

RP07

DUAL PORT TEST
CZRJNAO

AH-F963A-MC
FICHE 1 OF 2

MAY 1983
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TEST NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TEST NO.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
TEST NO.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
TEST NO.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
TEST NO.	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

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IDENTIFICATION

PRODUCT CODE: AC-F962A-MC
PRODUCT NAME: CZRJNAO RP07 DUAL PORT TEST
PRODUCT DATE: JANUARY 1, 1983
MAINTAINER: CX DIAGNOSTIC ENGINEERING
AUTHOR: MIKE LEAVITT

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TABLE OF CONTENTS

- 1.0 GENERAL INFORMATION
 - 1.1 PROGRAM ABSTRACT
 - 1.2 SYSTEM REQUIREMENTS
 - 1.3 RELATED DOCUMENTS AND STANDARDS
 - 1.4 DIAGNOSTIC HIERARCHY PREREQUISITES
 - 1.5 ASSUMPTIONS
 - 1.6 HARDWARE TEST REQUIREMENTS
- 2.0 OPERATING INSTRUCTIONS
 - 2.1 COMMANDS
 - 2.2 SWITCHES
 - 2.3 FLAGS
 - 2.4 HARDWARE QUESTIONS
 - 2.5
 - 2.6 EXTENDED P-TABLE DIALOGUE
 - 2.7 QUICK STARTUP PROCEDURE
- 3.0 ERROR INFORMATION
 - 3.1 TYPES OF ERROR MESSAGES
 - 3.2 SPECIFIC ERROR MESSAGES
- 4.0 PERFORMANCE AND PROGRESS REPORTS
- 5.0 DEVICE INFORMATION TABLES
- 6.0 TEST SUMMARIES

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THE RP07 DUAL PORT LOGIC TEST PERFORMS A SERIES OF TESTS WHICH VERIFY THAT THE RP07 DUAL PORT LOGIC IS FUNCTIONING PROPERLY. ONLY THE CONTROL LOGIC IS TESTED BY THIS PROGRAM; DATA HANDLING IN THE DUAL PORT MODE IS NOT TESTED BY THIS PROGRAM.

BOTH PORTS OF THE DRIVE ARE CABLED TO THE SAME MASSBUS BY A CABLE. THIS ARRANGEMENT ALLOWS THE DUAL PORT LOGIC TO BE TESTED FROM ONE PDP-11/RH11 OR RH70.

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

1. PDP-11 PROCESSOR
2. 28K OF MEMORY
3. KW11-L OR KW11-P CLOCK
4. CONSOLE TERMINAL
5. RH11 OR RH70 WITH AN RP07
6. STANDARD RP07 DRIVE TO DRIVE INTERCONNECT CABLE

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USERS MANUAL - CHQUS

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

RP07 FRONT END DIAGNOSTIC

THE PREREQUISITE SOFTWARE MUST BE RUN TWICE: ONCE FROM EACH PORT.

DYNAMIC OPERATION OF THE DUAL PORT OPTION IS TESTED BY THE RP07 PERFORMANCE EXERCISER PROGRAM.

1.5 ASSUMPTIONS

NONE

1.6 HARDWARE TEST REQUIREMENTS

EACH PORT OF THE RP07 MUST HAVE A UNIQUE DRIVE NUMBER, IE: PORT A = 0, PORT B = 1. IN ADDITION, PORT A 'OUT' MUST BE CONNECTED TO PORT B 'IN'. PORT B 'OUT' MUST BE CONNECTED TO A TERMINATOR.

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME)
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SECTION 4.0)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

2.2 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH. IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY 'DDDD'.

SWITCH	EFFECT
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDD	EXECUTE DDDDD PASSES (DDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDD = 1 TO 64000)
/UNITS:LIST	TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED

IN THE LIST. LIST EXAMPLE - /UNITS:0:5:10-12
 USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)

EXAMPLE OF SWITCH USAGE:

START/TESTS:1-5/PASS:1000/EOP:100

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	TESTS	PASS	FLAGS	EOP	UNITS
START	X	X	X	X	X
RESTART	X	X	X	X	X
CONTINUE		X	X	X	
PROCEED			X		
DROP					X
ADD					X
PRINT					
DISPLAY					X
FLAGS					
ZFLAGS					
EXIT					

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXR*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	'BELL' ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)

ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

* ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A 'BELL' ON ERROR, YOU MAY USE THE FOLLOWING STRING:

/FLAGS:LOE:IER:BOE

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?" YOU MUST ANSWER 'Y' AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN 'PRELOADED' USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP+ USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A 'Y', THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE FOLLOWING QUESTIONS FOR EACH UNIT.

UNIT 0
RPCS1 ADRS (O) 176700 ?
VECTOR ADRS (O) 254 ?
BR LEVEL (O) 5 ?
DRIVE # (O) 0 ?

THE 1ST QUESTION "RPCS1 ADRS" REQUIRES THAT THE USER INPUT THE ADDRESS OF RPCS1 OF THE CONTROLLER WHICH IS CONNECTED TO THE DRIVE UNDER TEST. DEFAULT IS 176700 (OCTAL).

THE 2ND QUESTION "VECTOR ADRS" REQUIRES THE USER TO INPUT THE INTERRUPT VECTOR ADDRESS OF THE RHXX CONTROLLER. DEFAULT IS 254 (OCTAL).

THE 3RD QUESTION "BR LEVEL" REQUIRES THE USER TO INPUT THE CONTROLLER INTERRUPT PRIORITY LEVEL. DEFAULT IS LEVEL 5.

THE 4TH QUESTION "PORT B DRIVE #" REQUIRES THE USER TO SPECIFY THE DRIVE NUMBER OF THE DRIVE TO BE TESTED. DEFAULT IS 0 (OCTAL).

THE 5TH QUESTION "PORT B DRIVE #" REQUIRES THE USER TO SPECIFY THE DRIVE NUMBER OF THE DRIVE TO BE TESTED. DEFAULT IS 1 (OCTAL).

THE FOLLOWING MESSAGE WILL THEN BE PRINTED:

'PORT A 'OUT' MUST BE CONNECTED TO PORT B 'IN' PORT B 'OUT' MUST BE CONNECTED TO A TERMINATOR DRIVE MUST BE ONLINE, WRITE ENABLED AND READY PORT SELECT SWITCH MUST BE IN THE A/B POSITION. EACH PORT SHALL HAVE A UNIQUE DRIVE NUMBER. CONTINUE' (L)

2.6 EXTENDED P-TABLE DIALOGUE

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. IF YOU HAVE A MULTIPLEXED DEVICE SUCH AS A MASS STORAGE CONTROLLER WITH SEVERAL DRIVES OR A COMMUNICATION DEVICE WITH SEVERAL LINES, THIS BECOMES TEDIOUS SINCE MOST OF THE ANSWERS ARE REPETITIOUS.

TO ILLUSTRATE A MORE EFFICIENT METHOD, SUPPOSE YOU ARE TESTING A FICTIONAL DEVICE, THE XY11. SUPPOSE THIS DEVICE CONSISTS OF A CONTROL MODULE WITH EIGHT UNITS (SUB-DEVICES) ATTACHED TO IT. THESE UNITS ARE DESCRIBED BY THE OCTAL NUMBERS 0 THROUGH 7. THERE IS ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS CALLED THE Q-FACTOR. THIS Q-FACTOR MAY BE 0 OR 1. BELOW IS A SIMPLE WAY TO BUILD A TABLE FOR ONE XY11 WITH EIGHT UNITS.

```
# UNITS (D) ? 8<CR>
UNIT 1
CSR ADDRESS (O) ? 160000<CR>
SUB-DEVICE # (O) ? 0<CR>
Q-FACTOR (O) 0 ? 1<CR>
UNIT 2
CSR ADDRESS (O) ? 160000<CR>
SUB-DEVICE # (O) ? 1<CR>
Q-FACTOR (O) 1 ? 0<CR>
UNIT 3
CSR ADDRESS (O) ? 160000<CR>
SUB-DEVICE # (O) ? 2<CR>
Q-FACTOR (O) 0 ? <CR>
UNIT 4
CSR ADDRESS (O) ? 160000<CR>
SUB-DEVICE # (O) ? 3<CR>
Q-FACTOR (O) 0 ? <CR>
UNIT 5
CSR ADDRESS (O) ? 160000<CR>
SUB-DEVICE # (O) ? 4<CR>
Q-FACTOR (O) 0 ? <CR>
UNIT 6
CSR ADDRESS (O) ? 160000<CR>
SUB-DEVICE # (O) ? 5<CR>
Q-FACTOR (O) 0 ? <CR>
UNIT 7
```



```
CSR ADDRESS (0) ? 160000<CR>
SUB-DEVICE # (0) ? 6<CR>
Q-FACTOR (0) 0 ? 1<CR>
```

```
UNIT 8
CSR ADDRESS (0) 160000<CR>
SUB-DEVICE # (0) ? 7<CR>
Q-FACTOR (0) 1 ? <CR>
```

NOTICE THAT THE DEFAULT VALUE FOR THE Q-FACTOR CHANGES WHEN A NON-DEFAULT RESPONSE IS GIVEN. BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

AS YOU CAN SEE FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS NOT VERY EFFICIENT.

THE RUNTIME SERVICES CAN TAKE MULTIPLE UNIT SPECIFICATIONS HOWEVER. LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION FEATURE.

```
# UNITS (0) ? 8<CR>
```

```
UNIT 1
CSR ADDRESS (0) ? 160000<CR>
SUB-DEVICE # (0) ? 0,1<CR>
Q-FACTOR (0) 0 ? 1,0<CR>
```

```
UNIT 3
CSR ADDRESS (0) ? 160000<CR>
SUB-DEVICE # (0) ? 2-5<CR>
Q-FACTOR (0) 0 ? 0<CR>
```

```
UNIT 7
CSR ADDRESS (0) ? 160000<CR>
SUB-DEVICE # (0) ? 6,7<CR>
Q-FACTOR (0) 0 ? 1<CR>
```

AS YOU CAN SEE IN THE ABOVE DIALOGUE, THE RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. IN THE FIRST PASS, TWO ENTRIES ARE BUILT SINCE TWO SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE SERVICES ASSUME THAT THE CSR ADDRESS IS 160000 FOR BOTH SINCE IT WAS SPECIFIED ONLY ONCE. IN THE SECOND PASS, FOUR ENTRIES WERE BUILT. THIS IS BECAUSE FOUR SUB-DEVICES WERE SPECIFIED. THE "-" CONSTRUCT TELLS THE RUNTIME SERVICES TO INCREMENT THE DATA FROM THE FIRST NUMBER TO THE SECOND. IN THIS CASE, SUB-DEVICES 2, 3, 4 AND 5 WERE SPECIFIED. (IF THE SUB-DEVICE WERE SPECIFIED BY ADDRESSES, THE INCREMENT WOULD BE BY 2 SINCE ADDRESSES MUST BE ON AN EVEN BOUNDARY.) THE CSR ADDRESSES AND Q-FACTORS FOR THE FOUR ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST TWO UNITS ARE SPECIFIED IN THE THIRD PASS.

THE WHOLE PROCESS COULD HAVE BEEN ACCOMPLISHED IN ONE PASS AS SHOWN BELOW.


```
# UNITS (D) ? 8<CR>
UNIT 1
CSR ADDRESS (O) ? 160000<CR>
SUB-DEVICE # (O) ? 0-7<CR>
Q-FACTOR (O) 0 ? 0,1,0,,,,,1,1<CR>
```

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

2.7 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK) QUESTIONS
3. TYPE 'R NAME', WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
NAME TYPE NUMBER ON UNIT NUMBER TST NUMBER PC:XXXXXX
ERROR MESSAGE
```

WHERE; NAME = DIAGNOSTIC NAME
TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
NUMBER = ERROR NUMBER
UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES

ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBK" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

DRIVE NOT IN NEUTRAL AFTER RELEASE - REQUEST NOT SET
REGISTER WRONG AFTER RELEASE WITH REQUEST SET
DRIVE SEIZED BY RELEASE COMMAND ISSUED WHEN DRIVE IN NEUTRAL
DRIVE IN NEUTRAL AFTER RELEASE - REQUEST SET
ATTN BIT WRONG AFTER RECALIBRATE COMMAND
DRIVE RETURNED TO NEUTRAL IF DRIVE CLEAR GIVEN WHILE DRIVE SEIZED
DRIVE RETURNED TO NEUTRAL IF MASSBUS INIT GIVEN WHILE DRIVE SEIZED
TIMEOUT ONE SHOT WAS RETRIGGERED WITHOUT REGISTER ACCESS
TIMEOUT HAS NOT OCCURRED WITHIN 2 SECONDS
DRIVE IS NON-EXISTENT ('NED' BIT SET)
ATTN BIT FOR PORT NOT RESET BY MASSBUS CLEAR
TIMEOUT CLEARED THE ATTENTION BIT
DRIVE NOT IN NEUTRAL OR SEIZED AFTER ATTN BIT WRITTEN
DRIVE IN NEUTRAL AFTER ATTENTION BIT WRITTEN
WRITING ATTENTION BIT (IN RPAS) DID NOT SET PORT REQUEST
CONTROLLER SELECT SWITCH ON DRIVE NOT IN "A/B"
CAN'T ACCESS DRIVE THROUGH EITHER PORT
ATTN BIT FOR SEIZING PORT NOT CLEARED BY MASSBUS INIT
ATTN BIT FOR OPPOSITE PORT CLEARED BY DRIVE CLEAR
ATTN BIT NOT CLEARED BY MASSBUS INIT, DRIVE IN NEUTRAL
THE ATTN BIT SET AFTER TIMEOUT WITH NO REQUEST AND "ERR" SET
RPAS REGISTER BITS SET BY WRITING ATA BIT

RELEASE COMMAND RECOGNIZED WHEN ISSUED BY NON-SEIZING PORT
TIMEOUT ONE-SHOT IS LESS THAN 500 MS
TIMEOUT ONE-SHOT NOT WITHIN SPEC (EXPECTED: 750 < 'TIME' < 1250 (MS))
ATTENTION NOT RESET BY WRITING RPAS
ATTENTION NOT RESET BY GO
ATTENTION RESET BY GO WHEN NOT SEIZED
WRONG DRIVE TYPE
DRIVE NOT ON LINE
SERIAL NUMBER READ THROUGH EACH PORT NOT THE SAME
DRIVE NOT SEIZED BY PORT
WRONG STATUS SEEN BY THE SEIZING PORT
REGISTER CONTENTS WERE SEEN BY OPPOSITE PORT - DRIVE WAS SEIZED
REGISTER CONTENTS WRONG AFTER RELEASE OR TIMEOUT
REGISTER CONTENTS WRONG
CONTROL BUS PARITY ERROR READING INDICATED REGISTER
COMMAND ISSUED WITH DRIVE IN ERROR STILL SETS GO BIT
ATTN BIT WRONG AFTER TIMEOUT - REQUEST NOT SET
ATTN BIT WRONG AFTER RELEASE - REQUEST SET
ATTN BIT WRONG AFTER RELEASE - REQUEST NOT SET
DRIVE NOT SEIZED WHEN ATTN BIT FOR PORT CLEARED
DRIVE SEIZED WHEN ZERO WRITTEN IN ATTN BIT
DRIVE NOT IN NEUTRAL AFTER TIMEOUT - REQUEST NOT SET
TIMEOUT CLEARED THE DRIVE'S ERROR BIT
RELEASE COMMAND RELEASED DRIVE WITH ERRORS SET
TIMEOUT ONE-SHOT DID NOT RETRIGGER
DRIVE CANNOT BE SEIZED BY WRITING ATA BIT
ILF ERROR CANNOT BE SET
DRIVE NOT READY AFTER RELEASE
CANNOT CLEAR ERROR BY DRIVE CLEAR

BOTH PORT NUMBERS THE SAME - TESTS NOT PERFORMED
NO CLOCK FOUND ON SYSTEM - TESTS NOT PERFORMED
WRONG SYSTEM CONFIGURATION - TESTS NOT PERFORMED

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THE 'EOP' SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END OF PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

5.0 DEVICE INFORMATION TABLES

THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF THE TEST-DEVICE PARAMETERS. THE STRUCTURE OF THIS TABLE IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES.

.WORD 176700	;RPCS1 BASE REGISTER ADDRESS
.WORD 254	;VECTOR ADDRESS
.WORD 240	;BR LEVEL 5 DEVICE
.WORD 0	;PORT A DRIVE #
.WORD 1	;PORT B DRIVE #
.WORD 1	;CONFIGURATION IS ALL RIGHT

6.0 TEST SUMMARIES

TEST 1: NEUTRAL ACCESS TEST

VERIFY THAT THE DRIVE IS ACCESSABLE THROUGH BOTH PORTS.

1. SELECT DRIVE PORT BY WRITING THE DRIVE NUMBER IN RPCS2,
2. ACCESS A REMOTE DRIVE REGISTER; IE: RPDS,
3. VERIFY THAT 'NED' IS NOT SET,
4. VERIFY THAT DRIVE IS DUAL PORTED BY READING DRIVE TYPE REGISTER,
5. VERIFY THAT DRIVE IS IN NEUTRAL BY READING MOL, PGM, VV, DPR AND DRY THROUGH BOTH PORTS,
6. VERIFY THAT SERIAL NUMBER IS THE SAME WHEN READ THROUGH BOTH PORTS.

FAULT LIST: J11, J12, J13, JUMPER CABLE, DUAL PORT JUMPER, INCORRECT START-UP SEQUENCE.

TEST 2: PORT A SEIZE/TIMEOUT TEST

1. SEIZE PORT A BY WRITING RPDA AND VERIFY THAT SEIZE OPERATION DID OCCUR.
2. SELECT PORT B BY WRITING DRIVE NUMBER INTO RPCS2,
3. READ ALL REGISTERS EXCEPT RPCS1 (EXPECT REGISTERS TO =0, EXCEPT RPDT AND RPAS WHEN READ FROM PORT B),
4. VERIFY THAT RELEASE TIMEOUT IS GREATER THAN 500 MSEC BUT LESS

5. THAN 2 SEC,
5. VERIFY THAT DRIVE IS IN THE NEUTRAL STATE AFTER RELEASE.

FAULT LIST: J11, J12

TEST 3: PORT B SEIZE/TIMEOUT TEST

SAME AS TEST 2 EXCEPT THAT THE SEIZE OPERATION IS DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 4: SEIZE/RELEASE TEST - PORT A

VERIFY THAT THE RELEASE COMMAND WORKS PROPERLY.

1. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS.
2. ISSUE RELEASE COMMAND THROUGH PORT A AND VERIFY DRIVE IS IN NEUTRAL AFTER A 40 MSEC DELAY.

FAULT LIST: J11, J12

TEST 5: PORT B SEIZE/RELEASE TEST

SAME AS TEST 4 BUT DONE THROUGH PORT B.

1. SEIZE DRIVE THROUGH PORT B BY WRITING RPDS.
2. ISSUE RELEASE COMMAND THROUGH PORT B AND VERIFY DRIVE IS IN NEUTRAL AFTER A 40 MSEC DELAY.

FAULT LIST: J13, J12

TEST 6: PORT A SEIZE TEST

SEIZE PORT A USING THE FOLLOWING PROCEDURES:

1. WRITE RPDS.
2. WRITE RPAS (UNIT UNDER TEST).
3. READ RPCS1.

ISSUE A RELEASE COMMAND BETWEEN EACH SEIZE OPERATION AND VERIFY THAT THE DRIVE DID RETURN TO THE NEUTRAL STATE.

FAULT LIST: J11, J12

TEST 7: PORT B SEIZE TEST

SAME AS TEST 6 BUT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 8: PORT A RELEASE INTERFERENCE TEST

1. CLEAR ATTENTION BITS FOR BOTH PORTS BY ISSUING A DRIVE CLEAR THROUGH BOTH PORTS,
2. ISSUE RELEASE COMMAND FOR EACH PORT AND WAIT 40 MS AFTER EACH RELEASE,
3. SEIZE DRIVE THROUGH PORT B BY WRITING RPDS AND VERIFY THAT SEIZE DID OCCUR,
4. ISSUE RELEASE COMMAND THROUGH PORT A AND VERIFY THAT DRIVE IS STILL SEIZED TO PORT B,
5. RELEASE DRIVE FROM PORT B,
6. VERIFY THAT DRIVE IS SEIZED TO PORT A WHEN RELEASED BY PORT B,
7. RELEASE DRIVE FROM PORT A,
8. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 9: PORT B RELEASE INTERFERENCE TEST

1. SAME AS TEST 8 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 10: PORT A RELEASE WITH ERROR TEST

1. CLEAR ATTENTION BITS THROUGH BOTH PORTS BY ISSUING A DRIVE CLEAR THROUGH BOTH PORTS,
2. ISSUE A RELEASE COMMAND FOR EACH PORT AND WAIT 40MS AFTER EACH COMMAND,
3. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS,
4. ISSUE ILLEGAL COMMAND THROUGH PORT A. AFTER A DELAY OF 40MS, VERIFY THAT ILF IS SET,
5. ISSUE RELEASE COMMAND TO PORT A,
6. VERIFY THAT PORT IS STILL SEIZED TO PORT A,
7. CLEAR ERRORS THROUGH PORT A,
8. RELEASE DRIVE THROUGH PORT A,
9. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 11: PORT B RELEASE WITH ERROR TEST

SAME AS TEST 10 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 12: PORT A SEIZE AND CLEAR TEST

VERIFY THAT A MASSBUS CLEAR OR DRIVE CLEAR WILL NOT CAUSE THE SEIZING PORT TO RELEASE THE DRIVE.

1. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS AND VERIFY THAT

- IT SEIZED,
2. ISSUE DRIVE CLEAR THROUGH PORT A,
3. VERIFY THAT DRIVE IS STILL SEIZED THROUGH PORT A,
4. ISSUE MASSBUS CLEAR THROUGH PORT A,
5. VERIFY THAT DRIVE IS STILL SEIZED THROUGH PORT A,
6. RELEASE DRIVE THROUGH PORT A,
7. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 13: PORT B SEIZE AND CLEAR TEST

SAME AS TEST 12 EXCEPT DONE THROUGH PORT B,

FAULT LIST: J13, J12

TEST 14: SEIZE BY RPAS TEST

VERIFY THAT WRITING APPROPRIATE BIT IN RPAS SEIZES THE DRIVE.

1. WRITE RPAS WITH ATTENTION BITS FOR BOTH PORTS,
2. VERIFY THAT EITHER PORT HAS SEIZED DRIVE,
3. RELEASE DRIVE FROM SEIZED PORT AND VERIFY, AFTER A 40MS DELAY, THAT OPPOSITE PORT SEIZES DRIVE,
4. RELEASE DRIVE AND VERIFY THAT IT IS IN NEUTRAL, AFTER 40MS.

FAULT LIST: J11, J12, J13

TEST 15: INHIBIT SEIZE BY RPAS TEST

VERIFY THAT DRIVE IS NOT SEIZED WHEN A ZERO IS WRITTEN INTO THE DRIVE'S ATTENTION BIT.

1. VERIFY THAT BOTH PORTS ARE IN NEUTRAL. IF THEY ARE NOT, ISSUE RELEASE COMMANDS AND VERIFY THAT PORTS DID RELEASE,
2. WRITE ALL ATTENTION BITS, EXCEPT FOR DRIVE BEING TESTED, IN RPAS,
3. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12, J13

TEST 16: SET PORT A REQUEST TEST

VERIFY THAT WRITING A DRIVE REGISTER SETS PORT REQUEST WHEN THE DRIVE IS SEIZED BY OPPOSITE PORT.

1. CLEAR ATTENTION BITS FOR BOTH PORTS.
2. SEIZE DRIVE THROUGH PORT B BY WRITING RPDS,
3. SET PORT REQUEST PORT A BY WRITING RPDS FROM PORT A,
4. RELEASE DRIVE FROM PORT B,
5. VERIFY THAT DRIVE SEIZES TO PORT A BY PORT A'S ATA BIT.
6. VERIFY THAT PORT B IS NOT SEIZED BY TESTING RPDS = 0,
7. RELEASE DRIVE FROM PORT A. VERIFY IT IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 17: SET PORT B REQUEST TEST

SAME AS TEST 16 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 18: RESET ATTENTION A BY DRIVE CLEAR

VERIFY THAT DRIVE CLEAR CLEARS ONLY THE ATTENTION BIT OF THE SEIZED PORT,

1. SET ATTENTION BITS FOR BOTH PORTS BY WRITING PAT BIT IN RPCS2 FROM BOTH PORTS.
2. WRITE A REMOTE REGISTER FOR EACH PORT.
3. VERIFY THAT ATA BIT IS SET ON EACH PORT.
4. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS AND VERIFY THAT DRIVE IS SEIZED TO PORT A.
5. ISSUE A DRIVE CLEAR COMMAND THROUGH PORT A AND VERIFY THAT ATTENTION BIT IS RESET.
6. RELEASE DRIVE FROM PORT A AND VERIFY THAT IT IS IN NEUTRAL.
7. VERIFY THAT ATTENTION BIT IS STILL SET ON PORT B.

FAULT LIST: J11, J12

TEST 19: RESET ATTENTION B BY DRIVE CLEAR

SAME AS TEST 18 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 20: RESET ATTENTION A AND B BY MASSBUS INIT

VERIFY THAT BOTH PORTS ARE IN NEUTRAL AND THAT EACH CORRESPONDING ATTENTION BIT IS SET. WITH THESE CONDITIONS PRESENT, VERIFY THAT A MASSBUS INIT WILL RESET BOTH ATTENTION BITS

1. SET ATTENTION BITS FOR BOTH PORTS.
2. RELEASE BOTH PORTS AND VERIFY THAT THEY ARE IN NEUTRAL.
3. ISSUE MASSBUS INIT.
4. VERIFY THAT BOTH ATTENTION BITS DID RESET.

TEST 21: RESET ATTENTION A BY SETTING 'GO' BIT

VERIFY THAT THE 'GO' BIT CLEARS ONLY THE ATTENTION BIT OF THE SEIZED PORT.

1. SET ATTENTION BITS FOR BOTH PORTS BY ISSUING OFFSET COMMAND THROUGH BOTH PORTS.
2. VERIFY THAT ATA IS SET FOR BOTH PORTS.
3. SEIZE DRIVE THROUGH PORT A AND VERIFY THAT IT IS SEIZED.
4. ISSUE NOP COMMAND THROUGH PORT A AND VERIFY THAT ATA BIT IS

5. ^{RESET,} RELEASE DRIVE FROM PORT A AND VERIFY THAT IT IS IN NEUTRAL,
6. VERIFY THAT ATTENTION BIT IS STILL SET ON PORT B.

FAULT LIST: J11, J12

TEST 22: RESET ATTENTION B BY SETTING 'GO' BIT
SAME AS TEST 21 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 23: RESET ATTENTION 'A' BY WRITING RPAS

VERIFY THAT ATA CAN BE RESET BY WRITING THE APPROPRIATE BIT IN THE RPAS REGISTER.

1. SET ATTENTION BIT ON BOTH PORTS BY ISSUING OFFSET COMMAND THROUGH BOTH PORTS AND VERIFY THAT THEY ARE SET,
2. VERIFY THAT DRIVE IS IN NEUTRAL BY LOOPING ON THE CONTENTS OF RPDS. THE DRIVE IS IN NEUTRAL WHEN RPDS IS NOT 0.
3. WRITE RPAS BIT FOR PORT A AND VERIFY THAT ATA BIT FOR THAT PORT IS RESET AND THAT ATA BIT FOR PORT B IS SET,
4. CLEAR ATTENTION BIT FOR PORT B BY ISSUING A DRIVE CLEAR COMMAND, THEN A RELEASE COMMAND AND WAITING 40MS AFTER THE RELEASE COMMAND HAS BEEN ISSUED.

FAULT LIST: J11, J12

TEST 24: RESET ATTENTION 'B' BY WRITING RPAS
SAME AS TEST 23 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 25: SET ATTENTION 'A' BY COMMAND

1. CLEAR ATTENTION BITS FOR BOTH PORTS,
2. SELECT PORT A AND ISSUE A RECAL COMMAND
3. VERIFY THAT ATTENTION BIT IS SET FOR PORT A,
4. RELEASE DRIVE FROM PORT A AND VERIFY THAT DRIVE IS IN NEUTRAL,
5. VERIFY THAT ATTENTION BIT IS NOT SET FOR PORT B.

FAULT LIST: J11, J12

TEST 26: SET ATTENTION 'B' BY COMMAND

SAME AS TEST 25 EXCEPT DONE THROUGH PORT B

FAULT LIST: J13, J12

TEST 27: TEST THAT PORT 'A' TIMEOUT DOES NOT RESET DRIVE

VERIFY THAT A PORT TIMEOUT DOES NOT INITIALIZE DRIVE.

1. CLEAR ATTENTION BIT FOR BOTH PORTS,
2. LOAD PORT A INTO RPCS2,
3. SEIZE DRIVE THROUGH PORT A BY WRITING RPDS = 0,
4. ISSUE ILLEGAL COMMAND THROUGH PORT A,
5. WAIT FOR DRIVE TO TIMEOUT AND RETURN TO NEUTRAL,
6. SELECT PORT A AND READ COMPOSITE ERROR IN RPDS, ILF BIT IN RPER1, AND ATA BIT IN RPDS,
7. VERIFY THAT DRIVE IS IN NEUTRAL AND THAT THE ATTENTION BIT IS NOT SET FOR PORT B,
8. ISSUE NOP TO PORT 'B' AND VERIFY THAT ATTENTION SETS DUE TO COMPOSITE ERROR BEING PREVIOUSLY SET.

FAULT LIST: J11, J12

TEST 28: TEST THAT PORT B TIMEOUT DOES NOT RESET DRIVE

SAME AS TEST 27 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 29: PORT 'A' RETRIGGER BY DEMAND TEST

VERIFY THAT PORT A TIMEOUT CAN BE RETRIGGERED BY MASSBUS DEMAND.

1. CLEAR ATTENTION BITS FOR BOTH PORTS,
2. SEIZE DRIVE THROUGH PORT A WAIT FOR 500 MSEC.
3. RETRIGGER TIMEOUT ON-SHOT BY READING RPDS (DRIVE SHOULDN'T HAVE GONE TO THE NEUTRAL STATE),
4. SET TIMER = 2 SECONDS,
5. SELECT PORT B AND WAIT FOR TIMER TO TIMEOUT,
6. READ ELAPSED TIME,
7. VERIFY THAT DRIVE IS IN NEUTRAL,
8. COMPARE ELAPSED TIME TO LIMITS,
9. IF ELAPSED TIME IS NOT WITHIN LIMITS, REPORT THE ERROR.

FAULT LIST: J11, J12

TEST 30: PORT 'B' RETRIGGER BY DEMAND TEST

SAME AS TEST 29, EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

TEST 31: PORT 'A' TIMEOUT/RELEASE TEST

VERIFY THAT THE TIMEOUT ONE-SHOT IS TRIGGERED WHEN THE DRIVE SWITCHES PORTS AND THAT SEIZING PORT PERFORMS NO REGISTER ACCESS.

1. CLEAR ATTENTION BITS FOR BOTH PORTS,
2. SEIZE DRIVE THROUGH PORT B BY WRITING RPDS,
3. SET REQUEST FOR PORT A BY WRITING RPDS THROUGH PORT A,
4. ISSUE RELEASE THROUGH PORT B,
5. VERIFY THAT DRIVE IS SEIZED BY PORT A,
6. LOAD TIME WITH AN ACTUAL MEASURED TIMEOUT + 25%,
7. WAIT FOR TIMER TO EXPIRE,
8. VERIFY THAT DRIVE IS IN NEUTRAL.

FAULT LIST: J11, J12

TEST 32: PORT 'B' TIMEOUT/RELEASE TEST

SAME AS TEST 31 EXCEPT DONE THROUGH PORT B.

FAULT LIST: J13, J12

a

.REM @

VERSION (CZRJN-A-0)

1. THIS VERSION IS THE STARTING POINT FOR CX DIAGNOSTIC SUPPORT OF THE RP07 DISK DRIVE.

@

HISTORY

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002001 132
002002 122
002003 112
002004 116
002005 000
002006 000
002007 000
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002010 101
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002011 060
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002012 000001
002014
002014 000200
002016
002016 100066
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002020 000000
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002022 002226
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002024 000000
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002026 101040
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002042 000000
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002046

;*LAST REVISION 01-JAN-83

.TITLE CZRJNAO RP07 DUAL PORT TEST
.SBTTL PROGRAM HEADER

.ENABL AMA,ABS
= 2000

::++
: THE PROGRAM HEADER IS THE INTERFACE BETWEEN
: THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
:--

LSNAME::		:DIAGNOSTIC NAME
	.ASCII /C/	
	.ASCII /Z/	
	.ASCII /R/	
	.ASCII /J/	
	.ASCII /N/	
	.BYTE 0	
	.BYTE 0	
	.BYTE 0	
LSREV::		:REVISION LEVEL
	.ASCII /A/	
LSDEPO::		:0
	.ASCII /0/	
LSUNIT::		:NUMBER OF UNITS
	.WORD TSPTHV	
LSTIML::		:LONGEST TEST TIME
	.WORD 200	
LSHPCP::		:POINTER TO H.W. QUES.
	.WORD LSHARD	
LSSPCP::		:POINTER TO S.W. QUES.
	.WORD 0	
LSHPTP::		:PTR. TO DEF. H.W. PTABLE
	.WORD LSHW	
LSSPTP::		:PTR. TO S.W. PTABLE
	.WORD 0	
LSLADP::		:DIAG. END ADDRESS
	.WORD LSLAST	
LSSTA::		:RESERVED FOR APT STATS
	.WORD 0	
LSCO::		
	.WORD 0	
LSDTYP::		:DIAGNOSTIC TYPE
	.WORD 0	
LSAPT::		:APT EXPANSION
	.WORD 0	
LSDTP::		:PTR. TO DISPATCH TABLE
	.WORD LSDISPAT	
LSPRIO::		:DIAGNOSTIC RUN PRIORITY
	.WORD 0	
LSENV1::		:FLAGS DESCRIBE HOW IT WAS SETUP
	.WORD 0	
LSEXP1::		:EXPANSION WORD

002046	000000	LSMREV::	.WORD	0	
002050					:SVC REV AND EDIT #
002050	003		.BYTE	CSREVISION	
002051	003		.BYTE	CSREDIT	
002052		LSEF::			:DIAG. EVENT FLAGS
002052	000000		.WORD	0	
002054	000000		.WORD	0	
002056		LSSPC::			
002056	000000		.WORD	0	
002060		L\$DEVP::			: POINTER TO DEVICE TYPE LIST
002060	002532		.WORD	L\$DVTYP	
002062		LSREPP::			:PTR. TO REPORT CODE
002062	000000		.WORD	0	
002064		L\$EXP4::			
002064	000000		.WORD	0	
002066		L\$EXP5::			
002066	000000		.WORD	0	
002070		LSAUT::			:PTR. TO ADD UNIT CODE
002070	000000		.WORD	0	
002072		LSDUT::			:PTR. TO DROP UNIT CODE
002072	000000		.WORD	0	
002074		L\$LUN::			:LUN FOR EXERCISERS TO FILL
002074	000000		.WORD	0	
002076		L\$DESP::			:POINTER TO DIAG. DESCRIPTION
002076	002540		.WORD	L\$DESC	
002100		L\$LOAD::			:GENERATE SPECIAL AUTOLOAD EMT
002100	104035		EMT	ESLOAD	
002102		L\$ETP::			:POINTER TO ERR_TBL
002102	000000		.WORD	0	
002104		LSICP::			:PTR. TO INIT CODE
002104	016730		.WORD	L\$INIT	
002106		L\$CCP::			:PTR. TO CLEAN-UP CODE
002106	017302		.WORD	L\$CLEAN	
002110		LSACP::			:PTR. TO AUTO CODE
002110	017300		.WORD	L\$AUTO	
002112		L\$PRT::			:PTR. TO PROTECT TABLE
002112	016722		.WORD	L\$PROT	
002114		L\$TEST::			:TEST NUMBER
002114	000000		.WORD	0	
002116		L\$DLY::			:DELAY COUNT
002116	000000		.WORD	0	
002120		L\$HIME::			:PTR. TO HIGH MEM
002120	000000		.WORD	0	

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.SBTTL DISPATCH TABLE

:++
: THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
: IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
:--

002122 000040
002124 017400
002126 021156
002130 023104
002132 025032
002134 026360
002136 027706
002140 030732
002142 031756
002144 033532
002146 035306
002150 036756
002152 040426
002154 042232
002156 044036
002160 046732
002162 047604
002164 051064
002166 052344
002170 054244
002172 056144
002174 060034
002176 061724
002200 063350
002202 064566
002204 066004
002206 067200
002210 070374
002212 072134
002214 073674
002216 074716
002220 075740
002222 077012

.WORD 32
L\$DISPATCH::
.WORD T1
.WORD T2
.WORD T3
.WORD T4
.WORD T5
.WORD T6
.WORD T7
.WORD T8
.WORD T9
.WORD T10
.WORD T11
.WORD T12
.WORD T13
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10 002224 000006
002226
002226
11 002226 176700
12 002230 000254
13 002232 000240
14 002234 000000
15 002236 000001
16 002240 000001
17
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28 002242

.SBTTL DEFAULT HARDWARE P-TABLE

;++
: THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
: THE TEST-DEVICE PARAMETERS. THE STRUCTURE OF THIS TABLE
: IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
: AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
:--

.WORD L10000-LSHW/2
LSHW::
DFPTBL::
.WORD 176700 ;RPCS1 BASE REGISTER ADDRESS
.WORD 254 ;VECTOR ADDRESS
.WORD 240 ;BR LEVEL 5 DEVICE
.WORD 0 ;PORT A DRIVE NUMBER
.WORD 1 ;PORT B DRIVE NUMBER
.WORD 1 ;CONFIGURATION IS ALL RIGHT

L10000:

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10 002242 000000
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002244
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```
.SBTTL SOFTWARE P-TABLE  
:  
:++  
: THE SOFTWARE TABLE CONTAINS VARIOUS DATA USED BY THE  
: PROGRAM AS OPERATIONAL PARAMETERS. THESE PARAMETERS ARE  
: SET UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR  
: AT RUN TIME.  
:--  
  
      .WORD  L10001-L$$W/2  
L$$W::  
SFPTBL::  
  
L10001:
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.SBTTL GLOBAL EQUATES SECTION

;++
: THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
: ARE USED IN MORE THAN ONE TEST.
:--

:
: BIT DIFINITIONS
:

100000	BIT15== 100000
040000	BIT14== 40000
020000	BIT13== 20000
010000	BIT12== 10000
004000	BIT11== 4000
002000	BIT10== 2000
001000	BIT09== 1000
000400	BIT08== 400
000200	BIT07== 200
000100	BIT06== 100
000040	BIT05== 40
000020	BIT04== 20
000010	BIT03== 10
000004	BIT02== 4
000002	BIT01== 2
000001	BIT00== 1

001000	BIT9== BIT09
000400	BIT8== BIT08
000200	BIT7== BIT07
000100	BIT6== BIT06
000040	BIT5== BIT05
000020	BIT4== BIT04
000010	BIT3== BIT03
000004	BIT2== BIT02
000002	BIT1== BIT01
000001	BIT0== BIT00

:
: EVENT FLAG DEFINITIONS
: EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
:

000040	EF.START== 32.	: START COMMAND WAS ISSUED
000037	EF.RESTART== 31.	: RESTART COMMAND WAS ISSUED
000036	EF.CONTINUE== 30.	: CONTINUE COMMAND WAS ISSUED
000035	EF.NEW== 29.	: A NEW PASS HAS BEEN STARTED
000034	EF.PWR== 28.	: A POWER-FAIL/POWER-UP OCCURRED

:
: PRIORITY LEVEL DEFINITIONS
:

000340	PRI07== 340
000300	PRI06== 300
000240	PRI05== 240
000200	PRI04== 200
000140	PRI03== 140
000100	PRI02== 100

000040
000000

PRI01== 40
PRI00== 0

·
·
· OPERATOR FLAG BITS
·

000004
000010
000020
000040
000100
000200
000400
001000
002000
004000
010000
020000
040000
100000

EVL== 4
LOT== 10
ADR== 20
IDU== 40
ISR== 100
UAM== 200
BOE== 400
PNT== 1000
PRI== 2000
IXE== 4000
IBE== 10000
IER== 20000
LOE== 40000
HOE== 100000

RHXX REGISTERS

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.SBTTL RHXX REGISTERS

:CONTROL AND STATUS REGISTER 1 (RPCS1)

000100	IE=	100	: INTERRUPT ENABLE (BIT #6)
000200	RDY=	200	: READY (BIT #7)
000400	A16=	400	: HIGH ORDER BUS ADDRESS BIT (BIT #8)
001000	A17=	1000	: HIGH ORDER BUS ADDRESS BIT (BIT #9)
002000	PSEL=	2000	: PORT SELECT (BIT #10)
020000	MCPE=	20000	: MASSBUS PARITY ERROR (BIT #13)
040000	TRE=	40000	: TRANSFER ERROR (BIT #14)
100000	SC=	100000	: SPECIAL CONDITION (BIT #15)

:WORD COUNT REGISTER (RPWC)
:(EACH BIT IS CALLED BY BIT NUMBER)

:BUS ADDRESS REGISTER (RPBA)
:(EACH BIT IS CALLED BY BIT NUMBER)

:CONTROL AND STATUS REGISTER 2 (RPCS2)

000001	U0=	1	: UNIT SELECT (BIT #0)
000002	U1=	2	: UNIT SELECT (BIT #1)
000004	U2=	4	: UNIT SELECT (BIT #2)
000010	BAI=	10	: BUS ADDRESS INCREMENT INHIBIT (BIT #3)
000020	PAT=	20	: MASSBUS PARITY TEST (BIT #4)
000040	CLR=	40	: CLEAR (BIT #5)
000100	IR=	100	: INPUT READY (BIT #6)
000200	OR=	200	: OUTPUT READY (BIT #7)
000400	MDPE=	400	: MASS BUS PARITY ERROR (BIT #8)
001000	MXF=	1000	: MISSED TRANSFER ERROR (BIT #9)
002000	PGE=	2000	: PROGRAM ERROR (BIT #10)
004000	NEM=	4000	: NON EXISTENT MEMORY (BIT #11)
010000	NED=	10000	: NON EXISTENT DRIVE (BIT #12)
020000	UPE=	20000	: UNIBUS PARITY ERROR (BIT #13)
040000	WCE=	40000	: WRITE CHECK ERROR (BIT #14)
100000	DLT=	100000	: DATA LATE (BIT #15)

:DATA BUFFER REGISTER (RPDB)
:(EACH BIT IS CALLED BY BIT NUMBER)

.SBTTL RP07 REGISTERS

:CONTROL AND STATUS REGISTER #1. (#00)

000001	GO=	1	: GO BIT (BIT #0)
000002	F0=	2	: FUNCTION CODE BIT #1
000004	F1=	4	: FUNCTION CODE BIT #2
000010	F2=	10	: FUNCTION CODE BIT #3
000020	F3=	20	: FUNCTION CODE BIT #4
000040	F4=	40	: FUNCTION CODE BIT #5
004000	DVA=	4000	: DEVICE AVAILABLE (BIT #11)


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60      ;DRIVE STATUS REGISTER (RPDS) (#01)
61
62      000001      OM=      1
63      000002      EWN=     2
64      000004      ILV=     4
65      000100      VV=      100
66      000200      DRY=     200      ;DRIVE READY (BIT #7)
67      000400      DPR=     400      ;DRIVE PRESENT (BIT #8)
68      001000      PGM=    1000      ;PROGRAMABLE (BIT #9)
69      002000      LBT=    2000      ;LAST SECTOR TRANSFERRED (BIT #10)
70      004000      WRL=    4000      ;WRITE LOCK (BIT #11)
71      010000      MOL=   10000      ;MEDIUM ON-LINE (BIT #12)
72      020000      PIP=   20000      ;POSITIONING OPERATION IN PROGRESS (BIT #13)
73      040000      ERR=   40000      ;COMPOSITE ERROR (BIT #14)
74      100000      ATA=  100000      ;ATTENTION ACTIVE (BIT #15)
75
76
77      ;ERROR REGISTER #01 (RPER1) (#02)
78
79      000001      ILF=      1      ;ILLEGAL FUNCTION (BIT #0)
80      000002      ILR=      2      ;ILLEGAL REGISTER (BIT #1)
81      000004      RMR=      4      ;REGISTER MODIFICATION REFUSED (BIT #2)
82      000010      PAR=     10      ;PARITY ERROR (BIT #3)
83      000020      FER=     20      ;FORMAT ERROR (BIT #4)
84      000040      WCF=     40      ;WRITE CLOCK FAIL (BIT #5)
85      000100      ECH=    100      ;ECC HARD ERROR (BIT #6)
86      000200      HCE=    200      ;HEADER COMPARE ERROR (BIT #7)
87      000400      HCRC=   400      ;HEADER CRC ERROR (BIT #8)
88      001000      AOE=  1000      ;ADDRESS OVERFLOW ERROR (BIT #9)
89      002000      IAE=  2000      ;INVALID ADDRESS ERROR (BIT #10)
90      004000      WLE=  4000      ;WRITE LOCK ERROR (BIT #11)
91      010000      DTE= 10000      ;DRIVE TIMING ERROR (BIT #12)
92      020000      OPI= 20000      ;OPERATION INCOMPLETE (BIT #13)
93      040000      UNS= 40000      ;DRIVE UNSAFE (BIT #14)
94      100000      DCK= 100000     ;DATA CHECK ERROR (BIT 15)
95
96
97      ;MAINTAINABILITY REGISTER (RPMR1)(#03)
98
99      100000      DMD=  100000      ;DIAGINOSTIC MODE (BIT #15)
100
101
102      ;ATTENTION SUMMARY PSEUDO-REGISTER (RPAS) (#04)
103
104      000001      AT0=      1      ;DEVICE 0 (BIT #0)
105      000002      AT1=      2      ;DEVICE 1 (BIT #1)
106      000004      AT2=      4      ;DEVICE 2 (BIT #2)
107      000010      AT3=     10      ;DEVICE 3 (BIT #3)
108      000020      AT4=     20      ;DEVICE 4 (BIT #4)
109      000040      AT5=     40      ;DEVICE 5 (BIT #5)
110      000100      AT6=    100      ;DEVICE 6 (BIT #6)
111      000200      AT7=    200      ;DEVICE 7 (BIT #7)
112
113
114      ;DESIRED SECTOR/TRACK ADDRESS REGISTER (RPDA) (#05)

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;(EACH BIT IS CALLED BY BIT NUMBER)

;DRIVE TYPE REGISTER (RPDT) (#06)

000001	DT00= 1	:DRIVE TYPE NUMBER BIT 1
000002	DT01= 2	:DRIVE TYPE NUMBER BIT 2
000004	DT02= 4	:DRIVE TYPE NUMBER BIT 3
000010	DT03= 10	:DRIVE TYPE NUMBER BIT 4
000020	DT04= 20	:DRIVE TYPE NUMBER BIT 5
000040	DT05= 40	:DRIVE TYPE NUMBER BIT 6
000100	DT06= 100	:DRIVE TYPE NUMBER BIT 7
000200	DT07= 200	:DRIVE TYPE NUMBER BIT 8
000400	DT08= 400	:DRIVE TYPE NUMBER BIT 9
004000	DRQ= 4000	:DRIVE REQUEST REQUIRED (BIT #11)
020000	MOH= 20000	:MOVING HEAD (BIT #13)
040000	TAP= 40000	:TAPE DRIVE (BIT #14)
100000	NBA= 100000	:NOT BLOCK ADDRESSED (BIT #15)

;LOOK-AHEAD REGISTER (RPLA) (#07)

000100	SC0= 100	:SECTOR COUNT FIELD 0 (BIT #6)
000200	SC1= 200	:SECTOR COUNT FIELD 1 (BIT #7)
000400	SC2= 400	:SECTOR COUNT FIELD 2 (BIT #8)
001000	SC3= 1000	:SECTOR COUNT FIELD 3 (BIT #9)
002000	SC4= 2000	:SECTOR COUNT FIELD 4 (BIT #10)
000400	SC5= 400	:::SECTOR COUNT FIELD 5 (BIT #11)
001000	SC6= 1000	:::SECTOR COUNT FIELD 6 (BIT #12)

;RP07 ERROR REGISTER #3 (RPER3) (#15)

000001	DGE= 1	:::DIAGNOSTIC ERROR (BIT #0)
000002	TPE= 2	:::TEMPERATURE WARNING ERROR (BIT #1)
000004	AIR= 4	:::AIR SYSTEM WARNING ERROR (BIT #2)
000010	DPE= 10	:::DATA PARITY ERROR (BIT #3)
000020	BPE= 20	:::BUFFER PARITY ERROR (BIT #4)
000040	DCU= 40	:::DC UNSAFE (BIT #5)
000100	IXU= 100	:::INDEX UNSAFE (BIT#6)
000200	DVC= 200	:::DEVICE CHECK (BIT #7)
000400	TCF= 400	:::TACH CALIBRATION FAILURE (BIT #8)
001000	LCE= 1000	:::LOSS OF CYLINDER ERROR (BIT #9)
040000	SKI= 40000	:SEEK INCOMPLETE (BIT #14)
100000	BSE= 100000	:::BAD SECTOR ERROR (BIT #15)

;OFFSET REGISTER (RPOF) (#11)

000200	OFD= 200	:OFFSET FORWARD (BIT #5)
002000	HCI= 2000	:HEADER COMPARE INHIBIT (BIT #10)
004000	ECI= 4000	:ERROR CORRECTION CODE INHIBIT (BIT #11)
010000	FMT16= 10000	:FORMAT BIT (BIT #12)
040000	MTD= 40000	:::MOVE TRACK DISCRIPTOR (BIT #14)
100000	CMOD= 100000	:::COMMAND MODIFIER BIT (BIT #15)

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:DESIRED CYLINDER ADDRESS (RPDC) (#12)
:(EACH BIT IS CALLED BY BIT NUMBER)

:CURRENT CYLINDER REGISTER (RPCC) (#13)
:(EACH BIT IS CALLED BY BIT NUMBER)

:SERIAL NUMBER REGISTER (RPSN) (#10)
:(EACH IS CALLED BY BIT NUMBER)

:RP07 ERROR REGISTER #2 (RPER2) (#14)

000400
001000
002000
004000
010000
100000

WRYUNS= 400 :::WRITE READY UNSAFE (BIT #8)
WOR= 1000 :::WRITE OVERRUN (BIT #9)
RWU1= 2000 :::READ/WRITE UNSAFE #1 (BIT #10)
RWU2= 4000 :::READ/WRITE UNSAFE #2 (BIT #11)
RWU3= 10000 :::READ WRITEE UNSAFE #3 (BIT #12)
PGE= 100000 :::PROGRAM ERROR (BIT #15)

:ECC POSITION REGISTER (RPEC1) (#16)
:(EACH BIT IS CALLED BY BIT NUMBER)

:ECC PATTERN REGISTER (RPEC2) (#17)
:(EACH BIT IS CALLED BY BIT NUMBER)

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.SBTTL GLOBAL DATA SECTION

:+
: THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
: IN MORE THAN ONE TEST.
:--

002244	000000	CLKSTA:: .WORD	0	:CLOCK STATUS (NO CLOCK= 0, KW11-P= 1 OR KW11-L= -1
002246	000000	PORTA:: .WORD	0	:ADDRESS OF PORT A
002250	000000	PORTB:: .WORD	0	:ADDRESS OF PORT B
002252	000000	PORTC:: .WORD	0	:ADDRESS OF DIFFERENT DRIVE
002254	000000	RQSTA:: .WORD	0	:REQUEST BIT FOR PORT A
002256	000000	RQSTB:: .WORD	0	:REQUEST BIT FOR PORT B
002260	000000	ASR1:: .WORD	0	:ATA-A OR ATA-B
002262	000000	ASRA:: .WORD	0	:::ATA-A
002264	000000	ASRB:: .WORD	0	:::ATA-B
002266	000000	PTNBR:: .WORD	0	:CONTAINS THE PORT ADDRESS FOR ERROR TYPEOUTS
002270	000000	SEIZPT:: .WORD	0	:CONTAINS THE ADDRESS OF THE SEIZING PORT
002272	000000	OPPR:: .WORD	0	:CONTAINS THE ADDRESS OF THE 'OPPOSITE' PORT
002274	000000	TSTNUM:: .WORD	0	:NUMBER OF THE CURRENT TEST
002276	000000	CKERR:: .WORD	0	:IF -1, A REGISTER MISCOMPARISON OCCURRED
002300	000000	NOSEIZ:: .WORD	0	:IF -1, THE PORT IN 'SEIZPT' DID NOT SEIZE THE DRIVE
002302	000000	RELERR:: .WORD	0	:IF -1, THE PORT IN 'SEIZPT' DID NOT RELEASE THE DRIVE
002304	000000	TIME:: .WORD	0	:ELAPSED TIME COUNTER
002306	000000	WATCH:: .WORD	0	:WATCH DOG TIMER LOCATION
002310	000000	TIMEA:: .WORD	0	:THE TIMEOUT ONE-SHOT VALUE MEASURED THROUGH PORT A
002312	000000	TIMEAP:: .WORD	0	:PORT A TIMEOUT VALUE + 25%
002314	000000	TIMEAM:: .WORD	0	:PORT A TIMEOUT VALUE - 25%
002316	000000	TIMEB:: .WORD	0	:THE TIMEOUT ONE-SHOT VALUE MEASURED THROUGH PORT B
002320	000000	TIMEBP:: .WORD	0	:PORT B TIMEOUT VALUE + 25%
002322	000000	TIMEBM:: .WORD	0	:PORT B TIMEOUT VALUE - 25%
002324	000000	TIMES:: .WORD	0	:STORAGE FOR TIMEOUT ONE-SHOT RETRIGGER TEST
002326	000000	CNFBAD:: .WORD	0	:BAD CONFIGURATION MARKER
002330	000000	ABC:: .WORD	0	:TIMER
002332	000000	BADDAT:: .WORD	0	:USED TO GET BAD DATA
002334	000000	BADADR:: .WORD	0	:USED TO GET FAILING REGISTER
002336	000000	EXPTED:: .WORD	0	:USED TO GET GOOD DATA
002340	000000	DRVBAD:: .WORD	0	:USED TO MARK A SYSTEM FATAL ERROR
002342	000000	TMP0:: .WORD	0	:TEMPORARY STORAGE
002344	000000	TMP1:: .WORD	0	:TEMPORARY STORAGE
002346	000000	TMP2:: .WORD	0	:TEMPORARY STORAGE
002350	000000	TMP3:: .WORD	0	:TEMPORARY STORAGE
002352	000000	TMP4:: .WORD	0	:TEMPORARY STORAGE
002354	000000	UNIT:: .WORD	0	:USED TO SELECT A UNIT #
002356	176700	RPADR:: .WORD	176700	:CONTAINS RPCS1 BASE ADDRESS
002360	000254	RPVEC:: .WORD	254,5*32.	:CONTAINS VECTOR ADDRESS & BR LEVEL
002364	000050	RHEXT:: .WORD	50	:CONTAINS RH70 OFFSET TO RPBAE
002366	000000	RHTYPE:: .WORD	0	:CONTAINS RHXX TYPE; RH11= 0, RH70= 1
002370	000000	DRVSN:: .WORD	0	:STORAGE FOR DRIVE S/N DIGITS
002372	176700	RPCS1:: .WORD	176700	:BASE ADDRESS USED FOR THE DRIVE
002374	176702	RPWC:: .WORD	176702	:WORD COUNT REGISTER
002376	176704	RPBA:: .WORD	176704	:BUFFER ADDRESS REGISTER
002400	176706	RPDA:: .WORD	176706	:DESIRED SECTOR/TRACK ADDRESS
002402	176710	RPCS2:: .WORD	176710	:RP07 STATUS REGISTER
002404	176712	RPDS:: .WORD	176712	:RP07 DRIVE STATUS

000240

58	002406	176714	RPER1:: .WORD	176714	:RP07 ERROR REGISTER #1
59	002410	176716	RPAS:: .WORD	176716	:RP07 ATTENTION SUMMARY PSEUDO REGISTER
60	002412	176720	RPLA:: .WORD	176720	:RP07 LOOK AHEAD REGISTER
61	002414	176722	RPDB:: .WORD	176722	:RP07 DATA BUFFER
62	002416	176724	RPMR1:: .WORD	176724	:RP07 MAINTENANCE REGISTER #1
63	002420	176726	RPDT:: .WORD	176726	:DRIVE TYPE REGISTER
64	002422	176730	RPSN:: .WORD	176730	:RP07 SERIAL NUMBER
65	002424	176732	RPOF:: .WORD	176732	:RP07 OFFSET REGISTER
66	002426	176734	RPDC:: .WORD	176734	:RP07 DESIRED CYLINDER
67	002430	176736	RPCC:: .WORD	176736	:RP07 CURRENT CYLINDER
68	002432	176742	RPER2:: .WORD	176742	:RP07 ERROR REGISTER #2
69	002434	176742	RPER3:: .WORD	176742	:RP07 ERROR REGISTER #3
70	002436	176744	RPEC1:: .WORD	176744	:RP07 ERROR-POSITION
71	002440	176746	RPEC2:: .WORD	176746	:RP07 ERROR PATTERN
72	002442	176750	RPBAE:: .WORD	176750	:BUFFER ADDRESS EXTENDED (RH70)
73	002444	176752	RPCS3:: .WORD	176752	:STATUS REGISTER (RH70)
74					
75			:ATTENTION BITS TABLE (AT/BIT=8 BYTES)		
76			:THIS TABLE CONTAINS THE CORRESPONDING BIT TO EACH DRIVES		
77			:ATTENTION BIT		
78					
79	002446	001	ATABIT:: .BYTE	1	:DRIVE 0
80	002447	002	.BYTE	2	:DRIVE 1
81	002450	004	.BYTE	4	:DRIVE 2
82	002451	010	.BYTE	10	:DRIVE 3
83	002452	020	.BYTE	20	:DRIVE 4
84	002453	040	.BYTE	40	:DRIVE 5
85	002454	100	.BYTE	100	:DRIVE 6
86	002455	200	.BYTE	200	:DRIVE 7
87					
88			: STORAGE FOR DEVICE REGISTERS		
89			:REG:: .BLKW 22.		:SAVE REGISTERS HERE
90	002456				
91					

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1      .SBTTL GLOBAL TEXT SECTION
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20 002532      122      120      060      L$DVTYP::
    002532      .ASCIZ /RP07/
                .EVEN
21
27
28
29
30 002540      122      120      060      L$DESC::
    002540      .ASCIZ /RP07 DUAL PORT TEST/
                .EVEN
31
38
39
40
41
42 002564      045      116      000      CRLF:: .ASCIZ /%N/
43 002567      045      116      045      DSNMSG:: .ASCIZ /%N%ADRIVE %01%A & %01%A, PG/
44 002623      045      124      000      SNDIGT:: .ASCIZ /%T/
45
46 002626      045      101      120      FRMT01: .ASCIZ /%APORT# %01%A REG ADR= %06%A CONTENTS= %06/
47 002701      045      101      122      FRMT03: .ASCIZ /%AREG ADR %06%A PORT A %01%A PORT B %01/
48 002751      045      101      052      FRMT04: .ASCII /%A*** SEIZE ERROR *** PORT# %01%A PORT# %01/
49 003024      045      116      045      .ASCIZ /%N%AREG ADR %06%A GOOD= %06%A BAD= %06/
50 003073      045      101      120      FRMT05: .ASCIZ /%APORT# %01%A REG ADR= %06%A GOOD= %06%A BAD= %06/
51 003155      045      101      052      FRMT07: .ASCII /%A*** RELEASE ERROR *** PORT# %01%A PORT# %01/
52 003232      045      116      045      .ASCIZ /%N%AREG ADR= %06%A GOOD= %06%A BAD= %06/
53
54 003302      045      101      120      FRMT11: .ASCIZ /%APORT #%01%A REG ADR= %06%A CONTENTS= %06/
55 003355      045      101      052      FRMT13: .ASCII /%A*** SEIZE ERROR *** PORT# %01%A PORT# %01/
56 003430      045      116      045      .ASCIZ /%N%AREG ADR= %06%A CONTENTS= %06/
57 003471      045      101      106      FRMT14: .ASCIZ /%AFAULT LIST: J11, J12%N/
58 003522      045      101      106      FRMT15: .ASCIZ /%AFAULT LIST: J13, J12%N/
59 003553      045      101      106      FRMT16: .ASCII /%AFAULT LIST: J11, J12, J13, MAINT CABLE, DUAL PORT%N/
60 003640      045      101      112      .ASCIZ /%AJUMPER, OR AN INCORRECT START-UP SEQUENCE%N/
61 003716      045      101      106      FRMT17: .ASCIZ /%AFAULT LIST: J11, J12, J13%N/
62
63 003754      045      101      122      FRMT22: .ASCIZ /%ARELEASING PORT# %01%A SEIZING PORT# %01/
64 004026      045      101      123      FRMT23: .ASCIZ /%ASEIZE PORT# %01%A REG ADR= %06%A CONTENTS= %06/
65 004107      045      101      122      FRMT26: .ASCIZ /%ARELEASING PORT# %01/
66
67 004135      045      101      122      FRMT31: .ASCIZ /%ARELEASING PORT# %01%A REQUESTING PORT# %01/
68 004212      045      101      120      FRMT36: .ASCIZ /%APORT# %01/
69
70 004226      045      101      052      FRMT44: .ASCIZ /%A*** RELEASE ERROR *** PORT# %01%A PORT# %01/
71 004304      045      101      120      FRMT46: .ASCIZ /%APORT A RPCS1= %06%A PORT B RPDS= %06/
72
73 004353      045      101      120      FRMT55: .ASCIZ /%APORT# %01%A TIMEOUT VALUE= %D5%A (IN MS)/
    
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74	004426	045	101	122	FRMT56:	.ASCIZ	/ZARPCS1 EXPECTED ADDRESS: %06/						
75	004464	045	101	120	FRMT57:	.ASCIZ	/ZAPORT A EXPECTED= %06% RECEIVED= %06/						
76	004532	045	116	045		.ASCIZ	/ZNZAPORT B EXPECTED= %06% RECEIVED= %06/						
77													
78	004603	045	101	120	FRMT64:	.ASCIZ	/ZAPORT# %01% FAILING REGISTER = RPER1/						
79	004651	045	116	045		.ASCIZ	/ZNZAEXPECTED= %06% RECEIVED= %06/						
80	004713	045	101	120	FRMT65:	.ASCIZ	/ZAPORT# %01% FAILING REGISTER = RPCS1/						
81	004761	045	116	045		.ASCIZ	/ZNZAEXPECTED= %06% RECEIVED= %06/						
82													
83	005023	045	116	045	FRMT66:	.ASCIZ	/ZNZADRIVE	RPCS1	RPWC	RPBA	RPDA	RPCS2	RPDS/
84	005114	045	116	045	FRMT67:	.ASCIZ	/ZNZ%06%	%06%	%06%	%06%	%06%	%06%	%06/
85	005174	045	116	045	FRMT70:	.ASCIZ	/ZNZARPER1	RPAS	RPLA	RPDB	RPMR1	RPDT	RPSN/
86	005265	045	116	045	FRMT71:	.ASCIZ	/ZNZ%06%	%06%	%06%	%06%	%06%	%06%	%06/
87	005345	045	116	045	FRMT72:	.ASCIZ	/ZNZARPOF	RPDC	RPCC	RPER2	RPER3	RPEC1	RPEC2/
88	005437	045	116	045	FRMT73:	.ASCIZ	/ZNZ%06%	%06%	%06%	%06%	%06%	%06%	%06%N/
89	005521	045	101	122	FRMT74:	.ASCIZ	/ZARPBAE	RPCS3/					
90	005541	045	116	045	FRMT75:	.ASCIZ	/ZNZ%06%	%06%N/					
91													
92													
93													
94	005560	127	122	117	EM1:	.ASCIZ	/WRONG DRIVE TYPE/						
95	005601	104	122	111	EM2:	.ASCIZ	/DRIVE NOT ON LINE/						
96	005623	123	105	122	EM3:	.ASCIZ	/SERIAL NUMBER READ THROUGH EACH PORT NOT THE SAME/						
97	005705	104	122	111	EM4:	.ASCIZ	/DRIVE NOT SEIZED BY PORT/						
98	005736	127	122	117	EM5:	.ASCIZ	/WRONG STATUS SEEN BY THE SEIZING PORT/						
99	006004	122	105	107	EM6:	.ASCIZ	/REG CONTENTS SEEN BY OPPOSITE PORT - DRIVE WAS SEIZED/						
100	006072	122	105	107	EM7:	.ASCIZ	/REG CONTENTS WRONG AFTER RELEASE OR TIMEOUT/						
101													
102	006146	122	105	107	EM10:	.ASCIZ	/REG CONTENTS WRONG/						
103	006171	103	117	116	EM11:	.ASCIZ	/CONTROL BUS PARITY ERROR READING INDICATED REGISTER/						
104	006255	103	117	115	EM12:	.ASCIZ	/COMMAND ISSUED WITH DRIVE IN ERROR STILL SETS GO BIT/						
105	006342	122	105	101	EM13:	.ASCIZ	/READIN PRESET DOES NOT SET VOLUME VALID FOR THE PORT/						
106	006427	126	117	114	EM14:	.ASCIZ	/VOLUME VALID SET ON THE WRONG PORT/						
107	006472	101	124	124	EM15:	.ASCIZ	/ATTN BIT WRONG AFTER TIMEOUT - REQUEST NOT SET/						
108	006551	101	124	124	EM16:	.ASCIZ	/ATTN BIT WRONG AFTER RELEASE - REQUEST SET/						
109	006624	101	124	124	EM17:	.ASCIZ	/ATTN BIT WRONG AFTER RELEASE - REQUEST NOT SET/						
110													
111	006703	104	122	111	EM20:	.ASCIZ	/DRIVE NOT SEIZED WHEN ATTN BIT FOR PORT CLEARED/						
112	006763	104	122	111	EM21:	.ASCIZ	/DRIVE SEIZED WHEN ZERO WRITTEN IN ATTN BIT/						
113	007036	104	122	111	EM22:	.ASCIZ	/DRIVE NOT IN NEUTRAL AFTER TIMEOUT - REQUEST NOT SET/						
114	007123	124	111	115	EM23:	.ASCIZ	/TIMEOUT CLEARED THE DRIVE'S ERROR BIT/						
115	007171	122	105	114	EM24:	.ASCIZ	/RELEASE COMMAND RELEASED DRIVE WITH ERRORS SET/						
116	007250	124	111	115	EM25:	.ASCIZ	/TIMEOUT ONE-SHOT DID NOT RETRIGGER/						
117	007313	104	122	111	EM26:	.ASCIZ	/DRIVE NOT IN NEUTRAL AFTER RELEASE - REQUEST NOT SET/						
118	007400	122	105	107	EM27:	.ASCIZ	/REGISTER WRONG AFTER RELEASE WITH REQUEST SET/						
119													
120	007456	104	122	111	EM30:	.ASCIZ	/DRIVE SEIZED BY RELEASE COMMAND ISSUED WHEN DRIVE IN NEUTRAL/						
121	007553	104	122	111	EM31:	.ASCIZ	/DRIVE IN NEUTRAL AFTER RELEASE - REQUEST SET/						
122	007630	101	124	124	EM32:	.ASCIZ	/ATTN BIT WRONG AFTER RECALIBRATE COMMAND/						
123	007701	104	122	111	EM33:	.ASCIZ	/DRIVE RETURNED TO NEUTRAL IF DRIVE CLEAR GIVEN WHILE DRIVE SEIZED/						
124	010003	104	122	111	EM34:	.ASCIZ	/DRIVE RETURNED TO NEUTRAL IF MASSBUS INIT GIVEN WHILE DRIVE SEIZED/						
125	010106	124	111	115	EM35:	.ASCIZ	/TIMEOUT ONE SHOT WAS RETRIGGERED WITHOUT REGISTER ACCESS/						
126	010177	124	111	115	EM36:	.ASCIZ	/TIMEOUT HAS NOT OCCURRED WITHIN 2 SECONDS/						
127	010251	104	122	111	EM37:	.ASCIZ	/DRIVE IS NON-EXISTENT ('NED' BIT SET)/						
128													
129	010317	101	124	124	EM40:	.ASCIZ	/ATTN BIT FOR PORT NOT RESET BY MASSBUS CLEAR/						
130	010374	124	111	115	EM41:	.ASCIZ	/TIMEOUT CLEARED THE ATTENTION BIT/						

.SBTTL GLOBAL ASCII MESSAGE SECTION

131	010436	104	122	111	EM42:	.ASCIZ	/DRIVE NOT IN NEUTRAL OR SEIZED AFTER ATTN BIT WRITTEN/
132	010524	104	122	111	EM43:	.ASCIZ	/DRIVE IN NEUTRAL AFTER ATTENTION BIT WRITTEN/
133	010601	127	122	111	EM44:	.ASCIZ	/WRITING ATTENTION BIT (IN RPAS) DID NOT SET PORT REQUEST/
134	010672	103	117	116	EM45:	.ASCIZ	@CONTROLLER SELECT SWITCH ON DRIVE NOT IN 'A/B'@
135	010751	103	101	116	EM46:	.ASCIZ	/CAN'T ACCESS DRIVE THROUGH EITHER PORT/
136	011020	101	124	124	EM47:	.ASCIZ	/ATTN BIT FOR SEIZING PORT NOT CLEARED BY MASSBUS INIT/
137							
138	011106	101	124	124	EM50:	.ASCIZ	/ATTN BIT FOR OPPOSITE PORT CLEARED BY DRIVE CLEAR/
139	011170	101	124	124	EM51:	.ASCIZ	/ATTN BIT NOT CLEARED BY MASSBUS INIT, DRIVE IN NEUTRAL/
140	011257	124	110	105	EM52:	.ASCIZ	/THE ATTN BIT SET AFTER TIMEOUT WITH NO REQUEST & 'ERR' SET/
141	011352	122	120	101	EM53:	.ASCIZ	/RPAS REGISTER BITS SET BY WRITING ATA BIT/
142	011424	122	105	114	EM54:	.ASCIZ	/RELEASE COMMAND RECOGNIZED WHEN ISSUED BY NON-SEIZING PORT/
143	011517	124	111	115	EM55:	.ASCIZ	/TIMEOUT ONE-SHOT IS LESS THAN 750 MS/
144	011564	124	111	115	EM56:	.ASCIZ	/TIMEOUT ONE-SHOT NOT WITHIN SPEC (EXPTED: 750MS < 'TIME' < 1250 MS)/
145							
146	011670	101	124	124	EM60:	.ASCIZ	/ATTENTION NOT RESET BY WRITING RPAS/
147	011734	101	124	124	EM61:	.ASCIZ	/ATTENTION NOT RESET BY GO/
148	011766	101	124	124	EM62:	.ASCIZ	/ATTENTION RESET BY GO WHEN NOT SEIZED/
149	012034	104	122	111	EM63:	.ASCIZ	/DRIVE CANNOT BE SEIZED BY WRITING ATA BIT/
150	012106	111	114	106	EM64:	.ASCIZ	/ILF ERROR CANNOT BE SET/
151	012136	104	122	111	EM65:	.ASCIZ	/DRIVE NOT READY AFTER RELEASE/
152	012174	103	101	116	EM66:	.ASCIZ	/CANNOT CLEAR ERROR BY DRIVE CLEAR/
153	012236	102	117	124	EM67:	.ASCIZ	/BOTH PORT NUMBERS THE SAME - TESTS NOT PERFORMED/
154							
155	012317	116	117	040	EM70:	.ASCIZ	/NO CLOCK FOUND ON SYSTEM - TESTS NOT PERFORMED/
156	012400	127	122	117	EM71:	.ASCIZ	/WRONG SYSTEM CONFIGURATION - TESTS NOT PERFORMED/
157							
158						.EVEN	
162							
173							

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012462 004737 016276
012466 013746 002332
012472 013746 002334
012476 013746 002266
012502 012746 002626
012506 012746 000004
012512 010600
012514 104414
012516 062706 000012
012522 004737 016350
012526
012526 104423
10 012530
012530 004737 016276
012534 013746 002332
012540 013746 002336
012544 013746 002334
012550 012746 002701
012554 012746 000004
012560 010600
012562 104414
012564 062706 000012
012570 004737 016350
012574
012574 104423
11 012576
012576 004737 016276
012602 013746 002332
012606 013746 002336
012612 013746 002334
012616 013746 002266
012622 013746 002270
012626 012746 002751
012632 012746 000006
012636 010600
012640 104414
012642 062706 000016
012646 004737 016350
012652
012652 104423
12 012654
012654 004737 016276
012660 013746 002332
012664 013746 002336
012670 013746 002334
012674 013746 002266
012700 012746 003073
012704 012746 000005

.SBTTL GLOBAL ERROR REPORT SECTION

;++
 : THE GLOBAL ERROR REPORT SECTION CONTAINS MESSAGE PRINTING AREAS
 : USED BY MORE THAN TEST TO OUTPUT ADDITIONAL ERROR INFORMATION. PRINTB
 : (BASIC) AND PRINTX (EXTENDED) CALLS ARE USED TO CALL PRINT SERVICES.
 :--

ERR0::
 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
 MOV BADDAT,-(SP)
 MOV BADADR,-(SP)
 MOV PTNBR,-(SP)
 MOV #FRMT01,-(SP)
 MOV #4,-(SP)
 MOV SP,R0
 TRAP C\$PNTB
 ADD #12,SP
 JSR PC,DMPREG ;DUMP THE REGISTER CONTENTS
 L10002:
 TRAP C\$MSG
 ERR1::
 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
 MOV BADDAT,-(SP)
 MOV EXPTED,-(SP)
 MOV BADADR,-(SP)
 MOV #FRMT03,-(SP)
 MOV #4,-(SP)
 MOV SP,R0
 TRAP C\$PNTB
 ADD #12,SP
 JSR PC,DMPREG ;DUMP THE REGISTER CONTENTS
 L10003:
 TRAP C\$MSG
 ERR2::
 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
 MOV BADDAT,-(SP)
 MOV EXPTED,-(SP)
 MOV BADADR,-(SP)
 MOV PTNBR,-(SP)
 MOV SEIZPT,-(SP)
 MOV #FRMT04,-(SP)
 MOV #6,-(SP)
 MOV SP,R0
 TRAP C\$PNTB
 ADD #16,SP
 JSR PC,DMPREG ;DUMP THE REGISTER CONTENTS
 L10004:
 TRAP C\$MSG
 ERR3::
 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
 MOV BADDAT,-(SP)
 MOV EXPTED,-(SP)
 MOV BADADR,-(SP)
 MOV PTNBR,-(SP)
 MOV #FRMT05,-(SP)
 MOV #5,-(SP)

	012710	010600		MOV	SP,R0	
	012712	104414		TRAP	C\$PNTB	
	012714	062706	000014	ADD	#14,SP	
	012720	004737	016350	JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	012724					
	012724	104423		L10005:	TRAP	C\$MSG
13	012726			ERR4::	TRAP	C\$MSG
	012726	004737	016276	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
	012732	013746	002332	MOV	BADDAT,-(SP)	
	012736	013746	002334	MOV	BADADR,-(SP)	
	012742	013746	002266	MOV	PTNBR,-(SP)	
	012746	013746	002270	MOV	SEIZPT,-(SP)	
	012752	012746	003355	MOV	#FRMT13,-(SP)	
	012756	012746	000005	MOV	#5,-(SP)	
	012762	010600		MOV	SP,R0	
	012764	104414		TRAP	C\$PNTB	
	012766	062706	000014	ADD	#14,SP	
	012772	004737	016350	JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	012776					
	012776	104423		L10006:	TRAP	C\$MSG
14	013000			ERR5::	TRAP	C\$MSG
	013000	004737	016276	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
	013004	013746	002332	MOV	BADDAT,-(SP)	
	013010	013746	002334	MOV	BADADR,-(SP)	
	013014	013746	002266	MOV	PTNBR,-(SP)	
	013020	012746	003302	MOV	#FRMT11,-(SP)	
	013024	012746	000004	MOV	#4,-(SP)	
	013030	010600		MOV	SP,R0	
	013032	104414		TRAP	C\$PNTB	
	013034	062706	000012	ADD	#12,SP	
	013040	004737	016350	JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013044					
	013044	104423		L10007:	TRAP	C\$MSG
15	013046			ERR6::	TRAP	C\$MSG
	013046	004737	016276	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
	013052	013746	002332	MOV	BADDAT,-(SP)	
	013056	013746	002336	MOV	EXPTED,-(SP)	
	013062	013746	002270	MOV	SEIZPT,-(SP)	
	013066	012746	004713	MOV	#FRMT65,-(SP)	
	013072	012746	000004	MOV	#4,-(SP)	
	013076	010600		MOV	SP,R0	
	013100	104414		TRAP	C\$PNTB	
	013102	062706	000012	ADD	#12,SP	
	013106	004737	016350	JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013112					
	013112	104423		L10010:	TRAP	C\$MSG
16	013114			ERR7::	TRAP	C\$MSG
	013114	004737	016276	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
	013120	013746	002266	MOV	PTNBR,-(SP)	
	013124	012746	004212	MOV	#FRMT36,-(SP)	
	013130	012746	000002	MOV	#2,-(SP)	
	013134	010600		MOV	SP,R0	
	013136	104414		TRAP	C\$PNTB	
	013140	062706	000006	ADD	#6,SP	
	013144	004737	016350	JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013150					
	013150	104423		L10011:	TRAP	C\$MSG

17	013152			ERR8::		
	013152	004737	016276		JSR	PC,SAVRPR ;GET THE REGISTER SNAPSHOT
	013156	013746	002266		MOV	PTNBR,-(SP)
	013162	013746	002270		MOV	SEIZPT,-(SP)
	013166	012746	003754		MOV	#FRMT22,-(SP)
	013172	012746	000003		MOV	#3,-(SP)
	013176	010600			MOV	SP,R0
	013200	104414			TRAP	C\$PNTB
	013202	062706	000010		ADD	#10,SP
	013206	004737	016350		JSR	PC,DMPREG ;DUMP THE REGISTER CONTENTS
	013212			L10012:		
	013212	104423			TRAP	C\$MSG
18	013214			ERR9::		
	013214	004737	016276		JSR	PC,SAVRPR ;GET THE REGISTER SNAPSHOT
	013220	013746	002332		MOV	BADDAT,-(SP)
	013224	013746	002334		MOV	BADADR,-(SP)
	013230	013746	002270		MOV	SEIZPT,-(SP)
	013234	012746	004026		MOV	#FRMT23,-(SP)
	013240	012746	000004		MOV	#4,-(SP)
	013244	010600			MOV	SP,R0
	013246	104414			TRAP	C\$PNTB
	013250	062706	000012		ADD	#12,SP
	013254	004737	016350		JSR	PC,DMPREG ;DUMP THE REGISTER CONTENTS
	013260			L10013:		
	013260	104423			TRAP	C\$MSG
19	013262			ERR10::		
	013262	004737	016276		JSR	PC,SAVRPR ;GET THE REGISTER SNAPSHOT
	013266	013746	002270		MOV	SEIZPT,-(SP)
	013272	012746	004212		MOV	#FRMT36,-(SP)
	013276	012746	000002		MOV	#2,-(SP)
	013302	010600			MOV	SP,R0
	013304	104414			TRAP	C\$PNTB
	013306	062706	000006		ADD	#6,SP
	013312	004737	016350		JSR	PC,DMPREG ;DUMP THE REGISTER CONTENTS
	013316			L10014:		
	013316	104423			TRAP	C\$MSG
20	013320			ERR11::		
	013320	004737	016276		JSR	PC,SAVRPR ;GET THE REGISTER SNAPSHOT
	013324	013746	002272		MOV	OPPRT,-(SP)
	013330	013746	002270		MOV	SEIZPT,-(SP)
	013334	012746	004135		MOV	#FRMT31,-(SP)
	013340	012746	000003		MOV	#3,-(SP)
	013344	010600			MOV	SP,R0
	013346	104414			TRAP	C\$PNTB
	013350	062706	000010		ADD	#10,SP
	013354	004737	016350		JSR	PC,DMPREG ;DUMP THE REGISTER CONTENTS
	013360			L10015:		
	013360	104423			TRAP	C\$MSG
21	013362			ERR12::		
	013362	004737	016276		JSR	PC,SAVRPR ;GET THE REGISTER SNAPSHOT
	013366	013746	002332		MOV	BADDAT,-(SP)
	013372	013746	002334		MOV	BADADR,-(SP)
	013376	013746	002270		MOV	SEIZPT,-(SP)
	013402	012746	002626		MOV	#FRMT01,-(SP)
	013406	012746	000004		MOV	#4,-(SP)
	013412	010600			MOV	SP,R0
	013414	104414			TRAP	C\$PNTB

	013416	062706	000012		ADD	#12,SP	
	013422	004737	016350		JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013426			L10016:	TRAP	C\$MSG	
22	013430	104423		ERR13::	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
	013430	004737	016276		MOV	OPPRT,-(SP)	
	013434	013746	002272		MOV	SEIZPT,-(SP)	
	013440	013746	002270		MOV	#FRMT44,-(SP)	
	013444	012746	004226		MOV	#3,-(SP)	
	013450	012746	000003		MOV	SP,RO	
	013454	010600			TRAP	C\$PNTB	
	013456	104414			ADD	#10,SP	
	013460	062706	000010		JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013464	004737	016350	L10017:	TRAP	C\$MSG	
	013470			ERR14::	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
23	013472	104423			MOV	TMP3,-(SP)	
	013472	004737	016276		MOV	TMP2,-(SP)	
	013476	013746	002350		MOV	#FRMT46,-(SP)	
	013502	013746	002346		MOV	#3,-(SP)	
	013506	012746	004304		MOV	SP,RO	
	013512	012746	000003		TRAP	C\$PNTB	
	013516	010600			ADD	#10,SP	
	013520	104414			JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013522	062706	000010	L10020:	TRAP	C\$MSG	
	013526	004737	016350	ERR15::	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
	013532				MOV	SEIZPT,-(SP)	
24	013532	104423			MOV	OPPRT,-(SP)	
	013534	004737	016276		MOV	#FRMT22,-(SP)	
	013540	013746	002270		MOV	#3,-(SP)	
	013544	013746	002272		MOV	SP,RO	
	013544	013746	002272		TRAP	C\$PNTB	
	013550	012746	003754		ADD	#10,SP	
	013554	012746	000003		JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013560	010600		L10021:	TRAP	C\$MSG	
	013562	104414		ERR16::	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
	013564	062706	000010		MOV	TIME,-(SP)	
	013570	004737	016350		MOV	SEIZPT,-(SP)	
	013574				MOV	#FRMT55,-(SP)	
25	013574	104423			MOV	#3,-(SP)	
	013576	004737	016276		MOV	SP,RO	
	013602	013746	002304		TRAP	C\$PNTB	
	013606	013746	002270		ADD	#10,SP	
	013512	012746	004353		JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013616	012746	000003	L10022:	TRAP	C\$MSG	
	013622	010600		ERR17::	JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
	013624	104414			MOV	RPCS1,-(SP)	
	013626	062706	000010		MOV	#FRMT56,-(SP)	
	013632	004737	016350		MOV	#2,-(SP)	
	013636						
26	013636	104423					
	013640	004737	016276				
	013644	013746	002372				
	013650	012746	004426				
	013654	012746	000002				

	013660	010600		MOV	SP,RO	
	013662	104414		TRAP	C\$PNTB	
	013664	062706	000006	ADD	#6,SP	
	013670	004737	016350	JSR	PC,DMPREG	;DUMP THE REGISTER CONTENTS
	013674					
	013674	104423		L10023:	TRAP	C\$MSG
27	013676			ERR18::	JSR	PC,SAVRPR ;GET THE REGISTER SNAPSHOT
	013676	004737	016276		MOV	TMP3,-(SP)
	013702	013746	002350		MOV	TMP2,-(SP)
	013706	013746	002346		MOV	TMP1,-(SP)
	013712	013746	002344		MOV	TMPO,-(SP)
	013716	013746	002342		MOV	#FRMT57,-(SP)
	013722	012746	004464		MOV	#5,-(SP)
	013726	012746	000005		MOV	SP,RO
	013732	010600			TRAP	C\$PNTB
	013734	104414			ADD	#14,SP
	013736	062706	000014		JSR	PC,DMPREG ;DUMP THE REGISTER CONTENTS
	013742	004737	016350			
	013746			L10024:	TRAP	C\$MSG
28	013750	104423		ERR19::	JSR	PC,SAVRPR ;GET THE REGISTER SNAPSHOT
	013750	004737	016276		MOV	BADDAT,-(SP)
	013754	013746	002332		MOV	EXPTED,-(SP)
	013760	013746	002336		MOV	SEIZPT,-(SP)
	013764	013746	002270		MOV	#FRMT64,-(SP)
	013770	012746	004603		MOV	#4,-(SP)
	013774	012746	000004		MOV	SP,RO
	014000	010600			TRAP	C\$PNTB
	014002	104414			ADD	#12,SP
	014004	062706	000012		JSR	PC,DMPREG ;DUMP THE REGISTER CONTENTS
	014010	004737	016350			
	014014			L10025:	TRAP	C\$MSG
29	014014	104423		ERR20::	JSR	PC,SAVRPR ;GET THE REGISTER SNAPSHOT
	014016	004737	016276		MOV	PORTB,-(SP)
	014022	013746	002250		MOV	PORTA,-(SP)
	014026	013746	002246		MOV	RPCS1,-(SP)
	014032	013746	002372		MOV	#FRMT03,-(SP)
	014036	012746	002701		MOV	#4,-(SP)
	014042	012746	000004		MOV	SP,RO
	014046	010600			TRAP	C\$PNTB
	014050	104414			ADD	#12,SP
	014052	062706	000012		JSR	PC,DMPREG ;DUMP THE REGISTER CONTENTS
	014056	004737	016350			
	014062			L10026:	TRAP	C\$MSG
30	014062	104423				

