 to 1024 times by writing their neighbors.
3. Tests null words 128 to 2048 times by reading nearby.
4. Tests full words 128 to 2048 times by reading nearby.

Each program operates, for every configuration of  $x$  bits, on locations whose addresses have the form  $11x\ x00\ 000\ xxx\ xxx$ . In such addresses, the program enters a full or null word, and writes or reads in the location 2000 higher a number of times. Each of the four programs tries a small number of times; ~~then a larger number~~; then double that number, up to the maximum of that program by successive doubles..

Each program prints:

1. A line of several groups of four ones and a blank to aid in recognition of the columns
2. A line for each number of neighboring memory operations. Each of the four programs has its own number of lines. The write-around programs print 7 lines; the read-around, 6. For instance, the first program will print a line for the bits that failed after 16 close writes, a line for those that failed after 32, and so on. A bit is indicated to have failed by the presence of a number in its position. The positions of columns 1 to 54 correspond to bits 1 to 54. The digit chosen is the number of the place in order of the number of times memory is disturbed nearby. For instance, on the first test, the line of 1's corresponds to the failures after 16 operations; the second line, made up of 2's, indicates the bits of the failures after 32 disturbances of memory nearby, and so forth.

When all four sections of the package have been executed, the continue button will cause all four to be re-executed.

These are two programs used to test memory by exercising it, thereby giving the parity correction logic a chance to tell of any malfunctions by sounding the beep. The programs run out of the T registers so as still to work, even when memory is in no condition to support the instructions of any such tests. The two are identical, except in the memory conditions they assume. May 23 is the older version, designed to run with only one bank of memory. Mar 26 is revised to take the testable memory in bank IV, the addresses from octal 60000 to octal 77767. With only two banks in operation, the addresses are equivalent to addresses octal 20000 through octal 37767. The tapes actually consist of four sections each, separated by tape feed characters. All except the second may be loaded independently; the second assumes the setting of the X register, 77775, by the first of the programs.

Program I stores full (all bits on) words in all the bank and sets X so that the second program will run. Having done so, it gives a load order to load the second program.

Program II stores null words in all locations addressed with the 400 bit of the address on that lie in the bank of memory in question. This program requires that X be set before entering. When it is finished, it gives a load order to enter the following program into the T registers.

Program III complements the whole bank, ending on a halt and transfer to its entry. Pressing the continue button will re-execute this program. To load the fourth program, one must depress the load switch.

Program IV reads and restores each location. It, too, ends on a halt and transfer to itself. As in the third program, the continue button will cause the program to be re-executed.

DISCRIMINATOR TEST      SELF LOADING      REVISED TO BANK IV 3/29/65

This program, for all locations in bank IV, enters either a full word or a null word. Having filled the bank, it checks the bank for any errors. All failures detected are printed out. The one time it enters and checks for null words; the next time it enters and checks for full words.

At the top of the page is a line of 123456789012345678...

Thereafter, all lines indicate errors detected. In the first 54 columns the presence of a character indicates that that bit has failed. For ease in reading the output, the character chosen is the last digit in the decimal representation of the number of the bit, counting from 1 to 54. Other information on the line consists of a one to indicate that the line is not the heading line and, in some versions of the program, a line count represented as a fifteen bit binary number.



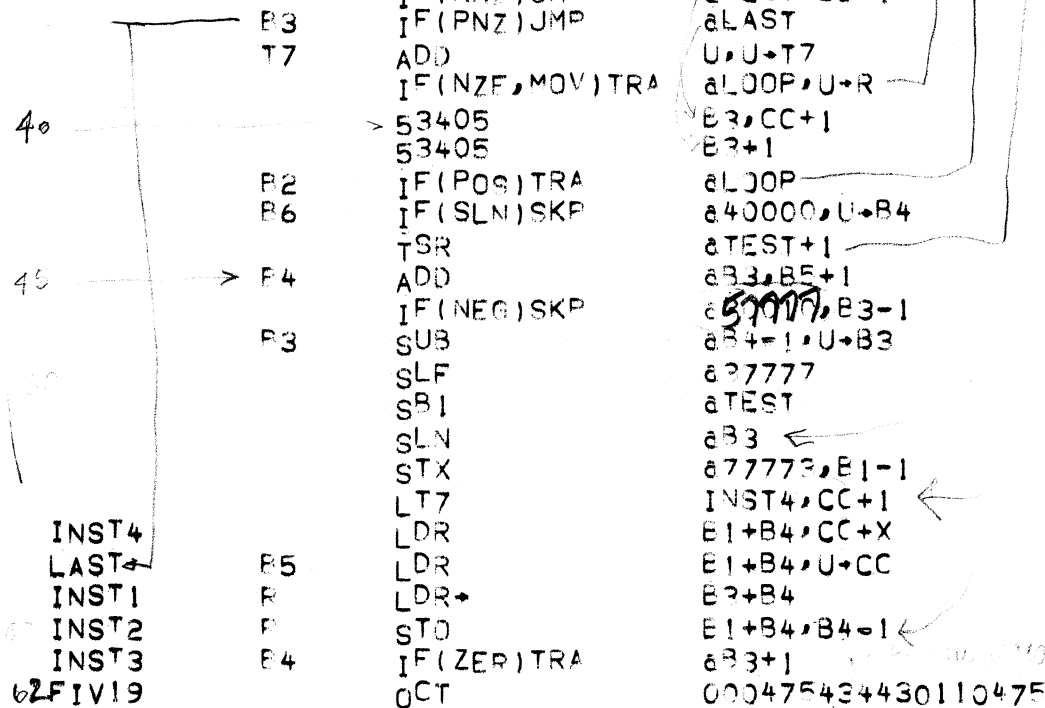
10  
16  
11  
14 RANLP  
21 STORE  
30 TEST  
31  
32 LOOP  
40  
45  
INST4  
LAST  
INST1  
INST2  
INST3  
62 FIV19

I  
T5  
IUI  
7  
T7  
B1  
B4  
T7  
7  
B3  
T7  
B2  
B6  
F4  
B3  
B5  
R  
P  
B4

ORG  
REM  
REM  
S36  
LT5  
IMP  
LUL  
CRR  
IDV  
CRR  
ORU+2  
STO  
OCT  
IF(<sup>POS OR</sup>~~ZER~~)SKP  
TSR  
LT4  
SUB  
LT5  
LT6  
STX  
SB2  
Z  
LLS  
ADD  
IF(NN7)JMP  
IF(PNZ)JMP  
ADD  
IF(NZF,MOV)TRA  
53405  
53405  
IF(POS)TRA  
IF(SLN)SKP  
TSR  
ADD  
IF(NEG)SKP  
SUB  
SLF  
SB1  
SLN  
STX  
LT7  
LDR  
LDR  
LDR  
STO  
IF(ZER)TRA  
OCT  
TRA  
END

DYNAMIC MEMORY TEST,  
MIGRATE IF SL. +1 ON.  
aSTORE,U+T6  
FIV19,I+BI  
T5,U+T6  
a7  
a+13,U+T7  
a4  
a+18  
CC,CC+1  
aB1  
Z  
a53777  
aRANLP,B1+1  
INST1,I+B4  
aTEST,U+B4  
INST2,U+B6  
INST3  
aR,I+B5  
aR7777,U+R  
a+15,R+T7  
a10,U+B3  
aTEST,B2-1  
aLAST  
U,U+T7  
aLOOP,U+R  
BR,CC+1  
BR+1  
aLOOP  
a40000,U+B4  
aTEST+1  
aB3,B5+1  
a53777,B3-1  
aB4-1,U+B3  
aR7777  
aTEST  
aB3  
a77773,B1-1  
INST4,CC+1  
B1+B4,CC+X  
B1+B4,U+CC  
BR+B4  
B1+B4,B4-1  
aB3+1  
000475434430110475  
a10

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worst case for P, C1, ..., C6

A. T7 = all 0's

T5 = 00 21000 10 0000 00000 [T63]

$\sim$   
A

T7 = 02 00400 00 1000 00000

T5 = 03 00000 00 0000 00000 [T63]

TEST SHORT REGISTER GATING

This series of tests provides the following exercises:

B-series registers  $\leftrightarrow$  B-adder in F3, incrementing  
and decrementing by 1

special purpose registers 77774-77777  $\leftrightarrow$  U in F1,  
F2, counting up and down

B-series registers  $\leftrightarrow$  U in F1, F2, counting up  
and down

1/10/61

TEST ROUTINE	TO RUN INITIALLY	INDICATION OF SUCCESSFUL TEST	PROPER STOP CONDITIONS (I)/(CC)	TO REPEAT TEST IF STOP CONDITIONS PROPER	TO REPEAT TEST IF STOP CONDITIONS NOT PROPER	REQUIREMENTS
COUNT CC UP IN F3 vs U in F2	'LOAD'	Manual stop while counting in progress; (U)=(CC)	(I)=00-00000-00-0000-00005 (CC)=00001 NOTE: Improper (L) denotes store to FT not working.	'CONTINUE'	Start from (CC)=5	Instructions T4-T7, 77777, Store to FT Counting of adder
COUNT CC DOWN in F3 vs U in F2	'LOAD'	Manual stop while counting in progress Last 15 bits of (U)=(CC)	(I)=00-00000-00-0000-00006 (CC)=00001 NOTE: Improper (I) denotes store to FT not working.	'CONTINUE'	Start from (CC)=6	Instructions T4-T7, 77777, 77767 Store to FT Counting of adder
COUNT B1 UP IN F3 vs U in F2	'LOAD'	Program Stop; (U)=77777	(I)=01-00000-30-4002-77777	'CONTINUE'	Start from (CC)=4	Instructions T4-T7, Counting of Adder
COUNT B1 DOWN in F3 vs U in F2	'LOAD'	Program Stop; (U)=007-700000	(I)=01-00000-30-4002-77777 (CC)=00010	'CONTINUE'	Start from (CC)=4	Instructions T4-T7, Counting of Adder
COUNT B2 UP in F3 vs U in F2	'LOAD'	Same as for B1 UP	(I)=01-00000-30-4004-77777 (CC)=00010	'CONTINUE'	Start from (CC)=4	Instructions T4-T7, Counting of Adder
COUNT B2 DOWN in F3 vs U in F2	'LOAD'	Same as for B1 DOWN	(I)=01-00000-30-4004-77777 (CC)=00010	*CONTINUE'	Start from (CC)=4	Instructions T4-T7, Counting of Adder

COUNT B3 UP in F3 vs U in F2	'LOAD'	Same as for B1 UP	(I)=01-00000- 30-4010- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT B3 DOWN in F3 vs U in F2	'LOAD'	Same as for B1 DOWN	(I)=01-00000- 30-4010- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT B4 UP in F3 vs U in F2	'LOAD'	Same as for B1 UP	(I)=01-00000- 30-4020- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT B4 DOWN in F3 vs U in F2	'LOAD'	Same as for B1 DOWN	(I)=01-00000- 30-4020- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT B5 UP in F3 vs U in F2	'LOAD'	Same as for B1 UP	(I)=01-00000- 30-4040- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT B5 DOWN in F3 vs U in F2	'LOAD'	Same as for B1 DOWN	(I)=01-00000- 30-4040- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT B6 UP in F3 vs U in F2	'LOAD'	Same as for B1 UP	(I)=01-00000- 30-4100- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT B6 DOWN in F3 vs U in F2	'LOAD'	Same as for B1 DOWN	(I)=01-00000- 30-4100- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT PF UP in F3 vs U in F2	'LOAD'	Same as for B1 UP	(I)=01-00000- 30-4200- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder

COUNT PF DOWN in F3 vs U in F2	'LOAD'	Same as for B1 DOWN	(I)=01-00000- 30-4200- 77777 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7, Counting of Adder
COUNT P2 UP in F2 vs B1 in F3	'LOAD'	Program Stop; (U)=0007--7	(I)=01-00000- 00-4000-00004 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7 B2→U Counting of Adder Counting of B1.
COUNT P2 DOWN in F2 vs B1 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=01-00000- 00-4000- 00004 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7 B2→U Counting of Adder Counting of B1
COUNT X UP in F2 vs B1 in F3	'LOAD'	Same as for P2 UP	(I)=01-00000- 00-4000- 00004 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7 B2→U Counting of Adder Counting of B1
COUNT X DOWN in P2 vs B1 in F3	'LOAD'	Same as for P2 DOWN	(I)=01-00000- 00-4000- 00004 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7 B2→U Counting of Adder Counting of B1
COUNT TT UP in F2 vs B1 in F3	'LOAD'	Same as for P2 UP	(I)=01-00000- 00-4000- 00004 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7 B2→U Counting of Adder Counting of B1
COUNT TT DOWN in F2 vs B1 in F3	'LOAD'	Same as for P2 DOWN	(I)=01-00000- 00-4000- 00004 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7 B2→U Counting of Adder Counting of B1
COUNT FT UP in F2 vs B1 in F3	'LOAD'	Same as for P2 UP	(I)=01-00000- 00-4000- 00004 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7 B2→U Counting of Adder Counting of B1
COUNT FT DOWN in F2 vs B1 in F3	'LOAD'	Same as for P2 DOWN	(I)=01-00000- 00-4000- 00004 (CC)=00010	'CONTINUE'	Start from (CC)= 4	Instructions T4-T7 B2→U Counting of Adder Counting of B1

COUNT B1 UP in F2 vs B2 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=41-00000- 51-4000- 00005 (CC)=00010	'CONTINUE'	Start from(CC)= 5	Instructions T4-T7
COUNT B1 DOWN in F2 vs B2 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=41-00000- 51-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B2 UP in F2 vs B1 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=42-00000- 52-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B2 DOWN in F2 vs B1 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=42-00000- 52-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B3 UP in F2 vs B4 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=43-00000- 53-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B3 DOWN in F2 vs B4 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=43-00000- 53-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B4 UP in F2 vs B3 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=44-00000- 54-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B4 DOWN in F2 vs B3 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=44-00000- 54-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B5 UP in F2 vs B6 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=45-00000- 55-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7

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COUNT B5 DOWN in F2 vs. B5 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=45-00000- 55-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B6 UP in F2 vs B5 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=46-00000- 56-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT B6 DOWN in F2 vs B5 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=46-00000- 56-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT BF UP in F2 vs B1 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=47-00000- 57-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7
COUNT PF DOWN in F2 vs B1 in F3	'LOAD'	Program Stop; (U)=007--7	(I)=47-00000- 57-4000- 00005 (CC)=00010	'CONTINUE'	Start from (CC)= 5	Instructions T4-T7



A-GATING  
TEST  
TAPE

006000100400100003  
000000000000000000  
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054502005400000001  
010104004400000027  
045322000000000005  
010104000400000015  
050000000400000010  
054502005400000001  
010104004400000027  
045322000000000005  
010104000400000022  
050000000400000010  
054502005400000001  
010104004400000027  
045322000000000005  
010104000400000010  
050000000400000010  
065000104400000005  
010100021400000012060100041400000011

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065000100400000002  
054506202400000001  
015000415400000000  
010104014400000035  
045322000000000005  
010104000400000017  
050000000400000010  
065000100400000002  
054506202400000001  
015000415400000000  
010104014400000035  
045322000000000005  
010104000400000026  
050000000400000010  
065000100400000002  
054506202400000001  
015000415400000000  
010104014400000035  
045322000000000005  
010104000400000010  
050000000400000010  
065000104400000005  
010100021400000014260100041400000010

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000000000000000001  
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054502005400000001

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010104000400000034	74
055000505400000004	75
045322000000000005	76
010104000400000016	77
050000000400000016	100
055000505400000004	101
045322000000000005	102
010104000400000022	103
050000000400000010	104
054502005400000001	105
010104000400000034	106
055000505400000004	107
045322000000000005	110
010104000400000030	111
050000000400000030	112
055000505400000004	113
045322000000000005	114
010104000400000010	115
050000000400000010	116
065000121400000005	117
010100000400000012060100041400000012	120
	121
006000100400100003	122
777777777777777777	123
777777777777777776	124
777777777777777776	125
777777777777777777	126
065000100400000002	127
054506205400000001	130
015000400400000000	131
010104000400000040	132
055000505400000004	133
045322000000000005	134
010104000400000020	135
050000000400000020	136
055000505400000004	137
045322000000000005	140
010104000400000024	141
050000000400000010	142
065000100400000002	143
054506205400000001	144
015000400400000000	145
010104000400000040	146
055000505400000004	147
045322000000000005	150
010104000400000034	151
050000000400000034	152
055000505400000004	153
045322000000000005	154
010104000400000010	155
050000000400000010	156
065000121400000005	157
010100000400000014260100041400000014	160
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006000100400100003	162
000000000000000000	163
000000000000000000	164
000000000000000001	165
000000000000000001	166

064502006400000001	167
010104005400000027	170
055322000000000006	171
010104000400000015	172
060000000400000010	173
064502006400000001	174
010104005400000027	175
055322000000000006	176
010104000400000022	177
060000000400000010	200
064502006400000001	201
010104005400000027	202
055322000000000006	203
010104000400000010	204
060000000400000010	205
075000105400000006	206
010100021400000012070100041400000011	207
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006000100400100003	211
777777777777777777	212
777777777777777777	213
777777777777777776	214
777777777777777776	215
075000100400000002	216
064506202400000001	217
015000416400000000	220
010104015400000035	221
055322000000000006	222
010104000400000017	223
060000000400000010	224
075000100400000002	225
064506202400000001	226
015000416400000000	227
010104015400000035	230
055322000000000006	231
010104000400000026	232
060000000400000010	233
075000100400000002	234
064506202400000001	235
015000416400000000	236
010104015400000035	237
055322000000000006	240
010104000400000010	241
060000000400000010	242
075000105400000006	243
010100021400000014270100041400000011	244
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006000100400100003	246
000000000000000000	247
000000000000000000	250
000000000000000001	251
000000000000000001	252
064502006400000001	253
010104000400000034	254
065000506400000005	255
055322000000000006	256
010104000400000016	257
060000000400000016	260
065000506400000005	261

06/25/68 14.10  
055322000000000006  
010104000400000022  
060000000400000010  
064502006400000001  
010104000400000034  
065000506400000005  
055322000000000006  
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055322000000000006  
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075000121400000006  
010100000400000012070100041400000012

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074502007400000001  
010104006400000027  
065322000000000007  
010104000400000015  
070000000400000010  
074502007400000001

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010104000400000022  
070000000400000010  
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010104006400000027  
065322000000000007  
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070000000400000010  
045000106400000007  
010100021400000012040100041400000011

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074506202400000001  
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010104000400000017  
070000000400000010  
045000100400000002  
074506202400000001  
015000417400000000  
010104016400000035  
065322000000000007  
010104000400000026  
070000000400000010  
045000100400000002  
074506202400000001  
015000417400000000  
010104016400000035  
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070000000400000010  
045000106400000007  
010100021400000014240100041400000010

006000100400100003  
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065322000000000007  
010104000400000022  
070000000400000010  
074502007400000001  
010104000400000034  
075000507400000006

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010104000400000030  
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075000507400000006  
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045000121400000007  
010100000400000012040100041400000012

006000100400100003  
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045000100400000002  
074506207400000001  
015000400400000000  
010104000400000040  
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010104000400000020  
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075000507400000006  
065322000000000007  
010104000400000024  
070000000400000010  
045000100400000002  
074506207400000001  
015000400400000000  
010104000400000040  
075000507400000006  
065322000000000007  
010104000400000034  
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075000507400000006  
065322000000000007  
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045000121400000007  
010100000400000014240100041400000014

006000100400100003  
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044502004400000001  
010104007400000027  
075322000000000004  
010104000400000015  
040000000400000010  
044502004400000001  
010104007400000027  
075322000000000004  
010104000400000022  
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044502004400000001  
010104007400000027

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075322000000000004  
010104000400000010  
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055000107400000004  
010100021400000012050100041400000011

006000100400100003  
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044506202400000001  
015000414400000000  
010104017400000035  
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040000000400000010  
055000100400000002  
044506202400000001  
015000414400000000  
010104017400000035  
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040000000400000010  
055000100400000002  
044506202400000001  
015000414400000000  
010104017400000035  
075322000000000004  
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040000000400000010  
055000107400000004  
010100021400000014250100041400000010

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044502004400000001  
010104000400000034  
045000504400000007  
075322000000000004  
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040000000400000016  
045000504400000007  
075322000000000004  
010104000400000022  
040000000400000010  
044502004400000001  
010104000400000034  
045000504400000007  
075322000000000004  
010104000400000030  
040000000400000030  
045000504400000007  
075322000000000004  
010104000400000010

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055000121400000004  
010100000400000012050100041400000012

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055000100400000002  
044506204400000001  
015000400400000000  
010104000400000040  
045000504400000007  
075322000000000004

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010104000400000020  
040000000400000020  
045000504400000007  
075322000000000004  
010104000400000024  
040000000400000010

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055000100400000002  
044506204400000001  
015000400400000000  
010104000400000040  
045000504400000007  
075322000000000004

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010104000400000034  
040000000400000034  
045000504400000007  
075322000000000004  
010104000400000010  
040000000400000010

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055000121400000004  
010100000400000014250100041400000014

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000000000000000001  
040104002400000033  
014502004400000001

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015400000400000000  
014502000400000001  
015322000000000002  
010104000400000015  
040000000400000006

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040104002400000033  
014502004400000001  
015400000400000000  
014502000400000001  
015322000000000002

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010104000400000024  
040000000400000006  
040104002400000033  
014502004400000001  
015400000400000000  
014502000400000001

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015322000000000002  
010104000400000006

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010000000400000006  
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25 January 1961

Class 5 Tests via Printer Output

The table on the following page gives fifteen tests which may be run on logical orders in conjunction with the diagonal print matrix set up for complement and shift tests. In each case the operands are taken from the following list:

- (1): '0' i.e., on all zero word
- (2): '1' i.e., on all one word
- (3): 'e0' i.e., a word with 53 zeros and 1 one
- (4): 'e1' i.e., a word with 53 ones and 1 zero

Operating Notes

1. Take the test tape marked 'Class 5 Printer Tests'. Set in SL#9 - SL#15 the shift (if any), to be applied after setting up UR. If SL#3 is off, a circular left shift is made; if SL#3 on, a circular right shift is made.
2. Load with 'Load Tape' switch.
3. Select test options as follows:
  - SL#4 and #5 off: Option (A)
  - SL#4 on : Option (B)
  - SL#4 off, SL#5 on: Option (C)
4. Restart: from location 201
5. To execute later versions, press 'Reset' and 'Load Tape'.

Output. Correct output is a line of 64 (SL#2 off) or 32 (SL#2 on) characters shifted from line to line by the amount and direction given by SL. On extract tests, left and right sides of the page are identical.

