

KE11-B

DIAGNOSTIC PACKAGE
MD-11-DZKED-A

EP-DZKED-A-DL-A
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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZKED-A
PRODUCT NAME: KE11-B DIAGNOSTIC PACKAGE
DATE: AUGUST 1976
MAINTAINED BY: DIAGNOSTIC PROGRAMMING GROUP
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1.0 ABSTRACT:

THIS IS A DIAGNOSTIC PACKAGE FOR USE WITH THE KE11-B. THIS PACKAGE INCLUDES A USER'S GUIDE WHICH CONTAINS A DETAILED EXPLANATION OF THE INDIVIDUAL ERRORS, THE PARAMETERS TO BE USED WHILE IN THE FAST ERROR LOOP MODE AND THE TEST POINTS TO BE CHECKED.

THERE ARE THREE PARTS TO THE MAIN TEST. THESE BEING
1. REGISTER TESTS, 2. LOGICAL AND ARITHMETIC SHIFT TESTS AND 3. MULTIPLY AND DIVIDE TESTS. THE PROGRAM ITSELF CONTAINS A COMPREHENSIVE ERROR HANDLER WHICH PERMITS THE USER TO INSERT THE DIFFERENT PARAMETERS FOR EACH INDIVIDUAL ERROR AND ENTER A FAST ERROR LOOP WHICH SHOULD GREATLY AID IN THE DEBUGGING OF THE KE11-B.

2.0 REQUIREMENTS:

- 1. PDP 11 (4K MINIMUM)
2. KE11-B INTERFACE
3. TELETYPE (ASR-33 OR EQUIVALENT)

3.0 LOADING PROCEEDURE:

LOAD THIS PROGRAM VIA THE ABSOLUTE LOADER

4.0 OPERATIONAL PROCEEDURE:

4.1 CONTROL SOFTWARE SWITCH SETTINGS

NOTE: ONLY AVAILABLE WHEN STARTING AT ADDRESS 210

SRO=1 SKIP LOGICAL AND ARITHMETIC SHIFT TESTS
SRI=1 SKIP MULTIPLY AND DIVIDE TESTS

4.2 OPERATOR ACTION

LOAD PROGRAM
LOAD ADDRESS 200
PRESS START

NOTE: STARTING AT ADDRESS 200 WILL NOT ALLOW ANY "SOFTWARE" SWITCH OPTIONS.

4.3 PASS DEFINATION

NORMAL OPERATION IS WITH ALL SWITCHS DOWN. UNDER THESE CONDITIONS A PASS WILL REQUIRE APPROXIMATLY 4 MINUTES AT WHICH TIME "EAE OK!" IS PRINTED ON THE TTY

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5.0 ERRORS:

5.1 BUSS TIMEOUT ERRORS

A CHECK IS MADE FOR BUSS TIMEOUT ERRORS FOR THE DURATION OF THE TESTS. ANY ERRORS WILL CAUSE A PRINTOUT INCLUDING THE LOCATION WHERE THE ERROR OCCURED AND A REQUEST FOR THE FAILING ADDRESS. THERE ARE FOUR COMMANDS ASSOCIATED WITH THIS TYPE OF ERROR WHICH ARE LISTED BELOW WITH THE EXCEPTION THAT THE "R" COMMAND RESTARTS THE PROGRAM FROM BUSS ERROR.

5.2 OPERATIONAL ERRORS

THERE ARE ELEVEN TYPES OF ERRORS POSSIBLE IN THIS PROGRAM NOT COUNTING BUSS TIMEOUT ERRORS. THESE ERRORS VARY AS TO THE NUMBER OF REGISTERS USED, THE INFORMATION DISPLAYED AND THE WAY THE ERROR LOOPS ARE CONSTRUCTED. IF YOU FOLLOW THE DIRECTIONS PRINTED AND USE THE "USER'S GUIDE" IN THIS DOCUMENT, YOU WILL HAVE NO PROBLEMS. AFTER SUPPLYING THE PARAMETERS OBTAINED FROM THE USER'S GUIDE, THERE ARE FOUR COMMANDS THAT CAN BE TYPED ON THE TTY TO CONTROL EXECUTION OF THE ERROR LOOP. THESE FOUR COMMANDS ARE AS FOLLOWS:

S= STOP THE LOOP
C= CONTINUE THE LOOP
P= CHANGE THE PARAMETERS
R= RETURN TO THE FAILING TEST

BEFORE USING ANY OTHER COMMAND, THE "S" COMMAND MUST BE USED FIRST.

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KE11 - B USER GUIDE

REGISTER TESTS

ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
001	177310	N/A	N/A	E60-11	ROM LDSC	SHEET 2	TEST SC=0, INSURE PROPER LOAD
002	177310	N/A	N/A	E60-11	ROM LDSC	SHEET 2,9	TEST SC=77 & SR=3X1, INSURE SC & SR =1'S
003	177304	N/A	N/A	E6-15	ROM ACTIVE	SHEET 7,8	TEST MQ=0, INSURE MQ =0 AT MQ REG & BUS DRVR
004	177304	N/A	N/A	E6-15	ROM ACTIVE	SHEET 2	TEST SR=36 WITH AC=MQ=0, MQ SIGN EXTENDS
005	177304	N/A	N/A	E6-15	ROM ACTIVE	SHEET 6,7,8	TEST MQ=1'S, INSURE PROPER LOAD AND BUS DRVRS
006	177304	N/A	N/A	E6-15	ROM ACTIVE	SHEET 2	TEST SR BIT 5 & 1, AC=177777 & MQ15=1
007	177302	N/A	N/A	E6-15	ROM ACTIVE	SHEET 6,7,8	TEST AC=0, INSURE PROPER LOAD & BUS DRVRS.
010	177302	N/A	N/A	E6-15	ROM ACTIVE	SHEET 2	TEST SR=20, IMPLIES AC=0, MQ = 177777
011	177302	N/A	N/A	E6-15	ROM ACTIVE	SHEET 7,8	TEST AC=177777, INSURE PROPER LOAD THE DATA PATH TO BUS DRIVERS IS VALID ALREADY AT THIS POINT IN TEST

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012	177302	N/A	N/A	E6-15	ROM ACTIVE	SHEET 2	TEST SR=42, IMPLIES AC=177777 AND MQ15=1 INSURE SR=42 AT E106 & E89
013	177304	177302	N/A	E6-15	ROM ACTIVE	SHEET 6,7,8	TEST MQ WITH ALL NUMBERS PLACE FAULTY DATA PATTERN AS REQUESTED MAYBE TWO BITS TIED TOGETHER
014	177304	177302	N/A	E6-15	ROM ACTIVE	SHEET 6,7,8	TEST AC WITH ALL NUMBERS PLACE FAULTY DATA PATTERN AS REQUESTED MAYBE TWO BITS TIED TOGETHER
015	177304	N/A	N/A	E48-5	ROM ALU 03	SHEET 9	TEST SIGN EXT INTO AC, AC SHOULD = 1'S THE ALU SHOULD BE SET FOR ALL ONE'S OP
016	177304	N/A	N/A	E48-5	ROM ALU 03	SHEET 9	TEST SIGN EXT INTO AC, AC SHOULD = 0'S THE ALU SHOULD BE SET FOR ALL ZERO'S
017	177304	N/A	N/A	E77-9	I/O LDX	SHEET 7	TEST BYTE SIGN EXT OF MQ, MQ=177777 INSURE E108 & E69 ARE WORKING
020	177304	N/A	N/A	E48-5	ROM ALU 03	SHEET 9	TEST BYTE SIGN EXT INTO AC, AC=177777 INSURE PROPER ALU OP.
REGISTER TESTS (CONT.)							
ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
021	177304	N/A	N/A	E77-9	I/O LDX	SHEET 7	TEST BYTE EXT OF MQ, MQ=0 INSURE E108 & E69 ARE WORKING
022	177304	N/A	N/A	E48-5	ROM ALU 03	SHEET 9	TEST BYTE SIGN EXT INTO AC, AC=0 INSURE PROPER ALU OP
023	177304	N/A	N/A	E48-5	ROM ALU 03	SHEET 9	TEST SIGN EXT OF MQ15 ONLY AC SHOULD =177777, MQ = 100000 INSURE PROPER ALU OP
024	177304	N/A	N/A	E48-5	ROM ALU 03	SHEET 9	TEST BYTE SIGN EXT OF MQ07 ONLY AC=177777, MQ=177600 INSURE PROPER ALU OP
025	177304	N/A	N/A	E77-9	I/O LDX	SHEET 7	TEST BYTE SIGN EXT OF MQ WITH MQ07=1 ONLY INSURE E108 & E69 ARE WORKING
026	177310	177312	N/A	E72-15	TIM READ STB	SHEET 2	TEST DATI AT NOR ONLY READS THE LOW BYTE WHICH IS THE SC. INSURE READ STB HI IS INHIBITED (E89-15)
027	177310	177312	N/A	E72-15	TIM READ STB	SHEET 2	TEST DATI AT NOR ONLY READS THE LOW BYTE WHICH IS THE SC.

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LOGICAL SHIFT TESTS							
ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
030	177314	177310	N/A	E60-5	ROM SC DEC	SHEET 2,8	TEST LSH, SHIFT LEFT ALL ZERO'S WITH MQ=0 INSURE STAT MQ00=0 AT E62-7
031	177314	177310	N/A	E68-9	I/O DATI	SHEET 2	TEST SR=36 AFTER LSH SHIFT LEFT ZEROS INSURE PROPER STATUS BITS.
032	177314	177310	N/A	E60-4	ROM SC ENB	SHEET 2,7	TEST LSH, SHIFT RIGHT ALL ZERO'S INTO AC INSURE ZERO IN AT STAT AC15 IN (E104-2, SHEET 7)
033	177314	177310	N/A	E68-9	I/O DATI	SHEET 2,6	TEST SR=36 AFTER LSH SHIFT RIGHT ZEROS AC & MQ SHOULD BOTH BE ZERO
034	177304	177302	177314	E60-4	ROM SC ENB	SHEET 2	TEST LSH WITH ZERO SHIFT COUNT MQ=1, AC=0 INSURE SC IS NEVER COUNTING
035	177304	177302	177314	E68-9	I/O DATI	SHEET 2,6	TEST SR = 20 AFTER LSH WITH ZERO SHIFT INSURE PROPER BIT SET IN SR ON SHEET 2
036	177304	177302	177314	E60-4	ROM SC ENB	SHEET 2,7,8	TEST LSH SHIFT RIGHT OF MQ WITH VARIABLE SHIFT COUNT 1 - 16, AC=0, MQ=1'S INITIALLY LOAD FAILING SHIFT COUNT INTO SWITCH REG AND INSURE PROPER DATA BEING SHIFTED
037	177304	177302	177314	E68-9	I/O DATI	SHEET 2,6	TEST SR=23 AFTER ABOVE (036) TEST INSURE SR BITS SET
040	177304	177302	177314	E60-4	ROM SC ENB	SHEET 2,7,8	TEST LSH ZERO SHIFT WITH AC=1'S INSURE PROPER DATA IN AC
041	177304	177302	177314	E68-9	I/O DATI	SHEET 2,6	TEST SR=350 AFTER ZERO SHIFT WITH AC=1'S, MQ=0 INITIALLY, CHECK FOR PROPER DATA
042	177304	177302	177314	E60-5	ROM SC DEC	SHEET 2,7,8	TEST LSH SHIFT LEFT OF AC WITH VARIABLE SHIFT COUNT 1-16, AC=1'S, MQ=0 INITIALLY LOAD FAILING SHIFT COUNT INTO SWITCH REG AND INSURE PROPER DATA BEING SHIFTED
043	177304	177302	177314	E68-9	I/O DATI	SHEET 2,6	TEST SR=311 AFTER ABOVE (040) TEST INSURE SR BITS SET.

LOGICAL SHIFT TESTS (CONT.)							COMMENTS
ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	
044	177304	177302	177314	E60-4	ROM SC ENB	SHEET 2,7,8	TEST LSH WITH ALT ONE/ZERO WITH ZERO SHIFT COUNT. AC=0, MQ=125252 INITIALLY. INSURE PROPER DATA PATTERN
045	177304	177302	177314	E68-9	I/O DATI	SHEET 2,6	TEST SR=20 AFTER ABOVE TEST (044) INSURE PROPER SR BITS.
046	177304	177302	177314	E60-4	ROM SC ENB	SHEET 2,7,8	TEST LSH WITH ALT ONE / ZEROS IN MQ USING VARIABLE SHIFT COUNT. LOAD FAILING SHIFT COUNT IN SWITCH REG AND INSURE PROPER DATA PATTERN. SHIFT COUNT VARIES FROM 177777 TO 177760. STATUS BITS ARE BAD FOR THIS TEST.
047	177304	177302	177314	E60-4	ROM SC ENB	SHEET 2,7,8	TEST DESCRIPTION AT ERR#046. ERROR IN DATA PATTERN OF MQ. LOAD FAULTY PATTERN IN REGISTERS WITH PROPER SHIFT COUNT AND MQ FOR FAULTY PATTERN.
050	177304	177302	177314	E60-4	ROM SC ENB	SHEET 2,7,8	TEST ALT ONE/ZERO IN AC REG WITH ZERO SHIFT COUNT FOR LSH OPERATION. THE AC IS DROPPING BITS OR BEING SHIFTED. CHECK OUT WHAT'S HAPPENING. LOAD MQ=0 AND AC=125252 AND LOCATE FAULTY BIT.
051	177304	177302	177314	E68-9	I/O DATI	SHEET 6,2	TEST SR=310 AFTER ABOVE TEST(050) LOAD MQ=0 AND AC=125252 AND SHIFT COUNT TO ZERO AND DETERMINE INCORRECT STATUS BITS.
052	177304	177302	177314	E68-9	I/O DATI	SHEET 2,6,7,8	TEST SR=211 OR 110 IF ODD OR EVEN SHIFT COUNT RESPECTIVELY. LOAD FAULTY PATTERN INTO REGISTERS AS INDICATED BY PRINTOUT AND CHECK STATUS BITS AT SHEET 9 CHIP E13.
053	177304	177302	177314	E60-5	ROM SC ENB	SHEET 2,7,8	TEST AC FOR PROPER DATA PATTERN LOAD AC AND SC WITH FAULTY DATA PATTERN AS INDICATED AND INSURE THAT AC HOLDS THE PROPER DATA AT TERMINATION OF SHIFTING.
054	177304	177302	177314	E60-5	ROM SC ENB	SHEET 2,7,8	TESTS SHIFT BETWEEN AC AND MQ WITH LSH SHIFT COUNT = 16. TEST AC=0. EXAMINE E53-7 FOR PROPER ENTERING DATA LOCATED ON SHEET 8.
055	177304	177302	177314	E60-5	ROM SC ENB	SHEET 8	TESTS MQ = 0 AFTER ABOVE OPERATION(054) EXAMINE STAT MQ00 IN AT E62-7 SHEET 8.
056	177304	177302	177314	E68-9	I/O DATI	SHEET 6	TESTS SR=36 AFTER OPERATION ABOVE (054)

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057	177304	177302	177314	E60-5	ROM SC ENB	SHEET 8
060	177304	177302	177314	E60-5	FJM SC ENB	SHEET 8
ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA
061	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2
062	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2
063	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8
064	177304	177302	177314	E6-15	ROM ACTIVE	SEET 2
065	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8
066	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8
067	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2
070	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8
071	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8
072	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2
073	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8
074	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8
075	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2

TESTS THAT ONES CAN BE SHIFTED INTO THE AC FROM THE MQ. INITIALLY MQ=177777 AC = 0 AND SHIFT COUNT IS 16. CHECK THAT ONES ARE SHIFTED INTO AC AT E53-7 SHEET 8.

TESTS MQ=0 AFTER ABOVE TEST (057). INSURE ZEROS ENTER MQ AT E62-7 AND THAT MQ IS COMPLETELY SHIFTED INTO AC. IT MUST BE SHIFTED 16 TIMES.

COMMENTS

TEST SR=150AT COMPLETION OF ABOVE TEST(057). INSURE SR IS CORRECT WHEN ROM ACTIVE IS COMPLETE WITH LSH CYCLE

TESTS AC=100000 AFTER LSH LEFT 16 TIMES WITH AC=0 AND MQ=177777 INITIALLY. INSURE PROPER SHIFT THROUGH AC SHEET 7,8.

TESTS MQ=0 AFTER ABOVE TEST (062). INSURE ZEROES SHIFTED INTO MQ AND ALL ONES ARE SHIFTED OUT.

CHECK SR FOR 111 AT END OF ROM ACTIVE LSH PULSE.

TEST LSH LEFT 16 WITH MQ=125252 AND AC=0 INITIALLY. AC IS CHECKED FOR 125252 AFTER SHIFT. LOAD DATA PATTERN AND CHECK AC AND MQ FOR PROPER SHIFT.

TESTS MQ=0 AFTER TEST 065. INSURE MQ=0.

TEST SR=110 AFTER TEST 065. CHECK STATUS BITS ON SHEET 2

TEST LSH LEFT 1 WITH AC=0 AND MQ=125252. CHECK AC=1 AFTER LSH IS DONE.

TEST MQ=52524 AFTER TEST 070.

TEST SR=0 AFTER TEST 070

TEST LSH LEFT WITH VARIABLE SHIFT COUNT OCTAL 21 TO 37. AC=0 AND MQ=000001 INITIALLY. LOAD FAULTY PATTERN INTO PROPER REGISTERS AND EXAMINE FAULT AREA.

TEST MQ=0 AFTER ABOVE TEST 073.

TESTS SR =10 AFTER TEST 073.

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LOGICAL SHIFT TESTS (CONT.)

ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
076	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TESTS AC=0 AFTER LSH RIGHT 16TIMES WITH AC=MQ=0 INITIALLY.
077	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TESTS MQ=0 AFTER ABOVE TEST 076
100	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2	TESTS SR=36 AFTER TEST 076.
101	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TEST LSH RIGHT 16 TIMES WITH AC=177777 AND MQ=0 INITIALLY. CHECKS FOR AC=0.
102	177304	177302	177314	E6-15	ROM ACTIVE	SHEET7,8	TEST MQ=177777 AFTER TEST 101. INSURE ONES ARE BEING SHIFTED INTO THE MQ AT E114-2 SHEET 7.
103	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2	TEST SR=20 AFTER TEST 101.
104	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TEST LSH RIGHT 31 TIMES WITH AC=177777 AND MQ = 0 INITIALLY. CHECKS FOR AC EQUAL ZERO AT COMPLETION OF SHIFTING.

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LOGICAL SHIFT TESTS (CONT.)

ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
105	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TESTS MQ=000001 AFTER ABOVE TEST 104. INSURE THAT ZERO IS SHIFTED THROUGH AC AND MQ.
106	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2	TESTS SR=23 AT END OF SHIFT.
107	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TEST LSH RIGHT 16 TIMES WITH AC=125252 AND MQ =0 INITIALLY. CHECK FOR PROPER DATA AT END OF SHIFT. AC SHOULD EQUAL ZERO.
110	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TEST MQ=125252 AT COMPLETION OF TEST 107.
111	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2	TEST SR=20 AT COMPLETION OF TEST 107.
112	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TEST LSH RIGHT 1 TIME WITH MQ=0 AND AC=52525 INITIALLY. CHECKS AC=25252 AFTER LSH COMPLETION.
113	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TEST MQ=100000 AFTER TEST 112.
114	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2	TEST SR=0 AFTER TEST 112 COMPLETION.
115	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TEST LSH RIGHT WITH VARIABLE SHIFT COUNT FROM 30 TO 19 TIMES WITH
116	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 7,8	TESTS MQ FOR PROPER DATA. LOAD FAULTY DATA PATTERN INTO REGISTERS AND EXAMINE MQ FOR PROPER DATA.
117	177304	177302	177314	E6-15	ROM ACTIVE	SHEET 2	TEST SR=22 AT COMPLETION OF TEST 115.

