



801

.REM x

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DCKBK-A1-D
PRODUCT NAME:	MUL INSTRUCTION TEST
DATE CREATED:	15 MAR 1972
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	BOB BRAIN

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MAYNARD, MASS

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DCKBKA.P11



110  
111  
112  
113  
114  
115  
116

TRAPVEC+4: 012716 ; MOVE SCOPE ADDRESS TO STACK  
TRAPVEC+6: ADDRESS ; ADDRESS OF PREVIOUS SCOPE  
TRAPVEC+10: 000006 ; RETURN TO TEST AT SCOPE

RESTORE ALL LOCATIONS BEFORE PROCEEDING TO NEXT TEST.

7.0 RESTRICTIONS  
NONE

8.0 MISCELLANEOUS  
ON TRAP ERRORS THE STACK POINTER(R6) WILL CONTAIN THE ADDRESS WHERE THE TRAP OCCURED.

8.1 EXECUTION TIME  
THE PROGRAM TAKES ABOUT 1 MINUTE.

8.2 STACK POINTER  
THE PROGRAM INITIALLY SETS THE STACK POINTER AT 500.

9.0 PROGRAM DESCRIPTIONS

THIS IS A TEST OF THE MUL INSTRUCTION. IT TESTS MUL ON  
DIFERENT NUMBER PATTERNS IN ALL REGISTERS

.TITLE MAINDEC-11-DCKBK-A MUL TEST  
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;PROGRAM BY BOB BRAIN

.ABS

000000  
000000  
010701  
000001  
000006  
000007  
177570  
177570  
177776  
000000

.=0 ;TRAP CATCHER 0 - 776

HLT=HALT  
SCOPE= 10701  
N=1  
SP=%6  
PC=%7  
SMR=177570  
DISPLAY=SMR  
PS=177776  
M=0

000200 000200 000576  
000167 001000  
001000 000000  
001002 012706 000500  
001006 005037 177776  
001012 032737 001000 177570  
001020 001403  
001022 012737 004000 177776  
001030 032767 000400 176532  
001036 001403  
001040 116767 176524 176722

.=200 JMP BEG  
.=1000  
ICNT: 0 ;PASS COUNT  
BEG: MOV #500,%6 ;## STACK AT 500 ##  
CLR @#PS ;WHICH REGISTER SET?  
BIT #1000,@#SMR  
BEQ .+10  
MOV #4000,@#PS ;ALTERNATE!  
BIT #400,SMR  
BEQ .+10  
MOVB SMR,177770

MAINDEC-11-DCKBK-A MUL TEST  
DCKBKA.P11

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**EO1**

\*\*\*\*\*  
:TEST 1 MUL 0 \* 80 = 0 0 PS = 4  
:\*\*\*\*\*

001046	010701			SCOPE		:TEST OF MULTIPLY
001050	012700	000000		MOV	80,XD	:LOAD MULTIPLIKAN WITH 0
001054	070027	000000		MUL	80,XD	:MULTIPLY 0 * 80
001060	013767	177776	013370	MOV	28PS,PSM	:SAVE PS
001066	122767	000004	013362	CHPB	84,PSM	:IS PS = 4
001074	001401			BEG	.+4	
001076	000000			HLT		:PS IS WRONG
001100	022700	000000		CHP	80,XD	:IS HIGH ORDER = 0
001104	001401			BEG	.+4	
001106	000000			HLT		:HIGH ORDER IS WRONG
001110	022701	000000		CHP	80,XD!1	:IS LOW ORDER = 0
001114	001401			BEG	.+4	
001116	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 2 MUL 0 \* 81 = 0 0 PS = 4  
:\*\*\*\*\*

001120	010701			SCOPE		:TEST OF MULTIPLY
001122	012700	000000		MOV	80,XD	:LOAD MULTIPLIKAN WITH 0
001126	070027	000001		MUL	81,XD	:MULTIPLY 0 * 81
001130	013767	177776	013316	MOV	28PS,PSM	:SAVE PS
001140	122767	000004	013310	CHPB	84,PSM	:IS PS = 4
001146	001401			BEG	.+4	
001150	000000			HLT		:PS IS WRONG
001152	022700	000000		CHP	80,XD	:IS HIGH ORDER = 0
001156	001401			BEG	.+4	
001160	000000			HLT		:HIGH ORDER IS WRONG
001162	022701	000000		CHP	80,XD!1	:IS LOW ORDER = 0
001166	001401			BEG	.+4	
001170	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 3 MUL 1 \* 80 = 0 0 PS = 4  
\*\*\*\*\*

001172 010701  
001174 012700 000001  
001200 070027 000000  
001204 013767 177776 013244  
001212 122767 000004 013236  
001220 001401  
001222 000000  
001224 022700 000000  
001230 001401  
001232 000000  
001234 022701 000000  
001240 001401  
001242 000000

SCOPE  
MOV 81,XD  
MUL 80,XD  
MOV 28PS,PSW  
CHPB 84,PSW  
BEQ .+4  
HLT  
CHP 80,XD  
BEQ .+4  
HLT  
CHP 80,XD!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 80  
:SAVE PS  
:IS PS = 4  
  
:PS IS WRONG  
:IS HIGH ORDER = 0  
  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 4 MUL -1 \* 81 = -1 -1 PS = 10  
\*\*\*\*\*

001244 010701  
001246 012700 177777  
001252 070027 000001  
001256 013767 177776 013172  
001264 122767 000010 013164  
001272 001401  
001274 000000  
001276 022700 177777  
001302 001401  
001304 000000  
001306 022701 177777  
001312 001401  
001314 000000

SCOPE  
MOV 8-1,XD  
MUL 81,XD  
MOV 28PS,PSW  
CHPB 810,PSW  
BEQ .+4  
HLT  
CHP 8-1,XD  
BEQ .+4  
HLT  
CHP 8-1,XD!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 81  
:SAVE PS  
:IS PS = 10  
  
:PS IS WRONG  
:IS HIGH ORDER = -1  
  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = -1  
  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 5 MUL 1 \* 8-1 = -1 -1 PS = 10  
\*\*\*\*\*

001316 010701  
001320 012700 000001  
001324 070027 177777  
001330 013767 177776 013120  
001336 122767 000010 013112  
001344 001401  
001346 000000  
001350 022700 177777  
001354 001401  
001356 000000  
001360 022701 177777  
001364 001401  
001366 000000

SCOPE  
MOV 81,XD  
MUL 8-1,XD  
MOV 38PS,PSW  
CMPB 810,PSW  
BEQ .+4  
HLT  
CMP 8-1,XD  
BEQ .+4  
HLT  
CMP 8-1,XD!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 8-1  
:SAVE PS  
:IS PS = 10  
  
:PS IS WRONG  
:IS HIGH ORDER = -1  
  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = -1  
  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 6 MUL 1 \* 82 = 0 2 PS = 0  
\*\*\*\*\*

001370 010701  
001372 012700 000001  
001376 070027 000002  
001402 013767 177776 013046  
001410 122767 000000 013040  
001416 001401  
001420 000000  
001422 022700 000000  
001426 001401  
001430 000000  
001432 022701 000002  
001436 001401  
001440 000000

SCOPE  
MOV 81,XD  
MUL 82,XD  
MOV 38PS,PSW  
CMPB 80,PSW  
BEQ .+4  
HLT  
CMP 80,XD  
BEQ .+4  
HLT  
CMP 82,XD!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 82  
:SAVE PS  
:IS PS = 0  
  
:PS IS WRONG  
:IS HIGH ORDER = 0  
  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 2  
  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 7 MUL 2 \* 2 = 0 4 PS = 0  
\*\*\*\*\*

001442	010701			SCOPE		:TEST OF MULTIPLY
001444	012700	000002		MOV	2, X0	:LOAD MULTIPLICAN WITH 2
001450	070027	000002		MUL	2, X0	:MULTIPLY 2 * 2
001454	013767	177776	012774	MOV	2, PS, PSM	:SAVE PS
001462	122767	000000	012766	CMPB	80, PSM	:IS PS = 0
001470	001401			BEG	.+4	
001472	000000			HLT		:PS IS WRONG
001474	022700	000000		CMP	80, X0	:IS HIGH ORDER = 0
001500	001401			BEG	.+4	
001502	000000			HLT		:HIGH ORDER IS WRONG
001504	022701	000004		CMP	84, X0! 1	:IS LOW ORDER = 4
001510	001401			BEG	.+4	
001512	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 10 MUL 1000 \* 200 = 1 0 PS = 1  
\*\*\*\*\*

001514	010701			SCOPE		:TEST OF MULTIPLY
001516	012700	001000		MOV	81000, X0	:LOAD MULTIPLICAN WITH 1000
001522	070027	000200		MUL	8200, X0	:MULTIPLY 1000 * 200
001526	013767	177776	012722	MOV	2, PS, PSM	:SAVE PS
001534	122767	000001	012714	CMPB	81, PSM	:IS PS = 1
001542	001401			BEG	.+4	
001544	000000			HLT		:PS IS WRONG
001546	022700	000001		CMP	81, X0	:IS HIGH ORDER = 1
001552	001401			BEG	.+4	
001554	000000			HLT		:HIGH ORDER IS WRONG
001556	022701	000000		CMP	80, X0! 1	:IS LOW ORDER = 0
001562	001401			BEG	.+4	
001564	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 11 MUL 200 \* 01000 = 1 0 PS = 1  
:\*\*\*\*\*

001566	010701			SCOPE		:TEST OF MULTIPLY
001570	012700	000200		MOV	0200,XD	:LOAD MULTIPLICAN WITH 200
001574	070027	001000		MUL	01000,XD	:MULTIPLY 200 * 01000
001600	013767	177776	012650	MOV	00PS,PSW	:SAVE PS
001606	122767	000001	012642	CHPB	01,PSW	:IS PS = 1
001614	001401			BEQ	.+4	
001616	000000			HLT		:PS IS WRONG
001620	022700	000001		CHP	01,XD	:IS HIGH ORDER = 1
001624	001401			BEQ	.+4	
001626	000000			HLT		:HIGH ORDER IS WRONG
001630	022701	000000		CHP	00,XD!1	:IS LOW ORDER = 0
001634	001401			BEQ	.+4	
001636	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 12 MUL 77777 \* 02 = 0 177776 PS = 1  
:\*\*\*\*\*

001640	010701			SCOPE		:TEST OF MULTIPLY
001642	012700	077777		MOV	077777,XD	:LOAD MULTIPLICAN WITH 77777
001646	070027	000002		MUL	02,XD	:MULTIPLY 77777 * 02
001652	013767	177776	012576	MOV	00PS,PSW	:SAVE PS
001660	122767	000001	012570	CHPB	01,PSW	:IS PS = 1
001666	001401			BEQ	.+4	
001670	000000			HLT		:PS IS WRONG
001672	022700	000000		CHP	00,XD	:IS HIGH ORDER = 0
001676	001401			BEQ	.+4	
001700	000000			HLT		:HIGH ORDER IS WRONG
001702	022701	177776		CHP	0177776,XD!1	:IS LOW ORDER = 177776
001706	001401			BEQ	.+4	
001710	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 13 MUL 2 \* 877777 = 0 177776 PS = 1  
:\*\*\*\*\*

001712	010701			SCOPE		:TEST OF MULTIPLY
001714	012700	000002		MOV	82,XD	:LOAD MULTIPICAN WITH 2
001720	070027	077777		MUL	877777,XD	:MULTIPLY 2 * 877777
001724	013767	177776	012524	MOV	8PS,PSW	:SAVE PS
001732	122767	000001	012516	CHPB	81,PSW	:IS PS = 1
001740	001401			BEG	.+4	
001742	000000			HLT		:PS IS WRONG
001744	022700	000000		CHP	80,XD	:IS HIGH ORDER = 0
001750	001401			BEG	.+4	
001752	000000			HLT		:HIGH ORDER IS WRONG
001754	022701	177776		CHP	8177776,%0!1	:IS LOW ORDER = 177776
001760	001401			BEG	.+4	
001762	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 14 MUL 7777 \* 810 = 0 77770 PS = 0  
:\*\*\*\*\*

001764	010701			SCOPE		:TEST OF MULTIPLY
001766	012700	007777		MOV	87777,XD	:LOAD MULTIPICAN WITH 7777
001772	070027	000010		MUL	810,XD	:MULTIPLY 7777 * 810
001776	013767	177776	012452	MOV	8PS,PSW	:SAVE PS
002004	122767	000000	012444	CHPB	80,PSW	:IS PS = 0
002012	001401			BEG	.+4	
002014	000000			HLT		:PS IS WRONG
002016	022700	000000		CHP	80,XD	:IS HIGH ORDER = 0
002022	001401			BEG	.+4	
002024	000000			HLT		:HIGH ORDER IS WRONG
002026	022701	077770		CHP	877770,%0!1	:IS LOW ORDER = 77770
002032	001401			BEG	.+4	
002034	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 15 MUL 10 \* 87777 = 0 77770 PS = 0  
:\*\*\*\*\*

002036	010701			SCOPE		:TEST OF MULTIPLY
002040	012700	000010		MOV	#10,%0	:LOAD MULTIPICAN WITH 10
002044	070027	007777		MUL	87777,%0	:MULTIPLY 10 * 87777
002050	013767	177776	012400	MOV	2#PS,PSH	:SAVE PS
002056	122767	000000	012372	CHPB	#0,PSH	:IS PS = 0
002064	001401			BEQ	+.4	
002066	000000			HLT		:PS IS WRONG
002070	022700	000000		CHP	#0,%0	:IS HIGH ORDER = 0
002074	001401			BEQ	+.4	
002076	000000			HLT		:HIGH ORDER IS WRONG
002100	022701	077770		CHP	877770,%0!1	:IS LOW ORDER = 77770
002104	001401			BEQ	+.4	
002106	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 16 MUL 77777 \* 877777 = 37777 1 PS = 1  
:\*\*\*\*\*

002110	010701			SCOPE		:TEST OF MULTIPLY
002112	012700	077777		MOV	877777,%0	:LOAD MULTIPICAN WITH 77777
002116	070027	077777		MUL	877777,%0	:MULTIPLY 77777 * 877777
002122	013767	177776	012326	MOV	2#PS,PSH	:SAVE PS
002130	122767	000001	012320	CHPB	#1,PSH	:IS PS = 1
002136	001401			BEQ	+.4	
002140	000000			HLT		:PS IS WRONG
002142	022700	037777		CHP	837777,%0	:IS HIGH ORDER = 37777
002146	001401			BEQ	+.4	
002150	000000			HLT		:HIGH ORDER IS WRONG
002152	022701	000001		CHP	#1,%0!1	:IS LOW ORDER = 1
002156	001401			BEQ	+.4	
002160	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 17 MUL 77777 \* 81 = 0 77777 PS = 0  
\*\*\*\*\*

002162	010701			SCOPE		:TEST OF MULTIPLY
002164	012700	077777		MOV	877777,%0	:LOAD MULTIPLICAN WITH 77777
002170	070027	000001		MUL	81,%0	:MULTIPLY 77777 * 81
002174	013767	177776	012254	MOV	28PS,PSW	:SAVE PS
002202	122767	000000	012246	CMPB	80,PSW	:IS PS = 0
002210	001401			BEQ	+.4	
002212	000000			HLT		:PS IS WRONG
002214	022700	000000		CMP	80,%0	:IS HIGH ORDER = 0
002220	001401			BEQ	+.4	
002222	000000			HLT		:HIGH ORDER IS WRONG
002224	022701	077777		CMP	877777,%0!1	:IS LOW ORDER = 77777
002230	001401			BEQ	+.4	
002232	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 20 MUL 1 \* 877777 = 0 77777 PS = 0  
\*\*\*\*\*

