

RP07

FE/HOST ISOLATOR
CZRJMA0

AH-F961A-MC
FICHE 1 OF 2

MAY 1983
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IDENTIFICATION

PRODUCT CODE: AC-F960A-MC
PRODUCT NAME: CZRJMAO RP07 FE/HOST ISOLATOR
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MAINTAINED: CX DIAGNOSTIC ENGINEERING
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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THE RP07 FRONT END DIAGNOSTIC IS A PROGRAM WHICH PARTIALLY AUTOMATES THE PATHFINDER DOCUMENT TO ALLOW COMPUTERIZED SEQUENTIAL DIAGNOSIS OF AN RP07. THE PROGRAM INITIALLY DEMONSTRATES HARDWARE INTEGRITY BETWEEN THE RHXX CONTROLLER, ASSOCIATED CABLING AND THE DISK CONTROL LOGIC (DCL). SATISFACTORY COMPLETION OF THIS PHASE OF TESTING THEN PERMITS 'HOST' INVOCATION OF THE RP07 RESIDENT MICRODIAGNOSTICS, THOSE SPECIFICALLY ALLOWING REMOTE EXECUTION, TO ASCERTAIN A REASONABLE LEVEL OF CONFIDENCE IN THE DISK DRIVE.

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

THIS PROGRAM, IN ORDER TO EXECUTE, WILL REQUIRE THE FOLLOWING SYSTEM HARDWARE:

1. A: XXDP+ LOAD MEDIUM,
2. A CONSOLE KEYBOARD/PRINTER,
3. A MINIMUM OF 28K WORD OF MAIN MEMORY,
4. A PDP11 PROCESSOR AND APPROPRIATE MASSBUS CONTROLLER WHICH CONFORMS TO (DEC STD 159) AND WHICH HAS A THROUGHPUT CAPACITY OF 2.2 MBYTES /SEC OR GREATER.
5. AT LEAST ONE RP07 WITH RHXX CONTROLLER

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USER'S MANUAL - CHQUS

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

ALL CPU, MEMORY, AND TERMINAL DIAGNOSTICS MUST RUN SUCCESSFULLY TO COMPLETION.

1.5 ASSUMPTIONS

NONE

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 'DDDDD'.

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:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDDD = 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 "DRIVE #" REQUIRES THE USER TO SPECIFY THE DRIVE NUMBER OF THE DRIVE TO BE TESTED. DEFAULT IS 0 (OCTAL).

2.5 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS OR AFTER A RESTART OR CONTINUE COMMAND, THE RUNTIME SERVICES WILL ASK FOR SOFTWARE PARAMETERS. THESE PARAMETERS WILL GOVERN SOME DIAGNOSTIC SPECIFIC OPERATION MODES. YOU WILL BE PROMPTED BY "CHANGE SW (L) ?". IF YOU WISH TO CHANGE ANY PARAMETERS, ANSWER BY TYPING "Y". THE SOFTWARE QUESTIONS AND THE DEFAULT VALUES ARE DESCRIBED IN THE NEXT PARAGRAPH(S).

THE FOLLOWING QUESTION ASKS IF THE USER WANTS TO EXECUTE THE MASSBUS INTERFACE SWITCH TEST. THIS IS USEFUL IF THE USER IS RUNNING MULTIPLE PASSES AND DOES NOT WISH TO SLOW DOWN TESTING IN ORDER TO "SWITCH" THE MASSBUS INTERFACE SWITCH.

'EXECUTE TEST 25., MASSBUS INTERFACE SWITCH TEST (L) Y ?'

THE FOLLOWING QUESTION ASKS IF THE USER WANTS THE RP07 INTERNAL ERROR LOG CONTENTS. THE ERROR LOG IN THE RP07 MAY BE USEFUL AS A TROUBLESHOOTING TOOL, AND AS SUCH MAY BE OUTPUT UPON REQUEST.

'EXECUTE TEST 52., PRINT CONTENTS OF INTERNAL ERROR LOG (L) Y ?'

THE FOLLOWING QUESTION ASKS THE USER IF THE INTERNAL RP07 READ/WRITE ROUTINE SHOULD BE LIMITED ONLY TO ONE TRACK. THIS MAY BE USEFUL TO HELP ISOLATE A SELECTED HEAD/CHIP FAILURE.

'SELECT A TRACK FOR THE RP07 INTERNAL RD-WRT TESTS (L) N ?'

THE FOLLOWING QUESTION ASKED ONLY IF THE ABOVE QUESTION IS ANSWERED 'YES', ALLOWS A USER TO SELECT ONE HEAD FOR THE INTERNAL READ/WRITE TESTS.

'TRACK ADDRESS (D) 0 ?'

THE FOLLOWING QUESTION ASKS IF THE USER DESIRES TO RUN ONLY ONE MICRODIAGNOSTIC. IF THE ANSWER IS YES, AND THE MANUAL MODE OF OPERATION IS ENABLED, THE USER WILL BE INTERROGATED AS TO WHICH ROUTINE TO SELECT FOR EXECUTION.

'EXECUTE TEST 60., SELECT A MICRO-DIAGNOSTIC FOR EXECUTION (L) N ?'

NOTE

ONCE THIS QUESTION HAS BEEN ANSWERED 'YES' AND THE ROUTINE HAS BEEN RUN AT LEAST ONCE, PROVIDING THAT THE USER HAS CORRECTLY INPUT A ROUTINE NUMBER WHICH IS VALID, THE SELECTED ROUTINE WILL ALWAYS RUN WHEN THE TEST IS SELECTED FOR EXECUTION. THE ONLY WAY THE USER MAY CHANGE THE ROUTINE SELECTED FOR EXECUTION IS TO HALT THE PROGRAM VIA THE CONTROL C (^C) MECHANISM AND ISSUE A NEW 'START' COMMAND. ANY OTHER METHOD OF RESUMING PROGRAM OPERATION WILL CONTINUE TO EXECUTE THE ROUTINE PREVIOUSLY ACCEPTED AS INPUT FROM THE USER.

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

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

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

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

UNIT 7
CSR ADDRESS (D) ? 160000<CR>
SUB-DEVICE # (D) ? 6,7<CR>
Q-FACTOR (D) 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 (D) ? 160000<CR>
SUB-DEVICE # (D) ? 0-7<CR>
Q-FACTOR (D) 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
7. ANSWER THE 'CHANGE SW' QUESTION WITH 'N'

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', 'IBR' 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

- COMPOSITE ERROR SET WHEN NOT EXPECTED -

THIS MESSAGE IS GENERATED WHEN COMPOSITE ERROR IS FOUND TO BE SET WHEN IT SHOULD HAVE BEEN RESET.

- DRIVE HUNG, DRY NOT SET IN TIME -

THIS MESSAGE IS GENERATED WHEN GO IS FOUND TO BE SET. THE
FUNCTION IS TIMED, AND WHEN THE TIMING FUNCTION EXPIRES, THE ABOVE
MESSAGE IS PRODUCED.

- DRIVE WRITE LOCKED -

THIS MESSAGE IS PRODUCED WHEN THE PROGRAM PREPARES TO EXECUTE A
WRITE FUNCTION AND THE WRITE LOCK BIT (RPDS:WRL) IS FOUND TO BE
ASSERTED.

- DRIVE OFFLINE -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM PREPARES TO EXECUTE
A COMMAND AND THE MEDIUM ON LINE BIT (RPDS:MOL) IS FOUND TO BE
RESET.

- RPCS2: OR FAILED TO SET IN TIME -

THIS MESSAGE IS GENERATED WHEN WHILE USING A TIMER, THE OUTPUT READY
BIT (RPCS2:OR) IS FOUND TO BE RESET UNTIL THE TIMER FUNCTION EXPIRES.

- RPCS2:OR FAILED TO CLEAR IN TIME -

THIS MESSAGE IS GENERATED WHEN WHILE USING A TIMER, THE OUTPUT READY
BIT (RPCS2:OR) IS FOUND TO BE SET UNTIL THE TIMER FUNCTION EXPIRES.

- RH CONTROLLER DIDN'T RESPOND (NO SSYNC). -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM ATTEMPTS TO ACCESS THE
CONTROLLER AT THE USER SPECIFIED ADDRESS, AND IT DOESN'T RESPOND.

- BIT(S) UNDER TEST DIDN'T CHANGE STATE -

THIS MESSAGE IS GENERATED WHEN THE REGISTER RESULTS ARE NOT THE COMPLIMENT
OF THE REGISTER STATE AT THE START OF THE TEST.

- RPCS2:CLR DIDN'T FUNCTION PROPERLY -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FINDS THAT THE CONTROLLER

CLEAR FUNCTION DID NOT FUNCTION PROPERLY.

- REG CONTENTS DON'T MATCH EXPECTED DATA -

THIS MESSAGE IS PRODUCED WHEN EXTRA BITS SET OR CLEAR WHEN THEY ARE NOT EXPECTED TO FUNCTION IN THIS MANNER.

- REG DIDN'T CLEAR WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN A REGISTER DOESN'T RESET WHEN EXPECTED.

- SC OR TRE SET WHEN NOT EXPECTED -

THIS MESSAGE IS GENERATED AS A RESULT OF DETECTING A TRANSFER ERROR (RPCS1:TRE) OR DETECTING AN UNEXPECTED ATA (RPCS1:SC)

- RPCS2:IR FAILED TO SET IN TIME -

THIS MESSAGE IS GENERATED WHEN USING A TIMER, INPUT READY (RPCS2:IR) IS FOUND TO BE RESET AFTER THE TIMING FUNCTION HAS EXPIRED.

- RPCS1, MCPE DIDN'T SET WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FAILS TO DETECT A MASSBUS CONTROL PARITY ERROR (RPCS1, MCPE).

- RPCS1, SC OR TRE DIDN'T SET WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FORCES AN ERROR OR ATTENTION, AND THE RESULTING TRE OR SC IN RPCS1 DOES NOT SET.

- BIT(S) UNDER TEST DIDN'T SET WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE STIMULUS AND THE RESULT DO NOT MATCH, AND THE RESULT WAS EXPECTED TO FORCE REGISTER BIT(S) TO TOGGLE FROM 0 TO 1.

- BIT(S) UNDER TEST DIDN'T CLEAR WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE STIMULUS AND THE RESULT DO NOT MATCH, AND THE RESULT WAS EXPECTED TO FORCE REGISTER BITS TO TOGGLE FROM

1 TO 0.

- RH INTERRUPTED AT WRONG PRIORITY -

THIS MESSAGE IS PRODUCED WHEN THE RH CONTROLLER INTERRUPTS AT A PRIORITY HIGHER THAN THE EXPECTED PRIORITY.

- RH GENERATED FALSE INTERRUPT -

THIS MESSAGE IS PRODUCED WHEN THE RH IS TESTED TO HAVE NO PREREQUISITE CONDITIONS WHICH COULD GENERATE AN INTERRUPT, YET DOES GENERATE AN INTERRUPT ANYWAY.

- RH DIDN'T INTERRUPT WHEN EXPECTED -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM EXPECTS AN INTERRUPT BUT DOESN'T GET ONE.

- DRIVE NOT PRESENT, TEST INVALID -

THIS MESSAGE IS GENERATED WHEN THE UNIT UNDER TEST IS FOUND TO BE NOT PRESENT.

- COMMAND EXECUTION INCORRECT -

THIS MESSAGE IS GENERATED WHEN A COMMAND IS EXECUTED AND THE DRIVE DOESN'T RETURN THE CORRECT STATUS FOR THE COMPLETED OPERATION.

- DATA LINES STUCK LOW -

THIS MESSAGE IS GENERATED WHEN, DURING A 'READ ALL TRACK DESCRIPTOR' OPERATION, THE DATA RECEIVED DOESN'T FORCE ALL 16 DATA LINES FROM A 0 TO 1.

- FAILED TO SEEK PROPERLY -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FAILS TO RECEIVE THE CORRECT STATUS FROM THE DRIVE UPON THE COMPLETION OF A SEEK OPERATION.

- DETECTED ERROR DURING WRITE DATA OPERATION -

THIS MESSAGE IS PRODUCED TO ENABLE THE USER TO DISCERN BETWEEN READ

AND WRITE ERRORS.

- FAILED TO CORRECTLY DETECT A WRITE CHECK ERROR -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FORCES A WRITE CHECK ERROR, BUT THE DRIVE FAILS TO POST THE CORRECT STATUS.

- DETECTED ERROR DURING FORMAT OPERATION -

THIS MESSAGE IS GENERATED TO ENABLE THE USER TO ISOLATE PROBLEMS WHICH OCCUR ONLY DURING A FORMAT OPERATION.

- DETECTED ERROR DURING DATA TRANSFER -

THIS MESSAGE IS GENERATED ANYTIME AN ERROR IS DETECTED DURING A DATA TRANSFER OPERATION OTHER THAN THE ONES MENTIONED ABOVE.

- FAILED AN RP07 INTERNAL MICRODIAGNOSTIC TEST -

THIS MESSAGE IS GENERATED ANYTIME THE PROGRAM DETECTS AN ERROR DURING THE MICRODIAGNOSTIC EXECUTION IN THE DRIVE.

- RHXX REGISTER SELECTION FAILURE -

THIS MESSAGE IS GENERATED WHEN THE RH REGISTER SELECT TESTS FAIL. IT IS INDICATIVE OF A MULTIPLEXOR OR SELECT LOGIC FAILURE.

- DATA RECEIVED DOESN'T MATCH EXPECTED DATA -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM COMPARES EXPECTED WITH RECEIVED DATA AND FINDS THAT THEY DON'T MATCH, INDICATING A READ ERROR.

- DETECTED A PERMANENT ERROR -

THIS MESSAGE IS GENERATED WHEN RPDS, ERR=1 AND RPER1, RPER2 AND RPER3 ARE ALL 0.

- INTERNAL RP07 DIAGNOSTIC TIME-OUT -

THIS MESSAGE IS GENERATED WHEN THE PROGRAM FINDS, USING A MAINTENANCE

TIMER, THAT THE DIAGNOSTIC EXECUTION DID NOT COMPLETE WHEN THE TIMER FUNCTION EXPIRED.

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 :DRIVE NUMBER

THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.

SWTTST: .WORD 1 :USED TO SELECT MASSBUS INTERFACE TEST;
:DISABLED= 0, ENABLED= 1
ERRDMP: .WORD 1 :USED TO ENABLE THE RP07 ERROR LOG DUMP
SELTRK: .WORD 0 :USED TO SELECT A TRACK ADDRESS IN THE MICRO-
:DIAGNOSTIC TEST
TRAKAD: .WORD 0 :USED TO GET THE USER TRACK ADDRESS
SELRUN: .WORD 0 :USED TO DETERMINE IF USER ELECTED A MICRO-
:DIAGNOSTIC TEST

IN THE BASIC DRIVE TEST, THERE IS A USER PROMPT WHICH ASKS THE OPERATOR TO DISABLE SWITCH A12-501 IN THE DRIVE. IF THE USER RESPONDS 'NO', THE TEST IS BYPASSED. IF THE USER RESPONDS 'YES', THE PROGRAM EXPECTS THE SWITCH TO BE DISABLED WHEN THE USER RESPONDS. THE PROGRAM, UPON COMPLETION OF THE TEST, ASKS THE USER TO RE-ENABLE THE SWITCH. IF THE USER RESPONDS 'NO' THE PROGRAM LOOPS UNTIL THE SWITCH HAS BEEN RE-ENABLED AND THE USER RESPONDS 'YES'.

IF THE MANUAL MODE OF OPERATION IS ENABLED AND THE USER HAS, THROUGH THE SOFTWARE QUESTIONS, INDICATED THAT ONE MICRO-DIAGNOSTIC IS TO BE SELECTED FOR EXECUTION, THE USER WILL BE ASKED TO INPUT A 2 CHARACTER HEX ENTRY WHICH WILL ALLOW SELECTION AND EXECUTION OF THAT PARTICULAR MICRO-DIAGNOSTIC.

6.0 TEST SUMMARIES

THE FOLLOWING REPRESENT A GENERAL LIST OF TESTS WHICH WILL BE PERFORMED BY THE RH70 CONTROLLER. THOSE TESTS MARKED WITH AN ASTERISK (*) WILL NOT BE EXECUTED WHEN AN RH11 CONTROLLER IS DETERMINED TO BE THE RP07 INTERFACE.

TEST 1: UNIT UNDER TEST

SELECTS A USER SPECIFIED CONTROLLER AND ASCERTAINS THAT THE CONTROLLER DOES INDEED EXIST, IE VALID SSYN RESPONSE

TEST 2: RP CLEAR TEST

THIS TEST ASCERTAINS CORRECTNESS OF THE DEVICE CLEAR FUNCTION BY WRITTING RPBA TO ALL ONES, SETTING RP CLR (BIT 5) IN RPCS2 AND PROVING THAT AT LEAST SOME OF THE BITS DID CLEAR IN RPBA. IT IS NOT THE INTENT OF THE PROGRAM, AT THIS TIME, TO PROVE THE CORRECTNESS OF THE RPBA REGISTER, IT IS JUST TO PROVE THAT THE RPCLR FUNCTION DOES WORK.

TEST 3. RPCS2 STATIC FUNCTIONAL TEST

THIS WALKS A ONE, ZERO, ALL ZEROS, ALL ONES THROUGH RPCS2. THE RANGE WILL BE FROM BIT 0 TO BIT 2. EXECUTE A DEVICE CLEAR (RPCS2: CLR) AND ENSURE THAT REGISTER DID RESET.

TEST 4: RPWC STATIC FUNCTIONAL TEST

THIS TEST WALKS A ONE, ZERO, ALL ONES THROUGH RPWC. WRITE REGISTER TO ZERO, AND ENSURE THAT REGISTER DID RESET. BITS TO TEST = BIT 0 - BIT 15.

TEST 5: RPBA STATIC FUNCTIONAL TEST

THIS TEST WALKS A ONE, ZERO, ALL ZER/A, ALL ONES THROUGH RPBA. ALLOW A DEVICE CLEAR AND CHECK THAT REGISTER DID RESET. BITS TO TEST = BIT 1 - BIT 15.

TEST 6: SC AND TRE TEST #1 (RH11 ONLY)

THIS TEST WILL TEST RPCS2, MXF (BIT 09) TO PROPERLY SET AND CLEAR. ONCE PROVEN FUNCTIONALLY CORRECT, SET THE BIT (RPCS2, MXF) = 1 AGAIN AND OBSERVE RPCS1, SC AND RPCS1, TRE. BOTH BITS SHOULD BE SET DUE TO MISSED TRANSFER (RPCS2, MXF - BIT09) BEING SET. SET RPCS2, CLR = 1 AND ENSURE THAT BITS CLEARED.

TEST 7: IR AND OR TEST

THIS TEST WILL TEST RPCS2, IR TO SET AND ENSURE THAT IT DOES WITHIN A FIXED TIME LIMIT. WHEN IT SETS, WRITE RPDB ONCE AND THEN TEST FOR RPCS2, OR TO SET WITHIN A FIXED TIME LIMIT.

TEST 8: RPDB READ/WRITE TEST #1

THIS TEST WRITES RPDB WITH 3 DATA PATTERNS INTERLOCKED WITH THE CORRECT TRANSITION OF RPCS2, IR. WHEN RPCS2, OR SET, READ RPDB AND CHECK DATA FOR CORRECTNESS.

TEST 9: RPDB READ/WRITE TEST #2

THIS TEST WRITES RPDB TWICE WITH THE SAME DATA PATTERN, INTERLOCKED WITH THE CORRECT TRANSITION OF RPCS2, IR. READ RPDB TWICE, INTERLOCKED WITH THE CORRECT TRANSITION OF RPCS2, OR, AND ENSURE THAT DATA IS CORRECT.

TEST 10: RPDB READ/WRITE TEST #3

THIS TEST WRITES DATA TO RPDB USING 8 DIFFERENT DATA PATTERNS, INTERLOCKED WITH THE CORRECT TRANSITIONS OF RPCS2, IR. READ RPDB AND VERIFY CORRECTNESS OF DATA, INTERLOCKED WITH THE CORRECT TRANSITIONS OF RPCS2, OR.

TEST 11: *MDPE, SC AND TRE TEST #2

THIS TEST WILL SET RPCS2, PAT=1. ENSURE THAT SC AND TRE IN RPCS1 = 0. ENSURE THAT RPCS2, MDPE DID NOT SET. WRITE RPDB ONCE AND VERIFY THAT RPCS1 SC AND TRE=1, DUE TO THE INVERTED (WRONG) PARITY. CHECK RPCS2, MDPE = 1. SET RPCS2, CLR AND ENSURE THAT BITS DID CLEAR.

TEST 12: *RPCS3 STATIC FUNCTIONAL TEST

THIS TEST WALKS A ONE, ZERO, ALL ZEROS, ALL ONES THROUGH RPCS3, FOR THE RANGE OF BITS 0-3 AND BIT 6. EXECUTE A DEVICE CLEAR AND ENSURE THAT REGISTER DID RESET.

TEST 13: *RPBAE STATIC FUNCTIONAL TEST

THIS TEST WALKS A ONE, ZERO, ALL ZEROS, ALL ONES THROUGH RPBAE. ISSUE DEVICE CLEAR AND ENSURE THAT REGISTER DID RESET.

TEST 14: *TEST DUPLICATED ADDRESS BIT 16

THIS TEST WILL RESET DEVICE AND SET RPCS1 A16 = 1, TEST THAT A16 ONLY SET. ENSURE THAT CORRESPONDING BIT IN RPBAE (BIT 0) ALSO = 1. ISSUE DEVICE CLEAR AND ENSURE THAT CORRESPONDING BITS DID CLEAR.

TEST 15: *TEST DUPLICATED ADDRESS BIT 17

THIS TEST WILL RESET THE DEVICE AND SET RPCS1 A17 = 1, TEST THAT A17 ONLY SET. ENSURE THAT CORRESPONDING BIT IN RPBAE (BIT 1) ALSO = 1. ISSUE DEVICE CLEAR AND ENSURE THAT CORRESPONDING BITS DID CLEAR.

TEST 16: TEST RPCS1 INTERRUPT ENABLE BIT

THIS TEST WILL RESET DEVICE AND SET RPCS1 IE (BIT 6) = 1. ENSURE THAT THE BIT UNDER TEST DID SET. ISSUE DEVICE CLEAR AND ENSURE THAT CORRESPONDING BITS DID CLEAR.

TEST 17: *TEST DUPLICATED INTERRUPT ENABLE BIT

THIS TEST SETS RPCS1, IE (BIT 06) = 1. ENSURE THAT RPCS3:IE ALSO SETS. ISSUE DEVICE CLEAR AND ENSURE THAT APPROPRIATE BITS CLEAR.

TEST 18: *IPCK0 TEST

THIS TEST WILL ISSUE DEVICE CLEAR, THEN SET IPCK0 (RPCS3 BIT 0)=1. CHECK THAT (RPCS2 IR (BIT 6) = 1) WITHIN A TIME PERIOD. WHEN IT DOES, WRITE 0'S (ONCE) INTO RPDB. THIS SHOULD FORCE (RPCS1 TRE AND SC = 1). READ RPDB WITH (RPCS2 OR = 1) AND (RPCS2 MDPE SHOULD = 1). DO SECOND INITIALIZATION AND DEVICE SHOULD CLEAR OUT.

TEST 19: *IPCK1 TEST

THIS TEST WILL ISSUE DEVICE CLEAR, THEN SET IPCK1 (RPCS3 BIT 1)=1. CHECK THAT (RPCS2 IR = 1) WITHIN A TIME PERIOD.

WHEN IT DOES, WRITE 0'S (ONCE) INTO RPDB. THIS SHOULD FORCE (RPCS1 TRE AND SC = 1). READ RPDB WITH (RPCS2 OR = 1) AND (RPCS2 MDPE (BIT 7) SHOULD = 1). DO SECOND INITIALIZATION AND DEVICE SHOULD CLEAR OUT.

TEST 20: *IPCK2 TEST

THIS TEST WILL ISSUE DEVICE CLEAR THEN SET IPCK2 (RPCS3 BIT 2)=1. CHECK THAT (RPCS2 IR = 1) WITHIN A TIME LIMIT. WHEN IT DOES, WRITE 0'S (TWICE) INTO RPDB. THIS SHOULD FORCE (RPCS1 TRE AND SC = 1). READ RPDB WITH (RPCS2 OR = 1) AND (RPCS2 MDPE SHOULD = 1). DO SECOND INITIALIZATION AND DEVICE SHOULD CLEAR OUT.

TEST 21: *IPCK3 TEST

THIS TEST WILL ISSUE DEVICE CLEAR, THEN SET IPCK3 (RPCS3 BIT 3)=1. CHECK THAT (RPCS2 IR = 1). WHEN IT DOES, WRITE RPDB WITH 0'S (TWICE). CHECK FOR SAME ERRORS AS 14 ABOVE. ISSUE DEVICE CLEAR AND ENSURE THAT DEVICE DID CLEAR OUT.

TEST 22: RHXX INTERRUPT TEST # 1

THIS TEST FORCES THE RHXX CONTROLLER TO INTERRUPT FROM THE HIGHEST PRIORITY LEVEL DOWN TO AND INCLUDING THE USER SPECIFIED PRIORITY LEVEL. IF THE DEVICE DOES ACTUALLY GENERATE AN INTERRUPT WHICH DOES GET RECOGNIZED BY THE PROGRAM, THE CONTROLLER PRIORITY CIRCUITRY IS SUSPECT.

TEST 23: RHXX INTERRUPT TEST #2

THIS TEST ASSUMES THAT SC=0 AND RPDS, ATA ALSO=0. IT THEN

ARMS THE CONTROLLER FOR AN INTERRUPT WHICH IT DOES NOT EXPECT TO RECEIVE. IF IT DOES, AND THERE IS NO APPARENT REASON FOR HAVING RECEIVED IT, IE SC=0 AND RDY DID NOT TOGGLE, THEN A HARDWARE MALFUNCTION MAY BE ASSUMED.

TEST 24: RHXX INTERRUPT TEST #3

THIS TEST SETS THE PRIORITY TO ONE LESS THAN THE USER SPECIFIED PRIORITY. IT THEN ARMS AN INTERRUPT AND FORCES THE CONTROLLER TO TOGGLE RDY. THESE ACTIONS SHOULD GENERATE AN INTERRUPT TO THE CORRECT VECTOR ADDRESS. IF THE INTERRUPT DOESN'T OCCUR, OR OCCURS AT THE WRONG ADDRESS, A HARDWARE MALFUNCTION IS ASSUMED.

TEST 25: BASIC DRIVE SELECT TEST

THIS TEST REQUIRES MANUAL INTERVENTION. IT WILL BE SKIPPED IF THE DIAGNOSTIC IS RUN IN UNATTENDED MODE, OR THE USER RESPONDS 'N' TO THE QUESTION: 'FOR DRIVE N, WILL YOU PLACE THE MASSBUS DISABLE SWITCH J12-S01 IN THE 'DISABLED' (DOWN) POSITION?' TO RUN THIS TEST, USE THE DISABLE SWITCH (J12-S01) TO DISCONNECT THE 'DRIVE UNDER TEST' FROM THE MASSBUS. NOW READ REG 06 (RPDT) AND VERIFY THAT NO DRIVE RESPONDS TO THIS DRIVE'S ADDRESS (REGISTER SHOULD = 0). WHEN THE TEST IS COMPLETE, THE USER WILL BE REQUIRED TO RE-ENABLE THE MASSBUS DISABLE SWITCH IN ORDER TO RUN ALL OTHER TESTS.

TEST 26: DEMAND AND TRANSFER TEST

THIS TEST WILL READ DRIVE TYPE REGISTER (SHOULD NOT EQUAL 0), BUT IGNORE DATA AND ERRORS. THE DRIVE TYPE REGISTER SHOULD NOT =0, ELSE THE TEST WILL FAIL.

TEST 27: UNIQUE UNIT UNDER TEST

THIS TEST WILL GUARANTEE THAT A UNIT UNDER TEST DOES NOT RESPOND TO ANY OTHER DRIVE ADDRESS ON THE MASSBUS.

WRITE DATA PATTERN 46(8) TO REGISTER 0 OF DRIVE UNDER TEST

WRITE 0'S TO REGISTER 0 OF ALL OTHER DRIVES ON THE BUS.

AFTER WRITING EACH DRIVE ON THE BUSS, READ AND VERIFY THAT REGISTER 0 IN THE DRIVE UNDER TEST HAS NOT BEEN MODIFIED.

TEST 28: READ DRIVE TYPE TEST

THIS TEST WILL READ DRIVE TYPE REGISTER AND ACCEPT 200/2, 24042. ANY OTHER VALUE WILL PRODUCE AN ERROR MESSAGE.

TEST 29: RPDA CONSTANT'S TEST

THIS TEST WILL WRITE-READ-VERIFY 1'S AND 0'S IN RPDA, AND AND FLOAT 1'S AND 0'S THROUGH RPDA.

TEST 30: PARITY BIT TRANSITION TEST

THIS TEST WILL VERIFY THAT PARITY BIT SENT FROM DRIVE TO RHXX IS

NOT STUCK AT 1 OR 0. (USE RPDA REGISTER),
WRITE 000000 => P=1 READ/CHECK FOR PARITY
(SHOULD NOT GET A CONTROLLER PARITY ERROR),
WRITE 000001 => P=0 READ/CHECK FOR PARITY
(SHOULD NOT GET A CONTROLLER PARITY ERROR)

TEST 31: FLOATING DATA PARITY TEST

THIS TEST WILL WRITE ALL 1'S AND ALL 0'S, THEN FLOAT 1'S AND 0'S
THROUGH RPDA, READING RPER1 AFTER EACH WRITE, AND
VERIFY THAT NO PARITY ERROR SET IN RPER1.

TEST 32: REGISTER SELECT TEST 1

THIS TEST WILL WRITE EACH WRITEABLE REGISTER WITH THE PATTERN
70(8)
READ IT BACK AND VERIFY FOR CORRECTNESS. REGISTERS USED IN THE
TEST ARE; RPCS1, RPLA, RPDC, RPOF.

TEST 33: REGISTER SELECT TEST 2

ENSURE THAT EACH WRITEABLE REGISTER HAS A UNIQUE ADDRESS.
WRITEABLE REGISTERS 0, 5, 11, 12
DATA = 70(8) REF REGISTERS,
DATA = 0 OTHER REGISTERS
WRITE 70(8) INTO SOME MASSBUS WRITEABLE REGISTER
WRITE 0'S TO EVERY OTHER ADDRESSABLE REGISTER ON THE MASSBUS.
AFTER EACH WRITE (STOP-2), READ AND VERIFY THAT THE REFERENCE
REGISTER HAS NOT BEEN MODIFIED (IF SO, IDENTIFY CONTROL LINE PAIR BY
REGISTER NUMBERS)
REPEAT 1 - 3 FOR ALL WRITEABLE REGISTERS.

TEST 34: DATA TEST RPMR1

THIS TEST WILL WRITE, READ/VERIFY THE MAINTENANCE REGISTER (RPMR1)
USING PATTERNS:
ALL 0'S
ALL 1'S
FLOAT 0'S
FLOAT 1'S

POSSIBLE FAULT: J8

TEST 35: MASSBUS INITIALIZE DRIVE CLEAR TEST

THIS TEST WILL SET RPMR1: DMD = 1, THEN ISSUE RPCS2, CLR. CHECK
DMD = 0. IF 0, MARK THE EVENT. SET DMD = 1 AGAIN,
THEN ISSUE DRIVE CLEAR COMMAND. VERIFY THAT DMD
DID AGAIN CLEAR.
IF DMD DIDN'T CLEAR WITH EITHER RPCS2, CLR OR
DRIVE CLEAR COMMAND, POSSIBLE FAULTS ARE: J12 OR J8.
IF DMD DIDN'T CLEAR WITH RPCS2, CLR, BUT DID CLEAR
WITH DRIVE CLEAR COMMAND, POSSIBLE FAULTS ARE J12,
CABLE, OR THE RHXX.
IF DMD DIDN'T CLEAR WHEN DRIVE CLEAR COMMAND WAS
EXECUTED, BUT DID CLEAR WHEN RPCS2, CLR WAS ASSERTED,

POSSIBLE FAULTS ARE J11, OR J12.