Table of Class 5 Tests

Version	(1)	(2)	(3)	(4)	(5)
Option					
(A)	S or U→U ε0 or 0→ε0	S→U→R ε0→ε0→...	S XTR U→U ε0(1)1→ε0	S XTR U→U 0(0)ε0→ε0	$\bar{S}$ XTR U→U 1(0)ε0→ε0
(B)	$\bar{S}$ or $\bar{U}$ →U ε0 or 0→ε1	S→U→R ε0→ε1→...	$\bar{S}$ or U→U ε1 or 0→ε1	S $\bar{XTR}$ U→U ε0(1)0→ε1	$\bar{S}$ XTR U→U ε1(1)1→ε1
(C)	$\bar{S}$ or $\bar{U}$ →U ε1 or 0→ε0	$\bar{S}$ or U→U ε0 or 0→ε0	S $\bar{XTR}$ U→U ε1(1)0→ε0	S $\bar{XTR}$ U→U 1(0)ε1→ε0	$\bar{S}$ XTR U→U 0(0)ε1→ε1

## Reference to Tests

Operation	With Operands	Tested By
S or U → U	ε0, 0	(1) (A)
S or U → U	ε1, 0	(1) (C)
$\bar{U}$ → U	ε0	(1) (B)
$\bar{U}$ → U	ε1	All (B) options
-----		
$\bar{S}$ → S	ε0	(3) (B)
$\bar{S}$ → S	ε1	(2) (C)
S → U → R	ε0, ε0, -	(2) (A)
S → U → R	ε0, ε1, -	(2) (B)
-----		
S XTR U → U	0(0)ε0	(4) (A)
S XTR U → U	0(0)ε1	(5) (C)
S XTR U → U	ε0(1)0	(4) (B)
S XTR U → U	ε0(1)1	(3) (A)
-----		
S XTR U → U	1(0)ε0	(5) (A)
S XTR U → U	1(0)ε1	(4) (C)
S XTR U → U	ε1(1)0	(5) (B)
S XTR U → U	ε1(1)1	(3) (C)

006000100400100200  
 004000200400010000  
 002170002400000001  
 004000105400000200  
 410101000400100004  
 055000161400677775  
 025000161400600000  
 054506600400000001  
 010100005400177772  
 010203000400020000  
 016121020400400000  
 016111020400400000  
 014000120400000200  
 014000100400000100  
 010207000400010000  
 012170020000100031  
 012170000000100031  
 012000100400100010  
 012000100400100015  
 410101000400177764  
 010207000400004000  
 010100000400100010  
 010207000400002000  
 010100000400100014  
 002170002000677776 | (A)  
 0021700061000677775 | (A)  
 014506600440077770  
 015000161400677776  
 025000100400600001  
 010100000400177764  
 005001402000677776 | (B)  
 005001461000677775 | (B)  
 014506600440077770  
 015010161400677776  
 025010100400600001  
 010100000400177756  
 005001500000677776  
 005001500000677775  
 005001402000677776 | (C)  
 005001461000677775 | (C)  
 010100000400177760  
 014505500440077770  
 014506600440077770100000000000201

VERSION (1)

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006000100400100227  
 005001000000677776 | (A) (2)  
 015300000000677775  
 014506600440077770  
 015000161400677776  
 025000100400600001  
 010100000400177764  
 005001400000677776 | (B)  
 015300400000677775  
 014506600440077770  
 015010161400677776  
 025010100400600001  
 010100000400177756  
 005001500000677776  
 005001500000677775  
 005021002000677776 | (C)  
 005021000000677775  
 010100000400177760  
 014505561440077770  
 014506661440077770100000400000201

006000100400100227 (3)  
 005010002400000000 | (A)  
 015002002000677776  
 014506600440077770  
 015000161400677776  
 025000100400600001  
 010100000400177764  
 005021002000677776 | (B)  
 005021000000677775  
 014506600440077770  
 015010161400677776  
 025010100400600001  
 010100000400177756  
 005001500000677776  
 005001500000677775  
 005010002400000000 | (C)  
 005002402000677776  
 010100000400177760  
 014505561440077770  
 014506661440077770100000400000201

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006000100400100227  
 005001010000677776 | (A) (4)  
 015002002400000000  
 014506600440077770  
 015000161400677776  
 025000100400600001  
 010100000400177764  
 005010002400000000 | (B)  
 005002402000677776  
 014506600440077770  
 015010161400677776  
 025010100400600001  
 010100000400177756  
 005001500000677776  
 005001500000677775  
 005001010000677776 | (C)  
 015022402400000000  
 010100000400177760  
 014505561440077770

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014505501440077770  
014506661440077770100000400000201

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006000100400100227  
005001010000677776 (A) (5)  
015022002400000000  
014506600440077770  
015000161400677776  
025000100400600001  
010100000400177764  
005010002400000000 (B)  
015022002000677776  
014506600440077770  
015010161400677776  
025010100400600001  
010100000400177756  
005001500000677776  
005001500000677775  
005001010000677776 (C)  
015002402400000000  
010100000400177760  
014505561440077770  
0145066614400777701000004000002010000000

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## Tag Test Program

This self-loading program tests setting, storing, and fetching of tags. For each tag and for each of 1000 memory locations, the sequence

Clear tags in ATR, memory

Delay

Set tag in ATR, memory

Branch on ATR

(type if ATR wrong)

Delay

Check tag in memory

(type if stored or fetched in correctly)

is executed. If an error is detected, an indication is typed on the console typewriter, provided SL1 is off. The error indications are:

0000i 10jj jj00 mmmmm for failure to set ATR

where i = tag that should have been set

j = tag that was actually set

mmmmm = memory address to which tag was stored

0000i j000 0777 mmmmm for failure to fetch correctly

where i = tag that should have been found

j = tag IL

mmmmm = memory address from which failure occurred

0000i j000 0000 mmmmm for failure to store correctly

where i = tag that should have been stored

j = tag IL

mmmmm = memory address at which failure occurred

If SL1 is on, no typing is done.

		ORG	20	1
	I	SB1,ERM	17600,U-B2	2
	T6	STO	B2+200,B1-1	3
		TLN	70000	4
		MLF	10000	5
		CLA	aL1	6
		STO	15	7
		CLA	aL2	10
		STO	16	11
		CLA	aL3	12
		STO	17	13
		DLY	Z	14
		SB1	4	15
OUT	B1	IF(ZER)TRA	CC-2,B1-1	16
		CLA	INA+B1	17
		RPL	ORA	20
		CLA	INB+B1	21
		RPL	ORB	22
		RPL	ORC	23
		SB2	1000	24
IN	B2	IF(ZER)TRA	OUT	25
		21701	B2+7777	26
		ILF	70000	27
		DLY	Z	30
		DLY	Z	31
ORA		CLA,ST3	B2+7777	32
		CLA,WTG	a10000	33
		STO,WTG	ML	34
		MLF	10000	35
		TRA	LZ	36
BACK		DLY	Z	37
		20000	Z	40
		ILF	70000	41
		LDR	B2+7777,B2-1	42
ORB		IF(TG3)TRA	IN	43
		LDR	B2+1000	44
ORC		IF(TG3)TRA	FTCHER	45
	Z	BAU	IL,R-Z	46
		LRS	d15	47
	B1	LRS	d15	50
	R	BAU	aB2+1000	51
		IF(SLN)SKP	40000	52
		TYP	U	53
		TRA	IN	54
FTCHER		CLA	a777,R-Z	55
		LRS	d9	56
	Z	BAU	IL	57
		LRS	d15	60
	B1	LRS	d15	61
	R	BAU	aB2+1000	62
		IF(SLN)SKP	40000	63
		TYP	U	64
		TRA	IN	65
LZ	B1	IF(NZE)SKP	aZ,R-Z	66
		TRA	BACK	67
	IB11	LRS	d15	70
	R	ORU	MZ	71
				72
				73

TAG  
TEST



		BAU	aB2+7777	74
		IF(SLN)SKP	40000	75
		TYP	U	76
		TRA	BACK	77
MZ		OCT	00000 1077 7700 00000	100
				101
L1	B1	IF(NZE)SKP	a1,R+Z	102
		TRA	BACK	103
	B1	LRS	d15	104
	R	ORU	M1	105
		BAU	aB2+7777	106
		IF(SLN)SKP	40000	107
		TYP	U	110
		TRA	BACK	111
M1		OCT	00000 1011 1100 00000	112
				113
L2	B1	IF(NZE)SKP	a2,R+Z	114
		TRA	BACK	115
	B1	LRS	d15	116
	R	ORU	M2	117
		BAU	aB2+7777	120
		IF(SLN)SKP	40000	121
		TYP	U	122
		TRA	BACK	123
M2		OCT	00000 1022 2200 00000	124
				125
L3	B1	IF(NZE)SKP	a3,R+Z	126
		TRA	BACK	127
	B1	LRS	d15	130
	R	ORU	M3	131
		BAU	aB2+7777	132
		IF(SLN)SKP	40000	133
		TYP	U	134
		TRA	BACK	135
M3		OCT	00000 1033 3300 00000	136
				137
INA		CLA→	B2+7777	140
		CLA,ST1→	B2+7777	141
		CLA,ST2→	B2+7777	142
		CLA,ST3→	B2+7777	143
				144
INB		IF(NTG)TRA	IN	145
		IF(TG1)TRA	IN	146
		IF(TG2)TRA	IN	147
		IF(TG3)TRA	IN	150
				151
		HTR	20	152
				153
		END		154
				155

1311	L1	0	115	0	1000	000000000000	0
1312	L2	0	126	0	1120	000000000000	0
1313	L3	0	137	0	1240	000000000000	0
1314	OUT	0	34	0	160	000000000000	0
1315	INA	0	150	0	1360	000000000000	0
1316	ORA	0	50	0	320	000000000000	0
1317	INB	0	154	0	1420	000000000000	0
1320	ORB	0	61	0	430	000000000000	0
1321	ORC	0	63	0	450	000000000000	0
1322	IN	0	43	0	250	000000000000	0
1323	LZ	0	104	0	660	000000000000	0
1324	BACK	0	55	0	370	000000000000	0
1325	FTCHER	0	73	0	550	000000000000	0
1326	MZ	0	114	0	770	000000000000	0
1327	M1	0	125	0	1110	000000000000	0
1330	M2	0	136	0	1230	000000000000	0
1331	M3	0	147	0	1350	000000000000	0

2		20	20	40021	42	4000	17600	
3		21	06	20001	61	4004	00200	
4		22	01	42003	00	4000	70000	
5		23	01	42005	00	4000	10000	
6		24	01	21700	00	4000	00115	L1
7		25	01	20001	00	4000	00015	
10		26	01	21700	00	4000	00126	L2
11		27	01	20001	00	4000	00016	
12		30	01	21700	00	4000	00137	L3
13		31	01	20001	00	4000	00017	
14		32	01	61000	00	0000	00000	
15		33	01	40001	00	4000	00004	
16	OUT	34	41	01010	61	4001	77775	
17		35	01	21700	00	0002	00150	INA
20		36	01	20301	00	0000	00050	ORA
21		37	01	21700	00	0002	00154	INB
22		40	01	20301	00	0000	00061	ORB
23		41	01	20301	00	0000	00063	ORC
24		42	01	40002	00	4000	01000	
25	IN	43	42	01010	00	4000	00034	OUT
26		44	01	21701	00	0004	07777	
27		45	01	42005	00	4000	70000	
30		46	01	61000	00	0000	00000	
31		47	01	61000	00	0000	00000	
32	ORA	50	01	21731	00	0004	07777	
33		51	01	21740	00	4000	10000	
34		52	01	20041	00	4000	77772	
35		53	01	42006	00	4000	10000	
36		54	01	01000	00	4000	00104	LZ
37	BACK	55	01	61000	00	0000	00000	
40		56	01	20000	00	0000	00000	
41		57	01	42005	00	4000	70000	
42		60	01	50400	62	0004	07777	
43	ORB	61	01	01003	00	4000	00043	IN
44		62	01	50400	00	0004	01000	
45	ORC	63	01	01003	00	4000	00073	FTCHER
46		64	00	20100	10	0000	77771	
47		65	01	45015	00	4000	00017	
50		66	41	45015	00	4000	00017	
51		67	02	20100	00	4004	01000	
52		70	01	02030	00	4000	40000	
53		71	01	60700	00	0000	00001	
54		72	01	01000	00	4000	00043	IN
55	FTCHER	73	01	21700	10	4000	00777	
56		74	01	45015	00	4000	00011	
57		75	00	20100	00	0000	77771	
60		76	01	45015	00	4000	00017	

61		77	41	45015	00	4000	00017	
62		100	02	20100	00	4004	01000	
63		101	01	02030	00	4000	40000	
64		102	01	60700	00	0000	00001	
65		103	01	01000	00	4000	00043	IN
66	LZ	104	41	02050	10	4000	00000	
67		105	01	01000	00	4000	00055	BACK
70		106	61	45015	00	4000	00017	
71		107	02	50010	00	0000	00114	MZ
72		110	01	20100	00	4004	07777	
73		111	01	02030	00	4000	40000	
74		112	01	60700	00	0000	00001	
75		113	01	01000	00	4000	00055	BACK
77	MZ	114	00	00010	77	7700	00000	
100	L1	115	41	02050	10	4000	00001	
101		116	01	01000	00	4000	00055	BACK
102		117	41	45015	00	4000	00017	
103		120	02	50010	00	0000	00125	M1
104		121	01	20100	00	4004	07777	
105		122	01	02030	00	4000	40000	
106		123	01	60700	00	0000	00001	
107		124	01	01000	00	4000	00055	BACK
111	M1	125	00	00010	11	1100	00000	
112	L2	126	41	02050	10	4000	00002	
113		127	01	01000	00	4000	00055	BACK
114		130	41	45015	00	4000	00017	
115		131	02	50010	00	0000	00136	M2
116		132	01	20100	00	4004	07777	
117		133	01	02030	00	4000	40000	
120		134	01	60700	00	0000	00001	
121		135	01	01000	00	4000	00055	BACK
123	M2	136	00	00010	22	2200	00000	
124	L3	137	41	02050	10	4000	00003	
125		140	01	01000	00	4000	00055	BACK
126		141	41	45015	00	4000	00017	
127		142	02	50010	00	0000	00147	M3
130		143	01	20100	00	4004	07777	
131		144	01	02030	00	4000	40000	
132		145	01	60700	00	0000	00001	
133		146	01	01000	00	4000	00055	BACK
135	M3	147	00	00010	33	3300	00000	
136	INA	150	01	21701	00	0004	07777	
137		151	01	21711	00	0004	07777	
140		152	01	21721	00	0004	07777	
141		153	01	21731	00	0004	07777	
142	INB	154	01	01004	00	4000	00043	IN
143		155	01	01001	00	4000	00043	IN
144		156	01	01002	00	4000	00043	IN
145		157	01	01003	00	4000	00043	IN
146		160	01	00000	00	4000	00020	

		ORG	10		1
FAIL	I,Z I	STX	aZ-2, U-B1		2
	B1	ERM, SB6	a30, U-T4		3
	Z	STO	a147+B1, B6-1		4
		SBI	a10		5
LOOP		LDR	T5		6
	Z	CRR	a1, R-T5		7
		IF (NUL) TRA	CC+1		10
	T4	ORU+	150+B1		11
	T4	LUL	a1, U-T4		12
	T5	IF (NUL) TRA	PRINT, B1+X		13
	B1	IF (POS) TRA	LOOP		14
		SBI	a22		15
		TRA	LOOP		16
PRINT	Z	BAU	a-B2		17
		ORU+	151		20
	Z	BAU	aB2		21
		ORU+	153		22
	Z	BAU	a-B3		23
		LUL	a30		24
		ORU+	151		25
	Z	BAU	aB3		26
		LUL	a30		27
		ORU+	153, R-Z		30
	I,Z I	LRS	a10		31
	B5	IF (NUL) TRA	CC+1		32
	R	ORU+	153, CC+1		33
	R	ORU+	151		34
		PRO+4	a150		35
	Z	TRA	PF, U-B3		36
BEGIN	Z	CPL+	T5, U-T6		37
	Z	SBZ 61072	aZ, U-B3		40
		TSR	FAIL, U-B5		41
	Z	MLN	a5000, U-T5		42
	I,Z I	SPA	aZ, U-B4		43
CYCLE	Z	ERM, SB6	a17600, B2+1		44
		STO	a177+B4, B6-1	} STORE 05	45
LOOPA	Z	ERM, SB6	a17600, B3+1		46
		ORU	177+B4, B6-1	} Test 05	47
		ORU+	T5		50
	B3	IF (POS) SKP	77770		51
		TRA	LOOPA		52
	Z	TSR	FAIL, U-B5		53
	T6	ERM, SB6	a17600, B2+1	} Store 15	54
		STO	a177+B4, B6-1		55
LOOPD	Z	ERM, SB6	a17600, B3+1		56
		ORU+200	177+B4, B6-1	} Test 15	57
		ORU+	T5		60
	B3	IF (POS) SKP	77770		61
		TRA	LOOPD		62
	I,Z I	TSR	FAIL, U-B5		63
	Z	IF (NUL, NTG) TRA	CC		64
		IF (TGI) TRA	CHANGE		65
		CLA	ORDERA		66
		STO	LOOPA+1		67
		CLA	ORDERD		70
		STO	LOOPD+1		71
		TRA	CYCLE		72
CHANGE		CLA	ORDERB		73
		STO	LOOPA+1		74
		CLA	ORDERE		75
		STO	LOOPD+1		76
		TRA	CYCLE		77
ORDERA		ORU	177+B4, B6-1		100
					101

4000  
6100

} STORE 05  
} Test 05

} Store 15  
} Test 15

ORDERD  
ORDERB  
ORDERE

ORU+200  
ADD+20  
SUB+20  
TRA

177+B4,B6-1  
177+B4,B6-1  
177+B4,B6-1  
BEGIN

102  
103  
104  
105  
106  
107  
110

END

260	FAIL	0	10	0	200000000000000	0
261	LOOP	0	14	0	600000000000000	0
262	PRINT	0	25	0	170000000000000	0
263	BEGIN	0	45	0	370000000000000	0
264	CYCLE	0	52	0	440000000000000	0
265	LOOPA	0	54	0	460000000000000	0
266	LOOPD	0	64	0	560000000000000	0
267	CHANGE	0	101	0	730000000000000	0
270	ORDERA	0	106	0	100000000000000	0
271	ORDERD	0	107	0	101000000000000	0
272	ORDERB	0	110	0	102000000000000	0
273	ORDERE	0	111	0	103000000000000	0

2	FAIL	10	20430054140007775	
3		11	414002604400000030	
4		12	2000166400200147	
5		13	14000100400000010	
6	LOOP	14	15040000000000005	
7		15	4505515400000001	
10		16	10104000400100001	
11		17	45001100000200150	
12		20	44502004400000001	
13		21	50104031400000025	PRINT
14		22	410111000400000014	LOOP
15		23	14000100400000022	
16		24	10100000400000014	LOOP
17	PRINT	25	2010000500400000	
20		26	15001100000000151	
21		27	2010000400400000	
22		30	15001100000000153	
23		31	2010000501000000	
24		32	14502000400000030	
25		33	15001100000000151	
26		34	2010000401000000	
27		35	14502000400000030	
30		36	15001110000000153	
31		37	204501500400000010	
32		40	450104000400100001	
33		41	25001120000000153	
34		42	25001100000000151	
35		43	16131400400000150	
36		44	100043420000000	
37	BEGIN	45	50101060000000005	
40		46	<del>50002</del> 43400000000	
41		47	14000045400000010	FAIL
42		50	4200205400005000	
43		51	206101044400000000	
44	CYCLE	52	4002622400017600	
45		53	12000166402000177	
46	LOOPA	54	4002623400017600	
47		55	15001066002000177	
50		56	15001100000000005	
51		57	43021100000007770	
52		60	10100000400000054	LOOPA
53		61	4000045400000010	FAIL
54		62	64002622400017600	
55		63	12000166402000177	
56	LOOPD	64	4002623400017600	
57		65	15021066002000177	
60		66	15001100000000005	
61		67	43021100000007770	
62		70	10100000400000064	LOOPD
63		71	204000045400000010	FAIL
64		72	104400400100000	
65		73	10100100400000101	CHANGE

66		74	12170000000000106	ORDERA
67		75	12000100400000055	LOOPA
70		76	12170000000000107	ORDERD
71		77	12000100400000065	LOOPD
72		100	10100000400000052	CYCLE
73	CHANGE	101	12170000000000110	ORDERB
74		102	12000100400000055	LOOPA
75		103	12170000000000111	ORDERE
76		104	12000100400000065	LOOPD
77		105	10100000400000052	CYCLE
100	ORDERA	106	15001066002000177	
101	ORDERD	107	15021066002000177	
102	ORDERB	110	11002066002000177	
103	ORDERE	111	11012066002000177	
104		112	10100000400000045	BEGIN

0	000000000000000001	000000000000000001
1	000000000000000001	000000000000000010
0	000000000000000001	000000000000000011
7	1	0000000000000000100
0	000000000000000001	0000000000000000101
7	1	0000000000000000110
0	000000000000000001	0000000000000000111
7	1	00000000000000001000
0	000000000000000001	00000000000000001001
7	1	00000000000000001010
0	000000000000000001	00000000000000001011
7	1	00000000000000001100
0	000000000000000001	00000000000000001001
7	1	00000000000000001010
0	000000000000000001	00000000000000001101
7	1	00000000000000001110
0	000000000000000001	00000000000000001111
7	1	000000000000000010000
0	000000000000000001	000000000000000010001
7	1	000000000000000010010
0	000000000000000001	000000000000000010011
7	1	000000000000000010100
0	000000000000000001	000000000000000010101
7	1	000000000000000010110
0	000000000000000001	000000000000000010111
7	1	000000000000000011000
0	000000000000000001	000000000000000011001
7	1	000000000000000011010
0	000000000000000001	000000000000000011011
7	1	000000000000000011100
0	000000000000000001	000000000000000011001
7	1	000000000000000011010
0	000000000000000001	000000000000000011011
7	1	000000000000000011100
0	000000000000000001	0000000000000000111001
7	1	0000000000000000111010
0	000000000000000001	0000000000000000111011
7	1	0000000000000000111100
0	000000000000000001	0000000000000000111101
7	1	0000000000000000111110
0	000000000000000001	0000000000000000111111
7	1	0000000000000000100000