002234	010701			SCOPE		:TEST OF MULTIPLY
002236	012700	000001		MOV	81,%0	:LOAD MULTIPLICAN WITH 1
002242	070027	077777		MUL	877777,%0	:MULTIPLY 1 * 877777
002246	013767	177776	012202	MOV	28PS,PSW	:SAVE PS
002254	122767	000000	012174	CMPB	80,PSW	:IS PS = 0
002262	001401			BEQ	+.4	
002264	000000			HLT		:PS IS WRONG
002266	022700	000000		CMP	80,%0	:IS HIGH ORDER = 0
002272	001401			BEQ	+.4	
002274	000000			HLT		:HIGH ORDER IS WRONG
002276	022701	077777		CMP	877777,%0!1	:IS LOW ORDER = 77777
002302	001401			BEQ	+.4	
002304	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 21 MUL 77777 \* 8-1 = -1 100001 PS = 10  
\*\*\*\*\*

002306 010701  
002310 012700 077777  
002314 070027 177777  
002320 013767 177776 012130  
002326 122767 000010 012122  
002334 001401  
002336 000000  
002340 022700 177777  
002344 001401  
002346 000000  
002350 022701 100001  
002354 001401  
002356 000000

SCOPE  
MOV 877777,%0  
MUL 8-1,%0  
MOV 2#PS,PSW  
CMPB 810,PSW  
BEQ .+4  
HLT  
CMP 8-1,%0  
BEQ .+4  
HLT  
CMP 8100001,%0!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 8-1  
:SAVE PS  
:IS PS = 10  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100001  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 22 MUL -1 \* 877777 = -1 100001 PS = 10  
\*\*\*\*\*

002360 010701  
002362 012700 177777  
002366 070027 077777  
002372 013767 177776 012056  
002400 122767 000010 012050  
002406 001401  
002410 000000  
002412 022700 177777  
002416 001401  
002420 000000  
002422 022701 100001  
002426 001401  
002430 000000

SCOPE  
MOV 8-1,%0  
MUL 877777,%0  
MOV 2#PS,PSW  
CMPB 810,PSW  
BEQ .+4  
HLT  
CMP 8-1,%0  
BEQ .+4  
HLT  
CMP 8100001,%0!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 877777  
:SAVE PS  
:IS PS = 10  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100001  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 23 MUL -2 \* 877777 = -1 2 PS = 11  
:\*\*\*\*\*

002432	010701			SCOPE		:TEST OF MULTIPLY
002434	012700	177776		MOV	8-2,XD	:LOAD MULTIPLICAN WITH -2
002440	070027	077777		MUL	877777,XD	:MULTIPLY -2 * 877777
002444	013767	177776	012004	MOV	38PS,PSW	:SAVE PS
002452	122767	000011	011776	CHPB	811,PSW	:IS PS = 11
002460	001401			BEQ	.+4	
002462	000000			HLT		:PS IS WRONG
002464	022700	177777		CHP	8-1,XD	:IS HIGH ORDER = -1
002470	001401			BEQ	.+4	
002472	000000			HLT		:HIGH ORDER IS WRONG
002474	022701	000002		CHP	82,XD!1	:IS LOW ORDER = 2
002500	001401			BEQ	.+4	
002502	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 24 MUL 77777 \* 8-2 = -1 2 PS = 11  
:\*\*\*\*\*

002504	010701			SCOPE		:TEST OF MULTIPLY
002506	012700	077777		MOV	877777,XD	:LOAD MULTIPLICAN WITH 77777
002512	070027	177776		MUL	8-2,XD	:MULTIPLY 77777 * 8-2
002516	013767	177776	011732	MOV	38PS,PSW	:SAVE PS
002524	122767	000011	011724	CHPB	811,PSW	:IS PS = 11
002532	001401			BEQ	.+4	
002534	000000			HLT		:PS IS WRONG
002536	022700	177777		CHP	8-1,XD	:IS HIGH ORDER = -1
002542	001401			BEQ	.+4	
002544	000000			HLT		:HIGH ORDER IS WRONG
002546	022701	000002		CHP	82,XD!1	:IS LOW ORDER = 2
002552	001401			BEQ	.+4	
002554	000000			HLT		:LOW ORDER IS WRONG

#####  
:TEST 25 MUL 125252 \* 02 = -1 52524 PS = 11  
:#####

002556 010701  
002560 012700 125252  
002564 070027 000002  
002570 013767 177776 011660  
002576 122767 000011 011652  
002604 001401  
002606 000000  
002610 022700 177777  
002614 001401  
002616 000000  
002620 022701 052524  
002624 001401  
002626 000000

SCOPE  
MOV 0125252,XD  
MUL 02,XD  
MOV 00PS,PSM  
CMPB 011,PSM  
BEQ .+4  
HLT  
CMP 0-1,XD  
BEQ .+4  
HLT  
CMP 052524,XD!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 125252  
:MULTIPLY 125252 \* 02  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 52524  
:  
:LOW ORDER IS WRONG

#####  
:TEST 26 MUL 2 \* 0125252 = -1 52524 PS = 11  
:#####

002630 010701  
002632 012700 000002  
002636 070027 125252  
002642 013767 177776 011606  
002650 122767 000011 011600  
002656 001401  
002660 000000  
002664 022700 177777  
002666 001401  
002670 000000  
002672 022701 052524  
002676 001401  
002700 000000

SCOPE  
MOV 02,XD  
MUL 0125252,XD  
MOV 00PS,PSM  
CMPB 011,PSM  
BEQ .+4  
HLT  
CMP 0-1,XD  
BEQ .+4  
HLT  
CMP 052524,XD!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 2  
:MULTIPLY 2 \* 0125252  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 52524  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 27 MUL 52525 \* 82 = 0 125252 PS = 1  
\*\*\*\*\*

002702	010701			SCOPE		:TEST OF MULTIPLY
002704	012700	052525		MOV	852525,X0	:LOAD MULTIPLICAN WITH 52525
002710	070027	000002		MUL	82,X0	:MULTIPLY 52525 * 82
002714	013767	177776	011534	MOV	80PS,PSW	:SAVE PS
002722	122767	000001	011526	CHPB	81,PSW	:IS PS = 1
002730	001401			BEQ	.+4	
002732	000000			HLT		:PS IS WRONG
002734	022700	000000		CHP	80,X0	:IS HIGH ORDER = 0
002740	001401			BEQ	.+4	
002742	000000			HLT		:HIGH ORDER IS WRONG
002744	022701	125252		CHP	8125252,X0!1	:IS LOW ORDER = 125252
002750	001401			BEQ	.+4	
002752	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 30 MUL 2 \* 852525 = 0 125252 PS = 1  
\*\*\*\*\*

002754	010701			SCOPE		:TEST OF MULTIPLY
002756	012700	000002		MOV	82,X0	:LOAD MULTIPLICAN WITH 2
002762	070027	052525		MUL	852525,X0	:MULTIPLY 2 * 852525
002766	013767	177776	011462	MOV	80PS,PSW	:SAVE PS
002774	122767	000001	011454	CHPB	81,PSW	:IS PS = 1
003002	001401			BEQ	.+4	
003004	000000			HLT		:PS IS WRONG
003006	022700	000000		CHP	80,X0	:IS HIGH ORDER = 0
003012	001401			BEQ	.+4	
003014	000000			HLT		:HIGH ORDER IS WRONG
003016	022701	125252		CHP	8125252,X0!1	:IS LOW ORDER = 125252
003022	001401			BEQ	.+4	
003024	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 31 MUL 125252 \* #40000 = 165252 100000 PS = 11  
:\*\*\*\*\*

003026	010701			SCOPE		:TEST OF MULTIPLY
003030	012700	125252		MOV	#125252,x0	:LOAD MULTIPICAN WITH 125252
003034	070027	040000		MUL	#40000,x0	:MULTIPLY 125252 * #40000
003040	013767	177776	011410	MOV	#PS,PSW	:SAVE PS
003046	122767	000011	011402	CHPB	#11,PSW	:IS PS = 11
003054	001401			BEG	.+4	
003056	000000			HLT		:PS IS WRONG
003060	022700	165252		CHP	#165252,x0	:IS HIGH ORDER = 165252
003064	001401			BEG	.+4	
003066	000000			HLT		:HIGH ORDER IS WRONG
003070	022701	100000		CHP	#100000,x0!1	:IS LOW ORDER = 100000
003074	001401			BEG	.+4	
003076	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 32 MUL 40000 \* #125252 = 165252 100000 PS = 11  
:\*\*\*\*\*

003100	010701			SCOPE		:TEST OF MULTIPLY
003102	012700	040000		MOV	#40000,x0	:LOAD MULTIPICAN WITH 40000
003106	070027	125252		MUL	#125252,x0	:MULTIPLY 40000 * #125252
003112	013767	177776	011336	MOV	#PS,PSW	:SAVE PS
003120	122767	000011	011330	CHPB	#11,PSW	:IS PS = 11
003126	001401			BEG	.+4	
003130	000000			HLT		:PS IS WRONG
003132	022700	165252		CHP	#165252,x0	:IS HIGH ORDER = 165252
003136	001401			BEG	.+4	
003140	000000			HLT		:HIGH ORDER IS WRONG
003142	022701	100000		CHP	#100000,x0!1	:IS LOW ORDER = 100000
003146	001401			BEG	.+4	
003150	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 33 MUL 10000 \* #10000 = 40000 0 PS = 1  
:\*\*\*\*\*

003152 010701  
003154 012700 100000  
003160 070027 100000  
003164 013767 177776 011264  
003172 122767 000001 011256  
003200 001401  
003202 000000  
003204 022700 040000  
003210 001401  
003212 000000  
003214 022701 000000  
003220 001401  
003222 000000

SCOPE  
MOV #100000,X0  
MUL #100000,X0  
MOV @PS,PSW  
CMPB #1,PSW  
BEQ .+4  
HLT  
CMP #40000,X0  
BEQ .+4  
HLT  
CMP #0,X0!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 100000  
:MULTIPLY 100000 \* #100000  
:SAVE PS  
:IS PS = 1  
:  
:PS IS WRONG  
:IS HIGH ORDER = 40000  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 34 MUL 70707 \* #70707 = 31221 44261 PS = 1  
:\*\*\*\*\*

003224 010701  
003226 012700 070707  
003232 070027 070707  
003236 013767 177776 011212  
003244 122767 000001 011204  
003252 001401  
003254 000000  
003256 022700 031221  
003262 001401  
003264 000000  
003266 022701 044261  
003272 001401  
003274 000000

SCOPE  
MOV #70707,X0  
MUL #70707,X0  
MOV @PS,PSW  
CMPB #1,PSW  
BEQ .+4  
HLT  
CMP #31221,X0  
BEQ .+4  
HLT  
CMP #44261,X0!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 70707  
:MULTIPLY 70707 \* #70707  
:SAVE PS  
:IS PS = 1  
:  
:PS IS WRONG  
:IS HIGH ORDER = 31221  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 44261  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 35 MUL 107070 \* 0107070 = 31222 26100 PS = 1  
\*\*\*\*\*

003276	010701			SCOPE		:TEST OF MULTIPLY
003300	012700	107070		MOV	0107070,XD	:LOAD MULTIPLICAN WITH 107070
003304	070027	107070		MUL	0107070,XD	:MULTIPLY 107070 * 0107070
003310	013767	177776	011140	MOV	0=PS,PSW	:SAVE PS
003316	122767	000001	011132	CHPB	01,PSW	:IS PS = 1
003324	001401			BEG	.+4	
003326	000000			HLT		:PS IS WRONG
003330	022700	031222		CHP	031222,XD	:IS HIGH ORDER = 31222
003334	001401			BEG	.+4	
003336	000000			HLT		:HIGH ORDER IS WRONG
003340	022701	026100		CHP	026100,XD!1	:IS LOW ORDER = 26100
003344	001401			BEG	.+4	
003346	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 36 MUL 100000 \* 077777 = 140000 100000 PS = 11  
\*\*\*\*\*

003350	010701			SCOPE		:TEST OF MULTIPLY
003352	012700	100000		MOV	0100000,XD	:LOAD MULTIPLICAN WITH 100000
003356	070027	077777		MUL	077777,XD	:MULTIPLY 100000 * 077777
003362	013767	177776	011066	MOV	0=PS,PSW	:SAVE PS
003370	122767	000011	011060	CHPB	011,PSW	:IS PS = 11
003376	001401			BEG	.+4	
003400	000000			HLT		:PS IS WRONG
003402	022700	140000		CHP	0140000,XD	:IS HIGH ORDER = 140000
003406	001401			BEG	.+4	
003410	000000			HLT		:HIGH ORDER IS WRONG
003412	022701	100000		CHP	0100000,XD!1	:IS LOW ORDER = 100000
003416	001401			BEG	.+4	
003420	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 37 MUL 77777 \* 0100000 = 140000 100000 PS = 11  
:\*\*\*\*\*

003422	010701			SCOPE		:TEST OF MULTIPLY
003424	012700	077777		MOV	077777,XD	:LOAD MULTIPLICAN WITH 77777
003430	070027	100000		MUL	0100000,XD	:MULTIPLY 77777 * 0100000
003434	013767	177776	011014	MOV	00PS,PSW	:SAVE PS
003442	122767	000011	011006	CHPB	011,PSW	:IS PS = 11
003450	001401			BEQ	.+4	
003452	000000			HLT		:PS IS WRONG
003454	022700	140000		CHP	0140000,XD	:IS HIGH ORDER = 140000
003460	001401			BEQ	.+4	
003462	000000			HLT		:HIGH ORDER IS WRONG
003464	022701	100000		CHP	0100000,XD!1	:IS LOW ORDER = 100000
003470	001401			BEQ	.+4	
003472	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 40 MUL 157634 \* 0104031 = 7453 133074 PS = 1  
:\*\*\*\*\*

003474	010701			SCOPE		:TEST OF MULTIPLY
003476	012700	157634		MOV	0157634,XD	:LOAD MULTIPLICAN WITH 157634
003502	070027	104031		MUL	0104031,XD	:MULTIPLY 157634 * 0104031
003506	013767	177776	010742	MOV	00PS,PSW	:SAVE PS
003514	122767	000001	010734	CHPB	01,PSW	:IS PS = 1
003522	001401			BEQ	.+4	
003524	000000			HLT		:PS IS WRONG
003526	022700	007453		CHP	07453,XD	:IS HIGH ORDER = 7453
003532	001401			BEQ	.+4	
003534	000000			HLT		:HIGH ORDER IS WRONG
003536	022701	133074		CHP	0133074,XD!1	:IS LOW ORDER = 133074
003542	001401			BEQ	.+4	
003544	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 41 MUL 104031 \* 8157634 = 7453 133074 PS = 1  
\*\*\*\*\*

003546	010701			SCOPE		:TEST OF MULTIPLY
003550	012700	104031		MOV	8104031,XD	:LOAD MULTIPLICAN WITH 104031
003554	070027	157634		MUL	8157634,XD	:MULTIPLY 104031 * 8157634
003560	013767	177776	010670	MOV	28PS,PSW	:SAVE PS
003566	122767	000001	010662	CHPB	81,PSW	:IS PS = 1
003574	001401			BEG	.+4	
003576	000000			HLT		:PS IS WRONG
003600	022700	007453		CHP	87453,XD	:IS HIGH ORDER = 7453
003604	001401			BEG	.+4	
003606	000000			HLT		:HIGH ORDER IS WRONG
003610	022701	133074		CHP	8133074,XD!1	:IS LOW ORDER = 133074
003614	001401			BEG	.+4	
003616	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 42 MUL 152210 \* 80 = 0 0 PS = 4  
\*\*\*\*\*