TEST 36: PARITY INITIALIZE TEST

THIS TEST WILL CHECK PARITY FOLLOWING MASSBUS INITIALIZE.
PROGRAM WILL THEN READ RPER1 AND VERIFY THAT RPER1, PAR AND ILF
ARE CLEAR.

TEST 37: PARITY ERROR DETECTION TEST

IMPLIED IN THIS TEST IS THAT THE PREVIOUS TEST DID
SUCCESSFULLY PASS. THIS TEST CREATES A 'DOUBLE
FAULT', WHICH IS USED TO DETERMINE THAT THE PARITY
DETECTION CIRCUITS WORK PROPERLY, AND THAT ANY COMMAND IS
REJECTED WHEN A PARITY ERROR IS DETECTED.
THE PROGRAM WILL SET RPCS2, PAT AND ISSUE A KNOWN ILLEGAL COMMAND,
CHECK RPCS1 AND VERIFY THAT GO (BIT 0) DID RESET
READ RPER1 AND CHECK FOR FOLLOWING:

1. IF RPER1, PAR IS THE ONLY ERROR BIT SET,
THERE WAS NO ERROR,
2. IF RPER1, ILF IS THE ONLY ERROR BIT FOUND,
REPLACE J12,
3. IF RPER1, ILF AND PAR ARE BOTH SET OR BOTH
CLEAR, REPLACE EITHER J9, J10, OR J12.
(THERE IS A GOOD CHANCE THAT THE 2901 IS BROKEN.)

TEST 38: CORRECT PARITY TEST

THIS TEST CHECKS A VARIETY OF DATA PATTERNS AND
VERIFIES THAT NO PARITY ERRORS OCCURRED. THE OPERATING
SEQUENCE IS AS FOLLOWS:

1. LOAD DATA PATTERNS INTO THE RPDA REGISTER,
2. READ THE RPDA REGISTER AND ENSURE THAT RHXX
DOES NOT DETECT ANY PARITY ERRORS.
PATTERNS:
ALL ONES
ALL ZEROS
FLOAT 1'S
FLOAT 0'S

TEST 39: CLEAR COMPOSITE ERROR BIT TEST

THIS TEST ENSURES THAT RPDS, ERR IS NOT STUCK AT A
ONE. IF IT IS (1) AND RPER1, RPER2 AND RPER3 ARE 0, A PERMANENT
ERROR IS REPORTED, ELSE A COMPOSITE ERROR IS REPORTED. OPERATING
SEQUENCE IS AS FOLLOWS:

1. ISSUE A CONTROLLER CLEAR.
2. READ RPDS AND ENSURE THAT ERR (BIT 14) IS CLEAR.

TEST 40: SET AND CLEAR COMPOSITE ERROR TEST

THIS TEST ENSURES THAT COMPOSITE ERROR RPDS, BIT
14 WILL SET AND CLEAR. SEQUENCE IS AS FOLLOWS:

1. SET PAT IN RPCS2, THEN WRITE DATA TO RPDA. THIS SHOULD CAUSE A PARITY ERROR.
2. READ RPDS AND CHECK THAT RPDS, ERR=1. ALSO CHECK THAT RPER1, PAR IS ALSO SET.
3. ISSUE A CONTROLLER CLEAR.
4. READ RPDS AND ENSURE THAT ERR (BIT 14)=0. READ RPER1 AND ENSURE THAT PAR (BIT 3)=0.

TEST 41: CLEAR ATA TEST

THIS TEST ENSURES THAT RPDS, ATA (BIT 15) IS NOT STUCK AT 1. SEQUENCE IS AS FOLLOWS:

1. ISSUE CONTROLLER CLEAR.
2. READ RPDS, ATA AND VERIFY THAT IT IS CLEAR.

TEST 42: SET AND CLEAR ATA TEST

THIS TEST, BY FORCING AN ERROR, TESTS THE CORRECT FUNCTIONALITY OF RPDS, ATA. SEQUENCE FOLLOWS:

1. SET RPCS2, PAT (BIT 04)=1, THEN WRITE DATA TO RPDA, FORCING A PARITY ERROR.
2. READ RPDS AND CHECK ATA (BIT 15) AND ERR (BIT 14) TO BOTH BE SET.
3. ISSUE A DRIVE CLEAR.
4. READ RPDS AND VERIFY THAT ATA (BIT 15) AND ERR (BIT 14) DID BOTH CLEAR.
5. REPEAT STEP 1.
6. SET RPCS2, CLR (BIT 5).
7. REPEAT STEP 4.

TEST 43: CLEAR RPAS TEST

THIS TEST ENSURES THAT NO BITS ARE SET IN RPAS. SEQUENCE IS AS FOLLOWS:

1. SET RPCS2, CLR (BIT 5)=1.
2. READ RPAS AND ENSURE THAT IT IS CLEAR.

NOTE

IF THIS TEST IS FAILED, THE CONTENTS OF THE PSEUDO REGISTER (RPAS) WILL BE PRINTED OUT, AND THE CONTENTS OF THE STATUS REGISTER FOR EVERY OTHER DRIVE ON THE MASSBUS. IF THE CAUSE OF THE FAILURE IS ANOTHER DRIVE ON THE BUS, EACH DRIVE MAY NEED TO BE POWERED DOWN ONE AT A TIME, UNTIL THE BAD DRIVE IS FOUND.

TEST 44: RPAS CORRECT POSITION DECODE TEST

THIS TEST CHECKS FOR THE CORRECT POSITION OF THE BIT DECODED IN THE PSEUDO REGISTER. SEQUENCE OF TEST FOLLOWS:

1. SET RPCS2, CLR (BIT 05)=1,
2. SET PAT IN RPCS2, THEN WRITE DATA TO RPDA, FORCING A PARITY ERROR,
3. READ RPAS AND VERIFY THAT BIT POSITION IS CORRECT FOR THE DRIVE UNDER TEST. ALSO VERIFY THAT RPDS, ATA AND ERR IS ALSO SET,
4. WRITE RPAS WITH THE CORRECT BIT FOR THE DRIVE UNDER TEST.
5. READ RPAS AND VERIFY THAT IT DID CLEAR. READ RPDS AND ENSURE THAT ATA CLEARED, BUT ERR DID NOT CLEAR.

TEST 45: RPAS UNIQUE POSITION DECODE TEST

THIS TEST VERIFIES THE UNIQUENESS OF THE PSEUDO REGISTER'S BIT WHICH CORRESPONDS TO THE UNIT-UNDER-TEST. SEQUENCE IS AS FOLLOWS:

1. SET RPCS2, CLR=1,
2. SET RPCS2, PAT=1, AND WRITE DATA TO RPDA, FORCING YET ANOTHER PARITY ERROR,
3. READ RPAS AND ENSURE THAT THE PROPER BIT IS SET. ENSURE THAT RPDS, ATA AND ERR ARE ALSO SET.
4. WRITE THE PSEUDO REGISTER WITH THE COMPLIMENT OF THE EXPECTED DATA IN ITEM 3,
5. READ RPAS AND ENSURE THAT THE BIT FOUND IN ITEM 3 DID NOT CLEAR. VERIFY THAT RPDS, ATA AND ERR DID NOT CLEAR.

TEST 46: CLEAR MASSBUS ATTN TEST

THIS TEST VERIFIES THAT MASSBUS ATTN IS NOT STUCK AT A 1. SEQUENCE IS AS FOLLOWS:

1. SET RPCS2, CLR=1,
2. READ RPCS1 AND VERIFY THAT SC (BIT 15) DID NOT SET (FOR RH20, ENSURE THAT ATTN=0).

NOTE

IF ANOTHER DRIVE IS SUSPECTED TO BE CAUSING THE MALFUNCTION, EACH DRIVE ON THE BUS MUST BE POWERED DOWN, ONE AT A TIME, UNTIL THE OFFENDING UNIT IS LOCATED.

TEST 47: SET AND CLEAR MASSBUS ATTN

THIS TEST VERIFIES THAT THE MASSBUS LINE 'ATTN' CAN BE SET AND CLEARED. SEQUENCE FOLLOWS:

1. SET RPCS2, PAT=1, AND WRITE RPDA WITH DATA, FORCING A PARITY ERROR,
2. READ RPCS1, SC (BIT 15) AND VERIFY THAT IT SET. (USE 'ATTN' IN RH20.),
3. SET RPCS2, CLR = 1, AND ENSURE THAT RPCS1, SC DID CLEAR.

TEST 48: READ-IN-PRESET COMMAND TEST

THIS IS THE FIRST TEST TO ISSUE A VALID COMMAND TO THE RP07. IT ENSURES THAT COMPOSITE ERROR DOES NOT SET AS A RESULT OF THE COMMAND EXECUTION. SEQUENCE FOLLOWS:

1. SET RPCS2, CLR=1,
2. ISSUE READ-IN-PRESET COMMAND,
3. VERIFY THAT RPDS, ERR=0.

TEST 49: RHXX UNIQUE REGISTER TEST

THIS TEST LOADS EACH WRITABLE RHXX REGISTER WITH A UNIQUE DATA PATTERN, AND EXPECTS THAT THE PATTERN WILL NOT CHANGE AS FURTHER REGISTERS ARE WRITTEN.

TEST 50: RPLA STATIC TEST

THIS TEST CHECKS RPLA FOR EVERY VALID SECTOR ADDRESS. IF, WHILE USING A MAINTENANCE TIMER, A SECTOR ADDRESS IS NOT FOUND IN TIME, AN ERROR IS REPORTED.

TEST 51: RPMR1 - RPER2 WRAP AROUND TEST

THIS TEST WRITE RPMR1 - LOW BYTE AND, AFTER WAITING A REASONABLE AMOUNT OF TIME FOR HARDWARE AND FIRMWARE LATENCY, EXPECTS RPER2, LOW BYTE, TO CONTAIN THE SAME DATA AS JUST WRITTEN INTO RPMR1. IF THE DATA IS NOT THE SAME, A HARDWARE MALFUNCTION MAY BE ASSUMED.

TEST 52: ERROR LOG DUMP

THIS ROUTINE UNLOADS THE RP07 INTERNAL ERROR LOG WHEN IT WAS REQUESTED BY THE USER. CONTENTS ARE NOT CHECKED, JUST REPORTED TO THE USER.

TEST 53: COMPOSITE MICROCODE TEST

THIS TEST IS A COMPOSITE TEST WHICH RUNS ALL OF THE AVAILABLE RP07 MICRODIAGNOSTICS. THE ROUTINE EMULATES THE RP07 POWER UP SEQUENCE. ERROR CODES ARE REPORTED IN HEX AS ARE THE ROUTINE NUMBERS WHICH WERE RUNNING AT THE TIME OF THE FAILURE.

TEST 54: READ-IN-PRESET FUNCTIONAL TEST

THIS TEST SETS UP RPDC, RPDA = -1, AND SETS RPOF:FMT16=1. IT THEN ISSUES A RIP AND EXPECTS RPDC AND RPDA TO BE ZERO. IT ALSO EXPECTS RPDC AND RPDA TO BE ZERO. IT ALSO EXPECTS RPOF.FMT TO BE RESET.

TEST 55: COMMAND REJECT TEST

THIS TEST, INVERTS PARITY AND ISSUES A RIP COMMAND. IF THE COMMAND EXECUTED WITH A PARITY ERROR PRESENT, IE RPDC OR RPDA=0 OR FMT16=0, THEN A HARDWARE MALFUNCTION MAY BE ASSUMED.

TEST 56: DATA TEST # 1

THIS TEST EXECUTES IN THE FOLLOWING MANNER;
READ TRACK DESCRIPTORS FROM ANYWHERE ON THE

PACK. THE PURPOSE IS TO ENSURE THAT THE DATA LINES TOGGLE. REPEAT PROCESS UNTIL ALL TESTABLE LINES HAVE TOGGLED (BITS 0 THROUGH 15). IGNORE ALL ERRORS; THEY MAY BE CAUSED BY CORRUPTED TRACK DESCRIPTOR RECORDS.

IF AFTER READING EVERY TRACK AND CYLINDER ON THE DRIVE, ALL DATA LINES STILL HAVE NOT TOGGLED FROM 0 TO 1, AN ERROR WILL BE REPORTED.

TEST 57: DATA TEST #2

THIS TEST EXECUTES IN THE FOLLOWING MANNER:

1. ATTEMPT TO ACCESS A C.E. CYLINDER WITHOUT SETTING RPER1:DMD (BIT 15). EXPECT RPER1, IAE TO SET.
2. ISSUE A RECAL COMMAND, THEN CHECK RPCC = 0.
3. ATTEMPT TO ACCESS A C.E. CYLINDER WITH RPER1: DMD=1, VERIFY CORRECT POSITION BY COMPARING RPDC WITH RPCC.

TEST 58: DATA TEST #3

THIS TEST EXECUTES IN THE FOLLOWING MANNER:

1. ATTEMPT TO FIND A DEFECT FREE C.E. TRACK BY DETERMINING PRESENCE OF A TD WITH NULL SET INFORMATION. IF ONE IS NOT FOUND DISPATCH MESSAGE STATING THAT C.E. TRACK #0 WILL BE FORMATTED PRIOR TO PERFORMING OPERATION.
2. FORMAT TRACK AND VERIFY SAME (USING NULLSET INFORMATION).
3. PERFORM SIMPLE DATA TESTING ON THE FORMATTED TRACK.

SIMPLE DATA TESTING TO INCLUDE:

1. WRITING DATA PATTERNS WITHOUT ERROR. RPWC WILL BE TESTED TO = 0, RPBA WILL BE TESTED TO INCREMENT.
2. WRITE CHECK DATA FORCING A WRITE CHECK ERROR. BUFFER POSITION OF THE ERROR WILL BE VERIFIED USING THE RPBA REGISTER.
3. WRITE CHECK DATA WITHOUT ERROR.
4. ISSUE A RIP COMMAND, FOLLOWED BY A READ HEADER AND DATA COMMAND ON CYL 630 TRACK JUST FORMATTED. VERIFY THAT RPER1, FER DID SET.

TEST 59: RPER1 NEGATIVE BIT TEST

THIS TEST ISSUES AN ILLEGAL FUNCTION AND EXPECTS RPER1, ILF TO SET. IT THEN ISSUES A COMMAND WITH THE WRONG SECTOR, WRONG TRACK ADDRESS AND EXPECTS RPER1, IAE TO SET AFTER EACH COMMAND.

TEST 60: USER SELECTED MICRODIAGNOSTIC ROUTINE

THIS TEST, IF MANUAL INTERVENTION IS ALLOWED AND THE USER, THROUGH USE OF THE SOFTWARE QUESTIONS, DID ANSWER 'YES' TO THE QUESTION 'DO YOU WANT TO SELECT ONE MICRODIAGNOSTIC FOR EXECUTION?', WILL

ALLOW THE USER TO SPECIFY A MICRODIAGNOSTIC ROUTINE FOR EXECUTION. ONLY LEGAL 'HEX' CHARACTERS WILL BE ACCEPTED AS INPUT. ANY PAIR OF HEX CHARACTERS WILL BE ACCEPTED. IT IS UP TO THE USER TO INSURE THAT A VALID ROUTINE IS SELECTED, OTHERWISE THE DRIVE WILL PRODUCE AN ERROR FOR AN INVALID ROUTINE SELECTION. THIS ROUTINE IS INTENDED PRIMARILY FOR DEBUG OF A PROBLEM, NOT SYSTEM ACCEPTANCE.

ONE APPLICATION OF THIS ROUTINE COULD BE TO LOOP 'FOREVER' ON A USER SELECTED MICRO DIAGNOSTIC ROUTINE, POSSIBLY TO DETECT INTERMITTENT PROBLEMS. THE COMMAND STRING TO PERFORM THIS WOULD BE AS FOLLOWS: 'STA/TEST:60/FLA:<OPTION LIST>'. THE OPTION IN THIS CASE WOULD BE 'LOT' (LOOP ON TEST). TO CHANGE THE ROUTINE, THE USER WOULD AGAIN USE THE 'START' COMMAND: 'STA/TEST:60/FLA:LOT'. THIS ACTION WOULD PERMIT THE USER TO CHANGE THE ROUTINE SELECTED FOR EXECUTION. ANY OTHER COMMAND, IE 'RES' OR 'CON', ETC, WILL USE THE ROUTINE PREVIOUSLY SELECTED BY THE USER, AND WILL NOT PERMIT THE USER TO CHANGE THE SELECTED ROUTINE.

TEST 61: NOP FUNCTIONAL TEST

THIS TEST VERIFIES THE CORRECT FUNCTIONALITY OF THE NOP COMMAND. INITIALLY, THE TEST VERIFIES THAT RPDS, DRY = 1, THEN ISSUES THE COMMAND. RPDS, DRY IS AGAIN CHECKED TO BE SET WITHIN A FIXED TIME LIMIT. IF THE LIMIT EXPIRES AND RPDS, DRY IS NOT SET, A 'DRIVE HUNG' MESSAGE WILL BE GENERATED. COMPOSITE ERROR AND TRANSFER ERROR ARE ALSO CHECKED AND VERIFIED TO NOT BE ASSERTED.

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VERSION (CZRJM-A-0)

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

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1          ;*LAST REVISION 01-JAN-83
2
365         .TITLE CZRJMA0 RP07 FE/HOST ISOLATOR
367         .SBTTL  PROGRAM HEADER
393
395 000000         .ENABL  AMA,ABS
396                =      2000
398
400         :++
401         : THE PROGRAM HEADER IS THE INTERFACE BETWEEN
402         : THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
403         :--
404
406
423
427 002000         L$NAME::          ;DIAGNOSTIC NAME
002000         .ASCII  /C/
002001         .ASCII  /Z/
002002         .ASCII  /R/
002003         .ASCII  /J/
002004         .ASCII  /M/
002005         .BYTE   0
002006         .BYTE   0
002007         .BYTE   0
002010         L$REV::          ;REVISION LEVEL
002010         .ASCII  /A/
002011         L$DEPO::          ;0
002011         .ASCII  /0/
002012         L$UNIT::          ;NUMBER OF UNITS
002012 000001         .WORD   T$PTHV
002014         L$TIML::          ;LONGEST TEST TIME
002014 000200         .WORD   200
002016         L$HPCP::          ;POINTER TO H.W. QUES.
002016 044762         .WORD   L$HARD
002020         L$SPCP::          ;POINTER TO S.W. QUES.
002020 045100         .WORD   L$SOFT
002022         L$HPTP::          ;PTR. TO DEF. H.W. PTABLE
002022 002320         .WORD   L$HW
002024         L$SPTP::          ;PTR. TO S.W. PTABLE
002024 002332         .WORD   L$SW
002026         L$LADP::          ;DIAG. END ADDRESS
002026 045656         .WORD   L$LAST
002030         L$STA::          ;RESERVED FOR APT STATS
002030 000000         .WORD   0
002032         L$CO::          ;
002032 000000         .WORD   0
002034         L$DTYP::          ;DIAGNOSTIC TYPE
002034 000000         .WORD   0
002036         L$APT::          ;APT EXPANSION
002036 000000         .WORD   0
002040         L$DTP::          ;PTR. TO DISPATCH TABLE
002040 002124         .WORD   L$DISPATCH
002042         L$PRIO::          ;DIAGNOSTIC RUN PRIORITY
002042 000000         .WORD   0
002044         L$ENVI::          ;FLAGS DESCRIBE HOW IT WAS SETUP
002044 000000         .WORD   0
002046         L$EXP1::          ;EXPANSION WORD
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002046	000000			
002050		LSMREV::	.WORD 0	
002050	003			;SVC REV AND EDIT #
002051	003		.BYTE C\$REVISION	
002052			.BYTE C\$EDIT	
002052	000000	LSEF::		;DIAG. EVENT FLAGS
002054	000000		.WORD 0	
002056		LSSPC::	.WORD 0	
002056	000000		.WORD 0	
002060		L\$DEVP::	.WORD 0	; POINTER TO DEVICE TYPE LIST
002060	006354		.WORD L\$DVTYP	
002062		L\$REPP::		;PTR. TO REPORT CODE
002062	000000		.WORD 0	
002064		L\$EXP4::	.WORD 0	
002064	000000		.WORD 0	
002066		L\$EXP5::	.WORD 0	
002066	000000		.WORD 0	
002070		L\$AUT::		;PTR. TO ADD UNIT CODE
002070	000000		.WORD 0	
002072		L\$DUT::		;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	006362		.WORD L\$DESC	
002100		L\$LOAD::		;GENERATE SPECIAL AUTOLOAD EMT
002100	104035		EMT E\$LOAD	
002102		L\$ETP::		;POINTER TO ERR_TBL
002102	000000		.WORD 0	
002104		L\$ICP::		;PTR. TO INIT CODE
002104	020652		.WORD L\$INIT	
002106		L\$CCP::		;PTR. TO CLEAN-UP CODE
002106	021350		.WORD L\$CLEAN	
002110		L\$ACP::		;PTR. TO AUTO CODE
002110	021346		.WORD L\$AUTO	
002112		L\$PRT::		;PTR. TO PROTECT TABLE
002112	020644		.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.
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002122	000075	.WORD	61
002124		L\$DISPATCH::	
002124	021514	.WORD	T1
002126	021612	.WORD	T2
002130	022000	.WORD	T3
002132	022142	.WORD	T4
002134	022302	.WORD	T5
002136	022444	.WORD	T6
002140	022774	.WORD	T7
002142	023270	.WORD	T8
002144	023442	.WORD	T9
002146	023602	.WORD	T10
002150	023772	.WORD	T11
002152	024152	.WORD	T12
002154	024334	.WORD	T13
002156	024510	.WORD	T14
002160	025034	.WORD	T15
002162	025360	.WORD	T16
002164	025540	.WORD	T17
002166	025732	.WORD	T18
002170	026230	.WORD	T19
002172	026526	.WORD	T20
002174	027044	.WORD	T21
002176	027362	.WORD	T22
002200	027634	.WORD	T23
002202	030102	.WORD	T24
002204	030322	.WORD	T25
002206	030514	.WORD	T26
002210	030624	.WORD	T27
002212	031016	.WORD	T28
002214	031154	.WORD	T29
002216	031322	.WORD	T30
002220	031446	.WORD	T31
002222	031600	.WORD	T32
002224	031736	.WORD	T33
002226	032136	.WORD	T34
002230	032302	.WORD	T35
002232	032562	.WORD	T36
002234	032720	.WORD	T37
002236	033142	.WORD	T38
002240	033324	.WORD	T39
002242	033454	.WORD	T40
002244	033732	.WORD	T41
002246	034032	.WORD	T42
002250	034320	.WORD	T43
002252	034424	.WORD	T44
002254	034636	.WORD	T45
002256	035110	.WORD	T46
002260	035206	.WORD	T47
002262	035324	.WORD	T48

002264	035502	.WORD	T49
002266	035760	.WORD	T50
002270	036232	.WORD	T51
002272	036732	.WORD	T52
002274	037702	.WORD	T53
002276	040130	.WORD	T54
002300	040364	.WORD	T55
002302	040624	.WORD	T56
002304	041156	.WORD	T57
002306	041676	.WORD	T58
002310	044004	.WORD	T59
002312	044322	.WORD	T60
002314	044614	.WORD	T61

```
1      .SBTTL  DEFAULT HARDWARE P-TABLE
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5      ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
6      ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
7      ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES.
8      ;--
9      002316  000004      .WORD  L10000-L$HW/2
10     002320
11     002320
12     002320  176700      L$HW::
13     002322  000254      DFPTBL::
14     002324  000240      .WORD  176700      ;RPCS1 BASE REGISTER ADDRESS
15     002326  000000      .WORD  254        ;VECTOR ADDRESS
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25     002330      .WORD  240        ;BR LEVEL 5 DEVICE
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1      .SBTTL  SOFTWARE P-TABLE
2
3      ;++
4      ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
5      ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
6      ;--
7
8 002330 000005      .WORD  L10001-L$SW/2
   002332
   002332
9 002332 000001      L$SW::
   SFPTBL::
   SWTTST: .WORD  1      ;USED TO SELECT MASSBUS INTERFACE TEST;
10                                     ;DISABLED= 0, ENABLED= 1
11 002334 000001      ERRDMP: .WORD  1      ;USED TO ENABLE THE RP07 ERROR LOG DUMP
12 002336 000000      SELTRK: .WORD  0      ;USED TO SELECT A TRACK ADDRESS IN THE MICRO-
13                                     ;DIAGNOSTIC TEST
14 002340 000000      TRAKAD: .WORD  0      ;USED TO GET THE USER TRACK ADDRESS
15 002342 000000      SELRUN: .WORD  0      ;USED TO DETERMINE IF USER SELECTED A MICRO-
16                                     ;DIAGNOSTIC TEST
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25 002344      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

00C040	PRI01== 40
000000	PRI00== 0
	: OPERATOR FLAG BITS
000004	EVLE== 4
000010	LOT== 10
000020	ADR== 20
000040	IDU== 40
000100	ISR== 100
000200	UAM== 200
000400	BOE== 400
001000	PNT== 1000
002000	PRI== 2000
004000	IXE== 4000
010000	IBE== 10000
020000	IER== 20000
040000	LOE== 40000
100000	HOE== 100000

```

1      .SBTTL  RHXX REGISTERS
2
3      ;CONTROL AND STATUS REGISTER 1 (RPCS1)
4
5      000100      IE      = 100      ;INTERRUPT ENABLE (BIT #6)
6      000200      RDY     = 200      ;READY (BIT #7)
7      000400      A16     = 400      ;HIGH ORDER BUS ADDRESS BIT (BIT #8)
8      001000      A17     =1000     ;HIGH ORDER BUS ADDRESS BIT (BIT #9)
9      002000      PSEL    =2000     ;PORT SELECT (BIT #10)
10     020000      MCPE    =20000    ;MASSBUS PARITY ERROR (BIT #13)
11     040000      TRE     =40000    ;TRANSFER ERROR (BIT #14)
12     100000      SC      =100000   ;SPECIAL CONDITION (BIT #15)
13
14
15     ;WORD COUNT REGISTER (RPWC)
16     ;EACH BIT IS CALLED BY BIT NUMBER
17
18
19     ;BUS ADDRESS REGISTER (RPBA)
20     ;EACH BIT IS CALLED BY BIT NUMBER
21
22
23     ;CONTROL AND STATUS REGISTER 2 (RPCS2)
24
25     000001      US1     = 1      ;UNIT SELECT (BIT #0)
26     000002      US2     = 2      ;UNIT SELECT (BIT #1)
27     000004      US4     = 4      ;UNIT SELECT (BIT #2)
28     000010      BAI     = 10     ;BUS ADDRESS INCREMENT INHIBIT (BIT #3)
29     000020      PAT     = 20     ;MASSBUS PARITY INHIBIT (BIT #4)
30     000040      CLR     = 40     ;CLEAR (BIT #5)
31     000100      IR      = 100    ;INPUT READY (BIT #6)
32     000200      OR       = 200    ;OUTPUT READY (BIT #7)
33     000400      MDPE    = 400    ;MASSBUS PARITY ERROR (BIT #8)
34     001000      MXF     = 1000   ;MISSED TRANSFER ERROR (BIT #9)
35     002000      PGE     = 2000   ;PROGRAM ERROR (BIT #10)
36     004000      NEM     = 4000   ;NON EXISTENT MEMORY (BIT #11)
37     010000      NED     = 10000  ;NON EXISTENT DRIVE (BIT #12)
38     020000      UPE     = 20000  ;UNIBUS PARITY ERROR
39     040000      WCE     = 40000  ;WRITE CHECK ERROR (BIT #14)
40     100000      DLT     = 100000 ;DATA LATE (BIT #15)
41
42
43     ;DATA BUFFER REGISTER (RPDB)
44     ;EACH BIT IS DEFINED BY BIT NUMBER
45
46     .SBTTL  RP07 REGISTERS
47
48     ;CONTROL AND STATUS 1 (#00)
49
50     000001      GO      = 1      ;GO BIT (BIT #0)
51     000002      F1      = 2      ;FUNCTION CODE BIT #1
52     000004      F2      = 4      ;FUNCTION CODE BIT #2
53     000010      F3      = 10     ;FUNCTION CODE BIT #3
54     000020      F4      = 20     ;FUNCTION CODE BIT #4
55     000040      F5      = 40     ;FUNCTION CODE BIT #5
56     004000      DVA     = 4000   ;DEVICE AVAILABLE (BIT #11)
57

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61      000001
62      000002
63      000004
64      000100
65      000200
66      000400
67      001000
68      002000
69      004000
70      010000
71      020000 -
72      040000
73      100000
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78      000001
79      000002
80      000004
81      000010
82      000020
83      000040
84      000100
85      000200
86      000400
87      001000
88      002000
89      004000
90      010000
91      020000
92      040000
93      100000
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98      100000
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103      000001
104      000002
105      000004
106      000010
107      000020
108      000040
109      000100
110      000200
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;DRIVE STATUS REGISTER (RPDS <#01>)
OM = 1      ;OFFSET MODE (BIT #0)
EWN = 2     ;EARLY WARNING (BIT #1)
ILEV = 4    ;INTERLEAVING AVAILABLE (BIT #2)
VV = 100    ;VOLUME VALID (BIT #6)
DRY = 200   ;DATA READY (BIT #7)
DPR = 400   ;DRIVE PRESENT (BIT #8)
PGM = 1000  ;PROGRAMABLE (BIT #9)
LBT = 2000  ;LAST BLOCK TRANSFERRED (BIT #10)
WRL = 4000  ;WRITE LOCKED (BIT #11)
MOL = 10000 ;MEDIUM ON LINE (BIT #12)
PIP = 20000 ;POSITIONER IN PROGRESS (BIT #13)
ERR = 40000 ;COMPOSITE ERROR (BIT #14)
ATA = 100000;ATTENTION ACTIVE (BIT #15)

;ERROR REGISTER #1 (RPER1 <#02>)
ILF = 1      ;ILLEGAL FUNCTION (BIT #0)
ILR = 2      ;ILLEGAL REGISTER (BIT #1)
RMR = 4      ;REGISTER MODIFICATION REFUSED (BIT #2)
PAR = 10     ;PARITY ERROR (BIT #3)
FER = 20     ;FORMAT ERROR (BIT #4)
WCF = 40     ;WRITE CLOCK FAIL (BIT #5)
ECH = 100    ;ECC HARD ERROR (BIT #6)
HCE = 200    ;HEADER COMPARE ERROR (BIT #7)
HCRC = 400   ;HEADER CRC ERROR (BIT #8)
AOE = 1000   ;ADDRESS OVERFLOW ERROR (BIT #9)
IAE = 2000   ;INVALID ADDRESS ERROR (BIT #10)
WLE = 4000   ;WRITE LOCK ERROR (BIT #11)
DTE = 10000  ;DRIVE TIMING ERROR (BIT #12)
OPI = 20000  ;OPERATION INCOMPLETE (BIT #13)
UNS = 40000  ;DRIVE UNSAFE (BIT #14)
DCK = 100000;DATA CHECK ERROR (BIT #15)

;DIAGNOSTIC MAINTAINABILITY REGISTER (RPMR1 <#03>)
DMD = 100000 ;DIAGNOSTIC MODE (BIT #15)

;ATTENTION SUMMARY PSEUDO REGISTER (RPAS <#04>)
AT0 = 1      ;DEVICE 0 (BIT #0)
AT1 = 2      ;DEVICE 1 (BIT #1)
AT2 = 4      ;DEVICE 2 (BIT #2)
AT3 = 10     ;DEVICE 3 (BIT #3)
AT4 = 20     ;DEVICE 4 (BIT #4)
AT5 = 40     ;DEVICE 5 (BIT #5)
AT6 = 100    ;DEVICE 6 (BIT #6)
AT7 = 200    ;DEVICE 7 (BIT #7)