```

1      .SBTTL GLOBAL SUBROUTINES SECTION
2
3      ;AUTO SIZE FOR RH70 CONTROLLER AND DETERMINE IF IT IS JUMPERED FOR 22 OR
4      ;32 REGISTERS
5      ;CALL
6      ;
7      ;      JSR      PC.SIZE70      ;CALL ROUTINE
8      ;
9      ;R5 MUST CONTAIN POINTER TO NEW RPCS1 BASE ADDRESS
10
11     014064 005037 002364      SIZE70: CLR      RHEXT      ;CLEAR RPBAE OFFSET
12     014070 005037 002366      CLR      RHXX      ;CLEAR RHXX TYPE REGISTER (RH11)
13     014074 013746 000004      MOV     ERRVEC,-(SP) ;SAVE CONTENTS OF ERROR VECTOR
14     014100 012737 014150 000004  MOV     #2$,ERRVEC  ;SETUP 'TRAP' RETURN ADDRESS
15     014106 011500      MOV     (R5),R0     ;GET RPCS1 ADDRESS
16     014110 062700 000050      ADD     #50,R0     ;GET REGISTER OFFSET FOR RH70
17     014114 012702 000012      MOV     #10.,R2    ;GET NUMBER OF REGISTERS TO CHECK
18     014120 005720      TST     (R0)+      ;TRAP IF NOT A VALID RPBAE
19     014122 005720      TST     (R0)+      ;TRAP IF NOT A VALID RPCS3
20     014124 012737 000050 002364  MOV     #50,RHEXT  ;LOAD OFFSET FOR RPBAE (22 REGISTER RH)
21     014132 005720      TST     (R0)+      ;TRAP IF NOT A VALID REGISTER
22     014134 005302      DEC     R2         ;DONE WITH ALL 32 REGISTERS ?
23     014136 001375      BNE     1$        ;BR IF NO
24     014140 012737 000074 002364  MOV     #74,RHEXT  ;LOAD OFFSET FOR RPBAE (32 REGISTER RH)
25     014146 000403      BR      3$
26     014150 012716 014156      2$:   MOV     #3$, (SP) ;SETUP RETURN ADDRESS
27     014154 000002      RTI
28
29     014156 011500      3$:   MOV     (R5),R0     ;GET RPCS1 REGISTER
30     014160 013702 002364      MOV     RHEXT,R2   ;GET RPBAE REGISTER OFFSET
31     014164 001415      BEQ     4$        ;BR IF NONE
32     014166 060002      ADD     R0,R2     ;GET RPBAE REGISTER
33     014170 052710 001400      BIS     #A17!A16,(R0) ;SET EXTENDED ADDRESS BITS IN RPCS1
34     014174 022712 000003      CMP     #3,(R2)   ;ARE THE EXTENDED BITS SET IN RPBAE ?
35     014200 001007      BNE     4$        ;BR IF NO
36     014202 005012      CLR     (R2)     ;CLEAR EXTENDED ADDRESS BITS IN RPBAE
37     014204 011046      MOV     (R0),-(SP) ;SAVE RPCS1 REG CONTENTS
38     014206 042726 176377      BIC     #^C<A17!A16>,(SP)+ ;ARE THE EXTEND BITS CLEAR IN RPCS1 ?
39     014212 001002      BNE     4$        ;BR IF NO
40     014214 005237 002366      INC     RHXX      ;SET RHXX TYPE REGISTER (RH70)
41     014220 012637 000004      4$:   MOV     (SP)+,ERRVEC ;RESTORE CONTENTS OF ERROR VECTOR
42     014224 000207      RTS     PC
    
```



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10
11
12
13 014226 005037 002244
14 014232 005037 014454
15
16 014236 012700 000120
    014242 104462
    014244 010005
17
18 014246 103031
19
20
21
22 014250 010537 014430
23 014254 011537 014432
24 014260 011537 014434
25 014264 062737 000002 014434
26 014272 012537 014436
27 014276 062737 000004 014436
28 014304 005725
29 014306 012537 014440
30 014312 012537 014454
31 014316 012737 000001 002244
32 014324 004737 014456
33 014330 000423
34 014332
35 014332 012700 000114
    014336 104462
    014340 010005
36
37 014342 103030
38
39
40
41 014344 010537 014444
42 014350 012537 014446
43 014354 005725
44 014356 012537 014450
45 014362 012537 014454
46 014366 012737 177777 002244
47 014374 004737 014522
48
49
50
51 014400 012737 000024 014426 2$:
52 014406 023727 014454 000062
53 014414 001403
    
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:DETERMINE IF THERE IS A CLOCK ON SYSTEM. START THE CLOCK. "CLKSTA" WILL
:INDICATE THE CLOCK TYPE.
:
:   0= NO CLOCK
:   +1= KW11-P
:   -1= KW11-L
:
:THIS ROUTINE WILL ALSO SETUP "TICKMS" (TIME PER CLOCK TICK IN MILLISECONDS)
:AND "TICKUS" (TIME PER CLOCK TICK IN MICROSECONDS) AS PER LINE FREQUENCY.
:CALL
:
:   JSR      PC,ST.CLK      ;START THE CLOCK
:   RETURN
:
ST.CLK: CLR      CLKSTA      ;ASSUME 'NO CLOCK'
        CLR      HERTZ      ;ASSUME 'UNKNOWN' HERTZ
        ;IS THERE A P-CLOCK PRESENT ?
        MOV      #'P,RO
        TRAP     C$CLCK
        MOV      RO,R5
        ;GO TO 1$ IF NO
        BCC      1$
        ;SET P-CLOCK P-TABLE & START P-CLOCK
        MOV      R5,PCLKTB   ;SAVE P-CLOCK TABLE ADDRESS
        MOV      (R5),PKCS   ;GET 'CSR' ADDRESS
        MOV      (R5),PKB    ;MAKE PKB ADDRESS BY
        ADD      #2,PKB      ;ADDING 2
        MOV      (R5)+,PKC   ;MAKE PKC ADDRESS BY
        ADD      #4,PKC      ;ADDING 4
        TST      (R5)+
        ;SKIP OVER 'BR LEVEL'
        MOV      (R5)+,PKV   ;GET 'VECTOR' ADDRESS
        MOV      (R5)+,HERTZ ;GET 'HERTZ' LINE FREQUENCY
        MOV      #1,CLKSTA   ;SET P-CLOCK FLAG
        JSR      PC,ST.PCLK  ;START P-CLOCK AS A WATCH DOG TIMER
        BR       2$
1$:
        ;IS THERE A L-CLOCK PRESENT ?
        MOV      #'L,RO
        TRAP     C$CLCK
        MOV      RO,R5
        ;GO TO 3$ IF NO
        BCC      3$
        ;SET L-CLOCK P-TABLE, START L-CLOCK
        MOV      R5,LCLKTB   ;SAVE L-CLOCK TABLE ADDRESS
        MOV      (R5)+,LKS   ;GET 'CSR' ADDRESS
        TST      (R5)+
        ;SKIP OVER 'BR LEVEL'
        MOV      (R5)+,LKV   ;GET 'VECTOR' ADDRESS
        MOV      (R5)+,HERTZ ;GET 'HERTZ' LINE FREQUENCY
        MOV      #-1,CLKSTA  ;L-CLOCK FLAG
        JSR      PC,ST.LCLK  ;START L-CLOCK AS A WATCH DOG TIMER
        ;GET THE CLOCK TICK COUNT
2$:
        MOV      #20,TICKMS  ;ASSUME 20.0 MSEC &
        CMP      HERTZ,#50.  ;IS IT 50 HERTZ LINE FREQUENCY ?
        BEQ      3$          ;BR IF YES
    
```

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54 014416 012737 000020 014426      MOV    #16.,TICKMS      ;MUST BE 60HZ, 16.666 MSEC &
55 014424 000207                    3$:   RTS    PC
56
57 014426 000020                    TICKMS: .WORD 16.      ;16 MILLISECONDS PER CLOCK TICK
58
59                                ;KW11-P CLOCK TABLE, CSR REG, PKB REG, PKC REG & VEC ADR
60
61 014430 000000                    PCLKTB: .WORD 0      ;P-CLK TBL ADR
62
63 014432 172540                    PKCS:  .WORD 172540   ;CONTROL & STATUS
64 014434 172542                    PKB:   .WORD 172542   ;COUNT SET BFR
65 014436 172544                    PKC:   .WORD 172544   ;COUNTER
66 014440 000104 000106            PKV:   .WORD 104,106  ;VECTOR
67
68                                ;KW11-L CLOCK TABLE, CSR REG & VEC ADR
69
70 014444 000000                    LCLKTB: .WORD 0      ;L-CLK TBL ADR
71
72 014446 177546                    LKS:   .WORD 177546   ;CONTROL & STATUS
73 014450 000100 000102            LKV:   .WORD 100,102 ;VECTOR
74
75 014454 000000                    HERTZ: .WORD 0      ;60 HZ. OR 50 HZ. LINE FREQUENCY
76
77 014456                    ST.PCLK:
78                                ;SETUP VECTOR FOR P-CLOCK
79 014456 012746 000300            MOV    #PRI06,-(SP)
    014462 012746 014610            MOV    #KWSRV,-(SP)
    014466 013746 014440            MOV    PKV,-(SP)
    014472 012746 000003            MOV    #3,-(SP)
    014476 104437                    TRAP   C$$VEC
    014500 062706 000010            ADD    #10,SP
80 014504 012777 177777 177722    MOV    #-1,@PKB      ;COUNT ONE TICK
81 014512 012777 000135 177712    MOV    #135,@PKCS   ;"INT.EN.", COUNT UP", "MODE 1 (REPEAT)",
82                                ;"LINE REQ", AND "RUN"
83 014520 000207                    RTS    PC            ;RETURN
84
85 014522                    ST.LCLK:
86                                ;SETUP VECTOR FOR L-CLOCK
87 014522 012746 000300            MOV    #PRI06,-(SP)
    014526 012746 014610            MOV    #KWSRV,-(SP)
    014532 013746 014450            MOV    LKV,-(SP)
    014536 012746 000003            MOV    #3,-(SP)
    014542 104437                    TRAP   C$$VEC
    014544 062706 000010            ADD    #10,SP
88 014550 012777 000100 177670    MOV    #100,@LKS    ;START THE KW11-L
89 014556 000207                    RTS    PC            ;RETURN
90
91                                ;THIS ROUTINE IS USED TO STOP THE SYSTEM CLOCK
92                                ;CALL
93                                ;
94                                ;      JSR    PC,STOPCK      ;CALL ROUTINE
95 014560 005737 002244            STOPCK: TST    CLKSTA   ;IS THERE A CLOCK AVAILABLE ?
96 014564 001410                    BEQ    2$            ;BR IF NO
97 014566 100404                    BMI    1$            ;BR IF L-CLOCK
98 014570 042777 000101 177634    BIC    #101,@PKCS   ;STOP THE P-CLOCK
99 014576 000403                    BR     2$
100 014600 042777 000100 177640 1$: BIC    #100,@LKS    ;STOP THE L-CLOCK
    
```



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101 014606 000207      2$:   RTS      PC
102
103                   ;KW11 CLOCK INTERRUPT SERVICE ROUTINE
104
106 014610 063737 014426 002304 KWSRV: ADD      TICKMS,TIME      ;ADD TO ELAPSED TIME COUNTER
107 014616 103003                BCC      1$              ;BRANCH IF NO OVERFLOW
108 014620 012737 177777 002304     MOV      #-1,TIME        ;OVERFLOW - RESTORE MAXIMUM COUNT
109 014626 005737 002306     1$:   TST      WATCH          ;IS WATCH ALREADY ZERO ?
110 014632 001406                BEQ      2$              ;BR IF IT IS
111 014634 163737 014426 002306     SUB      TICKMS,WATCH    ;SUBTRACT FROM WATCH DOG COUNTER
112 014642 100002                BPL      2$              ;BR IF NOT MINUS
113 014644 005037 002306     CLR      WATCH          ;CLEAR WATCH DOG COUNTER
114 014650 000240     2$:   NOP
115 014652 L10027:  RTI
    014652 000002

116
117                   ;ROUTINE TO CALCULATE + AND - 25% TIME TOLERANCE VALUES
118
119 014654 162706 000004     TOLER: SUB      #4,SP      ;SETUP STACK
120 014660 016616 000004     MOV      4(SP),(SP)      ;SAVE STACK
121 014664 013546                MOV      @R5+,-(SP)      ;GET TIME VALUE
122 014666 011666 000004     MOV      (SP),4(SP)      ;MOVE TIME VALUE
123 014672 011666 000006     MOV      (SP),6(SP)      ;MOVE VALUE AGAIN
124 014676 006216                ASR      (SP)             ;DIVIDE BY 2
125 014700 006216                ASR      (SP)             ;DIVIDE BY 2 AGAIN (FOR A TOTAL OF 4)
126 014702 061666 000004     ADD      (SP),4(SP)      ;CALCULATE UPPER LIMIT FOR TIMEOUT
127 014706 162666 000004     SUB      (SP)+,4(SP)     ;CALCULATE LOWER LIMIT FOR TIMEOUT
128 014712 000205                RTS      R5              ;RETURN WITH TOLERANCES ON THE STACK
129

130 014714 005737 002326     DRVINI: TST      CNFBAD    ;USER LEGAL CONFIGURATION?
131 014720 001006                BNE      1$              ;TAKE BRANCH IF GOOD!!
132 014722 104455                TRAP     C$ERDF
    014724 000003                .WORD   3
    014726 012400                .WORD   EM71
    014730 000000                .WORD   0
133 014732 000137 016112     JMP      12$             ;GET OUT, THE SYSTEM IS BAD!!
134 014736 005037 002340     1$:   CLR      DRVBAD    ;DEFAULT IS THAT DRIVE IS GOOD!
135 014742 023737 002246 002250     CMP      PORTA,PORTB    ;2 DIFFERENT DRIVE NUMBERS?
136 014750 001006                BNE      2$              ;IF <>, OK
137 014752 104455                TRAP     C$ERDF
    014754 000001                .WORD   1
    014756 012236                .WORD   EM67
    014760 012576                .WORD   ERR2
138 014762 000137 016112     JMP      12$             ;TAKE BAD RETURN
139 014766 013737 002246 002252     2$:   MOV      PORTA,PORTC  ;GENERATE A NON-TESTED DRIVE NUMBER
140 014774 005237 002252     3$:   INC      PORTC        ;FORM A UNIT UNDER TEST
141 015000 042737 177770 002252     BIC      #^C7,PORTC     ;THROW AWAY UNUSED BITS
142 015006 023737 002250 002252     CMP      PORTB,PORTC    ;MATCH TO PORT B?
143 015014 001767                BEQ      3$              ;DO AGAIN, IF SO.
144 015016 013701 002246     MOV      PORTA,R1        ;FROM INDEX
145 015022 116137 002446 002262     MOVB    ATABIT(R1),ASRA  ;GET ATTENTION BIT
146 015030 116137 002446 002260     MOVB    ATABIT(R1),ASR1  ;GET ATTENTION BIT
147 015036 013701 002250     MOV      PORTB,R1        ;GET PORT B ADDRESS AS INDEX
148 015042 116137 002446 002264     MOVB    ATABIT(R1),ASRB  ;GET ATTENTION BIT
149 015050 156137 002446 002260     BISB    ATABIT(R1),ASR1  ;GET BOTH ATTENTION BITS
155 015056 005037 002310     CLR      TIMEA          ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
    015062 005037 002312     CLR      TIMEAP         ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
    
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015066 005037 002314      CLR      TIMEAM      ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
015072 005037 002316      CLR      TIMEB       ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
015076 005037 002320      CLR      TIMEBP      ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
015102 005037 002322      CLR      TIMEBM      ;CLEAR TIMEOUT ONE-SHOT VALUE LOCATION
159                                     ;SET PRIORITY TO 5
160 015106 012700 000240    MOV      #PRI05,R0
161 015112 104441          TRAP     C$SPRI
                                     ;START THE TIMER
015114 005037 002304      CLR      TIME        ;CLEAR THE ELAPSED TIME COUNTER
162 015120 012737 003720 002306  MOV      #2000.,WATCH ;SET WATCH TO 2000. MS
                                     ;SEIZE THE DRIVE THROUGH PORT A
015126 113777 002246 165246  MOVB     PORTA,@RPCS2 ;SELECT PORT A
015134 013737 002246 002270  MOV      PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
015142 005077 165232          CLR      @RPDA       ;WRITE RPDA
015146 113777 002250 165226  MOVB     PORTB,@RPCS2 ;SELECT PORT B
015154 013737 002250 002266  MOV      PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
015162 013737 002250 002272  MOV      PORTB,OPPRT ;'OPPOSITE' PORT ADDRESS
015170 017737 165210 002332  MOV      @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT A
015176 013737 002404 002334  MOV      RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
015204 005037 002336          CLR      EXPTED      ;REGISTER SHOULD BE ZERO
015210 023737 002336 002332  CMP      EXPTED,BADDAT ;IS THE REGISTER ZERO
015216 001406          BEQ     64$          ;BR IF IT IS
015220 104456          TRAP     C$ERHRD
015222 000001          .WORD  1
015224 005705          .WORD  EM4
015226 012576          .WORD  ERR2
015230 000137 016112          JMP     12$          ;BYPASS REST OF THE SUBTEST
015234                                     64$:
015234 113777 002246 165140  MOVB     PORTA,@RPCS2 ;SELECT PORT A
015242 013737 002246 002266  MOV      PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
015250 017737 165130 002332  MOV      @RPDS,BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
015256 042737 020005 002332  BIC     #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
015264 012737 011700 002336  MOV      #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
015272 013737 002336 002344  MOV      EXPTED,TMP1 ;USE GOOD DATA AS A MASK
015300 005137 002344          COM     TMP1        ;COMPLEMENT THE EXPECTED STATUS
015304 013737 002332 002342  MOV      BADDAT,TMPO ;SAVE THE ACTUAL STATUS
015312 043737 002344 002342  BIC     TMP1,TMPO    ;CLEAR UNWANTED BITS
015320 023737 002336 002342  CMP      EXPTED,TMPO ;ARE THE EXPECTED STATUS BITS SET ?
015326 001404          BEQ     65$          ;BR IF THEY ARE
015330 104456          TRAP     C$ERHRD
015332 000002          .WORD  2
015334 005736          .WORD  EM5
015336 012654          .WORD  ERR3
163 015340                                     65$:
164 015346 113777 002250 165034  MOVB     PORTB,@RPCS2 ;SELECT PORT B
165 015346 013737 002250 002266  MOV      PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
166                                     ;WAIT FOR PORT B TO TIME OUT
167 015354 005777 165024          4$: TST     @RPDS        ;DRIVE SEIZED YET?
168 015360 001021          BNE     5$          ;IF NOT ZERO, YES
169 015362 005737 002306          TST     WATCH       ;DID TIMER EXPIRE?
    
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170 015366 001372      BNE      4$          ;IF NOT ZERO, NO
171 015370 104456      TRAP     C$ERHRD
      015372 000035      .WORD   29
      015374 010177      .WORD   EM36
      015376 013320      .WORD   ERR11
172 015400 012746 003716  MOV     #FRMT17,-(SP)
      015404 012746 000001  MOV     #1,-(SP)
      015410 010600      MOV     SP,R0
      015412 104414      TRAP    C$PNTB
      015414 062706 000004  ADD     #4,SP
173 015420 000137 016112  JMP     12$          ;TAKE THE BAD RETURN
174 015424                5$:                ;SET PRIORITY TO 7
175 015424 012700 000340  MOV     #PRI07,R0
      015430 104441      TRAP    C$SPRI
176 015432 023727 002304 001356  CMP     TIME,#750.   ;TIME WITHIN LOWEST LIMIT?
177 015440 103404      BLO     6$          ;TAKE BRANCH IF TIME IS TOO LOW
178 015442 023727 002304 002342  CMP     TIME,#1250. ;TIME WITHIN UPPER LIMIT?
179 015450 101406      BLOS    7$          ;TAKE BRANCH IF LEGAL
180 015452                6$:
      015452 104456      TRAP    C$ERHRD
      015454 000037      .WORD   31
      015456 011564      .WORD   EM56
      015460 013576      .WORD   ERR16
181 015462 000137 016112  JMP     12$          ;TAKE THE BAD RETURN
182 015466 013737 002304 002310 7$: MOV     TIME,TIMEA   ;SAVE THE MEASURED TIME
183 015474 004537 014654      JSR     R5,TOLER     ;COMPUTE THE TOLERANCES
      .WORD   TIMEA
184 015500 002310      MOV     (SP)+,TIMEAP ;SAVE THE RESULTS
185 015502 012637 002312      MOV     (SP)+,TIMEAM ;+ AND - 25%
186 015506 012637 002314      ;SET PRIORITY TO 5
187
188 015512 012700 000240  MOV     #PRI05,R0
      015516 104441      TRAP    C$SPRI
189
      ;START THE TIMER
190 015520 005037 002304      CLR     TIME          ;CLEAR THE ELAPSED TIME COUNTER
      015524 012737 003720 002306  MOV     #2000.,WATCH ;SET WATCH TO 2000. MS
      ;SEIZE THE DRIVE THROUGH PORT B
      MOVB   PORTB,@RPCS2 ;SELECT PORT B
      MOV    PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
      CLR    @RPDA        ;WRITE RPDA
      MOVB   PORTA,@RPCS2 ;SELECT PORT A
      MOV    PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
      MOV    PORTA,OPPRT  ;'OPPOSITE' PORT ADDRESS
      MOV    @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT B
      MOV    RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
      CLR    EXPTED       ;REGISTER SHOULD BE ZERO
      CMP    EXPTED,BADDAT ;IS THE REGISTER ZERO
      BEQ    66$          ;BR IF IT IS
      TRAP   C$ERHRD
      .WORD  1
      .WORD  EM4
      .WORD  ERR2
      JMP    12$          ;BYPASS REST OF THE SUBTEST
    
```

```

015640
015640 113777 002250 164534 66$: MOVB PORTB, @RPCS2 ;SELECT PORT B
015646 013737 002250 002266 MOV PORTB, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
015654 017737 164524 002332 MOV @RPDS, BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
015662 042737 020005 002332 BIC #OM!PIP!ILV, BADDAT ;CLEAR DONT CARE BITS
015670 012737 011700 002336 MOV #MOL!PGM!DPR!DRY!VV, EXPTED ;EXPECTED STATUS
015676 013737 002336 002344 MOV EXPTED, TMP1 ;USE GOOD DATA AS A MASK
015704 005137 002344 COM TMP1 ;COMPLEMENT THE EXPECTED STATUS
015710 013737 002332 002342 MOV BADDAT, TMPO ;SAVE THE ACTUAL STATUS
015716 043737 002344 002342 BIC TMP1, TMPO ;CLEAR UNWANTED BITS
015724 023737 002336 002342 CMP EXPTED, TMPO ;ARE THE EXPECTED STATUS BITS SET ?
015732 001404 BEQ 67$ ;BR IF THEY ARE
015734 104456 TRAP C$ERHRD
015736 000002 .WORD 2
015740 005736 .WORD EM5
015742 012654 .WORD ERR3
191 015744 113777 002246 164430 67$: MOVB PORTA, @RPCS2 ;SELECT PORT A
015752 013737 002246 002266 MOV PORTA, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
192
193 ;WAIT FOR PORT A TO TIME OUT
194
195 015760 005777 164420 8$: TST @RPDS ;DRIVE SEIZED YET?
196 015764 001020 BNE 9$ ;TAKE BRANCH IF SO
197 015766 005737 002306 TST WATCH ;CLOCK TIMED OUT?
198 015772 001372 BNE 8$ ;TAKE BRANCH IF NOT
199 015774 104456 TRAP C$ERHRD
015776 000036 .WORD 30
016000 010177 .WORD EM36
016002 013320 .WORD ERR11
200 016004 012746 003716 MOV #FRMT17, -(SP)
016010 012746 000001 MOV #1, -(SP)
016014 010600 MOV SP, R0
016016 104414 TRAP C$PNTB
016020 062706 000004 ADD #4, SP
201 016024 000432 BR 12$ ;TAKE THE BAD RETURN
202 016026 9$: ;SET PRIORITY TO 7
203 016026 012700 000340 MOV #PRI07, R0
016032 104441 TRAP C$SPRI
204 016034 023727 002304 001356 CMP TIME, #750. ;TIME LOWER THAN SPEC?
205 016042 103404 BLO 10$ ;TAKE BRANCH IF SO
206 016044 023727 002304 002342 CMP TIME, #1250. ;TIME GREATER THAN SPEC?
207 016052 101404 BLOS 11$ ;TAKE BRANCH IF NOT
208 016054 10$: TRAP C$ERHRD
016054 104456 .WORD 32
016056 000040 .WORD EM56
016060 011564 .WORD ERR16
016062 013576 .WORD
209 016064 013737 002304 002316 11$: MOV TIME, TIMEB ;SAVE THE MEASURED RELEASE TIME
210 016072 004537 014654 JSR R5, TOLER ;CALCULATE THE TOLERANCES
211 016076 002316 .WORD TIMEB
212 016100 012637 002320 MOV (SP)+, TIMEBP ;+25%
213 016104 012637 002322 MOV (SP)+, TIMEBM ;-25%
214 016110 000403 BR 13$ ;TAKE THE GOOD RETURN
215 016112 012737 177777 002340 12$: MOV #-1, DRVBAD ;MARK THE DRIVE BAD STATUS
216 016120 000207 13$: RTS PC ;RETURN
    
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016122
016122 010246
016124 010346
016126 010546
016130 012702 000024
016134 012703 002372
016140
016140 013700 002354
016144 104442
016146 010005
016150 103040
016152 011346
016154 011546
016156 166616 000002
016162 061623
016164 005302
016166 001375
016170 004737 014064
016174 005737 002366
016200 001406
016202 013702 002364
016206 061502
016210 010223
016212 005722
016214 010213
016216 022626
016220 012537 002356
016224 012537 002360
016230 012537 002362
016234 012537 002246
016240 012537 002250
016244 011537 002326
016250 000406
016252 005237 002354
016256 023727 002354 000007
016264 101725
016266 012605
016270 012603
    
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*****
:THIS MODULE CREATES THE TABLES WHICH ARE USED TO SELECT DEVICE PARAMETERS
:USED IN THIS PROGRAM. INCLUDED IN THE PARAMETER LIST ARE THE FOLLOWING ITEMS:
:BASE REGISTER ADDRESSES FOR THE DEVICE, VECTOR ADDRESS OF THE DEVICE,
:DETERMINATION VIA OPERATOR FOR THE FOLLOWING: CONTROLLER TYPE. IN ADDITION,
:DIALOGUE DETERMINES THE PRIORITY OF THE CONTROLLER, AND THE SELECTION OF A
:DRIVE NUMBER FOR TEST (PORT A & PORT B).
*
:INPUTS ARE: NONE
*
:OUTPUTS ARE: RPADD, RHTYPE, RPBAE, RPCS3, DRIVE, RPCS1
*
:THIS MODULE IS CALLED BY: THE INITIALIZATION CODE
*****
    
```

```

TABLD::
      MOV R2,-(SP)      ::PUSH R2 ON STACK
      MOV R3,-(SP)      ::PUSH R3 ON STACK
      MOV R5,-(SP)      ::PUSH R5 ON STACK
      MOV #20,R2        :R2 = ITERATION COUNT
      MOV #RPCS1,R3     :R3 = DATA SINK
1$:   MOV UNIT,R0       :GET HARDWARE P-TABLE
      TRAP CS$PHRD
      MOV R0,R5
      BCC 4$
      MOV (R3),-(SP)    :SAVE R3
      MOV (R5),-(SP)    :AND THE BASE ADDRESS
      SUB 2(SP),(SP)    :DERIVE NEW ADDRESS
2$:   ADD (SP),(R3)+    :LOG IT IN NEW TABLE
      DEC R2           :COUNT LOGGING
      BNE 2$          :R2 NOT ZERO, CONTINUE LOGGING
      JSR PC,SIZE70    :SEE IF RH70 IS PRESENT
      TST RHTYPE      :IS IT AN RH70 ?
      BEQ 3$          :BR IF NO
      MOV RHEXT,R2    :GET RPBAE OFFSET
      ADD (R5),R2     :ADD BASE ADDRESS TO OFFSET
      MOV R2,(R3)+    :SAVE NEW RPBAE
      TST (R2)+       :ADD 2
      MOV R2,(R3)     :SAVE NEW RPCS3
3$:   CMP (SP)+,(SP)+  :DONE, RESTORE THE STACK
      MOV (R5)+,RPADR  :SAVE RPCS1 BASE ADDRESS
      MOV (R5)+,RPVEC  :SAVE INTERRUPT VECTOR ADDRESS
      MOV (R5)+,RPVEC+2 :SAVE INTERRUPT PRIORITY
      MOV (R5)+,PORTA  :SAVE DRIVE NUMBER FOR PORT A
      MOV (R5)+,PORTB  :SAVE DRIVE NUMBER FOR PORT B
      MOV (R5),CNFBAD  :GET THE SYSTEM CONFIGURATION STATUS
      BR 5$          :SKIP NEXT
4$:   INC UNIT        :TRY THE NEXT UNIT #
      CMP UNIT,#7    :DID WE TRY ALL THE UNIT #'S?
      BLOS 1$       :BR IF <= 7, NO
5$:   MOV (SP)+,R5    ::POP STACK INTO R5
      MOV (SP)+,R3    ::POP STACK INTO R3
    
```

55 016272 012602
 56 016274 000207
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 65 016276
 016276 010346
 016300 010246
 016302 010146
 66 016304 012702 002372
 67 016310 012701 002456
 68 016314 012703 000023
 69 016320 013221
 70 016322 005303
 71 016324 003375
 72 016326 005737 002366
 73 016332 001402
 74 016334 013221
 75 016336 013221
 76 016340
 016340 012601
 016342 012602
 016344 012603
 77 016346 000207
 78
 79 016350
 016350 012746 005023
 016354 012746 000001
 016360 010600
 016362 104415
 016364 062706 000004
 80 016370 013746 002470
 016374 013746 002466
 016400 013746 002464
 016404 013746 002462
 016410 013746 002460
 016414 013746 002456
 016420 013746 002246
 016424 012746 005114
 016430 012746 000010
 016434 010600
 016436 104415
 016440 062706 000022
 81 016444 012746 005174
 016450 012746 000001
 016454 010600
 016456 104415
 016460 062706 000004
 82 016464 013746 002506
 016470 013746 002504
 016474 013746 002502

```

MOV (SP)+,R2      ;;POP STACK INTO R2
RTS PC           ;;TAKE THE RETURN

.SBTTL REGISTER BUFFER MODULE
*****
:THIS MODULE CREATES AN IMAGE OF THE RP REGISTERS.
:IT IS USED FOR DIAGNOSTIC PURPOSES SUBSEQUENT TO A DISK COMMAND.
:INPUTS INCLUDE: RPCS1 - RPCS3.  OUTPUTS INCLUDE: REG+0 - REG + 52.
:MODULE IS CALLED BY: 'ERRO'.
*****

SAVRPR:
MOV R3,-(SP)      ;;PUSH R3 ON STACK
MOV R2,-(SP)      ;;PUSH R2 ON STACK
MOV R1,-(SP)      ;;PUSH R1 ON STACK
MOV #RPCS1,R2     ;;AND THE TRANSFER ADDRESSES
MOV #REG,R1       ;;OF THE SOURCE AND SINK BUFFERS
MOV #19,R3        ;;GET THE ITERATION COUNT
1$: MOV @R2+,(R1)+  ;;NOW LOG THE DATA
DEC R3           ;;ONE LESS REGISTER TO GO
BGT 1$          ;;IF >0, KEEP GOING
TST RHTYPE      ;;WHICH CONTROLLER?
BEQ 2$          ;;IF ZERO, IT'S AN RH11
MOV @R2+,(R1)+  ;;LOG RPBAE
MOV @R2+,(R1)+  ;;LOG RPCS3
2$:
MOV (SP)+,R1     ;;POP STACK INTO R1
MOV (SP)+,R2     ;;POP STACK INTO R2
MOV (SP)+,R3     ;;POP STACK INTO R3
RTS PC          ;;RETURN TO MAIN FOR ERROR REPORT

DMPREG:
MOV #FRMT66,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #4,SP
MOV REG+12,-(SP)
MOV REG+10,-(SP)
MOV REG+6,-(SP)
MOV REG+4,-(SP)
MOV REG+2,-(SP)
MOV REG,-(SP)
MOV PORTA,-(SP)
MOV #FRMT67,-(SP)
MOV #10,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #22,SP
MOV #FRMT70,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #4,SP
MOV REG+30,-(SP)
MOV REG+26,-(SP)
MOV REG+24,-(SP)
    
```


	016500	013746	002500	MOV	REG+22,-(SP)	
	016504	013746	002476	MOV	REG+20,-(SP)	
	016510	013746	002474	MOV	REG+16,-(SP)	
	016514	013746	002472	MOV	REG+14,-(SP)	
	016520	012746	005265	MOV	#FRMT71,-(SP)	
	016524	012746	000010	MOV	#10,-(SP)	
	016530	010600		MOV	SP,R0	
	016532	104415		TRAP	C\$PNTX	
83	016534	062706	000022	ADD	#22,SP	
	016540	012746	005345	MOV	#FRMT72,-(SP)	
	016544	012746	000001	MOV	#1,-(SP)	
	016550	010600		MOV	SP,R0	
	016552	104415		TRAP	C\$PNTX	
84	016554	062706	000004	ADD	#4,SP	
	016560	013746	002524	MOV	REG+46,-(SP)	
	016564	013746	002522	MOV	REG+44,-(SP)	
	016570	013746	002520	MOV	REG+42,-(SP)	
	016574	013746	002516	MOV	REG+40,-(SP)	
	016600	013746	002514	MOV	REG+36,-(SP)	
	016604	013746	002512	MOV	REG+34,-(SP)	
	016610	013746	002510	MOV	REG+32,-(SP)	
	016614	012746	005437	MOV	#FRMT73,-(SP)	
	016620	012746	000010	MOV	#10,-(SP)	
	016624	010600		MOV	SP,R0	
	016626	104415		TRAP	C\$PNTX	
85	016630	062706	000022	ADD	#22,SP	
	016634	005737	002366	TST	RHTYPE	:WHICH CONTROLLER?
86	016640	001424		BEQ	1\$:IF ZERO, RH1
87	016642	012746	005521	MOV	#FRMT74,-(SP)	
	016646	012746	000001	MOV	#1,-(SP)	
	016652	010600		MOV	SP,R0	
	016654	104415		TRAP	C\$PNTX	
88	016656	062706	000004	ADD	#4,SP	
	016662	013746	002530	MOV	REG+52,-(SP)	
	016666	013746	002526	MOV	REG+50,-(SP)	
	016672	012746	005541	MOV	#FRMT75,-(SP)	
	016676	012746	000003	MOV	#3,-(SP)	
	016702	010600		MOV	SP,R0	
	016704	104415		TRAP	C\$PNTX	
89	016706	062706	000010	ADD	#10,SP	
90	016712	000207		RTS	PC	:TAKE THE RETURN
92						

```
12      .SBTTL MISCELLANEOUS SECTIONS
13      .SBTTL REPORT CODING SECTION
41
43      :++
44      : THE REPORT CODING SECTION CONTAINS THE
45      : "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
46      :--
47
48 016714 LSRPT::
49
61
62 016714 000167      .WORD JSJMP
63 016716 000000      .WORD L10030-2-.
64
65
66
67      .EVEN
68 016720 L10030: TRAP CSRPT
69 016720 104425
```


1
2
3
4
5
6
7
8 016722
9 016722 000000
10 016724 177777
11 016726 000010
13

.SBTTL PROTECTION TABLE
:++
: THIS TABLE IS USED BY THE RUNTIME SERVICES
: TO PROTECT THE LOAD MEDIA.
:--
LSPROT::
 0 :P-TABLE OFFSET OF CSR
 -1 :NOT A MASS BUS DEVICE
 10 :P-TABLE OFFSET OF DRIVE #

```

1          .SBTTL INITIALIZE SECTION
2
3          :++
4          : THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
5          : AT THE BEGINNING OF EACH PASS.
6          :--
7
8          016730          L$INIT::
9
10         016730 104433          TRAP      C$RESET          ;RESET THE WORLD
11
12         016732 012700 000034    MOV      #EF.PWR,RO          ;POWER UP SEQUENCE ?
13         016736 104447          TRAP      C$REFG
14
15         016740 103434          BCS      3$          ;GO TO 3$ IF YES
16
17         016742 012700 000036    MOV      #EF.CON,RO        ;CONTINUE COMMAND ?
18         016746 104447          TRAP      C$REFG
19
20         016750 103430          BCS      3$          ;GO TO 3$ IF YES
21
22         016752 012700 000035    MOV      #EF.NEW,RO        ;'STA', 'RES' OR 'NEW PASS' ?
23         016756 104447          TRAP      C$REFG
24
25         016760 103013          BCC      2$          ;GO TO 2$ IF NO, MUST BE NEW 'SUB-PASS'
26
27         016762 103013          1$:          ;CR-LF
28         016762 012746 002564    MOV      #CRLF,-(SP)
29         016766 012746 000001    MOV      #1,-(SP)
30         016772 010600          MOV      SP,RO
31         016774 104417          TRAP      C$PNTF
32         016776 062706 000004    ADD      #4,SP
33
34         017002 012737 177777 002354  MOV      #-1,UNIT          ;INITIALIZE FOR UNIT 0 ON START
35         017010 005237 002354 2$:          ;INCREMENT TO NEXT UNIT
36         017014 004737 016122    JSR      PC,TABELD        ;LOAD THE HARDWARE P-TABLES
37         017020 023727 002354 000007  CMP      UNIT,#7          ;DID WE TEST THE LAST UNIT?
38         017026 101401          BLOS     3$          ;IF <= 7, NO
39         017030 000754          BR       1$          ;START AGAIN
40         017032 012777 000040 163342 3$:          ;MASSBUS INIT TO CLEAR IMPENDING INTERRUPTS
41
42         017040 004737 014226    JSR      PC,ST.CLK        ;START CLOCK
43         017044 005737 002244    TST      CLKSTA          ;IS THERE A CLOCK AVAILABLE ?
44         017050 001006          BNE     4$          ;BR IF YES
45         017052 104455          TRAP      C$ERDF
46         017054 000002          .WORD    2
47         017056 012317          .WORD    EM70
48         017060 000000          .WORD    0
49         017062 104432          TRAP      C$EXIT
50         017064 000212          .WORD    L10032-.
51
52         017066          4$:          ;START THE TIMER
53
54         017066 005037 002304    CLR      TIME            ;CLEAR THE ELAPSED TIME COUNTER
55         017072 012737 003720 002306  MOV      #2000.,WATCH    ;SET WATCH TO 2000. MS
56         017100 005737 002306 5$:          TST      WATCH          ;DID TIMER EXPIRE ?
57         017104 001375          BNE     5$          ;IF NOT ZERO, NO
58
59
60
61

```



```

42                                     ;PRINT DRIVE SERIAL NUMBER
43
44 017106 012701 000004                MOV     #4,R1           ;4 DIGITS
45 017112 013777 002246 163262        MOV     PORTA,@RPCS2   ;SELECT PORT A DRIVE
46 017120 013746 002250                MOV     PORTB,-(SP)
    017124 013746 002246                MOV     PORTA,-(SP)
    017130 012746 002567                MOV     #DSNMSG,-(SP)
    017134 012746 000003                MOV     #3,-(SP)
    017140 010600                MOV     SP,R0
    017142 104417                TRAP    C$PNTF
    017144 062706 000010                ADD     #10,SP
47 017150 017746 163246                MOV     @RPSN,-(SP)   ;FETCH S/N
48 017154 005002                        CLR     R2            ;ZERO OUTPUT
49 017156 006116                        ROL    R2            ;PUT NEXT DIGIT INTO R2
50 017160 006102                        ROL    R2
51 017162 006116                        ROL    R2
52 017164 006102                        ROL    R2
53 017166 006116                        ROL    R2
54 017170 006102                        ROL    R2
55 017172 006116                        ROL    R2
56 017174 006102                        ROL    R2
57 017176 062702 000060                ADD     #'0,R2        ;MAKE RESULT ASCII
58 017202 010237 002370                MOV     R2,DRVSN     ;SAVE R2 FOR PRINT
59 017206 012746 002370                MOV     #DRVSN,-(SP)
    017212 012746 002623                MOV     #SNDIGT,-(SP)
    017216 012746 000002                MOV     #2,-(SP)
    017222 010600                MOV     SP,R0
    017224 104417                TRAP    C$PNTF
    017226 062706 000006                ADD     #6,SP
60 017232 005301                        DEC     R1            ;COUNT DOWN DIGIT
61 017234 003347                        BGT    6$            ;NEXT DIGIT
62 017236 005726                        TST    (SP)+         ;RESTORE STACK
63                                     ;CR-LF
64 017240 012746 002564                MOV     #CRLF,-(SP)
    017244 012746 000001                MOV     #1,-(SP)
    017250 010600                MOV     SP,R0
    017252 104417                TRAP    C$PNTF
    017254 062706 000004                ADD     #4,SP
65 017260 004737 014714                JSR    PC,DRVINI     ;INITIALIZE THE DRIVES
66                                     ;SET PRIORITY TO 5
67 017264 012700 000240                MOV     #PRI05,R0
    017270 104441                TRAP    C$SPRI
68
92
93 017272 104432                        TRAP    C$EXIT
    017274 000002                .WORD  L10032-.
94
106                                     .EVEN
107
108 017276 104411                        L10032: TRAP    C$INIT
    017276 104411
    
```

1
2
3
4
5
6
7
8
9
10 017300
11
18
19 017300 104461
017300

.SBTTL AUTODROP SECTION

:++
: THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
: THE "ADR" FLAG WAS SET. THE UNIT(S) UNDER TEST ARE CHECKED TO
: SEE IF THEY WILL RESPOND. THOSE THAT DON'T ARE IMMEDIATELY
: DROPPED FROM TESTING.
:--

LSAUTO::

L10033: TRAP CSAUTO


```

1
2
3
4
5
6
7
8 017302
9
10 017302 012700 000340
11 017306 104441
12 017310 012777 000040 163064
13 017316 013777 002246 163056
14 017324 004737 014560
15 017330 005737 002244
16 017334 001410
17 017336 100404
18 017340 013700 014440
19 017344 104436
20 017346 000403
21 017350
22 017350 013700 014450
23 017354 104436
24 017356
25 017356 104432
26 017360 000002
27
28
29
30
31
32
33 017356 104432
34 017360 000002
35
36
37
38 017362
39 017362 104412

```

```

.SBTTL CLEANUP CODING SECTION

:++
: THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
: AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
:--

L$CLEAN::

;SET PRIORITY TO 7
MOV #PRI07,R0
TRAP C$SPRI
MOV #CLR,@RPCS2 ;MASSBUS INIT TO CLEAR IMPENDING INTERRUPTS
MOV PORTA,@RPCS2 ;GET PORT 'A' DRIVE NUMBER
JSR PC,STOPCK ;STOP CLOCK
TST CLKSTA ;RELEASE APPROPRIATE CLOCK VECTOR
BEQ 2$ ;NO CLOCK, SKIP
BMI 1$ ;L-CLK
;P-CLK VECTOR RELEASE

MOV PKV,R0
TRAP C$CVEC
BR 2$ ;L-CLK VECTOR RELEASE

1$:
MOV LKV,R0
TRAP C$CVEC

2$:

TRAP C$EXIT
.WORD L10034-.

.EVEN

L10034:
TRAP C$CLEAN

```

1
2
3
4
5
6
7
8 017364
9
18
19 017364 000167
017366 000000
20
21
22
23
24
25
35 017370
017370 104453

```
.SBTTL DROP UNIT SECTION  
:++  
: THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE  
: TO NO LONGER BE TESTED.  
:--  
LSDU::  
  
      .WORD JSJMP  
      .WORD L10035-2-.  
  
      .EVEN  
L10035: TRAP CSDU
```


1
2
3
4
5
6
7
8
9 017372
10
11
12 017372 000167
13 017374 000000
14
15
16
17
18 017376
19 017376 104452
20
21
22
23
24
25
26
27
28

.SBTTL ADD UNIT SECTION

:+
: THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
: TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
: TO THE TEST CYCLE.
:--

LSAU::

.WORD JSJMP
.WORD L10036-2-

.EVEN

L10036: TRAP CSAU

2

.SBTTL HARDWARE TESTS

1
2
37
39
40
41
42
43
44
45
46
47
48
49
56
62
66
67
71
75
76
77
78
79
93

.SBTTL TEST 1 NEUTRAL ACCESS TEST

```

: *
: * VERIFY THAT THE DRIVE IS ACCESSIBLE TO BOTH PORTS
: *
: * A. SELECT DRIVE, VERIFY THAT THE DRIVE IS PRESENT, THAT THE
: * DRIVE IS A DUAL PORT RPO7, THAT THE DRIVE IS ONLINE (RPDS HAS
: * 'MOL', 'PGM', 'DPR', & 'DRY' BITS SET), AND THE THE DRIVE SERIAL
: * NUMBER READ THROUGH BOTH PORTS IS THE SAME.
: *
: * B. THE TEST IS REPEATED THROUGH BOTH PORTS.
: *
    
```

```

T1::
TST    DRVBAD           ;SYSTEM OK??
BEQ    1$              ;IF ZERO, YES!
TRAP   C$EXIT
        .WORD          L10037-
1$:    MOV    #CLR,@RPCS2 ;INITIALIZE THE MASSBUS
    
```

```

:*****
:VERIFY THAT DRIVE IS PRESENT THROUGH PORTS A & B
    
```

```

93 017420 113777 002246 162754      MOV    PORTA,@RPCS2      ;SELECT PORT A
    017426 013737 002246 002266      MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
    017434 005777 162744              TST    @RPDS            ;SEE IF DRIVE (PORT A) PRESENT
    017440 005037 002276              CLR    CKERR            ;CLEAR THE 'CHECK ERROR' INDICATOR
    017444 017737 162732 002332      MOV    @RPCS2,BADDAT    ;GET CONTENTS OF RPCS2
    017452 013737 002402 002334      MOV    RPCS2,BADADR     ;FORM REGISTER ADDRESS OF ERROR MESSAGE
    017460 005037 002336              CLR    EXPTED           ;WHAT REGISTER SHOULD BE
    017464 013737 002332 002342      MOV    BADDAT,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
    017472 042737 167777 002342      BIC    #^CNED,TMPO     ;SAVE SPECIFIED BITS
    017500 023737 002336 002342      CMP    EXPTED,TMPO     ;COMPARE THE BITS
    017506 001427                      BEQ    64$              ;BR IF OK
    017510 013737 002332 002352      MOV    BADDAT,TMP4     ;COPY 'BAD DATA'
    017516 042737 010000 002352      BIC    #NED,TMP4       ;CLEAR THE MASKED BITS
    017524 053737 002352 002336      BIS    TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
    017532 104456                      TRAP   C$ERHRD
    017534 000003                      .WORD  3
    017536 010251                      .WORD  EM37
    017540 013152                      .WORD  ERR8
    017542 012746 003716              MOV    #FRMT17,-(SP)
    017546 012746 000001              MOV    #1,-(SP)
    017552 010600                      MOV    SP,R0
    017554 104414                      TRAP   C$PNTB
    017556 062706 000004              ADD    #4,SP
    017562 005137 002276              COM    CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
    017566                      64$:
    017566 005737 002276              TST    CKERR           ;WAS 'NED' SET ?
    017572 001403                      BEQ    +10             ;BR IF NOT
    017574 012777 000040 162600      MOV    #CLR,@RPCS2     ;ISSUE MASSBUS INIT TO CLEAR 'NED'
    017602 113777 002250 162572      MOV    PORTB,@RPCS2    ;SELECT PORT B
    017610 013737 002250 002266      MOV    PORTB,PINBR     ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
    017616 005777 162562              TST    @RPDS            ;SEE IF DRIVE (PORT B) PRESENT
    017622 005037 002276              CLR    CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
    
```

```

017626 017737 162550 002332      MOV      @RPCS2,BADDAT      ;GET CONTENTS OF RPCS2
017634 013737 002402 002334      MOV      RPCS2,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
017642 005037 002336                CLR      EXPTED             ;WHAT REGISTER SHOULD BE
017646 013737 002332 002342      MOV      BADDAT,TMPO       ;MOVE REGISTER CONTENTS TO 'TMPO'
017654 042737 167777 002342      BIC      #^CNED,TMPO       ;SAVE SPECIFIED BITS
017662 023737 002336 002342      CMP      EXPTED,TMPO       ;COMPARE THE BITS
017670 001427                BEQ      66$               ;BR IF OK
017672 013737 002332 002352      MOV      BADDAT,TMP4       ;COPY 'BAD DATA'
017700 042737 010000 002352      BIC      #NED,TMP4         ;CLEAR THE MASKED BITS
017706 053737 002352 002336      BIS      TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
017714 104456                TRAP     C$ERHRD
017716 000003                .WORD   3
017720 010251                .WORD   EM37
017722 013152                .WORD   ERR8
017724 012746 003716      MOV      #FRMT17,-(SP)
017730 012746 000001      MOV      #1,-(SP)
017734 010600                MOV     SP,R0
017736 104414                TRAP     C$PNTB
017740 062706 000004      ADD      #4,SP
017744 005137 002276      COM      CKERR              ;SET THE REGISTER COMPARE ERROR INDICATOR
017750                66$:
017750 005737 002276      TST      CKERR              ;WAS 'NED' SET ?
017754 001403                BEQ     .+10                ;BR IF NOT
017756 012777 000040 162416      MOV      #CLR,@RPCS2       ;ISSUE MASSBUS INIT TO CLEAR 'NED'

;*****
;CONFIRM THAT DRIVE IS AN RP07 AND IS DUAL PORTED

94
95
96
97
101 017764 113777 002246 162410      MOV      PORTA,@RPCS2      ;SELECT PORT A
017772 013737 002246 002266      MOV      PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
020000 005037 002276                CLR      CKERR              ;CLEAR THE 'CHECK ERROR' INDICATOR
020004 017737 162410 002332      MOV      @RPDT,BADDAT     ;GET CONTENTS OF RPDT
020012 013737 002420 002334      MOV      RPDT,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
020020 012737 024040 002336      MOV      #024040,EXPTED   ;:WHAT REGISTER SHOULD BE
020026 013737 002332 002342      MOV      BADDAT,TMPO       ;MOVE REGISTER CONTENTS TO 'TMPO'
020034 042737 000003 002342      BIC      #^C177774,TMPO    ;SAVE SPECIFIED BITS
020042 023737 002336 002342      CMP      EXPTED,TMPO       ;COMPARE THE BITS
020050 001427                BEQ      68$               ;BR IF OK
020052 013737 002332 002352      MOV      BADDAT,TMP4       ;COPY 'BAD DATA'
020060 042737 177774 002352      BIC      #177774,TMP4     ;CLEAR THE MASKED BITS
020066 053737 002352 002336      BIS      TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
020074 104456                TRAP     C$ERHRD
020076 000003                .WORD   3
020100 005560                .WORD   EM1
020102 012462                .WORD   ERRO
020104 012746 003716      MOV      #FRMT17,-(SP)
020110 012746 000001      MOV      #1,-(SP)
020114 010600                MOV     SP,R0
020116 104414                TRAP     C$PNTB
020120 062706 000004      ADD      #4,SP
020124 005137 002276      COM      CKERR              ;SET THE REGISTER COMPARE ERROR INDICATOR
020130                68$:
020130 113777 002250 162244      MOV      PORTB,@RPCS2     ;SELECT PORT B
020136 013737 002250 002266      MOV      PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
020144 005037 002276                CLR      CKERR              ;CLEAR THE 'CHECK ERROR' INDICATOR
020150 017737 162244 002332      MOV      @RPDT,BADDAT     ;GET CONTENTS OF RPDT
020156 013737 002420 002334      MOV      RPDT,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
    
```



```

020164 012737 024040 002336      MOV      #024040,EXPTED      :::WHAT REGISTER SHOULD BE
020172 013737 002332 002342      MOV      BADDAT,TMPO        :MOVE REGISTER CONTENTS TO 'TMPO'
020200 042737 000003 002342      BIC      #^C177774,TMPO     :SAVE SPECIFIED BITS
020206 023737 002336 002342      CMP      EXPTED,TMPO        :COMPARE THE BITS
020214 001427                          BEQ      70$                :BR IF OK
020216 013737 002332 002352      MOV      BADDAT,TMP4        :COPY 'BAD DATA'
020224 042737 177774 002352      BIC      #177774,TMP4       :CLEAR THE MASKED BITS
020232 053737 002352 002336      BIS      TMP4,EXPTED        : 'OR' WITH GOOD DATA FOR TYPEOUT
020240 104456      TRAP     C$ERHRD
020242 000003      .WORD   3
020244 005560      .WORD   EM1
020246 012462      .WORD   ERRO
020250 012746 003716      MOV      #FRMT17,-(SP)
020254 012746 000001      MOV      #1,-(SP)
020260 010600      MOV      SP,R0
020262 104414      TRAP     C$PNTB
020264 062706 000004      ADD      #4,SP
020270 005137 002276      COM      CKERR              ;SET THE REGISTER COMPARE ERROR INDICATOR
020274
    
```

70\$:

```

:*****
:VERIFY THROUGH BOTH PORTS THAT THE DRIVE IS ON LINE AND IN NEUTRAL
    
```

102
103
104
105
110

```

020274 113777 002246 162100      MOV      PORTA,@RPCS2        ;SELECT PORT A
020302 013737 002246 002266      MOV      PORTA,PTNBR        :MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
020310 005037 002276                          CLR      CKERR              :CLEAR THE 'CHECK ERROR' INDICATOR
020314 017737 162064 002332      MOV      @RPDS,BADDAT        :GET CONTENTS OF RPDS
020322 013737 002404 002334      MOV      RPDS,BADADR        :FORM REGISTER ADDRESS OF ERROR MESSAGE
020330 012737 001000 002336      MOV      #PGM,EXPTED        :::WHAT REGISTER SHOULD BE
020336 013737 002332 002342      MOV      BADDAT,TMPO        :MOVE REGISTER CONTENTS TO 'TMPO'
020344 042737 176777 002342      BIC      #^CPGM,TMPO        :SAVE SPECIFIED BITS
020352 023737 002336 002342      CMP      EXPTED,TMPO        :COMPARE THE BITS
020360 001427                          BEQ      72$                :BR IF OK
020362 013737 002332 002352      MOV      BADDAT,TMP4        :COPY 'BAD DATA'
020370 042737 001000 002352      BIC      #PGM,TMP4          :CLEAR THE MASKED BITS
020376 053737 002352 002336      BIS      TMP4,EXPTED        : 'OR' WITH GOOD DATA FOR TYPEOUT
020404 104456      TRAP     C$ERHRD
020406 000003      .WORD   3
020410 010672      .WORD   EM45
020412 012462      .WORD   ERRO
020414 012746 003716      MOV      #FRMT17,-(SP)
020420 012746 000001      MOV      #1,-(SP)
020424 010600      MOV      SP,R0
020426 104414      TRAP     C$PNTB
020430 062706 000004      ADD      #4,SP
020434 005137 002276      COM      CKERR              ;SET THE REGISTER COMPARE ERROR INDICATOR
020440
    
```

72\$:

```

020440 005037 002276                          CLR      CKERR              :CLEAR THE 'CHECK ERROR' INDICATOR
020444 017737 161734 002332      MOV      @RPDS,BADDAT        :GET CONTENTS OF RPDS
020452 013737 002404 002334      MOV      RPDS,BADADR        :FORM REGISTER ADDRESS OF ERROR MESSAGE
020460 012737 010600 002336      MOV      #MOL!DPR!DRY,EXPTED :::WHAT REGISTER SHOULD BE
020466 013737 002332 002342      MOV      BADDAT,TMPO        :MOVE REGISTER CONTENTS TO 'TMPO'
020474 042737 167177 002342      BIC      #^C10600,TMPO      :SAVE SPECIFIED BITS
020502 023737 002336 002342      CMP      EXPTED,TMPO        :COMPARE THE BITS
020510 001427                          BEQ      74$                :BR IF OK
020512 013737 002332 002352      MOV      BADDAT,TMP4        :COPY 'BAD DATA'
020520 042737 010600 002352      BIC      #10600,TMP4        :CLEAR THE MASKED BITS
    
```

```

020526 053737 002352 002336      BIS      TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
020534 104456                      TRAP     C$ERHRD
020536 000003                      .WORD   3
020540 005601                      .WORD   EM2
020542 012654                      .WORD   ERR3
020544 012746 003716      MOV     #FRMT17,-(SP)
020550 012746 000001      MOV     #1,-(SP)
020554 010600                      MOV     SP,R0
020556 104414                      TRAP     C$PNTB
020560 062706 000004      ADD     #4,SP
020564 005137 002276      COM     CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
020570                                74$:
020570 113777 002250 161604      MOV     PORTB,@RPCS2   ;SELECT PORT B
020576 013737 002250 002266      MOV     PORTB,PTNBR   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
020604 005037 002276                      CLR     CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
020610 017737 161570 002332      MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
020616 013737 002404 002334      MOV     RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
020624 012737 001000 002336      MOV     #PGM,EXPTED   ;:WHAT REGISTER SHOULD BE
020632 013737 002332 002342      MOV     BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
020640 042737 176777 002342      BIC     #^CPGM,TMPO   ;SAVE SPECIFIED BITS
020646 023737 002336 002342      CMP     EXPTED,TMPO   ;COMPARE THE BITS
020654 001427                      BEQ     76$           ;BR IF OK
020656 013737 002332 002352      MOV     BADDAT,TMP4   ;COPY 'BAD DATA'
020664 042737 001000 002352      BIC     #PGM,TMP4     ;CLEAR THE MASKED BITS
020672 053737 002352 002336      BIS     TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
020700 104456                      TRAP     C$ERHRD
020702 000003                      .WORD   3
020704 010672                      .WORD   EM45
020706 012462                      .WORD   ERRO
020710 012746 003716      MOV     #FRMT17,-(SP)
020714 012746 000001      MOV     #1,-(SP)
020720 010600                      MOV     SP,R0
020722 104414                      TRAP     C$PNTB
020724 062706 000004      ADD     #4,SP
020730 005137 002276      COM     CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
020734                                76$:
020734 005037 002276                      CLR     CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
020740 017737 161440 002332      MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
020746 013737 002404 002334      MOV     RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
020754 012737 010600 002336      MOV     #MOL!DPR!DRY,EXPTED ;:WHAT REGISTER SHOULD BE
020762 013737 002332 002342      MOV     BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
020770 042737 167177 002342      BIC     #^C10600,TMPO ;SAVE SPECIFIED BITS
020776 023737 002336 002342      CMP     EXPTED,TMPO   ;COMPARE THE BITS
021004 001427                      BEQ     78$           ;BR IF OK
021006 013737 002332 002352      MOV     BADDAT,TMP4   ;COPY 'BAD DATA'
021014 042737 010600 002352      BIC     #10600,TMP4   ;CLEAR THE MASKED BITS
021022 053737 002352 002336      BIS     TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
021030 104456                      TRAP     C$ERHRD
021032 000003                      .WORD   3
021034 005601                      .WORD   EM2
021036 012654                      .WORD   ERR3
021040 012746 003716      MOV     #FRMT17,-(SP)
021044 012746 000001      MOV     #1,-(SP)
021050 010600                      MOV     SP,R0
021052 104414                      TRAP     C$PNTB
021054 062706 000004      ADD     #4,SP
021060 005137 002276      COM     CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
    
```



```

021064          78$:
111
112
113          ::*****
114          ;VERIFY THAT DRIVE SERIAL NUMBER AS SEEN THROUGH BOTH PORTS IS THE SAME
115 021064 113777 002246 161310          MOVB   PORTA,@RPCS2      ;SELECT PORT A
116 021072 017737 161324 002336          MOV    @RPSN,EXPTED     ;STORE THE PORT A SERIAL NUMBER
117 021100 113777 002250 161274          MOVB   PORTB,@RPCS2     ;SELECT PORT B
118 021106 017737 161310 002332          MOV    @RPSN,BADDAT    ;STORE THE PORT B SERIAL NUMBER
119 021114 023737 002336 002332          CMP    EXPTED,BADDAT   ;ARE THEY THE SAME ?
120 021122 001414          BEQ    2$              ;BR IF THEY ARE
124 021124 104456          TRAP   C$SERHRD
      021126 000021          .WORD 17
      021130 005623          .WORD EM3
      021132 012530          .WORD ERR1
125 021134 012746 003553          MOV    #FRMT16,-(SP)
      021140 012746 000001          MOV    #1,-(SP)
      021144 010600          MOV    SP,R0
      021146 104414          TRAP   C$PNTB
      021150 062706 000004          ADD    #4,SP
126 021154          2$:
127 021154          L10037:
      021154 104401          TRAP   C$SETST
    
```

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```
.SBTTL TEST 2 PORT 'A' SEIZE/TIMEOUT TEST
;*VERIFY THAT THE DRIVE CAN BE SEIZED BY WRITING A REMOTE REGISTER AND THAT
;* IT CAN BE RELEASED BY THE ONE SECOND TIMER.
;*
;* A. WRITE 0'S INTO RPDA THROUGH PORT 'A'; VERIFY THAT THE DRIVE
;* HAS BEEN SEIZED.
;*
;* B. READ EACH DRIVE REGISTER, EXCEPT RPCS1, THROUGH PORT 'B';
;* VERIFY THAT 0'S ARE READ FROM EACH REGISTER.
;*
;* C. WAIT FOR THE PORT TIMEOUT TO RELEASE THE DRIVE.
;* MEASURE THE DURATION OF THE TIMEOUT ONE SHOT AND SAVE THE
;* VALUE FOR LATER USE. VERIFY THAT TIMEOUT RETURNED THE DRIVE TO
;* NEUTRAL. ALSO VERIFY THAT THE DURATION OF THE ONE SHOT IS > 500 MS.
;*
```

```
195 021156
199 021156 005737 002340
    021162 001402
    021164 104432
    021166 001714
    021170
    021170 012700 000240
    021174 104441
```

```
T2::
    TST     DRVBAD      ;SYSTEM OK?
    BEQ     64$         ;TAKE BRANCH IF SO...
    TRAP   C$EXIT
    .WORD  L10040-.

64$:
    MOV     #PRI05,R0   ;SET PRIORITY TO 5
    TRAP   C$SPRI

;START THE TIMER

    CLR     TIME        ;CLEAR THE ELAPSED TIME COUNTER
    MOV     #1250.,WATCH ;SET WATCH TO 1250. MS
;*****
```

```
021176 005037 002304
021202 012737 002342 002306
```

```
;SEIZE THE DRIVE THROUGH PORT A

021210 113777 002246 161164
021216 013737 002246 002270
021224 005077 161150

    MOV     PORTA,@RPCS2 ;SELECT PORT A
    MOV     PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
    CLR     @RPDA        ;WRITE RPDA

021230 113777 002250 161144
021236 013737 002250 002266
021244 013737 002250 002272
021252 017737 161126 002332
021260 013737 002404 002334
021266 005037 002336
021272 023737 002336 002332
021300 001406
021302 104456
021304 000001
021306 005705
021310 012576
021312 000137 023062
021316

    MOV     PORTB,@RPCS2 ;SELECT PORT B
    MOV     PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
    MOV     PORTB,OPPRT ;'OPPOSITE' PORT ADDRESS
    MOV     @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT A
    MOV     RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
    CLR     EXPTED       ;REGISTER SHOULD BE ZERO
    CMP     EXPTED,BADDAT ;IS THE REGISTER ZERO
    BEQ     65$         ;BR IF IT IS
    TRAP   C$ERHRD
    .WORD  1
    .WORD  EM4
    .WORD  ERR2
    JMP     5$         ;BYPASS REST OF THE SUBTEST

65$:
    MOV     PORTA,@RPCS2 ;SELECT PORT A
    MOV     PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
    MOV     @RPDS,BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
    BIC     #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
    MOV     #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
```

```
021210 113777 002246 161164
021216 013737 002246 002270
021224 005077 161150

021230 113777 002250 161144
021236 013737 002250 002266
021244 013737 002250 002272
021252 017737 161126 002332
021260 013737 002404 002334
021266 005037 002336
021272 023737 002336 002332
021300 001406
021302 104456
021304 000001
021306 005705
021310 012576
021312 000137 023062
021316
021316 113777 002246 161056
021324 013737 002246 002266
021332 017737 161046 002332
021340 042737 020005 002332
021346 012737 011700 002336
```



```

021354 013737 002336 002344      MOV      EXPTED,TMP1  ;USE GOOD DATA AS A MASK
021362 005137 002344              COM      TMP1        ;COMPLEMENT THE EXPECTED STATUS
021366 013737 002332 002342      MOV      BADDAT,TMPO ;SAVE THE ACTUAL STATUS
021374 043737 002344 002342      BIC      TMP1,TMPO   ;CLEAR UNWANTED BITS
021402 023737 002336 002342      CMP      EXPTED,TMPO ;ARE THE EXPECTED STATUS BITS SET ?
021410 001404              BEQ      66$         ;BR IF THEY ARE
021412 104456              TRAP     C$ERHRD
021414 000002              .WORD   2
021416 005736              .WORD   EM5
021420 012654              .WORD   ERR3
021422
    
```

66\$:
 :*****
 :READ THE DRIVE REGISTERS THROUGH PORT B AND STORE THEM ON THE STACK

```

021422 113777 002250 160752      MOV      PORTB,@RPCS2 ;SELECT PORT B
021430 013737 002250 002266      MOV      PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
021436 017746 160776              MOV      @RPEC2,-(SP) ;STORE REGISTER RPEC2, PORT B, FOR CHECK
021442 017746 160770              MOV      @RPEC1,-(SP) ;STORE REGISTER RPEC1, PORT B, FOR CHECK
021446 017746 160750              MOV      @RPSN,-(SP)  ;STORE REGISTER RPSN, PORT B, FOR CHECK
021452 017746 160750              MOV      @RPDC,-(SP)  ;STORE REGISTER RPDC, PORT B, FOR CHECK
021456 017746 160742              MOV      @RPOF,-(SP)  ;STORE REGISTER RPOF, PORT B, FOR CHECK
021462 017746 160746              MOV      @RPER3,-(SP) ;STORE REGISTER RPER3, PORT B, FOR CHECK
021466 017746 160720              MOV      @RPLA,-(SP)  ;STORE REGISTER RPLA, PORT B, FOR CHECK
021472 017746 160702              MOV      @RPDA,-(SP)  ;STORE REGISTER RPDA, PORT B, FOR CHECK
021476 017746 160714              MOV      @RPMR1,-(SP) ;STORE REGISTER RPMR1, PORT B, FOR CHECK
021502 017746 160700              MOV      @RPER1,-(SP) ;STORE REGISTER RPER1, PORT B, FOR CHECK
    
```

:*****
 :WAIT FOR PORT A TO TIMEOUT

```

021506 005777 160672      1$:      TST      @RPDS      ;WAIT FOR THE DRIVE TO TIMEOUT
021512 001021              BNE     2$         ;BR WHEN TIMEOUT OCCURS
021514 005737 002306      TST      WATCH     ;CHECK WATCH
021520 001372              BNE     1$         ;BR IF NOT ZERO
021522 104456              TRAP     C$ERHRD
021524 000022              .WORD   18
021526 010177              .WORD   EM36
021530 013320              .WORD   ERR11
021532 012746 003471      MOV      #FRMT14,-(SP)
021536 012746 000001      MOV      #1,-(SP)
021542 010600              MOV      SP,R0
021544 104414              TRAP     C$PNTB
021546 062706 000004      ADD      #4,SP
021552 000137 022302      JMP      4$         ;BYPASS TIMEOUT TIME CHECK
021556              ;SET PRIORITY TO 7
021556 012700 000340      2$:      MOV      #PRI07,R0
021562 104441              TRAP     C$SPRI
    
```

:*****
 :VERIFY THAT THE TIMEOUT ONE-SHOT IS AT LEAST 750 MS

```

021564 023727 002304 001356      CMP      TIME,#750. ;WAS MEASURED TIME AT LEAST 750 MS?
021572 103014              BHIS    3$         ;BR IF IT WAS
021574 104456              TRAP     C$ERHRD
021576 000023              .WORD   19
021600 011517              .WORD   EM55
021602 013640              .WORD   ERR17
    
```

```

021604 012746 003471      MOV    #FRMT14,-(SP)
021610 012746 000001      MOV    #1,-(SP)
021614 010600              MOV    SP,R0
021616 104414              TRAP  C$PNTB
021620 062706 000004      ADD   #4,SP
    
```

 ;VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AFTER PORT A TIMED OUT

```

021624 012700 000240      3$:   MOV    #PRI05,R0      ;SET PRIORITY TO 5
021624 012700 000240      TRAP  C$SPRI
021630 104441
    
```

;VERIFY THAT THE DRIVE IS IN NEUTRAL

```

021632 005037 002302      CLR    RELERR          ;CLEAR THE 'RELEASE ERROR ' INDICATOR
021636 013737 002404 002334  MOV    RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
021644 012737 011700 002336  MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
021652 113777 002246 160522  MOV    PORTA,@RPCS2    ;SELECT PORT A.
021660 017737 160520 002346  MOV    @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
021666 042737 024005 002346  BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
021674 013737 002346 002342  MOV    TMP2,TMP0       ;COPY IT INTO 'TMP0'
021702 042737 100100 002342  BIC    #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
021710 113777 002250 160464  MOV    PORTB,@RPCS2    ;SELECT PORT B.
021716 017737 160462 002350  MOV    @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
021724 042737 024005 002350  BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
021732 013737 002350 002344  MOV    TMP3,TMP1       ;COPY IT INTO 'TMP1'
021740 042737 100100 002344  BIC    #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
021746 023737 002342 002344  CMP    TMP0,TMP1      ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
021754 001021              BNE    67$            ;BR IF NOT
021756 005737 002342      TST    TMP0           ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
021762 001065              BNE    69$            ;BR IF NOT
021764 104456              TRAP  C$SERHRD
021766 000006              .WORD 6
021770 010751              .WORD EM46
021772 013534              .WORD ERR15
021774 012746 003716      MOV    #FRMT17,-(SP)
022000 012746 000001      MOV    #1,-(SP)
022004 010600              MOV    SP,R0
022006 104414              TRAP  C$PNTB
022010 062706 000004      ADD   #4,SP
022014 000137 022302      JMP    71$            ;BYPASS THE REST OF THE CHECKS
022020 013737 002346 002332 67$:  MOV    TMP2,BADDAT     ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
022026 013737 002250 002266  MOV    PORTB,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
022034 113777 002250 160340  MOV    PORTB,@RPCS2    ;SELECT PORT B.
022042 005737 002342      TST    TMP0           ;SEE IF STATUS EQ 0 FROM PORT A.
022046 001414              BEQ    68$            ;BR IF ZERO
022050 013737 002246 002266  MOV    PORTA,PTNBR     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
022056 013737 002350 002332  MOV    TMP3,BADDAT     ;'BAD DATA' FOR ERROR TYPE OUT
022064 113777 002246 160310  MOV    PORTA,@RPCS2    ;SELECT PORT A.
022072 005737 002344      TST    TMP1           ;SEE IF STATUS EQ ZERO FROM PORT B.
022076 001017              BNE    69$            ;BR IF NOT
022100 012737 177777 002302 68$:  MOV    #-1,RELERR     ;SET 'RELEASE ERROR' INDICATOR
022106 104456              TRAP  C$SERHRD
022110 000011              .WORD 9
022112 007313              .WORD EM26
022114 013214              .WORD ERR9
    
```



```

022116 012746 003716      MOV      #FRMT17,-(SP)
022122 012746 000001      MOV      #1,-(SP)
022126 010600      MOV      SP,R0
022130 104414      TRAP     C$PNTB
022132 062706 000004      ADD      #4,SP
022136 013737 002346 002332 69$:      MOV      TMP2,BADDAT      ;LOOK FOR BIT FAILURES WHEN RPDS READ
022144 013737 002246 002266      MOV      PORTA,PTNBR      ;CHANGE PORT NUMBER
022152 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
022160 023737 002336 002332      CMP      EXPTED,BADDAT    ;ALL BITS OK ?
022166 001414      BEQ      70$              ;BR IF OK FROM PORT A.
022170 104456      TRAP     C$ERHRD
022172 000013      .WORD   11
022174 006072      .WORD   EM7
022176 013000      .WORD   ERR5
022200 012746 003471      MOV      #FRMT14,-(SP)
022204 012746 000001      MOV      #1,-(SP)
022210 010600      MOV      SP,R0
022212 104414      TRAP     C$PNTB
022214 062706 000004      ADD      #4,SP
022220 013737 002350 002332 70$:      MOV      TMP3,BADDAT      ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
022226 013737 002250 002266      MOV      PORTB,PTNBR      ;CHANGE PORT NUMBER
022234 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
022242 023737 002336 002332      CMP      EXPTED,BADDAT    ;SEE IF READ OK FROM PORT B.
022250 001414      BEQ      71$              ;BR IF OK
022252 104456      TRAP     C$ERHRD
022254 000014      .WORD   12
022256 006072      .WORD   EM7
022260 013000      .WORD   ERR5
022262 012746 003522      MOV      #FRMT15,-(SP)
022266 012746 000001      MOV      #1,-(SP)
022272 010600      MOV      SP,R0
022274 104414      TRAP     C$PNTB
022276 062706 000004      ADD      #4,SP
022302
    
```

71\$:

 ;CHECK THE REGISTERS STORED THROUGH PORT B. ALL REGISTERS SHOULD BE ZERO.
 ;THE REGISTERS ARE STORED ON THE STACK.

```

022302 013737 002250 002266 4$:      MOV      PORTB,PTNBR      ;CHANGE 'PORT NUMBER' TO THE OPPOSITE PORT
022310 013737 002406 002334      MOV      RPER1,BADADR     ;ADDRESS OF RPER1 FOR TYPEOUT
022316 012637 002332      MOV      (SP)+,BADDAT     ;CHECK THE STORED CONTENTS OF RPER1
022322 001414      BEQ      .+32              ;CONTENTS ZERO ?
022324 104456      TRAP     C$ERHRD
022326 000024      .WORD   20
022330 006004      .WORD   EM6
022332 012726      .WORD   ERR4
022334 012746 003471      MOV      #FRMT14,-(SP)
022340 012746 000001      MOV      #1,-(SP)
022344 010600      MOV      SP,R0
022346 104414      TRAP     C$PNTB
022350 062706 000004      ADD      #4,SP
022354 013737 002416 002334      MOV      RPMR1,BADADR     ;ADDRESS OF RPMR1 FOR TYPEOUT
022362 012637 002332      MOV      (SP)+,BADDAT     ;CHECK THE STORED CONTENTS OF RPMR1
022366 001414      BEQ      .+32              ;CONTENTS ZERO ?
022370 104456      TRAP     C$ERHRD
022372 000024      .WORD   20
022374 006004      .WORD   EM6
    
```

022376	012726			.WORD	ERR4	
022400	012746	003471		MOV	#FRMT14,-(SP)	
022404	012746	000001		MOV	#1,-(SP)	
022410	010600			MOV	SP,R0	
022412	104414			TRAP	C\$PNTB	
022414	062706	000004		ADD	#4,SP	
022420	013737	002400	002334	MOV	RPDA,BADADR	:ADDRESS OF RPDA FOR TYPEOUT
022426	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPDA
022432	001414			BEQ	+.32	:CONTENTS ZERO ?
022434	104456			TRAP	C\$ERHRD	
022436	000024			.WORD	20	
022440	006004			.WORD	EM6	
022442	012726			.WORD	ERR4	
022444	012746	003471		MOV	#FRMT14,-(SP)	
022450	012746	000001		MOV	#1,-(SP)	
022454	010600			MOV	SP,R0	
022456	104414			TRAP	C\$PNTB	
022460	062706	000004		ADD	#4,SP	
022464	013737	002412	002334	MOV	RPLA,BADADR	:ADDRESS OF RPLA FOR TYPEOUT
022472	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPLA
022476	001414			BEQ	+.32	:CONTENTS ZERO ?
022500	104456			TRAP	C\$ERHRD	
022502	000024			.WORD	20	
022504	006004			.WORD	EM6	
022506	012726			.WORD	ERR4	
022510	012746	003471		MOV	#FRMT14,-(SP)	
022514	012746	000001		MOV	#1,-(SP)	
022520	010600			MOV	SP,R0	
022522	104414			TRAP	C\$PNTB	
022524	062706	000004		ADD	#4,SP	
022530	013737	002434	002334	MOV	RPER3,BADADR	:ADDRESS OF RPER3 FOR TYPEOUT
022536	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPER3
022542	001414			BEQ	+.32	:CONTENTS ZERO ?
022544	104456			TRAP	C\$ERHRD	
022546	000024			.WORD	20	
022550	006004			.WORD	EM6	
022552	012726			.WORD	ERR4	
022554	012746	003471		MOV	#FRMT14,-(SP)	
022560	012746	000001		MOV	#1,-(SP)	
022564	010600			MOV	SP,R0	
022566	104414			TRAP	C\$PNTB	
022570	062706	000004		ADD	#4,SP	
022574	013737	002424	002334	MOV	RPOF,BADADR	:ADDRESS OF RPOF FOR TYPEOUT
022602	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPOF
022606	001414			BEQ	+.32	:CONTENTS ZERO ?
022610	104456			TRAP	C\$ERHRD	
022612	000024			.WORD	20	
022614	006004			.WORD	EM6	
022616	012726			.WORD	ERR4	
022620	012746	003471		MOV	#FRMT14,-(SP)	
022624	012746	000001		MOV	#1,-(SP)	
022630	010600			MOV	SP,R0	
022632	104414			TRAP	C\$PNTB	
022634	062706	000004		ADD	#4,SP	
022640	013737	002426	002334	MOV	RPDC,BADADR	:ADDRESS OF RPDC FOR TYPEOUT
022646	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPDC
022652	001414			BEQ	+.32	:CONTENTS ZERO ?

022654	104456		TRAP	C\$ERHRD	
022656	000025		.WORD	21	
022660	006004		.WORD	EM6	
022662	012726		.WORD	ERR4	
022664	012746	003471	MOV	#FRMT14,-(SP)	
022670	012746	000001	MOV	#1,-(SP)	
022674	010600		MOV	SP,R0	
022676	104414		TRAP	C\$PNTB	
022700	062706	000004	ADD	#4,SP	
022704	013737	002422	MOV	RPSN,BADADR	:ADDRESS OF RPSN FOR TYPEOUT
022712	012637	002332	MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPSN
022716	001414		BEQ	.+32	:CONTENTS ZERO ?
022720	104456		TRAP	C\$ERHRD	
022722	000025		.WORD	21	
022724	006004		.WORD	EM6	
022726	012726		.WORD	ERR4	
022730	012746	003471	MOV	#FRMT14,-(SP)	
022734	012746	000001	MOV	#1,-(SP)	
022740	010600		MOV	SP,R0	
022742	104414		TRAP	C\$PNTB	
022744	062706	000004	ADD	#4,SP	
022750	013737	002436	MOV	RPEC1,BADADR	:ADDRESS OF RPEC1 FOR TYPEOUT
022756	012637	002332	MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPEC1
022762	001414		BEQ	.+32	:CONTENTS ZERO ?
022764	104456		TRAP	C\$ERHRD	
022766	000025		.WORD	21	
022770	006004		.WORD	EM6	
022772	012726		.WORD	ERR4	
022774	012746	003471	MOV	#FRMT14,-(SP)	
023000	012746	000001	MOV	#1,-(SP)	
023004	010600		MOV	SP,R0	
023006	104414		TRAP	C\$PNTB	
023010	062706	000004	ADD	#4,SP	
023014	013737	002440	MOV	RPEC2,BADADR	:ADDRESS OF RPEC2 FOR TYPEOUT
023022	012637	002332	MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPEC2
023026	001414		BEQ	.+32	:CONTENTS ZERO ?
023030	104456		TRAP	C\$ERHRD	
023032	000025		.WORD	21	
023034	006004		.WORD	EM6	
023036	012726		.WORD	ERR4	
023040	012746	003471	MOV	#FRMT14,-(SP)	
023044	012746	000001	MOV	#1,-(SP)	
023050	010600		MOV	SP,R0	
023052	104414		TRAP	C\$PNTB	
023054	062706	000004	ADD	#4,SP	
023060	000410		BR	6\$:EXIT NOW
023062					
023062	012746	003471	MOV	#FRMT14,-(SP)	
023066	012746	000001	MOV	#1,-(SP)	
023072	010600		MOV	SP,R0	
023074	104414		TRAP	C\$PNTB	
023076	062706	000004	ADD	#4,SP	
203 023102					
023102	104401		L10040:	TRAP	C\$ETST

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.SBTTL TEST 3 SEIZE/TIMEOUT TEST

```

: *VERIFY THAT THE DRIVE CAN BE SEIZED BY WRITING A REMOTE REGISTER AND THAT
: *IT CAN BE RELEASED BY THE ONE SECOND TIMER.
: *
: * A. WRITE 0'S INTO RPDA THROUGH PORT 'B'; VERIFY THAT THE DRIVE
: * HAS BEEN SEIZED.
: *
: * B. READ EACH DRIVE REGISTER, EXCEPT RPCS1, THROUGH PORT 'A';
: * VERIFY THAT 0'S ARE READ FROM EACH REGISTER.
: *
: * C. WAIT FOR THE PORT TIMEOUT TO RELEASE THE DRIVE.
: * MEASURE THE DURATION OF THE TIMEOUT ONE SHOT AND SAVE THE
: * VALUE FOR LATER USE. VERIFY THAT TIMEOUT RETURNED THE DRIVE TO
: * NEUTRAL. ALSO VERIFY THAT THE DURATION OF THE ONE SHOT IS >500 MS.
: *
    
```

18 023104
 22 023104 005737 002340
 023110 001402
 023112 104432
 023114 001714
 023116
 023116 012700 000240
 023122 104441

 023124 005037 002304
 023130 012737 002342 002306

 023136 113777 002250 157236
 023144 013737 002250 002270
 023152 005077 157222

 023156 113777 002246 157216
 023164 013737 002246 002266
 023172 013737 002246 002272
 023200 017737 157200 002332
 023206 013737 002404 002334
 023214 005037 002336
 023220 023737 002336 002332
 023226 001406
 023230 104456
 023232 000001
 023234 005705
 023236 012576
 023240 000137 025010
 023244
 023244 113777 002250 157130
 023252 013737 002250 002266
 023260 017737 157120 002332
 023266 042737 020005 002332
 023274 012737 011700 002336

```

T3::
TST      DRVBAD      ;SYSTEM OK?
BEQ      64$         ;TAKE BRANCH IF SO...
TRAP     C$EXIT
.WORD    L10041-.