7

4

5

3

3

3





# READER TEST

2/18/64 10.59

Line	Op	Code	Op	Line
		ORG	00101	1
		REM	BACK-TRANSLATION	2
L1		CLA	L2,CC+1	3
L2		OCT	270000000000000000	4
L3		TRA	aL50	5
L4		40021	a100	6
	T7	PH7	7,B1-1	7
	-1Z1	SB1	aZ	10
L7	B1	IF(NEG)SKP	a77	11
		TRA	aL14	12
L11	B1	CRR	a6	13
	T7	PHX	2,B1+1	14
		TRA	aL7	15
L14	T7	PH7	7	16
	B2	IF(PNZ)SKP	a1,B2+1	17
		TRA	aL4	20
L17	Z	BEU	aZ,U→B1	21
L20	T7	RHX→	a6	22
		SYD	7	23
		IF(NUL)TRA	aL32,R→Z	24
	T.6	IF(NUL)SKP	aB1+Z	25
		TRA	aL33	26
L25	B1	IF(NNZ)SKP	a77,B1+1	27
		TRA	aL17	30
L27		40023	a*77770,B3+1	31
	B3	20000	aZ,B3-1	32
		TRA	aL20	33
L32		HTR	aL17	34
L33		40026	a200	35
	Z	20003	a777,B6-1	36
		CLA	L36,CC+1	37
L36		OCT	4040404040404040	40
L37		20001	<del>*110</del> a1110	41
		CLA	L41,CC+1	42
L41		OCT	3232323232323232	43
L42		STO	a1142	44
		CLA	L44,CC+1	45
L44		OCT	0404040404040404	46
L45		STO	a1134,CC+1	47
		OCT	016121000400001000	50
L47	B1	TRA	aL56,R→Z	51
L50		STO	a7	52
		CLA	L52,CC+1	53
L52		OCT	010000000000000000	54
L53		STO	a6	55
		SB2	aZ	56
		TRA	aL4	57
L56	B1	CRR	a3	60
		AND	a7	61
		ADD	1,U→B4	62
		CLA	L62,CC+1	63
L62		OCT	020000000000000000	64
L63		ORU→	B4+1001	65
	Z	CRL	a4,U→B4	66
		CLA	L66,CC+1	67
L66		OCT	010000000000000000	70
L67		ORU→	B4+1001,R→Z	71
	T.6	CRR	a3	72
		AND	a7	73
		ADD	1,U→B4	74
		CLA	L74,CC+1	75
L74		OCT	000200000000000000	76
L75		ORU→	B4+1001	77
	Z	CRL	a4,U→B4	100
				101

READER TEST  
L100  
L101

	CLA	L100,CG+1	102
	OCT	00010000000000000000	103
	ORU→	B4+1001,R→Z	104
B1	CRR	a3	105
	AND	a7	106
	LUL	a1	107
	CRL	a3,U→R	110
	LUL	a33	111
	ORU→	1003	112
R	CPL	aZ	113
	AND	a167	114
	CRL	a33	115
	ORU→	1001	116
B1	SYD	6,R→Z	117
	CRR	a3	120
	AND	a7	121
	LUL	a1	122
	CRL	a3,U→R	123
	LUL	a22	124
	ORU→	1157	125
R	CPL	aZ	126
	AND	a167	127
	CRL	a22	130
	ORU→	1001	131
Z	PRA	a1000	132
	TRA	aL25	133
	<del>OCT</del>	<del>7FA</del> *101 00000000000000000000	134
	END		135
			136
			137

260	L1	0	101	0	5000000000000000	0
261	L2	0	102	0	7000000000000000	0
262	L3	0	103	0	1000000000000000	0
263	L50	0	150	0	6100000000000000	0
264	L4	0	104	0	1100000000000000	0
265	L7	0	107	0	1400000000000000	0
266	L14	0	114	0	2100000000000000	0
267	L11	0	111	0	1600000000000000	0
270	L17	0	117	0	2400000000000000	0
271	L20	0	120	0	2500000000000000	0
272	L32	0	132	0	3700000000000000	0
273	L33	0	133	0	4000000000000000	0
274	L25	0	125	0	3200000000000000	0
275	L27	0	127	0	3400000000000000	0
276	L36	0	136	0	4400000000000000	0
277	L37	0	137	0	4500000000000000	0
300	L41	0	141	0	5000000000000000	0
301	L42	0	142	0	5100000000000000	0
302	L44	0	144	0	5400000000000000	0
303	L45	0	145	0	5500000000000000	0
304	L47	0	147	0	6000000000000000	0
305	L56	0	156	0	7000000000000000	0
306	L52	0	152	0	6400000000000000	0
307	L53	0	153	0	6500000000000000	0
310	L62	0	162	0	7500000000000000	0
311	L63	0	163	0	7600000000000000	0
312	L66	0	166	0	1020000000000000	0
313	L67	0	167	0	1030000000000000	0
314	L74	0	174	0	1110000000000000	0
315	L75	0	175	0	1120000000000000	0
316	L100	0	200	0	1160000000000000	0
317	L101	0	201	0	1170000000000000	0

BACK-TRANSLATION

5	L1	101	12170020000000102	L2
7	L2	102	270000000000000000	
10	L3	103	10100000400000150	L50
11	L4	104	14002100400000100	
12		105	76050061000000007	
13		106	304000100400000000	
14	L7	107	410251000400000077	
15		110	10100000400000114	L14
16	L11	111	414505500400000006	
17		112	76040021000000002	
20		113	10100000400000107	L7
21	L14	114	76050000000000007	
22		115	420615022400000001	
23		116	10100000400000104	L4
24	L17	117	2100041400000000	
25	L20	120	76010100400000006	
26		121	15322000000000007	
27		122	10104010400000132	L32
30		123	60204000400200000	
31		124	10100000400000133	L33
32	L25	125	410655021400000077	
33		126	10100000400000117	L17
34	L27	127	14002323440077770	
35		130	432000063400000000	
36		131	10100000400000120	L20
37	L32	132	10000000400000117	L17
40	L33	133	14002600400000200	
41		134	2000366400000777	
42		135	12170020000000136	L36
44	L36	136	4040404040404040	
45	L37	137	12000100040000110	

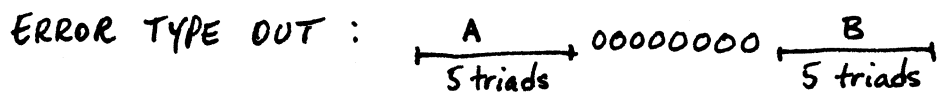
46		140	12170020000000141	L41
50	L41	141	3232323232323232	
51	L42	142	12000100400001142	
52		143	12170020000000144	L44
54	L44	144	4040404040404040	
55	L45	145	12000120400001134	
57		146	16121000400001000	
60	L47	147	410100010400000156	L56
61	L50	150	12000100400000007	
62		151	12170020000000152	L52
64	L52	152	10000000000000000	
65	L53	153	12000100400000006	
66		154	14000200400000000	
67		155	10100000400000104	L4
70	L56	156	414505500400000003	
71		157	15031400400000007	
72		160	11000044000000001	
73		161	12170020000000162	L62
75	L62	162	20000000000000000	
76	L63	163	15001100002001001	
77		164	4506644400000004	
100		165	12170020000000166	L66
102	L66	166	10000000000000000	
103	L67	167	15001110002001001	
104		170	64505500400000003	
105		171	15031400400000007	
106		172	11000044000000001	
107		173	12170020000000174	L74
111	L74	174	20000000000000000	
112	L75	175	15001100002001001	
113		176	4506644400000004	
114		177	12170020000000200	L100
116	L100	200	10000000000000000	
117	L101	201	15001110002001001	
120		202	414505500400000003	
121		203	15031400400000007	
122		204	14502000400000001	
123		205	14506602400000003	
124		206	14502000400000033	
125		207	15001100000001003	
126		210	25010000400000000	
127		211	15031400400000167	
130		212	14506600400000033	
131		213	15001100000001001	
132		214	415322010000000006	
133		215	14505500400000003	
134		216	15031400400000007	
135		217	14502000400000001	
136		220	14506602400000003	
137		221	14502000400000022	
140		222	15001100000001157	
141		223	25010000400000000	
142		224	15031400400000167	
143		225	14506600400000022	
144		226	15001100000001001	
145		227	6121000400001000	
146		230	10100000400000125	L25
150		231	0	

H/20/62

START

TYPE

	ORG	10
	REM	TEST ADDRESSING / JANE
	REM	STORE UPWARDS
	SBI	100
B1	STO	B1
B1	IF(ZER)SKP	a20000, B1+1
	TRA	CC-3
	REM	CHECK UPWARD STORAGE
	SBI	100
B1	IF(ZER)SKP	B1
	TSR	TYPE
B1	IF(ZER)SKP	a20000, B1+1
	TRA	CC-4
	REM	STORE DOWNWARDS
	SBI	20000
B1	STO	B1
B1	IF(ZER)SKP	a100, B1-1
	TRA	CC-3
	REM	CHECK DOWNWARDS STORAGE
	SBI	20000
B1	IF(ZER)SKP	B1
	TSR	TYPE
B1	IF(ZER)SKP	a100, B1-1
	TRA	CC-4
	HTR	START
	REM	TYPE ERROR ADDRESS / CONTENTS
B1	LUL	d39
	BAU	B1, U+S
PF	TYP	S, U+CC
	REM	TRANSFER ON LOAD
	TRA	10
	END	



where A is address of improper store  
and B = (A)

STORES TO RANGE [100, 20000]

222 START 0 10 0  
223 TYPE 0 33 0

1100000000000000 0  
5400000000000000 0

2

TEST ADDRESSING / JANE  
STORE UPWARDS

11 START 10 1400100400000100 1  
12 11 41200100400200000 0  
13 12 410201021400020000 0  
14 13 10100000400177774 0

CHECK UPWARD STORAGE

21 14 1400100400000100 0  
22 15 410201000000200000 0  
23 16 14000000400000033 2  
24 17 410201021400020000 0  
25 20 10100000400177773 0

TYPE

STORE DOWNWARDS

31 21 1400100400020000 0  
32 22 41200100400200000 0  
33 23 410201061400000100 0  
34 24 10100000400177774 0

CHECK DOWNWARDS STORAGE

41 25 1400100400020000 0  
42 26 410201000000200000 0  
43 27 14000000400000033 2  
44 30 410201061400000100 0  
45 31 10100000400177773 0  
46 32 10000000400000010 2

TYPE

START

TYPE ERROR ADDRESS / CONTENTS

54 TYPE 33 414502000400000047 1  
55 34 12010003000200000 0  
56 35 476070040000000003 0

TRANSFER ON LOAD

62 36 10100000400000010 0

1 1400100400000100 41200100400200000 410201021400020000 101000004  
6 410201000000200000 14000000400000033 410201021400020000 101000004  
13 41200100400200000 410201061400000100 10100000400177774 14001004  
20 14000000400000033 410201061400000100 10100000400177773 100000004  
25 12010003000200000 476070040000000003 10100000400000010

START

6/11/62

LOOP1

TEST1

LOOP2

TEST2

	OR3	20	2
	REM	WRITE/READ AROUND TEST	3
	REM	REVISED 3-5-62	4
	MLN	21000, I+31	5
	NOB	Z, 31-1	6
	SPF	20, U+B1	7
	SB3,ERM	100, B1+1	10
	ST0	P4-1+B1, 32-1	11
	CLA	PRINT	12
	ST0	P4+2	13
	61070	a10, I+31	14
	61110	P4, U+B3	15
	ST0	P4+2	16
	STX	3700	17
	SB2	a1024	20
	REM	TEST FOR ZEROS FAILING ON WRITE-AROUND	21
	SB4,ERM	PF	22
	61000	Z, 34-1	23
	SB3	4000	24
	AB1	a31 [for second run: AB1 a4]	25
	REM	TEST 16 TO 1024 TIMES	26
	ST0	77777	27
	Z	B3+2000	30
	50004	Z	31
	SB6,ERM	B1	32
	ST0	*77777, B5-1	33
	CLA	B3+2000, U+T7	34
	AND	T6, U+T5	35
	T7	ORJ-	36
	T5	ORJ-	37
	Z	50005	40
	B3	AND	41
		IF(NZE)TRA	42
	B3	IF(ZER)SKP	43
	Z	TRA	44
	Z	PRV	45
	B1	ST0	46
		IF(ZER)SKP	47
		TRA	50
		CLA	51
		ST0	52
		61040	53
		61110	54
	Z	ST0	55
		REM	56
		SB4,ERM	57
		61000	60
		SB3	61
		AB1	62
		REM	63
		ST0	64
	B3	50005	65
	Z	SB6,ERM	66
	Z	ST0	67
	Z	FST	70
	S	50100	71
		AND	72
	T7	ORJ-	73
	T5	ORJ-	74
	B3	AND	75
		IF(NZE)TRA	76
	B3	IF(ZER)SKP	77
	Z	TRA	100
	Z	PRV	101
	Z	ST0	102



		IF(ZER)SKP	a32	103
		TRA	LOOP2	104
		CLA	PRINT	105
		STO	PM+6	106
		61060	a100,I+B1	107
		61110	PM	110
	Z	STO	PM+6	111
		SB2	d2048	112
LOOP3		REM	TEST FOR ZEROES FAILING ON READ-AROUND	113
		SB4,ERM	PF	114
		61000	Z,B4=1	115
		SB3	4000	116
		ABI	a31	117
TEST3	B3	REM	TEST 128 TO 2048 TIMES	120
	Z	STO	77777	121
		STO	B3+2000	122
		CPL→	a33	123
		SB5,ERM	B1	124
		NOP	*77777,B5-1	125
		CLA	B3+2000	126
		ORU.	PM+6	127
	Z	50005	B3+2000,B3+1	130
	B3	AND	a77	131
		IF(NZF)TRA	TEST3	132
	B3	IF(ZER)SKP	a1+100	133
		TRA	TEST3,B3+X	134
		PRN	PM	135
	Z	STO	PM+6	136
	B1	IF(ZER)SKP	a32	137
		TRA	LOOP3	140
		CLA	PRINT	141
		STO	PM+10	142
		61040	a100,I+B1	143
		61110	PM	144
	Z	STO	PM+10	145
LOOP4		REM	TEST FOR ONES FAILING ON READ-AROUND	146
		SB4,ERM	PF	147
		61000	Z,B4=1	150
		SB3	4000	151
		ABI	a31	152
TEST4	B3	REM	TEST 128 TO 2048 TIMES	153
	Z	STO	77777	154
	Z	50005	B3+2000	155
		STO	B3	156
		SB5,ERM	B1	157
		NOP	*77777,B5-1	160
	Z	FST	B3+2000,B3+1	161
	S	50111	PM+10	162
	B3	AND	a77	163
		IF(NZF)TRA	TEST4	164
	B3	IF(ZER)SKP	a1+100	165
		TRA	TEST4,B3+X	166
		PRN	PM	167
	Z	STO	PM+10	170
	B1	IF(ZER)SKP	a32	171
		TRA	LOOP4	172
PM		HTR	START+2	173
PRINT		EQU	300	174
		OCT	757367573675736757	175
	Z	TRA	START,U+B1	176
		END		177
				200

PROGRAM

222	START	0	20	0	1100000000000000	0
223	PM	0	300	0	2370000000000000	2
224	PRINT	0	177	0	2410000000000000	0
225	LOOP1	0	34	0	3300000000000000	0
226	TEST1	0	40	0	4300000000000000	0
227	LOOP2	0	67	0	1000000000000000	0
230	TEST2	0	73	0	1100000000000000	0
231	LOOP3	0	122	0	1450000000000000	0
232	TEST3	0	126	0	1550000000000000	0
233	LOOP4	0	153	0	2070000000000000	0
234	TEST4	0	157	0	2170000000000000	0

6/11/62

WRITE/READ AROUND TEST  
REVISED 3-5-62

11	START	20	14200271400021000	1	
12		21	2004061000000000	0	
13		22	4000741400000020	0	
14		23	14002221400000100	0	
15		24	2000162400200277	2	PM
16		25	12170000000000177	2	PRINT
17		26	12000100400000302	2	PM
20		27	16107071400000010	0	
21		30	416111045000000300	2	PM
22		31	2000100400000302	2	PM
23		32	14300500400003700	0	
24		33	14000200400002000	0	
TEST FOR ZEROES FAILING ON WRITE-AROUND					
33	LOOP1	34	14002400420000000	1	
34		35	16100064000000000	0	
35		36	14000300400004000	0	
36		37	14100100400200000	0	
TEST 16 TO 1024 TIMES					
43	TEST1	40	432000100400077777	1	
44		41	2000100401002000	0	
45		42	15000400000000000	0	
46		43	14002600400200000	0	
47		44	12000166440077777	0	
50		45	12170007001002000	0	
51		46	15031405000000006	0	
52		47	75001100000000006	0	
53		50	55001100000000302	2	PM
54		51	5000523001002000	0	
55		52	435031400400000077	0	
56		53	10105000400000040	2	TEST1
57		54	430201000400014100	0	
60		55	10100033400000040	2	TEST1
61		56	61110060000000300	2	PM
62		57	2000100400000302	2	PM
63		60	41020100040040000	0	
64		61	10100000400000034	2	LOOP1
65		62	12170000000000177	2	PRINT
66		63	12000100400000304	2	PM
67		64	16104071400000010	0	
70		65	16111000000000300	2	PM
71		66	2000100400000304	2	PM
TEST FOR ONES FAILING ON WRITE-AROUND					
100	LOOP2	67	14002400420000000	1	
101		70	16100064000000000	0	
102		71	14000300400004000	0	
103		72	14100100400200000	0	
TEST 16 TO 1024 TIMES					
110	TEST2	73	432000100400077777	1	
111		74	5000500001002000	0	
112		75	4002600400200000	0	
113		76	12000166440077777	0	

114	77	2004123001002000	0		
115	100	35010007000000000	0		
116	101	150314050000000006	0		
117	102	750011000000000006	0		
120	103	550011000000000304	2	PM	
121	104	4350314004000000077	0		
122	105	101050004000000073	2	TEST2	
123	106	430201000400014100	0		
124	107	101000334000000073	2	TEST2	
125	110	61110060000000300	2	PM	
126	111	20001004000000304	2	PM	
127	112	410201000400400000	0		
130	113	101000004000000067	2	LOOP2	
131	114	121700000000000177	2	PRINT	
132	115	120001004000000306	2	PM	
133	116	16106071400000100	0		
134	117	161110000000000300	2	PM	
135	120	20001004000000306	2	PM	
136	121	14000200400004000	0		
TEST FOR ZEROS FAILING ON READ-AROUND					
145	LOOP3	122	140024004200000000	1	
146		123	161000640000000000	0	
147		124	14000300400004000	0	
150		125	14100100400200000	0	
TEST 128 TO 2048 TIMES					
155	TEST3	126	432000100400077777	1	
156		127	2000100401002000	0	
157		130	15010100401000000	0	
160		131	14002600400200000	0	
161		132	12004066040077777	0	
162		133	12170000001002000	0	
163		134	150011000000000306	2	PM
164		135	5000523001002000	0	
165		136	4350314004000000077	0	
166		137	10105000400000126	2	TEST3
167		140	430201000400014100	0	
170		141	10100033400000126	2	TEST3
171		142	161110000000000300	2	PM
172		143	20001004000000306	2	PM
173		144	410201000400400000	0	
174		145	10100000400000122	2	LOOP3
175		146	121700000000000177	2	PRINT
176		147	120001004000000310	2	PM
177		150	16104071400000100	0	
200		151	161110000000000300	2	PM
201		152	20001004000000310	2	PM
TEST FOR ONES FAILING ON READ-AROUND					
207	LOOP4	153	140024004200000000	1	
210		154	161000640000000000	0	
211		155	14000300400004000	0	
212		156	14100100400200000	0	
TEST 128 TO 2048 TIMES					
217	TEST4	157	432000100400077777	1	
220		160	5000500001002000	0	
221		161	2000100401000000	0	
222		162	14002600400200000	0	
223		163	12004066040077777	0	
224		164	2004123001002000	0	
225		165	350111000000000310	2	PM
226		166	4350314004000000077	0	
227		167	10105000400000157	2	TEST4
230		170	430201000400014100	0	
231		171	10100033400000157	2	TEST4
232		172	161110000000000300	2	PM
233		173	20001004000000310	2	PM
234		174	410201000400400000	0	

235		175	10100000400000153	2	LOOP 4
236		176	10000000400000022	2	START
241	PRINT	177	757367573675736757	1	
242		200	100041400000020	2	START

50010000000020 READ 20  
470100000000200 READ 2276  
2133000000200 TAGSET 2276  
3100000000200 EXECUTE 2276

5 15512  
47 15443  
47 15443  
47 15443

1 0003 2277 12170020000100000  
3 0000 0004 12000100400000004  
4 0006 2302 12170020000100000  
6 0000 0005 12000100400000005  
7 0000 0005 15040000000000005  
10 0000 0033 44501100400000033  
11 0000 0005 15040000000000005  
12 0000 0033 44501200400000033  
13 0000 0005 15040000000000005  
14 0000 0033 44501500400000033  
15 0000 0005 15040000000000005  
16 0000 0033 44501600400000033  
17 0000 0005 15040000000000005  
20 0000 0033 44502100400000033  
21 0000 0005 15040000000000005  
22 0000 0033 44502200400000033  
23 0000 0005 15040000000000005  
24 0000 0033 44502500400000033  
25 0000 0005 15040000000000005  
26 0000 0033 44502600400000033  
27 0000 0005 15040000000000005  
30 0000 0033 44505100400000033  
31 0000 0005 15040000000000005  
32 0000 0033 44505200400000033  
33 0000 0005 15040000000000005  
34 0000 0033 44505500400000033  
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36 0000 0033 44505600400000033  
37 0000 0005 15040000000000005  
40 0000 0033 44506100400000033  
41 0000 0005 15040000000000005  
42 0000 0033 44506200400000033  
43 0000 0005 15040000000000005  
44 0000 0033 44506500400000033  
45 0000 0005 15040000000000005  
46 0000 0033 44506600400000033

111111111111111111  
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50967

000070100000000200  
 012170020000100000  
 11111111111111111111  
 012000100400000004  
 012170020000100000  
 77777777777777777777  
 012000100400000005  
 015040000000000005  
 044501100400000033  
 015040000000000005  
 044501200400000033  
 015040000000000005  
 044501500400000033  
 015040000000000005  
 044501600400000033  
 015040000000000005  
 044502100400000033  
 015040000000000005  
 044502200400000033  
 015040000000000005  
 044502500400000033  
 015040000000000005  
 044502600400000033  
 015040000000000005  
 044505100400000033  
 015040000000000005  
 044505200400000033  
 015040000000000005  
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 044506100400000033  
 015040000000000005  
 044506200400000033  
 015040000000000005  
 044506500400000033  
 015040000000000005  
 044506600400000033  
 000000000440000200