;DESIRED SECTOR/TRACK ADDRESS REGISTER (RPDA <#05>)
;EACH BIT IS CALLED BY BIT NUMBER
  
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115			
116			
117		;DRIVE TYPE REGISTER (RPDT <#06>)	
118			
119	000001	DRT0 = 1	;DRIVE TYPE NUMBER (BIT #0)
120	000002	DRT1 = 2	;DRIVE TYPE NUMBER (BIT #1)
121	000004	DRT2 = 4	;DRIVE TYPE NUMBER (BIT #2)
122	000010	DRT3 = 10	;DRIVE TYPE NUMBER (BIT #3)
123	000020	DRT4 = 20	;DRIVE TYPE NUMBER (BIT #4)
124	000040	DRT5 = 40	;DRIVE TYPE NUMBER (BIT #5)
125	000100	DRT6 = 100	;DRIVE TYPE NUMBER (BIT #6)
126	000200	DRT7 = 200	;DRIVE TYPE NUMBER (BIT #7)
127	000400	DRT8 = 400	;DRIVE TYPE NUMBER (BIT #8)
128	004000	DRQ = 4000	;DRIVE REQUEST REQUIRED (BIT #11)
129	020000	MOH = 20000	;MOVING HEAD TYPE DRIVE (BIT #13)
130	040000	TAP = 40000	;TAPE DRIVE (BIT #14)
131	100000	NBA = 100000	;NOT BLOCK ADDRESSED (BIT #15)
132			
133			
134		;LOOK AHEAD REGISTER (RPLA <#07>)	
135			
136	000100	SC1 = 100	;SECTOR COUNT FIELD 1 (BIT #6)
137	000200	SC2 = 200	;SECTOR COUNT FIELD 2 (BIT #7)
138	000400	SC4 = 400	;SECTOR COUNT FIELD 4 (BIT #8)
139	001000	SC8 = 1000	;SECTOR COUNT FIELD 8 (BIT #9)
140	002000	SC16 = 2000	;SECTOR COUNT FIELD 16 (BIT #10)
141	004000	SC32 = 4000	;SECTOR COUNT FIELD 32 (BIT #11)
142	010000	SC64 = 10000	;SECTOR COUNT FIELD 64 (BIT #12)
143			
144			
145		;RP07 SERIAL NUMBER REGISTER (RPSN <#10>)	
146		;EACH BIT IS CALLED BY BIT NUMBER	
147			
148			
149		;RP07 OFFSET REGISTER (RPOF <#11>)	
150			
151	000200	OFFDIR = 200	;OFFSET DIRECTION (BIT #7)
152	002000	HCI = 2000	;HEADER COMPARE CODE INHIBIT (BIT #10)
153	004000	ECI = 4000	;ERROR CORRECTION CODE INHIBIT (BIT #11)
154	010000	FMT = 10000	;16 BIT FORMAT (BIT #12)
155	040000	MTD = 40000	;MOVE TRACK DESCRIPTOR (BIT #14)
156	100000	CMOD = 100000	;COMMAND MODIFIER (BIT #15)
157			
158			
159		;RP07 DESIRED CYLINDER ADDRESS (RPDC <#12>)	
160		;EACH BIT IS CALLED BY BIT NUMBER	
161			
162			
163		;RP07 CURRENT CYLINDER ADDRESS (RPCC <#13>)	
164		;EACH BIT IS CALLED BY BIT NUMBER	
165			
166			
167		;RP07 ERROR REGISTER 3 (RPER3 <#15>)	
168			
169	000002	SCF = 2	;SYNC CLOCK FAILURE (BIT #1)
170	000004	SBE = 4	;SYNC BYTE ERROR (BIT #2)
171	000010	DPE = 10	;DATA PARITY ERROR (BIT #3)

172	000020	SDF	= 20	:SERDES DATA FAILURE (BIT #4)
173	000040	DCU	= 40	:DC UNSAFE (BIT #5)
174	000100	IXU	= 100	:INDEX UNSAFE (BIT #6)
175	000200	DVC	= 200	:DEVICE CHECK (BIT #7)
176	000400	PHF	= 400	:8080 PROCESSOR HANDSHAKE FAILURE (BIT #8)
177	001000	LCE	= 1000	:LOSS OF CYLINDER ERROR (BIT #9)
178	002000	LBC	= 2000	:LOSS OF BIT CLOCK (BIT #10)
179	020000	DSE	= 20000	:DEFECT SKIP ERROR (BIT #13)
180	C40000	SKI	= 40000	:SEEK INCOMPLETE (BIT #14)
181	100C00	BSE	= 100000	:BAD SECTOR ERROR (BIT #15)

:FP07 ERROR REGISTER #2 (RPER2 <#14>)

184				:BITS 0 THROUGH 7 = READ ONLY BITS
185				:WRITE READY UNSAFE (BIT #8)
186	000400	WRU	= 400	:WRITE OVERRUN (BIT #9)
187	001000	WOR	= 1000	:READ/WRITE UNSAFE #1 (BIT #10)
188	002000	RWU1	= 2000	:READ/WRITE UNSAFE #2 (BIT #11)
189	004000	RWU2	= 4000	:READ/WRITE UNSAFE #3 (BIT #12)
190	010000	RWU3	= 10000	:CPU UNSAFE (BIT #13)
191	020000	CPU	= 20000	:CROM PARITY ERROR (BIT #14)
192	040000	CPE	= 40000	:PROGRAMMING ERROR
193	100000	PGE	= 100000	

:ECC POSITION REGISTER (RPEC1 <#16>)

:EACH BIT IS DEFINED BY BIT NUMBER

:ECC PATTERN REGISTER (RPEC2 <#17>)

:EACH BIT IS DEFINED BY BIT NUMBER

.SBTTL RP07 COMMAND DEFINITIONS

204				
205	000005	SEEK	= 5	:SEEK
206	000007	RECAL	= 7	:RECALIBRATE
207	000011	DRCLR	= 11	:DRIVE CLEAR
208	000013	RELEASE	= 13	:DRIVE RELEASE
209	000015	NOP	= 15	:NO OPERATION
210	000021	RIP	= 21	:READ IN PRESET (NO OPERATION)
211	000031	SEARCH	= 31	:SEARCH
212	000035	DIAG	= 35	:DIAGNOSTIC MODE
213	000051	WCKD	= 51	:WRITE CHECK DATA
214	000053	WCKHD	= 53	:WRITE CHECK HEADER AND DATE
215	000061	WRDTA	= 61	:WRITE DATA
216	000063	FORTRK	= 63	:FORMAT HEADER AND SD FOR ENTIRE TRACK
217	000065	WRD	= 65	:WRITE TRACK DESCRIPTOR
218	000071	RDDTA	= 71	:READ DATA
219	000073	RDHDTA	= 73	:READ HEADER AND DATA
220	000075	RTD	= 75	:READ TRACK DESCRIPTOR
221				

```

1      .SBTTL  GLOBAL DATA SECTION
2
3      :++
4      : THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
5      : IN MORE THAN ONE TEST.
6      :--
7
8 002344 000001  PATT1:: 000001
9 002346 177776  PATT2:: 177776
10 002350 177777  PATT3:: 177777
11 002352 000000  PATT4:: 000000
12 002354 125252  PATT5:: 125252
13 002356 052525  PATT6:: 052525
14 002360 000070  PATT7:: 000070
15 002362 030221  PATT8:: 030221
16 002364 000002  PATT9:: 000002
17
18 002366 000000  TABADD:: .WORD 0
19 002370 000037  ENDTRK:: .WORD 31.
20 002372 000000  LASTRK:: .WORD 0
21 002374 001165  ENDCYL:: .WORD 629.
22 002376 000000  LASCYL:: .WORD 0
23 002400 000000  BITPOS:: .WORD 0
24 002402 000012  ITCOUN:: .WORD 10.
25 002404 000000  ERRWD1:: .WORD 0
26 002406 000000  ERRWD2:: .WORD 0
27 002410 000000  BYTCNT:: .WORD 0
28 002412 000000  NEGWRD:: .WORD 0
29 002414 000000  DESTRK:: .WORD 0
30 002416 000000  DESCYL:: .WORD 0
31 002420 000000  FUNCTN:: .WORD 0
32 002422 000000  ROUTDO:: .WORD 0
33 002424 000000  SELNUM:: .WORD 0
34
35 002426 000000  CLKSTA:: .WORD 0
36 002430 000000  FASTAT:: .WORD 0
37 002432 000000  CSTORE:: .WORD 0
38 002434 000000  PATCNT:: .WORD 0
39 002436 000000  TEMP:: .WORD 0
40 002440 000000  SNK:: .WORD 0
41 002442 000000  SRC:: .WORD 0
42 002444 000000  SRCTMP:: .WORD 0
43 002446 000000  MASK:: .WORD 0
44 002450 000000  MSK:: .WORD 0
45 002452 000000  RCVED:: .WORD 0
46 002454 000000  EXPTD:: .WORD 0
47 002456 000000  TESTRG:: .WORD 0
48 002460 000000  ILOCK:: .WORD 0
49 002462 000000  INTFLG:: .WORD 0
50 002464 000000  UNABLE:: .WORD 0
51 002466 000000  ERSTAT:: .WORD 0
52 002470 000000  FATOF:: .WORD 0
53
54 002472 000000  UNIT:: .WORD 0
55 002474 176700  RPADR:: .WORD 176700
56 002476 000254  RPVEC:: .WORD 254.5*32.
57 002502 000050  RHEXT:: .WORD 50

```

;PATTERN 8 (WORST CASE)

```

;BUFFER POINTER
;LAST TRACK (RP07+)
;PROGRAM CONTROLLED LAST TRACK
;LAST CYLINDER, (RP07+)
;PROGRAM CONTROLLED LAST CYLINDER
;USED TO MASK THE CORRECT RPAS BIT POSITION
;ITERATION COUNTER
;ERROR MESSAGE INDEX #1
;ERROR MESSAGE INDEX #2
;USED TO INDICATE #OF WORDS TRANSFERRED
;NEGATED WORD COUNT FOR DRIVER
;USED TO SELECT A DESIRED TRACK
;USED TO SELECT A DESIRED CYLINDER
;USED TO SPECIFY A SELECTED FUNCTION
;USE THIS PARAMETER ('USER SELECTED' INDICATOR)
;USED TO STORE THE USER MICRODIAGNOSTIC INPUT

;CLOCK STATUS (NO CLOCK= 0, KW11-P= 1 OR KW11-L= -1)
;FAILED STATUS (USED INTERNALLY BY PROGRAM)
;SAVE CARRY FROM PREVIOUS XFER
;# OF PATTERNS TO USE
;TEMPORARY STORAGE FOR SCOPE LOOPS
;ADDRESS OF REGISTER UNDER TEST
;ADDRESS OF TESTING DATA PATTERN
;DATA PATTERN TEMPORARY STORAGE
;CONTAINS # OF BITS TO TEST
;CONTAINS BIT UNDER TEST
;CONTAINS RECEIVED BAD DATA
;CONTAINS EXPECTED GOOD DATA
;CONTAINS ADDRESS OF REGISTER UNDER TEST
;USED TO INDICATE RPDB IR/OR POLLING
;USED TO INDICATE THAT AN INTERRUPT HAS OCCURRED
;USED TO CHECK FOR MANUAL INTERVENTION
;REPORTS PASS/FAIL STATUS TO CALLING MODULE
;FUNCTION AT TIME OF FAILURE

;USED TO SELECT A UNIT FOR TEST
;CONTAINS RPCS1 BASE ADDRESS
;CONTAINS VECTOR ADDRESS & BR LEVEL
;CONTAINS RH70 OFFSET TO RPBAE