64$:
MOV      #PRI05,R0   ;SET PRIORITY TO 5
TRAP     C$SPRI

;START THE TIMER

CLR      TIME        ;CLEAR THE ELAPSED TIME COUNTER
MOV      #1250.,WATCH ;SET WATCH TO 1250. MS
:*****

;SEIZE THE DRIVE THROUGH PORT B

MOVB     PORTB,@RPCS2 ;SELECT PORT B
MOV      PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR      @RPDA        ;WRITE RPDA

MOVB     PORTA,@RPCS2 ;SELECT PORT A
MOV      PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
MOV      PORTA,OPPRT  ;'OPPOSITE' PORT ADDRESS
MOV      @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT B
MOV      RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
CLR      EXPTED       ;REGISTER SHOULD BE ZERO
CMP      EXPTED,BADDAT ;IS THE REGISTER ZERO
BEQ      65$         ;BR IF IT IS
TRAP     C$ERHRD
.WORD    1
.WORD    EM4
.WORD    ERR2
JMP      5$         ;BYPASS REST OF THE SUBTEST

65$:
MOVB     PORTB,@RPCS2 ;SELECT PORT B
MOV      PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
MOV      @RPDS,BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
BIC      #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
MOV      #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
    
```



```

023302 013737 002336 002344      MOV      EXPTED,TMP1  ;USE GOOD DATA AS A MASK
023310 005137 002344              COM      TMP1        ;COMPLEMENT THE EXPECTED STATUS
023314 013737 002332 002342      MOV      BADDAT,TMPO ;SAVE THE ACTUAL STATUS
023322 043737 002344 002342      BIC      TMP1,TMPO   ;CLEAR UNWANTED BITS
023330 023737 002336 002342      CMP      EXPTED,TMPO ;ARE THE EXPECTED STATUS BITS SET ?
023336 001404              BEQ      66$         ;BR IF THEY ARE
023340 104456              TRAP     C$ERHRD
023342 000002              .WORD   2
023344 005736              .WORD   EM5
023346 012654              .WORD   ERR3
023350
    
```

```

66$:
:*****
:READ THE DRIVE REGISTERS THROUGH PORT A AND STORE THEM ON THE STACK
    
```

```

023350 113777 002246 157024      MOV      PORTA,@RPCS2 ;SELECT PORT A
023356 013737 002246 002266      MOV      PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
023364 017746 157050              MOV      @RPEC2,-(SP) ;STORE REGISTER RPEC2, PORT A, FOR CHECK
023370 017746 157042              MOV      @RPEC1,-(SP) ;STORE REGISTER RPEC1, PORT A, FOR CHECK
023374 017746 157022              MOV      @RPSN,-(SP)  ;STORE REGISTER RPSN, PORT A, FOR CHECK
023400 017746 157022              MOV      @RPDC,-(SP)  ;STORE REGISTER RPDC, PORT A, FOR CHECK
023404 017746 157014              MOV      @RPOF,-(SP)  ;STORE REGISTER RPOF, PORT A, FOR CHECK
023410 017746 157020              MOV      @RPER3,-(SP) ;STORE REGISTER RPER3, PORT A, FOR CHECK
023414 017746 156772              MOV      @RPLA,-(SP)  ;STORE REGISTER RPLA, PORT A, FOR CHECK
023420 017746 156754              MOV      @RPDA,-(SP)  ;STORE REGISTER RPDA, PORT A, FOR CHECK
023424 017746 156766              MOV      @RPMR1,-(SP) ;STORE REGISTER RPMR1, PORT A, FOR CHECK
023430 017746 156752              MOV      @RPER1,-(SP) ;STORE REGISTER RPER1, PORT A, FOR CHECK
    
```

```

:*****
:WAIT FOR PORT B TO TIMEOUT
    
```

```

023434 005777 156744      1$:      TST      @RPDS        ;WAIT FOR THE DRIVE TO TIMEOUT
023440 001021              BNE      2$          ;BR WHEN TIMEOUT OCCURS
023442 005737 002306      TST      WATCH        ;CHECK WATCH
023446 001372              BNE      1$          ;BR IF NOT ZERO
023450 104456              TRAP     C$ERHRD
023452 000022              .WORD   18
023454 010177              .WORD   EM36
023456 013320              .WORD   ERR11
023460 012746 003522      MOV      #FRMT15,-(SP)
023464 012746 000001      MOV      #1,-(SP)
023470 010600              MOV      SP,R0
023472 104414              TRAP     C$PNTB
023474 062706 000004      ADD      #4,SP
023500 000137 024230      JMP      4$          ;BYPASS TIMEOUT TIME CHECK
023504              ;SET PRIORITY TO 7
023504 012700 000340      2$:      MOV      #PRI07,R0
023510 104441              TRAP     C$SPRI
    
```

```

:*****
:VERIFY THAT THE TIMEOUT ONE-SHOT IS AT LEAST 750 MS
    
```

```

023512 023727 002304 001356      CMP      TIME,#750.  ;WAS MEASURED TIME AT LEAST 750 MS?
023520 103014              BHS      3$          ;BR IF IT WAS
023522 104456              TRAP     C$ERHRD
023524 000023              .WORD   19
023526 011517              .WORD   EM55
023530 013640              .WORD   ERR17
    
```

```

023532 012746 003522      MOV      #FRMT15,-(SP)
023536 012746 000001      MOV      #1,-(SP)
023542 010600              MOV      SP,R0
023544 104414              TRAP     C$PNTB
023546 062706 000004      ADD      #4,SP

:*****
:VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AFTER PORT B TIMED OUT

023552 012700 000240      3$:      MOV      #PRI05,R0          ;SET PRIORITY TO 5
023552 012700 000240      TRAP     C$SPRI
023556 104441              ;VERIFY THAT THE DRIVE IS IN NEUTRAL

023560 005037 002302      CLR      RELERR           ;CLEAR THE 'RELEASE ERROR' INDICATOR
023564 013737 002404 002334      MOV      RPDS,BADADR      ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
023572 012737 011700 002336      MOV      #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
023600 113777 002246 156574      MOV      PORTA,@RPCS2     ;SELECT PORT A.
023606 017737 156572 002346      MOV      @RPDS,TMP2       ;GET THE DRIVE STATUS REGISTER FROM PORT A.
023614 042737 024005 002346      BIC      #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
023622 013737 002346 002342      MOV      TMP2,TMP0        ;COPY IT INTO 'TMP0'
023630 042737 100100 002342      BIC      #ATA!VV,TMP0     ;CLEAR PORT DEPENDENT BITS FROM THE COPY
023636 113777 002250 156536      MOV      PORTB,@RPCS2     ;SELECT PORT B.
023644 017737 156534 002350      MOV      @RPDS,TMP3       ;GET THE DRIVE STATUS REGISTER FROM PORT B.
023652 042737 024005 002350      BIC      #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
023660 013737 002350 002344      MOV      TMP3,TMP1        ;COPY IT INTO 'TMP1'
023666 042737 100100 002344      BIC      #ATA!VV,TMP1     ;CLEAR PORT DEPENDENT BITS FROM THE COPY
023674 023737 002342 002344      CMP      TMP0,TMP1        ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
023702 001021              BNE      67$             ;BR IF NOT
023704 005737 002342      TST      TMP0             ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
023710 001065              BNE      69$             ;BR IF NOT
023712 104456              TRAP     C$ERHRD
023714 000006              .WORD   6
023716 010751              .WORD   EM46
023720 013534              .WORD   ERR15
023722 012746 003716      MOV      #FRMT17,-(SP)
023726 012746 000001      MOV      #1,-(SP)
023732 010600              MOV      SP,R0
023734 104414              TRAP     C$PNTB
023736 062706 000004      ADD      #4,SP
023742 000137 024230      JMP      71$             ;BYPASS THE REST OF THE CHECKS
023746 013737 002346 002332 67$:      MOV      TMP2,BADDAT      ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
023754 013737 002250 002266      MOV      PORTB,PTNBR      ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
023762 113777 002250 156412      MOV      PORTB,@RPCS2     ;SELECT PORT B.
023770 005737 002342      TST      TMP0             ;SEE IF STATUS EQ 0 FROM PORT A.
023774 001414              BEQ      68$             ;BR IF ZERO
023776 013737 002246 002266      MOV      PORTA,PTNBR      ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
024004 013737 002350 002332      MOV      TMP3,BADDAT      ;'BAD DATA' FOR ERROR TYPE OUT
024012 113777 002246 156362      MOV      PORTA,@RPCS2     ;SELECT PORT A.
024020 005737 002344      TST      TMP1             ;SEE IF STATUS EQ ZERO FROM PORT B.
024024 001017              BNE      69$             ;BR IF NOT
024026 012737 177777 002302 68$:      MOV      #-1,RELERR       ;SET 'RELEASE ERROR' INDICATOR
024034 104456              TRAP     C$ERHRD
024036 000011              .WORD   9
024040 007313              .WORD   EM26
024042 013214              .WORD   ERR9
    
```



```

024044 012746 003716      MOV      #FRMT17,-(SP)
024050 012746 000001      MOV      #1,-(SP)
024054 010600      MOV      SP,R0
024056 104414      TRAP     C$PNTB
024060 062706 000004      ADD      #4,SP
024064 013737 002346 002332 69$:      MOV      TMP2,BADDAT      ;LOOK FOR BIT FAILURES WHEN RPDS READ
024072 013737 002246 002266      MOV      PORTA,PTNBR      ;CHANGE PORT NUMBER
024100 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
024106 023737 002336 002332      CMP      EXPTED,BADDAT    ;ALL BITS OK ?
024114 001414      BEQ      70$              ;BR IF OK FROM PORT A.
024116 104456      TRAP     C$SERHRD
024120 000013      .WORD   11
024122 006072      .WORD   EM7
024124 013000      .WORD   ERR5
024126 012746 003471      MOV      #FRMT14,-(SP)
024132 012746 000001      MOV      #1,-(SP)
024136 010600      MOV      SP,R0
024140 104414      TRAP     C$PNTB
024142 062706 000004      ADD      #4,SP
024146 013737 002350 002332 70$:      MOV      TMP3,BADDAT      ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
024154 013737 002250 002266      MOV      PORTB,PTNBR      ;CHANGE PORT NUMBER
024162 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
024170 023737 002336 002332      CMP      EXPTED,BADDAT    ;SEE IF READ OK FROM PORT B.
024176 001414      BEQ      71$              ;BR IF OK
024200 104456      TRAP     C$SERHRD
024202 000014      .WORD   12
024204 006072      .WORD   EM7
024206 013000      .WORD   ERR5
024210 012746 003522      MOV      #FRMT15,-(SP)
024214 012746 000001      MOV      #1,-(SP)
024220 010600      MOV      SP,R0
024222 104414      TRAP     C$PNTB
024224 062706 000004      ADD      #4,SP
024230
    
```

71\$:
 ;*****
 ;CHECK THE REGISTERS STORED THROUGH PORT A. ALL REGISTERS SHOULD BE ZERO.
 ;THE REGISTERS ARE STORED ON THE STACK.

```

024230 013737 002246 002266 4$:      MOV      PORTA,PTNBR      ;CHANGE 'PORT NUMBER' TO THE OPPOSITE PORT
024236 013737 002406 002334      MOV      RPER1,BADADR     ;ADDRESS OF RPER1 FOR TYPEOUT
024244 012637 002332      MOV      (SP)+,BADDAT     ;CHECK THE STORED CONTENTS OF RPER1
024250 001414      BEQ      .+32              ;CONTENTS ZERO ?
024252 104456      TRAP     C$SERHRD
024254 000024      .WORD   20
024256 006004      .WORD   EM6
024260 012726      .WORD   ERR4
024262 012746 003522      MOV      #FRMT15,-(SP)
024266 012746 000001      MOV      #1,-(SP)
024272 010600      MOV      SP,R0
024274 104414      TRAP     C$PNTB
024276 062706 000004      ADD      #4,SP
024302 013737 002416 002334      MOV      RPMR1,BADADR     ;ADDRESS OF RPMR1 FOR TYPEOUT
024310 012637 002332      MOV      (SP)+,BADDAT     ;CHECK THE STORED CONTENTS OF RPMR1
024314 001414      BEQ      .+32              ;CONTENTS ZERO ?
024316 104456      TRAP     C$SERHRD
024320 000024      .WORD   20
024322 006004      .WORD   EM6
    
```

024324	012726			.WORD	ERR4	
024326	012746	003522		MOV	#FRMT15,-(SP)	
024332	012746	000001		MOV	#1,-(SP)	
024336	010600			MOV	SP,R0	
024340	104414			TRAP	C\$PNTB	
024342	062706	000004		ADD	#4,SP	
024346	013737	002400	002334	MOV	RPDA,BADADR	:ADDRESS OF RPDA FOR TYPEOUT
024354	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPDA
024360	001414			BEQ	.+32	:CONTENTS ZERO ?
024362	104456			TRAP	C\$SERHRD	
024364	000024			.WORD	20	
024366	006004			.WORD	EM6	
024370	012726			.WORD	ERR4	
024372	012746	003522		MOV	#FRMT15,-(SP)	
024376	012746	000001		MOV	#1,-(SP)	
024402	010600			MOV	SP,R0	
024404	104414			TRAP	C\$PNTB	
024406	062706	000004		ADD	#4,SP	
024412	013737	002412	002334	MOV	RPLA,BADADR	:ADDRESS OF RPLA FOR TYPEOUT
024420	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPLA
024424	001414			BEQ	.+32	:CONTENTS ZERO ?
024426	104456			TRAP	C\$SERHRD	
024430	000024			.WORD	20	
024432	006004			.WORD	EM6	
024434	012726			.WORD	ERR4	
024436	012746	003522		MOV	#FRMT15,-(SP)	
024442	012746	000001		MOV	#1,-(SP)	
024446	010600			MOV	SP,R0	
024450	104414			TRAP	C\$PNTB	
024452	062706	000004		ADD	#4,SP	
024456	013737	002434	002334	MOV	RPER3,BADADR	:ADDRESS OF RPER3 FOR TYPEOUT
024464	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPER3
024470	001414			BEQ	.+32	:CONTENTS ZERO ?
024472	104456			TRAP	C\$SERHRD	
024474	000024			.WORD	20	
024476	006004			.WORD	EM6	
024500	012726			.WORD	ERR4	
024502	012746	003522		MOV	#FRMT15,-(SP)	
024506	012746	000001		MOV	#1,-(SP)	
024512	010600			MOV	SP,R0	
024514	104414			TRAP	C\$PNTB	
024516	062706	000004		ADD	#4,SP	
024522	013737	002424	002334	MOV	RPOF,BADADR	:ADDRESS OF RPOF FOR TYPEOUT
024530	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPOF
024534	001414			BEQ	.+32	:CONTENTS ZERO ?
024536	104456			TRAP	C\$SERHRD	
024540	000024			.WORD	20	
024542	006004			.WORD	EM6	
024544	012726			.WORD	ERR4	
024546	012746	003522		MOV	#FRMT15,-(SP)	
024552	012746	000001		MOV	#1,-(SP)	
024556	010600			MOV	SP,R0	
024560	104414			TRAP	C\$PNTB	
024562	062706	000004		ADD	#4,SP	
024566	013737	002426	002334	MOV	RPDC,BADADR	:ADDRESS OF RPDC FOR TYPEOUT
024574	012637	002332		MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPDC
024600	001414			BEQ	.+32	:CONTENTS ZERO ?

024602	104456		TRAP	C\$ERHRD	
024604	000025		.WORD	21	
024606	006004		.WORD	EM6	
024610	012726		.WORD	ERR4	
024612	012746	003522	MOV	#FRMT15,-(SP)	
024616	012746	000001	MOV	#1,-(SP)	
024622	010600		MOV	SP,R0	
024624	104414		TRAP	C\$PNTB	
024626	062706	000004	ADD	#4,SP	
024632	013737	002422	MOV	RPSN,BADADR	:ADDRESS OF RPSN FOR TYPEOUT
024640	012637	002332	MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPSN
024644	001414		BEQ	.+32	:CONTENTS ZERO ?
024646	104456		TRAP	C\$ERHRD	
024650	000025		.WORD	21	
024652	006004		.WORD	EM6	
024654	012726		.WORD	ERR4	
024656	012746	003522	MOV	#FRMT15,-(SP)	
024662	012746	000001	MOV	#1,-(SP)	
024666	010600		MOV	SP,R0	
024670	104414		TRAP	C\$PNTB	
024672	062706	000004	ADD	#4,SP	
024676	013737	002436	MOV	RPEC1,BADADR	:ADDRESS OF RPEC1 FOR TYPEOUT
024704	012637	002332	MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPEC1
024710	001414		BEQ	.+32	:CONTENTS ZERO ?
024712	104456		TRAP	C\$ERHRD	
024714	000025		.WORD	21	
024716	006004		.WORD	EM6	
024720	012726		.WORD	ERR4	
024722	012746	003522	MOV	#FRMT15,-(SP)	
024726	012746	000001	MOV	#1,-(SP)	
024732	010600		MOV	SP,R0	
024734	104414		TRAP	C\$PNTB	
024736	062706	000004	ADD	#4,SP	
024742	013737	002440	MOV	RPEC2,BADADR	:ADDRESS OF RPEC2 FOR TYPEOUT
024750	012637	002332	MOV	(SP)+,BADDAT	:CHECK THE STORED CONTENTS OF RPEC2
024754	001414		BEQ	.+32	:CONTENTS ZERO ?
024756	104456		TRAP	C\$ERHRD	
024760	000025		.WORD	21	
024762	006004		.WORD	EM6	
024764	012726		.WORD	ERR4	
024766	012746	003522	MOV	#FRMT15,-(SP)	
024772	012746	000001	MOV	#1,-(SP)	
024776	010600		MOV	SP,R0	
025000	104414		TRAP	C\$PNTB	
025002	062706	000004	ADD	#4,SP	
025006	000410		BR	6\$:EXIT NOW
025010			5\$:		
025010	012746	003522	MOV	#FRMT15,-(SP)	
025014	012746	000001	MOV	#1,-(SP)	
025020	010600		MOV	SP,R0	
025022	104414		TRAP	C\$PNTB	
025024	062706	000004	ADD	#4,SP	
025030			6\$:		
26 025030			L10041:		
025030	104401		TRAP	C\$ETST	

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.SBTTL TEST 4 SEIZE/RELEASE TEST

;*TEST THE OPERATION OF THE RELEASE COMMAND, DRIVE SEIZED

;* A. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.

;* B. CHECK VOLUME VALID AND CLEAR ANY ERROR

;* C. ISSUE A RELEASE COMMAND THROUGH PORT 'A'. VERIFY THAT THE DRIVE
 RETURNED TO NEUTRAL, AND THAT NO ERRORS ARE INDICATED BY THE
 DRIVE.

112 025032
 116 025032 005737 002340
 025036 001402
 025040 104432
 025042 001314
 025044

T4::
 TST DRVBAD ;SYSTEM OK?
 BEQ 64\$;TAKE BRANCH IF SO
 TRAP C\$EXIT
 .WORD L10042-

64\$:
 ;START THE TIMER

025044 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
 025050 012737 002342 002306 MOV #1250.,WATCH ;SET WATCH TO 1250. MS

 ;SEIZE THE DRIVE AND CHECK VOLUME VALID

;SEIZE THE DRIVE THROUGH PORT A

025056 113777 002246 155316 MOVB PORTA,@RPCS2 ;SELECT PORT A
 025064 013737 002246 002270 MOV PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
 025072 005077 155306 CLR @RPDS ;WRITE RPDS

025076 013737 002250 002272 MOV PORTB,OPPRT ;'OPPOSITE' PORT ADDRESS
 025104 005037 002276 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
 025110 017737 155270 002332 MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
 025116 013737 002404 002334 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
 025124 012737 000100 002336 MOV #VV,EXPTED ;:WHAT REGISTER SHOULD BE
 025132 013737 002332 002342 MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
 025140 042737 177677 002342 BIC #^CVV,TMPO ;SAVE SPECIFIED BITS
 025146 023737 002336 002342 CMP EXPTED,TMPO ;COMPARE THE BITS
 025154 001427 BEQ 67\$;BR IF OK
 025156 013737 002332 002352 MOV BADDAT,TMP4 ;COPY 'BAD DATA'
 025164 042737 000100 002352 BIC #VV,TMP4 ;CLEAR THE MASKED BITS
 025172 053737 002352 002336 BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT

025200 104456 TRAP C\$ERHRD
 025202 000003 .WORD 3
 025204 006342 .WORD EM13
 025206 012726 .WORD ERR4
 025210 012746 003716 MOV #FRMT17,-(SP)
 025214 012746 000001 MOV #1,-(SP)
 025220 010600 MOV SP,R0
 025222 104414 TRAP C\$PNTB
 025224 062706 000004 ADD #4,SP
 025230 005137 002276 COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR

025234
 025234 012777 000040 155140 67\$: MOV #CLR,@RPCS2 ;CLEAR DRIVE

```

;RELEASE THE DRIVE FROM PORT A

025242 113777 002246 155132      MOV  PORTA,@RPCS2      ;SELECT PORT A
025250 013737 002246 002266      MOV  PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
025256 012777 000013 155106      MOV  #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

;START THE TIMER

025264 005037 002304              CLR  TIME              ;CLEAR THE ELAPSED TIME COUNTER
025270 012737 000050 002306      MOV  #40.,WATCH      ;SET WATCH TO 40. MS
025276 005737 002306 69$:      TST  WATCH
025302 001375                      BNE  69$

;VERIFY THAT THE DRIVE IS IN NEUTRAL

025304 005037 002302              CLR  RELERR           ;CLEAR THE 'RELEASE ERROR ' INDICATOR
025310 013737 002404 002334      MOV  RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
025316 012737 011700 002336      MOV  #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
025324 113777 002246 155050      MOV  PORTA,@RPCS2   ;SELECT PORT A.
025332 017737 155046 002346      MOV  @RPDS,TMP2     ;GET THE DRIVE STATUS REGISTER FROM PORT A.
025340 042737 024005 002346      BIC  #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
025346 013737 002346 002342      MOV  TMP2,TMP0      ;COPY IT INTO 'TMP0'
025354 042737 100100 002342      BIC  #ATA!VV,TMP0   ;CLEAR PORT DEPENDENT BITS FROM THE COPY
025362 113777 002250 155012      MOV  PORTB,@RPCS2   ;SELECT PORT B.
025370 017737 155010 002350      MOV  @RPDS,TMP3     ;GET THE DRIVE STATUS REGISTER FROM PORT B.
025376 042737 024005 002350      BIC  #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
025404 013737 002350 002344      MOV  TMP3,TMP1     ;COPY IT INTO 'TMP1'
025412 042737 100100 002344      BIC  #ATA!VV,TMP1   ;CLEAR PORT DEPENDENT BITS FROM THE COPY
025420 023737 002342 002344      CMP  TMP0,TMP1     ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
025426 001021                      BNE  70$            ;BR IF NOT
025430 005737 002342              TST  TMP0            ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
025434 001065                      BNE  72$            ;BR IF NOT
025436 104456                      TRAP C$ERHRD
025440 000006                      .WORD 6
025442 010751                      .WORD EM46
025444 013534                      .WORD ERR15
025446 012746 003716              MOV  #FRMT17,-(SP)
025452 012746 000001              MOV  #1,-(SP)
025456 010600                      MOV  SP,R0
025460 104414                      TRAP C$PNTB
025462 062706 000004              ADD  #4,SP
025466 000137 025754              JMP  74$
025472 013737 002346 002332 70$:  MOV  TMP2,BADDAT    ;BYPASS THE REST OF THE CHECKS
025500 013737 002250 002266      MOV  PORTB,PTNBR    ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
025506 113777 002250 154666      MOV  PORTB,@RPCS2   ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
025514 005737 002342              MOV  PORTB,@RPCS2   ;SELECT PORT B.
025520 001414                      TST  TMP0           ;SEE IF STATUS EQ 0 FROM PORT A.
025522 013737 002246 002266      BEQ  71$            ;BR IF ZERO
025530 013737 002350 002332      MOV  PORTA,PTNBR    ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
025536 113777 002246 154636      MOV  TMP3,BADDAT    ;'BAD DATA' FOR ERROR TYPE OUT
025544 005737 002344              MOV  PORTA,@RPCS2   ;SELECT PORT A.
025550 001017                      TST  TMP1           ;SEE IF STATUS EQ ZERO FROM PORT B.
025552 012737 177777 002302 71$:  BNE  72$            ;BR IF NOT
                                          MOV  #-1,RELERR     ;SET 'RELEASE ERROR' INDICATOR
    
```

025560	104456			TRAP	C\$ERHRD		
025562	000011			.WORD	9		
025564	007313			.WORD	EM26		
025566	013214			.WORD	ERR9		
025570	012746	003716		MOV	#FRMT17,-(SP)		
025574	012746	000001		MOV	#1,-(SP)		
025600	010600			MOV	SP,R0		
025602	104414			TRAP	C\$PNTB		
025604	062706	000004		ADD	#4,SP		
025610	013737	002346	002332	72\$:	MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
025616	013737	002246	002266		MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
025624	042737	100000	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
025632	023737	002336	002332		CMP	EXPTED,BADDAT	:ALL BITS OK ?
025640	001414			BEQ	73\$:BR IF OK FROM PORT A.
025642	104456			TRAP	C\$ERHRD		
025644	000013			.WORD	11		
025646	006072			.WORD	EM7		
025650	013000			.WORD	ERR5		
025652	012746	003471		MOV	#FRMT14,-(SP)		
025656	012746	000001		MOV	#1,-(SP)		
025662	010600			MOV	SP,R0		
025664	104414			TRAP	C\$PNTB		
025666	062706	000004		ADD	#4,SP		
025672	013737	002350	002332	73\$:	MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
025700	013737	002250	002266		MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
025706	042737	100000	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
025714	023737	002336	002332		CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
025722	001414			BEQ	74\$:BR IF OK
025724	104456			TRAP	C\$ERHRD		
025726	000014			.WORD	12		
025730	006072			.WORD	EM7		
025732	013000			.WORD	ERR5		
025734	012746	003522		MOV	#FRMT15,-(SP)		
025740	012746	000001		MOV	#1,-(SP)		
025744	010600			MOV	SP,R0		
025746	104414			TRAP	C\$PNTB		
025750	062706	000004		ADD	#4,SP		
025754				74\$:			
025754	005737	002302		TST	RELERR		:DID DRIVE RETURN TO NEUTRAL ?
025760	001402			BEQ	+6		:BR IF IN NEUTRAL
025762	000137	026276		JMP	1\$:GO WAIT FOR DRIVE TO TIMEOUT
025766	113777	002246	154406	MOV	PORTA,@RPCS2		:SELECT PORT A
025774	013737	002246	002266	MOV	PORTA,PTNBR		:MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
026002	005037	002276		CLR	CKERR		:CLEAR THE 'CHECK ERROR' INDICATOR
026006	017737	154372	002332	MOV	@RPDS,BADDAT		:GET CONTENTS OF RPDS
026014	013737	002404	002334	MOV	RPDS,BADADR		:FORM REGISTER ADDRESS OF ERROR MESSAGE
026022	005037	002336		CLR	EXPTED		:WHAT REGISTER SHOULD BE
026026	013737	002332	002342	MOV	BADDAT,TMPO		:MOVE REGISTER CONTENTS TO 'TMPO'
026034	042737	077777	002342	BIC	#*CATA,TMPO		:SAVE SPECIFIED BITS
026042	023737	002336	002342	CMP	EXPTED,TMPO		:COMPARE THE BITS
026050	001427			BEQ	75\$:BR IF OK
026052	013737	002332	002352	MOV	BADDAT,TMP4		:COPY 'BAD DATA'
026060	042737	100000	002352	BIC	#ATA,TMP4		:CLEAR THE MASKED BITS
026066	053737	002352	002336	BIS	TMP4,EXPTED		: 'OR' WITH GOOD DATA FOR TYPEOUT
026074	104456			TRAP	C\$ERHRD		
026076	000003			.WORD	3		
026100	006624			.WORD	EM17		


```

026102 013000          .WORD  ERR5
026104 012746 003716  MOV    #FRMT17,-(SP)
026110 012746 000001  MOV    #1,-(SP)
026114 010600          MOV    SP,RO
026116 104414          TRAP   C$PNTB
026120 062706 000004  ADD    #4,SP
026124 005137 002276  COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
026130
75$:
026130 113777 002250 154244  MOVB   PORTB,@RPCS2      ;SELECT PORT B
026136 013737 002250 002266  MOV    PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
026144 005037 002276          CLR    CKERR            ;CLEAR THE 'CHECK ERROR' INDICATOR
026150 017737 154230 002332  MOV    @RPDS,BADDAT     ;GET CONTENTS OF RPDS
026156 013737 002404 002334  MOV    RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
026164 005037 002336          CLR    EXPTED           ;WHAT REGISTER SHOULD BE
026170 013737 002332 002342  MOV    BADDAT,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
026176 042737 077777 002342  BIC    #^CATA,TMPO      ;SAVE SPECIFIED BITS
026204 023737 002336 002342  CMP    EXPTED,TMPO      ;COMPARE THE BITS
026212 001427          BEQ    77$              ;BR IF OK
026214 013737 002332 002352  MOV    BADDAT,TMP4      ;COPY 'BAD DATA'
026222 042737 100000 002352  BIC    #ATA,TMP4        ;CLEAR THE MASKED BITS
026230 053737 002352 002336  BIS    TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
026236 104456          TRAP   C$SERHRD
026240 000003          .WORD  3
026242 006624          .WORD  EM17
026244 013000          .WORD  ERR5
026246 012746 003716  MOV    #FRMT17,-(SP)
026252 012746 000001  MOV    #1,-(SP)
026256 010600          MOV    SP,RO
026260 104414          TRAP   C$PNTB
026262 062706 000004  ADD    #4,SP
026266 005137 002276  COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
026272
77$:
026272 000137 026356  JMP    2$              ;GO CHECK FOR LOOP ON ERROR
    
```

 ;IF RELEASE COMMAND DIDN'T RELEASE THE DRIVE, WAIT FOR THE PORT TIMEOUT
 ;TO RELEASE THE DRIVE

```

026276
120 026276 113777 002250 154076 1$:
026304 013737 002250 002266  MOVB   PORTB,@RPCS2      ;SELECT PORT B
026312 005777 154066          MOV    PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
026316 001017          TST    @RPDS            ;WAIT FOR TIMEOUT TO RELEASE DRIVE
026320 005737 002306          BNE    2$                ;BR WHEN DRIVE RELEASED
026324 001364          TST    WATCH            ;CHECK THE WATCH
026326 104456          BNE    1$                ;BR IF NOT ZERO
026330 000026          TRAP   C$SERHRD
026332 010177          .WORD  22
026334 013320          .WORD  EM36
026336 012746 003471  MOV    #FRMT14,-(SP)
026342 012746 000001  MOV    #1,-(SP)
026346 010600          MOV    SP,RO
026350 104414          TRAP   C$PNTB
026352 062706 000004  ADD    #4,SP
026356
2$:
L10042:
026356 104401          TRAP   C$ETST
    
```

1
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18

```
.SBTTL TEST 5 PORT 'B' SEIZE/RELEASE TEST
:*TEST THE OPERATION OF THE RELEASE COMMAND, DRIVE SEIZED
:*
:* A. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
:*
:* B. SET VOLUME VALID AND CLEAR ANY ERROR
:*
:* C. ISSUE A RELEASE COMMAND THROUGH PORT 'B'. VERIFY THAT THE DRIVE
:* RETURNED TO NEUTRAL, AND THAT NO ERRORS ARE INDICATED BY THE
:* DRIVE.
:*
```

```
026360
026360 005737 002340
026364 001402
026366 104432
026370 001314
026372
```

```
T5::
TST DRVBAD ;SYSTEM OK?
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10043-
```

64\$:

;START THE TIMER

```
026372 005037 002304
026376 012737 002342 002306
```

```
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #1250.,WATCH ;SET WATCH TO 1250. MS
```

```
::*****
;SEIZE THE DRIVE AND CHECK VOLUME VALID
```

;SEIZE THE DRIVE THROUGH PORT B

```
026404 113777 002250 153770
026412 013737 002250 002270
026420 005077 153760
```

```
MOVB PORTB,@RPCS2 ;SELECT PORT B
MOV PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR @RPDS ;WRITE RPDS
```

```
026424 013737 002246 002272
026432 005037 002276
026436 017737 153742 002332
026444 013737 002404 002334
026452 012737 000100 002336
026460 013737 002332 002342
026466 042737 177677 002342
026474 023737 002336 002342
026502 001427
026504 013737 002332 002352
026512 042737 000100 002352
026520 053737 002352 002336
```

```
MOV PORTA,OPPRT ;'OPPOSITE' PORT ADDRESS
CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
MOV @RPDS,BADADR ;GET CONTENTS OF RPDS
MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
MOV #VV,EXPTED ;:WHAT REGISTER SHOULD BE
MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
BIC #^CVV,TMPO ;SAVE SPECIFIED BITS
CMP EXPTED,TMPO ;COMPARE THE BITS
BEQ 67$ ;BR IF OK
MOV BADDAT,TMP4 ;COPY 'BAD DATA'
BIC #VV,TMP4 ;CLEAR THE MASKED BITS
BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
TRAP C$ERHRD
```

```
026526 104456
026530 000003
026532 006342
026534 012726
026536 012746 003716
026542 012746 000001
026546 010600
026550 104414
026552 062706 000004
026556 005137 002276
```

```
.WORD 3
.WORD EM13
.WORD ERR4
MOV #FRMT17,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C$PNTB
ADD #4,SP
COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
```

67\$:

```
026562
026562 012777 000040 153612
```

```
MOV #CLR,@RPCS2 ;CLEAR DRIVE
```

;RELEASE THE DRIVE FROM PORT B

026570	113777	002250	153604	MOV	PORTB,@RPCS2	;SELECT PORT B
026576	013737	002250	002266	MOV	PORTB,PTNBR	;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
026604	012777	000013	153560	MOV	#13,@RPCS1	;ISSUE RELEASE THROUGH PORT B

;START THE TIMER

026612	005037	002304		CLR	TIME	;CLEAR THE ELAPSED TIME COUNTER
026616	012737	000050	002306	MOV	#40.,WATCH	;SET WATCH TO 40. MS
026624	005737	002306		TST	WATCH	
026630	001375			BNE	69\$	

;VERIFY THAT THE DRIVE IS IN NEUTRAL

026632	005037	002302		CLR	RELERR	;CLEAR THE 'RELEASE ERROR ' INDICATOR
026636	013737	002404	002334	MOV	RPDS,BADADR	;FORM THE ADDRESS OF RPDS FOR TYPEOUT
026644	012737	011700	002336	MOV	#MOL!PGM!DPR!DRY!VV,EXPTD	;COMPARISON CONSTANT
026652	113777	002246	153522	MOV	PORTA,@RPCS2	;SELECT PORT A.
026660	017737	153520	002346	MOV	@RPDS,TMP2	;GET THE DRIVE STATUS REGISTER FROM PORT A.
026666	042737	024005	002346	BIC	#PIP!WRL!OM!ILV,TMP2	;CLEAR DONT CARES
026674	013737	002346	002342	MOV	TMP2,TMP0	;COPY IT INTO 'TMP0'
026702	042737	100100	002342	BIC	#ATA!VV,TMP0	;CLEAR PORT DEPENDENT BITS FROM THE COPY
026710	113777	002250	153464	MOV	PORTB,@RPCS2	;SELECT PORT B.
026716	017737	153462	002350	MOV	@RPDS,TMP3	;GET THE DRIVE STATUS REGISTER FROM PORT B.
026724	042737	024005	002350	BIC	#PIP!WRL!OM!ILV,TMP3	;CLEAR DONT CARES
026732	013737	002350	002344	MOV	TMP3,TMP1	;COPY IT INTO 'TMP1'
026740	042737	100100	002344	BIC	#ATA!VV,TMP1	;CLEAR PORT DEPENDENT BITS FROM THE COPY
026746	023737	002342	002344	CM	TMP0,TMP1	;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
026754	001021			BNE	70\$;BR IF NOT
026756	005737	002342		TST	TMP0	;REGISTERS ARE THE SAME: ARE THEY ZERO ?
026762	001065			BNE	72\$;BR IF NOT
026764	104456			TRAP	C\$ERHRD	
026766	000006			.WORD	6	
026770	010751			.WORD	EM46	
026772	013534			.WORD	ERR15	
026774	012746	003716		MOV	#FRMT17,-(SP)	
027000	012746	000001		MOV	#1,-(SP)	
027004	010600			MOV	SP,R0	
027006	104414			TRAP	C\$PNTB	
027010	062706	000004		ADD	#4,SP	
027014	000137	027302		JMP	74\$;BYPASS THE REST OF THE CHECKS
027020	013737	002346	002332	MOV	TMP2,BADDAT	;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
027026	013737	002250	002266	MOV	PORTB,PTNBR	;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
027034	113777	002250	153340	MOV	PORTB,@RPCS2	;SELECT PORT B.
027042	005737	002342		TST	TMP0	;SEE IF STATUS EQ 0 FROM PORT A.
027046	001414			BEQ	71\$;BR IF ZERO
027050	013737	002246	002266	MOV	PORTA,PTNBR	;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
027056	013737	002350	002332	MOV	TMP3,BADDAT	; 'BAD DATA' FOR ERROR TYPE OUT
027064	113777	002246	153310	MOV	PORTA,@RPCS2	;SELECT PORT A.
027072	005737	002344		TST	TMP1	;SEE IF STATUS EQ ZERO FROM PORT B.
027076	001017			BNE	72\$;BR IF NOT
027100	012737	177777	002302	MOV	#-1,RELERR	;SET 'RELEASE ERROR' INDICATOR

027106	104456			TRAP	C\$ERHRD	
027110	000011			.WORD	9	
027112	007313			.WORD	EM26	
027114	013214			.WORD	ERR9	
027116	012746	003716		MOV	#FRMT17,-(SP)	
027122	012746	000001		MOV	#1,-(SP)	
027126	010600			MOV	SP,RO	
027130	104414			TRAP	C\$PNTB	
027132	062706	000004		ADD	#4,SP	
027136	013737	002346	002332	MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
027144	013737	002246	002266	MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
027152	042737	100000	002332	BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
027160	023737	002336	002332	CMP	EXPTED,BADDAT	:ALL BITS OK ?
027166	001414			BEQ	73\$:BR IF OK FROM PORT A.
027170	104456			TRAP	C\$ERHRD	
027172	000013			.WORD	11	
027174	006072			.WORD	EM7	
027176	013000			.WORD	ERR5	
027200	012746	003471		MOV	#FRMT14,-(SP)	
027204	012746	000001		MOV	#1,-(SP)	
027210	010600			MOV	SP,RO	
027212	104414			TRAP	C\$PNTB	
027214	062706	000004		ADD	#4,SP	
027220	013737	002350	002332	MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
027226	013737	002250	002266	MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
027234	042737	100000	002332	BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
027242	023737	002336	002332	CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
027250	001414			BEQ	74\$:BR IF OK
027252	104456			TRAP	C\$ERHRD	
027254	000014			.WORD	12	
027256	006072			.WORD	EM7	
027260	013000			.WORD	ERR5	
027262	012746	003522		MOV	#FRMT15,-(SP)	
027266	012746	000001		MOV	#1,-(SP)	
027272	010600			MOV	SP,RO	
027274	104414			TRAP	C\$PNTB	
027276	062706	000004		ADD	#4,SP	
027302						74\$:
027302	005737	002302		TST	RELERR	:DID DRIVE RETURN TO NEUTRAL ?
027306	001402			BEQ	+6	:BR IF IN NEUTRAL
027310	000137	027624		JMP	1\$:GO WAIT FOR DRIVE TO TIMEOUT
027314	113777	002250	153060	MOVB	PORTB,@RPCS2	:SELECT PORT B
027322	013737	002250	002266	MOV	PORTB,PTNBR	:MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
027330	005037	002276		CLR	CKERR	:CLEAR THE 'CHECK ERROR' INDICATOR
027334	017737	153044	002332	MOV	@RPDS,BADDAT	:GET CONTENTS OF RPDS
027342	013737	002404	002334	MOV	RPDS,BADADR	:FORM REGISTER ADDRESS OF ERROR MESSAGE
027350	005037	002336		CLR	EXPTED	:WHAT REGISTER SHOULD BE
027354	013737	002332	002342	MOV	BADDAT,TMPO	:MOVE REGISTER CONTENTS TO 'TMPO'
027362	042737	077777	002342	BIC	#^CATA,TMPO	:SAVE SPECIFIED BITS
027370	023737	002336	002342	CMP	EXPTED,TMPO	:COMPARE THE BITS
027376	001427			BEQ	75\$:BR IF OK
027400	013737	002332	002352	MOV	BADDAT,TMP4	:COPY 'BAD DATA'
027406	042737	100000	002352	BIC	#ATA,TMP4	:CLEAR THE MASKED BITS
027414	053737	002352	002336	BIS	TMP4,EXPTED	: 'OR' WITH GOOD DATA FOR TYPEOUT
027422	104456			TRAP	C\$ERHRD	
027424	000003			.WORD	3	
027426	006624			.WORD	EM17	


```

027430 013000          .WORD  ERR5
027432 012746 003716  MOV    #FRMT17,-(SP)
027436 012746 000001  MOV    #1,-(SP)
027442 010600          MOV    SP,R0
027444 104414          TRAP   C$PNTB
027446 062706 000004  ADD    #4,SP
027452 005137 002276  COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
027456          75$:
027456 113777 002246 152716  MOVB   PORTA,@RPCS2    ;SELECT PORT A
027464 013737 002246 002266  MOV    PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
027472 005037 002276          CLR    CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
027476 017737 152702 002332  MOV    @RPDS,BADDAT   ;GET CONTENTS OF RPDS
027504 013737 002404 002334  MOV    RPDS,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
027512 005037 002336          CLR    EXPTED         ;WHAT REGISTER SHOULD BE
027516 013737 002332 002342  MOV    BADDAT,TMPO    ;MOVE REGISTER CONTENTS TO 'TMPO'
027524 042737 077777 002342  BIC    #^CATA,TMPO    ;SAVE SPECIFIED BITS
027532 023737 002336 002342  CMP    EXPTED,TMPO    ;COMPARE THE BITS
027540 001427          BEQ    77$           ;BR IF OK
027542 013737 002332 002352  MOV    BADDAT,TMP4    ;COPY 'BAD DATA'
027550 042737 100000 002352  BIC    #ATA,TMP4     ;CLEAR THE MASKED BITS
027556 053737 002352 002336  BIS    TMP4,EXPTED    ;'OR' WITH GOOD DATA FOR TYPEOUT
027564 104456          TRAP   C$ERHRD
027566 000003          .WORD  3
027570 006624          .WORD  EM17
027572 013000          .WORD  ERR5
027574 012746 003716  MOV    #FRMT17,-(SP)
027600 012746 000001  MOV    #1,-(SP)
027604 010600          MOV    SP,R0
027606 104414          TRAP   C$PNTB
027610 062706 000004  ADD    #4,SP
027614 005137 002276  COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
027620          77$:
027620 000137 027704  JMP    2$           ;GO CHECK FOR LOOP ON ERROR
    
```

 ;IF RELEASE COMMAND DIDN'T RELEASE THE DRIVE, WAIT FOR THE PORT TIMEOUT
 ;TO RELEASE THE DRIVE

```

027624          1$:
027624 113777 002246 152550  MOVB   PORTA,@RPCS2    ;SELECT PORT A
027632 013737 002246 002266  MOV    PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
027640 005777 152540          TST    @RPDS          ;WAIT FOR TIMEOUT TO RELEASE DRIVE
027644 001017          BNE    2$           ;BR WHEN DRIVE RELEASED
027646 005737 002306  TST    WATCH          ;CHECK THE WATCH
027652 001364          BNE    1$           ;BR IF NOT ZERO
027654 104456          TRAP   C$ERHRD
027656 000026          .WORD  22
027660 010177          .WORD  EM36
027662 013320          .WORD  ERR11
027664 012746 003522  MOV    #FRMT15,-(SP)
027670 012746 000001  MOV    #1,-(SP)
027674 010600          MOV    SP,R0
027676 104414          TRAP   C$PNTB
027700 062706 000004  ADD    #4,SP
22 027704          2$:
027704 104401  L10043: TRAP   C$SETST
    
```

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.SBTTL TEST 6 PORT 'A' SEIZE THROUGH ALL MECHANISMS TEST

:*TEST OPERATION OF SEIZE OPERATION, DRIVE IN NEUTRAL

:*
:* A. VERIFY THAT SEIZE OPERATION DID OCCUR.
:*

T6::
TST DRVBAD ;SYSTEM OK??
BEQ 64\$;TAKE BRANCH IF SO
TRAP C\$EXIT
.WORD L10044-

64\$:

;SEIZE THE DRIVE THROUGH PORT A

027720	113777	002246	152454	MOV	PORTA,@RPCS2	;SELECT PORT A
027726	013737	002246	002270	MOV	PORTA,SEIZPT	;STORE SEIZING PORT'S ADDRESS
027734	005777	152432		TST	@RPCS1	;READ THE CONTROL REGISTER
027740	113777	002250	152434	MOV	PORTB,@RPCS2	;SELECT PORT B
027746	013737	002250	002266	MOV	PORTB,PTNBR	;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
027754	013737	002250	002272	MOV	PORTB,OPPR	; 'OPPOSITE' PORT ADDRESS
027762	017737	152416	002332	MOV	@RPDS,BADDAT	;SEE IF DRIVE SEIZED BY PORT A
027770	013737	002404	002334	MOV	RPDS,BADADR	;GENERATE BAD REGISTER ADDRESS
027776	005037	002336		CLR	EXPTED	;REGISTER SHOULD BE ZERO
030002	023737	002336	002332	CMP	EXPTED,BADDAT	;IS THE REGISTER ZERO
030010	001406			BEQ	65\$;BR IF IT IS
030012	104456			TRAP	C\$ERHRD	
030014	000001			.WORD	1	
030016	005705			.WORD	EM4	
030020	012576			.WORD	ERR2	
030022	000137	030730		JMP	1\$;BYPASS REST OF THE SUBTEST

65\$:

030026	113777	002246	152346	MOV	PORTA,@RPCS2	;SELECT PORT A
030034	013737	002246	002266	MOV	PORTA,PTNBR	;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030042	017737	152336	002332	MOV	@RPDS,BADDAT	;SEE IF SEIZING PORT SEES CORRECT STATUS
030050	042737	020005	002332	BIC	#OM!PIP!ILV,BADDAT	;CLEAR DONT CARE BITS
030056	012737	011700	002336	MOV	#MOL!PGM!DPR!DRY!VV,EXPTED	;EXPECTED STATUS
030064	013737	002336	002344	MOV	EXPTED,TMP1	;USE GOOD DATA AS A MASK
030072	005137	002344		COM	TMP1	;COMPLEMENT THE EXPECTED STATUS
030076	013737	002332	002342	MOV	BADDAT,TMPO	;SAVE THE ACTUAL STATUS
030104	043737	002344	002342	BIC	TMP1,TMPO	;CLEAR UNWANTED BITS
030112	023737	002336	002342	CMP	EXPTED,TMPO	;ARE THE EXPECTED STATUS BITS SET ?
030120	001404			BEQ	66\$;BR IF THEY ARE
030122	104456			TRAP	C\$ERHRD	
030124	000002			.WORD	2	
030126	005736			.WORD	EM5	
030130	012654			.WORD	ERR3	

66\$:

030132	113777	002246	152242	MOV	PORTA,@RPCS2	;SELECT PORT A
030140	013737	002246	002266	MOV	PORTA,PTNBR	;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030146	012777	000013	152216	MOV	#13,@RPCS1	;ISSUE RELEASE THROUGH PORT ADDRESS

;START THE TIMER

030154	005037	002304		CLR	TIME	;CLEAR THE ELAPSED TIME COUNTER
030160	012737	000050	002306	MOV	#40.,WATCH	;SET WATCH TO 40. MS


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030166 005737 002306          67$:  TST      WATCH
030172 001375                                     BNE      67$

                                ;SEIZE THE DRIVE THROUGH PORT A

030174 113777 002246 152200  MOVB    PORTA,@RPCS2 ;SELECT PORT A
030202 013737 002246 002270  MOV     PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
030210 013777 002262 152172  MOV     ASRA,@RPAS   ;WRITE THE DRIVE'S ATTENTION BIT
030216 113777 002250 152156  MOVB    PORTB,@RPCS2 ;SELECT PORT B
030224 013737 002250 002266  MOV     PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030232 013737 002250 002272  MOV     PORTB,OPPR1 ;'OPPOSITE' PORT ADDRESS
030240 017737 152140 002332  MOV     @RPDS,BADADR ;SEE IF DRIVE SEIZED BY PORT A
030246 013737 002404 002334  MOV     RPDS,BADADR ;GENERATE BAD REGISTER ADDRESS
030254 005037 002336          CLR     EXPTED      ;REGISTER SHOULD BE ZERO
030260 023737 002336 002332  CMP     EXPTED,BADADR ;IS THE REGISTER ZERO
030266 001406          BEQ     68$         ;BR IF IT IS
030270 104456          TRAP    C$ERHRD
030272 000001          .WORD  1
030274 005705          .WORD  EM4
030276 012576          .WORD  ERR2
030300 000137 030730          JMP     1$         ;BYPASS REST OF THE SUBTEST
030304          68$:
030304 113777 002246 152070  MOVB    PORTA,@RPCS2 ;SELECT PORT A
030312 013737 002246 002266  MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030320 017737 152060 002332  MOV     @RPDS,BADADR ;SEE IF SEIZING PORT SEES CORRECT STATUS
030326 042737 020005 002332  BIC     #OM!PIP!ILV,BADADR ;CLEAR DONT CARE BITS
030334 012737 011700 002336  MOV     #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
030342 013737 002336 002344  MOV     EXPTED,TMP1 ;USE GOOD DATA AS A MASK
030350 005137 002344          COM     TMP1       ;COMPLEMENT THE EXPECTED STATUS
030354 013737 002332 002342  MOV     BADADR,TMPO ;SAVE THE ACTUAL STATUS
030362 043737 002344 002342  BIC     TMP1,TMPO   ;CLEAR UNWANTED BITS
030370 023737 002336 002342  CMP     EXPTED,TMPO ;ARE THE EXPECTED STATUS BITS SET ?
030376 001404          BEQ     69$         ;BR IF THEY ARE
030400 104456          TRAP    C$ERHRD
030402 000002          .WORD  2
030404 005736          .WORD  EM5
030406 012654          .WORD  ERR3
030410          69$:
030410 113777 002246 151764  MOVB    PORTA,@RPCS2 ;SELECT PORT A
030416 013737 002246 002266  MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030424 012777 000013 151740  MOV     #13,@RPCS1 ;ISSUE RELEASE THROUGH PORT ADDRESS

                                ;START THE TIMER

030432 005037 002304          CLR     TIME       ;CLEAR THE ELAPSED TIME COUNTER
030436 012737 000050 002306  MOV     #40.,WATCH ;SET WATCH TO 40. MS
030444 005737 002306          70$:  TST     WATCH
030450 001375                                     BNE     70$

                                ;SEIZE THE DRIVE THROUGH PORT A

030452 113777 002246 151722  MOVB    PORTA,@RPCS2 ;SELECT PORT A
030460 013737 002246 002270  MOV     PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
030466 012777 177777 151712  MOV     #177777,@RPER1 ;WRITE 177777 INTO RPER1
030474 113777 002250 151700  MOVB    PORTB,@RPCS2 ;SELECT PORT B
    
```

```

030502 013737 002250 002266      MOV     PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030510 013737 002250 002272      MOV     PORTB,OPPRT ;'OPPOSITE' PORT ADDRESS
030516 017737 151662 002332      MOV     @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT A
030524 013737 002404 002334      MOV     RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
030532 005037 002336      CLR     EXPTED      ;REGISTER SHOULD BE ZERO
030536 023737 002336 002332      CMP     EXPTED,BADDAT ;IS THE REGISTER ZERO
030544 001406      BEQ     71$        ;BR IF IT IS
030546 104456      TRAP   C$ERHRD
030550 000001      .WORD  1
030552 005705      .WORD  EM4
030554 012576      .WORD  ERR2
030556 000137 030730      JMP     1$          ;BYPASS REST OF THE SUBTEST
030562      71$:
030562 113777 002246 151612      MOV     PORTA,@RPCS2 ;SELECT PORT A
030570 013737 002246 002266      MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030576 017737 151602 002332      MOV     @RPDS,BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
030604 042737 020005 002332      BIC     #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
030612 012737 011700 002336      MOV     #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
030620 013737 002336 002344      MOV     EXPTED,TMP1 ;USE GOOD DATA AS A MASK
030626 005137 002344      COM     TMP1        ;COMPLEMENT THE EXPECTED STATUS
030632 013737 002332 002342      MOV     BADDAT,TMPO ;SAVE THE ACTUAL STATUS
030640 043737 002344 002342      BIC     TMP1,TMPO   ;CLEAR UNWANTED BITS
030646 023737 002336 002342      CMP     EXPTED,TMPO ;ARE THE EXPECTED STATUS BITS SET ?
030654 001404      BEQ     72$        ;BR IF THEY ARE
030656 104456      TRAP   C$ERHRD
030660 000002      .WORD  2
030662 005736      .WORD  EM5
030664 012654      .WORD  ERR3
030666      72$:
030666 113777 002246 151506      MOV     PORTA,@RPCS2 ;SELECT PORT A
030674 013737 002246 002266      MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
030702 012777 000013 151462      MOV     #13,@RPCS1  ;ISSUE RELEASE THROUGH PORT ADDRESS

;START THE TIMER

030710 005037 002304      CLR     TIME        ;CLEAR THE ELAPSED TIME COUNTER
030714 012737 000050 002306      MOV     #40.,WATCH ;SET WATCH TO 40. MS
030722 005737 002306      TST    WATCH
030726 001375      BNE    73$

030730      73$:
51 030730      1$:
030730      L10044:
030730 104401      TRAP   C$SETST
    
```


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.SBTTL TEST 7 PORT 'B' SEIZE THROUGH ALL MECHANISMS TEST

;*TEST OPERATION OF SEIZE OPERATION, DRIVE IN NEUTRAL

;* A. VERIFY THAT SEIZE OPERATION DID OCCUR.

12 030732 005737 002340
 030732 001402
 030736 001402
 030740 104432
 030742 001012
 030744

T7::
 TST DRVBAD ;SYSTEM OK??
 BEQ 64\$;TAKE BRANCH IF SO
 TRAP C\$EXIT
 .WORD L10045-.

64\$:

;SEIZE THE DRIVE THROUGH PORT B

030744 113777 002250 151430
 030752 013737 002250 002270
 030760 005777 151406
 030764 113777 002246 151410
 030772 013737 002246 002266
 031000 013737 002246 002272
 031006 017737 151372 002332
 031014 013737 002404 002334
 031022 005037 002336
 031026 023737 002336 002332
 031034 001406
 031036 104456
 031040 000001
 031042 005705
 031044 012576
 031046 000137 031754

MOV B PORTB, @RPCS2 ;SELECT PORT B
 MOV PORTB, SEIZPT ;STORE SEIZING PORT'S ADDRESS
 TST @RPCS1 ;READ THE CONTROL REGISTER
 MOV B PORTA, @RPCS2 ;SELECT PORT A
 MOV PORTA, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 MOV PORTA, OPPRT ;'OPPOSITE' PORT ADDRESS
 MOV @RPDS, BADDAT ;SEE IF DRIVE SEIZED BY PORT B
 MOV RPDS, @ADR ;GENERATE BAD REGISTER ADDRESS
 CLR EXPTED ;REGISTER SHOULD BE ZERO
 CMP EXPTED, BADDAT ;IS THE REGISTER ZERO
 BEQ 65\$;BR IF IT IS
 TRAP C\$ERHRD
 .WORD 1
 .WORD EM4
 .WORD ERR2
 JMP 1\$;BYPASS REST OF THE SUBTES:

65\$:

031052
 031052 113777 002250 151322
 031060 013737 002250 002266
 031066 017737 151312 002332
 031074 042737 020005 002332
 031102 012737 011700 002336
 031110 013737 002336 002344
 031116 005137 002344
 031122 013737 002332 002342
 031130 043737 002344 002342
 031136 023737 002336 002342
 031144 001404
 031146 104456
 031150 000002
 031152 005736
 031154 012654
 031156

MOV B PORTB, @RPCS2 ;SELECT PORT B
 MOV PORTB, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 MOV @RPDS, BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
 BIC #OM!PIP!ILV, BADDAT ;CLEAR DONT CARE BITS
 MOV #MOL!PGM!DPR!DRY!VV, EXPTED ;EXPECTED STATUS
 MOV EXPTED, TMP1 ;USE GOOD DATA AS A MASK
 COM TMP1 ;COMPLEMENT THE EXPECTED STATUS
 MOV BADDAT, TMPO ;SAVE THE ACTUAL STATUS
 BIC TMP1, TMPO ;CLEAR UNWANTED BITS
 CMP EXPTED, TMPO ;ARE THE EXPECTED STATUS BITS SET ?
 BEQ 66\$;BR IF THEY ARE
 TRAP C\$ERHRD
 .WORD 2
 .WORD EM5
 .WORD ERR3

66\$:

031156 113777 002250 151216
 031164 013737 002250 002266
 031172 012777 000013 151172

MOV B PORTB, @RPCS2 ;SELECT PORT B
 MOV PORTB, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 MOV #13, @RPCS1 ;ISSUE RELEASE THROUGH PORT ADDRESS

;START THE TIMER

031200 005037 002304
 031204 012737 000050 002306

CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
 MOV #40., WATCH ;SET WATCH TO 40. MS

031212 005737 002306
 031216 001375

67\$: TST WATCH
 BNE 67\$

;SEIZE THE DRIVE THROUGH PORT B

031220 113777 002250 151154
 031226 013737 002250 002270
 031234 013777 002264 151146
 031242 113777 002246 151132
 031250 013737 002246 002266
 031256 013737 002246 002272
 031264 017737 151114 002332
 031272 013737 002404 002334
 031300 005037 002336
 031304 023737 002336 002332
 031312 001406
 031314 104456
 031316 000001
 031320 005705
 031322 012576
 031324 000137 031754

MOV B PORTB, @RPCS2 ;SELECT PORT B
 MOV PORTB, SEIZPT ;STORE SEIZING PORT'S ADDRESS
 MOV ASRB, @RPAS ;WRITE THE DRIVE'S ATTENTION BIT
 MOV B PORTA, @RPCS2 ;SELECT PORT A
 MOV PORTA, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 MOV PORTA, OPPRT ;'OPPOSITE' PORT ADDRESS
 MOV @RPDS, BADDAT ;SEE IF DRIVE SEIZED BY PORT B
 MOV RPDS, BADADR ;GENERATE BAD REGISTER ADDRESS
 CLR EXPTED ;REGISTER SHOULD BE ZERO
 CMP EXPTED, BADDAT ;IS THE REGISTER ZERO
 BEQ 68\$;BR IF IT IS
 TRAP C\$ERHRD
 .WORD 1
 .WORD EM4
 .WORD ERR2
 JMP 1\$;BYPASS REST OF THE SUBTEST

68\$:

031330
 031330 113777 002250 151044
 031336 013737 002250 002266
 031344 017737 151034 002332
 031352 042737 020005 002332
 031360 012737 011700 002336
 031366 013737 002336 002344
 031374 005137 002344
 031400 013737 002332 002342
 031406 043737 002344 002342
 031414 023737 002336 002342
 031422 001404
 031424 104456
 031426 000002
 031430 005736
 031432 012654

MOV B PORTB, @RPCS2 ;SELECT PORT B
 MOV PORTB, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 MOV @RPDS, BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
 BIC #OM!PIP!ILV, BADDAT ;CLEAR DONT CARE BITS
 MOV #MOL!PGM!DPR!DRY!VV, EXPTED ;EXPECTED STATUS
 MOV EXPTED, TMP1 ;USE GOOD DATA AS A MASK
 COM TMP1 ;COMPLEMENT THE EXPECTED STATUS
 MOV BADDAT, TMPO ;SAVE THE ACTUAL STATUS
 BIC TMP1, TMPO ;CLEAR UNWANTED BITS
 CMP EXPTED, TMPO ;ARE THE EXPECTED STATUS BITS SET ?
 BEQ 69\$;BR IF THEY ARE
 TRAP C\$ERHRD
 .WORD 2
 .WORD EM5
 .WORD ERR3

69\$:

031434 113777 002250 150740
 031442 013737 002250 002266
 031450 012777 000013 150714

MOV B PORTB, @RPCS2 ;SELECT PORT B
 MOV PORTB, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 MOV #13, @RPCS1 ;ISSUE RELEASE THROUGH PORT ADDRESS

;START THE TIMER

031456 005037 002304
 031462 012737 000050 002306
 031470 005737 002306
 031474 001375

70\$:

CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
 MOV #40, WATCH ;SET WATCH TO 40. MS
 TST WATCH
 BNE 70\$

;SEIZE THE DRIVE THROUGH PORT B

031476 113777 002250 150676
 031504 013737 002250 002270
 031512 012777 177777 150666
 031520 113777 002246 150654

MOV B PORTB, @RPCS2 ;SELECT PORT B
 MOV PORTB, SEIZPT ;STORE SEIZING PORT'S ADDRESS
 MOV #177777, @RPER1 ;WRITE 177777 INTO RPER1
 MOV B PORTA, @RPCS2 ;SELECT PORT A


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031526 013737 002246 002266      MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031534 013737 002246 002272      MOV     PORTA,OPPRT ;'OPPOSITE' PORT ADDRESS
031542 017737 150636 002332      MOV     @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT B
031550 013737 002404 002334      MOV     RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
031556 005037 002336          CLR     EXPTED      ;REGISTER SHOULD BE ZERO
031562 023737 002336 002332      CMP     EXPTED,BADDAT ;IS THE REGISTER ZERO
031570 001406          BEQ     71$        ;BR IF IT IS
031572 104456          TRAP   C$ERHRD
031574 000001          .WORD 1
031576 005705          .WORD EM4
031600 012576          .WORD ERR2
031602 000137 031754          JMP     1$         ;BYPASS REST OF THE SUBTEST
031606          71$:
031606 113777 002250 150566      MOV     PORTB,@RPCS2 ;SELECT PORT B
031614 013737 002250 002266      MOV     PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031622 017737 150556 002332      MOV     @RPDS,BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
031630 042737 020005 002332      BIC     #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
031636 012737 011700 002336      MOV     #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
031644 013737 002336 002344      MOV     EXPTED,TMP1 ;USE GOOD DATA AS A MASK
031652 005137 002344          COM     TMP1      ;COMPLEMENT THE EXPECTED STATUS
031656 013737 002332 002342      MOV     BADDAT,TMPO ;SAVE THE ACTUAL STATUS
031664 043737 002344 002342      BIC     TMP1,TMPO  ;CLEAR UNWANTED BITS
031672 023737 002336 002342      CMP     EXPTED,TMPO ;ARE THE EXPECTED STATUS BITS SET ?
031700 001404          BEQ     72$        ;BR IF THEY ARE
031702 104456          TRAP   C$ERHRD
031704 000002          .WORD 2
031706 005736          .WORD EM5
031710 012654          .WORD ERR3
031712          72$:
031712 113777 002250 150462      MOV     PORTB,@RPCS2 ;SELECT PORT B
031720 013737 002250 002266      MOV     PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
031726 012777 000013 150436      MOV     #13,@RPCS1 ;ISSUE RELEASE THROUGH PORT ADDRESS

                                ;START THE TIMER
031734 005037 002304          CLR     TIME      ;CLEAR THE ELAPSED TIME COUNTER
031740 012737 000050 002306      MOV     #40.,WATCH ;SET WATCH TO 40. MS
031746 005737 002306          TST     WATCH
031752 001375          BNE     73$
                                73$:
031754          1$:
16 031754          L10045:
031754 104401          TRAP   C$ETST
    
```

```

1      .SBTTL TEST 8 PORT 'A' RELEASE/INTERFERENCE TEST
2
3      ;*VERIFY THAT A COMMAND ISSUED BY ONE PORT IS NOT RECOGNIZED IF THE DRIVE
4      ;* IS SEIZED BY THE OTHER PORT.
5
6      ;* A. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
7
8      ;* B. ISSUE A RELEASE COMMAND THROUGH PORT 'A'.
9
10     ;* C. VERIFY THAT THE DRIVE IS STILL SEIZED BY PORT 'B'.
11
12     ;* D. RELEASE THE DRIVE THROUGH PORT 'B'. VERIFY THAT THE DRIVE SWITCHED
13     ;* TO PORT 'A'.
14
15     ;* E. RELEASE THE DRIVE THROUGH PORT 'A'. VERIFY THAT THE DRIVE RETURNED
16     ;* TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
17     ;*
18
82     031756
86     031756 005737 002340
      031762 001402
      031764 104432
      031766 001542
      031770

T8::   TST      DRVBAD      ;SYSTEM OK?
      BEQ      64$        ;TAKE BRANCH IF SO
      TRAP    C$EXIT
      .WORD   L10046-.

64$:

      ;CLEAR ATTENTION BITS FOR BOTH PORTS

031770 113777 002246 150404  MOVB  PORTA,@RPCS2  ;SELECT PORT #A
031776 005077 150402          CLR   @RPDS        ;SEIZE THE DRIVE
032002 012777 000011 150362  MOV   #11,@RPCS1   ;ISSUE DRIVE CLEAR
032010 012777 000013 150354  MOV   #13,@RPCS1   ;RELEASE THE DRIVE

      ;START THE TIMER

032016 005037 002304          CLR   TIME         ;CLEAR THE ELAPSED TIME COUNTER
032022 012737 000050 002306  MOV   #40.,WATCH  ;SET WATCH TO 40. MS
032030 005737 002306          TST   WATCH
032034 001375          BNE   65$
032036 113777 002250 150336  MOVB  PORTB,@RPCS2  ;SELECT PORT #B
032044 005077 150334          CLR   @RPDS        ;SEIZE THE DRIVE THROUGH PORT 'B'
032050 012777 000011 150314  MOV   #11,@RPCS1   ;ISSUE DRIVE CLEAR
032056 012777 000013 150306  MOV   #13,@RPCS1   ;RELEASE THE DRIVE

      ;START THE TIMER

032064 005037 002304          CLR   TIME         ;CLEAR THE ELAPSED TIME COUNTER
032070 012737 000050 002306  MOV   #40.,WATCH  ;SET WATCH TO 40. MS
032076 005737 002306          TST   WATCH
032102 001375          BNE   66$

65$:
66$:

;*****

      ;SEIZE THE DRIVE THROUGH PORT B

032104 113777 002250 150270  MOVB  PORTB,@RPCS2  ;SELECT PORT B
032112 013737 002250 002270  MOV   PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
032120 005077 150260          CLR   @RPDS        ;WRITE RPDS
    
```



```

032124 113777 002246 150250      MOVB   PORTA,@RPCS2      ;SELECT PORT A
032132 013737 002246 002266      MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032140 013737 002246 002272      MOV    PORTA,OPPRT      ;'OPPOSITE' PORT ADDRESS
032146 017737 150232 002332      MOV    @RPDS,BADDAT     ;SEE IF DRIVE SEIZED BY PORT B
032154 013737 002404 002334      MOV    RPDS,BADADR      ;GENERATE BAD REGISTER ADDRESS
032162 005037 002336             CLR    EXPTED           ;REGISTER SHOULD BE ZERO
032166 023737 002336 002332      CMP    EXPTED,BADDAT    ;IS THE REGISTER ZERO
032174 001406             BEQ    67$              ;BR IF IT IS
032176 104456             TRAP   C$ERHRD
032200 000001             .WORD 1
032202 005705             .WORD EM4
032204 012576             .WORD ERR2
032206 000137 033530             JMP    1$                ;BYPASS REST OF THE SUBTEST
032212             67$:
032212 113777 002250 150162      MOVB   PORTB,@RPCS2      ;SELECT PORT B
032220 013737 002250 002266      MOV    PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032226 017737 150152 002332      MOV    @RPDS,BADDAT     ;SEE IF SEIZING PORT SEES CORRECT STATUS
032234 042737 020005 002332      BIC    #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
032242 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
032250 013737 002336 002344      MOV    EXPTED,TMP1      ;USE GOOD DATA AS A MASK
032256 005137 002344             COM    TMP1              ;COMPLEMENT THE EXPECTED STATUS
032262 013737 002332 002342      MOV    BADDAT,TMPO      ;SAVE THE ACTUAL STATUS
032270 043737 002344 002342      BIC    TMP1,TMPO        ;CLEAR UNWANTED BITS
032276 023737 002336 002342      CMP    EXPTED,TMPO      ;ARE THE EXPECTED STATUS BITS SET ?
032304 001404             BEQ    68$              ;BR IF THEY ARE
032306 104456             TRAP   C$ERHRD
032310 000002             .WORD 2
032312 005736             .WORD EM5
032314 012654             .WORD ERR3
032316
    
```

68\$:

 ;TRY TO EXECUTE A RELEASE COMMAND THROUGH PORT A

```

032316 113777 002246 150056      MOVB   PORTA,@RPCS2      ;SELECT PORT A
032324 013737 002246 002266      MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032332 012777 000013 150032      MOV    #13,@RPCS1      ;ISSUE A RELEASE COMMAND THROUGH PORT A
    
```

 ;VERIFY THAT THE DRIVE IS STILL SEIZED BY PORT B

```

032340 005037 002276             CLR    CKERR             ;CLEAR THE 'CHECK ERROR' INDICATOR
032344 017737 150034 002332      MOV    @RPDS,BADDAT     ;GET CONTENTS OF RPDS
032352 013737 002404 002334      MOV    RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
032360 005037 002336             CLR    EXPTED           ;WHAT REGISTER SHOULD BE
032364 023737 002336 002332      CMP    EXPTED,BADDAT    ;IS THE REGISTER OK ?
032372 001416             BEQ    69$              ;BR IF OK
032374 104456             TRAP   C$ERHRD
032376 000004             .WORD 4
032400 006146             .WORD EM10
032402 012654             .WORD ERR3
032404 012746 003716      MOV    #FRMT17,-(SP)
032410 012746 000001      MOV    #1,-(SP)
032414 010600             MOV    SP,R0
032416 104414             TRAP   C$PNTB
032420 062706 000004      ADD    #4,SP
032424 005137 002276             COM    CKERR             ;SET THE REGISTER COMPARE ERROR INDICATOR
032430 017737 147736 002332 69$:      MOV    @RPCS1,BADDAT    ;GET THE CONTENTS OF RHCS1
    
```

```

032436 013737 002372 002334      MOV    RPCS1,BADADR      ;FORM ADDRESS OF REGISTER
032444 032737 020000 002332      BIT    #MCPE,BADDAT    ;IS 'MCPE' SET ?
032452 001417                      BEQ    70$              ;BR IF NOT
032454 104456                      TRAP   C$ERHRD
032456 000005                      .WORD 5
032460 006171                      .WORD EM11
032462 013046                      .WORD ERR6
032464 012746 003716      MOV    #FRMT17,-(SP)
032470 012746 000001      MOV    #1,-(SP)
032474 010600      MOV    SP,R0
032476 104414      TRAP   C$PNTB
032500 062706 000004      ADD    #4,SP
032504 012777 040000 147660      MOV    #TRE,@RPCS1      ;CLEAR 'MCPE'
032512
032512 005737 002276      70$:  TST    CKERR          ;WAS RPDS NON ZERO ?
032516 001402                      BEQ    .+6              ;CONTENTS OF RPDS SEEN BY PORT A
032520 000137 033530      JMP    1$              ;DRIVE IN NEUTRAL, BYPASS REST OF TEST
    
```

::*****

;RELEASE THE DRIVE FROM PORT B

```

032524 113777 002250 147650      MOV    PORTB,@RPCS2      ;SELECT PORT B
032532 013737 002250 002266      MOV    PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032540 012777 000013 147624      MOV    #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B
    
```

;START THE TIMER

```

032546 005037 002304                      CLR    TIME              ;CLEAR THE ELAPSED TIME COUNTER
032552 012737 000050 002306      MOV    #40.,WATCH      ;SET WATCH TO 40. MS
032560 005737 002306      71$:  TST    WATCH
032564 001375      BNE    71$
    
```

;VERIFY THAT DRIVE IS SEIZED BY PORT A WHEN RELEASED BY PORT B

```

032566 005037 002302                      CLR    RELERR           ;CLEAR 'RELEASE ERROR' INDICATOR
032572 012737 111700 002336      MOV    #ATA!MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
032600 013737 002404 002334      MOV    RPDS,BADADR      ;REGISTER ADDRESS
032606 113777 002246 147566      MOV    PORTA,@RPCS2      ;SELECT PORT A
032614 013737 002246 002266      MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032622 017737 147556 002342      MOV    @RPDS,TMPO       ;READ STATUS REGISTER FROM PORT A
032630 042737 000004 002342      BIC    #ILV,TMPO        ;CLEAR DON'T CARE BIT
032636 113777 002250 147536      MOV    PORTB,@RPCS2      ;SELECT PORT B
032644 013737 002250 002266      MOV    PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
032652 017737 147526 002332      MOV    @RPDS,BADDAT     ;DRIVE STATUS FROM PORT B
032660 042737 000004 002332      BIC    #ILV,BACDAT      ;CLEAR DON'T CARE BIT
032666 001417                      BEQ    72$              ;BR IF STATUS FROM PORT B ZERO
032670 005737 002342      TST    TMPO             ;IS STATUS FROM PORT A ZERO ?
032674 001414                      BEQ    72$              ;BR IF ZERO
032676 104456                      TRAP   C$ERHRD
032700 000016                      .WORD 14
032702 007553                      .WORD EM31
032704 013362                      .WORD ERR12
032706 012746 003522      MOV    #FRMT15,-(SP)
032712 012746 000001      MOV    #1,-(SP)
032716 010600      MOV    SP,R0
    
```



```

032720 104414          TRAP  C$PNTB
032722 062706 000004   ADD   #4,SP
032726 013737 002342 002332 72$:  MOV  TMP0,BADAT      ;CHECK STATUS FROM PORT A
032734 013737 002246 002266      MOV  PORTA,PTNBR    ;CHANGE PORT ADDRESS FOR TYPEOUT
032742 023737 002336 002332      CMP   EXPTED,BADAT  ;COMPARE WITH CONSTANT
032750 001414          BEQ   73$           ;BR IF OK
032752 104456          TRAP  C$ERHRD
032754 000017          .WORD 15
032756 007400          .WORD EM27
032760 013000          .WORD ERR5
032762 012746 003522   MOV  #FRMT15,-(SP)
032766 012746 000001   MOV  #1,-(SP)
032772 010600          MOV  SP,R0
032774 104414          TRAP  C$PNTB
032776 062706 000004   ADD   #4,SP
033002          73$:

;RELEASE THE DRIVE FROM PORT A

033002 113777 002246 147372   MOVB  PORTA,@RPCS2   ;SELECT PORT A
033010 013737 002246 002266   MOV  PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
033016 012777 000013 147346   MOV  #13,@RPCS1     ;ISSUE RELEASE THROUGH PORT A

;START THE TIMER

033024 005037 002304          CLR  TIME           ;CLEAR THE ELAPSED TIME COUNTER
033030 012737 000050 002306 74$:  MOV  #40.,WATCH    ;SET WATCH TO 40. MS
033036 005737 002306          TST  WATCH
033042 001375          BNE  74$

;VERIFY THAT THE DRIVE IS IN NEUTRAL

033044 005037 002302          CLR  RELERR         ;CLEAR THE 'RELEASE ERROR ' INDICATOR
033050 013737 002404 002334   MOV  RPDS,BADADR    ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
033056 012737 011700 002336   MOV  #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
033064 113777 002246 147310   MOVB  PORTA,@RPCS2   ;SELECT PORT A.
033072 017737 147306 002346   MOV  @RPDS,TMP2     ;GET THE DRIVE STATUS REGISTER FROM PORT A.
033100 042737 024005 002346   BIC  #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
033106 013737 002346 002342   MOV  TMP2,TMP0      ;COPY IT INTO 'TMP0'
033114 042737 100100 002342   BIC  #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
033122 113777 002250 147252   MOVB  PORTB,@RPCS2   ;SELECT PORT B.
033130 017737 147250 002350   MOV  @RPDS,TMP3     ;GET THE DRIVE STATUS REGISTER FROM PORT B.
033136 042737 024005 002350   BIC  #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
033144 013737 002350 002344   MOV  TMP3,TMP1      ;COPY IT INTO 'TMP1'
033152 042737 100100 002344   BIC  #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
033160 023737 002342 002344   CMP  TMP0,TMP1      ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
033166 001021          BNE  75$           ;BR IF NOT
033170 005737 002342          TST  TMP0           ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
033174 001073          BNE  77$           ;BR IF NOT
033176 104456          TRAP  C$ERHRD
033200 000006          .WORD 6
033202 010751          .WORD EM46
033204 013534          .WORD ERR15
033206 012746 003716   MOV  #FRMT17,-(SP)
033212 012746 000001   MOV  #1,-(SP)
033216 010600          MOV  SP,R0
    
```

```

033220 104414          TRAP  C$PNTB
033222 062706 000004  ADD   #4,SP
033226 000137 033530  JMP   79$
033232 013737 002346 002332 75$:  MOV  TMP2,BADDAT ;BYPASS THE REST OF THE CHECKS
033240 013737 002250 002266  MOV  PORTB,PTNBR ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
033246 113777 002250 147126  MOVB PORTB,@RPCS2 ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
033254 005737 002342  TST  TMP0 ;SELECT PORT B.
033260 001414  BEQ  76$ ;SEE IF STATUS EQ 0 FROM PORT A.
033262 013737 002246 002266  MOV  PORTA,PTNBR ;BR IF ZERO
033270 013737 002350 002332  MOV  TMP3,BADDAT ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
033276 113777 002246 147076  MOVB PORTA,@RPCS2 ;'BAD DATA' FOR ERROR TYPE OUT
033304 005737 002344  TST  TMP1 ;SELECT PORT A.
033310 001025  BNE  77$ ;SEE IF STATUS EQ ZERO FROM PORT B.
033312 012737 177777 002302 76$:  MOV  #-1,RELERR ;BR IF NOT
033320 012777 000011 147044  MOV  #11,@RPCS1 ;SET 'RELEASE ERROR' INDICATOR
033326 012777 000013 147036  MOV  #13,@RPCS1 ;CLEAR THE DRIVE
033334 104456  TRAP  C$ERHRD ;RELEASE THE DRIVE
033336 000011  .WORD 9
033340 007313  .WORD EM26
033342 013214  .WORD ERR9
033344 012746 003716  MOV  #FRMT17,-(SP)
033350 012746 000001  MOV  #1,-(SP)
033354 010600  MOV  SP,R0
033356 104414  TRAP  C$PNTB
033360 062706 000004  ADD   #4,SP
033364 013737 002346 002332 77$:  MOV  TMP2,BADDAT ;LOOK FOR BIT FAILURES WHEN RPDS READ
033372 013737 002246 002266  MOV  PORTA,PTNBR ;CHANGE PORT NUMBER
033400 042737 100000 002332  BIC  #ATA,BADDAT ;DON'T CHECK THE ATTN BIT
033406 023737 002336 002332  CMP  EXPTED,BADDAT ;ALL BITS OK ?
033414 001414  BEQ  78$ ;BR IF OK FROM PORT A.
033416 104456  TRAP  C$ERHRD
033420 000013  .WORD 11
033422 006072  .WORD EM7
033424 013000  .WORD ERR5
033426 012746 003471  MOV  #FRMT14,-(SP)
033432 012746 000001  MOV  #1,-(SP)
033436 010600  MOV  SP,R0
033440 104414  TRAP  C$PNTB
033442 062706 000004  ADD   #4,SP
033446 013737 002350 002332 78$:  MOV  TMP3,BADDAT ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
033454 013737 002250 002266  MOV  PORTB,PTNBR ;CHANGE PORT NUMBER
033462 042737 100000 002332  BIC  #ATA,BADDAT ;DON'T CHECK THE ATTN BIT
033470 023737 002336 002332  CMP  EXPTED,BADDAT ;SEE IF READ OK FROM PORT B.
033476 001414  BEQ  79$ ;BR IF OK
033500 104456  TRAP  C$ERHRD
033502 000014  .WORD 12
033504 006072  .WORD EM7
033506 013000  .WORD ERR5
033510 012746 003522  MOV  #FRMT15,-(SP)
033514 012746 000001  MOV  #1,-(SP)
033520 010600  MOV  SP,R0
033522 104414  TRAP  C$PNTB
033524 062706 000004  ADD   #4,SP
033530 79$:
033530 1$:
90 033530 L10046:
033530 104401  TRAP  C$ETST
    
```


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```
.SBTTL TEST 9 PORT 'B' RELEASE INTERFERENCE TEST
:*VERIFY THAT A COMMAND ISSUED BY ONE PORT IS NOT RECOGNIZED IF THE DRIVE
:* IS SEIZED BY THE OTHER PORT.
:*
:* A. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
:*
:* B. ISSUE A RELEASE COMMAND THROUGH PORT 'B'.
:*
:* C. VERIFY THAT THE DRIVE IS STILL SEIZED BY PORT 'A'.
:*
:* D. RELEASE THE DRIVE THROUGH PORT 'A'. VERIFY THAT THE DRIVE SWITCHED
:* TO PORT 'B'.
:*
:* E. RELEASE THE DRIVE THROUGH PORT 'B'. VERIFY THAT THE DRIVE RETURNED
:* TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
:*
```

19 033532
23 033532 005737 002340
033536 001402
033540 104432
033542 001542
033544

```
T9::
TST DRVBAD ;SYSTEM OK?
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10047-
```

;CLEAR ATTENTION BITS FOR BOTH PORTS

033544 113777 002246 146630
033552 005077 146626
033556 012777 000011 146606
033564 012777 000013 146600

```
MOVB PORTA,@RPCS2 ;SELECT PORT #A
CLR @RPDS ;SEIZE THE DRIVE
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

;START THE TIMER

033572 005037 002304
033576 012737 000050 002306
033604 005737 002306
033610 001375
033612 113777 002250 146562
033620 005077 146560
033624 012777 000011 146540
033632 012777 000013 146532

65\$:

```
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 65$
MOVB PORTB,@RPCS2 ;SELECT PORT #B
CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

;START THE TIMER

033640 005037 002304
033644 012737 000050 002306
033652 005737 002306
033656 001375