003620	010701			SCOPE		:TEST OF MULTIPLY
003622	012700	152210		MOV	8152210,XD	:LOAD MULTIPLICAN WITH 152210
003626	070027	000000		MUL	80,XD	:MULTIPLY 152210 * 80
003632	013767	177776	010616	MOV	28PS,PSW	:SAVE PS
003640	122767	000004	010610	CHPB	84,PSW	:IS PS = 4
003646	001401			BEG	.+4	
003650	000000			HLT		:PS IS WRONG
003652	022700	000000		CHP	80,XD	:IS HIGH ORDER = 0
003656	001401			BEG	.+4	
003660	000000			HLT		:HIGH ORDER IS WRONG
003662	022701	000000		CHP	80,XD!1	:IS LOW ORDER = 0
003666	001401			BEG	.+4	
003670	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 43 MUL 0 \* #152210 = 0 0 PS = 4  
\*\*\*\*\*

003672 010701  
003674 012700 000000  
003700 070027 152210  
003704 013767 177776 010544  
003712 122767 000004 010536  
003720 001401  
003722 000000  
003724 022700 000000  
003730 001401  
003732 000000  
003734 022701 000000  
003740 001401  
003742 000000

SCOPE  
MOV #0,%D  
MUL #152210,%D  
MOV @PS,PSW  
CMPB #4,PSW  
BEQ .+4  
HLT  
CMP #0,%D  
BEQ .+4  
HLT  
CMP #0,%D!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 0  
:MULTIPLY 0 \* #152210  
:SAVE PS  
:IS PS = 4  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 44 MUL -1 \* #0 = 0 0 PS = 4  
\*\*\*\*\*

003744 010701  
003746 012700 177777  
003752 070027 000000  
003756 013767 177776 010472  
003764 122767 000004 010464  
003772 001401  
003774 000000  
003776 022700 000000  
004002 001401  
004004 000000  
004006 022701 000000  
004012 001401  
004014 000000

SCOPE  
MOV #-1,%D  
MUL #0,%D  
MOV @PS,PSW  
CMPB #4,PSW  
BEQ .+4  
HLT  
CMP #0,%D  
BEQ .+4  
HLT  
CMP #0,%D!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* #0  
:SAVE PS  
:IS PS = 4  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 45 MUL 0 \* 0-1 = 0 0 PS = 4  
:\*\*\*\*\*

004016	010701			SCOPE		:TEST OF MULTIPLY
004020	012700	000000		MOV	00,XD	:LOAD MULTIPICAN WITH 0
004024	070027	177777		MUL	0-1,XD	:MULTIPLY 0 * 0-1
004030	013767	177776	010420	MOV	00PS,PSW	:SAVE PS
004036	122767	000004	010412	CHPB	04,PSW	:IS PS = 4
004044	001401			BEQ	.+4	
004046	000000			HLT		:PS IS WRONG
004050	022700	000000		CHP	00,XD	:IS HIGH ORDER = 0
004054	001401			BEQ	.+4	
004056	000000			HLT		:HIGH ORDER IS WRONG
004060	022701	000000		CHP	00,XD!1	:IS LOW ORDER = 0
004064	001401			BEQ	.+4	
004066	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 46 MUL -1 \* 01 = -1 -1 PS = 10  
:\*\*\*\*\*

004070	010701			SCOPE		:TEST OF MULTIPLY
004072	012701	177777		MOV	0-1,X1	:LOAD MULTIPICAN WITH -1
004076	070127	000001		MUL	01,X1	:MULTIPLY -1 * 01
004102	013767	177776	010346	MOV	00PS,PSW	:SAVE PS
004110	122767	000010	010340	CHPB	010,PSW	:IS PS = 10
004116	001401			BEQ	.+4	
004120	000000			HLT		:PS IS WRONG
004122	022701	177777		CHP	0-1,X1	:IS HIGH ORDER = -1
004126	001401			BEQ	.+4	
004130	000000			HLT		:HIGH ORDER IS WRONG
004132	022701	177777		CHP	0-1,X1!1	:IS LOW ORDER = -1
004136	001401			BEQ	.+4	
004140	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 47 MUL -1 \* 80 = 0 0 PS = 4  
\*\*\*\*\*

004142	010701			SCOPE		:TEST OF MULTIPLY
004144	012701	177777		MOV	#-1,%1	:LOAD MULTIPLICAN WITH -1
004150	070127	000000		MUL	#0,%1	:MULTIPLY -1 * 80
004154	013767	177776	010274	MOV	2#PS,PSW	:SAVE PS
004162	122767	000004	010266	CMPB	#4,PSW	:IS PS = 4
004170	001401			BEQ	+.4	
004172	000000			HLT		:PS IS WRONG
004174	022701	000000		CMP	#0,%1	:IS HIGH ORDER = 0
004200	001401			BEQ	+.4	
004202	000000			HLT		:HIGH ORDER IS WRONG
004204	022701	000000		CMP	#0,%1!1	:IS LOW ORDER = 0
004210	001401			BEQ	+.4	
004212	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 50 MUL 77777 \* #100000 = 100000 100000 PS = 11  
\*\*\*\*\*

004214	010701			SCOPE		:TEST OF MULTIPLY
004216	012701	077777		MOV	#77777,%1	:LOAD MULTIPLICAN WITH 77777
004222	070127	100000		MUL	#100000,%1	:MULTIPLY 77777 * #100000
004226	013767	177776	010222	MOV	2#PS,PSW	:SAVE PS
004234	122767	000011	010214	CMPB	#11,PSW	:IS PS = 11
004242	001401			BEQ	+.4	
004244	000000			HLT		:PS IS WRONG
004246	022701	100000		CMP	#100000,%1	:IS HIGH ORDER = 100000
004252	001401			BEQ	+.4	
004254	000000			HLT		:HIGH ORDER IS WRONG
004256	022701	100000		CMP	#100000,%1!1	:IS LOW ORDER = 100000
004262	001401			BEQ	+.4	
004264	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST S1 MUL -1 \* 877777 = 100001 100001 PS = 10  
:\*\*\*\*\*

004266	010701			SCOPE		:TEST OF MULTIPLY
004270	012701	177777		MOV	8-1,%1	:LOAD MULTIPLICAN WITH -1
004274	070127	077777		MUL	877777,%1	:MULTIPLY -1 * 877777
004300	013767	177776	010150	MOV	3#PS,PSW	:SAVE PS
004306	122767	000010	010142	CHPB	810,PSW	:IS PS = 10
004314	001401			BEQ	+.4	
004316	000000			HLT		:PS IS WRONG
004320	022701	100001		CHP	8100001,%1	:IS HIGH ORDER = 100001
004324	001401			BEQ	+.4	
004326	000000			HLT		:HIGH ORDER IS WRONG
004330	022701	100001		CHP	8100001,%1!1	:IS LOW ORDER = 100001
004334	001401			BEQ	+.4	
004336	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST S2 MUL 77777 \* 877777 = 1 1 PS = 1  
:\*\*\*\*\*

004340	010701			SCOPE		:TEST OF MULTIPLY
004342	012701	077777		MOV	877777,%1	:LOAD MULTIPLICAN WITH 77777
004346	070127	077777		MUL	877777,%1	:MULTIPLY 77777 * 877777
004352	013767	177776	010076	MOV	3#PS,PSW	:SAVE PS
004360	122767	000001	010070	CHPB	81,PSW	:IS PS = 1
004366	001401			BEQ	+.4	
004370	000000			HLT		:PS IS WRONG
004372	022701	000001		CHP	81,%1	:IS HIGH ORDER = 1
004376	001401			BEQ	+.4	
004400	000000			HLT		:HIGH ORDER IS WRONG
004402	022701	000001		CHP	81,%1!1	:IS LOW ORDER = 1
004406	001401			BEQ	+.4	
004410	000000			HLT		:LOW ORDER IS WRONG

```

*****
:TEST 53 MUL 2 * #2 = 4 4 PS = 0
*****
    
```

004412	010701			SCOPE		:TEST OF MULTIPLY
004414	012701	000002		MOV	#2,%1	:LOAD MULTIPLICAN WITH 2
004420	070127	000002		MUL	#2,%1	:MULTIPLY 2 * #2
004424	013767	177776	010024	MOV	2#PS,PSW	:SAVE PS
004432	122767	000000	010016	CMPB	#0,PSW	:IS PS = 0
004440	001401			BEQ	+.4	
004442	000000			HLT		:PS IS WRONG
004444	022701	000004		CMP	#4,%1	:IS HIGH ORDER = 4
004450	001401			BEQ	+.4	
004452	000000			HLT		:HIGH ORDER IS WRONG
004454	022701	000004		CMP	#4,%1!1	:IS LOW ORDER = 4
004460	001401			BEQ	+.4	
004462	000000			HLT		:LOW ORDER IS WRONG

```

*****
:TEST 54 MUL 0 * #0 = 0 0 PS = 4
*****
    
```

004464	010701			SCOPE		:TEST OF MULTIPLY
004466	012702	000000		MOV	#0,%2	:LOAD MULTIPLICAN WITH 0
004472	070227	000000		MUL	#0,%2	:MULTIPLY 0 * #0
004476	013767	177776	007752	MOV	2#PS,PSW	:SAVE PS
004504	122767	000004	007744	CMPB	#4,PSW	:IS PS = 4
004512	001401			BEQ	+.4	
004514	000000			HLT		:PS IS WRONG
004516	022702	000000		CMP	#0,%2	:IS HIGH ORDER = 0
004522	001401			BEQ	+.4	
004524	000000			HLT		:HIGH ORDER IS WRONG
004526	022703	000000		CMP	#0,%2!1	:IS LOW ORDER = 0
004532	001401			BEQ	+.4	
004534	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 55 MUL 0 \* 01 = 0 0 PS = 4  
:\*\*\*\*\*

004536	010701			SCOPE		:TEST OF MULTIPLY
004540	012702	000000		MOV	00,x2	:LOAD MULTIPLICAN WITH 0
004544	070227	000001		MUL	01,x2	:MULTIPLY 0 * 01
004550	013767	177776	007700	MOV	00PS,PSM	:SAVE PS
004556	122767	000004	007672	CHPB	04,PSM	:IS PS = 4
004564	001401			BEG	.+4	
004566	000000			HLT		:PS IS WRONG
004570	022702	000000		CHP	00,x2	:IS HIGH ORDER = 0
004574	001401			BEG	.+4	
004576	000000			HLT		:HIGH ORDER IS WRONG
004600	022703	000000		CHP	00,x2!1	:IS LOW ORDER = 0
004604	001401			BEG	.+4	
004606	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 56 MUL 1 \* 00 = 0 0 PS = 4  
:\*\*\*\*\*

004610	010701			SCOPE		:TEST OF MULTIPLY
004612	012702	000001		MOV	01,x2	:LOAD MULTIPLICAN WITH 1
004616	070227	000000		MUL	00,x2	:MULTIPLY 1 * 00
004622	013767	177776	007626	MOV	00PS,PSM	:SAVE PS
004630	122767	000004	007620	CHPB	04,PSM	:IS PS = 4
004636	001401			BEG	.+4	
004640	000000			HLT		:PS IS WRONG
004642	022702	000000		CHP	00,x2	:IS HIGH ORDER = 0
004646	001401			BEG	.+4	
004650	000000			HLT		:HIGH ORDER IS WRONG
004652	022703	000000		CHP	00,x2!1	:IS LOW ORDER = 0
004656	001401			BEG	.+4	
004660	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 57 MUL -1 \* 01 = -1 -1 PS = 10  
:\*\*\*\*\*

004662 010701  
004664 012702 177777  
004670 070227 000001  
004674 013767 177776 007554  
004702 122767 000010 007546  
004710 001401  
004712 000000  
004714 022702 177777  
004720 001401  
004722 000000  
004724 022703 177777  
004730 001401  
004732 000000

SCOPE  
MOV 0-1,x2  
MUL 01,x2  
MOV 00PS,PSW  
CMPB 010,PSW  
BEQ .+4  
HLT  
CMP 0-1,x2  
BEQ .+4  
HLT  
CMP 0-1,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 01  
:SAVE PS  
:IS PS = 10  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = -1  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 60 MUL 1 \* 0-1 = -1 -1 PS = 10  
:\*\*\*\*\*

004734 010701  
004736 012702 000001  
004742 070227 177777  
004746 013767 177776 007502  
004754 122767 000010 007474  
004762 001401  
004764 000000  
004766 022702 177777  
004772 001401  
004774 000000  
004776 022703 177777  
005002 001401  
005004 000000

SCOPE  
MOV 01,x2  
MUL 0-1,x2  
MOV 00PS,PSW  
CMPB 010,PSW  
BEQ .+4  
HLT  
CMP 0-1,x2  
BEQ .+4  
HLT  
CMP 0-1,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 0-1  
:SAVE PS  
:IS PS = 10  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = -1  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 61 MUL 1 \* 82 = 0 2 PS = 0  
\*\*\*\*\*

005006	010701			SCOPE		:TEST OF MULTIPLY
005010	012702	000001		NOV	81,X2	:LOAD MULTIPICAN WITH 1
005014	070227	000002		MUL	82,X2	:MULTIPLY 1 * 82
005020	013767	177776	007430	NOV	28PS,PSM	:SAVE PS
005026	122767	000000	007422	CHPB	80,PSM	:IS PS = 0
005034	001401			BEG	.+4	
005036	000000			HLT		:PS IS WRONG
005040	022702	000000		CHPB	80,X2	:IS HIGH ORDER = 0
005044	001401			BEG	.+4	
005046	000000			HLT		:HIGH ORDER IS WRONG
005050	022703	000002		CHPB	82,X2!1	:IS LOW ORDER = 2
005054	001401			BEG	.+4	
005056	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 62 MUL 2 \* 82 = 0 4 PS = 0  
\*\*\*\*\*

005060	010701			SCOPE		:TEST OF MULTIPLY
005062	012702	000002		NOV	82,X2	:LOAD MULTIPICAN WITH 2
005066	070227	000002		MUL	82,X2	:MULTIPLY 2 * 82
005072	013767	177776	007356	NOV	28PS,PSM	:SAVE PS
005100	122767	000000	007350	CHPB	80,PSM	:IS PS = 0
005106	001401			BEG	.+4	
005110	000000			HLT		:PS IS WRONG
005112	022702	000000		CHPB	80,X2	:IS HIGH ORDER = 0
005116	001401			BEG	.+4	
005120	000000			HLT		:HIGH ORDER IS WRONG
005122	022703	000004		CHPB	84,X2!1	:IS LOW ORDER = 4
005126	001401			BEG	.+4	
005130	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 63 MUL 1000 \* 200 = 1 0 PS = 1  
\*\*\*\*\*

005132	010701			SCOPE		:TEST OF MULTIPLY
005134	012702	001000		MOV	200,x2	:LOAD MULTIPLICAN WITH 1000
005140	070227	000200		MUL	200,x2	:MULTIPLY 1000 * 200
005144	013767	177776	007304	MOV	28PS,PSH	:SAVE PS
005150	122767	000001	007276	CHPB	21,PSH	:IS PS = 1
005160	001401			BEQ	.+4	
005162	000000			HLT		:PS IS WRONG
005164	022702	000001		CHP	21,x2	:IS HIGH ORDER = 1
005170	001401			BEQ	.+4	
005172	000000			HLT		:HIGH ORDER IS WRONG
005174	022703	000000		CHP	20,x2!1	:IS LOW ORDER = 0
005200	001401			BEQ	.+4	
005202	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 64 MUL 200 \* 1000 = 1 0 PS = 1  
\*\*\*\*\*