```

```

58 002504 000000      RHTYPE:: .WORD 0      ;CONTAINS RHXX TYPE; RH11= 0, RH70= 1
59 002506 000000      DRVNO:: .WORD 0      ;DRIVE NUMBER
60 002510 000000      DRVSX:: .WORD 0      ;STORAGE FOR EACH S/N DIGIT
61
62 002512 176700      RPCS1:: .WORD 176700  ;BASE ADDRESS USED FOR THE DRIVE
63 002514 176702      RPWC:: .WORD 176702  ;WORD COUNT REGISTER
64 002516 176704      RPBA:: .WORD 176704  ;BYTE ADDRESS REGISTER
65 002520 176706      RPDA:: .WORD 176706  ;DESIRED SECTOR/TRACK ADDRESS
66 002522 176710      RPCS2:: .WORD 176710  ;RP07 STATUS REGISTER
67 002524 176712      RPDS:: .WORD 176712  ;RP07 DRIVE STATUS
68 002526 176714      RPER1:: .WORD 176714  ;RP07 ERROR REGISTER #1
69 002530 176716      RPAS:: .WORD 176716  ;RP07 ATTENTION SUMMARY PSEUDO REGISTER
70 002532 176720      RPLA:: .WORD 176720  ;RP07 LOOK AHEAD REGISTER
71 002534 176722      RPDB:: .WORD 176722  ;RP07 DATA BUFFER
72 002536 176724      RPMR1:: .WORD 176724  ;RP07 MAINTENANCE REGISTER #1
73 002540 176726      RPDT:: .WORD 176726  ;DRIVE TYPE REGISTER
74 002542 176730      RPSN:: .WORD 176730  ;RP07 SERIAL NUMBER
75 002544 176732      RPOF:: .WORD 176732  ;RP07 OFFSET REGISTER
76 002546 176734      RPDC:: .WORD 176734  ;RP07 DESIRED CYLINDER
77 002550 176736      RPCC:: .WORD 176736  ;RP07 CURRENT CYLINDER
78 002552 176740      RPER2:: .WORD 176740  ;RP07 ERROR REGISTER #2
79 002554 176742      RPER3:: .WORD 176742  ;RP07 ERROR REGISTER #3
80 002556 176744      RPEC1:: .WORD 176744  ;RP07 ERROR POSITION
81 002560 176746      RPEC2:: .WORD 176746  ;RP07 ERROR PATTERN
82 002562 176750      RPBAE:: .WORD 176750  ;RH70 REGISTER
83 002564 176752      RPCS3:: .WORD 176752  ;RH70 REGISTER
84
85      ;ATTENTION BITS TABLE (ATABIT=8 BYTES)
86      ;THIS TABLE CONTAINS THE CORRESPONDING BIT TO EACH DRIVES
87      ;ATTENTION BIT
88
89 002566 001          ATABIT:: .BYTE 1      ;DRIVE 0
90 002567 002          .BYTE 2      ;DRIVE 1
91 002570 004          .BYTE 4      ;DRIVE 2
92 002571 010          .BYTE 10     ;DRIVE 3
93 002572 020          .BYTE 20     ;DRIVE 4
94 002573 040          .BYTE 40     ;DRIVE 5
95 002574 100          .BYTE 100    ;DRIVE 6
96 002575 200          .BYTE 200    ;DRIVE 7
97
98      ; STORAGE FOR DEVICE REGISTERS
99
100 002576      REG:: .BLKW 22.      ;SAVE REGISTERS HERE
101
102 002652      PSTACK:: .BLKW 10.    ;SOFTWARE PSEUDO STACK
103 002676      MCUTXT:: .BLKW 13.    ;ASCII TEXT POINTER FILE
104 002730      IOBUFF:: .BLKW <50.*6> ;BUFFER USED FOR DATA TRANSFERS
105
106      ; MODULE CALLOUT DISPATCH TABLE
107
108 004060 011161      MCUTAB:: J1      ;
109 004062 011166      J2      ;A02 MODULE (BIT0 ERRWD1)
110 004064 011173      J3      ;A03 MODULE (BIT2 ERRWD1)
111 004066 011200      J4      ;A04 MODULE (BIT3 ERRWD1)
112 004070 011205      J5      ;A05 MODULE (BIT4 ERRWD1)
113 004072 011212      J6      ;A06 MODULE (BIT5 ERRWD1)
114 004074 011217      J7      ;A07 MODULE (BIT6 ERRWD1)

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115	004076	011224	J8	:A08 MODULE (BIT 7 ERRWD1)
116	004100	011231	J9	:A09 MODULE (BIT 8 ERRWD1)
117	004102	011236	J10	:A10 MODULE (BIT 9 ERRWD1)
118	004104	011243	J11	:A11 MODULE (BIT 10 ERRWD1)
119	004106	011250	J12	:A12 MODULE (BIT 11 ERRWD1)
120	004110	011255	J13	:A13 MODULE (BIT 12 ERRWD1)
121	004112	011262	J14	:A14 MODULE (BIT 13 ERRWD1)
122	004114	011267	J15	:A15 MODULE (BIT 14 ERRWD1)
123	004116	011274	J16	:A16 MODULE (BIT 15 ERRWD1)
124	004120	011301	J17	:A17 MODULE (BIT 0 ERRWD2)
125	004122	011132	RH	:RH CONTROLLER (BIT 1 ERRWD2)
126	004124	011151	CA	:CABLE (BIT 2 ERRWD2)
127	004126	011121	DS	:MASSBUS DISABLE SWITCH (BIT 3 ERRWD2)
128	004130	011074	AD	:DUAL DRIVE RESPONSE (BIT 4 ERRWD2)
129	004132	011306	J20	:A20 MODULE (BIT 5 ERRWD2)
130	004134	011313	J21	:A21 MODULE (BIT 6 ERRWD2)
131	004136	011320	HDA	:HDA CALLOUT (BIT 7 ERRWD2)
132	004140	011325	TERM	:TERMINATOR CALLOUT (BIT 8 ERRWD2)
133	004142	011341	SENSOR	:PHASE DETECTOR SENSOR (BIT 9 ERRWD2)
134	004144	011361	BLOWER	:BLOWER ASSY, (BIT 10 ERRWD2)
135	004146	011376	PTRANS	:POWER TRANSFORMER (BIT 11 ERRWD2)
136	004150	011421	MIRBRK	:MOTOR / BRAKE ASSY'S (BIT 12 ERRWD2)
137	004152	011443	K1RELA	:RELAY K1 (BIT 13 ERRWD2)
138	004154	011455	OPRPNL	:OPERATOR'S PANEL (BIT 14 ERRWD2)
139	004156	011477	DRVBLT	:DRIVE BELT (BIT 15 ERRWD2)
140				
141	004160	000002	TST03:: 2	:# OF PATTERNS USED IN THIS TEST
142	004162	002522	RPCS2	:REGISTER TO TEST
143	004164	000037	000037	:BIT MASK, BITS TO TEST = 1
144	004166	002344	PATT1	:PATTERN TO USE
145	004170	002346	PATT2	:PATTERN TO USE
146				
147	004172	000002	TST04:: 2	:# OF PATTERNS USED IN THIS TEST
148	004174	002514	RPWC	:REGISTER TO TEST
149	004176	177777	177777	:BIT MASK, BITS TO TEST = 1
150	004200	002344	PATT1	:PATTERN TO USE
151	004202	002346	PATT2	:PATTERN TO USE
152				
153	004204	000002	TST05:: 2	:# OF PATTERNS USED IN THIS TEST
154	004206	002516	RPBA	:REGISTER TO TEST
155	004210	177776	177776	:BIT MASK, BITS TO TEST = 1
156	004212	002364	PATT9	:PATTERN TO USE
157	004214	002346	PATT2	:PATTERN TO USE
158				
159	004216	000003	TST08:: 3	:# OF PATTERNS IN USE IN THIS TEST
160	004220	002534	RPDB	:REGISTER UNDER TEST
161	004222	177777	177777	:BIT MASK, BITS TO TEST = 1
162	004224	002344	PATT1	:PATTERN TO USE
163	004226	002346	PATT2	:PATTERN TO USE
164	004230	002354	PATT5	:PATTERN TO USE
165				
166	004232	000002	TST11:: 2	:# OF PATTERNS TO USE IN THIS TEST
167	004234	002564	RPCS3	:REGISTER TO TEST
168	004236	000117	000117	:BIT MASK, BITS TO TEST = 1
169	004240	002344	PATT1	:PATTERN TO USE
170	004242	002346	PATT2	:PATTERN TO USE
171				

172 004244 000002	TST12:: 2	:# OF PATTERNS TO USE IN THIS TEST
173 004246 002562	RPBAE	:REGISTER TO TEST
174 004250 000077	000077	:BIT MASK, BITS TO TEST = 1
175 004252 002344	PATT1	:PATTERN TO USE
176 004254 002346	PATT2	:PATTERN TO USE
177		
178 004256 000003	TST28:: 3	:# OF PATTERNS TO USE
179 004260 002520	RPDA	:REGISTER TO TEST
180 004262 177777	177777	:BIT MASK, BITS TO TEST = 1
181 004264 002344	PATT1	:PATTERN TO USE
182 004266 002346	PATT2	:PATTERN TO USE
183 004270 002350	PATT3	:PATTERN TO USE
184		
185 004272 002512	TST33:: RPCS1	:FILE OF REGISTERS
186 004274 002520	RPDA	:TO BE USED IN
187 004276 002544	RPOF	:THIS TEST
188 004300 002546	RPDC	:LAST REGISTER USED - THIS TEST
189		
190 004302 000010	TST34:: 8.	:# OF PATTERNS TO USE
191 004304 002536	RPMR1	:REGISTER TO TEST
192 004306 177777	177777	:BITS TO TEST
193 004310 002344	PATT1	:USE THIS PATTERN
194 004312 002346	PATT2	:USE THIS PATTERN
195 004314 002350	PATT3	:USE THIS PATTERN
196 004316 002354	PATT5	:USE THIS PATTERN
197 004320 002356	PATT6	:USE THIS PATTERN
198 004322 002360	PATT7	:USE THIS PATTERN
199 004324 002362	PATT8	:USE THIS PATTERN
200 004326 002364	PATT9	:USE THIS PATTERN
201		
202 004330 002512	TST49:: RPCS1	:FILE OF WRITABLE REGISTERS TO TEST
203 004332 002514	RPWC	
204 004334 002516	RPBA	
205 004336 002520	RPDA	
206 004340 002522	RPCS2	
207 004342 002536	RPMR1	
208 004344 002544	RPOF	
209 004346 002546	RPDC	
210 004350 002562	RPBAE	
211 004352 002564	RPCS3	

.SBTTL MODULE CALLOUT TABLE

;LAST ERROR CODE GUIDE REVISION: 3/15/81 (REV A)
;LAST CHANGE TO THIS SOURCE CODE: 4/22/81

1			
2			
3			
4			
5			
6	004354	000000	EC.00: 0 ;NOT USED (00 ERROR CODE)
7	004356	000000	0 ;NOT USED
8	004360	000000	0 ;NOT USED (01 ERROR CODE)
9	004362	000000	0 ;NOT USED
10	004364	000000	0 ;NOT USED (02 ERROR CODE)
11	004366	000000	0 ;NOT USED
12	004370	000000	0 ;NOT USED (03 ERROR CODE)
13	004372	000000	0 ;NOT USED
14	004374	000000	0 ;NOT USED (04 ERROR CODE)
15	004376	000000	0 ;NOT USED
16	004400	000000	0 ;NOT USED (05 ERROR CODE)
17	004402	000000	0 ;NOT USED
18	004404	000000	0 ;NOT USED (06 ERROR CODE)
19	004406	000000	0 ;NOT USED
20	004410	000000	0 ;NOT USED (07 ERROR CODE)
21	004412	000000	0 ;NOT USED
22	004414	000000	0 ;NOT USED (08 ERROR CODE)
23	004416	000000	0 ;NOT USED
24	004420	000000	0 ;NOT USED (09 ERROR CODE)
25	004422	000000	0 ;NOT USED
26	004424	000000	0 ;NOT USED (0A ERROR CODE)
27	004426	000000	0 ;NOT USED
28	004430	000000	0 ;NOT USED (0B ERROR CODE)
29	004432	000000	0 ;NOT USED
30	004434	000000	0 ;NOT USED (0C ERROR CODE)
31	004436	000000	0 ;NOT USED
32	004440	000000	0 ;NOT USED (0D ERROR CODE)
33	004442	000000	0 ;NOT USED
34	004444	000000	0 ;NOT USED (0E ERROR CODE)
35	004446	000000	0 ;NOT USED
36	004450	000000	0 ;NOT USED (0F ERROR CODE)
37	004452	000000	0 ;NOT USED
38	004454	000100	BIT6 ;A7 MODULE (10 ERROR CODE)
39	004456	000000	0 ;NO CALLOUT
40	004460	000100	BIT6 ;A7 MODULE (11 ERROR CODE)
41	004462	000000	0 ;NO CALLOUT
42	004464	000100	BIT6 ;A7 MODULE (12 ERROR CODE)
43	004466	000000	0 ;NO CALLOUT
44	004470	000100	BIT6 ;A7 MODULE (13 ERROR CODE)
45	004472	000000	0 ;NO CALLOUT
46	004474	000100	BIT6 ;A7 MODULE (14 ERROR CODE)
47	004476	000000	0 ;NO CALLOUT
48	004500	000100	BIT6 ;A7 MODULE (15 ERROR CODE)
49	004502	000000	0 ;NO CALLOUT
50	004504	000100	BIT6 ;A7 MODULE (16 ERROR CODE)
51	004506	000000	0 ;NOT USED
52	004510	000100	BIT6 ;A7 MODULE (17 ERROR CODE)
53	004512	000000	0 ;NO CALLOUT
54	004514	000100	BIT6 ;A7 MODULE (18 ERROR CODE)
55	004516	000000	0 ;NO CALLOUT
56	004520	000100	BIT6 ;A7 MODULE (19 ERROR CODE)
57	004522	000000	0 ;NO CALLOUT

58	004524	000100	BIT6	:A7 MODULE (1A ERROR CODE)
59	004526	000000	0	:NO CALLOUT
60	004530	000070	BIT3!BIT4!BIT5	:A4,A5,A6 MODULES (1B ERROR CODE)
61	004532	000200	BIT7	:HDA
62	004534	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (1C ERROR CODE)
63	004536	000200	BIT7	:HDA
64	004540	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (1D ERROR CODE)
65	004542	000200	BIT7	:HDA
66	004544	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (1E ERROR CODE)
67	004546	000200	BIT7	:HDA
68	004550	177776	^(BIT0!BIT1!BIT2	:A4 - A16 MODULES (1F ERROR CODE)
69	004552	000040	BIT5	:A20 MODULE
70	004554	000100	BIT6	:A7 MODULE (20 ERROR CODE)
71	004556	000000	0	:NO CALLOUT
72	004560	000100	BIT6	:A7 MODULE (21 ERROR CODE)
73	004562	000000	0	:NO CALLOUT
74	004564	000100	BIT6	:A7 MODULE (22 ERROR CODE)
75	004566	000000	0	:NO CALLOUT
76	004570	000100	BIT6	:A7 MODULE (23 ERROR CODE)
77	004572	000000	0	:NO CALLOUT
78	004574	000100	BIT6	:A7 MODULE (24 ERROR CODE)
79	004576	000000	0	:NO CALLOUT
80	004600	000100	BIT6	:A7 MODULE (25 ERROR CODE)
81	004602	000000	0	:NO CALLOUT
82	004604	000100	BIT6	:A7 MODULE (26 ERROR CODE)
83	004606	000000	0	:NO CALLOUT
84	004610	000522	BIT1!BIT4!BIT6!BIT8	:A2, A5, A7, A9 MODULES (28 ERROR CODE)
85	004612	000000	0	:NO CALLOUT
86	004614	000050	BIT3!BIT5	:A4, A6 MODULE (28 ERROR CODE)
87	004616	000000	0	:NO CALLOUT
88	004620	000030	BIT3!BIT4	:A4, A5 MODULE (29 ERROR CODE)
89	004622	000000	0	:NO CALLOUT
90	004624	000050	BIT3!BIT5	:A4, A6 MODULES (2A ERROR CODE)
91	004626	000000	0	:NO CALLOUT
92	004630	000030	BIT3!BIT4	:A4, A5 MODULE (2B ERROR CODE)
93	004632	000000	0	:NO CALLOUT
94	004634	000050	BIT3!BIT5	:A4, A6 MODULE (2C ERROR CODE)
95	004636	000000	0	:NO CALLOUT
96	004640	000050	BIT3!BIT5	:A4, A6 MODULE (2D ERROR CODE)
97	004642	000000	0	:NO CALLOUT
98	004644	000030	BIT3!BIT4	:A4, A5 MODULE (2E ERROR CODE)
99	004646	000000	0	:NO CALLOUT
100	004650	000030	BIT3!BIT4	:A4, A5 MODULE (2F ERROR CODE)
101	004652	000000	0	:NO CALLOUT
102	004654	001400	BIT8!BIT9	:A9, A10 MODULES (30 ERROR CODE)
103	004656	000000	0	:NO CALLOUT
104	004660	001000	BIT9	:A10 MODULE (31 ERROR CODE)
105	004662	000000	0	:NO CALLOUT
106	004664	001000	BIT9	:A10 MODULE (32 ERROR CODE)
107	004666	000000	0	:NO CALLOUT
108	004670	001400	BIT8!BIT9	:A9,A10 MODULE (33 ERROR CODE)
109	004672	000000	0	:NO CALLOUT
110	004674	001000	BIT9	:A10 MODULE (34 ERROR CODE)
111	004676	000000	0	:NO CALLOUT
112	004700	001000	BIT9	:A10 ERROR CODE (35 ERROR CODE)
113	004702	000000	0	:NO CALLOUT
114	004704	001000	BIT9	:A10 MODULE (36 ERROR CODE)

115	004706	000000	0	:NO CALLOUT
116	004710	001000	BIT9	:A10 MODULE (37 ERROR CODE)
117	004712	000000	0	:NO CALLOUT
118	004714	001000	BIT9	:A10 MODULE (38 ERROR CODE)
119	004716	000000	0	:NO CALLOUT
120	004720	001000	BIT9	:A10 MODULE (39 ERROR CODE)
121	004722	000000	0	:NO CALLOUT
122	004724	001000	BIT9	:A10 MODULE (3A ERROR CODE)
123	004726	000000	0	:NOT USED
124	004730	001000	BIT9	:A10 MODULE (3B ERROR CODE)
125	004732	000000	0	:NOT USED
126	004734	000100	BIT6	:A7 MODULE (3C ERROR CODE)
127	004736	000000	0	:NOT USED
128	004740	000100	BIT6	:A7 MODULE (3D ERROR CODE)
129	004742	000000	0	:NOT USED
130	004744	000100	BIT6	:A7 MODULE (3E ERROR CODE)
131	004746	000000	0	:NOT USED
132	004750	001102	BIT1!BIT6!BIT9	:A2, A7, A10 MODULES (3F ERROR CODE)
133	004752	000000	0	:NOT USED
134	004754	000000	0	:NO CALLOUT (40 ERROR CODE)
135	004756	000000	0	:NO CALLOUT
136	004760	000102	BIT1!BIT6	:A2, A7 MODULES (41 ERROR CODE)
137	004762	002000	BIT10	:BLOWER ASSY
138	004764	000343	BIT0!BIT1!BIT5!BIT6!BIT7	:A1, A2, A6, A7, A8 MODULES (42 ERROR CODE)
139	004766	135200	BIT7!BIT9!BIT11!BIT12!BIT13!BIT15	:HDA, PHASE DETECTOR, TRANSFORMER, MOTOR, K1, BELT
140	004770	000040	BIT5	:A6 MODULE (43 ERROR CODE)
141	004772	000200	BIT7	:HDA CALLOUT
142	004774	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (44 ERROR CODE)
143	004776	000200	BIT7	:HDA CALLOUT
144	005000	000070	BIT3!BIT4!BIT5	:A4, A5, A6 (45 ERROR CODE)
145	005002	000200	BIT7	:HDA CALLOUT
146	005004	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (46 ERROR CODE)
147	005006	000200	BIT7	:HDA
148	005010	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (47 ERROR CODE)
149	005012	000200	BIT7	:HDA
150	005014	000030	BIT3!BIT4	:A4, A5 MODULES (48 ERROR CODE)
151	005016	000000	0	:NO CALLOUT
152	005020	000030	BIT3!BIT4	:A4, A5 MODULES (49 ERROR CODE)
153	005022	000000	0	:NO CALLOUT
154	005024	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (4A ERROR CODE)
155	005026	000200	BIT7	:HDA
156	005030	000032	BIT1!BIT3!BIT4	:A2, A4, A5 MODULES (4B ERROR CODE)
157	005032	000000	0	:NO CALLOUT
158	005034	000020	BIT4	:A5 MODULE (4C ERROR CODE)
159	005036	000000	0	:NO CALLOUT
160	005040	000020	BIT4	:A5 MODULE (4D ERROR CODE)
161	005042	000000	0	:NO CALLOUT
162	005044	000053	BIT0!BIT1!BIT3!BIT5	:A1, A2, A4, A6 MODULES (4E ERROR CODE)
163	005046	000000	0	:NO CALLOUT
164	005050	000012	BIT1!BIT3	:A2, A4 MODULES (4F ERROR CODE)
165	005052	000000	0	:NOT USED
166	005054	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (50 ERROR CODE)
167	005056	000200	BIT7	:HDA
168	005060	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (51 ERROR CODE)
169	005062	000200	BIT7	:HDA
170	005064	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (52 ERROR CODE)
171	005066	000200	BIT7	:HDA

172	005070	000050	BIT3!BIT5	:A4, A6 MODULES (53 ERROR CODE)
173	005072	000000	0	:NO CALLOUT
174	005074	000012	BIT1!BIT3	:A2, A4 MODULES (54 ERROR CODE)
175	005076	000000	0	:NOT USED
176	005100	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (55 ERROR CODE)
177	005102	000200	BIT7	:HDA
178	005104	000012	BIT1!BIT3	:A2, A4 MODULES (56 ERROR CODE)
179	005106	000000	0	:NOT USED
180	005110	000030	BIT3!BIT4	:A4, A5 MODULES (57 ERROR CODE)
181	005112	000000	0	:NO CALLOUT
182	005114	000030	BIT3!BIT4	:A4, A5 MODULES (58 ERROR CODE)
183	005116	000000	0	:NO CALLOUT
184	005120	000030	BIT3!BIT4	:A4, A5 MODULES (59 ERROR CODE)
185	005122	000000	0	:NO CALLOUT
186	005124	000030	BIT3!BIT4	:A4, A5 MODULES (5A ERROR CODE)
187	005126	000000	0	:NO CALLOUT
188	005130	000030	BIT3!BIT4	:A4, A5 MODULES (5B ERROR CODE)
189	005132	000000	0	:NO CALLOUT
190	005134	000030	BIT3!BIT4	:A4, A5 MODULES (5C ERROR CODE)
191	005136	000000	0	:NO CALLOUT
192	005140	000030	BIT3!BIT4	:A4, A5 MODULES (5D ERROR CODE)
193	005142	000000	0	:NO CALLOUT
194	005144	000030	BIT3!BIT4	:A4, A5 MODULES (5E ERROR CODE)
195	005146	000000	0	:NO CALLOUT
196	005150	000030	BIT3!BIT4	:A4, A5 MODULES (5F ERROR CODE)
197	005152	000000	0	:NO CALLOUT
198	005154	000330	BIT3!BIT4!BIT6!BIT7	:A4, A5, A7, A8 MODULES (60 ERROR CODE)
199	005156	040000	BIT14	:OPERATOR'S PANEL
200	005160	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (61 ERROR CODE)
201	005162	000200	BIT7	:HDA
202	005164	000050	BIT3!BIT5	:A4, A6 MODULES (62 ERROR CODE)
203	005166	000000	0	:NO CALLOUT
204	005170	000020	BIT4	:A5 MODULE (63 ERROR CODE)
205	005172	000000	0	:NOT USED
206	005174	004570	BIT3!BIT4!BIT5!BIT6!BIT8!BIT11	:A4, A5, A6, A7, A9, A12 MODULES (64 ERROR CODE)
207	005176	000200	BIT7	:HDA
208	005200	004550	BIT3!BIT5!BIT6!BIT8!BIT11	:A4, A6, A7, A9, A12 MODULES (65 ERROR CODE)
209	005202	000000	0	:NO CALLOUT
210	005204	000070	BIT3!BIT4!BIT5	:A4, A5, A6 MODULES (66 ERROR CODE)
211	005206	000000	0	:NO CALLOUT
212	005210	000040	BIT5	:A6 MODULES (67 ERROR CODE)
213	005212	000000	0	:NO CALLOUT
214	005214	000050	BIT3!BIT5	:A4, A6 MODULES (68 ERROR CODE)
215	005216	000000	0	:NO CALLOUT
216	005220	000200	BIT7	:A8 MODULE (69 ERROR CODE)
217	005222	000000	0	:NOT USED
218	005224	004200	BIT7!BIT11	:A8, A12 MODULES (6A ERROR CODE)
219	005226	000004	BIT2	:MASSBUS CABLE
220	005230	000000	0	:NOT USED (6B ERROR CODE)
221	005232	000000	0	:NOT USED
222	005234	000160	BIT4!BIT5!BIT6	:A5, A6, A7 MODULES (6C ERROR CODE)
223	005236	000000	0	:NO CALLOUT
224	005240	000160	BIT4!BIT5!BIT6	:A5, A6, A7 MODULE (6D ERROR CODE)
225	005242	000000	0	:NO CALLOUT
226	005244	000060	BIT4!BIT5	:A5, A6 MODULE (6E ERROR CODE)
227	005246	000000	0	:NO CALLOUT
228	005250	000060	BIT4!BIT5	:A5, A6 MODULE (6F ERROR CODE)

229	005252	000000	0	;NO CALLOUT
230	005254	000130	BIT3!BIT4!BIT6	;A4, A5, A7 MODULES (70 ERROR CODE)
231	005256	000000	0	;NO CALLOUT
232	005260	000010	BIT3	;A4 MODULE (71 ERROR CODE)
233	005262	000000	0	;NO CALLOUT
234	005264	000012	BIT1!BIT3	;A2, A4 MODULE (72 ERROR CODE)
235	005266	000000	0	;NO CALLOUT
236	005270	000012	BIT1!BIT3	;A2, A4 MODULE (73 ERROR CODE)
237	005272	000000	0	;NO CALLOUT
238	005274	000020	BIT4	;A5 MODULE (74 ERROR CODE)
239	005276	000000	0	;NO CALLOUT
240	005300	000020	BIT4	;A5 MODULE (75 ERROR CODE)
241	005302	000000	0	;NO CALLOUT
242	005304	000020	BIT4	;A5 MODULE (76 ERROR CODE)
243	005306	000000	0	;NO CALLOUT
244	005310	000020	BIT4	;A5 MODULE (77 ERROR CODE)
245	005312	000000	0	;NO CALLOUT
246	005314	000020	BIT4	;A5 MODULE (78 ERROR CODE)
247	005316	000000	0	;NO CALLOUT
248	005320	000020	BIT4	;A5 MODULE (79 ERROR CODE)
249	005322	000000	0	;NO CALLOUT
250	005324	000020	BIT4	;A5 MODULE (7A ERROR CODE)
251	005326	000000	0	;NO CALLOUT
252	005330	000020	BIT4	;A5 MODULE (7B ERROR CODE)
253	005332	000000	0	;NO CALLOUT
254	005334	000020	BIT4	;A5 MODULE (7C ERROR CODE)
255	005336	000000	0	;NO CALLOUT
256	005340	000020	BIT4	;A5 MODULE (7D ERROR CODE)
257	005342	000000	0	;NO CALLOUT
258	005344	165700	BIT6!BIT7!BIT8!BIT9!BIT11!BIT13!BIT14!BIT15	;A7, A8, A9, A10, A12, A14, A15, A16 (7E
259	005346	000201	BIT0!BIT7	;A17, HDA CALLOUT (7E ERROR CODE)
260	005350	016200	BIT7!BIT10!BIT11!BIT12	;A8, A11, A12, A13 (7F ERROR CODE)
261	005352	000000	0	;NO CALLOUT
262	005354	000100	BIT6	;A7 MODULE (80 ERROR CODE)
263	005356	001000	BIT9	;PHASE DETECTOR
264	005360	001600	BIT7!BIT8!BIT9	;A8, A9, A10 MODULE (81 ERROR CODE)
265	005362	000000	0	;NO CALLOUT
266	005364	001400	BIT8!BIT9	;A9, A10 MODULES (82 ERROR CODE)
267	005366	000000	0	;NO CALLOUT
268	005370	001700	BIT6!BIT7!BIT8!BIT9	;A7, A8, A9, A10 MODULES (83 ERROR CODE)
269	005372	000000	0	;NO CALLOUT
270	005374	025600	BIT7!BIT8!BIT9!BIT11!BIT13	;A8, A9, A10, A12, A14 MODULES (84 ERROR CODE)
271	005376	000000	0	;NO CALLOUT
272	005400	001400	BIT8!BIT9	;A9, A10 MODULES (85 ERROR CODE)
273	005402	000000	0	;NO CALLOUT
274	005404	001400	BIT8!BIT9	;A9, A10 MODULES (86 ERROR CODE)
275	005406	000000	0	;NO CALLOUT
276	005410	000600	BIT7!BIT8	;A8, A9 MODULES (87 ERROR CODE)
277	005412	000000	0	;NO CALLOUT
278	005414	000000	0	;NO CALLOUT (88 ERROR CODE)
279	005416	000000	0	;NO CALLOUT
280	005420	000200	BIT7	;A8 MODULE (89 ERROR CODE)
281	005422	000000	0	;NOT USED
282	005424	000240	BIT5!BIT7	;A6, A8 MODULE (8A ERROR CODE)
283	005426	000000	0	;NO CALLOUT
284	005430	000020	BIT4	;A5 MODULE (8B ERROR CODE)
285	005432	000000	0	;NO CALLOUT

286	005434	000020	BIT4	:A5 MODULE (8C ERROR CODE)
287	005436	000000	0	:NO CALLOUT
288	005440	000020	BIT4	:A5 MODULE (8D ERROR CODE)
289	005442	000000	0	:NO CALLOUT
290	005444	165200	BIT7!BIT9!BIT11!BIT13!BIT14!BIT15;A8, A10, A12, A14, A15, A16	MODULE (8E ERROR CODE)
291	005446	000200	BIT7	:HDA
292	005450	001400	BIT8!BIT9	:A9, A10 MODULES (8F ERROR CODE)
293	005452	000000	0	:NO CALLOUT
294	005454	004000	BIT11	:A12 MODULE (90 ERROR CODE)
295	005456	000000	0	:NO CALLOUT
296	005460	004200	BIT7!BIT11	:A8, A12 MODULES (91 ERROR CODE)
297	005462	000000	0	:NO CALLOUT
298	005464	004000	BIT11	:A12 MODULE (92 ERROR CODE)
299	005466	000000	0	:NO CALLOUT
300	005470	004200	BIT7!BIT11	:A8, A12 MODULES (93 ERROR CODE)
301	005472	000000	0	:NO CALLOUT
302	005474	004000	BIT11	:A12 MODULE (94 ERROR CODE)
303	005476	000000	0	:NO CALLOUT
304	005500	004300	BIT6!BIT7!BIT11	:A7, A8, A12 MODULES (95 ERROR CODE)
305	005502	000000	0	:NO CALLOUT
306	005504	004000	BIT11	:A12 MODULE (96 ERROR CODE)
307	005506	000000	0	:NO CALLOUT
308	005510	004000	BIT11	:A12 MODULE (97 ERROR CODE)
309	005512	000000	0	:NO CALLOUT
310	005514	004200	BIT7!BIT11	:A8, A12 MODULES (98 ERROR CODE)
311	005516	000000	0	:NO CALLOUT
312	005520	004200	BIT7!BIT11	:A8, A12 MODULES (99 ERROR CODE)
313	005522	000000	0	:NO CALLOUT
314	005524	004200	BIT7!BIT11	:A8, A12 MODULES (9A ERROR CODE)
315	005526	000000	0	:NO CALLOUT
316	005530	004200	BIT7!BIT11	:A8, A12 MODULES (9B ERROR CODE)
317	005532	000000	0	:NO CALLOUT
318	005534	004200	BIT7!BIT11	:A8, A12 MODULES (9C ERROR CODE)
319	005536	000000	0	:NO CALLOUT
320	005540	004000	BIT11	:A12 MODULE (9D ERROR CODE)
321	005542	000000	0	:NO CALLOUT
322	005544	004000	BIT11	:A12 MODULE (9E ERROR CODE)
323	005546	000000	0	:NO CALLOUT
324	005550	004000	BIT11	:A12 MODULE (9F ERROR CODE)
325	005552	000000	0	:NO CALLOUT
326	005554	004000	BIT11	:A12 MODULE (A0 ERROR CODE)
327	005556	000000	0	:NO CALLOUT
328	005560	004000	BIT11	:A12 MODULE (A1 ERROR CODE)
329	005562	000000	0	:NO CALLOUT
330	005564	004000	BIT11	:A12 MODULE (A2 ERROR CODE)
331	005566	000000	0	:NO CALLOUT
332	005570	004000	BIT11	:A12 MODULE (A3 ERROR CODE)
333	005572	000000	0	:NO CALLOUT
334	005574	004000	BIT11	:A12 MODULE (A4 ERROR CODE)
335	005576	000000	0	:NO CALLOUT
336	005600	004200	BIT7!BIT11	:A8, A12 MODULES (A5 ERROR CODE)
337	005602	000000	0	:NO CALLOUT
338	005604	004200	BIT7!BIT11	:A8, A12 MODULES (A6 ERROR CODE)
339	005606	000000	0	:NO CALLOUT
340	005610	004000	BIT11	:A12 MODULE (A7 ERROR CODE)
341	005612	000000	0	:NO CALLOUT
342	005614	004000	BIT11	:A12 MODULE (A8 ERROR CODE)

343	005616	000000	0	:NO CALLOUT
344	005620	004000	BIT11	:A12 MODULE (A9 ERROR CODE)
345	005622	000000	0	:NO CALLOUT
346	005624	004000	BIT11	:A12 MODULE (AA ERROR CODE)
347	005626	000000	0	:NO CALLOUT
348	005630	004000	BIT11	:A12 MODULE (AB ERROR CODE)
349	005632	000000	0	:NO CALLOUT
350	005634	004000	BIT11	:A12 MODULE (AC ERROR CODE)
351	005636	000000	0	:NO CALLOUT
352	005640	004000	BIT11	:A12 MODULE (AD ERROR CODE)
353	005642	000000	0	:NO CALLOUT
354	005644	004000	BIT11	:A12 MODULE (AE ERROR CODE)
355	005646	000000	0	:NO CALLOUT
356	005650	004000	BIT11	:A12 MODULE (AF ERROR CODE)
357	005652	000000	0	:NO CALLOUT
358	005654	004000	BIT11	:A12 MODULE (B0 ERROR CODE)
359	005656	000000	0	:NO CALLOUT
360	005660	004000	BIT11	:A12 MODULE (B1 ERROR CODE)
361	005662	000000	0	:NO CALLOUT
362	005664	004000	BIT11	:A12 MODULE (B2 ERROR CODE)
363	005666	000000	0	:NO CALLOUT
364	005670	004000	BIT11	:A12 MODULE (B3 ERROR CODE)
365	005672	000000	0	:NO CALLOUT
366	005674	004000	BIT11	:A12 MODULE (B4 ERROR CODE)
367	005676	000000	0	:NO CALLOUT
368	005700	004000	BIT11	:A12 MODULE (B5 ERROR CODE)
369	005702	000000	0	:NO CALLOUT
370	005704	004000	BIT11	:A12 MODULE (B6 ERROR CODE)
371	005706	000000	0	:NO CALLOUT
372	005710	004000	BIT11	:A12 MODULE (B7 ERROR CODE)
373	005712	000000	0	:NO CALLOUT
374	005714	004000	BIT11	:A12 MODULE (B8 ERROR CODE)
375	005716	000000	0	:NO CALLOUT
376	005720	004300	BIT6!BIT7!BIT11	:A7, A8, A12 MODULE (B9 ERROR CODE)
377	005722	000000	0	:NO CALLOUT
378	005724	004200	BIT7!BIT11	:A8, A12 MODULES (BA ERROR CODE)
379	005726	000000	0	:NO CALLOUT
380	005730	000000	0	:NO CALLOUT (BB ERROR CODE)
381	005732	000000	0	:NO CALLOUT
382	005734	000000	0	:NO CALLOUT (BC ERROR CODE)
383	005736	000000	0	:NO CALLOUT
384	005740	000000	0	:NO CALLOUT (BD ERROR CODE)
385	005742	000000	0	:NO CALLOUT
386	005744	004000	BIT11	:A12 MODULE (BE ERROR CODE)
387	005746	000000	0	:NO CALLOUT
388	005750	004000	BIT11	:A12 MODULE (BF ERROR CODE)
389	005752	000000	0	:NO CALLOUT
390	005754	000020	BIT4	:A5 MODULE (C0 ERROR CODE)
391	005756	000000	0	:NO CALLOUT
392	005760	000020	BIT4	:A5 MODULE (C1 ERROR CODE)
393	005762	000000	0	:NO CALLOUT
394	005764	000030	BIT3!BIT4	:A4, A5 MODULES (C2 ERROR CODE)
395	005766	000000	0	:NO CALLOUT
396	005770	000020	BIT4	:A5 MODULE (C3 ERROR CODE)
397	005772	000000	0	:NO CALLOUT
398	005774	000020	BIT4	:A5 MODULE (C4 ERROR CODE)
399	005776	000000	0	:NO CALLOUT

400 006000	000060	BIT4!BIT5	:A5, A6 MODULES (C5 ERROR CODE)
401 006002	000000	0	:NO CALLOUT
402 006004	000020	BIT4	:A5 MODULE (C6 ERROR CODE)
403 006006	000000	0	:NO CALLOUT
404 006010	000000	0	:NOT USED (C7 ERROR CODE)
405 006012	000000	0	:NOT USED
406 006014	000000	0	:NOT USED (C8 ERROR CODE)
407 006016	000000	0	:NOT USED
408 006020	000000	0	:NOT USED (C9 ERROR CODE)
409 006022	000000	0	:NOT USED
410 006024	000000	0	:NOT USED (CA ERROR CODE)
411 006026	000000	0	:NOT USED
412 006030	000000	0	:NOT USED (CB ERROR CODE)
413 006032	000000	0	:NOT USED
414 006034	000000	0	:NOT USED (CC ERROR CODE)
415 006036	000000	0	:NOT USED
416 006040	000000	0	:NOT USED (CD ERROR CODE)
417 006042	000000	0	:NOT USED
418 006044	000000	0	:NOT USED (CE ERROR CODE)
419 006046	000000	0	:NOT USED
420 006050	000000	0	:NOT USED (CF ERROR CODE)
421 006052	000000	0	:NOT USED
422 006054	001400	BIT8!BIT9	:A9, A10 MODULE (D0 ERROR CODE)
423 006056	000000	0	:NO CALLOUT
424 006060	021400	BIT8!BIT9!BIT13	:A9, A10, A14 MODULES (D1 ERROR CODE)
425 006062	000000	0	:NO CALLOUT
426 006064	001000	BIT9	:A10 MODULE (D2 ERROR CODE)
427 006066	000000	0	:NO CALLOUT
428 006070	005400	BIT8!BIT9!BIT11	:A9, A10, A12 MODULES (D3 ERROR CODE)
429 006072	000000	0	:NO CALLOUT
430 006074	021000	BIT9!BIT13	:A10, A14 MODULES (D4 ERROR CODE)
431 006076	000000	0	:NO CALLOUT
432 006100	025400	BIT8!BIT9!BIT11!BIT13	:A9, A10, A12, A14 MODULES (D5 ERROR CODE)
433 006102	000000	0	:NO CALLOUT
434 006104	061000	BIT9!BIT13!BIT14	:A10, A14, A15 MODULES (D6 ERROR CODE)
435 006106	000001	BIT0	:A17 MODULE
436 006110	000000	0	:NOT USED (D7 ERROR CODE)
437 006112	000000	0	:NOT USED
438 006114	001000	BIT9	:A10 MODULE (D8 ERROR CODE)
439 006116	000000	0	:NO CALLOUT
440 006120	000000	0	:NOT USED (D9 ERROR CODE)
441 006122	000000	0	:NOT USED
442 006124	004400	BIT8!BIT11	:A9, A12 MODULE (DA ERROR CODE)
443 006126	000000	0	:NO CALLOUT
444 006130	000000	0	:NOT USED (DB ERROR CODE)
445 006132	000000	0	:NOT USED
446 006134	060000	BIT13!BIT14	:A14, A15 MODULES (DC ERROR CODE)
447 006136	000000	0	:NO CALLOUT
448 006140	061000	BIT9!BIT13!BIT14	:A10, A14, A15 MODULES (DD ERROR CODE)
449 006142	000000	0	:NO CALLOUT
450 006144	020000	BIT13	:A14 MODULE (DE ERROR CODE)
451 006146	000000	0	:NO CALLOUT
452 006150	020000	BIT13	:A14 MODULE (DF ERROR CODE)
453 006152	000000	0	:NO CALLOUT
454 006154	020000	BIT13	:A14 MODULE (EO ERROR CODE)
455 006156	000000	0	:NO CALLOUT
456 006160	020000	BIT13	:A14 MODULE (E1 ERROR CODE)

MODULE CALLOUT TABLE

457	006162	000000	0	:NOT USED
458	006164	020000	BIT13	:A14 MODULE (E2 ERROR CODE)
459	006166	000000	0	:NO CALLOUT
460	006170	020000	BIT13	:A14 MODULE (E3 ERROR CODE)
461	006172	000000	0	:NO CALLOUT
462	006174	020000	BIT13	:A14 MODULE (E4 ERROR CODE)
463	006176	000000	0	:NO CALLOUT
464	006200	000000	0	:NOT USED (E5 ERROR CODE)
465	006202	000000	0	:NOT USED
466	006204	160000	BIT13!BIT14!BIT15	:A14, A15, A16 MODULE (E6 ERROR CODE)
467	006206	000000	0	:OPEN
468	006210	040000	BIT14	:A15 MODULE (E7 ERROR CODE)
469	006212	000000	0	:OPEN
470	006214	141000	BIT9!BIT14!BIT15	:A10, A14, A15 MODULES (E8 ERROR CODE)
471	006216	000000	0	:NO CALLOUT
472	006220	001000	BIT9	:A10 MODULE (E9 ERROR CODE)
473	006222	000000	0	:NO CALLOUT
474	006224	000600	BIT7!BIT8	:A8, A9 MODULES (EA ERROR CODE)
475	006226	000000	0	:NO CALLOUT
476	006230	000000	0	:NO CALLOUT (EB ERROR CODE)
477	006232	000000	0	:NO CALLOUT
478	006234	000000	0	:NO CALLOUT (EC ERROR CODE)
479	006236	000000	0	:NO CALLOUT
480	006240	000100	BIT6	:A7 MODULE (ED ERROR CODE)
481	006242	000000	0	:NO CALLOUT
482	006244	000000	0	:NO CALLOUT (EE ERROR CODE)
483	006246	000000	0	:NO CALLOUT
484	006250	000000	0	:NO CALLOUT (EF ERROR CODE)
485	006252	000000	0	:NO CALLOUT
486	006254	100000	BIT15	:A16 MODULE (F0 ERROR CODE)
487	006256	000000	0	:NO CALLOUT
488	006260	100200	BIT7!BIT15	:A8, A16 MODULE (F1 ERROR CODE)
489	006262	000201	BIT0!BIT7	:A17, HDA CALLOUT
490	006264	100000	BIT15	:A16 MODULE (F2 ERROR CODE)
491	006266	000200	BIT7	:HDA CALLOUT
492	006270	100000	BIT15	:A16 MODULE (F3 ERROR CODE)
493	006272	000200	BIT7	:HDA CALLOUT
494	006274	100000	BIT15	:A16 MODULE (F4 ERROR CODE)
495	006276	000200	BIT7	:HDA CALLOUT
496	006300	100000	BIT15	:A16 MODULE (F5 ERROR CODE)
497	006302	000000	0	:NOT USED
498	006304	141000	BIT9!BIT14!BIT15	:A10, A15, A16 MODULE (F6 ERROR CODE)
499	006306	000201	BIT0!BIT7	:A17, HDA CALLOUT
500	006310	100000	BIT15	:A16 MODULE (F7 ERROR CODE)
501	006312	000201	BIT0!BIT7	:A17, HDA CALLOUT
502	006314	100000	BIT15	:A16 MODULE (F8 ERROR CODE)
503	006316	000000	0	:NO CALLOUT
504	006320	100000	BIT15	:A16 MODULE (F9 ERROR CODE)
505	006322	000000	0	:NO CALLOUT
506	006324	000000	0	:NOT USED (FA ERROR CODE)
507	006326	000000	0	:NOT USED
508	006330	000000	0	:NOT USED (FB ERROR CODE)
509	006332	000000	0	:NOT USED
510	006334	000000	0	:NOT USED (FC ERROR CODE)
511	006336	000000	0	:NOT USED
512	006340	000000	0	:NOT USED (FD ERROR CODE)
513	006342	000000	0	:NOT USED

514	006344	000000	0	;NOT USED (FE ERROR CODE)
515	006346	000000	0	;NOT USED
516	006350	000000	0	;NOT USED (FF ERROR CODE)
517	006352	000000	0	;NOT USED
518				

```
1          .SBTTL  GLOBAL TEXT SECTION
2
3          :++
4          : THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
5          : MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
6          : MORE THAN ONE TEST.
7          :--
8
15         : NAMES OF DEVICES SUPPORTED BY PROGRAM
16
17 006354    L$DVTYP::
006354      .ASCIIZ  /RP07/
          .EVEN
18
24         : TEST DESCRIPTION
25
26         L$DESC::
27 006362    .ASCIIZ  /RP07 FRONT END-HOST ISOLATOR/
006362      .EVEN
28
35         : FORMAT STATEMENTS USED IN PRINT CALLS
36
37
38
39 006420    045      116      000  CRLF:: .ASCIIZ  /%N/
40 006423    045      116      045  DSNMSG:: .ASCIIZ  /%N%ADRIIVE %01%A, PG/
41 006447    045      124      000  SNDIGT:: .ASCIIZ  /%T/
45 006452    045      101      124  MSGMOL:: .ASCIIZ  /%ATEST %D2%A. BYPASSED, DRIVE OFFLINE%N/
46 006522    045      101      124  MSGWLO:: .ASCIIZ  /%ATEST %D2%A. BYPASSED, DRIVE WRITE LOCKED%N/
47 006577    045      116      045  MESG10::.ASCIIZ  /%N%ADRIIVE %01%A, WAITING FOR 'MOL' TO SET (DRIVE OFFLINE)/
48 006671    045      116      045  MESG11::.ASCIIZ  /%N%ADRIIVE %01%A, WAITING FOR 'DRY' TO SET (DRV NOT READY)/
49 006763    045      116      045  MESG12::.ASCIIZ  /%N%ATO REFORMAT FE CYLINDER, TRACK #0 UPON PROGRAM COMPLETION./
50 007062    045      116      045  MESG15::.ASCIIZ  /%N%AREFORMATTING FE CYLINDER, TRACK #0. USE THE FORMAT PROGRAM/
51
52 007161    045      101      122  FRMT00::.ASCIIZ  /%AREGISTER UNDER TEST: %06/
53 007214    045      116      045  FRMT01::.ASCIIZ  /%N%AEXPECTED DATA: %06%A      RECEIVED DATA: %06/
54 007273    045      101      106  FLST00::.ASCIIZ  /%AFAULT LIST: /
55 007312    045      124      000  FLST01::.ASCIIZ  /%T/
56 007315    045      101      052  FRMT02::.ASCIIZ  /%A** THERE IS ALSO A POSSIBILITY OF A HDA FAILURE **%N/
57 007404    045      116      045  FRMT03::.ASCIIZ  /%N%ADRIIVE %01%A, /
58 007426    045      101      115  FRMT04::.ASCIIZ  /%AMICRO-CODE TEST #: %T%T%T%T%A (HEX)/
59 007474    045      101      040  FRMT05::.ASCIIZ  /%A      ERROR CODE: %T%T%T%T%A (HEX)%N/
60 007545    045      101      106  FRMT06::.ASCIIZ  /%AFAILING FUNCTION: %T/
61 007574    045      116      045  FRMT07::.ASCIIZ  /%N%ASEEKS TOO LONG: %D3/
62
63 007624    045      116      045  FRMT10::.ASCIIZ  /%N%ASEEK OVERSHOOTS: %D3/
64 007655    045      116      045  FRMT11::.ASCIIZ  /%N%ASOFT SEEK OVERSHOOTS: %D3/
65 007717    045      116      045  FRMT12::.ASCIIZ  /%N%AGUARD-BAND DETECTED SKI'S %D3/
66 007756    045      116      045  FRMT13::.ASCIIZ  /%N%AINDEX ERRORS: %D3/
67 010004    045      116      045  FRMT14::.ASCIIZ  /%N%APLO UNSAFES: %D3/
68 010031    045      116      045  FRMT15::.ASCIIZ  /%N%AFALLED RECAL ATTEMPTS: %D3/
69 010070    045      116      045  FRMT16::.ASCIIZ  /%N%(HEX) ERROR LOG ENTRIES, IF PRESENT, ARE AS FOLLOWS:/
70 010161    045      124      045  FRMT17::.ASCIIZ  /%T%T%T%T%A      /
71
72 010202    045      116      045  FRMT20::.ASCIIZ  /%N%A8080 REV. LEVEL IS: %D3%N%A2901 REV. LEVEL IS: %D3/
73 010271    045      116      045  FRMT23::.ASCIIZ  /%N%AROUTINE NO. (2 CHAR "HEX" INPUT) /
```