66\$:

```
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 66$
```

::*****

;SEIZE THE DRIVE THROUGH PORT A

033660 113777 002246 146514
033666 013737 002246 002270
033674 005077 146504

```
MOVB PORTA,@RPCS2 ;SELECT PORT A
MOV PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR @RPDS ;WRITE RPDS
```

```

033700 113777 002250 146474      MOVB   PORTB,@RPCS2      ;SELECT PORT B
033706 013737 002250 002266      MOV    PORTB,PTNBR     ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
033714 013737 002250 002272      MOV    PORTB,OPPR     ;'OPPOSITE' PORT ADDRESS
033722 017737 146456 002332      MOV    @RPDS,BADDAT   ;SEE IF DRIVE SEIZED BY PORT A
033730 013737 002404 002334      MOV    RPDS,BADADR    ;GENERATE BAD REGISTER ADDRESS
033736 005037 002336             CLR    EXPTED         ;REGISTER SHOULD BE ZERO
033742 023737 002336 002332      CMP    EXPTED,BADDAT  ;IS THE REGISTER ZERO
033750 001406             BEQ    67$           ;BR IF IT IS
033752 104456             TRAP   C$ERHRD
033754 000001             .WORD 1
033756 005705             .WORD EM4
033760 012576             .WORD ERR2
033762 000137 035304             JMP    1$           ;BYPASS REST OF THE SUBTEST
033766             67$:
033766 113777 002246 146406      MOVB   PORTA,@RPCS2   ;SELECT PORT A
033774 013737 002246 002266      MOV    PORTA,PTNBR   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034002 017737 146376 002332      MOV    @RPDS,BADDAT  ;SEE IF SEIZING PORT SEES CORRECT STATUS
034010 042737 020005 002332      BIC    #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
034016 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
034024 013737 002336 002344      MOV    EXPTED,TMP1   ;USE GOOD DATA AS A MASK
034032 005137 002344             COM    TMP1          ;COMPLEMENT THE EXPECTED STATUS
034036 013737 002332 002342      MOV    BADDAT,TMPO   ;SAVE THE ACTUAL STATUS
034044 043737 002344 002342      BIC    TMP1,TMPO     ;CLEAR UNWANTED BITS
034052 023737 002336 002342      CMP    EXPTED,TMPO   ;ARE THE EXPECTED STATUS BITS SET ?
034060 001404             BEQ    68$           ;BR IF THEY ARE
034062 104456             TRAP   C$ERHRD
034064 000002             .WORD 2
034066 005736             .WORD EM5
034070 012654             .WORD ERR3
034072             68$:
:*****
:TRY TO EXECUTE A RELEASE COMMAND THROUGH PORT B
034072 113777 002250 146302      MOVB   PORTB,@RPCS2   ;SELECT PORT B
034100 013737 002250 002266      MOV    PORTB,PTNBR   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034106 012777 000013 146256      MOV    #13,@RPCS1    ;ISSUE A RELEASE COMMAND THROUGH PORT B
:*****
:VERIFY THAT THE DRIVE IS STILL SEIZED BY PORT A
034114 005037 002276             CLR    CKERR         ;CLEAR THE 'CHECK ERROR' INDICATOR
034120 017737 146260 002332      MOV    @RPDS,BADDAT  ;GET CONTENTS OF RPDS
034126 013737 002404 002334      MOV    RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
034134 005037 002336             CLR    EXPTED        ;WHAT REGISTER SHOULD BE
034140 023737 002336 002332      CMP    EXPTED,BADDAT ;IS THE REGISTER OK ?
034146 001416             BEQ    69$           ;BR IF OK
034150 104456             TRAP   C$ERHRD
034152 000004             .WORD 4
034154 006146             .WORD EM10
034156 012654             .WORD ERR3
034160 012746 003716      MOV    #FRMT17,-(SP)
034164 012746 000001      MOV    #1,-(SP)
034170 010600             MOV    SP,R0
034172 104414             TRAP   C$PNTB
034174 062706 000004      ADD    #4,SP
034200 005137 002276             COM    CKERR         ;SET THE REGISTER COMPARE ERROR INDICATOR
034204 017737 146162 002332 69$:      MOV    @RPCS1,BADDAT ;GET THE CONTENTS OF RHCS1
    
```



```

034212 013737 002372 002334      MOV      RPCS1,BADADR      ;FORM ADDRESS OF REGISTER
034220 032737 020000 002332      BIT      #MCPE,BADDAT    ;IS 'MCPE' SET ?
034226 001417                      BEQ      70$              ;BR IF NOT
034230 104456                      TRAP    C$ERHRD
034232 000005                      .WORD   5
034234 006171                      .WORD   EM11
034236 013046                      .WORD   ERR6
034240 012746 003716      MOV      #FRMT17,-(SP)
034244 012746 000001      MOV      #1,-(SP)
034250 010600                      MOV      SP,R0
034252 104414                      TRAP    C$PNTB
034254 062706 000004      ADD      #4,SP
034260 012777 040000 146104      MOV      #TRE,@RPCS1      ;CLEAR 'MCPE'
034266                                70$:
034266 005737 002276      TST      CKERR            ;WAS RPDS NON ZERO ?
034272 001402                      BEQ      +6              ;CONTENTS OF RPDS SEEN BY PORT B
034274 000137 035304      JMP      IS$              ;DRIVE IN NEUTRAL, BYPASS REST OF TEST
    
```

;;*****

;RELEASE THE DRIVE FROM PORT A

```

034300 113777 002246 146074      MOV      PORTA,@RPCS2      ;SELECT PORT A
034306 013737 002246 002266      MOV      PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034314 012777 000013 146050      MOV      #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A
    
```

;START THE TIMER

```

034322 005037 002304          CLR      TIME              ;CLEAR THE ELAPSED TIME COUNTER
034326 012737 000050 002306      MOV      #40.,WATCH      ;SET WATCH TO 40. MS
034334 005737 002306          TST      WATCH
034340 001375                      BNE     71$
    
```

;VERIFY THAT DRIVE IS SEIZED BY PORT B WHEN RELEASED BY PORT A

```

034342 005037 002302          CLR      RELERR            ;CLEAR 'RELEASE ERROR' INDICATOR
034346 012737 111700 002336      MOV      #ATA!MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
034354 013737 002404 002334      MOV      RPDS,BADADR      ;REGISTER ADDRESS
034362 113777 002250 146012      MOV      PORTB,@RPCS2      ;SELECT PORT B
034370 013737 002250 002266      MOV      PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034376 017737 146002 002342      MOV      @RPDS,TMPO        ;READ STATUS REGISTER FROM PORT B
034404 042737 000004 002342      BIC      #ILV,TMPO         ;CLEAR DON'T CARE BIT
034412 113777 002246 145762      MOV      PORTA,@RPCS2      ;SELECT PORT A
034420 013737 002246 002266      MOV      PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034426 017737 145752 002332      MOV      @RPDS,BADDAT     ;DRIVE STATUS FROM PORT A
034434 042737 000004 002332      BIC      #ILV,BADDAT      ;CLEAR DON'T CARE BIT
034442 001417                      BEQ      72$              ;BR IF STATUS FROM PORT A ZERO
034444 005737 002342      TST      TMPO              ;IS STATUS FROM PORT B ZERO ?
034450 001414                      BEQ      72$              ;BR IF ZERO
034452 104456                      TRAP    C$ERHRD
034454 000016                      .WORD   14
034456 007553                      .WORD   EM31
034460 013362                      .WORD   ERR12
034462 012746 003522      MOV      #FRMT15,-(SP)
034466 012746 000001      MOV      #1,-(SP)
034472 010600                      MOV      SP,R0
    
```

```

034474 104414          TRAP  C$PNTB
034476 062706 000004   ADD   #4,SP
034502 013737 002342   MOV   TMPO,BADDAT      ;CHECK STATUS FROM PORT B
034510 013737 002250   MOV   PORTB,PTNBR     ;CHANGE PORT ADDRESS FOR TYPEOUT
034516 023737 002336   CMP   EXPTED,BADDAT   ;COMPARE WITH CONSTANT
034524 001414          BEQ   73$              ;BR IF OK
034526 104456          TRAP  C$ERHRD
034530 000017          .WORD 15
034532 007400          .WORD EM27
034534 013000          .WORD ERR5
034536 012746 003522   MOV   #FRMT15,-(SP)
034542 012746 000001   MOV   #1,-(SP)
034546 010600          MOV   SP,RO
034550 104414          TRAP  C$PNTB
034552 062706 000004   ADD   #4,SP
034556          73$:

;RELEASE THE DRIVE FROM PORT B

034556 113777 002250 145616   MOVB  PORTB,@RPCS2     ;SELECT PORT B
034564 013737 002250 002266   MOV   PORTB,PTNBR     ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
034572 012777 000013 145572   MOV   #13,@RPCS1     ;ISSUE RELEASE THROUGH PORT B

;START THE TIMER

034600 005037 002304          CLR   TIME              ;CLEAR THE ELAPSED TIME COUNTER
034604 012737 000050 002306   MOV   #40,WATCH        ;SET WATCH TO 40. MS
034612 005737 002306          TST   WATCH
034616 001375          BNE   74$

;VERIFY THAT THE DRIVE IS IN NEUTRAL

034620 005037 002302          CLR   RELERR            ;CLEAR THE 'RELEASE ERROR ' INDICATOR
034624 013737 002404 002334   MOV   RPDS,BADADR     ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
034632 012737 011700 002336   MOV   #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
034640 113777 002246 145534   MOVB  PORTA,@RPCS2     ;SELECT PORT A.
034646 017737 145532 002346   MOV   @RPDS,TMP2      ;GET THE DRIVE STATUS REGISTER FROM PORT A.
034654 042737 024005 002346   BIC   #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
034662 013737 002346 002342   MOV   TMP2,TMPO       ;COPY IT INTO 'TMPO'
034670 042737 100100 002342   BIC   #ATA!VV,TMPO    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
034676 113777 002250 145476   MOVB  PORTB,@RPCS2     ;SELECT PORT B.
034704 017737 145474 002350   MOV   @RPDS,TMP3      ;GET THE DRIVE STATUS REGISTER FROM PORT B.
034712 042737 024005 002350   BIC   #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
034720 013737 002350 002344   MOV   TMP3,TMP1       ;COPY IT INTO 'TMP1'
034726 042737 100100 002344   BIC   #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
034734 023737 002342 002344   CMP   TMPO,TMP1       ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
034742 001021          BNE   75$              ;BR IF NOT
034744 005737 002342          TST   TMPO             ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
034750 001073          BNE   77$              ;BR IF NOT
034752 104456          TRAP  C$ERHRD
034754 000006          .WORD 6
034756 010751          .WORD EM46
034760 013534          .WORD ERR15
034762 012746 003716   MOV   #FRMT17,-(SP)
034766 012746 000001   MOV   #1,-(SP)
034772 010600          MOV   SP,RO
    
```


034774	104414				TRAP	CSPNTB	
034776	062706	000004			ADD	#4,SP	
035002	000137	035304			JMP	79\$	
035006	013737	002346	002332	75\$:	MOV	TMP2,BADDAT	:BYPASS THE REST OF THE CHECKS
035014	013737	002250	002266		MOV	PORTB,PTNBR	:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
035022	113777	002250	145352		MOV	PORTB,@RPCS2	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
035030	005737	002342			MOVB	PORTB,@RPCS2	:SELECT PORT B.
035034	001414				TST	TMP0	:SEE IF STATUS EQ 0 FROM PORT A.
035036	013737	002246	002266		BEQ	76\$:BR IF ZERO
035044	013737	002350	002332		MOV	PORTA,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
035052	113777	002246	145322		MOV	TMP3,BADDAT	: 'BAD DATA' FOR ERROR TYPE OUT
035060	005737	002344			MOVB	PORTA,@RPCS2	:SELECT PORT A.
035064	001025				TST	TMP1	:SEE IF STATUS EQ ZERO FROM PORT B.
035066	012737	177777	002302	76\$:	BNE	77\$:BR IF NOT
035074	012777	000011	145270		MOV	#-1,RELERR	:SET 'RELEASE ERROR' INDICATOR
035102	012777	000013	145262		MOV	#11,@RPCS1	:CLEAR THE DRIVE
035110	104456				MOV	#13,@RPCS1	:RELEASE THE DRIVE
035112	000011				TRAP	C\$ERHRD	
035114	007313				.WORD	9	
035116	013214				.WORD	EM26	
035120	012746	003716			.WORD	ERR9	
035124	012746	000001			MOV	#FRMT17,-(SP)	
035130	010600				MOV	#1,-(SP)	
035132	104414				MOV	SP,R0	
035134	062706	000004			TRAP	CSPNTB	
035140	013737	002346	002332	77\$:	ADD	#4,SP	
035146	013737	002246	002266		MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
035154	042737	100000	002332		MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
035162	023737	002336	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
035170	001414				CMP	EXPTED,BADDAT	:ALL BITS OK ?
035172	104456				BEQ	78\$:BR IF OK FROM PORT A.
035174	000013				TRAP	C\$ERHRD	
035176	006072				.WORD	11	
035200	013000				.WORD	EM7	
035202	012746	003471			.WORD	ERR5	
035206	012746	000001			MOV	#FRMT14,-(SP)	
035212	010600				MOV	#1,-(SP)	
035214	104414				MOV	SP,R0	
035216	062706	000004			TRAP	CSPNTB	
035222	013737	002350	002332	78\$:	ADD	#4,SP	
035230	013737	002250	002266		MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
035236	042737	100000	002332		MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
035244	023737	002336	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
035252	001414				CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
035254	104456				BEQ	79\$:BR IF OK
035256	000014				TRAP	C\$ERHRD	
035260	006072				.WORD	12	
035262	013000				.WORD	EM7	
035264	012746	003522			.WORD	ERR5	
035270	012746	000001			MOV	#FRMT15,-(SP)	
035274	010600				MOV	#1,-(SP)	
035276	104414				MOV	SP,R0	
035300	062706	000004			TRAP	CSPNTB	
035304				79\$:	ADD	#4,SP	
035304				1\$:			
27 035304				L10047:			
035304	104401				TRAP	C\$ETST	

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```
.SBTTL TEST 10 PORT 'A' RELEASE WITH ERRORS TEST
:*VERIFY THAT A RELEASE COMMAND PERFORMS NO ACTION IF ISSUED WHEN ERROR
:* BIT IS SET IN THE DRIVE.
:*
:* A. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
:*
:* B. FORCE ILF ERROR BY ISSUING ILLEGAL COMMAND (03)
:*
:* C. ISSUE A RELEASE COMMAND THROUGH PORT 'A'. VERIFY THAT THE 'GO'
:* BIT HAS RESET, THAT THE DRIVE HAS NOT RETURNED TO NEUTRAL, AND
:* THAT RPER1 HAS NOT BEEN CLEARED.
:*
:* D. CLEAR RPER1 BY ISSUING A DRIVE CLEAR COMMAND THROUGH PORT 'A'.
:*
:* E. ISSUE A RELEASE COMMAND THROUGH PORT 'A'. VERIFY THAT THE DRIVE
:* RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
:*
```

```
100 035306
104 035306 005737 002340
    035312 001402
    035314 104432
    035316 001436
    035320
```

```
T10::
TST     DRVBAD      ;SYSTEM OK??
BEQ     64$         ;TAKE BRANCH IF SO
TRAP    C$EXIT
.WORD   L10050-
```

;CLEAR ATTENTION BITS FOR BOTH PORTS

```
035320 113777 002246 145054
035326 005077 145052
035332 012777 000011 145032
035340 012777 000013 145024
```

```
MOV     PORTA,@RPCS2 ;SELECT PORT #A
CLR     @RPDS        ;SEIZE THE DRIVE
MOV     #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV     #13,@RPCS1   ;RELEASE THE DRIVE
```

;START THE TIMER

```
035346 005037 002304
035352 012737 000050 002306
035360 005737 002306
035364 001375
035366 113777 002250 145006
035374 005077 145004
035400 012777 000011 144764
035406 012777 000013 144756
```

```
65$: CLR     TIME      ;CLEAR THE ELAPSED TIME COUNTER
      MOV     #40,WATCH ;SET WATCH TO 40. MS
      TST     WATCH
      BNE     65$
      MOV     PORTB,@RPCS2 ;SELECT PORT #B
      CLR     @RPDS        ;SEIZE THE DRIVE THROUGH PORT 'B'
      MOV     #11,@RPCS1   ;ISSUE DRIVE CLEAR
      MOV     #13,@RPCS1   ;RELEASE THE DRIVE
```

;START THE TIMER

```
035414 005037 002304
035420 012737 000050 002306
035426 005737 002306
035432 001375
```

```
66$: CLR     TIME      ;CLEAR THE ELAPSED TIME COUNTER
      MOV     #40,WATCH ;SET WATCH TO 40. MS
      TST     WATCH
      BNE     66$
```

::*****

;SEIZE THE DRIVE THROUGH PORT A

```
035434 113777 002246 144740
035442 013737 002246 002270
035450 005077 144730
```

```
MOV     PORTA,@RPCS2 ;SELECT PORT A
MOV     PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR     @RPDS        ;WRITE RPDS
```



```

035454 013737 002250 002272      MOV    PORTB,OPRPT      ;'OPPOSITE' PORT ADDRESS
                                ;*****
                                ;FORCE AN ERROR

035462 012777 000003 144702      MOV    #3,@RPCS1       ;SET ILF BITS
                                ;START THE TIMER

035470 005037 002304                CLR    TIME            ;CLEAR THE ELAPSED TIME COUNTER
035474 012737 000050 002306      MOV    #40,WATCH       ;SET WATCH TO 40. MS
035502 005737 002306      69$:  TST    WATCH
035506 001375                BNE    69$

                                ;VERIFY THAT ILF IS SET

035510 005037 002276                CLR    CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
035514 017737 144666 002332      MOV    @RPER1,BADDAT  ;GET CONTENTS OF RPER1
035522 013737 002406 002334      MOV    RPER1,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
035530 012737 000001 002336      MOV    #1,EXPTED      ;:WHAT REGISTER SHOULD BE
035536 023737 002336 002332      CMP    EXPTED,BADDAT  ;IS THE REGISTER OK ?
035544 001416                BEQ    70$            ;BR IF OK
035546 104456                TRAP   C$ERHRD
035550 000003                .WORD 3
035552 012106                .WORD EM64
035554 014016                .WORD ERR20
035556 012746 003716      MOV    #FRMT17,-(SP)
035562 012746 000001      MOV    #1,-(SP)
035566 010600                MOV    SP,R0
035570 104414                TRAP   C$PNTB
035572 062706 000004      ADD    #4,SP
035576 005137 002276      COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
035602                                70$:
035602 012777 000013 144562      MOV    #13,@RPCS1     ;ISSUE A RELEASE COMMAND
035610 005037 002276                CLR    CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
035614 017737 144552 002332      MOV    @RPCS1,BADDAT ;GET CONTENTS OF RPCS1
035622 013737 002372 002334      MOV    RPCS1,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
035630 012737 004012 002336      MOV    #4012,EXPTED  ;:WHAT REGISTER SHOULD BE
035636 013737 002332 002342      MOV    BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
035644 042737 173765 002342      BIC    #^C4012,TMPO  ;SAVE SPECIFIED BITS
035652 023737 002336 002342      CMP    EXPTED,TMPO   ;COMPARE THE BITS
035660 001427                BEQ    72$            ;BR IF OK
035662 013737 002332 002352      MOV    BADDAT,TMP4   ;COPY 'BAD DATA'
035670 042737 004012 002352      BIC    #4012,TMP4   ;CLEAR THE MASKED BITS
035676 053737 002352 002336      BIS    TMP4,EXPTED  ;'OR' WITH GOOD DATA FOR TYPEOUT
035704 104456                TRAP   C$ERHRD
035706 000003                .WORD 3
035710 006255                .WORD EM12
035712 013114                .WORD ERR7
035714 012746 003716      MOV    #FRMT17,-(SP)
035720 012746 000001      MOV    #1,-(SP)
035724 010600                MOV    SP,R0
035726 104414                TRAP   C$PNTB
035730 062706 000004      ADD    #4,SP
035734 005137 002276      COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
035740                                72$:
035740 005737 002276      TST    CKERR          ;DID 'GO' BIT RESET ?
    
```

```

035744 001002          BNE      +6          ;BR IF NOT
035746 000137 036006   JMP      1$          ;'GO' BIT RESET
035752 012777 000040 144422   MOV     #CLR,@RPCS2 ;INIT THE RH11
035760 113777 002246 144414   MOV     PORTA,@RPCS2 ;SELECT PORT A
035766 013737 002246 002266   MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
035774 012777 000013 144370   MOV     #13,@RPCS1 ;RELEASE THE DRIVE THROUGH PORT A
036002 000137 036754   JMP     2$          ;BYPASS THE REST OF THE TEST

;*****
036006 113777 002250 144366   MOV     PORTB,@RPCS2 ;SELECT PORT B
036014 013737 002250 002266   MOV     PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
036022 005037 002276         CLR     CKERR        ;CLEAR THE 'CHECK ERROR' INDICATOR
036026 017737 144352 002332   MOV     @RPDS,BADDAT ;GET CONTENTS OF RPDS
036034 013737 002404 002334   MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
036042 005037 002336         CLR     EXPTED       ;WHAT REGISTER SHOULD BE
036046 023737 002336 002332   CMP     EXPTED,BADDAT ;IS THE REGISTER OK ?
036054 001416         BEQ     74$          ;BR IF OK
036056 104456         TRAP   C$ERHRD
036060 000003         .WORD 3
036062 007171         .WORD EM24
036064 040000         .WORD ERR
036066 012746 003716   MOV     #FRMT17,-(SP)
036072 012746 000001   MOV     #1,-(SP)
036076 010600         MOV     SP,R0
036100 104414         TRAP   C$PNTB
036102 062706 000004   ADD     #4,SP
036106 005137 002276   COM     CKERR        ;SET THE REGISTER COMPARE ERROR INDICATOR
036112
74$: 036112 113777 002246 144262   MOV     PORTA,@RPCS2 ;SELECT PORT A
036120 013737 002246 002266   MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
036126 005037 002276         CLR     CKERR        ;CLEAR THE 'CHECK ERROR' INDICATOR
036132 017737 144250 002332   MOV     @RPER1,BADDAT ;GET CONTENTS OF RPER1
036140 013737 002406 002334   MOV     RPER1,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
036146 012737 000001 002336   MOV     #1,EXPTED    ;WHAT REGISTER SHOULD BE
036154 023737 002336 002332   CMP     EXPTED,BADDAT ;IS THE REGISTER OK ?
036162 001416         BEQ     76$          ;BR IF OK
036164 104456         TRAP   C$ERHRD
036166 000004         .WORD 4
036170 006146         .WORD EM10
036172 012654         .WORD ERR3
036174 012746 003716   MOV     #FRMT17,-(SP)
036200 012746 000001   MOV     #1,-(SP)
036204 010600         MOV     SP,R0
036206 104414         TRAP   C$PNTB
036210 062706 000004   ADD     #4,SP
036214 005137 002276   COM     CKERR        ;SET THE REGISTER COMPARE ERROR INDICATOR
036220
76$: ;*****
;CLEAR THE ERRORS THROUGH PORT A
036220 012777 000011 144144   MOV     #11,@RPCS1  ;ISSUE A DRIVE CLEAR

;*****
;RELEASE THE DRIVE FROM PORT A
036226 113777 002246 144146   MOV     PORTA,@RPCS2 ;SELECT PORT A
    
```



```

036234 013737 002246 002266      MOV    PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
036242 012777 000013 144122      MOV    #13,@RPCS1 ;ISSUE RELEASE THROUGH PORT A

                                ;START THE TIMER

036250 005037 002304                CLR    TIME        ;CLEAR THE ELAPSED TIME COUNTER
036254 012737 000050 002306      MOV    #40.,WATCH ;SET WATCH TO 40. MS
036262 005737 002306      78$:  TST    WATCH
036266 001375                BNE    78$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

036270 005037 002302                CLR    RELERR      ;CLEAR THE 'RELEASE ERROR ' INDICATOR
036274 013737 002404 002334      MOV    RPDS,BADADR ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
036302 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
036310 113777 002246 144064      MOV    PORTA,@RPCS2 ;SELECT PORT A.
036316 017737 144062 002346      MOV    @RPDS,TMP2  ;GET THE DRIVE STATUS REGISTER FROM PORT A.
036324 042737 024005 002346      BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
036332 013737 002346 002342      MOV    TMP2,TMP0  ;COPY IT INTO 'TMP0'
036340 042737 100100 002342      BIC    #ATA!VV,TMP0 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
036346 113777 002250 144026      MOV    PORTB,@RPCS2 ;SELECT PORT B.
036354 017737 144024 002350      MOV    @RPDS,TMP3 ;GET THE DRIVE STATUS REGISTER FROM PORT B.
036362 042737 024005 002350      BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
036370 013737 002350 002344      MOV    TMP3,TMP1  ;COPY IT INTO 'TMP1'
036376 042737 100100 002344      BIC    #ATA!VV,TMP1 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
036404 023737 002342 002344      CMP    TMP0,TMP1  ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
036412 001021                BNE    79$        ;BR IF NOT
036414 005737 002342                TST    TMP0
036420 001073                BNE    81$        ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
036422 104456                TRAP   C$ERHRD   ;BR IF NOT
036424 000006                .WORD 6
036426 010751                .WORD EM46
036430 013534                .WORD ERR15
036432 012746 003716      MOV    #FRMT17,-(SP)
036436 012746 000001      MOV    #1,-(SP)
036442 010600                MOV    SP,R0
036444 104414                TRAP   C$PNTB
036446 062706 000004      ADD    #4,SP
036452 000137 036754      JMP    83$
036456 013737 002346 002332 79$: MOV    TMP2,BADDAT ;BYPASS THE REST OF THE CHECKS
036464 013737 002250 002266      MOV    PORTB,PTNBR ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
036472 113777 002250 143702      MOV    PORTB,@RPCS2 ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
036500 005737 002342      MOV    TMP0 ;SELECT PORT B.
036504 001414                TST    TMP0 ;SEE IF STATUS EQ 0 FROM PORT A.
036506 013737 002246 002266      BEQ    80$        ;BR IF ZERO
036514 013737 002350 002332      MOV    PORTA,PTNBR ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
036522 113777 002246 143652      MOV    TMP3,BADDAT ;'BAD DATA' FOR ERROR TYPE OUT
036530 005737 002344      MOV    PORTA,@RPCS2 ;SELECT PORT A.
036534 001025                TST    TMP1 ;SEE IF STATUS EQ ZERO FROM PORT B.
036536 012737 177777 002302 80$: BNE    81$        ;BR IF NOT
036544 012777 000011 143620      MOV    #-1,RELERR ;SET 'RELEASE ERROR' INDICATOR
036552 012777 000013 143612      MOV    #11,@RPCS1 ;CLEAR THE DRIVE
036560 104456                TRAP   C$ERHRD   ;RELEASE THE DRIVE
036562 000011                .WORD 9
036564 007313                .WORD EM26
036566 013214                .WORD ERR9
    
```

```
036570 012746 003716      MOV      #FRMT17,-(SP)
036574 012746 000001      MOV      #1,-(SP)
036600 010600      MOV      SP,RO
036602 104414      TRAP     C$PNTB
036604 062706 000004      ADD      #4,SP
036610 013737 002346 002332 81$:      MOV      TMP2,BADDAT      ;LOOK FOR BIT FAILURES WHEN RPDS READ
036616 013737 002246 002266      MOV      PORTA,PTNBR      ;CHANGE PORT NUMBER
036624 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
036632 023737 002336 002332      CMP      EXPTED,BADDAT    ;ALL BITS OK ?
036640 001414      BEQ      82$              ;BR IF OK FROM PORT A.
036642 104456      TRAP     C$ERHRD
036644 000013      .WORD   11
036646 006072      .WORD   EM7
036650 013000      .WORD   ERR5
036652 012746 003471      MOV      #FRMT14,-(SP)
036656 012746 000001      MOV      #1,-(SP)
036662 010600      MOV      SP,RO
036664 104414      TRAP     C$PNTB
036666 062706 000004      ADD      #4,SP
036672 013737 002350 002332 82$:      MOV      TMP3,BADDAT      ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
036700 013737 002250 002266      MOV      PORTB,PTNBR      ;CHANGE PORT NUMBER
036706 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
036714 023737 002336 002332      CMP      EXPTED,BADDAT    ;SEE IF READ OK FROM PORT B.
036722 001414      BEQ      83$              ;BR IF OK
036724 104456      TRAP     C$ERHRD
036726 000014      .WORD   12
036730 006072      .WORD   EM7
036732 013000      .WORD   ERR5
036734 012746 003522      MOV      #FRMT15,-(SP)
036740 012746 000001      MOV      #1,-(SP)
036744 010600      MOV      SP,RO
036746 104414      TRAP     C$PNTB
036750 062706 000004      ADD      #4,SP
036754      83$:
036754      2$:
108 036754      L10050:
036754 104401      TRAP     C$ETST
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.SBTTL TEST 11 PORT 'B' RELEASE WITH ERRORS TEST

:*VERIFY THAT A RELEASE COMMAND PERFORMS NO ACTION IF ISSUED WHEN ERROR BIT IS SET IN THE DRIVE.

- :* A. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
- :* B. FORCE ILF ERROR BY ISSUING ILLEGAL COMMAND (03)
- :* C. ISSUE A RELEASE COMMAND THROUGH PORT 'B'. VERIFY THAT THE 'GO' BIT HAS RESET, THAT THE DRIVE HAS NOT RETURNED TO NEUTRAL, AND THAT RPER1 HAS NOT BEEN CLEARED.
- :* D. CLEAR RPER1 BY ISSUING A DRIVE CLEAR COMMAND THROUGH PORT 'B'.
- :* E. ISSUE A RELEASE COMMAND THROUGH PORT 'B'. VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.

20 036756
 24 036756 005737 002340
 036762 001402
 036764 104432
 036766 001436
 036770

T11::
 TST DRVBAD ;SYSTEM OK??
 BEQ 64\$;TAKE BRANCH IF SO
 TRAP C\$EXIT
 .WORD L10051-

64\$:

;CLEAR ATTENTION BITS FOR BOTH PORTS

036770 113777 002246 143404 MOVB PORTA,@RPCS2 ;SELECT PORT #A
 036776 005077 143402 CLR @RPDS ;SEIZE THE DRIVE
 037002 012777 000011 143362 MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
 037010 012777 000013 143354 MOV #13,@RPCS1 ;RELEASE THE DRIVE

;START THE TIMER

037016 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
 037022 012737 000050 002306 MOV #40,WATCH ;SET WATCH TO 40. MS
 037030 005737 002306 65\$: TST WATCH
 037034 001375 BNE 65\$
 037036 113777 002250 143336 MOVB PORTB,@RPCS2 ;SELECT PORT #B
 037044 005077 143334 CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
 037050 012777 000011 143314 MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
 037056 012777 000013 143306 MOV #13,@RPCS1 ;RELEASE THE DRIVE

;START THE TIMER

037064 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
 037070 012737 000050 002306 MOV #40,WATCH ;SET WATCH TO 40. MS
 037076 005737 002306 66\$: TST WATCH
 037102 001375 BNE 66\$

;;*****

;SEIZE THE DRIVE THROUGH PORT B

037104 113777 002250 143270 MOVB PORTB,@RPCS2 ;SELECT PORT B
 037112 013737 002250 002270 MOV PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
 037120 005077 143260 CLR @RPDS ;WRITE RPDS

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037124 013737 002246 002272      MOV      PORTA,OPPRT      ;'OPPOSITE' PORT ADDRESS
                                ;*****
                                ;FORCE AN ERROR

037132 012777 000003 143232      MOV      #3,@RPCS1      ;SET ILF BITS
                                ;START THE TIMER

037140 005037 002304              CLR      TIME            ;CLEAR THE ELAPSED TIME COUNTER
037144 012737 000050 002306      MOV      #40,WATCH      ;SET WATCH TO 40. MS
037152 005737 002306 69$:      TST      WATCH
037156 001375              BNE      69$

                                ;VERIFY THAT ILF IS SET

037160 005037 002276              CLR      CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR.
037164 017737 143216 002332      MOV      @RPER1,BADDAT ;GET CONTENTS OF RPER1
037172 013737 002406 002334      MOV      RPER1,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
037200 012737 000001 002336      MOV      #1,EXPTED     ;:WHAT REGISTER SHOULD BE
037206 023737 002336 002332      CMP      EXPTED,BADDAT ;IS THE REGISTER OK ?
037214 001416              BEQ      70$            ;BR IF OK
037216 104456              TRAP    CSERHRD
037220 000003              .WORD  3
037222 012106              .WORD  EM64
037224 014016              .WORD  ERR20
037226 012746 003716      MOV      #FRMT17,-(SP)
037232 012746 000001      MOV      #1,-(SP)
037236 010600              MOV      SP,RO
037240 104414              TRAP    CSPNTB
037242 062706 000004      ADD      #4,SP
037246 005137 002276 70$:      COM      CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR

037252 012777 000013 143112      MOV      #13,@RPCS1    ;ISSUE A RELEASE COMMAND
037260 005037 002276              CLR      CKERR         ;CLEAR THE 'CHECK ERROR' INDICATOR
037264 017737 143102 002332      MOV      @RPCS1,BADDAT ;GET CONTENTS OF RPCS1
037272 013737 002372 002334      MOV      RPCS1,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
037300 012737 004012 002336      MOV      #4012,EXPTED ;:WHAT REGISTER SHOULD BE
037306 013737 002332 002342      MOV      BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
037314 042737 173765 002342      BIC      #^C4012,TMPO  ;SAVE SPECIFIED BITS
037322 023737 002336 002342      CMP      EXPTED,TMPO  ;COMPARE THE BITS
037330 001427              BEQ      72$            ;BR IF OK
037332 013737 002332 002352      MOV      BADDAT,TMP4   ;COPY 'BAD DATA'
037340 042737 004012 002352      BIC      #4012,TMP4   ;CLEAR THE MASKED BITS
037346 053737 002352 002336      BIS      TMP4,EXPTED  ;'OR' WITH GOOD DATA FOR TYPEOUT
037354 104456              TRAP    CSERHRD
037356 000003              .WORD  3
037360 006255              .WORD  EM12
037362 013114              .WORD  ERR7
037364 012746 003716      MOV      #FRMT17,-(SP)
037370 012746 000001      MOV      #1,-(SP)
037374 010600              MOV      SP,RO
037376 104414              TRAP    CSPNTB
037400 062706 000004      ADD      #4,SP
037404 005137 002276 72$:      COM      CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR

037410 005737 002276              TST      CKERR         ;DID 'GO' BIT RESET ?
    
```



```
037414 001002          BNE      +6          ;BR IF NOT
037416 000137 037456  JMP      1$          ;'GO' BIT RESET
037422 012777 000040 142752  MOV      #CLR,@RPCS2 ;INIT THE RH11
037430 113777 002250 142744  MOVB    PORTB,@RPCS2 ;SELECT PORT B
037436 013737 002250 002266  MOV      PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
037444 012777 000013 142720  MOV      #13,@RPCS1 ;RELEASE THE DRIVE THROUGH PORT B
037452 000137 040424  JMP      2$          ;BYPASS THE REST OF THE TEST

;:*****
037456 113777 002246 142716  MOVB    PORTA,@RPCS2 ;SELECT PORT A
037464 013737 002246 002266  MOV      PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
037472 005037 002276          CLR      CKERR      ;CLEAR THE 'CHECK ERROR' INDICATOR
037476 017737 142702 002332  MOV      @RPDS,BADDAT ;GET CONTENTS OF RPDS
037504 013737 002404 002334  MOV      RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
037512 005037 002336          CLR      EXPTED     ;WHAT REGISTER SHOULD BE
037516 023737 002336 002332  CMP      EXPTED,BADDAT ;IS THE REGISTER OK ?
037524 001416          BEQ      74$        ;BR IF OK
037526 104456          TRAP    CSERHRD
037530 000003          .WORD  3
037532 007171          .WORD  EM24
037534 040000          .WORD  ERR
037536 012746 003716  MOV      #FRMT17,-(SP)
037542 012746 000001  MOV      #1,-(SP)
037546 010600          MOV      SP,RO
037550 104414          TRAP    C$PNTB
037552 062706 000004  ADD      #4,SP
037556 005137 002276  COM      CKERR      ;SET THE REGISTER COMPARE ERROR INDICATOR
037562          74$:
037562 113777 002250 142612  MOVB    PORTB,@RPCS2 ;SELECT PORT B
037570 013737 002250 002266  MOV      PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
037576 005037 002276          CLR      CKERR      ;CLEAR THE 'CHECK ERROR' INDICATOR
037602 017737 142600 002332  MOV      @RPER1,BADDAT ;GET CONTENTS OF RPER1
037610 013737 002406 002334  MOV      RPER1,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
037616 012737 000001 002336  MOV      #1,EXPTED   ;:WHAT REGISTER SHOULD BE
037624 023737 002336 002332  CMP      EXPTED,BADDAT ;IS THE REGISTER OK ?
037632 001416          BEQ      76$        ;BR IF OK
037634 104456          TRAP    CSERHRD
037636 000004          .WORD  4
037640 006146          .WORD  EM10
037642 012654          .WORD  ERR3
037644 012746 003716  MOV      #FRMT17,-(SP)
037650 012746 000001  MOV      #1,-(SP)
037654 010600          MOV      SP,RO
037656 104414          TRAP    C$PNTB
037660 062706 000004  ADD      #4,SP
037664 005137 002276  COM      CKERR      ;SET THE REGISTER COMPARE ERROR INDICATOR
037670          76$:
;:*****
;:CLEAR THE ERRORS THROUGH PORT B
037670 012777 000011 142474  MOV      #11,@RPCS1 ;ISSUE A DRIVE CLEAR
;:*****
;:RELEASE THE DRIVE FROM PORT B
037676 113777 002250 142476  MOVB    PORTB,@RPCS2 ;SELECT PORT B
```

```
037704 013737 002250 002266      MOV      PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
037712 012777 000013 142452      MOV      #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT B

                                ;START THE TIMER

037720 005037 002304                CLR      TIME              ;CLEAR THE ELAPSED TIME COUNTER
037724 012737 000050 002306      MOV      #40,WATCH        ;SET WATCH TO 40. MS
037732 005737 002306      TST     WATCH
037736 001375      BNE     78$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

037740 005037 002302                CLR      RELERR           ;CLEAR THE 'RELEASE ERROR ' INDICATOR
037744 013737 002404 002334      MOV      RPDS,BADADR      ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
037752 012737 011700 002336      MOV      #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
037760 113777 002246 142414      MOV      PORTA,@RPCS2     ;SELECT PORT A.
037766 017737 142412 002346      MOV      @RPDS,TMP2       ;GET THE DRIVE STATUS REGISTER FROM PORT A.
037774 042737 024005 002346      BIC      #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
040002 013737 002346 002342      MOV      TMP2,TMP0        ;COPY IT INTO 'TMP0'
040010 042737 100100 002342      BIC      #ATA!VV,TMP0      ;CLEAR PORT DEPENDENT BITS FROM THE COPY
040016 113777 002250 142356      MOV      PORTB,@RPCS2     ;SELECT PORT B.
040024 017737 142354 002350      MOV      @RPDS,TMP3       ;GET THE DRIVE STATUS REGISTER FROM PORT B.
040032 042737 024005 002350      BIC      #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
040040 013737 002350 002344      MOV      TMP3,TMP1        ;COPY IT INTO 'TMP1'
040046 042737 100100 002344      BIC      #ATA!VV,TMP1      ;CLEAR PORT DEPENDENT BITS FROM THE COPY
040054 023737 002342 002344      CMP      TMP0,TMP1        ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
040062 001021      BNE     79$              ;BR IF NOT
040064 005737 002342      TST     TMP0              ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
040070 001073      BNE     81$              ;BR IF NOT
040072 104456      TRAP   C$ERHRD
040074 000006      .WORD 6
040076 010751      .WORD EM46
040100 013534      .WORD ERR15
040102 012746 003716      MOV      #FRMT17,-(SP)
040106 012746 000001      MOV      #1,-(SP)
040112 010600      MOV      SP,R0
040114 104414      TRAP   C$PNTB
040116 062706 000004      ADD     #4,SP
040122 000137 040424      JMP     83$
040126 013737 002346 002332 79$:  MOV      TMP2,BADDAT      ;BYPASS THE REST OF THE CHECKS
040134 013737 002250 002266      MOV      PORTB,PTNBR      ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
040142 113777 002250 142232      MOV      PORTB,@RPCS2     ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
040150 005737 002342      TST     TMP0              ;SELECT PORT B.
040154 001414      BEQ     80$              ;SEE IF STATUS EQ 0 FROM PORT A.
040156 013737 002246 002266      MOV      PORTA,PTNBR      ;BR IF ZERO
040164 013737 002350 002332      MOV      TMP3,BADDAT      ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
040172 113777 002246 142202      MOV      PORTA,@RPCS2     ;'BAD DATA' FOR ERROR TYPE OUT
040200 005737 002344      TST     TMP1              ;SELECT PORT A.
040204 001025      BNE     81$              ;SEE IF STATUS EQ ZERO FROM PORT B.
040206 012737 177777 002302 80$:  MOV      #-1,RELERR       ;BR IF NOT
040214 012777 000011 142150      MOV      #11,@RPCS1      ;SET 'RELEASE ERROR' INDICATOR
040222 012777 000013 142142      MOV      #13,@RPCS1      ;CLEAR THE DRIVE
040230 104456      TRAP   C$ERHRD          ;RELEASE THE DRIVE
040232 000011      .WORD 9
040234 007313      .WORD EM26
040236 013214      .WORD ERR9
```


040240	012746	003716		MOV	#FRMT17,-(SP)		
040244	012746	000001		MOV	#1,-(SP)		
040250	010600			MOV	SP,R0		
040252	104414			TRAP	CSPNTB		
040254	062706	000004		ADD	#4,SP		
040260	013737	002346	002332	81\$:	MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
040266	013737	002246	002266		MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
040274	042737	100000	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
040302	023737	002336	002332		CMP	EXPTED,BADDAT	:ALL BITS OK ?
040310	001414			BEQ	82\$:BR IF OK FROM PORT A.
040312	104456			TRAP	CSEHRD		
040314	000013			.WORD	11		
040316	006072			.WORD	EM7		
040320	013000			.WORD	ERR5		
040322	012746	003471		MOV	#FRMT14,-(SP)		
040326	012746	000001		MOV	#1,-(SP)		
040332	010600			MOV	SP,R0		
040334	104414			TRAP	CSPNTB		
040336	062706	000004		ADD	#4,SP		
040342	013737	002350	002332	82\$:	MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
040350	013737	002250	002266		MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
040356	042737	100000	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
040364	023737	002336	002332		CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
040372	001414			BEQ	83\$:BR IF OK
040374	104456			TRAP	CSEHRD		
040376	000014			.WORD	12		
040400	006072			.WORD	EM7		
040402	013000			.WORD	ERR5		
040404	012746	003522		MOV	#FRMT15,-(SP)		
040410	012746	000001		MOV	#1,-(SP)		
040414	010600			MOV	SP,R0		
040416	104414			TRAP	CSPNTB		
040420	062706	000004		ADD	#4,SP		
040424				83\$:			
040424				2\$:			
28 040424				L10051:			
040424	104401			TRAP	CSETST		

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.SBTTL TEST 12 PORT 'A' SEIZE AND CLEAR TEST
: *VERIFY THAT A MASSBUS CLEAR OR DRIVE CLEAR WILL NOT CAUSE THE SEIZING
: *PORT TO RELEASE THE DRIVE.
: *
: * A. SEIZE THE DRIVE BY WRITING 0'S INTO RPDS THROUGH PORT 'A'.
: * VERIFY THAT THE DRIVE HAS BEEN SEIZED.
: *
: * B. ISSUE A DRIVE CLEAR THROUGH PORT 'A' AND VERIFY THAT THE DRIVE
: * DOES NOT RETURN TO NEUTRAL.
: *
: * C. ISSUE A MASSBUS CLEAR THROUGH THE RH70 AND VERIFY THAT THE DRIVE
: * DOES NOT RETURN TO NEUTRAL.
: *
: * D. RELEASE THE DRIVE THROUGH PORT 'A'. VERIFY THAT THE DRIVE
: * RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
: *
```

85 040426
 89 040426 005737 002340
 040432 001402
 040434 104432
 040436 001572

```
T12::
TST DRVBAD ;SYSTEM OK?
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10052-
```

040440

```
:*****
64$:
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:SEIZE THE DRIVE THROUGH PORT A

040440 113777 002246 141734
 040446 013737 002246 002270
 040454 005077 141724

 040460 113777 002250 141714
 040466 013737 002250 002266
 040474 013737 002250 002272
 040502 017737 141676 002332
 040510 013737 002404 002334
 040516 005037 002336
 040522 023737 002336 002332
 040530 001406
 040532 104456
 040534 000001
 040536 005705
 040540 012576
 040542 000137 042230
 040546
 040546 113777 002246 141626
 040554 013737 002246 002266
 040562 017737 141616 002332
 040570 042737 020005 002332
 040576 012737 011700 002336
 040604 013737 002336 002344
 040612 005137 002344
 040616 013737 002332 002342
 040624 043737 002344 002342
 040632 023737 002336 002342
 040640 001404

```
MOV B PORTA,@RPCS2 ;SELECT PORT A
MOV PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR @RPDS ;WRITE RPDS
  

MOV B PORTB,@RPCS2 ;SELECT PORT B
MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
MOV PORTB,OPPRT ;'OPPOSITE' PORT ADDRESS
MOV @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT A
MOV RPDS,BADADR ;GENERATE BAD REGISTER ADDRESS
CLR EXPTED ;REGISTER SHOULD BE ZERO
CMP EXPTED,BADDAT ;IS THE REGISTER ZERO
BEQ 65$ ;BR IF IT IS
TRAP C$ERHRD
.WORD 1
.WORD EM4
.WORD ERR2
JMP 1$ ;BYPASS REST OF THE SUBTEST
  

65$:
MOV B PORTA,@RPCS2 ;SELECT PORT A
MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
MOV @RPDS,BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
BIC #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
MOV #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
MOV EXPTED,TMP1 ;USE GOOD DATA AS A MASK
COM TMP1 ;COMPLEMENT THE EXPECTED STATUS
MOV BADDAT,TMPO ;SAVE THE ACTUAL STATUS
BIC TMP1,TMPO ;CLEAR UNWANTED BITS
CMP EXPTED,TMPO ;ARE THE EXPECTED STATUS BITS SET ?
BEQ 66$ ;BR IF THEY ARE
```


040642 104456
 040644 000002
 040646 005736
 040650 012654
 040652

TRAP CSERHRD
 .WORD 2
 .WORD EM5
 .WORD ERR3

66\$:
 :*****
 :DRIVE CLEAR THROUGH PORT A FIRST

040652 012777 000011 141512

MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR THROUGH PORT A

:*****
 :VERIFY THAT DRIVE STILL SEIZED BY PORT A

040660 113777 002250 141514
 040666 013737 002250 002266
 040674 005037 002276
 040700 017737 141500 002332
 040706 013737 002404 002334
 040714 005037 002336
 040720 013737 002332 002342
 040726 042737 100004 002342
 040734 023737 002336 002342
 040742 001427
 040744 013737 002332 002352
 040752 042737 077773 002352
 040760 053737 002352 002336
 040766 104456
 040770 000003
 040772 007701
 040774 040000
 040776 012746 003716
 041002 012746 000001
 041006 010600
 041010 104414
 041012 062706 000004
 041016 005137 002276

MOVB PORTB,@RPCS2 ;SELECT PORT B
 MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
 MOV @RPDS,BADADR ;GET CONTENTS OF RPDS
 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
 CLR EXPTED ;WHAT REGISTER SHOULD BE
 MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
 BIC #^C77773,TMPO ;SAVE SPECIFIED BITS
 CMP EXPTED,TMPO ;COMPARE THE BITS
 BEQ 67\$;BR IF OK
 MOV BADDAT,TMP4 ;COPY 'BAD DATA'
 BIC #77773,TMP4 ;CLEAR THE MASKED BITS
 BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
 TRAP CSERHRD
 .WORD 3
 .WORD EM33
 .WORD ERR
 MOV #FRMT17,-(SP)
 MOV #1,-(SP)
 MOV SP,RO
 TRAP C\$PNTB
 ADD #4,SP
 COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR

67\$:
 MOVB PORTA,@RPCS2 ;SELECT PORT A
 MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
 MOV @RPDS,BADADR ;GET CONTENTS OF RPDS
 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
 MOV #MOL!PGM!DPR!DRY!VV,EXPTED ;:WHAT REGISTER SHOULD BE
 MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
 BIC #^C77773,TMPO ;SAVE SPECIFIED BITS
 CMP EXPTED,TMPO ;COMPARE THE BITS
 BEQ 69\$;BR IF OK
 MOV BADDAT,TMP4 ;COPY 'BAD DATA'
 BIC #77773,TMP4 ;CLEAR THE MASKED BITS
 BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT

041132 104456
 041134 000003
 041136 007701
 041140 040000
 041142 012746 003716
 041146 012746 000001
 041152 010600

TRAP CSERHRD
 .WORD 3
 .WORD EM33
 .WORD ERR
 MOV #FRMT17,-(SP)
 MOV #1,-(SP)
 MOV SP,RO

```

041154 104414          TRAP  C$PNTB
041156 062706 000004  ADD   #4,SP
041162 005137 002276  COM   CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
041166
69$:
:*****
:;NOW ISSUE MASSBUS INIT

041166 012777 000040 141206      MOV   #CLR,@RPCS2    ;ISSUE MASSBUS INIT
:*****
:;CONFIRM THAT DRIVE STILL SEIZED BY PORT A

041174 113777 002250 141200      MOVB  PORTB,@RPCS2   ;SELECT PORT B
041202 013737 002250 002266      MOV   PORTB,PTNBR   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
041210 005037 002276          CLR   CKERR         ;CLEAR THE 'CHECK ERROR' INDICATOR
041214 017737 141164 002332      MOV   @RPDS,BADDAT  ;GET CONTENTS OF RPDS
041222 013737 002404 002334      MOV   RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
041230 005037 002336          CLR   EXPTED        ;WHAT REGISTER SHOULD BE
041234 013737 002332 002342      MOV   BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
041242 042737 100004 002342      BIC   #^C77773,TMPO ;SAVE SPECIFIED BITS
041250 023737 002336 002342      CMP   EXPTED,TMPO   ;COMPARE THE BITS
041256 001427          BEQ   71$          ;BR IF OK
041260 013737 002332 002352      MOV   BADDAT,TMP4   ;COPY 'BAD DATA'
041266 042737 077773 002352      BIC   #77773,TMP4   ;CLEAR THE MASKED BITS
041274 053737 002352 002336      BIS   TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
041302 104456          TRAP  C$SERHRD
041304 000003          .WORD 3
041306 010003          .WORD EM34
041310 013320          .WORD ERR11
041312 012746 003716      MOV   #FRMT17,-(SP)
041316 012746 000001      MOV   #1,-(SP)
041322 010600          MOV   SP,RO
041324 104414          TRAP  C$PNTB
041326 062706 000004  ADD   #4,SP
041332 005137 002276  COM   CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
041336
71$:
:*****
:;SELECT PORT A
041336 113777 002246 141036      MOVB  PORTA,@RPCS2   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
041344 013737 002246 002266      MOV   PORTA,PTNBR   ;CLEAR THE 'CHECK ERROR' INDICATOR
041352 005037 002276          CLR   CKERR
041356 017737 141022 002332      MOV   @RPDS,BADDAT  ;GET CONTENTS OF RPDS
041364 013737 002404 002334      MOV   RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
041372 012737 011700 002336      MOV   #MOL!PGM!DPR!DRY!VV,EXPTED ;:;WHAT REGISTER SHOULD BE
041400 013737 002332 002342      MOV   BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
041406 042737 100004 002342      BIC   #^C77773,TMPO ;SAVE SPECIFIED BITS
041414 023737 002336 002342      CMP   EXPTED,TMPO   ;COMPARE THE BITS
041422 001427          BEQ   73$          ;BR IF OK
041424 013737 002332 002352      MOV   BADDAT,TMP4   ;COPY 'BAD DATA'
041432 042737 077773 002352      BIC   #77773,TMP4   ;CLEAR THE MASKED BITS
041440 053737 002352 002336      BIS   TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
041446 104456          TRAP  C$SERHRD
041450 000003          .WORD 3
041452 010003          .WORD EM34
041454 040000          .WORD ERR
041456 012746 003716      MOV   #FRMT17,-(SP)
041462 012746 000001      MOV   #1,-(SP)
041466 010600          MOV   SP,RO
041470 104414          TRAP  C$PNTB
    
```



```

041472 062706 000004          ADD    #4,SP
041476 005137 002776          COM    CKERR                ;SET THE REGISTER COMPARE ERROR INDICATOR
041502                                73$:
                                ;RELEASE THE DRIVE FROM PORT A

041502 113777 002246 140672      MOV    PORTA,@RPCS2        ;SELECT PORT A
041510 013737 002246 002266      MOV    PORTA,PTNBR        ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
041516 012777 000013 140646      MOV    #13,@RPCS1        ;ISSUE RELEASE THROUGH PORT A

                                ;START THE TIMER

041524 005037 002304          CLR    TIME                ;CLEAR THE ELAPSED TIME COUNTER
041530 012737 000050 002306      MOV    #40.,WATCH        ;SET WATCH TO 40. MS
041536 005737 002306          TST   WATCH
041542 001375 002306          BNE   75$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

041544 005037 002302          CLR    RELERR             ;CLEAR THE 'RELEASE ERROR ' INDICATOR
041550 013737 002404 002334      MOV    RPDS,BADADR        ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
041556 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
041564 113777 002246 140610      MOV    PORTA,@RPCS2        ;SELECT PORT A.
041572 017737 140606 002346      MOV    @RPDS,TMP2         ;GET THE DRIVE STATUS REGISTER FROM PORT A.
041600 042737 024005 002346      BIC   #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
041606 013737 002346 002342      MOV    TMP2,TMP0         ;COPY IT INTO 'TMP0'
041614 042737 100100 002342      BIC   #ATA!VV,TMP0        ;CLEAR PORT DEPENDENT BITS FROM THE COPY
041622 113777 002250 140552      MOV    PORTB,@RPCS2        ;SELECT PORT B.
041630 017737 140550 002350      MOV    @RPDS,TMP3         ;GET THE DRIVE STATUS REGISTER FROM PORT B.
041636 042737 024005 002350      BIC   #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
041644 013737 002350 002344      MOV    TMP3,TMP1         ;COPY IT INTO 'TMP1'
041652 042737 100100 002344      BIC   #ATA!VV,TMP1        ;CLEAR PORT DEPENDENT BITS FROM THE COPY
041660 023737 002342 002344      CMP   TMP0,TMP1          ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
041666 001021 002342          BNE   76$                ;BR IF NOT
041670 005737 002342          TST   TMP0                ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
041674 001073 002342          BNE   78$                ;BR IF NOT
041676 104456          TRAP  C$ERHRD
041700 000006          .WORD 6
041702 010751          .WORD EM46
041704 013534          .WORD ERR15
041706 012746 003716      MOV    #FRMT17,-(SP)
041712 012746 000001      MOV    #1,-(SP)
041716 010600          MOV    SP,R0
041720 104414          TRAP  C$PNTB
041722 062706 000004          ADD    #4,SP
041726 000137 042230          JMP    80$                ;BYPASS THE REST OF THE CHECKS
041732 013737 002346 002332 76$:      MOV    TMP2,BADDAT        ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
041740 013737 002250 002266      MOV    PORTB,PTNBR        ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
041746 113777 002250 140426      MOV    PORTB,@RPCS2        ;SELECT PORT B.
041754 005737 002342          TST   TMP0                ;SEE IF STATUS EQ 0 FROM PORT A.
041760 001414          BEQ   77$                ;BR IF ZERO
041762 013737 002246 002266      MOV    PORTA,PTNBR        ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
041770 013737 002350 002332      MOV    TMP3,BADDAT        ;'BAD DATA' FOR ERROR TYPE OUT
041776 113777 002246 140376      MOV    PORTA,@RPCS2        ;SELECT PORT A.
042004 005737 002344          TST   TMP1                ;SEE IF STATUS EQ ZERO FROM PORT B.
042010 001025          BNE   78$                ;BR IF NOT
    
```

```

042012 012737 177777 002302 77$: MOV #-1,RELERR ;SET 'RELEASE ERROR' INDICATOR
042020 012777 000011 140344 MOV #11,@RPCS1 ;CLEAR THE DRIVE
042026 012777 000013 140336 MOV #13,@RPCS1 ;RELEASE THE DRIVE
042034 104456 TRAP C$ERHRD
042036 000011 .WORD 9
042040 007313 .WORD EM26
042042 013214 .WORD ERR9
042044 012746 003716 MOV #FRMT17,-(SP)
042050 012746 000001 MOV #1,-(SP)
042054 010600 MOV SP,R0
042056 104414 TRAP C$PNTB
042060 062706 000004 ADD #4,SP
042064 013737 002346 002332 78$: MOV TMP2,BADDAT ;LOOK FOR BIT FAILURES WHEN RPDS READ
042072 013737 002246 002266 MOV PORTA,PTNBR ;CHANGE PORT NUMBER
042100 042737 100000 002332 BIC #ATA,BADDAT ;DON'T CHECK THE ATTN BIT
042106 023737 002336 002332 CMP EXPTED,BADDAT ;ALL BITS OK ?
042114 001414 BEQ 79$ ;BR IF OK FROM PORT A.
042116 104456 TRAP C$ERHRD
042120 000013 .WORD 11
042122 006072 .WORD EM7
042124 013000 .WORD ERR5
042126 012746 003471 MOV #FRMT14,-(SP)
042132 012746 000001 MOV #1,-(SP)
042136 010600 MOV SP,R0
042140 104414 TRAP C$PNTB
042142 062706 000004 ADD #4,SP
042146 013737 002350 002332 79$: MOV TMP3,BADDAT ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
042154 013737 002250 002266 MOV PORTB,PTNBR ;CHANGE PORT NUMBER
042162 042737 100000 002332 BIC #ATA,BADDAT ;DON'T CHECK THE ATTN BIT
042170 023737 002336 002332 CMP EXPTED,BADDAT ;SEE IF READ OK FROM PORT B.
042176 001414 BEQ 80$ ;BR IF OK
042200 104456 TRAP C$ERHRD
042202 000014 .WORD 12
042204 006072 .WORD EM7
042206 013000 .WORD ERR5
042210 012746 003522 MOV #FRMT15,-(SP)
042214 012746 000001 MOV #1,-(SP)
042220 010600 MOV SP,R0
042222 104414 TRAP C$PNTB
042224 062706 000004 ADD #4,SP
042230 80$:
042230 1$:
93 042230 L10052: TRAP C$ETST
042230 104401
    
```


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.SBTTL TEST 13 PORT 'B' SEIZE AND CLEAR TEST

:*VERIFY THAT A MASSBUS CLEAR OR DRIVE CLEAR WILL NOT CAUSE THE SEIZING PORT TO RELEASE THE DRIVE.

- :* A. SEIZE THE DRIVE BY WRITING 0'S INTO RPDS THROUGH PORT 'B'. VERIFY THAT THE DRIVE HAS BEEN SEIZED.
- :* B. ISSUE A DRIVE CLEAR THROUGH PORT 'B' AND VERIFY THAT THE DRIVE DOES NOT RETURN TO NEUTRAL.
- :* C. ISSUE A MASSBUS CLEAR THROUGH THE RH70 AND VERIFY THAT THE DRIVE DOES NOT RETURN TO NEUTRAL.
- :* D. RELEASE THE DRIVE THROUGH PORT 'B'. VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.

T13::

```
TST    DRVBAD      ;SYSTEM OK?
BEQ    64$         ;TAKE BRANCH IF SO
TRAP   C$EXIT
.WORD  L10053-
```

64\$:

:SEIZE THE DRIVE THROUGH PORT B

```
042244 113777 002250 140130
042252 013737 002250 002270
042260 005077 140120
```

```
MOVB   PORTB,@RPCS2 ;SELECT PORT B
MOV    PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR    @RPDS        ;WRITE RPDS
```

```
042264 113777 002246 140110
042272 013737 002246 002266
042300 013737 002246 002272
042306 017737 140072 002332
042314 013737 002404 002334
```

```
MOVB   PORTA,@RPCS2 ;SELECT PORT A
MOV    PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
MOV    PORTA,OPPRT  ;'OPPOSITE' PORT ADDRESS
MOV    @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT B
MOV    RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
CLR    EXPTED       ;REGISTER SHOULD BE ZERO
CMP    EXPTED,BADDAT ;IS THE REGISTER ZERO
BEQ    65$          ;BR IF IT IS
```

```
042322 005037 002336
042326 023737 002336 002332
042334 001406
042336 104456
042340 000001
```

```
.WORD  1
.WORD  EM4
.WORD  ERR2
JMP    1$          ;BYPASS REST OF THE SUBTEST
```

```
042342 005705
042344 012576
042346 000137 044034
```

65\$:

```
042352 113777 002250 140022
042360 013737 002250 002266
042366 017737 140012 002332
042374 042737 020005 002332
042402 012737 011700 002336
042410 013737 002336 002344
042416 005137 002344
042422 013737 002332 002342
042430 043737 002344 002342
042436 023737 002336 002342
042444 001404
```

```
MOVB   PORTB,@RPCS2 ;SELECT PORT B
MOV    PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
MOV    @RPDS,BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
BIC    #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
MOV    EXPTED,TMP1  ;USE GOOD DATA AS A MASK
COM    TMP1         ;COMPLEMENT THE EXPECTED STATUS
MOV    BADDAT,TMPO  ;SAVE THE ACTUAL STATUS
BIC    TMP1,TMPO    ;CLEAR UNWANTED BITS
CMP    EXPTED,TMPO  ;ARE THE EXPECTED STATUS BITS SET ?
BEQ    66$          ;BR IF THEY ARE
```

042446 104456
 042450 000002
 042452 005736
 042454 012654
 042456

TRAP C\$ERHRD
 .WORD 2
 .WORD EMS
 .WORD ERR3

66\$:

 ;DRIVE CLEAR THROUGH PORT B FIRST

042456 012777 000011 137706

MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR THROUGH PORT B

 ;VERIFY THAT DRIVE STILL SEIZED BY PORT B

042464 113777 002246 137710
 042472 013737 002246 002266
 042500 005037 002276
 042504 017737 137674 002332
 042512 013737 002404 002334
 042520 005037 002336
 042524 013737 002332 002342
 042532 042737 100004 002342
 042540 023737 002336 002342
 042546 001427
 042550 013737 002332 002352
 042556 042737 077773 002352
 042564 053737 002352 002336

MOVB PORTA,@RPCS2 ;SELECT PORT A
 MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
 MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
 CLR EXPTED ;WHAT REGISTER SHOULD BE
 MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
 BIC #^C77773,TMPO ;SAVE SPECIFIED BITS
 CMP EXPTED,TMPO ;COMPARE THE BITS
 BEQ 67\$;BR IF OK
 MOV BADDAT,TMP4 ;COPY 'BAD DATA'
 BIC #77773,TMP4 ;CLEAR THE MASKED BITS
 BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT

042572 104456
 042574 000003
 042576 007701
 042600 040000
 042602 012746 003716
 042606 012746 000001
 042612 010600
 042614 104414
 042616 062706 000004
 042622 005137 002276

TRAP C\$ERHRD
 .WORD 3
 .WORD EM33
 .WORD ERR
 MOV #FRMT17,-(SP)
 MOV #1,-(SP)
 MOV SP,RO
 TRAP C\$PNTB
 ADD #4,SP
 COM CKERR

;SET THE REGISTER COMPARE ERROR INDICATOR

67\$:

042626 113777 002250 137546
 042634 013737 002250 002266
 042642 005037 002276
 042646 017737 137532 002332
 042654 013737 002404 002334
 042662 012737 011700 002336
 042670 013737 002332 002342
 042676 042737 100004 002342
 042704 023737 002336 002342
 042712 001427
 042714 013737 002332 002352
 042722 042737 077773 002352
 042730 053737 002352 002336

MOVB PORTB,@RPCS2 ;SELECT PORT B
 MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
 MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
 MOV #MOL!PGM!DPR!DRY!VV,EXPTED ;WHAT REGISTER SHOULD BE
 MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
 BIC #^C77773,TMPO ;SAVE SPECIFIED BITS
 CMP EXPTED,TMPO ;COMPARE THE BITS
 BEQ 69\$;BR IF OK
 MOV BADDAT,TMP4 ;COPY 'BAD DATA'
 BIC #77773,TMP4 ;CLEAR THE MASKED BITS
 BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT

042736 104456
 042740 000003
 042742 007701
 042744 040000
 042746 012746 003716
 042752 012746 000001
 042756 010600

TRAP C\$ERHRD
 .WORD 3
 .WORD EM33
 .WORD ERR
 MOV #FRMT17,-(SP)
 MOV #1,-(SP)
 MOV SP,RO


```

042760 104414          TRAP  C$PNTB
042762 062706 000004  ADD   #4,SP
042766 005137 002276  COM   CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
042772                                     69$:
;*****
;NOW ISSUE MASSBUS INIT

042772 012777 000040 137402      MOV   #CLR,@RPCS2    ;ISSUE MASSBUS INIT
;*****
;CONFIRM THAT DRIVE STILL SEIZED BY PORT B

043000 113777 002246 137374      MOVB  PORTA,@RPCS2    ;SELECT PORT A
043006 013737 002246 002266      MOV   PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
043014 005037 002276          CLR   CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
043020 017737 137360 002332      MOV   @RPDS,BADDAT  ;GET CONTENTS OF RPDS
043026 013737 002404 002334      MOV   RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
043034 005037 002336          CLR   EXPTED        ;WHAT REGISTER SHOULD BE
043040 013737 002332 002342      MOV   BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
043046 042737 100004 002342      BIC   #^C7773,TMPO  ;SAVE SPECIFIED BITS
043054 023737 002336 002342      CMP   EXPTED,TMPO   ;COMPARE THE BITS
043062 001427          BEQ   71$           ;BR IF OK
043064 013737 002332 002352      MOV   BADDAT,TMP4   ;COPY 'BAD DATA'
043072 042737 077773 002352      BIC   #77773,TMP4   ;CLEAR THE MASKED BITS
043100 053737 002352 002336      BIS   TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
043106 104456          TRAP  C$SERHRD
043110 000003          .WORD 3
043112 010003          .WORD EM34
043114 013320          .WORD ERR11
043116 012746 003716      MOV   #FRMT17,-(SP)
043122 012746 000001      MOV   #1,-(SP)
043126 010600          MOV   SP,R0
043130 104414          TRAP  C$PNTB
043132 062706 000004  ADD   #4,SP
043136 005137 002276  COM   CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
043142                                     71$:
043142 113777 002250 137232      MOVB  PORTB,@RPCS2   ;SELECT PORT B
043150 013737 002250 002266      MOV   PORTB,PTNBR   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
043156 005037 002276          CLR   CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
043162 017737 137216 002332      MOV   @RPDS,BADDAT  ;GET CONTENTS OF RPDS
043170 013737 002404 002334      MOV   RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
043176 012737 011700 002336      MOV   #MOL!PGM!DPR!DRY!VV,EXPTED  ;:WHAT REGISTER SHOULD BE
043204 013737 002332 002342      MOV   BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
043212 042737 100004 002342      BIC   #^C7773,TMPO  ;SAVE SPECIFIED BITS
043220 023737 002336 002342      CMP   EXPTED,TMPO   ;COMPARE THE BITS
043226 001427          BEQ   73$           ;BR IF OK
043230 013737 002332 002352      MOV   BADDAT,TMP4   ;COPY 'BAD DATA'
043236 042737 077773 002352      BIC   #77773,TMP4   ;CLEAR THE MASKED BITS
043244 053737 002352 002336      BIS   TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
043252 104456          TRAP  C$SERHRD
043254 000003          .WORD 3
043256 010003          .WORD EM34
043260 040000          .WORD ERR
043262 012746 003716      MOV   #FRMT17,-(SP)
043266 012746 000001      MOV   #1,-(SP)
043272 010600          MOV   SP,R0
043274 104414          TRAP  C$PNTB
    
```

```

043276 062706 000004          ADD    #4,SP
043302 005137 002276          COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
043306                                73$:
                                ;RELEASE THE DRIVE FROM PORT B

043306 113777 002250 137066      MOVB   PORTB,@RPCS2    ;SELECT PORT B
043314 013737 002250 002266      MOV    PORTB,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
043322 012777 000013 137042      MOV    #13,@RPCS1    ;ISSUE RELEASE THROUGH PORT B

                                ;START THE TIMER

043330 005037 002304          CLR    TIME          ;CLEAR THE ELAPSED TIME COUNTER
043334 012737 000050 002306      MOV    #40,WATCH    ;SET WATCH TO 40. MS
043342 005737 002306          TST   WATCH
043346 001375          BNE   75$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

043350 005037 002302          CLR    RELERR        ;CLEAR THE 'RELEASE ERROR ' INDICATOR
043354 013737 002404 002334      MOV    RPDS,BADADR   ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
043362 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
043370 113777 002246 137004      MOVB   PORTA,@RPCS2  ;SELECT PORT A.
043376 017737 137002 002346      MOV    @RPDS,TMP2    ;GET THE DRIVE STATUS REGISTER FROM PORT A.
043404 042737 024005 002346      BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
043412 013737 002346 002342      MOV    TMP2,TMP0     ;COPY IT INTO 'TMP0'
043420 042737 100100 002342      BIC    #ATA!VV,TMP0  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
043426 113777 002250 136746      MOVB   PORTB,@RPCS2  ;SELECT PORT B.
043434 017737 136744 002350      MOV    @RPDS,TMP3    ;GET THE DRIVE STATUS REGISTER FROM PORT B.
043442 042737 024005 002350      BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
043450 013737 002350 002344      MOV    TMP3,TMP1     ;COPY IT INTO 'TMP1'
043456 042737 100100 002344      BIC    #ATA!VV,TMP1  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
043464 023737 002342 002344      CMP    TMP0,TMP1     ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
043472 001021          BNE   76$          ;BR IF NOT
043474 005737 002342          TST   TMP0          ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
043500 001073          BNE   78$          ;BR IF NOT
043502 104456          TRAP  C$ERHRD
043504 000006          .WORD 6
043506 010751          .WORD EM46
043510 013534          .WORD ERR15
043512 012746 003716      MOV    #FRMT17,-(SP)
043516 012746 000001      MOV    #1,-(SP)
043522 010600          MOV    SP,R0
043524 104414          TRAP  C$PNTB
043526 062706 000004          ADD    #4,SP
043532 000137 044034          JMP    80$          ;BYPASS THE REST OF THE CHECKS
043536 013737 002346 002332 76$:      MOV    TMP2,BADDAT   ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
043544 013737 002250 002266      MOV    PORTB,PTNBR  ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
043552 113777 002250 136622      MOVB   PORTB,@RPCS2  ;SELECT PORT B.
043560 005737 002342          TST   TMP0          ;SEE IF STATUS EQ 0 FROM PORT A.
043564 001414          BEQ   77$          ;BR IF ZERO
043566 013737 002246 002266      MOV    PORTA,PTNBR  ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
043574 013737 002350 002332      MOV    TMP3,BADDAT  ;'BAD DATA' FOR ERROR TYPE OUT
043602 113777 002246 136572      MOVB   PORTA,@RPCS2  ;SELECT PORT A.
043610 005737 002344          TST   TMP1          ;SEE IF STATUS EQ ZERO FROM PORT B.
043614 001025          BNE   78$          ;BR IF NOT
    
```



```

043616 012737 177777 002302 77$: MOV #-1,RELERR ;SET 'RELEASE ERROR' INDICATOR
043624 012777 000011 136540 MOV #11,@RPCS1 ;CLEAR THE DRIVE
043632 012777 000013 136532 MOV #13,@RPCS1 ;RELEASE THE DRIVE
043640 104456 TRAP C$ERHRD
043642 000011 .WORD 9
043644 007313 .WORD EM26
043646 013214 .WORD ERR9
043650 012746 003716 MOV #FRMT17,-(SP)
043654 012746 000001 MOV #1,-(SP)
043660 010600 MOV SP,R0
043662 104414 TRAP C$PNTB
043664 062706 000004 ADD #4,SP
043670 013737 002346 002332 78$: MOV TMP2,BADDAT ;LOOK FOR BIT FAILURES WHEN RPDS READ
043676 013737 002246 002266 MOV PORTA,PTNBR ;CHANGE PORT NUMBER
043704 042737 100000 002332 BIC #ATA,BADDAT ;DON'T CHECK THE ATTN BIT
043712 023737 002336 002332 CMP EXPTED,BADDAT ;ALL BITS OK ?
043720 001414 BEQ 79$ ;BR IF OK FROM PORT A.
043722 104456 TRAP C$ERHRD
043724 000013 .WORD 11
043726 006072 .WORD EM7
043730 013000 .WORD ERR5
043732 012746 003471 MOV #FRMT14,-(SP)
043736 012746 000001 MOV #1,-(SP)
043742 010600 MOV SP,R0
043744 104414 TRAP C$PNTB
043746 062706 000004 ADD #4,SP
043752 013737 002350 002332 79$: MOV TMP3,BADDAT ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
043760 013737 002250 002266 MOV PORTB,PTNBR ;CHANGE PORT NUMBER
043766 042737 100000 002332 BIC #ATA,BADDAT ;DON'T CHECK THE ATTN BIT
043774 023737 002336 002332 CMP EXPTED,BADDAT ;SEE IF READ OK FROM PORT B.
044002 001414 BEQ 80$ ;BR IF OK
044004 104456 TRAP C$ERHRD
044006 000014 .WORD 12
044010 006072 .WORD EM7
044012 013000 .WORD ERR5
044014 012746 003522 MOV #FRMT15,-(SP)
044020 012746 000001 MOV #1,-(SP)
044024 010600 MOV SP,R0
044026 104414 TRAP C$PNTB
044030 062706 000004 ADD #4,SP
044034 80$:
044034 1$:
27 044034 L10053:
044034 104401 TRAP C$ETST
    
```

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```
.SBTTL TEST 14 SEIZE BY RPAS TEST
:*TEST THAT WRITING THE APPROPRIATE DRIVE BIT INTO THE ATTENTION REGISTER
:* (RPAS) SEIZES THE DRIVE. VERIFY THAT REQUEST IS SET FOR THE OTHER
:* PORT.
:*
:* A. WRITE THE APPROPRIATE DRIVE BITS INTO RPAS; VERIFY THAT THE DRIVE
:* IS SEIZED.
:*
:* B. ISSUE A RELEASE COMMAND THROUGH THE SEIZING PORT; VERIFY THAT THE
:* DRIVE SWITCHES TO THE OPPOSITE PORT. ISSUE A RELEASE THROUGH THE
:* OPPOSITE PORT AND VERIFY THAT THE DRIVE IS IN NEUTRAL.
:*
```

138 044036
 142 044036 005737 002340
 044042 001402
 044044 104432
 044046 002662
 044050

```
T14::
TST DRVBAD ;SYSTEM OK?
BEQ 64$ ;TAKE BRANCH IF SO
TRAP CSEXIT
.WORD L10054-
```

64\$: ;CLEAR ATTENTION BITS FOR BOTH PORTS

044050 113777 002246 136324
 044056 005077 136322
 044062 012777 000011 136302
 044070 012777 000013 136274

```
MOV B PORTA,@RPCS2 ;SELECT PORT #A
CLR @RPDS ;SEIZE THE DRIVE
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

65\$: ;START THE TIMER

044076 005037 002304
 044102 012737 000050 002306
 044110 005737 002306
 044114 001375
 044116 113777 002250 136256
 044124 005077 136254
 044130 012777 000011 136234
 044136 012777 000013 136226

```
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40.,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 65$
MOV B PORTB,@RPCS2 ;SELECT PORT #B
CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

66\$: ;START THE TIMER

044144 005037 002304
 044150 012737 000050 002306
 044156 005737 002306
 044162 001375

```
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40.,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 66$
```

 ;SELECT DRIVE OTHER THAN THAT BEING TESTED

044164 113777 002252 136210
 044172 013737 002246 002270

```
MOV B PORTC,@RPCS2 ;SELECT DRIVE NOT BEING TESTED
MOV PORTA,SEIZPT ;'SEIZED' PORT ADDRESS
```

 ;WRITE THE DRIVE'S ATTENTION BIT

044200 013777 002260 136202
 044206 113777 002246 136166
 044214 013737 002246 002266

```
MOV ASR1,@RPAS ;WRITE THE ATTENTION BITS OF THE DRIVE BEING TESTED
MOV B PORTA,@RPCS2 ;SELECT PORT A
MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
```

 :VERIFY THAT EITHER PORT A OR PORT B HAS THE DRIVE

```

044222 005777 136156          TST    @RPDS          ;SEE THE REGISTER THROUGH PORT A ?
044226 001027                BNE    1$            ;BR IF YES
044230 113777 002250 136144  MOVB   PORTB,@RPCS2   ;SELECT PORT B
044236 013737 002250 002266  MOV    PORTB,PTNBR   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044244 005777 136134          TST    @RPDS          ;SEE REGISTER THROUGH PORT B ?
044250 001047                BNE    2$            ;BR IF YES
044252 104456                TRAP   C$ERHRD
044254 000027                .WORD 23
044256 010436                .WORD EM42
044260 000000                .WORD 0
044262 012746 003716        MOV    #FRMT17,-(SP)
044266 012746 000001        MOV    #1,-(SP)
044272 010600                MOV    SP,R0
044274 104414                TRAP   C$PNTB
044276 062706 000004        ADD    #4,SP
044302 000137 046730        JMP    4$            ;BYPASS REST OF TEST
044306                                1$:
044306 113777 002250 136066  MOVB   PORTB,@RPCS2   ;SELECT PORT B
044314 013737 002250 002266  MOV    PORTB,PTNBR   ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044322 005777 136056          TST    @RPDS          ;REGISTER SHOULD BE ZERO THROUGH PORT B
044326 001002                BNE    .+6           ;BR IF STATUS REG IS NOT ZERO
044330 000137 045544        JMP    3$            ;STATUS REG IS ZERO
044334 104456                TRAP   C$ERHRD
044336 000030                .WORD 24
044340 010524                .WORD EM43
044342 000000                .WORD 0
044344 012746 003522        MOV    #FRMT15,-(SP)
044350 012746 000001        MOV    #1,-(SP)
044354 010600                MOV    SP,R0
044356 104414                TRAP   C$PNTB
044360 062706 000004        ADD    #4,SP
044364 000137 046730        JMP    4$            ;BYPASS REST OF TEST
    
```

 :PORT B HAS THE DRIVE. VERIFY THAT PORT A HAS PORT REQUEST SET

```

044370                                2$:
044370 005037 002276          CLR    CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
044374 017737 136004 002332  MOV    @RPDS,BADDAT  ;GET CONTENTS OF RPDS
044402 013737 002404 002334  MOV    RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
044410 012737 011700 002336  MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;:WHAT REGISTER SHOULD BE
044416 013737 002332 002342  MOV    BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
044424 042737 106077 002342  BIC    #^C71700,TMPO ;SAVE SPECIFIED BITS
044432 023737 002336 002342  CMP    EXPTED,TMPO   ;COMPARE THE BITS
044440 001427                BEQ    67$           ;BR IF OK
044442 013737 002332 002352  MOV    BADDAT,TMP4   ;COPY 'BAD DATA'
044450 042737 071700 002352  BIC    #71700,TMP4   ;CLEAR THE MASKED BITS
044456 053737 002352 002336  BIS    TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
044464 104456                TRAP   C$ERHRD
044466 000004                .WORD 4
044470 006146                .WORD EM10
044472 012654                .WORD ERR3
044474 012746 003716        MOV    #FRMT17,-(SP)
044500 012746 000001        MOV    #1,-(SP)
    
```

```

044504 010600      MOV      SP,R0
044506 104414      TRAP     C$PNTB
044510 062706 000004  ADD      #4,SP
044514 005137 002276  COM      CKERR      ;SET THE REGISTER COMPARE ERROR INDICATOR
044520      67$:
044520 013737 002250 002270  MOV      PORTB,SEIZPT ;ADDRESS FOR ERROR MESSAGE
044526 013737 002246 002272  MOV      PORTA,OPPRT  ;SAME AS ABOVE

;RELEASE THE DRIVE FROM PORT B

044534 113777 002250 135640  MOVB     PORTB,@RPCS2 ;SELECT PORT B
044542 013737 002250 002266  MOV      PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044550 012777 000013 135614  MOV      #13,@RPCS1  ;ISSUE RELEASE THROUGH PORT B

;START THE TIMER

044556 005037 002304      CLR      TIME      ;CLEAR THE ELAPSED TIME COUNTER
044562 012737 000050 002306  MOV      #40.,WATCH ;SET WATCH TO 40. MS
044570 005737 002306      TST     WATCH
044574 001375      BNE     69$

;VERIFY THAT DRIVE IS SEIZED BY PORT A WHEN RELEASED BY PORT B

044576 005037 002302      CLR      RELERR     ;CLEAR 'RELEASE ERROR' INDICATOR
044602 012737 111700 002336  MOV      #ATA!MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
044610 013737 002404 002334  MOV      RPDS,BADADR ;REGISTER ADDRESS
044616 113777 002246 135556  MOVB     PORTA,@RPCS2 ;SELECT PORT A
044624 013737 002246 002266  MOV      PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044632 017737 135546 002342  MOV      @RPDS,TMPO  ;READ STATUS REGISTER FROM PORT A
044640 042737 000004 002342  BIC      #ILV,TMPO  ;CLEAR DON'T CARE BIT
044646 113777 002250 135526  MOVB     PORTB,@RPCS2 ;SELECT PORT B
044654 013737 002250 002266  MOV      PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
044662 017737 135516 002332  MOV      @RPDS,BADDAT ;DRIVE STATUS FROM PORT B
044670 042737 000004 002332  BIC      #ILV,BADDAT ;CLEAR DON'T CARE BIT
044676 001417      BEQ     70$        ;BR IF STATUS FROM PORT B ZERO
044700 005737 002342      TST     TMPO      ;IS STATUS FROM PORT A ZERO ?
044704 001414      BEQ     70$        ;BR IF ZERO
044706 104456      TRAP     C$SERHRD
044710 000015      .WORD   13
044712 010601      .WORD   EM44
044714 040000      .WORD   ERR
044716 012746 003522  MOV      #FRMT15,-(SP)
044722 012746 000001  MOV      #1,-(SP)
044726 010600      MOV      SP,R0
044730 104414      TRAP     C$PNTB
044732 062706 000004  ADD      #4,SP
044736 013737 002342 002332 70$: MOV      TMPO,BADDAT ;CHECK STATUS FROM PORT A
044744 013737 002246 002266  MOV      PORTA,PTNBR ;CHANGE PORT ADDRESS FOR TYPEOUT
044752 023737 002336 002332  CMP      EXPTED,BADDAT ;COMPARE WITH CONSTANT
044760 001414      BEQ     71$        ;BR IF OK
044762 104456      TRAP     C$SERHRD
044764 000017      .WORD   15
044766 007400      .WORD   EM27
044770 013000      .WORD   ERR5
044772 012746 003522  MOV      #FRMT15,-(SP)
044776 012746 000001  MOV      #1,-(SP)
    
```



```

045002 010600          MOV    SP,R0
045004 104414          TRAP   C$PNTB
045006 062706 000004   ADD    #4,SP
045012                                71$:
                                ;RELEASE THE DRIVE FROM PORT A

045012 113777 002246 135362  MOVB   PORTA,@RPCS2      ;SELECT PORT A
045020 013737 002246 002266  MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
045026 012777 000013 135336  MOV    #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                ;START THE TIMER

045034 005037 002304          CLR    TIME              ;CLEAR THE ELAPSED TIME COUNTER
045040 012737 000050 002306  MOV    #40,WATCH        ;SET WATCH TO 40. MS
045046 005737 002306          TST   WATCH
045052 001375          BNE   72$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

045054 005037 002302          CLR    RELERR           ;CLEAR THE 'RELEASE ERROR ' INDICATOR
045060 013737 002404 002334  MOV    RPDS,BADADR      ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
045066 012737 011700 002336  MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
045074 113777 002246 135300  MOVB   PORTA,@RPCS2      ;SELECT PORT A.
045102 017737 135276 002346  MOV    @RPDS,TMP2       ;GET THE DRIVE STATUS REGISTER FROM PORT A.
045110 042737 024005 002346  BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
045116 013737 002346 002342  MOV    TMP2,TMP0        ;COPY IT INTO 'TMP0'
045124 042737 100100 002342  BIC    #ATA!VV,TMP0      ;CLEAR PORT DEPENDENT BITS FROM THE COPY
045132 113777 002250 135242  MOVB   PORTB,@RPCS2      ;SELECT PORT B.
045140 017737 135240 002350  MOV    @RPDS,TMP3       ;GET THE DRIVE STATUS REGISTER FROM PORT B.
045146 042737 024005 002350  BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
045154 013737 002350 002344  MOV    TMP3,TMP1        ;COPY IT INTO 'TMP1'
045162 042737 100100 002344  BIC    #ATA!VV,TMP1      ;CLEAR PORT DEPENDENT BITS FROM THE COPY
045170 023737 002342 002344  CMP    TMP0,TMP1        ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
045176 001021          BNE   73$              ;BR IF NOT
045200 005737 002342          TST   TMP0              ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
045204 001073          BNE   75$              ;BR IF NOT
045206 104456          TRAP   C$ERHRD
045210 000006          .WORD 6
045212 010751          .WORD EM46
045214 013534          .WORD ERR15
045216 012746 003716  MOV    #FRMT17,-(SP)
045222 012746 000001  MOV    #1,-(SP)
045226 010600          MOV    SP,R0
045230 104414          TRAP   C$PNTB
045232 062706 000004   ADD    #4,SP
045236 000137 045540          JMP    77$
045242 013737 002346 002332 73$: MOV    TMP2,BADDAT      ;BYPASS THE REST OF THE CHECKS
045250 013737 002250 002266  MOV    PORTB,PTNBR      ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
045256 113777 002250 135116  MOVB   PORTB,@RPCS2      ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
045264 005737 002342          TST   TMP0              ;SELECT PORT B.
045270 001414          BEQ   74$              ;SEE IF STATUS EQ 0 FROM PORT A.
045272 013737 002246 002266  MOV    PORTA,PTNBR      ;BR IF ZERO
045300 013737 002350 002332  MOV    TMP3,BADDAT      ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
045306 113777 002246 135066  MOV    PORTA,@RPCS2      ;'BAD DATA' FOR ERROR TYPE OUT
045314 005737 002344          TST   TMP1              ;SELECT PORT A.
                                ;SEE IF STATUS EQ ZERO FROM PORT B.
    
```

```

045320 001025
045322 012737 177777 002302 74$: BNE 75$ ;BR IF NOT
045330 012777 000011 135034 MOV #-1,RELERR ;SET 'RELEASE ERROR' INDICATOR
045336 012777 000013 135026 MOV #11,@RPCS1 ;CLEAR THE DRIVE
045344 104456 TRAP #13,@RPCS1 ;RELEASE THE DRIVE
045346 000011 .WORD CSERHRD
045350 007313 .WORD 9
045352 013214 .WORD EM26
045354 012746 003716 MOV #FRMT17,-(SP)
045360 012746 000001 MOV #1,-(SP)
045364 010600 MOV SP,R0
045366 104414 TRAP C$PNTB
045370 062706 000004 ADD #4,SP
045374 013737 002346 002332 75$: MOV TMP2,BADDAT ;LOOK FOR BIT FAILURES WHEN RPDS READ
045402 013737 002246 002266 MOV PORTA,PTNBR ;CHANGE PORT NUMBER
045410 042737 100000 002332 BIC #ATA,BADDAT ;DON'T CHECK THE ATTN BIT
045416 023737 002336 002332 CMP EXPTED,BADDAT ;ALL BITS OK ?
045424 001414 BEQ 76$ ;BR IF OK FROM PORT A.
045426 104456 TRAP CSERHRD
045430 000013 .WORD 11
045432 006072 .WORD EM7
045434 013000 .WORD ERR5
045436 012746 003471 MOV #FRMT14,-(SP)
045442 012746 000001 MOV #1,-(SP)
045446 010600 MOV SP,R0
045450 104414 TRAP C$PNTB
045452 062706 000004 ADD #4,SP
045456 013737 002350 002332 76$: MOV TMP3,BADDAT ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
045464 013737 002250 002266 MOV PORTB,PTNBR ;CHANGE PORT NUMBER
045472 042737 100000 002332 BIC #ATA,BADDAT ;DON'T CHECK THE ATTN BIT
045500 023737 002336 002332 CMP EXPTED,BADDAT ;SEE IF READ OK FROM PORT B.
045506 001414 BEQ 77$ ;BR IF OK
045510 104456 TRAP CSERHRD
045512 000014 .WORD 12
045514 006072 .WORD EM7
045516 013000 .WORD ERR5
045520 012746 003522 MOV #FRMT15,-(SP)
045524 012746 000001 MOV #1,-(SP)
045530 010600 MOV SP,R0
045532 104414 TRAP C$PNTB
045534 062706 000004 ADD #4,SP
045540 000137 046730 77$: JMP 4$
    
```