ARITHMETIC SHIFT TESTS

ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
120	177304	177302	177316	E6-15	ROM ACTIVE	SHEET 2,6,7,8,9	TESTS ASH OPERATION UNDER VARIETY OF CONDITONS LOCATED IN TABLES TBLA1 THROUGH TBLA13. INSURE THAT SIGN EXTENSIO IS PROPER VIA SHEET 9 E3-6. INSURE SHEET 8 E62-LOW. EXAMINE AC & MQ AS REQUIRED. HOWEVER, AT THIS POINT DATA PATHS ARE PRETTY WELL CHECKED OUT FOR SHIFT PATTERNS. ERROR 120 IS FAILURE OF THE AC. LOAD FAILING DATA PATTERN AND DEBUG.
121	177304	177302	177316	E6-15	ROM ACTIVE	SHEET 2,6,7,8	TEST ASH OP FOR PROPER MQ DATA UNDER TEST 120.
122	177304	177302	177316	E6-15	ROM ACTIVE	SHEET 2	TESTS SR FOR PROPER DATA. SR WILL INDICATE OVERFLOW CONDITIONS AT SR7/SR6 XOR. THE ISR SHEET CONTAINS OVERFLOW DATA VIA E57-11.

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NORMALIZE TESTS

ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
123	177304	177302	177312	E60-4	ROM SC ENB	SHEET 2	TEST NORMALIZE USING TABLES TBLB1 THROUGH TBLB7. CHECK THAT MUX NOR1 (SHT 2 AND MUX NOR2 (SHT 2 E56-8) ARE CAUSING CYCLE TERMINATION. NOR1=> THAT AC=140000 AND MQ PRIOR TO ENTERING TEST. NOR2 => THAT EITHER SC=AC=160000 AND MQ=000000 OR AC14 NOT EQUAL AC13 BEFORE THE NEXT SHIFT. THE REST OF THE CIRCUITR PRETTY MUCH CHECKED OUT. FAILURE AT TEST 123 INDICATES AC FAILURE.

124	177304	177302	177312	E60-4	ROM SC ENB	SHEET 7,8	TEST MQ FOR PROPER DATA AT COMPLETION OF TEST 123.
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125 TEST 123.	177304	177302	177312	E60-4	ROM SC ENB	SHEET 2	TEST SR= PROPER DATA AT COMPLETION OF
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MULTIPLY TESTS

ERR #	REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
126	177304	177302	177306	E35-5 E60-5	ROM PC BR04 ROM SC DEC	SHEET ????	TEST MULTIPLY OPERATION VIA TABLES TBLC1 THROUGH TBLC6. THIS TEST USES ALL SIGN CONVENTIONS AND DATA PATTERNS TO SHAKE OUT THE BUGS. TWO SYNC POINTS ARE NOTED BUT FURTHER POI' , MAY BE WRITTEN DEPENDENT ON TYPE OF FAILURE. THE ALU SHEET 7,8 IS DRIVEN FROM MUXES ON SHEET 9 THROUGH THREE DIFFERENT TYPES OF OPERATIONS. F=A+B, F=A-B AND F=A. SHEET 9 USED WITH FLOW CHARTS SHOULD BE A GOOD STARTING POINT. FAILURE AT THIS TEST IMPLIES BAD AC DATA.

127	177304	177302	177306	E35-5 E60-5	ROM PC BR04 ROM SC DEC		SEE ABOVE TEST 126 FOR EXPLANATION. FAILURE HERE INDICATES BAD MQ DATA.
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130	177304	177302	177306	E35-5	ROM PC BR04	HSV6 20	LOADED VIA E21-1*(SHEET 09.2HCV80GEPS ZEROED AND SR7 GETS SR6 INPUT.
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DIVIDE ERR #	TESTS REG#1	REG#2	REG#3	SYNC PT	SYNC MNEM	TEST AREA	COMMENTS
131	177302	177300	N/A	E39-2	ROM OVFL1	SHEET 3	TESTS FOR OVERFLOW ON ZERO DIVIDE SHOULD SET OVERFLOW FROM E74-6 SHT 3.
132	177302	177300	N/A	E13-10	WORD SEL	SHEET 9	INDICATES AC WAS POS. SIGN AND THE N BIT WAS NOT IF ERROR OCCURED. CHECK THAT SR7 (E13-13) WAS ZEROED.
133	177302	177300	N/A	E13-10	WORD SEL	SHEET 9	INDICATES AC WAS NEG. SIGN AND THE N BIT WAS NOT IF ERROR OCCURED. CHECK THAT SR7 WAS SET.
134	177302	177300	N/A	E13-10	WORD SEL	SHEET 9	INDICATES THAT OVERFLOW NOT SET WHEN AC=52525 & DIV=52525. CHECK THAT SR7 WAS SET AT E13-13 SHT 9.
135	177302	177300	N/A	E13-10	WORD SEL	SHEET 9	INDICATES THAT SR6 WAS NOT AT THE CORRECT SIGN. CHECK E13-15 SHT 9, SR6 SHOULD BE ZERO.
136	177302	177300	N/A	E13-10	WORD SEL	SHEET 9	INDICATES THAT SR6 WAS NOT SET CHECK E13-15 SHT 3.
137	177304	177302	177300	E6-15	ROM ACTIVE	SHEET 3,9	TEST OF DIVIDE OPERATION WITH TABLES TBLD1 THROUGH TBLD16. FAILURE INDICATES BAD AC DATA. REFER TO TABLE FOR CORRECT DATA PATTERN. SHEETS 3 & 9 ARE GOOD STARTING POINTS AS THE REST OF THE MODULE IS PREVIOUSLY TESTED.
140	177304	177302	177300	E6-15	ROM ACTIVE	SHEET 3 & 9	TEST FAILURE DUE TO BAD MQ DATA. INSURE PROPER ALU CONTROL LINES.
141	177304	177302	177300	E6-15	ROM ACTIVE	SHEET 9	FAILURE DUE TO BAD STATUS REG AFTER DIVIDE OP OF TEST 137. CHECK E13 SHEET 9 FOR PROPER OPERATION.
142	177304	177306	N/A	E6-15	ROM ACTIVE		THIS TESTS SUCCESSIVE MULTIPLIES. FAILURE IN THIS AREA MOST LIKELY DUE TO SOME OBSCURE TIMING ERROR?? FAILURE DUE TO MQ NOT EQUAL 40000 AFTER MULTIPLYING MQ=1 AND MUL=2 FOURTEEN SUCCESSIVE TIMES.

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MISCELLANEOUS TESTS ON MULTIPLY AND DIVIDE SEQUENCES
ERR # REG#1 REG#2 REG#3 SYNC PT SYNC MNEM

TEST AREA

COMMENTS

143 177304 177302 177306 E6-15 ROM ACTIVE

TEST 142. THIS FAILURE INDICATES THAT
AC NOT EQUAL ZERO AFTER SUCCESSIVE MULT.

144 177304 177302 177306 E6-15 ROM ACTIVE

TEST 142. THIS FAILURE INDICATES THAT
SR NOT EQUAL 22 AFTER SUCCESSIVE MULT.

145 177304 177302 177300 E6-15 ROM ACTIVE

THIS TEST SUCCESSIVE DIVIDES. MQ=40000
INITIALLY AND IS DIVIDED BY DIV=2 FOURTEEN TIMES
FAILURE AGAIN PROBABLY DUE TO TIMING ERROR.

THIS TEST FAILURE DUE TO THE AC NOT EQUAL 0
AFTER SUCCESSIVE DIVIDE.

146 177304 177302 177300 E6-15 ROM ACTIVE

REFER TO TEST 145. FAILURE HERE
INDICATES THAT THE MQ NOT EQUAL TO
000001 AFTER SUCCESSIVE DIVIDE.

147 177304 177302 177300 E6-15 ROM ACTIVE

REFER TO TEST 145. FAILURE HERE INDICATES
SR NOT EQUAL 22 AFTER SUCCESSIVE DIVIDE.

150 N/A N/A N/A E6-15 ROM ACTIVE

TEST ALTERNATE MUL/DIV OPERATION.
MQ INITIALLY=52525, THEN ALT. MUL
AND DIV. BY 40000.
FAILURE AT THIS POINT INDICATES MQ
NOT EQUAL TO 52525 AFTER COMPLETION.

151 N/A N/A N/A E6-15 ROM ACTIVE

REFER TO TEST 150. FAILURE AT THIS
POINT AC NOT EQUAL 0 AFTER ALT.
MULT & DIV. OPS.

152 N/A N/A N/A E6-15 ROM ACTIVE

REFER TO TEST 150. FAILURE AT
THIS POINT INDICATES FAILURE OF
SR TO EQUAL 22.

153 N/A N/A N/A E6-15 ROM ACTIVE

TESTS PROCESSING OF DATA. FAILURE
INDICATES THAT THE MQ NOT=100000
AFTER MULTIPLY OPERATION.
MQ=125252 AND MUL=40000 INITIALLY.

154 N/A N/A N/A E6-15 ROM ACTIVE

REFER TO TEST 153. FAILURE AT THIS
POINT INDICATES AC NOT
EQUAL TO 165252.

155 N/A N/A N/A E6-15 ROM ACTIVE

TEST DIVIDE PROCESSING. MQ=000001,
AC=25253 AND DIV=125252 INITIALLY. FAILURE
AT THIS POINT INDICATES BAD AC DATA.

156 N/A N/A N/A E6-15 ROM ACTIVE

REFER TO TEST 155. FAILURE AT
THIS POINT INDICATES BAD MQ DATA.

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564 .LIST BIN,SEQ,LOC

568 ;MACRO DEFINITIONS:

573 .ABS
574 ;DEFINITIONS:

575 000000
576 000001
577 000002
578 000003
579 000004
580 000005
581 000006
582 000007
583 177560
584 177562
585 177564
586 177566
587 000240
588 177776

590 .LIST MEB
591 .=0

592	000000	000002	.+2	
593	000002	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
594	000004	000006	.+2	
595	000006	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
596	000010	000012	.+2	
597	000012	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
598	000014	000016	.+2	
599	000016	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
600	000020	000022	.+2	
601	000022	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
602	000024	000026	.+2	
603	000026	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
604	000030	000032	.+2	
605	000032	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
606	000034	000036	.+2	
607	000036	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
608	000040	000042	.+2	
609	000042	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
610	000044	000046	.+2	
611	000046	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
612	000050	000052	.+2	
613	000052	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
614	000054	000056	.+2	
615	000056	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
616	000060	000062	.+2	
617	000062	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS
618	000064	000066	.+2	
619	000066	000000	HALT	;TRAPPED TO PREVIOUS ADDRESS

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620	000070	000072							
621	000072	000074							
622	000074	000076							
623	000076	000080							
624		000046							
625	000046	007224							
626		000052							
627	000052	000060							
628		000060							
629	000060	007242							
630	000062	000340							
631		000200							
632	000200	005067	000422						
633	000204	000167	000570						
634		000210							
635	000210	012767	000001	000410					
636	000216	000167	000556						
637		000602							
638	000602	177300							
639	000604	177302							
640	000606	177304							
641	000610	177306							
642	000612	177310							
643	000614	177311							
644	000616	177312							
645	000620	177314							
646	000622	177316							
647	000624	000500							
648	000626	000000							
649		001000							
650	001000	012767	012400	176776					
651	001006	012706	000600						
652	001012	005077	177566						
653	001016	005077	177564						
654	001022	005003							
655	001024	005767	177576						
656	001030	001411							
657	001032	012704	014175						
658	001036	004567	012050						
659	001042	004567	011446						
660	001046	016767	011720	177550					
661	001054	005067	006160						
662	001060	005046							
663	001062	012746	001070						
664	001066	000002							
665									
666									
667									
668									
669	001070	012777	000000	177514					
670	001076	105777	177510						
671	001102	001405							
672	001104	004567	006362						
673	001110	000001							
674	001112	000001							
675	001114	000765							

;TRAPPED TO PREVIOUS ADDRESS

;TRAPPED TO PREVIOUS ADDRESS

:SET BIT TO ASK FOR OPTIONS

;SOFTWARE SWITCH REGISTER

;SET UP ILLEGAL ADDRESS RETURN
;SET UP STACK;ASK FOR SW OPTIONS
;NO;GO GET IT
;STORE IT
;CLEAR PASS COUNT
;CLEAR PSW PRIORITY
;SO TTY CAN INTERRUPT

; REGISTER TEST FOR WRITABILITY

;CHECK SC FLOPS FOR 0 STATE

676									;CHECK SR AND SC FLOPS FOR 1 STATE
677									
678	001116	012777	140477	177466	TS2:	MOV	#140477,ASC		
679	001124	017746	177462			MOV	ASC,-(6)		
680	001130	042716	037300			BIC	#37300,(6)		
681	001134	022726	140477			CMP	#140477,(6)+		
682	001140	001405				SEQ	.+14		
683	001142	004567	006324			JSR	R5,ECOMP		
684	001146	000001				1			
685	001150	000002				2			
686	001152	000761				BR	TS2		
687	001154	005077	177432			CLR	ASC		
688									
689									;CHECK MQ FLOPS FOR 0 STATE
690	001160	012777	000000	177420	TS3:	MOV	#0,AMQ		
691	001166	005777	177414			TST	AMQ		
692	001172	001405				BEQ	.+14		
693	001174	004567	006272			JSR	R5,ECOMP		
694	001200	000001				1			
695	001202	000003				3			
696	001204	000765				BR	TS3		
697									
698	001206	122777	000036	177400		CMPB	#36,ASR		;CHECK STATUS 36
699	001214	001405				BEQ	.+14		
700	001216	004567	006250			JSR	R5,ECOMP		
701	001222	000001				1			
702	001224	000004				4			
703	001226	000754				BR	TS3		
704									
705									;CHECK MQ FLOPS FOR 1 STATE
706	001230	012777	177777	177350	TS4:	MOV	#-1,AMQ		
707	001236	022777	177777	177342		CMP	#-1,AMQ		
708	001244	001405				BEQ	.+14		
709	001246	004567	006220			JSR	R5,ECOMP		
710	001252	000001				1			
711	001254	000005				5			
712	001256	000764				BR	TS4		
713									
714	001260	122777	000042	177326		CMPB	#42,ASR		;CHECK STATUS 42
715	001266	001405				BEQ	.+14		
716	001270	004567	006176			JSR	R5,ECOMP		
717	001274	000001				1			
718	001276	000006				6			
719	001300	000753				BR	TS4		
720									;CHECK AC FLOPS FOR 0 STATE
721	001302	012777	000000	177274	TS5:	MOV	#0,AC		
722	001310	005777	177270			TST	AC		
723	001314	001405				BEQ	.+14		
724	001316	004567	006150			JSR	R5,ECOMP		
725	001322	000001				1			
726	001324	000007				7			
727	001326	000765				BR	TS5		
728									
729	001330	122777	000020	177256		CMPB	#20,ASR		;CHECK STATUS 20
730	001336	001405				BEQ	.+14		
731	001340	004567	006126			JSR	R5,ECOMP		

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732	001344	000001			1		
733	001346	000010			10		
734	001350	000754			BR	TSS	
735							
736							;CHECK AC FLOPS FOR 1 STATE
737	001352	012777	177777	177224	TS6:	MOV	#-1, JAC
738	001360	022777	177777	177216		CMP	#-1, JAC
739	001366	001405				BEQ	.+14
740	001370	004567	006076			JSR	R5, ECOMP
741	001374	000001			1		
742	001376	000011			11		
743	001400	000764			BR	TS6	
744							
745	001402	122777	000042	177204		CMPB	#42, JSR
746	001410	001405				BEQ	.+14
747	001412	004567	006054			JSR	R5, ECOMP
748	001416	000001			1		
749	001420	000012			12		
750	001422	000753			BR	TS6	
751							
752							;CHECK AC AND MQ WITH ALL NUMBERS
753	001424	005001			TS7:	CLR	R1
754	001426	005201			CP1:	INC	R1
755	001430	001424				BEQ	TS8
756	001432	010177	177150			MOV	R1, JMQ
757	001436	020177	177144			CMP	R1, JMQ
758	001442	001405				BEQ	.+14
759	001444	004567	006022			JSR	R5, ECOMP
760	001450	000002			2		
761	001452	000013			13		
762	001454	000764			BR	CP1	
763	001456	010177	177122			MOV	R1, JAC
764	001462	020177	177116			CMP	R1, JAC
765	001466	001757				BEQ	CP1
766	001470	004567	005776			JSR	R5, ECOMP
767	001474	000002			2		
768	001476	000014			14		
769	001500	000752			BR	CP1	
770							;TEST OF SIGN EXTENTION
771	001502	012777	177777	177076	TS8:	MOV	#-1, JMQ
772	001510	022777	177777	177066		CMP	#-1, JAC
773	001516	001405				BEQ	.+14
774	001520	004567	005746			JSR	R5, ECOMP
775	001524	000001			1		
776	001526	000015			15		
777	001530	000764			BR	TS8	
778							
779	001532	005077	177050		15:	CLR	JMQ
780	001536	005777	177042			TST	JAC
781	001542	001405				BEQ	.+14
782	001544	004567	005722			JSR	R5, ECOMP
783	001550	000001			1		
784	001552	000016			16		
785	001554	000766			BR	15	
786							
787	001556	012777	177777	177022	25:	MOVB	#-1, JMQ
							;TEST OF BYTE SIGN EXTENTION