CIA all 1's, CC+1  
 -  
 STO T4  
 CLA all 7's, CC+1  
 -  
 STO T5  
 LDR T5  
 T4 shift d27  
 LDR T5  
 T4 shift d27  
 :  
 :

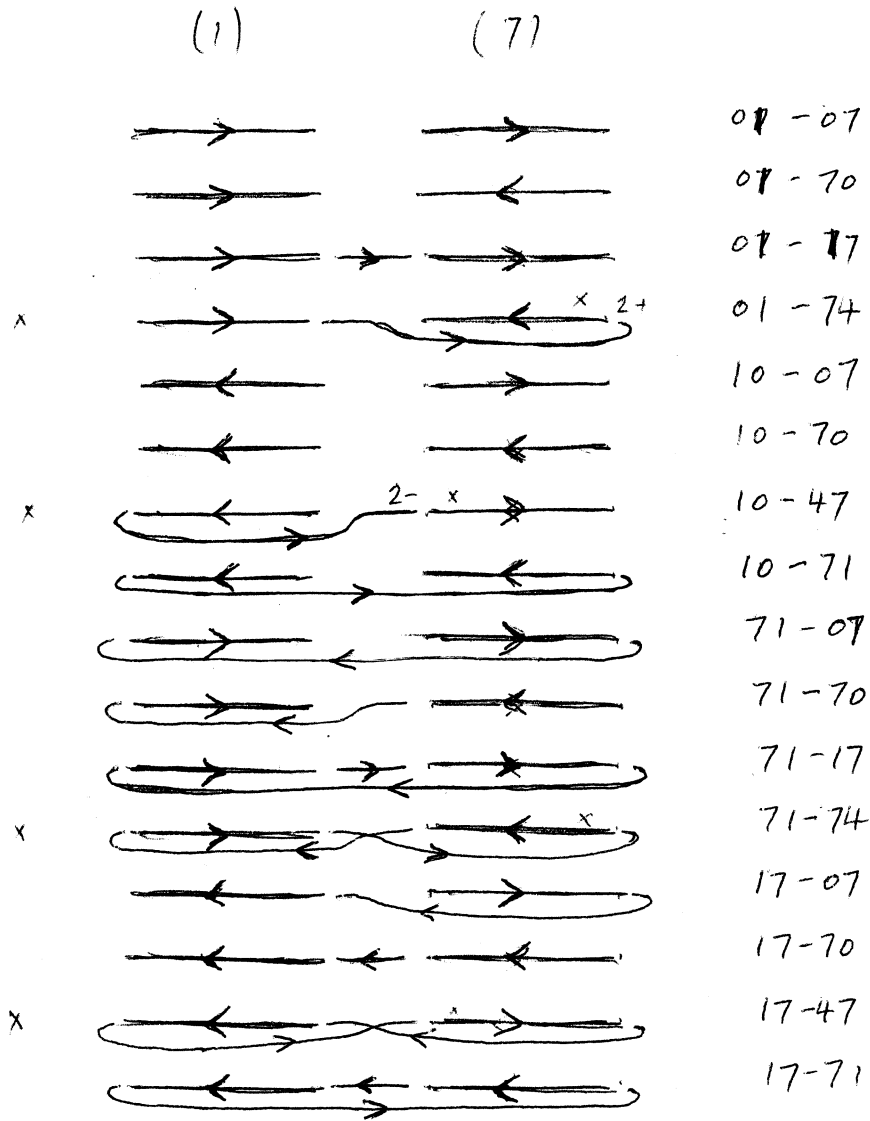
HTR \*200

000002133000000200

target \*200

000003100000000200

execute \*200



07-07

07-70

07-17

01-74

10-07

10-70

10-47

10-71

71-07

71-70

71-17

71-74

17-07

17-70

17-47

17-71

006000100400100003  
014002600400000200  
002000366400000077  
002170004000000021  
012000100400000210  
044501004400000001  
012000100400000242  
044501004400000001  
015001100400000242  
044501004400000001  
012000100400000234  
044501004400000001  
015001100400000242  
006002000000000000  
40000000000000000010100000400000004

↙ sets up print matrix  
to print "ERROR"

006000100400100007  
005040006400000000  
002170004400000001 - initial no.  
044401005400000001 is +1  
041000000000000004  
015322000000000005  
010104000400000017  
010100000400000032  
060120002400000021  
050100004400000012  
105040006500000000  
002170004500000001 - initial no.  
044401005400000001 is -1  
041000000000000004  
015322000000000005  
010104000400000030  
010100000400000032  
060120000400000010  
050100004400000023  
016121000400000100  
010000000400000010010100000400000010

Program doubles number by  
shifting; then adding to itself.  
Test on SYD; if not NUL  
ERROR is printed. After  
Print, HTR to beginning  
with result of SYD in U.

ORG 201  
 REM TEST FOR CLASS ZERO  
 ORDERS. THE TEST IS  
 IN TWO PARTS, A AND B.  
 IN THE FIRST PART, 22  
 TESTS ARE MADE WHICH ARE  
 EXPECTED TO BE SATISFIED.  
 IF THEY ARE NOT, THE TEST  
 ORDER IS TYPED OUT AND THE TEST RE

REPEATED.  
INITIALISATION.

CLA a-1,U→T4  
 CLA L,U→T5  
 CLA L+1,U→T6  
 CLA L+2,U→T7  
 SLF 77777  
 SB1 1

Z STO,ST2 40  
 Z STO,ST3 41  
 Z STO 42  
 Z STO,ST1 100

SLN 40  
 REM END OF INITIALISATION

REM START FIRST CYCLE OF TESTS. x ✓

SB4 20  
 SLN 1  
 IF(SLN)SKP 1

2

TRA CYCLEB  
 REM NOTE....TO FORCE EXECUTION OF  
 CYCLE B, LOCK SL 1 OFF.

CYCLEA CLA A+B4-2  
 TESTA Z STO TESTA,B4-1  
 AERR Z TYP TESTA,CC+1  
 AOK B4 IF(NZE)TRA CYCLEA-1,CC+1

CYCLEB TRA TESTA  
 SB4 22  
 SLF 1  
 IF(SLF)SKP 1

TRA CYCLEA  
 REM NOTE....TO FORCE EXECUTION OF  
 CYCLE A, LOCK SL 1 ON.

REM START OF SECOND CYCLE OF TESTS.

CLA B+B4-20  
 STO TESTB,B4-1

TESTB Z Z  
 BOK ACC 2

BERR TYP TESTB  
 TRA TESTB  
 B4 IF(NZE)TRA CYCLEB+4  
 TRA CYCLEA-4

REM LIST OF TEST A WORDS.

A T4 IF(ZER)SKP -a1  
 -T4 IF(NZE)SKP -aZ  
 T4 IF(ODD)SKP a1  
 T4 IF(EVN)SKP aZ  
 T4 IF(NMO)SKP a-1  
 T4 IF(MOV)SKP -T5  
 -T6 IF(EOV)SKP T6  
 T6 IF(NEO)SKP T6  
 T6 O2100 a0  
 O O2500 -T5



	IF(SLN) SKP	aB1+37
	IF(SLF) SKP	aB1+77
Z	IF(PNZ) SKP	T4
-T6	IF(NNZ) SKP	T7
-T4	IF(PNZ×TG3) SKP	41
T4	IF(NNZ×NTG) SKP	42
Z	IF(SLN×TG2) SKP	B1+37
Z	IF(SLF×TG1) SKP	B1+77

| eval 'a'

REM LIST OF TEST B WORDS

B	T4	IF(NZE) SKP	-a1
	-T4	IF(ZER) SKP	-aZ
	T4	IF(EVN) SKP	a1
	T4	IF(ODD) SKP	aZ
	T4	IF(MOV) SKP	a-1
	T4	IF(NMO) SKP	-T5
	-T6	IF(NEG) SKP	T6
	T6	IF(ECV) SKP	T6
	T6	02500	0
	0	02100	-T5
	Z	IF(SLF) SKP	aB1+37
	Z	IF(SLN) SKP	aB1+77
	Z	IF(NNZ) SKP	T4
	-T6	IF(PNZ) SKP	T7
	-T4	IF(PNZ×TG3) SKP	42
	T4	IF(NNZ×NTG) SKP	41
	Z	IF(SLN×TG1) SKP	B1+37
	Z	IF(SLF×TG2) SKP	B1+77

REM LIST OF CONSTANTS.

L	OCT	004000000000000000	76
	OCT	373000000000000000	75
	OCT	011000000000000000	77

TRA 201  
REM THE END

END

		ORG	14		
		REM	FLOATING POINT TEST THROUGH		
			FULL RANGE.		
		HTR	15		
15	Z	<del>SB3</del> <i>TR (LOC) TRA</i>	<del>000, 000</del>		
16	Z	SB1	0, U→B2		
17		MLN	10000		
20		TLN	4		
21		CLA	DNEOM, U→T5		
22		CLA	DNUM, U→T4		
		REM	BEGINNING OF TEST LOOP		
		REM			
23	TEST	<sup>10</sup> T4	10700	<sup>100</sup> T5, R→T7	<i>FDV</i>
24			AB1	1, U→T6	<i>1/10 m.u.</i>
25		T5 <sup>100</sup>	<del>10600</del>	T6, U→T6	<i>FMP</i>
26		R	10400	T7	<i>FAD</i>
27			10600	TM47	
30			10400	T6	
31			10500	T4	<i>FSD</i>
32			IF(ZER) TRA	NEXT	
33			<del>HTR</del> TRA	TEST	
		REM	END OF TEST. MODIFY FOR NEXT CYCLE		
34	NWEXT	T4	<del>10600</del>	-FACTOR, U→T4	
		TRA		TEST, B3+1	
	FACTOR	DEC	1.05		<i>(01/0010314631463146)</i>
	DNEUOM	DEC	100.0		<i>(01/1440)</i>
	DNUM	DEC	10.0		<i>(01/0120)</i>
	TM47	OCT	72002000000000000000		
42		HTR	15		
		REM	END OF FLOATING POINT TEST.		

END

*Paper tape for TYPE order (60700) in loc 42. should be changed for easier use.*

200 0 2430001000011735  
 201 0 12170004500000001  
 202 0 121700050000000306  
 203 0 121700060000000307  
 204 0 121700070000000315  
 205 0 14200400400077777  
 206 0 14000100400000001  
 207 0 2002100400000040  
 210 0 2003100400000041  
 211 0 2000100400000042  
 212 0 2001100400000103  
 213 0 14200000400000040  
 214 0 14000400400000022  
 215 0 14200000400000001  
 216 0 10203000400000001  
 217 0 10100000400000226  
 220 0 12170000002000241  
 221 0 12000164400000222  
 222 0 0  
 223 0 16070020000000222  
 224 0 440105020400000217  
 225 0 10100000400000222  
 226 0 14000400400000022  
 227 0 14200400400000001  
 230 0 10207000400000001  
 231 0 10100000400000220  
 232 0 12170000002000263  
 233 0 12000164400000234  
 234 0 0  
 235 0 14100000400000002  
 236 0 16070000000000234  
 237 0 10100000400000234  
  
 240 0 440105000400000232  
 241 0 10100000400000214  
 242 0 40201000500000001  
 243 0 14020500050000000  
 244 0 40206000400000001  
 245 0 40202000400000000  
 246 0 40260000500000001  
 247 0 40220000100000005  
 250 0 160230000000000006  
 251 0 60270000000000006  
 252 0 60210000400000000  
 253 0 250000100000005

0602100 004000 00000  
 0402010 005000 00001

TEST FOR CLASS ZERO ORDERS. THE TEST IS IN TWO PARTS, A AND B. IN THE FIRST PART, 22 TEST  
 S ARE MADE WHICH ARE EXPECTED TO BE SATISFIED. IF THEY ARE NOT, THE TEST ORDER IS TYPED OU  
 T AND THE TEST RE PEATED...  
 INITIALISATION...  
 END OF INITIALISATION...  
 START FIRST CYCLE OF TESTS.  
 NOTE... TO FORCE EXECUTION OF CYCLE B, LOCK SL 1 OFF..  
 NOTE... TO FORCE EXECUTION OF CYCLE A, LOCK SL 1 ON...  
 START OF SECIND CYCLE OF TESTS...  
 LIST OF TEST A WORDS...  
 LIST OF TEST B WORDS...  
 LIST OF CONSTANTS.

7051 4000000000000000  
 7053 3730000000000000  
 7055 1100000000000000  
 THE END..

74	0076	4477	12160020000100000	3100100000000000	3100100000000000	4100000000000000
76	0000	7061	12000100440177772	7061	3100100000000000	4100000000000000
77	4102	0300	14000000440000126	300	3100100000000000	4100000000000000
221	L	0	306	0	2100000000000000	0
222	CYCLEB	0	226	0	1010000000000000	0
223	CYCLEA	0	220	0	7300000000000000	0
224	A	0	242	0	1350000000000000	0
225	TESTA	0	222	0	7500000000000000	0
226	AERR	0	223	0	7600000000000000	0
227	AOK	0	224	0	7700000000000000	0
230	B	0	264	0	1630000000000000	0
231	TESTB	0	234	0	1230000000000000	0
232	BOK	0	235	0	1240000000000000	0
233	BERR	0	236	0	1250000000000000	0
100	0000	2007	431000100040000103	221	222	7740000000000000
101	0446	3714	14000027440000212	3714	222	7740000000000000
103	0105	2011	12170020040000105	7	7	7740000000000000
105	0000	77776	14200451400077776	7777777777777776	7	7740000000000000
106	0000	77770	12000121400077770	7777777777777770	7	7740000000000000
107	0000	6641	12170041040000114	13010000000000200	13010000000000200	7740000000000000
110	0000	1774	12000100440000123	1774	13010000000000200	7740000000000000
111	0113	0040	10207000400000040	40	13010000000000140	1000000000000000
113	0115	4517	410105000400100001	4517	200	1000000000000000

TEST FOR CLASS ZERO ORDERS. THE TEST IS IN TWO PARTS, A AND B. IN THE FIRST PART, 22 TEST  
 S ARE MADE WHICH ARE EXPECTED TO BE SATISFIED. IF THEY ARE NOT, THE TEST ORDER IS TYPED OU  
 T AND THE TEST RE PEATED...  
 INITIALISATION...  
 END OF INITIALISATION...  
 START FIRST CYCLE OF TESTS.

35	201	12170004500000001	0	
36	202	121700050000000306	2	L
37	203	121700060000000307	2	L
40	204	121700070000000310	2	L
41	205	14200400400077777	0	
42	206	14000100400000001	0	
43	207	20021004000000040	0	
44	210	20031004000000041	0	
45	211	20001004000000042	0	
46	212	20011004000000100	0	
47	213	14200000400000040	0	
60	214	14000400400000022	0	
61	215	14200000400000001	0	
62	216	10203000400000001	0	
63	217	10100000400000226	2	CYCLEB
73	CYCLEA 220	12170000002000240	3	A

74		221	120001044000000222	2	TESTA
75	TESTA	222	0	1	
76	AERR	223	16070020000000222	3	TESTA
77	AOK	224	440105020400000217	3	CYCLEA
100		225	10100000400000222	2	TESTA
101	CYCLEB	226	14000400400000022	1	
102		227	14200400400000001	0	
103		230	10207000400000001	0	
104		231	10100000400000220	2	CYCLEA

NOTE,,,,,TO FORCE EXECUTION OF CYCLE A, LOCK SL 1 ON,,,  
 START OF SECIND CYCLE OF TESTS,,,,,

121		232	12170000002000242	2	B
122		233	12000164400000234	2	TESTB
123	TESTB	234	0	1	
124	BOK	235	14100000400000002	1	
125	BERR	236	16070000000000234	3	TESTB
126		237	10100000400000234	2	TESTB
127		240	440105000400000232	2	CYCLEB
130		241	10100000400000214	2	CYCLEA

LIST OF TEST A WORDS,,,,,:

135	A	242	40201000500000001	1	
136		243	140205000500000000	0	
137		244	40206000400000001	0	
140		245	40202000400000000	0	
141		246	40200000500000001	0	
142		247	40200000100000005	0	
143		250	160230000000000006	0	
144		251	60270000000000006	0	
145		252	60210000400000000	0	
146		253	2500000000000005	0	
147		254	10203000400200037	0	
150		255	10207000400200077	0	
151		256	6150000000000004	0	
152		257	160655000000000007	0	
153		260	140615300000000041	0	
154		261	40655400000000042	0	
155		262	603200400200037	0	
156		263	607100400200077	0	

LIST OF TEST B WORDS,,,,,:

163	B	264	40205000500000001	1	
164		265	140201000500000000	0	
165		266	40202000400000001	0	
166		267	40206000400000000	0	
167		270	40220000500000001	0	
170		271	40200000100000005	0	
171		272	160270000000000006	0	
172		273	60230000000000006	0	
173		274	60250000000000000	0	
174		275	2100000000000005	0	
175		276	207000400200037	0	
176		277	203000400200077	0	
177		300	6550000000000004	0	
200		301	160615000000000007	0	
201		302	140615300000000042	0	
202		303	40655400000000041	0	
203		304	603100400200037	0	
204		305	607200400200077	0	

LIST OF CONSTANTS,

7051 4000000000000000  
 7053 3730000000000000  
 7055 1100000000000000  
 216

311 10100000400000201 0

THE END.,

6	14000100400000001	2002100400000040	2003100400000041	2000100400000042	2001100400000043
13	14200000400000040	1400040040000002	14200000400000001	10203000400000001	10100000400000226
20	12170000002000220	1200012440000022	0	16070020000000222	440105020400000217
25	10100000400000222	1400040040000022	14200400400000001	10207000400000001	10100000400000220
32	12170000002000242	12000164400000234	0	14100000400000002	16070000000000234
37	10100000400000234	44010500040000232	10100000400000214	40201000500000001	140205000500000000
44	40206000400000001	4020200040000000	40260000500000001	40220000100000005	160230000000000006
51	60270000000000006	6021000040000000	2500000000000005	10203000400200037	10207000400200077
56	6150000000000004	16065500000000007	140615300000000041	40655400000000042	603200400200037
63	407100400200077	40205000500000001	140201000500000000	40202000400000001	40206000400000000
70	40220000500000001	40260000100000005	160270000000000006	60230000000000006	60250000000000000
75	2100000000000005	207000400200037	203000400200077	655000000000004	16061500000000007
102	140615300000000042	40655400000000041	603100400200037	607200400200077	4000000000000000
107	37300000000000000	1100000000000000	10100000400000201		

ERROR IN SETU.....LINE NO. 222  
FLOATING POINT TEST THROUGH FULL RANGE.....  
BEGINNING OF TEST LOOP.....

END OF TEST. MODIFY FOR NEXT CYCLE.,

7106 +1049999999999-000  
7110 +1000000000000+020  
7112 +1000000000000+010  
7114 720020000000000000

END OF FLOATING POINT TEST.

74	0076	4477	12160020000100000	3100100000000000	3100100000000000	4500000000000000
76	0000	7122	12000100440177772	7122	3100100000000000	4500000000000000
77	4102	0300	14000000440000126	300	3100100000000000	4500000000000000

221	DNEOM	0	37	0	4700000000000000	0
222	DNUM	0	40	0	5100000000000000	0
223	TEST	0	23	0	2500000000000000	0
224	TM47	0	41	0	5300000000000000	0
225	NEXT	0	34	0	4300000000000000	0
226	FACTOR	0	36	0	4500000000000000	0

100	0000	2007	431000100040000103	62	63	7740000000000000
101	0446	3714	14000027440000212	3714	63	7740000000000000
103	0105	2011	12170020040000105	7	7	7740000000000000
105	0000	77776	14200451400077776	7777777777777776	7	7740000000000000
106	0000	77770	12000121400077770	7777777777777770	7	7740000000000000
107	0000	7041	12170041040000114	13010000000000013	13010000000000013	7740000000000000
110	0000	1774	12000100440000123	1774	13010000000000013	7740000000000000
111	0113	0040	10207000400000040	40	13007777777777753	1000000000000000
113	0115	4517	410105000400100001	4517	13	1000000000000000

FLOATING POINT TEST THROUGH FULL RANGE.....

10	14	10000000400000015	0	
11	15	14000300400000000	0	
12	16	40001424000000000	0	
13	17	14200200400010000	0	
14	20	14200300400000004	0	
15	21	121700050000000037	2	DNEOM
16	22	121700040000000040	2	DNUM

BEGINNING OF TEST LOOP.....

25	TEST	23	41070017000000005	1	
26		24	14100106400000001	0	
27		25	51060006000000006	0	
30		26	21040000000000007	0	
31		27	110500000000000041	2	TM47
32		30	110400000000000006	0	
33		31	110500000000000004	0	
34		32	101010004000000034	2	NEXT
35		33	100000004000000023	2	TEST

END OF TEST. MODIFY FOR NEXT CYCLE.,

43	NEXT	34	410600041000000036	3	FACTOR
44		35	101000234000000023	2	TEST

7106 +1049999999999-000  
7110 +1000000000000+020  
7112 +1000000000000+010  
7114 720020000000000000

END OF FLOATING POINT TEST.

1	10000000400000015	14000300400000000	40001424000000000	14200200400010000	14200300400000004
6	121700050000000037	121700040000000040	41070017000000005	14100106400000001	51060006000000006
13	21040000000000007	110600000000000041	110400000000000006	110500000000000004	101010004000000034
20	100000004000000023	410600041000000036	101000234000000023	10010314631463146	11440000000000000
25	101200000000000000	720020000000000000	10000000400000015		

MARTY'S VARIATION:  
42 01-60700-00-0000-00001  
43 45-60700-00-0000-00001  
44 43-60700-00-0000-00001  
45 00-01000-00-4000-00023  
46 01-01000-00-4000-00023

Integer divide test, with alternating signs in numerator. Test count in B1, and error count in B2. HTR to repeat test with same operands if an error is detected.

$$\frac{T4}{T5} = T6 + \frac{T7}{T5}$$

Initially, (T5) = 12345. After the nth test, (T4) =  $(-1)^n(123 + nx456)$   
 WHERE n=0 on the first test. SB

		ORG	11,30
START	Z	SB1	Z,U→B2
		CLA	a12345,U→T5
TEST	T4	IDV	T5,R→T7
		AB1	1,U→T6
		MPY	T5
	R	ADD	T7
		SUB	T4
		IF(ZER)TRA	NEXT
		HTR	TEST,B2+1
NEXT	T4	IF(POS)TRA	CC+1, <del>B1+1</del>
		SUB	a456,CC+1
		ADD	a456
	-U	TRA	TEST,U→T4
		END	



TEST GATING TO AND FROM A-REGISTERS

26 January 1961

The following remarks apply to all test programs:

To initiate testing, press "load". Memory is used for storage of instructions. Tight loops are avoided by duplicating or triplicating code where necessary.