005204	010701			SCOPE		:TEST OF MULTIPLY
005206	012702	000200		MOV	200,x2	:LOAD MULTIPLICAN WITH 200
005212	070227	001000		MUL	200,x2	:MULTIPLY 200 * 1000
005216	013767	177776	007232	MOV	28PS,PSH	:SAVE PS
005224	122767	000001	007224	CHPB	21,PSH	:IS PS = 1
005232	001401			BEQ	.+4	
005234	000000			HLT		:PS IS WRONG
005236	022702	000001		CHP	21,x2	:IS HIGH ORDER = 1
005242	001401			BEQ	.+4	
005244	000000			HLT		:HIGH ORDER IS WRONG
005246	022703	000000		CHP	20,x2!1	:IS LOW ORDER = 0
005252	001401			BEQ	.+4	
005254	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 65 MUL 77777 \* 82 = 0 177776 PS = 1  
:\*\*\*\*\*

005296 010701  
005298 012702 077777  
005300 070227 000002  
005302 013767 177776 007160  
005304 122767 000001 007152  
005306 001401  
005308 000000  
005310 022702 000000  
005312 001401  
005314 000000  
005316 000000  
005318 022703 177776  
005320 001401  
005322 000000  
005324 000000

SCOPE  
MOV 877777,x2  
MUL 82,x2  
MOV 28PS,PSH  
CHPB 81,PSH  
BEQ .+4  
HLT  
CMP 80,x2  
BEQ .+4  
HLT  
CMP 8177776,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 82  
:SAVE PS  
:IS PS = 1  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 177776  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 66 MUL 2 \* 877777 = 0 177776 PS = 1  
:\*\*\*\*\*

005330 010701  
005332 012702 000002  
005334 070227 077777  
005336 013767 177776 007106  
005338 122767 000001 007100  
005340 001401  
005342 000000  
005344 022702 000000  
005346 001401  
005348 000000  
005350 022703 177776  
005352 001401  
005354 000000  
005400 000000

SCOPE  
MOV 82,x2  
MUL 877777,x2  
MOV 28PS,PSH  
CHPB 81,PSH  
BEQ .+4  
HLT  
CMP 80,x2  
BEQ .+4  
HLT  
CMP 8177776,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 2  
:MULTIPLY 2 \* 877777  
:SAVE PS  
:IS PS = 1  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 177776  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 67 MUL 7777 \* 810 = 0 77770 PS = 0  
:\*\*\*\*\*

005402	010701			SCOPE		:TEST OF MULTIPLY
005404	012702	007777		MOV	87777,x2	:LOAD MULTIPLICAN WITH 7777
005410	070227	000010		MUL	810,x2	:MULTIPLY 7777 * 810
005414	013767	177776	007034	MOV	38PS,PSW	:SAVE PS
005420	122767	000000	007026	CHPB	80,PSW	:IS PS = 0
005430	001401			BEQ	+.4	
005436	000000			HLT		:PS IS WRONG
005434	022702	000000		CHP	80,x2	:IS HIGH ORDER = 0
005440	001401			BEQ	+.4	
005442	000000			HLT		:HIGH ORDER IS WRONG
005444	022703	077770		CHP	877770,x2!1	:IS LOW ORDER = 77770
005450	001401			BEQ	+.4	
005452	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 70 MUL 10 \* 87777 = 0 77770 PS = 0  
:\*\*\*\*\*

005454	010701			SCOPE		:TEST OF MULTIPLY
005456	012702	000010		MOV	810,x2	:LOAD MULTIPLICAN WITH 10
005462	070227	007777		MUL	87777,x2	:MULTIPLY 10 * 87777
005466	013767	177776	006762	MOV	38PS,PSW	:SAVE PS
005474	122767	000000	006754	CHPB	80,PSW	:IS PS = 0
005502	001401			BEQ	+.4	
005504	000000			HLT		:PS IS WRONG
005506	022702	000000		CHP	80,x2	:IS HIGH ORDER = 0
005512	001401			BEQ	+.4	
005514	000000			HLT		:HIGH ORDER IS WRONG
005516	022703	077770		CHP	877770,x2!1	:IS LOW ORDER = 77770
005522	001401			BEQ	+.4	
005524	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 71 MUL 77777 \* 877777 = 37777 1 PS = 1  
:\*\*\*\*\*

005526	010701			SCOPE		:TEST OF MULTIPLY
005530	012702	077777		MOV	877777,x2	:LOAD MULTIPLICAN WITH 77777
005534	070227	077777		MUL	877777,x2	:MULTIPLY 77777 * 877777
005540	013767	177776	006710	MOV	38PS,PSW	:SAVE PS
005546	122767	000001	006702	CHPB	81,PSW	:IS PS = 1
005554	001401			BEQ	+.4	
005556	000000			HLT		:PS IS WRONG
005560	022702	037777		CHP	837777,x2	:IS HIGH ORDER = 37777
005564	001401			BEQ	+.4	
005566	000000			HLT		:HIGH ORDER IS WRONG
005570	022703	000001		CHP	81,x2!1	:IS LOW ORDER = 1
005574	001401			BEQ	+.4	
005576	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 72 MUL 77777 \* 81 = 0 77777 PS = 0  
:\*\*\*\*\*

005600	010701			SCOPE		:TEST OF MULTIPLY
005602	012702	077777		MOV	877777,x2	:LOAD MULTIPLICAN WITH 77777
005606	070227	000001		MUL	81,x2	:MULTIPLY 77777 * 81
005612	013767	177776	006636	MOV	38PS,PSW	:SAVE PS
005620	122767	000000	006630	CHPB	80,PSW	:IS PS = 0
005626	001401			BEQ	+.4	
005630	000000			HLT		:PS IS WRONG
005632	022702	000000		CHP	80,x2	:IS HIGH ORDER = 0
005636	001401			BEQ	+.4	
005640	000000			HLT		:HIGH ORDER IS WRONG
005642	022703	077777		CHP	877777,x2!1	:IS LOW ORDER = 77777
005646	001401			BEQ	+.4	
005650	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 73 MUL 1 \* 877777 = 0 77777 PS = 0  
:\*\*\*\*\*

005552 010701  
005554 012702 000001  
005560 070227 077777  
005564 013767 177776 006564  
005572 122767 000000 006556  
005700 001401  
005702 000000  
005704 022702 000000  
005710 001401  
005712 000000  
005714 022703 077777  
005720 001401  
005722 000000

SCOPE  
MOV 81,x2  
MUL 877777,x2  
MOV 2@PS,PSW  
CMPB 80,PSW  
BEQ .+4  
HLT  
CMP 80,x2  
BEQ .+4  
HLT  
CMP 877777,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 877777  
:SAVE PS  
:IS PS = 0  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 77777  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 74 MUL 77777 \* 8-1 = -1 100001 PS = 10  
:\*\*\*\*\*

005724 010701  
005726 012702 077777  
005732 070227 177777  
005736 013767 177776 006512  
005744 122767 000010 006504  
005752 001401  
005754 000000  
005756 022702 177777  
005762 001401  
005764 000000  
005766 022703 100001  
005772 001401  
005774 000000

SCOPE  
MOV 877777,x2  
MUL 8-1,x2  
MOV 2@PS,PSW  
CMPB 810,PSW  
BEQ .+4  
HLT  
CMP 8-1,x2  
BEQ .+4  
HLT  
CMP 8100001,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 8-1  
:SAVE PS  
:IS PS = 10  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100001  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
: TEST 75 MUL -1 \* 877777 = -1 100001 PS = 10  
: \*\*\*\*\*

005776 010701  
006000 012702 177777  
006004 070227 077777  
006010 013767 177776 006440  
006016 122767 000010 006432  
006024 001401  
006026 000000  
006030 022702 177777  
006034 001401  
006036 000000  
006040 022703 100001  
006044 001401  
006046 000000

SCOPE  
MOV 8-1,x2  
MUL 877777,x2  
MOV 2#PS,PSW  
CMPB 810,PSW  
BEQ .+4  
HLT  
CMP 8-1,x2  
BEQ .+4  
HLT  
CMP 8100001,x2!1  
BEQ .+4  
HLT

: TEST OF MULTIPLY  
: LOAD MULTIPLICAN WITH -1  
: MULTIPLY -1 \* 877777  
: SAVE PS  
: IS PS = 10  
: PS IS WRONG  
: IS HIGH ORDER = -1  
: HIGH ORDER IS WRONG  
: IS LOW ORDER = 100001  
: LOW ORDER IS WRONG

\*\*\*\*\*  
: TEST 76 MUL -2 \* 877777 = -1 2 PS = 11  
: \*\*\*\*\*

006050 010701  
006052 012702 177776  
006056 070227 077777  
006062 013767 177776 006366  
006070 122767 000011 006360  
006076 001401  
006100 000000  
006102 022702 177777  
006106 001401  
006110 000000  
006112 022703 000002  
006116 001401  
006120 000000

SCOPE  
MOV 8-2,x2  
MUL 877777,x2  
MOV 2#PS,PSW  
CMPB 811,PSW  
BEQ .+4  
HLT  
CMP 8-1,x2  
BEQ .+4  
HLT  
CMP 82,x2!1  
BEQ .+4  
HLT

: TEST OF MULTIPLY  
: LOAD MULTIPLICAN WITH -2  
: MULTIPLY -2 \* 877777  
: SAVE PS  
: IS PS = 11  
: PS IS WRONG  
: IS HIGH ORDER = -1  
: HIGH ORDER IS WRONG  
: IS LOW ORDER = 2  
: LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 77 MUL 77777 \* 8-2 = -1 2 PS = 11  
\*\*\*\*\*

006122 010701  
006124 012702 077777  
006130 070227 177776  
006134 013767 177776 006314  
006142 122767 000011 006306  
006150 001401  
006152 000000  
006154 022702 177777  
006160 001401  
006162 000000  
006164 022703 000002  
006170 001401  
006172 000000

SCOPE  
MOV #77777,x2  
MUL 8-2,x2  
MOV @#PS,PSW  
CMPB #11,PSW  
BEQ .+4  
HLT  
CMP 8-1,x2  
BEQ .+4  
HLT  
CMP #2,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 8-2  
:SAVE PS  
:IS PS = 11  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 2  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 100 MUL 125252 \* #2 = -1 52524 PS = 11  
\*\*\*\*\*

006174 010701  
006176 012702 125252  
006202 070227 000002  
006206 013767 177776 006242  
006214 122767 000011 006234  
006222 001401  
006224 000000  
006226 022702 177777  
006232 001401  
006234 000000  
006236 022703 052524  
006242 001401  
006244 000000

SCOPE  
MOV #125252,x2  
MUL #2,x2  
MOV @#PS,PSW  
CMPB #11,PSW  
BEQ .+4  
HLT  
CMP 8-1,x2  
BEQ .+4  
HLT  
CMP #52524,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 125252  
:MULTIPLY 125252 \* #2  
:SAVE PS  
:IS PS = 11  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 52524  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 101 MUL 2 \* #125252 = -1 52524 PS = 11  
\*\*\*\*\*

006246 010701  
006250 012702 000002  
006254 070227 125252  
006260 013767 177776 006170  
006266 122767 000011 006162  
006274 001401  
006276 000000  
006300 022702 177777  
006304 001401  
006306 000000  
006310 022703 052524  
006314 001401  
006316 000000

SCOPE  
MOV #2,%2  
MUL #125252,%2  
MOV @#PS,PSW  
CMPB #11,PSW  
BEQ .+4  
HLT  
CMP #-1,%2  
BEQ .+4  
HLT  
CMP #52524,%2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPICAN WITH 2  
:MULTIPLY 2 \* #125252  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 52524  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 102 MUL 52525 \* #2 = 0 125252 PS = 1  
\*\*\*\*\*

006320 010701  
006322 012702 052525  
006326 070227 000002  
006332 013767 177776 006116  
006340 122767 000001 006110  
006346 001401  
006350 000000  
006352 022702 000000  
006356 001401  
006360 000000  
006362 022703 125252  
006366 001401  
006370 000000

SCOPE  
MOV #52525,%2  
MUL #2,%2  
MOV @#PS,PSW  
CMPB #1,PSW  
BEQ .+4  
HLT  
CMP #0,%2  
BEQ .+4  
HLT  
CMP #125252,%2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPICAN WITH 52525  
:MULTIPLY 52525 \* #2  
:SAVE PS  
:IS PS = 1  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 125252  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 103 MUL 2 \* #52525 = 0 125252 PS = 1  
\*\*\*\*\*

006372 010701  
006374 012702 000002  
006400 070227 052525  
006404 013767 177776 006044  
006412 122767 000001 006036  
006420 001401  
006422 000000  
006424 022702 000000  
006430 001401  
006432 000000  
006434 022703 125252  
006440 001401  
006442 000000

SCOPE  
MOV #2,%2  
MUL #52525,%2  
MOV @PS,PSW  
CMPB #1,PSW  
BEQ .+4  
HLT  
CMP #0,%2  
BEQ .+4  
HLT  
CMP #125252,%2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 2  
:MULTIPLY 2 \* #52525  
:SAVE PS  
:IS PS = 1  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 125252  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 104 MUL 125252 \* #40000 = 165252 100000 PS = 11  
\*\*\*\*\*

006444 010701  
006446 012702 125252  
006452 070227 040000  
006456 013767 177776 005772  
006464 122767 000011 005764  
006472 001401  
006474 000000  
006476 022702 165252  
006502 001401  
006504 000000  
006506 022703 100000  
006512 001401  
006514 000000

SCOPE  
MOV #125252,%2  
MUL #40000,%2  
MOV @PS,PSW  
CMPB #11,PSW  
BEQ .+4  
HLT  
CMP #165252,%2  
BEQ .+4  
HLT  
CMP #100000,%2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 125252  
:MULTIPLY 125252 \* #40000  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = 165252  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100000  
:  
:LOW ORDER IS WRONG

```

:*****
:TEST 105 MUL 40000 * #125252 = 165252 100000 PS = 11
:*****
    
```

006516	010701			SCOPE		:TEST OF MULTIPLY
006520	012702	040000		MOV	#40000,%2	:LOAD MULTIPICAN WITH 40000
006524	070227	125252		MUL	#125252,%2	:MULTIPLY 40000 * #125252
006530	013767	177776	005720	MOV	@#PS,PSW	:SAVE PS
006536	122767	000011	005712	CMPB	#11,PSW	:IS PS = 11
006544	001401			BEQ	+.4	
006546	000000			HLT		:PS IS WRONG
006550	022702	165252		CMP	#165252,%2	:IS HIGH ORDER = 165252
006554	001401			BEQ	+.4	
006556	000000			HLT		:HIGH ORDER IS WRONG
006560	022703	100000		CMP	#100000,%2!1	:IS LOW ORDER = 100000
006564	001401			BEQ	+.4	
006566	000000			HLT		:LOW ORDER IS WRONG

```

:*****
:TEST 106 MUL 100000 * #100000 = 40000 0 PS = 1
:*****
    
```