```
74
75 010337      045      116      045 FRMT40:::ASCIIZ /%N%ADRIVE  RPCS1  RPWC  RPBA  RPDA  RPCS2  RPDS/
76 010430      045      116      045 FRMT41:::ASCIIZ /%N%06%A  %06%A  %06%A  %06%A  %06%A  %06/
77
78 010510      045      116      045 FRMT50:::ASCIIZ /%N%ARPER1  RPAS  RPLA  RPDB  RPMR1  RPDT  RPSN/
79 010601      045      116      045 FRMT51:::ASCIIZ /%N%06%A  %06%A  %06%A  %06%A  %06%A  %06/
80
81 010661      045      116      045 FRMT60:::ASCIIZ /%N%ARPOF  RPDC  RPCC  RPER2  RPER3  RPEC1  RPEC2/
82 010753      045      116      045 FRMT61:::ASCIIZ /%N%06%A  %06%A  %06%A  %06%A  %06%A  %06%N/
83
84 011035      045      101      122 FRMT70:::ASCIIZ /%ARPBAE  RPCS3/
85 011055      045      116      045 FRMT71:::ASCIIZ /%N%06%A  %06%N/
86
97
```

.SBTTL GLOBAL ASCII MESSAGE SECTION

1						
2						
3	011074	104	125	101	AD::	.ASCIIZ /DUAL DRIVE RESPONSE /
4	011121	101	061	062	DS::	.ASCIIZ /A12-S01 /
5	011132	122	110	040	RH::	.ASCIIZ /RH CONTROLLER /
6	011151	103	101	102	CA::	.ASCIIZ /CABLES /
7	011161	101	060	061	J1::	.ASCIIZ /A01 /
8	011166	101	060	062	J2::	.ASCIIZ /A02 /
9	011173	101	060	063	J3::	.ASCIIZ /A03 /
10	011200	101	060	064	J4::	.ASCIIZ /A04 /
11	011205	101	060	065	J5::	.ASCIIZ /A05 /
12	011212	101	060	066	J6::	.ASCIIZ /A06 /
13	011217	101	060	067	J7::	.ASCIIZ /A07 /
14	011224	101	060	070	J8::	.ASCIIZ /A08 /
15	011231	101	060	071	J9::	.ASCIIZ /A09 /
16	011236	101	061	060	J10::	.ASCIIZ /A10 /
17	011243	101	061	061	J11::	.ASCIIZ /A11 /
18	011250	101	061	062	J12::	.ASCIIZ /A12 /
19	011255	101	061	063	J13::	.ASCIIZ /A13 /
20	011262	101	061	064	J14::	.ASCIIZ /A14 /
21	011267	101	061	065	J15::	.ASCIIZ /A15 /
22	011274	101	061	066	J16::	.ASCIIZ /A16 /
23	011301	101	061	067	J17::	.ASCIIZ /A17 /
24	011306	101	062	060	J20::	.ASCIIZ /A20 /
25	011313	101	062	061	J21::	.ASCIIZ /A21 /
26						
27	011320	110	104	101	HDA::	.ASCIIZ /HDA /
28	011325	124	105	122	TERM::	.ASCIIZ /TERMINATOR /
29	011341	063	040	120	SENSOR::	.ASCIIZ /3 PHASE SENSOR /
30	011361	102	114	117	BLOWER::	.ASCIIZ /BLOWER ASSY /
31	011376	120	117	127	PTRANS::	.ASCIIZ /POWER TRANSFORMER /
32	011421	115	117	124	MTRBRK::	.ASCIIZ /MOTOR-BRAKE ASSY /
33	011443	122	105	114	K1RELA::	.ASCIIZ /RELAY-K1 /
34	011455	117	120	105	OPRPNL::	.ASCIIZ /OPERATOR'S PANEL /
35	011477	115	117	124	DRVBLT::	.ASCIIZ /MOTOR BELT, MOTOR SPRING /
36						
37	011531	122	105	101	READTD::	.ASCIIZ /READ TD'S/
38	011543	127	122	124	WTCKHD::	.ASCIIZ /WRT CHK HDR & DATA/
39	011566	127	122	111	WTCKD::	.ASCIIZ /WRITE CHECK DATA/
40						
41	011607	120	114	101	MESG13::	.ASCIIZ /PLACE INTERFACE SWITCH A12-S01 IN DOWN POSITION/
42	011667	120	114	101	MESG14::	.ASCIIZ /PLACE INTERFACE SWITCH A12-S01 IN UP POSITION/
43						
44	011747	103	117	115	EM1::	.ASCIIZ /COMPOSITE ERROR SET WHEN NOT EXPECTED/
45	012015	104	122	111	EM2::	.ASCIIZ /DRIVE HUNG, DRY NOT SET IN TIME/
46	012055	104	122	111	EM3::	.ASCIIZ /DRIVE WRITE LOCKED/
47	012100	104	122	111	EM4::	.ASCIIZ /DRIVE OFFLINE/
48	012116	122	120	103	EM5::	.ASCIIZ /RPCS2:OR FAILED TO SET IN TIME/
49	012155	122	120	103	EM6::	.ASCIIZ /RPCS2:OR FAILED TO CLEAR IN TIME/
50	012217	104	122	111	EM7::	.ASCIIZ /DRIVE SHOULD BE WRITE ENABLED AND ON LINE!//
51						
52	012272	122	110	040	EM11::	.ASCIIZ /RH CONTROLLER DIDN'T RESPOND (NO SSYNC)/
53	012342	102	111	124	EM12::	.ASCIIZ /BIT(S) UNDER TEST DIDN'T CHANGE STATE/
54	012410	122	120	103	EM13::	.ASCIIZ /RPCS2: CLR DIDN'T FUNCTION PROPERLY/
55	012454	122	105	107	EM14::	.ASCIIZ /REG CONTENTS DON'T MATCH EXPECTED DATA/
56	012523	122	105	107	EM15::	.ASCIIZ /REG DIDN'T CLEAR WHEN EXPECTED/
57	012562	123	103	040	EM16::	.ASCIIZ /SC OR TRE SET WHEN NOT EXPECTED/

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58 012622      122      120      103 EM17:: .ASCIIZ /RPCS2:IR FAILED TO SET IN TIME/
59
60 012661      122      120      103 EM20:: .ASCIIZ /RPCS1:MCPE DIDN'T SET WHEN EXPECTED/
61 012725      122      120      103 EM21:: .ASCIIZ /RPCS1:SC OR TRE DIDN'T SET WHEN EXPECTED/
62 012776      102      111      124 EM22:: .ASCIIZ /BIT(S) UNDER TEST DIDN'T SET WHEN EXPECTED/
63 013051      102      111      124 EM23:: .ASCIIZ /BIT(S) UNDER TEST DIDN'T CLEAR WHEN EXPECTED/
64 013126      122      110      040 EM24:: .ASCIIZ /RH INTERRUPTED AT WRONG PRIORITY/
65 013167      122      110      040 EM25:: .ASCIIZ /RH GENERATED FALSE INTERRUPT/
66 013224      122      110      040 EM26:: .ASCIIZ /RH DIDN'T INTERRUPT WHEN EXPECTED/
67 013266      104      122      111 EM27:: .ASCIIZ /DRIVE NOT PRESENT, TEST INVALID/
68
69 013326      103      117      115 EM30:: .ASCIIZ /COMMAND EXECUTION INCORRECT/
70 013362      104      101      124 EM31:: .ASCIIZ /DATA LINE(S) STUCK LOW/
71 013411      106      101      111 EM32:: .ASCIIZ /FAILED TO SEEK PROPERLY/
72 013441      104      105      124 EM33:: .ASCIIZ /DETECTED ERROR DURING DATA TRANSFER/
73 013505      106      101      111 EM34:: .ASCIIZ /FAILED TO CORRECTLY DETECT A WRITE CHECK ERROR/
74 013564      106      101      11  EM35:: .ASCIIZ /FAILED AN RP07 INTERNAL MICRODIAGNOSTIC TEST/
75 013641      122      110      130 EM36:: .ASCIIZ /RHXX REGISTER SELECTION FAILURE/
76 013701      104      101      124 EM37:: .ASCIIZ /DATA RECEIVED DOESN'T MATCH EXPECTED DATA/
77
78 013753      104      105      124 EM40:: .ASCIIZ /DETECTED ERROR DURING WRITE DATA OPERATION/
79 014026      104      105      124 EM41:: .ASCIIZ /DETECTED ERROR DURING FORMAT OPERATION/
80 014075      104      105      124 EM42:: .ASCIIZ /DETECTED A PERMANENT ERROR/
81 014130      111      116      124 EM43:: .ASCIIZ /INTERNAL RP07 DIAGNOSTIC TIME-OUT/

```

.EVEN

.SBTTL GLOBAL ERROR REPORT SECTION

```

;+
; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
; THAT ARE USED IN MORE THAN ONE TEST. IT ALSO INCLUDES THE ASCII MESSAGES
; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
;--

```

```

96 014172
97 014172 004737 017326
98 014176 004737 020532
99 014202 013746 002456
   014206 012746 007161
   014212 012746 000002
   014216 010600
   014220 104414
   014222 062706 000006
100 014226 013746 002452
   014232 013746 002454
   014236 012746 007214
   014242 012746 000003
   014246 010600
   014250 104414
   014252 062706 000010
101 014256 004737 016212
102 014262 004737 016556
103
104 014266 012746 006420
   014272 012746 000001
   014276 010600

ERRO::
      JSR      PC,SAVRPR      ;GET THE REGISTER SNAPSHOT NOW
      JSR      PC,DECODE     ;DECODE THE BIT MASK FOR THE ERROR!
      MOV      TESTRG,-(SP)
      MOV      #FRMT00,-(SP)
      MOV      #2,-(SP)
      MOV      SP,R0
      TRAP     C$PNTB
      ADD      #6,SP
      MOV      RCVED,-(SP)
      MOV      EXPTED,-(SP)
      MOV      #FRMT01,-(SP)
      MOV      #3,-(SP)
      MOV      SP,R0
      TRAP     C$PNTB
      ADD      #10,SP
      JSR      PC,DMPREG      ;DO THE REGISTER DUMP NOW
      JSR      PC,FAULTS     ;REPORT THE FAULT LIST
                               ;CR-LF
      MOV      #CRLF,-(SP)
      MOV      #1,-(SP)
      MOV      SP,R0

```

105	014300	104414	000004	TRAP	C\$PNTB	
	014302	062706		ADD	#4,SP	
	014306			L10002:		
	014306	104423		TRAP	C\$MSG	
106						
107	014310			ERR1::		
108	014310	004737	017326	JSR	PC,SAVRPR	:GET THE REGISTER SNAPSHOT NOW
109	014314	010446		MOV	#4,-(SP)	:PUT THE ROUTINE NUMBER ON THE STACK
110	014316	004737	015416	JSR	PC,OCTHEX	:AND CONVERT TO HEX
111						
112	014322	012746	002660	MOV	#PSTACK+6,-(SP)	
	014326	012746	002656	MOV	#PSTACK+4,-(SP)	
	014332	012746	002654	MOV	#PSTACK+2,-(SP)	
	014336	012746	002652	MOV	#PSTACK,-(SP)	
	014342	012746	007426	MOV	#FRMT04,-(SP)	
	014346	012746	000005	MOV	#5,-(SP)	
	014352	010600		MOV	SP,R0	
	014354	104414		TRAP	C\$PNTB	
	014356	062706	000014	ADD	#14,SP	
113	014362	017746	166164	MOV	@RPER2,-(SP)	:GET THE CONTENTS OF RPER2 ON THE STACK
114	014366	042716	177400	BIC	#177400,(SP)	:AND ELIMINATE THE HIGH ORDER BITS
115	014372	004737	015416	JSR	PC,OCTHEX	:NOW CONVERT TO HEX
116						
117	014376	012746	002660	MOV	#PSTACK+6,-(SP)	
	014402	012746	002656	MOV	#PSTACK+4,-(SP)	
	014406	012746	002654	MOV	#PSTACK+2,-(SP)	
	014412	012746	002652	MOV	#PSTACK,-(SP)	
	014416	012746	007474	MOV	#FRMT05,-(SP)	
	014422	012746	000005	MOV	#5,-(SP)	
	014426	010600		MOV	SP,R0	
	014430	104414		TRAP	C\$PNTB	
	014432	062706	000014	ADD	#14,SP	
118	014436	004737	016212	JSR	PC,DMPREG	:DUMP THE REGISTERS NOW
119	014442	00 737	016132	JSR	PC,CALMOD	:REPORT THE MODULE LIST
120	014446	004737	020532	JSR	PC,DECODE	:DECODE THE MASK BITS FOR A MODULE CALLOUT
121	014452	004737	016556	JSR	PC,FAULTS	:AND REPORT THE FIND
122						:CR-LF
123	014456	012746	006420	MOV	#CRLF,-(SP)	
	014462	012746	000001	MOV	#1,-(SP)	
	014466	010600		MOV	SP,R0	
	014470	104414		TRAP	C\$PNTB	
	014472	062706	000004	ADD	#4,SP	
124	014476			L10003:		
	014476	104423		TRAP	C\$MSG	
125						
126	014500			ERR2::		
127	014500	004737	020532	JSR	PC,DECODE	:DECODE THE MESSAGE
128	014504	013746	002506	MOV	DRVNO,-(SP)	
	014510	012746	007404	MOV	#FRMT03,-(SP)	
	014514	012746	000002	MOV	#2,-(SP)	
	014520	010600		MOV	SP,R0	
	014522	104414		TRAP	C\$PNTB	
	014524	062706	000006	ADD	#6,SP	
129	014524	013746	002470	MOV	FATOF,-(SP)	
	014524	012746	007545	MOV	#FRMT06,-(SP)	
	014540	012746	000002	MOV	#2,-(SP)	
	014544	010600		MOV	SP,R0	

	014546	104414		TRAP	C\$PNTB	
	014550	062706	000006	ADD	#6,SP	
130	014554	013746	002452	MOV	RCVED,-(SP)	
	014560	013746	002454	MOV	EXPTED,-(SP)	
	014564	012746	007214	MOV	#FRMT01,-(SP)	
	014570	012746	000003	MOV	#3,-(SP)	
	014574	010600		MOV	SP,RO	
	014576	104414		TRAP	C\$PNTB	
	014600	062706	000010	ADD	#10,SP	
131						;CR-LF
132	014604	012746	006420	MOV	#CRLF,-(SP)	
	014610	012746	000001	MOV	#1,-(SP)	
	014614	010600		MOV	SP,RO	
	014616	104414		TRAP	C\$PNTB	
	014620	062706	000004	ADD	#4,SP	
133	014624	004737	016556	JSR	PC,FAULTS	;REPORT THE FAULT LIST
134						;CR-LF
135	014630	012746	006420	MOV	#CRLF,-(SP)	
	014634	012746	000001	MOV	#1,-(SP)	
	014640	010600		MOV	SP,RO	
	014642	104414		TRAP	C\$PNTB	
	014644	062706	000004	ADD	#4,SP	
136	014650			L10004:	TRAP	C\$MSG
137		104423				
138	014652			ERR3::		
139	014652	004737	016212	JSR	PC,DMPREG	;JUST DUMP THE REGISTERS
140						;CR-LF
141	014656	012746	006420	MOV	#CRLF,-(SP)	
	014662	012746	000001	MOV	#1,-(SP)	
	014666	010600		MOV	SP,RO	
	014670	104414		TRAP	C\$PNTB	
	014672	062706	000004	ADD	#4,SP	
142	014676			L10005:	TRAP	C\$MSG
143	014676	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      ;      JSR      PC,SIZE70      ;CALL ROUTINE
7      ;
8      ;R5 MUST CONTAIN POINTER TO NEW RPCS1 BASE ADDRESS
9
11     014700 005037 002502      SIZE70: CLR      RHEXT      ;CLEAR RPBAE OFFSET
12     014704 005037 002504      CLR      RHXX      ;CLEAR RHXX TYPE REGISTER (RH11)
13     014710 013746 000004      MOV      ERRVEC,-(SP) ;SAVE CONTENTS OF ERROR VECTOR
14     014714 012737 014764 000004      MOV      #2$,ERRVEC ;SETUP 'TRAP' RETURN ADDRESS
15     014722 011500      MOV      (R5),R0 ;GET RPCS1 ADDRESS
16     014724 062700 000050      ADD      #50,R0 ;GET REGISTER OFFSET FOR RH70
17     014730 012702 000012      MOV      #10.,R2 ;GET NUMBER OF REGISTERS TO CHECK
18     014734 005720      TST      (R0)+ ;TRAP IF NOT A VALID RPBAE
19     014736 005720      TST      (R0)+ ;TRAP IF NOT A VALID RPCS3
20     014740 012737 000050 002502      MOV      #50,RHEXT ;LOAD OFFSET FOR RPBAE (22 REGISTER RH)
21     014746 005720      1$: TST      (R0)+ ;TRAP IF NOT A VALID REGISTER
22     014750 005302      DEC      R2 ;DONE WITH ALL 32 REGISTERS ?
23     014752 001375      BNE      1$ ;BR IF NO
24     014754 012737 000074 002502      MOV      #74,RHEXT ;LOAD OFFSET FOR RPBAE (32 REGISTER RH)
25     014762 000403      BR      3$
26     014764 012716 014772      2$: MOV      #3$, (SP) ;SETUP RETURN ADDRESS
27     014770 000002      RTI
28
29     014772 011500      3$: MOV      (R5),R0 ;GET RPCS1 REGISTER
30     014774 013702 002502      MOV      RHEXT,R2 ;GET RPBAE REGISTER OFFSET
31     015000 001415      BEQ      4$ ;BR IF NONE
32     015002 060002      ADD      R0,R2 ;GET RPBAE REGISTER
33     015004 052710 001400      BIS      #A17!A16,(R0) ;SET EXTENDED ADDRESS BITS IN RPCS1
34     015010 022712 000003      CMP      #3,(R2) ;ARE THE EXTENDED BITS SET IN RPBAE ?
35     015014 001007      BNE      4$ ;BR IF NO
36     015016 005012      CLR      (R2) ;CLEAR EXTENDED ADDRESS BITS IN RPBAE
37     015020 011046      MOV      (R0),-(SP) ;SAVE RPCS1 REG CONTENTS
38     015022 042726 176377      BIC      #*C<A17!A16>,(SP)+ ;ARE THE EXTEND BITS CLEAR IN RPCS1 ?
39     015026 001002      BNE      4$ ;BR IF NO
40     015030 005237 002504      INC      RHXX ;SET RHXX TYPE REGISTER (RH70)
41     015034 012637 000004      4$: MOV      (SP)+,ERRVEC ;RESTORE CONTENTS OF ERROR VECTOR
42     015040 000207      RTS      PC

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1      .SBTTL  DISK DRIVER AND SUPPORT ROUTINES
2
3      ;*****
4      ;THIS MODULE IS USED ANYTIME A DIAGNOSTIC COMMAND HAS JUST BEEN ISSUED BY
5      ;THE MODULE 'DRIVER'. IT POLLS THE CORRECT ATTENTION BIT IN THE PSEUDO
6      ;REGISTER AND USES A 'WATCHDOG TIMER' TO VERIFY THAT THE BIT DOES EVENTUALLY
7      ;SET. IF IT DOES NOT, AN ERROR MESSAGE IS PRODUCED REPORTING A MICRO-
8      ;DIAGNOSTIC TIMEOUT.
9      ;*****
10
11 015042 010146      RPARDY: MOV      R1,-(SP)      ;SAVE R1
12 015044 010446      MOV      R4,-(SP)      ;SAVE R4
13 015046 012701 000062  MOV      #50,R1      ;GET AN OVERALL ITERATION COUNT
14 015052 033777 002400 165450 1$: BIT      BITPOS,@RPAS ;DONE??
15 015060 001012      BNE      2$            ;IF SET, YES
16 015062 004737 017000      JSR      PC,WAIT    ;USE THE WATCHDOG TIMER
17 015066 005301      DEC      R1            ;ONE LESS CYCLE TO-GO
18 015070 005370      BGT      1$            ;IF NOT ZERO, KEEP WATCHING
19 015072 017704 165440      MOV      @RPMR1,R4   ;GET CONTENTS OF RPMR1
20 015076 104456      TRAP      C$ERHRD
    015100 000621      .WORD     401
    015102 014130      .WORD     EM43
    015104 014310      .WORD     ERR1
21 015106 013777 002400 165414 2$: MOV      BITPOS,@RPAS ;RESET THE ATTENTION BIT TO 0
22 015114 012604      MOV      (SP)+,R4        ;RESTORE R4
23 015116 012601      MOV      (SP)+,R1        ;RESTORE R1
24 015120 000207      RTS      PC              ;TAKE THE RETURN
25
26      ;*****
27      ;THIS MODULE IS CALLED BY THE DRIVER WHEN EVER A NON-DATA COMMAND HAS
28      ;JUST BEEN ISSUED. (EXCEPT A DIAGNOSTIC COMMAND.) IT POLLS FOR RPDS:
29      ;DRY. THE FUNCTION IS NOT TIMED USING A WATCHDOG TIMER, BUT SUPERVISOR
30      ;'BREAKS' ARE SUPPORTED.
31      ;*****
32
33 015122      READY:
    015122 104422      TRAP      C$BRK
34 015124 105777 165374      TSTB     @RPDS      ;READY TRUE?
35 015130 100374      BPL      READY    ;NO, SO WAIT SOME MORE
36 015132 000207      RTS      PC          ;TAKE THE RETURN
37
38      ;*****
39      ;THIS MODULE IS CALLED BY THE DRIVER ANYTIME A DATA COMMAND HAS JUST BEEN
40      ;ISSUED. IT POLLS FOR CONTROLLER READY. THE FUNCTION IS NOT TIMED USING
41      ;A WATCHDOG TIMER, BUT SUPERVISOR 'BREAKS' ARE SUPPORTED.
42      ;*****
43
44 015134      CREADY:
    015134 104422      TRAP      C$BRK
45 015136 105777 165350      TSTB     @RPLS1    ;CONTROLLER READY?
46 015142 100374      BPL      CREADY   ;IF 0, NO...WAIT SOME MORE
47 015144 000207      RTS      PC          ;IT'S 1, RETURN

```

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11
12 015146 005437 002412 DRIVER: NEG NEGWRD ;NEGATE THE WORD COUNT ONLY ONCE!
13 015152 004737 015122 JSR PC,READY ;POLL FOR DRIVE READY!
14 015156 022737 000035 002420 CMP #DIAG,FUNCTN ;DIAGNOSTIC COMMAND??
15 015164 001414 BEQ 1$ ;IF EQUAL, SKIP NEXT CODE
16 015166 013777 002412 165320 MOV NEGWRD,@RPWC ;WORD COUNT ---> RP REGISTER
17 015174 013777 002416 165344 MOV DESCYL,@RPDC ;GET THE CYLINDER ADDRESS TO THE DEVICE REGISTER
18 015202 013777 002414 165310 MOV DESTRK,@RPDA ;TRACK/SEC ---> RP REGISTER
19 015210 013777 002366 165300 MOV TABADD,@RPBA ;LOAD THE TRANSFER ADDRESS
20 015216 013777 002420 165266 1$: MOV FUNCTN,@RPCS1 ;GET THE COMMAND TO EXECUTE
21 015224 023727 002420 000035 CMP FUNCTN,#DIAG ;IS THIS A DATA COMMAND?
22 015232 101004 BHI 2$ ;IF > THAN A DIAGNOSTIC COMMAND, YES
23 015234 001406 BEQ 3$ ;IF =, IT GETS HANDLED UNIQUELY
24 015236 004737 015122 JSR PC,READY ;POLL FOR DRIVE READY
25 015242 000405 BR 4$ ;AND SKIP NEXT POLL OPERATION
26 015244 004737 015134 2$: JSR PC,CREADY ;POLL FOR CONTROLLER READY
27 015250 000402 BR 4$ ;NOW RETURN
28 015252 004737 015042 3$: JSR PC,RPARDY ;LOOK FOR ATTENTION NOW
29 015256 000207 4$: RTS PC ;NOW RETURN
30
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38
39 015260 004737 016662 DIAGST::JSR PC,SEIZE ;GET THE DRIVE'S ATTENTION!
40 015264 012777 177000 165244 MOV #177000,@RPMR1 ;SET UP THE 'HANDSHAKE'
41 015272 012737 000035 002420 MOV #DIAG,FUNCTN ;CREATE THE DIAGNOSTIC COMMAND
42 015300 004737 015146 JSR PC,DRIVER ;ISSUE THE COMMAND
43 015304 004737 016662 JSR PC,SEIZE ;RESET COMPOSITE ERROR (SETS WHEN FE IS WRITTEN INTO RPMR1)
44 015310 000207 RTS PC ;AND RETURN TO MAIN

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9 015312 012737 040011 002420 DIAGEN: MOV #TRE!DRCLR,FUNCTN;SET UP FOR A CONTROLLER-DRIVE CLEAR COMMAND
10 015320 004737 015146 JSR PC,DRIVER ;ISSUE THE COMMAND
11 015324 012777 177400 165204 MOV #177400,@RPMR1 ;TERMINATE THE SESSION
12 015332 012737 000035 002420 MOV #DIAG,FUNCTN ;AND SET UP THE COMMAND
13 015340 004737 015146 JSR PC,DRIVER ;ISSUE THE COMMAND NOW!!
14 015344 005077 165166 CLR @RPMR1 ;RESET THE DIAGNOSTIC MODE BIT
15 015350 000207 RTS PC ;RETURN TO MAIN
16
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23
24 015352 010477 165160 DIAGLD: MOV R4,@RPMR1 ;NOW SET THE DIAGNOSTIC NUMBER
25 015356 052777 100000 165152 BIS #BIT15,@RPMR1 ;AND SET DMD = 1
26 015364 012737 000035 002420 MOV #DIAG,FUNCTN ;AND SET UP FOR A DIAGNOSTIC COMMAND
27 015372 004737 015146 JSR PC,DRIVER ;ISSUE THE COMMAND NOW!
28 015376 000207 RTS PC ;RETURN TO CALLER!
29
30 .SBTTL PROGRAM UTILITIES
31
32
33
34
35
36
37
38 015400 017746 165132 DRVCLR: MOV @RPMR1,-(SP) ;SAVE CONTENTS OF RPMR1
39 015404 004737 016662 JSR PC,SEIZE ;NOW RESET THE DRIVE
40 015410 012677 165122 MOV (SP)+,@RPMR1 ;RESTORE THE MAINTENANCE REGISTER
41 015414 000207 RTS PC ;AND RETURN TO CALLER
42
43
44
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46
47
48
49 015416 010 /6 OCTHEX: MOV R1,-(SP) ;SAVE R1
50 015420 010246 MOV R2,-(SP) ;SAVE R2
51 015422 012700 002652 MOV #PSTACK,R0 ;SET UP THE BUFFER ADDRESS
52 015426 012702 000004 MOV #4,R2 ;GET THE ITERATION VALUES
53 015432 012701 000004 1$: MOV #4,R1 ;AND DUPLICATE FOR TWO LOOPS
54 015436 005010 CLR (R0) ;INITIALIZE THE BUFFER
55 015440 006310 2$: ASL (R0) ;MOVE THE PREVIOUS BIT(S) OVER
56 015442 000241 CLC ;CARRY = 0
57 015444 006366 000006 ASL 6(SP) ;ROTATE A BIT FROM THE TEST VALUE

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58 015450 103002          BCC 3$          ;IF ZERO, SKIP NEXT INSTRUCTION
59 015452 052710 000001   BIS #BIT0,(R0) ;MARK THE BIT AS BEING SET
60 015456 005301          3$: DEC R1       ;ONE LESS ITERATION TO GO
61 015460 003367          BGT 2$          ;BUT NOT DONE UNTIL = 0!
62 015462 005720          TST (R0)+      ;NEXT BUFFER LOCATION
63 015464 005302          DEC R2         ;ONE LESS ITERATION TO-GO
64 015466 003361          BGT 1$         ;IF NOT ZERO, KEEP GOING!
65 015470 012702 000004   MOV #4,R2     ;GET THE NEW ITERATION COUNT
66 015474 012700 002652   MOV #PSTACK,R0 ;AND GET THE BUFFER ADDRESS AGAIN
67 015500 005710          4$: TST (R0)   ;CONTENTS ZERO?
68 015502 003004          BGT 5$         ;IF NOT, SKIP NEXT
69 015504 005020          CLR (R0)+      ;SET THIS CHARACTER = NULL
70 015506 005302          DEC R2         ;ONE LESS CHARACTER TO GO
71 015510 003373          BGT 4$         ;IF NOT ZERO, KEEP GOING
72 015512 000412          BR 8$          ;DONE, RETURN!
73 015514 021027 000011   5$: CMP (R0),#11 ;ALPHA OR NUMERIC CHARACTER?
74 015520 101003          BHI 6$         ;IF > 11, ALPHA!
75 015522 062720 000060   ADD #60,(R0)+ ;MAKE NUMERIC ASCII
76 015526 000402          BR 7$          ;AND GO-ON
77 015530 062720 000067   6$: ADD #55.,(R0)+ ;MAKE HEX ASCII
78 015534 005302          7$: DEC R2     ;ONE LESS ITERATION TO-GO
79 015536 003366          BGT 5$         ;ONE LESS ITERATION, IF NOT ZERO
80 015540 0'2602          8$: MOV (SP)+,R2 ;RESTORE R2
81 015542 012601          MOV (SP)+,R1   ;AND R1
82 015544 012616          MOV (SP)+,(SP) ;MOVE STACK OVER INPUT VALUE
83 015546 000207          RTS PC         ;AND RETURN

```

```

*****
; 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
*****

```

```

98 015550 005037 002426   ST.CLK: CLR CLKSTA ;ASSUME 'NO CLOCK'
99 015554 005037 015750   CLR HERTZ      ;ASSUME 'UNKNOWN' HERTZ
100                                     ;IS THERE A P-CLOCK PRESENT ?
101 015560 012700 000120   MOV #P,R0
102 015564 104462          TRAP C$CLK
103 015566 010005          MOV R0,R5
104                                     ;GO TO 1$ IF NO
105 015570 103031          BCC 1$
106                                     ;SET P-CLOCK P-TABLE & START P-CLOCK
107 015572 010537 015724   MOV R5,PCLKTB ;SAVE P-CLOCK TABLE ADDRESS
108 015576 011537 015726   MOV (R5),PKCS ;GET 'CSR' ADDRESS
109 015602 011537 015730   MOV (R5),PKB  ;MAKE PKB ADDRESS BY
110 015606 062737 000002 015730   ADD #2,PKB ;ADDING 2
111 015614 012537 015732   MOV (R5)+,PKC ;MAKE PKC ADDRESS BY
112 015620 062737 000004 015732   ADD #4,PKC ;ADDING 4

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113 015626 005725          TST      (R5)+      ;SKIP OVER 'BR LEVEL'
114 015630 012537 015734    MOV      (R5)+,PKV    ;GET 'VECTOR' ADDRESS
115 015634 012537 015750    MOV      (R5)+,HERTZ  ;GET 'HERTZ' LINE FREQUENCY
116 015640 012737 000001 002426  MOV      #1,CLKSTA ;SET P-CLOCK FLAG
117 015646 004737 015752    JSR      PC,ST.PCLK  ;START P-CLOCK AS A WATCH DOG TIMER
118 015652 000207          RTS      PC
119 015654          1$:          ;IS THERE A L-CLOCK PRESENT ?
120 015654 012700 000114    MOV      #'L,R0
      015660 104462          TRAP     C$CLCK
      015662 010005          MOV      R0,R5
121          ;GC TO 2$ IF NO
122 015664 103016          BCC      2$
123          ;SET L-CLOCK P-TABLE, START L-CLOCK
124
125
126 015666 010537 015740    MOV      R5,LCLKTB  ;SAVE L-CLOCK TABLE ADDRESS
127 015672 012537 015742    MOV      (R5)+,LKS    ;GET 'CSR' ADDRESS
128 015676 005725          TST      (R5)+      ;SKIP OVER 'BR LEVEL'
129 015700 012537 015744    MOV      (R5)+,LKV    ;GET 'VECTOR' ADDRESS
130 015704 012537 015750    MOV      (R5)+,HERTZ  ;GET 'HERTZ' LINE FREQUENCY
131 015710 012737 177777 002426  MOV      #-1,CLKSTA ;L-CLOCK FLAG
132 015716 004737 016016    JSR      PC,ST.LCLK  ;START L-CLOCK AS A WATCH DOG TIMER
133 015722 000207          2$:      RTS      PC
134
135          ;KW11-P CLOCK TABLE, CSR REG, PKB REG, PKC REC & VEC ADR
136
137 015724 000000          PCLKTB: .WORD 0          ;P-CLK TBL ADR
138
139 015726 172540          PKCS:   .WORD 172540      ;CONTROL & STATUS
140 015730 172542          PKB:    .WORD 172542      ;COUNT SET BFR
141 015732 172544          PKC:    .WORD 172544      ;COUNTER
142 015734 000104 000106    PKV:    .WORD 104,106    ;VECTOR
143
144          ;KW11-L CLOCK TABLE, CSR REG & VEC ADR
145
146 015740 000000          LCLKTB: .WORD 0          ;L-CLK TBL ADR
147
148 015742 177546          LKS:    .WORD 177546      ;CONTROL & STATUS
149 015744 000100 000102    LKV:    .WORD 100,102    ;VECTOR
150
151 015750 000000          HERTZ:   .WORD 0          ;60 HZ. OR 50 HZ. LINE FREQUENCY
152
153 015752          ST.PCLK:      ;SETUP VECTOR FOR P-CLOCK
154 015752 012746 000300    MOV      #PRI06,-(SP)
      015756 012746 016104    MOV      #KWSRV,-(SP)
      015762 013746 015734    MOV      PKV,-(SP)
      015766 012746 000003    MOV      #3,-(SP)
      015772 104437          TRAP     C$SVEC
      015774 062706 000010    ADD      #10,SP
155 016000 012777 000001 177722    MOV      #1,@PKB    ;COUNT ONE TICK
156 016006 012777 000115 177712    MOV      #115,@PKCS ;'INT.EN.',COUNT DOWN'', 'MODE 1 (REPEAT)',
157          ;'LINE FREQ'', AND 'RUN'
158 016014 000207          1$:      RTS      PC          ;RETURN
159
160          ST.LCLK:          ;SETUP VECTOR FOR L-CLOCK
161 016016 012746 000300    MOV      #PRI06,-(SP)
      016022 012746 016104    MOV      #KWSRV,-(SP)

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016026 013746 015744      MOV      LKV,-(SP)
016032 012746 000003      MOV      #3,-(SP)
016036 104437              TRAP      C$SVEC
016040 062706 000010      ADD       #10,SP
162 016044 012777 000100 177670 1$:      MOV      #100,@LKS      ;START THE KW11-L
163 016052 000207              RTS      PC      ;RETURN
164
165      ;THIS ROUTINE IS USED TO STOP THE SYSTEM CLOCK
166      ;CALL
167      ;      JSR      PC,STOPCK      ;CALL ROUTINE
168
169 016054 005737 002426      STOPCK: TST      CLKSTA      ;IS THERE A CLOCK AVAILABLE ?
170 016060 001410              BEQ      2$      ;BR IF NO
171 016062 100404              BMI      1$      ;BR IF L-CLOCK
172 016064 042777 000101 177634      BIC      #101,@PKCS      ;STOP THE P-CLOCK
173 016072 000403              BR      2$
174 016074 042777 000100 177640 1$:      BIC      #100,@LKS      ;STOP THE L-CLOCK
175 016102 000207              2$:      RTS      PC
176
177      ;KW11 CLOCK INTERRUPT SERVICE ROUTINE
178
180 016104 012746 000024      KJSRV:  MOV      #20,-(SP)      ;ASSUME 20.0 MSEC
181 016110 023727 015750 000062      CMP      HERTZ,#50.      ;IS IT 50 HERTZ LINE FREQUENCY ?
182 016116 001402              BEQ      1$      ;BR IF YES
183 016120 012716 000020      MOV      #16,-(SP)      ;MUST BE 60HZ, 16.667 MSEC
184 016124 162637 016776      1$:      SUB      (SP)+,WATIME      ;SUBTRACT TIME PER TICK IN MILLISECONDS
185 016130      L10006:      SUB      (SP)+,WATIME
186      RTI
187
188      ;*****
189      ;THIS MODULE IS USED TO DECODE THE CONTENTS OF RPER2 AND PRODUCE A MODULE
190      ;FAULT LIST BASED ON THE CONTENTS OF RPER2. INPUT IS FROM RPER2 (LOW BYTE)
191      ;OUTPUT IS TO ERRWD1 AND ERRWD2. TABLE LOOKUP IS DONE STARTING AT EC.00.
192      ;*****
193 016132 010146      CALMOD:  MOV      R1,-(SP)      ;SAVE R1
194 016134 010246      MOV      R2,-(SP)      ;SAVE R2
195 016136 017702 164410      MOV      @RPER2,R2      ;GET THE CONTENTS OF RPER2
196 016142 012701 004354      MOV      #EC.00,R1      ;GET THE TOP OF THE CALLOUT LIST
197 016146 042702 177400      BIC      #177400,R2      ;STRIP THE HIGH BYTE INFORMATION
198 016152 001005      BNE      1$      ;IF NOT ZERO, IT'S VALID
199 016154 005037 002404      CLR      ERRWD1      ;SET THE CALLOUT LIST TO 0
200 016160 005037 002406      CLR      ERRWD2      ;FOR BOTH (THIS ERROR CODE IS BAD)
201 016164 000407      BR      2$      ;NOW TAKE THE RETURN
202 016166 022121      1$:      CMP      (R1)+,(R1)+      ;MOVE THROUGH THE LIST
203 016170 005302      DEC      R2      ;ONE LESS ENTRY TO GO
204 016172 003375      BGT      1$      ;DO UNTIL R2 = 0
205 016174 012137 002404      MOV      (R1)+,ERRWD1      ;LOAD THE MODULE CALLOUT FOR THIS CODE
206 016200 011137 002406      MOV      (R1),ERRWD2      ;FOR BOTH MASKS
207 016204 012602      2$:      MOV      (SP)+,R2      ;RESTORE R2
208 016206 012601      MOV      (SP)+,R1      ;RESTORE R1
209 016210 000207      RTS      PC      ;AND RETURN TO CALLER
210
211      ;*****
212      ;THIS MODULE IS PART OF THE I/O SUPPORT. IT IS USED TO DUMP THE RP-07
213      ;REGISTERS AS PART OF AN ERROR MESSAGE. INPUT TO THIS MODULE IS FROM
214      ;REG - REG+52. OUTPUT IS TO THE USED SPECIFIED PRINTING DEVICE.