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788	001564	022777	177777	177014		CMP	#-1,2MQ	;CHECK FOR SIGN EXTENTION IN MQ
789	001572	001405				BEQ	.+14	;SKIP IF OK
790	001574	004567	005672			JSR	R5,ECOMP	
791	001600	000001				1		
792	001602	000017				17		
793	001604	000764				BR	25	
794	001606	022777	177777	176770		CMP	#-1,2AC	;CHECK FOR SIGN EXTENTION IN AC
795	001614	001405				BEQ	.+14	;SKIP IF OK
796	001616	004567	005650			JSR	R5,ECOMP	
797	001622	000001				1		
798	001624	000020				20		
799	001626	000753				BR	25	
800								
801	001630	105077	176752		35:	CLRB	2MQ	;CHECK FOR BYTE ZERO SIGN EXTENTION
802	001634	005777	176746			TST	2MQ	;CHECK FOR ZERO MQ
803	001640	001405				BEQ	.+14	;SKIP IF OK
804	001642	004567	005624			JSR	R5,ECOMP	
805	001646	000001				1		
806	001650	000021				21		
807	001652	000766				BR	35	
808	001654	005777	176724			TST	2AC	;CHECK FOR ZERO AC
809	001660	001405				BEQ	.+14	;SKIP IF OK
810	001662	004567	005604			JSR	R5,ECOMP	
811	001666	000001				1		
812	001670	000022				22		
813	001672	000756				BR	35	
814								
815	001674	012777	100000	176704	45:	MOV	#100000,2MQ	;LOAD MQ WITH LARGEST NUMBER
816	001702	022777	177777	176674		CMP	#-1,2AC	;DID IT SIGN EXTEND
817	001710	001405				BEQ	.+14	;SKIP IF OK
818	001712	004567	005554			JSR	R5,ECOMP	
819	001716	000001				1		
820	001720	000023				23		
821	001722	000764				BR	45	
822								
823	001724	112777	000200	176654	55:	MOV8	#200,2MQ	;LOAD MQ WITH LARGEST BYTE
824	001732	022777	177777	176644		CMP	#-1,2AC	;DID IT SIGN EXTEND
825	001740	001405				BEQ	.+14	;SKIP IF OK
826	001742	004567	005524			JSR	R5,ECOMP	
827	001746	000001				1		
828	001750	000024				24		
829	001752	000764				BR	55	
830	001754	022777	177600	176624		CMP	#177600,2MQ	;DID IT SIGN EXTEND
831	001762	001405				BEQ	.+14	;SKIP IF OK
832	001764	004567	005502			JSR	R5,ECOMP	
833	001770	000001				1		
834	001772	000025				25		
835	001774	000753				BR	55	
836								
837	001776	012777	000077	176606	65:	MOV	#77,2SC	;LOAD SC WITH -1
838	002004	022777	000077	176604		CMP	#77,2NOR	;CHECK FOR SIGN EXTENTION
839	002012	001405				BEQ	.+14	
840	002014	004567	005452			JSR	R5,ECOMP	
841	002020	000001				1		
842	002022	000026				26		
843	002024	000764				BR	65	

```

844
845 002026 005077 176560      75:  CLR      QSC      ;CLEAR SC
846 002032 005777 176560      TST      QNOR     ;CHECK NOR
847 002036 001405      BEQ      .+14
848 002040 004567 005426      JSR      R5,ECOMP
849 002044 000001      1
850 002046 000027      27
851 002050 000766      BR      75
852
853 ;
854 ;
855 002052 032767 000001 176544 ; AT THIS POINT, ALL THE REGISTERS CAN HANDLE DATA OF
856 002060 001401      BIT      #1,SFTSWR ANY FORM
857 002062 000167 003342      BEQ      .+4
858 ;
859 ; LOGICAL SHIFT TEST SECTION
860 ; TEST MQ SHIFT OF 0'S LEFT
861
862
863 002066 005077 176512      TS9:  CLR      QAC
864 002072 005077 176510      CLR      QMQ
865 002076 012700 177777      MOV      #-1,%0
866 002102 005200      LOOP:  INC      %0
867 002104 005077 176502      CLR      QSC      ;CLEAR SR AND SC
868 002110 010077 176504      MOV      %0,QLSH   ;SHIFT RD TIMES LEFT
869 002114 005777 176466      TST      QMQ      ;TEST MQ FOR '0'
870 002120 001405      BEQ      .+14      ;SKIP ERROR IF GOOD
871 002122 004567 005344      JSR      R5,ECOMP
872 002126 000001      1
873 002130 000030      30
874 002132 000763      BR      LOOP
875 002134 122777 000036 176452  CMPB     #36,QSR      ;CHECK STATUS REGISTER
876 002142 001405      BEQ      .+14      ;SKIP ERROR IF GOOD
877 002144 004567 005322      JSR      R5,ECOMP
878 002150 000001      1
879 002152 000031      31
880 002154 000752      BR      LOOP
881 002156 022700 000020      CMP      #16,%0      ;LAST ONE
882 002162 001347      BNE     LOOP
883
884
885 ;
886 ; TEST AC SHIFT OF 0'S RIGHT
887
888
889 002164 012700 000001      TS10:  MOV      #1,%0
890 002170 005300      LOOP1:  DEC      %0
891 002172 005077 176414      CLR      QSC      ;CLEAR SR AND SC
892 002176 010077 176416      MOV      %0,QLSH   ;SHIFT RD TIMES RIGHT
893 002202 005777 176376      TST      QAC      ;TEST AC FOR '0'
894 002206 001405      BEQ      .+14      ;SKIP ERROR IF GOOD
895 002210 004567 005256      JSR      R5,ECOMP
896 002214 000002      2
897 002216 000032      32
898 002220 000763      BR      LOOP1
899 002222 122777 000036 176364  CMPB     #36,QSR      ;CHECK STATUS REGISTER

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900 002230 001405          BEQ      .+14          ;SKIP ERROR IF GOOD
901 002232 004567 005234   JSR      R5,ECOMP
902 002236 000002          2
903 002240 000033          33
904 002242 000752          BR       LOOP1
905 002244 022700 177760   CMP      #-16.,%0      ;LAST ONE
906 002250 001347          BNE      LOOP1
907
908          ;          TEST MQ SHIFT OF 1'S RIGHT
909
910
911 002252 012777 177777 176326 TS11: MOV      #-1,%MQ      ;SET MQ=-1
912 002260 005077 176320          CLR      %AC          ;CLEAR AC
913 002264 005077 176330          CLR      %LSH          ;INITALIZE SHIFT BY 0
914 002270 027727 176312 177777   CMP      %MQ, #-1      ;COMPAIR UNSHIFTED MQ TO -1
915 002276 001405          BEQ      .+14          ;SKIP ERROR IF GOOD
916 002300 004567 005166   JSR      R5,ECOMP
917 002304 000002          2
918 002306 000034          34
919 002310 000760          BR       TS11
920 002312 122777 000020 176274   CMPB     #20,%SR      ;CHECK STATUS
921 002320 001405          BEQ      .+14          ;SKIP ERROR IF GOOD
922 002322 004567 005144   JSR      R5,ECOMP
923 002326 000002          2
924 002330 000035          35
925 002332 000747          BR       TS11
926
927
928 002334 012700 177777          TS11A: MOV      #177777,R0      ;SHIFT COUNT
929 002340 012701 077777          MOV      #777777,R1      ;DATA PATTERN
930 002344 012777 177777 176234 1$:  MOV      #-1,%MQ      ;SET MQ TO -1
931 002352 005077 176226          CLR      %AC          ;CLEAR AC
932 002356 010077 176236          MOV      R0,%LSH          ;SHIFT MQ R0 TIMES RIGHT
933 002362 020177 176220          CMP      R1,%MQ          ;CHECK RESULT
934 002366 001405          BEQ      .+14          ;SKIP IF CORRECT
935 002370 004567 005076   JSR      R5,ECOMP
936 002374 000003          3
937 002376 000036          36
938 002400 000761          BR       1$
939 002402 122777 000023 176204   CMPB     #23,%SR      ;CHECK STATUS
940 002410 001405          BEQ      .+14          ;SKIP IF CORRECT
941 002412 004567 005054   JSR      R5,ECOMP
942 002416 000003          3
943 002420 000037          37
944 002422 000750          BR       1$
945 002424 005300          DEC      R0          ;STEP SHIFT COUNT
946 002426 000241          CLC          ;CLEAR CARRY
947 002430 006001          ROR      R1          ;SHIFT DATA PATTERN
948 002432 001401          BEQ      TS12          ;GO TO NEXT TEST IF DONE
949 002434 000743          BR       1$          ;OTHERWISE CONTINUE
950
951
952
953          ;          TEST AC SHIFT OF 1'S LEFT
954
955