006570	010701			SCOPE		:TEST OF MULTIPLY
006572	012702	100000		MOV	#100000,%2	:LOAD MULTIPICAN WITH 100000
006576	070227	100000		MUL	#100000,%2	:MULTIPLY 100000 * #100000
006602	013767	177776	005646	MOV	@#PS,PSW	:SAVE PS
006610	122767	000001	005640	CMPB	#1,PSW	:IS PS = 1
006616	001401			BEQ	+.4	
006620	000000			HLT		:PS IS WRONG
006622	022702	040000		CMP	#40000,%2	:IS HIGH ORDER = 40000
006626	001401			BEQ	+.4	
006630	000000			HLT		:HIGH ORDER IS WRONG
006632	022703	000000		CMP	#0,%2!1	:IS LOW ORDER = 0
006636	001401			BEQ	+.4	
006640	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 107 MUL 70707 \* 870707 = 31221 44261 PS = 1  
\*\*\*\*\*

006642	010701			SCOPE		:TEST OF MULTIPLY
006644	012702	070707		MOV	870707,x2	:LOAD MULTIPLICAN WITH 70707
006650	070227	070707		MUL	870707,x2	:MULTIPLY 70707 * 870707
006654	013767	177776	005574	MOV	38PS,PSW	:SAVE PS
006662	122767	000001	005566	CHPB	81,PSW	:IS PS = 1
006670	001401			BEG	.+4	
006672	000000			HLT		:PS IS WRONG
006674	022702	031221		CHP	831221,x2	:IS HIGH ORDER = 31221
006700	001401			BEG	.+4	
006702	000000			HLT		:HIGH ORDER IS WRONG
006704	022703	044261		CHP	844261,x2!1	:IS LOW ORDER = 44261
006710	001401			BEG	.+4	
006712	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 110 MUL 107070 \* 8107070 = 31222 26100 PS = 1  
\*\*\*\*\*

006714	010701			SCOPE		:TEST OF MULTIPLY
006716	012702	107070		MOV	8107070,x2	:LOAD MULTIPLICAN WITH 107070
006722	070227	107070		MUL	8107070,x2	:MULTIPLY 107070 * 8107070
006726	013767	177776	005522	MOV	38PS,PSW	:SAVE PS
006734	122767	000001	005514	CHPB	81,PSW	:IS PS = 1
006742	001401			BEG	.+4	
006744	000000			HLT		:PS IS WRONG
006746	022702	031222		CHP	831222,x2	:IS HIGH ORDER = 31222
006752	001401			BEG	.+4	
006754	000000			HLT		:HIGH ORDER IS WRONG
006756	022703	026100		CHP	826100,x2!1	:IS LOW ORDER = 26100
006762	001401			BEG	.+4	
006764	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 111 MUL 100000 \* 877777 = 140000 100000 PS = 11  
:\*\*\*\*\*

006766 010701  
006770 012702 100000  
006774 070227 077777  
007000 013767 177776 005450  
007006 122767 000011 005442  
007014 001401  
007016 000000  
007020 022702 140000  
007024 001401  
007026 000000  
007030 022703 100000  
007034 001401  
007036 000000

SCOPE  
MOV @100000,x2  
MUL @77777,x2  
MOV @PS,PSW  
CMPB @11,PSW  
BEQ .+4  
HLT  
CMP @140000,x2  
BEQ .+4  
HLT  
CMP @100000,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 100000  
:MULTIPLY 100000 \* 877777  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = 140000  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100000  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 112 MUL 77777 \* @100000 = 140000 100000 PS = 11  
:\*\*\*\*\*

007040 010701  
007042 012702 077777  
007046 070227 100000  
007052 013767 177776 005376  
007058 122767 000011 005370  
007066 001401  
007070 000000  
007072 022702 140000  
007076 001401  
007100 000000  
007102 022703 100000  
007106 001401  
007110 000000

SCOPE  
MOV @77777,x2  
MUL @100000,x2  
MOV @PS,PSW  
CMPB @11,PSW  
BEQ .+4  
HLT  
CMP @140000,x2  
BEQ .+4  
HLT  
CMP @100000,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* @100000  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = 140000  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100000  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 113 MUL 157634 \* 0104031 = 7453 133074 PS = 1  
:\*\*\*\*\*

007112 010701  
007114 012702 157634  
007120 070227 104031  
007124 013767 177776 005324  
007130 122767 000001 005316  
007140 001401  
007142 000000  
007144 022702 007453  
007150 001401  
007152 000000  
007154 022703 133074  
007160 001401  
007162 000000

SCOPE  
MOV @157634,X2  
MUL @104031,X2  
MOV @PS,PSM  
CMPB @1,PSM  
BEQ .+4  
HLT  
CMP @7453,X2  
BEQ .+4  
HLT  
CMP @133074,X2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 157634  
:MULTIPLY 157634 \* 0104031  
:SAVE PS  
:IS PS = 1  
:PS IS WRONG  
:IS HIGH ORDER = 7453  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 133074  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 114 MUL 104031 \* 0157634 = 7453 133074 PS = 1  
:\*\*\*\*\*

007164 010701  
007166 012702 104031  
007172 070227 157634  
007176 013767 177776 005252  
007204 122767 000001 005244  
007212 001401  
007214 000000  
007216 022702 007453  
007222 001401  
007224 000000  
007226 022703 133074  
007232 001401  
007234 000000

SCOPE  
MOV @104031,X2  
MUL @157634,X2  
MOV @PS,PSM  
CMPB @1,PSM  
BEQ .+4  
HLT  
CMP @7453,X2  
BEQ .+4  
HLT  
CMP @133074,X2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 104031  
:MULTIPLY 104031 \* 0157634  
:SAVE PS  
:IS PS = 1  
:PS IS WRONG  
:IS HIGH ORDER = 7453  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 133074  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 115 MUL 152210 \* 80 = 0 0 PS = 4  
\*\*\*\*\*

007236 010701  
007240 012702 152210  
007244 070227 000000  
007250 013767 177776 005200  
007256 122767 000004 005172  
007264 001401  
007266 000000  
007270 022702 000000  
007274 001401  
007276 000000  
007300 022703 000000  
007304 001401  
007306 000000

SCOPE  
MOV 8152210,x2  
MUL 80,x2  
MOV 28PS,PSH  
CMPB 84,PSH  
BEQ .+4  
HLT  
CMP 80,x2  
BEQ .+4  
HLT  
CMP 80,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 152210  
:MULTIPLY 152210 \* 80  
:SAVE PS  
:IS PS = 4  
  
:PS IS WRONG  
:IS HIGH ORDER = 0  
  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 116 MUL 0 \* 8152210 = 0 0 PS = 4  
\*\*\*\*\*

007310 010701  
007312 012702 000000  
007316 070227 152210  
007322 013767 177776 005126  
007330 122767 000004 005120  
007336 001401  
007340 000000  
007342 022702 000000  
007346 001401  
007350 000000  
007352 022703 000000  
007356 001401  
007360 000000

SCOPE  
MOV 80,x2  
MUL 8152210,x2  
MOV 28PS,PSH  
CMPB 84,PSH  
BEQ .+4  
HLT  
CMP 80,x2  
BEQ .+4  
HLT  
CMP 80,x2!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 0  
:MULTIPLY 0 \* 8152210  
:SAVE PS  
:IS PS = 4  
  
:PS IS WRONG  
:IS HIGH ORDER = 0  
  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 117 MUL -1 \* 80 = 0 0 PS = 4  
\*\*\*\*\*

007362	010701			SCOPE		:TEST OF MULTIPLY
007364	012702	177777		MOV	8-1,x2	:LOAD MULTIPLICAN WITH -1
007370	070227	000000		MUL	80,x2	:MULTIPLY -1 * 80
007374	013767	177776	005054	MOV	28PS,PSW	:SAVE PS
007402	122767	000004	005046	CMPB	84,PSW	:IS PS = 4
007410	001401			BEG	.+4	
007412	000000			HLT		:PS IS WRONG
007414	022702	000003		CMP	80,x2	:IS HIGH ORDER = 0
007420	001401			BEG	.+4	
007422	000000			HLT		:HIGH ORDER IS WRONG
007424	022703	000000		CMP	80,x2!1	:IS LOW ORDER = 0
007430	001401			BEG	.+4	
007432	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 120 MUL 0 \* 8-1 = 0 0 PS = 4  
\*\*\*\*\*

007434	010701			SCOPE		:TEST OF MULTIPLY
007436	012702	000000		MOV	80,x2	:LOAD MULTIPLICAN WITH 0
007442	070227	177777		MUL	8-1,x2	:MULTIPLY 0 * 8-1
007446	013767	177776	005002	MOV	28PS,PSW	:SAVE PS
007454	122767	000004	004774	CMPB	84,PSW	:IS PS = 4
007462	001401			BEG	.+4	
007464	000000			HLT		:PS IS WRONG
007466	022702	000000		CMP	80,x2	:IS HIGH ORDER = 0
007472	001401			BEG	.+4	
007474	000000			HLT		:HIGH ORDER IS WRONG
007476	022703	000000		CMP	80,x2!1	:IS LOW ORDER = 0
007502	001401			BEG	.+4	
007504	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 121 MUL -1 \* 01 = -1 -1 PS = 10  
:\*\*\*\*\*

007506	010701			SCOPE		:TEST OF MULTIPLY
007510	012703	177777		MOV	0-1,x3	:LOAD MULTIPICAN WITH -1
007514	070327	000001		MUL	01,x3	:MULTIPLY -1 * 01
007520	013767	177776	004730	MOV	00PS,PSW	:SAVE PS
007526	122767	000010	004722	CHPB	010,PSW	:IS PS = 10
007534	001401			BEQ	.+4	
007536	000000			HLT		:PS IS WRONG
007540	022703	177777		CHP	0-1,x3	:IS HIGH ORDER = -1
007544	001401			BEQ	.+4	
007546	000000			HLT		:HIGH ORDER IS WRONG
007550	022703	177777		CHP	0-1,x3!1	:IS LOW ORDER = -1
007554	001401			BEQ	.+4	
007556	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 122 MUL -1 \* 00 = 0 0 PS = 4  
:\*\*\*\*\*

007560	010701			SCOPE		:TEST OF MULTIPLY
007562	012703	177777		MOV	0-1,x3	:LOAD MULTIPICAN WITH -1
007566	070327	000000		MUL	00,x3	:MULTIPLY -1 * 00
007572	013767	177776	004656	MOV	00PS,PSW	:SAVE PS
007600	122767	000004	004650	CHPB	04,PSW	:IS PS = 4
007606	001401			BEQ	.+4	
007610	000000			HLT		:PS IS WRONG
007612	022703	000000		CHP	00,x3	:IS HIGH ORDER = 0
007616	001401			BEQ	.+4	
007620	000000			HLT		:HIGH ORDER IS WRONG
007622	022703	000000		CHP	00,x3!1	:IS LOW ORDER = 0
007626	001401			BEQ	.+4	
007630	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 123 MUL 77777 \* 100000 = 100000 100000 PS = 11  
:\*\*\*\*\*

007632 010701  
007634 012703 077777  
007640 070327 100000  
007644 013767 177776 004604  
007652 122767 000011 004576  
007660 001401  
007662 000000  
007664 022703 100000  
007670 001401  
007672 000000  
007674 022703 100000  
007700 001401  
007702 000000

SCOPE  
NOV 877777,x3  
MUL 100000,x3  
NOV 2#PS,PSM  
CMPB 10,PSM  
BEQ .+4  
HLT  
CMP 100000,x3  
BEQ .+4  
HLT  
CMP 100000,x3!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 100000  
:SAVE PS  
:IS PS = 11  
:PS IS WRONG  
:IS HIGH ORDER = 100000  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100000  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 124 MUL -1 \* 877777 = 100001 100001 PS = 10  
:\*\*\*\*\*

007704 010701  
007706 012703 177777  
007712 070327 077777  
007716 013767 177776 004532  
007724 122767 000010 004524  
007732 001401  
007734 000000  
007736 022703 100001  
007742 001401  
007744 000000  
007746 022703 100001  
007752 001401  
007754 000000

SCOPE  
NOV 8-1,x3  
MUL 877777,x3  
NOV 2#PS,PSM  
CMPB 10,PSM  
BEQ .+4  
HLT  
CMP 100001,x3  
BEQ .+4  
HLT  
CMP 100001,x3!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 877777  
:SAVE PS  
:IS PS = 10  
:PS IS WRONG  
:IS HIGH ORDER = 100001  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100001  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 125 MUL 77777 \* 877777 = 1 1 PS = 1  
:\*\*\*\*\*

007756 010701  
007760 012703 077777  
007764 070327 077777  
007770 013767 177776 004460  
007776 122767 000001 004452  
010004 001401  
010006 000000  
010010 022703 000001  
010014 001401  
010016 000000  
010020 022703 000001  
010024 001401  
010026 000000

SCOPE  
MOV 877777,X3  
MUL 877777,X3  
MOV 28PS,PSM  
CHPB 81,PSM  
BEQ .+4  
HLT  
CMP 81,X3  
BEQ .+4  
HLT  
CMP 81,X3!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 877777  
:SAVE PS  
:IS PS = 1  
:  
:PS IS WRONG  
:IS HIGH ORDER = 1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 1  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 126 MUL 2 \* 82 = 4 4 PS = 0  
:\*\*\*\*\*

010030 010701  
010032 012703 000002  
010036 070327 000002  
010042 013767 177776 004406  
010050 122767 000000 004400  
010056 001401  
010060 000000  
010062 022703 000004  
010066 001401  
010070 000000  
010072 022703 000004  
010076 001401  
010100 000000

SCOPE  
MOV 82,X3  
MUL 82,X3  
MOV 28PS,PSM  
CHPB 80,PSM  
BEQ .+4  
HLT  
CMP 84,X3  
BEQ .+4  
HLT  
CMP 84,X3!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 2  
:MULTIPLY 2 \* 82  
:SAVE PS  
:IS PS = 0  
:  
:PS IS WRONG  
:IS HIGH ORDER = 4  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 4  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 127 MUL 0 \* 80 = 0 0 PS = 4  
\*\*\*\*\*

Address	Instruction	Hex	Hex	Scope	Comments
010102	010701			SCOPE	:TEST OF MULTIPLY
010104	012704	000000		MOV 80,X4	:LOAD MULTIPICAN WITH 0
010110	070427	000000		MUL 80,X4	:MULTIPLY 0 * 80
010114	013767	177776	004334	MOV 28PS,PSM	:SAVE PS
010122	122767	000004	004326	CMPB 84,PSM	:IS PS = 4
010130	001401			BEG .+4	
010132	000000			HLT	:PS IS WRONG
010134	022704	000000		CMP 80,X4	:IS HIGH ORDER = 0
010140	001401			BEG .+4	
010142	000000			HLT	:HIGH ORDER IS WRONG
010144	022705	000000		CMP 80,X4!1	:IS LOW ORDER = 0
010150	001401			BEG .+4	
010152	000000			HLT	:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 130 MUL 0 \* 81 = 0 0 PS = 4  
\*\*\*\*\*

Address	Instruction	Hex	Hex	Scope	Comments
010154	010701			SCOPE	:TEST OF MULTIPLY
010156	012704	000000		MOV 80,X4	:LOAD MULTIPICAN WITH 0
010162	070427	000001		MUL 81,X4	:MULTIPLY 0 * 81
010166	013767	177776	004262	MOV 28PS,PSM	:SAVE PS
010174	122767	000004	004254	CMPB 84,PSM	:IS PS = 4
010202	001401			BEG .+4	
010204	000000			HLT	:PS IS WRONG
010206	022704	000000		CMP 80,X4	:IS HIGH ORDER = 0
010212	001401			BEG .+4	
010214	000000			HLT	:HIGH ORDER IS WRONG
010216	022705	000000		CMP 80,X4!1	:IS LOW ORDER = 0
010222	001401			BEG .+4	
010224	000000			HLT	:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 131 MUL 1 \* 80 = 0 0 PS = 4  
:\*\*\*\*\*