 ;THE DRIVE IS SEIZED BY PORT A. VERIFY THAT PORT B HAS PORT REQUEST SET

```

045544 113777 002246 134630 3$: MOV#B PORTA,@RPCS2 ;SELECT PORT A
045552 013737 002246 002266 MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
045560 005037 002276 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
045564 017737 134614 002332 MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
045572 013737 002404 002334 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
045600 012737 011700 002336 MOV #MOL!PGM!DPR!DRY!VV,EXPTED ;;WHAT REGISTER SHOULD BE
045606 013737 002332 002342 MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
045614 042737 106077 002342 BIC #^C71700,TMPO ;SAVE SPECIFIED BITS
045622 023737 002336 002342 CMP EXPTED,TMPO ;COMPARE THE BITS
    
```



```

045630 001427          BEQ      78$          ;BR IF OK
045632 013737 002332 002352  MOV      BADDAT,TMP4  ;COPY 'BAD DATA'
045640 042737 071700 002352  BIC      #71700,TMP4  ;CLEAR THE MASKED BITS
045646 053737 002352 002336  BIS      TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
045654 104456          TRAP    C$ERHRD
045656 000004          .WORD   4
045660 006146          .WORD   EM10
045662 012654          .WORD   ERR3
045664 012746 003716  MOV      #FRMT17,-(SP)
045670 012746 000001  MOV      #1,-(SP)
045674 010600          MOV      SP,RO
045676 104414          TRAP    C$PNTB
045700 062706 000004  ADD      #4,SP
045704 005137 002276  COM      CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
045710          78$:
045710 013737 002246 002270  MOV      PORTA,SEIZPT ;ADDRESS FOR ERROR MESSAGE
045716 013737 002250 002272  MOV      PORTB,OPRT   ;SAME AS ABOVE

;RELEASE THE DRIVE FROM PORT A

045724 113777 002246 134450  MOVB     PORTA,@RPCS2 ;SELECT PORT A
045732 013737 002246 002266  MOV      PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
045740 012777 000013 134424  MOV      #13,@RPCS1  ;ISSUE RELEASE THROUGH PORT A

;START THE TIMER

045746 005037 002304          CLR      TIME          ;CLEAR THE ELAPSED TIME COUNTER
045752 012737 000050 002306  MOV      #40,WATCH     ;SET WATCH TO 40. MS
045760 005737 002306          TST      WATCH
045764 001375          BNE     80$

;VERIFY THAT DRIVE IS SEIZED BY PORT B WHEN RELEASED BY PORT A

045766 005037 002302          CLR      RELERR        ;CLEAR 'RELEASE ERROR' INDICATOR
045772 012737 111700 002336  MOV      #ATA!MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
046000 013737 002404 002334  MOV      RPDS,BADADR   ;REGISTER ADDRESS
046006 113777 002250 134366  MOVB     PORTB,@RPCS2  ;SELECT PORT B
046014 013737 002250 002266  MOV      PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
046022 017737 134356 002342  MOV      @RPDS,TMPO    ;READ STATUS REGISTER FROM PORT B
046030 042737 000004 002342  BIC      #ILV,TMPO    ;CLEAR DON'T CARE BIT
046036 113777 002246 134336  MOVB     PORTA,@RPCS2  ;SELECT PORT A
046044 013737 002246 002266  MOV      PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
046052 017737 134326 002332  MOV      @RPDS,BADDAT ;DRIVE STATUS FROM PORT A
046060 042737 000004 002332  BIC      #ILV,BADDAT  ;CLEAR DON'T CARE BIT
046066 001417          BEQ      81$          ;BR IF STATUS FROM PORT A ZERO
046070 005737 002342  TST      TMPO          ;IS STATUS FROM PORT B ZERO ?
046074 001414          BEQ      81$          ;BR IF ZERO
046076 104456          TRAP    C$ERHRD
046100 000015          .WORD   13
046102 010601          .WORD   EM44
046104 013472          .WORD   ERR14
046106 012746 003522  MOV      #FRMT15,-(SP)
046112 012746 000001  MOV      #1,-(SP)
046116 010600          MOV      SP,RO
046120 104414          TRAP    C$PNTB
046122 062706 000004  ADD      #4,SP
    
```

```

046126 013737 002342 002332 81$: MOV     TMPO,BADDAT      ;CHECK STATUS FROM PORT B
046134 013737 002250 002266      MOV     PORTB,PTNBR    ;CHANGE PORT ADDRESS FOR TYPEOUT
046142 023737 002336 002332      CMP     EXPTED,BADDAT  ;COMPARE WITH CONSTANT
046150 001414      BEQ     82$           ;BR IF OK
046152 104456      TRAP   C$ERHRD
046154 000017      .WORD 15
046156 007400      .WORD EM27
046160 013000      .WORD ERR5
046162 012746 003522      MOV     #FRMT15,-(SP)
046166 012746 000001      MOV     #1,-(SP)
046172 010600      MOV     SP,R0
046174 104414      TRAP   C$PNTB
046176 062706 000004      ADD     #4,SP
046202      82$:

;RELEASE THE DRIVE FROM PORT B

046202 113777 002250 134172      MOVB   PORTB,@RPCS2    ;SELECT PORT B
046210 013737 002250 002266      MOV     PORTB,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
046216 012777 000013 134146      MOV     #13,@RPCS1    ;ISSUE RELEASE THROUGH PORT B

;START THE TIMER

046224 005037 002304      CLR     TIME           ;CLEAR THE ELAPSED TIME COUNTER
046230 012737 000050 002306      MOV     #40,,WATCH    ;SET WATCH TO 40. MS
046236 005737 002306      TST    WATCH
046242 001375      BNE    83$           83$:

;VERIFY THAT THE DRIVE IS IN NEUTRAL

046244 005037 002302      CLR     RELERR        ;CLEAR THE 'RELEASE ERROR ' INDICATOR
046250 013737 002404 002334      MOV     RPDS,BADADR    ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
046256 012737 011700 002336      MOV     #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
046264 113777 002246 134110      MOVB   PORTA,@RPCS2    ;SELECT PORT A.
046272 017737 134106 002346      MOV     @RPDS,TMP2     ;GET THE DRIVE STATUS REGISTER FROM PORT A.
046300 042737 024005 002346      BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
046306 013737 002346 002342      MOV     TMP2,TMPO     ;COPY IT INTO 'TMPO'
046314 042737 100100 002342      BIC    #ATA!VV,TMPO    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
046322 113777 002250 134052      MOVB   PORTB,@RPCS2    ;SELECT PORT B.
046330 017737 134050 002350      MOV     @RPDS,TMP3     ;GET THE DRIVE STATUS REGISTER FROM PORT B.
046336 042737 024005 002350      BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
046344 013737 002350 002344      MOV     TMP3,TMP1     ;COPY IT INTO 'TMP1'
046352 042737 100100 002344      BIC    #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
046360 023737 002342 002344      CMP     TMPO,TMP1     ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
046366 001021      BNE    84$           ;BR IF NOT
046370 005737 002342      TST    TMPO           ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
046374 001073      BNE    86$           ;BR IF NOT
046376 104456      TRAP   C$ERHRD
046400 000006      .WORD 6
046402 010751      .WORD EM46
046404 013534      .WORD ERR15
046406 012746 003716      MOV     #FRMT17,-(SP)
046412 012746 000001      MOV     #1,-(SP)
046416 010600      MOV     SP,R0
046420 104414      TRAP   C$PNTB
046422 062706 000004      ADD     #4,SP
    
```



```

046426 000137 046730          JMP      88$
046432 013737 002346 002332 84$:  MOV     TMP2,BADDAT
046440 013737 002250 002266      MOV     PORTB,PTNBR
046446 113777 002250 133726      MOVVB   PORTB,@RPCS2
046454 005737 002342          TST     TMP0
046460 001414          BEQ     85$
046462 013737 002246 002266      MOV     PORTA,PTNBR
046470 013737 002350 002332      MOV     TMP3,BADDAT
046476 113777 002246 133676      MOVVB   PORTA,@RPCS2
046504 005737 002344          TST     TMP1
046510 001025          BNE     86$
046512 012737 177777 002302 85$:  MOV     #-1,RELERR
046520 012777 000011 133644      MOV     #11,@RPCS1
046526 012777 000013 133636      MOV     #13,@RPCS1
046534 104456          TRAP   C$ERHRD
046536 000011          .WORD  9
046540 007313          .WORD  EM26
046542 013214          .WORD  ERR9
046544 012746 003716      MOV     #FRMT17,-(SP)
046550 012746 000001      MOV     #1,-(SP)
046554 010600          MOV     SP,R0
046556 104414          TRAP   C$PNTB
046560 062706 000004          ADD     #4,SP
046564 013737 002346 002332 86$:  MOV     TMP2,BADDAT
046572 013737 002246 002266      MOV     PORTA,PTNBR
046600 042737 100000 002332      BIC     #ATA,BADDAT
046606 023737 002336 002332      CMP     EXPTED,BADDAT
046614 001414          BEQ     87$
046616 104456          TRAP   C$ERHRD
046620 000013          .WORD  11
046622 006072          .WORD  EM7
046624 013000          .WORD  ERR5
046626 012746 003471      MOV     #FRMT14,-(SP)
046632 012746 000001      MOV     #1,-(SP)
046636 010600          MOV     SP,R0
046640 104414          TRAP   C$PNTB
046642 062706 000004          ADD     #4,SP
046646 013737 002350 002332 87$:  MOV     TMP3,BADDAT
046654 013737 002250 002266      MOV     PORTB,PTNBR
046662 042737 100000 002332      BIC     #ATA,BADDAT
046670 023737 002336 002332      CMP     EXPTED,BADDAT
046676 001414          BEQ     88$
046700 104456          TRAP   C$ERHRD
046702 000014          .WORD  12
046704 006072          .WORD  EM7
046706 013000          .WORD  ERR5
046710 012746 003522      MOV     #FRMT15,-(SP)
046714 012746 000001      MOV     #1,-(SP)
046720 010600          MOV     SP,R0
046722 104414          TRAP   C$PNTB
046724 062706 000004          ADD     #4,SP
046730          88$:
046730          4$:
146 046730          L10054:
046730 104401          TRAP   C$SETST
    
```

```

;BYPASS THE REST OF THE CHECKS
;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
;SELECT PORT B.
;SEE IF STATUS EQ 0 FROM PORT A.
;BR IF ZERO
;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
;'BAD DATA' FOR ERROR TYPE OUT
;SELECT PORT A.
;SEE IF STATUS EQ ZERO FROM PORT B.
;BR IF NOT
;SET 'RELEASE ERROR' INDICATOR
;CLEAR THE DRIVE
;RELEASE THE DRIVE

;LOOK FOR BIT FAILURES WHEN RPDS READ
;CHANGE PORT NUMBER
;DON'T CHECK THE ATTN BIT
;ALL BITS OK ?
;BR IF OK FROM PORT A.

;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
;CHANGE PORT NUMBER
;DON'T CHECK THE ATTN BIT
;SEE IF READ OK FROM PORT B.
;BR IF OK
    
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```
.SBTTL TEST 15 INHIBIT SEIZE BY RPAS TEST
;*VERIFY THAT THE DRIVE IS NOT SEIZED WHEN A 'ZERO' IS WRITTEN INTO
;* THE DRIVE'S ATTENTION BIT.
;*
;* A. SELECT A DRIVE NOT BEING TESTED AND WRITE ALL BITS, EXCEPT THE
;* BIT OF THE DRIVE BEING TESTED, INTO THE ATTENTION REGISTER.
;*
;* B. VERIFY THAT THE DRIVE IS STILL IN NEUTRAL.
;*
```

```
046732
046732 005737 002340
046736 001402
046740 104432
046742 000640
046744
```

```
T15::
TST DRVBAD ;SYSTEM OK?
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10055-
```

```
046744 113777 002246 133430
046752 005077 133426
046756 012777 000011 133406
046764 012777 000013 133403
```

```
;CLEAR ATTENTION BITS FOR BOTH PORTS
MOV PORTA,@RPCS2 ;SELECT PORT #A
CLR @RPDS ;SEIZE THE DRIVE
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

```
046772 005037 002304
046776 012737 000050 002306
047004 005737 002306
047010 001375
047012 113777 002250 133362
047020 005077 133360
047024 012777 000011 133340
047032 012777 000013 133332
```

```
;START THE TIMER
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40,WATCH ;SET WATCH TO 40. MS
65$: TST WATCH
BNE 65$
MOV PORTB,@RPCS2 ;SELECT PORT #B
CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

```
047040 005037 002304
047044 012737 000050 002306
047052 005737 002306
047056 001375
047060 113777 002252 133314
```

```
;START THE TIMER
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40,WATCH ;SET WATCH TO 40. MS
66$: TST WATCH
BNE 66$
MOV PORTC,@RPCS2 ;SELECT DRIVE NOT BEING TESTED
```

```
047066 013737 002260 002342
047074 005137 002342
047100 013777 002342 133302
```

```
::*****
;WRITE ALL ATTENTION BITS EXCEPT BIT FOR DRIVE UNDER TEST
```

```
MOV ASR1,TMPO ;STORE ATTN BIT FOR PORT A
COM TMPO ;COMPLEMENT IT
MOV TMPO,@RPAS ;WRITE THE ATTN REGISTER
```

```
::*****
;VERIFY THAT DRIVE REMAINED IN NEUTRAL
```

```
;VERIFY THAT THE DRIVE IS IN NEUTRAL
```


047106	005037	002302		CLR	RELERR	;CLEAR THE 'RELEASE ERROR ' INDICATOR
047112	013737	002404	002334	MOV	RPDS,BADADR	;FORM THE ADDRESS OF RPDS FOR TYPEOUT
047120	012737	011700	002336	MOV	#MOL!PGM!DPR!DRY!VV,EXPTD	;COMPARISON CONSTANT
047126	113777	002246	133246	MOVB	PORTA,@RPCS2	;SELECT PORT A.
047134	017737	133244	002346	MOV	@RPDS,TMP2	;GET THE DRIVE STATUS REGISTER FROM PORT A.
047142	042737	024005	002346	BIC	#PIP!WRL!OM!ILV,TMP2	;CLEAR DONT CARES
047150	013737	002346	002342	MOV	TMP2,TMP0	;COPY IT INTO 'TMP0'
047156	042737	100100	002342	BIC	#ATA!VV,TMP0	;CLEAR PORT DEPENDENT BITS FROM THE COPY
047164	113777	002250	133210	MOVB	PORTB,@RPCS2	;SELECT PORT B.
047172	017737	133206	002350	MOV	@RPDS,TMP3	;GET THE DRIVE STATUS REGISTER FROM PORT B.
047200	042737	024005	002350	BIC	#PIP!WRL!OM!ILV,TMP3	;CLEAR DONT CARES
047206	013737	002350	002344	MOV	TMP3,TMP1	;COPY IT INTO 'TMP1'
047214	042737	100100	002344	BIC	#ATA!VV,TMP1	;CLEAR PORT DEPENDENT BITS FROM THE COPY
047222	023737	002342	002344	CMP	TMP0,TMP1	;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
047230	001021			BNE	67\$;BR IF NOT
047232	005737	002342		TST	TMP0	;REGISTERS ARE THE SAME: ARE THEY ZERO ?
047236	001077			BNE	69\$;BR IF NOT
047240	104456			TRAP	C\$ERHRD	
047242	000006			.WORD	6	
047244	010751			.WORD	EM46	
047246	013534			.WORD	ERR15	
047250	012746	003716		MOV	#FRMT17,-(SP)	
047254	012746	000001		MOV	#1,-(SP)	
047260	010600			MOV	SP,R0	
047262	104414			TRAP	C\$PNTB	
047264	062706	000004		ADD	#4,SP	
047270	000137	047602		JMP	71\$;BYPASS THE REST OF THE CHECKS
047274	013737	002346	002332	MOV	TMP2,BADDAT	;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
047302	013737	002250	002266	MOV	PORTB,PTNBR	;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
047310	113777	002250	133064	MOVB	PORTB,@RPCS2	;SELECT PORT B.
047316	005737	002342		TST	TMP0	;SEE IF STATUS EQ 0 FROM PORT A.
047322	001414			BEQ	68\$;BR IF ZERO
047324	013737	002246	002266	MOV	PORTA,PTNBR	;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
047332	013737	002350	002332	MOV	TMP3,BADDAT	; 'BAD DATA' FOR ERROR TYPE OUT
047340	113777	002246	133034	MOVB	PORTA,@RPCS2	;SELECT PORT A.
047346	005737	002344		TST	TMP1	;SEE IF STATUS EQ ZERO FROM PORT B.
047352	001031			BNE	69\$;BR IF NOT
047354	012737	177777	002302	MOV	#-1,RELERR	;SET 'RELEASE ERROR' INDICATOR
047362	012777	000011	133002	MOV	#11,@RPCS1	;CLEAR THE DRIVE
047370	012777	000013	132774	MOV	#13,@RPCS1	;RELEASE THE DRIVE
047376	104456			TRAP	C\$ERHRD	
047400	000007			.WORD	7	
047402	006763			.WORD	EM21	
047404	013152			.WORD	ERR8	
047406	104456			TRAP	C\$ERHRD	
047410	000010			.WORD	8	
047412	006763			.WORD	EM21	
047414	000000			.WORD	0	
047416	012746	003716		MOV	#FRMT17,-(SP)	
047422	012746	000001		MOV	#1,-(SP)	
047426	010600			MOV	SP,R0	
047430	104414			TRAP	C\$PNTB	
047432	062706	000004		ADD	#4,SP	
047436	013737	002346	002332	MOV	TMP2,BADDAT	;LOOK FOR BIT FAILURES WHEN RPDS READ
047444	013737	002246	002266	MOV	PORTA,PTNBR	;CHANGE PORT NUMBER
047452	042737	100000	002332	BIC	#ATA,BADDAT	;DON'T CHECK THE ATTN BIT
047460	023737	002336	002332	CMP	EXPTD,BADDAT	;ALL BITS OK ?

047466	001414			BEQ	70\$				
047470	104456			TRAP	C\$ERHRD				:BR IF OK FROM PORT A.
047472	000013			.WORD	11				
047474	006072			.WORD	EM7				
047476	013000			.WORD	ERR5				
047500	012746	003471		MOV	#FRMT14,-(SP)				
047504	012746	000001		MOV	#1,-(SP)				
047510	010600			MOV	SP,R0				
047512	104414			TRAP	C\$PNTB				
047514	062706	000004		ADD	#4,SP				
047520	013737	002350	002332	MOV	TMP3,BADDAT				:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
047526	013737	002250	002266	MOV	PORTB,PTNBR				:CHANGE PORT NUMBER
047534	042737	100000	002332	BIC	#ATA,BADDAT				:DON'T CHECK THE ATTN BIT
047542	023737	002336	002332	CMP	EXPTED,BADDAT				:SEE IF READ OK FROM PORT B.
047550	001414			BEQ	71\$:BR IF OK
047552	104456			TRAP	C\$ERHRD				
047554	000014			.WORD	12				
047556	006072			.WORD	EM7				
047560	013000			.WORD	ERR5				
047562	012746	003522		MOV	#FRMT15,-(SP)				
047566	012746	000001		MOV	#1,-(SP)				
047572	010600			MOV	SP,R0				
047574	104414			TRAP	C\$PNTB				
047576	062706	000004		ADD	#4,SP				
61	047602								
	047602		71\$:						
	047602	104401	L10055:	TRAP	C\$ETST				

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```
.SBTTL TEST 16 SET PORT 'A' REQUEST TEST
:*VERIFY THAT WRITING A DRIVE REGISTER SETS 'PORT REQUEST' WHEN THE
:* DRIVE IS SEIZED BY THE OTHER PORT.
:*
:* A. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
:*
:* B. WRITE 0'S INTO RPDS FROM PORT 'A'; VERIFY THAT THE DRIVE IS STILL
:* SEIZED BY PORT 'B'.
:*
:* C. ISSUE A RELEASE COMMAND FROM PORT 'B' AND VERIFY THAT THE DRIVE
:* SWITCHED TO PORT 'A'. VERIFY THAT THE ATTENTION BIT IS SET FOR
:* PORT 'A' AND IS NOT SET FOR PORT 'B'.
:*
:* D. ISSUE A RELEASE COMMAND THROUGH PORT 'A' AND VERIFY THAT THE DRIVE
:* RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
:*
```

78 047604
82 047604 005737 002340
047610 001402
047612 104432
047614 001246
047616

```
T16::
TST     DRVBAD      ;SYSTEM OK???
BEQ     64$         ;TAKE BRANCH IF SO
TRAP   C$EXIT
.WORD  L10056-
```

64\$:

;CLEAR ATTENTION BITS FOR BOTH PORTS

047616 113777 002246 132556
047624 005077 132554
047630 012777 000011 132534
047636 012777 000013 132526

```
MOVB   PORTA,@RPCS2 ;SELECT PORT #A
CLR    @RPDS         ;SEIZE THE DRIVE
MOV    #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV    #13,@RPCS1   ;RELEASE THE DRIVE
```

;START THE TIMER

047644 005037 002304
047650 012737 000050 002306
047656 005737 002306
047662 001375
047664 113777 002250 132510
047672 005077 132506
047676 012777 000011 132466
047704 012777 000013 132460

65\$:

```
CLR    TIME         ;CLEAR THE ELAPSED TIME COUNTER
MOV    #40.,WATCH  ;SET WATCH TO 40. MS
TST    WATCH
BNE    65$
MOVB   PORTB,@RPCS2 ;SELECT PORT #B
CLR    @RPDS         ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV    #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV    #13,@RPCS1   ;RELEASE THE DRIVE
```

;START THE TIMER

047712 005037 002304
047716 012737 000050 002306
047724 005737 002306
047730 001375

66\$:

```
CLR    TIME         ;CLEAR THE ELAPSED TIME COUNTER
MOV    #40.,WATCH  ;SET WATCH TO 40. MS
TST    WATCH
BNE    66$
```

;;*****

;SEIZE THE DRIVE THROUGH PORT B

047732 113777 002250 132442
047740 013737 002250 002270
047746 005077 132432

```
MOVB   PORTB,@RPCS2 ;SELECT PORT B
MOV    PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR    @RPDS         ;WRITE RPDS
```

```

047752 013737 002246 002272      MOV     PORTA,OPPRT      ;'OPPOSITE' PORT ADDRESS
047760 013777 002246 132414      MOV     PORTA,@RPCS2    ;SELECT PORT A
047766 013737 002246 002266      MOV     PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
;*****
;SET PORT REQUEST

047774 005077 132404              CLR     @RPDS          ;SET PORT REQUEST FOR PORT A
;*****
;RELEASE THROUGH PORT B. DRIVE SHOULD SWITCH TO PORT A.

050000 113777 002250 132374      MOV     PORTB,@RPCS2    ;SELECT PORT B
050006 013737 002250 002266      MOV     PORTB,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
050014 012777 000013 132350      MOV     #13,@RPCS1     ;ISSUE RELEASE THROUGH PORT ADDRESS

;START THE TIMER

050022 005037 002304              CLR     TIME           ;CLEAR THE ELAPSED TIME COUNTER
050026 012737 000050 002306      MOV     #40.,WATCH    ;SET WATCH TO 40. MS
050034 005737 002306              TST    WATCH
050040 001375                      BNE    69$

050042 113777 002250 132332      MOV     PORTB,@RPCS2    ;SELECT PORT B
050050 013737 002250 002266      MOV     PORTB,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
050056 005037 002276              CLR     CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
050062 017737 132316 002332      MOV     @RPDS,BADADR   ;GET CONTENTS OF RPDS
050070 013737 002404 002334      MOV     RPDS,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
050076 005037 002336              CLR     EXPTED         ;WHAT REGISTER SHOULD BE
050102 013737 002332 002342      MOV     BADDAT,TMPO    ;MOVE REGISTER CONTENTS TO 'TMPO'
050110 042737 077777 002342      BIC    #^CATA,TMPO    ;SAVE SPECIFIED BITS
050116 023737 002336 002342      CMP    EXPTED,TMPO    ;COMPARE THE BITS
050124 001427                      BEQ    70$            ;BR IF OK
050126 013737 002332 002352      MOV     BADDAT,TMP4    ;COPY 'BAD DATA'
050134 042737 100000 002352      BIC    #ATA,TMP4      ;CLEAR THE MASKED BITS
050142 053737 002352 002336      BIS    TMP4,EXPTED    ;'OR' WITH GOOD DATA FOR TYPEOUT
050150 104456                      TRAP   C$ERHRD
050152 000003                      .WORD 3
050154 006551                      .WORD EM16
050156 013000                      .WORD ERR5
050160 012746 003716              MOV     #FRMT17,-(SP)
050164 012746 000001              MOV     #1,-(SP)
050170 010600                      MOV     SP,R0
050172 104414                      TRAP   C$PNTB
050174 062706 000004              ADD     #4,SP
050200 005137 002276              COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
050204                                70$:
050204 113777 002246 132170      MOV     PORTA,@RPCS2    ;SELECT PORT A
050212 013737 002246 002266      MOV     PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
050220 005037 002276              CLR     CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
050224 017737 132154 002332      MOV     @RPDS,BADADR   ;GET CONTENTS OF RPDS
050232 013737 002404 002334      MOV     RPDS,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
050240 012737 100000 002336      MOV     #ATA,EXPTED    ;WHAT REGISTER SHOULD BE
050246 013737 002332 002342      MOV     BADDAT,TMPO    ;MOVE REGISTER CONTENTS TO 'TMPO'
050254 042737 077777 002342      BIC    #^CATA,TMPO    ;SAVE SPECIFIED BITS
050262 023737 002336 002342      CMP    EXPTED,TMPO    ;COMPARE THE BITS
050270 001427                      BEQ    72$            ;BR IF OK
050272 013737 002332 002352      MOV     BADDAT,TMP4    ;COPY 'BAD DATA'
    
```



```

050300 042737 100000 002352      BIC      #ATA,TMP4      ;CLEAR THE MASKED BITS
050306 053737 002352 002336      BIS      TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
050314 104456                      TRAP    C$ERHRD
050316 000003                      .WORD   3
050320 006551                      .WORD   EM16
050322 013000                      .WORD   ERR5
050324 012746 003716      MOV     #FRMT17,-(SP)
050330 012746 000001      MOV     #1,-(SP)
050334 010600                      MOV     SP,R0
050336 104414                      TRAP    C$PNTB
050340 062706 000004      ADD     #4,SP
050344 005137 002276      COM     CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
050350
72$:
;*****

;RELEASE THE DRIVE FROM PORT A
050350 113777 002246 132024      MOV     PORTA,@RPCS2   ;SELECT PORT A
050356 013737 002246 002266      MOV     PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
050364 012777 000013 132000      MOV     #13,@RPCS1    ;ISSUE RELEASE THROUGH PORT A

;START THE TIMER
050372 005037 002304          CLR     TIME          ;CLEAR THE ELAPSED TIME COUNTER
050376 012737 000050 002306      MOV     #40,WATCH     ;SET WATCH TO 40. MS
050404 005737 002306          TST    WATCH
050410 001375          BNE    74$

;VERIFY THAT THE DRIVE IS IN NEUTRAL
050412 005037 002302          CLR     RELERR        ;CLEAR THE 'RELEASE ERROR ' INDICATOR
050416 013737 002404 002334      MOV     RPDS,BADADR   ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
050424 012737 011700 002336      MOV     #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
050432 113777 002246 131742      MOV     PORTA,@RPCS2   ;SELECT PORT A.
050440 017737 131740 002346      MOV     @RPDS,TMP2    ;GET THE DRIVE STATUS REGISTER FROM PORT A.
050446 042737 024005 002346      BIC     #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
050454 013737 002346 002342      MOV     TMP2,TMP0     ;COPY IT INTO 'TMP0'
050462 042737 100100 002342      BIC     #ATA!VV,TMP0  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
050470 113777 002250 131704      MOV     PORTB,@RPCS2   ;SELECT PORT B.
050476 017737 131702 002350      MOV     @RPDS,TMP3    ;GET THE DRIVE STATUS REGISTER FROM PORT B.
050504 042737 024005 002350      BIC     #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
050512 013737 002350 002344      MOV     TMP3,TMP1     ;COPY IT INTO 'TMP1'
050520 042737 100100 002344      BIC     #ATA!VV,TMP1  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
050526 023737 002342 002344      CMP     TMP0,TMP1     ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
050534 001021          BNE    75$           ;BR IF NOT
050536 005737 002342          TST    TMP0          ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
050542 001073          BNE    77$           ;BR IF NOT
050544 104456                      TRAP    C$ERHRD
050546 000006                      .WORD   6
050550 010751                      .WORD   EM46
050552 013534                      .WORD   ERR15
050554 012746 003716      MOV     #FRMT17,-(SP)
050560 012746 000001      MOV     #1,-(SP)
050564 010600                      MOV     SP,R0
050566 104414                      TRAP    C$PNTB
050570 062706 000004      ADD     #4,SP
    
```

050574	000137	051062			JMP	79\$:BYPASS THE REST OF THE CHECKS
050600	013737	002346	002332	75\$:	MOV	TMP2,BADDAT		:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
050606	013737	002250	002266		MOV	PORTB,PTNBR		:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
050614	113777	002250	131560		MOVB	PORTB,@RPCS2		:SELECT PORT B.
050622	005737	002342			TST	TMP0		:SEE IF STATUS EQ 0 FROM PORT A.
050626	001414				BEQ	76\$:BR IF ZERO
050630	013737	002246	002266		MOV	PORTA,PTNBR		:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
050636	013737	002350	002332		MOV	TMP3,BADDAT		: 'BAD DATA' FOR ERROR TYPE OUT
050644	113777	002246	131530		MOVB	PORTA,@RPCS2		:SELECT PORT A.
050652	005737	002344			TST	TMP1		:SEE IF STATUS EQ ZERO FROM PORT B.
050656	001025				BNE	77\$:BR IF NOT
050660	012737	177777	002302	76\$:	MOV	#-1,RELERR		:SET 'RELEASE ERROR' INDICATOR
050666	012777	000011	131476		MOV	#11,@RPCS1		:CLEAR THE DRIVE
050674	012777	000013	131470		MOV	#13,@RPCS1		:RELEASE THE DRIVE
050702	104456				TRAP	C\$ERHRD		
050704	000011				.WORD	9		
050706	007313				.WORD	EM26		
050710	013214				.WORD	ERR9		
050712	012746	003716			MOV	#FRMT17,-(SP)		
050716	012746	000001			MOV	#1,-(SP)		
050722	010600				MOV	SP,R0		
050724	104414				TRAP	C\$PNTB		
050726	062706	000004			ADD	#4,SP		
050732	013737	002346	002332	77\$:	MOV	TMP2,BADDAT		:LOOK FOR BIT FAILURES WHEN RPDS READ
050740	013737	002246	002266		MOV	PORTA,PTNBR		:CHANGE PORT NUMBER
050746	023737	002336	002332		CMP	EXPTED,BADDAT		:ALL BITS OK ?
050754	001414				BEQ	78\$:BR IF OK FROM PORT A.
050756	104456				TRAP	C\$ERHRD		
050760	000013				.WORD	11		
050762	006072				.WORD	EM7		
050764	013000				.WORD	ERR5		
050766	012746	003471			MOV	#FRMT14,-(SP)		
050772	012746	000001			MOV	#1,-(SP)		
050776	010600				MOV	SP,R0		
051000	104414				TRAP	C\$PNTB		
051002	062706	000004			ADD	#4,SP		
051006	013737	002350	002332	78\$:	MOV	TMP3,BADDAT		:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
051014	013737	002250	002266		MOV	PORTB,PTNBR		:CHANGE PORT NUMBER
051022	023737	002336	002332		CMP	EXPTED,BADDAT		:SEE IF READ OK FROM PORT B.
051030	001414				BEQ	79\$:BR IF OK
051032	104456				TRAP	C\$ERHRD		
051034	000014				.WORD	12		
051036	006072				.WORD	EM7		
051040	013000				.WORD	ERR5		
051042	012746	003522			MOV	#FRMT15,-(SP)		
051046	012746	000001			MOV	#1,-(SP)		
051052	010600				MOV	SP,R0		
051054	104414				TRAP	C\$PNTB		
051056	062706	000004			ADD	#4,SP		
051062				79\$:				
051062				1\$:				
86 051062				L10056:				
051062	104401				TRAP	C\$ETST		

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```
.SBTTL TEST 17 SET PORT 'B' REQUEST TEST
;*VERIFY THAT WRITING A DRIVE REGISTER SETS 'PORT REQUEST' WHEN THE
;*DRIVE IS SEIZED BY THE OTHER PORT.
;*
;* A. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
;*
;* B. WRITE 0'S INTO RPDS FROM PORT 'B'; VERIFY THAT THE DRIVE IS STILL
;* SEIZED BY PORT 'A'.
;*
;* C. ISSUE A RELEASE COMMAND FROM PORT 'A' AND VERIFY THAT THE DRIVE
;* SWITCHED TO PORT 'B'. VERIFY THAT THE ATTENTION BIT IS SET FOR
;* PORT 'B' AND IS NOT SET FOR PORT 'A'.
;*
;* D. ISSUE A RELEASE COMMAND THROUGH PORT 'B' AND VERIFY THAT THE DRIVE
;* RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
;*
```

19 051064
23 051064 005737 00234J
051070 001402
051072 104432
051074 001246
051076

```
T17::
TST DRVBAD ;SYSTEM OK???
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10057-
```

;CLEAR ATTENTION BITS FOR BOTH PORTS

```
051076 113777 002246 131276 MOVB PORTA,@RPCS2 ;SELECT PORT #A
051104 005077 131274 CLR @RPDS ;SEIZE THE DRIVE
051110 012777 000011 131254 MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
051116 012777 000013 131246 MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

;START THE TIMER

```
051124 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
051130 012737 000050 002306 MOV #40,WATCH ;SET WATCH TO 40. MS
051136 005737 002306 65$: TST WATCH
051142 001375 BNE 65$
051144 113777 002250 131230 MOVB PORTB,@RPCS2 ;SELECT PORT #B
051152 005077 131226 CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
051156 012777 000011 131206 MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
051164 012777 000013 131200 MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

;START THE TIMER

```
051172 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
051176 012737 000050 002306 MOV #40,WATCH ;SET WATCH TO 40. MS
051204 005737 002306 66$: TST WATCH
051210 001375 BNE 66$
```

;;*****

;SEIZE THE DRIVE THROUGH PORT A

```
051212 113777 002246 131162 MOVB PORTA,@RPCS2 ;SELECT PORT A
051220 013737 002246 002270 MOV PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
051226 005077 131152 CLR @RPDS ;WRITE RPDS
```

```

051232 013737 002250 002272      MOV      PORTB,OPPRT      ;'OPPOSITE' PORT ADDRESS
051240 113777 002250 131134      MOV      PORTB,@RPDS2    ;SELECT PORT B
051246 013737 002250 002266      MOV      PORTB,PTNBR     ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
;*****
;SET PORT REQUEST

051254 005077 131124              CLR      @RPDS           ;SET PORT REQUEST FOR PORT B
;*****
;RELEASE THROUGH PORT A. DRIVE SHOULD SWITCH TO PORT B.

051260 113777 002246 131114      MOV      PORTA,@RPDS2    ;SELECT PORT A
051266 013737 002246 002266      MOV      PORTA,PTNBR     ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
051274 012777 000013 131070      MOV      #13,@RPDS1     ;ISSUE RELEASE THROUGH PORT ADDRESS

;START THE TIMER

051302 005037 002304              CLR      TIME            ;CLEAR THE ELAPSED TIME COUNTER
051306 012737 000050 002306      MOV      #40,WATCH      ;SET WATCH TO 40. MS
051314 005737 002306 69$:      TST      WATCH
051320 001375                      BNE      69$

051322 113777 002246 131052      MOV      PORTA,@RPDS2    ;SELECT PORT A
051330 013737 002246 002266      MOV      PORTA,PTNBR     ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
051336 005037 002276              CLR      CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
051342 017737 131036 002332      MOV      @RPDS,BADADR    ;GET CONTENTS OF RPDS
051350 013737 002404 002334      MOV      RPDS,BADADR     ;FORM REGISTER ADDRESS OF ERROR MESSAGE
051356 005037 002336              CLR      EXPTED          ;WHAT REGISTER SHOULD BE
051362 013737 002332 002342      MOV      BADDR,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
051370 042737 077777 002342      BIC      #^CATA,TMPO     ;SAVE SPECIFIED BITS
051376 023737 002336 002342      CMP      EXPTED,TMPO     ;COMPARE THE BITS
051404 001427                      BEQ      70$             ;BR IF OK
051406 013737 002332 002352      MOV      BADDR,TMP4     ;COPY 'BAD DATA'
051414 042737 100000 002352      BIC      #ATA,TMP4       ;CLEAR THE MASKED BITS
051422 053737 002352 002336      BIS      TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
051430 104456                      TRAP
051432 000003                      .WORD   3
051434 006551                      .WORD   EM16
051436 013000                      .WORD   ERR5
051440 012746 003716              MOV      #FRMT17,-(SP)
051444 012746 000001              MOV      #1,-(SP)
051450 010600                      MOV      SP,R0
051452 104414                      TRAP    C$PNTB
051454 062706 000004              ADD      #4,SP
051460 005137 002276              COM      CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
051464 70$:
051464 113777 002250 130710      MOV      PORTB,@RPDS2    ;SELECT PORT B
051472 013737 002250 002266      MOV      PORTB,PTNBR     ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
051500 005037 002276              CLR      CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
051504 017737 130674 002332      MOV      @RPDS,BADADR    ;GET CONTENTS OF RPDS
051512 013737 002404 002334      MOV      RPDS,BADADR     ;FORM REGISTER ADDRESS OF ERROR MESSAGE
051520 012737 100000 002336      MOV      #ATA,EXPTED     ;WHAT REGISTER SHOULD BE
051526 013737 002332 002342      MOV      BADDR,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
051534 042737 077777 002342      BIC      #^CATA,TMPO     ;SAVE SPECIFIED BITS
051542 023737 002336 002342      CMP      EXPTED,TMPO     ;COMPARE THE BITS
051550 001427                      BEQ      72$             ;BR IF OK
051552 013737 002332 002352      MOV      BADDR,TMP4     ;COPY 'BAD DATA'
    
```



```

051560 042737 100000 002352      BIC      #ATA,TMP4      ;CLEAR THE MASKED BITS
051566 053737 002352 002336      BIS      TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
051574 104456                      TRAP    C$ERHRD
051576 000003                      .WORD  3
051600 006551                      .WORD  EM16
051602 013000                      .WORD  ERR5
051604 012746 003716      MOV      #FRMT17,-(SP)
051610 012746 000001      MOV      #1,-(SP)
051614 010600                      MOV      SP,RO
051616 104414                      TRAP    C$PNTB
051620 062706 000004      ADD      #4,SP
051624 005137 002276      COM      CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
051630
72$:
;:*****

;RELEASE THE DRIVE FROM PORT B

051630 113777 002250 130544      MOV      PORTB,@RPCS2  ;SELECT PORT B
051636 013737 002250 002266      MOV      PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
051644 012777 000013 130520      MOV      #13,@RPCS1  ;ISSUE RELEASE THROUGH PORT B

;START THE TIMER

051652 005037 002304          CLR      TIME          ;CLEAR THE ELAPSED TIME COUNTER
051656 012737 000050 002306      MOV      #40,WATCH    ;SET WATCH TO 40. MS
051664 005737 002306          TST     WATCH
051670 001375          BNE     74$

;VERIFY THAT THE DRIVE IS IN NEUTRAL

051672 005037 002302          CLR      RELERR        ;CLEAR THE 'RELEASE ERROR ' INDICATOR
051676 013737 002404 002334      MOV      RPDS,BADADR   ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
051704 012737 011700 002336      MOV      #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
051712 113777 002246 130462      MOV      PORTA,@RPCS2  ;SELECT PORT A.
051720 017737 130460 002346      MOV      @RPDS,TMP2    ;GET THE DRIVE STATUS REGISTER FROM PORT A.
051726 042737 024005 002346      BIC      #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
051734 013737 002346 002342      MOV      TMP2,TMP0     ;COPY IT INTO 'TMP0'
051742 042737 100100 002342      BIC      #ATA!VV,TMP0  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
051750 113777 002250 130424      MOV      PORTB,@RPCS2  ;SELECT PORT B.
051756 017737 130422 002350      MOV      @RPDS,TMP3    ;GET THE DRIVE STATUS REGISTER FROM PORT B.
051764 042737 024005 002350      BIC      #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
051772 013737 002350 002344      MOV      TMP3,TMP1     ;COPY IT INTO 'TMP1'
052000 042737 100100 002344      BIC      #ATA!VV,TMP1  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
052006 023737 002342 002344      CMP      TMP0,TMP1     ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
052014 001021          BNE     75$           ;BR IF NOT
052016 005737 002342          TST     TMP0          ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
052022 001073          BNE     77$           ;BR IF NOT
052024 104456                      TRAP    C$ERHRD
052026 000006                      .WORD  6
052030 010751                      .WORD  EM46
052032 013534                      .WORD  ERR15
052034 012746 003716      MOV      #FRMT17,-(SP)
052040 012746 000001      MOV      #1,-(SP)
052044 010600                      MOV      SP,RO
052046 104414                      TRAP    C$PNTB
052050 062706 000004      ADD      #4,SP
    
```

052054	000137	052342			JMP	79\$:BYPASS THE REST OF THE CHECKS
052060	013737	002346	002332	75\$:	MOV	TMP2,BADDAT		:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
052066	013737	002250	002266		MOV	PORTB,PTNBR		:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
052074	113777	002250	130300		MOVB	PORTB,@RPCS2		:SELECT PORT B.
052102	005737	002342			TST	TMP0		:SEE IF STATUS EQ 0 FROM PORT A.
052106	001414				BEQ	76\$:BR IF ZERO
052110	013737	002246	002266		MOV	PORTA,PTNBR		:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
052116	013737	002350	002332		MOV	TMP3,BADDAT		: 'BAD DATA' FOR ERROR TYPE OUT
052124	113777	002246	130250		MOVB	PORTA,@RPCS2		:SELECT PORT A.
052132	005737	002344			TST	TMP1		:SEE IF STATUS EQ ZERO FROM PORT B.
052136	001025				BNE	77\$:BR IF NOT
052140	012737	177777	002302	76\$:	MOV	#-1,RELERR		:SET 'RELEASE ERROR' INDICATOR
052146	012777	000011	130216		MOV	#11,@RPCS1		:CLEAR THE DRIVE
052154	012777	000013	130210		MOV	#13,@RPCS1		:RELEASE THE DRIVE
052162	104456				TRAP	C\$ERHRD		
052164	000011				.WORD	9		
052166	007313				.WORD	EM26		
052170	013214				.WORD	ERR9		
052172	012746	003716			MOV	#FRMT17,-(SP)		
052176	012746	000001			MOV	#1,-(SP)		
052202	010600				MOV	SP,R0		
052204	104414				TRAP	C\$PNTB		
052206	062706	000004			ADD	#4,SP		
052212	013737	002346	002332	77\$:	MOV	TMP2,BADDAT		:LOOK FOR BIT FAILURES WHEN RPDS READ
052220	013737	002246	002266		MOV	PORTA,PTNBR		:CHANGE PORT NUMBER
052226	023737	002336	002332		CMP	EXPTED,BADDAT		:ALL BITS OK ?
052234	001414				BEQ	78\$:BR IF OK FROM PORT A.
052236	104456				TRAP	C\$ERHRD		
052240	000013				.WORD	11		
052242	006072				.WORD	EM7		
052244	013000				.WORD	ERR5		
052246	012746	003471			MOV	#FRMT14,-(SP)		
052252	012746	000001			MOV	#1,-(SP)		
052256	010600				MOV	SP,R0		
052260	104414				TRAP	C\$PNTB		
052262	062706	000004			ADD	#4,SP		
052266	013737	002350	002332	78\$:	MOV	TMP3,BADDAT		:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
052274	013737	002250	002266		MOV	PORTB,PTNBR		:CHANGE PORT NUMBER
052302	023737	002336	002332		CMP	EXPTED,BADDAT		:SEE IF READ OK FROM PORT B.
052310	001414				BEQ	79\$:BR IF OK
052312	104456				TRAP	C\$ERHRD		
052314	000014				.WORD	12		
052316	006072				.WORD	EM7		
052320	013000				.WORD	ERR5		
052322	012746	003522			MOV	#FRMT15,-(SP)		
052326	012746	000001			MOV	#1,-(SP)		
052332	010600				MOV	SP,R0		
052334	104414				TRAP	C\$PNTB		
052336	062706	000004			ADD	#4,SP		
052342				79\$:				
052342				1\$:				
27 052342				L10057:				
052342	104401				TRAP	C\$ETST		

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```
.SBTTL TEST 18 RESET ATTENTION 'A' BY DRV CLR
:*VERIFY THAT A DRIVE CLEAR COMMAND CLEARS ONLY THE ATTENTION BIT OF THE
:* SEIZING PORT.
:*
:* A. SET EACH PORT 'S ATTENTION BIT. VERIFY THAT BOTH ATTENTION BITS
:* SET.
:*
:* B. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
:*
:* C. ISSUE A DRIVE CLEAR COMMAND.
:*
:* D. RELEASE THE DRIVE THROUGH PORT 'A'. VERIFY THAT THE ATTENTION
:* BIT FOR PORT 'A' HAS BEEN CLEARED AND THE ATTENTION BIT FOR PORT
:* 'B' IS STILL SET.
:*
```

```
100 052344
104 052344 005737 002340
    052350 001402
    052352 104432
    052354 001666

052356
```

```
T18::
    TST     DRVBAD           ;SYSTEM OK?
    BEQ     64$             ;IF SO, TAKE THE BRANCH
    TRAP   C$EXIT
    .WORD  L10060-
:*****
64$:
```

```
052356 113777 002246 130016
052364 005777 130014
052370 001775
052372 052777 000020 130002
052400 005077 130002
052404 013777 002250 127770
052412 005777 127766
052416 001775
052420 052777 000020 127754
052426 005077 127754
052432 113777 002246 127742
052440 005777 127740
052444 001775
```

```
        ;SET ATTENTION BITS FOR BOTH PORTS
67$:    MOVB   PORTA,@RPCS2   ;SELECT PORT A
        TST   @RPDS         ;MAKE SURE DRIVE AVAILABLE
        BEQ   67$
        BIS   #20,@RPCS2
        CLR   @RPER1        ;FORCE ATA BIT
        MOV   PORTB,@RPCS2  ;SELECT THE OTHER PORT
65$:    TST   @RPDS         ;WAIT FOR DRIVE TO TIMEOUT
        BEQ   65$          ;BR IF DRIVE HASN'T TIMED OUT
        BIS   #20,@RPCS2
        CLR   @RPER1        ;FORCE ATA BIT
        MOVB  PORTA,@RPCS2  ;SELECT PORT A AGAIN
66$:    TST   @RPDS         ;WAIT FOR DRIVE TO TIMEOUT
        BEQ   66$          ;BR IF DRIVE HASN'T TIMED OUT
:*****
```

```
052446 113777 002246 127726
052454 013737 002246 002266
052462 005037 002276
052466 017737 127712 002332
052474 013737 002404 002334
052502 012737 100000 002336
052510 013737 002332 002342
052516 042737 077777 002342
052524 023737 002336 002342
052532 001427
052534 013737 002332 002352
052542 042737 100000 002352
052550 053737 002352 002336
```

```
        ;CONFIRM THAT BOTH ATTENTION BITS ARE SET
        MOVB  PORTA,@RPCS2   ;SELECT PORT A
        MOV   PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
        CLR   CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
        MOV   @RPDS,BADDAT   ;GET CONTENTS OF RPDS
        MOV   RPDS,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
        MOV   #ATA,EXPTED    ;::WHAT REGISTER SHOULD BE
        MOV   BADDAT,TMPO    ;MOVE REGISTER CONTENTS TO 'TMPO'
        BIC   #^CATA,TMPO    ;SAVE SPECIFIED BITS
        CMP   EXPTED,TMPO    ;COMPARE THE BITS
        BEQ   68$           ;BR IF OK
        MOV   BADDAT,TMP4    ;COPY 'BAD DATA'
        BIC   #ATA,TMP4     ;CLEAR THE MASKED BITS
        BIS   TMP4,EXPTED    ;'OR' WITH GOOD DATA FOR TYPEOUT
```

```

052556 104456          TRAP  CSERHRD
052560 000004          .WORD 4
052562 006146          .WORD EM10
052564 012654          .WORD ERR3
052566 012746 003716  MOV  #FRMT17,-(SP)
052572 012746 000001  MOV  #1,-(SP)
052576 010600          MOV  SP,RO
052600 104414          TRAP  C$PNTB
052602 062706 000004  ADD  #4,SP
052606 005137 002276  COM  CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
052612                                68$:
052612 005737 002276  TST  CKERR          ;WAS ATTN BIT FOR PORT A SET ?
052616 001402          BEQ  .+6            ;BR IF IT WAS
052620 000137 054242  JMP  1$            ;BYPASS REST OF TEST IF NOT
052624 113777 002250 127550  MOVB PORTB,@RPCS2  ;SELECT PORT B
052632 013737 002250 002266  MOV  PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
052640 005037 002276  CLR  CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
052644 017737 127534 002332  MOV  @RPDS,BADDAT ;GET CONTENTS OF RPDS
052652 013737 002404 002334  MOV  RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
052660 012737 100000 002336  MOV  #ATA,EXPTED  ;:WHAT REGISTER SHOULD BE
052666 013737 002332 002342  MOV  BADDAT,TMPO  ;MOVE REGISTER CONTENTS TO 'TMPO'
052674 042737 077777 002342  BIC  #^CATA,TMPO  ;SAVE SPECIFIED BITS
052702 023737 002336 002342  CMP  EXPTED,TMPO  ;COMPARE THE BITS
052710 001427          BEQ  70$            ;BR IF OK
052712 013737 002332 002352  MOV  BADDAT,TMP4  ;COPY 'BAD DATA'
052720 042737 100000 002352  BIC  #ATA,TMP4    ;CLEAR THE MASKED BITS
052726 053737 002352 002336  BIS  TMP4,EXPTED  ;'OR' WITH GOOD DATA FOR TYPEOUT
052734 104456          TRAP  CSERHRD
052736 000004          .WORD 4
052740 006146          .WORD EM10
052742 012654          .WORD ERR3
052744 012746 003716  MOV  #FRMT17,-(SP)
052750 012746 000001  MOV  #1,-(SP)
052754 010600          MOV  SP,RO
052756 104414          TRAP  C$PNTB
052760 062706 000004  ADD  #4,SP
052764 005137 002276  COM  CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
052770                                70$:
052770 005737 002276  TST  CKERR          ;WAS ATTN BIT FOR PORT B SET ?
052774 001402          BEQ  .+6            ;BR IF IT WAS
052776 000137 054242  JMP  1$            ;BYPASS REST OF TEST IF NOT
    
```

;;*****

```

;SEIZE THE DRIVE THROUGH PORT A
053002 113777 002246 127372  MOVB PORTA,@RPCS2  ;SELECT PORT A
053010 013737 002246 002270  MOV  PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
053016 005077 127362          CLR  @RPDS          ;WRITE RPDS
053022 113777 002250 127352  MOVB PORTB,@RPCS2  ;SELECT PORT B
053030 013737 002250 002266  MOV  PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
053036 013737 002250 002272  MOV  PORTB,OPPRT  ;'OPPOSITE' PORT ADDRESS
053044 017737 127334 002332  MOV  @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT A
053052 013737 002404 002334  MOV  RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
053060 005037 002336          CLR  EXPTED        ;REGISTER SHOULD BE ZERO
053064 023737 002336 002332  CMP  EXPTED,BADDAT ;IS THE REGISTER ZERO
    
```



```
053072 001406 BEQ 72$ ;BR IF IT IS
053074 104456 TRAP C$ERHRD
053076 000001 .WORD 1
053100 005705 .WORD EM4
053102 012576 .WORD ERR2
053104 000137 054242 JMP 1$ ;BYPASS REST OF THE SUBTEST
053110 72$:
053110 113777 002246 127264 MOVB PORTA, @RPCS2 ;SELECT PORT A
053116 013737 002246 002266 MOV PORTA, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
053124 017737 127254 002332 MOV @RPDS, BADDAT ;SEE IF SEIZING PORT SEES CORRECT STATUS
053132 042737 020005 002332 BIC #OM!PIP!ILV, BADDAT ;CLEAR DONT CARE BITS
053140 012737 011700 002336 MOV #MOL!PGM!DPR!DRY!VV, EXPTED ;EXPECTED STATUS
053146 013737 002336 002344 MOV EXPTED, TMP1 ;USE GOOD DATA AS A MASK
053154 005137 002344 COM TMP1 ;COMPLEMENT THE EXPECTED STATUS
053160 013737 002332 002342 MOV BADDAT, TMPO ;SAVE THE ACTUAL STATUS
053166 043737 002344 002342 BIC TMP1, TMPO ;CLEAR UNWANTED BITS
053174 023737 002336 002342 CMP EXPTED, TMPO ;ARE THE EXPECTED STATUS BITS SET ?
053202 001404 BEQ 73$ ;BR IF THEY ARE
053204 104456 TRAP C$ERHRD
053206 000002 .WORD 2
053210 005736 .WORD EM5
053212 012654 .WORD ERR3
053214 73$:
;*****
;ISSUE DRIVE CLEAR COMMAND TO PORT A
053214 012777 000011 127150 MOV #11, @RPCS1 ;DO A DRIVE CLEAR COMMAND
;*****
;VERIFY THAT ATTENTION BIT FOR PORT A CLEARED
053222 005037 002276 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
053226 017737 127152 002332 MOV @RPDS, BADDAT ;GET CONTENTS OF RPDS
053234 013737 002404 002334 MOV RPDS, BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
053242 005037 002336 CLR EXPTED ;WHAT REGISTER SHOULD BE
053246 013737 002332 002342 MOV BADDAT, TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
053254 042737 077777 002342 BIC #^CATA, TMPO ;SAVE SPECIFIED BITS
053262 023737 002336 002342 CMP EXPTED, TMPO ;COMPARE THE BITS
053270 001427 BEQ 74$ ;BR IF OK
053272 013737 002332 002352 MOV BADDAT, TMP4 ;COPY 'BAD DATA'
053300 042737 100000 002352 BIC #ATA, TMP4 ;CLEAR THE MASKED BITS
053306 053737 002352 002336 BIS TMP4, EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
053314 104456 TRAP C$ERHRD
053316 000003 .WORD 3
053320 011020 .WORD EM47
053322 013262 .WORD ERR10
053324 012746 003716 MOV #FRMT17, -(SP)
053330 012746 000001 MOV #1, -(SP)
053334 010600 MOV SP, RC
053336 104414 TRAP C$PNTB
053340 062706 000004 ADD #4, SP
053344 005137 002276 COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
053350 74$:
;*****
;RELEASE THE DRIVE FROM PORT A
```

```

053350 113777 002246 127024      MOVB   PORTA,@RPCS2      ;SELECT PORT A
053356 013737 002246 002266      MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
053364 012777 000013 127000      MOV    #13,@RPCS1      ;ISSUE RELEASE THROUGH PORT A

                                ;START THE TIMER

053372 005037 002304                CLR    TIME              ;CLEAR THE ELAPSED TIME COUNTER
053376 012737 000050 002306      MOV    #40,WATCH        ;SET WATCH TO 40. MS
053404 005737 002306      76$:  TST    WATCH
053410 001375                BNE    76$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

053412 005037 002302                CLR    RELERR           ;CLEAR THE 'RELEASE ERROR' INDICATOR
053414 013737 002404 002334      MOV    RPDS,BADADR      ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
053424 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
053432 113777 002246 126742      MOVB   PORTA,@RPCS2      ;SELECT PORT A.
053440 017737 126740 002346      MOV    @RPDS,TMP2       ;GET THE DRIVE STATUS REGISTER FROM PORT A.
053446 042737 024005 002346      BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
053454 013737 002346 002342      MOV    TMP2,TMP0        ;COPY IT INTO 'TMP0'
053462 042737 100100 002342      BIC    #ATA!VV,TMP0     ;CLEAR PORT DEPENDENT BITS FROM THE COPY
053470 113777 002250 126704      MOVB   PORTB,@RPCS2      ;SELECT PORT B.
053476 017737 126702 002350      MOV    @RPDS,TMP3       ;GET THE DRIVE STATUS REGISTER FROM PORT B.
053504 042737 024005 002350      BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
053512 013737 002350 002344      MOV    TMP3,TMP1        ;COPY IT INTO 'TMP1'
053520 042737 100100 002344      BIC    #ATA!VV,TMP1     ;CLEAR PORT DEPENDENT BITS FROM THE COPY
053526 023737 002342 002344      CMP    TMP0,TMP1        ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
053534 001021                BNE    77$              ;BR IF NOT
053536 005737 002342                TST    TMP0              ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
053542 001073                BNE    79$              ;BR IF NOT
053544 104456                TRAP   C$ERHRD
053546 000006                .WORD 6
053550 010751                .WORD EM46
053552 013534                .WORD ERR15
053554 012746 003716      MOV    #FRMT17,-(SP)
053560 012746 000001      MOV    #1,-(SP)
053564 010600                MOV    SP,R0
053566 104414                TRAP   C$PNTB
053570 062706 000004      ADD    #4,SP
053574 000137 054076      JMP    81$              ;BYPASS THE REST OF THE CHECKS
053600 013737 002346 002332 77$:  MOV    TMP2,BADDAT      ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
053606 013737 002250 002266      MOV    PORTB,PTNBR      ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
053614 113777 002250 126560      MOVB   PORTB,@RPCS2      ;SELECT PORT B.
053622 005737 002342      TST    TMP0              ;SEE IF STATUS EQ 0 FROM PORT A.
053626 001414                BEQ    78$              ;BR IF ZERO
053630 013737 002246 002266      MOV    PORTA,PTNBR      ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
053636 013737 002350 002332      MOV    TMP3,BADDAT      ;'BAD DATA' FOR ERROR TYPE OUT
053644 113777 002246 126530      MOVB   PORTA,@RPCS2      ;SELECT PORT A.
053652 005737 002344      TST    TMP1              ;SEE IF STATUS EQ ZERO FROM PORT B.
053656 001025                BNE    79$              ;BR IF NOT
053660 012737 177777 002302 78$:  MOV    #-1,RELERR       ;SET 'RELEASE ERROR' INDICATOR
053666 012777 000011 126476      MOV    #11,@RPCS1       ;CLEAR THE DRIVE
053674 012777 000013 126470      MOV    #13,@RPCS1       ;RELEASE THE DRIVE
053702 104456                TRAP   C$ERHRD
053704 000011                .WORD 9
053706 007313                .WORD EM26
    
```



```

053710 013214          .WORD  ERR9
053712 012746 003716  MOV    #FRMT17,-(SP)
053716 012746 000001  MOV    #1,-(SP)
053722 010600          MOV    SP,RO
053724 104414          TRAP   C$PNTB
053726 062706 000004  ADD    #4,SP
053732 013737 002346 002332 79$:  MOV    TMP2,BADDAT      ;LOOK FOR BIT FAILURES WHEN RPDS READ
053740 013737 002246 002266  MOV    PORTA,PTNBR      ;CHANGE PORT NUMBER
053746 042737 100000 002332  BIC    #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
053754 023737 002336 002332  CMP    EXPTED,BADDAT    ;ALL BITS OK ?
053762 001414          BEQ    80$              ;BR IF OK FROM PORT A.
053764 104456          TRAP   C$ERHRD
053766 000013          .WORD  11
053770 006072          .WORD  EM7
053772 013000          .WORD  ERR5
053774 012746 003471  MOV    #FRMT14,-(SP)
054000 012746 000001  MOV    #1,-(SP)
054004 010600          MOV    SP,RO
054006 104414          TRAP   C$PNTB
054010 062706 000004  ADD    #4,SP
054014 013737 002350 002332 80$:  MOV    TMP3,BADDAT      ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
054022 013737 002250 002266  MOV    PORTB,PTNBR      ;CHANGE PORT NUMBER
054030 042737 100000 002332  BIC    #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
054036 023737 002336 002332  CMP    EXPTED,BADDAT    ;SEE IF READ OK FROM PORT B.
054044 001414          BEQ    81$              ;BR IF OK
054046 104456          TRAP   C$ERHRD
054050 000014          .WORD  12
054052 006072          .WORD  EM7
054054 013000          .WORD  ERR5
054056 012746 003522  MOV    #FRMT15,-(SP)
054062 012746 000001  MOV    #1,-(SP)
054066 010600          MOV    SP,RO
054070 104414          TRAP   C$PNTB
054072 062706 000004  ADD    #4,SP
054076
    
```

81\$:
 ;*****
 ;CHECK ATTENTION BIT ON THE OPPOSITE PORT (PORT B)

```

054076 113777 002250 126276  MOVB   PORTB,@RPCS2      ;SELECT PORT B
054104 013737 002250 002266  MOV    PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
054112 005037 002276          CLR    CKERR            ;CLEAR THE 'CHECK ERROR' INDICATOR
054116 017737 126262 002332  MOV    @RPDS,BADDAT     ;GET CONTENTS OF RPDS
054124 013737 002404 002334  MOV    RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
054132 012737 100000 002336  MOV    #ATA,EXPTED      ;:WHAT REGISTER SHOULD BE
054140 013737 002332 002342  MOV    BADDAT,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
054146 042737 077777 002342  BIC    #^CATA,TMPO      ;SAVE SPECIFIED BITS
054154 023737 002336 002342  CMP    EXPTED,TMPO      ;COMPARE THE BITS
054162 001427          BEQ    82$              ;BR IF OK
054164 013737 002332 002352  MOV    BADDAT,TMP4      ;COPY 'BAD DATA'
054172 042737 100000 002352  BIC    #ATA,TMP4        ;CLEAR THE MASKED BITS
054200 053737 002352 002336  BIS    TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
054206 104456          TRAP   C$ERHRD
054210 000003          .WORD  3
054212 011106          .WORD  EM50
054214 012726          .WORD  ERR4
054216 012746 003716  MOV    #FRMT17,-(SP)
054222 012746 000001  MOV    #1,-(SP)
    
```

054226	010600		MOV	SP,RO	
054230	104414		TRAP	C\$PNTB	
054232	062706	000004	ADD	#4,SP	
054236	005137	002276	COM	CKERR	
054242					
054242					
108 054242					
054242	104401		TRAP	C\$ETST	

82\$:
1\$:
L10060:

;SET THE REGISTER COMPARE ERROR INDICATOR

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

```
.SBTTL TEST 19 RESET ATTENTION 'B' BY DRV CLR
:*VERIFY THAT A DRIVE CLEAR COMMAND CLEARS ONLY THE ATTENTION BIT OF THE
:* SEIZING PORT.
:*
:* A. SET EACH PORT'S ATTENTION BIT. VERIFY THAT BOTH ATTENTION BITS
:* SET.
:*
:* B. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
:*
:* C. ISSUE A DRIVE CLEAR COMMAND.
:*
:* D. RELEASE THE DRIVE THROUGH PORT 'B'. VERIFY THAT THE ATTENTION
:* BIT FOR PORT 'B' HAS BEEN CLEARED AND THE ATTENTION BIT FOR PORT
:* 'A' IS STILL SET.
:*
```

18 054244
22 054244 005737 002340
054250 001402
054252 104432
054254 001666

```
T19::
TST DRVBAD ;SYSTEM OK?
BEQ 64$ ;IF SO, TAKE THE BRANCH
TRAP C$EXIT
.WORD L10061-
```

054256

```
::*****
64$:
```

```
;SET ATTENTION BITS FOR BOTH PORTS
```

054256 113777 002246 126116
054264 005777 126114
054270 001775
054272 052777 000020 126102
054300 005077 126102
054304 013777 002250 126070
054312 005777 126066
054316 001775
054320 052777 000020 126054
054326 005077 126054
054332 113777 002246 126042
054340 005777 126040
054344 001775

```
67$: MOVB PORTA,@RPCS2 ;SELECT PORT A
TST @RPDS ;MAKE SURE DRIVE AVAILABLE
BEQ 67$
BIS #20,@RPCS2
CLR @RPER1 ;FORCE ATA BIT
65$: MOV PORTB,@RPCS2 ;SELECT THE OTHER PORT
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 65$ ;BR IF DRIVE HASN'T TIMED OUT
BIS #20,@RPCS2
CLR @RPER1 ;FORCE ATA BIT
66$: MOVB PORTA,@RPCS2 ;SELECT PORT A AGAIN
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 66$ ;BR IF DRIVE HASN'T TIMED OUT
```

```
::*****
;CONFIRM THAT BOTH ATTENTION BITS ARE SET
```

054346 113777 002250 126026
054354 013737 002250 002266
054362 005037 002276
054366 017737 126012 002332
054374 013737 002404 002334
054402 012737 100000 002336
054410 013737 002332 002342
054416 042737 077777 002342
054424 023737 002336 002342
054432 001427
054434 013737 002332 002352
054442 042737 100000 002352
054450 053737 002352 002336
054456 104456

```
MOVB PORTB,@RPCS2 ;SELECT PORT B
MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
MOV @RPDS,BADADR ;GET CONTENTS OF RPDS
MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
MOV #ATA,EXPTED ;:WHAT REGISTER SHOULD BE
MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
BIC #^CATA,TMPO ;SAVE SPECIFIED BITS
CMP EXPTED,TMPO ;COMPARE THE BITS
BEQ 68$ ;BR IF OK
MOV BADDAT,TMP4 ;COPY 'BAD DATA'
BIC #ATA,TMP4 ;CLEAR THE MASKED BITS
BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
TRAP C$ERHRD
```

```

054460 000004          .WORD 4
054462 006146          .WORD EM10
054464 012654          .WORD ERR3
054466 012746 003716  MOV #FRMT17,-(SP)
054472 012746 000001  MOV #1,-(SP)
054476 010600          MOV SP,RO
054500 104414          TRAP C$PNTB
054502 062706 000004  ADD #4,SP
054506 005137 002276  COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
054512          68$: TST CKERR ;WAS ATTN BIT FOR PORT B SET ?
054512 005737 002276  BEQ .+6 ;BR IF IT WAS
054516 001402          JMP 1$ ;BYPASS REST OF TEST IF NOT
054520 000137 056142  MOVB PORTA,@RPCS2 ;SELECT PORT A
054524 113777 002246 125650  MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
054532 013737 002246 002266  CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
054540 005037 002276  MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
054544 017737 125634 002332  MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
054552 013737 002404 002334  MOV #ATA,EXPTED ;:WHAT REGISTER SHOULD BE
054560 012737 100000 002336  MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
054566 013737 002332 002342  BIC #^CATA,TMPO ;SAVE SPECIFIED BITS
054574 042737 077777 002342  CMP EXPTED,TMPO ;COMPARE THE BITS
054602 023737 002336 002342  BEQ 70$ ;BR IF OK
054610 001427          MOV BADDAT,TMP4 ;COPY 'BAD DATA'
054612 013737 002332 002352  BIC #ATA,TMP4 ;CLEAR THE MASKED BITS
054620 042737 100000 002352  BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
054626 053737 002352 002336  TRAP C$ERHRD
054634 104456          .WORD 4
054636 000004          .WORD EM10
054640 006146          .WORD ERR3
054642 012654          .WORD
054644 012746 003716  MOV #FRMT17,-(SP)
054650 012746 000001  MOV #1,-(SP)
054654 010600          MOV SP,RO
054656 104414          TRAP C$PNTB
054660 062706 000004  ADD #4,SP
054664 005137 002276  COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
054670          70$: TST CKERR ;WAS ATTN BIT FOR PORT A SET ?
054670 005737 002276  BEQ .+6 ;BR IF IT WAS
054674 001402          JMP 1$ ;BYPASS REST OF TEST IF NOT
054676 000137 056142
    
```

;;*****

```

;SEIZE THE DRIVE THROUGH PORT B
054702 113777 002250 125472  MOVB PORTB,@RPCS2 ;SELEC PORT B
054710 013737 002250 002270  MOV PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
054716 005077 125462  CLR @RPDS ;WRITE RPDS
054722 113777 002246 125452  MOVB PORTA,@RPCS2 ;SELECT PORT A
054730 013737 002246 002266  MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
054736 013737 002246 002272  MOV PORTA,OPPRT ;'OPPOSITE' PORT ADDRESS
054744 017737 125434 002332  MOV @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT B
054752 013737 002404 002334  MOV RPDS,BADADR ;GENERATE BAD REGISTER ADDRESS
054760 005037 002336  CLR EXPTED ;REGISTER SHOULD BE ZERO
054764 023737 002336 002332  CMP EXPTED,BADDAT ;IS THE REGISTER ZERO
054772 001406  BEQ 72$ ;BR IF IT IS
    
```



```

054774 104456          TRAP    C$ERHRD
054776 000001          .WORD  1
055000 005705          .WORD  EM4
055002 012576          .WORD  ERR2
055004 000137 056142  JMP     1$           ;BYPASS REST OF THE SUBTEST
055010 113777 002250 125364 72$:  MOVB   PORTB,@RPCS2      ;SELECT PORT B
055016 013737 002250 002266  MOV    PORTB,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
055024 017737 125354 002332  MOV    @RPDS,BADDAT  ;SEE IF SEIZING PORT SEES CORRECT STATUS
055032 042737 020005 002332  BIC    #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
055040 012737 011700 002336  MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
055046 013737 002336 002344  MOV    EXPTED,TMP1   ;USE GOOD DATA AS A MASK
055054 005137 002344          COM     TMP1         ;COMPLEMENT THE EXPECTED STATUS
055060 013737 002332 002342  MOV    BADDAT,TMPO   ;SAVE THE ACTUAL STATUS
055066 043737 002344 002342  BIC    TMP1,TMPO     ;CLEAR UNWANTED BITS
055074 023737 002336 002342  CMP    EXPTED,TMPO   ;ARE THE EXPECTED STATUS BITS SET ?
055102 001404          BEQ    73$           ;BR IF THEY ARE
055104 104456          TRAP    C$ERHRD
055106 000002          .WORD  2
055110 005736          .WORD  EM5
055112 012654          .WORD  ERR3
055114          73$:
;*****
;ISSUE DRIVE CLEAR COMMAND TO PORT B
055114 012777 000011 125250  MOV    #11,@RPCS1    ;DO A DRIVE CLEAR COMMAND
;*****
;VERIFY THAT ATTENTION BIT FOR PORT B CLEARED
055122 005037 002276          CLR    CKERR         ;CLEAR THE 'CHECK ERROR' INDICATOR
055126 017737 125252 002332  MOV    @RPDS,BADDAT  ;GET CONTENTS OF RPDS
055134 013737 002404 002334  MOV    RPDS,BADADR   ;FORM REGISTER ADDRESS OF ERROR MESSAGE
055142 005037 002336          CLR    EXPTED        ;WHAT REGISTER SHOULD BE
055146 013737 002332 002342  MOV    BADDAT,TMPO   ;MOVE REGISTER CONTENTS TO 'TMPO'
055154 042737 077777 002342  BIC    #^CATA,TMPO   ;SAVE SPECIFIED BITS
055162 023737 002336 002342  CMP    EXPTED,TMPO   ;COMPARE THE BITS
055170 001427          BEQ    74$           ;BR IF OK
055172 013737 002332 002352  MOV    BADDAT,TMP4   ;COPY 'BAD DATA'
055200 042737 100000 002352  BIC    #ATA,TMP4     ;CLEAR THE MASKED BITS
055206 053737 002352 002336  BIS    TMP4,EXPTED   ;'OR' WITH GOOD DATA FOR TYPEOUT
055214 104456          TRAP    C$ERHRD
055216 000003          .WORD  3
055220 011020          .WORD  EM47
055222 013262          .WORD  ERR10
055224 012746 003716  MOV    #FRMT17,-(SP)
055230 012746 000001  MOV    #1,-(SP)
055234 010600          MOV    SP,R0
055236 104414          TRAP    C$PNTB
055240 062706 000004  ADD    #4,SP
055244 005137 002276  COM     CKERR        ;SET THE REGISTER COMPARE ERROR INDICATOR
055250          74$:
;*****
;RELEASE THE DRIVE FROM PORT B
055250 113777 002250 125124  MOVB   PORTB,@RPCS2  ;SELECT PORT B
    
```

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055256 013737 002250 002266      MOV    PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
055264 012777 000013 125100      MOV    #13,@RPCS1  ;ISSUE RELEASE THROUGH PORT B

                                ;START THE TIMER

055272 005037 002304                CLR    TIME          ;CLEAR THE ELAPSED TIME COUNTER
055276 012737 000050 002306      MOV    #40.,WATCH   ;SET WATCH TO 40. MS
055304 005737 002306      76$:  TST    WATCH
055310 001375                BNE    76$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

055312 005037 002302                CLR    RELERR        ;CLEAR THE 'RELEASE ERROR ' INDICATOR
055316 013737 002404 002334      MOV    RPDS,BADADR   ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
055324 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
055332 113777 002246 125042      MOV    PORTA,@RPCS2  ;SELECT PORT A.
055340 017737 125040 002346      MOV    @RPDS,TMP2    ;GET THE DRIVE STATUS REGISTER FROM PORT A.
055346 042737 024005 002346      BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
055354 013737 002346 002342      MOV    TMP2,TMP0     ;COPY IT INTO 'TMP0'
055362 042737 100100 002342      BIC    #ATA!VV,TMP0  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
055370 113777 002250 125004      MOV    PORTB,@RPCS2  ;SELECT PORT B.
055376 017737 125002 002350      MOV    @RPDS,TMP3    ;GET THE DRIVE STATUS REGISTER FROM PORT B.
055404 042737 024005 002350      BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
055412 013737 002350 002344      MOV    TMP3,TMP1     ;COPY IT INTO 'TMP1'
055420 042737 100100 002344      BIC    #ATA!VV,TMP1  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
055426 023737 002342 002344      CMP    TMP0,TMP1    ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
055434 001021                BNE    77$          ;BR IF NOT
055436 005737 002342                TST    TMP0         ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
055442 001073                BNE    79$          ;BR IF NOT
055444 104456                TRAP   C$ERHRD
055446 000006                .WORD 6
055450 010751                .WORD EM46
055452 013534                .WORD ERR15
055454 012746 003716      MOV    #FRMT17,-(SP)
055460 012746 000001      MOV    #1,-(SP)
055464 010600                MOV    SP,R0
055466 104414                TRAP   C$PNTB
055470 062706 000004      ADD    #4,SP
055474 000137 055776                JMP    81$
055500 013737 002346 002332 77$: MOV    TMP2,BADDAT   ;BYPASS THE REST OF THE CHECKS
055506 013737 002250 002266      MOV    PORTB,PTNBR  ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
055514 113777 002250 124660      MOV    PORTB,@RPCS2 ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
055522 005737 002342                TST    TMP0         ;SELECT PORT B.
055526 001414                BEQ    78$          ;SEE IF STATUS EQ 0 FROM PORT A.
055530 013737 002246 002266      MOV    PORTA,PTNBR  ;BR IF ZERO
055536 013737 002350 002332      MOV    TMP3,BADDAT  ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
055544 113777 002246 124630      MOV    PORTA,@RPCS2 ;'BAD DATA' FOR ERROR TYPE OUT
055552 005737 002344                TST    TMP1         ;SELECT PORT A.
055556 001025                BNE    79$          ;SEE IF STATUS EQ ZERO FROM PORT B.
055560 012737 177777 002302 78$: MOV    #-1,RELERR   ;BR IF NOT
055566 012777 000011 124576      MOV    #11,@RPCS1  ;SET 'RELEASE ERROR' INDICATOR
055574 012777 000013 124570      MOV    #13,@RPCS1  ;CLEAR THE DRIVE
055602 104456                TRAP   C$ERHRD     ;RELEASE THE DRIVE
055604 000011                .WORD 9
055606 007313                .WORD EM26
055610 013214                .WORD ERR9
    
```



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055612 012746 003716      MOV      #FRMT17,-(SP)
055616 012746 000001      MOV      #1,-(SP)
055622 010600      MOV      SP,RO
055624 104414      TRAP     C$PNTB
055626 062706 000004      ADD      #4,SP
055632 013737 002346 002332 79$:      MOV      TMP2,BADDAT      ;LOOK FOR BIT FAILURES WHEN RPDS READ
055640 013737 002246 002266      MOV      PORTA,PTNBR      ;CHANGE PORT NUMBER
055646 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
055654 023737 002336 002332      CMP      EXPTED,BADDAT    ;ALL BITS OK ?
055662 001414      BEQ      80$              ;BR IF OK FROM PORT A.
055664 104456      TRAP     C$SERHRD
055666 000013      .WORD   11
055670 006072      .WORD   EM7
055672 013000      .WORD   ERR5
055674 012746 003471      MOV      #FRMT14,-(SP)
055700 012746 000001      MOV      #1,-(SP)
055704 010600      MOV      SP,RO
055706 104414      TRAP     C$PNTB
055710 062706 000004      ADD      #4,SP
055714 013737 002350 002332 80$:      MOV      TMP3,BADDAT      ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
055722 013737 002250 002266      MOV      PORTB,PTNBR      ;CHANGE PORT NUMBER
055730 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
055736 023737 002336 002332      CMP      EXPTED,BADDAT    ;SEE IF READ OK FROM PORT B.
055744 001414      BEQ      81$              ;BR IF OK
055746 104456      TRAP     C$SERHRD
055750 000014      .WORD   12
055752 006072      .WORD   EM7
055754 013000      .WORD   ERR5
055756 012746 003522      MOV      #FRMT15,-(SP)
055762 012746 000001      MOV      #1,-(SP)
055766 010600      MOV      SP,RO
055770 104414      TRAP     C$PNTB
055772 062706 000004      ADD      #4,SP
055776

81$:
:*****
:CHECK ATTENTION BIT ON THE OPPOSITE PORT (PORT A)

055776 113777 002246 124376      MOV      PORTA,@RPCS2      ;SELECT PORT A
056004 013737 002246 002266      MOV      PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
056012 005037 002276      CLR      CKERR              ;CLEAR THE 'CHECK ERROR' INDICATOR
056016 017737 124362 002332      MOV      @RPDS,BADDAT      ;GET CONTENTS OF RPDS
056024 013737 002404 002334      MOV      RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
056032 012737 100000 002336      MOV      #ATA,EXPTED      ;:WHAT REGISTER SHOULD BE
056040 013737 002332 002342      MOV      BADDAT,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
056046 042737 077777 002342      BIC      #^CATA,TMPO      ;SAVE SPECIFIED BITS
056054 023737 002336 002342      CMP      EXPTED,TMPO      ;COMPARE THE BITS
056062 001427      BEQ      82$              ;BR IF OK
056064 013737 002332 002352      MOV      BADDAT,TMP4      ;COPY 'BAD DATA'
056072 042737 100000 002352      BIC      #ATA,TMP4        ;CLEAR THE MASKED BITS
056100 053737 002352 002336      BIS      TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
056106 104456      TRAP     C$SERHRD
056110 000003      .WORD   3
056112 011106      .WORD   EM50
056114 012726      .WORD   ERR4
056116 012746 003716      MOV      #FRMT17,-(SP)
056122 012746 000001      MOV      #1,-(SP)
056126 010600      MOV      SP,RO
    