```

```

956
957 002436 005077 176144 TS12: CLR      @MQ
958 002442 012777 177777 176134 MOV      #-1,@AC      ;SET AC=-1
959 002450 005077 176144 CLR      @LSH      ;INITIALIZE SHIFT BY 0
960 002454 027727 176124 177777 CMP      @AC, #-1      ;COMPAIR UNSHIFTED AC TO -1
961 002462 001405 BEQ      .+14      ;SKIP ERROR IF GOOD
962 002464 004567 005002 JSR      R5,ECOMP
963 002470 000003 3
964 002472 000040 40
965 002474 000760 BR      TS12
966 002476 122777 000350 176110 CMPB     #350,@SR      ;CHECK STATUS
967 002504 001405 BEQ      .+14      ;SKIP ERROR IF STATUS CORRECT
968 002506 004567 004760 JSR      R5,ECOMP
969 002512 000003 3
970 002514 000041 41
971 002516 000747 BR      TS12
972
973 002520 012700 000001 TS12A: MOV      #1,R0      ;SHIFT COUNT
974 002524 012701 177776 MOV      #177776,R1      ;DATA PATTERN
975 002530 012777 177777 176046 1S: MOV      #-1,@AC      ;SET AC TO ONES
976 002536 010077 176056 MOV      R0,@LSH      ;SHIFT AC R0 TIMES LEFT
977 002542 020177 176036 CMP      R1,@AC      ;CHECK RESULT
978 002546 001405 BEQ      .+14      ;SKIP IF CORRECT
979 002550 004567 004716 JSR      R5,ECOMP
980 002554 000002 2
981 002556 000042 42
982 002560 000763 BR      1S
983 002562 122777 000311 176024 CMPB     #311,@SR      ;CHECK STATUS
984 002570 001405 BEQ      .+14      ;SKIP IF STATUS CORRECT
985 002572 004567 004674 JSR      R5,ECOMP
986 002576 000002 2
987 002600 000043 43
988 002602 000752 BR      1S
989 002604 005200 INC      R0      ;STEP SHIFT COUNT
990 002606 022700 000020 CMP      #20,R0      ;CHECK FOR LAST SHIFT
991 002612 001403 BEQ      TS13      ;GO TO NEXT TEST IF DONE
992 002614 000241 CLC      ;CLEAR CARRY
993 002616 006101 ROL      R1      ;SHIFT DATA PATTERN
994 002620 000743 BR      1S      ;CONTINUE
995
996
997
998
999 ; TEST MQ SHIFT RIGHT OF ALTERNATE 1'S AND 0'S
1000
1001
1002
1003 002622 012777 125252 175756 TS13: MOV      #125252,@MQ      ;SET MQ=125252
1004 002630 005077 175750 CLR      @AC      ;CLEAR AC
1005 002634 005077 175760 CLR      @LSH      ;INITIALIZE SHIFT BY 0
1006 002640 027727 175742 125252 CMP      @MQ,#125252      ;COMPAIR MQ
1007 002646 001405 BEQ      .+14      ;SKIP ERROR IF GOOD
1008 002650 004567 004616 JSR      R5,ECOMP
1009 002654 000003 3
1010 002656 000044 44
1011 002660 000760 BR      TS13

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1012	002662	122777	000020	175724		CMPB	#20,JSR		;CHECK STATUS
1013	002670	001405				BEQ	.+14		;SKIP ERROR IF GOOD
1014	002672	004567	004574			JSR	R5,ECOMP		
1015	002676	000003				3			
1016	002700	000045				45			
1017	002702	000747				BR	TS13		
1018									
1019									
1020	002704	012700	177777		TS13A:	MOV	#-1,R0		;SHIFT COUNT
1021	002710	012701	152525			MOV	#152525,R1		;DATA PATTERN
1022	002714	005067	000102			CLR	FLOP		;CLEAR COMPARATOR
1023	002720	012777	125252	175660	1S:	MOV	#125252,2MQ		;SET MQ = 125252
1024	002726	010077	175666			MOV	R0,2LSH		;SHIFT MQ R0 TIMES RIGHT
1025	002732	126777	000064	175654		CMPB	FLOP,JSR		;CHECK STATUS
1026	002740	001405				BEQ	.+14		;SKIP IF CORRECT
1027	002742	004567	004524			JSR	R5,ECOMP		
1028	002746	000002				2			
1029	002750	000046				46			
1030	002752	000762				BR	1S		
1031	002754	020177	175626			CMP	R1,2MQ		;CHECK DATA
1032	002760	001405				BEQ	.+14		;SKIP IF CORRECT
1033	002762	004567	004504			JSR	R5,ECOMP		
1034	002766	000002				2			
1035	002770	000047				47			
1036	002772	000752				BR	1S		
1037	002774	005267	000022			INC	FLOP		;FLIP FLOP
1038	003000	042767	177776	000014		BIC	#177776,FLOP		
1039	003006	005300				DEC	R0		;STEP SHIFT COUNT
1040	003010	022700	177760			CMP	#177760,R0		;DONE?
1041	003014	001403				BEQ	TS14		;GO TO NEXT TEST IF DONE
1042	003016	006201				ASR	R1		;SHIFT DATA PATTERN
1043	003020	000737				BR	1S		;CONTINUE
1044	003022	000000			FLOP:	DOO			;STATUS COMPARATOR
1045					;	TEST AC	SHIFT LEFT OF AL	TERNATE 1'S AND 0'S	
1046									
1047									
1048	003024	005077	175556		TS14:	CLR	2MQ		;SET AC=125252
1049	003030	012777	125252	175546		MOV	#125252,2AC		;INITALIZE SHIFT BY 0
1050	003036	005077	175556			CLR	2LSH		;COMPAIR AC
1051	003042	027727	175536	125252		CMP	2AC,#125252		;SKIP ERROR IF GOOD
1052	003050	001405				BEQ	.+14		
1053	003052	004567	004414			JSR	R5,ECOMP		
1054	003056	000003				3			
1055	003060	000050				50			
1056	003062	000760				BR	TS14		
1057	003064	122777	000310	175522		CMPB	#310,JSR		;CHECK STATUS
1058	003072	001405				BEQ	.+14		;SKIP ERROR IF GOOD
1059	003074	004567	004372			JSR	R5,ECOMP		
1060	003100	000003				3			
1061	003102	000051				51			
1062	003104	000747				BR	TS14		
1063									
1064									
1065	003106	012700	000001		TS14A:	MOV	#1,R0		;SHIFT COUNT
1066	003112	012701	052524			MOV	#52524,R1		;DATA PATTERN
1067	003116	012767	000211	177676		MOV	#211,FLOP		;SET UP STATUS COMPARATOR

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1068	003124	012777	125252	175452	1\$:	MOV	#125252, QAC	;SET AC = 125252
1069	003132	010077	175462			MOV	R0, QLSH	;SHIFT AC R0 TIMES LEFT
1070	003136	126777	177660	175450		CMPB	FLOP, QSR	;CHECK STATUS(211 W/CARRY, 110 W/O CARRY)
1071	003144	001405				BEQ	.+14	;SKIP IF STATUS CORRECT
1072	003146	004567	004320			JSR	R5, ECOMP	
1073	003152	000002				2		
1074	003154	000052				52		
1075	003156	000762				BR	1\$	
1076	003160	020177	175420			CMP	R1, QAC	;CHECK DATA
1077	003164	001405				BEQ	.+14	;SKIP ERROR IF GOOD
1078	003166	004567	004300			JSR	R5, ECOMP	
1079	003172	000002				2		
1080	003174	000053				53		
1081	003176	000752				BR	1\$	
1082	003200	162767	000101	177614	2\$:	SUB	#101, FLOP	;FLIP FLOP
1083	003206	062767	100000	177764		ADD	#100000, 2\$	
1084	003214	000241				CLC		;CLEAR CARRY
1085	003216	005200				INC	R0	;STEP SHIFT COUNT
1086	003220	022700	000017			CMP	#17, R0	;DONE?
1087	003224	001403				BEQ	TS1\$	;GO TO NEXT TEST IF DONE
1088	003226	006301				ASL	R1	;SHIFT DATA PATTERN
1089	003230	000241				CLC		;CLEAR CARRY
1090	003232	000734				BR	1\$	;CONTINUE
1091							TEST OF MQ SHIFT INTO AC	
1092								
1093								
1094								
1095								
1096	003234	012777	000000	175344	TS15:	MOV	#0, QMQ	;TEST OF LOGICAL SHIFT
1097	003242	012777	000000	175334		MOV	#0, QAC	;LOAD MQ WITH 0
1098	003250	012777	000020	175342		MOV	#16, QLSH	;LOAD AC WITH 0
1099	003256	022777	000000	175320		CMP	#0, QAC	;LOAD SHIFT COUNT (LSH) WITH 16.
1100	003264	001405				BEQ	.+14	;COMPARE AC WITH 0
1101	003266	004567	004200			JSR	R5, ECOMP	;GO TO ERROR IF BAD
1102	003272	000003				3		
1103	003274	000054				54		
1104	003276	000756				BR	TS15	
1105	003300	022777	000000	175300		CMP	#0, QMQ	;COMPARE MQ WITH 0
1106	003306	001405				BEQ	.+14	;GO TO ERROR IF BAD
1107	003310	004567	004156			JSR	R5, ECOMP	
1108	003314	000003				3		
1109	003316	000055				55		
1110	003320	000745				BR	TS15	
1111	003322	122777	000036	175264		CMPB	#36, QSR	;COMPARE SR WITH 36
1112	003330	001405				BEQ	.+14	;SKIP ERROR IF GOOD
1113	003332	004567	004134			JSR	R5, ECOMP	
1114	003336	000003				3		
1115	003340	000056				56		
1116	003342	000734				BR	TS15	
1117								
1118								
1119								
1120								
1121	003344	012777	177777	175234	1\$:	MOV	#-1, QMQ	;TEST OF LOGICAL SHIFT
1122	003352	012777	000000	175224		MOV	#0, QAC	;LOAD MQ WITH -1
1123	003360	012777	000020	175232		MOV	#16, QLSH	;LOAD AC WITH 0
								;LOAD SHIFT COUNT (LSH) WITH 16.

1124	003366	022777	177777	175210		CMP	#-1, QAC	;COMPARE AC WITH -1
1125	003374	001405				BEQ	.+14	;GO TO ERROR IF BAD
1126	003376	004567	004070			JSR	R5, ECOMP	
1127	003402	000003				3		
1128	003404	000057				57		
1129	003406	000756				BR	1\$	
1130	003410	022777	000000	175170		CMP	#0, QMQ	;COMPARE MQ WITH 0
1131	003416	001405				BEQ	.+14	;GO TO ERROR IF BAD
1132	003420	004567	004046			JSR	R5, ECOMP	
1133	003424	000003				3		
1134	003426	000060				60		
1135	003430	000745				BR	1\$	
1136	003432	122777	000150	175154		CMPB	#150, QSR	;COMPARE SR WITH 150
1137	003440	001405				BEQ	.+14	;SKIP ERROR IF GOOD
1138	003442	004567	004024			JSR	R5, ECOMP	
1139	003446	000003				3		
1140	003450	000061				61		
1141	003452	000734				BR	1\$	
1142								
1143								
1144								
1145								;TEST OF LOGICAL SHIFT
1146	003454	012777	177777	175124	2\$:	MOV	#-1, QMQ	;LOAD MQ WITH -1
1147	003462	012777	000000	175114		MOV	#0, QAC	;LOAD AC WITH 0
1148	003470	012777	000037	175122		MOV	#31, QLSH	;LOAD SHIFT COUNT (LSH) WITH 31.
1149	003476	022777	100000	175100		CMP	#100000, QAC	;COMPARE AC WITH 100000
1150	003504	001405				BEQ	.+14	;GO TO ERROR IF BAD
1151	003506	004567	003760			JSR	R5, ECOMP	
1152	003512	000013				3		
1153	003514	000062				62		
1154	003516	000756				BR	2\$	
1155	003520	022777	000000	175060		CMP	#0, QMQ	;COMPARE MQ WITH 0
1156	003526	001405				BEQ	.+14	;GO TO ERROR IF BAD
1157	003530	004567	003736			JSR	R5, ECOMP	
1158	003534	000003				3		
1159	003536	000063				63		
1160	003540	000745				BR	2\$	
1161	003542	122777	000111	175044		CMPB	#111, QSR	;COMPARE SR WITH 111
1162	003550	001405				BEQ	.+14	;SKIP ERROR IF GOOD
1163	003552	004567	003714			JSR	R5, ECOMP	
1164	003556	000003				3		
1165	003560	000064				64		
1166	003562	000734				BR	2\$	
1167								;TEST OF LOGICAL SHIFT
1168	003564	012777	125252	175014	3\$:	MOV	#125252, QMQ	;LOAD MQ WITH 125252
1169	003572	012777	000000	175004		MOV	#0, QAC	;LOAD AC WITH 0
1170	003600	012777	000020	175012		MOV	#16, QLSH	;LOAD SHIFT COUNT (LSH) WITH 16.
1171	003606	022777	125252	174770		CMP	#125252, QAC	;COMPARE AC WITH 125252
1172	003614	001405				BEQ	.+14	;GO TO ERROR IF BAD
1173	003616	004567	003650			JSR	R5, ECOMP	
1174	003622	000003				3		
1175	003624	000065				65		
1176	003626	000756				BR	3\$	
1177	003630	022777	000000	174750		CMP	#0, QMQ	;COMPARE MQ WITH 0
1178	003636	001405				BEQ	.+14	;GO TO ERROR IF BAD
1179	003640	004567	003626			JSR	R5, ECOMP	

1180	003644	000003			3		
1181	003646	000066			66		
1182	003650	000745			BR	3\$	
1183	003652	122777	000110	174734	CMPB	#110,SR	;COMPARE SR WITH 110
1184	003660	001405			BEQ	.+14	;SKIP ERROR IF GOOD
1185	003662	004567	003604		JSR	R5,ECOMP	
1186	003666	000003			3		
1187	003670	000067			67		
1188	003672	000734			BR	3\$	
1189							
1190							
1191							
1192							;TEST OF LOGICAL SHIFT
1193	003674	012777	125252	174704	4\$: MOV	#125252,AMQ	;LOAD MQ WITH 125252
1194	003702	012777	000000	174674	MOV	#0,AC	;LOAD AC WITH 0
1195	003710	012777	000001	174702	MOV	#1,LSH	;LOAD SHIFT COUNT (LSH) WITH 1
1196	003716	022777	000001	174660	CMP	#1,AC	;COMPARE AC WITH 1
1197	003724	001405			BEQ	.+14	;GO TO ERROR IF BAD
1198	003726	004567	003540		JSR	R5,ECOMP	
1199	003732	000003			3		
1200	003734	000070			70		
1201	003736	000756			BR	4\$	
1202	003740	022777	052524	174640	CMP	#52524,AMQ	;COMPARE MQ WITH 52524
1203	003746	001405			BEQ	.+14	;GO TO ERROR IF BAD
1204	003750	004567	003516		JSR	R5,ECOMP	
1205	003754	000003			3		
1206	003756	000071			71		
1207	003760	000745			BR	4\$	
1208	003762	122777	000000	174624	CMPB	#0,SR	;COMPARE SR WITH 0
1209	003770	001405			BEQ	.+14	;SKIP ERROR IF GOOD
1210	003772	004567	003474		JSR	R5,ECOMP	
1211	003776	000033			3		
1212	004000	000072			72		
1213	004002	000734			BR	4\$	
1214							
1215							
1216							;TEST OF LOGICAL SHIFT
1217	004004	012700	000021		TS15A: MOV	#21,R0	;SHIFT COUNT
1218	004010	012701	000002		MOV	#2,R1	;DATA PATTERN
1219	004014	012777	000001	174564	1\$: MOV	#1,AMQ	;SET MQ = 1
1220	004022	012777	000000	174554	MOV	#0,AC	;SET AC = 0
1221	004030	010077	174564		MOV	R0,LSH	;SHIFT MQ INTO AC R0 TIMES
1222	004034	020177	174544		CMP	R1,AC	;CHECK DATA
1223	004040	001405			BEQ	.+14	;SKIP ERROR IF GOOD
1224	004042	004567	003424		JSR	R5,ECOMP	
1225	004046	000003			3		
1226	004050	000073			73		
1227	004052	000760			BR	1\$	
1228	004054	022777	000000	174524	CMP	#0,AMQ	;IS MQ CLEARED?
1229	004062	001405			BEQ	.+14	;SKIP ERROR IF CLEARED
1230	004064	004567	003402		JSR	R5,ECOMP	
1231	004070	000003			3		
1232	004072	000074			74		
1233	004074	000747			BR	1\$	
1234	004076	122777	000010	174510	CMPB	#10,SR	;CHECK STATUS
1235	004104	001405			BEQ	.+14	;SKIP ERROR IF CORRECT

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1236	004106	004567	003360		JSR	R5, ECOMP	
1237	004112	000003			3		
1238	004114	000075			75		
1239	004116	000736			BR	15	
1240	004122	005200			INC	R0	; STEP SHIFT COUNT
1241	004122	022700	000037		CMP	#37, R0	; DONE?
1242	004126	001403			BEQ	TS16	; GO TO NEXT TEST IF DONE
1243	004130	000241			CLC		; CLEAR CARRY
1244	004132	006101			ROL	R1	; SHIFT DATA PATTERN
1245	004134	000727			BR	15	; CONTINUE
1246							
1247							
1248							
1249							
1250							
1251							
1252	004136	012777	000000	174442	TS16:	MOV	#0, 2MQ
1253	004144	012777	000000	174432		MOV	#0, 2AC
1254	004152	012777	177760	174440		MOV	#-16, 2LSH
1255	004160	022777	000000	174416		CMP	#0, 2AC
1256	004166	001405				BEQ	+14
1257	004170	004567	003276			JSR	R5, ECOMP
1258	004174	000003				3	
1259	004176	000076				76	
1260	004200	000756				BR	TS16
1261	004202	022777	000000	174376		CMP	#0, 2MQ
1262	004210	001405				BEQ	+14
1263	004212	004567	003254			JSR	R5, ECOMP
1264	004216	000003				3	
1265	004220	000077				77	
1266	004222	000745				BR	TS16
1267	004224	122777	000036	174362		CMPB	#36, 2SR
1268	004232	001405				BEQ	+14
1269	004234	004567	003232			JSR	R5, ECOMP
1270	004240	000003				3	
1271	004242	000100				100	
1272	004244	000734				BR	TS16
1273							
1274							
1275							
1276	004246	012777	000000	174332	15:	MOV	#0, 2MQ
1277	004254	012777	177777	174322		MOV	#-1, 2AC
1278	004262	012777	177760	174330		MOV	#-16, 2LSH
1279	004270	022777	000000	174306		CMP	#0, 2AC
1280	004276	001405				BEQ	+14
1281	004300	004567	003166			JSR	R5, ECOMP
1282	004304	000003				3	
1283	004306	000101				101	
1284	004310	000756				BR	15
1285	004312	022777	177777	174266		CMP	#-1, 2MQ
1286	004320	001405				BEQ	+14
1287	004322	004567	003144			JSR	R5, ECOMP
1288	004326	000003				3	
1289	004330	000102				102	
1290	004332	000745				BR	15
1291	004334	122777	000020	174252		CMPB	#20, 2SR

1292	004342	001405			BEQ	+.14		;SKIP ERROR IF GOOD
1293	004344	004567	003122		JSR	R5,ECOMP		
1294	004350	000003			3			
1295	004352	000103			103			
1296	004254	000734			BR	1\$		
1297								;TEST OF LOGICAL SHIFT
1298	004356	012777	000000	174222	2\$: MOV	#0,2MQ		;LOAD MQ WITH 0
1299	004364	012777	177777	174212	MOV	#-1,2AC		;LOAD AC WITH -1
1300	004372	012777	177741	174220	MOV	#-31,2LSH		;LOAD SHIFT COUNT (LSH) WITH -31.
1301	004400	022777	000000	174176	CMP	#0,2AC		;COMPARE AC WITH 0
1302	004406	001405			BEQ	+.14		;GO TO ERROR IF BAD
1303	004410	004567	003056		JSR	R5,ECOMP		
1304	004414	000003			3			
1305	004416	000104			104			
1306	004420	000756			BR	2\$		
1307	004422	022777	000001	174156	CMP	#1,2MQ		;COMPARE MQ WITH 1
1308	004430	001405			BEQ	+.14		;GO TO ERROR IF BAD
1309	004432	004567	003034		JSR	R5,ECOMP		
1310	004436	000003			3			
1311	004440	000105			105			
1312	004442	000745			BR	2\$		
1313	004444	122777	000023	174142	CMPB	#23,2SR		;COMPARE SR WITH 23
1314	004452	001405			BEQ	+.14		;SKIP ERROR IF GOOD
1315	004454	004567	003012		JSR	R5,ECOMP		
1316	004460	000003			3			
1317	004462	000106			106			
1318	004464	000734			BR	2\$		
1319								
1320								
1321								
1322								;TEST OF LOGICAL SHIFT
1323	004466	012777	000000	174112	3\$: MOV	#0,2MQ		;LOAD MQ WITH 0
1324	004474	012777	125252	174102	MOV	#125252,2AC		;LOAD AC WITH 125252
1325	004502	012777	177760	174110	MOV	#-16,2LSH		;LOAD SHIFT COUNT (LSH) WITH -16.
1326	004510	022777	000000	174066	CMP	#0,2AC		;COMPARE AC WITH 0
1327	004516	001405			BEQ	+.14		;GO TO ERROR IF BAD
1328	004520	004567	002746		JSR	R5,ECOMP		
1329	004524	000003			3			
1330	004526	000107			107			
1331	004530	000756			BR	3\$		
1332	004532	022777	125252	174046	CMP	#125252,2MQ		;COMPARE MQ WITH 125252
1333	004540	001405			BEQ	+.14		;GO TO ERROR IF BAD
1334	004542	004567	002724		JSR	R5,ECOMP		
1335	004546	000003			3			
1336	004550	000110			110			
1337	004552	000745			BR	3\$		
1338	004554	122777	000020	174032	CMPB	#20,2SR		;COMPARE SR WITH 20
1339	004562	001405			BEQ	+.14		;SKIP ERROR IF GOOD
1340	004564	004567	002702		JSR	R5,ECOMP		
1341	004570	000003			3			
1342	004572	000111			111			
1343	004574	000734			BR	3\$		
1344								
1345								
1346								
1347								;TEST OF LOGICAL SHIFT

1348	004576	012777	000000	174002	4S:	MOV	#0, QMQ	; LOAD MQ WITH 0
1349	004604	012777	052525	173772		MOV	#52525, QAC	; LOAD AC WITH 52525
1350	004612	012777	177777	174000		MOV	#-1, QLSH	; LOAD SHIFT COUNT (LSH) WITH -1
1351	004620	022777	025252	173756		CMP	#25252, QAC	; COMPARE AC WITH 25252
1352	004626	001405				BEQ	.+14	; GO TO ERROR IF BAD
1353	004630	004567	002636			JSR	RS, ECOMP	