Error stop is the only programmed stop. (U) show what was stored into or fetched from a T-register improperly if a T is being tested, or what was in U before an interchange with R that was not properly executed.

Progress of testing is indicated by (B1), which is skipped by 1 each time a complete pass is made, testing of bits positions 54 through 1.

To resume testing after error stop, press "continue".

To terminate testing, stop manually.

Regarding specific programs, in order as on tape:

	<u>TEST</u>
<u>T4</u>	0---0010---0
	becomes 0---0100---0
<hr/>	
<u>T4</u>	1---1101---1
	becomes 1---1011---1
<hr/>	
<u>T4</u>	0---0010---0
	becomes 1---1011---1
	becomes 0---0100---0
<hr/>	

REQUIREMENTS

GATING OF SAME PATTERN  
TO AND FROM T5.



T4        1---1101---1  
 becomes 0---0100---0  
 becomes 1---1011---1

GATING OF SAME PATTERN TO AND  
 FROM T5.

T5        0---0010---0  
 becomes 0---0100---0

T5        1---1101---1  
 becomes 1---1011---1

T5        0---0010---0  
 becomes 1---1011---1  
 becomes 0---0100---0

GATING OF SAME PATTERN TO AND  
 FROM T6.

T5        1---1101---1  
 becomes 0---0100---0  
 becomes 1---1011---1

T6        0---0010---0  
 becomes 0---0100---0

T6        1---1101---1  
 becomes 1---1011---1

GATING OF SAME PATTERN TO AND  
 FROM T7.

T6        0---0010---0  
 becomes 1---1011---1  
 becomes 0---0100---0

T6        1---1101---1  
 becomes 0---0100---0  
 becomes 1---1011---1

T7        0---0010---0  
 becomes 0---0100---0

T7        1---1101---1  
 becomes 1---1011---1

GATING OF SAME PATTERN TO AND  
 FROM T4.

T7        0---0010---0  
 becomes 1---1011---1  
 becomes 0---0100---0

T7        1---1101---1  
 becomes 0---0100---0  
 becomes 1---1011---1

interchange

U 0---0100---0  
 ↑  
 R 0---0010---0

---

interchange

U 1---1011---1  
 ↑  
 R 1---1101---1

---

interchange

U 0---010----0  
 ↑  
 R 1---101----1

and

U 1---101----1  
 ↑  
 R 0---010----1

---

interchange

U 1---1011---1  
 ↑  
 R 0---0010---0

and

U 0---0100---0  
 ↑  
 R 1---1101---1

---

GATING OF SAME PATTERNS TO AND  
 FROM T4, T5.

006000100400100003

~~T4~~ 0-0010-0

000000000000000000 (T4)

becomes 0-0100-0

000000000000000001 (T5)

000000000000000001 (T6)

000000000000000000 (T9)

054502005400000001 10

T5 LLS a1, U→T5

010104004400000027 11

IF(NUL)TRA a27, U→T4

045322000000000005 12

T4 SYM T5

010104000400000015 13

IF(NUL)TRA a15

050000000400000010 14

T5 HTR a10

054502005400000001 15

T5 LLS a1, U→T5

010104004400000027 16

IF(NUL)TRA a27, U→T4

045322000000000005 17

T4 SYM T5

010104000400000022 20

IF(NUL)TRA a22

050000000400000010 21

T5 HTR a10

054502005400000001 22

T5 LLS a1, U→T5

010104004400000027 23

IF(NUL)TRA a27, U→T4

045322000000000005 24

T4 SYM T5

010104000400000010 25

IF(NUL)TRA a10

050000000400000010 26

T5 HTR a10

065000104400000005 27

T6 STD aT5, U→T4

010100021400000012 30

TRA a12, B1+1

31 060100041400000011

T6 TRA a11, U→B1

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006000100400100003		<del>T4</del>	1-1101-1
77777777777777777777	4	becomes	1-1011-1
77777777777777777776	5		
77777777777777777776	6		
77777777777777777777	7		
0650001004000000002	10	T6	STO a2
0545062024000000001	11	T5	LLS a1, U→R
0150004154000000000	12		CMP a7, R→T5
0101040144000000035	13		IF(NUL)TRA a35, R→T4
0453220000000000005	14	T4	SYM T5
0101040004000000017	15		IF(NUL)TRA a17
0500000004000000010	16	T5	HTR a10
0650001004000000002	17	T6	STO aR
0545062024000000001	20	T5	LLS a1, U→R
0150004154000000000	21		CMP a2, R→T5
0101040144000000035	22		IF(NUL)TRA a35, R→T4
0453220000000000005	23	T4	SYM T5
0101040004000000026	24		IF(NUL)TRA a26
0500000004000000010	25	T5	HTR a10
0650001004000000002	26	T6	STO aR
0545062024000000001	27	T5	LLS a1, U→R
0150004154000000000	30		CMP a7, R→T5
0101040144000000035	31		IF(NUL)TRA a35, R→T4
0453220000000000005	32	T4	SYM T5
0101040004000000010	33		IF(NUL)TRA a10
0500000004000000010	34	T5	HTR a10
0650001044000000005	35	T6	STO a35, U→T4
0101000214000000014	36		TRA a14, B141
2601000414000000010		-T6	TRA a10, U→B1

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006000100400100003		T4	1	1101	1
777777777777777777	4	becomes 0	0	0100	0
777777777777777776	5	becomes 1	1	1011	1
777777777777777776	6				
777777777777777777	7				
065000100400000002	10		76	STD	AR
05450 <del>00</del> <sup>62</sup> 05400000001	11		75	LLS	a1, U→TS
015000400400000000	12			CMP	AR
010104000400000004	13			IF(NUL)TRR	A40
055000505400000004	14		75	CMP→	A74, U→TS
045322000000000005	15		74	SYM	TS
010104000400000002	16			IF(NUL)TRR	A20
0500000004000000020	17		75	HTR	A20
055000505400000004	20		75	CMP→	A74, U→TS
045322000000000005	21		74	SYM	TS
0101040004000000024	22			IF(NUL)TRR	A24
0500000004000000010	23		75	HTR	A10
065000100400000002	24		76	STD	AR
05450 <del>00</del> <sup>62</sup> 05400000001	25		75	LLS	a1, U→TS
015000400400000000	26			CMP	AR
010104000400000004	27			IF(NUL)TRR	A40
055000505400000004	30		75	CMP→	A74, U→TS
0453220000000000005	31		74	SYM	TS
010104000400000003 <del>3</del> <sup>4</sup>	32			IF(NUL)TRR	A34
050000000400000003 <del>3</del> <sup>4</sup>	33		75	HTR	A34
055000505400000004	34		75	CMP→	A74, U→TS
0453220000000000005	35		74	SYM	TS
0101040004000000010	36			IF(NUL)TRR	A10
0500000004000000010	37		75	HTR	A10
065000121400000005	40		76	STD	A75, R10
0101000004000000014	41			TRR	A14
2601000414000000014			76	TRR	A14, U→01

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006000100400100003

~~TS~~

0 - 0010 - 0

000000000000000000

becomes

0 - 0100 - 0

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000000000000000001

064502006400000001

010104005400000027

055322000000000006

010104000400000015

060000000400000010

064502006400000001

010104005400000027

055322000000000006

010104000400000022

060000000400000010

064502006400000001

010104005400000027

055322000000000006

010104000400000010

060000000400000010

075000105400000006

010100021400000012

070100041400000011

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006000100400100003

~~TS~~ 1-1101-1  
becomes 1-1011-1

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075000100400000002

064506202400000001

015000416400000000

010104015400000035

055322000000000006

010104000400000017

060000000400000010

075000100400000002

064506202400000001

015000416400000000

010104015400000035

055322000000000006

010104000400000026

060000000400000010

075000100400000002

064506202400000001

015000416400000000

010104015400000035

055322000000000006

010104000400000010

060000000400000010

075000105400000006

010100021400000014

270100041400000010

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006000100400100003

~~TS~~

0 — 0010 — 0

000000000000000000

becomes

1 — 1011 — 1

000000000000000000

becomes

0 — 0100 — 0

000000000000000001

000000000000000001

064502006400000001

010104000400000034

065000506400000005

055322000000000006

010104000400000016

060000000400000016

065000506400000005

055322000000000006

010104000400000022

060000000400000010

064502006400000001

010104000400000034

065000506400000005

055322000000000006

010104000400000030

060000000400000030

065000506400000005

055322000000000006

010104000400000010

060000000400000010

075000121400000006

010100000400000012

070100041400000012

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006000100400100003

~~TS~~

1 — 1101 — 1

777777777777777777

becomes

0 — 0100 — 0

777777777777777777

becomes

1 — 1011 — 1

777777777777777776

777777777777777776

065000100400000002

064506206400000001

015000400400000000

010104000400000040

065000506400000005

055322000000000006

010104000400000020

060000000400000020

065000506400000005

055322000000000006

010104000400000024

060000000400000010

075000100400000002

064506206400000001

015000400400000000

010104000400000040

065000506400000005

055322000000000006

01010400040000003<sup>4</sup>~~3~~

06000000040000003<sup>4</sup>~~3~~

065000506400000005

055322000000000006

010104000400000010

060000000400000010

075000121400000006

010100000400000014

270100041400000014

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006000100400100003

~~T6~~

0 - 001.0 - 0

000000000000000001

becomes

0 - 0100 - 0

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074502007400000001

010104006400000027

065322000000000007

010104000400000015

070000000400000010

074502007400000001

010104006400000027

065322000000000007

010104000400000022

070000000400000010

074502007400000001

010104006400000027

065322000000000007

010104000400000010

070000000400000010

045000106400000007

010100021400000012

040100041400000011

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006000100400100003

~~T6~~

1 — 1101 — 1

7777777777777777776

becomes

1 — 1011 — 1

777777777777777777

777777777777777777

777777777777777776

045000100400000002

074506202400000001

015000417400000000

010104016400000035

065322000000000007

010104000400000017

070000000400000010

045000100400000002

074506202400000001

015000417400000000

010104016400000035

065322000000000007

010104000400000026

070000000400000010

~~06~~5000100400000002

074506202400000001

015000417400000000

010104016400000035

065322000000000007

010104000400000010

070000000400000010

045000106400000007

010100021400000014

240100041400000010

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006000100400100003

~~16~~

0 — 0010 — 0

000000000000000001

becomes

1 — 1011 — 1

000000000000000000

becomes

0 — 0100 — 0

000000000000000000

000000000000000001

074502007400000001

010104000400000034

075000507400000006

065322000000000007

010104000400000016

070000000400000016

075000507400000006

065322000000000007

010104000400000022

070000000400000010

074502007400000001

010104000400000034

075000507400000006

065322000000000007

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065322000000000007

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006000100400100003

~~T6~~

1 — 1101 — 1

77777777777777777776

becomes

0 — 0100 — 0

77777777777777777777

becomes

1 — 1011 — 1

77777777777777777777

77777777777777777776

075000100400000002

074506207400000001

015000400400000000

010104000400000040

075000507400000006

065322000000000007

010104000400000020

070000000400000020

075000507400000006

065322000000000007

010104000400000024

070000000400000010

045000100400000002

074506207400000001

015000400400000000

010104000400000040

075000507400000006

065322000000000007

01010400040000003<sup>4</sup><sub>3</sub>

07000000040000003<sup>4</sup><sub>3</sub>

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006000100400100003

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becomes

0 — 0100 — 0

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044502004400000001

010104007400000027

075322000000000004

010104000400000015

040000000400000010

044502004400000001

010104007400000027

075322000000000004

010104000400000022

040000000400000010

044502004400000001

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010100021400000012

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~~TM~~ 1 — 1101 — 1

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becomes 1 — 1011 — 1

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055000100400000002

044506202400000001

015000414400000000

010104017400000035

075322000000000004

010104000400000017

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055000100400000002

044506202400000001

015000414400000000

010104017400000035

075322000000000004

010104000400000026

040000000400000010

055000100400000002

044506202400000001

015000414400000000

010104017400000035

075322000000000004

010104000400000010

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055000107400000004

010100021400000014

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006000100400100003

~~T9~~

0 — 0010 — 0

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becomes

1 — 1011 — 1

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becomes

0 — 0100 — 0

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044502004400000001

010104000400000034

045000504400000007

075322000000000004

010104000400000016

040000000400000016

045000504400000007

075322000000000004

010104000400000022

040000000400000010

044502004400000001

010104000400000034

045000504400000007

075322000000000004

010104000400000030

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006000100400100003

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1 — 1101 — 1

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becomes

0 — 0100 — 0

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becomes

1 — 1011 — 1

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044506204400000001

015000400400000000

010104000400000040

045000504400000007

075322000000000004

010104000400000020

040000000400000020

045000504400000007

075322000000000004

010104000400000024

040000000400000010

055000100400000002

044506204400000001

015000400400000000

010104000400000040

045000504400000007

075322000000000004

010104000400000033

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045000504400000007

075322000000000004

010104000400000010

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055000121400000004

010100000400000014

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006000100400100003

interchange

00000000000000000001

U 0-0100-0

00000000000000000001

R 0-0010-0

040104002400000033

014502004400000001

011100000400000000

014502000400000001

0153220000000000002

010104000400000015

040000000400000006

040104002400000033

014502004400000001

011100000400000000

014502000400000001

0153220000000000002

010104000400000024

040000000400000006

040104002400000033

014502004400000001

011100000400000000

014502000400000001

0153220000000000002

010104000400000006

010000000400000006

055000121400000004

010100002400000007

050100041400000006

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006000100400100003

interchange

777777777777777776

U 1-1011-1

777777777777777776

↓  
R 1-1101-1

045000400400000000

010104000400000040

045000100400000002

015000400400000000

014502000400000001

015000500400000004

011100000400000000

015000400400000000

014502000400000001

015000400400000000

015322000000000002

010104000400000023

040000000400000006

045000400400000000

010104000400000040

045000100400000002

015000400400000000

014502000400000001

015000500400000004

011100000400000000

015000400400000000

014502000400000001

015000400400000000

015322000000000002

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040000000400000006

055000121400000004

010100002400000011

250100041400000010

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006000100400100003

interchange

00000000000000000001

U 0 — 010 — 0

00000000000000000001

↓  
R 1 — 101 — 1

0545020054000000001

and

0101040024000000025

U 1 — 101 — 1

0150005004000000005

↓  
R 0 — 010 — 0

0111000004000000000

0150004004000000000

0153220000000000002

0101040004000000016

0500000004000000016

0550001004000000002

0150005004000000005

0111000004000000000

0150004004000000000

0153220000000000002

0101040004000000006

0500000004000000006

0450001214000000005

0101000024000000010

0501000414000000026

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006000100400100003

interchange

0000000000000000001

U 1 - 1011 - 1

0000000000000000001

R 0 - 0010 - 0

050104002400000030

and

014502000400000001

U 0 - 0100 - 0

015000500400000005

R 1 - 1101 - 1

011100000400000000

014502000400000001

015000400400000000

015322000000000002

010104000400000017

050000000400000017

055000500400000005

014501000400000001

015000500400000002

051100000400000000

015000400400000000

014502000400000001

015322000000000002

010104000400000006

050000000400000006

045000121400000005

010100002400000007

050100041400000031

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006000100400100003      COUNT CC UP IN F3  
 01500010 400077777      VS U IN F2  
 012170000400000010  
 014200200400020000  
 011000020400000001  
 010100060400000005

006000100400100003      COUNT CC DOWN IN F3  
 006000100400077767      VS U IN F2  
 405000100400077777  
 012170000400077770  
 014002000400077767  
 010100000400000004  
 011010060400000001

006000100400100003      COUNT B1 UP IN F3      PFD → a3+CC  
 014300500400000004      VS U IN F2      STX      a4  
 004200241400020000      7      (RW)      a3+CC, U-1  
 011000021400000001      AND      a1, B1  
 010000030400200000      -1      a3+CC, U-1  
 010100000400000004      7      a4

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006000100400100003      COUNT B1 DOWN IN F3      RTR → a3+CC  
 014300500400000004      VS U IN F2      STX      a4  
 004200241400020000      7      (RW)      a3+CC, U-1  
 011010061400000001      SUB      a1, B1-1  
 010000030400200000      47E      a3+CC, U-1  
 010100000400000004      7      a4

006000100400100003      COUNT B2 UP IN F3  
 014300500400000004      VS U IN F2  
 004200242400020000

011000022400000001

010000030400400000

010100000400000004

006000100400100003 COUNT B2 DOWN IN F3

014300500400000004 VS U IN F2

004200242400020000

011010062400000001

010000030400400000

010100000400000004

006000100400100003 COUNT B3 UP IN F3

014300500400000004 VS U IN F2

004200243400020000

011000023400000001

010000030401000000

010100000400000004

006000100400100003 COUNT B3 DOWN IN F3

014300500400000004 VS U IN F2

004200243400020000

011010063400000001

010000030401000000

010100000400000004

006000100400100003 COUNT B4 UP IN F3

014300500400000004 VS U IN F2

004200244400020000

011000024400000001

010000030402000000

010100000400000004

006000100400100003

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014300500400000004 COUNT B4 DOWN IN F3

004200244400020000 VS U IN F2

011010064400000001

010000030402000000

010100000400000004

006000100400100003 COUNT B5 UP IN F3

014300500400000004 VS U IN F2

004200245400020000

011000025400000001

010000030404000000

010100000400000004

006000100400100003 COUNT B5 DOWN IN F3

014300500400000004 VS U IN F2

004200245400020000

011010065400000001

010000030404000000

010100000400000004

006000100400100003 COUNT B6 UP IN F3

014300500400000004 VS U IN F2

004200246400020000

011000026400000001

010000030410000000

010100000400000004

006000100400100003 COUNT B6 DOWN IN F3

014300500400000004 VS U IN F2

004200246400020000

011010066400000001

010 00030410000000

010100000400000004

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006000100400100003    COUNT PF UP IN F3  
014300500400000004    VS U IN F2  
004200247400020000  
011000027400000001  
010000030420000000  
010100000400000004

006000100400100003    COUNT PF DOWN IN F3  
014300500400000004    VS U IN F2  
004200247400020000  
011010067400000001  
010000030420000000  
010100000400000004

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006000100400100003

COUNT X UP IN F2

RTR → 3+CC

415000121400077774

VS B1 IN F3

B1 STO AX, B1+1

414002142400000000

B1 SBI, ERM AZ, U → B2

421000121000077774

B2 ADD → AX, B1+1

010000000400000004

HTR a4

000100041400000004

Z TRA a4, U → B1

006000100400100003

COUNT X DOWN IN F2

RTR → 3+CC

415000161400077774

VS B1 IN F3

B1 STO AX, B1-1

414002142400000000

B1. SBI, ERM AZ, U → B2

421000161000077774

B2 ADD → AX, B1-1

010000000400000004

HTR a4

000100041400000004

Z TRA a4, U → B1

006000100400100003

COUNT P2 UP IN F2

415000121400077775

VS B1 IN F3

414002142400000000

421000121000077775

010000000400000004

000100041400000004

006000100400100003

COUNT P2 DOWN IN F2

415000161400077775

VS B1 IN F3

414002142400000000

421000161000077775

010000000400000004

000100041400000004

006000100400100003

COUNT TT UP IN F2

415000121400077776

VS B1 IN F3

414002142400000000

421000121000077776

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010000000400000004

000100041400000004

006000100400100003

COUNT TT DOWN IN F2

415000161400077776

VS BI IN F3

414002142400000000

421000161000077776

010000000400000004

000100041400000004

006000100400100003

COUNT FT UP IN F2

415000121400077777

VS BI IN F3

414002142400000000

421000121000077777

010000000400000004

000100041400000004

006000100400100003

COUNT FT DOWN IN F2

415000161400077777

VS BI IN F3

414002142400000000

421000161000077777

010000000400000004

000100041400000004

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006000100400100003

COUNT B1 UP IN F2

RTR > a3+cc

004000241400000001

VS B2 IN F3

Z SB2 a1, U->B1

411000041400000001

B1 ADD a1, U->B1

420105022400000005

B2 IF(B2)TRA a5, B2+1

410000051400000005

B1 HTR a5, R->B1

010100010400000004

TRA a4, R>Z

006000100400100003

COUNT B1 DOWN IN F2

RTR > a3+cc

004000241400077776

VS B2 IN F3

Z SB2 a1, U->B1

411010041400000001

B1 SOB a1, U->B1

420105062400000005

B2 IF(B2)TRA a5, B2-1

410000051400000005

B1 HTR a5, R->B1

010100010400000004

TRA a4, R>Z

006000100400100003

COUNT B2 UP IN F2

004000142400000001

VS B1 IN F3

421000042400000001

410105021400000005

420000052400000005

010100010400000004

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006000100400100003

COUNT B2 DOWN IN F2

004000142400077776

VS B1 IN F3

421010042400000001

410105061400000005

420000052400000005

010100010400000004

006000100400100003

COUNT B3 UP IN F2

004000443400000001

VS B4 IN F3

431000043400000001

440105023400000005

430000053400000005

010100010400000004

006000100400100003

COUNT B3 DOWN IN F2

004000443400077776

VS B4 IN F3

431010043400000001

440105064400000005

430000053400000005

010100010400000004

006000100400100003

COUNT B4 UP IN F2

004000344400000001

VS B3 IN F3

441000044400000001

430105023400000005

440000054400000005

010100010400000004

006000100400100003

COUNT B4 DOWN IN F2

004000344400077776

VS B3 IN F3

441010044400000001

430105063400000005

440000054400000005

010100010400000004

006000100400100003

COUNT B5 UP IN F2

004000645400000001

VS B6 IN F3

451000045400000001

460105026400000005

450000055400000005

010100010400000004

006000100400100003

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004000645400077776  
451010045400000001  
460105066400000005  
450000055400000005  
010100010400000004

COUNT B5 DOWN IN F2  
VS B6 IN F3

006000100400100003  
004000546400000001  
461000046400000001  
450105025400000005  
460000056400000005  
010100010400000004

COUNT B6 UP IN F2  
VS B5 IN F3

006000100400100003  
004000546400077776  
461010046400000001  
450105065400000005  
460000056400000005  
010100010400000004

COUNT B6 DOWN IN F2  
VS B5 IN F3

006000100400100003  
004000147400000001  
471000047400000001  
410105021400000005  
470000057400000005  
010100010400000004

COUNT PF UP IN F2  
VS B1 IN F3

006000100400100003  
004000147400077776  
471010047400000001  
410105061400000005  
470000057400000005  
010100010400000004

COUNT PF DOWN IN F2  
VS B1 IN F3

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ELEMENTARY CLASS O TEST PROGRAM

Operating Instructions

- (a) Clear Lights
- (b) Load Tape
- (c) Ends properly with HTR a10 in I.