```

056130	104414		TRAP	C\$PNTB	
056132	062706	000004	ADD	#4, SP	
056136	005137	002276	COM	CKERR	
056142					
056142					
26 056142					
056142	104401				

82\$:
1\$:
L10061: TRAP C\$SETST

;SET THE REGISTER COMPARE ERROR INDICATOR

1
2
3
4
5
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7
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16
17
18
96
97 056144
101 056144 005737 002340
056150 001402
056152 104432
056154 001656

056156

056156 113777 002246 124216
056164 005777 124214
056170 001775
056172 012777 000017 124172
056200 013777 002250 124174
056206 005777 124172
056212 001775
056214 012777 000017 124150
056222 113777 002246 124152
056230 005777 124150
056234 001775

056236 113777 002246 124136
056244 013737 002246 002266
056252 005037 002276
056256 017737 124122 002332
056264 013737 002404 002334
056272 012737 100000 002336
056300 013737 002332 002342
056306 042737 077777 002342
056314 023737 002336 002342
056322 001427
056324 013737 002332 002352
056332 042737 100000 002352
056340 053737 002352 002336
056346 104456

```
.SBTTL TEST 20 RESET ATTENTION 'A' BY 'GO'
;* VERIFY THAT THE 'GO BIT CLEARS ONLY THE ATTENTION BIT OF THE
;* SEIZING PORT.
;*
;* A. SET EACH PORT'S ATTENTION BIT, AND VERIFY THAT BOTH
;* ATTENTION BITS ARE SET.
;*
;* B. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S
;* INTO RMDS.
;*
;* C. ISSUE A NOP COMMAND.
;*
;* D. RELEASE THE FRIVE THROUGH PORT 'A'. VERIFY THAT THE
;* ATTENTION BIT FOR PORT 'A' IS RESET, AND THE
;* ATTENTION BIT FOR PORT 'B' IS STILL SET.
;*

T20::
TST     DRVBAD           ;SYSTEM OK??
BEQ     64$             ;TAKE BRANCH IF SO
TRAP   C$EXIT
        .WORD    L10062-

;*****
64$:
        ;SET ATTENTION BITS FOR BOTH PORTS

67$:   MOVB    PORTA,@RPCS2 ;SELECT PORT A
        TST     @RPDS      ;MAKE SURE DRIVE AVAILABLE
        BEQ     67$
        MOV     #17,@RPCS1
        MOV     PORTB,@RPCS2 ;SELECT THE OTHER PORT
65$:   TST     @RPDS      ;WAIT FOR DRIVE TO TIMEOUT
        BEQ     65$        ;BR IF DRIVE HASN'T TIMED OUT
        MOV     #17,@RPCS1 ;FORCE ATA BIT
        MOVB    PORTA,@RPCS2 ;SELECT PORT A AGAIN
66$:   TST     @RPDS      ;WAIT FOR DRIVE TO TIMEOUT
        BEQ     66$        ;BR IF DRIVE HASN'T TIMED OUT
;*****
;CONFIRM THAT BOTH ATTENTION BITS ARE SET

        MOVB    PORTA,@RPCS2 ;SELECT PORT A
        MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
        CLR     CKERR       ;CLEAR THE 'CHECK ERROR' INDICATOR
        MOV     @RPDS,BADDAT ;GET CONTENTS OF RPDS
        MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
        MOV     #ATA,EXPTED  ;:::WHAT REGISTER SHOULD BE
        MOV     BADDAT,TMPO  ;MOVE REGISTER CONTENTS TO 'TMPO'
        BIC     #^CATA,TMPO  ;SAVE SPECIFIED BITS
        CMP     EXPTED,TMPO  ;COMPARE THE BITS
        BEQ     68$         ;BR IF OK
        MOV     BADDAT,TMP4  ;COPY 'BAD DATA'
        BIC     #ATA,TMP4    ;CLEAR THE MASKED BITS
        BIS     TMP4,EXPTED  ;'OR' WITH GOOD DATA FOR TYPEOUT
        TRAP   C$SERHRD
```

```

056350 000004          .WORD 4
056352 006146          .WORD EM10
056354 012654          .WORD ERR3
056356 012746 003716  MOV #FRMT17,-(SP)
056362 012746 000001  MOV #1,-(SP)
056366 010600          MOV SP,RO
056370 104414          TRAP C$PNTB
056372 062706 000004  ADD #4,SP
056376 005137 002276  COM CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
056402                                68$:
056402 005737 002276  TST CKERR          ;WAS ATTENTION SET FOR A??
056406 001402          BEQ .+6           ;YES!!
056410 000137 060032  JMP 1$           ;NO - BYPASS REST OF TEST
056414 113777 002250 123760  MOVB PORTB,@RPCS2 ;SELECT PORT B
056422 013737 002250 002266  MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
056430 005037 002276          CLR CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
056434 017737 123744 002332  MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
056442 013737 002404 002334  MOV RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
056450 012737 100000 002336  MOV #ATA,EXPTED  ;:WHAT REGISTER SHOULD BE
056456 013737 002332 002342  MOV BADDAT,TMPO  ;MOVE REGISTER CONTENTS TO 'TMPO'
056464 042737 077777 002342  BIC #^CATA,TMPO ;SAVE SPECIFIED BITS
056472 023737 002336 002342  CMP EXPTED,TMPO  ;COMPARE THE BITS
056500 001427          BEQ 70$          ;BR IF OK
056502 013737 002332 002352  MOV BADDAT,TMP4  ;COPY 'BAD DATA'
056510 042737 100000 002352  BIC #ATA,TMP4    ;CLEAR THE MASKED BITS
056516 053737 002352 002336  BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
056524 104456          TRAP C$SERHRD
056526 000004          .WORD 4
056530 006146          .WORD EM10
056532 012654          .WORD ERR3
056534 012746 003716  MOV #FRMT17,-(SP)
056540 012746 000001  MOV #1,-(SP)
056544 010600          MOV SP,RO
056546 104414          TRAP C$PNTB
056550 062706 000004  ADD #4,SP
056554 005137 002276  COM CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
056560                                70$:
056560 005737 002276  TST CKERR          ;WAS ATTENTION SET FOR B??
056564 001402          BEQ .+6           ;YES!!
056566 000137 060032  JMP 1$           ;NO - BYPASS REST OF TEST
    
```

;;*****

```

                                ;SEIZE THE DRIVE THROUGH PORT A
056572 113777 002246 123602  MOVB PORTA,@RPCS2 ;SELECT PORT A
056600 013737 002246 002270  MOV PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
056606 005077 123572          CLR @RPDS          ;WRITE RPDS

056612 113777 002250 123562  MOVB PORTB,@RPCS2 ;SELECT PORT B
056620 013737 002250 002266  MOV PORTB,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
056626 013737 002250 002272  MOV PORTB,OPPRT ;'OPPOSITE' PORT ADDRESS
056634 017737 123544 002332  MOV @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT A
056642 013737 002404 002334  MOV RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
056650 005037 002336          CLR EXPTED        ;REGISTER SHOULD BE ZERO
056654 023737 002336 002332  CMP EXPTED,BADDAT ;IS THE REGISTER ZERO
056662 001406          BEQ 72$          ;BR IF IT IS
    
```



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056664 104456          TRAP    C$ERHRD
056666 000001          .WORD  1
056670 005705          .WORD  EM4
056672 012576          .WORD  ERR2
056674 000137 060032  JMP    1$           ;BYPASS REST OF THE SUBTEST
056700 113777 002246 123474 72$:  MOVB   PORTA,@RPCS2      ;SELECT PORT A
056706 013737 002246 002266  MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
056714 017737 123464 002332  MOV    @RPDS,BADDAT     ;SEE IF SEIZING PORT SEES CORRECT STATUS
056722 042737 020005 002332  BIC    #OM!PIP!LV,BADDAT ;CLEAR DONT CARE BITS
056730 012737 011700 002336  MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
056736 013737 002336 002344  MOV    EXPTED,TMP1      ;USE GOOD DATA AS A MASK
056744 005137 002344          COM     TMP1           ;COMPLEMENT THE EXPECTED STATUS
056750 013737 002332 002342  MOV    BADDAT,TMPO      ;SAVE THE ACTUAL STATUS
056756 043737 002344 002342  BIC    TMP1,TMPO        ;CLEAR UNWANTED BITS
056764 023737 002336 002342  CMP    EXPTED,TMPO      ;ARE THE EXPECTED STATUS BITS SET ?
056772 001404          BEQ    73$           ;BR IF THEY ARE
056774 104456          TRAP    C$ERHRD
056776 000002          .WORD  2
057000 005736          .WORD  EM5
057002 012654          .WORD  ERR3
057004          73$:
;*****
;ISSUE NOP COMMAND TO PORT A
057004 012777 000001 123360  MOV    #1,@RPCS1
;*****
;VERIFY THAT ATTENTION FOR PORT A CLEARED
057012 005037 002276          CLR    CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
057016 017737 123362 002332  MOV    @RPDS,BADDAT     ;GET CONTENTS OF RPDS
057024 013737 002404 002334  MOV    RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
057032 005037 002336          CLR    EXPTED          ;WHAT REGISTER SHOULD BE
057036 013737 002332 002342  MOV    BADDAT,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
057044 042737 077777 002342  BIC    #^CATA,TMPO      ;SAVE SPECIFIED BITS
057052 023737 002336 002342  CMP    EXPTED,TMPO      ;COMPARE THE BITS
057060 001427          BEQ    74$           ;BR IF OK
057062 013737 002332 002352  MOV    BADDAT,TMP4      ;COPY 'BAD DATA'
057070 042737 100000 002352  BIC    #ATA,TMP4        ;CLEAR THE MASKED BITS
057076 053737 002352 002336  BIS    TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
057104 104456          TRAP    C$ERHRD
057106 000003          .WORD  3
057110 011734          .WORD  EM61
057112 013262          .WORD  ERR10
057114 012746 003716  MOV    #FRMT17,-(SP)
057120 012746 000001  MOV    #1,-(SP)
057124 010600          MOV    SP,R0
057126 104414          TRAP    C$PNTB
057130 062706 000004  ADD    #4,SP
057134 005137 002276          COM    CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
057140          74$:
;*****
;RELEASE THE DRIVE FROM PORT A
057140 113777 002246 123234  MOVB   PORTA,@RPCS2      ;SELECT PORT A
    
```

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057146 013737 002246 002266      MOV    PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
057154 012777 000013 123210      MOV    #13,@RPCS1 ;ISSUE RELEASE THROUGH PORT A

                                ;START THE TIMER

057162 005037 002304                CLR    TIME        ;CLEAR THE ELAPSED TIME COUNTER
057166 012737 000050 002306      MOV    #40.,WATCH ;SET WATCH TO 40. MS
057174 005737 002306      76$:  TST    WATCH
057200 001375                BNE    76$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

057202 005037 002302                CLR    RELERR      ;CLEAR THE 'RELEASE ERROR ' INDICATOR
057206 013737 002404 002334      MOV    RPDS,BADADR ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
057214 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
057222 113777 002246 123152      MOV    PORTA,@RPCS2 ;SELECT PORT A.
057230 017737 123150 002346      MOV    @RPDS,TMP2  ;GET THE DRIVE STATUS REGISTER FROM PORT A.
057236 042737 024005 002346      BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
057244 013737 002346 002342      MOV    TMP2,TMP0   ;COPY IT INTO 'TMP0'
057252 042737 100100 002342      BIC    #ATA!VV,TMP0 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
057260 113777 002250 123114      MOV    PORTB,@RPCS2 ;SELECT PORT B.
057266 017737 123112 002350      MOV    @RPDS,TMP3  ;GET THE DRIVE STATUS REGISTER FROM PORT B.
057274 042737 024005 002350      BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
057302 013737 002350 002344      MOV    TMP3,TMP1   ;COPY IT INTO 'TMP1'
057310 042737 100100 002344      BIC    #ATA!VV,TMP1 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
057316 023737 002342 002344      CMP    TMP0,TMP1   ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
057324 001021                BNE    77$        ;BR IF NOT
057326 005737 002342                TST    TMP0        ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
057332 001073                BNE    79$        ;BR IF NOT
057334 104456                TRAP   C$ERHRD
057336 000006                .WORD 6
057340 010751                .WORD EM46
057342 013534                .WORD ERR15
057344 012746 003716      MOV    #FRMT17,-(SP)
057350 012746 000001      MOV    #1,-(SP)
057354 010600                MOV    SP,R0
057356 104414                TRAP   C$PNTB
057360 062706 000004      ADD    #4,SP
057364 000137 057666      JMP    81$
057370 013737 002346 002332 77$: MOV    TMP2,BADDAT ;BYPASS THE REST OF THE CHECKS
057376 013737 002250 002266      MOV    PORTB,PTNBR ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
057404 113777 002250 122770      MOV    PORTB,@RPCS2 ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
057412 005737 002342                TST    TMP0        ;SELECT PORT B.
057416 001414                BEQ    78$        ;SEE IF STATUS EQ 0 FROM PORT A.
057420 013737 002246 002266      MOV    PORTA,PTNBR ;BR IF ZERO
057426 013737 002350 002332      MOV    TMP3,BADDAT ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
057434 113777 002246 122740      MOV    PORTA,@RPCS2 ;'BAD DATA' FOR ERROR TYPE OUT
057442 005737 002344                TST    TMP1        ;SELECT PORT A.
057446 001025                BNE    79$        ;SEE IF STATUS EQ ZERO FROM PORT B.
057450 012737 177777 002302 78$: MOV    #-1,RELERR  ;BR IF NOT
057456 012777 000011 122706      MOV    #11,@RPCS1 ;SET 'RELEASE ERROR' INDICATOR
057464 012777 000013 122700      MOV    #13,@RPCS1 ;CLEAR THE DRIVE
057472 104456                TRAP   C$ERHRD    ;RELEASE THE DRIVE
057474 000011                .WORD 9
057476 007313                .WORD EM26
057500 013214                .WORD ERR9
  
```



```

057502 012746 003716      MOV      #FRMT17,-(SP)
057506 012746 000001      MOV      #1,-(SP)
057512 010600      MOV      SP,RO
057514 104414      TRAP     C$PNTB
057516 062706 000004      ADD      #4,SP
057522 013737 002346 002332 79$:      MOV      TMP2,BADDAT      ;LOOK FOR BIT FAILURES WHEN RPDS READ
057530 013737 002246 002266      MOV      PORTA,PTNBR      ;CHANGE PORT NUMBER
057536 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
057544 023737 002336 002332      CMP      EXPTED,BADDAT    ;ALL BITS OK ?
057552 001414      BEQ      80$              ;BR IF OK FROM PORT A.
057554 104456      TRAP     C$ERHRD
057556 000013      .WORD   11
057560 006072      .WORD   EM7
057562 013000      .WORD   ERR5
057564 012746 003471      MOV      #FRMT14,-(SP)
057570 012746 000001      MOV      #1,-(SP)
057574 010600      MOV      SP,RO
057576 104414      TRAP     C$PNTB
057600 062706 000004      ADD      #4,SP
057604 013737 002350 002332 80$:      MOV      TMP3,BADDAT      ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
057612 013737 002250 002266      MOV      PORTB,PTNBR      ;CHANGE PORT NUMBER
057620 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
057626 023737 002336 002332      CMP      EXPTED,BADDAT    ;SEE IF READ OK FROM PORT B.
057634 001414      BEQ      81$              ;BR IF OK
057636 104456      TRAP     C$ERHRD
057640 000014      .WORD   12
057642 006072      .WORD   EM7
057644 013000      .WORD   ERR5
057646 012746 003522      MOV      #FRMT15,-(SP)
057652 012746 000001      MOV      #1,-(SP)
057656 010600      MOV      SP,RO
057660 104414      TRAP     C$PNTB
057662 062706 000004      ADD      #4,SP
057666      81$:
:*****
:VERIFY THAT ATTENTION FOR PORT B IS STILL SET

057666 113777 002250 122506      MOV      PORTB,@RPCS2      ;SELECT PORT B
057674 013737 002250 002266      MOV      PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
057702 005037 002276      CLR      CKERR              ;CLEAR THE 'CHECK ERROR' INDICATOR
057706 017737 122472 002332      MOV      @RPDS,BADDAT      ;GET CONTENTS OF RPDS
057714 013737 002404 002334      MOV      RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
057722 012737 100000 002336      MOV      #ATA,EXPTED      ;:WHAT REGISTER SHOULD BE
057730 013737 002332 002342      MOV      BADDAT,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
057736 042737 077777 002342      BIC      #^CATA,TMPO      ;SAVE SPECIFIED BITS
057744 023737 002336 002342      CMP      EXPTED,TMPO      ;COMPARE THE BITS
057752 001427      BEQ      82$              ;BR IF OK
057754 013737 002332 002352      MOV      BADDAT,TMP4      ;COPY 'BAD DATA'
057762 042737 100000 002352      BIC      #ATA,TMP4        ;CLEAR THE MASKED BITS
057770 053737 002352 002336      BIS      TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
057776 104456      TRAP     C$ERHRD
060000 000003      .WORD   3
060002 011766      .WORD   EM62
060004 012726      .WORD   ERR4
060006 012746 003716      MOV      #FRMT17,-(SP)
060012 012746 000001      MOV      #1,-(SP)
060016 010600      MOV      SP,RO
    
```

060020	104414		TRAP	CSPNTB	
060022	062706	000004	ADD	#4,SP	
060026	005137	002276	COM	CKERR	;SET THE REGISTER COMPARE ERROR INDICATOR
060032					
060032					
105 060032					
060032	104401		TRAP	CSETST	

82\$:
1\$:
L10062:

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```
.SBTTL TEST 21 RESET ATTENTION 'B' BY 'GO' TEST
:* VERIFY THAT THE 'GO' BIT CLEARS ONLY THE ATTENTION BIT OF THE
:* SEIZING PORT.
:*
:* A. SET EACH PORT'S ATTENTION BIT, AND VERIFY THAT BOTH
:* ATTENTION BITS ARE SET.
:*
:* B. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S
:* INTO RMD5.
:*
:* C. ISSUE A NOP COMMAND.
:*
:* D. RELEASE THE DRIVE THROUGH PORT 'B'. VERIFY THAT THE
:* ATTENTION BIT FOR PORT 'B' IS RESET, AND THE
:* ATTENTION BIT FOR PORT 'A' IS STILL SET.
:*
```

20 060034
24 060034 005737 002340
060040 001402
060042 104432
060044 001656

```
T21::
TST DRVBAD ;SYSTEM OK??
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10063-
```

060046

```
::*****
64$:
```

;SET ATTENTION BITS FOR BOTH PORTS

060046 113777 002246 122326
060054 005777 122324
060060 001775
060062 012777 000017 122302
060070 013777 002250 122304
060076 005777 122302
060102 001775
060104 012777 000017 122260
060112 113777 002246 122262
060120 005777 122260
060124 001775

```
67$: MOVB PORTA,@RPCS2 ;SELECT PORT A
TST @RPDS ;MAKE SURE DRIVE AVAILABLE
BEQ 67$
65$: MOV #17,@RPCS1
MOV PORTB,@RPCS2 ;SELECT THE OTHER PORT
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 65$ ;BR IF DRIVE HASN'T TIMED OUT
MOV #17,@RPCS1 ;FORCE ATA BIT
66$: MOVB PORTA,@RPCS2 ;SELECT PORT A AGAIN
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 66$ ;BR IF DRIVE HASN'T TIMED OUT
```

```
::*****
;CONFIRM THAT BOTH ATTENTION BITS ARE SET
```

060126 113777 002250 122246
060134 013737 002250 002266
060142 005037 002276
060146 017737 122232 002332
060154 013737 002404 002334
060162 012737 100000 002336
060170 013737 002332 002342
060176 042737 077777 002342
060204 023737 002336 002342
060212 001427
060214 013737 002332 002352
060222 042737 100000 002352
060230 053737 002352 002336
060236 104456

```
MOVB PORTB,@RPCS2 ;SELECT PORT B
MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
MOV @RPDS,BADADR ;GET CONTENTS OF RPDS
MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
MOV #ATA,EXPTED ;:WHAT REGISTER SHOULD BE
MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
BIC #^CATA,TMPO ;SAVE SPECIFIED BITS
CMP EXPTED,TMPO ;COMPARE THE BITS
BEQ 68$ ;BR IF OK
MOV BADDAT,TMP4 ;COPY 'BAD DATA'
BIC #ATA,TMP4 ;CLEAR THE MASKED BITS
BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
TRAP C$SERHRD
```

```

060240 000004          .WORD 4
060242 006146          .WORD EM10
060244 012654          .WORD ERR3
060246 012746 003716  MOV #FRMT17,-(SP)
060252 012746 000001  MOV #1,-(SP)
060256 010600          MOV SP,R0
060260 104414          TRAP C$PNTB
060262 062706 000004  ADD #4,SP
060266 005137 002276  COM CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
060272          68$:
060272 005737 002276  TST CKERR          ;WAS ATTENTION SET FOR B??
060276 001402          BEQ .+6            ;YES!!
060300 000137 061722  JMP 1$            ;NO - BYPASS REST OF TEST
060304 113777 002246 122070  MOVB PORTA,@RPCS2 ;SELECT PORT A
060312 013737 002246 002266  MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
060320 005037 002276          CLR CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
060324 017737 122054 002332  MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
060332 013737 002404 002334  MOV RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
060340 012737 100000 002336  MOV #ATA,EXPTED  ;:WHAT REGISTER SHOULD BE
060346 013737 002332 002342  MOV BADDAT,TMPO  ;MOVE REGISTER CONTENTS TO 'TMPO'
060354 042737 077777 002342  BIC #^CATA,TMPO ;SAVE SPECIFIED BITS
060362 023737 002336 002342  CMP EXPTED,TMPO  ;COMPARE THE BITS
060370 001427          BEQ 70$           ;BR IF OK
060372 013737 002332 002352  MOV BADDAT,TMP4  ;COPY 'BAD DATA'
060400 042737 100000 002352  BIC #ATA,TMP4    ;CLEAR THE MASKED BITS
060406 053737 002352 002336  BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
060414 104456          TRAP C$SERHRD
060416 000004          .WORD 4
060420 006146          .WORD EM10
060422 012654          .WORD ERR3
060424 012746 003716  MOV #FRMT17,-(SP)
060430 012746 000001  MOV #1,-(SP)
060434 010600          MOV SP,R0
060436 104414          TRAP C$PNTB
060440 062706 000004  ADD #4,SP
060444 005137 002276  COM CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
060450          70$:
060450 005737 002276  TST CKERR          ;WAS ATTENTION SET FOR A??
060454 001402          BEQ .+6            ;YES!!
060456 000137 061722  JMP 1$            ;NO - BYPASS REST OF TEST
    
```

::*****

;SEIZE THE DRIVE THROUGH PORT B

```

060462 113777 002250 121712  MOVB PORTB,@RPCS2 ;SELECT PORT B
060470 013737 002250 002270  MOV PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
060476 005077 121702          CLR @RPDS          ;WRITE RPDS

060502 113777 002246 121672  MOVB PORTA,@RPCS2 ;SELECT PORT A
060510 013737 002246 002266  MOV PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
060516 013737 002246 002272  MOV PORTA,OPPRT  ;'OPPOSITE' PORT ADDRESS
060524 017737 121654 002332  MOV @RPDS,BADDAT ;SEE IF DRIVE SEIZED BY PORT B
060532 013737 002404 002334  MOV RPDS,BADADR  ;GENERATE BAD REGISTER ADDRESS
060540 005037 002336          CLR EXPTED        ;REGISTER SHOULD BE ZERO
060544 023737 002336 002332  CMP EXPTED,BADDAT ;IS THE REGISTER ZERO
060552 001406          BEQ 72$           ;BR IF IT IS
    
```



```

060554 104456          TRAP    C$ERHRD
060556 000001          .WORD  1
060560 005705          .WORD  EM4
060562 012576          .WORD  ERR2
060564 000137 061722  JMP     1$           ;BYPASS REST OF THE SUBTEST
060570
060570 113777 002250 121604 72$:  MOVB   PORTB,@RPCS2      ;SELECT PORT B
060576 013737 002250 002266  MOV    PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
060604 017737 121574 002332  MOV    @RPDS,BADDAT     ;SEE IF SEIZING PORT SEES CORRECT STATUS
060612 042737 020005 002332  BIC    #OM!PIP!ILV,BADDAT ;CLEAR DONT CARE BITS
060620 012737 011700 002336  MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;EXPECTED STATUS
060626 013737 002336 002344  MOV    EXPTED,TMP1      ;USE GOOD DATA AS A MASK
060634 005137 002344          COM     TMP1           ;COMPLEMENT THE EXPECTED STATUS
060640 013737 002332 002342  MOV    BADDAT,TMPO      ;SAVE THE ACTUAL STATUS
060646 043737 002344 002342  BIC    TMP1,TMPO        ;CLEAR UNWANTED BITS
060654 023737 002336 002342  CMP    EXPTED,TMPO      ;ARE THE EXPECTED STATUS BITS SET ?
060662 001404          BEQ    73$           ;BR IF THEY ARE
060664 104456          TRAP    C$ERHRD
060666 000002          .WORD  2
060670 005736          .WORD  EM5
060672 012654          .WORD  ERR3
060674
73$:
;:*****
;:ISSUE NOP COMMAND TO PORT B
060674 012777 000001 121470  MOV    #1,@RPCS1
;:*****
;:VERIFY THAT ATTENTION FOR PORT B CLEARED
060702 005037 002276          CLR    CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
060706 017737 121472 002332  MOV    @RPDS,BADDAT     ;GET CONTENTS OF RPDS
060714 013737 002404 002334  MOV    RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
060722 005037 002336          CLR    EXPTED          ;WHAT REGISTER SHOULD BE
060726 013737 002332 002342  MOV    BADDAT,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
060734 042737 077777 002342  BIC    #^CATA,TMPO      ;SAVE SPECIFIED BITS
060742 023737 002336 002342  CMP    EXPTED,TMPO      ;COMPARE THE BITS
060750 001427          BEQ    74$           ;BR IF OK
060752 013737 002332 002352  MOV    BADDAT,TMP4      ;COPY 'BAD DATA'
060760 042737 100000 002352  BIC    #ATA,TMP4        ;CLEAR THE MASKED BITS
060766 053737 002352 002336  BIS    TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
060774 104456          TRAP    C$ERHRD
060776 000003          .WORD  3
061000 011734          .WORD  EM61
061002 013262          .WORD  ERR10
061004 012746 003716  MOV    #FRMT17,-(SP)
061010 012746 000001  MOV    #1,-(SP)
061014 010600          MOV    SP,R0
061016 104414          TRAP    C$PNTB
061020 062706 000004  ADD    #4,SP
061024 005137 002276          COM    CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
061030
74$:
;:*****
;:RELEASE THE DRIVE FROM PORT B
061030 113777 002250 121344  MOVB   PORTB,@RPCS2      ;SELECT PORT B
    
```

```

061036 013737 002250 002266      MOV    PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
061044 012777 000013 121320      MOV    #13,@RPCS1 ;ISSUE RELEASE THROUGH PORT B

                                ;START THE TIMER

061052 005037 002304                CLR    TIME          ;CLEAR THE ELAPSED TIME COUNTER
061056 012737 000050 002306      MOV    #40, WATCH   ;SET WATCH TO 40. MS
061064 005737 002306      76$:  TST    WATCH
061070 001375                BNE    76$

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

061072 005037 002302                CLR    RELERR        ;CLEAR THE 'RELEASE ERROR ' INDICATOR
061076 013737 002404 002334      MOV    RPDS,BADADR  ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
061104 012737 011700 002336      MOV    #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
061112 113777 002246 121262      MOVB   PORTA,@RPCS2 ;SELECT PORT A.
061120 017737 121260 002346      MOV    @RPDS,TMP2   ;GET THE DRIVE STATUS REGISTER FROM PORT A.
061126 042737 024005 002346      BIC    #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
061134 013737 002346 002342      MOV    TMP2,TMP0    ;COPY IT INTO 'TMP0'
061142 042737 100100 002342      BIC    #ATA!VV,TMP0 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
061150 113777 002250 121224      MOVB   PORTB,@RPCS2 ;SELECT PORT B.
061156 017737 121222 002350      MOV    @RPDS,TMP3   ;GET THE DRIVE STATUS REGISTER FROM PORT B.
061164 042737 024005 002350      BIC    #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
061172 013737 002350 002344      MOV    TMP3,TMP1    ;COPY IT INTO 'TMP1'
061200 042737 100100 002344      BIC    #ATA!VV,TMP1 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
061206 023737 002342 002344      CMP    TMP0,TMP1    ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
061214 001021                BNE    77$          ;BR IF NOT
061216 005737 002342                TST    TMP0         ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
061222 001073                BNE    79$          ;BR IF NOT
061224 104456                TRAP   C$ERHRD
061226 000006                .WORD 6
061230 010751                .WORD EM46
061232 013534                .WORD ERR15
061234 012746 003716      MOV    #FRMT17,-(SP)
061240 012746 000001      MOV    #1,-(SP)
061244 010600                MOV    SP,R0
061246 104414                TRAP   C$PNTB
061250 062706 000004      ADD    #4,SP
061254 000137 061556                JMP    81$
061260 013737 002346 002332 77$: MOV    TMP2,BADDAT ;BYPASS THE REST OF THE CHECKS
061266 013737 002250 002266      MOV    PORTB,PTNBR ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
061274 113777 002250 121100      MOVB   PORTB,@RPCS2 ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
061302 005737 002342                TST    TMP0         ;SELECT PORT B.
061306 001414                BEQ    78$          ;SEE IF STATUS EQ 0 FROM PORT A.
061310 013737 002246 002266      MOV    PORTA,PTNBR ;BR IF ZERO
061316 013737 002350 002332      MOV    TMP3,BADDAT ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
061324 113777 002246 121050      MOVB   PORTA,@RPCS2 ;'BAD DATA' FOR ERROR TYPE OUT
061332 005737 002344                TST    TMP1         ;SELECT PORT A.
061336 001025                BNE    79$          ;SEE IF STATUS EQ ZERO FROM PORT B.
061340 012737 177777 002302 78$: MOV    #-1,RELERR  ;BR IF NOT
061346 012777 000011 121016      MOV    #11,@RPCS1 ;SET 'RELEASE ERROR' INDICATOR
061354 012777 000013 121010      MOV    #13,@RPCS1 ;CLEAR THE DRIVE
061362 104456                TRAP   C$ERHRD     ;RELEASE THE DRIVE
061364 000011                .WORD 9
061366 007313                .WORD EM26
061370 013214                .WORD ERR9
    
```



```

061372 012746 003716      MOV      #FRMT17,-(SP)
061376 012746 000001      MOV      #1,-(SP)
061402 010600      MOV      SP,RO
061404 104414      TRAP     C$PNTB
061406 062706 000004      ADD      #4,SP
061412 013737 002346 002332 79$:      MOV      TMP2,BADDAT      ;LOOK FOR BIT FAILURES WHEN RPDS READ
061420 013737 002246 002266      MOV      PORTA,PTNBR      ;CHANGE PORT NUMBER
061426 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
061434 023737 002336 002332      CMP      EXPTED,BADDAT    ;ALL BITS OK ?
061442 001414      BEQ      80$              ;BR IF OK FROM PORT A.
061444 104456      TRAP     C$ERHRD
061446 000013      .WORD   11
061450 006072      .WORD   EM7
061452 013000      .WORD   ERR5
061454 012746 003471      MOV      #FRMT14,-(SP)
061460 012746 000001      MOV      #1,-(SP)
061464 010600      MOV      SP,RO
061466 104414      TRAP     C$PNTB
061470 062706 000004      ADD      #4,SP
061474 013737 002350 002332 80$:      MOV      TMP3,BADDAT      ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
061502 013737 002250 002266      MOV      PORTB,PTNBR      ;CHANGE PORT NUMBER
061510 042737 100000 002332      BIC      #ATA,BADDAT      ;DON'T CHECK THE ATTN BIT
061516 023737 002336 002332      CMP      EXPTED,BADDAT    ;SEE IF READ OK FROM PORT B.
061524 001414      BEQ      81$              ;BR IF OK
061526 104456      TRAP     C$ERHRD
061530 000014      .WORD   12
061532 006072      .WORD   EM7
061534 013000      .WORD   ERR5
061536 012746 003522      MOV      #FRMT15,-(SP)
061542 012746 000001      MOV      #1,-(SP)
061546 010600      MOV      SP,RO
061550 104414      TRAP     C$PNTB
061552 062706 000004      ADD      #4,SP
061556                                     81$:
;*****
;VERIFY THAT ATTENTION FOR PORT A IS STILL SET

061556 113777 002246 120616      MOV      PORTA,@RPCS2      ;SELECT PORT A
061564 013737 002246 002266      MOV      PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
061572 005037 002276      CLR      CKERR              ;CLEAR THE 'CHECK ERROR' INDICATOR
061576 017737 120602 002332      MOV      @RPDS,BADDAT      ;GET CONTENTS OF RPDS
061604 013737 002404 002334      MOV      RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
061612 012737 100000 002336      MOV      #ATA,EXPTED      ;:WHAT REGISTER SHOULD BE
061620 013737 002332 002342      MOV      BADDAT,TMPO      ;MOVE REGISTER CONTENTS TO 'TMPO'
061626 042737 077777 002342      BIC      #^CATA,TMPO      ;SAVE SPECIFIED BITS
061634 023737 002336 002342      CMP      EXPTED,TMPO      ;COMPARE THE BITS
061642 001427      BEQ      82$              ;BR IF OK
061644 013737 002332 002352      MOV      BADDAT,TMP4      ;COPY 'BAD DATA'
061652 042737 100000 002352      BIC      #ATA,TMP4        ;CLEAR THE MASKED BITS
061660 053737 002352 002336      BIS      TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
061666 104456      TRAP     C$ERHRD
061670 000003      .WORD   3
061672 011766      .WORD   EM62
061674 012726      .WORD   ERR4
061676 012746 003716      MOV      #FRMT17,-(SP)
061702 012746 000001      MOV      #1,-(SP)
061706 010600      MOV      SP,RO
    
```

061710	104414		TRAP	CSPNTB	
061712	062706	000004	ADD	#4, SP	
061716	005137	002276	COM	CKERR	
061722					;SET THE REGISTER COMPARE ERROR INDICATOR
061722					
28 061722			82\$:		
061722	104401		1\$:		
			L10063:		
			TRAP	CSETST	

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```
.SBTTL TEST 22 RESET ATTENTION 'A' & 'B' BY MASSBUS INIT
;*VERIFY THAT MASSBUS CLEAR RESETS BOTH PORT'S ATTENTION BITS WHEN THE
;* DRIVE IS IN NEUTRAL.
;*
;* A. SET THE ATTENTION BITS FOR BOTH PORTS.
;*
;* B. VERIFY THAT THE DRIVE IS IN NEUTRAL.
;*
;* C. ISSUE A MASSBUS INIT. VERIFY THAT BOTH ATTENTION BITS HAVE
;* RESET.
;*
```

88 061724
 92 061724 005737 002340
 061730 001402
 061732 104432
 061734 001412

```
T22::
TST DRVBAD ;SYSTEM OK??
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10064-
```

061736

```
::*****
64$:
```

```
;SET ATTENTION BITS FOR BOTH PORTS
```

061736 113777 002246 120436
 061744 005777 120434
 061750 001775
 061752 012777 000017 120412
 061760 013777 002250 120414
 061766 005777 120412
 061772 001775
 061774 012777 000017 120370
 062002 113777 002246 120372
 062010 005777 120370
 062014 001775

```
67$: MOVB PORTA,@RPCS2 ;SELECT PORT A
TST @RPDS ;MAKE SURE DRIVE AVAILABLE
BEQ 67$
65$: MOV #17,@RPCS1
MOV PORTB,@RPCS2 ;SELECT THE OTHER PORT
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 65$ ;BR IF DRIVE HASN'T TIMED OUT
MOV #17,@RPCS1 ;FORCE ATA BIT
66$: MOVB PORTA,@RPCS2 ;SELECT PORT A AGAIN
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 66$ ;BR IF DRIVE HASN'T TIMED OUT
```

```
::*****
;CONFIRM THAT BOTH ATTENTION BITS ARE SET
```

062016 113777 002246 120356
 062024 013737 002246 002266
 062032 005037 002276
 062036 017737 120342 002332
 062044 013737 002404 002334
 062052 012737 100000 002336
 062060 013737 002332 002342
 062066 042737 077777 002342
 062074 023737 002336 002342
 062102 001427
 062104 013737 002332 002352
 062112 042737 100000 002352
 062120 053737 002352 002336
 062126 104456
 062130 000004
 062132 006146
 062134 012654
 062136 012746 003716
 062142 012746 000001
 062146 010600

```
MOVB PORTA,@RPCS2 ;SELECT PORT A
MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
MOV #ATA,EXPTED ;WHAT REGISTER SHOULD BE
MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
BIC #^CATA,TMPO ;SAVE SPECIFIED BITS
CMP EXPTED,TMPO ;COMPARE THE BITS
BEQ 68$ ;BR IF OK
MOV BADDAT,TMP4 ;COPY 'BAD DATA'
BIC #ATA,TMP4 ;CLEAR THE MASKED BITS
BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
TRAP CSERHRD
.WORD 4
.WORD EM10
.WORD ERR3
MOV #FRMT17,-(SP)
MOV #1,-(SP)
MOV SP,R0
```

```

062150 104414 TRAP C$PNTB
062152 062706 000004 ADD #4,SP
062156 005137 002276 COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
062162 68$: TST CKERR ;WAS ATTN BIT FOR PORT A SET ?
062162 005737 002276 BEQ +6 ;BR IF IT WAS
062166 001402 JMP 1$ ;BYPASS REST OF TEST IF NOT
062170 000137 063346 MOVB PORTB,@RPCS2 ;SELECT PORT B
062174 113777 002250 120200 MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
062202 013737 002250 002266 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
062210 005037 002276 MOV @RPDS,BADADR ;GET CONTENTS OF RPDS
062214 017737 120164 002332 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
062222 013737 002404 002334 MOV #ATA,EXPTD ;:WHAT REGISTER SHOULD BE
062230 012737 100000 002336 MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
062236 013737 002332 002342 BIC #^CATA,TMPO ;SAVE SPECIFIED BITS
062244 042737 077777 002342 CMP EXPTD,TMPO ;COMPARE THE BITS
062252 023737 002336 002342 BEQ 70$ ;BR IF OK
062260 001427 MOV BADDAT,TMP4 ;COPY 'BAD DATA'
062262 013737 002332 002352 BIC #ATA,TMP4 ;CLEAR THE MASKED BITS
062270 042737 100000 002352 BIS TMP4,EXPTD ;'OR' WITH GOOD DATA FOR TYPEOUT
062276 053737 002352 002336 TRAP C$SERHRD
062304 104456 .WORD 4
062306 000004 .WORD EM10
062310 006146 .WORD ERR3
062312 012654 MOV #FRMT17,-(SP)
062314 012746 003716 MOV #1,-(SP)
062320 012746 000001 MOV SP,RO
062324 010600 TRAP C$PNTB
062326 104414 ADD #4,SP
062330 062706 000004 COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
062334 005137 002276 70$: TST CKERR ;WAS ATTN BIT FOR PORT B SET ?
062340 005737 002276 BEQ +6 ;BR IF IT WAS
062344 001402 JMP 1$ ;BYPASS REST OF TEST IF NOT
062346 000137 063346
    
```

;;*****

;VERIFY THAT THE DRIVE IS IN NEUTRAL

```

062352 005037 002302 CLR RELERR ;CLEAR THE 'RELEASE ERROR ' INDICATOR
062356 013737 002404 002334 MOV RPDS,BADADR ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
062364 012737 111700 002336 MOV #111700,EXPTD ;COMPARISON CONSTANT
062372 113777 002246 120002 MOVB PORTA,@RPCS2 ;SELECT PORT A.
062400 017737 120000 002346 MOV @RPDS,TMP2 ;GET THE DRIVE STATUS REGISTER FROM PORT A.
062406 042737 024005 002346 BIC #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
062414 013737 002346 002342 MOV TMP2,TMPO ;COPY IT INTO 'TMPO'
062422 042737 100100 002342 BIC #ATA!VV,TMPO ;CLEAR PORT DEPENDENT BITS FROM THE COPY
062430 113777 002250 117744 MOVB PORTB,@RPCS2 ;SELECT PORT B.
062436 017737 117742 002350 MOV @RPDS,TMP3 ;GET THE DRIVE STATUS REGISTER FROM PORT B.
062444 042737 024005 002350 BIC #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
062452 013737 002350 002344 MOV TMP3,TMP1 ;COPY IT INTO 'TMP1'
062460 042737 100100 002344 BIC #ATA!VV,TMP1 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
062466 023737 002342 002344 CMP TMPO,TMP1 ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
062474 001021 BNE 72$ ;BR IF NOT
062476 005737 002342 TST TMPO ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
062502 001073 BNE 74$ ;BR IF NOT
062504 104456 TRAP C$SERHRD
    
```


062506	000006			.WORD	6	
062510	010751			.WORD	EM46	
062512	013534			.WORD	ERR15	
062514	012746	003716		MOV	#FRMT17,-(SP)	
062520	012746	000001		MOV	#1,-(SP)	
062524	010600			MOV	SP,RO	
062526	104414			TRAP	C\$PNTB	
062530	062706	000004		ADD	#4,SP	
062534	000137	063022		JMP	76\$	
062540	013737	002346	002332	MOV	TMP2,BADDAT	:BYPASS THE REST OF THE CHECKS
062546	013737	002250	002266	MOV	PORTB,PTNBR	:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
062554	113777	002250	117620	MOVB	PORTB,@RPCS2	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
062562	005737	002342		TST	TMP0	:SELECT PORT B.
062566	001414			BEQ	73\$:SEE IF STATUS EQ 0 FROM PORT A.
062570	013737	002246	002266	MOV	PORTA,PTNBR	:BR IF ZERO
062576	013737	002350	002332	MOV	TMP3,BADDAT	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
062604	113777	002246	117570	MOVB	PORTA,@RPCS2	: 'BAD DATA' FOR ERROR TYPE OUT
062612	005737	002344		TST	TMP1	:SELECT PORT A.
062616	001025			BNE	74\$:SEE IF STATUS EQ ZERO FROM PORT B.
062620	012737	177777	002302	MOV	#-1,RELERR	:BR IF NOT
062626	012777	000011	117536	MOV	#11,@RPCS1	:SET 'RELEASE ERROR' INDICATOR
062634	012777	000013	117530	MOV	#13,@RPCS1	:CLEAR THE DRIVE
062642	104456			TRAP	C\$ERHRD	:RELEASE THE DRIVE
062644	000011			.WORD	9	
062646	007313			.WORD	EM26	
062650	013214			.WORD	ERR9	
062652	012746	003716		MOV	#FRMT17,-(SP)	
062656	012746	000001		MOV	#1,-(SP)	
062662	010600			MOV	SP,RO	
062664	104414			TRAP	C\$PNTB	
062666	062706	000004		ADD	#4,SP	
062672	013737	002346	002332	MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
062700	013737	002246	002266	MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
062706	023737	002336	002332	CMP	EXPTED,BADDAT	:ALL BITS OK ?
062714	001414			BEQ	75\$:BR IF OK FROM PORT A.
062716	104456			TRAP	C\$ERHRD	
062720	000013			.WORD	11	
062722	006072			.WORD	EM7	
062724	013000			.WORD	ERR5	
062726	012746	003471		MOV	#FRMT14,-(SP)	
062732	012746	000001		MOV	#1,-(SP)	
062736	010600			MOV	SP,RO	
062740	104414			TRAP	C\$PNTB	
062742	062706	000004		ADD	#4,SP	
062746	013737	002350	002332	MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
062754	013737	002250	002266	MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
062762	023737	002336	002332	CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
062770	001414			BEQ	76\$:BR IF OK
062772	104456			TRAP	C\$ERHRD	
062774	000014			.WORD	12	
062776	006072			.WORD	EM7	
063000	013000			.WORD	ERR5	
063002	012746	003522		MOV	#FRMT15,-(SP)	
063006	012746	000001		MOV	#1,-(SP)	
063012	010600			MOV	SP,RO	
063014	104414			TRAP	C\$PNTB	
063016	062706	000004		ADD	#4,SP	

```

063022          76$:
063022 005737 002302      TST      RELERR      ;WAS DRIVE IN NEUTRAL ?
063026 001402              BEQ      .+6          ;BR IF IT WAS
063030 000137 063346      JMP      1$          ;BYPASS RESET OF TEST
;*****
;ISSUE THE MASSBUS INIT

063034 012777 000040 117340      MOV      #CLR,@RPCS2      ;ISSUE A MASSBUS INIT
;*****
;CHECK THE ATTENTION BITS OF BOTH PORTS

063042 113777 002246 117332      MOV      PORTA,@RPCS2      ;SELECT PORT A
063050 013737 002246 002266      MOV      PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
063056 005037 002276              CLR      CKERR            ;CLEAR THE 'CHECK ERROR' INDICATOR
063062 017737 117316 002332      MOV      @RPDS,BADDAT      ;GET CONTENTS OF RPDS
063070 013737 002404 002334      MOV      RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
063076 005037 002336              CLR      EXPTED           ;WHAT REGISTER SHOULD BE
063102 013737 002332 002342      MOV      BADDAT,TMPO       ;MOVE REGISTER CONTENTS TO 'TMPO'
063110 042737 077777 002342      BIC      #^CATA,TMPO       ;SAVE SPECIFIED BITS
063116 023737 002336 002342      CMP      EXPTED,TMPO       ;COMPARE THE BITS
063124 001427              BEQ      77$             ;BR IF OK
063126 013737 002332 002352      MOV      BADDAT,TMP4       ;COPY 'BAD DATA'
063134 042737 100000 002352      BIC      #ATA,TMP4         ;CLEAR THE MASKED BITS
063142 053737 002352 002336      BIS      TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
063150 104456              TRAP      C$ERHRD
063152 000003              .WORD    3
063154 011170              .WORD    EM51
063156 012654              .WORD    ERR3
063160 012746 003716      MOV      #FRMT17,-(SP)
063164 012746 000001      MOV      #1,-(SP)
063170 010600              MOV      SP,RO
063172 104414              TRAP      C$PNTB
063174 062706 000004      ADD      #4,SP
063200 005137 002276      COM      CKERR            ;SET THE REGISTER COMPARE ERROR INDICATOR
;*****
77$:
063204 113777 002250 117170      MOV      PORTB,@RPCS2      ;SELECT PORT B
063212 013737 002250 002266      MOV      PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
063220 005037 002276              CLR      CKERR            ;CLEAR THE 'CHECK ERROR' INDICATOR
063224 017737 117154 002332      MOV      @RPDS,BADDAT      ;GET CONTENTS OF RPDS
063232 013737 002404 002334      MOV      RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
063240 005037 002336              CLR      EXPTED           ;WHAT REGISTER SHOULD BE
063244 013737 002332 002342      MOV      BADDAT,TMPO       ;MOVE REGISTER CONTENTS TO 'TMPO'
063252 042737 077777 002342      BIC      #^CATA,TMPO       ;SAVE SPECIFIED BITS
063260 023737 002336 002342      CMP      EXPTED,TMPO       ;COMPARE THE BITS
063266 001427              BEQ      79$             ;BR IF OK
063270 013737 002332 002352      MOV      BADDAT,TMP4       ;COPY 'BAD DATA'
063276 042737 100000 002352      BIC      #ATA,TMP4         ;CLEAR THE MASKED BITS
063304 053737 002352 002336      BIS      TMP4,EXPTED       ;'OR' WITH GOOD DATA FOR TYPEOUT
063312 104456              TRAP      C$ERHRD
063314 000003              .WORD    3
063316 011170              .WORD    EM51
063320 012654              .WORD    ERR3
063322 012746 003716      MOV      #FRMT17,-(SP)
063326 012746 000001      MOV      #1,-(SP)
063332 010600              MOV      SP,RO
063334 104414              TRAP      C$PNTB
    
```


063336	062706	000004	ADD	#4,SP	
063342	005137	002276	COM	CKERR	;SET THE REGISTER COMPARE ERROR INDICATOR
063346					
063346			79\$:		
96 063346			1\$:		
063346	104401		L10064:		
			TRAP	CSETST	

TEST 23 RESET ATTENTION 'A' BY WRITING RPAS

1
2
3
4
5
6
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11
12
13
14

.SBTTL TEST 23 RESET ATTENTION 'A' BY WRITING RPAS

:*VERIFY THAT ATA BIT CAN BE RESET BY WRITING THE APPROPRIATE BIT IN THE ATTENTION SUMMARY REGISTER (RPAS).

- :* A. SET ATTENTION BITS IN BOTH PORTS, VERIFY THAT BOTH ARE SET.
- :* B. VERIFY THAT DRIVE IS IN NEUTRAL.
- :* C. WRITE PORT 'A' ATTENTION BIT IN RPAS, VERIFY THAT ONLY PORT 'A' ATTENTION BIT IS RESET.

99 063350
103 063350 005737 002340
063354 001402
063356 104432
063360 001204

T23::
TST DRVBAD ;SYSTEM OK??
BEQ 64\$;TAKE BRANCH IF SO
TRAP C\$EXIT
.WORD L10065-

64\$:

;SET ATTENTION BITS FOR BOTH PORTS

063362 113777 002246 117012
063370 005777 117010
063374 001775
063376 012777 000017 116766
063404 013777 002250 116770
063412 005777 116766
063416 001775
063420 012777 000017 116744
063426 113777 002246 116746
063434 005777 116744
063440 001775

67\$:
MOV B PORTA,@RPCS2 ;SELECT PORT A
TST @RPDS ;MAKE SURE DRIVE AVAILABLE
BEQ 67\$
MOV #17,@RPCS1
MOV PORTB,@RPCS2 ;SELECT THE OTHER PORT
65\$:
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 65\$;BR IF DRIVE HASN'T TIMED OUT
MOV #17,@RPCS1 ;FORCE ATA BIT
66\$:
MOV B PORTA,@RPCS2 ;SELECT PORT A AGAIN
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 66\$;BR IF DRIVE HASN'T TIMED OUT

:CONFIRM THAT BOTH ATTENTION BITS ARE SET.

063442 113777 002246 116732
063450 013737 002246 002266
063456 005037 002276
063462 017737 116722 002332
063470 013737 002410 002334
063476 013737 002260 002336
063504 023737 002336 002332
063512 001416
063514 104456
063516 000004
063520 006146
063522 012654
063524 012746 003716
063530 012746 000001
063534 010600
063536 104414
063540 062706 000004
063544 005137 002276
063550
063550 005737 002276

MOV B PORTA,@RPCS2 ;SELECT PORT A
MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
MOV @RPAS,BADDAT ;GET CONTENTS OF RPAS
MOV RPAS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
MOV ASR1,EXPTED ;:WHAT REGISTER SHOULD BE
68\$:
CMP EXPTED,BADDAT ;IS THE REGISTER OK ?
BEQ 68\$;BR IF OK
TRAP C\$ERHRD
.WORD 4
.WORD EM10
.WORD ERR3
MOV #FRMT17,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C\$PNTB
ADD #4,SP
COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
68\$:
TST CKERR ;ARE BOTH BITS SET?


```

063554 001402          BEQ      .+6      ;BR YES
063556 000137 064450  JMP      4$      ;BYPASS REST OF TEST
                                ;CHECK IF NEUTRAL

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

063562 005037 002302  CLR      RELERR    ;CLEAR THE 'RELEASE ERROR ' INDICATOR
063566 013737 002404 002334  MOV      RPDS,BADADR ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
063574 012737 111700 002336  MOV      #111700,EXPTD ;COMPARISON CONSTANT
063602 113777 002246 116572  MOVB     PORTA,@RPCS2 ;SELECT PORT A.
063610 017737 116570 002346  MOV      @RPDS,TMP2  ;GET THE DRIVE STATUS REGISTER FROM PORT A.
063616 042737 024005 002346  BIC      #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
063624 013737 002346 002342  MOV      TMP2,TMP0   ;COPY IT INTO 'TMP0'
063632 042737 100100 002342  BIC      #ATA!VV,TMP0 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
063640 113777 002250 116534  MOVB     PORTB,@RPCS2 ;SELECT PORT B.
063646 017737 116532 002350  MOV      @RPDS,TMP3  ;GET THE DRIVE STATUS REGISTER FROM PORT B.
063654 042737 024005 002350  BIC      #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
063662 013737 002350 002344  MOV      TMP3,TMP1   ;COPY IT INTO 'TMP1'
063670 042737 100100 002344  BIC      #ATA!VV,TMP1 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
063676 023737 002342 002344  CMP      TMP0,TMP1   ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
063704 001021          BNE      70$        ;BR IF NOT
063706 005737 002342  TST      TMP0        ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
063712 001073          BNE      72$        ;BR IF NOT
063714 104456          TRAP     CSERHRD
063716 000006          .WORD   6
063720 010751          .WORD   EM46
063722 013534          .WORD   ERR15
063724 012746 003716  MOV      #FRMT17,-(SP)
063730 012746 000001  MOV      #1,-(SP)
063734 010600          MOV      SP,R0
063736 104414          TRAP     CSPNTB
063740 062706 000004  ADD      #4,SP
063744 000137 064232  JMP      74$
063750 013737 002346 002332 70$:  MOV      TMP2,BADDAT ;BYPASS THE REST OF THE CHECKS
063756 013737 002250 002266  MOV      PORTB,PTNBR ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
063764 113777 002250 116410  MOVB     PORTB,@RPCS2 ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
063772 005737 002342  TST      TMP0        ;SELECT PORT B.
063776 001414          BEQ      71$        ;SEE IF STATUS EQ 0 FROM PORT A.
064000 013737 002246 002266  MOV      PORTA,PTNBR ;BR IF ZERO
064006 013737 002350 002332  MOV      TMP3,BADDAT ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
064014 113777 002246 116360  MOVB     PORTA,@RPCS2 ;'BAD DATA' FOR ERROR TYPE OUT
064022 005737 002344  TST      TMP1        ;SELECT PORT A.
064026 001025          BNE      72$        ;SEE IF STATUS EQ ZERO FROM PORT B.
064030 012737 177777 002302 71$:  MOV      #-1,RELERR  ;BR IF NOT
064036 012777 000011 116326  MOV      #11,@RPCS1  ;SET 'RELEASE ERROR' INDICATOR
064044 012777 000013 116320  MOV      #13,@RPCS1 ;CLEAR THE DRIVE
064052 104456          TRAP     CSERHRD    ;RELEASE THE DRIVE
064054 000011          .WORD   9
064056 007313          .WORD   EM26
064060 013214          .WORD   ERR9
064062 012746 003716  MOV      #FRMT17,-(SP)
064066 012746 000001  MOV      #1,-(SP)
064072 010600          MOV      SP,R0
064074 104414          TRAP     CSPNTB
064076 062706 000004  ADD      #4,SP
064102 013737 002346 002332 72$:  MOV      TMP2,BADDAT ;LOOK FOR BIT FAILURES WHEN RPDS READ
    
```

```

064110 013737 002246 002266      MOV     PORTA,PTNBR      ;CHANGE PORT NUMBER
064116 023737 002336 002332      CMP     EXPTED,BADDAT   ;ALL BITS OK ?
064124 001414                      BEQ     73$             ;BR IF OK FROM PORT A.
064126 104456                      TRAP   C$SERHRD
064130 000013                      .WORD  11
064132 006072                      .WORD  EM7
064134 013000                      .WORD  ERR5
064136 012746 003471      MOV     #FRMT14,-(SP)
064142 012746 000001      MOV     #1,-(SP)
064146 010600      MOV     SP,RO
064150 104414                      TRAP   C$PNTB
064152 062706 000004      ADD     #4,SP
064156 013737 002350 002332 73$:  MOV     TMP3,BADDAT     ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
064164 013737 002250 002266      MOV     PORTB,PTNBR     ;CHANGE PORT NUMBER
064172 023737 002336 002332      CMP     EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
064200 001414                      BEQ     74$             ;BR IF OK
064202 104456                      TRAP   C$SERHRD
064204 000014                      .WORD  12
064206 006072                      .WORD  EM7
064210 013000                      .WORD  ERR5
064212 012746 003522      MOV     #FRMT15,-(SP)
064216 012746 000001      MOV     #1,-(SP)
064222 010600      MOV     SP,RO
064224 104414                      TRAP   C$PNTB
064226 062706 000004      ADD     #4,SP
064232                      74$:
064232 005737 002302      TST     RELERR          ;IS DRIVE NEUTRAL?
064236 001402                      BEQ     +6              ;BR YES
064240 000137 064450                      JMP     4$              ;BYPASS REST OF TEST

064244 013777 002262 116136      ;WRITE PORT A ATTENTION BIT
                                MOV     ASRA,@RPAS

                                ;VERIFY THAT THE CORRECT ATA BIT IS RESET

064252 005037 002276                      CLR     CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
064256 017737 116126 002332      MOV     @RPAS,BADDAT   ;GET CONTENTS OF RPAS
064264 013737 002410 002334      MOV     RPAS,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
064272 013737 002264 002336      MOV     ASRB,EXPTED    ;:WHAT REGISTER SHOULD BE
064300 023737 002336 002332      CMP     EXPTED,BADDAT  ;IS THE REGISTER OK ?
064306 001416                      BEQ     75$             ;BR IF OK
064310 104456                      TRAP   C$SERHRD
064312 000004                      .WORD  4
064314 006146                      .WORD  EM10
064316 012654                      .WORD  ERR3
064320 012746 003716      MOV     #FRMT17,-(SP)
064324 012746 000001      MOV     #1,-(SP)
064330 010600      MOV     SP,RO
064332 104414                      TRAP   C$PNTB
064334 062706 000004      ADD     #4,SP
064340 005137 002276      COM     CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
064344                      75$:
064344 005737 002276      TST     CKERR
064350 001415                      BEQ     1$              ;BR YES
064352 104456                      TRAP   C$SERHRD
064354 000031                      .WORD  25
064356 011670                      .WORD  EM60
    
```



```

064360 012654          .WORD  ERR3
064362 012746 003522  MOV    #FRMT15,-(SP)
064366 012746 000001  MOV    #1,-(SP)
064372 010600          MOV    SP,RO
064374 104414          TRAP  C$PNTB
064376 062706 000004  ADD    #4,SP
064402 000422          BR     4$          ;BYPASS REST OF TEST
                    ;WAIT FOR DRIVE TO RELEASE BY TIMEOUT

064404          1$:
064404 113777 002246 115770  MOVB  PORTA,@RPCS2          ;SELECT PORT A
064412 013737 002246 002266  MOV   PORTA,PTNBR          ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
064420 005777 115760          TST   @RPDS                ;MAKE SURE DRIVE IS AVAILABLE
064424 001775          BEQ   2$
064426 113777 002250 115746  MOVB  PORTB,@RPCS2          ;SELECT PORT B
064434 013737 002250 002266  MOV   PORTB,PTNBR          ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
064442 005777 115736          TST   @RPDS                ;MAKE SURE DRIVE IS AVAILABLE
064446 001775          BEQ   3$
064450          4$:
                    ;CLEAR ATTENTION BITS FOR BOTH PORTS

064450 113777 002246 115724  MOVB  PORTA,@RPCS2          ;SELECT PORT #A
064456 005077 115722          CLR   @RPDS                ;SEIZE THE DRIVE
064462 012777 000011 115702  MOV   #11,@RPCS1           ;ISSUE DRIVE CLEAR
064470 012777 000013 115674  MOV   #13,@RPCS1           ;RELEASE THE DRIVE

                    ;START THE TIMER

064476 005037 002304          CLR   TIME                  ;CLEAR THE ELAPSED TIME COUNTER
064502 012737 000050 002306  MOV   #40.,WATCH           ;SET WATCH TO 40. MS
064510 005737 002306          77$: TST   WATCH
064514 001375          BNE  77$
064516 113777 002250 115656  MOVB  PORTB,@RPCS2          ;SELECT PORT #B
064524 005077 115654          CLR   @RPDS                ;SEIZE THE DRIVE THROUGH PORT 'B'
064530 012777 000011 115634  MOV   #11,@RPCS1           ;ISSUE DRIVE CLEAR
064536 012777 000013 115626  MOV   #13,@RPCS1           ;RELEASE THE DRIVE

                    ;START THE TIMER

064544 005037 002304          CLR   TIME                  ;CLEAR THE ELAPSED TIME COUNTER
064550 012737 000050 002306  MOV   #40.,WATCH           ;SET WATCH TO 40. MS
064556 005737 002306          78$: TST   WATCH
064562 001375          BNE  78$
107 064564          L10065:
064564 104401          TRAP C$ETST
    
```

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```
.SBTTL TEST 24 RESET ATTENTION 'B' BY WRITING RPAS
;*VERIFY THAT ATA BIT CAN BE RESET BY WRITING THE APPROPRIATE BIT
;* BIT IN THE ATTENTION SUMMARY REGISTER (RPAS)
;*
;* A. SET ATTENTION BITS IN BOTH PORTS, VERIFY THAT BOTH ARE SET
;*
;* B. VERIFY THAT DRIVE IS IN NEUTRAL
;*
;* C. WRITE PORT 'B' ATTENTION BIT IN RPAS, VERIFY THAT ONLY
;* PORT 'B' ATTENTION BIT IS RESET.
;*
```

```
064566
064566 005737 002340
064572 001402
064574 104432
064576 001204
064600
```

```
T24::
TST DRVBAD ;SYSTEM OK??
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10066-
```

```
*****
64$:
```

```
;SET ATTENTION BITS FOR BOTH PORTS
```

```
064600 113777 002246 115574
064606 005777 115572
064612 001775
064614 012777 000017 115550
064622 013777 002250 115552
064630 005777 115550
064634 001775
064636 012777 000017 115526
064644 113777 002246 115530
064652 005777 115526
064656 001775
```

```
67$: MOVB PORTA,@RPCS2 ;SELECT PORT A
TST @RPDS ;MAKE SURE DRIVE AVAILABLE
BEQ 67$
MOV #17,@RPCS1
MOV PORTB,@RPCS2 ;SELECT THE OTHER PORT
65$: TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 65$ ;BR IF DRIVE HASN'T TIMED OUT
MOV #17,@RPCS1 ;FORCE ATA BIT
66$: MOVB PORTA,@RPCS2 ;SELECT PORT A AGAIN
TST @RPDS ;WAIT FOR DRIVE TO TIMEOUT
BEQ 66$ ;BR IF DRIVE 'ASN'T TIMED OUT
```

```
*****
;CONFIRM THAT BOTH ATTENTION BITS ARE SET.
```

```
064660 113777 002250 115514
064666 013737 002250 002266
064674 005037 002276
064700 017737 115504 002332
064706 013737 002410 002334
064714 013737 002260 002336
064722 023737 002336 002332
064730 001416
064732 104456
064734 000004
064736 006146
064740 012654
064742 012746 003716
064746 012746 000001
064752 010600
064754 104414
064756 062706 000004
064762 005137 002276
064766
064766 005737 002276
064772 001402
```

```
MOVB PORTB,@RPCS2 ;SELECT PORT B
MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
MOV @RPAS,BADADR ;GET CONTENTS OF RPAS
MOV RPAS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
MOV ASR1,EXPTED ;:WHAT REGISTER SHOULD BE
CMP EXPTED,BADADR ;IS THE REGISTER OK ?
BEQ 68$ ;BR IF OK
TRAP C$ERHRD
.WORD 4
.WORD EM10
.WORD ERR3
MOV #FRMT17,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C$PNTB
ADD #4,SP
COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
68$: TST CKERR ;ARE BOTH BITS SET?
BEQ .+6 ;BR YES
```



```

064774 000137 065666          JMP      4$          ;BYPASS REST OF TEST
                                ;CHECK IF NEUTRAL

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL

065000 005037 002302          CLR      RELERR      ;CLEAR THE 'RELEASE ERROR ' INDICATOR
065004 013737 002404 002334    MOV      RPDS,BADADR ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
065012 012737 111700 002336    MOV      #111700,EXPTED ;COMPARISON CONSTANT
065020 113777 002246 115354    MOV      PORTA,@RPCS2 ;SELECT PORT A.
065026 017737 115352 002346    MOV      @RPDS,TMP2  ;GET THE DRIVE STATUS REGISTER FROM PORT A.
065034 042737 024005 002346    BIC      #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
065042 013737 002346 002342    MOV      TMP2,TMP0  ;COPY IT INTO 'TMP0'
065050 042737 100100 002342    BIC      #ATA!VV,TMP0 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
065056 113777 002250 115316    MOV      PORTB,@RPCS2 ;SELECT PORT B.
065064 017737 115314 002350    MOV      @RPDS,TMP3  ;GET THE DRIVE STATUS REGISTER FROM PORT B.
065072 042737 024005 002350    BIC      #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
065100 013737 002350 002344    MOV      TMP3,TMP1  ;COPY IT INTO 'TMP1'
065106 042737 100100 002344    BIC      #ATA!VV,TMP1 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
065114 023737 002342 002344    CMP      TMP0,TMP1  ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
065122 001021          BNE      70$        ;BR IF NOT
065124 005737 002342          TST      TMP0        ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
065130 001073          BNE      72$        ;BR IF NOT
065132 104456          TRAP     C$ERHRD
065134 000006          .WORD   6
065136 010751          .WORD   EM46
065140 013534          .WORD   ERR15
065142 012746 003716    MOV      #FRMT17,-(SP)
065146 012746 000001    MOV      #1,-(SP)
065152 010600          MOV      SP,R0
065154 104414          TRAP     C$PNTB
065156 062706 000004          ADD      #4,SP
065162 000137 065450          JMP      74$        ;BYPASS THE REST OF THE CHECKS
065166 013737 002346 002332 70$:    MOV      TMP2,BADDAT ;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
065174 013737 002250 002266    MOV      PORTB,PTNBR ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
065202 113777 002250 115172    MOV      PORTB,@RPCS2 ;SELECT PORT B.
065210 005737 002342          TST      TMP0        ;SEE IF STATUS EQ 0 FROM PORT A.
065214 001414          BEQ      71$        ;BR IF ZERO
065216 013737 002246 002266    MOV      PORTA,PTNBR ;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
065224 013737 002350 002332    MOV      TMP3,BADDAT ;'BAD DATA' FOR ERROR TYPE OUT
065232 113777 002246 115142    MOV      PORTA,@RPCS2 ;SELECT PORT A.
065240 005737 002344          TST      TMP1        ;SEE IF STATUS EQ ZERO FROM PORT B.
065244 001025          BNE      72$        ;BR IF NOT
065246 012737 177777 002302 71$:    MOV      #-1,RELERR  ;SET 'RELEASE ERROR' INDICATOR
065254 012777 000011 115110    MOV      #11,@RPCS1 ;CLEAR THE DRIVE
065262 012777 000013 115102    MOV      #13,@RPCS1 ;RELEASE THE DRIVE
065270 104456          TRAP     C$ERHRD
065272 000011          .WORD   9
065274 007313          .WORD   EM26
065276 013214          .WORD   ERR9
065300 012746 003716    MOV      #FRMT17,-(SP)
065304 012746 000001    MOV      #1,-(SP)
065310 010600          MOV      SP,R0
065312 104414          TRAP     C$PNTB
065314 062706 000004          ADD      #4,SP
065320 013737 002346 002332 72$:    MOV      TMP2,BADDAT ;LOOK FOR BIT FAILURES WHEN RPDS READ
065326 013737 002246 002266    MOV      PORTA,PTNBR ;CHANGE PORT NUMBER
    
```

```

065334 023737 002336 002332      CMP      EXPTED,BADDAT      ;ALL BITS OK ?
065342 001414                      BEQ      73$              ;BR IF OK FROM PORT A.
065344 104456                      TRAP     C$ERHRD
065346 000013                      .WORD   11
065350 006072                      .WORD   EM7
065352 013000                      .WORD   ERR5
065354 012746 003471              MOV      #FRMT14,-(SP)
065360 012746 000001              MOV      #1,-(SP)
065364 010600                      MOV      SP,RO
065366 104414                      TRAP     C$PNTB
065370 062706 000004              ADD      #4,SP
065374 013737 002350 002332 73$:  MOV      TMP3,BADDAT      ;CHECK RPDS FOR BIT FAILURES - FROM PORT B.
065402 013737 002250 002266      MOV      PORTB,PTNBR     ;CHANGE PORT NUMBER
065410 023737 002336 002332      CMP      EXPTED,BADDAT   ;SEE IF READ OK FROM PORT B.
065416 001414                      BEQ      74$              ;BR IF OK
065420 104456                      TRAP     C$ERHRD
065422 000014                      .WORD   12
065424 006072                      .WORD   EM7
065426 013000                      .WORD   ERR5
065430 012746 003522              MOV      #FRMT15,-(SP)
065434 012746 000001              MOV      #1,-(SP)
065440 010600                      MOV      SP,RO
065442 104414                      TRAP     C$PNTB
065444 062706 000004              ADD      #4,SP
065450                                74$:
065450 005737 002302              TST      RELERR          ;IS DRIVE NEUTRAL?
065454 001402                      BEQ      .+6              ;BR YES
065456 000137 065666              JMP      4$              ;BYPASS REST OF TEST

                                ;WRITE PORT B ATTENTION BIT
065462 013777 002264 114720      MOV      ASRB,@RPAS

                                ;VERIFY THAT THE CORRECT ATA BIT IS RESET

065470 005037 002276                      CLR      CKERR            ;CLEAR THE 'CHECK ERROR' INDICATOR
065474 017737 114710 002332      MOV      @RPAS,BADDAT   ;GET CONTENTS OF RPAS
065502 013737 002410 002334      MOV      RPAS,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
065510 013737 002262 002336      MOV      ASRA,EXPTED    ;:WHAT REGISTER SHOULD BE
065516 023737 002336 002332      CMP      EXPTED,BADDAT  ;IS THE REGISTER OK ?
065524 001416                      BEQ      75$              ;BR IF OK
065526 104456                      TRAP     C$ERHRD
065530 000004                      .WORD   4
065532 006146                      .WORD   EM10
065534 012654                      .WORD   ERR3
065536 012746 003716              MOV      #FRMT17,-(SP)
065542 012746 000001              MOV      #1,-(SP)
065546 010600                      MOV      SP,RO
065550 104414                      TRAP     C$PNTB
065552 062706 000004              ADD      #4,SP
065556 005137 002276              COM      CKERR            ;SET THE REGISTER COMPARE ERROR INDICATOR
065562                                75$:
065562 005737 002276              TST      CKERR
065566 001415                      BEQ      1$              ;BR YES
065570 104456                      TRAP     C$ERHRD
065572 000031                      .WORD   25
065574 011670                      .WORD   EM60
065576 012654                      .WORD   ERR3
    
```



```

065600 012746 003471      MOV    #FRMT14, -(SP)
065604 012746 000001      MOV    #1, -(SP)
065610 010600              MOV    SP, R0
065612 104414              TRAP  C$PNTB
065614 062706 000004      ADD    #4, SP
065620 000422              BR     4$                ;BYPASS REST OF TEST
                                ;WAIT FOR DRIVE TO RELEASE BY TIMEOUT

065622 113777 002250 114552 1$:  MOVB  PORTB, @RPCS2      ;SELECT PORT B
065622 013737 002250 002266      MOV    PORTB, PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
065630 005777 114542              TST    @RPDS              ;MAKE SURE DRIVE IS AVAILABLE
065636 001775              BEQ    2$
065642 113777 002246 114530      MOVB  PORTA, @RPCS2      ;SELECT PORT A
065644 013737 002246 002266      MOV    PORTA, PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
065652 005777 114520              TST    @RPDS              ;MAKE SURE DRIVE IS AVAILABLE
065660 001775              BEQ    3$
065666              ;CLEAR ATTENTION BITS FOR BOTH PORTS

065666 113777 002246 114506      MOVB  PORTA, @RPCS2      ;SELECT PORT #A
065674 005077 114504              CLR    @RPDS              ;SEIZE THE DRIVE
065700 012777 000011 114464      MOV    #11, @RPCS1       ;ISSUE DRIVE CLEAR
065706 012777 000013 114456      MOV    #13, @RPCS1       ;RELEASE THE DRIVE

                                ;START THE TIMER

065714 005037 002304              CLR    TIME                ;CLEAR THE ELAPSED TIME COUNTER
065720 012737 000050 002306      MOV    #40., WATCH       ;SET WATCH TO 40. MS
065726 005737 002306 77$:  TST    WATCH
065732 001375              BNE   77$
065734 113777 002250 114440      MOVB  PORTB, @RPCS2      ;SELECT PORT #B
065742 005077 114436              CLR    @RPDS              ;SEIZE THE DRIVE THROUGH PORT 'B'
065746 012777 000011 114416      MOV    #11, @RPCS1       ;ISSUE DRIVE CLEAR
065754 012777 000013 114410      MOV    #13, @RPCS1       ;RELEASE THE DRIVE

                                ;START THE TIMER

065762 005037 002304              CLR    TIME                ;CLEAR THE ELAPSED TIME COUNTER
065766 012737 000050 002306      MOV    #40., WATCH       ;SET WATCH TO 40. MS
065774 005737 002306 78$:  TST    WATCH
066000 001375              BNE   78$
22 066002 L10066: TRAP  C$SETST
066002 104401
    
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```
.SBTTL TEST 25 SET ATTENTION 'A' BY COMMAND
;*TEST THE OPERATION OF THE PORT A AND PORT B ATTENTION BITS AFTER A
;*COMMAND.
;*
;*A. ISSUE A RECALIBRATE COMMAND THROUGH PORT 'A'.
;*
;*B. WAIT FOR THE RECALIBRATE COMMAND TO COMPLETE ('DRY' TO BECOME
;*'1'). VERIFY THAT THE ATTENTION BIT FOR PORT 'A' IS SET AND
;*THAT THE ATTENTION BIT FOR PORT 'B' IS NOT SET.
;*
;*C. RELEASE THE DRIVE THROUGH PORT 'A'. VERIFY THAT THE DRIVE RETURNED
;*TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
;*
```

```
066004
066004 005737 002340
066010 001402
066012 104432
066014 001162
066016
```

```
T25::
TST DRVBAD ;SYSTEM OK??
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10067-
```

```
64$:
;CLEAR ATTENTION BITS FOR BOTH PORTS
MOVB PORTA,@RPCS2 ;SELECT PORT #A
CLR @RPDS ;SEIZE THE DRIVE
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

```
066016 113777 002246 114356
066024 005077 114354
066030 012777 000011 114334
066036 012777 000013 114326
```

```
;START THE TIMER
65$:
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40.,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 65$
MOVB PORTB,@RPCS2 ;SELECT PORT #B
CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

```
066044 005037 002304
066050 012737 000050 002306
066056 005737 002306
066062 001375
066064 113777 002250 114310
066072 005077 114306
066076 012777 000011 114266
066104 012777 000013 114260
```

```
;START THE TIMER
66$:
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40.,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 66$
MOVB PORTA,@RPCS2 ;SELECT PORT A
MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
MOV PORTA,SEIZPT ;'SEIZED' PORT ADDRESS
```

```
066112 005037 002304
066116 012737 000050 002306
066124 005737 002306
066130 001375
066132 113777 002246 114242
066140 013737 002246 002266
066146 013737 002246 002270
```

```
*****
;DO A RECALIBRATE THROUGH PORT A
```

```
066154 012777 000007 114210 MOV #7,@RPCS1 ;ISSUE A RECALIBRATE COMMAND THROUGH PORT A
```

```
*****
;WAIT FOR DRIVE TO FINISH
```



```

066162 032777 000200 114214      BIT      #DRY,@RPDS      ;WAIT FOR DRIVE TO FINISH
066170 001774      BEQ      -6           ;BR IF NOT FINISHED

:*****
:CONFIRM THAT ATTENTION IS SET FOR PORT A

066172 005037 002276      CLR      CKERR        ;CLEAR THE 'CHECK ERROR' INDICATOR
066176 017737 114202 002332      MOV      @RPDS,BADDAT ;GET CONTENTS OF RPDS
066204 013737 002404 002334      MOV      RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
066212 012737 100000 002336      MOV      #ATA,EXPTED  ;:WHAT REGISTER SHOULD BE
066220 013737 002332 002342      MOV      BADDAT,TMPO  ;MOVE REGISTER CONTENTS TO 'TMPO'
066226 042737 077777 002342      BIC      #^CATA,TMPO  ;SAVE SPECIFIED BITS
066234 023737 002336 002342      CMP      EXPTED,TMPO  ;COMPARE THE BITS
066242 001427      BEQ      67$         ;BR IF OK
066244 013737 002332 002352      MOV      BADDAT,TMP4  ;COPY 'BAD DATA'
066252 042737 100000 002352      BIC      #ATA,TMP4    ;CLEAR THE MASKED BITS
066260 053737 002352 002336      BIS      TMP4,EXPTED  ;'OR' WITH GOOD DATA FOR TYPEOUT
066266 104456      TRAP     C$SERHRD
066270 000003      .WORD   3
066272 007630      .WORD   EM32
066274 012654      .WORD   ERR3
066276 012746 003716      MOV      #FRMT17,-(SP)
066302 012746 000001      MOV      #1,-(SP)
066306 010600      MOV      SP,R0
066310 104414      TRAP     C$PNTB
066312 062706 000004      ADD      #4,SP
066316 005137 002276      COM      CKERR        ;SET THE REGISTER COMPARE ERROR INDICATOR
066322

67$:

;RELEASE THE DRIVE FROM PORT A

066322 113777 002246 114052      MOV      PORTA,@RPCS2 ;SELECT PORT A
066330 013737 002246 002266      MOV      PORTA,PTNBR  ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
066336 012777 000013 114026      MOV      #13,@RPCS1  ;ISSUE RELEASE THROUGH PORT A

;START THE TIMER

066344 005037 002304      CLR      TIME        ;CLEAR THE ELAPSED TIME COUNTER
066350 012737 000050 002306      MOV      #40,WATCH   ;SET WATCH TO 40. MS
066356 005737 002306      TST      WATCH
066362 001375      BNE      69$

69$:

;VERIFY THAT THE DRIVE IS IN NEUTRAL

066364 005037 002302      CLR      RELERR      ;CLEAR THE 'RELEASE ERROR' INDICATOR
066370 013737 002404 002334      MOV      RPDS,BADADR ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
066376 012737 011700 002336      MOV      #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
066404 113777 002246 113770      MOV      PORTA,@RPCS2 ;SELECT PORT A.
066412 017737 113766 002346      MOV      @RPDS,TMP2  ;GET THE DRIVE STATUS REGISTER FROM PORT A.
066420 042737 024005 002346      BIC      #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
066426 013737 002346 002342      MOV      TMP2,TMPO   ;COPY IT INTO 'TMPO'
066434 042737 100100 002342      BIC      #ATA!VV,TMPO ;CLEAR PORT DEPENDENT BITS FROM THE COPY
066442 113777 002250 113732      MOV      PORTB,@RPCS2 ;SELECT PORT B.
066450 017737 113730 002350      MOV      @RPDS,TMP3  ;GET THE DRIVE STATUS REGISTER FROM PORT B.
066456 042737 024005 002350      BIC      #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
    
```

066464	013737	002350	002344	MOV	TMP3,TMP1	:COPY IT INTO 'TMP1'
066472	042737	100100	002344	BIC	#ATA!VV,TMP1	:CLEAR PORT DEPENDENT BITS FROM THE COPY
066500	023737	002342	002344	CMP	TMP0,TMP1	:IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
066506	001021			BNE	70\$:BR IF NOT
066510	005737	002342		TST	TMP0	:REGISTERS ARE THE SAME: ARE THEY ZERO ?
066514	001073			BNE	72\$:BR IF NOT
066516	104456			TRAP	C\$ERHRD	
066520	000006			.WORD	6	
066522	010751			.WORD	EM46	
066524	013534			.WORD	ERR15	
066526	012746	003716		MOV	#FRMT17,-(SP)	
066532	012746	000001		MOV	#1,-(SP)	
066536	010600			MOV	SP,RO	
066540	104414			TRAP	C\$PNTB	
066542	062706	000004		ADD	#4,SP	
066546	000137	067034		JMP	74\$:BYPASS THE REST OF THE CHECKS
066552	013737	002346	002332	MOV	TMP2,BADDAT	:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
066560	013737	002250	002266	MOV	PORTB,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
066566	113777	002250	113606	MOVB	PORTB,@RPCS2	:SELECT PORT B.
066574	005737	002342		TST	TMP0	:SEE IF STATUS EQ 0 FROM PORT A.
066600	001414			BEQ	71\$:BR IF ZERO
066602	013737	002246	002266	MOV	PORTA,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
066610	013737	002350	002332	MOV	TMP3,BADDAT	: 'BAD DATA' FOR ERROR TYPE OUT
066616	113777	002246	113556	MOVB	PORTA,@RPCS2	:SELECT PORT A.
066624	005737	002344		TST	TMP1	:SEE IF STATUS EQ ZERO FROM PORT B.
066630	001025			BNE	72\$:BR IF NOT
066632	012737	177777	002302	MOV	#-1,RELERR	:SET 'RELEASE ERROR' INDICATOR
066640	012777	000011	113524	MOV	#11,@RPCS1	:CLEAR THE DRIVE
066646	012777	000013	113516	MOV	#13,@RPCS1	:RELEASE THE DRIVE
066654	104456			TRAP	C\$ERHRD	
066656	000011			.WORD	9	
066660	007313			.WORD	EM26	
066662	013214			.WORD	ERR9	
066664	012746	003716		MOV	#FRMT17,-(SP)	
066670	012746	000001		MOV	#1,-(SP)	
066674	010600			MOV	SP,RO	
066676	104414			TRAP	C\$PNTB	
066700	062706	000004		ADD	#4,SP	
066704	013737	002346	002332	MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
066712	013737	002246	002266	MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
066720	023737	002336	002332	CMP	EXPTD,BADDAT	:ALL BITS OK ?
066726	001414			BEQ	73\$:BR IF OK FROM PORT A.
066730	104456			TRAP	C\$ERHRD	
066732	000013			.WORD	11	
066734	006072			.WORD	EM7	
066736	013000			.WORD	ERR5	
066740	012746	003471		MOV	#FRMT14,-(SP)	
066744	012746	000001		MOV	#1,-(SP)	
066750	010600			MOV	SP,RO	
066752	104414			TRAP	C\$PNTB	
066754	062706	000004		ADD	#4,SP	
066760	013737	002350	002332	MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
066766	013737	002250	002266	MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
066774	023737	002336	002332	CMP	EXPTD,BADDAT	:SEE IF READ OK FROM PORT B.
067002	001414			BEQ	74\$:BR IF OK
067004	104456			TRAP	C\$ERHRD	
067006	000014			.WORD	12	

067010	006072			.WORD	EM7	
067012	013000			.WORD	ERR5	
067014	012746	003522		MOV	#FRMT15,-(SP)	
067020	012746	000001		MOV	#1,-(SP)	
067024	010600			MOV	SP,R0	
067026	104414			TRAP	C\$PNTB	
067030	062706	000004		ADD	#4,SP	
067034						
067034	113777	002250	113340	74\$:	MOV B	PORTB,@RPCS2 ;SELECT PORT B
067042	013737	002250	002266	MOV	PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT	
:*****						
:CONFIRM THAT ATTENTION IS NOT SET FOR PORT B						
067050	005037	002276		CLR	CKERR	:CLEAR THE 'CHECK ERROR' INDICATOR
067054	017737	113324	002332	MOV	@RPDS,BADDAT	:GET CONTENTS OF RPDS
067062	013737	002404	002334	MOV	RPDS,BADADR	:FORM REGISTER ADDRESS OF ERROR MESSAGE
067070	005037	002336		CLR	EXPTED	:WHAT REGISTER SHOULD BE
067074	013737	002332	002342	MOV	BADDAT,TMP0	:MOVE REGISTER CONTENTS TO 'TMP0'
067102	042737	077777	002342	BIC	#^CATA,TMP0	:SAVE SPECIFIED BITS
067110	023737	002336	002342	CMP	EXPTED,TMP0	:COMPARE THE BITS
067116	001427			BEQ	75\$:BR IF OK
067120	013737	002332	002352	MOV	BADDAT,TMP4	:COPY 'BAD DATA'
067126	042737	100000	002352	BIC	#ATA,TMP4	:CLEAR THE MASKED BITS
067134	053737	002352	002336	BIS	TMP4,EXPTED	: 'OR' WITH GOOD DATA FOR TYPEOUT
067142	104456			TRAP	C\$SERHRD	
067144	000003			.WORD	3	
067146	007630			.WORD	EM32	
067150	012654			.WORD	ERR3	
067152	012746	003716		MOV	#FRMT17,-(SP)	
067156	012746	000001		MOV	#1,-(SP)	
067162	010600			MOV	SP,R0	
067164	104414			TRAP	C\$PNTB	
067166	062706	000004		ADD	#4,SP	
067172	005137	002276		COM	CKERR	:SET THE REGISTER COMPARE ERROR INDICATOR
067176				75\$:		
83 067176				L10067:		
067176	104401			TRAP	C\$SETST	