1354	004634	000003				3		
1355	004636	000112				112		
1356	004640	000756				BR	4S	
1357	004642	022777	100000	173736		CMP	#100000, QMQ	; COMPARE MQ WITH 100000
1358	004650	001405				BEQ	.+14	; GO TO ERROR IF BAD
1359	004652	004567	002614			JSR	RS, ECOMP	
1360	004656	000003				3		
1361	004660	000113				113		
1362	004662	000745				BR	4S	
1363	004664	122777	000000	173722		CMPB	#0, QSR	; COMPARE SR WITH 0
1364	004672	001405				BEQ	.+14	; SKIP ERROR IF GOOD
1365	004674	004567	002572			JSR	RS, ECOMP	
1366	004700	000003				3		
1367	004702	000114				114		
1368	004704	000734				BR	4S	
1369								
1370								; TEST OF LOGICAL SHIFT
1371	004706	012700	177742		TS16A:	MOV	#177742, R0	; SHIFT COUNT
1372	004712	012701	000002			MOV	#2, R1	; DATA PATTERN
1373	004716	012777	000000	173662	1S:	MOV	#0, QMQ	; LOAD MQ WITH 0
1374	004724	012777	100000	173652		MOV	#100000, QAC	; LOAD AC WITH 100000
1375	004732	010077	173662			MOV	R0, QLSH	; SHIFT AC INTO MQ R0 TIMES
1376	004736	022777	000000	173640		CMP	#0, QAC	; AC CLEARED?
1377	004744	001405				BEQ	.+14	; SKIP ERROR IF CLEARED
1378	004746	004567	002520			JSR	RS, ECOMP	
1379	004752	000003				3		
1380	004754	000115				115		
1381	004756	000757				BR	1S	
1382	004760	020177	173622			CMP	R1, QMQ	; CHECK DATA
1383	004764	001405				BEQ	.+14	; SKIP ERROR IF GOOD
1384	004766	004567	002500			JSR	RS, ECOMP	
1385	004772	000003				3		
1386	004774	000116				116		
1387	004776	000747				BR	1S	
1388	005000	122777	000022	173606		CMPB	#22, QSR	; CHECK STATUS
1389	005006	001405				BEQ	.+14	; SKIP ERROR IF GOOD
1390	005010	004567	002456			JSR	RS, ECOMP	
1391	005014	000003				3		
1392	005016	000117				117		
1393	005020	000736				BR	1S	
1394	005022	005200				INC	R0	; STEP SHIFT COUNT
1395	005024	022700	177755			CMP	#177755, R0	; DONE?
1396	005030	001403				BEQ	TS17	; GO TO NEXT TEST IF DONE
1397	005032	000241				CLC		; CLEAR CARRY
1398	005034	006101				ROL	R1	; SHIFT DATA PATTERN
1399	005036	000727				BR	1S	; CONTINUE
1400								
1401								
1402	005040	012701	014224			MOV	#TBLA1, R1	; SET POINTER
1403	005044	005000				CLR	R0	; CLEAR SHIFT COUNT

; AT THIS POINT, LOGICAL SHIFT WORKS!

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1404	005046	012767	000000	000144	1\$:	MOV	#0, CCNT	: SET LOAD COUNT
1405	005054	012702	005222			MOV	#PMQ, R2	: SET LOAD ADDRESS POINTER
1406	005060	012122			2\$:	MOV	(R1)+, (R2)+	: LOAD PARAMETERS
1407	005062	005267	000132			INC	CCNT	: INCREMENT LOAD COUNT
1408	005066	022767	000006	000124		CMP	#6, CCNT	: FINISHED LOADING?
1409	005074	001371				BNE	2\$	: NO! KEEP ON LOADING
1410	005076	016777	000120	173502	3\$:	MOV	PMQ, #PMQ	: LOAD MQ
1411	005104	016777	000114	173472		MOV	PAC, #PAC	: LOAD AC
1412	005112	016777	000110	173502		MOV	PASH, #PASH	: LOAD SHIFT FACTOR
1413	005120	026777	000104	173456		CMP	ACCP, #ACCP	: COMPARE AC
1414	005126	001405				BEQ	.+14	: SKIP ERROR IF GOOD
1415	005130	004567	002336			JSR	R5, ECOMP	
1416	005134	000004				4		
1417	005136	000120				120		
1418	005140	000756				BR	3\$	
1419	005142	026777	000064	173436		CMP	MQCP, #MQCP	: COMPARE MQ
1420	005150	001405				BEQ	.+14	: SKIP ERROR IF GOOD
1421	005152	004567	002314			JSR	R5, ECOMP	
1422	005156	000004				4		
1423	005160	000121				121		
1424	005162	000745				BR	3\$	
1425	005164	126777	000044	173422		CMPB	SRCP, #SRCP	: CHECK STATUS
1426	005172	001405				BEQ	.+14	: SKIP ERROR IF CORRECT
1427	005174	004567	002272			JSR	R5, ECOMP	
1428	005200	000004				4		
1429	005202	000122				122		
1430	005204	000734				BR	3\$	
1431	005206	005200				INC	R0	: STEP SHIFT COUNT
1432	005210	022700	000015			CMP	#15, R0	: DONE?
1433	005214	001410				BEQ	TS18	: GO TO NEXT TEST IF DONE
1434	005216	000713				BR	1\$	: CONTINUE
1435	005220	000000				DOO		: LOAD COUNTER
1436	005222	000000				DOO		: MQ PARAMETER
1437	005224	000000				DOO		: AC PARAMETER
1438	005226					PDIV:		: DIV PARAMETER
1439	005226					PMUL:		: MUL PARAMETER
1440	005226	000000				PASH:	DOO	: ASH PARAMETER
1441	005230	000000				ACCP:	DOO	: AC COMPARATOR
1442	005232	000000				MQCP:	DOO	: MQ COMPARATOR
1443	005234	000000				SRCP:	DOO	: SR COMPARATOR
1444								
1445								: AT THIS POINT, THE ARITHMETIC SHIFT WORKS
1446	005236	005000				TS18:	CLR R0	: CLEAR CYCLE COUNT
1447	005240	012701	014460			MOV	#TBLB1, R1	: LOAD POINTER
1448	005244	012767	000000	177746	1\$:	MOV	#0, CCNT	: SET LOAD COUNT
1449	005252	012702	005222			MOV	#PMQ, R2	: LOAD ADDRESS POINTER
1450	005256	012122			2\$:	MOV	(R1)+, (R2)+	: LOAD PARAMETERS
1451	005260	005267	177734			INC	CCNT	: INCREMENT LOAD COUNT
1452	005264	022767	000006	177726		CMP	#6, CCNT	: DONE?
1453	005272	001371				BNE	2\$	: NO! CONTINUE LOADING
1454	005274	016777	177722	173304	3\$:	MOV	PMQ, #PMQ	: LOAD MQ
1455	005302	016777	177716	173274		MOV	PAC, #PAC	: LOAD AC
1456	005310	005077	173302			CLR	#NOR	: START NORMALIZE
1457	005314	026777	177710	173262		CMP	ACCP, #ACCP	: COMPARE AC
1458	005322	001405				BEQ	.+14	: SKIP ERROR IF GOOD
1459	005324	004567	002142			JSR	R5, ECOMP	

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1460	005330	000004		4		
1461	005332	000123		123		
1462	005334	000757		BR	3\$	
1463	005336	026777	177670 173242	CMP	MQCP,2MQ	;COMPARE MQ
1464	005344	001405		BEQ	.+14	;SKIP ERROR IF GOOD
1465	005346	004567	002120	JSR	R5,ECOMP	
1466	005352	000004		4		
1467	005354	000124		124		
1468	005356	000746		BR	3\$	
1469	005360	026777	177650 173224	CMP	SRCP,2SC	;CHECK STATUS
1470	005366	001405		BEQ	.+14	;SKIP ERROR IF GOOD
1471	005370	004567	002076	JSR	R5,ECOMP	
1472	005374	000004		4		
1473	005376	000125		125		
1474	005400	000735		BR	3\$	
1475	005402	005200		INC	RO	;STEP CYCLE COUNT
1476	005404	022700	000007	CMP	#7,RO	;DONE?
1477	005410	001407		BEQ	TS19	;GO TO NEXT TEST IF DONE
1478	005412	000714		BR	1\$	;CONTINUE
1479	005414	032767	000002 173202	BIT	#2,SFTSWR	
1480	005422	001401		BEQ	.+4	
1481	005424	000167	001530	JMP	.DEV	
1482		005430				
1483			.DIV=.			
1484			; TEST OF MULTIPLY			
1485						
1486						
1487	005430	005000		TS19:	CLR RO	;CLEAR CYCLE COUNT
1488	005432	012701	014604	MOV	#TBLC1,R1	;LOAD POINTER
1489	005436	005067	177556	1\$: CLR	CCNT	;SET LOAD COUNT
1490	005442	012702	005222	MOV	#PMQ,R2	;LOAD ADDRESS POINTER
1491	005446	012122		2\$: MOV	(R1)+,(R2)+	;LOAD PARAMETERS
1492	005450	005267	177544	INC	CCNT	;INCREMENT LOAD COUNT
1493	005454	022767	000006 177536	CMP	#6,CCNT	;DONE?
1494	005462	001371		BNE	2\$	;NO! KEEP LOADING
1495	005464	016777	177532 173114	3\$: MOV	PMQ,2MQ	;LOAD MQ
1496	005472	016777	177530 173110	MOV	PMUL,2MUL	;LOAD MUL
1497	005500	026777	177524 173076	CMP	ACCP,2AC	;COMPARE AC
1498	005506	001405		BEQ	.+14	;SKIP ERROR IF GOOD
1499	005510	004567	001756	JSR	R5,ECOMP	
1500	005514	000004		4		
1501	005516	000126		126		
1502	005520	000761		BR	3\$	
1503	005522	026777	177504 173056	CMP	MQCP,2MQ	;COMPARE MQ
1504	005530	001405		BEQ	.+14	;SKIP ERROR IF GOOD
1505	005532	004567	001734	JSR	R5,ECOMP	
1506	005536	000004		4		
1507	005540	000127		127		
1508	005542	000750		BR	3\$	
1509	005544	126777	177464 173042	CMPB	SRCP,2SR	;CHECK STATUS
1510	005552	001405		BEQ	.+14	;SKIP ERROR IF GOOD
1511	005554	004567	001712	JSR	R5,ECOMP	
1512	005560	000004		4		
1513	005562	000130		130		
1514	005564	000737		BR	3\$	
1515	005566	005200		INC	RO	;STEP CYCLE COUNT

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1516	005570	022700	000006		CMP	#6, R0	; DONE?
1517	005574	001401			BEG	TS20	; GO TO NEXT TEST IF DONE
1518	005576	000717			BR	15	; CONTINUE
1519							
1520						TEST OF DIVIDE	
1521							
1522	005600	005077	173002	TS20:	CLR	QMQ	; TEST OF DIVIDE
1523	005604	005077	172772		CLR	QDIV	; LOAD MQ WITH 0
1524	005610	106177	173000		ROLB	QSR	; LOAD DIV WITH 0 AND DIVIDE
1525	005614	102405			BVS	.+14	; SHIFT OVERFLOW BIT INTO PS
1526	005616	004567	001650		JSR	R5, ECOMP	; SKIP ERROR IF GOOD
1527	005622	000005			S		
1528	005624	000131			13:		
1529	005626	000764			BR	TS20	
1530	005630	005777	172750		TST	QAC	; CHECK AC'S SIGN
1531	005634	100411			BMI	.MIN	
1532	005636	106177	172752		ROLB	QSR	; SET APROPRIATE N AND V BITS
1533	005642	100016			BPL	TS20A	
1534	005644	004567	001622		JSR	R5, ECOMP	
1535	005650	000005			S		
1536	005652	000132			132		
1537	005654	000751			BR	TS20	
1538	005656	000410			BR	TS20A	
1539	005660	106177	172730	.MIN:	ROLB	QSR	; SET APROPRIATE N AND V BITS
1540	005664	100405			BMI	.+14	
1541	005666			.HLT:			
1542	005666	004567	001600		JSR	R5, ECOMP	
1543	005672	000005			S		
1544	005674	000133			133		
1545	005676	000740			BR	TS20	
1546							
1547							
1548							
1549	005700	005077	172702	TS20A:	CLR	QMQ	; TEST OF DIVIDE
1550	005704	012777	052525 172672		MOV	#52525, QAC	; CLEAR THE MQ
1551	005712	012777	052525 172662		MOV	#52525, QDIV	; LOAD AC WITH 52525
1552	005720	106177	172670		ROLB	QSR	; LOAD DIV WITH 52525 AND DIVIDE
1553	005724	102405			BVS	.+14	; SHIFT OVERFLOW BIT INTO PS
1554	005726	004567	001540		JSR	R5, ECOMP	; SKIP ERROR IF GOOD
1555	005732	000005			S		
1556	005734	000134			134		
1557	005736	000760			BR	TS20A	
1558	005740	005777	172640		TST	QAC	; CHECK AC'S SIGN
1559	005744	100411			BMI	.MIN1	
1560	005746	106177	172642		ROLB	QSR	; SET APROPRIATE N AND V BITS
1561	005752	100016			BPL	TS20B	
1562	005754	004567	001512		JSR	R5, ECOMP	
1563	005760	000005			S		
1564	005762	000135			135		
1565	005764	000745			BR	TS20A	
1566	005766	000410			BR	TS20B	
1567	005770	106177	172620	.MIN1:	ROLB	QSR	; SET APROPRIATE N AND V BITS
1568	005774	100405			BMI	.+14	
1569	005776			.HLT1:			
1570	005776	004567	001470		JSR	R5, ECOMP	
1571	006002	000005			S		

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1572	006004	000136			136		
1573	006006	000734			BR	TS20A	
1574	006010	005000			CLR	RO	; CLEAR CYCLE COUNT
1575	006012	012701	014714		MOV	#TBLD1,R1	; LOAD POINTER
1576	006016	005067	177176		CLR	CCNT	; SET LOAD COUNT
1577	006022	012702	005222		MOV	#PMQ,R2	; LOAD ADDRESS POINTER
1578	006026	012122			MOV	(R1)+,(R2)+	; LOAD PARAMETERS
1579	006030	005267	177164		INC	CCNT	; INCREMENT LOAD COUNT
1580	006034	022767	000006	177156	CMP	#6,CCNT	; DONE?
1581	006042	001371			BNE	2\$	; NO! KEEP LOADING
1582	006044	016777	177152	172534	MOV	PMQ,AMQ	; LOAD MQ
1583	006052	016777	177146	172524	MOV	PAC,AC	; LOAD AC
1584	006060	016777	177142	172514	MOV	PDIV,ADIV	; LOAD DIV AND DIVIDE
1585	006066	026777	177136	172510	CMP	ACCP,AC	; COMPARE AC (REMAINDER)
1586	006074	001405			BEQ	.+14	; SKIP ERROR IF GOOD
1587	006076	004567	001370		JSR	R5,ECOMP	
1588	006102	000004			4		
1589	006104	000137			137		
1590	006106	000756			BR	3\$	
1591	006110	026777	177116	172470	CMP	MQCP,AMQ	; COMPARE MQ (QUOTIENT)
1592	006116	001405			BEQ	.+14	; SKIP ERROR IF GOOD
1593	006120	004567	001346		JSR	R5,ECOMP	
1594	006124	000004			4		
1595	006126	000140			140		
1596	006130	000745			BR	3\$	
1597	006132	126777	177076	172454	CMPB	SRCP,JSR	; CHECK STATUS
1598	006140	001405			BEQ	.+14	; SKIP ERROR IF GOOD
1599	006142	004567	001324		JSR	R5,ECOMP	
1600	006146	000004			4		
1601	006150	000141			141		
1602	006152	000734			BR	3\$	
1603	006154	005200			INC	RO	; STEP CYCLE COUNT
1604	006156	022700	000020		CMP	#20,RO	; DONE?
1605	006162	001401			BEQ	TS21	; GO TO NEXT TEST IF DONE
1606	006164	000714			BR	1\$	; CONTINUE
1607							; TEST OF SUCCESSIVE MULTIPLIES
1608	006166	012777	000001	172412	TS21: MOV	#1,AMQ	
1609	006174	012777	000002	172406	MOV	#2,AMUL	; FOURTEEN MULTIPLIES
1610	006202	012777	000002	172400	MOV	#2,AMUL	
1611	006210	012777	000002	172372	MOV	#2,AMUL	
1612	006216	012777	000002	172364	MOV	#2,AMUL	
1613	006224	012777	000002	172356	MOV	#2,AMUL	
1614	006232	012777	000002	172350	MOV	#2,AMUL	
1615	006240	012777	000002	172342	MOV	#2,AMUL	
1616	006246	012777	000002	172334	MOV	#2,AMUL	
1617	006254	012777	000002	172326	MOV	#2,AMUL	
1618	006262	012777	000002	172320	MOV	#2,AMUL	
1619	006270	012777	000002	172312	MOV	#2,AMUL	
1620	006276	012777	000002	172304	MOV	#2,AMUL	
1621	006304	012777	000002	172276	MOV	#2,AMUL	
1622	006312	012777	000002	172270	MOV	#2,AMUL	
1623							
1624	006326	022777	040000	172260	CMP	#40000,AMQ	
1625	006326	001405			BEQ	.+14	
1626	006330	004567	001136		JSR	R5,ECOMP	
1627	006334	000006			6		

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1628	006336	000142			142	
1629	006340	000712			BR	TS21
1630	006342	005777	172236		TST	2AC
1631	006346	001405			BEQ	.+14
1632	006350	004567	001116		JSR	R5, ECOMP
1633	006354	000006			6	
1634	006356	000143			143	
1635	006360	000702			BR	TS21
1636	006362	122777	000022	172224	CMPB	#22, 2SR ;CHECK STATUS 22
1637	006370	001405			BEQ	.+14
1638	006372	004567	001074		JSR	R5, ECOMP
1639	006376	000006			6	
1640	006400	000144			144	
1641	006402	000671			BR	TS21
1642						;TEST OF SUCCESSION DIVIDES
1643	006404	012777	040000	172174	TS22: MOV	#40000, 2MQ
1644	006412	012777	000002	172162	MOV	#2, 2DIV
1645	006420	012777	000002	172154	MOV	#2, 2DIV
1646	006426	012777	000002	172146	MOV	#2, 2DIV
1647	006434	012777	000002	172140	MOV	#2, 2DIV
1648	006442	012777	000002	172132	MOV	#2, 2DIV
1649	006450	012777	000002	172124	MOV	#2, 2DIV
1650	006456	012777	000002	172116	MOV	#2, 2DIV
1651	006464	012777	000002	172110	MOV	#2, 2DIV
1652	006472	012777	000002	172102	MOV	#2, 2DIV
1653	006500	012777	000002	172074	MOV	#2, 2DIV
1654	006506	012777	000002	172066	MOV	#2, 2DIV
1655	006514	012777	000002	172060	MOV	#2, 2DIV
1656	006522	012777	000002	172052	MOV	#2, 2DIV
1657	006530	012777	000002	172044	MOV	#2, 2DIV
1658						
1659	006536	005777	172042		TST	2AC
1660	006542	001405			BEQ	.+14
1661	006544	004567	000722		JSR	R5, ECOMP
1662	006550	000006			6	
1663	006552	000145			145	
1664	006554	000713			BR	TS22
1665	006556	022777	000001	172022	CMP	#1, 2MQ
1666	006564	001405			BEQ	.+14
1667	006566	004567	000700		JSR	R5, ECOMP
1668	006572	000006			6	
1669	006574	000146			146	
1670	006576	000702			BR	TS22
1671	006580	122777	000022	172006	CMPB	#22, 2SR ;CHECK STATUS 22
1672	006606	001405			BEQ	.+14
1673	006610	004567	000656		JSR	R5, ECOMP
1674	006614	000006			6	
1675	006616	000147			147	
1676	006620	000671			BR	TS22
1677						;TEST OR ALTERNATE MUL AND DIV
1678	006622	012777	052525	171756	TS23: MOV	#52525, 2MQ
1679	006630	012777	040000	171752	MOV	#40000, 2MUL
1680	006636	012777	040000	171736	MOV	#40000, 2DIV
1681	006644	012777	040000	171736	MOV	#40000, 2MUL
1682	006652	012777	040000	171722	MOV	#40000, 2DIV
1683	006660	012777	040000	171722	MOV	#40000, 2MUL

1684	006666	012777	040000	171706	MOV	#40000,2DIV	
1685	006674	012777	040000	171706	MOV	#40000,2MUL	
1686	006702	012777	040000	171672	MOV	#40000,2DIV	
1687	006710	012777	040000	171672	MOV	#40000,2MUL	
1688	006716	012777	040000	171656	MOV	#40000,2DIV	
1689							
1690	006724	022777	052525	171654	CMP	#52525,2MQ	
1691	006732	001405			BEQ	.+14	
1692	006734	004567	000532		JSR	R5,ECOMP	
1693	006740	000007			7		
1694	006742	000150			150		
1695	006744	000726			BR	TS23	
1696	006746	005777	171632		TST	2AC	
1697	006752	001405			BEQ	.+14	
1698	006754	004567	000512		JSR	R5,ECOMP	
1699	006760	000007			7		
1700	006762	000151			151		
1701	006764	000716			BR	TS23	
1702	006766	122777	000022	171620	CMPB	#22,2SR	;CHECK STATUS 22
1703	006774	001405			BEQ	.+14	
1704	006776	004567	000470		JSR	R5,ECOMP	
1705	007002	000007			7		
1706	007004	000152			152		
1707	007006	000705			BR	TS23	
1708							;TEST OF FAST PROCESSING OF DATA
1709	007010	016700	171572		MOV	MQ,%0	;SET UP POINTER
1710	007014	012720	125252		MOV	#125252,(0)+	;LOAD MQ
1711	007020	012710	040000		MOV	#40000,(0)	;LOAD MUL
1712	007024	014001			MOV	-(0),%1	;SAVE MQ
1713	007026	014002			MOV	-(0),%2	;SAVE AC
1714	007030	005720			TST	(0)+	
1715	007032	020127	100000		CMP	%1,#100000	;CHECK MQ
1716	007036	001405			BEQ	.+14	
1717	007040	004567	000426		JSR	R5,ECOMP	
1718	007044	000010			10		
1719	007046	000153			153		
1720	007050	000757			BR	TS24	
1721	007052	020227	165252		CMP	%2,#165252	;CHECK AC
1722	007056	001405			BEQ	.+14	
1723	007060	004567	000406		JSR	R5,ECOMP	
1724	007064	000010			10		
1725	007066	000154			154		
1726	007070	000747			BR	TS24	
1727							
1728							;SAVE WITH DIVIDE
1729	007072	016700	171510		MOV	MQ,%0	
1730	007076	012710	000001		MOV	#1,(0)	;LOAD MQ WITH 1
1731	007102	012740	025253		MOV	#25253,-(0)	;LOAD AC WITH 25253
1732	007106	012740	125252		MOV	#125252,-(0)	;DIVIDE
1733	007112	005720			TST	(0)+	
1734	007114	012001			MOV	(0)+,%1	;SAVE THE AC IN R1
1735	007116	011002			MOV	(0),%2	;SAVE THE MQ IN R2
1736	007120	020127	000001		CMP	%1,#1	;TEST THE AC
1737	007124	001405			BEQ	.+14	
1738	007126	004567	000340		JSR	R5,ECOMP	
1739	007132	000011			11		

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1740	007134	000155			155		