Description of Tests

The programs test conditional SKP, JMP and TRA instruction for the following conditions:

- (1) Positive Test on a negative result.
- (2) Positive Test on a positive result
- (3) Not Zero Test on a zero result.
- (4) Nul Test on a non-nul number.
- (5) MOV Test with MOV indicator on.
- (6) NMO Test with indicator off.
- (7) ODD Test on a negative even number.
- (8) Even Test on a positive odd number.

Description of Output (Typewriter)

(1) ERRORS

(a) Orders executed in Repeat Mode

{ ORDER which failed  
COUNT - No. of  
executions  
before  
failure.

(b) Orders executed in a loop

{ ORDER which failed

(2) Breakpoints

0077...76 - End of test 2

0077...76 - End of test 3



\*\*\*\*\*

Class 4 - Shift Orders - Test Program

Operating Instructions

- (a) Clear Lights
- (b) Load Paper Tape (self-loading)
- (c) Ends properly with HTR al+B3 in I.

Tests and Outputs

TEST	INITIAL TYPE-OUT; DESCRIPTION	ERROR TYPE-OUT
U-left-right	334501000000...0 Shifts an isolated 1 between Stage 54 and Sign Stage.	<u>NO.</u> of executions before failure. <u>ORDER</u> which failed.
U-left-right	33450100...011111 Shifts an isolated 0 between Stage 54 and Sign.	<u>NO.</u> of executions before failure. <u>ORDER</u> which failed.
CIRCLE 0	3345050...0....0 Shifts an isolated 1 with a Circle Right order.	<u>NO.</u> of executions before failure. <u>ORDER</u> which failed.
CIRCLE 1	3345050...011111 Shifts an isolated 0 with a Circle Right order.	<u>NO.</u> of executions before failure. <u>ORDER</u> which failed.
DOUBLE MANTISSA	3344000...00000 Shifts a +1 with an arithmetic right shift. Shifts a -1 with an arithmetic right shift.	<u>NO.</u> of executions before failure. <u>ORDER</u> which failed.

January 5th 1961

Printer, Shift and Complement test

Operating Instructions.

(a) Set up Sense Lights manually as follows:

SL 1 - off  
SL 2 - for alphanumeric output: off  
          for numeric output: on  
SL 3 - for left shift: off  
          for right shift: on  
SL 4 - for 'normal' shift (all 0's and one 1 in UR): off  
          for complemented shift (all 1's and one 0 in UR): on  
SL 5 - for 'normal' loading of UR : off  
          for complementing print matrix rows in memory, and  
          recomplementing UR before shifting: on

SL 6,7,8 - not used.

SL 9 - 15 - set up the amount of shift required.

(b) Load tape. Program will transfer automatically to first instruction in 201

(c) Restart procedure: Transfer to 201.

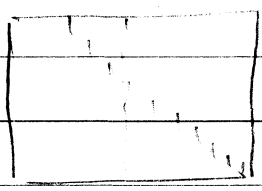
(d) To use a different print matrix (other than 10000 to 10177): Set B2 = fwa of print matrix and transfer to 202

Description of Program. Initially a print matrix is set up in diagonal form to give the codes 01234.... in type positions 45 to 108. With each successive line this configuration will be shifted according to the codes in the sense lights. The positions of SL 4 and 5 should not affect the output.

006000100400100200  
 201 004000200400010000  
 202 002170002400000001  
 203 004000105400000200  
 204 410101000400100004  
 205 055000161400677775  
 206 02500016140060 000  
 207 054506600400000001  
 210 010100005400177772  
 211 010203000400020000  
 212 016121020400400000  
 213 016111020400400000  
 214 014000120400000200  
 215 014000100400000100  
 216 010207000400010000  
 217 012170020000100031  
 220 012170000000100031  
 221 012000100400100010  
 222 012000100400100015  
 223 410101000400177764  
 224 010207000400004000  
 225 010100000400100010  
 226 010207000400002000  
 227 010100000400100014  
 230 002170002000677776  
 231 002170061000677775  
 232 014506600440077770

LOAD TO 201 ON

SET UP PRINT MATRIX



10000 - 10177

$\sigma^2$  OFF: Print 64 chars  
 ON: Print 32 chars

Set EI for shift count

$\sigma^3$  ON?  
 Right shift  
 Left shift  
 Store shift orders

End of shift loop count

$\sigma^4$  OFF?  
 No: Transfer to complement shift  
 YES:  $\sigma^5$  OFF?  
 No: Transfer to complement storage  
 YES: Normal shift loop

Shift by (SL)

$\sigma^2$ : Numeric print only (ON)  
 $\sigma^3$ : Shift right (ON), Left (OFF)  
 $\sigma^4$ : Complement OR before & after shifting  
 $\sigma^5$ : Complement & complement memory word before shift

0  
9  
8  
7  
6  
5  
4  
3  
2  
1  
0  
9  
8  
7  
6  
5  
4  
3

233 015000161400677776

234 025000100400600001

235 010100000400177764

236 005001402000677776

237 005001461000677775

238 014506600440077770

239 015010161400677776

242 025010100400600001

243 010100000400177756

R 244 005001500000677776

L 245 005001500000677775

246 005001402000677776

247 005001461000677775

250 010100000400177760

251 014505500440077770

252 014506600440077770

Load VR a complement

Shift by (S)

Complement & store

Complement in memory

Load a complement

Complement shift

Complement in memory, VR normal shift

Shift RIGHT

Shift LEFT

100000000000201 TRAILER

00end00 End of Tape

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14  
13  
12  
11  
10  
9  
8  
7  
6  
5  
4  
3

TEST COUNTING CF M IN FIELD 4 Joel Cyprus 2-14-61

006000100400100003

004002400400077775

003000064435701676

033000000400000000

010000000400000004

003000071400000001

003000072400000010

003000073400000020

003000074400000040

003000075400000100

003000076400000200

003000077400000400

000100000400000004

000100000400000010

TEST COUNTING OF M IN FIELD 4 Joel Cyprus 2-14-61

MODIFIED TO COUNT ON B4 AND USE B6 AS TALLY. T.A.K. 9-10-61

006000100400100003

004002600400077775

00300006427701676

033000000400000000

010000000400000004

003000071400000001

003000072400000010

003000073400000020

003000074400000200

003000075400000100

003000076400000040

003000077400000400

000100000400000004

000100000400000010

APPENDIX B  
TABLE OF POWERS OF 2

$2^n$	$n$	$2^{-n}$
1	0	1.0
2	1	0.5
4	2	0.25
8	3	0.125
16	4	0.062 5
32	5	0.031 25
64	6	0.015 625
128	7	0.007 812 5
256	8	0.003 906 25
512	9	0.001 953 125
1 024	10	0.000 976 562 5
2 048	11	0.000 488 281 25
4 096	12	0.000 244 140 625
8 192	13	0.000 122 070 312 5
16 384	14	0.000 061 035 156 25
32 768	15	0.000 030 517 578 125
65 536	16	0.000 015 258 789 062 5
131 072	17	0.000 007 629 394 531 25
262 144	18	0.000 003 814 697 265 625
524 288	19	0.000 001 907 348 632 812 5
1 048 576	20	0.000 000 953 674 316 406 25
2 097 152	21	0.000 000 476 837 158 203 125
4 194 304	22	0.000 000 238 418 579 101 562 5
8 388 608	23	0.000 000 119 209 289 550 781 25
16 777 216	24	0.000 000 059 604 644 775 390 625
33 554 432	25	0.000 000 029 802 322 387 695 312 5
67 108 864	26	0.000 000 014 901 161 193 847 656 25
134 217 728	27	0.000 000 007 450 580 596 923 828 125
268 435 456	28	0.000 000 003 725 290 298 461 914 062 5
536 870 912	29	0.000 000 001 862 645 149 230 957 031 25
1 073 741 824	30	0.000 000 000 931 322 574 615 478 515 625
2 147 483 648	31	0.000 000 000 465 661 287 307 739 257 812 5
4 294 967 296	32	0.000 000 000 232 830 643 653 869 628 906 25
8 589 934 592	33	0.000 000 000 116 415 321 826 934 814 453 125
17 179 869 184	34	0.000 000 000 058 207 660 913 467 407 226 562 5
34 359 738 368	35	0.000 000 000 029 103 830 456 733 703 613 281 25
68 719 476 736	36	0.000 000 000 014 551 915 228 366 851 806 640 625
137 438 953 472	37	0.000 000 000 007 275 957 614 183 425 903 320 312 5
274 877 906 944	38	0.000 000 000 003 637 978 807 091 712 951 660 156 25
549 755 813 888	39	0.000 000 000 001 818 989 403 545 856 475 830 078 125

# APPENDIX C. OCTAL-DECIMAL INTEGER CONVERSION TABLE

0000 | 0000  
to | to  
0777 | 0511  
(Octal) | (Decimal)

Octal Decimal  
10000 - 4096  
20000 - 8192  
30000 - 12288  
40000 - 16384  
50000 - 20480  
60000 - 24576  
70000 - 28672

	0	1	2	3	4	5	6	7
0000	0000	0001	0002	0003	0004	0005	0006	0007
0010	0008	0009	0010	0011	0012	0013	0014	0015
0020	0016	0017	0018	0019	0020	0021	0022	0023
0030	0024	0025	0026	0027	0028	0029	0030	0031
0040	0032	0033	0034	0035	0036	0037	0038	0039
0050	0040	0041	0042	0043	0044	0045	0046	0047
0060	0048	0049	0050	0051	0052	0053	0054	0055
0070	0056	0057	0058	0059	0060	0061	0062	0063
0100	0064	0065	0066	0067	0068	0069	0070	0071
0110	0072	0073	0074	0075	0076	0077	0078	0079
0120	0080	0081	0082	0083	0084	0085	0086	0087
0130	0088	0089	0090	0091	0092	0093	0094	0095
0140	0096	0097	0098	0099	0100	0101	0102	0103
0150	0104	0105	0106	0107	0108	0109	0110	0111
0160	0112	0113	0114	0115	0116	0117	0118	0119
0170	0120	0121	0122	0123	0124	0125	0126	0127
0200	0128	0129	0130	0131	0132	0133	0134	0135
0210	0136	0137	0138	0139	0140	0141	0142	0143
0220	0144	0145	0146	0147	0148	0149	0150	0151
0230	0152	0153	0154	0155	0156	0157	0158	0159
0240	0160	0161	0162	0163	0164	0165	0166	0167
0250	0168	0169	0170	0171	0172	0173	0174	0175
0260	0176	0177	0178	0179	0180	0181	0182	0183
0270	0184	0185	0186	0187	0188	0189	0190	0191
0300	0192	0193	0194	0195	0196	0197	0198	0199
0310	0200	0201	0202	0203	0204	0205	0206	0207
0320	0208	0209	0210	0211	0212	0213	0214	0215
0330	0216	0217	0218	0219	0220	0221	0222	0223
0340	0224	0225	0226	0227	0228	0229	0230	0231
0350	0232	0233	0234	0235	0236	0237	0238	0239
0360	0240	0241	0242	0243	0244	0245	0246	0247
0370	0248	0249	0250	0251	0252	0253	0254	0255

	0	1	2	3	4	5	6	7
0400	0256	0257	0258	0259	0260	0261	0262	0263
0410	0264	0265	0266	0267	0268	0269	0270	0271
0420	0272	0273	0274	0275	0276	0277	0278	0279
0430	0280	0281	0282	0283	0284	0285	0286	0287
0440	0288	0289	0290	0291	0292	0293	0294	0295
0450	0296	0297	0298	0299	0300	0301	0302	0303
0460	0304	0305	0306	0307	0308	0309	0310	0311
0470	0312	0313	0314	0315	0316	0317	0318	0319
0500	0320	0321	0322	0323	0324	0325	0326	0327
0510	0328	0329	0330	0331	0332	0333	0334	0335
0520	0336	0337	0338	0339	0340	0341	0342	0343
0530	0344	0345	0346	0347	0348	0349	0350	0351
0540	0352	0353	0354	0355	0356	0357	0358	0359
0550	0360	0361	0362	0363	0364	0365	0366	0367
0560	0368	0369	0370	0371	0372	0373	0374	0375
0570	0376	0377	0378	0379	0380	0381	0382	0383
0600	0384	0385	0386	0387	0388	0389	0390	0391
0610	0392	0393	0394	0395	0396	0397	0398	0399
0620	0400	0401	0402	0403	0404	0405	0406	0407
0630	0408	0409	0410	0411	0412	0413	0414	0415
0640	0416	0417	0418	0419	0420	0421	0422	0423
0650	0424	0425	0426	0427	0428	0429	0430	0431
0660	0432	0433	0434	0435	0436	0437	0438	0439
0670	0440	0441	0442	0443	0444	0445	0446	0447
0700	0448	0449	0450	0451	0452	0453	0454	0455
0710	0456	0457	0458	0459	0460	0461	0462	0463
0720	0464	0465	0466	0467	0468	0469	0470	0471
0730	0472	0473	0474	0475	0476	0477	0478	0479
0740	0480	0481	0482	0483	0484	0485	0486	0487
0750	0488	0489	0490	0491	0492	0493	0494	0495
0760	0496	0497	0498	0499	0500	0501	0502	0503
0770	0504	0505	0506	0507	0508	0509	0510	0511

1000 | 0512  
to | to  
1777 | 1023  
(Octal) | (Decimal)

	0	1	2	3	4	5	6	7
1000	0512	0513	0514	0515	0516	0517	0518	0519
1010	0520	0521	0522	0523	0524	0525	0526	0527
1020	0528	0529	0530	0531	0532	0533	0534	0535
1030	0536	0537	0538	0539	0540	0541	0542	0543
1040	0544	0545	0546	0547	0548	0549	0550	0551
1050	0552	0553	0554	0555	0556	0557	0558	0559
1060	0560	0561	0562	0563	0564	0565	0566	0567
1070	0568	0569	0570	0571	0572	0573	0574	0575
1100	0576	0577	0578	0579	0580	0581	0582	0583
1110	0584	0585	0586	0587	0588	0589	0590	0591
1120	0592	0593	0594	0595	0596	0597	0598	0599
1130	0600	0601	0602	0603	0604	0605	0606	0607
1140	0608	0609	0610	0611	0612	0613	0614	0615
1150	0616	0617	0618	0619	0620	0621	0622	0623
1160	0624	0625	0626	0627	0628	0629	0630	0631
1170	0632	0633	0634	0635	0636	0637	0638	0639
1200	0640	0641	0642	0643	0644	0645	0646	0647
1210	0648	0649	0650	0651	0652	0653	0654	0655
1220	0656	0657	0658	0659	0660	0661	0662	0663
1230	0664	0665	0666	0667	0668	0669	0670	0671
1240	0672	0673	0674	0675	0676	0677	0678	0679
1250	0680	0681	0682	0683	0684	0685	0686	0687
1260	0688	0689	0690	0691	0692	0693	0694	0695
1270	0696	0697	0698	0699	0700	0701	0702	0703
1300	0704	0705	0706	0707	0708	0709	0710	0711
1310	0712	0713	0714	0715	0716	0717	0718	0719
1320	0720	0721	0722	0723	0724	0725	0726	0727
1330	0728	0729	0730	0731	0732	0733	0734	0735
1340	0736	0737	0738	0739	0740	0741	0742	0743
1350	0744	0745	0746	0747	0748	0749	0750	0751
1360	0752	0753	0754	0755	0756	0757	0758	0759
1370	0760	0761	0762	0763	0764	0765	0766	0767

	0	1	2	3	4	5	6	7
1400	0768	0769	0770	0771	0772	0773	0774	0775
1410	0776	0777	0778	0779	0780	0781	0782	0783
1420	0784	0785	0786	0787	0788	0789	0790	0791
1430	0792	0793	0794	0795	0796	0797	0798	0799
1440	0800	0801	0802	0803	0804	0805	0806	0807
1450	0808	0809	0810	0811	0812	0813	0814	0815
1460	0816	0817	0818	0819	0820	0821	0822	0823
1470	0824	0825	0826	0827	0828	0829	0830	0831
1500	0832	0833	0834	0835	0836	0837	0838	0839
1510	0840	0841	0842	0843	0844	0845	0846	0847
1520	0848	0849	0850	0851	0852	0853	0854	0855
1530	0856	0857	0858	0859	0860	0861	0862	0863
1540	0864	0865	0866	0867	0868	0869	0870	0871
1550	0872	0873	0874	0875	0876	0877	0878	0879
1560	0880	0881	0882	0883	0884	0885	0886	0887
1570	0888	0889	0890	0891	0892	0893	0894	0895
1600	0896	0897	0898	0899	0900	0901	0902	0903
1610	0904	0905	0906	0907	0908	0909	0910	0911
1620	0912	0913	0914	0915	0916	0917	0918	0919
1630	0920	0921	0922	0923	0924	0925	0926	0927
1640	0928	0929	0930	0931	0932	0933	0934	0935
1650	0936	0937	0938	0939	0940	0941	0942	0943
1660	0944	0945	0946	0947	0948	0949	0950	0951
1670	0952	0953	0954	0955	0956	0957	0958	0959
1700	0960	0961	0962	0963	0964	0965	0966	0967
1710	0968	0969	0970	0971	0972	0973	0974	0975
1720	0976	0977	0978	0979	0980	0981	0982	0983
1730	0984	0985	0986	0987	0988	0989	0990	0991
1740	0992	0993	0994	0995	0996	0997	0998	0999
1750	1000	1001	1002	1003	1004	1005	1006	1007
1760	1008	1009	1010	1011	1012	1013	1014	1015
1770	1016	1017	1018	1019	1020	1021	1022	1023



# OCTAL-DECIMAL INTEGER CONVERSION TABLE

	0	1	2	3	4	5	6	7
2000	1024	1025	1026	1027	1028	1029	1030	1031
2010	1032	1033	1034	1035	1036	1037	1038	1039
2020	1040	1041	1042	1043	1044	1045	1046	1047
2030	1048	1049	1050	1051	1052	1053	1054	1055
2040	1056	1057	1058	1059	1060	1061	1062	1063
2050	1064	1065	1066	1067	1068	1069	1070	1071
2060	1072	1073	1074	1075	1076	1077	1078	1079
2070	1080	1081	1082	1083	1084	1085	1086	1087
2100	1088	1089	1090	1091	1092	1093	1094	1095
2110	1096	1097	1098	1099	1100	1101	1102	1103
2120	1104	1105	1106	1107	1108	1109	1110	1111
2130	1112	1113	1114	1115	1116	1117	1118	1119
2140	1120	1121	1122	1123	1124	1125	1126	1127
2150	1128	1129	1130	1131	1132	1133	1134	1135
2160	1136	1137	1138	1139	1140	1141	1142	1143
2170	1144	1145	1146	1147	1148	1149	1150	1151
2200	1152	1153	1154	1155	1156	1157	1158	1159
2210	1160	1161	1162	1163	1164	1165	1166	1167
2220	1168	1169	1170	1171	1172	1173	1174	1175
2230	1176	1177	1178	1179	1180	1181	1182	1183
2240	1184	1185	1186	1187	1188	1189	1190	1191
2250	1192	1193	1194	1195	1196	1197	1198	1199
2260	1200	1201	1202	1203	1204	1205	1206	1207
2270	1208	1209	1210	1211	1212	1213	1214	1215
2300	1216	1217	1218	1219	1220	1221	1222	1223
2310	1224	1225	1226	1227	1228	1229	1230	1231
2320	1232	1233	1234	1235	1236	1237	1238	1239
2330	1240	1241	1242	1243	1244	1245	1246	1247
2340	1248	1249	1250	1251	1252	1253	1254	1255
2350	1256	1257	1258	1259	1260	1261	1262	1263
2360	1264	1265	1266	1267	1268	1269	1270	1271
2370	1272	1273	1274	1275	1276	1277	1278	1279

	0	1	2	3	4	5	6	7
2400	1280	1281	1282	1283	1284	1285	1286	1287
2410	1288	1289	1290	1291	1292	1293	1294	1295
2420	1296	1297	1298	1299	1300	1301	1302	1303
2430	1304	1305	1306	1307	1308	1309	1310	1311
2440	1312	1313	1314	1315	1316	1317	1318	1319
2450	1320	1321	1322	1323	1324	1325	1326	1327
2460	1328	1329	1330	1331	1332	1333	1334	1335
2470	1336	1337	1338	1339	1340	1341	1342	1343
2500	1344	1345	1346	1347	1348	1349	1350	1351
2510	1352	1353	1354	1355	1356	1357	1358	1359
2520	1360	1361	1362	1363	1364	1365	1366	1367
2530	1368	1369	1370	1371	1372	1373	1374	1375
2540	1376	1377	1378	1379	1380	1381	1382	1383
2550	1384	1385	1386	1387	1388	1389	1390	1391
2560	1392	1393	1394	1395	1396	1397	1398	1399
2570	1400	1401	1402	1403	1404	1405	1406	1407
2600	1408	1409	1410	1411	1412	1413	1414	1415
2610	1416	1417	1418	1419	1420	1421	1422	1423
2620	1424	1425	1426	1427	1428	1429	1430	1431
2630	1432	1433	1434	1435	1436	1437	1438	1439
2640	1440	1441	1442	1443	1444	1445	1446	1447
2650	1448	1449	1450	1451	1452	1453	1454	1455
2660	1456	1457	1458	1459	1460	1461	1462	1463
2670	1464	1465	1466	1467	1468	1469	1470	1471
2700	1472	1473	1474	1475	1476	1477	1478	1479
2710	1480	1481	1482	1483	1484	1485	1486	1487
2720	1488	1489	1490	1491	1492	1493	1494	1495
2730	1496	1497	1498	1499	1500	1501	1502	1503
2740	1504	1505	1506	1507	1508	1509	1510	1511
2750	1512	1513	1514	1515	1516	1517	1518	1519
2760	1520	1521	1522	1523	1524	1525	1526	1527
2770	1528	1529	1530	1531	1532	1533	1534	1535

2000      1024  
to            to  
2777        1535  
(Octal)    (Decimal)

Octal    Decimal  
10000 - 4096  
20000 - 8192  
30000 - 12288  
40000 - 16384  
50000 - 20480  
60000 - 24576  
70000 - 28672