010226 010701  
010230 012704 000001  
010234 070427 000000  
010240 013767 177776 004210  
010246 122767 000004 004202  
010254 001401  
010256 000000  
010260 022704 000000  
010264 001401  
010266 000000  
010270 022705 000000  
010274 001401  
010276 000000

SCOPE  
MOV 81,x4  
MUL 80,x4  
MOV 28PS,PSW  
CMPB 84,PSW  
BEQ .+4  
HLT  
CMP 80,x4  
BEQ .+4  
HLT  
CMP 80,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 80  
:SAVE PS  
:IS PS = 4  
  
:PS IS WRONG  
:IS HIGH ORDER = 0  
  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 132 MUL -1 \* 81 = -1 -1 PS = 10  
:\*\*\*\*\*

010300 010701  
010302 012704 177777  
010306 070427 000001  
010312 013767 177776 004136  
010320 122767 000010 004130  
010326 001401  
010330 000000  
010332 022704 177777  
010336 001401  
010340 000000  
010342 022705 177777  
010346 001401  
010350 000000

SCOPE  
MOV 8-1,x4  
MUL 81,x4  
MOV 28PS,PSW  
CMPB 810,PSW  
BEQ .+4  
HLT  
CMP 8-1,x4  
BEQ .+4  
HLT  
CMP 8-1,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 81  
:SAVE PS  
:IS PS = 10  
  
:PS IS WRONG  
:IS HIGH ORDER = -1  
  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = -1  
  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 133 MUL 1 \* 0-1 = -1 -1 PS = 10  
\*\*\*\*\*

010352 010701  
010354 012704 000001  
010360 070427 177777  
010364 013767 177776 004064  
010372 122767 000010 004056  
010400 001401  
010402 000000  
010404 022704 177777  
010410 001401  
010412 000000  
010414 022705 177777  
010420 001401  
010422 000000

SCOPE  
MOV 01,X4  
MUL 0-1,X4  
MOV 00PS,PSW  
CMPB 010,PSW  
BEQ .+4  
HLT  
CMP 0-1,X4  
BEQ .+4  
HLT  
CMP 0-1,X4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 0-1  
:SAVE PS  
:IS PS = 10  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = -1  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 134 MUL 1 \* 02 = 0 2 PS = 0  
\*\*\*\*\*

010424 010701  
010426 012704 000001  
010432 070427 000002  
010436 013767 177776 004012  
010444 122767 000000 004004  
010452 001401  
010454 000000  
010456 022704 000000  
010462 001401  
010464 000000  
010466 022705 000002  
010472 001401  
010474 000000

SCOPE  
MOV 01,X4  
MUL 02,X4  
MOV 00PS,PSW  
CMPB 00,PSW  
BEQ .+4  
HLT  
CMP 00,X4  
BEQ .+4  
HLT  
CMP 02,X4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 02  
:SAVE PS  
:IS PS = 0  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 2  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 135 MUL 2 \* #2 = 0 4 PS = 0  
\*\*\*\*\*

010476	010701			SCOPE		:TEST OF MULTIPLY
010500	012704	000002		MOV	#2,%4	:LOAD MULTIPLICAN WITH 2
010504	070427	000002		MUL	#2,%4	:MULTIPLY 2 * #2
010510	013767	177776	003740	MOV	@#PS,PSW	:SAVE PS
010516	122767	000000	003732	CMPB	#0,PSW	:IS PS = 0
010524	001401			BEQ	+.4	
010526	000000			HLT		:PS IS WRONG
010530	022704	000000		CMP	#0,%4	:IS HIGH ORDER = 0
010534	001401			BEQ	+.4	
010536	000000			HLT		:HIGH ORDER IS WRONG
010540	022705	000004		CMP	#4,%4!1	:IS LOW ORDER = 4
010544	001401			BEQ	+.4	
010546	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 136 MUL 1000 \* #200 = 1 0 PS = 1  
\*\*\*\*\*

010550	010701			SCOPE		:TEST OF MULTIPLY
010552	012704	001000		MOV	#1000,%4	:LOAD MULTIPLICAN WITH 1000
010556	070427	000200		MUL	#200,%4	:MULTIPLY 1000 * #200
010562	013767	177776	003666	MOV	@#PS,PSW	:SAVE PS
010570	122767	000001	003660	CMPB	#1,PSW	:IS PS = 1
010576	001401			BEQ	+.4	
010600	000000			HLT		:PS IS WRONG
010602	022704	000001		CMP	#1,%4	:IS HIGH ORDER = 1
010606	001401			BEQ	+.4	
010610	000000			HLT		:HIGH ORDER IS WRONG
010612	022705	000000		CMP	#0,%4!1	:IS LOW ORDER = 0
010616	001401			BEQ	+.4	
010620	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 137 MUL 200 \* #1000 = 1 0 PS = 1  
:\*\*\*\*\*

010622	010701			SCOPE		:TEST OF MULTIPLY
010624	012704	000200		MOV	#200,%4	:LOAD MULTIPLICAN WITH 200
010630	070427	001000		MUL	#1000,%4	:MULTIPLY 200 * #1000
010634	013767	177776	003614	MOV	@#PS,PSW	:SAVE PS
010642	122767	000001	003606	CMPB	#1,PSW	:IS PS = 1
010650	001401			BEQ	+.4	
010652	000000			HLT		:PS IS WRONG
010654	022704	000001		CMP	#1,%4	:IS HIGH ORDER = 1
010660	001401			BEQ	+.4	
010662	000000			HLT		:HIGH ORDER IS WRONG
010664	022705	000000		CMP	#0,%4!1	:IS LOW ORDER = 0
010670	001401			BEQ	+.4	
010672	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 140 MUL 77777 \* #2 = 0 177776 PS = 1  
:\*\*\*\*\*

010674	010701			SCOPE		:TEST OF MULTIPLY
010676	012704	077777		MOV	#77777,%4	:LOAD MULTIPLICAN WITH 77777
010702	070427	000002		MUL	#2,%4	:MULTIPLY 77777 * #2
010706	013767	177776	003542	MOV	@#PS,PSW	:SAVE PS
010714	122767	000001	003534	CMPB	#1,PSW	:IS PS = 1
010722	001401			BEQ	+.4	
010724	000000			HLT		:PS IS WRONG
010726	022704	000000		CMP	#0,%4	:IS HIGH ORDER = 0
010732	001401			BEQ	+.4	
010734	000000			HLT		:HIGH ORDER IS WRONG
010736	022705	177776		CMP	#177776,%4!1	:IS LOW ORDER = 177776
010742	001401			BEQ	+.4	
010744	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 141 MUL 2 \* 877777 = 0 177776 PS = 1  
\*\*\*\*\*

010746	010701			SCOPE		:TEST OF MULTIPLY
010750	012704	000002		MOV	82,x4	:LOAD MULTIPLICAN WITH 2
010754	070427	077777		MUL	877777,x4	:MULTIPLY 2 * 877777
010760	013767	177776	003470	MOV	28PS,PSW	:SAVE PS
010766	122767	000001	003462	CMPB	81,PSW	:IS PS = 1
010774	001401			BEQ	.+4	
010776	000000			HLT		:PS IS WRONG
011000	022704	000000		CMP	80,x4	:IS HIGH ORDER = 0
011004	001401			BEQ	.+4	
011006	000000			HLT		:HIGH ORDER IS WRONG
011010	022705	177776		CMP	8177776,x4!1	:IS LOW ORDER = 177776
011014	001401			BEQ	.+4	
011016	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 142 MUL 7777 \* 810 = 0 77770 PS = 0  
\*\*\*\*\*

011020	010701			SCOPE		:TEST OF MULTIPLY
011022	012704	007777		MOV	87777,x4	:LOAD MULTIPLICAN WITH 7777
011026	070427	000010		MUL	810,x4	:MULTIPLY 7777 * 810
011032	013767	177776	003416	MOV	28PS,PSW	:SAVE PS
011040	122767	000000	003410	CMPB	80,PSW	:IS PS = 0
011046	001401			BEQ	.+4	
011050	000000			HLT		:PS IS WRONG
011052	022704	000000		CMP	80,x4	:IS HIGH ORDER = 0
011056	001401			BEQ	.+4	
011060	000000			HLT		:HIGH ORDER IS WRONG
011062	022705	077770		CMP	877770,x4!1	:IS LOW ORDER = 77770
011066	001401			BEQ	.+4	
011070	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
: TEST 143 MUL 10 \* 07777 = 0 77770 PS = 0  
: \*\*\*\*\*

011072	010701			SCOPE		: TEST OF MULTIPLY
011074	012704	000010		MOV	010,x4	: LOAD MULTIPLICAN WITH 10
011100	070427	007777		MUL	07777,x4	: MULTIPLY 10 * 07777
011104	013767	177776	003344	MOV	00PS,PSM	: SAVE PS
011112	122767	000000	003336	CMPB	00,PSM	: IS PS = 0
011120	001401			BEQ	.+4	
011122	000000			HLT		: PS IS WRONG
011124	022704	000000		CMP	00,x4	: IS HIGH ORDER = 0
011130	001401			BEQ	.+4	
011132	000000			HLT		: HIGH ORDER IS WRONG
011134	022705	077770		CMP	077770,x4!1	: IS LOW ORDER = 77770
011140	001401			BEQ	.+4	
011142	000000			HLT		: LOW ORDER IS WRONG

\*\*\*\*\*  
: TEST 144 MUL 7777 \* 07777 = 37777 1 PS = 1  
: \*\*\*\*\*

011144	010701			SCOPE		: TEST OF MULTIPLY
011146	012704	077777		MOV	077777,x4	: LOAD MULTIPLICAN WITH 77777
011152	070427	077777		MUL	077777,x4	: MULTIPLY 77777 * 077777
011156	013767	177776	003272	MOV	00PS,PSM	: SAVE PS
011164	122767	000001	003264	CMPB	01,PSM	: IS PS = 1
011172	001401			BEQ	.+4	
011174	000000			HLT		: PS IS WRONG
011176	022704	037777		CMP	037777,x4	: IS HIGH ORDER = 37777
011202	001401			BEQ	.+4	
011204	000000			HLT		: HIGH ORDER IS WRONG
011206	022705	000001		CMP	01,x4!1	: IS LOW ORDER = 1
011212	001401			BEQ	.+4	
011214	000000			HLT		: LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 145 MUL 77777 \* 81 = 0 77777 PS = 0  
\*\*\*\*\*

011216 010701  
011220 012704 077777  
011224 070427 000001  
011230 013767 177776 003220  
011236 122767 000000 003212  
011244 001401  
011246 000000  
011250 022704 000000  
011254 001401  
011256 000000  
011260 022705 077777  
011264 001401  
011266 000000

SCOPE  
MOV 877777,x4  
MUL 81,x4  
MOV 28PS,PSM  
CHPB 80,PSM  
BEQ .+4  
HLT  
CHP 80,x4  
BEQ .+4  
HLT  
CHP 877777,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 81  
:SAVE PS  
:IS PS = 0  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 77777  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 146 MUL 1 \* 877777 = 0 77777 PS = 0  
\*\*\*\*\*

011270 010701  
011272 012704 000001  
011276 070427 077777  
011302 013767 177776 003146  
011310 122767 000000 003140  
011316 001401  
011320 000000  
011322 022704 000000  
011326 001401  
011330 000000  
011332 022705 077777  
011336 001401  
011340 000000

SCOPE  
MOV 81,x4  
MUL 877777,x4  
MOV 28PS,PSM  
CHPB 80,PSM  
BEQ .+4  
HLT  
CHP 80,x4  
BEQ .+4  
HLT  
CHP 877777,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 1  
:MULTIPLY 1 \* 877777  
:SAVE PS  
:IS PS = 0  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 77777  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 147 MUL 77777 \* 8-1 = -1 100001 PS = 10  
:\*\*\*\*\*

011342 010701  
011344 012704 077777  
011350 070427 177777  
011354 013767 177776 003074  
011362 122767 000010 003066  
011370 001401  
011372 000000  
011374 022704 177777  
011400 001401  
011402 000000  
011404 022705 100001  
011410 001401  
011412 000000

SCOPE  
MOV 877777,x4  
MUL 8-1,x4  
MOV 28PS,PSW  
CMPB 810,PSW  
BEQ .+4  
HLT  
CMP 8-1,x4  
BEQ .+4  
HLT  
CMP 8100001,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 8-1  
:SAVE PS  
:IS PS = 10  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100001  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 150 MUL -1 \* 877777 = -1 100001 PS = 10  
:\*\*\*\*\*

011414 010701  
011416 012704 177777  
011422 070427 077777  
011426 013767 177776 003022  
011434 122767 000010 003014  
011442 001401  
011444 000000  
011446 022704 177777  
011450 001401  
011452 000000  
011456 022705 100001  
011462 001401  
011464 000000

SCOPE  
MOV 8-1,x4  
MUL 877777,x4  
MOV 28PS,PSW  
CMPB 810,PSW  
BEQ .+4  
HLT  
CMP 8-1,x4  
BEQ .+4  
HLT  
CMP 8100001,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 877777  
:SAVE PS  
:IS PS = 10  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100001  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 151 MUL -2 \* 877777 = -1 2 PS = 11  
\*\*\*\*\*

011466 010701  
011470 012704 177776  
011474 070427 077777  
011500 013767 177776 002750  
011506 122767 000011 002742  
011514 001401  
011516 000000  
011520 022704 177777  
011524 001401  
011526 000000  
011530 022705 000002  
011534 001401  
011536 000000

SCOPE  
MOV 8-2,x4  
MUL 877777,x4  
MOV 28PS,PSW  
CMPB 811,PSW  
BEQ .+4  
HLT  
CMP 8-1,x4  
BEQ .+4  
HLT  
CMP 82,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -2  
:MULTIPLY -2 \* 877777  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 2  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 152 MUL 77777 \* 8-2 = -1 2 PS = 11  
\*\*\*\*\*

011540 010701  
011542 012704 077777  
011546 070427 177776  
011552 013767 177776 002676  
011556 122767 000011 002670  
011566 001401  
011570 000000  
011572 022704 177777  
011576 001401  
011600 000000  
011602 022705 000002  
011606 001401  
011610 000000

SCOPE  
MOV 877777,x4  
MUL 8-2,x4  
MOV 28PS,PSW  
CMPB 811,PSW  
BEQ .+4  
HLT  
CMP 8-1,x4  
BEQ .+4  
HLT  
CMP 82,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 8-2  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 2  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 153 MUL 125252 \* 02 = -1 52524 PS = 11  
\*\*\*\*\*

011612	010701			SCOPE		:TEST OF MULTIPLY
011614	012704	125252		MOV	0125252,x4	:LOAD MULTIPLICAN WITH 125252
011620	070427	000002		MUL	02,x4	:MULTIPLY 125252 * 02
011624	013767	177776	002624	MOV	00PS,PSW	:SAVE PS
011632	122767	000011	002616	CHPB	011,PSW	:IS PS = 11
011640	001401			BEQ	.+4	
011642	000000			HLT		:PS IS WRONG
011644	022704	177777		CHP	0-1,x4	:IS HIGH ORDER = -1
011650	001401			BEQ	.+4	
011652	000000			HLT		:HIGH ORDER IS WRONG
011654	022705	052524		CHP	052524,x4!1	:IS LOW ORDER = 52524
011660	001401			BEQ	.+4	
011662	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 154 MUL 2 \* 0125252 = -1 52524 PS = 11  
\*\*\*\*\*