1741	007136	000755			BR	TS25	
1742	007140	020227	100000		CMP	%2, #100000	;TEST THE MQ
1743	007144	001405			BEQ	+14	
1744	007146	004567	000320		JSR	RS, ECOMP	
1745	007152	000011			11		
1746	007154	000156			156		
1747	007156	000745			BR	TS25	
1748							
1749							
1750		007160					
1751	007160	005267	000054		INC	PASCNT	; INCREMENT PASS COUNT
1752	007164	022767	000122	000046	CMP	#122, PASCNT	; 100 PASSES?
1753	007172	001402			BEQ	15	; YES! GO REPORT END OF PASS
1754	007174	000167	171660		JMP	BG1	; NO! CYCLE THRU TESTS AGAIN
1755	007200						
1756	007200	012704	013756		MOV	#ENMES, R4	
1757	007204	004567	003702		JSR	RS, PRINT	
1758	007210	005067	000024		CLR	PASCNT	; ZERO PASS COUNTER
1759	007214	013700	000042		MOV	#42, R0	; GET MONITOR ADDRESS
1760	007220	001405			BEQ	SEND1	; IF NOT
1761	007222	000005			RESET		
1762	007224	004710			JSR	7, (0)	; GO TO MONITOR
1763	007226	000240	000240	000240		240, 240, 240	; SAVE ROOM FOR ACT11
1764	007234	000137	001060		JMP	#BG1	; RETURN
1765	007240	000000			PASCNT:	000	; PASS COUNTER
1766							
1767							
1768							
1769							
1770	007242	042767	000100	170310	MON:	BIC	#100, KBS
1771	007250	016767	170306	000212	MOV	KBB, CMND	; DISABLE FURTHER INTERRUPTS
1772	007256	042767	177600	000204	BIC	#177600, CMND	; SAVE COMMAND
1773	007264	032737	000200	177564	BIT	#200, #PSR	; CLEAR UNUSED BITS
1774	007272	001774			BEQ	-6	
1775	007274	016767	000170	170264	MOV	CMND, PBR	
1776	007302	022767	000120	000160	MONA:	CMP	#'P, CMND
1777	007310	001450			BEQ	PCHNG	; IS IT A PARAMETER CHANGE?
1778	007312	022767	000123	000150	CMP	#'S, CMND	; YES!
1779	007320	001422			BEQ	STOP	; IS IT A STOP?
1780	007322	022767	000103	000140	CMP	#'C, CMND	; YES!
1781	007330	001424			BEQ	CONU	; IS IT A CONTINUE?
1782	007332	022767	000122	000130	CMP	#'R, CMND	; YES!
1783	007340	001424			BEQ	RETURN	; IS IT A RETURN?
1784	007342						; YES!
1785	007342	012704	014072		ILLCMD:	MOV	#ILMES, R4
1786	007346	004567	003540		JSR	RS, PRINT	
1787	007352	032737	000200	177560	BIT	#200, #KBS	
1788	007360	001774			BEQ	-6	
1789	007362	000167	177654		JMP	MON	; BETTER LUCK NEXT TIME!
1790	007366				STOP:		
1791	007366	032737	000200	177560	BIT	#200, #KBS	
1792	007374	001774			BEQ	-6	
1793	007376	000167	177640		JMP	MON	; GOT IT!
1794	007402	052767	000100	170150	CONU:	BIS	#100, KBS
1795	007410	000002			RTI		; ENABLE PI
							; CONTINUE TESTING

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1796	007412	016700	000034	RETURN:	MOV	STRO,RO	;RESTORE RO
1797	007416	022626			CMP	(SP)+,(SP)+	;POP THIS INTERRUPT OFF THE STACK
1798	007420	005046			CLR	-(SP)	
1799	007422	012746	007430		MOV	#15,-(SP)	
1800	007426	000002			RTI		
1801	007430	000205		1\$:	RTS	R5	;RETURN FROM ERROR
1802	007432	022626		PCHNG:	CMP	(SP)+,(SP)+	;POP THIS INTERUPT OFF THE STACK
1803	007434	005046			CLR	-(SP)	
1804	007436	012746	007444		MOV	#15,-(SP)	
1805	007442	000002			RTI		
1806	007444	000177	000000	1\$:	JMP	3PARCHN	;GO GET NEW PARAMETERS
1807	007450	000000		PARCHN:	000		;PARAMETER CHANGE RETURN ADDRESS
1808	007452	000000		STRO:	000		;RO STORAGE
1809	007454	000000		REG1:	000		;REGISTER 1 ADDRESS
1810	007456	000000		REG10:	000		;REGISTER 1 STATIC DATA
1811	007460	000000		REG2:	000		;REGISTER 2 ADDRESS
1812	007462	000000		REG20:	000		;REGISTER 2 STATIC DATA
1813	007464	000000		REG3:	000		;REGISTER 3 ADDRESS
1814	007466	000000		REG30:	000		;REGISTER 3 STATIC DATA
1815	007470	000000		CMND:	000		;COMMAND STORAGE
1816	007472	00067	177754	ECOMP:	MOV	RO,STRO	;SAVE RO
1817	007476	012567	000130		MOV	(R5)+,ET	;STORE ERROR TYPE
1818	007502	012704	013555		MOV	#EMES1,R4	
1819	007506	004567	003400		JSR	R5,PRINT	
1820	007512	012567	003254		MOV	(R5)+,ADDRS	;TYPE ERROR NUMBER
1821	007516	004567	003252		JSR	R5,OC1AS	
1822	007522	004567	003540		JSR	R5,PRINTS	
1823	007526	022737	007224	000042	CMP	#SENDAD,2#42	
1824	007534	001001			BNE	1\$	;BR IF NO
1825	007536	000000			HALT		
1826	007540	022767	000005	000064	1\$:	CMP	#5,ET
1827	007546	001436			BEQ	ETYP5P	;WHAT TYPE ERROR IS IT?
1828	007550	100413			BMI	2\$	;IT'S A TYPE 5
1829	007552	022767	000003	000052	CMP	#3,ET	;IT'S GREATER THAN 5
1830	007560	001425			BEQ	ETYP3P	;IS IT A 3?
1831	007562	100426			BMI	ETYP4P	;YES!
1832	007564	022767	000001	000040	CMP	#1,ET	;MUST BE A TYPE 4
1833	007572	001436			BEQ	ETYP1	;IS IT A 1?
1834	007574	000167	000260		JMP	ETYP2	;YES!
1835	007600	022767	000007	000024	2\$:	CMP	#7,ET
1836	007606	001422			BEQ	ETYP7P	;MUST BE A TYPE 2 AT THIS POINT
1837	007610	100402			BMI	3\$	;IS IT A 7?
1838	007612	000167	000032		JMP	ETYP6P	;YES!
1839	007616	022767	000010	000006	3\$:	CMP	#10,ET
1840	007624	001415			BEQ	ETYP8P	;MUST BE AN 8 OR 9
1841	007626	000167	000032		JMP	ETYP9P	;IT'S A TYPE 6
1842	007632	000000			ET:	000	;IS IT A TYPE 8?
1843	007634	000167	000452		ETYP3P:	JMP	ETYP3
1844	007640	000167	000752		ETYP4P:	JMP	ETYP4
1845	007644	000167	001442		ETYP5P:	JMP	ETYP5
1846	007650	000167	001574		ETYP6P:	JMP	ETYP6
1847	007654	000167	001766		ETYP7P:	JMP	ETYP7
1848	007660	000167	002206		ETYP8P:	JMP	ETYP8
1849	007664	000167	002334		ETYP9P:	JMP	ETYP9
1850	007670	012767	007670	177552	ETYP1:	MOV	#ETYP1,PARCHN
1851	007676	012704	013642		MOV	#EMES4,R4	;LOAD PARAMETER RETURN

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1852	007702	004567	003204		JSR	R5, PRINT	
1853	007706	017767	170674	003056	MOV	QMO, ADDRS	
1854	007714	004567	003054		JSR	R5, OCTAS	
1855	007720	004567	003224		JSR	R5, PRINT1	
1856	007724	017767	170654	003040	MOV	QAC, ADDRS	
1857	007732	004567	003036		JSR	R5, OCTAS	
1858	007736	004567	003206		JSR	R5, PRINT1	
1859	007742	017767	170644	003022	MOV	QSC, ADDRS	
1860	007750	004567	003020		JSR	R5, OCTAS	
1861	007754	004567	003170		JSR	R5, PRINT1	
1862	007760	012704	013304		MOV	#AMES1, R4	
1863	007764	004567	003122		JSR	R5, PRINT	
1864	007770	004567	002520		JSR	R5, ASCAL	; GET IT
1865	007774	016767	002772	177452	MOV	ADDRS, REG1	; SAVE IT
1866	010002	012704	013766		MOV	#IMES1, R4	
1867	010006	004567	003100		JSR	R5, PRINT	
1868	010012	012704	014035		MOV	#IMES2, R4	
1869	010016	004567	003070		JSR	R5, PRINT	
1870	010022	005067	167534		CLR	KBB	; CLEAR BUFFER
1871	010026	032737	000200	177560	BIT	#200, Q#KBS	
1872	010034	001774			BEQ	.-6	
1873	010036	005067	167520		CLR	KBB	; CLEAR BUFFER
1874	010042	052767	000100	167510	BIS	#100, KBS	; ENABLE PI
1875	010050	016777	170550	177376	MOV	SFTSWR, QREG1	; DO FUNCTION
1876	010056	000774			BR	IS	
1877							
1878	010060				ETYP2:		
1879	010060	012704	013716		MOV	#EMES5, R4	
1880	010064	004567	003022		JSR	R5, PRINT	
1881	010070	016767	177356	002674	MOV	STRO, ADDRS	
1882	010076	004567	002672		JSR	R5, OCTAS	
1883	010102	004567	003042		JSR	R5, PRINT1	
1884	010106	012704	013565		MOV	#EMES2, R4	
1885	010112	004567	002774		JSR	R5, PRINT	
1886	010116	010167	002650		MOV	R1, ADDRS	
1887	010122	004567	002646		JSR	R5, OCTAS	
1888	010126	004567	003016		JSR	R5, PRINT1	
1889	010132	012767	010140	177310	MOV	#ETYP2A, PARCN	; LOAD PARAMETER RETURN
1890	010140				ETYP2A:		
1891	010140	012704	013304		MOV	#AMES1, R4	
1892	010144	004567	002742		JSR	R5, PRINT	
1893	010150	004567	002340		JSR	R5, ASCAL	; GET IT
1894	010154	016767	002612	177272	MOV	ADDRS, REG1	; SAVE IT
1895	010162	012704	013447		MOV	#OMES1, R4	
1896	010166	004567	002720		JSR	R5, PRINT	
1897	010172	004567	002316		JSR	R5, ASCAL	; GET IT
1898	010176	016767	002570	177252	MOV	ADDRS, REG1D	; SAVE IT
1899	010204	012704	013345		MOV	#AMES2, R4	
1900	010210	004567	002676		JSR	R5, PRINT	
1901	010214	004567	002274		JSR	R5, ASCAL	; GET IT
1902	010220	016767	002546	177232	MOV	ADDRS, REG2	; SAVE IT
1903	010226	012704	013766		MOV	#IMES1, R4	
1904	010232	004567	002654		JSR	R5, PRINT	
1905	010236	012704	014035		MOV	#IMES2, R4	
1906	010242	004567	002644		JSR	R5, PRINT	
1907	010246	005067	167310		CLR	KBB	; CLEAR BUFFER

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1908 010252 032737 000200 177560
1909 010260 001774
1910 010262 005067 167274

BIT
BEQ
CLR

#200, @#KBS
.-6
KBB

;CLEAR BUFFER

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1911	010266	052767	000100	167264		BIS	#100,KBS	;ENABLE FI
1912	010274	016777	177156	177152	1\$:	MOV	REG10, @REG1	;DO FUNCTION
1913	010302	016777	170316	177150		MOV	SFTSWR, @REG2	
1914	010310	000771				BR	1\$	
1915	010312				ETYP3:			
1916	010312	012704	013716			MOV	#EMESS, P4	
1917	010316	004567	002570			JSR	R5, PRINT	
1918	010322	016767	177124	002442		MOV	STRO, ADDR5	
1919	010330	004567	002440			JSR	R5, OCTAS	
1920	010334	004567	002610			JSR	R5, PRINT1	
1921	010340	012704	013565			MOV	#EMES2, R4	
1922	010344	004567	002542			JSR	R5, PRINT	
1923	010350	010167	002416			MOV	R1, ADDR5	
1924	010354	004567	002414			JSR	R5, OCTAS	
1925	010360	004567	002564			JSR	R5, PRINT1	
1926	010364	012767	010372	177056		MOV	#ETYP3A, PARCHN	;LOAD PARAMETER RETURN

1927	010372			ETYP3A:	MOV	#AMES1, R4	
1928	010372	012704	013304		JSR	R5, PRINT	
1929	010376	004567	002510		JSR	R5, ASCAL	; GET IT
1930	010402	004567	002106		JSR	R5, ASCAL	; SAVE IT
1931	010406	016767	002360	177040	MOV	ADDRS, REG1	
1932	010414	012704	013447		MOV	#DMES1, R4	
1933	010420	004567	002466		JSR	R5, PRINT	
1934	010424	004567	002064		JSR	R5, ASCAL	; GET IT
1935	010430	016767	002336	177020	MOV	ADDRS, REG10	; SAVE IT
1936	010436	012704	013345		MOV	#AMES2, R4	
1937	010442	004567	002444		JSR	R5, PRINT	
1938	010446	004567	002042		JSR	R5, ASCAL	; GET IT
1939	010452	016767	002314	177000	MOV	ADDRS, REG2	; SAVE IT
1940	010460	012704	013447		MOV	#DMES1, R4	
1941	010464	004567	002422		JSR	R5, PRINT	
1942	010470	004567	002020		JSR	R5, ASCAL	; GET IT
1943	010474	016767	002272	176760	MOV	ADDRS, REG20	; SAVE IT
1944	010502	012704	013406		MOV	#AMES3, R4	
1945	010506	004567	002400		JSR	R5, PRINT	
1946	010512	004567	001776		JSR	R5, ASCAL	; GET IT
1947	010516	016767	002250	176740	MOV	ADDRS, REG3	; SAVE IT
1948	010524	012704	013766		MOV	#IMES1, R4	
1949	010530	004567	002356		JSR	R5, PRINT	
1950	010534	012704	014035		MOV	#IMES2, R4	
1951	010540	004567	002346		JSR	R5, PRINT	
1952	010544	005067	167012		CLR	KBB	; CLEAR BUFFER
1953	010550	032737	000200	177560	BIT	#200, @KBS	
1954	010556	001774			BEQ	.-6	
1955	010560	005067	166776		CLR	KBB	; CLEAR BUFFER
1956	010564	052767	000100	166766	BIS	#100, KBS	; ENABLE PI
1957	010572	016777	176660	176654	IS: MOV	REG10, @REG1	; DO FUNCTION
1958	010600	016777	176656	176652	MOV	REG20, @REG2	
1959	010606	016777	170012	176650	MOV	SFTSWR, @REG3	
1960	010614	000766			BR	IS	
1961	010616			ETYP4:	MOV	#EMES5, R4	
1962	010616	012704	013716		JSR	R5, PRINT	
1963	010622	004567	002264		JSR	R0, ADDRS	
1964	010626	010067	002140		MOV	R5, OCTAS	
1965	010632	004567	002136		JSR	R5, PRINT1	
1966	010636	004567	002306		JSR	R5, PRINT1	
1967	010642	012704	013571		MOV	#EMES3, R4	
1968	010646	004567	002240		JSR	R5, PRINT	
1969	010652	016767	174344	002112	MOV	PMQ, ADDRS	
1970	010660	004567	002110		JSR	R5, OCTAS	
1971	010664	004567	002250		JSR	R5, PRINT1	
1972	010670	016767	174330	002074	MOV	PAC, ADDRS	
1973	010676	004567	002072		JSR	R5, OCTAS	
1974	010702	004567	002242		JSR	R5, PRINT1	
1975	010706	016767	174314	002056	MOV	PASH, ADDRS	
1976	010714	004567	002054		JSR	R5, OCTAS	
1977	010720	004567	002224		JSR	R5, PRINT1	
1978	010724	016767	174300	002040	MOV	ACCP, ADDRS	
1979	010732	004567	002036		JSR	R5, OCTAS	
1980	010736	004567	002206		JSR	R5, PRINT1	
1981	010742	016767	174264	002022	MOV	MQCP, ADDRS	
1982	010750	004567	002020		JSR	R5, OCTAS	

1983	010754	004567	002170		JSR	R5, PRINT1	
1984	010760	016767	174250	002004	MOV	SRCP, ADDR5	
1985	010766	004567	002002		JSR	R5, OCTAS	
1986	010772	004567	002152		JSR	R5, PRINT1	
1987	010776	012704	013642		MOV	#MES4, R4	
1988	011002	004567	002104		JSR	R5, PRINT	
1989	011006	017767	167574	001756	MOV	QMO, ADDR5	
1990	011014	004567	001754		JSR	R5, OCTAS	
1991	011020	004567	002124		JSR	R5, PRINT1	
1992	011024	017767	167554	001740	MOV	QAC, ADDR5	
1993	011032	004567	001736		JSR	R5, OCTAS	
1994	011036	004567	002106		JSR	R5, PRINT1	
1995	011042	017767	167544	001722	MOV	QSC, ADDR5	
1996	011050	004567	001720		JSR	R5, OCTAS	
1997	011054	004567	002070		JSR	R5, PRINT1	
1998	011060	012767	011066	176362	MOV	#ETYP4A, PARCN	;LOAD PARAMETER RETURN
1999	011066						
2000	011066	012704	013304		MOV	#MES1, R4	
2001	011072	004567	002014		JSR	R5, PRINT	
2002	011076	004567	001412		JSR	R5, ASCAL	;GET IT
2003	011102	016767	001664	176344	MOV	ADDR5, REG1	;SAVE IT
2004	011110	012704	013447		MOV	#MES1, R4	
2005	011114	004567	001772		JSR	R5, PRINT	
2006	011120	004567	001370		JSR	R5, ASCAL	;GET IT
2007	011124	016767	001642	176324	MOV	ADDR5, REG10	;SAVE IT
2008	011132	012704	013345		MOV	#MES2, R4	
2009	011136	004567	001750		JSR	R5, PRINT	
2010	011142	004567	001346		JSR	R5, ASCAL	;GET IT
2011	011146	016767	001620	176304	MOV	ADDR5, REG2	;SAVE IT
2012	011154	012704	013447		MOV	#MES1, R4	
2013	011160	004567	001726		JSR	R5, PRINT	
2014	011164	004567	001324		JSR	R5, ASCAL	;GET IT
2015	011170	016767	001576	176264	MOV	ADDR5, REG20	;SAVE IT
2016	011176	012704	013406		MOV	#MES3, R4	
2017	011202	004567	001704		JSR	R5, PRINT	
2018	011206	004567	001302		JSR	R5, ASCAL	;GET IT
2019	011212	016767	001554	176244	MOV	ADDR5, REG3	;SAVE IT
2020	011220	012704	013766		MOV	#MES1, R4	
2021	011224	004567	001662		JSR	R5, PRINT	
2022	011230	012704	014035		MOV	#MES2, R4	
2023	011234	004567	001652		JSR	R5, PRINT	
2024	011240	005067	166316		CLR	K88	;CLEAR BUFFER
2025	011244	032737	000200	177560	BIT	#200, 2#KBS	
2026	011252	001774			BEQ	.-6	
2027	011254	005067	166302		CLR	K88	;CLEAR BUFFER
2028	011260	052767	000100	166272	BIS	#100, KBS	;ENABLE PI
2029	011266	016777	176164	176160	MOV	REG10, 2REG1	;DO FUNCTION
2030	011274	016777	176162	176156	MOV	REG20, 2REG2	
2031	011302	016777	167316	176154	MOV	SFTSWR, 2REG3	
2032	011310	000766			BR	IS	
2033	011312	012767	011312	176130	MOV	#ETYP5, PARCN	;LOAD PARAMETER RETURN
2034	011320	012704	013474		MOV	#MES2, R4	
2035	011324	004567	001562		JSR	R5, PRINT	
2036	011330	004567	001160		JSR	R5, ASCAL	;GET IT
2037	011334	016767	001432	176114	MOV	ADDR5, REG10	;SAVE IT
2038	011342	012704	013514		MOV	#MES3, R4	

2039	011346	004567	001540		JSR	R5, PRINT	
2040	011352	004567	001136		JSR	R5, ASCAL	; GET IT
2041	011356	016767	001410	176076	MOV	ADDRS, REG2D	; SAVE IT
2042	011364	012704	014035		MOV	#IMES2, R4	
2043	011370	004567	001516		JSR	R5, PRINT	
2044	011374	005067	166162		CLR	KBB	; CLEAR BUFFER
2045	011400	032737	000200	177560	BIT	#200, 2#KBS	
2046	011406	001774			BEQ	.-6	
2047	011410	005067	166146		CLR	KBB	; CLEAR BUFFER
2048	011414	052767	000100	166136	BIS	#100, KBS	; ENABLE PI
2049	011422	105077	167166		JSR		; CLEAR SR
2050	011426	005077	167154		CLR	2MQ	; CLEAR MQ
2051	011432	016777	176020	167144	MOV	REG1D, 2AC	; LOAD AC
2052	011440	016777	176016	167134	MOV	REG2D, 2DIV	; LOAD DIV
2053	011446	000765			BR	1\$	
2054	011450	012767	011450	175772	MOV	#ETYP6, PARCN	; LOAD PARAMETER RETURN
2055	011456	012704	013535		MOV	#DMES4, R4	
2056	011462	004567	001424		JSR	R5, PRINT	
2057	011466	004567	001022		JSR	R5, ASCAL	; GET IT
2058	011472	016767	001274	175762	MOV	ADDRS, REG2D	; SAVE IT
2059	011500	012704	013304		MOV	#AMES1, R4	
2060	011504	004567	001402		JSR	R5, PRINT	
2061	011510	004567	001000		JSR	R5, ASCAL	; GET IT
2062	011514	016767	001252	175732	MOV	ADDRS, REG1	; SAVE IT
2063	011522	012704	013447		MOV	#DMES1, R4	
2064	011526	004567	001360		JSR	R5, PRINT	
2065	011532	004567	000756		JSR	R5, ASCAL	; GET IT
2066	011536	016767	001230	175712	MOV	ADDRS, REG1D	; SAVE IT
2067	011544	012704	014035		MOV	#IMES2, R4	
2068	011550	004567	001336		JSR	R5, PRINT	
2069	011554	005067	166002		CLR	KBB	; CLEAR BUFFER
2070	011560	032737	000200	177560	BIT	#200, 2#KBS	
2071	011566	001774			BEQ	.-6	
2072	011570	005067	165766		CLR	KBB	; CLEAR BUFFER
2073	011574	052767	000100	165756	BIS	#100, KBS	; ENABLE PI
2074	011602	105077	167006		JSR		; CLEAR SR
2075	011606	005077	166772		CLR	2AC	; CLEAR AC
2076	011612	012767	000016	000024	MOV	#16, CYCNT	; SET CYCLE COUNTER
2077	011620	016777	175636	166760	MOV	REG2D, 2MQ	; LOAD MQ
2078	011626	016777	175624	175620	MOV	REG1D, 2REG1	
2079	011634	005367	000004		DEC	CYCNT	; FOURTEEN CYCLES?
2080	011640	100760			BMI	1\$	; YES!
2081	011642	000771			BR	2\$	; NO!
2082	011644	000000			DOO		; CYCLE COUNTER
2083	011646	012767	011646	175574	MOV	#ETYP7, PARCN	; LOAD PARAMETER RETURN
2084	011654	012704	013535		MOV	#DMES4, R4	
2085	011660	004567	001226		JSR	R5, PRINT	
2086	011664	004567	000624		JSR	R5, ASCAL	; GET IT
2087	011670	016767	001076	175560	MOV	ADDRS, REG1D	; SAVE IT
2088	011676	012704	013447		MOV	#DMES1, R4	
2089	011702	004567	001204		JSR	R5, PRINT	
2090	011706	004567	000602		JSR	R5, ASCAL	; GET IT