	0	1	2	3	4	5	6	7
3000	1536	1537	1538	1539	1540	1541	1542	1543
3010	1544	1545	1546	1547	1548	1549	1550	1551
3020	1552	1553	1554	1555	1556	1557	1558	1559
3030	1560	1561	1562	1563	1564	1565	1566	1567
3040	1568	1569	1570	1571	1572	1573	1574	1575
3050	1576	1577	1578	1579	1580	1581	1582	1583
3060	1584	1585	1586	1587	1588	1589	1590	1591
3070	1592	1593	1594	1595	1596	1597	1598	1599
3100	1600	1601	1602	1603	1604	1605	1606	1607
3110	1608	1609	1610	1611	1612	1613	1614	1615
3120	1616	1617	1618	1619	1620	1621	1622	1623
3130	1624	1625	1626	1627	1628	1629	1630	1631
3140	1632	1633	1634	1635	1636	1637	1638	1639
3150	1640	1641	1642	1643	1644	1645	1646	1647
3160	1648	1649	1650	1651	1652	1653	1654	1655
3170	1656	1657	1658	1659	1660	1661	1662	1663
3200	1664	1665	1666	1667	1668	1669	1670	1671
3210	1672	1673	1674	1675	1676	1677	1678	1679
3220	1680	1681	1682	1683	1684	1685	1686	1687
3230	1688	1689	1690	1691	1692	1693	1694	1695
3240	1696	1697	1698	1699	1700	1701	1702	1703
3250	1704	1705	1706	1707	1708	1709	1710	1711
3260	1712	1713	1714	1715	1716	1717	1718	1719
3270	1720	1721	1722	1723	1724	1725	1726	1727
3300	1728	1729	1730	1731	1732	1733	1734	1735
3310	1736	1737	1738	1739	1740	1741	1742	1743
3320	1744	1745	1746	1747	1748	1749	1750	1751
3330	1752	1753	1754	1755	1756	1757	1758	1759
3340	1760	1761	1762	1763	1764	1765	1766	1767
3350	1768	1769	1770	1771	1772	1773	1774	1775
3360	1776	1777	1778	1779	1780	1781	1782	1783
3370	1784	1785	1786	1787	1788	1789	1790	1791

	0	1	2	3	4	5	6	7
3400	1792	1793	1794	1795	1796	1797	1798	1799
3410	1800	1801	1802	1803	1804	1805	1806	1807
3420	1808	1809	1810	1811	1812	1813	1814	1815
3430	1816	1817	1818	1819	1820	1821	1822	1823
3440	1824	1825	1826	1827	1828	1829	1830	1831
3450	1832	1833	1834	1835	1836	1837	1838	1839
3460	1840	1841	1842	1843	1844	1845	1846	1847
3470	1848	1849	1850	1851	1852	1853	1854	1855
3500	1856	1857	1858	1859	1860	1861	1862	1863
3510	1864	1865	1866	1867	1868	1869	1870	1871
3520	1872	1873	1874	1875	1876	1877	1878	1879
3530	1880	1881	1882	1883	1884	1885	1886	1887
3540	1888	1889	1890	1891	1892	1893	1894	1895
3550	1896	1897	1898	1899	1900	1901	1902	1903
3560	1904	1905	1906	1907	1908	1909	1910	1911
3570	1912	1913	1914	1915	1916	1917	1918	1919
3600	1920	1921	1922	1923	1924	1925	1926	1927
3610	1928	1929	1930	1931	1932	1933	1934	1935
3620	1936	1937	1938	1939	1940	1941	1942	1943
3630	1944	1945	1946	1947	1948	1949	1950	1951
3640	1952	1953	1954	1955	1956	1957	1958	1959
3650	1960	1961	1962	1963	1964	1965	1966	1967
3660	1968	1969	1970	1971	1972	1973	1974	1975
3670	1976	1977	1978	1979	1980	1981	1982	1983
3700	1984	1985	1986	1987	1988	1989	1990	1991
3710	1992	1993	1994	1995	1996	1997	1998	1999
3720	2000	2001	2002	2003	2004	2005	2006	2007
3730	2008	2009	2010	2011	2012	2013	2014	2015
3740	2016	2017	2018	2019	2020	2021	2022	2023
3750	2024	2025	2026	2027	2028	2029	2030	2031
3760	2032	2033	2034	2035	2036	2037	2038	2039
3770	2040	2041	2042	2043	2044	2045	2046	2047

3000      1536  
to            to  
3777        2047  
(Octal)    (Decimal)

# OCTAL-DECIMAL INTEGER CONVERSION TABLE

4000 | 2048  
to | to  
4777 | 2559  
(Octal) | (Decimal)

Octal Decimal  
10000 - 4096  
20000 - 8192  
30000 - 12288  
40000 - 16384  
50000 - 20480  
60000 - 24576  
70000 - 28672

	0	1	2	3	4	5	6	7
4000	2048	2049	2050	2051	2052	2053	2054	2055
4010	2056	2057	2058	2059	2060	2061	2062	2063
4020	2064	2065	2066	2067	2068	2069	2070	2071
4030	2072	2073	2074	2075	2076	2077	2078	2079
4040	2080	2081	2082	2083	2084	2085	2086	2087
4050	2088	2089	2090	2091	2092	2093	2094	2095
4060	2096	2097	2098	2099	2100	2101	2102	2103
4070	2104	2105	2106	2107	2108	2109	2110	2111
4100	2112	2113	2114	2115	2116	2117	2118	2119
4110	2120	2121	2122	2123	2124	2125	2126	2127
4120	2128	2129	2130	2131	2132	2133	2134	2135
4130	2136	2137	2138	2139	2140	2141	2142	2143
4140	2144	2145	2146	2147	2148	2149	2150	2151
4150	2152	2153	2154	2155	2156	2157	2158	2159
4160	2160	2161	2162	2163	2164	2165	2166	2167
4170	2168	2169	2170	2171	2172	2173	2174	2175
4200	2176	2177	2178	2179	2180	2181	2182	2183
4210	2184	2185	2186	2187	2188	2189	2190	2191
4220	2192	2193	2194	2195	2196	2197	2198	2199
4230	2200	2201	2202	2203	2204	2205	2206	2207
4240	2208	2209	2210	2211	2212	2213	2214	2215
4250	2216	2217	2218	2219	2220	2221	2222	2223
4260	2224	2225	2226	2227	2228	2229	2230	2231
4270	2232	2233	2234	2235	2236	2237	2238	2239
4300	2240	2241	2242	2243	2244	2245	2246	2247
4310	2248	2249	2250	2251	2252	2253	2254	2255
4320	2256	2257	2258	2259	2260	2261	2262	2263
4330	2264	2265	2266	2267	2268	2269	2270	2271
4340	2272	2273	2274	2275	2276	2277	2278	2279
4350	2280	2281	2282	2283	2284	2285	2286	2287
4360	2288	2289	2290	2291	2292	2293	2294	2295
4370	2296	2297	2298	2299	2300	2301	2302	2303

	0	1	2	3	4	5	6	7
4400	2304	2305	2306	2307	2308	2309	2310	2311
4410	2312	2313	2314	2315	2316	2317	2318	2319
4420	2320	2321	2322	2323	2324	2325	2326	2327
4430	2328	2329	2330	2331	2332	2333	2334	2335
4440	2336	2337	2338	2339	2340	2341	2342	2343
4450	2344	2345	2346	2347	2348	2349	2350	2351
4460	2352	2353	2354	2355	2356	2357	2358	2359
4470	2360	2361	2362	2363	2364	2365	2366	2367
4500	2368	2369	2370	2371	2372	2373	2374	2375
4510	2376	2377	2378	2379	2380	2381	2382	2383
4520	2384	2385	2386	2387	2388	2389	2390	2391
4530	2392	2393	2394	2395	2396	2397	2398	2399
4540	2400	2401	2402	2403	2404	2405	2406	2407
4550	2408	2409	2410	2411	2412	2413	2414	2415
4560	2416	2417	2418	2419	2420	2421	2422	2423
4570	2424	2425	2426	2427	2428	2429	2430	2431
4600	2432	2433	2434	2435	2436	2437	2438	2439
4610	2440	2441	2442	2443	2444	2445	2446	2447
4620	2448	2449	2450	2451	2452	2453	2454	2455
4630	2456	2457	2458	2459	2460	2461	2462	2463
4640	2464	2465	2466	2467	2468	2469	2470	2471
4650	2472	2473	2474	2475	2476	2477	2478	2479
4660	2480	2481	2482	2483	2484	2485	2486	2487
4670	2488	2489	2490	2491	2492	2493	2494	2495
4700	2496	2497	2498	2499	2500	2501	2502	2503
4710	2504	2505	2506	2507	2508	2509	2510	2511
4720	2512	2513	2514	2515	2516	2517	2518	2519
4730	2520	2521	2522	2523	2524	2525	2526	2527
4740	2528	2529	2530	2531	2532	2533	2534	2535
4750	2536	2537	2538	2539	2540	2541	2542	2543
4760	2544	2545	2546	2547	2548	2549	2550	2551
4770	2552	2553	2554	2555	2556	2557	2558	2559

5000 | 2560  
to | to  
5777 | 3071  
(Octal) | (Decimal)

	0	1	2	3	4	5	6	7
5000	2560	2561	2562	2563	2564	2565	2566	2567
5010	2568	2569	2570	2571	2572	2573	2574	2575
5020	2576	2577	2578	2579	2580	2581	2582	2583
5030	2584	2585	2586	2587	2588	2589	2590	2591
5040	2592	2593	2594	2595	2596	2597	2598	2599
5050	2600	2601	2602	2603	2604	2605	2606	2607
5060	2608	2609	2610	2611	2612	2613	2614	2615
5070	2616	2617	2618	2619	2620	2621	2622	2623
5100	2624	2625	2626	2627	2628	2629	2630	2631
5110	2632	2633	2634	2635	2636	2637	2638	2639
5120	2640	2641	2642	2643	2644	2645	2646	2647
5130	2648	2649	2650	2651	2652	2653	2654	2655
5140	2656	2657	2658	2659	2660	2661	2662	2663
5150	2664	2665	2666	2667	2668	2669	2670	2671
5160	2672	2673	2674	2675	2676	2677	2678	2679
5170	2680	2681	2682	2683	2684	2685	2686	2687
5200	2688	2689	2690	2691	2692	2693	2694	2695
5210	2696	2697	2698	2699	2700	2701	2702	2703
5220	2704	2705	2706	2707	2708	2709	2710	2711
5230	2712	2713	2714	2715	2716	2717	2718	2719
5240	2720	2721	2722	2723	2724	2725	2726	2727
5250	2728	2729	2730	2731	2732	2733	2734	2735
5260	2736	2737	2738	2739	2740	2741	2742	2743
5270	2744	2745	2746	2747	2748	2749	2750	2751
5300	2752	2753	2754	2755	2756	2757	2758	2759
5310	2760	2761	2762	2763	2764	2765	2766	2767
5320	2768	2769	2770	2771	2772	2773	2774	2775
5330	2776	2777	2778	2779	2780	2781	2782	2783
5340	2784	2785	2786	2787	2788	2789	2790	2791
5350	2792	2793	2794	2795	2796	2797	2798	2799
5360	2800	2801	2802	2803	2804	2805	2806	2807
5370	2808	2809	2810	2811	2812	2813	2814	2815

	0	1	2	3	4	5	6	7
5400	2816	2817	2818	2819	2820	2821	2822	2823
5410	2824	2825	2826	2827	2828	2829	2830	2831
5420	2832	2833	2834	2835	2836	2837	2838	2839
5430	2840	2841	2842	2843	2844	2845	2846	2847
5440	2848	2849	2850	2851	2852	2853	2854	2855
5450	2856	2857	2858	2859	2860	2861	2862	2863
5460	2864	2865	2866	2867	2868	2869	2870	2871
5470	2872	2873	2874	2875	2876	2877	2878	2879
5500	2880	2881	2882	2883	2884	2885	2886	2887
5510	2888	2889	2890	2891	2892	2893	2894	2895
5520	2896	2897	2898	2899	2900	2901	2902	2903
5530	2904	2905	2906	2907	2908	2909	2910	2911
5540	2912	2913	2914	2915	2916	2917	2918	2919
5550	2920	2921	2922	2923	2924	2925	2926	2927
5560	2928	2929	2930	2931	2932	2933	2934	2935
5570	2936	2937	2938	2939	2940	2941	2942	2943
5600	2944	2945	2946	2947	2948	2949	2950	2951
5610	2952	2953	2954	2955	2956	2957	2958	2959
5620	2960	2961	2962	2963	2964	2965	2966	2967
5630	2968	2969	2970	2971	2972	2973	2974	2975
5640	2976	2977	2978	2979	2980	2981	2982	2983
5650	2984	2985	2986	2987	2988	2989	2990	2991
5660	2992	2993	2994	2995	2996	2997	2998	2999
5670	3000	3001	3002	3003	3004	3005	3006	3007
5700	3008	3009	3010	3011	3012	3013	3014	3015
5710	3016	3017	3018	3019	3020	3021	3022	3023
5720	3024	3025	3026	3027	3028	3029	3030	3031
5730	3032	3033	3034	3035	3036	3037	3038	3039
5740	3040	3041	3042	3043	3044	3045	3046	3047
5750	3048	3049	3050	3051	3052	3053	3054	3055
5760	3056	3057	3058	3059	3060	3061	3062	3063
5770	3064	3065	3066	3067	3068	3069	3070	3071

# OCTAL-DECIMAL INTEGER CONVERSION TABLE

	0	1	2	3	4	5	6	7
6000	3072	3073	3074	3075	3076	3077	3078	3079
6010	3080	3081	3082	3083	3084	3085	3086	3087
6020	3088	3089	3090	3091	3092	3093	3094	3095
6030	3096	3097	3098	3099	3100	3101	3102	3103
6040	3104	3105	3106	3107	3108	3109	3110	3111
6050	3112	3113	3114	3115	3116	3117	3118	3119
6060	3120	3121	3122	3123	3124	3125	3126	3127
6070	3128	3129	3130	3131	3132	3133	3134	3135
6100	3136	3137	3138	3139	3140	3141	3142	3143
6110	3144	3145	3146	3147	3148	3149	3150	3151
6120	3152	3153	3154	3155	3156	3157	3158	3159
6130	3160	3161	3162	3163	3164	3165	3166	3167
6140	3168	3169	3170	3171	3172	3173	3174	3175
6150	3176	3177	3178	3179	3180	3181	3182	3183
6160	3184	3185	3186	3187	3188	3189	3190	3191
6170	3192	3193	3194	3195	3196	3197	3198	3199
6200	3200	3201	3202	3203	3204	3205	3206	3207
6210	3208	3209	3210	3211	3212	3213	3214	3215
6220	3216	3217	3218	3219	3220	3221	3222	3223
6230	3224	3225	3226	3227	3228	3229	3230	3231
6240	3232	3233	3234	3235	3236	3237	3238	3239
6250	3240	3241	3242	3243	3244	3245	3246	3247
6260	3248	3249	3250	3251	3252	3253	3254	3255
6270	3256	3257	3258	3259	3260	3261	3262	3263
6300	3264	3265	3266	3267	3268	3269	3270	3271
6310	3272	3273	3274	3275	3276	3277	3278	3279
6320	3280	3281	3282	3283	3284	3285	3286	3287
6330	3288	3289	3290	3291	3292	3293	3294	3295
6340	3296	3297	3298	3299	3300	3301	3302	3303
6350	3304	3305	3306	3307	3308	3309	3310	3311
6360	3312	3313	3314	3315	3316	3317	3318	3319
6370	3320	3321	3322	3323	3324	3325	3326	3327

	0	1	2	3	4	5	6	7
6400	3328	3329	3330	3331	3332	3333	3334	3335
6410	3336	3337	3338	3339	3340	3341	3342	3343
6420	3344	3345	3346	3347	3348	3349	3350	3351
6430	3352	3353	3354	3355	3356	3357	3358	3359
6440	3360	3361	3362	3363	3364	3365	3366	3367
6450	3368	3369	3370	3371	3372	3373	3374	3375
6460	3376	3377	3378	3379	3380	3381	3382	3383
6470	3384	3385	3386	3387	3388	3389	3390	3391
6500	3392	3393	3394	3395	3396	3397	3398	3399
6510	3400	3401	3402	3403	3404	3405	3406	3407
6520	3408	3409	3410	3411	3412	3413	3414	3415
6530	3416	3417	3418	3419	3420	3421	3422	3423
6540	3424	3425	3426	3427	3428	3429	3430	3431
6550	3432	3433	3434	3435	3436	3437	3438	3439
6560	3440	3441	3442	3443	3444	3445	3446	3447
6570	3448	3449	3450	3451	3452	3453	3454	3455
6600	3456	3457	3458	3459	3460	3461	3462	3463
6610	3464	3465	3466	3467	3468	3469	3470	3471
6620	3472	3473	3474	3475	3476	3477	3478	3479
6630	3480	3481	3482	3483	3484	3485	3486	3487
6640	3488	3489	3490	3491	3492	3493	3494	3495
6650	3496	3497	3498	3499	3500	3501	3502	3503
6660	3504	3505	3506	3507	3508	3509	3510	3511
6670	3512	3513	3514	3515	3516	3517	3518	3519
6700	3520	3521	3522	3523	3524	3525	3526	3527
6710	3528	3529	3530	3531	3532	3533	3534	3535
6720	3536	3537	3538	3539	3540	3541	3542	3543
6730	3544	3545	3546	3547	3548	3549	3550	3551
6740	3552	3553	3554	3555	3556	3557	3558	3559
6750	3560	3561	3562	3563	3564	3565	3566	3567
6760	3568	3569	3570	3571	3572	3573	3574	3575
6770	3576	3577	3578	3579	3580	3581	3582	3583

6000 to 6777 (Octal)      3072 to 3583 (Decimal)

Octal    Decimal  
10000 - 4096  
20000 - 8192  
30000 - 12288  
40000 - 16384  
50000 - 20480  
60000 - 24576  
70000 - 28672

	0	1	2	3	4	5	6	7
7000	3584	3585	3586	3587	3588	3589	3590	3591
7010	3592	3593	3594	3595	3596	3597	3598	3599
7020	3600	3601	3602	3603	3604	3605	3606	3607
7030	3608	3609	3610	3611	3612	3613	3614	3615
7040	3616	3617	3618	3619	3620	3621	3622	3623
7050	3624	3625	3626	3627	3628	3629	3630	3631
7060	3632	3633	3634	3635	3636	3637	3638	3639
7070	3640	3641	3642	3643	3644	3645	3646	3647
7100	3648	3649	3650	3651	3652	3653	3654	3655
7110	3656	3657	3658	3659	3660	3661	3662	3663
7120	3664	3665	3666	3667	3668	3669	3670	3671
7130	3672	3673	3674	3675	3676	3677	3678	3679
7140	3680	3681	3682	3683	3684	3685	3686	3687
7150	3688	3689	3690	3691	3692	3693	3694	3695
7160	3696	3697	3698	3699	3700	3701	3702	3703
7170	3704	3705	3706	3707	3708	3709	3710	3711
7200	3712	3713	3714	3715	3716	3717	3718	3719
7210	3720	3721	3722	3723	3724	3725	3726	3727
7220	3728	3729	3730	3731	3732	3733	3734	3735
7230	3736	3737	3738	3739	3740	3741	3742	3743
7240	3744	3745	3746	3747	3748	3749	3750	3751
7250	3752	3753	3754	3755	3756	3757	3758	3759
7260	3760	3761	3762	3763	3764	3765	3766	3767
7270	3768	3769	3770	3771	3772	3773	3774	3775
7300	3776	3777	3778	3779	3780	3781	3782	3783
7310	3784	3785	3786	3787	3788	3789	3790	3791
7320	3792	3793	3794	3795	3796	3797	3798	3799
7330	3800	3801	3802	3803	3804	3805	3806	3807
7340	3808	3809	3810	3811	3812	3813	3814	3815
7350	3816	3817	3818	3819	3820	3821	3822	3823
7360	3824	3825	3826	3827	3828	3829	3830	3831
7370	3832	3833	3834	3835	3836	3837	3838	3839

	0	1	2	3	4	5	6	7
7400	3840	3841	3842	3843	3844	3845	3846	3847
7410	3848	3849	3850	3851	3852	3853	3854	3855
7420	3856	3857	3858	3859	3860	3861	3862	3863
7430	3864	3865	3866	3867	3868	3869	3870	3871
7440	3872	3873	3874	3875	3876	3877	3878	3879
7450	3880	3881	3882	3883	3884	3885	3886	3887
7460	3888	3889	3890	3891	3892	3893	3894	3895
7470	3896	3897	3898	3899	3900	3901	3902	3903
7500	3904	3905	3906	3907	3908	3909	3910	3911
7510	3912	3913	3914	3915	3916	3917	3918	3919
7520	3920	3921	3922	3923	3924	3925	3926	3927
7530	3928	3929	3930	3931	3932	3933	3934	3935
7540	3936	3937	3938	3939	3940	3941	3942	3943
7550	3944	3945	3946	3947	3948	3949	3950	3951
7560	3952	3953	3954	3955	3956	3957	3958	3959
7570	3960	3961	3962	3963	3964	3965	3966	3967
7600	3968	3969	3970	3971	3972	3973	3974	3975
7610	3976	3977	3978	3979	3980	3981	3982	3983
7620	3984	3985	3986	3987	3988	3989	3990	3991
7630	3992	3993	3994	3995	3996	3997	3998	3999
7640	4000	4001	4002	4003	4004	4005	4006	4007
7650	4008	4009	4010	4011	4012	4013	4014	4015
7660	4016	4017	4018	4019	4020	4021	4022	4023
7670	4024	4025	4026	4027	4028	4029	4030	4031
7700	4032	4033	4034	4035	4036	4037	4038	4039
7710	4040	4041	4042	4043	4044	4045	4046	4047
7720	4048	4049	4050	4051	4052	4053	4054	4055
7730	4056	4057	4058	4059	4060	4061	4062	4063
7740	4064	4065	4066	4067	4068	4069	4070	4071
7750	4072	4073	4074	4075	4076	4077	4078	4079
7760	4080	4081	4082	4083	4084	4085	4086	4087
7770	4088	4089	4090	4091	4092	4093	4094	4095

7000 to 7777 (Octal)      3584 to 4095 (Decimal)