011664	010701			SCOPE		:TEST OF MULTIPLY
011666	012704	000002		MOV	02,x4	:LOAD MULTIPLICAN WITH 2
011672	070427	125252		MUL	0125252,x4	:MULTIPLY 2 * 0125252
011676	013767	177776	002552	MOV	00PS,PSW	:SAVE PS
011704	122767	000011	002544	CHPB	011,PSW	:IS PS = 11
011712	001401			BEQ	.+4	
011714	000000			HLT		:PS IS WRONG
011716	022704	177777		CHP	0-1,x4	:IS HIGH ORDER = -1
011722	001401			BEQ	.+4	
011724	000000			HLT		:HIGH ORDER IS WRONG
011726	022705	052524		CHP	052524,x4!1	:IS LOW ORDER = 52524
011732	001401			BEQ	.+4	
011734	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 155 MUL 52525 \* 02 = 0 125252 PS = 1  
:\*\*\*\*\*

011736	010701			SCOPE		:TEST OF MULTIPLY
011740	012704	052525		MOV	052525,x4	:LOAD MULTIPLICAN WITH 52525
011744	070427	000002		MUL	02,x4	:MULTIPLY 52525 * 02
011750	013767	177776	002500	MOV	00PS,PSW	:SAVE PS
011756	122767	000001	002472	CHPB	01,PSW	:IS PS = 1
011764	001401			BEG	.+4	
011766	000000			HLT		:PS IS WRONG
011770	022704	000000		CHP	00,x4	:IS HIGH ORDER = 0
011774	001401			BEG	.+4	
011776	000000			HLT		:HIGH ORDER IS WRONG
012000	022705	125252		CHP	0125252,x4!1	:IS LOW ORDER = 125252
012004	001401			BEG	.+4	
012006	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 156 MUL 2 \* 052525 = 0 125252 PS = 1  
:\*\*\*\*\*

012010	010701			SCOPE		:TEST OF MULTIPLY
012012	012704	000002		MOV	02,x4	:LOAD MULTIPLICAN WITH 2
012016	070427	052525		MUL	052525,x4	:MULTIPLY 2 * 052525
012022	013767	177776	002426	MOV	00PS,PSW	:SAVE PS
012030	122767	000001	002420	CHPB	01,PSW	:IS PS = 1
012036	001401			BEG	.+4	
012040	000000			HLT		:PS IS WRONG
012042	022704	000000		CHP	00,x4	:IS HIGH ORDER = 0
012046	001401			BEG	.+4	
012050	000000			HLT		:HIGH ORDER IS WRONG
012052	022705	125252		CHP	0125252,x4!1	:IS LOW ORDER = 125252
012056	001401			BEG	.+4	
012060	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 157 MUL 125252 \* #40000 = 165252 100000 PS = 11  
:\*\*\*\*\*

012062	010701			SCOPE		:TEST OF MULTIPLY
012064	012704	125252		MOV	#125252,X4	:LOAD MULTIPLICAN WITH 125252
012070	070427	040000		MUL	#40000,X4	:MULTIPLY 125252 * #40000
012074	013767	177776	002354	MOV	3#PS,PSW	:SAVE PS
012102	122767	000011	002346	CHPB	#11,PSW	:IS PS = 11
012110	001401			BEQ	.+4	
012112	000000			HLT		:PS IS WRONG
012114	022704	165252		CHP	#165252,X4	:IS HIGH ORDER = 165252
012120	001401			BEQ	.+4	
012122	000000			HLT		:HIGH ORDER IS WRONG
012124	022705	100000		CHP	#100000,X4!1	:IS LOW ORDER = 100000
012130	001401			BEQ	.+4	
012132	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 160 MUL 40000 \* #125252 = 165252 100000 PS = 11  
:\*\*\*\*\*

012134	010701			SCOPE		:TEST OF MULTIPLY
012136	012704	040000		MOV	#40000,X4	:LOAD MULTIPLICAN WITH 40000
012142	070427	125252		MUL	#125252,X4	:MULTIPLY 40000 * #125252
012146	013767	177776	002302	MOV	3#PS,PSW	:SAVE PS
012154	122767	000011	002274	CHPB	#11,PSW	:IS PS = 11
012162	001401			BEQ	.+4	
012164	000000			HLT		:PS IS WRONG
012166	022704	165252		CHP	#165252,X4	:IS HIGH ORDER = 165252
012172	001401			BEQ	.+4	
012174	000000			HLT		:HIGH ORDER IS WRONG
012176	022705	100000		CHP	#100000,X4!1	:IS LOW ORDER = 100000
012202	001401			BEQ	.+4	
012204	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 161 MUL 100000 \* 8100000 = 40000 0 PS = 1  
:\*\*\*\*\*

012206	010701			SCOPE		:TEST OF MULTIPLY
012210	012704	100000		MOV	8100000,x4	:LOAD MULTIPLICAN WITH 100000
012214	070427	100000		MUL	8100000,x4	:MULTIPLY 100000 * 8100000
012220	013767	177776	002230	MOV	2#PS,PSW	:SAVE PS
012226	122767	000001	002222	CHPB	81,PSW	:IS PS = 1
012234	001401			BEG	+.4	
012236	000000			HLT		:PS IS WRONG
012240	022704	040000		CHP	840000,x4	:IS HIGH ORDER = 40000
012244	001401			BEG	+.4	
012246	000000			HLT		:HIGH ORDER IS WRONG
012250	022705	000000		CHP	80,x4!1	:IS LOW ORDER = 0
012254	001401			BEG	+.4	
012256	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 162 MUL 70707 \* 870707 = 31221 44261 PS = 1  
:\*\*\*\*\*

012260	010701			SCOPE		:TEST OF MULTIPLY
012262	012704	070707		MOV	870707,x4	:LOAD MULTIPLICAN WITH 70707
012266	070427	070707		MUL	870707,x4	:MULTIPLY 70707 * 870707
012272	013767	177776	002156	MOV	2#PS,PSW	:SAVE PS
012300	122767	000001	002150	CHPB	81,PSW	:IS PS = 1
012306	001401			BEG	+.4	
012310	000000			HLT		:PS IS WRONG
012312	022704	031221		CHP	831221,x4	:IS HIGH ORDER = 31221
012316	001401			BEG	+.4	
012320	000000			HLT		:HIGH ORDER IS WRONG
012322	022705	044261		CHP	844261,x4!1	:IS LOW ORDER = 44261
012326	001401			BEG	+.4	
012330	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 163 MUL 107070 \* 0107070 = 31222 26100 PS = 1  
\*\*\*\*\*

012332	010701			SCOPE		:TEST OF MULTIPLY
012334	012704	107070		MOV	0107070,x4	:LOAD MULTIPLICAN WITH 107070
012340	070427	107070		MUL	0107070,x4	:MULTIPLY 107070 * 0107070
012344	013767	177776	002104	MOV	00PS,PSW	:SAVE PS
012352	122767	000001	002076	CHPB	01,PSW	:IS PS = 1
012360	001401			BEG	.+4	
012362	000000			HLT		:PS IS WRONG
012364	022704	031222		CHP	031222,x4	:IS HIGH ORDER = 31222
012370	001401			BEG	.+4	
012372	000000			HLT		:HIGH ORDER IS WRONG
012374	022705	026100		CHP	026100,x4!1	:IS LOW ORDER = 26100
012400	001401			BEG	.+4	
012402	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 164 MUL 100000 \* 077777 = 140000 100000 PS = 11  
\*\*\*\*\*

012404	010701			SCOPE		:TEST OF MULTIPLY
012406	012704	100000		MOV	0100000,x4	:LOAD MULTIPLICAN WITH 100000
012412	070427	077777		MUL	077777,x4	:MULTIPLY 100000 * 077777
012416	013767	177776	002032	MOV	00PS,PSW	:SAVE PS
012424	122767	000011	002024	CHPB	011,PSW	:IS PS = 11
012432	001401			BEG	.+4	
012434	000000			HLT		:PS IS WRONG
012436	022704	140000		CHP	0140000,x4	:IS HIGH ORDER = 140000
012442	001401			BEG	.+4	
012444	000000			HLT		:HIGH ORDER IS WRONG
012446	022705	100000		CHP	0100000,x4!1	:IS LOW ORDER = 100000
012452	001401			BEG	.+4	
012454	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 165 MUL 77777 \* 100000 = 140000 100000 PS = 11  
\*\*\*\*\*

012456 010701  
012460 012704 077777  
012464 070427 100000  
012470 013767 177776 001760  
012476 122767 000011 001752  
012504 001401  
012506 000000  
012510 022704 140000  
012514 001401  
012516 000000  
012520 022705 100000  
012524 001401  
012526 000000

SCOPE  
MOV 877777,X4  
MUL 8100000,X4  
MOV 28PS,PSW  
CMPB 811,PSW  
BEQ .+4  
HLT  
CMP 814000,X4  
BEQ .+4  
HLT  
CMP 8100000,X4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 100000  
:SAVE PS  
:IS PS = 11  
:PS IS WRONG  
:IS HIGH ORDER = 140000  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100000  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 166 MUL 157634 \* 104031 = 7453 133074 PS = 1  
\*\*\*\*\*

012530 010701  
012532 012704 157634  
012536 070427 104031  
012542 013767 177776 001706  
012550 122767 000001 001700  
012556 001401  
012560 000000  
012562 022704 007453  
012566 001401  
012570 000000  
012572 022705 133074  
012576 001401  
012600 000000

SCOPE  
MOV 8157634,X4  
MUL 8104031,X4  
MOV 28PS,PSW  
CMPB 81,PSW  
BEQ .+4  
HLT  
CMP 87453,X4  
BEQ .+4  
HLT  
CMP 8133074,X4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 157634  
:MULTIPLY 157634 \* 104031  
:SAVE PS  
:IS PS = 1  
:PS IS WRONG  
:IS HIGH ORDER = 7453  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 133074  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 167 MUL 104031 \* 0157634 = 7453 133074 PS = 1  
:\*\*\*\*\*

012602	010701			SCOPE		:TEST OF MULTIPLY
012604	012704	104031		MOV	0104031,x4	:LOAD MULTIPLICAN WITH 104031
012610	070427	157634		MUL	0157634,x4	:MULTIPLY 104031 * 0157634
012614	013767	177776	001634	MOV	00PS,PSW	:SAVE PS
012622	122767	000001	001626	CMPB	01,PSW	:IS PS = 1
012630	001401			BEQ	+.4	
012632	000000			HLT		:PS IS WRONG
012634	022704	007453		CMP	07453,x4	:IS HIGH ORDER = 7453
012640	001401			BEQ	+.4	
012642	000000			HLT		:HIGH ORDER IS WRONG
012644	022705	133074		CMP	0133074,x4!1	:IS LOW ORDER = 133074
012650	001401			BEQ	+.4	
012652	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 170 MUL 152210 \* 00 = 0 0 PS = 4  
:\*\*\*\*\*

012654	010701			SCOPE		:TEST OF MULTIPLY
012656	012704	152210		MOV	0152210,x4	:LOAD MULTIPLICAN WITH 152210
012662	070427	000000		MUL	00,x4	:MULTIPLY 152210 * 00
012666	013767	177776	001562	MOV	00PS,PSW	:SAVE PS
012674	122767	000004	001554	CMPB	04,PSW	:IS PS = 4
012702	001401			BEQ	+.4	
012704	000000			HLT		:PS IS WRONG
012706	022704	000000		CMP	00,x4	:IS HIGH ORDER = 0
012712	001401			BEQ	+.4	
012714	000000			HLT		:HIGH ORDER IS WRONG
012716	022705	000000		CMP	00,x4!1	:IS LOW ORDER = 0
012722	001401			BEQ	+.4	
012724	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 171 MUL 0 \* #152210 = 0 0 PS = 4  
:\*\*\*\*\*

012726 010701  
012730 012704 000000  
012734 070427 152210  
012740 013767 177776 001510  
012746 122767 000004 001502  
012754 001401  
012756 000000  
012760 022704 000000  
012764 001401  
012766 000000  
012770 022705 000000  
012774 001401  
012776 000000

SCOPE  
MOV #0,%4  
MUL #152210,%4  
MOV 2#PS,PSW  
CMPB #4,PSW  
BEQ .+4  
HLT  
CMP #0,%4  
BEQ .+4  
HLT  
CMP #0,%4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 0  
:MULTIPLY 0 \* #152210  
:SAVE PS  
:IS PS = 4  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 172 MUL -1 \* #0 = 0 0 PS = 4  
:\*\*\*\*\*

013000 010701  
013002 012704 177777  
013006 070427 000000  
013012 013767 177776 001436  
013020 122767 000004 001430  
013026 001401  
013030 000000  
013032 022704 000000  
013036 001401  
013040 000000  
013042 022705 000000  
013046 001401  
013050 000000

SCOPE  
MOV #-1,%4  
MUL #0,%4  
MOV 2#PS,PSW  
CMPB #4,PSW  
BEQ .+4  
HLT  
CMP #0,%4  
BEQ .+4  
HLT  
CMP #0,%4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* #0  
:SAVE PS  
:IS PS = 4  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 173 MUL 0 \* 0-1 = 0 0 PS = 4  
:\*\*\*\*\*

013052 010701  
013054 012704 000000  
013060 070427 177777  
013064 013767 177776 001364  
013072 122767 000004 001356  
013100 001401  
013102 000000  
013104 022704 000000  
013110 001401  
013112 000000  
013114 022705 000000  
013120 001401  
013122 000000

SCOPE  
MOV 00,x4  
MUL 0-1,x4  
MOV 00PS,PSM  
CMPB 04,PSM  
BEQ .+4  
HLT  
CMP 00,x4  
BEQ .+4  
HLT  
CMP 00,x4!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 0  
:MULTIPLY 0 \* 0-1  
:SAVE PS  
:IS PS = 4  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 174 MUL -1 \* 01 = -1 -1 PS = 10  
:\*\*\*\*\*

013124 010701  
013126 012705 177777  
013130 070527 000001  
013136 013767 177776 001312  
013144 122767 000010 001304  
013150 001401  
013152 000000  
013154 022705 177777  
013160 001401  
013164 000000  
013166 022705 177777  
013172 001401  
013174 000000

SCOPE  
MOV 0-1,x5  
MUL 01,x5  
MOV 00PS,PSM  
CMPB 010,PSM  
BEQ .+4  
HLT  
CMP 0-1,x5  
BEQ .+4  
HLT  
CMP 0-1,x5!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 01  
:SAVE PS  
:IS PS = 10  
:  
:PS IS WRONG  
:IS HIGH ORDER = -1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = -1  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 175 MUL -1 \* 80 = 0 0 PS = 4  
\*\*\*\*\*

013176 010701  
013200 012705 177777  
013204 070527 000000  
013210 013767 177776 001240  
013216 122767 000004 001232  
013224 001401  
013226 000000  
013230 022705 000000  
013234 001401  
013236 000000  
013240 022705 000000  
013244 001401  
013246 000000

SCOPE  
MOV 8-1,XS  
MUL 80,XS  
MOV 38PS,PSW  
CMPB 84,PSW  
BEQ .+4  
HLT  
CMP 80,XS  
BEQ .+4  
HLT  
CMP 80,XS!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 80  
:SAVE PS  
:IS PS = 4  
:  
:PS IS WRONG  
:IS HIGH ORDER = 0  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 0  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 176 MUL 77777 \* 810000 = 100000 100000 PS = 11  
\*\*\*\*\*