2091	011712	016767	001054	175542	MOV	ADDRS, REG2D	; SAVE IT
2092	011720	012704	014035		MOV	#IMES2, R4	
2093	011724	004567	001162		JSR	R5, PRINT	
2094	011730	005067	165626		CLR	KBB	; CLEAR BUFFFER

2095	011734	032737	000200	177560		BIT	#200,2#KBS	
2096	011742	001774				BEQ	.-6	
2097	011744	005067	165612			CLR	KBB	;CLEAR BUFFER
2098	011750	052767	000100	165602		BIS	#100,KBS	;ENABLE PI
2099	011756	005077	166622		1S:	CLR	JAC	;CLEAR AC
2100	011762	105077	166626			CLRB	JSR	;CLEAR SR
2101	011766	016777	175464	166612		MOV	REG1D,2MQ	;LOAD MQ
2102	011774	016777	175462	166606		MOV	REG2D,2MUL	;DO FUNCTION
2103	012002	016777	175454	166572		MOV	REG2D,2DIV	
2104	012010	016777	175446	166572		MOV	REG2D,2MUL	
2105	012016	016777	175440	166556		MOV	REG2D,2DIV	
2106	012024	016777	175432	166556		MOV	REG2D,2MUL	
2107	012032	016777	175424	166542		MOV	REG2D,2DIV	
2108	012040	016777	175416	166542		MOV	REG2D,2MUL	
2109	012046	016777	175410	166526		MOV	REG2D,2DIV	
2110	012054	016777	175402	166526		MOV	REG2D,2MUL	
2111	012062	016777	175374	166512		MOV	REG2D,2DIV	
2112	012070	000732				BR	1S	
2113	012072	012767	012072	175350	ETYP8:	MOV	#ETYP8,PARCHN	;LOAD PARAMETER RETURN
2114	012100	012704	013535			MOV	#DMES4,R4	
2115	012104	004567	001002			JSR	R5,PRINT	
2116	012110	004567	000400			JSR	R5,ASCAL	;GET IT
2117	012114	016767	000652	175334		MOV	ADDRS,REG1D	;SAVE IT
2118	012122	012704	013447			MOV	#DMES1,R4	
2119	012126	004567	000760			JSR	R5,PRINT	
2120	012132	004567	000356			JSR	R5,ASCAL	;GET IT
2121	012136	016767	000630	175316		MOV	ADDRS,REG2D	;SAVE IT
2122	012144	012704	014035			MOV	#IMES2,R4	
2123	012150	004567	000736			JSR	R5,PRINT	
2124	012154	005067	165402			CLR	KBB	;CLEAR BUFFER
2125	012160	032737	000200	177560		BIT	#200,2#KBS	
2126	012166	001774				BEQ	.-6	
2127	012170	005067	165366			CLR	KBB	;CLEAR BUFFER
2128	012174	052767	000100	165356		BIS	#100,KBS	;ENABLE PI
2129	012202	005077	166376		1S:	CLR	JAC	;CLEAR AC
2130	012206	016700	166374			MOV	MQ,R0	;SET POINTER
2131	012212	016720	175240			MOV	REG1D,(R0)+	;LOAD MQ
2132	012216	016710	175240			MOV	REG2D,(R0)	;LOAD MUL
2133	012222	000767				BR	1S	
2134	012224	012767	012224	175216	ETYP9:	MOV	#ETYP9,PARCHN	;LOAD PARAMETER RETURN
2135	012232	012704	013535			MOV	#DMES4,R4	
2136	012236	004567	000650			JSR	R5,PRINT	
2137	012242	004567	000246			JSR	R5,ASCAL	;GET IT
2138	012246	016767	000520	175202		MOV	ADDRS,REG1D	;SAVE IT
2139	012254	012704	013474			MOV	#DMES2,R4	
2140	012260	004567	000626			JSR	R5,PRINT	
2141	012264	004567	000224			JSR	R5,ASCAL	;GET IT
2142	012270	016767	000476	175164		MOV	ADDRS,REG2D	;SAVE IT
2143	012276	012704	013514			MOV	#DMES3,R4	
2144	012302	004567	000604			JSR	R5,PRINT	
2145	012306	004567	000202			JSR	R5,ASCAL	;GET IT
2146	012312	016767	000454	175146		MOV	ADDRS,REG3D	;SAVE IT
2147	012320	012704	014035			MOV	#IMES2,R4	
2148	012324	004567	000562			JSR	R5,PRINT	
2149	012330	005067	165226			CLR	KBB	;CLEAR BUFFER
2150	012334	032737	000200	177560		BIT	#200,2#KBS	

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2151	012342	001774			BEQ	.-6	
2152	012344	005067	165212		CLR	KBB	; CLEAR BUFFER
2153	012350	052767	000100	165202	BIS	#100, KBB	; ENABLE PI
2154	012356	016700	166224		MOV	MQ, R0	; SET POINTER
2155	012362	016710	175070		MOV	REG10, (R0)	; LOAD MQ
2156	012366	016740	175070		MOV	REG20, -(R0)	; LOAD AC
2157	012372	016740	175070		MOV	REG30, -(R0)	; LOAD CIV
2158	012376	000767			BR	IS	
2159	012400				ILLAD:		
2160	012400	012704	014135		MOV	#ILLMES, R4	
2161	012404	004567	000502		JSR	R5, PRINT	
2162	012410	011667	000356		MOV	(SP), ADDR5	
2163	012414	004567	000354		JSR	R5, OCTAS	
2164	012420	004567	000524		JSR	R5, PRINT1	
2165	012424				ILLAD1:		
2166	012424	012704	013722		MOV	#EMES6, R4	
2167	012430	004567	000456		JSR	R5, PRINT	
2168	012434	004567	000054		JSR	R5, ASCAL	; GET IT
2169	012440	016767	000326	175006	MOV	ADDR5, REG1	; SAVE IT
2170	012446	012767	012510	165330	MOV	#ILLAD3, 4	; SET UP RETURN
2171	012454	012767	012424	174766	MOV	#ILLAD1, PARCHN	
2172	012462	012705	001000		MOV	#INIT, R5	
2173	012466	005067	165070		CLR	KBB	
2174	012472	012767	000100	165060	MOV	#100, KBB	
2175	012500	005777	174750		ILLAD2:	TST	; REFERENCE THE FAILING ADDRESS
2176	012504	000240			NOP		
2177	012506	000774			BR	ILLAD2	; TRY AGAIN
2178	012510	022626			ILLAD3:	CMP	; NO POP THE STACK AND CONTINUE
2179	012512	000772			BR	(SP)+, (SP)+	
2180	012514	005067	000246		ASCAL:	ILLAD2	
2181	012520	005067	000246		CLR	CFLG	
2182	012524				CLR	ADDR5	
2183	012524	032737	000200	177560	ASCAL1:	BIT	#200, 2#KBS
2184	012532	001774			BEQ	.-6	
2185	012534	013730	177562		MOV	2#KBB, R0	
2186	012540	022700	000215		ASCAL2:	CMP	#215, R0
2187	012544	001461			BEQ	ASCAL3	
2188	012546	022700	000212		CMP	#212, R0	
2189	012552	001456			BEQ	ASCAL3	
2190	012554	022700	000377		CMP	#377, R0	; CHARACTER RUBOUT
2191	012560	001027			BNE	ASCALA	
2192	012562	016767	000204	000172	MOV	ADDR5, ECHO	
2193	012570	042767	177770	000164	BIC	#177770, ECHO	
2194	012576	052767	000260	000156	BIS	#260, ECHO	
2195	012604	032737	000200	177564	BIT	#200, 2#PSR	
2196	012612	001774			BEQ	.-6	
2197	012614	016737	000142	177566	MOV	ECHO, 2#PBR	
2198	012622	006267	000144		ASR	ADDR5	
2199	012626	006267	000140		ASR	ADDR5	
2200	012632	006267	000134		ASR	ADDR5	
2201	012636	000732			BR	ASCAL1	
2202	012640				ASCALA:		
2203	012640	032737	000200	177564	BIT	#200, 2#PSR	
2204	012646	001774			BEQ	.-6	
2205	012650	005267	000112		INC	CFLG	
2206	012654	010037	177566		MOV	R0, 2#PBR	

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2207	012660	042700	177760			BIC #177760, R0
2208	012664	006367	000102			ASL ADDRS
2209	012670	006367	000076			ASL ADDRS
2210	012674	006367	000072			ASL ADDRS
2211	012700	050067	000066			BIS R0, ADDRS
2212	012704	000167	177614			JMP ASCAL1
2213	012710	010067	000054		ASCAL3:	MOV R0, MODCMP
2214	012714	032737	000200	177564		BIT #200, 2#PSR
2215	012722	001774				BEQ .-6
2216	012724	012737	000012	177566		MOV #12, 2#PBR
2217	012732	032737	000200	177564		BIT #200, 2#PSR
2218	012740	001774				BEQ .-6
2219	012742	012737	000015	177566		MOV #15, 2#PBR
2220	012750	032737	000200	177564		BIT #200, 2#PSR
2221	012756	001774				BEQ .-6
2222	012760	000205				RTS R5
2223	012762	000000			ECHO:	000
2224	012764	000000			AFLG:	000
2225	012766	000000			CFLG:	000
2226	012770	000000			MODCMP:	000
2227	012772	000000			ADDRS:	0
2228	012774	005067	000106		OCTAS:	CLR DIGCNT
2229	013000	012704	013302			MOV #STPLST, R4
2230	013004	022767	000006	000074	OCTAS1:	CMP #6, DIGCNT
2231	013012	001434				BEQ OCTAS3
2232	013014	016767	177752	000066		MOV ADDRS, WORK
2233	013022	022767	000001	000056		CMP #1, DIGCNT
2234	013030	001003				BNE OCTAS2
2235	013032	042767	160000	177732		BIC #160000, ADDRS
2236	013040	042767	177770	000042	OCTAS2:	BIC #177770, WORK
2237	013046	052767	000060	000034		BIS #60, WORK
2238	013054	116744	000030			MOVB WORK, -(R4)
2239	013060	006067	177706			ROR ADDRS
2240	013064	006067	177702			ROR ADDRS
2241	013070	006067	177676			ROR ADDRS
2242	013074	005267	000006			INC DIGCNT
2243	013100	000167	177700			JMP OCTAS1
2244	013104	000205			OCTAS3:	RTS R5
2245	013106	000000			DIGCNT:	0
2246	013110	000000			WORK:	0
2247	013112				PRINT:	
2248	013112	032737	000200	177564		BIT #200, 2#PSR
2249	013120	001774				BEQ .-6
2250	013122	012737	000015	177566		MOV #15, 2#PBR
2251	013130	032737	000200	177564		BIT #200, 2#PSR
2252	013136	001774				BEQ .-6
2253	013140	001774				BEQ .-6
2254	013142	012737	000012	177566		MOV #12, 2#PBR
2255	013150	122714	000046		PRINT1:	CMPB #'8, 2R4
2256	013154	001434				BEQ PRINT3
2257	013156	122714	000052			CMPB #'*, 2R4
2258	013162	001401				BEQ 15
2259	013164	000420				BR PRINT2
2260	013166				15:	
2261	013166	032737	000200	177564		BIT #200, 2#PSR
2262	013174	001774				BEQ .-6

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2263	013176	012737	000015	177566	MOV	#15,0#PBR
2264	013204	032737	000200	177564	BIT	#200,0#PSR
2265	013212	001774			BEQ	.-6
2266	013214	012737	000012	177566	MOV	#12,0#PBR
2267	013222	105724			TSTB	(R4)+
2268	013224	000751			BR	PRINT1
2269	013226				PRINT2:	
2270	013226	032737	000200	177564	BIT	#200,0#PSR
2271	013234	001774			BEQ	.-6
2272	013236	112437	177566		MOVB (R4)+,0#PBR	
2273	013242	000167	177702		JMP PRINT1	
2274	013246				PRINT3:	
2275	013246	032737	000200	177564	BIT	#200,0#PSR
2276	013254	001774			BEQ	.-6
2277	013256	012737	000040	177566	MOV	#40,0#PBR
2278	013264	000205			RTS R5	
2279	013266	105724			PRINTS:	
2280	013270	001776			TSTB	(R4)+
2281	013272	000726			BEQ	PRINTS
2282	013274	000	000	000	BR	PRINT1
2283	013277	000	000		STLIST:	.BYTE 0,0,0,0,0
2284	013301	000			LISTDA:	.BYTE 0
2285	013	2	000046		STPLST:	'&
2286	013304	044127	052101	051447	AMES1:	.ASCII /WHAT'S THE ADDRESS OF REGISTER1'&/
2287	013312	052040	042510	040440		
2288	013320	042104	042522	051523		
2289	013326	047440	020106	042522		
2290	013334	044507	052123	051105		
2291	013342	037461	046			
2292	013345	127	040510	023524	AMES2:	.ASCII /WHAT'S THE ADDRESS OF REGISTER2'&/
2293	013352	020123	044124	020105		
2294	013360	042101	051104	051505		
2295	013366	020123	043117	051040		
2296	013374	043505	051511	042524		
2297	013402	031122	023077			
2298	013406	044127	052101	051447	AMES3:	.ASCII /WHAT'S THE ADDRESS OF REGISTER3'&/
2299	013414	052040	042510	040440		
2300	013422	042104	042522	051523		
2301	013430	047440	020106	042522		
2302	013436	044507	052123	051105		
2303	013444	037463	046			
2304	013447	124	050131	020105	DMES1:	.ASCII /TYPE IN DATA PATTERN&/
2305	013454	047111	042040	052101		
2306	013462	020101	040520	052124		
2307	013470	051105	023116			
2308	013474	040504	040524	043040	DMES2:	.ASCII /DATA FOR AC IS'&/
2309	013502	051117	040440	020103		
2310	013510	051511	023077			
2311	013514	040504	040524	043040	DMES3:	.ASCII /DATA FOR DIV IS'&/
2312	013522	051117	042040	053111		
2313	013530	044440	037523	046		
2314	013535	104	052101	020101	DMES4:	.ASCII /DATA FOR MQ IS'&/
2315	013542	047506	020122	050515		
2316	013550	044440	037523	046		
2317	013555	105	051122	051117	EMES1:	.ASCII /ERROR# &/
2318	013562	020043	046			

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2319	013565	122	036461	046	EMES2: .ASCII /R1=8/
2320	013571	120	051101	046501	EMES3: .ASCII /PARAMETERS USED DURING THIS ERROR WERE: *8/
2321	013576	052105	051105	020123	
2322	013604	051525	042105	042040	
2323	013612	051125	047111	020107	
2324	013620	044124	051511	042440	
2325	013626	051122	051117	053440	
2326	013634	051105	035105	023052	
2327	013642	047503	052116	047105	EMES4: .ASCII /CONTENTS OF MQ,AC,SR AND SC AT ERROR WERE: *8/
2328	013650	051524	047440	020106	
2329	013656	050515	040454	026103	
2330	013664	051123	040440	042116	
2331	013672	051440	020103	052101	
2332	013700	042440	051122	051117	
2333	013706	053440	051105	035105	
2334	013714	023052			
2335	013716	030122	023075		EMES5: .ASCII /R0=8/
2336	013722	054524	042520	044440	EMES6: .ASCII /TYPE IN THE FAILING ADDRESS8/
2337	013730	020116	044124	020105	
2338	013736	040506	046111	047111	
2339	013744	020107	042101	051104	
2340	013752	051505	023123		
2341	013756	040505	020105	045517	ENMES: .ASCII /EAE OK!8/
2342	013764	023041			
2343	013766	051123	053440	046111	IMES1: .ASCII /SR WILL HOLD THE VARIABLE DATA PATTERN8/
2344	013774	020114	047510	042114	
2345	014002	052040	042510	053040	
2346	014010	051101	040511	046102	
2347	014016	020105	040504	040524	
2348	014024	050040	052101	042524	
2349	014032	047122	046		
2350	014035	120	042522	051523	IMES2: .ASCII /PRESS ANY TTY KEY WHEN READY8/
2351	014042	040440	054516	052040	
2352	014050	054524	045440	054505	
2353	014056	053440	042510	020116	
2354	014064	042522	042101	023131	
2355	014072	046111	042514	040507	ILMES: .ASCII /ILLEGAL COMMAND!! S,C,R OR P ONLY!8/
2356	014100	020114	047503	046515	
2357	014106	047101	020504	020041	
2358	014114	026123	026103	020122	
2359	014122	051117	050040	047440	
2360	014130	046116	020531	046	
2361	014135	111	046114	043505	ILLMES: .ASCII /ILLEGAL ADDRESS REFERENCE AT PC8/
2362	014142	046101	040440	042104	
2363	014150	042522	051523	051040	
2364	014156	043105	051105	047105	
2365	014164	042503	040440	020124	
2366	014172	041520	046		
2367	014175	124	050131	020105	INMS1: .ASCII /TYPE IN SWITCH OPTIONS8/
2368	014202	047111	051440	044527	
2369	014210	041524	020110	050117	
2370	014216	044524	047117	023123	
2371					.EVEN
2372					;TABLES
2373					
2374	014224	000000			TBLA1: 000 ;PMQ

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2375	014226	000000	000	: PAC
2376	014230	177760	-16.	: PASH/PMUL/PDIV
2377	014232	000000	000	: ACCP
2378	014234	000000	000	: MQCP
2379	014236	000036	36	: SRCP
2380	014240	000000	TBLA2: 000	
2381	014242	177777	-1	
2382	014244	177760	-16.	
2383	014246	177777	-1	
2384	014250	177777	-1	
2385	014252	000342	342	
2386	014254	000000	TBLA3: 000	
2387	014256	125252	125252	
2388	014260	177760	-16.	
2389	014262	177777	-1	
2390	014264	125252	125252	
2391	014266	000342	342	
2392	014270	000000	TBLA4: 000	
2393	014272	052525	52525	
2394	014274	177760	-16.	
2395	014276	000000	000	
2396	014300	052525	52525	
2397	014302	000022	22	
2398	014304	000000	TBLA5: 000	
2399	014306	100000	100000	
2400	014310	177740	-32.	
2401	014312	177777	-1	
2402	014314	177777	-1	
2403	014316	000343	343	
2404	014320	000000	TBLA6: 000	
2405	014322	000000	000	
2406	014324	000020	16.	
2407	014326	000000	000	
2408	014330	000000	000	
2409	014332	000036	36	
2410	014334	177777	TBLA7: -1	
2411	014336	000000	000	
2412	014340	000017	15.	
2413	014342	077777	77777	
2414	014344	100000	100000	
2415	014346	000000	000	
2416	014350	177777	TBLA8: -1	
2417	014352	000000	000	
2418	014354	000020	16.	
2419	014356	077777	77777	
2420	014360	000000	000	
2421	014362	000211	211	
2422	014364	177776	TBLA9: -2	
2423	014366	100000	100000	
2424	014370	000017	15.	
2425	014372	177777	-1	
2426	014374	000000	000	
2427	014376	000150	150	
2428	014400	125252	TBLA10: 125252	
2429	014402	000000	000	
2430	014404	000017	15.	

2431	014406	052525		52525
2432	014410	000000		000
2433	014412	000010		10
2434	014414	125252	TBLA11:	125252
2435	014416	000000		000
2436	014420	000020		16.
2437	014422	025252		25252
2438	014424	000000		000
2439	014426	000211		211
2440	014430	052525	TBLA12:	52525
2441	014432	000000		000
2442	014434	000020		16.
2443	014436	052525		52525
2444	014440	000000		000
2445	014442	000010		10
2446	014444	000000	TBLA13:	000
2447	014446	177777		-1
2448	014450	000020		16.
2449	014452	100000		100000
2450	014454	000000		000
2451	014456	000110		110
2452	014460	000000	TBLB1:	000
2453	014462	000000		000
2454	014464	000000		000
2455	014466	000000		000
2456	014470	000000		000
2457	014472	017037		17037
2458	014474	177777	TBLB2:	-1
2459	014476	177777		-1
2460	014500	000000		000
2461	014502	140000		140000
2462	014504	000000		000
2463	014506	144036		144036
2464	014510	000000	TBLB3:	000
2465	014512	177777		-1
2466	014514	000000		000
2467	014516	140000		140000
2468	014520	000000		000
2469	014522	144016		144016
2470	014524	000001	TBLB4:	1
2471	014526	000000		000
2472	014530	000000		000
2473	014532	040000		40000
2474	014534	000000		000
2475	014536	004036		4036
2476	014540	000005	TBLB5:	5
2477	014542	000000		000
2478	014544	000000		000
2479	014546	050000		50000
2480	014550	000000		000
2481	014552	004034		4034
2482	014554	000001	TBLB6:	1
2483	014556	100000		100000
2484	014560	000000		000
2485	014562	100000		100000
2486	014564	000001		1

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2487	014566	140000		140000
2488	014570	125252	TBLB7:	125252
2489	014572	170000		170000
2490	014574	000000		000
2491	014576	100005		100005
2492	014600	052520		52520
2493	014602	140003		140003
2494	014604	000000	TBLC1:	000
2495	014606	000000		000
2496	014610	000000		000
2497	014612	000000		000
2498	014614	000000		000
2499	014616	000036		36
2500	014620	177777	TBLC2:	-1
2501	014622	000000		000
2502	014624	000001		1
2503	014626	177777		-1
2504	014630	177777		-1
2505	014632	000342		342
2506	014634	125252	TBLC3:	125252
2507	014636	000000		000
2508	014640	000002		2
2509	014642	177777		-1
2510	014644	052524		52524
2511	014646	000340		340
2512	014650	052525	TBLC4:	52525
2513	014652	000000		000
2514	014654	000002		2
2515	014656	000000		000
2516	014660	125252		125252
2517	014662	000020		20
2518	014664	125252	TBLC5:	125252
2519	014666	000000		000
2520	014670	040000		40000
2521	014672	165252		165252
2522	014674	100000		100000
2523	014676	000300		300
2524	014700	100000	TBLC6:	100000
2525	014702	000000		000
2526	014704	100000		100000
2527	014706	040000		40000
2528	014710	000000		000
2529	014712	000010		10
2530	014714	177777	TBLD1:	-1