# APPENDIX D. OCTAL-DECIMAL FRACTION CONVERSION TABLE

OCTAL	DEC.	OCTAL	DEC.	OCTAL	DEC.	OCTAL	DEC.
.000	.000000	.100	.125000	.200	.250000	.300	.375000
.001	.001953	.101	.126953	.201	.251953	.301	.376953
.002	.003906	.102	.128906	.202	.253906	.302	.378906
.003	.005859	.103	.130859	.203	.255859	.303	.380859
.004	.007812	.104	.132812	.204	.257812	.304	.382812
.005	.009765	.105	.134765	.205	.259765	.305	.384765
.006	.011718	.106	.136718	.206	.261718	.306	.386718
.007	.013671	.107	.138671	.207	.263671	.307	.388671
.010	.015625	.110	.140625	.210	.265625	.310	.390625
.011	.017578	.111	.142578	.211	.267578	.311	.392578
.012	.019531	.112	.144531	.212	.269531	.312	.394531
.013	.021484	.113	.146484	.213	.271484	.313	.396484
.014	.023437	.114	.148437	.214	.273437	.314	.398437
.015	.025390	.115	.150390	.215	.275390	.315	.400390
.016	.027343	.116	.152343	.216	.277343	.316	.402343
.017	.029296	.117	.154296	.217	.279296	.317	.404296
.020	.031250	.120	.156250	.220	.281250	.320	.406250
.021	.033203	.121	.158203	.221	.283203	.321	.408203
.022	.035156	.122	.160156	.222	.285156	.322	.410156
.023	.037109	.123	.162109	.223	.287109	.323	.412109
.024	.039062	.124	.164062	.224	.289062	.324	.414062
.025	.041015	.125	.166015	.225	.291015	.325	.416015
.026	.042968	.126	.167968	.226	.292968	.326	.417968
.027	.044921	.127	.169921	.227	.294921	.327	.419921
.030	.046875	.130	.171875	.230	.296875	.330	.421875
.031	.048828	.131	.173828	.231	.298828	.331	.423828
.032	.050781	.132	.175781	.232	.300781	.332	.425781
.033	.052734	.133	.177734	.233	.302734	.333	.427734
.034	.054687	.134	.179687	.234	.304687	.334	.429687
.035	.056640	.135	.181640	.235	.306640	.335	.431640
.036	.058593	.136	.183593	.236	.308593	.336	.433593
.037	.060546	.137	.185546	.237	.310546	.337	.435546
.040	.062500	.140	.187500	.240	.312500	.340	.437500
.041	.064453	.141	.189453	.241	.314453	.341	.439453
.042	.066406	.142	.191406	.242	.316406	.342	.441406
.043	.068359	.143	.193359	.243	.318359	.343	.443359
.044	.070312	.144	.195312	.244	.320312	.344	.445312
.045	.072265	.145	.197265	.245	.322265	.345	.447265
.046	.074218	.146	.199218	.246	.324218	.346	.449218
.047	.076171	.147	.201171	.247	.326171	.347	.451171
.050	.078125	.150	.203125	.250	.328125	.350	.453125
.051	.080078	.151	.205078	.251	.330078	.351	.455078
.052	.082031	.152	.207031	.252	.332031	.352	.457031
.053	.083984	.153	.208984	.253	.333984	.353	.458984
.054	.085937	.154	.210937	.254	.335937	.354	.460937
.055	.087890	.155	.212890	.255	.337890	.355	.462890
.056	.089843	.156	.214843	.256	.339843	.356	.464843
.057	.091796	.157	.216796	.257	.341796	.357	.466796
.060	.093750	.160	.218750	.260	.343750	.360	.468750
.061	.095703	.161	.220703	.261	.345703	.361	.470703
.062	.097656	.162	.222656	.262	.347656	.362	.472656
.063	.099609	.163	.224609	.263	.349609	.363	.474609
.064	.101562	.164	.226562	.264	.351562	.364	.476562
.065	.103515	.165	.228515	.265	.353515	.365	.478515
.066	.105468	.166	.230468	.266	.355468	.366	.480468
.067	.107421	.167	.232421	.267	.357421	.367	.482421
.070	.109375	.170	.234375	.270	.359375	.370	.484375
.071	.111328	.171	.236328	.271	.361328	.371	.486328
.072	.113281	.172	.238281	.272	.363281	.372	.488281
.073	.115234	.173	.240234	.273	.365234	.373	.490234
.074	.117187	.174	.242187	.274	.367187	.374	.492187
.075	.119140	.175	.244140	.275	.369140	.375	.494140
.076	.121093	.176	.246093	.276	.371093	.376	.496093
.077	.123046	.177	.248046	.277	.373046	.377	.498046

# OCTAL-DECIMAL FRACTION CONVERSION TABLE

OCTAL	DEC.	OCTAL	DEC.	OCTAL	DEC.	OCTAL	DEC.
.000000	.000000	.000100	.000244	.000200	.000488	.000300	.000732
.000001	.000003	.000101	.000247	.000201	.000492	.000301	.000736
.000002	.000007	.000102	.000251	.000202	.000495	.000302	.000740
.000003	.000011	.000103	.000255	.000203	.000499	.000303	.000743
.000004	.000015	.000104	.000259	.000204	.000503	.000304	.000747
.000005	.000019	.000105	.000263	.000205	.000507	.000305	.000751
.000006	.000022	.000106	.000267	.000206	.000511	.000306	.000755
.000007	.000026	.000107	.000270	.000207	.000514	.000307	.000759
.000010	.000030	.000110	.000274	.000210	.000518	.000310	.000762
.000011	.000034	.000111	.000278	.000211	.000522	.000311	.000766
.000012	.000038	.000112	.000282	.000212	.000526	.000312	.000770
.000013	.000041	.000113	.000286	.000213	.000530	.000313	.000774
.000014	.000045	.000114	.000289	.000214	.000534	.000314	.000778
.000015	.000049	.000115	.000293	.000215	.000537	.000315	.000782
.000016	.000053	.000116	.000297	.000216	.000541	.000316	.000785
.000017	.000057	.000117	.000301	.000217	.000545	.000317	.000789
.000020	.000061	.000120	.000305	.000220	.000549	.000320	.000793
.000021	.000064	.000121	.000308	.000221	.000553	.000321	.000797
.000022	.000068	.000122	.000312	.000222	.000556	.000322	.000801
.000023	.000072	.000123	.000316	.000223	.000560	.000323	.000805
.000024	.000076	.000124	.000320	.000224	.000564	.000324	.000808
.000025	.000080	.000125	.000324	.000225	.000568	.000325	.000812
.000026	.000083	.000126	.000328	.000226	.000572	.000326	.000816
.000027	.000087	.000127	.000331	.000227	.000576	.000327	.000820
.000030	.000091	.000130	.000335	.000230	.000579	.000330	.000823
.000031	.000095	.000131	.000339	.000231	.000583	.000331	.000827
.000032	.000099	.000132	.000343	.000232	.000587	.000332	.000831
.000033	.000102	.000133	.000347	.000233	.000591	.000333	.000835
.000034	.000106	.000134	.000350	.000234	.000595	.000334	.000839
.000035	.000110	.000135	.000354	.000235	.000598	.000335	.000843
.000036	.000114	.000136	.000358	.000236	.000602	.000336	.000846
.000037	.000118	.000137	.000362	.000237	.000606	.000337	.000850
.000040	.000122	.000140	.000366	.000240	.000610	.000340	.000854
.000041	.000125	.000141	.000370	.000241	.000614	.000341	.000858
.000042	.000129	.000142	.000373	.000242	.000617	.000342	.000862
.000043	.000133	.000143	.000377	.000243	.000621	.000343	.000865
.000044	.000137	.000144	.000381	.000244	.000625	.000344	.000869
.000045	.000141	.000145	.000385	.000245	.000629	.000345	.000873
.000046	.000144	.000146	.000389	.000246	.000633	.000346	.000877
.000047	.000148	.000147	.000392	.000247	.000637	.000347	.000881
.000050	.000152	.000150	.000396	.000250	.000640	.000350	.000885
.000051	.000156	.000151	.000400	.000251	.000644	.000351	.000888
.000052	.000160	.000152	.000404	.000252	.000648	.000352	.000892
.000053	.000164	.000153	.000408	.000253	.000652	.000353	.000896
.000054	.000167	.000154	.000411	.000254	.000656	.000354	.000900
.000055	.000171	.000155	.000415	.000255	.000659	.000355	.000904
.000056	.000175	.000156	.000419	.000256	.000663	.000356	.000907
.000057	.000179	.000157	.000423	.000257	.000667	.000357	.000911
.000060	.000183	.000160	.000427	.000260	.000671	.000360	.000915
.000061	.000186	.000161	.000431	.000261	.000675	.000361	.000919
.000062	.000190	.000162	.000434	.000262	.000679	.000362	.000923
.000063	.000194	.000163	.000438	.000263	.000682	.000363	.000926
.000064	.000198	.000164	.000442	.000264	.000686	.000364	.000930
.000065	.000202	.000165	.000446	.000265	.000690	.000365	.000934
.000066	.000205	.000166	.000450	.000266	.000694	.000366	.000938
.000067	.000209	.000167	.000453	.000267	.000698	.000367	.000942
.000070	.000213	.000170	.000457	.000270	.000701	.000370	.000946
.000071	.000217	.000171	.000461	.000271	.000705	.000371	.000949
.000072	.000221	.000172	.000465	.000272	.000709	.000372	.000953
.000073	.000225	.000173	.000469	.000273	.000713	.000373	.000957
.000074	.000228	.000174	.000473	.000274	.000717	.000374	.000961
.000075	.000232	.000175	.000476	.000275	.000720	.000375	.000965
.000076	.000236	.000176	.000480	.000276	.000724	.000376	.000968
.000077	.000240	.000177	.000484	.000277	.000728	.000377	.000972

## OCTAL-DECIMAL FRACTION CONVERSION TABLE

OCTAL	DEC.	OCTAL	DEC.	OCTAL	DEC.	OCTAL	DEC.
.000400	.000976	.000500	.001220	.000600	.001464	.000700	.001708
.000401	.000980	.000501	.001224	.000601	.001468	.000701	.001712
.000402	.000984	.000502	.001228	.000602	.001472	.000702	.001716
.000403	.000988	.000503	.001232	.000603	.001476	.000703	.001720
.000404	.000991	.000504	.001235	.000604	.001480	.000704	.001724
.000405	.000995	.000505	.001239	.000605	.001483	.000705	.001728
.000406	.000999	.000506	.001243	.000606	.001487	.000706	.001731
.000407	.001003	.000507	.001247	.000607	.001491	.000707	.001735
.000410	.001007	.000510	.001251	.000610	.001495	.000710	.001739
.000411	.001010	.000511	.001255	.000611	.001499	.000711	.001743
.000412	.001014	.000512	.001258	.000612	.001502	.000712	.001747
.000413	.001018	.000513	.001262	.000613	.001506	.000713	.001750
.000414	.001022	.000514	.001266	.000614	.001510	.000714	.001754
.000415	.001026	.000515	.001270	.000615	.001514	.000715	.001758
.000416	.001029	.000516	.001274	.000616	.001518	.000716	.001762
.000417	.001033	.000517	.001277	.000617	.001522	.000717	.001766
.000420	.001037	.000520	.001281	.000620	.001525	.000720	.001770
.000421	.001041	.000521	.001285	.000621	.001529	.000721	.001773
.000422	.001045	.000522	.001289	.000622	.001533	.000722	.001777
.000423	.001049	.000523	.001293	.000623	.001537	.000723	.001781
.000424	.001052	.000524	.001296	.000624	.001541	.000724	.001785
.000425	.001056	.000525	.001300	.000625	.001544	.000725	.001789
.000426	.001060	.000526	.001304	.000626	.001548	.000726	.001792
.000427	.001064	.000527	.001308	.000627	.001552	.000727	.001796
.000430	.001068	.000530	.001312	.000630	.001556	.000730	.001800
.000431	.001071	.000531	.001316	.000631	.001560	.000731	.001804
.000432	.001075	.000532	.001319	.000632	.001564	.000732	.001808
.000433	.001079	.000533	.001323	.000633	.001567	.000733	.001811
.000434	.001083	.000534	.001327	.000634	.001571	.000734	.001815
.000435	.001087	.000535	.001331	.000635	.001575	.000735	.001819
.000436	.001091	.000536	.001335	.000636	.001579	.000736	.001823
.000437	.001094	.000537	.001338	.000637	.001583	.000737	.001827
.000440	.001098	.000540	.001342	.000640	.001586	.000740	.001831
.000441	.001102	.000541	.001346	.000641	.001590	.000741	.001834
.000442	.001106	.000542	.001350	.000642	.001594	.000742	.001838
.000443	.001110	.000543	.001354	.000643	.001598	.000743	.001842
.000444	.001113	.000544	.001358	.000644	.001602	.000744	.001846
.000445	.001117	.000545	.001361	.000645	.001605	.000745	.001850
.000446	.001121	.000546	.001365	.000646	.001609	.000746	.001853
.000447	.001125	.000547	.001369	.000647	.001613	.000747	.001857
.000450	.001129	.000550	.001373	.000650	.001617	.000750	.001861
.000451	.001132	.000551	.001377	.000651	.001621	.000751	.001865
.000452	.001136	.000552	.001380	.000652	.001625	.000752	.001869
.000453	.001140	.000553	.001384	.000653	.001628	.000753	.001873
.000454	.001144	.000554	.001388	.000654	.001632	.000754	.001876
.000455	.001148	.000555	.001392	.000655	.001636	.000755	.001880
.000456	.001152	.000556	.001396	.000656	.001640	.000756	.001884
.000457	.001155	.000557	.001399	.000657	.001644	.000757	.001888
.000460	.001159	.000560	.001403	.000660	.001647	.000760	.001892
.000461	.001163	.000561	.001407	.000661	.001651	.000761	.001895
.000462	.001167	.000562	.001411	.000662	.001655	.000762	.001899
.000463	.001171	.000563	.001415	.000663	.001659	.000763	.001903
.000464	.001174	.000564	.001419	.000664	.001663	.000764	.001907
.000465	.001178	.000565	.001422	.000665	.001667	.000765	.001911
.000466	.001182	.000566	.001426	.000666	.001670	.000766	.001914
.000467	.001186	.000567	.001430	.000667	.001674	.000767	.001918
.000470	.001190	.000570	.001434	.000670	.001678	.000770	.001922
.000471	.001194	.000571	.001438	.000671	.001682	.000771	.001926
.000472	.001197	.000572	.001441	.000672	.001686	.000772	.001930
.000473	.001201	.000573	.001445	.000673	.001689	.000773	.001934
.000474	.001205	.000574	.001449	.000674	.001693	.000774	.001937
.000475	.001209	.000575	.001453	.000675	.001697	.000775	.001941
.000476	.001213	.000576	.001457	.000676	.001701	.000776	.001945
.000477	.001216	.000577	.001461	.000677	.001705	.000777	.001949

Following the initialization of the process, control would revert to the main system routine, which would set up the standard waiting period for the terminal, or would read the paper tape job into core and store it on the disc, depending on the device which defined the job. The use of the standard waiting period is in case something should go wrong with the connection to the terminal. Should this period expire with no activity from the terminal, a message would be issued on the log, and the process would become undefined.

It is envisioned that the requests made from a terminal would be in the way of things one might do interactively with his process, while those made from a batch stream would be somewhat more restricted in scope. The language of the process commands has been conceived with these considerations in mind. There are in fact two sets of commands to the system, although any command may be used from any process definition medium, except, of course those which assume that a program has been interrupted in the course of operation. These commands may only be from the command console or terminals.

Below is a list of the universal commands which one might like to issue from a paper tape batch stream:

- 1, Define a file (file in the sense of I/O file as well as permanent system vectors)
2. Execute special system programs, such as Compilers the assembler, a text editor, trace and tag setup programs, and perhaps the program library routines. One might also wish to set up diagnostic dumps if certain conditions occur, and to set up for monitoring variables in the system or his program.
3. Execute a routine in his process, with parameters possible..

A programmer at a terminal might wish to do all these things, as well as these:

1. Change array structures and bounds.
2. Discontinue a process.
3. Dump files, structures, etc. on various media.
4. Begin the reading of a command input stream from another medium, i.e. a process started at the console might read in its symbolic material from prepared paper (or magnetic) tapes.

Thus, the following language commands are proposed:

1. <PROC PROCNAME IDENTINFORMATION, TIME=...,CORE=...,SENSE=..., (cr)  
This command has already been mentioned.
2. <SFILE FILENAME <device information>, <other relevant data>  
This would define a system file and/or permanent I/O file.
3. <PFILE FILENAME etc...  
This would attach a file to a process only.
4. <STRUCT STRUCNAM=(l29), or  
<STRUCT STRUCNAM=(N), where n has been defined, or



<STRUCT SNAME=((100),(100),(100)), a 3 by 100 matrix  
 (This format most useful for more complicated structures,  
 such as ((100),(100),100,75,(10)). A Simple method  
 is:

<STRUC SNAME=100 BY 3 BY 10

(one may also specify:

<STRUCT SNAME=3 BY 100 (STATUS=WP,USER=21,22)

Rather arbitrary structures may thus be defined by  
 this command. I think the thing to do is call the  
 structures previously called files structures, and  
 leave the name "FILE" for things which are actually  
 files, or data sets.

5. <END PROCNAME

This defines the end of the process, for the benefit  
 of the interpreter and batch stream processor.

The above commands serve more or less to define the  
 process and its environment. One may also think of an  
 additional class of commands which are calls to specific  
 named routines:

6. <TRANS ROUTINE LANGUAGE <relevant data>.

Routine is the name given to the program segment on  
 the process symbol table. The result of the assembly will  
 be assigned a place on the process base for the process  
 calling for the translation.

7. <PLACER READ,EDIT,PUNCH,LIST,CHECK

which would be followed by a symbolic tape and  
 edit specifications. Needless to say, the old placer  
 will have to be considerably revised, almost to the  
 point that it would be worthwhile to come up with a  
 more modern text editing method.

9. <TRACE ROUTINE1=1,32,36,48,ROUT2  
which sets trace tags on the indicated instructions.  
If no instructions are specified, the entire program  
will be traced. The trace mode bit will also be  
set on the control word for the program.
10. <MONITOR VAR1,VAR2  
where VAR1 and VAR2 may be process or system variables.  
Results of stores into these locations will cause output  
on the user's output device.
11. <PRINT <relevant data>  
which would cause the printing of the specified mater-  
ial on the appropriate medium, when possible.
12. <DIADUMP PROCNAME COND= (<conditions list>).  
which would print out relevant information in the event  
of a program failure.
13. <EXEC ROUTINE (<parameter list>), or  
<EXEC ROUTINE.i (<parameter list>), or, further,  
<EXEC PROCESS.ROUTINE.i (<parameter list>)  
One may execute the first sort of EXEC command, which  
simply executes the first instruction. Or, if he  
has multiple entry points for the routine, he may begin  
execution at the entry point named, i, with the proper  
initialization being done. Execution of routines from  
other processes may be allowed, if security problems  
and referencing difficulties are not too great.
14. <CIS MT, or <CIS PT, or <CIS DK  
These would cause reading of the rest, or part of  
command input stream from the designated device.  
Appropriate addressing information would be required,  
It should be possible to include a fair number of the  
above commands into the assembler directly.

```
1000 BEGIN ;
1001     FILE FILEOUT 15 (2,10); ;
1002     FORMAT FOUT("XN = ",F5.2,"  YN = ",E20.12,"  ERR = ",E20.12); ;
1100 REAL PROCEDURE F(X,Y);REAL X,Y; ;
1200 BEGIN ;
1300         F := -16*X*Y; ;
1400 END; ;
1800 % ;
2000 REAL     H,XN,YN,A,ALPH; ;
2010     INTEGER I,J,METHOD; ;
2300 REAL PROCEDURE EULER; ;
2400     BEGIN ;
2500         EULER := YN+ H*F(XN,YN) ;
2600     END; ;
3000 REAL PROCEDURE RK2(A); REAL A; ;
3100 BEGIN ;
3200     REAL T1,T2; ;
3300     T1 := F(XN,YN);    T2:= H/(2*A); ;
3400     RK2 := YN+(1-A)*H*T1 + A*H*F(XN+T2,YN+T2*T1); ;
3500 END; ;
3600 REAL PROCEDURE RK4; ;
3700 BEGIN ;
3800     REAL K1,K2,K3,K4; ;
3900     REAL T1; ;
3950     T1:=H/2; ;
4000     K1:= F(XN,YN); ;
4100     K2:= F(XN+T1,YN+K1*T1); ;
4200     K3:= F(XN+T1,YN+K2*T1); ;
4300     K4:= F(XN+H,YN+K3*H); ;
```

```

4400      RK4:= YN + (H/6)*(K1+2*K2+2*K3+K4);
4500 END;
10000 REAL PROCEDURE CALL(X);INTEGER X;
10100 BEGIN
10200      CASE X OF
10250      BEGIN
10300          CALL:= EULER;
10700          CALL := RK2 (ALPH);
10900          CALL := RK4;
11000      END
11100 END OF PROCEDURE CALL;
11500 REAL PROCEDURE Y(X); REAL X;
11600      Y := .5*EXP(.5*(9-16*X*X));
12000 PROCEDURE MAINLINE;
12100 BEGIN
12150      WRITE ( FILEOUT,<////////>);
12200      WRITE (FILEOUT,<"STEP SIZE OF ",E15.7>,H);
12300      WRITE ( FILEOUT,<"Y0 EQUAL      ",E15.7>,YN);
12400      FOR XN := -.75 STEP H UNTIL .75 DO
12500          BEGIN
12600          IF XN=-.5 OR XN=0 OR XN = .5 OR XN=.75 THEN
12700              WRITE (FILEOUT,FOUT,XN,YN,YN-Y(XN));
12800              YN:=CALL ( METHOD );
12850          END;
12900      END;
20000 * THIS IS WHERE THE WORK IS INITIATED
20200
20300      FOR I := 4 STEP 1 UNTIL 8 DO BEGIN
20400          H:=2.*(-I); METHOD := 0;
20500          YN := .5; MAINLINE;
20600          FND;

```

```
20700   FOR ALPH := .5,1 DO           :
20800       FOR J := 4 STEP 1 UNTIL 8 DO BEGIN   :
20900           H := 2.*(-J); METHOD := 1;       :
21000           YN := .5; MAINLINE;             :
21100           END;                           :
21300   FOR I := 4 STEP 1 UNTIL 8 DO BEGIN   :
21400       H := 2.*(-I); METHOD := 3;          :
21500       YN := .5; MAINLINE;               :
21600       END;                             :
21700   FOR I := 4 STEP 1 UNTIL 8 DO         :
21800       FOR J := 8 STEP -1 UNTIL 4 DO BEGIN :
21900           H := 2.*(-I); YN := .5 + 2*(-J); :
22000           METHOD := 0; MAINLINE;         :
22100           END;                           :
22200   END.
```

LABEL ORDS 0R76007200172102?USER=R760072; EXECUTE COPY /R760072

COPY /R760072