```

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215
216
217 016212
218 016212 012746 010337
    016216 012746 000001
    016222 010600
    016224 104415
    016226 062706 000004
219 016232 013746 002610
    016236 013746 002606
    016242 013746 002604
    016246 013746 002602
    016252 013746 002600
    016256 013746 002576
    016262 013746 002506
    016266 012746 010430
    016272 012746 000010
    016276 010600
    016300 104415
    016302 062706 000022
220
221 016306 012746 010510
    016312 012746 000001
    016316 010600
    016320 104415
    016322 062706 000004
222 016326 013746 002626
    016332 013746 002624
    016336 013746 002622
    016342 013746 002620
    016346 013746 002616
    016352 013746 002614
    016356 013746 002612
    016362 012746 010601
    016366 012746 000010
    016372 010600
    016374 104415
    016376 062706 000022
223
224 016402 012746 010661
    016406 012746 000001
    016412 010600
    016414 104415
    016416 062706 000004
225 016422 013746 002644
    016426 013746 002642
    016432 013746 002640
    016436 013746 002636
    016442 013746 002634
    016446 013746 002632
    016452 013746 002630
    016456 012746 010753
    016462 012746 000010
    016466 010600
    016470 104415
    016472 062706 000022
226 016476 005737 002504

```

```

DMPREG:
MOV #FRMT40,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #4,SP
MOV REG+12,-(SP)
MOV REG+10,-(SP)
MOV REG+6,-(SP)
MOV REG+4,-(SP)
MOV REG+2,-(SP)
MOV REG,-(SP)
MOV DRVNO,-(SP)
MOV #FRMT41,-(SP)
MOV #10,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #22,SP

;PRINT 'DRIVE RPCS1 RPWC RPBA RPDA RPCS2 RPDS'

MOV #FRMT50,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #4,SP
MOV REG+30,-(SP)
MOV REG+26,-(SP)
MOV REG+24,-(SP)
MOV REG+22,-(SP)
MOV REG+20,-(SP)
MOV REG+16,-(SP)
MOV REG+14,-(SP)
MOV #FRMT51,-(SP)
MOV #10,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #22,SP

;PRINT 'RPER1 RPAS RPLA RPDB RPMR1 RPDT RPSN'

MOV #FRMT60,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #4,SP
MOV REG+46,-(SP)
MOV REG+44,-(SP)
MOV REG+42,-(SP)
MOV REG+40,-(SP)
MOV REG+36,-(SP)
MOV REG+34,-(SP)
MOV REG+32,-(SP)
MOV #FRMT61,-(SP)
MOV #10,-(SP)
MOV SP,R0
TRAP C$PNTX
ADD #22,SP

;PRINT 'RPOF RPDC RPCC RPER2 RPER3 RPEC1 RPEC2'

TST RHTYPE
;IS IT RH70 CONTROLLER ?

```

```
227 016502 001424      BEQ      1$      ;BR IF NO
228                                     ;PRINT 'RPBAE  RPCS3'
229 016504 012746 011035  MOV      #FRMT70,-(SP)
      016510 012746 000001  MOV      #1,-(SP)
      016514 010600      MOV      SP,R0
      016516 104415      TRAP     C$PNTX
      016520 062706 000004  ADD      #4,SP
230 016524 013746 002650  MOV      REG+52,-(SP)
      016530 013746 002646  MOV      REG+50,-(SP)
      016534 012746 011055  MOV      #FRMT71,-(SP)
      016540 012746 000003  MOV      #3,-(SP)
      016544 010600      MOV      SP,R0
      016546 104415      TRAP     C$PNTX
      016550 062706 000010  ADD      #10,SP
231 016554 000207      1$: RTS      PC
```

```

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7
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9 016556
   016556 012746 007273
   016562 012746 000001
   016566 010600
   016570 104414
   016572 062706 000004
10 016576 010146
11 016600 012701 000015
12 016604
   016604 012246
   016606 012746 007312
   016612 012746 000002
   016616 010600
   016620 104414
   016622 062706 000006
13 016626 005712
14 016630 001402
15 016632 005301
16 016634 003363
17 016636
18 016636 012746 006420
   016642 012746 000001
   016646 010600
   016650 104414
   016652 062706 000004
19 016656 012601
20 016660 000207

```

```

*****
;THIS MODULE IS USED TO PRINT THE MODULE FAULT LIST TO THE USER. IT
;IS PART OF THE I/O SUPPORT USED WHEN AN ERROR MESSAGE IS PRODUCED.
;INPUT IS SET UP BY 'DECODE' SO THAT R2 IS THE LIST POINTER. OUTPUT IS
;TO THE USER SPECIFIED PRINTING DEVICE.
*****

```

FAULTS:

```

MOV    #FLST00,-(SP)
MOV    #1,-(SP)
MOV    SP,R0
TRAP   C$PNTB
ADD    #4,SP
MOV    R1,-(SP)      ;;PUSH R1 ON STACK
MOV    #13,R1        ;GET THE ITERATION COUNT

1$:
MOV    (R2)+,-(SP)
MOV    #FLST01,-(SP)
MOV    #2,-(SP)
MOV    SP,R0
TRAP   C$PNTB
ADD    #6,SP
TST    (R2)          ;MORE DATA?
BEQ    2$            ;IF ZERO, NO!
DEC    R1             ;ONE LESS ITERATION TO-GO
BGT    1$            ;DO UNTIL = 0, OR (R2) = 0
                     ;CR-LF

2$:
MOV    #CRLF,-(SP)
MOV    #1,-(SP)
MOV    SP,R0
TRAP   C$PNTB
ADD    #4,SP
MOV    (SP)+,R1      ;;POP STACK INTO R1
R-S     PC           ;AND RETURN TO CALLER

```

```
1
2
3      ;*****
4      ;THIS MODULE DOES THE SEIZE OPERATION IN THE EVENT THAT
5      ;A GIVEN DRIVE IS DUAL PORTED.
6      ;CALL IS JSR PC, SEIZE
7      ;THERE ARE NO SIDE EFFECTS
8      ;*****
9 016662 052777 000040 163632 SEIZE: BIS      #CLR,@RPCS2      ;START OUT WITH A CLEARED CONTROLLER
10 016670 013777 002506 163624      MOV      DRVNO,@RPCS2      ;RELOAD THE DRIVE NUMBER
11 016676 105777 163622      TSTB     @RPDS      ;IS THIS DRIVE SEIZED BY ANOTHER PORT?
12 016702 100424      BMI      3$      ;NO, JUST TAKE RETURN
13 016704 005077 163614      CLR      @RPDS      ;ISSUE A DRIVE REQUEST
14 016710 010246      MOV      R2,-(SP)      ;SAVE R2
15 016712 012702 000012      MOV      #10,R2      ;LOAD R2 WITH AN OVERALL ITERATION COUNT
16 016716 105777 163602      1$: TSTB     @RPDS      ;NOW WAIT FOR THE OTHER PORT TO RELEASE
17 016722 100410      BMI      2$      ;NOT YET IF RPDS:DRY = 0
18 016724 004737 017000      JSR      PC,WAIT      ;AND REDUCE THE ITERATION COUNT
19 016730 005302      DEC      R2      ;LOOK AGAIN FOR DRIVE PRESENT
20 016732 001371      BNE      1$
21 016734 104455      TRAP     C$ERDF
    016736 000001      .WORD     1
    016740 013266      .WORD     EM27
    016742 000000      .WORD     0
22 016744 112777 000377 163556 2$: MOV      #377,@RPAS      ;CLEAR ANY UNWANTED ATTENTION BITS
23 016752 012602      MOV      (SP)+,R2      ;RESTORE R2
24 016754 000207      3$: RTS      PC      ;AND TAKE RETURN
25
26      ;*****
27      ;THIS MODULE IS USED TO WAIT FOR THE SPECIFIED TIME IN MILLISECONDS
28      ;CALL
29      ;       MOV      #NUMBER,-(SP)      ;NUMBER IN MILLISECONDS TO WAIT
30      ;       JSR      PC,WAITMS      ;CALL WAIT ROUTINE
31
32      ;NOTE: THE SHORTEST WAIT CANNOT BE LESS THAN 16.66MS
33      ;*****
34
35
36 016756 016637 000002 016776 WAITMS: MOV      2(SP),WATIME      ;GET WAIT TIME IN MILLISECONDS
37 016764 005737 016776      1$: TST      WATIME      ;DONE WITH WAIT YET ?
38 016770 003375      BGT      1$      ;BR IF NO
39 016772 012616      MOV      (SP)+,(SP)      ;ADJUST RETURN ADDRESS ON STACK
40 016774 000207      RTS      PC      ;NOW RETURN TO MAIN
41
42 016776 000000      WATIME: .WORD     0      ;WAIT TIME GOES HERE
43
44      ;*****
45      ;THIS MODULE IS USED TO STALL IN LOOPS WHICH MUST WAIT FOR THE
46      ;RP07 MICROPROCESSORS. THE WAIT IS A FIXED TIME PERIOD, AND
47      ;CANNOT BE CHANGED DYNAMICALLY. THERE ARE NO SIDE EFFECTS.
48      ;*****
49
50 017000      WAIT:
    017000 012727 000372      MOV      #250.,(PC)+
    017004 000000      .WORD     0
    017006 013727 002116      MOV      L$DLY,(PC)+
    017012 000000      .WORD     0
```

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017014 005367 177772      DEC      -6(PC)
017020 001375              BNE      -4
017022 005367 177756      DEC      -22(PC)
017026 001367              BNE      -20
51 017030 000207              RTS      PC      ;NOW RETURN TO MAIN
52
53
54
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58
59
60 017032 005037 002466      ERRCK: CLR      ERSTAT      ;START OUT WITHOUT ERRORS!
61 017036 032777 040000 163460  BIT      #ERR,@RPDS      ;COMPOSITE ERROR?
62 017044 001415              BEQ      1$      ;NOT IF 0!
63 017046 013737 002524 002456  MOV      RPDS,TESTRG      ;GET THE FAILING REGISTER
64 017054 017737 163444 002452  MOV      @RPDS,RCVED      ;AND THE FAILING DATA
65 017062 013737 002452 002454  MOV      RCVED,EXPTED      ;NOW FORM THE EXPECTED DATA
66 017070 042737 040000 002454  BIC      #ERR,EXPTED      ;BY CLEARING THE CORRECT BIT
67 017076 000420              BR      2$      ;NOW, GO-ON
68 017100 032777 160000 163404 1$:  BIT      #SC!TRE!MCPE,@RPCS1;DID WE GET ANY ERRORS?
69 017106 001417              BEQ      3$      ;IF ZERO, NO!
70 017110 013737 002512 002456  MOV      RPCS1,TESTRG      ;GET THE FAILING REGISTER
71 017116 017737 163370 002452  MOV      @RPCS1,RCVED      ;AND THE FAILING DATA
72 017124 013737 002452 002454  MOV      RCVED,EXPTED      ;NOW FORM THE EXPECTED DATA
73 017132 042737 160000 002454  BIC      #SC!TRE!MCPE,EXPTED;BY CLEARING THE CORRECT BITS!
74 017140 012737 177777 002466 2$:  MOV      #-1,ERSTAT      ;SHOW THE ERROR STATUS
75 017146 000207              3$:  RTS      PC      ;RETURN TO MAIN
76
77
78
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83
84
85 017150 010246              LOCATE: MOV      R2,-(SP)      ;SAVE R2
86 017152 017702 163340              MOV      @RPBA,R2      ;GET THE ADDRESS OF THE EXPECTED DATA
87 017156 162702 000002              SUB      #2,R2      ;AND CORRECT IT
88 017162 005737 002504              TST      RHTYPE      ;WHICH CONTROLLER??
89 017166 001422              BEQ      3$      ;IT'S AN RH11 IF 0!
90 017170 032777 004000 163366  BIT      #BIT11,@RPCS3      ;IS IT AN EVEN WORD TRANSFER?
91 017176 001402              BEQ      1$      ;NO, IT IS NOT, IF 0!
92 017200 162702 000004              SUB      #4,R2      ;CORRECT IT!
93 017204 032777 002000 163352 1$:  BIT      #BIT10,@RPCS3      ;IS IT A DOUBLE WORD TRANSFER?
94 017212 001402              BEQ      2$      ;IF 7EPO, NO!!
95 017214 162702 000002              SUB      #2,R2      ;CORRECT FOR A DOUBLE WORD TRANSFER
96 017220 032777 010000 163336 2$:  BIT      #BIT12,@RPCS3      ;IS IT AN ODD WORD TRANSFER?
97 017226 001402              BEQ      3$      ;IF ZERO, NO!
98 017230 162702 000002              SUB      #2,R2      ;CORRECT FOR ODD WORD
99 017234 011237 002454 3$:  MOV      (R2),EXPTED      ;GET THE ACTUAL DATA
100 017240 017737 163270 C02452  MOV      @RPDB,RCVED      ;AND FAILING DATA
101 017246 012602              MOV      (SP)+,R2      ;NOW RESTORE R2
102 017250 000207              RTS      PC      ;AND RETURN TO MAIN
103

```

```

;*****
;THIS MODULE DOES SOME OF THE ERROR CHECKING WHICH MUST OCCUR AS A
;RESULT OF ANY DATA TRANSFER. THE MODULE CHECKS SC, TRE, AND MCPE IN
;RPCS1, AND CHECKS ERR IN RPDS. IF ERRORS ARE DETECTED, 'ERSTAT' IS
;SET TO -1, OTHERWISE 'ERSTAT' = 0. THERE ARE NO OTHER SIDE EFFECTS.
;*****

```

```

;*****
;THIS MODULE DOES THE DATA LOGGING IN THE EVENT OF A DATA BUFFER
;MISCOMPARE. THE ADDRESS 'RPDB' IS LOADED INTO 'TESTRG', THE
;CORRECTED CONTENTS OF 'RPBA' ARE USED TO POINT TO THE EXPECTED DATA IN 'EXPTED',
;AND THE CONTENTS OF 'RPDB' ARE LOADED INTO THE RECEIVED DATA 'RCVED'.
;THERE ARE NO OTHER SIDE EFFECTS.
;*****

```

```
104 ;*****
105 ;THIS MODULE IS USED FOR AN ERROR LOG DUMP. IT IS FED BY R1, WHICH
106 ;INITIALLY IS N - 1 FOR THE ROUTINE TO BE SELECTED. R4 IS USED FOR
107 ;THE DUMP ROUTINE, AND R1, AFTER BEING INCREMENTED IS USED AS THE
108 ;LOW BYTE ARGUMENT IN R4. THIS MODULE IS CALLED BY THE TEST WHICH
109 ;DUMPS THE RP07 ERROR LOG.
110 ;*****
111
112 017252 040104 NEXLOC: BIC R1,R4 ;TAKE THE PREVIOUS ARGUMENT FROM R4
113 017254 005201 INC R1 ;GET THE NEXT RAM ADDRESS
114 017256 050104 BIS R1,R4 ;NOW LOAD THE ARGUMENT INTO R4
115 017260 004737 015352 JSR PC,DIAGLD ;R4 IS USED TO LOAD THE DIAGNOSTIC ROUTINE
116 017264 000207 RTS PC ;NOW TAKE THE RETURN
```

PROGRAM UTILITIES

```

1          ;*****
2          ;THIS MODULE CONTROLS SPIRAL READS OR WRITES. IT INCREMENTS THE DESIRED
3          ;TRACK ADDRESS UNTIL IT IS READY TO OVERFLOW INTO AN ILLEGAL ADDRESS.
4          ;WHEN THIS IS READY TO HAPPEN, THE DESIRED TRACK IS SET TO ZERO, AND THE
5          ;DESIRED CYLINDER ADDRESS IS INCREMENTED. THE TERMINAL STATE IS REACHED
6          ;WHEN THE DESIRED CYLINDER IS ABOUT TO OVERFLOW, AND THE DESIRED TRACK IS
7          ;ALSO ABOUT TO OVERFLOW. WHEN THIS HAPPENS, THE DESIRED TRACK ADDRESS
8          ;IS RESET TO 0. THE CALLING MODULE MUST DETECT WHEN THIS CONDITION
9          ;OCCURS. VARIABLES: DESCYL, AND DESTRK ARE AFFECTED BY THIS MODULE.
10         ;THIS MODULE IS AFFECTED BY THE VALUE IN 'LASTRK', WHICH REPRESENTS
11         ;THE LAST USER TRACK, AND BY LASCYL, WHICH REPRESENTS THE LAST USER
12         ;CYLINDER ADDRESS ON THE DRIVE. LASCYL DOES NOT INCLUDE ANY DIAGNOSTIC
13         ;FE CYLINDER ADDRESSING.
14         ;*****
15
16 017266 123737 002415 002372 SPIRAL: CMPB   DESTRK+1,LASTRK ;TRACK COUNT AT MAX?
17 017274 103003          BHIS   1$          ;IF HIGHER OR SAME, YES!
18 017276 105237 002415          INCB  DESTRK+1      ;NEXT TRACK PLEASE...
19 017302 000410          BR      3$          ;AND RETURN
20 017304 023737 002416 002376 1$:   CMP    DESCYL,LASCYL ;LAST CYLINDER ADDRESS?
21 017312 101002          BHI     2$          ;YES, WE ARE ABOUT TO OVERFLOW!!
22 017314 005237 002416          INC    DESCYL      ;NEXT CYLINDER ADDRESS PLEASE....
23 017320 105037 002415          2$:   CLRB  DESTRK+1  ;RESET THE TRACK ADDRESS TO 0
24 017324 000207          3$:   RTS    PC          ;NAD TAKE THE RETURN
25
26         ;*****
27         ;THIS MODULE CREATES AN IMAGE OF THE RP REGISTERS.
28         ;IT IS USED TO SAVE THE REGISTERS FOR AN ERROR DUMP AFTER
29         ;AN ERROR IS DETECTED. CALL IS JSR PC,SAVRPR
30         ;THE OUTPUT OF THIS MODULE LOADS A BUFFER CALLED 'REG'
31         ;*****
32
33 017326 010046          SAVRPR: MOV    R0,-(SP)
34 017330 010146          MOV    R1,-(SP)
35 017332 012700 002512          MOV    #RPCS1,R0      ;AND THE TRANSFER ADDRESSES
36 017336 012701 002576          MOV    #REG,R1       ;OF THE SOURCE AND REG BUFFERS
37 017342 013021          1$:   MOV    @(R0)+,(R1)+   ;NOW LOG THE DATA
38 017344 022700 002562          CMP    #RPBAE,R0     ;ARE WE AT THE LIMIT?
39 017350 101374          BHI     1$                ;DO UNTIL ALL RHXX REGISTERS ARE LOGGED
40 017352 005737 002504          TST    RHTYPE
41 017356 001402          BEQ     2$
42 017360 013021          MOV    @(R0)+,(R1)+   ;GET THE CONTENTS OF RPBAE
43 017362 013021          MOV    @(R0)+,(R1)+   ;GET THE CONTENTS OF RPCS3
44 017364 012601          2$:   MOV    (SP)+,R1
45 017366 012600          MOV    (SP)+,R0
46 017370 000207          RTS    PC          ;RETURN TO MAIN FOR ERROR REPORT
47
48         ;*****
49         ;THE FOLLOWING THREE MODULES ARE USED TO FORM UP EXPECTED VS RECEIVED DATA
50         ;FOR TWO TYPES OF CASES. THE FIRST IS WHEN THE PROGRAM TRIES TO SET A BIT
51         ;AND THE BIT FAILS TO SET, AND THE SECOND IS WHEN THE BIT FAILS TO CLEAR.
52         ;THE FORMER CASE IS HANDLED BY 'BISEXP' AND THE LATTER BY 'BICEXP'.
53         ;BOTH 'BISEXP' AND 'BICEXP' CALL 'REGSET' TO PERFORM SOME PRELIMINARY
54         ;DATA SETUP. BOTH MODULES 'BISEXP' AND 'BICEXP' AFFECT THE FOLLOWING:
55         ;'TESTRG', 'EXPTED', 'RCVED'.
56         ;*****
57

```

```
58 017372 017602 000000      BISEXP::MOV    @ (SP),R2      ;GET THE POINTER TO THE FAILING REG.
59 017376 004737 017452      JSR      PC,REGSET    ;GO LOAD RESULTS
60 017402 062716 000002      ADD      #2,(SP)      ;MOVE THE POINTER TO GET THE BIT MASK
61 017406 057637 000000 002454  BIS      @ (SP),EXPTED    ;SET EXPECTED BIT WHICH FAILED
62 017414 062716 000002      ADD      #2,(SP)      ;MOVE THE POINTER FOR A RETURN
63 017420 000207              RTS      PC          ;RETURN
64
65 017422 017602 000000      BICEXP::MOV    @ (SP),R2      ;GET THE POINTER TO THE FAILING REG.
66 017426 004737 017452      JSR      PC,REGSET    ;GO LOAD RESULTS
67 017432 062716 000002      ADD      #2,(SP)      ;MOVE THE POINTER TO GET THE MASK
68 017436 047637 000000 002454  BIC      @ (SP),EXPTED    ;CLEAR EXPECTED BIT WHICH FAILED
69 017444 062716 000002      ADD      #2,(SP)      ;MOVE THE POINTER TO TAKE A RETURN
70 017450 000207              RTS      PC          ;NOW TAKE THE RETURN
71
72 017452 011237 002456      REGSET: MOV    (R2),TESTRG    ;GET THE FAILING REGISTER
73 017456 011202              MOV    (R2),R2      ;GET THE FAILING REGISTER
74 017460 011237 002452              MOV    (R2),RCVED    ;NOW GET ITS CONTENTS
75 017464 013737 002452 002454  MOV    RCVED,EXPTED    ;AND FORM EXPECTED DATA
76 017472 000207              RTS      PC          ;RETURN
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90 017474 005137 002450      RESET:  COM     MSK          ;INVERT THE BIT MASK, BITS TO TEST=1
91 017500 010246              MOV     R2,-(SP)        ;SAVE R2
92 017502 017602 000002      MOV     @2(SP),R2      ;FORM ADDRESS OF REGISTER UNDER TEST
93 017506 011202              MOV     (R2),R2      ;GOT IT NOW!
94 017510 052777 000040 163004  BIS     #CLR,@RPCS2    ;SET RPCS2:CLR=1
95 017516 033712 002450      BIT     MSK,(R2)      ;LOOK FOR BIT(S) UNDER TEST TO CLEAR
96 017522 001415              BEQ     1$           ;IF OK, SKIP ERROR DISPATCH
97 017524 010237 002456      MOV     R2,TESTRG    ;LOAD THE FAILING ADDRESS
98 017530 011237 002454      MOV     (R2),EXPTED    ;AND GET THE FAILING DATA
99 017534 011237 002452      MOV     (R2),RCVED    ;AND SAVE IT
100 017540 043737 002450 002454  BIC     MSK,EXPTED    ;NOW FORM THE EXPECTED DATA
101 017546 104456              TRAP    C$ERHRD
    017550 000005              .WORD   5
    017552 012523              .WORD   EM15
    017554 014172              .WORD   ERRO
102 017556 005137 002450      1$:   COM     MSK          ;BITS TO TEST=0
103 017562 012602              MOV     (SP)+,R2      ;RESTORE R2
104 017564 062716 000002      ADD     #2,(SP)      ;MOVE RETURN ADDRESS OVER DATA FIELD
105 017570 000207              RTS      PC          ;RETURN
```

PROGRAM UTILITIES

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13 017572 005737 002460 LDZERO: TST ILOCK ;POLLED MODE?
14 017576 001402 BEQ 1$ ;NOT IF ZERO
15 017600 004737 017672 JSR PC,IRLOCK ;POLL AND WAIT FOR IR TO SET
16 017604 005077 162630 1$: CLR @SNK ;WRITE 0'S TO THE REGISTER UNDER TEST
17 017610 005737 002460 TST ILOCK ;POLLED MODE?
18 017614 001402 BEQ 2$ ;NOT IF ZERO
19 017616 004737 017706 JSR PC,ORLOCK ;OK, POLL FOR OR TO SET
20 017622 017737 162612 002452 2$: MOV @SNK,RCVED ;GET THE TEST RESULTS
21 017630 043737 002450 002452 BIC MSK,RCVED ;STRIP OUT THE UNWANTED BITS
22 017636 013737 002450 002454 MOV MSK,EXPTED ;GET THE BIT MASK
23 017644 005137 002454 COM EXPTED ;BITS-TO-TEST = 1
24 017650 033737 002454 002452 BIT EXPTED,RCVED ;NOW DO THE DATA COMPARISON
25 017656 001404 BEQ 4$ ;BITS TO TEST = 0, OK!
26 017660 104456 TRAP C$ERHRD
    017662 000006 .WORD 6
    017664 012523 .WORD EM15
    017666 014172 .WORD ERRO
27 017670 000207 4$: RTS PC ;RETURN TO MAIN
28
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35
36 017672 IRLOCK: TRAP C$BRK
37 017672 104422 BIT #IR,@RPCS2 ;POLL IR IN RPCS2
38 017674 032777 000100 162620 BEQ IRLOCK ;AND WAIT FOR IT!
39 017702 001773 RTS PC ;NOW RETURN TO CALLING SUBROUTINE
40
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47
48 017706 ORLOCK: TRAP C$BRK
49 017706 104422 BIT #OR,@RPCS2 ;POLL OR IN RPCS2
50 017710 032777 000200 162604 BEQ ORLOCK ;AND WAIT FOR IT!
51 017716 001773 RTS PC ;NOW RETURN TO CALLING SUBROUTINE
52 017720 000207
```

THIS MODULE, WITH EXTERNALLY SET-UP LINKAGE, WRITES THE REGISTER-UNDER
TEST TO A ZERO. IF THE BITS UNDER TEST DO NOT CLEAR AS EXPECTED, AN
ERROR MESSAGE IS DISPATCHED IN THIS MODULE. CONTROL IS DETERMINED BY:
"ILOCK", WHICH DETERMINES IF THE DEVICE MUST BE POLLED, IE "IR" OR "OR"
= 1 AND "MSK" WHICH CONTAINS THE BITS-UNDER-TEST = 0. WHEN THE
MODULE IS CALLED, "SNK" SHOULD EQUAL THE ADDRESS OF THE REGISTER UNDER TEST.
THE OUTPUT OF THIS MODULE IS IN THREE VARIABLES: "TESTRG", "EXPTED", AND
"RCVED".

THIS MODULE POLLS "IR" TO EQUAL A ONE AT SOME TIME. THE ACTUAL TESTING
OF "IR" AGAINST A WATCHDOG TIMER IS NOT DONE HERE, BUT A SUPERVISOR CALL
IS ISSUED IN CASE "IR" NEVER SETS, AND THE DIAGNOSTIC HANGS. THE DIAGNOSTIC
WILL RESPOND TO A CONTROL C WHILE IN THIS MODULE.

THIS MODULE POLLS "OR" AND WAITS FOR IT TO SET. THE ACTUAL TESTING
OF "OR" AGAINST A WATCHDOG TIMER IS NOT DONE HERE, BUT A SUPERVISOR CALL
IS ISSUED IN CASE "OR" NEVER SETS, AND THE DIAGNOSTIC HANGS. THE DIAGNOSTIC
WILL RESPOND TO A CONTROL C WHILE IN THIS MODULE.

PROGRAM UTILITIES

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8 017722 004737 016662 PRELOD: JSR PC,SEIZE ;GET THE DRIVE'S ATTENTION
9 017726 C12777 000021 162556 MOV #RIP,@RPCS1 ;ISSUE A READ IN PRESET COMMAND
10 017734 052777 010000 162602 BIS #FMT,@RPOF ;16 BITS/WORD
11 017742 000207 RTS PC ;RETURN
12
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28
29 017744 010246 SETUP: MOV R2,-(SP) ;SAVE R2
30 017746 005037 002432 CLR CSTORE ;CLEAN CARRY STORE
31 017752 017602 000002 MOV @2(SP),R2 ;GET TABLE ADDRESS
32 017756 012237 002434 MOV (R2)+,PATCNT ;GET THE # OF PATTERNS TO RUN
33 017762 013237 002440 MOV @2(SP)+,SNK ;ADDRESS:REGISTER TO TEST
34 017766 013737 002440 002456 MOV SNK,TESTRG ;ADDRESS = REGISTER UNDER TEST
35 017774 012237 002446 MOV (R2)+,MASK ;BITS TO TEST
36 020000 011237 002442 MOV (R2),SRC ;TEST PATTERN
37 020004 017737 162432 002444 MOV @SRC,SRCTMP ;BUFFER TO DIDDLE THE BITS
38 020012 013737 002446 002450 MOV MASK,MSK ;GET THE BITS TO STRIP OUT
39 020020 005137 002450 COM MSK ;DON'T CARE BITS = 1
40 020024 012602 MOV (SP)+,R2 ;RESTORE R2
41 020026 062716 000002 ADD #2,(SP) ;MODIFY RETURN OVER DATA FIELD
42 020032 000207 RTS PC ;RETURN
43
44
45
46
47
48
49
50
51 020034 013746 002444 FLOAT: MOV SRCIMP,-(SP) ;PUT PATTERN ON STACK
52 020040 063716 002432 ADD CSTORE,(SP) ;ADD CARRY FROM LAST ROTATE
53 020044 043716 002450 PIC MSK,(SP) ;CLEAR OUT UNWANTED BITS
54 020050 011637 002454 MOV (SP),EXPTD ;GET THE EXPECTED DATA
55 020054 005737 002460 TST ILOCK ;SHOULD WE POLL IR/OR??
56 020060 001402 BEQ 1$ ;NO, JUST DO THE LOAD FUNCTION
57 020062 004737 017672 JSR PC,IRLOCK ;GO-AHEAD AND POLL FOR IR = 1
```

THIS MODULE, ONCE THE DRIVE HAS BEEN SEIZED, DOES A PRELOAD OF THE DRIVE.
A PRELOAD IS AN OPERATION WHEREIN THE DRIVE IS SET UP THROUGH USE OF A READ
IN PRESET COMMAND, AND SETTING FORMAT 16 = 1. THERE ARE NO SIDE EFFECTS.