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```
.SBTTL TEST 26 SET ATTENTION 'B' BY COMMAND
:*TEST THE OPERATION OF THE PORT A AND PORT B ATTENTION BITS AFTER A
:* COMMAND.
:*
:* A. ISSUE A RECALIBRATE COMMAND THROUGH PORT 'B'.
:*
:* B. WAIT FOR THE RECALIBRATE COMMAND TO COMPLETE ('DRY' TO BECOME
:* '1'). VERIFY THAT THE ATTENTION BIT FOR PORT 'B' IS SET AND
:* THAT THE ATTENTION BIT FOR PORT 'A' IS NOT SET.
:*
:* C. RELEASE THE DRIVE THROUGH PORT 'B'. VERIFY THAT THE DRIVE RETURNED
:* TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
:*
```

```
067200
067200 005737 002340
067204 001402
067206 104432
067210 001162
067212
```

```
T26::
TST DRVBAD ;SYSTEM OK??
BEQ 64$ ;TAKE BRANCH IF SO
TRAP CSEXIT
.WORD L10070-
```

```
64$:
;CLEAR ATTENTION BITS FOR BOTH PORTS
```

```
067212 113777 002246 113162
067220 005077 113160
067224 012777 000011 113140
067232 012777 000013 113132
```

```
MOVB PORTA,@RPCS2 ;SELECT PORT #A
CLR @RPDS ;SEIZE THE DRIVE
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

```
;START THE TIMER
```

```
067240 005037 002304
067244 012737 000050 002306
067252 005737 002306
067256 001375
067260 113777 002250 113114
067266 005077 113112
067272 012777 000011 113072
067300 012777 000013 113064
```

```
65$:
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40.,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 65$
MOVB PORTB,@RPCS2 ;SELECT PORT #B
CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

```
;START THE TIMER
```

```
067306 005037 002304
067312 012737 000050 002306
067320 005737 002306
067324 001375
067326 113777 002250 113046
067334 013737 002250 002266
067342 013737 002250 002270
```

```
66$:
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40.,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 66$
MOVB PORTB,@RPCS2 ;SELECT PORT B
MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
MOV PORTB,SEIZPT ;'SEIZED' PORT ADDRESS
```

```
::*****
;DO A RECALIBRATE THROUGH PORT B
```

```
067350 012777 000007 113014
```

```
MOV #7,@RPCS1 ;ISSUE A RECALIBRATE COMMAND THROUGH PORT B
```

```
::*****
;WAIT FOR DRIVE TO FINISH
```



```

067356 032777 000200 113020      BIT      #DRY,@RPDS      ;WAIT FOR DRIVE TO FINISH
067364 001774                      BEQ      -6            ;BR IF NOT FINISHED

:*****
:CONFIRM THAT ATTENTION IS SET FOR PORT B

067366 005037 002276                      CLR      CKERR        ;CLEAR THE 'CHECK ERROR' INDICATOR
067372 017737 113006 002332      MOV      @RPDS,BADADR ;GET CONTENTS OF RPDS
067400 013737 002404 002334      MOV      RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
067406 012737 100000 002336      MOV      #ATA,EXPTED ;WHAT REGISTER SHOULD BE
067414 013737 002332 002342      MOV      BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
067422 042737 077777 002342      BIC      #^CATA,TMPO ;SAVE SPECIFIED BITS
067430 023737 002336 002342      CMP      EXPTED,TMPO ;COMPARE THE BITS
067436 001427                      BEQ      67$         ;BR IF OK
067440 013737 002332 002352      MOV      BADDAT,TMP4 ;COPY 'BAD DATA'
067446 042737 100000 002352      BIC      #ATA,TMP4   ;CLEAR THE MASKED BITS
067454 053737 002352 002336      BIS      TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
067462 104456                      TRAP     C$ERHRD
067464 000003                      .WORD   3
067466 007630                      .WORD   EM32
067470 012654                      .WORD   ERR3
067472 012746 003716      MOV      #FRMT17,-(SP)
067476 012746 000001      MOV      #1,-(SP)
067502 010600                      MOV      SP,R0
067504 104414                      TRAP     C$PNTB
067506 062706 000004      ADD      #4,SP
067512 005137 002276                      COM      CKERR        ;SET THE REGISTER COMPARE ERROR INDICATOR
067516                                     67$:

;RELEASE THE DRIVE FROM PORT B

067516 113777 002250 112656      MOV      PORTB,@RPCS2 ;SELECT PORT B
067524 013737 002250 002266      MOV      PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
067532 012777 000013 112632      MOV      #13,@RPCS1 ;ISSUE RELEASE THROUGH PORT B

;START THE TIMER

067540 005037 002304                      CLR      TIME        ;CLEAR THE ELAPSED TIME COUNTER
067544 012737 000050 002306      MOV      #40,WATCH   ;SET WATCH TO 40. MS
067552 005737 002306                      TST      WATCH
067556 001375                                     69$:
BNE      69$

;VERIFY THAT THE DRIVE IS IN NEUTRAL

067560 005037 002302                      CLR      RELERR      ;CLEAR THE 'RELEASE ERROR' INDICATOR
067564 013737 002404 002334      MOV      RPDS,BADADR ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
067572 012737 011700 002336      MOV      #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
067600 113777 002246 112574      MOV      PORTA,@RPCS2 ;SELECT PORT A.
067606 017737 112572 002346      MOV      @RPDS,TMP2  ;GET THE DRIVE STATUS REGISTER FROM PORT A.
067614 042737 024005 002346      BIC      #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
067622 013737 002346 002342      MOV      TMP2,TMPO   ;COPY IT INTO 'TMPO'
067630 042737 100100 002342      BIC      #ATA!VV,TMPO ;CLEAR PORT DEPENDENT BITS FROM THE COPY
067636 113777 002250 112536      MOV      PORTB,@RPCS2 ;SELECT PORT B.
067644 017737 112534 002350      MOV      @RPDS,TMP3  ;GET THE DRIVE STATUS REGISTER FROM PORT B.
067652 042737 024005 002350      BIC      #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
    
```

067660	013737	002350	002344	MOV	TMP3,TMP1	:COPY IT INTO 'TMP1'
067666	042737	100100	002344	BIC	#ATA!VV,TMP1	:CLEAR PORT DEPENDENT BITS FROM THE COPY
067674	023737	002342	002344	CMP	TMP0,TMP1	:IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
067702	001021			BNE	70\$:BR IF NOT
067704	005737	002342		TST	TMP0	:REGISTERS ARE THE SAME: ARE THEY ZERO ?
067710	001073			BNE	72\$:BR IF NOT
067712	104456			TRAP	C\$ERHRD	
067714	000006			.WORD	6	
067716	010751			.WORD	EM46	
067720	013534			.WORD	ERR15	
067722	012746	003716		MOV	#FRMT17,-(SP)	
067726	012746	000001		MOV	#1,-(SP)	
067732	010600			MOV	SP,R0	
067734	104414			TRAP	C\$PNTB	
067736	062706	000004		ADD	#4,SP	
067742	000137	070230		JMP	74\$:BYPASS THE REST OF THE CHECKS
067746	013737	002346	002332	MOV	TMP2,BADDAT	:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
067754	013737	002250	002266	MOV	PORTB,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
067762	113777	002250	112412	MOVB	PORTB,@RPCS2	:SELECT PORT B.
067770	005737	002342		TST	TMP0	:SEE IF STATUS EQ 0 FROM PORT A.
067774	001414			BEQ	71\$:BR IF ZERO
067776	013737	002246	002266	MOV	PORTA,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
070004	013737	002350	002332	MOV	TMP3,BADDAT	: 'BAD DATA' FOR ERROR TYPE OUT
070012	113777	002246	112362	MOVB	PORTA,@RPCS2	:SELECT PORT A.
070020	005737	002344		TST	TMP1	:SEE IF STATUS EQ ZERO FROM PORT B.
070024	001025			BNE	72\$:BR IF NOT
070026	012737	177777	002302	MOV	#-1,RELERR	:SET 'RELEASE ERROR' INDICATOR
070034	012777	000011	112330	MOV	#11,@RPCS1	:CLEAR THE DRIVE
070042	012777	000013	112322	MOV	#13,@RPCS1	:RELEASE THE DRIVE
070050	104456			TRAP	C\$ERHRD	
070052	000011			.WORD	9	
070054	007313			.WORD	EM26	
070056	013214			.WORD	ERR9	
070060	012746	003716		MOV	#FRMT17,-(SP)	
070064	012746	000001		MOV	#1,-(SP)	
070070	010600			MOV	SP,R0	
070072	104414			TRAP	C\$PNTB	
070074	062706	000004		ADD	#4,SP	
070100	013737	002346	002332	MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
070106	013737	002246	002266	MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
070114	023737	002336	002332	CMP	EXPTED,BADDAT	:ALL BITS OK ?
070122	001414			BEQ	73\$:BR IF OK FROM PORT A.
070124	104456			TRAP	C\$ERHRD	
070126	000013			.WORD	11	
070130	006072			.WORD	EM7	
070132	013000			.WORD	ERR5	
070134	012746	003471		MOV	#FRMT14,-(SP)	
070140	012746	000001		MOV	#1,-(SP)	
070144	010600			MOV	SP,R0	
070146	104414			TRAP	C\$PNTB	
070150	062706	000004		ADD	#4,SP	
070154	013737	002350	002332	MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
070162	013737	002250	002266	MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
070170	023737	002336	002332	CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
070176	001414			BEQ	74\$:BR IF OK
070200	104456			TRAP	C\$ERHRD	
070202	000014			.WORD	12	


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070204 006072          .WORD  EM7
070206 013000          .WORD  ERR5
070210 012746 003522  MOV    #FRMT15,-(SP)
070214 012746 000001  MOV    #1,-(SP)
070220 010600          MOV    SP,R0
070222 104414          TRAP   C$PNTB
070224 062706 000004  ADD    #4,SP
070230          74$:
070230 113777 002246 112144  MOVB   PORTA,@RPCS2      ;SELECT PORT A
070236 013737 002246 002266  MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
;*****
;CONFIRM THAT ATTENTION IS NOT SET FOR PORT A

070244 005037 002276          CLR    CKERR              ;CLEAR THE 'CHECK ERROR' INDICATOR
070250 017737 112130 002332  MOV    @RPDS,BADDAT      ;GET CONTENTS OF RPDS
070256 013737 002404 002334  MOV    RPDS,BADADR      ;FORM REGISTER ADDRESS OF ERROR MESSAGE
070264 005037 002336          CLR    EXPTED            ;WHAT REGISTER SHOULD BE
070270 013737 002332 002342  MOV    BADDAT,TMPO       ;MOVE REGISTER CONTENTS TO 'TMPO'
070276 042737 077777 002342  BIC    #^CATA,TMPO      ;SAVE SPECIFIED BITS
070304 023737 002336 002342  CMP    EXPTED,TMPO      ;COMPARE THE BITS
070312 001427          BEQ    75$              ;BR IF OK
070314 013737 002332 002352  MOV    BADDAT,TMP4      ;COPY 'BAD DATA'
070322 042737 100000 002352  BIC    #ATA,TMP4        ;CLEAR THE MASKED BITS
070330 053737 002352 002336  BIS    TMP4,EXPTED      ;'OR' WITH GOOD DATA FOR TYPEOUT
070336 104456          TRAP   C$SERHRD
070340 000003          .WORD  3
070342 007630          .WORD  EM32
070344 012654          .WORD  ERR3
070346 012746 003716  MOV    #FRMT17,-(SP)
070352 012746 000001  MOV    #1,-(SP)
070356 010600          MOV    SP,R0
070360 104414          TRAP   C$PNTB
070362 062706 000004  ADD    #4,SP
070366 005137 002276          COM    CKERR              ;SET THE REGISTER COMPARE ERROR INDICATOR
24 070372          75$:
070372 104401          L10070: TRAP   C$SETST
    
```

```
1 .SBTTL TEST 27 TEST THAT PORT 'A' TIMEOUT DOES NOT RESET DRIVE
2
3 ;*VERIFY THAT PORT TIMEOUT DOES NOT INITIALIZE THE DRIVE.
4 ;*
5 ;* A. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
6 ;*
7 ;* B. WRITE 03 INTO RPCS1 THROUGH PORT 'A' TO FORCE AN ATTENTION & ILF ERROR.
8 ;*
9 ;* C. WAIT FOR THE DRIVE TO TIMEOUT. VERIFY THAT THE DRIVE RETURNED TO
10 ;* NEUTRAL; THAT ATTENTION IS SET FOR PORT 'A' AND NOT SET FOR
11 ;* PORT 'B'; AND THAT BOTH PORTS SEE 1'S IN THE ERROR REGISTER.
12 ;*
13
113 070374
117 070374 005737 002340 T27:: TST DRVBAD ;SYSTEM OK??
070400 001402 BEQ 64$ ;TAKE BRANCH IF SO
070402 104432 TRAP CSEXIT
070404 001526 .WORD L10071-.
070406 64$:

;CLEAR ATTENTION BITS FOR BOTH PORTS

070406 113777 002246 111766 MOVB PORTA,@RPCS2 ;SELECT PORT #A
070414 005077 111764 CLR @RPDS ;SEIZE THE DRIVE
070420 012777 000011 111744 MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
070426 012777 000013 111736 MOV #13,@RPCS1 ;RELEASE THE DRIVE

;START THE TIMER

070434 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
070440 012737 000050 002306 MOV #40.,WATCH ;SET WATCH TO 40. MS
070446 005737 002306 65$: TST WATCH
070452 001375 BNE 65$
070454 113777 002250 111720 MOVB PORTB,@RPCS2 ;SELECT PORT #B
070462 005077 111716 CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
070466 012777 000011 111676 MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
070474 012777 000013 111670 MOV #13,@RPCS1 ;RELEASE THE DRIVE

;START THE TIMER

070502 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
070506 012737 000050 002306 MOV #40.,WATCH ;SET WATCH TO 40. MS
070514 005737 002306 66$: TST WATCH
070520 001375 BNE 66$

;*****
;SEIZE THE DRIVE THROUGH PORT A

070522 113777 002246 111652 MOVB PORTA,@RPCS2 ;SELECT PORT A
070530 013737 002246 002270 MOV PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
070536 005077 111642 CLR @RPDS ;WRITE RPDS

070542 013737 002250 002272 MOV PORTB,OPPRT ;'OPPOSITE' PORT ADDRESS
;*****
;FORCE AN ATTENTION BY SETTING ERRORS.

070550 012777 000003 111614 MOV #3,@RPCS1 ;SET ILF ERROR BIT
```



```

;START THE TIMER
070556 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
070562 012737 002342 002306 MOV #1250.,WATCH ;SET WATCH TO 1250. MS
070570 113777 002250 111604 MOVB PORTB,@RPCS2 ;SELECT PORT B
070576 013737 002250 002266 MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TIMEOUT
;*****
;WAIT FOR DRIVE TO TIMEOUT
070604 005777 111574 1$: TST @RPDS ;WAIT FOR THE DRIVE TO BE RELEASED
070610 001017 BNE 2$ ;BR IF DRIVE RELEASED
070612 005737 002306 TST WATCH ;WATCH AT ZERO ?
070616 001372 BNE 1$ ;BR IF NOT
070620 104456 TRAP C$ERHRD
070622 000032 .WORD 26
070624 010177 .WORD EM36
070626 013320 .WORD ERR11
070630 012746 003716 MOV #FRMT17,-(SP)
070634 012746 000001 MOV #1,-(SP)
070640 010600 MOV SP,R0
070642 104414 TRAP C$PNTB
070644 062706 000004 ADD #4,SP
070650 2$: MOVB PORTA,@RPCS2 ;SELECT PORT A
070650 113777 002246 111524 MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TIMEOUT
070656 013737 002246 002266 ;*****
;THE ERROR BIT ('ERR') IN RPDS SHOULD STILL BE SET
070664 005037 002276 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
070670 017737 111510 002332 MOV @RPDS,BADDAT ;GET CONTENTS OF RPDS
070676 013737 002404 002334 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
070704 012737 040000 002336 MOV #ERR,EXPTED ;WHAT REGISTER SHOULD BE
070712 013737 002332 002342 MOV BADDAT,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
070720 042737 137777 002342 BIC #^CERR,TMPO ;SAVE SPECIFIED BITS
070726 023737 002336 002342 CMP EXPTED,TMPO ;COMPARE THE BITS
070734 001427 BEQ 69$ ;BR IF OK
070736 013737 002332 002352 MOV BADDAT,TMP4 ;COPY 'BAD DATA'
070744 042737 040000 002352 BIC #ERR,TMP4 ;CLEAR THE MASKED BITS
070752 053737 002352 002336 BIS TMP4,EXPTED ;'OR' WITH GOOD DATA FOR TIMEOUT
070760 104456 TRAP C$ERHRD
070762 000003 .WORD 3
070764 007123 .WORD EM23
070766 013262 .WORD ERR10
070770 012746 003716 MOV #FRMT17,-(SP)
070774 012746 000001 MOV #1,-(SP)
071000 010600 MOV SP,R0
071002 104414 TRAP C$PNTB
071004 062706 000004 ADD #4,SP
071010 005137 002276 COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
071014 69$: ;*****
;THE ERROR REGISTER SHOULD CONTAIN ILF BIT
071014 005037 002276 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
071020 017737 111362 002332 MOV @RPER1,BADDAT ;GET CONTENTS OF RPER1
071026 013737 002406 002334 MOV RPER1,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
    
```

```

071034 012737 000001 002336      MOV      #1,EXPTED      :::WHAT REGISTER SHOULD BE
071042 023737 002336 002332      CMP      EXPTED,BADDAT  :IS THE REGISTER OK ?
071050 001416                      BEQ      71$           :BR IF OK
071052 104456                      TRAP     C$ERHRD
071054 000004                      .WORD   4
071056 006146                      .WORD   EM10
071060 012654                      .WORD   ERR3
071062 012746 003716      MOV      #FRMT17,-(SP)
071066 012746 000001      MOV      #1,-(SP)
071072 010600                      MOV      SP,RO
071074 104414                      TRAP     C$PNTB
071076 062706 000004      ADD      #4,SP
071102 005137 002276      COM      CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
071106
    
```

```

71$:
:*****
:THE ATTENTION BIT FOR PORT A SHOULD STILL BE SET
    
```

```

071106 005037 002276                      CLR      CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
071112 017737 111266 002332      MOV      @RPDS,BADDAT  :GET CONTENTS OF RPDS
071120 013737 002404 002334      MOV      RPDS,BADADR   :FORM REGISTER ADDRESS OF ERROR MESSAGE
071126 012737 100000 002336      MOV      #ATA,EXPTED   :::WHAT REGISTER SHOULD BE
071134 013737 002332 002342      MOV      BADDAT,TMPO   :MOVE REGISTER CONTENTS TO 'TMPO'
071142 042737 077777 002342      BIC      #^CATA,TMPO   ;SAVE SPECIFIED BITS
071150 023737 002336 002342      CMP      EXPTED,TMPO   ;COMPARE THE BITS
071156 001427                      BEQ      73$           :BR IF OK
071160 013737 002332 002352      MOV      BADDAT,TMP4   :COPY 'BAD DATA'
071166 042737 100000 002352      BIC      #ATA,TMP4     :CLEAR THE MASKED BITS
071174 053737 002352 002336      BIS      TMP4,EXPTED   :'OR' WITH GOOD DATA FOR TYPEOUT
071202 104456                      TRAP     C$ERHRD
071204 000003                      .WORD   3
071206 010374                      .WORD   EM41
071210 013262                      .WORD   ERR10
071212 012746 003716      MOV      #FRMT17,-(SP)
071216 012746 000001      MOV      #1,-(SP)
071222 010600                      MOV      SP,RO
071224 104414                      TRAP     C$PNTB
071226 062706 000004      ADD      #4,SP
071232 005137 002276      COM      CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
071236
    
```

```

73$:
:*****
:VERIFY THAT THE DRIVE IS IN NEUTRAL
    
```

```

071236 005037 002302                      CLR      RELERR        ;CLEAR THE 'RELEASE ERROR ' INDICATOR
071242 013737 002404 002334      MOV      RPDS,BADADR   :FORM THE ADDRESS OF RPDS FOR TYPEOUT
071250 012737 051700 002336      MOV      #51700,EXPTED ;COMPARSION CONSTANT
071256 113777 002246 111116      MOV      PORTA,@RPCS2  :SELECT PORT A.
071264 017737 111114 002346      MOV      @RPDS,TMP2    :GET THE DRIVE STATUS REGISTER FROM PORT A.
071272 042737 024005 002346      BIC      #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
071300 013737 002346 002342      MOV      TMP2,TMPO     :COPY IT INTO 'TMPO'
071306 042737 100100 002342      BIC      #ATA!VV,TMPO   :CLEAR PORT DEPENDENT BITS FROM THE COPY
071314 113777 002250 111060      MOV      PORTB,@RPCS2  :SELECT PORT B.
071322 017737 111056 002350      MOV      @RPDS,TMP3    :GET THE DRIVE STATUS REGISTER FROM PORT B.
071330 042737 024005 002350      BIC      #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
071336 013737 002350 002344      MOV      TMP3,TMP1     :COPY IT INTO 'TMP1'
071344 042737 100100 002344      BIC      #ATA!VV,TMP1   :CLEAR PORT DEPENDENT BITS FROM THE COPY
071352 023737 002342 002344      CMP      TMPO,TMP1     :IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
    
```


071360	001021			BNE	75\$:BR IF NOT
071362	005737	002342		TST	TMP0		:REGISTERS ARE THE SAME: ARE THEY ZERO ?
071366	001073			BNE	77\$:BR IF NOT
071370	104456			TRAP	C\$ERHRD		
071372	000006			.WORD	6		
071374	010751			.WORD	EM46		
071376	013534			.WORD	ERR15		
071400	012746	003716		MOV	#FRMT17,-(SP)		
071404	012746	000001		MOV	#1,-(SP)		
071410	010600			MOV	SP,RO		
071412	104414			TRAP	C\$PNTB		
071414	062706	000004		ADD	#4,SP		
071420	000137	071722		JMP	79\$:BYPASS THE REST OF THE CHECKS
071424	013737	002346	002332	MOV	TMP2,BADDAT	75\$:	:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
071432	013737	002250	002266	MOV	PORTB,PTNBR		:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
071440	113777	002250	110734	MOVB	PORTB,@RPCS2		:SELECT PORT B.
071446	005737	002342		TST	TMP0		:SEE IF STATUS EQ 0 FROM PORT A.
071452	001414			BEQ	76\$:BR IF ZERO
071454	013737	002246	002266	MOV	PORTA,PTNBR		:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
071462	013737	002350	002332	MOV	TMP3,BADDAT		: 'BAD DATA' FOR ERROR TYPE OUT
071470	113777	002246	110704	MOVB	PORTA,@RPCS2		:SELECT PORT A.
071476	005737	002344		TST	TMP1		:SEE IF STATUS EQ ZERO FROM PORT B.
071502	001025			BNE	77\$:BR IF NOT
071504	012737	177777	002302	MOV	#-1,RELERR	76\$:	:SET 'RELEASE ERROR' INDICATOR
071512	012777	000011	110652	MOV	#11,@RPCS1		:CLEAR THE DRIVE
071520	012777	000013	110644	MOV	#13,@RPCS1		:RELEASE THE DRIVE
071526	104456			TRAP	C\$ERHRD		
071530	000011			.WORD	9		
071532	007313			.WORD	EM26		
071534	013214			.WORD	ERR9		
071536	012746	003716		MOV	#FRMT17,-(SP)		
071542	012746	000001		MOV	#1,-(SP)		
071546	010600			MOV	SP,RO		
071550	104414			TRAP	C\$PNTB		
071552	062706	000004		ADD	#4,SP		
071556	013737	002346	002332	MOV	TMP2,BADDAT	77\$:	:LOOK FOR BIT FAILURES WHEN RPDS READ
071564	013737	002246	002266	MOV	PORTA,PTNBR		:CHANGE PORT NUMBER
071572	042737	100000	002332	BIC	#ATA,BADDAT		:DON'T CHECK THE ATTN BIT
071600	023737	002336	002332	CMP	EXPTED,BADDAT		:ALL BITS OK ?
071606	001414			BEQ	78\$:BR IF OK FROM PORT A.
071610	104456			TRAP	C\$ERHRD		
071612	000013			.WORD	11		
071614	006072			.WORD	EM7		
071616	013000			.WORD	ERR5		
071620	012746	003471		MOV	#FRMT14,-(SP)		
071624	012746	000001		MOV	#1,-(SP)		
071630	010600			MOV	SP,RO		
071632	104414			TRAP	C\$PNTB		
071634	062706	000004		ADD	#4,SP		
071640	013737	002350	002332	MOV	TMP3,BADDAT	78\$:	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
071646	013737	002250	002266	MOV	PORTB,PTNBR		:CHANGE PORT NUMBER
071654	042737	100000	002332	BIC	#ATA,BADDAT		:DON'T CHECK THE ATTN BIT
071662	023737	002336	002332	CMP	EXPTED,BADDAT		:SEE IF READ OK FROM PORT B.
071670	001414			BEQ	79\$:BR IF OK
071672	104456			TRAP	C\$ERHRD		
071674	000014			.WORD	12		
071676	006072			.WORD	EM7		

071700 013000
 071702 012746 003522
 071706 012746 000001
 071712 010600
 071714 104414
 071716 062706 000004
 071722

.WORD ERR5
 MOV #FRMT15, -(SP)
 MOV #1, -(SP)
 MOV SP, R0
 TRAP C\$PNTB
 ADD #4, SP

79\$:

 :THE ATTENTION BIT FOR PORT B SHOULD NOT BE SET

071722 113777 002250 110452
 071730 013737 002250 002266
 071736 005037 002276
 071742 017737 110436 002332
 071750 013737 002404 002334
 071756 005037 002336
 071762 013737 002332 002342
 071770 042737 077777 002342
 071776 023737 002336 002342
 072004 001427
 072006 013737 002332 002352
 072014 042737 100000 002352
 072022 053737 002352 002336
 072030 104456
 072032 000003
 072034 011257
 072036 040000
 072040 012746 003716
 072044 012746 000001
 072050 010600
 072052 104414
 072054 062706 000004
 072060 005137 002276
 072064

MOVB PORTB, @RPCS2 ;SELECT PORT B
 MOV PORTB, PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
 MOV @RPDS, BADDAT ;GET CONTENTS OF RPDS
 MOV RPDS, BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
 CLR EXPTED ;WHAT REGISTER SHOULD BE
 MOV BADDAT, TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
 BIC #^CATA, TMPO ;SAVE SPECIFIED BITS
 CMP EXPTED, TMPO ;COMPARE THE BITS
 BEQ 80\$;BR IF OK
 MOV BADDAT, TMP4 ;COPY 'BAD DATA'
 BIC #ATA, TMP4 ;CLEAR THE MASKED BITS
 BIS TMP4, EXPTED ;'OR' WITH GOOD DATA FOR TYPEOUT
 TRAP C\$SERHRD
 .WORD 3
 .WORD EM52
 .WORD ERR
 MOV #FRMT17, -(SP)
 MOV #1, -(SP)
 MOV SP, R0
 TRAP C\$PNTB
 ADD #4, SP
 COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR

80\$:

;CLEAR ATTENTION BIT FOR PORT A

072064 113777 002246 110310
 072072 005077 110306
 072076 012777 000011 110266
 072104 012777 000013 110260

MOVB PORTA, @RPCS2 ;SELECT PORT #A
 CLR @RPDS ;SEIZE THE DRIVE
 MOV #11, @RPCS1 ;ISSUE DRIVE CLEAR
 MOV #13, @RPCS1 ;RELEASE THE DRIVE

;START THE TIMER

072112 005037 002304
 072116 012737 000050 002306
 072124 005737 002306
 072130 001375
 121 072132
 072132 104401

CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
 MOV #40, WATCH ;SET WATCH TO 40. MS
 TST WATCH
 BNE 82\$
 TRAP C\$SETST

82\$:

L10071:

1
2
3
4
5
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7
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10
11
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14
18

.SBTTL TEST 28 TEST THAT PORT 'B' TIMEOUT DOES NOT RESET DRIVE
 ;*VERIFY THAT PORT TIMEOUT DOES NOT INITIALIZE THE DRIVE.
 ;*
 ;* A. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
 ;*
 ;* B. WRITE 1'S INTO RPER1 THROUGH PORT 'B'.
 ;*
 ;* C. WAIT FOR THE DRIVE TO TIMEOUT. VERIFY THAT THE DRIVE RETURNED TO
 ;* NEUTRAL; THAT ATTENTION IS SET FOR PORT 'B' AND IS NOT SET FOR
 ;* PORT 'A'; AND THAT BOTH PORTS SEE 1'S IN THE ERROR REGISTER.
 ;*

072134
072134 005737 002340
072140 001402
072142 104432
072144 001526
072146

T28::
TST DRVBAD ;SYSTEM OK??
BEQ 64\$;TAKE BRANCH IF SO
TRAP C\$EXIT
.WORD L10072-.

64\$:
;CLEAR ATTENTION BITS FOR BOTH PORTS

072146 113777 002246 110226
072154 005077 110224
072160 012777 000011 110204
072166 012777 000013 110176

MOV B PORTA,@RPCS2 ;SELECT PORT #A
CLR @RPDS ;SEIZE THE DRIVE
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE

;START THE TIMER

072174 005037 002304
072200 012737 000050 002306
072206 005737 002306
072212 001375
072214 113777 002250 110160
072222 005077 110156
072226 012777 000011 110136
072234 012777 000013 110130

65\$:
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40.,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 65\$
MOV B PORTB,@RPCS2 ;SELECT PORT #B
CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE

;START THE TIMER

072242 005037 002304
072246 012737 000050 002306
072254 005737 002306
072260 001375

66\$:
CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40.,WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 66\$

;;*****

;SEIZE THE DRIVE THROUGH PORT B

072262 113777 002250 110112
072270 013737 002250 002270
072276 005077 110102

MOV B PORTB,@RPCS2 ;SELECT PORT B
MOV PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR @RPDS ;WRITE RPDS

072302 013737 002246 002272

MOV PORTA,OPPRT ;'OPPOSITE' PORT ADDRESS

;;*****
;FORCE AN ATTENTION BY SETTING ERRORS.

072310 012777 000003 110054

MOV #3,@RPCS1 ;SET ILF ERROR BIT

```

;START THE TIMER
072316 005037 002304 CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
072322 012737 002342 002306 MOV #1250,WATCH ;SET WATCH TO 1250. MS
072330 113777 002246 110044 MOVB PORTA,@RPCS2 ;SELECT PORT A
072336 013737 002246 002266 MOV PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
;*****
;WAIT FOR DRIVE TO TIMEOUT
072344 005777 110034 1$: TST @RPDS ;WAIT FOR THE DRIVE TO BE RELEASED
072350 001017 BNE 2$ ;BR IF DRIVE RELEASED
072352 005737 002306 TST WATCH ;WATCH AT ZERO ?
072356 001372 BNE 1$ ;BR IF NOT
072360 104456 TRAP C$ERHRD
072362 000032 .WORD 26
072364 010177 .WORD EM36
072366 013320 .WORD ERR11
072370 012746 003716 MOV #FRMT17,-(SP)
072374 012746 000001 MOV #1,-(SP)
072400 010600 MOV SP,R0
072402 104414 TRAP C$PNTB
072404 062706 000004 ADD #4,SP
072410 2$: MOVB PORTB,@RPCS2 ;SELECT PORT B
072410 113777 002250 107764 MOV PORTB,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
072416 013737 002250 002266 ;*****
;THE ERROR BIT ('ERR') IN RPDS SHOULD STILL BE SET
072424 005037 002276 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
072430 017737 107750 002332 MOV @RPDS,BADADR ;GET CONTENTS OF RPDS
072436 013737 002404 002334 MOV RPDS,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
072444 012737 040000 002336 MOV #ERR,EXPTD ;;WHAT REGISTER SHOULD BE
072452 013737 002332 002342 MOV BADADR,TMPO ;MOVE REGISTER CONTENTS TO 'TMPO'
072460 042737 137777 002342 BIC #^CERR,TMPO ;SAVE SPECIFIED BITS
072466 023737 002336 002342 CMP EXPTD,TMPO ;COMPARE THE BITS
072474 001427 BEQ 69$ ;BR IF OK
072476 013737 002332 002352 MOV BADADR,TMP4 ;COPY 'BAD DATA'
072504 042737 040000 002352 BIC #ERR,TMP4 ;CLEAR THE MASKED BITS
072512 053737 002352 002336 BIS TMP4,EXPTD ;'OR' WITH GOOD DATA FOR TYPEOUT
072520 104456 TRAP C$ERHRD
072522 000003 .WORD 3
072524 007123 .WORD EM23
072526 013262 .WORD ERR10
072530 012746 003716 MOV #FRMT17,-(SP)
072534 012746 000001 MOV #1,-(SP)
072540 010600 MOV SP,R0
072542 104414 TRAP C$PNTB
072544 062706 000004 ADD #4,SP
072550 005137 002276 COM CKERR ;SET THE REGISTER COMPARE ERROR INDICATOR
072554 ;*****
;THE ERROR REGISTER SHOULD CONTAIN ILF BIT
072554 005037 002276 CLR CKERR ;CLEAR THE 'CHECK ERROR' INDICATOR
072560 017737 107622 002332 MOV @RPER1,BADADR ;GET CONTENTS OF RPER1
072566 013737 002406 002334 MOV RPER1,BADADR ;FORM REGISTER ADDRESS OF ERROR MESSAGE
    
```



```
072574 012737 000001 002336      MOV      #1,EXPTED      :::WHAT REGISTER SHOULD BE
072602 023737 002336 002332      CMP      EXPTED,BADDAT  :IS THE REGISTER OK ?
072610 001416                      BEQ      71$           :BR IF OK
072612 104456                      TRAP    C$ERHRD
072614 000004                      .WORD   4
072616 006146                      .WORD   EM10
072620 012654                      .WORD   ERR3
072622 012746 003716      MOV      #FRMT17,-(SP)
072626 012746 000001      MOV      #1,-(SP)
072632 010600                      MOV     SP,R0
072634 104414                      TRAP    C$PNTB
072636 062706 000004      ADD     #4,SP
072642 005137 002276      COM     CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
072646
```

71\$:
:*****
:THE ATTENTION BIT FOR PORT B SHOULD STILL BE SET

```
072646 005037 002276                      CLR     CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
072652 017737 107526 002332      MOV     @RPDS,BADDAT  ;GET CONTENTS OF RPDS
072660 013737 002404 002334      MOV     RPDS,BADADR  ;FORM REGISTER ADDRESS OF ERROR MESSAGE
072666 012737 100000 002336      MOV     #ATA,EXPTED  :::WHAT REGISTER SHOULD BE
072674 013737 002332 002342      MOV     BADDAT,TMPO  ;MOVE REGISTER CONTENTS TO 'TMPO'
072702 042737 077777 002342      BIC     #^CATA,TMPO  ;SAVE SPECIFIED BITS
072710 023737 002336 002342      CMP     EXPTED,TMPO  ;COMPARE THE BITS
072716 001427                      BEQ     73$           ;BR IF OK
072720 013737 002332 002352      MOV     BADDAT,TMP4  ;COPY 'BAD DATA'
072726 042737 100000 002352      BIC     #ATA,TMP4    ;CLEAR THE MASKED BITS
072734 053737 002352 002336      BIS     TMP4,EXPTED  ;'OR' WITH GOOD DATA FOR TYPEOUT
072742 104456                      TRAP    C$ERHRD
072744 000003                      .WORD   3
072746 010374                      .WORD   EM41
072750 013262                      .WORD   ERR10
072752 012746 003716      MOV     #FRMT17,-(SP)
072756 012746 000001      MOV     #1,-(SP)
072762 010600                      MOV     SP,R0
072764 104414                      TRAP    C$PNTB
072766 062706 000004      ADD     #4,SP
072772 005137 002276      COM     CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
072776
```

73\$:
:*****
:VERIFY THAT THE DRIVE IS IN NEUTRAL

```
072776 005037 002302                      CLR     RELERR        ;CLEAR THE 'RELEASE ERROR ' INDICATOR
073002 013737 002404 002334      MOV     RPDS,BADADR  ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
073010 012737 051700 002336      MOV     #51700,EXPTED ;COMPARSION CONSTANT
073016 113777 002246 107356      MOV     PORTA,@RPCS2 ;SELECT PORT A.
073024 017737 107354 002346      MOV     @RPDS,TMP2  ;GET THE DRIVE STATUS REGISTER FROM PORT A.
073032 042737 024005 002346      BIC     #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
073040 013737 002346 002342      MOV     TMP2,TMPO    ;COPY IT INTO 'TMPO'
073046 042737 100100 002342      BIC     #ATA!VV,TMPO  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
073054 113777 002250 107320      MOV     PORTB,@RPCS2 ;SELECT PORT B.
073062 017737 107316 002350      MOV     @RPDS,TMP3  ;GET THE DRIVE STATUS REGISTER FROM PORT B.
073070 042737 024005 002350      BIC     #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
073076 013737 002350 002344      MOV     TMP3,TMP1    ;COPY IT INTO 'TMP1'
073104 042737 100100 002344      BIC     #ATA!VV,TMP1  ;CLEAR PORT DEPENDENT BITS FROM THE COPY
073112 023737 002342 002344      CMP     TMPO,TMP1    ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
```

073120	001021				BNE	75\$:BR IF NOT
073122	005737	002342			TST	TMP0		:REGISTERS ARE THE SAME: ARE THEY ZERO ?
073126	001073				BNE	77\$:BR IF NOT
073130	104456				TRAP	C\$ERHRD		
073132	000006				.WORD	6		
073134	010751				.WORD	EM46		
073136	013534				.WORD	ERR15		
073140	012746	003716			MOV	#FRMT17,-(SP)		
073144	012746	000001			MOV	#1,-(SP)		
073150	010600				MOV	SP,R0		
073152	104414				TRAP	C\$PNTB		
073154	062706	000004			ADD	#4,SP		
073160	000137	073462			JMP	79\$:BYPASS THE REST OF THE CHECKS
073164	013737	002346	002332	75\$:	MOV	TMP2,BADDAT		:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
073172	013737	002250	002266		MOV	PORTB,PTNBR		:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
073200	113777	002250	107174		MOVB	PORTB,@RPCS2		:SELECT PORT B.
073206	005737	002342			TST	TMP0		:SEE IF STATUS EQ 0 FROM PORT A.
073212	001414				BEQ	76\$:BR IF ZERO
073214	013737	002246	002266		MOV	PORTA,PTNBR		:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
073222	013737	002350	002332		MOV	TMP3,BADDAT		: 'BAD DATA' FOR ERROR TYPE OUT
073230	113777	002246	107144		MOVB	PORTA,@RPCS2		:SELECT PORT A.
073236	005737	002344			TST	TMP1		:SEE IF STATUS EQ ZERO FROM PORT B.
073242	001025				BNE	77\$:BR IF NOT
073244	012737	177777	002302	76\$:	MOV	#-1,RELERR		:SET 'RELEASE ERROR' INDICATOR
073252	012777	000011	107112		MOV	#11,@RPCS1		:CLEAR THE DRIVE
073260	012777	000013	107104		MOV	#13,@RPCS1		:RELEASE THE DRIVE
073266	104456				TRAP	C\$ERHRD		
073270	000011				.WORD	9		
073272	007313				.WORD	EM26		
073274	013214				.WORD	ERR9		
073276	012746	003716			MOV	#FRMT17,-(SP)		
073302	012746	000001			MOV	#1,-(SP)		
073306	010600				MOV	SP,R0		
073310	104414				TRAP	C\$PNTB		
073312	062706	000004			ADD	#4,SP		
073316	013737	002346	002332	77\$:	MOV	TMP2,BADDAT		:LOOK FOR BIT FAILURES WHEN RPDS READ
073324	013737	002246	002266		MOV	PORTA,PTNBR		:CHANGE PORT NUMBER
073332	042737	100000	002332		BIC	#ATA,BADDAT		:DON'T CHECK THE ATTN BIT
073340	023737	002336	002332		CMP	EXPTED,BADDAT		:ALL BITS OK ?
073346	001414				BEQ	78\$:BR IF OK FROM PORT A.
073350	104456				TRAP	C\$ERHRD		
073352	000013				.WORD	11		
073354	006072				.WORD	EM7		
073356	013000				.WORD	ERR5		
073360	012746	003471			MOV	#FRMT14,-(SP)		
073364	012746	000001			MOV	#1,-(SP)		
073370	010600				MOV	SP,R0		
073372	104414				TRAP	C\$PNTB		
073374	062706	000004			ADD	#4,SP		
073400	013737	002350	002332	78\$:	MOV	TMP3,BADDAT		:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
073406	013737	002250	002266		MOV	PORTB,PTNBR		:CHANGE PORT NUMBER
073414	042737	100000	002332		BIC	#ATA,BADDAT		:DON'T CHECK THE ATTN BIT
073422	023737	002336	002332		CMP	EXPTED,BADDAT		:SEE IF READ OK FROM PORT B.
073430	001414				BEQ	79\$:BR IF OK
073432	104456				TRAP	C\$ERHRD		
073434	000014				.WORD	12		
073436	006072				.WORD	EM7		


```

073440 013000
073442 012746 003522
073446 012746 000001
073452 010600
073454 104414
073456 062706 000004
073462
    
```

```

        .WORD  ERR5
        MOV    #FRMT15,-(SP)
        MOV    #1,-(SP)
        MOV    SP,R0
        TRAP   C$PNTB
        ADD    #4,SP
79$:
;*****
;THE ATTENTION BIT FOR PORT A SHOULD NOT BE SET
    
```

```

073462 113777 002246 106712      MOVB   PORTA,@RPCS2      ;SELECT PORT A
073470 013737 002246 002266      MOV    PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
073476 005037 002276              CLR    CKERR            ;CLEAR THE 'CHECK ERROR' INDICATOR
073502 017737 106676 002332      MOV    @RPDS,BADDAT    ;GET CONTENTS OF RPDS
073510 013737 002404 002334      MOV    RPDS,BADADR     ;FORM REGISTER ADDRESS OF ERROR MESSAGE
073516 005037 002336              CLR    EXPTED          ;WHAT REGISTER SHOULD BE
073522 013737 002332 002342      MOV    BADDAT,TMPO     ;MOVE REGISTER CONTENTS TO 'TMPO'
073530 042737 077777 002342      BIC    #^CATA,TMPO     ;SAVE SPECIFIED BITS
073536 023737 002336 002342      CMP    EXPTED,TMPO     ;COMPARE THE BITS
073544 001427              BEQ    80$             ;BR IF OK
073546 013737 002332 002352      MOV    BADDAT,TMP4     ;COPY 'BAD DATA'
073554 042737 100000 002352      BIC    #ATA,TMP4       ;CLEAR THE MASKED BITS
073562 053737 002352 002336      BIS    TMP4,EXPTED     ;'OR' WITH GOOD DATA FOR TYPEOUT
073570 104456      TRAP   C$SERHRD
073572 000003      .WORD  3
073574 011257      .WORD  EM52
073576 040000      .WORD  ERR
073600 012746 003716      MOV    #FRMT17,-(SP)
073604 012746 000001      MOV    #1,-(SP)
073610 010600      MOV    SP,R0
073612 104414      TRAP   C$PNTB
073614 062706 000004      ADD    #4,SP
073620 005137 002276      COM    CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
073624
80$:
    
```

;CLEAR ATTENTION BIT FOR PORT B

```

073624 113777 002250 106550      MOVB   PORTB,@RPCS2    ;SELECT PORT #B
073632 005077 106546              CLR    @RPDS           ;SEIZE THE DRIVE
073636 012777 000011 106526      MOV    #11,@RPCS1     ;ISSUE DRIVE CLEAR
073644 012777 000013 106520      MOV    #13,@RPCS1     ;RELEASE THE DRIVE
    
```

;START THE TIMER

```

073652 005037 002304              CLR    TIME            ;CLEAR THE ELAPSED TIME COUNTER
073656 012737 000050 002306      MOV    #40.,WATCH     ;SET WATCH TO 40. MS
073664 005737 002306              TST   WATCH
073670 001375              BNE   82$
22 073672 104401      L10072: TRAP   C$SETST
073672
82$:
    
```

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108
112

```
.SBTTL TEST 29 PORT 'A' RETRIGGER BY DEMAND
:*VERIFY THAT THE PORT TIMEOUT ONE-SHOT CAN BE RETRIGGERED BY MASSBUS DEMAND.
:*
:* A. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
:*
:* B. WAIT 500 MS AND READ RPDS THROUGH PORT 'A'.
:*
:* C. VERIFY THAT THE TIMEOUT OCCURS WITHIN + OR - 25% OF THE SPECIFIED
:*    TIME. (THE MEASUREMENT IS MADE FROM STEP 'B'.)
:*
:* D. VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION
:*    BIT IS SET.
:*
```

```
073674
073674 005737 002340
073700 001402
073702 104432
073704 001010
073706
```

```
T29::
TST     DRVBAD      ;SYSTEM OK?
BEQ     64$         ;TAKE BRANCH IF SO
TRAP   C$EXIT
.WORD  L10073-
```

64\$:

;CLEAR ATTENTION BITS FOR BOTH PORTS

```
073706 113777 002246 106466
073714 005077 106464
073720 012777 000011 106444
073726 012777 000013 106436
```

```
MOVB   PORTA,@RPCS2 ;SELECT PORT #A
CLR    @RPDS         ;SEIZE THE DRIVE
MOV    #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV    #13,@RPCS1   ;RELEASE THE DRIVE
```

;START THE TIMER

```
073734 005037 002304
073740 012737 000050 002306
073746 005737 002306
073752 001375
073754 113777 002250 106420
073762 005077 106416
073766 012777 000011 106376
073774 012777 000013 106370
```

65\$:

```
CLR    TIME         ;CLEAR THE ELAPSED TIME COUNTER
MOV    #40.,WATCH  ;SET WATCH TO 40. MS
TST    WATCH
BNE    65$
MOVB   PORTB,@RPCS2 ;SELECT PORT #B
CLR    @RPDS         ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV    #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV    #13,@RPCS1   ;RELEASE THE DRIVE
```

;START THE TIMER

```
074002 005037 002304
074006 012737 000050 002306
074014 005737 002306
074020 001375
```

66\$:

```
CLR    TIME         ;CLEAR THE ELAPSED TIME COUNTER
MOV    #40.,WATCH  ;SET WATCH TO 40. MS
TST    WATCH
BNE    66$
```

;;*****

;SEIZE THE DRIVE THROUGH PORT A

```
074022 113777 002246 106352
074030 013737 002246 002270
074036 005077 106342
```

```
MOVB   PORTA,@RPCS2 ;SELECT PORT A
MOV    PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR    @RPDS         ;WRITE RPDS
```

```
074042 013737 002250 002272
```

```
MOV    PORTB,OPPRT  ;'OPPOSITE' PORT ADDRESS
```

;;*****

;WAIT 500 MS


```

;START THE TIMER
074050 005037 002304          CLR     TIME           ;CLEAR THE ELAPSED TIME COUNTER
074054 012737 000764 002306  MOV     #500.,WATCH    ;SET WATCH TO 500. MS
074062 005737 002306 1$:    TST     WATCH          ;WATCH EQUAL TO ZERO
074066 001375          BNE     1$             ;BR IF NOT

;START THE TIMER
074070 005037 002304          CLR     TIME           ;CLEAR THE ELAPSED TIME COUNTER
074074 012737 002342 002306  MOV     #1250.,WATCH   ;SET WATCH TO 1250. MS
;*****
;RETRIGGER THE TIMEOUT ONE-SHOT

074102 005777 106276          TST     @RPDS          ;RETRIGGER THE ONE-SHOT
074106 113777 002250 106266  MOV     PORTB,@RPCS2   ;SELECT PORT B
074114 013737 002250 002266  MOV     PORTB,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
074122 005777 106256 2$:    TST     @RPDS          ;WAIT FOR TIMEOUT
074126 001017          BNE     3$             ;BR IF TIMEOUT OCCURRED
074130 005737 002306          TST     WATCH          ;WATCH EQUAL TO ZERO ?
074134 001372          BNE     2$             ;BR IF NOT
074136 104456          TRAP    C$ERHRD
074140 000033          .WORD  27
074142 010177          .WORD  EM36
074144 013320          .WORD  ERR11
074146 012746 003716          MOV     #FRMT17,-(SP)
074152 012746 000001          MOV     #1,-(SP)
074156 010600          MOV     SP,R0
074160 104414          TRAP    C$PNTB
074162 062706 000004          ADD     #4,SP
074166 013737 002304 002324 3$:  MOV     TIME,TIMES    ;SAVE THE ELAPSED TIME VALUE
;*****

;VERIFY THAT THE DRIVE IS IN NEUTRAL
074174 005037 002302          CLR     RELERR         ;CLEAR THE 'RELEASE ERROR ' INDICATOR
074200 013737 002404 002334  MOV     RPDS,BADADR    ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
074206 012737 011700 002336  MOV     #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
074214 113777 002246 106160  MOV     PORTA,@RPCS2   ;SELECT PORT A.
074222 017737 106156 002346  MOV     @RPDS,TMP2     ;GET THE DRIVE STATUS REGISTER FROM PORT A.
074230 042737 024005 002346  BIC     #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
074236 013737 002346 002342  MOV     TMP2,TMP0      ;COPY IT INTO 'TMP0'
074244 042737 100100 002342  BIC     #ATA!VV,TMP0    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
074252 113777 002250 106122  MOV     PORTB,@RPCS2   ;SELECT PORT B.
074260 017737 106120 002350  MOV     @RPDS,TMP3     ;GET THE DRIVE STATUS REGISTER FROM PORT B.
074266 042737 024005 002350  BIC     #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
074274 013737 002350 002344  MOV     TMP3,TMP1      ;COPY IT INTO 'TMP1'
074302 042737 100100 002344  BIC     #ATA!VV,TMP1    ;CLEAR PORT DEPENDENT BITS FROM THE COPY
074310 023737 002342 002344  CMP     TMP0,TMP1      ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
074316 001021          BNE     69$           ;BR IF NOT
074320 005737 002342          TST     TMP0           ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
074324 001073          BNE     71$           ;BR IF NOT
074326 104456          TRAP    C$ERHRD
074330 000006          .WORD  6
    
```

074332	010751				.WORD	EM46	
074334	013534				.WORD	ERR15	
074336	012746	003716			MOV	#FRMT17,-(SP)	
074342	012746	000001			MOV	#1,-(SP)	
074346	010600				MOV	SP,R0	
074350	104414				TRAP	C\$PNTB	
074352	062706	000004			ADD	#4,SP	
074356	000137	074644			JMP	73\$	
074362	013737	002346	002332	69\$:	MOV	TMP2,BADDAT	:BYPASS THE REST OF THE CHECKS
074370	013737	002250	002266		MOV	PORTB,PTNBR	:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
074376	113777	002250	105776		MOV	PORTB,@RPCS2	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
074404	005737	002342			MOV	PORTB,@RPCS2	:SELECT PORT B.
074410	001414				TST	TMP0	:SEE IF STATUS EQ 0 FROM PORT A.
074412	013737	002246	002266		BEQ	70\$:BR IF ZERO
074420	013737	002350	002332		MOV	PORTA,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
074426	113777	002246	105746		MOV	TMP3,BADDAT	: 'BAD DATA' FOR ERROR TYPE OUT
074434	005737	002344			MOV	PORTA,@RPCS2	:SELECT PORT A.
074440	001025				TST	TMP1	:SEE IF STATUS EQ ZERO FROM PORT B.
074442	012737	177777	002302	70\$:	BNE	71\$:BR IF NOT
074450	012777	000011	105714		MOV	#-1,RELERR	:SET 'RELEASE ERROR' INDICATOR
074456	012777	000013	105706		MOV	#11,@RPCS1	:CLEAR THE DRIVE
074464	104456				MOV	#13,@RPCS1	:RELEASE THE DRIVE
074466	000010				TRAP	C\$ERHRD	
074470	007400				.WORD	8	
074472	000000				.WORD	EM27	
074474	012746	003716			.WORD	0	
074500	012746	000001			MOV	#FRMT17,-(SP)	
074504	010600				MOV	#1,-(SP)	
074506	104414				MOV	SP,R0	
074510	062706	000004			TRAP	C\$PNTB	
074514	013737	002346	002332	71\$:	ADD	#4,SP	
074522	013737	002246	002266		MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
074530	023737	002336	002332		MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
074536	001414				CMP	EXPTED,BADDAT	:ALL BITS OK ?
074540	104456				BEQ	72\$:BR IF OK FROM PORT A.
074542	000013				TRAP	C\$ERHRD	
074544	006072				.WORD	11	
074546	013000				.WORD	EM7	
074550	012746	003471			.WORD	ERR5	
074554	012746	000001			MOV	#FRMT14,-(SP)	
074560	010600				MOV	#1,-(SP)	
074562	104414				MOV	SP,R0	
074564	062706	000004			TRAP	C\$PNTB	
074570	013737	002350	002332	72\$:	ADD	#4,SP	
074576	013737	002250	002266		MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
074604	023737	002336	002332		MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
074612	001414				CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
074614	104456				BEQ	73\$:BR IF OK
074616	000014				TRAP	C\$ERHRD	
074620	006072				.WORD	12	
074622	013000				.WORD	EM7	
074624	012746	003522			.WORD	ERR5	
074630	012746	000001			MOV	#FRMT15,-(SP)	
074634	010600				MOV	#1,-(SP)	
074636	104414				MOV	SP,R0	
074640	062706	000004			TRAP	C\$PNTB	
074644				73\$:	ADD	#4,SP	

;CHECK THE TIME FROM RETRIGGER TO TIMEOUT

074644	023737	002324	002312	CMP	TIMES,TIMEAP	;MEASURED TIME GREATER THAN +25% TOLERANCE ?
074652	003020			BGT	4\$;BR IF GREATER
074654	023737	002324	002314	CMP	TIMES,TIMEAM	;MEASURED TIME LESS THAN -25% TOLERANCE
074662	002014			BGE	4\$;BR IF NOT
074664	104456			TRAP	C\$ERHRD	
074666	000034			.WORD	28	
074670	007250			.WORD	EM25	
074672	013320			.WORD	ERR11	
074674	012746	003471		MOV	#FRMT14,-(SP)	
074700	012746	000001		MOV	#1,-(SP)	
074704	010600			MOV	SP,RO	
074706	104414			TRAP	C\$PNTB	
074710	062706	000004		ADD	#4,SP	
074714						
116 074714				4\$:		
074714	104401			L10073:		
				TRAP	C\$ETST	

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```
.SBTTL TEST 30 PORT 'B' RETRIGGER BY DEMAND
;*VERIFY THAT THE PORT TIMEOUT ONE-SHOT CAN BE RETRIGGERED BY MASSBUS DEMAND.
;*
;* A. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
;*
;* B. WAIT 500 MS AND WRITE 0'B INTO RPDS THROUGH PORT 'A'.
;*
;* C. VERIFY THAT THE TIMEOUT OCCURS WITHIN + OR - 25% OF THE SPECIFIED
;* TIME. (THE MEASUREMENT IS MADE FROM STEP 'B'.)
;*
;* D. VERIFY THAT THE DRIVE RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION
;* BIT IS SET.
;*
```

```
074716
074716 005737 002340
074722 001402
074724 104432
074726 001010
074730
```

```
T30::
TST     DRVBAD      ;SYSTEM OK?
BEQ     64$         ;TAKE BRANCH IF SO
TRAP    C$EXIT
        .WORD      L10074-
```

```
64$:
;CLEAR ATTENTION BITS FOR BOTH PORTS
```

```
074730 113777 002246 105444
074736 005077 105442
074742 012777 000011 105422
074750 012777 000013 105414
```

```
MOV     PORTA,@RPCS2 ;SELECT PORT #A
CLR     @RPDS        ;SEIZE THE DRIVE
MOV     #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV     #13,@RPCS1   ;RELEASE THE DRIVE
```

```
;START THE TIMER
```

```
074756 005037 002304
074762 012737 000050 002306
074770 005737 002306
074774 001375
074776 113777 002250 105376
075004 005077 105374
075010 012777 000011 105354
075016 012777 000013 105346
```

```
65$:
CLR     TIME         ;CLEAR THE ELAPSED TIME COUNTER
MOV     #40.,WATCH  ;SET WATCH TO 40. MS
TST     WATCH
BNE     65$
MOV     PORTB,@RPCS2 ;SELECT PORT #B
CLR     @RPDS        ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV     #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV     #13,@RPCS1   ;RELEASE THE DRIVE
```

```
;START THE TIMER
```

```
075024 005037 002304
075030 012737 000050 002306
075036 005737 002306
075042 001375
```

```
66$:
CLR     TIME         ;CLEAR THE ELAPSED TIME COUNTER
MOV     #40.,WATCH  ;SET WATCH TO 40. MS
TST     WATCH
BNE     66$
```

```
;;*****
```

```
;SEIZE THE DRIVE THROUGH PORT B
```

```
075044 113777 002250 105330
075052 013737 002250 002270
075060 005077 105320
```

```
MOV     PORTB,@RPCS2 ;SELECT PORT B
MOV     PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR     @RPDS        ;WRITE RPDS
```

```
075064 013737 002246 002272
```

```
MOV     PORTA,OPPR1 ;'OPPOSITE' PORT ADDRESS
```

```
;;*****
;WAIT 500 MS
```



```

                                ;START THE TIMER
075072 005037 002304          CLR     TIME          ;CLEAR THE ELAPSED TIME COUNTER
075076 012737 000764 002306  MOV     #500.,WATCH ;SET WATCH TO 500. MS
075104 005737 002306          TST     WATCH        ;WATCH EQUAL TO ZERO
075110 001375                  BNE     1$           ;BR IF NOT

                                ;START THE TIMER
075112 005037 002304          CLR     TIME          ;CLEAR THE ELAPSED TIME COUNTER
075116 012737 002342 002306  MOV     #1250.,WATCH ;SET WATCH TO 1250. MS
;*****
;RETRIGGER THE TIMEOUT ONE-SHOT

075124 005777 105254          TST     @RPDS        ;RETRIGGER THE ONE-SHOT
075130 113777 002246 105244  MOV     PORTA,@RPCS2 ;SELECT PORT A
075136 013737 002246 002266  MOV     PORTA,PTNBR ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
075144 005777 105234          TST     @RPDS        ;WAIT FOR TIMEOUT
075150 001017                  BNE     3$           ;BR IF TIMEOUT OCCURRED
075152 005737 002306          TST     WATCH        ;WATCH EQUAL TO ZERO ?
075156 001372                  BNE     2$           ;BR IF NOT
075160 104456                  TRAP    C$ERHRD
075162 000033                  .WORD  27
075164 010177                  .WORD  EM36
075166 013320                  .WORD  ERR11
075170 012746 003716          MOV     #FRMT17,-(SP)
075174 012746 000001          MOV     #1,-(SP)
075200 010600                  MOV     SP,R0
075202 104414                  TRAP    C$PNTB
075204 062706 000004          ADD     #4,SP
075210 013737 002304 002324 3$: MOV     TIME,TIMES ;SAVE THE ELAPSED TIME VALUE

;*****

                                ;VERIFY THAT THE DRIVE IS IN NEUTRAL
075216 005037 002302          CLR     RELERR       ;CLEAR THE 'RELEASE ERROR ' INDICATOR
075222 013737 002404 002334  MOV     RPDS,BADADR  ;FORM THE ADDRESS OF RPDS FOR TYPEOUT
075230 012737 011700 002336  MOV     #MOL!PGM!DPR!DRY!VV,EXPTED ;COMPARISON CONSTANT
075236 113777 002246 105136  MOV     PORTA,@RPCS2 ;SELECT PORT A.
075244 017737 105134 002346  MOV     @RPDS,TMP2   ;GET THE DRIVE STATUS REGISTER FROM PORT A.
075252 042737 024005 002346  BIC     #PIP!WRL!OM!ILV,TMP2 ;CLEAR DONT CARES
075260 013737 002346 002342  MOV     TMP2,TMP0    ;COPY IT INTO 'TMP0'
075266 042737 100100 002342  BIC     #ATA!VV,TMP0 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
075274 113777 002250 105100  MOV     PORTB,@RPCS2 ;SELECT PORT B.
075302 017737 105076 002350  MOV     @RPDS,TMP3   ;GET THE DRIVE STATUS REGISTER FROM PORT B.
075310 042737 024005 002350  BIC     #PIP!WRL!OM!ILV,TMP3 ;CLEAR DONT CARES
075316 013737 002350 002344  MOV     TMP3,TMP1    ;COPY IT INTO 'TMP1'
075324 042737 100100 002344  BIC     #ATA!VV,TMP1 ;CLEAR PORT DEPENDENT BITS FROM THE COPY
075332 023737 002342 002344  CMP     TMP0,TMP1    ;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
075340 001021                  BNE     69$         ;BR IF NOT
075342 005737 002342          TST     TMP0         ;REGISTERS ARE THE SAME: ARE THEY ZERO ?
075346 001073                  BNE     71$         ;BR IF NOT
075350 104456                  TRAP    C$ERHRD
075352 000006                  .WORD  6
    
```

075354	010751				.WORD	EM46	
075356	013534				.WORD	ERR15	
075360	012746	003716			MOV	#FRMT17,-(SP)	
075364	012746	000001			MOV	#1,-(SP)	
075370	010600				MOV	SP,RO	
075372	104414				TRAP	C\$PNTB	
075374	062706	000004			ADD	#4,SP	
075400	000137	075666			JMP	73\$	
075404	013737	002346	002332	69\$:	MOV	TMP2,BADDAT	:BYPASS THE REST OF THE CHECKS
075412	013737	002250	002266		MOV	PORTB,PTNBR	:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
075420	113777	002250	104754		MOV	PORTB,@RPCS2	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
075426	005737	002342			MOVB	PORTB,@RPCS2	:SELECT PORT B.
075432	001414				TST	TMP0	:SEE IF STATUS EQ 0 FROM PORT A.
075434	013737	002246	002266		BEQ	70\$:BR IF ZERO
075442	013737	002350	002332		MOV	PORTA,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
075450	113777	002246	104724		MOV	TMP3,BADDAT	: 'BAD DATA' FOR ERROR TYPE OUT
075456	005737	002344			MOVB	PORTA,@RPCS2	:SELECT PORT A.
075462	001025				TST	TMP1	:SEE IF STATUS EQ ZERO FROM PORT B.
075464	012737	177777	002302	70\$:	BNE	71\$:BR IF NOT
075472	012777	000011	104672		MOV	#-1,RELERR	:SET 'RELEASE ERROR' INDICATOR
075500	012777	000013	104664		MOV	#11,@RPCS1	:CLEAR THE DRIVE
075506	104456				MOV	#13,@RPCS1	:RELEASE THE DRIVE
075510	000010				TRAP	C\$ERHRD	
075512	007400				.WORD	8	
075514	000000				.WORD	EM27	
075516	012746	003716			.WORD	0	
075522	012746	000001			MOV	#FRMT17,-(SP)	
075526	010600				MOV	#1,-(SP)	
075530	104414				MOV	SP,RO	
075532	062706	000004			TRAP	C\$PNTB	
075536	013737	002346	002332	71\$:	ADD	#4,SP	
075544	013737	002246	002266		MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
075552	023737	002336	002332		MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
075560	001414				CMP	EXPTD,BADDAT	:ALL BITS OK ?
075562	104456				BEQ	72\$:BR IF OK FROM PORT A.
075564	000013				TRAP	C\$ERHRD	
075566	006072				.WORD	11	
075570	013000				.WORD	EM7	
075572	012746	003471			.WORD	ERR5	
075576	012746	000001			MOV	#FRMT14,-(SP)	
075602	010600				MOV	#1,-(SP)	
075604	104414				MOV	SP,RO	
075606	062706	000004			TRAP	C\$PNTB	
075612	013737	002350	002332	72\$:	ADD	#4,SP	
075620	013737	002250	002266		MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
075626	023737	002336	002332		MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
075634	001414				CMP	EXPTD,BADDAT	:SEE IF READ OK FROM PORT B.
075636	104456				BEQ	73\$:BR IF OK
075640	000014				TRAP	C\$ERHRD	
075642	006072				.WORD	12	
075644	013000				.WORD	EM7	
075646	012746	003522			.WORD	ERR5	
075652	012746	000001			MOV	#FRMT15,-(SP)	
075656	010600				MOV	#1,-(SP)	
075660	104414				MOV	SP,RO	
075662	062706	000004			TRAP	C\$PNTB	
075666				73\$:	ADD	#4,SP	

 :CHECK THE TIME FROM RETRIGGER TO TIMEOUT

075666	023737	002324	002320	CMP	TIMES,TIMEBP	:MEASURED TIME GREATER THAN +25% TOLERANCE ?
075674	003020			BGT	4\$:BR IF GREATER
075676	023737	002324	002322	CMP	TIMES,TIMEBM	:MEASURED TIME LESS THAN -25% TOLERANCE
075704	002014			BGE	4\$:BR IF NOT
075706	104456			TRAP	C\$ERHRD	
075710	000034			.WORD	28	
075712	007250			.WORD	EM25	
075714	013320			.WORD	ERR11	
075716	012746	003522		MOV	#FRMT15 -(SP)	
075722	012746	000001		MOV	#1, -(SP,	
075726	010600			MOV	SP, R0	
075730	104414			TRAP	C\$PNTB	
075732	062706	000004		ADD	#4, SP	
075736						
24 075736				4\$:		
075736	104401			L10074:		
				TRAP	C\$ETST	

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```
.SBTTL TEST 31 PORT 'A' TIMEOUT/RELEASE
;*VERIFY THAT THE TIMEOUT ONE-SHOT IS TRIGGERED WHEN THE DRIVE
;*SWITCHES PORTS AND SEIZING PORT PERFORMS NO REGISTER ACCESSES.
;*
;* A. SEIZE THE DRIVE THROUGH PORT 'B' BY WRITING 0'S INTO RPDS.
;*
;* B. SET PORT REQUEST BY WRITING 0'S INTO RPDS FROM PORT 'A'.
;*
;* C. ISSUE A RELEASE COMMAND FROM PORT 'B'. VERIFY THAT THE DRIVE
;*HAS SWITCHED TO THE OTHER PORT AND THAT THE 'ATA' BIT DID NOT
;*SET FOR PORT 'B'. REGISTERS WILL NOT BE CHECKED THROUGH PORT 'A'.
;*
;* D. WAIT THE TIMEOUT INTERVAL + 25%. VERIFY THAT THE DRIVE HAS
;*BEEN RELEASED.
;*
;* E. RELEASE THE DRIVE THROUGH PORT 'A'. VERIFY THAT THE DRIVE
;*RETURNED TO NEUTRAL AND THAT NEITHER ATTENTION BIT IS SET.
;*
```

```
110 075740
114 075740 005737 002340
    075744 001402
    075746 104432
    075750 001040
    075752
```

```
T31::
    TST     DRVBAD      ;SYSTEM OK?
    BEQ     64$        ;TAKE BRANCH IF SO
    TRAP    C$EXIT
    .WORD   L10075-.
```

```
;CLEAR ATTENTION BITS FOR BOTH PORTS
```

```
075752 113777 002246 104422
075760 005077 104420
075764 012777 000011 104400
075772 012777 000013 104372
```

```
MOVB     PORTA,@RPCS2 ;SELECT PORT #A
CLR      @RPDS        ;SEIZE THE DRIVE
MOV      #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV      #13,@RPCS1   ;RELEASE THE DRIVE
```

```
;START THE TIMER
```

```
076000 005037 002304
076004 012737 000050 002306
076012 005737 002306
076016 001375
076020 113777 002250 104354
076026 005077 104352
076032 012777 000011 104332
076040 012777 000013 104324
```

65\$:

```
CLR      TIME         ;CLEAR THE ELAPSED TIME COUNTER
MOV      #40.,WATCH   ;SET WATCH TO 40. MS
TST      WATCH
BNE      65$
MOVB     PORTB,@RPCS2 ;SELECT PORT #B
CLR      @RPDS        ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV      #11,@RPCS1   ;ISSUE DRIVE CLEAR
MOV      #13,@RPCS1   ;RELEASE THE DRIVE
```

```
;START THE TIMER
```

```
076046 005037 002304
076052 012737 000050 002306
076060 005737 002306
076064 001375
```

66\$:

```
CLR      TIME         ;CLEAR THE ELAPSED TIME COUNTER
MOV      #40.,WATCH   ;SET WATCH TO 40. MS
TST      WATCH
BNE      66$
```

```
;SEIZE THE DRIVE THROUGH PORT B
```

```
076066 113777 002250 104306
076074 013737 002250 002270
```

```
MOVB     PORTB,@RPCS2 ;SELECT PORT B
MOV      PORTB,SEIZPT ;STORE SEIZING PORT'S ADDRESS
```



```

076102 005077 104276          CLR    @RPDS          ;WRITE RPDS
076106 013737 002246 002272    MOV    PORTA,OPPRT    ;'OPPOSITE' PORT ADDRESS
076114 113777 002246 104260    MOV    PORTA,@RPCS2   ;SELECT PORT A
076122 013737 002246 002266    MOV    PORTA,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
;*****
;SET REQUEST THROUGH PORT A
076130 005077 104250          CLR    @RPDS          ;SET REQUEST FOR PORT A
076134 113777 002250 104240    MOV    PORTB,@RPCS2   ;SELECT PORT B
076142 013737 002250 002266    MOV    PORTB,PTNBR    ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
;*****
;RELEASE THE DRIVE THROUGH PORT B
076150 012777 000013 104214    MOV    #13,@RPCS1     ;RELEASE DRIVE THROUGH PORT B
;START THE TIMER
076156 005037 002304          CLR    TIME           ;CLEAR THE ELAPSED TIME COUNTER
076162 012737 000050 002306    MOV    #40.,WATCH     ;SET WATCH TO 40. MS
076170 005737 002306 69$:    TST    WATCH
076174 001375          BNE    69$
;*****
;WAIT THE MEASURED TIMEOUT FOR THE PORT (+ 25%)
076176 013737 002312 002306    MOV    TIMEAP,WATCH   ;SET WATCH TO MEASURED TIMEOUT VALUE + 25%
;*****
;VERIFY THAT THE DRIVE IS SEIZED BY PORT A
076204 005037 002276          CLR    CKERR          ;CLEAR THE 'CHECK ERROR' INDICATOR
076210 017737 104170 002332    MOV    @RPDS,BADDAT   ;GET CONTENTS OF RPDS
076216 013737 002404 002334    MOV    RPDS,BADADR    ;FORM REGISTER ADDRESS OF ERROR MESSAGE
076224 005037 002336          CLR    EXPTED         ;WHAT REGISTER SHOULD BE
076230 023737 002336 002332    CMP    EXPTED,BADDAT  ;IS THE REGISTER OK ?
076236 001416          BEQ    70$           ;BR IF OK
076240 104456          TRAP   C$ERHRD
076242 000003          .WORD 3
076244 007553          .WORD EM31
076246 013362          .WORD ERR12
076250 012746 003716          MOV    #FRMT17,-(SP)
076254 012746 000001          MOV    #1,-(SP)
076260 010600          MOV    SP,R0
076262 104414          TRAP   C$PNTB
076264 062706 000004          ADD    #4,SP
076270 005137 002276          COM    CKERR          ;SET THE REGISTER COMPARE ERROR INDICATOR
076274          70$:    TST    CKERR          ;REGISTER OK ?
076274 005737 002276          BEQ    +6            ;BR IF OK
076300 001402          JMP    1$            ;BYPASS REST OF TEST IF NOT
076302 000137 077010
;WAIT FOR THE TIMER TO RELEASE THE DRIVE
076306 005737 002306          TST    WATCH          ;WATCH EQUAL ZERO ?
076312 001375          BNE    -4            ;BR IF NOT
    
```

 :CONFIRM THAT THE DRIVE HAS TIMED OUT

;VERIFY THAT THE DRIVE IS IN NEUTRAL

076314	005037	002302		CLR	RELERR	:CLEAR THE 'RELEASE ERROR' INDICATOR
076320	013737	002404	002334	MOV	RPDS,BADADR	:FORM THE ADDRESS OF RPDS FOR TYPEOUT
076326	012737	011700	002336	MOV	#MOL!PGM!DPR!DRY!VV,EXPTD	:COMPARISON CONSTANT
076334	113777	002246	104040	MOVB	PORTA,@RPCS2	:SELECT PORT A.
076342	017737	104036	002346	MOV	@RPDS,TMP2	:GET THE DRIVE STATUS REGISTER FROM PORT A.
076350	042737	024005	002346	BIC	#PIP!WRL!OM!ILV,TMP2	:CLEAR DONT CARES
076356	013737	002346	002342	MOV	TMP2,TMP0	:COPY IT INTO 'TMP0'
076364	042737	100100	002342	BIC	#ATA!VV,TMP0	:CLEAR PORT DEPENDENT BITS FROM THE COPY
076372	113777	002250	104002	MOVB	PORTB,@RPCS2	:SELECT PORT B.
076400	017737	104000	002350	MOV	@RPDS,TMP3	:GET THE DRIVE STATUS REGISTER FROM PORT B.
076406	042737	024005	002350	BIC	#PIP!WRL!OM!ILV,TMP3	:CLEAR DONT CARES
076414	013737	002350	002344	MOV	TMP3,TMP1	:COPY IT INTO 'TMP1'
076422	042737	100100	002344	BIC	#ATA!VV,TMP1	:CLEAR PORT DEPENDENT BITS FROM THE COPY
076430	023737	002342	002344	CMP	TMP0,TMP1	:IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
076436	001021			BNE	72\$:BR IF NOT
076440	005737	002342		TST	TMP0	:REGISTERS ARE THE SAME: ARE THEY ZERO ?
076444	001077			BNE	74\$:BR IF NOT
076446	104456			TRAP	C\$ERHRD	
076450	000006			.WORD	6	
076452	010751			.WORD	EM46	
076454	013534			.WORD	ERR15	
076456	012746	003716		MOV	#FRMT17,-(SP)	
076462	012746	000001		MOV	#1,-(SP)	
076466	010600			MOV	SP,R0	
076470	104414			TRAP	C\$PNTB	
076472	062706	000004		ADD	#4,SP	
076476	000137	077010		JMP	76\$:BYPASS THE REST OF THE CHECKS
076502	013737	002346	002332	MOV	TMP2,BADDAT	:SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
076510	013737	002250	002266	MOV	PORTB,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
076516	113777	002250	103656	MOVB	PORTB,@RPCS2	:SELECT PORT B.
076524	005737	002342		TST	TMP0	:SEE IF STATUS EQ 0 FROM PORT A.
076530	001414			BEQ	73\$:BR IF ZERO
076532	013737	002246	002266	MOV	PORTA,PTNBR	:SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
076540	013737	002350	002332	MOV	TMP3,BADDAT	: 'BAD DATA' FOR ERROR TYPE OUT
076546	113777	002246	103626	MOVB	PORTA,@RPCS2	:SELECT PORT A.
076554	005737	002344		TST	TMP1	:SEE IF STATUS EQ ZERO FROM PORT B.
076560	001031			BNE	74\$:BR IF NOT
076562	012737	177777	002302	MOV	#-1,RELERR	:SET 'RELEASE ERROR' INDICATOR
076570	012777	000011	103574	MOV	#11,@RPCS1	:CLEAR THE DRIVE
076576	012777	000013	103566	MOV	#13,@RPCS1	:RELEASE THE DRIVE
076604	104456			TRAP	C\$ERHRD	
076606	000007			.WORD	7	
076610	010106			.WORD	EM35	
076612	013152			.WORD	ERR8	
076614	104456			TRAP	C\$ERHRD	
076616	000010			.WORD	8	
076620	010106			.WORD	EM35	
076622	000000			.WORD	0	
076624	012746	003716		MOV	#FRMT17,-(SP)	
076630	012746	000001		MOV	#1,-(SP)	
076634	010600			MOV	SP,R0	

076636	104414				TRAP	C\$PNTB	
076640	062706	000004			ADD	#4,SP	
076644	013737	002346	002332	74\$:	MOV	TMP2,BADDAT	:LOOK FOR BIT FAILURES WHEN RPDS READ
076652	013737	002246	002266		MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
076660	042737	100000	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
076666	023737	002336	002332		CMP	EXPTED,BADDAT	:ALL BITS OK ?
076674	001414				BEQ	75\$:BR IF OK FROM PORT A.
076676	104456				TRAP	C\$ERHRD	
076700	000013				.WORD	11	
076702	006072				.WORD	EM7	
076704	013000				.WORD	ERR5	
076706	012746	003471			MOV	#FRMT14,-(SP)	
076712	012746	000001			MOV	#1,-(SP)	
076716	010600				MOV	SP,RO	
076720	104414				TRAP	C\$PNTB	
076722	062706	000004			ADD	#4,SP	
076726	013737	002350	002332	75\$:	MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
076734	013737	002250	002266		MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
076742	042737	100000	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
076750	023737	002336	002332		CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
076756	001414				BEQ	76\$:BR IF OK
076760	104456				TRAP	C\$ERHRD	
076762	000014				.WORD	12	
076764	006072				.WORD	EM7	
076766	013000				.WORD	ERR5	
076770	012746	003522			MOV	#FRMT15,-(SP)	
076774	012746	000001			MOV	#1,-(SP)	
077000	010600				MOV	SP,RO	
077002	104414				TRAP	C\$PNTB	
077004	062706	000004			ADD	#4,SP	
077010				76\$:			
077010				1\$:			
118 077010				L10075:			
077010	104401				TRAP	C\$SETST	

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```
.SBTTL TEST 32 PORT 'B' TIMEOUT/RELEASE
:*VERIFY THAT THE TIMEOUT ONE-SHOT IS TRIGGERED WHEN THE DRIVE
:*SWITCHES PORTS AND SEIZING PORT PERFORMS NO REGISTER ACCESSES.
:*
:* A. SEIZE THE DRIVE THROUGH PORT 'A' BY WRITING 0'S INTO RPDS.
:*
:* B. SET PORT REQUEST BY WRITING 0'S INTO RPDS FROM PORT 'B'.
:*
:* C. ISSUE A RELEASE COMMAND FROM PORT 'A'. VERIFY THAT THE DRIVE
:*HAS SWITCHED TO THE OTHER PORT AND THAT THE 'ATA' BIT DID NOT
:*SET FOR PORT 'A'. REGISTERS WILL NOT BE CHECKED THROUGH PORT 'B'.
:*
:* D. WAIT THE TIMEOUT INTERVAL + 25%. VERIFY THAT THE DRIVE HAS
:*BEEN RELEASED.
:*
```

```
18 077012
22 077012 005737 002340
077016 001402
077020 104432
077022 001040
077024
```

```
T32::
TST DRVBAD ;SYSTEM OK?
BEQ 64$ ;TAKE BRANCH IF SO
TRAP C$EXIT
.WORD L10076-
```

```
;CLEAR ATTENTION BITS FOR BOTH PORTS
```

```
077024 113777 002246 103350
077032 005077 103346
077036 012777 000011 103326
077044 012777 000013 103320
```

```
MOV B PORTA,@RPCS2 ;SELECT PORT #A
CLR @RPDS ;SEIZE THE DRIVE
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

```
;START THE TIMER
```

```
077052 005037 002304
077056 012737 000050 002306
077064 005737 002306
077070 001375
077072 113777 002250 103302
077100 005077 103300
077104 012777 000011 103260
077112 012777 000013 103252
```

```
65$: CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40, WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 65$
MOV B PORTB,@RPCS2 ;SELECT PORT #B
CLR @RPDS ;SEIZE THE DRIVE THROUGH PORT 'B'
MOV #11,@RPCS1 ;ISSUE DRIVE CLEAR
MOV #13,@RPCS1 ;RELEASE THE DRIVE
```

```
;START THE TIMER
```

```
077120 005037 002304
077124 012737 000050 002306
077132 005737 002306
077136 001375
```

```
66$: CLR TIME ;CLEAR THE ELAPSED TIME COUNTER
MOV #40, WATCH ;SET WATCH TO 40. MS
TST WATCH
BNE 66$
```

```
::*****
```

```
;SEIZE THE DRIVE THROUGH PORT A
```

```
077140 113777 002246 103234
077146 013737 002246 002270
077154 005077 103224
077160 013737 002250 002272
```

```
MOV B PORTA,@RPCS2 ;SELECT PORT A
MOV PORTA,SEIZPT ;STORE SEIZING PORT'S ADDRESS
CLR @RPDS ;WRITE RPDS
MOV PORTB,OPPRT ;'OPPOSITE' PORT ADDRESS
```



```

077166 113777 002250 103206      MOV  PORTB,@RPCS2      ;SELECT PORT B
077174 013737 002250 002266      MOV  PORTB,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
;*****
;SET REQUEST THROUGH PORT B

077202 005077 103176      CLR  @RPDS            ;SET REQUEST FOR PORT B
077206 113777 002246 103166      MOV  PORTA,@RPCS2      ;SELECT PORT A
077214 013737 002246 002266      MOV  PORTA,PTNBR      ;MOVE PORT ADDRESS TO LOCATION FOR TYPEOUT
;*****
;RELEASE THE DRIVE THROUGH PORT A

077222 012777 000013 103142      MOV  #13,@RPCS1       ;RELEASE DRIVE THROUGH PORT A
;START THE TIMER

077230 005037 002304      CLR  TIME            ;CLEAR THE ELAPSED TIME COUNTER
077234 012737 000050 002306      MOV  #40,WATCH        ;SET WATCH TO 40. MS
077242 005737 002306      69$: TST  WATCH
077246 001375      BNE  69$

;*****
;WAIT THE MEASURED TIMEOUT FOR THE PORT (+ 25%)

077250 013737 002320 002306      MOV  TIMEBP,WATCH     ;SET WATCH TO MEASURED TIMEOUT VALUE + 25%
;*****
;VERIFY THAT THE DRIVE IS SEIZED BY PORT B

077256 005037 002276      CLR  CKERR           ;CLEAR THE 'CHECK ERROR' INDICATOR
077262 017737 103116 002332      MOV  @RPDS,BADADR    ;GET CONTENTS OF RPDS
077270 013737 002404 002334      MOV  RPDS,BADADR     ;FORM REGISTER ADDRESS OF ERROR MESSAGE
077276 005037 002336      CLR  EXPTED          ;WHAT REGISTER SHOULD BE
077302 023737 002336 002332      CMP  EXPTED,BADADR   ;IS THE REGISTER OK ?
077310 001416      BEQ  70$             ;BR IF OK
077312 104456      TRAP C$ERHRD
077314 000003      .WORD 3
077316 007553      .WORD EM31
077320 013362      .WORD ERR12
077322 012746 003716      MOV  #FRMT17,-(SP)
077326 012746 000001      MOV  #1,-(SP)
077332 010600      MOV  SP,RO
077334 104414      TRAP C$PNTB
077336 062706 000004      ADD  #4,SP
077342 005137 002276      COM  CKERR           ;SET THE REGISTER COMPARE ERROR INDICATOR
077346      70$:
077346 005737 002276      TST  CKERR           ;REGISTER OK ?
077352 001402      BEQ  +6              ;BR IF OK
077354 000137 100062      JMP  1$             ;BYPASS REST OF TEST IF NOT

;WAIT FOR THE TIMER TO RELEASE THE DRIVE
077360 005737 002306      TST  WATCH          ;WATCH EQUAL ZERO ?
077364 001375      BNE  -4              ;BR IF NOT
;*****
;CONFIRM THAT THE DRIVE HAS TIMED OUT
    
```


;VERIFY THAT THE DRIVE IS IN NEUTRAL

077366	005037	002302		CLR	RELERR	;CLEAR THE 'RELEASE ERROR' INDICATOR
077372	013737	002404	002334	MOV	RPDS,BADADR	;FORM THE ADDRESS OF RPDS FOR TYPEOUT
077400	012737	011700	002336	MOV	#MOL!PGM!DPR!DRY!VV,EXPTD	;COMPARISON CONSTANT
077406	113777	002246	102766	MOVB	PORTA,@RPCS2	;SELECT PORT A.
077414	017737	102764	002346	MOV	@RPDS,TMP2	;GET THE DRIVE STATUS REGISTER FROM PORT A.
077422	042737	024005	002346	BIC	#PIP!WRL!OM!ILV,TMP2	;CLEAR DONT CARES
077430	013737	002346	002342	MOV	TMP2,TMP0	;COPY IT INTO 'TMP0'
077436	042737	100100	002342	BIC	#ATA!VV,TMPC	;CLEAR PORT DEPENDENT BITS FROM THE COPY
077444	113777	002250	102730	MOVB	PORTB,@RPCS2	;SELECT PORT B.
077452	017737	102726	002350	MOV	@RPDS,TMP3	;GET THE DRIVE STATUS REGISTER FROM PORT B.
077460	042737	024005	002350	BIC	#PIP!WRL!OM!ILV,TMP3	;CLEAR DONT CARES
077466	013737	002350	002344	MOV	TMP3,TMP1	;COPY IT INTO 'TMP1'
077474	042737	100100	002344	BIC	#ATA!VV,TMP1	;CLEAR PORT DEPENDENT BITS FROM THE COPY
077502	023737	002342	002344	CMP	TMP0,TMP1	;IS THE STATUS REGISTER THE SAME FROM BOTH PORTS ?
077510	001021			BNE	72\$;BR IF NOT
077512	005737	002342		TST	TMP0	;REGISTERS ARE THE SAME: ARE THEY ZERO ?
077516	001077			BNE	74\$;BR IF NOT
077520	104456			TRAP	C\$ERHRD	
077522	000006			.WORD	6	
077524	010751			.WORD	EM46	
077526	013534			.WORD	ERR15	
077530	012746	003716		MOV	#FRMT17,-(SP)	
077534	012746	000001		MOV	#1,-(SP)	
077540	010600			MOV	SP,R0	
077542	104414			TRAP	C\$PNTB	
077544	062706	000004		ADD	#4,SP	
077550	000137	100062		JMP	76\$;BYPASS THE REST OF THE CHECKS
077554	013737	002346	002332	MOV	TMP2,BADDAT	;SET UP POSSIBLE BAD DATA FOR ERROR MESSAGE
077562	013737	002250	002266	MOV	PORTB,PTNBR	;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
077570	113777	002250	102604	MOVB	PORTB,@RPCS2	;SELECT PORT B.
077576	005737	002342		TST	TMP0	;SEE IF STATUS EQ 0 FROM PORT A.
077602	001414			BEQ	73\$;BR IF ZERO
077604	013737	002246	002266	MOV	PORTA,PTNBR	;SEIZING PORT IF TEST SHOWS DRIVE NOT IN NEUTRAL
077612	013737	002350	002332	MOV	TMP3,BADDAT	; 'BAD DATA' FOR ERROR TYPE OUT
077620	113777	002246	102554	MOVB	PORTA,@RPCS2	;SELECT PORT A.
077626	005737	002344		TST	TMP1	;SEE IF STATUS EQ ZERO FROM PORT B.
077632	001031			BNE	74\$;BR IF NOT
077634	012737	177777	002302	MOV	#-1,RELERR	;SET 'RELEASE ERROR' INDICATOR
077642	012777	000011	102522	MOV	#11,@RPCS1	;CLEAR THE DRIVE
077650	012777	000013	102514	MOV	#13,@RPCS1	;RELEASE THE DRIVE
077656	104456			TRAP	C\$ERHRD	
077660	00C007			.WORD	7	
077662	010106			.WORD	EM35	
077664	013152			.WORD	ERR8	
077666	104456			TRAP	C\$ERHRD	
077670	000010			.WORD	8	
077672	010106			.WORD	EM35	
077674	000000			.WORD	0	
077676	012746	003716		MOV	#FRMT17,-(SP)	
077702	012746	000001		MOV	#1,-(SP)	
077706	010600			MOV	SP,R0	
077710	104414			TRAP	C\$PNTB	
077712	062706	000004		ADD	#4,SP	
077716	013737	002346	002332	MOV	TMP2,BADDAT	;LOOK FOR BIT FAILURES WHEN RPDS READ

077724	013737	002246	002266		MOV	PORTA,PTNBR	:CHANGE PORT NUMBER
077732	042737	100000	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
077740	023737	002336	002332		CMP	EXPTED,BADDAT	:ALL BITS OK ?
077746	001414				BEQ	75\$:BR IF OK FROM PORT A.
077750	104456				TRAP	C\$ERHRD	
077752	000013				.WORD	11	
077754	006072				.WORD	EM7	
077756	013000				.WORD	ERR5	
077760	012746	003471			MOV	#FRMT14,-(SP)	
077764	012746	000001			MOV	#1,-(SP)	
077770	010600				MOV	SP,R0	
077772	104414				TRAP	C\$PNTB	
077774	062706	000004			ADD	#4,SP	
100000	013737	002350	002332	75\$:	MOV	TMP3,BADDAT	:CHECK RPDS FOR BIT FAILURES - FROM PORT B.
100006	013737	002250	002266		MOV	PORTB,PTNBR	:CHANGE PORT NUMBER
100014	042737	100000	002332		BIC	#ATA,BADDAT	:DON'T CHECK THE ATTN BIT
100022	023737	002336	002332		CMP	EXPTED,BADDAT	:SEE IF READ OK FROM PORT B.
100030	001414				BEQ	76\$:BR IF OK
100032	104456				TRAP	C\$ERHRD	
100034	000014				.WORD	12	
100036	006072				.WORD	EM7	
100040	013000				.WORD	ERR5	
100042	012746	003522			MOV	#FRMT15,-(SP)	
100046	012746	000001			MOV	#1,-(SP)	
100052	010600				MOV	SP,R0	
100054	104414				TRAP	C\$PNTB	
100056	062706	000004			ADD	#4,SP	
100062				76\$:			
100062				1\$:			
26					.EVEN		
27							
28	100062			L10076:			
29	100062	104401			TRAP	C\$ETST	

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.TITLE PARAMETER CODING

.SBTTL HARDWARE PARAMETER CODING SECTION

```

:++
: THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
: THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES. THE
: MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
: INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES. THE
: MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
: WITH THE OPERATOR.
:--
  
```

.WORD L10077-L\$HARD/2
 L\$HARD::

;PRINT 'RPCS1 ADRS?'