013250 010701  
013252 012705 077777  
013256 070527 100000  
013262 013767 177776 001166  
013270 122767 000011 001160  
013276 001401  
013300 000000  
013302 022705 100000  
013306 001401  
013310 000000  
013312 022705 100000  
013316 001401  
013320 000000

SCOPE  
MOV 877777,XS  
MUL 810000,XS  
MOV 38PS,PSW  
CMPB 811,PSW  
BEQ .+4  
HLT  
CMP 810000,XS  
BEQ .+4  
HLT  
CMP 810000,XS!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 810000  
:SAVE PS  
:IS PS = 11  
:  
:PS IS WRONG  
:IS HIGH ORDER = 100000  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100000  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 177 MUL -1 \* 877777 = 100001 100001 PS = 10  
\*\*\*\*\*

013322 010701  
013324 012705 177777  
013330 070527 077777  
013334 013767 177776 001114  
013342 122767 000010 001106  
013350 001401  
013352 000000  
013354 022705 100001  
013360 001401  
013362 000000  
013364 022705 100001  
013370 001401  
013372 000000

SCOPE  
MOV 0-1,XS  
MUL 877777,XS  
MOV @PS,PSW  
CMPB @10,PSW  
BEQ .+4  
HLT  
CMP @100001,XS  
BEQ .+4  
HLT  
CMP @100001,XS!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH -1  
:MULTIPLY -1 \* 877777  
:SAVE PS  
:IS PS = 10  
:  
:PS IS WRONG  
:IS HIGH ORDER = 100001  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100001  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 200 MUL 77777 \* 877777 = 1 1 PS = 1  
\*\*\*\*\*

013374 010701  
013376 012705 077777  
013402 070527 077777  
013406 013767 177776 001042  
013414 122767 000001 001034  
013422 001401  
013424 000000  
013426 022705 000001  
013432 001401  
013434 000000  
013436 022705 000001  
013442 001401  
013444 000000

SCOPE  
MOV 877777,XS  
MUL 877777,XS  
MOV @PS,PSW  
CMPB @1,PSW  
BEQ .+4  
HLT  
CMP @1,XS  
BEQ .+4  
HLT  
CMP @1,XS!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 77777  
:MULTIPLY 77777 \* 877777  
:SAVE PS  
:IS PS = 1  
:  
:PS IS WRONG  
:IS HIGH ORDER = 1  
:  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 1  
:  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 201 MUL 2 \* 82 = 44 PS = 0  
\*\*\*\*\*

013446	010701			SCOPE		:TEST OF MULTIPLY
013450	012705	000002		MOV	82,X5	:LOAD MULTIPLICAN WITH 2
013454	070527	000002		MUL	82,X5	:MULTIPLY 2 * 82
013460	013767	177776	000770	MOV	2#PS,PSW	:SAVE PS
013466	122767	000000	000762	CHPB	80,PSW	:IS PS = 0
013474	001401			BEG	.+4	
013476	000000			HLT		:PS IS WRONG
013500	022705	000004		CHP	84,X5	:IS HIGH ORDER = 4
013504	001401			BEG	.+4	
013506	000000			HLT		:HIGH ORDER IS WRONG
013510	022705	000004		CHP	84,X5!1	:IS LOW ORDER = 4
013514	001401			BEG	.+4	
013516	000000			HLT		:LOW ORDER IS WRONG
013520	012702	040000		MOV	840000,X2	
013524	012703	014462		MOV	851,X3	
013530	012704	014464		MOV	852,X4	

\*\*\*\*\*  
:TEST 202 MUL 125252 \* S1 = 165252 100000 PS = 11  
\*\*\*\*\*

013534	010701			SCOPE		:TEST OF MULTIPLY
013536	012700	125252		MOV	8125252,X0	:LOAD MULTIPLICAN WITH 125252
013542	070067	000714		MUL	S1,X0	:MULTIPLY 125252 * S1
013546	013767	177776	000702	MOV	2#PS,PSW	:SAVE PS
013554	122767	000011	000674	CHPB	811,PSW	:IS PS = 11
013562	001401			BEG	.+4	
013564	000000			HLT		:PS IS WRONG
013566	022700	165252		CHP	8165252,X0	:IS HIGH ORDER = 165252
013572	001401			BEG	.+4	
013574	000000			HLT		:HIGH ORDER IS WRONG
013576	022701	100000		CHP	8100000,X0!1	:IS LOW ORDER = 100000
013602	001401			BEG	.+4	
013604	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
: TEST 203 MUL 125252 \* 252 = 165252 100000 PS = 11  
: \*\*\*\*\*

013606 010701  
013610 012700 125252  
013614 070077 000644  
013620 013767 177776 000630  
013626 122767 000011 000622  
013632 001401  
013636 000000  
013640 022700 165252  
013644 001401  
013648 000000  
013650 022701 100000  
013654 001401  
013656 000000

SCOPE  
MOV @125252,x0  
MUL @252,x0  
MOV @PS,PSM  
CMPB @11,PSM  
BEQ .+4  
HLT  
CMP @165252,x0  
BEQ .+4  
HLT  
CMP @100000,x0!1  
BEQ .+4  
HLT

: TEST OF MULTIPLY  
: LOAD MULTIPLICAN WITH 125252  
: MULTIPLY 125252 \* 252  
: SAVE PS  
: IS PS = 11  
: PS IS WRONG  
: IS HIGH ORDER = 165252  
: HIGH ORDER IS WRONG  
: IS LOW ORDER = 100000  
: LOW ORDER IS WRONG

\*\*\*\*\*  
: TEST 204 MUL 125252 \* 251 = 165252 100000 PS = 11  
: \*\*\*\*\*

013660 010701  
013662 012700 125252  
013666 070037 014462  
013672 013767 177776 000556  
013700 122767 000011 000550  
013706 001401  
013710 000000  
013712 022700 165252  
013716 001401  
013720 000000  
013722 022701 100000  
013726 001401  
013730 000000

SCOPE  
MOV @125252,x0  
MUL @251,x0  
MOV @PS,PSM  
CMPB @11,PSM  
BEQ .+4  
HLT  
CMP @165252,x0  
BEQ .+4  
HLT  
CMP @100000,x0!1  
BEQ .+4  
HLT

: TEST OF MULTIPLY  
: LOAD MULTIPLICAN WITH 125252  
: MULTIPLY 125252 \* 251  
: SAVE PS  
: IS PS = 11  
: PS IS WRONG  
: IS HIGH ORDER = 165252  
: HIGH ORDER IS WRONG  
: IS LOW ORDER = 100000  
: LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 205 MUL 125252 \* X2 = 165252 100000 PS = 11  
\*\*\*\*\*

013732	010701			SCOPE		:TEST OF MULTIPLY
013734	012700	125252		MOV	@125252,X0	:LOAD MULTIPLICAN WITH 125252
013740	070002			MUL	X2,X0	:MULTIPLY 125252 * X2
013742	013767	177776	000506	MOV	@PS,PSW	:SAVE PS
013750	122767	000011	000500	CHPB	@11,PSW	:IS PS = 11
013756	001401			BEQ	.+4	
013760	000000			HLT		:PS IS WRONG
013762	022700	165252		CHP	@165252,X0	:IS HIGH ORDER = 165252
013766	001401			BEQ	.+4	
013770	000000			HLT		:HIGH ORDER IS WRONG
013772	022701	100000		CHP	@100000,X0!1	:IS LOW ORDER = 100000
013776	001401			BEQ	.+4	
014000	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 206 MUL 125252 \* (3)+ = 165252 100000 PS = 11  
\*\*\*\*\*

014002	010701			SCOPE		:TEST OF MULTIPLY
014004	012700	125252		MOV	@125252,X0	:LOAD MULTIPLICAN WITH 125252
014010	070023			MUL	(3)+,X0	:MULTIPLY 125252 * (3)+
014012	013767	177776	000436	MOV	@PS,PSW	:SAVE PS
014020	122767	000011	000430	CHPB	@11,PSW	:IS PS = 11
014026	001401			BEQ	.+4	
014030	000000			HLT		:PS IS WRONG
014032	022700	165252		CHP	@165252,X0	:IS HIGH ORDER = 165252
014036	001401			BEQ	.+4	
014040	000000			HLT		:HIGH ORDER IS WRONG
014042	022701	100000		CHP	@100000,X0!1	:IS LOW ORDER = 100000
014046	001401			BEQ	.+4	
014050	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 207 MUL 125252 \* -(3) = 165252 100000 PS = 11  
\*\*\*\*\*

014052 010701  
014054 012700 125252  
014060 070043  
014062 013767 177776 000366  
014070 122767 000011 000360  
014076 001401  
014100 000000  
014102 022700 165252  
014106 001401  
014110 000000  
014112 022701 100000  
014116 001401  
014120 000000

SCOPE  
MOV @125252,XD  
MUL -(3),XD  
MOV @PS,PSW  
CMPB @11,PSW  
BEQ .+4  
HLT  
CMP @165252,XD  
BEQ .+4  
HLT  
CMP @100000,XD!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 125252  
:MULTIPLY 125252 \* -(3)  
:SAVE PS  
:IS PS = 11  
:PS IS WRONG  
:IS HIGH ORDER = 165252  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100000  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 210 MUL 125252 \* 2(4) = 165252 100000 PS = 11  
\*\*\*\*\*

014122 010701  
014124 012700 125252  
014130 070064 000002  
014134 013767 177776 000314  
014142 122767 000011 000306  
014150 001401  
014152 000000  
014154 022700 165252  
014160 001401  
014162 000000  
014164 022701 100000  
014170 001401  
014172 000000

SCOPE  
MOV @125252,XD  
MUL 2(4),XD  
MOV @PS,PSW  
CMPB @11,PSW  
BEQ .+4  
HLT  
CMP @165252,XD  
BEQ .+4  
HLT  
CMP @100000,XD!1  
BEQ .+4  
HLT

:TEST OF MULTIPLY  
:LOAD MULTIPLICAN WITH 125252  
:MULTIPLY 125252 \* 2(4)  
:SAVE PS  
:IS PS = 11  
:PS IS WRONG  
:IS HIGH ORDER = 165252  
:HIGH ORDER IS WRONG  
:IS LOW ORDER = 100000  
:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 211 MUL 125252 \* 2(4) = 165252 100000 PS = 11  
\*\*\*\*\*

014174	010701			SCOPE		:TEST OF MULTIPLY
014176	012700	125252		MOV	@125252,x0	:LOAD MULTIPLICAN WITH 125252
014202	070074	000000		MUL	@(4),x0	:MULTIPLY 125252 * 2(4)
014206	013767	177776	000242	MOV	@PS,PSW	:SAVE PS
014214	122767	000011	000234	CHPB	@11,PSW	:IS PS = 11
014222	001401			BEQ	.+4	
014224	000000			HLT		:PS IS WRONG
014226	022700	165252		CHP	@165252,x0	:IS HIGH ORDER = 165252
014232	001401			BEQ	.+4	
014234	000000			HLT		:HIGH ORDER IS WRONG
014236	022701	100000		CHP	@100000,x0!1	:IS LOW ORDER = 100000
014242	001401			BEQ	.+4	
014244	000000			HLT		:LOW ORDER IS WRONG

\*\*\*\*\*  
:TEST 212 MUL 125252 \* 2(4)+ = 165252 100000 PS = 11  
\*\*\*\*\*

014246	010701			SCOPE		:TEST OF MULTIPLY
014250	012700	125252		MOV	@125252,x0	:LOAD MULTIPLICAN WITH 125252
014254	070034			MUL	@(4)+,x0	:MULTIPLY 125252 * 2(4)+
014256	013767	177776	000172	MOV	@PS,PSW	:SAVE PS
014264	122767	000011	000164	CHPB	@11,PSW	:IS PS = 11
014272	001401			BEQ	.+4	
014274	000000			HLT		:PS IS WRONG
014276	022700	165252		CHP	@165252,x0	:IS HIGH ORDER = 165252
014302	001401			BEQ	.+4	
014304	000000			HLT		:HIGH ORDER IS WRONG
014306	022701	100000		CHP	@100000,x0!1	:IS LOW ORDER = 100000
014312	001401			BEQ	.+4	
014314	000000			HLT		:LOW ORDER IS WRONG

```
*****
TEST 213 MUL 125252 * 2-(4) = 165252 100000 PS = 11
*****
```

```
014316 010701 SCOPE ;TEST OF MULTIPLY
014320 012700 125252 MOV #125252,X0 ;LOAD MULTIPLICAN WITH 125252
014324 070054 MUL 2-(4),X0 ;MULTIPLY 125252 * 2-(4)
014326 013767 177776 000122 MOV 2#PS,PSW ;SAVE PS
014334 122767 000011 000114 CMPB #11,PSW ;IS PS = 11
014342 001401 BEQ .+4
014344 000000 HLT ;PS IS WRONG
014346 022700 165252 CMP #165252,X0 ;IS HIGH ORDER = 165252
014352 001401 BEQ .+4
014354 000000 HLT ;HIGH ORDER IS WRONG
014356 022701 100000 CMP #100000,X0!1 ;IS LOW ORDER = 100000
014362 001401 BEQ .+4
014364 000000 HLT ;LOW ORDER IS WRONG
```

```
014366 005267 164406 INC ICNT
014372 016737 164402 177570 MOV ICNT,2#DISPLAY
014400 022767 020000 164372 CMP #20000,ICNT
014406 001402 BEQ .+6
014410 000167 164366 JMP BEG
014414 005067 164360 CLR ICNT
014420 105737 177564 TSTB 2#177564
014424 100375 BPL .-4
014426 112737 000007 177566 MOVB #7,2#177566
014434 013700 000042 MOV 2#42,X0 ;GET MONITOR RETURN ADDRESS
014440 001404 BEQ 1$ ;SKIP IF NONE
014442 004710 JSR 7,(0) ;GO BACK TO THE MONITOR
014444 000240 NOP
014446 000240 NOP
014450 000240 NOP
014452 000137 000200 1$: JMP 2#200 ;RESTART THE PROGRAM
```

```
014456 000000 PSH: 0
014460 177777 SD: -1
014462 040000 S1: 40000
014464 014462 S2: S1
014466 040000 S3: 40000
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000001 .END



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		594	860	879	898	917	936	955	974	993	1012	1031	1050	1069
		841	1107	1126	1145	1164	1183	1202	1221	1240	1259	1278	1297	1316
		1088	1354	1373	1392	1411	1430	1449	1468	1487	1506	1525	1544	1563
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		1829	2095	2114	2133	2152	2171	2190	2209	2228	2247	2266	2285	2304
		2076	2342	2361	2380	2399	2418	2437	2456	2475	2494	2513	2532	2551
		2323	2589	2612	2631	2650	2669	2688	2707	2726	2745	2764	2783	
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			519	538	556#	557	575#	594#	595	613#	614	632#	633	633
			651#	670#	671	689#	690	708#	709	727#	728	746#	747	765#
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			898#	917#	918	936#	937	955#	956	974#	975	993#	994	1012#
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RUN-TIME: 12 21 3 SECONDS  
RUN-TIME RATIO: 102/37=2.7  
CORE USED: 7K (14 PAGES)

E07

Speaker system 2 channels, 21 W, 200 Hz dist. peak, 2 dist. w/100, 24 pages  
[REDACTED]

[REDACTED]