2531	014716	177777		-1
2532	014720	000001		1
2533	014722	000000		000
2534	014724	177777		-1
2535	014726	000320		320
2536	014730	000000	TBLD2:	000
2537	014732	000000		000
2538	014734	000001		1
2539	014736	000000		000
2540	014740	000000		000
2541	014742	000036		36
2542	014744	125252	TBLF :	125252

2543	014746	177777	-1
2544	014750	000002	2
2545	014752	000000	000
2546	014754	152525	152525
2547	014756	000320	320
2548	014760	052525	TBLD4: 52525
2549	014762	000000	00
2550	014764	000002	2
2551	014766	000001	1
2552	014770	025252	25252
2553	014772	000000	000
2554	014774	177777	TBLD5: -1
2555	014776	177777	-1
2556	015000	177777	-1
2557	015002	000000	000
2558	015004	000001	1
2559	015006	000022	22
2560	015010	000000	TBLD6: 000
2561	015012	025253	25253
2562	015014	125252	125252
2563	015016	000000	000
2564	015020	100000	100000
2565	015022	000320	320
2566	015024	000001	TBLD7: 1
2567	015026	025253	25253
2568	015030	125252	125252
2569	015032	000001	1
2570	015034	100000	100000
2571	015036	000300	300
2572	015040	077777	TBLD8: 77777
2573	015042	037777	37777
2574	015044	077777	77777
2575	015046	077776	77776
2576	015050	077777	77777
2577	015052	000000	000
2578	015054	100000	TBLD9: 100000
2579	015056	000000	000
2580	015060	000002	2
2581	015062	000000	000
2582	015064	040000	40000
2583	015066	000022	22
2584	015070	100001	TBLD10: 100001
2585	015072	000000	000
2586	015074	000002	2
2587	015076	000001	1
2588	015100	040000	40000
2589	015102	000000	000
2590	015104	037776	TBLD11: 37776
2591	015106	020000	20000
2592	015110	077777	77777
2593	015112	077776	77776
2594	015114	040000	40000
2595	015116	000000	000
2596	015120	077777	TBLD12: 77777
2597	015122	177777	177777
2598	015124	177776	177776

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2599	015126	177777	177777
2600	015130	040000	40000
2601	015132	000040	40
2602	015134	100001	TBLD13: 100001
2603	015136	157777	157777
2604	015140	100000	100000
2605	015142	100001	100001
2606	015144	040000	40000
2607	015146	000000	000
2608	015150	052525	TBLD14: 52525
2609	015152	000000	000
2610	015154	052525	52525
2611	015156	000000	000
2612	015160	000001	1
2613	015162	000022	22
2614	015164	052524	TBLD15: 52524
2615	015166	000000	000
2616	015170	052525	52525
2617	015172	052524	52524
2618	015174	000000	000
2619	015176	000010	10
2620	015200	000000	TBLD16: 000
2621	015202	000000	000
2622	015204	125252	125252
2623	015206	000000	000
2624	015210	000000	000
2625	015212	000036	36
2626		000001	.END

AC	000604	639*	652*	721*	722	737*	738	763*	764	772	780	794	808	816
		824	863*	893	912*	931*	958*	960	975*	977	1004*	1049*	1051	1068*
		1076	1097*	1099	1122*	1124	1147*	1149	1169*	1171	1194*	1196	1220*	1222
		1253*	1255	1277*	1279	1299*	1301	1324*	1326	1349*	1351	1374*	1376	1411*
		1413	1455*	1457	1497	1530	1550*	1558	1583*	1585	1630	1659	1696	1856
		1992	2051*	2075*	2099*	2129*								
ACCP	005230	1413	1441*	1457	1497	1585	1978							
ADDRS	012772	660	1820*	1853*	1856*	1859*	1865	1881*	1886*	1894	1898	1902	1918*	1923*
		1931	1935	1939	1943	1947	1964*	1969*	1972*	1975*	1978*	1981*	1984*	1989*
		1992*	1995*	2003	2007	2011	2015	2019	2037	2041	2058	2062	2066	2087
		2091	2117	2121	2138	2142	2146	2162*	2169	2181*	2192	2198*	2199*	2200*
		2208*	2209*	2210*	2211*	2227*	2232	2235*	2239*	2240*	2241*			
AFLG	012754	2224*												
AMES1	013304	1862	1891	1928	2000	2059	2286*							
AMES2	013345	1899	1936	2008	2292*									
AMES3	013406	1944	2016	2298*										
ASCAL	012514	659	1864	1893	1897	1901	1930	1934	1938	1942	1946	2002*	2006	2010
		2014	2018	2036	2040	2057	2061	2065	2086	2090	2116	2120	2137	2141
		2145	2168	2180*										
ASCALA	012640	2191	2202*											
ASCAL1	012524	2182*	2201	2212										
ASCAL2	012540	2186*												
ASCAL3	012710	2187	2189	2213*										
ASH	000622	646*	1412*											
BEGIN	001006	651*												
BG1	001060	662*	1754	1764										
CC	= 177776	588*												
CCNT	005220	1404*	1407*	1408	1435*	1448*	1451*	1452	1489*	1492*	1493	1576*	1579*	1580
CFLG	0127F3	2180*	2205*	2225*										
CMND	007470	1771*	1772*	1775	1776	1778	1780	1782	1815*					
CONU	007402	1781	1794*											
CP1	001426	754*	762	765	769									
CYCNT	011644	2076*	2079*	2082*										
DIGCNT	013106	2228*	2230	2233	2242*	2245*								
DIV	000602	638*	1523*	1551*	1584*	1644*	1645*	1646*	1647*	1648*	1649*	1650*	1651*	1652*
		1653*	1654*	1655*	1656*	1657*	1680*	1682*	1684*	1686*	1688*	2052*	2103*	2105*
		2107*	2109*	2111*										
DMES1	013447	1895	1932	1940	2004	2012	2063	2088	2118	2304*				
DMES2	013474	2034	2139	2308*										
DMES3	013514	2038	2143	2311*										
DMES4	013535	2055	2084	2114	2135	2314*								
ECHO	012762	2192*	2193*	2194*	2197	2223*								
ECOMP	007472	672	683	693	700	709	716	724	731	740	747	759	766	774
		782	790	796	804	810	818	826	832	840	848	871	877	895
		901	916	922	935	941	962	968	979	985	1008	1014	1027	1033
		1053	1059	1072	1078	1101	1107	1113	1126	1132	1138	1151	1157	1163
		1173	1179	1185	1198	1204	1210	1224	1230	1236	1257	1263	1269	1281
		1287	1293	1303	1309	1315	1328	1334	1340	1353	1359	1365	1378	1384
		1390	1415	1421	1427	1459	1465	1471	1499	1505	1511	1526	1534	1542
		1554	1562	1570	1587	1593	1599	1626	1632	1638	1661	1667	1673	1692
		1698	1704	1717	1723	1738	1744	1816*						
EMES1	013555	1818	2317*											
EMES2	013565	1884	1921	2319*										
EMES3	013571	1967	2320*											
EMES4	013642	1851	1987	2327*										
EMES5	013716	1879	1916	1962	2335*									

EMES6	013722	2166	2336#																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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MAIN. MACY11 27(732) 03-NOV-76 15:41 PAGE 56
 DZKEDA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

NOP	= 000240	587*												
NOR	000516	644*	838	846	1456*									
OCTAS	012774	1821	1854	1857	1860	1882	1887	1919	1924	1965	1970	1973	1976	1979
		1982	1985	1990	1993	1996	2163	2228*						
OCTAS1	013004	2230*	2243											
OCTAS2	013040	2234	2236*											
OCTAS3	013104	2231	2244*											
PAC	005224	1411	1437*	1455	1583	1972								
PARCHN	007450	1806	1807*	1850*	1889*	1926*	1998*	2033*	2054*	2083*	2113*	2134*	2171*	
PASNT	007240	661*	1751*	1752	1758*	1765*								
PASH	005226	1412	1440*	1975										
PSR	= 177566	586*	1775*	2197*	2206*	2216*	2219*	2250*	2254*	2263*	2266*	2272*	2277*	
PC	=X000007	582*												
PCHNG	007432	1777	1802*											
PDIV	005226	1438*	1584											
PMQ	005222	1405	1410	1436*	1449	1454	1490	1495	1577	1582	1969			
PMUL	005226	1439*	1496											
PRINT	C13112	658	1757	1786	1819	1852	1863	1867	1869	1880	1885	1892	1896	1900
		1904	1906	1917	1922	1929	1933	1937	1941	1945	1949	1951	1963	1968
		1988	2001	2005	2009	2013	2017	2021	2023	2035	2039	2043	2056	2060
		2064	2068	2085	2089	2093	2115	2119	2123	2136	2140	2144	2148	2161
		2167	2247*											
PRINTS	013266	1822	2279*	2280										
PRINT1	013150	1855	1858	1861	1883	1888	1920	1925	1966	1971	1974	1977	1980	1983
		1986	1991	1994	1997	2164	2255*	2268	2273	2281				
PRINT2	013226	2259	2269*											
PRINT3	013246	2255	2274*											
PSR	= 177564	581*	1773	2195	2203	2214	2217	2220	2248	2251	2261	2264	2270	2275
REG1	007454	1805*	1865*	1875*	1894*	1912*	1931*	1957*	2003*	2029*	2062*	2078*	2169*	2175
REG10	007456	1810*	1898*	1912	1935*	1957	2007*	2029	2037*	2051	2066*	2078	2087*	2101
		2117*	2131	2138*	2155									
REG2	007460	1811*	1902*	1913*	1939*	1958*	2011*	2030*						
REG20	007462	1812*	1943*	1958	2015*	2030	2041*	2052	2058*	2077	2091*	2102	2103	2104
		2105	2106	2107	2108	2109	2110	2111	2121*	2132	2142*	2156		
REG3	007464	1813*	1947*	1959*	2019*	2031*								
REG30	007466	1814*	2146*	2157										
RETURN	007412	1783	1796*											
RD	=%000000	575*	928*	932	945*	973*	976	989*	990	1020*	1024	1039*	1040	1065*
		1069	1085*	1086	1217*	1221	1240*	1241	1371*	1375	1394*	1395	1403*	1431*
		1432	1446*	1475*	1476	1487*	1515*	1516	1574*	1603*	1604	1759*	1796*	1816
		1964	2130*	2131*	2132*	2154*	2155*	2156*	2157*	2185*	2186	2188	2190	2206
		2207*	2211	2213										
R1	=%000001	576*	753*	754*	756	757	763	764	929*	933	947*	974*	977	993*
		1021*	1031	1042*	1066*	1076	1088*	1218*	1222	1244*	1372*	1382	1398*	1402*
		1406	1447*	1450	1488*	1491	1575*	1578	1886	1923				
R2	=%000002	577*	1405*	1406*	1449*	1450*	1490*	1491*	1577*	1578*				
R3	=%000003	578*												
R4	=%000004	579*	657*	1756*	1785*	1818*	1851*	1862*	1866*	1868*	1879*	1884*	1891*	1895*
		1899*	1903*	1905*	1916*	1921*	1928*	1932*	1936*	1940*	1944*	1948*	1950*	1962*
		1967*	1987*	2000*	2004*	2008*	2012*	2016*	2020*	2022*	2034*	2038*	2042*	2055*
		2059*	2063*	2067*	2084*	2088*	2092*	2114*	2118*	2122*	2135*	2139*	2143*	2147*
		2160*	2166*	2229*	2238*	2255	2257	2267	2272	2279				
RS	=%000005	580*	658*	659*	672*	683*	693*	700*	709*	716*	724*	731*	740*	747*
		759*	766*	774*	782*	790*	796*	804*	810*	818*	826*	832*	840*	848*
		871*	877*	895*	901*	916*	922*	935*	941*	962*	968*	979*	985*	1008*
		1014*	1027*	1033*	1053*	1059*	1072*	1078*	1101*	1107*	1113*	1126*	1132*	1138*

[illegible]

[illegible]

.MAIN. MACY11 27(732) 03-NOV-76 15:41 PAGE 59
DZKEDA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

[illegible]

.MAIN. MACY11 27(732) 03-NOV-76 15:41 PAGE 61
DZKEDA.P11 CROSS REFERENCE TABLE -- MACRO NAMES

[illegible]

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.MAIN. MACY11 27(732) 03-NOV-76 15:41 PAGE 62
DZKEDA.P11 CROSS REFERENCE TABLE -- MACRO NAMES

.SDIV	18
.SEOP	18
.SERRO	18
.SERRT	18
.SMULT	18
.SPOWE	18
.SRAND	18
.SRODE	18
.SRODC	18
.SREAD	18
.SR2AZ	18
.SSAVE	18
.SSB2D	18
.SSB2O	18
.SSCOP	18
.SSIZE	18
.SSUPR	18
.STRAP	18
.STYPB	18
.STYPD	18
.STYPE	18
.STYPO	18
.S4OCA	18
.1170	18

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 DZKEDA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

ADD	1083														
ASL	1088	2208	2209	2210											
ASR	1042	2198	2199	2200											
BEQ	656	671	692	692	699	708	715	723	730	739	746	755	758	765	773
	781	789	795	803	809	817	825	831	839	847	856	871	876	894	900
	915	921	934	940	948	961	967	978	984	991	1007	1013	1026	1032	1041
	1052	1058	1071	1077	1087	1100	1106	1112	1125	1131	1137	1151	1156	1162	1172
	1178	1184	1197	1203	1209	1223	1229	1235	1242	1256	1262	1263	1280	1286	1292
	1302	1308	1314	1327	1333	1339	1352	1358	1364	1377	1383	1383	1396	1414	1420
	1426	1433	1458	1464	1470	1477	1480	1498	1504	1510	1517	1583	1592	1598	1605
	1625	1631	1637	1660	1666	1672	1691	1697	1703	1716	1722	1737	1743	1753	1760
	1774	1777	1779	1781	1783	1788	1792	1827	1830	1833	1836	1841	1872	1909	1954
	2026	2046	2071	2096	2126	2151	2184	2187	2189	2196	2204	2215	2218	2221	2231
	2249	2252	2253	2256	2258	2262	2265	2271	2276	2280					
BIC	680	1032	1770	1772	2193	2207	2235	2236							
BIS	1794	1874	1911	1956	2028	2048	2073	2098	2128	2153	2194	2211	2237		
BIT	955	1479	1773	1787	1791	1871	1908	1953	2025	2045	2070	2095	2125	2150	2183
	2195	2203	2214	2217	2220	2248	2251	2261	2264	2270	2275				
BMI	1531	1540	1559	1568	1828	1831	1837	2080							
BNE	882	906	1409	1453	1494	1581	1824	2191	2234						
BPL	1533	1561													
BR	675	686	696	703	712	719	727	734	743	750	762	765	777	785	793
	799	807	813	821	829	835	843	851	874	880	898	904	919	925	938
	944	949	965	971	982	988	994	1011	1017	1030	1036	1042	1056	1062	1075
	1081	1090	1104	1110	1116	1129	1135	1141	1154	1160	1166	1176	1182	1188	1201
	1207	1213	1227	1233	1239	1245	1260	1266	1272	1284	1290	1296	1306	1312	1318
	1331	1337	1343	1356	1362	1368	1381	1387	1393	1399	1418	1424	1430	1434	1462
	1468	1474	1478	1502	1508	1514	1518	1529	1537	1538	1545	1557	1565	1566	1573
	1590	1596	1602	1606	1629	1635	1641	1664	1670	1676	1695	1701	1707	1720	1726
	1741	1747	1876	1914	1960	2032	2053	2081	2112	2133	2158	2177	2179	2201	2259
	2268	2281													
BVS	1525	1553													
CLC	946	992	1084	1089	1243	1397									
CLR	632	652	653	654	661	662	687	753	779	845	863	864	867	891	912
	913	931	957	959	1004	1005	1022	1048	1050	1403	1446	1456	1487	1489	1522
	1523	1549	1574	1576	1758	1798	1803	1870	1873	1907	1910	1952	1955	2024	2027
	2044	2047	2050	2069	2072	2075	2094	2097	2099	2124	2127	2129	2149	2152	2173
	2180	2181	2228												
CLRB	801	2049	2074	2100											
CMP	681	707	738	757	764	772	788	794	816	824	830	838	881	905	914
	933	960	977	990	1006	1031	1040	1051	1076	1086	1099	1105	1124	1130	1149
	1155	1171	1177	1196	1202	1222	1228	1241	1255	1261	1279	1285	1301	1307	1326
	1332	1351	1357	1376	1382	1395	1408	1413	1419	1432	1452	1457	1463	1469	1476
	1493	1497	1503	1516	1580	1585	1591	1604	1624	1665	1690	1715	1721	1736	1742
	1752	1776	1778	1780	1782	1797	1802	1823	1826	1829	1832	1835	1839	2178	2186
	2188	2190	2230	2233											
CMPB	698	714	729	745	875	899	920	939	966	983	1012	1025	1057	1070	1111
	1136	1161	1183	1208	1234	1267	1291	1313	1338	1363	1388	1425	1509	1597	1636
	1671	1702	2255	2257											
DEC	890	945	1039	2079											
HALT	593	595	597	599	601	603	605	607	609	611	613	615	617	619	621
	623	1825													
INC	754	866	989	1037	1085	1240	1394	1407	1431	1451	1475	1492	1515	1579	1603
	1751	2205	2242												
JMP	633	636	857	1481	1754	1764	1789	1793	1806	1834	1838	1841	1843	1844	1845
	1846	1847	1848	1849	2212	2243	2273								

JSR	658	659	672	683	693	700	709	716	724	731	740	747	759	766	774	
	782	790	796	804	810	818	826	832	840	848	871	877	895	901	916	
	922	935	941	962	968	979	985	1008	1014	1027	1033	1053	1059	1072	1078	
	1101	1107	1113	1126	1132	1138	1151	1157	1163	1173	1179	1185	1198	1204	1210	
	1224	1230	1236	1257	1263	1269	1281	1287	1293	1303	1309	1315	1328	1334	1340	
	1353	1359	1365	1378	1384	1390	1415	1421	1427	1459	1465	1471	1499	1505	1511	
	1526	1534	1542	1554	1562	1570	1597	1593	1599	1626	1632	1638	1661	1667	1673	
	1692	1698	1704	1717	1723	1738	1744	1757	1762	1786	1819	1821	1822	1852	1854	
	1855	1857	1858	1860	1861	1863	1864	1867	1869	1880	1882	1883	1885	1887	1888	
	1892	1893	1896	1897	1900	1901	1904	1906	1917	1919	1920	1922	1924	1925	1929	
	1930	1933	1934	1937	1938	1941	1942	1945	1946	1949	1951	1963	1965	1966	1968	
	1970	1971	1973	1974	1976	1977	1979	1980	1982	1983	1985	1986	1988	1990	1991	
	1993	1994	1996	1997	2001	2002	2005	2006	2009	2010	2013	2014	2017	2018	2021	
	2023	2035	2036	2039	2040	2043	2056	2057	2060	2061	2064	2065	2068	2085	2086	
	2089	2090	2093	2115	2116	2119	2120	2123	2136	2137	2140	2141	2144	2145	2148	
	2161	2163	2164	2167	2168											
	MOV	635	650	651	657	660	663	669	678	679	690	706	721	737	756	763
		771	815	837	865	868	889	892	911	928	929	930	932	958	973	974
		975	976	1003	1020	1021	1023	1024	1049	1065	1066	1067	1068	1069	1096	1097
		1098	1121	1122	1123	1146	1147	1148	1168	1169	1170	1193	1194	1195	1217	1218
1219		1220	1221	1252	1253	1254	1276	1277	1278	1298	1299	1300	1323	1324	1325	
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1866		1868	1875	1879	1881	1884	1886	1889	1891	1894	1895	1898	1899	1902	1903	
1905		1912	1913	1916	1918	1921	1923	1926	1928	1931	1932	1935	1936	1939	1940	
1943		1944	1947	1948	1950	1957	1958	1959	1962	1964	1967	1969	1972	1975	1978	
1981		1984	1987	1989	1992	1995	1998	2000	2003	2004	2007	2008	2011	2012	2015	
2016		2019	2020	2022	2029	2030	2031	2033	2034	2037	2038	2041	2042	2051	2052	
2054		2055	2058	2059	2062	2063	2066	2067	2076	2077	2078	2083	2084	2087	2088	
2091		2092	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2113	2114	
2117		2118	2121	2122	2130	2131	2132	2134	2135	2138	2139	2142	2143	2146	2147	
2154	2155	2156	2157	2160	2162	2166	2169	2170	2171	2172	2174	2185	2192	2197		
2206	2213	2216	2219	2229	2232	2250	2254	2263	2266	2277						
MOV8	787	823	2238	2272												
NOP	2176															
RESET	1761															
ROL	993	1244	1398													
ROLB	1524	1532	1539	1552	1560	1567										
ROR	947	2239	2240	2241												
RTI	664	1795	1800	1805												
RTS	1801	2222	2244	2278												
SUB	1082															
TST	655	691	722	780	802	808	846	869	893	1530	1558	1630	1659	1696	1714	
	1733	2175														
TST8	670	2267	2279													
.ABS	573															
.ASCII	2286	2292	2298	2304	2308	2311	2314	2317	2319	2320	2327	2335	2336	2341	2343	
	2350	2355	2361	2367												
.BYTE	2282	2284														
.ENABL	1															
.END	2626															

K05

.MAIN. MACY11 27(732) 03-NOV-76 15:41 PAGE 66
DZKEDA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

.EVEN	2371				
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.MACRO	1	569	570	571	572
.NLIST	1	115			
.REM	3	116			
.WORD	627				

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DEFAULT GLOBALS GENERATED: 0

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RUN-TIME RATIO: 133/64=2.0
CORE USED: 33K (65 PAGES)