.WORD T\$CODE
 .WORD MSG1
 .WORD T\$LOLIM
 .WORD T\$HILIM

;PRINT 'VECTOR ADRS?'

.WORD T\$CODE
 .WORD MSG4
 .WORD T\$LOLIM
 .WORD T\$HILIM

;PRINT 'BR LEVEL?'

.WORD T\$CODE
 .WORD MSG5
 .WORD 340
 .WORD T\$LOLIM
 .WORD T\$HILIM

;PRINT 'PORT A DRIVE #?'

.WORD T\$CODE
 .WORD MSG6
 .WORD 7
 .WORD T\$LOLIM
 .WORD T\$HILIM

;PRINT 'PORT B DRIVE #?'

.WORD T\$CODE
 .WORD MSG7
 .WORD 7
 .WORD T\$LOLIM
 .WORD T\$HILIM

;PRINT MESSAGE #10

.WORD T\$CODE
 .WORD MSG10
 .WORD 1
 .EVEN

L10077:

```

MSG1: .ASCIZ /RPCS1 ADRS/
MSG4: .ASCIZ /VECTOR ADRS/
MSG5: .ASCIZ /BR LEVEL/
MSG6: .ASCIZ /PORT A DRIVE #/
MSG7: .ASCIZ /PORT B DRIVE #/
MSG10: .ASCII <CR><LF>/PORT A "OUT" MUST BE CONNECTED TO PORT B "IN" AND/
      .ASCII <CR><LF>/PORT B "OUT" MUST BE CONNECTED TO A TERMINATOR./
  
```

<CR><LF>/PORT A "OUT" MUST BE CONNECTED TO PORT B "IN" AND/
 <CR><LF>/PORT B "OUT" MUST BE CONNECTED TO A TERMINATOR./

78	100416	015	012	124	.ASCII	<CR><LF>/THE DRIVE MUST BE ONLINE, WRITE ENABLED, READY AND/
79	100503	015	012	120	.ASCII	<CR><LF>@PORT SELECT SWITCH MUST BE IN THE A/B POSITION.@
80	100564	015	012	101	.ASCII	<CR><LF>/ALSO, EACH PORT MUST HAVE A UNIQUE DRIVE NUMBER./
81	100651	015	012	012	.ASCIIZ	<CR><LF><LF>/CONTINUE/
82						
83					.EVEN	

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12 100666 000000
100670
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25 100670
26
33
34 100670
35
42
43 101034 101060
101036 000010
101040

```
.SBTTL SOFTWARE PARAMETER CODING SECTION  
:  
:++  
: THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS  
: THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES. THE  
: MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE  
: INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES. THE  
: MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS  
: WITH THE OPERATOR.  
:--  
:  
: .WORD L10100-L$SOFT/2  
L$SOFT::  
:  
: .EVEN  
:  
: .EVEN  
L10100:  
:  
$PATCH::.BLKW 50.  
:  
: .EVEN  
: .WORD T$FREE  
: .WORD T$SIZE  
L$LAST::
```


13				
15	101040	000000	.WORD	0
	101042	000006	.WORD	L10103-. /2-1
	101044			
16	101044	176700	.WORD	176700
17	101046	000254	.WORD	254
18	101050	000240	.WORD	240
19	101052	000000	.WORD	0
20	101054	000001	.WORD	1
21	101056	000001	.WORD	1
22	101060			
24		000001		
			L10103:	
			.END	

ABC = 002330 G	CNFBAD = 002326 G	DCU = 000040	EM34 = 010003	EWN = 000002
ADR = 000020 G	CR = 000015 G	DFPTBL = 002226 G	EM35 = 010106	EXPTED = 002336 G
AIR = 000004	CRLF = 002564 G	DGE = 000001	EM36 = 010177	ESEND = 002100
AOE = 001000	C\$AU = 000052	DIAGMC = 000000	EM37 = 010251	E\$LOAD = 000035
ASRA = 002262 G	C\$AUTO = 000061	DLT = 100000	EM4 = 005705	FER = 000020
ASRB = 002264 G	C\$BRK = 000022	DMD = 100000	EM40 = 010317	FMT16 = 010000
ASR1 = 002260 G	C\$BSEG = 000004	DMPREG = 016350	EM41 = 010374	FRMT01 = 002626
ASSEMB = 000010	C\$SUB = 000002	DPE = 000010	EM42 = 010436	FRMT03 = 002701
ATA = 100000	C\$CEFG = 000045	DPR = 000400	EM43 = 010524	FRMT04 = 002751
ATABIT = 002446 G	C\$CLCK = 000062	DRQ = 004000	EM44 = 010601	FRMT05 = 003073
ATO = 000001	C\$CLEA = 000012	DRVBAD = 002340 G	EM45 = 010672	FRMT07 = 003155
AT1 = 000002	C\$CLOS = 000035	DRVINI = 014714	EM46 = 010751	FRMT11 = 003302
AT2 = 000004	C\$CLP1 = 000006	DRVSN = 002370 G	EM47 = 011020	FRMT13 = 003355
AT3 = 000010	C\$CVEC = 000036	DRY = 000200	EM5 = 005736	FRMT14 = 003471
AT4 = 000020	C\$DCLN = 000044	DSNMSG = 002567 G	EM50 = 011106	FRMT15 = 003522
AT5 = 000040	C\$DODU = 000051	DTE = 010000	EM51 = 011170	FRMT16 = 003553
AT6 = 000100	C\$DRPT = 000024	DT00 = 000001	EM52 = 011257	FRMT17 = 003716
AT7 = 000200	C\$DU = 000053	DT01 = 000002	EM53 = 011352	FRMT22 = 003754
A16 = 000400	C\$EDIT = 000003	DT02 = 000004	EM54 = 011424	FRMT23 = 004026
A17 = 001000	C\$ERDF = 000055	DT03 = 000010	EM55 = 011517	FRMT26 = 004107
BADADR = 002334 G	C\$ERHR = 000056	DT04 = 000020	EM56 = 011564	FRMT31 = 004135
BADDAT = 002332 G	C\$ERRO = 000060	DT05 = 000040	EM6 = 006004	FRMT36 = 004212
BAI = 000010	C\$ERSF = 000054	DT06 = 000100	EM60 = 011670	FRMT44 = 004226
BELL = 000007 G	C\$ERSO = 000057	DT07 = 000200	EM61 = 011734	FRMT46 = 004304
BIT0 = 000001 G	C\$ESCA = 000010	DT08 = 000400	EM62 = 011766	FRMT55 = 004353
BIT00 = 000001 G	C\$SEEG = 000005	DVA = 004000	EM63 = 012034	FRMT56 = 004426
BIT01 = 000002 G	C\$ESUB = 000003	DVC = 000200	EM64 = 012106	FRMT57 = 004464
BIT02 = 000004 G	C\$ETST = 000001	ECH = 000100	EM65 = 012136	FRMT64 = 004603
BIT03 = 000010 G	C\$EXIT = 000032	ECI = 004000	EM66 = 012174	FRMT65 = 004713
BIT04 = 000020 G	C\$GETB = 000026	EF.CON = 000036 G	EM67 = 012236	FRMT66 = 005023
BIT05 = 000040 G	C\$GETW = 000027	EF.NEW = 000035 G	EM7 = 006072	FRMT67 = 005114
BIT06 = 000100 G	C\$GMAN = 000043	EF.PWR = 000034 G	EM70 = 012317	FRMT70 = 005174
BIT07 = 000200 G	C\$GPHR = 000042	EF.RES = 000037 G	EM71 = 012400	FRMT71 = 005265
BIT08 = 000400 G	C\$GPLO = 000030	EF.STA = 000040 G	ERR = 040000	FRMT72 = 005345
BIT09 = 001000 G	C\$GPRI = 000040	EM1 = 005560	ERRVEC = 000004	FRMT73 = 005437
BIT1 = 000002 G	C\$INIT = 000011	EM10 = 006146	ERR0 = 012462 G	FRMT74 = 005521
BIT10 = 002000 G	C\$INLP = 000020	EM11 = 006171	ERR1 = 012530 G	FRMT75 = 005541
BIT11 = 004000 G	C\$MANI = 000050	EM12 = 006255	ERR10 = 013262 G	F\$AU = 000015
BIT12 = 010000 G	C\$MEM = 000031	EM13 = 006342	ERR11 = 013320 G	F\$AUTO = 000020
BIT13 = 020000 G	C\$MSG = 000023	EM14 = 006427	ERR12 = 013362 G	F\$BGN = 000040
BIT14 = 040000 G	C\$OPEN = 000034	EM15 = 006472	ERR13 = 013430 G	F\$CLEA = 000007
BIT15 = 100000 G	C\$PNTB = 000014	EM16 = 006551	ERR14 = 013472 G	F\$DU = 000016
BIT2 = 000004 G	C\$PNTF = 000017	EM17 = 006624	ERR15 = 013534 G	F\$END = 000041
BIT3 = 000010 G	C\$PNTS = 000016	EM2 = 005601	ERR16 = 013576 G	F\$HARD = 000004
BIT4 = 000020 G	C\$PNTX = 000015	EM20 = 006703	ERR17 = 013640 G	F\$HW = 000013
BIT5 = 000040 G	C\$QIO = 000377	EM21 = 006763	ERR18 = 013676 G	F\$INIT = 000006
BIT6 = 000100 G	C\$RDBU = 000007	EM22 = 007036	ERR19 = 013750 G	F\$JMP = 000050
BIT7 = 000200 G	C\$REFG = 000047	EM23 = 007123	ERR2 = 012576 G	F\$MOD = 000000
BIT8 = 000400 G	C\$RESE = 000033	EM24 = 007171	ERR20 = 014016 G	F\$MSG = 000011
BIT9 = 001000 G	C\$REVI = 000003	EM25 = 007250	ERR3 = 012654 G	F\$PROT = 000021
BOE = 000400 G	C\$RFLA = 000021	EM26 = 007313	ERR4 = 012726 G	F\$PWR = 000017
BPE = 000020	C\$RPT = 000025	EM27 = 007400	ERR5 = 013000 G	F\$RPT = 000012
BSE = 100000	C\$SEFG = 000046	EM3 = 005623	ERR6 = 013046 G	F\$SEG = 000003
CKERR = 002276 G	C\$SPRI = 000041	EM30 = 007456	ERR7 = 013114 G	F\$SOFT = 000005
CLKSTA = 002244 G	C\$SVEC = 000037	EM31 = 007553	ERR8 = 013152 G	F\$SRV = 000010
CLR = 000040	C\$TPRI = 000013	EM32 = 007630	ERR9 = 013214 G	F\$SUB = 000002
CMOD = 100000	DCK = 100000	EM33 = 007701	EVL = 000004 G	F\$SW = 000014

SYMBOL TABLE

FSTEST=	000001	ISSETU=	000041	L\$REV	002010	G	L10057	052342	PIP	=	020000		
FO	=	ISSFT	=	L\$RPT	016714	G	L10060	054242	PKB	=	014434		
F1	=	ISSRV	=	L\$SOFT	100670	G	L10061	056142	PKC	=	014436		
F2	=	ISSUB	=	L\$SPC	002056	G	L10062	060032	PKCS	=	014432		
F3	=	ISTST	=	L\$SPCF	002020	G	L10063	061722	PKV	=	014440		
F4	=	JSJMP	=	L\$SPTP	002024	G	L10064	063346	PNT	=	001000	G	
GO	=	KWSRV	014610	L\$STA	002030	G	L10065	064564	PORTA	=	002246	G	
G\$CNT0=	000200	LBT	=	L\$SW	002244	G	L10066	066002	PORTB	=	002250	G	
G\$DELM=	000372	LCE	=	L\$TEST	002114	G	L10067	067176	PORTC	=	002252	G	
G\$DISP=	000003	LCLKTB	014444	L\$TIML	002014	G	L10070	070372	PRI	=	002000	G	
G\$EXCP=	000400	LF	=	L\$UNIT	002012	G	L10071	072132	PRI00	=	000000	G	
G\$HILI=	000002	LKS	014446	L10000	002242		L10072	073672	PRI01	=	000040	G	
G\$LOLI=	000001	LKV	014450	L10001	002244		L10073	074714	PRI02	=	000100	G	
G\$NO	=	LOE	=	L10002	012526		L10074	075736	PRI03	=	000140	G	
G\$OFFS=	000400	LOT	=	L10003	012574		L10075	077010	PRI04	=	000200	G	
G\$OFSI=	000376	LSACP	002110	L10004	012652		L10076	100062	PRI05	=	000240	G	
G\$PRMA=	000001	LSAPT	002036	L10005	012724		L10077	100152	PRI06	=	000300	G	
G\$PRMD=	000002	LSAU	017372	L10006	012776		L10100	100670	PRI07	=	000340	G	
G\$PRML=	000000	LSAUT	002070	L10007	013044		L10101	101044	PSEL	=	002000		
G\$RADA=	000140	LSAUTO	017300	L10010	013112		L10103	101060	PTNBR	=	002266	G	
G\$RADB=	000000	L\$CCP	002106	L10011	013150		MCPE	=	020000	RDY	=	000200	
G\$RADD=	000040	L\$CLEA	017302	L10012	013212		MDPE	=	000400	REG	=	002456	G
G\$RADL=	000120	L\$CO	002032	L10013	013260		MESG1	100152	RELERR	=	002302	G	
G\$RADO=	000020	L\$DEPO	002011	L10014	013316		MESG10	100250	RELOK	=	000001		
G\$XFER=	000004	L\$DESC	002540	L10015	013360		MESG4	100165	RHEXT	=	002364	G	
G\$YES	=	L\$DESP	002076	L10016	013426		MESG5	100201	RHTYPE	=	002366	G	
HCE	=	L\$DEVP	002060	L10017	013470		MESG6	100212	RMR	=	000004		
HCI	=	L\$DISP	002124	L10020	013532		MESG7	100231	RPADR	=	002356	G	
HCRC	=	L\$DLY	002116	L10021	013574		MOH	=	020000	RPAS	=	002410	G
HELP	=	L\$DTP	002040	L10022	013636		MOL	=	010000	RPBA	=	002376	G
HERTZ	014454	L\$DTP	002034	L10023	013674		MTD	=	040000	RPBAE	=	002442	G
HOE	=	L\$DU	017364	L10024	013746		MXF	=	001000	RPCC	=	002430	G
IAE	=	L\$DUT	002072	L10025	014014		NBA	=	100000	RPCS1	=	002372	G
IBE	=	L\$DVTY	002532	L10026	014062		NED	=	010000	RPCS2	=	002402	G
IDU	=	L\$EF	002052	L10027	014652		NEM	=	004000	RPCS3	=	002444	G
IE	=	L\$ENVI	002044	L10030	016720		NOATA	=	000001	RPDA	=	002400	G
IER	=	L\$ETP	002102	L10032	017276		NOSEIZ	002300	RPDB	=	002414	G	
ILF	=	L\$EXP1	002046	L10033	017300		OFD	=	000200	RPDC	=	002426	G
ILR	=	L\$EXP4	002064	L10034	017362		OM	=	000001	RPDS	=	002404	G
ILV	=	L\$EXP5	002066	L10035	017370		ONEFIL	=	000001	RPDT	=	002420	G
IR	=	L\$HARD	100066	L10036	017376		OPI	=	020000	RPEC1	=	002436	G
ISR	=	L\$HIME	002120	L10037	021154		OPPRT	002272	RPEC2	=	002440	G	
IXE	=	L\$HPCP	002016	L10040	023102		OR	=	000200	RPER1	=	002406	G
IXU	=	L\$HPTP	002022	L10041	025030		OSAPTS=	000000	RPER2	=	002432	G	
ISAU	=	L\$HW	002226	L10042	026356		OSAU	=	000000	RPER3	=	002434	G
ISAUTO=	000041	LSICP	002104	L10043	027704		OSBGNR=	000000	RPLA	=	002412	G	
ISCLN	=	LSINIT	016730	L10044	030730		OSBGNS=	000000	RPMR1	=	002416	G	
ISDU	=	LSLADP	002026	L10045	031754		OSDU	=	000000	RPOF	=	002424	G
ISHRD	=	LSLAST	101040	L10046	033530		OSERRT=	000000	RPSN	=	002422	G	
ISINIT=	000041	LSLOAD	002100	L10047	035304		OSGNSW=	000000	RPVEC	=	002360	G	
ISMOD	=	LSLUN	002074	L10050	036754		OSPOIN=	000001	RPWC	=	002374	G	
ISMSG	=	LSMREV	002050	L10051	040424		OSSETU=	000001	RQSTA	=	002254	G	
ISPROT=	000040	LSNAME	002000	L10052	042230		PAR	=	000010	RQSTB	=	002256	G
ISPTAB=	000041	L\$PRIO	002042	L10053	044034		PAT	=	000020	RWU1	=	002000	
ISPWR	=	L\$PROT	016722	L10054	046730		PCLKTB	014430	RWU2	=	004000		
ISRPT	=	L\$PRT	002112	L10055	047602		PGE	=	100000	RWU3	=	010000	
ISSEG	=	L\$REPP	002062	L10056	051062		PGM	=	001000	SAVRPR	=	016276	

SC = 100000	TIMEAM 002314 G	T\$NS1 = 000005	T\$\$SRV= 010027	T32 077012 G
SC0 = 000100	TIMEAP 002312 G	T\$PCNT= 000000	T\$\$SW = 010001	T4 025032 G
SC1 = 000200	TIMEB 002316 G	T\$PTAB= 010102	T\$\$TES= 010076	T5 026360 G
SC2 = 000400	TIMEBM 002322 G	T\$PTHV= 000001	T1 017400 G	T6 027706 G
SC3 = 001000	TIMEBP 002320 G	T\$PTNU= 000001	T10 035306 G	T7 030732 G
SC4 = 002000	TIMES 002324 G	T\$SAVL= 177777	T11 036756 G	T8 031756 G
SC5 = 000400	TMP0 002342 G	T\$SEGL= 177777	T12 040426 G	T9 033532 G
SC6 = 001000	TMP1 002344 G	T\$SIZE= 000010	T13 042232 G	UAM = 000200 G
SEIZPT 002270 G	TMP2 002346 G	T\$SUBN= 000000	T14 044036 G	UNIT = 002354 G
SFPTBL 002244 G	TMP3 002350 G	T\$TAGL= 177777	T15 046732 G	UNS = 040000
SIZE70 014064	TMP4 002352 G	T\$TAGN= 010104	T16 047604 G	UPE = 020000
SKI = 040000	TOLER 014654	T\$TEMP= 000000	T17 051064 G	U0 = 000001
SNDIGT 002623 G	TPE = 000002	T\$TEST= 000040	T18 052344 G	U1 = 000002
STOPCK 014560	TRE = 040000	T\$TSTM= 177777	T19 054244 G	U2 = 000004
ST.CLK 014226	TSTNUM 002274 G	T\$TSTS= 000001	T2 021156 G	VV = 000100
ST.LCL 014522	T\$ARGC= 000001	T\$\$AU = 010036	T20 056144 G	VVSET = 000001
ST.PCL 014456	T\$CODE= 005130	T\$\$AUT= 010033	T21 060034 G	WATCH = 002306 G
SVCGBL= 000000	T\$ERRN= 000014	T\$\$CLE= 010034	T22 061724 G	WCE = 040000
SVCINS= 000000	T\$EXCP= 000000	T\$\$DAT= 010103	T23 063350 G	WCF = 000040
SVCSUB= 000000	T\$FLAG= 000040	T\$\$DU = 010035	T24 064566 G	WLE = 004000
SVCTAG= 000000	T\$FREE= 101060	T\$\$HAR= 010077	T25 066004 G	WOR = 001000
SVCTST= 000000	T\$GMAN= 000000	T\$\$HW = 010000	T26 067200 G	WRL = 004000
S\$LSYM= 010000	T\$HILI= 000007	T\$\$INI= 010032	T27 070374 G	WRYUNS= 000400
TABELD 016122 G	T\$LAST= 000001	T\$\$MSG= 010026	T28 072134 G	X\$ALWA= 000000
TAP = 040000	T\$LOLI= 000000	T\$\$PC = 000001	T29 073674 G	X\$FALS= 000040
TCF = 000400	T\$LSYM= 010000	T\$\$PRO= 010031	T3 023104 G	X\$OFFS= 000400
TICKMS 014426	T\$LTNO= 000040	T\$\$PTA= 010102	T30 074716 G	X\$TRUE= 000020
TIME 002304 G	T\$NEST= 177777	T\$\$RPT= 010030	T31 075740 G	\$PATCH 100670 G
TIMEA 002310 G	T\$NSO = 000000	T\$\$SOF= 010100		

. ABS. 101060 000
 000000 001
 ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 46080 WORDS (180 PAGES)
 DYNAMIC MEMORY AVAILABLE FOR 70 PAGES
 CZRJNA.BIC,CZRJNA/C=[20,0]SVC34R.MLB,[20,12]CZRJNA.DOC,CZRJNA.HIS,CZRJNA

\$\$\$ERR	13-104													
\$\$\$MFG	2-17	2-30	6-3	7-904	7-966									
\$PATCH	61-34#													
A16	12-7#	16-33	16-38											
A17	12-8#	16-33	16-38											
ABC	13-34#													
ADR	11-57#													
AIR	12-150#													
AOE	12-88#													
ASR1	13-14#	17-146*	17-149*	40-142	41-57	49-103	50-18							
ASRA	13-15#	17-145*	32-47	49-103	50-18									
ASRB	13-16#	17-148*	33-12	49-103	50-18									
ASSEMB	7-915	7-915												
ATO	12-104#													
AT1	12-105#													
AT2	12-106#													
AT3	12-107#													
AT4	12-108#													
AT5	12-109#													
AT6	12-110#													
AT7	12-111#													
ATA	12-74#	28-199	28-199	28-199	28-199	29-22	29-22	29-22	29-22	30-116	30-116	30-116	30-116	30-116
	30-116	30-116	30-116	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	34-86	34-86	34-86
	34-86	34-86	35-23	35-23	35-23	35-23	35-23	36-104	36-104	36-104	36-104	37-24	37-24	37-24
	37-24	38-89	38-89	38-89	38-89	39-23	39-23	39-23	39-23	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	41-57	41-57	41-57	41-57	42-82	42-82	42-82	42-82	42-82
	42-82	42-82	43-23	43-23	43-23	43-23	43-23	43-23	43-23	44-104	44-104	44-104	44-104	44-104
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	45-22	45-22	45-22	45-22	45-22
	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	46-101	46-101	46-101	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	47-24	47-24	47-24
	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	48-92
	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	48-92	49-103	49-103	50-18
	50-18	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79	52-20	52-20	52-20	52-20	52-20
	52-20	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	53-117	54-18	54-18	54-18
	54-18	54-18	54-18	54-18	54-18	55-112	55-112	56-20	56-20	57-114	57-114	57-114	57-114	58-22
	58-22	58-22	58-22											
ATABIT	13-79#	17-145	17-146	17-148	17-149									
BADADR	13-36#	15-9	15-10	15-11	15-12	15-13	15-14	15-18	15-21	17-162*	17-190*	27-93*	27-93*	27-101*
	27-101*	27-110*	27-110*	27-110*	27-110*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*
	28-199*	28-199*	28-199*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*
	29-22*	30-116*	30-116*	30-116*	30-116*	31-18*	31-18*	31-18*	31-18*	32-47*	32-47*	32-47*	33-12*	33-12*
	33-12*	34-86*	34-86*	34-86*	34-86*	34-86*	35-23*	35-23*	35-23*	35-23*	35-23*	36-104*	36-104*	36-104*
	36-104*	36-104*	37-24*	37-24*	37-24*	37-24*	37-24*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	39-23*
	39-23*	39-23*	39-23*	39-23*	39-23*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	41-57*	42-82*	42-82*
	42-82*	43-23*	43-23*	43-23*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	45-22*	45-22*	45-22*	45-22*
	45-22*	45-22*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*
	48-92*	48-92*	48-92*	48-92*	48-92*	49-103*	49-103*	49-103*	50-18*	50-18*	50-18*	51-79*	51-79*	51-79*
	52-20*	52-20*	52-20*	53-117*	53-117*	53-117*	53-117*	53-117*	54-18*	54-18*	54-18*	54-18*	54-18*	55-112*
	56-20*	57-114*	57-114*	58-22*	58-22*									
BADDAT	13-35#	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-18	15-21	15-28	17-162	17-162	17-162*
	17-162*	17-162*	17-190	17-190	17-190*	17-190*	17-190*	27-93	27-93	27-93	27-93	27-93*	27-93*	27-101
	27-101	27-101	27-101	27-101*	27-101*	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110	27-110*
	27-110*	27-110*	27-110*	27-118*	27-119	28-199	28-199	28-199	28-199	28-199*	28-199*	28-199*	28-199*	28-199*
	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*	28-199*
	29-22	29-22	29-22	29-22	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*
	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	29-22*	30-116	30-116	30-116	30-116	30-116

EF.CON	11-57#	21-16												
EF.NEW	11-57#	21-20												
EF.PWR	11-57#	21-12												
EF.RES	11-57#													
EF.STA	11-57#													
EM1	14-94#	27-101	27-101											
EM10	14-102#	34-86	35-23	36-104	37-24	40-142	40-142	44-104	44-104	45-22	45-22	46-101	46-101	47-24
	47-24	48-92	48-92	49-103	49-103	50-18	50-18	53-117	54-18					
EM11	14-103#	34-86	35-23											
EM12	14-104#	36-104	37-24											
EM13	14-105#	30-116	31-18											
EM14	14-106#													
EM15	14-107#													
EM16	14-108#	42-82	42-82	43-23	43-23									
EM17	14-109#	30-116	30-116	31-18	31-18									
EM2	14-95#	27-110	27-110											
EM20	14-111#													
EM21	14-112#	41-57	41-57											
EM22	14-113#													
EM23	14-114#	53-117	54-18											
EM24	14-115#	36-104	37-24											
EM25	14-116#	55-112	56-20											
EM26	14-117#	28-199	29-22	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	42-82
	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18		
EM27	14-118#	34-86	35-23	40-142	40-142	55-112	56-20							
EM3	14-96#	27-124												
EM30	14-120#													
EM31	14-121#	34-86	35-23	57-114	58-22									
EM32	14-122#	51-79	51-79	52-20	52-20									
EM33	14-123#	38-89	38-89	39-23	39-23									
EM34	14-124#	38-89	38-89	39-23	39-23									
EM35	14-125#	57-114	57-114	58-22	58-22									
EM36	14-126#	17-171	17-199	28-199	29-22	30-116	31-18	53-117	54-18	55-112	56-20			
EM37	14-127#	27-93	27-93											
EM4	14-97#	17-162	17-190	28-199	29-22	32-47	32-47	32-47	33-12	33-12	33-12	34-86	35-23	38-89
	39-23	44-104	45-22	46-101	47-24									
EM40	14-129#													
EM41	14-130#	53-117	54-18											
EM42	14-131#	40-142												
EM43	14-132#	40-142												
EM44	14-133#	40-142	40-142											
EM45	14-134#	27-110	27-110											
EM46	14-135#	28-199	29-22	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	41-57
	42-82	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18	55-112
	56-20	57-114	58-22											
EM47	14-136#	44-104	45-22											
EM5	14-98#	17-162	17-190	28-199	29-22	32-47	32-47	32-47	33-12	33-12	33-12	34-86	35-23	38-89
	39-23	44-104	45-22	46-101	47-24									
EM50	14-138#	44-104	45-22											
EM51	14-139#	48-92	48-92											
EM52	14-140#	53-117	54-18											
EM53	14-141#													
EM54	14-142#													
EM55	14-143#	28-199	29-22											
EM56	14-144#	17-180	17-208											
EM6	14-99#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	29-22	29-22	29-22

EXPTED	13-37#	15-10	15-11	15-12	15-15	15-28	17-162	17-162	17-162	17-162*	17-162*	17-190	17-190	17-190
	17-190*	17-190*	27-93	27-93	27-93*	27-93*	27-93*	27-93*	27-101	27-101	27-101*	27-101*	27-101*	27-101*
	27-110	27-110	27-110	27-110	27-110*	27-110*	27-110*	27-110*	27-110*	27-110*	27-110*	27-110*	27-116*	27-119
	28-199	28-199	28-199	28-199	28-199	28-199*	28-199*	28-199*	29-22	29-22	29-22	29-22	29-22	29-22*
	29-22*	29-22*	30-116	30-116	30-116	30-116	30-116	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*
	31-18	31-18	31-18	31-18	31-18	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	32-47	32-47
	32-47	32-47	32-47	32-47	32-47	32-47	32-47	32-47*	32-47*	32-47*	32-47*	32-47*	32-47*	33-12
	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*
	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86*	34-86*	34-86*	34-86*	34-86*	35-23	35-23
	35-23	35-23	35-23	35-23	35-23	35-23*	35-23*	35-23*	35-23*	35-23*	36-104	36-104	36-104	36-104
	36-104	36-104	36-104*	36-104*	36-104*	36-104*	36-104*	36-104*	37-24	37-24	37-24	37-24	37-24	37-24
	37-24*	37-24*	37-24*	37-24*	37-24*	37-24*	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89
	38-89	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*
	39-23*	39-23*	39-23*	39-23*	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142*	40-142*
	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	41-57	41-57	41-57*	42-82	42-82	42-82	42-82	42-82*
	42-82*	42-82*	42-82*	42-82*	43-23	43-23	43-23	43-23	43-23*	43-23*	43-23*	43-23*	43-23*	44-104
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*
	44-104*	44-104*	44-104*	44-104*	44-104*	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	46-101	46-101
	46-101	46-101	46-101	46-101	46-101	46-101	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*
	46-101*	46-101*	46-101*	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24*	47-24*
	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	47-24*	48-92	48-92	48-92	48-92	48-92
	48-92	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	48-92*	49-103	49-103	49-103	49-103	49-103
	49-103*	49-103*	49-103*	50-18	50-18	50-18	50-18	50-18*	50-18*	50-18*	51-79	51-79	51-79	51-79
	51-79*	51-79*	51-79*	51-79*	51-79*	52-20	52-20	52-20	52-20	52-20*	52-20*	52-20*	52-20*	52-20*
	53-117	53-117	53-117	53-117	53-117	53-117	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*	53-117*
	54-18	54-18	54-18	54-18	54-18	54-18	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*	54-18*
	55-112	55-112	55-112*	56-20	56-20	56-20	57-114	57-114	57-114	57-114*	57-114*	58-22	58-22	58-22
	58-22*	58-22*												
FSAU	7-915#	25-9	25-36											
FSAUTO	7-915#	22-10	22-19											
F\$BGN	7-915#	7-941	10-21	11-51	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16	15-17	15-18
	15-19	15-20	15-21	15-22	15-23	15-24	15-25	15-26	15-27	15-28	15-29	17-105	18-91	19-42
	19-48	20-8	21-8	21-37	21-93	22-10	23-8	23-33	24-8	25-9	25-37	27-38	27-62	27-71
	27-127	28-195	28-199	28-203	29-18	29-22	29-26	30-112	30-116	30-120	31-14	31-18	31-22	32-43
	32-47	32-51	33-8	33-12	33-16	34-82	34-86	34-90	35-19	35-23	35-27	36-100	36-104	36-108
	37-20	37-24	37-28	38-85	38-89	38-93	39-19	39-23	39-27	40-138	40-142	40-146	41-53	41-57
	41-61	42-78	42-82	42-86	43-19	43-23	43-27	44-100	44-104	44-108	45-18	45-22	45-26	46-97
	46-101	46-105	47-20	47-24	47-28	48-88	48-92	48-96	49-99	49-103	49-107	50-14	50-18	50-22
	51-75	51-79	51-83	52-16	52-20	52-24	53-113	53-117	53-121	54-14	54-18	54-22	55-108	55-112
	55-116	56-16	56-20	56-24	57-110	57-114	57-118	58-18	58-22	58-28	59-1	60-43	60-53	61-12
	61-44	62-14	62-15	62-15	62-22	62-23								
F\$CLEA	7-915#	23-8	23-48											
F\$DU	7-915#	24-8	24-35											
F\$END	7-915	7-915	7-915	7-915	7-915	7-915	7-915	7-915	7-915	7-915	7-915	7-915	7-915	7-915
	7-915	7-915	7-915#	7-941	10-21	11-51	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16
	15-17	15-18	15-19	15-20	15-21	15-22	15-23	15-24	15-25	15-26	15-27	15-28	15-29	17-115
	18-91	19-42	19-62	19-78	21-37	21-93	21-108	22-19	23-33	23-48	24-19	24-35	25-20	25-36
	25-37	27-38	27-62	27-62	27-62	27-71	27-127	27-127	28-195	28-195	28-195	28-199	28-203	28-203
	29-18	29-18	29-18	29-22	29-26	29-26	30-112	30-112	30-112	30-116	30-120	30-120	31-14	31-14
	31-14	31-18	31-22	31-22	32-43	32-43	32-43	32-47	32-51	32-51	33-8	33-8	33-8	33-12
	33-16	33-16	34-82	34-82	34-82	34-86	34-90	34-90	35-19	35-19	35-19	35-23	35-27	35-27
	36-100	36-100	36-100	36-104	36-108	36-108	37-20	37-20	37-20	37-24	37-28	37-28	38-85	38-85
	38-85	38-89	38-93	38-93	39-19	39-19	39-19	39-23	39-27	39-27	40-138	40-138	40-138	40-142
	40-146	40-146	41-53	41-53	41-53	41-57	41-61	41-61	42-78	42-78	42-78	42-82	42-86	42-86

	43-19	43-19	43-19	43-23	43-27	43-27	44-100	44-100	44-100	44-104	44-108	44-108	45-18	45-18
	45-18	45-22	45-26	45-26	46-97	46-97	46-97	46-101	46-105	46-105	47-20	47-20	47-20	47-24
	47-28	47-28	48-88	48-88	48-88	48-92	48-96	48-96	49-99	49-99	49-99	49-103	49-107	49-107
	50-14	50-14	50-14	50-18	50-22	50-22	51-75	51-75	51-75	51-79	51-83	51-83	52-16	52-16
	52-16	52-20	52-24	52-24	53-113	53-113	53-113	53-117	53-121	53-121	54-14	54-14	54-14	54-18
	54-22	54-22	55-108	55-108	55-108	55-112	55-116	55-116	56-16	56-16	56-16	56-20	56-24	56-24
	57-110	57-110	57-110	57-114	57-118	57-118	58-18	58-18	58-18	58-22	58-28	58-28	59-1	60-43
	60-66	61-25	61-44	62-14	62-15	62-22	62-23							
F\$HARD	7-915#	60-53	60-66											
F\$HW	7-915#	9-10	9-28											
F\$INIT	7-915#	21-8	21-108											
F\$JMP	7-915#	19-62	19-62	21-37	21-93	23-33	24-19	24-19	25-20	25-20	27-71	28-199	29-22	30-116
	31-18	32-47	33-12	34-86	35-23	36-104	37-24	38-89	39-23	40-142	41-57	42-82	43-23	44-104
F\$MOD	45-22	46-101	47-24	48-92	49-103	50-18	51-79	52-20	53-117	54-18	55-112	56-20	57-114	58-22
F\$MSG	7-915#	7-941	10-21	11-51	18-91	19-42	25-37	27-38	59-1	60-43	61-44			
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	15-15	15-16	15-16	15-17	15-17	15-18	15-18	15-19	15-19	15-20	15-20	15-21	15-21	15-22
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	15-29													
F\$PROT	7-915#	20-8	20-12											
F\$PWR	7-915#													
F\$RPT	7-915#	19-48	19-78											
F\$SEG	7-915#													
F\$SOFT	7-915#	61-12	61-25											
F\$SRV	7-915#	17-105	17-115											
F\$SUB	7-915#													
F\$SW	7-915#	10-10	10-20											
F\$TEST	7-915#	27-62	27-127	28-195	28-203	29-18	29-26	30-112	30-120	31-14	31-22	32-43	32-51	33-8
	33-16	34-82	34-90	35-19	35-27	36-100	36-108	37-20	37-28	38-85	38-93	39-19	39-27	40-138
	40-146	41-53	41-61	42-78	42-86	43-19	43-27	44-100	44-108	45-18	45-26	46-97	46-105	47-20
	47-28	48-88	48-96	49-99	49-107	50-14	50-22	51-75	51-83	52-16	52-24	53-113	53-121	54-14
	54-22	55-108	55-116	56-16	56-24	57-110	57-118	58-18	58-28					
F0	12-52#													
F1	12-53#													
F2	12-54#													
F3	12-55#													
F4	12-56#													
FER	12-83#													
FMT16	12-167#													
FRMT01	14-46#	15-9	15-21											
FRMT03	14-47#	15-10	15-29											
FRMT04	14-48#	15-11												
FRMT05	14-50#	15-12												
FRMT07	14-51#													
FRMT11	14-54#	15-14												
FRMT13	14-55#	15-13												
FRMT14	14-57#	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199
	28-199	29-22	30-116	30-116	31-18	34-86	35-23	36-104	37-24	38-89	39-23	40-142	40-142	41-57
	42-82	43-23	44-104	45-22	46-101	47-24	48-92	49-103	50-18	50-18	51-79	52-20	53-117	54-18
	55-112	55-112	56-20	57-114	58-22									
FRMT15	14-58#	28-199	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22	29-22
	29-22	29-22	30-116	31-18	31-18	34-86	34-86	34-86	35-23	35-23	35-23	36-104	37-24	38-89
	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142	41-57	42-82	43-23	44-104	45-22	46-101
	47-24	48-92	49-103	49-103	50-18	51-79	52-20	53-117	54-18	55-112	56-20	56-20	57-114	58-22
FRMT16	14-59#	27-125												
FRMT17	14-61#	17-172	17-200	27-93	27-93	27-101	27-101	27-110	27-110	27-110	27-110	28-199	28-199	29-22

	29-22	30-116	30-116	30-116	30-116	30-116	31-18	31-18	31-18	31-18	31-18	34-86	34-86	34-86
	34-86	35-23	35-23	35-23	35-23	36-104	36-104	36-104	36-104	36-104	36-104	37-24	37-24	37-24
	37-24	37-24	37-24	38-89	38-89	38-89	38-89	38-89	38-89	39-23	39-23	39-23	39-23	39-23
	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142	41-57	41-57	42-82	42-82	42-82	42-82
	43-23	43-23	43-23	43-23	44-104	44-104	44-104	44-104	44-104	44-104	45-22	45-22	45-22	45-22
	45-22	45-22	46-101	46-101	46-101	46-101	46-101	46-101	47-24	47-24	47-24	47-24	47-24	47-24
	48-92	48-92	48-92	48-92	48-92	48-92	49-103	49-103	49-103	49-103	50-18	50-18	50-18	50-18
	51-79	51-79	51-79	51-79	52-20	52-20	52-20	52-20	53-117	53-117	53-117	53-117	53-117	53-117
	53-117	54-18	54-18	54-18	54-18	54-18	54-18	54-18	55-112	55-112	55-112	56-20	56-20	56-20
	57-114	57-114	57-114	58-22	58-22	58-22								
FRMT22	14-63#	15-17	15-24											
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FRMT57	14-75#	15-27												
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FRMT72	14-87#	18-83												
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G\$DELM	7-915#													
G\$DISP	7-915#													
G\$EXCP	7-915#													
G\$HILI	7-915#													
G\$LOLI	7-915#													
G\$NO	7-915#													
G\$OFFS	7-915#	60-55	60-57	60-59	60-61	60-63	60-65							
G\$OF SI	7-915#	60-55	60-57	60-59	60-61	60-63	60-65							
G\$PRMA	7-915#	60-55	60-57											
G\$PRMD	7-915#	60-59	60-61	60-63										
G\$PRML	7-915#	60-65												
G\$RADA	7-915#													
G\$RADB	7-915#													
G\$RADD	7-915#													
G\$RADL	7-915#	60-65												
G\$RADO	7-915#	60-55	60-57	60-59	60-61	60-63								
G\$XFER	7-915#													
G\$YES	7-915#	60-55	60-57	60-59	60-61	60-63	60-65							
GO	12-51#													
HCE	12-86#													
HCI	12-165#													
HCRC	12-87#													
HELP	7-896#	7-910	7-932	7-949	7-972	8-10	9-18	10-12	11-4#	11-41	12-201	13-92	14-22	14-32
	14-163	14-174	15-31	19-4#	19-50	19-64	20-14	21-69	21-95	22-12	23-24	23-35	24-10	24-21
	25-11	25-22	26-5#	27-50	27-57	58-30	60-5#	61-14	61-27	61-36	62-1			

ISR	11-57#			
IXE	11-57#			
IXU	12-154#			
J\$JMP	7-915#	19-62	24-19	25-20
K\$SRV	17-79	17-87	17-106#	
L\$ACP	7-969#			
L\$APT	7-969#			
L\$AU	25-9#			
L\$AUT	7-969#			
L\$AUTO	7-969	22-10#		
L\$CCP	7-969#			
L\$CLEA	7-969	23-8#		
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L\$DEPO	7-969#			
L\$DESC	7-969	14-30#		
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L\$DEVP	7-969#			
L\$DISP	7-969	8-8#		
L\$DLY	7-969#			
L\$DTP	7-969#			
L\$DTYP	7-969#			
L\$DU	24-8#			
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L\$DVTY	7-969	14-20#		
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L\$EXP1	7-969#			
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L\$EXP5	7-969#			
L\$HARD	7-969	60-53	60-53#	
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L\$LOAD	7-969#			
L\$LUN	7-969#			
L\$MREV	7-969#			
L\$NAME	7-969#			
L\$PRIO	7-969#			
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L\$REPP	7-969#			
L\$REV	7-969#			
L\$RPT	19-48#			
L\$SOFT	61-12	61-12#		
L\$SPC	7-969#			
L\$SPCP	7-969#			
L\$SPTP	7-969#			
L\$STA	7-969#			
L\$SW	10-10	10-10#		
L\$TEST	7-969#			

L\$TIML	7-969#		
L\$UNIT	7-969#		
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L10001	10-10	10-20#	
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L10033	22-19#		
L10034	23-33	23-48#	
L10035	24-19	24-35#	
L10036	25-20	25-36#	
L10037	27-71	27-127#	
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L10043	31-18	31-22#	
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L10045	33-12	33-16#	
L10046	34-86	34-90#	
L10047	35-23	35-27#	
L10050	36-104	36-108#	
L10051	37-24	37-28#	
L10052	38-89	38-93#	
L10053	39-23	39-27#	
L10054	40-142	40-146#	
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L10056	42-82	42-86#	
L10057	43-23	43-27#	
L10060	44-104	44-108#	
L10061	45-22	45-26#	
L10062	46-101	46-105#	
L10063	47-24	47-28#	
L10064	48-92	48-96#	
L10065	49-103	49-107#	
L10066	50-18	50-22#	

TSSDU	24-8#	24-19	24-35											
TSSHAR	60-53	60-53#	60-66											
TSSHW	9-10	9-10#	9-28											
TSSINI	21-8#	21-37	21-93	21-108										
TSSMSG	15-9	15-9#	15-10	15-10#	15-11	15-11#	15-12	15-12#	15-13	15-13#	15-14	15-14#	15-15	15-15#
	15-16	15-16#	15-17	15-17#	15-18	15-18#	15-19	15-19#	15-20	15-20#	15-21	15-21#	15-22	15-22#
	15-23	15-23#	15-24	15-24#	15-25	15-25#	15-26	15-26#	15-27	15-27#	15-28	15-28#	15-29	15-29#
TSSPC	62-14#	62-23												
TSSPRO	20-8#													
TSSPTA	62-14#	62-15	62-15#											
TSSRPT	19-48#	19-62	19-78											
TSSSOF	61-12	61-12#	61-25											
TSSSRV	17-105#	17-115												
TSSSW	10-10	10-10#	10-20											
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	36-104	36-108	37-20#	37-24	37-28	38-85#	38-89	38-93	39-19#	39-23	39-27	40-138#	40-142	40-146
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	55-108#	55-112	55-116	56-16#	56-20	56-24	57-110#	57-114	57-118	58-18#	58-22	58-28		
TSARGC	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969#	7-969#	7-969#
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	31-18#	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86	34-86
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	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
	36-104#	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#	37-24#	37-24#	37-24#
	37-24#	37-24#	37-24#	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89#
	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	39-23	39-23	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	39-23	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
	39-23#	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
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	41-57#	42-82	42-82	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
	42-82#	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#
	43-23#	44-104	44-104	44-104	44-104	44-104	44-104	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
	44-104#	44-104#	44-104#	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	46-101	46-101	46-101	46-101	46-101
	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
	46-101#	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24	47-24
	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	48-92	48-92	48-92	48-92	48-92
	48-92	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
	48-92#	49-103	49-103	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103	49-103	49-103	49-103
	49-103#	50-18	50-18	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18	50-18	50-18	50-18
	50-18#	51-79	51-79	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79	51-79	51-79	51-79
	51-79#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20	52-20	52-20	52-20	52-20	52-20	52-20#
	52-20#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117	53-117	53-117	53-117
	53-117#	54-18	54-18	54-18	54-18	54-18#	54-18#	54-18#	54-18#	54-18#	54-18	54-18	54-18	54-18
	54-18#	55-112	55-112	55-112	55-112	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#
	55-112#	56-20	56-20	56-20	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20	56-20	56-20	56-20
	56-20#	57-114	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114	57-114	57-114	57-114	57-114
	57-114#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22	58-22	58-22	58-22	58-22	58-22	58-22#
	58-22#	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#			
TSEXCP	60-55#	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-61#	60-63	60-63#			
T\$FLAG	19-62	19-62#	19-62#	21-37	21-37	21-37#	21-37#	21-93	21-93	21-93	21-93#	21-93#	23-33	23-33
	23-33#	24-19	24-19#	24-19#	25-20	25-20#	25-20#	27-71	27-71	27-71#	27-71#	27-71#	28-199	28-199
	28-199#	29-22	29-22	29-22#	29-22#	30-116	30-116	30-116#	30-116#	31-18	31-18	31-18#	31-18#	32-47
	32-47	32-47#	32-47#	33-12	33-12	33-12#	33-12#	34-86	34-86	34-86#	34-86#	34-86#	35-23	35-23
	35-23#	36-104	36-104	36-104#	36-104#	37-24	37-24	37-24#	37-24#	38-89	38-89	38-89#	38-89#	39-23
	39-23	39-23#	39-23#	40-142	40-142	40-142#	40-142#	41-57	41-57	41-57#	41-57#	42-82	42-82	42-82#
	42-82#	43-23	43-23	43-23#	43-23#	44-104	44-104	44-104#	44-104#	45-22	45-22	45-22#	45-22#	46-101
	46-101	46-101#	46-101#	47-24	47-24	47-24#	47-24#	48-92	48-92	48-92#	48-92#	49-103	49-103	49-103#
	49-103#	50-18	50-18	50-18#	50-18#	51-79	51-79	51-79#	51-79#	52-20	52-20	52-20#	52-20#	53-117
	53-117	53-117#	53-117#	54-18	54-18	54-18#	54-18#	55-112	55-112	55-112#	55-112#	56-20	56-20	56-20#
	56-20#	57-114	57-114	57-114#	57-114#	58-22	58-22	58-22#	58-22#					
T\$FREE	61-43	62-23#												
T\$GMAN	7-915#													
T\$HILI	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#				
T\$LAST	7-915#	61-43#	62-14											
T\$LOLI	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#				
T\$LSYM	7-915	7-915#	9-28	10-20	15-9	15-10	15-11	15-12	15-13	15-14	15-15	15-16	15-17	15-18
	15-19	15-20	15-21	15-22	15-23	15-24	15-25	15-26	15-27	15-28	15-29	17-115	19-78	21-108
	22-19	23-48	24-35	25-36	27-127	28-203	29-26	30-120	31-22	32-51	33-16	34-90	35-27	36-108
	37-28	38-93	39-27	40-146	41-61	42-86	43-27	44-108	45-26	46-105	47-28	48-96	49-107	50-22
	51-83	52-24	53-121	54-22	55-116	56-24	57-118	58-28	60-66	61-25				
T\$LTNO	61-43#													
T\$NEST	7-915#	7-941	7-941	7-941#	9-10	9-10	9-10#	9-28	9-28	9-28	9-28#	10-10	10-10	10-10#
	10-20	10-20	10-20	10-20#	10-21	10-21	10-21	10-21#	11-51	11-51	11-51#	15-9	15-9	15-9
	15-9	15-9	15-9#	15-9#	15-10	15-10	15-10	15-10	15-10	15-10#	15-10#	15-11	15-11	15-11
	15-11	15-11	15-11#	15-11#	15-12	15-12	15-12	15-12	15-12	15-12#	15-12#	15-13	15-13	15-13
	15-13	15-13	15-13#	15-13#	15-14	15-14	15-14	15-14	15-14	15-14#	15-14#	15-15	15-15	15-15
	15-15	15-15	15-15#	15-15#	15-16	15-16	15-16	15-16	15-16	15-16#	15-16#	15-17	15-17	15-17

	15-17	15-17	15-17#	15-17#	15-18	15-18	15-18	15-18	15-18	15-18#	15-18#	15-19	15-19	15-19
	15-19	15-19	15-19#	15-19#	15-20	15-20	15-20	15-20	15-20	15-20#	15-20#	15-21	15-21	15-21
	15-21	15-21	15-21#	15-21#	15-22	15-22	15-22	15-22	15-22	15-22#	15-22#	15-23	15-23	15-23
	15-23	15-23	15-23#	15-23#	15-24	15-24	15-24	15-24	15-24	15-24#	15-24#	15-25	15-25	15-25
	15-25	15-25	15-25#	15-25#	15-26	15-26	15-26	15-26	15-26	15-26#	15-26#	15-27	15-27	15-27
	15-27	15-27	15-27#	15-27#	15-28	15-28	15-28	15-28	15-28	15-28#	15-28#	15-29	15-29	15-29
	15-29	15-29	15-29#	15-29#	17-105	17-105	17-105#	17-115	17-115	17-115	17-115#	18-91	18-91	18-91
	18-91#	19-42	19-42	19-42#	19-48	19-48	19-48#	19-78	19-78	19-78	19-78#	20-8	20-8	20-8#
	20-12	20-12	20-12	20-12#	21-8	21-8	21-8#	21-108	21-108	21-108	21-108#	22-10	22-10	22-10#
	22-19	22-19	22-19	22-19#	23-8	23-8	23-8#	23-48	23-48	23-48	23-48#	24-8	24-8	24-8#
	24-35	24-35	24-35	24-35#	25-9	25-9	25-9#	25-36	25-36	25-36	25-36#	25-37	25-37	25-37
	25-37#	27-38	27-38	27-38#	27-62	27-62	27-62#	27-127	27-127	27-127	27-127#	28-195	28-195	28-195#
	28-203	28-203	28-203	28-203#	29-18	29-18	29-18#	29-26	29-26	29-26	29-26#	30-112	30-112	30-112#
	30-120	30-120	30-120	30-120#	31-14	31-14	31-14#	31-22	31-22	31-22	31-22#	32-43	32-43	32-43#
	32-51	32-51	32-51	32-51#	33-8	33-8	33-8#	33-16	33-16	33-16	33-16#	34-82	34-82	34-82#
	34-90	34-90	34-90	34-90#	35-19	35-19	35-19#	35-27	35-27	35-27	35-27#	36-100	36-100	36-100#
	36-108	36-108	36-108	36-108#	37-20	37-20	37-20#	37-28	37-28	37-28	37-28#	38-85	38-85	38-85#
	38-93	38-93	38-93	38-93#	39-19	39-19	39-19#	39-27	39-27	39-27	39-27#	40-138	40-138	40-138#
	40-146	40-146	40-146	40-146#	41-53	41-53	41-53#	41-61	41-61	41-61	41-61#	42-78	42-78	42-78#
	42-86	42-86	42-86	42-86#	43-19	43-19	43-19#	43-27	43-27	43-27	43-27#	44-100	44-100	44-100#
	44-108	44-108	44-108	44-108#	45-18	45-18	45-18#	45-26	45-26	45-26	45-26#	46-97	46-97	46-97#
	46-105	46-105	46-105	46-105#	47-20	47-20	47-20#	47-28	47-28	47-28	47-28#	48-88	48-88	48-88#
	48-96	48-96	48-96	48-96#	49-99	49-99	49-99#	49-107	49-107	49-107	49-107#	50-14	50-14	50-14#
	50-22	50-22	50-22	50-22#	51-75	51-75	51-75#	51-83	51-83	51-83	51-83#	52-16	52-16	52-16#
	52-24	52-24	52-24	52-24#	53-113	53-113	53-113#	53-121	53-121	53-121	53-121#	54-14	54-14	54-14#
	54-22	54-22	54-22	54-22#	55-108	55-108	55-108#	55-116	55-116	55-116	55-116#	56-16	56-16	56-16#
	56-24	56-24	56-24	56-24#	57-110	57-110	57-110#	57-118	57-118	57-118	57-118#	58-18	58-18	58-18#
	58-28	58-28	58-28	58-28#	59-1	59-1	59-1#	59-1#	60-43	60-43	60-43#	60-53	60-53	60-53#
	60-66	60-66	60-66	60-66#	61-12	61-12	61-12#	61-25	61-25	61-25	61-25#	61-44	61-44	61-44
	61-44#													
T\$NSO	7-941#	10-21	11-51#	18-91	19-42#	25-37	27-38#	59-1	60-43#	61-44				
T\$NS1	9-10#	9-28	10-10#	10-20	15-9	15-9#	15-10	15-10#	15-11	15-11#	15-12	15-12#	15-13	15-13#
	15-14	15-14#	15-15	15-15#	15-16	15-16#	15-17	15-17#	15-18	15-18#	15-19	15-19#	15-20	15-20#
	15-21	15-21#	15-22	15-22#	15-23	15-23#	15-24	15-24#	15-25	15-25#	15-26	15-26#	15-27	15-27#
	15-28	15-28#	15-29	15-29#	17-105#	17-115	19-48#	19-78	20-8#	20-12	21-8#	21-108	22-10#	22-19
	23-8#	23-48	24-8#	24-35	25-9#	25-36	27-62#	27-127	28-195#	28-203	29-18#	29-26	30-112#	30-120
	31-14#	31-22	32-43#	32-51	33-8#	33-16	34-82#	34-90	35-19#	35-27	36-100#	36-108	37-20#	37-28
	38-85#	38-93	39-19#	39-27	40-138#	40-146	41-53#	41-61	42-78#	42-86	43-19#	43-27	44-100#	44-108
	45-18#	45-26	46-97#	46-105	47-20#	47-28	48-88#	48-96	49-99#	49-107	50-14#	50-22	51-75#	51-83
	52-16#	52-24	53-113#	53-121	54-14#	54-22	55-108#	55-116	56-16#	56-24	57-110#	57-118	58-18#	58-28
	60-53#	60-66	61-12#	61-25										
T\$PCNT	62-14#	62-15	62-15	62-15#										
T\$PTAB	62-15	62-15#												
T\$PTHV	7-969	62-23#												
T\$PTNU	7-915#	62-15	62-15#	62-23	62-23									
T\$SAVL	7-915#													
T\$SEGL	7-915#													
T\$SIZE	61-43	62-23#												
T\$SUBN	7-915#	27-62#	28-195#	29-18#	30-112#	31-14#	32-43#	33-8#	34-82#	35-19#	36-100#	37-20#	38-85#	39-19#
	40-138#	41-53#	42-78#	43-19#	44-100#	45-18#	46-97#	47-20#	48-88#	49-99#	50-14#	51-75#	52-16#	53-113#
	54-14#	55-108#	56-16#	57-110#	58-18#									
T\$TAGL	7-915#													
T\$TAGN	7-915#	9-10	9-10	9-10#	10-10	10-10	10-10#	15-9	15-9	15-9#	15-10	15-10	15-10#	15-11
	15-11	15-11#	15-12	15-12	15-12#	15-13	15-13	15-13#	15-14	15-14	15-14#	15-15	15-15	15-15#
	15-16	15-16	15-16#	15-17	15-17	15-17#	15-18	15-18	15-18#	15-19	15-19	15-19#	15-20	15-20
	15-20#	15-21	15-21	15-21#	15-22	15-22	15-22#	15-23	15-23	15-23#	15-24	15-24	15-24#	15-25

T24	8-8	50-14#												
T25	8-8	51-75#												
T26	8-8	52-16#												
T27	8-8	53-113#												
T28	8-8	54-14#												
T29	8-8	55-108#												
T3	8-8	29-18#												
T30	8-8	56-16#												
T31	8-8	57-110#												
T32	8-8	58-18#												
T4	8-8	30-112#												
T5	8-8	31-14#												
T6	8-8	32-43#												
T7	8-8	33-8#												
T8	8-8	34-82#												
T9	8-8	35-19#												
TABELD	18-17#	21-27												
TAP	12-131#													
TCF	12-156#													
TICKMS	17-51*	17-54*	17-57#	17-106	17-111									
TIME	13-24#	15-25	17-106*	17-108*	17-161*	17-176	17-178	17-182	17-189*	17-204	17-206	17-209	21-38*	28-199
	28-199*	29-22	29-22*	30-116*	30-116*	31-18*	31-18*	32-47*	32-47*	32-47*	33-12*	33-12*	33-12*	34-86*
	34-86*	34-86*	34-86*	35-23*	35-23*	35-23*	35-23*	36-104*	36-104*	36-104*	36-104*	37-24*	37-24*	37-24*
	37-24*	38-89*	39-23*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	41-57*	41-57*	42-82*	42-82*	42-82*
	42-82*	43-23*	43-23*	43-23*	43-23*	44-104*	45-22*	46-101*	47-24*	49-103*	49-103*	50-18*	50-18*	51-79*
	51-79*	51-79*	52-20*	52-20*	52-20*	53-117*	53-117*	53-117*	53-117*	54-18*	54-18*	54-18*	54-18*	55-112
	55-112*	55-112*	55-112*	55-112*	56-20	56-20*	56-20*	56-20*	56-20*	57-114*	57-114*	57-114*	58-22*	58-22*
	58-22*													
TIMEA	13-26#	17-155*	17-182*	17-184										
TIMEAM	13-28#	17-155*	17-186*	55-112										
TIMEAP	13-27#	17-155*	17-185*	55-112	57-114									
TIMEB	13-29#	17-155*	17-209*	17-211										
TIMEBM	13-31#	17-155*	17-213*	56-20										
TIMEBP	13-30#	17-155*	17-212*	56-20	58-22									
TIMES	13-32#	55-112	55-112	55-112*	56-20	56-20	56-20*							
TMPO	13-39#	15-27	17-162	17-162*	17-162*	17-190	17-190*	17-190*	17-190*	27-93	27-93	27-93*	27-93*	27-93*
	27-101	27-101	27-101*	27-101*	27-101*	27-110	27-110	27-110	27-110	27-110	27-110*	27-110*	27-110*	27-110*
	27-110*	27-110*	27-110*	27-110*	28-199	28-199	28-199	28-199	28-199*	28-199*	28-199*	28-199*	29-22	29-22
	29-22	29-22	29-22*	29-22*	29-22*	29-22*	29-22*	30-116	30-116	30-116	30-116	30-116	30-116*	30-116*
	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	30-116*	31-18	31-18	31-18	31-18	31-18	31-18*	31-18*
	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	31-18*	32-47	32-47	32-47	32-47*	32-47*	32-47*	32-47*
	32-47*	33-12	33-12	33-12	33-12*	33-12*	33-12*	33-12*	33-12*	33-12*	34-86	34-86	34-86	34-86
	34-86	34-86	34-86*	34-86*	34-86*	34-86*	34-86*	35-23	35-23	35-23	35-23	35-23	35-23	35-23
	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	35-23*	36-104	36-104	36-104	36-104*	36-104*	36-104*	36-104*
	37-24	37-24	37-24	37-24	37-24*	37-24*	37-24*	38-89	38-89	38-89	38-89	38-89	38-89	38-89
	38-89	38-89	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*	38-89*
	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*
	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	39-23*	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*
	40-142*	40-142*	41-57	41-57	41-57	41-57	41-57*	41-57*	41-57*	41-57*	42-82	42-82	42-82	42-82
	42-82	42-82*	42-82*	42-82*	42-82*	42-82*	42-82*	43-23	43-23	43-23	43-23	43-23	43-23*	43-23*
	43-23*	43-23*	43-23*	43-23*	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104*	44-104*
	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	44-104*	45-22	45-22	45-22	45-22
	45-22	45-22	45-22	45-22	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*	45-22*
	45-22*	45-22*	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101*	46-101*	46-101*	46-101*
	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	46-101*	47-24	47-24	47-24	47-24	47-24

TOLER	17-119#	17-183	17-210											
TPE	12-149#													
TRE	12-11#	34-86	35-23											
TSTNUM	13-20#													
U0	12-25#													
U1	12-26#													
U2	12-27#													
UAM	11-57#													
UNIT	13-45#	18-21	18-47*	18-48	21-25*	21-26*	21-28							
UNS	12-93#													
UPE	12-38#													
VV	12-65#	17-162	17-190	28-199	28-199	28-199	28-199	29-22	29-22	29-22	29-22	30-116	30-116	30-116
	30-116	30-116	30-116	31-18	31-18	31-18	31-18	31-18	31-18	32-47	32-47	32-47	33-12	33-12
	33-12	34-86	34-86	34-86	34-86	34-86	35-23	35-23	35-23	35-23	35-23	36-104	36-104	36-104
	37-24	37-24	37-24	38-89	38-89	38-89	38-89	38-89	38-89	39-23	39-23	39-23	39-23	39-23
	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	41-57	41-57	41-57
	42-82	42-82	42-82	43-23	43-23	43-23	44-104	44-104	44-104	44-104	45-22	45-22	45-22	45-22
	46-101	46-101	46-101	46-101	47-24	47-24	47-24	47-24	48-92	48-92	49-103	49-103	50-18	50-18
	51-79	51-79	51-79	52-20	52-20	52-20	53-117	53-117	54-18	54-18	55-112	55-112	55-112	56-20
	56-20	56-20	57-114	57-114	57-114	58-22	58-22	58-22						
VVSET	14-10#	17-162	17-190	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	28-199	29-22	29-22
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	34-86	34-86	34-86	34-86	34-86	34-86	34-86	35-23	35-23	35-23	35-23	35-23	35-23	35-23
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	37-24	37-24	38-89	38-89	38-89	38-89	38-89	38-89	38-89	38-89	39-23	39-23	39-23	39-23
	39-23	39-23	39-23	39-23	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142	40-142
	40-142	40-142	40-142	40-142	40-142	40-142	41-57	41-57	41-57	41-57	41-57	41-57	41-57	42-82
	42-82	42-82	42-82	42-82	42-82	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23	44-104
	44-104	44-104	44-104	44-104	44-104	44-104	45-22	45-22	45-22	45-22	45-22	45-22	45-22	45-22
	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101	47-24	47-24	47-24	47-24	47-24	47-24
	47-24	47-24	48-92	48-92	48-92	48-92	48-92	48-92	49-103	49-103	49-103	49-103	49-103	49-103
	50-18	50-18	50-18	50-18	50-18	50-18	51-79	51-79	51-79	51-79	51-79	51-79	51-79	51-79
	52-20	52-20	52-20	52-20	52-20	52-20	52-26#	52-28#	53-117	53-117	53-117	53-117	53-117	53-117
	54-18	54-18	54-18	54-18	54-18	54-18	55-112	55-112	55-112	55-112	55-112	55-112	55-112	56-20
	56-20	56-20	56-20	56-20	57-114	57-114	57-114	57-114	57-114	57-114	58-22	58-22	58-22	58-22
	58-22	58-22												
WATCH	13-25#	17-109	17-111*	17-113*	17-161*	17-169	17-189*	17-197	21-38*	21-39	28-199	28-199*	29-22	29-22*
	30-116	30-116	30-116*	30-116*	31-18	31-18	31-18*	31-18*	32-47	32-47	32-47	32-47*	32-47*	32-47*
	33-12	33-12	33-12	33-12*	33-12*	33-12*	34-86	34-86	34-86	34-86	34-86*	34-86*	34-86*	34-86*
	35-23	35-23	35-23	35-23*	35-23*	35-23*	35-23*	35-23*	36-104	36-104	36-104	36-104	36-104*	36-104*
	36-104*	36-104*	37-24	37-24	37-24	37-24	37-24*	37-24*	37-24*	37-24*	38-89	38-89*	39-23	39-23*
	40-142	40-142	40-142	40-142	40-142	40-142	40-142*	40-142*	40-142*	40-142*	40-142*	40-142*	41-57	41-57
	41-57*	41-57*	42-82	42-82	42-82	42-82	42-82*	42-82*	42-82*	42-82*	43-23	43-23	43-23	43-23
	43-23*	43-23*	43-23*	43-23*	44-104	44-104*	45-22	45-22*	46-101	46-101*	47-24	47-24*	49-103	49-103
	49-103*	49-103*	50-18	50-18	50-18*	50-18*	51-79	51-79	51-79	51-79*	51-79*	51-79*	52-20	52-20
	52-20	52-20*	52-20*	52-20*	53-117	53-117	53-117	53-117	53-117*	53-117*	53-117*	53-117*	54-18	54-18
	54-18	54-18	54-18*	54-18*	54-18*	54-18*	55-112	55-112	55-112	55-112	55-112*	55-112*	55-112*	55-112*
	56-20	56-20	56-20	56-20	56-20*	56-20*	56-20*	56-20*	57-114	57-114	57-114	57-114	57-114*	57-114*
	57-114*	57-114*	58-22	58-22	58-22	58-22	58-22*	58-22*	58-22*	58-22*				
WCE	12-39#													
WCF	12-84#													
WLE	12-90#													
WOR	12-187#													
WRL	12-70#	28-199	28-199	29-22	29-22	30-116	30-116	31-18	31-18	34-86	34-86	35-23	35-23	36-104
	36-104	37-24	37-24	38-89	38-89	39-23	39-23	40-142	40-142	40-142	40-142	41-57	41-57	42-82

	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104#	36-104#	36-104#	36-104#	36-104#
	36-104#	36-104#	37-24	37-24	37-24	37-24	37-24	37-24	37-24	37-24#	37-24#	37-24#	37-24#	37-24#
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	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#	38-89#
	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23	39-23#	39-23#	39-23#	39-23#	39-23#	39-23#
	39-23#	39-23#	40-142	40-142	40-142	40-142	40-142	40-142	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#
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	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	40-142#	41-57	41-57	41-57	41-57	41-57#	41-57#
	41-57#	41-57#	42-82	42-82	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#	42-82#	42-82#
	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#	43-23#
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#	44-104#
	44-104#	44-104#	44-104#	44-104#	45-22	45-22	45-22	45-22	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#	45-22#
	46-101	46-101	46-101	46-101	46-101	46-101	46-101	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#	46-101#
	46-101#	46-101#	47-24	47-24	47-24	47-24	47-24	47-24	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#	47-24#
	48-92	48-92	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#	48-92#
	49-103	49-103	49-103	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#	49-103#
	50-18	50-18	50-18	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#	50-18#
	51-79	51-79	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#	51-79#
	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#	52-20#
	53-117	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#	53-117#
	54-18	54-18	54-18	54-18	54-18	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#	54-18#
	55-112	55-112	55-112	55-112	55-112	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#	55-112#
	56-20	56-20	56-20	56-20	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#	56-20#
	57-114	57-114	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#	57-114#
	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22	58-22	58-22	58-22	58-22	58-22
MSESCA	1-D06#	7-915#												
MSESCS	1-D10#	7-915#												
MSEXCP	1-E01#	7-915#	60-55	60-55	60-55#	60-57	60-57	60-57#	60-59	60-59	60-59#	60-61	60-61	60-61#
MSEXIT	60-63	60-63	60-63#											
	1-D14#	7-915#	19-62#	21-37	21-37#	21-93	21-93#	23-33	23-33#	24-19#	25-20#	27-71	27-71#	28-199
	28-199#	29-22	29-22#	30-116	30-116#	31-18	31-18#	32-47	32-47#	33-12	33-12#	34-86	34-86#	35-23
	35-23#	36-104	36-104#	37-24	37-24#	38-89	38-89#	39-23	39-23#	40-142	40-142#	41-57	41-57#	42-82
	42-82#	43-23	43-23#	44-104	44-104#	45-22	45-22#	46-101	46-101#	47-24	47-24#	48-92	48-92#	49-103
	49-103#	50-18	50-18#	51-79	51-79#	52-20	52-20#	53-117	53-117#	54-18	54-18#	55-112	55-112#	56-20
	56-20#	57-114	57-114#	58-22	58-22#									
MSEXSE	1-D22#	7-915#	19-62#	21-37#	21-93#	23-33#	24-19#	25-20#	27-71#	28-199#	29-22#	30-116#	31-18#	32-47#
	33-12#	34-86#	35-23#	36-104#	37-24#	38-89#	39-23#	40-142#	41-57#	42-82#	43-23#	44-104#	45-22#	46-101#
	47-24#	48-92#	49-103#	50-18#	51-79#	52-20#	53-117#	54-18#	55-112#	56-20#	57-114#	58-22#		
MSEXTJ	1-D18#	7-915#	19-62	19-62#	21-37#	21-93#	23-33#	24-19	24-19#	25-20	25-20#	27-71#	28-199#	29-22#
	30-116#	31-18#	32-47#	33-12#	34-86#	35-23#	36-104#	37-24#	38-89#	39-23#	40-142#	41-57#	42-82#	43-23#
	44-104#	45-22#	46-101#	47-24#	48-92#	49-103#	50-18#	51-79#	52-20#	53-117#	54-18#	55-112#	56-20#	57-114#
	58-22#													
MSGEN	1-D38#	7-915#	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969	7-969
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	9-28	9-28#	10-10	10-10	10-10#	10-10#	10-20	10-20#	14-20	14-20#	14-30	14-30#	15-9	15-9
	15-9#	15-9#	15-10	15-10	15-10#	15-10#	15-11	15-11	15-11#	15-11#	15-12	15-12	15-12#	15-12#
	15-13	15-13	15-13#	15-13#	15-14	15-14	15-14#	15-14#	15-15	15-15	15-15#	15-15#	15-16	15-16
	15-16#	15-16#	15-17	15-17	15-17#	15-17#	15-18	15-18	15-18#	15-18#	15-19	15-19	15-19#	15-19#
	15-20	15-20	15-20#	15-20#	15-21	15-21	15-21#	15-21#	15-22	15-22	15-22#	15-22#	15-23	15-23
	15-23#	15-23#	15-24	15-24	15-24#	15-24#	15-25	15-25	15-25#	15-25#	15-26	15-26	15-26#	15-26#

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	60-53#	60-55	60-55	60-55	60-55	60-55	60-57	60-57	60-57	60-57	60-59	60-59	60-59
	60-59	60-59	60-59#	60-61	60-61	60-61	60-61	60-61	60-61#	60-63	60-63	60-63	60-63
	60-63#	60-65	60-65	60-65	60-65#	60-66	60-66#	61-12	61-12#	61-25	61-25#	61-43	61-43
	61-43#	62-15	62-15	62-15#	62-15#								
MSGNLS	1-C13#	7-915#											
MSGNSU	1-B98#	7-915#											
MSGNTA	1-B90#	7-915#	9-28	9-28#	10-20	10-20#	15-9	15-9#	15-10	15-10#	15-11	15-11#	15-12
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	15-20	15-20#	15-21	15-21#	15-22	15-22#	15-23	15-23#	15-24	15-24#	15-25	15-25#	15-26
	15-27	15-27#	15-28	15-28#	15-29	15-29#	17-115	17-115#	19-78	19-78#	21-108	21-108#	22-19
	23-48	23-48#	24-35	24-35#	25-36	25-36#	27-127	27-127#	28-203	28-203#	29-26	29-26#	30-120
	31-22	31-22#	32-51	32-51#	33-16	33-16#	34-90	34-90#	35-27	35-27#	36-108	36-108#	37-28
	38-93	38-93#	39-27	39-27#	40-146	40-146#	41-61	41-61#	42-86	42-86#	43-27	43-27#	44-108
	45-26	45-26#	46-105	46-105#	47-28	47-28#	48-96	48-96#	49-107	49-107#	50-22	50-22#	51-83
	52-24	52-24#	53-121	53-121#	54-22	54-22#	55-116	55-116#	56-24	56-24#	57-118	57-118#	58-28
	60-66	60-66#	61-25	61-25#	62-15	62-15#	62-22	62-22#					
MSGNTE	1-B94#	7-915#	27-62	27-62#	28-195	28-195#	29-18	29-18#	30-112	30-112#	31-14	31-14#	32-43
	33-8	33-8#	34-82	34-82#	35-19	35-19#	36-100	36-100#	37-20	37-20#	38-85	38-85#	39-19
	40-138	40-138#	41-53	41-53#	42-78	42-78#	43-19	43-19#	44-100	44-100#	45-18	45-18#	46-97
	47-20	47-20#	48-88	48-88#	49-99	49-99#	50-14	50-14#	51-75	51-75#	52-16	52-16#	53-113
	54-14	54-14#	55-108	55-108#	56-16	56-16#	57-110	57-110#	58-18	58-18#			
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	17-172#	17-175#	17-180#	17-188#	17-190#	17-190#	17-199#	17-200#	17-203#	17-208#	18-21#	18-79#	18-80#
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	61-12	61-12#												
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	36-104	36-104	36-104	36-104	36-104	36-104	36-104	36-104#	36-104	36-104#	36-104	36-104	36-104	36-104#
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	41-57	41-57	41-57#	41-57#	41-57#	41-57#	41-57#	41-57#	41-57	41-57#	41-57	41-57	41-57	41-57#
	42-82	42-82	42-82	42-82	42-82#	42-82#	42-82#	42-82#	42-82	42-82#	42-82	42-82	42-82	42-82#
	43-23	43-23	43-23	43-23	43-23	43-23	43-23	43-23#	43-23	43-23#	43-23	43-23	43-23	43-23#
	44-104	44-104	44-104	44-104	44-104	44-104	44-104	44-104#	44-104	44-104#	44-104	44-104	44-104	44-104#

	56-20#	56-20#	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114	57-114#	57-114#
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	58-22	58-22	58-22	58-22	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#	58-22#
MSRADI	1-D77#	7-915#	60-55	60-55#	60-57	60-57#	60-59	60-59#	60-61	60-61#	60-63	60-63#	60-65#
MSRBRO	1-C52#	7-915#											
MSRNRO	1-C62#	7-915#	17-16	17-16#	17-35	17-35#	18-21	18-21#					
MSSETS	1-D32#	7-915#	7-941	7-941#	9-10	9-10#	10-10	10-10#	11-51	11-51#	15-9	15-9#	15-10
	15-11	15-11#	15-12	15-12#	15-13	15-13#	15-14	15-14#	15-15	15-15#	15-16	15-16#	15-17
	15-18	15-18#	15-19	15-19#	15-20	15-20#	15-21	15-21#	15-22	15-22#	15-23	15-23#	15-24
	15-25	15-25#	15-26	15-26#	15-27	15-27#	15-28	15-28#	15-29	15-29#	17-105	17-105#	19-42
	19-48	19-48#	20-8	20-8#	21-8	21-8#	22-10	22-10#	23-8	23-8#	24-8	24-8#	25-9
	27-38	27-38#	27-62	27-62#	28-195	28-195#	29-18	29-18#	30-112	30-112#	31-14	31-14#	32-43
	33-8	33-8#	34-82	34-82#	35-19	35-19#	36-100	36-100#	37-20	37-20#	38-85	38-85#	39-19
	40-138	40-138#	41-53	41-53#	42-78	42-78#	43-19	43-19#	44-100	44-100#	45-18	45-18#	46-97
	47-20	47-20#	48-88	48-88#	49-99	49-99#	50-14	50-14#	51-75	51-75#	52-16	52-16#	53-113
	54-14	54-14#	55-108	55-108#	56-16	56-16#	57-110	57-110#	58-18	58-18#	60-43	60-43#	60-53#
	61-12	61-12#											
MSSTAR	1-A33#	7-915#											
MS SVC	1-C33#	7-915#	15-9	15-9	15-9#	15-9#	15-10	15-10	15-10#	15-10#	15-11	15-11	15-11#
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	15-15#	15-15#	15-16	15-16	15-16#	15-16#	15-17	15-17	15-17#	15-17#	15-18	15-18	15-18#
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	17-162	17-162	17-171	17-172	17-172#	17-175	17-175#	17-180	17-188	17-188#	17-190	17-190	17-199
	17-200#	17-203	17-203#	17-208	18-21	18-21#	18-79	18-79#	18-80	18-80#	18-81	18-81#	18-82
	18-83	18-83#	18-84	18-84#	18-87	18-87#	18-88	18-88#	19-62#	19-78	19-78#	21-10	21-10#
	21-12#	21-16	21-16#	21-20	21-20#	21-24	21-24#	21-36	21-37	21-37#	21-46	21-46#	21-59
	21-64	21-64#	21-67	21-67#	21-93	21-93#	21-108	21-108#	22-19	22-19#	23-10	23-10#	23-18
	23-21	23-21#	23-33	23-33#	23-48	23-48#	24-19#	24-35	24-35#	25-20#	25-36	25-36#	27-71
	27-93	27-93	27-93	27-93	27-93#	27-93#	27-101	27-101	27-101	27-101#	27-101#	27-101#	27-110
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	30-116	30-116	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116#	30-116
	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18	31-18
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	32-47	32-47	32-47	32-47	32-47	32-47	32-47#	32-51	32-51#	33-12	33-12	33-12	33-12
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	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-24#	37-28	37-28#	38-89	38-89	38-89	38-89