THIS MODULE DOES THE PARAMETER SETUP FOR 'FLOAT', 'LDZERO' AND 'CONSET'.
IT GETS ITS INPUT FROM A TABLE POINTED TO BY THE STACK WHEN THE
MODULE IS INITIALLY CALLED. THIS TABLE CONTAINS THE DATA STRUCTURE
USED BY SOME TESTS. CONTAINED WITHIN THE DATA STRUCTURES ARE
THE FOLLOWING: 1) THE REGISTER UNDER TEST, 2) THE BITS UNDER TEST, 3)
THE DATA PATTERNS TO USE, 4) THE NUMBER OF PATTERNS TO USE.
THE OUTPUT OF THIS MODULE IS IN: 'MSK'; WHICH CONTAINS THE COMPLIMENTED
FORM OF THE BITS UNDER TEST, 'PATCNT' WHICH CONTAINS THE NUMBER OF PATTERNS
TO USE, 'MASK' WHICH CONTAINS THE NUMBER OF BITS TO TEST, 'SRC'; WHICH
CONTAINS THE ADDRESS OF THE DATA PATTERN TO USE, 'SNK'; WHICH CONTAINS
THE ADDRESS OF THE REGISTER TO TEST, 'SRCTMP'; WHICH IS LOADED FOR A
POSSIBLE ERROR CONDITION, 'CSTORE' WHICH CONTAINS THE CARRY BIT FROM THE
LAST OPERATION (INITIALLY SET TO 0, INDICATING THE FIRST OPERATION).

THIS MODULE GENERATES A BIT WHICH IS FLOATED THROUGH A SELECTED REGISTER
UNDER TEST. IT IS SETUP THROUGH THE MODULE 'SETUP'. IF ERRORS ARE DETECTED,
IT WILL DISPATCH AN APPROPRIATE ERROR MESSAGE. THIS MODULE EFFECTS THE
FOLLOWING VARIABLES: 'MASK', 'CSTORE', 'SRCTMP', 'RCVED', 'EXPTD'.

```

58 020066 011677 162346      1$:  MOV      (SP),@SNK      ;WRITE DATA TO REG UNDER TEST
59 020072 005737 002460      TST      ILOCK      ;SHOULD WE POLL FOR OR = 1?
60 020076 001402              BEQ      2$      ;NO, JUST GET RESULTS
61 020100 004737 017706      JSR      PC,ORLOCK      ;OK, POLL FOR OR = 1
62 020104 017746 162330      2$:  MOV      @SNK,-(SP)      ;GET THE RESULTS
63 020110 043716 002450      BIC      MSK,(SP)      ;STRIP UNWANTED DATA
64 020114 011637 002452      MOV      (SP),RCVED      ;AND SAVE FOR POSSIBLE ERROR REPORT
65 020120 022626              CMP      (SP)+,(SP)+      ;LOOK FOR MATCH
66 020122 001411              BEQ      5$      ;IF MATCH, SKIP ERROR DISPATCH
67 020124 062716 000002      ADD      #2,(SP)      ;ERROR, MODIFY RETURN FOR ERROR LOOP
68 020130 005037 002446      CLR      MASK      ;MASK = 0 FOR PREMATURE EXIT
69 020134 104456              TRAP     C$ERHRD
    020136 000007              .WORD    7
    020140 012454              .WORD    EM14
    020142 014172              .WORD    ERRO
70 020144 000207      4$:  RTS      PC      ;RETURN
71 020146 000241      5$:  CLC              ;CARRY = 0
72 020150 006137 002446      ROL      MASK      ;REDUCE THE ITERATION COUNT BY ONE
73 020154 000241              CLC              ;CARRY = 0
74 020156 006137 002444      ROL      SRCTMP      ;ROTATE PATTERN
75 020162 103403              BCS      6$      ;OBSERVE & SAVE CARRY
76 020164 005037 002432      CLR      CSTORE      ;CARRY=0
77 020170 000765              BR       4$      ;RETURN
78 020172 012737 000001 002432 6$:  MOV      #1,CSTORE      ;CARRY = 1
79 020200 000761              BR       4$      ;RETURN
80
81
82      ;*****
83      ;THIS MODULE DOES SOME DATA COMPARISON. IF THE DATA DOES NOT MATCH,
84      ;AN ERROR MESSAGE AND APPROPRIATE DATA ARE REPORTED. VARIABLES AFFECTED ARE:
85      ;'PSTACK', 'TESTRG', 'RCVED', 'EXPTED'.
86      ;*****
87 020202 010246      COMPAR: MOV      R2,-(SP)      ;SAVE R2
88 020204 012702 002652      MOV      #PSTACK,R2      ;GET THE SOFTWARE PSTACK ADDRESS
89 020210 017612 000002      MOV      @2(SP),(R2)      ;GET THE ADDRESS OF THE DATA PATTERN TO RUN
90 020214 013242              MOV      @2(R2)+,-(R2)      ;NOW GET THE DATA PATTERN TO USE
91 020216 043712 002450      BIC      MSK,(R2)      ;THROW OUT UNUSED DATA
92 020222 011237 002454      MOV      (R2),EXPTED      ;AND SAVE EXPECTED RESULTS FOR POSSIBLE ERROR
93 020226 005737 002460      TST      ILOCK      ;POLL IR/OR MODE?
94 020232 001402              BEQ      1$      ;NO, JUST GO-ON
95 020234 004737 017672      JSR      PC,IRLOCK      ;WAIT FOR IR TO SET, IT REALLY WILL!
96 020240 012277 162174      1$:  MOV      (R2)+,@SNK      ;WRITE DATA TO THE REGISTER
97 020244 005737 002460      TST      ILOCK      ;POLL IR/OR MODE?
98 020250 001402              BEQ      2$      ;NOT IF ZERO
99 020252 004737 017706      JSR      PC,ORLOCK      ;WAIT FOR OR TO SET, IT REALLY WILL!
100 020256 017712 162156      2$:  MOV      @SNK,(R2)      ;GET THE RESULTS
101 020262 043712 002450      BIC      MSK,(R2)      ;IGNORE UNUSED DATA
102 020266 013737 002440 002456      MOV      SNK,TESTRG      ;SAVE REGISTER UNDER TEST
103 020274 011237 002452      MOV      (R2),RCVED      ;AND THE REGISTER DATA
104 020300 021242              CMP      (R2),-(R2)      ;CHECK RESULTS
105 020302 001406              BEQ      4$      ;OK, SKIP ERROR REPORT
106 020304 104456              TRAP     C$ERHRD
    020306 000004              .WORD    4
    020310 012454              .WORD    EM14
    020312 014172              .WORD    ERRO
107 020314 005037 002402      CLR      TCOUN      ;SET ITERATIONS TO 0
108 020320 012602      4$:  MOV      (SP)+,R2      ;RESTORE R2

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```

109 020322 062716 000002          ADD    #2,(SP)      ;MOVE RETURN OVER DATA INPUT
110 020326 000207          RTS      PC              ;NOW RETURN TO MAIN
111
112          ;*****
113          ;THIS MODULE IS USED TO CONTINUE A SETUP PROCEDURE BETWEEN SUBTESTS
114          ;WITHIN A DIAGNOSTIC TEST. IT AFFECTS THE FOLLOWING VARIABLES: 'PATCNT',
115          ;'CSTORE', 'MASK', 'SRCTMP', 'SRC'.
116          ;*****
117
118 020330 005337 002434          CONSET: DEC    PATCNT      ;ONE LESS PATTERN TO GO
119 020334 100415              BMI      1$              ;UNDERFLOW, WF'RE FINISHED!
120 020336 005037 002432          CLR      CSTORE        ;CLEAR CARR, STORE
121 020342 062737 000002 002442  ADD     #2,SRC        ;GET NEXT PATTERN
122 020350 013737 002450 002446  MOV     MSK,MASK      ;RELOAD # OF BITS TO TEST
123 020356 005137 002446          COM      MASK          ;CORRECT THE INVERSION (BITS TESTED=1)
124 020362 017737 162054 002444  MOV     @SRC,SRCTMP    ;LOAD THE BUFFER FOR BIT MANIPULATION
125 020370 000207          1$:      RTS      PC          ;RETURN

```

```

1
2
3
4
5
6
7
8
9 020372 010146
10 020374 012701 000062
11 020400 013777 002506 162114
12 020406 032777 010000 162110
13 020414 001017
14 020416 004737 017000
15 020422 005301
16 020424 003370
17 020426 013746 002506
    020432 012746 006577
    020436 012746 000002
    020442 010600
    020444 104417
    020446 062706 000006
18 020452 000750
19
20 020454 012701 000062
21 020460 032777 000200 162036
22 020466 001017
23 020470 004737 017000
24 020474 005301
25 020476 003370
26 020500 013746 002506
    020504 012746 006671
    020510 012746 000002
    020514 010600
    020516 104417
    020520 062706 000006
27 020524 000753
28
29 020526 012601
30 020530 000207

;*****
;THIS MODULE IS USED IN THE EVENT OF A POWER FAIL. IT WAITS FOR DRIVE
;READY TO SET BEFORE RETURNING TO THE MAIN CODE. IT MAINTAINS A TIMER
;WHICH PERIODICALLY INFORMS THE USER THAT DRIVE READY HAS NOT YET SET, AND
;THE PROGRAM IS WAITING FOR IT TO SET BEFORE CONTINUING THE TESTS.
;*****
WATDRY: MOV R1, -(SP) ;SAVE R1
1$: MOV #50, R1 ;GET AN ITERATION COUNT
MOV DRVNO, @RPCS2 ;LOAD THE UNIT UNDER TEST
2$: BIT #MOL, @RPDS ;MEDIUM ON LINE?
BNE 3$ ;IF = 1, YES
JSR PC, WAIT ;STALL FOR A WHILE
DEC R1 ;ONE LESS ITERATION TO-GO
BGT 2$ ;DO UNTIL R1 = 0
MOV DRVNO, -(SP)
MOV #MSG10, -(SP)
MOV #2, -(SP)
MOV SP, R0
TRAP C$PNTF
ADD #6, SP
BR 1$ ;AND LOOP

3$: MOV #50, R1 ;GET AN ITERATION COUNT
4$: BIT #DRY, @RPDS ;IS DRIVE READY SET?
BNE 5$ ;YES, GO-ON
JSR PC, WAIT ;STALL FOR A WHILE
DEC R1 ;ONE LESS ITERATION TO-GO
BGT 4$ ;DO UNTIL R1 = 0
MOV DRVNO, -(SP)
MOV #MSG11, -(SP)
MOV #2, -(SP)
MOV SP, R0
TRAP C$PNTF
ADD #6, SP
BR 3$ ;AND LOOP

5$: MOV (SP)+, R1 ;RESTORE R1
RTS PC ;EXIT

```

```

1
2
3
4
5
6
7
8
9
10 020532 012700 002404
11 020536 012702 004060
12 020542 012703 002676
13 020546 012705 000002
14 020552 012704 000015
15 020556 012701 000001
16 020562 030110
17 020564 001402
18 020566 011223
19 020570 005304
20 020572 005722
21 020574 006301
22 020576 001371
23 020600 005305
24 020602 001402
25 020604 005720
26 020606 000763
27 020610 005704
28 020612 001403
29 020614 005023
30 020616 005304
31 020620 003375
32 020622 012702 002676
33 020626 000207
34
35
36
37
38
39 020630
40 020630 005237 002462
41 020634
42 020634 000002

;*****
;THIS MODULE DECODES TWO VARIABLES: 'ERRWD1' AND 'ERRWD2'.  CONTAINED
;WITHIN THESE TWO VARIABLES ARE BITS WHICH REPRESENT THE VARIOUS MODULES
;WHICH ARE TO BE CALLED OUT FOR DIAGNOSTIC TEST FAILURES.  AFTER THE
;DECODING IS DONE, THE MODULE CREATED AN ASCII DISPATCH TABLE WHICH
;POINTS TO THE VARIOUS ASCII MESSAGES REPRESENTING THE ACTUAL MODULE CALLOUT.
;*****

DECDL: MOV #ERRWD1,R0 ;GET THE FIRST ERROR WORD STATUS
        MOV #MCUTAB,R2 ;GET THE MODULE CALL OUT INDEX FILE
        MOV #MCUTXT,R3 ;NOW GET THE OUTPUT POINTER FILE
        MOV #2,R5 ;WE'RE DOING 2 ERROR WORD MASKS!
        MOV #13,R4 ;AND WE'RE CREATING 13. MESSAGE FILES!
1$: MOV #BIT0,R1 ;FORM THE INITIAL BIT MASK
2$: BIT R1,(R0) ;IS THIS BIT 'ON'??
    BEQ 3$ ;NO, DON'T DO ANYTHING NOW!
    MOV (R2),(R3)+ ;GET THIS MESSAGE!
    DEC R4 ;ONE LESS MESSAGE TO GET!
3$: TST (R2)+ ;NEXT INPUT MESSAGE PLEASE...
    ASL R1 ;MOV MASK OVER FOR NEXT FIND...
    BNE 2$ ;KEEP GOING IF NOT ZERO
    DEC R5 ;NEXT ERROR WORD STATUS ?
    BEQ 4$ ;IF ZERO, DONE WITH SEARCH
    TST (R0)+ ;NEXT ERROR WORD PLEASE..
    BR 1$ ;NOW SCAN THIS WORD!
4$: TST R4 ;DID WE LOAD 7 MESSAGES?
    BEQ 6$ ;YES, JUST LOAD POINTER AND RETURN
5$: CLR (R3)+ ;CREATE THE NULL MESSAGE FILE
    DEC R4 ;DONE?
    BGT 5$ ;NOT IF > 0!
6$: MOV #MCUTXT,R2 ;LOAD THE OUTPUT POINTER NOW, WE'RE DONE!
    RTS PC ;TAKE THE RETURN

;*****
;THIS IS A SIMPLE INTERRUPT ROUTINE WHICH TALLYS THE NUMBER OF INTERRUPTS
;RECEIVED FOR ANY SELECTED OPERATION.
;*****

INTSRV: INC INTFLG ;COUNT THIS INTERRUPT
L10007: RTI

```

```
11      .SBTTL  REPORT CODING SECTION
39
41      :++
42      : THE REPORT CODING SECTION CONTAINS THE
43      : 'PRINTS' CALLS THAT GENERATE STATISTICAL REPORTS.
44      :--
45
46 020636      LSRPT::
47
59
60 020636      000167      .WORD  JSJMP
   020640      000000      .WORD  L10010-2-.
61
63      .EVEN
73
74
75 020642      L10010:
   020642      104425      TRAP   CSRPT
```

1			.SBTTL	PROTECTION TABLE	
2					
3			;	++	
4			;	THIS TABLE IS USED BY THE RUNTIME SERVICES	
5			;	TO PROTECT THE LOAD MEDIA.	
6			;	--	
7					
8	020644		L\$PROT::		
9	020644	000000		0	;P-TABLE OFFSET OF CSR
10	020646	177777		-1	;NOT A MASSBUS DEVICE
11	020650	000006		6	;P-TABLE OFFSET DRIVE #
13					

```
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 020652      L$INIT::
9
10 020652      104433      TRAP      C$RESET      ;RESET THE WORLD
11
12 020654      012700      000034      MOV      #EF.PWR,R0      ;POWER UP SEQUENCE ?
13 020660      104447      TRAP      C$REFG
14
15 020662      103504      BCS      5$      ;GO TO 5$ IF YES
16
17 020664      012700      000036      MOV      #EF.CON,R0      ;CONTINUE COMMAND ?
18 020670      104447      TRAP      C$REFG
19
20 020672      103002      BCC      1$      ;GO TO 1$ IF NO, ELSE
21
22 020674      104432      TRAP      C$EXIT      ;EXIT INIT
23 020676      000446      .WORD      L10012-.
24
25 020700      012700      000035      1$:      MOV      #EF.NEW,R0      ;'STA', 'RES' OR 'NEW PASS' ?
26 020704      104447      TRAP      C$REFG
27
28 020706      103015      BCC      2$      ;GO TO 2$ IF NO, MUST BE NEW 'SUB-PASS'
29 020710      005037      002422      CLR      ROUTDO      ;ALLOW A NEW USER SELECTED MICRO DIAGNOSTIC SELECTION
30
31 020714      012746      006420      MOV      #CRLF,-(SP)      ;CR-LF
32 020720      012746      000001      MOV      #1,-(SP)
33 020724      010600      MOV      SP,R0
34 020726      104417      TRAP      C$PNTF
35 020730      062706      000004      ADD      #4,SP
36 020734      012737      177777      002472      2$:      MOV      #-1,UNIT      ;RESET UNIT COUNT
37 020742      005237      002472      INC      UNIT      ;GET NEXT UNIT NUMBER FOR TESTING
38 020746      012702      000024      MOV      #20,R2      ;RH/RP REGISTER COUNT
39 020752      012703      002512      MOV      #RPCS1,R3      ;DATA SINK
40
41 020756      013700      002472      MOV      UNIT,R0      ;GET UNIT FROM HARDWARE P-TABLE
42 020762      104442      TRAP      C$GPHRD
43 020764      010005      MOV      R0,R5
44
45 020766      103365      BCC      2$
46 020770      011346      MOV      (R3),-(SP)      ;SAVE R3
47 020772      011546      MOV      (R5),-(SP)      ;AND THE BASE ADDRESS
48 020774      166616      000002      SUB      2(SP),(SP)      ;DERIVE NEW ADDRESS
49 021000      061623      3$:      ADD      (SP),(R3)+      ;LOG IT IN NEW TABLE
50 021002      005302      DEC      R2      ;COUNT LOGGING
51 021004      001375      BNE      3$      ;R2 NOT ZERO, CONTINUE LOGGING
52 021006      004737      014700      JSR      PC,SIZE70      ;SEE IF RH70 IS PRESENT
53 021012      005737      002504      TST      RHTYPE      ;IS IT AN RH70 ?
54 021016      001406      BEQ      4$      ;BR IF NO
55 021020      013702      002502      MOV      RHEXT,R2      ;GET RPBAE OFFSET
56 021024      061502      ADD      (R5),R2      ;ADD BASE ADDRESS TO OFFSET
57 021026      010223      MOV      R2,(R3)+      ;SAVE NEW RPBAE
58 021030      005722      TST      (R2)+      ;ADD 2
```

```
52 021032 010213      MOV      R2,(R3)      ;SAVE NEW RPCS3
53
54 021034 022626      4$:  CMP      (SP)+,(SP)+      ;RESTORE STACK
55 021036 012537 002474  MOV      (R5)+,RPADR      ;SAVE RPCS1 BASE ADDRESS
56 021042 012537 002476  MOV      (R5)+,RPVEC      ;SAVE INTERRUPT VECTOR ADDRESS
57 021046 012537 002500  MOV      (R5)+,RPVEC+2      ;SAVE INTERRUPT PRIORITY
58 021052 011537 002506  MOV      (R5),DRVNO      ;SETUP DRIVE NUMBER FOR UNIT N
59 021056 013737 002370 002372  MOV      ENDTRK,LASTRK      ;SET UP THE LAST USABLE TRACK
60 021064 013737 002374 002376  MOV      ENDCYL,LASCYL      ;AND THE LAST USABLE CYLINDER
61 021072 000402      BR      6$
62
63 021074 004737 020372      5$:  JSR      PC,WATDRY      ;PWR FAIL, WAIT FOR THE DRIVE TO GO READY
64 021100 005037 002404      6$:  CLR      ERRWD1      ;NO ERROR STATUS BITS
65 021104 005037 002406      CLR      ERRWD2      ;FOR BOTH MASKS
66 021110 005037 002460      CLR      ILOCK      ;START WITHOUT IR/OR INTERLOCK
67 021114 005037 002462      CLR      INTFLG      ;RESET THE INTERRUPT COUNTER
68 021120 005037 002464      CLR      UNABLE      ;INSURE THAT UNIT IS ENABLED
69 021124 005037 002466      CLR      ERSTAT      ;NO FAIL STATUS
70 021130 005037 002420      CLR      FUNCTN      ;START UP WITH NO FUNCTION CODE
71 021134 012777 000040 161360  MOV      #CLR,@RPCS2      ;MASSBUS INIT TO CLEAR IMPENDING INTERRUPTS
72 021142 013701 002506      MOV      DRVNO,R1      ;GET THE DRIVE NUMBFR
73 021146 010177 161350      MOV      R1,@RPCS2      ;SELECT DRIVE
74 021152 005037 002400      CLR      BITPOS      ;CLEAR ATTENTION BIT POSITION WORD
75 021156 116137 002566 002400  MOVB     ATABIT(R1),BITPOS      ;GET ATA BIT POSITION FOR THIS DRIVE
76 021164 004737 015550      JSR      PC,ST.CLK      ;START THE CLOCK
77 021170 012746 003720      MOV      #2000,-(SP)      ;WAIT 2000. MS
78 021174 004737 016756      JSR      PC,WAITMS
79
80      ;PRINT DRIVE SERIAL NUMBER
81 021200 012701 000004      MOV      #4,R1      ;4 DIGITS
82 021204 013746 002506      MOV      DRVNO,-(SP)
83 021210 012746 006423      MOV      #DSNMSG,-(SP)
84 021214 012746 000002      MOV      #2,-(SP)
85 021220 010600      MOV      SP,R0
86 021222 104417      TRAP     C$PNTF
87 021224 062706 000006      ADD      #6,SP
88 021230 017746 161306      7$:  MOV      @RPSN,-(SP)      ;FETCH S/N
89 021234 005002      CLR      R2      ;ZERO OUTPUT
90 021236 006116      ROL      (SP)      ;PUT NEXT DIGIT INTO R2
91 021240 006102      ROL      R2
92 021242 006116      ROL      (SP)
93 021244 006102      ROL      R2
94 021246 006116      ROL      (SP)
95 021250 006102      ROL      R2
96 021252 006116      ROL      (SP)
97 021254 006102      ROL      R2
98 021256 062702 000060      ADD      #'0,R2      ;MAKE RESULT ASCII
99 021262 010237 002510      MOV      R2,DRVSN      ;SAVE R2 FOR PRINT
100 021266 012746 002510      MOV      #DRVSN,-(SP)
101 021272 012746 006447      MOV      #SNDIGT,-(SP)
102 021276 012746 000002      MOV      #2,-(SP)
103 021302 010600      MOV      SP,R0
104 021304 104417      TRAP     C$PNTF
105 021306 062706 000006      ADD      #6,SP
106 021312 005301      DEC      R1      ;COUNT DOWN DIGIT
107 021314 003347      BGT      7$      ;NEXT DIGIT
```

98	021316	005726		TST	(SP)+		:RESTORE STACK
99							:CR-LF
100	021320	012746	006420	MOV	#CRLF,-(SP)		
	021324	012746	000C01	MOV	#1,-(SP)		
	021330	010600		MOV	SP,R0		
	021332	104417		TRAP	C\$PNTF		
	021334	062706	000004	ADD	#4,SP		
101							
125							
126	021340	104432		TRAP	C\$EXIT		
	021342	000002		.WORD	L10012-		
127							
139				.EVEN			
140							
141	021344						
	021344	104411					
			L10012:	TRAP	C\$INIT		

```
1      .SBTTL  AUTODROP SECTION
2
3      ;**
4      ; THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
5      ; THE "ADR" FLAG WAS SET.  THE UNIT(S) UNDER TEST ARE CHECKED TO
6      ; SEE IF THEY WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY
7      ; DROPPED FROM TESTING.
8      ;--
9
10     021346      L$AUTO::
11
18     021346      L10013:
    021346 104461      TRAP      C$AUTO
```

```

1      .SBTTL  CLEANUP CODING SECTION
2
3      ;++
4      ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
5      ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
6      ;--
7
8 021350      L$CLEAN:
9 021350      005037 002404      CLR      ERRWD1      ;AND ANY LEFT-OVER ERROR STATUS
10 021354      005037 002406      CLR      ERRWD2      ;FOR BOTH MASKS!
11 021360      005037 002466      CLR      ERSTAT      ;SET FOR PASS STATUS
12 021364      005037 002430      CLR      FASTAT      ;ENSURE THAT 'INTERNAL' FAILED STATUS = 0
13 021370      005037 002464      CLR      UNABLE      ;INSURE THAT UNIT IS ENABLED
14 021374      022737 000035 002420      CMP      #DIAG,FUNCTN ;WAS LAST COMMAND A DIAGNOSTIC COMMAND?
15 021402      001002      BNE      1$      ;IF SO, TAKE THE BRANCH
16 021404      004737 015312      JSR      PC,DIAGEN      ;AND ENSURE THAT THE UNIT ISN'T IN DIAGNOSTIC MODE
17 021410      1$:
18 021410      012700 000340      MOV      #PRI07,R0      ;SET PRIORITY TO 7
19 021414      104441      TRAP      C$SPRI
20 021416      004737 016054      JSR      PC,STOPCK      ;STOP CLOCK
21 021422      012777 000040 161072      MOV      #CLR,@RPCS2      ;MASSBUS INIT TO CLEAR IMPENDING INTERRUPTS
22 021430      013777 002506 161064      MOV      DRVNO,@RPCS2      ;GET DRIVE NUMBER
23 021436      005737 002426      TST      CLKSTA      ;RELEASE APPROPRIATE CLOCK VECTOR
24 021442      001410      BEQ      3$      ;NO CLOCK, SKIP
25 021444      100404      BMI      2$      ;L-CLK
26 021446      013700 015734      MOV      PKV,R0      ;P-CLK VECTOR RELEASE
27 021452      104436      TRAP      C$CVEC
28 021454      000403      BR      3$
29 021456      2$:
30 021456      013700 015744      MOV      LKV,R0      ;L-CLK VECTOR RELEASE
31 021462      104436      TRAP      C$CVEC
32 021464      3$:
33 021464      013700 002476      MOV      RPVEC,R0      ;RP07 VECTOR RELEASE
34 021470      104436      TRAP      C$CVEC
35
36
37
38
39
40
41
42 021472      104432      TRAP      C$EXIT
43 021474      000002      .WORD      L10014-.
44
45
46
47
48
49
50
51
52
53
54
55      .EVEN
56
57 021476      L10014:
58 021476      104412      TRAP      C$CLEAN

```

```
1      .SBTTL  DROP UNIT SECTION
2
3
4      :++
5      : THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
6      : TO NO LONGER BE TESTED.
7      :--
8 021500 LSDU::
9
18
19 021500 000167      .WORD  JSJMP
20 021502 000000      .WORD  L10015-2-.
32
33      .EVEN
34 021504      L10015:
   021504 104453      TRAP   C$DU
```

```
1      .SBTTL  ADD UNIT SECTION
2
3
4      :++
5      : THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
6      : TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
7      : TO THE TEST CYCLE.
8      :--
9      021506
10
11
12
13
14
15
16
17
18
19
20      021506  000167      .WORD  JSJMP
21      021510  000000      .WORD  L10016-2-.
22
23
24
25
26
27
28
29
30
31
32
33      .EVEN
34
35      021512
36      021512  104452      L10016:  TRAP  CSAU
```

2

.SBTTL HARDWARE TESTS

.SBTTL TEST 1 UNIT UNDER TEST

```

1
2
37
39
40      ;%      TEST 01 UNIT UNDER TEST
41      ;%      : GET CSR ADDRESS AND ACCESS THE CONTROLLER
42      ;%      : IF DEVICE DOESN'T RESPOND
43      ;%      : : THEN
44      ;%      : : OUTPUT ERROR MESSAGE (NO SSYNC, DEVICE NOT PRESENT)
45      ;%      : : ENDF
46      ;%      : END TEST 01
47
54
60 021514      T1::      MOV      #10.,ITCOUN      ;LOAD THE OVERALL ITERATION COUNTER
61 021514      012737      000012      002402      1$:
62 021522      012746      000240      MOV      #240,-(SP)
    021526      012746      021564      MOV      #2$,-(SP)
    021532      012746      000004      MOV      #4,-(SP)
    021536      012746      000003      MOV      #3,-(SP)
    021542      104437      TRAP      C$SVEC
    021544      062706      000010      ADD      #10,SP
63 021550      005777      160736      TST      @RPCS1      ;ACCESS THE CONTROLLER
64 021554      012700      000004      MOV      #4,R0
    021560      104436      TRAP      C$CVEC
65 021562      000407      BR      3$
66 021564      022626      2$:      CMP      (SP)+,(SP)+      ;RESTORE THE STACK, DEVICE DIDN'T RESPOND
67 021566      104456      TRAP      C$ERHRD
    021570      000001      .WORD      1
    021572      012272      .WORD      EM11
    021574      000000      .WORD      0
68 021576      005037      002402      CLR      ITCOUN      ;SET ITERATIONS TO 0
69 021602      005337      002402      3$:      DEC      ITCOUN      ;ONE LESS ITERATION TO GO
70 021606      003345      BGT      1$      ;KEEP GOING UNTIL = 0!
71 021610      L10017:      TRAP      C$ETST
    021610      104401
  
```

```

1      .SBTTL TEST 2 RP CLEAR TEST
2
3      :% TEST 02 RPCLEAR TEST
4      :% : WRITE RPBA = #-2
5      :% : GET CONTENTS OF RPBA AND STORE THEM
6      :% : IF RPBA = 0
7      :% : : THEN
8      :% : : OUTPUT ERROR MESSAGE (RPBA DIDN'T SET)
9      :% : : ELSE
10     :% : : SET RPCS2: CLR (BIT 05) = 1
11     :% : : ENDF
12     :% : COMPARE RPBA WITH STORED VALUE
13     :% : IF RPBA DID NOT CHANGE
14     :% : : THEN
15     :% : : OUTPUT ERROR MESSAGE (DEVICE CLEAR DID NOT FUNCTION)
16     :% : : ENDF
17     :% E' ) TEST 02
18
19 021612 T2::
20 021612 012737 000012 002402 1$: MOV #10.,ITCOUN ;LOAD THE OVERALL ITERATION COUNT
21 021620 104404 TRAP C$BSEG
22 021622 013777 002346 160666 MOV PATT2,@RPBA ;LOAD UP RPBA WITH ALL ONES
23 021630 005777 160662 TST @RPBA ;SEE IF ANY BIT SET
24 021634 001024 BNE 2$ ;IF ANY BITS SET, TAKE BRANCH
25 021636 013737 002516 002456 MOV RPBA,TESTRG ;SAVE THE ADDRESS OF THE REGISTER UNDER TEST
26 021644 017737 160646 002452 MOV @RPBA,RCVED ;AND ITS CONTENTS
27 021652 013737 002346 002454 MOV PATT2,EXPTED ;NOW GET THE EXPECTED RESULTS
28 021660 005037 002404 CLR ERRWD1 ;NO RP07 MODULE CALLOUT
29 021664 012737 000002 002406 MOV #BIT1,ERRWD2 ;JUST CALLOUT THE CONTROLLER
30 021672 104456 TRAP C$ERHRD
31 021674 000002 .WORD 2
32 021676 012776 .WORD EM22
33 021700 014172 .WORD ERRO
34 021702 005037 002402 CLR ITCOUN ;ITERATIONS = 0
35 021706 10000$: TRAP C$ESEG
36 021710 104404 TRAP C$BSEG
37 021712 017746 160600 MOV @RPBA,-(SP) ;SAVE RPBA FOR COMPARISON
38 021716 052777 000040 160576 BIS #CLR,@RPCS2 ;ISSUE DEVICE CLEAR
39 021724 027726 160566 CMP @RPBA,(SP)+ ;COMPARE PRESENT RPBA STATE WITH RPBA LAST STATE
40 021730 001016 BNE 3$ ;TAKE BRANCH IF A CHANGE OCCURRED
41 021732 005037 002454 CLR EXPTED ;FORM THE EXPECTED DATA
42 021736 013737 002516 002456 MOV RPBA,TESTRG ;GET ADDRESS OF FAILING REGISTER
43 021744 017737 160546 002452 MOV @RPBA,RCVED ;AND THE CONTENTS OF RPBA
44 021752 104456 TRAP C$ERHRD
45 021754 000003 .WORD 3
46 021756 012410 .WORD EM13
47 021760 014172 .WORD ERRO
48 021762 005037 002402 CLR ITCOUN ;ITERATIONS = 0
49 021766 10001$: TRAP C$ESEG
50 021770 005337 002402 DEC ITCOUN ;ONE LESS ITERATION TO-GO
51 021774 003311 BGT 1$ ;IF NOT 0, KEEP GOING!
52 021776 L10020:

```

CZRJMA0 RP07 FE/HOST ISOLATOR MACRO V04.00 1-JAN-83 13:37:00 PAGE 37-1^{C 8}
TEST 2 RP CLEAR TEST

SEQ 0093

021770 104401

TRAP C\$ETST

```

1      .SBTTL  TEST 3  RPCS2 READ WRITE TEST
2
3      :%      TEST 03  RPCS2 READ-WRITE TEST
4      :%      :  WRITE RPCS2 WITH DATA PATTERNS 1-4, ONE AT A TIME
5      :%      :  BITS TO TEST = 0..2
6      :%      :  IF RPCS2 DOES NOT MATCH PATTERN
7      :%      :  :  THEN
8      :%      :  :  OUTPUT ERROR MESSAGE (BIT UNDER TEST DID-NOT SET)
9      :%      :  :  ELSE
10     :%      :  :  SET RPCS2:  CLR = 1
11     :%      :  :  ENDF
12     :%      :  IF RPCS2 BIT UNDER TEST DID NOT CLEAR
13     :%      :  :  THEN OUTPUT ERROR MESSAGE (BIT DIDN'T CLEAR WITH DEVICE CLEAR)
14     :%      :  :  ENDF
15     :%      :  END TEST 03
16
17 022000      T3::      MOV      #BIT1,ERRWD2      ;SET UP THE MODULE CALLOUT (JUST-IN-CASE)
18 022000      012737      000002      002406      CLR      ERRWD1      ;NO MODULE CALLOUT FOR THE DRIVE
19 022006      005037      002404      MOV      #10.,ITCOUN      ;LOAD THE OVERALL ITERATION COUNT
20 022012      012737      000012      002402
21 022020      1$:      JSR      PC,SETUP      ;LOAD I/O POINTERS
22 022020      004737      017744      TST03      ;FROM THIS TABLE
23 022024      004160      64$:      MOV      SRCTMP,TEMP      ;SET UP FOR POSSIBLE LOOP
24 022026      013737      002444      002436      TRAP      C$BSEG
25 022034      104404      JSR      PC,FLOAT      ;FLOAT THE PATTERN
26 022036      004737      020034      BR      65$      ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
27 022042      000403      65$:      MOV      TEMP,SRCTMP      ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
28 022044      013737      002436      002444
29 022052      65$:      10000$:      TRAP      C$ESEG
30 022052      104405      TST      MASK      ;IF MASK = 0, WE'RE DONE
31 022054      005737      002446      BNE      64$
32 022060      001362      JSR      PC,CONSET      ;GET NEXT PATTERN
33 022062      004737      020330      TST      PATCNT      ;IF PATTERN COUNT UNDERFLOWED, DONE!
34 022066      005737      002434      BGE      64$      ;NOT DONE YET, GO-ON
35 022072      002355      TRAP      C$BSEG
36 022074      104404      JSR      PC,COMPAR      ;WRITE THE NEXT PATTERN
37 022076      004737      020202      PATT4      ;WHICH IS PATTERN #4
38 022102      002352      10001$:      TRAP      C$ESEG
39 022104      104405      TRAP      C$BSEG
40 022106      104404      TRAP      C$BSEG
41 022110      104404      JSR      PC,COMPAR      ;DO ANOTHER DATA COMPARISON
42 022112      004737      020202      PATT3      ;USING PATTERN #3
43 022116      002350      10003$:      TRAP      C$ESEG
44 022120      104405      JSR      PC,RESET      ;RESET THE DEVICE
45 022122      004737      017474      RPCS2      ;CLEAR RPCS2 BY SETTING MASSBUS CLEAR
46 022126      002522      10002$:      TRAP      C$ESEG
47 022130      104405      DEC      ITCOUNT      ;ONE LESS ITERATION TO-GO
48 022132      005337      002402      BGT      1$      ;KEEP GOING IF NOT ZERO
49 022136      003330      L10021:      TRAP      C$ETST
50 022140      104401

```

```

1      .SBTTL  TEST 4  RPWC READ WRITE TEST
2
3      :%      TEST 04  RPWC READ-WRITE TEST
4      :%      :  WRITE RPWC WITH DATA PATTERNS 1..4
5      :%      :  BITS TO TEST = 1..15
6      :%      :  IF RPWC BIT UNDER TEST DOESN'T MATCH EXPECTED
7      :%      :  :  THEN
8      :%      :  :  OUTPUT ERROR MESSAGE (BIT UNDER TEST DID NOT SET)
9      :%      :  :  ELSE
10     :%      :  :  WRITE RPWC = 0
11     :%      :  ENDIF
12     :%      :  IF RPWC BIT(S) UNDER TEST DID NOT CLEAR
13     :%      :  :  THEN
14     :%      :  :  OUTPUT ERROR MESSAGE (BIT(S) DIDN'T CLEAR WHEN EXPECTED)
15     :%      :  ENDIF
16     :%      END TEST 04
17
18 022142      T4::
19 022142      005037  002404      CLR      ERRWD1      ;MODULE CALLOUT
20 022146      012737  000002  002406  MOV      #BIT1,ERRWD2 ;FOR THIS TEST
21 022154      012737  000012  002402  MOV      #10.,ITCOUN ;LOAD THE OVERALL ITERATION COUNT
22 022162      004737  017744      1$:      JSR      PC,SETUP      ;LOAD I/O POINTERS
23 022166      004172      TST04      TST04      ;FROM THIS TABLE
24 022170      013737  002444  002436  64$:  MOV      SRCTMP,TEMP ;SET UP FOR POSSIBLE LOOP
25 022176      104404      TRAP      C$BSEG
26 022200      004737  020034      JSR      PC,FLOAT      ;FLOAT THE PATTERN
27 022204      000403      BR      65$      ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
28 022206      013737  002436  002444  65$:  MOV      TEMP,SRCTMP ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
29 022214      10000$:
30 022214      104405      TRAP      C$ESEG
31 022216      005737  002446      TST      MASK      ;IF MASK = 0, WE'RE DONE
32 022222      001362      BNE      64$
33 022224      004737  020330      JSR      PC,CONSET      ;GET NEXT PATTERN
34 022230      005737  002434      TST      PATCNT      ;IF PATTERN COUNT UNDERFLOWED, DONE!
35 022234      002355      BGE      64$      ;NOT DONE YET, GO-ON
36 022236      104404      TRAP      C$BSEG
37 022240      004737  020202      JSR      PC,COMPAR      ;WRITE THE NEXT PATTERN
38 022244      002352      PATT4      ;WHICH IS PATTERN #4
39 022246      10001$:
40 022246      104405      TRAP      C$ESEG
41 022250      104404      TRAP      C$BSEG
42 022252      104404      TRAP      C$BSEG
43 022254      004737  020202      JSR      PC,COMPAR      ;DO ANOTHER DATA COMPARISON
44 022260      002350      PATT3      ;US'NG PATTERN #3
45 022262      10003$:
46 022262      104405      TRAP      C$ESEG
47 022264      004737  017572      JSR      PC,LDZERO      ;WRITE RPWC TO 0 TO CLEAR IT!
48 022270      10002$:
49 022270      104405      TRAP      C$ESEG
50 022272      005337  002402      DEC      ITCOUN      ;0 LESS ITERATION TO-GO
51 022276      003331      BGT      1$      ;IF NOT ZERO, KEEP GOING
52 022300      L10022:
53 022300      104401      TRAP      C$ETST

```

```

1      .SBTTL  TEST 5  RPBA READ WRITE TEST
2
3      :%      TEST 05  RPBA READ-WRITE TEST
4      :%      :  WRITE RPBA WITH DATA PATTERNS 1..4, ONE AT A TIME
5      :%      :  BITS TO TEST = 0..15
6      :%      :  IF RPBA BIT(S) UNDER TEST DON'T MATCH EXPECTED DATA
7      :%      :  :  THEN
8      :%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST DON'T MATCH TEST DATA)
9      :%      :  :  ELSE
10     :%      :  :  WRITE RPCS2:  CLR = 1
11     :%      :  :  ENDF
12     :%      :  IF RPBA BIT(S) UNDER TEST DIDN'T CLEAR
13     :%      :  :  THEN
14     :%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST DIDN'T CLEAR)
15     :%      :  :  ENDF
16     :%      :  END TEST 05
17
18 022302 005037 002404 15::  CLR  ERRWD1  ;MODULE CALLOUT
19 022306 012737 000002 002406  MOV  #BIT1,ERRWD2 ;FOR THIS TEST
20 022314 012737 000012 002402  MOV  #10.,ITCOUN ;LOAD THE ITERATION COUNTER
21 022322 004737 017744 1$:  JSR  PC,SETUP ;LOAD I/O POINTERS
    022326 004204  TST05 ;FROM THIS TABLE
    022330 013737 002444 002436 64$: MOV  SRCTMP,TEMP ;SET UP FOR POSSIBLE LOOP
    022336 104404  TRAP  C$BSEG
    022340 004737 020034  JSR  PC,FLOAT ;FLOAT THE PATTERN
    022344 000403  BR 65$ ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
    022346 013737 002436 002444 65$: MOV  TEMP,SRCTMP ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
    022354 10000$: TRAP  C$ESEG
    022354 104405  TST  MASK ;IF MASK = 0, WE'RE DONE
    022356 005737 002446  BNE 64$
    022362 001362  JSR  PC,CONSET ;GET NEXT PATTERN
    022364 004737 020330  TST  PATCNT ;IF PATTERN COUNT UNDERFLOWED, DONE!
    022370 005737 002434  BGE 64$ ;NOT DONE YET, GO-ON
    022374 002355  TRAP  C$BSEG
    022376 104404  JSR  PC,COMPAR ;WRITE THE NEXT PATTERN
    022400 004737 020202  PATT4 ;WHICH IS PATTERN #4
    022404 002352 10001$: TRAP  C$ESEC
    022406 104405  TRAP  C$BSEG
    022410 104404  TRAP  C$BSEG
    022412 104404  TRAP  C$BSEG
    022414 004737 020202  JSR  PC,COMPAR ;DO ANOTHER DATA COMPARISON
    022420 002350  PATT3 ;USING PATTERN #3
    022422 10003$: TRAP  C$ESEC
    022424 004737 017474  JSR  PC,RESET ;RESET THE DEVICE
    022430 002516 10002$: RPBA ;CLEAR RPBA BY SETTING MASSBUS CLEAR
    022432 104405  TRAP  C$ESEC
    022434 005337 002402  DEC  ITCOUN ;ONE LESS TO GO
    022440 003330  BGT 1$ ;IF => 0, KEEP GOING!
    022442 104401  L10023: TRAP  C$ETST
  
```

```

1      .SBTTL TEST 6 SC & TRE TEST 1 (RH11)
2
3      :% TEST 06 SPECIAL CONDITION AND TRANSFER ERROR TEST (RH11 TEST ONLY!)
4      :% : SET RPCS2: CLR = 1
5      :% : IF RPCS1: SC OR RPCS1: TRE = 1
6      :% : : THEN
7      :% : : OUTPUT ERROR MESSAGE (BIT STUCK AT 1, AND SHOULDN'T BE)
8      :% : : ELSE
9      :% : : SET RPCS2: MXF (BIT 09) = 1
10     :% : : IF RPCS2: MXF <> 1
11     :% : : : THEN
12     :% : : : OUTPUT ERROR MESSAGE (BIT FAILED TO SET WHEN EXPECTED)
13     :% : : : ELSE
14     :% : : : IF RPCS1: TRE <> 1
15     :% : : : : THEN
16     :% : : : : OUTPUT ERROR MESSAGE (BIT FAILED TO SET WHEN EXPECTED)
17     :% : : : : ENDF
18     :% : : : IF RPCS1: SC <> 1
19     :% : : : : THEN
20     :% : : : : OUTPUT ERROR MESSAGE (BIT FAILED TO SET WHEN EXPECTED)
21     :% : : : : ENDF
22     :% : : : SET RPCS2: CLR = 1
23     :% : : : IF RPCS1: TRE OR SC = 1
24     :% : : : : THEN
25     :% : : : : OUTPUT ERROR MESSAGE (BITS FAILED TO CLEAR)
26     :% : : : : ENDF
27     :% : : : ENDF
28     :% : : ENDF
29     :% END TEST 06
30
31 022444 T6::
32 022444 005737 002504 TST RHTYPE :WHICH CONTROLLER??
33 022450 001402 BEQ 1$ :IF 0, IT'S AN RH11
34 022452 104432 TRAP C$EXIT
35 022454 000316 .WORD L10024-
36 022456 005037 002404 1$: CLR ERRWD1 ;MODULE CALLOUT FOR THIS TEST
37 022462 012737 000002 002406 MOV #BIT1,ERRWD2 ;ONLY THE CONTROLLER
38 022476 012737 000012 002402 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNTER
39 022476 104404 2$: TRAP C$BSEG
40 022500 104404 TRAP C$BSEG
41 022502 052777 000040 160012 BIS #CLR,@RPCS2 ;INITIALIZE THE DEVICE
42 022510 013777 002506 160004 MOV DRVNO,@RPCS2 ;AND LOAD THE DRIVE NUMBER
43 022516 032777 140000 157766 BI #SC!TRE,@RPCS1 ;SPECIAL CONDITION OR TRANSFER ERROR?
44 022524 001412 BEQ 3$
45 022526 004737 017422 JSR PC,BICEXP ;LOAD FAILING DATA
46 022532 002512 RPCS1 ;FAILING REGISTER
47 022534 140000 SC!TRE ;BIT UNDER TEST
48 022536 104456 TRAP C$ERHRD
49 022540 000010 .WORD 8
50 022542 012562 .WORD EM16
022544 014172 .WORD ERRO
48 022546 005037 002402 CLR ITCOUN ;ITERATIONS = 0
49 022552 3$:
022552 10001$: TRAP C$ESEG
022552 104405 TRAP C$BSEG
022554 104404

```

51	022556	052777	001000	157736	BIS	#MXF,@RPCS2	;SET MISSED TRANSFER = 1
52	022564	032777	001000	157730	BIT	#MXF,@RPCS2	;DID I* SET?
53	022572	001012			BNE	4\$	;YES I1 DID, SKIP ERROR DISPATCH
54	022574	004737	017372		JSR	PC,BISEXP	;LOAD FAILING DATA
55	022600	002522			RPCS2		;FAILING REGISTER
56	022602	001000			MXF		;BIT UNDER TEST
57	022604	104456			TRAP	C\$ERHRD	
	022606	000011			.WORD	9	
	022610	012776			.WORD	EM22	
	022612	014172			.WORD	ERRO	
58	022614	005037	002402		CLR	ITCOUN	;ITERATIONS = 0
59	022620						
	022620						
	022620	104405			TRAP	C\$ESEG	
60	022622	032777	040000	157662	BIT	#TRE,@RPCS1	;DID WE DETECT A TRANSFER ERROR??
61	022630	001012			BNE	5\$	;YES, GO-ON
62	022632	004737	017372		JSR	PC,BISEXP	;LOAD FAILING DATA
63	022636	002512			RPCS1		;FAILING REGISTER
64	022640	040000			TRE		;BIT UNDER TEST
65	022642	104456			TRAP	C\$ERHRD	
	022644	000012			.WORD	10	
	022646	012776			.WORD	EM22	
	022650	014172			.WORD	ERRO	
66	022652	005037	002402		CLR	ITCOUN	;ITERATIONS = 0
67	022656	032777	100000	157626	BIT	#SC,@RPCS1	;DID WE GET SPECIAL CONDITION?
68	022664	001012			BNE	6\$	;YES, SKIP ERROR DISPATCH
69	022666	004737	017372		JSR	PC,BISEXP	;LOAD FAILING DATA
70	022672	002512			RPCS1		;FAILING REGISTER
71	022674	100000			SC		;BIT UNDER TEST
72	022676	104456			TRAP	C\$ERHRD	
	022700	000013			.WORD	11	
	022702	012776			.WORD	EM22	
	022704	014172			.WORD	ERRO	
73	022706	005037	002402		CLR	ITCOUN	;ITERATIONS = 0
74	022712	052777	000040	157602	BIS	#CLR,@RPCS2	;CLEAR OUT THE CONTROLLER
75	022720	013777	002506	157574	MOV	DRVNO,@RPCS2	;RELOAD THE DRIVE NUMBER
76	022726	032777	140000	157556	BIT	#SC:TRE,@RPCS1	;DID SC AND TRE CLEAR OUT?
77	022734	001412			BEQ	7\$	;YES, TEST OK!
78	022736	004737	017422		JSR	PC,BICEXP	;LOAD FAILING DATA
79	022742	002512			RPCS1		;FAILING REGISTER
80	022744	140000			SC:TRE		;BIT UNDER TEST
81	022746	104456			TRAP	C\$ERHRD	
	022750	000014			.WORD	12	
	022752	013051			.WORD	EM23	
	022754	014172			.WORD	ERP	
82	022756	005037	002402		CLR	ITCOUN	;ITERATIONS = 0
83	022762						
	022762						
	022762	104405			TRAP	C\$ESEG	
84	022764	005337	002402		DEC	ITCOUN	;ONE LESS ITERATION TO GO
85	022770	003242			BGT	2\$	;KEEP GOING IF => 0!
86	022772						
	022772	104401			TRAP	C\$ETST	

```

1      .SBTTL TEST 7 IR AND OR TEST
2
3      :% TEST 07 IR AND OR TEST #1
4      :% : TEST RPCS2: IR = 1
5      :% : IF RPCS2: IR <> 1
6      :% : THEN
7      :% : WAIT USING A TIMING LOOP
8      :% : IF TIMING LOOP HAS EXPIRED AND IR <> 1
9      :% : THEN
10     :% : OUTPUT ERROR MESSAGE (BIT FAILED TO SET WHEN EXPECTED)
11     :% : ELSE
12     :% : WRITE RPDB = 0, ONCE
13     :% : ENDF
14     :% : IF RPCS2: OR <> 1
15     :% : THEN
16     :% : WAIT, USING A TIMING LOOP
17     :% : IF TIMING LOOP HAS EXPIRED AND RPCS2: OR <> '
18     :% : THEN
19     :% : OUTPUT ERROR MESSAGE (RPCS2: OR DIDN'T SET IN TIME)
20     :% : ENDF
21     :% : ELSE
22     :% : READ RPDB ONCE
23     :% : ENDF
24     :% : IF RPCS2: OR <> 0
25     :% : THEN
26     :% : OUTPUT ERROR MESSAGE (BIT FAILED TO CLEAR WHEN EXPECTED)
27     :% : ENDF
28     :% : ENDF
29     :% END TEST 07
30
31 022774 T7::
32 022774 005037 002404 CLR ERRWD1 ;MODULE CALLOUT FOR THIS TEST
33 023000 012737 000002 002406 MOV #BIT1,ERRWD2 ;ONLY THE CONTROLLER COULD FAIL!
34 023006 012737 000012 002402 MOV #10.,ITCOUNT ;LOAD THE ITERATION COUNT
35 023014 1$:
36 023014 104404 TRAP C$BSEG
37 023016 104404 TRAP C$BSEG
38 023020 032777 000100 157474 BIT #IR,@RPCS2 ;LOOK FOR IR TO SET IN RPCS2
39 023026 001032 BNE 2$ ;SET, GO-ON
40 023030 012727 000002 MOV #2,(PC)+
41 023034 000000 .WORD 0
42 023036 013727 002116 MOV L$DLY,(PC)+
43 023042 000000 .WORD 0
44 023044 005367 177772 DEC -6(PC)
45 023050 001375 BNE -4
46 023052 005367 177756 DEC -22(PC)
47 023056 001367 BNE -20
48 023060 032777 000100 157434 BIT #IR,@RPCS2 ;LOOK FOR IR TO BE SET NOW!
49 023066 001012 BNE 2$ ;IT SET IN TIME
50 023070 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
51 023074 002522 RPCS2 ;FAILING REGISTER
52 023076 000100 IR ;BIT UNDER TEST
53 023100 104456 TRAP C$ERHRD
54 023102 000015 .WORD 13
55 023104 012622 .WORD EM17
56 023106 014172 .WORD ERRO
57 023110 005037 002402 CLR ITCOUN ;ITERATIONS = 0

```

47	023114			2\$:		
	023114			10001\$:		
	023114	104405			TRAP	C\$ESEG
48	023116	005077	157412		CLR	@RPDB
49	023122	032777	000200	157372	BIT	#OR,@RPCS2
50	023130	001032			BNE	3\$
51	023132	012727	000020		MOV	#20,(PC)+
	023136	000000			.WORD	0
	023140	013727	002116		MOV	L\$DLY,(PC)+
	023144	000000			.WORD	0
	023146	005367	177772		DEC	-6(PC)
	023152	001375			BNE	.-4
	023154	005367	177756		DEC	-22(PC)
	023160	001367			BNE	.-20
52	023162	032777	000200	157332	BIT	#OR,@RPCS2
53	023170	001012			BNE	3\$
54	023172	004737	017372		JSR	PC,BISEXP
55	023176	002522			RPCS2	
56	023200	000200			OR	
57	023202	104456			TRAP	C\$ERHRD
	023204	000016			.WORD	14
	023206	012116			.WORD	EM5
	023210	014172			.WORD	ERRO
58	023212	005037	002402		CLR	ITCOUN
59	023216	005777	157312		TST	@RPDB
60	023222	032777	000200	157272	BIT	#OR,@RPCS2
61	023230	001412			BEQ	4\$
62	023232	004737	017422		JSR	PC,BICEXP
63	023236	002522			RPCS2	
64	023240	000200			OR	
65	023242	104456			TRAP	C\$ERHRD
	023244	000017			.WORD	15
	023246	012155			.WORD	EM6
	023250	014172			.WORD	ERRO
66	023252	005037	002402		CLR	ITCOUN
67	023256					
	023256			4\$:		
	023256			10000\$:		
	023256	104405			TRAP	C\$ESEG
68	023260	005337	002402		DEC	ITCOUN
69	023264	003253			BGT	1\$
70	023266			L10025:		
	023266	104401			TRAP	C\$ETST

;WRITE RPDB ONCE WITH DATA
 ;NOW LOOK FOR OUTPUT READY
 ;GOT IT, GO ON
 ;LOOK FOR OR TO BE SET NOW
 ;IT SET IN TIME
 ;LOAD FAILING DATA
 ;FAILING REGISTER
 ;BIT UNDER TEST
 ;ITERATIONS = 0
 ;READ THE BUFFER NOW
 ;OR SHOULD NOW = 0
 ;IT CLEARED, TEST OK
 ;LOAD FAILING DATA
 ;FAILING REGISTER
 ;BIT UNDER TEST
 ;ITERATIONS = 0
 ;ONE LESS ITERATION TO-GO
 ;KEEP GOING UNTIL <= 0

```

1      .SBTTL TEST 8 RPDB READ WRITE TEST #1
2
3      :% TEST 08 RPDB READ WRITE TEST #1
4      : WRITE RPDB WITH DATA PATTERNS 1,2,5, ONE AT A TIME
5      : BITS TO TEST=0..15
6      : IF RPCS2: IR<>1
7      : THEN
8      : : POLL BIT UNTIL IT SETS
9      : : ELSE
10     : : WRITE DATA TO RPDB
11     : : ENDF
12     : IF RPCS2: OR<>1
13     : THEN
14     : : POLL BIT UNTIL IT SETS
15     : : ELSE
16     : : READ RPDB
17     : : ENDF
18     : IF RPDB RECEIVED DATA DOESN'T MATCH EXPECTED DATA
19     : THEN
20     : : OUTPUT ERROR MESSAGE (BITS RECEIVED DON'T MATCH EXPECTED DATA)
21     : : ENDF
22     : IF RPCS2: IR<>1
23     : THEN
24     : : POLL RPCS2: IR UNTIL IT SETS
25     : : ENDF
26     : WRITE RPDB WITH 0'S
27     : IF RPCS2: OR<>1
28     : THEN
29     : : POLL RPCS2: OR UNTIL IT SETS
30     : : ENDF
31     : IF RPDB<>0
32     : THEN
33     : : OUTPUT ERROR MESSAGE (BITS FAILED TO CLEAR)
34     : : ENDF
35     :% END TEST 08
36
37 023270 T8:: MOV #-1,ILOCK ;MARK THE RPDB POLL MODE
38 023270 012737 177777 002460 CLR ERRWD1 ;CREATE THE MODULE CALLOUT
39 023276 005037 002404 MOV #BIT1,ERRWD2 ;FOR THIS TEST
40 023302 012737 000002 002406 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNTER
41 023310 012737 000012 002402
42 023316 1$: JSR PC,SETUP ;LOAD I/O POINTERS
023316 004737 017744 TST08 ;FROM THIS TABLE
023322 004216 64$: MOV SRCTMP,TEMP ;SET UP FOR POSSIBLE LOOP
023324 013737 002444 002436 TRAP C$BSEG
023332 104404 JSR PC,FLOAT ;FLOAT THE PATTERN
023334 004737 020034 BR 65$ ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
023340 000403 MOV TEMP,SRCTMP ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
023342 013737 002436 002444
023350 65$:
023350 10000$: TRAP C$ESEG
023350 104404 TST MASK ;IF MASK = 0, WE'RE DONE
023352 005737 002446 BNE 64$
023356 001362 JSR PC,CONSET ;GET NEXT PATTERN
023360 004737 020330 TST PATCNT ;IF PATTERN COUNT UNDERFLOWED, DONE!
023364 005737 002434 BGE 64$ ;NOT DONE YET, GO-ON
023370 002355

```

023372	104404		TRAP	C\$BSEG	
023374	004737	020202	JSR	PC,COMPAR	;WRITE THE NEXT PATTERN
023400	002352		PATT4		;WHICH IS PATTERN #4
023402			10001\$:		
023402	104405		TRAP	C\$ESEG	
023404	104404		TRAP	C\$BSEG	
023406	104404		TRAP	C\$BSEG	
023410	004737	020202	JSR	PC,COMPAR	;DO ANOTHER DATA COMPARISON
023414	002350		PATT3		;USING PATTERN #3
023416			10003\$:		
023416	104405		TRAP	C\$ESEG	
023420	004737	017572	JSR	PC,LDZERO	;WRITE RPDB TO 0 TO CLEAR IT!
023424			10002\$:		
023424	104405		TRAP	C\$ESEG	
43 023426	005337	002402	DEC	ITCOUN	;ONE LESS ITERATION TO-GO
44 023432	003331		BGT	1\$	;KEEP GOING UNTIL <= 0!
45 023434	005037	002460	CLR	ILOCK	;CLEAR THE FOLLED MODE OF OPERATION
46 023440			L10026:		
023440	104401		TRAP	C\$ETST	

```

1      .SBTTL TEST 09 RPDB READ WRITE TEST #2
2
3      :% TEST 09 RPDB READ WRITE TEST #2
4      :% : FOR 2 ITERATIONS DO
5      :% : : IF RPCS2: IR <> 1
6      :% : : : THEN
7      :% : : : POLL BIT UNTIL IT SETS
8      :% : : : ELSE
9      :% : : : WRITE RPDB WITH PATTERN #5
10     :% : : : ENDF
11     :% : : END DO
12     :% : FOR 2 ITERATIONS DO
13     :% : : IF RPCS2: OR <> 1
14     :% : : : THEN
15     :% : : : POLL BIT UNTIL IT SETS
16     :% : : : ELSE
17     :% : : : READ RPDB
18     :% : : : ENDF
19     :% : : IF RPDB <> PATTERN #5
20     :% : : : THEN
21     :% : : : OUTPUT ERROR MESSAGE (BITS RECEIVED DON'T MATCH EXPECTED DATA)
22     :% : : : ENDF
23     :% : : END DO
24     :% : END TEST 09
25
26 023442 T9:: MOV #PATT5,EXPTED ;GET THE TESTING DATA PATTERN
27 023442 012737 002554 002454 CLR ERRWD1 ;CREATE THE MODULE CALLOUT
28 023450 005037 002404 MOV #BIT1,ERRWD2 ;FOR THIS TEST
29 023454 012737 000002 002406 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
30 023462 012737 000012 002402
31 023470 104404 1$: TRAP C$BSEG
32 023472 012703 000001 MOV #1,R3 ;SET UP TO DO TWO WRITE OPERATIONS
33 023476 004737 017672 2$: JSR PC,IRLOCK ;WAIT FOR IR TO SET!
34 023502 013777 002454 157024 MOV EXPTED,@RPDB ;NOW LOAD RPDB ONCE
35 023510 005303 DEC R3 ;ONE LESS ITERATION TO GO
36 023512 002371 BGE 2$ ;IF NOT MINUS, LOAD RPDB AGAIN!
37 023514 012703 000001 MOV #1,R3 ;NOW SET-UP TO DO TWO READ OPERATIONS
38 023520 004737 017706 3$: JSR PC,ORLOCK ;WAIT FOR OR TO SET
39 023524 023777 002454 157002 CMP EXPTED,@RPDB ;DOES THE DATA MATCH?
40 023532 001414 BEQ 4$ ;IF EQUAL, YES IT'S OK
41 023534 013737 002534 002456 MOV RPDB,TESTRG ;GET THE FAILING REGISTER
42 023542 017737 156766 002452 MOV @RPDB,RCVED ;NOW GET THE FAILING DATA
43 023550 104456 TRAP C$ERHRD
44 023552 000020 .WORD 16
45 023554 012454 .WORD EM14
46 023556 014172 .WORD ERRO
47 023560 005037 002402 CLR ITCOUN ;RESET FURTHER ITERATIONS
48 023564 005303 4$: DEC R3 ;ONE LESS ITERATION TO-DO
49 023566 002354 BGE 3$ ;IF NOT MINUS, DO-AGAIN
50 023570 10000$: TRAP C$ESEG
51 023572 005337 002402 DEC ITCOUN ;ONE LESS ITERATION TO GO
52 023576 003334 BGT 1$ ;KEEP GOING UNTIL <= 0
53 023600 L10027: TRAP C$ETST
54 023600 104401

```

```

1      .SBTTL TEST 10 RPDB READ WRITE TEST #3
2
3      :% TEST 10 RPDB READ WRITE TEST #3
4      :% : FOR 8 ITERATIONS DO
5      :% : : IF RRPCS2: IR <> 1
6      :% : : THEN
7      :% : : : POLL BIT UNTIL IT SETS
8      :% : : : ELSE
9      :% : : : WRITE RPDB WITH A DATA PATTERN (SEQUENTIALLY USING PATTERNS 1 THRU 8)
10     :% : : : ENDF
11     :% : : ENDF
12     :% : : FOR 8 ITERATIONS DO
13     :% : : : IF RPCS2: OR <> 1
14     :% : : : THEN
15     :% : : : : POLL BIT UNTIL IT SETS
16     :% : : : : ELSE
17     :% : : : : READ RPDB
18     :% : : : : ENDF
19     :% : : : IF RPDB DOESN'T MATCH EXPECTED DATA
20     :% : : : : THEN
21     :% : : : : : OUTPUT ERROR MESSAGE (BITS RECEIVED DON'T MATCH EXPECTED DATA)
22     :% : : : : ENDF
23     :% : : : ENDF
24     :% : : ENDF
25     :% : ENDF TEST 10
26
27 023602 013737 002534 002456 T10:: MOV RPDB,TESTRG ;GET THE ADDRESS OF THE REGISTER UNDER TEST
28 023602 005037 002404 CLR ERRWD1 ;MODULE CALLOUT, THIS TEST
29 023610 012737 000002 002406 MOV #BIT1,ERRWD2 ;ONLY THE CONTROLLER
30 023622 012737 000012 002402 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
31 023630 1$: TRAP C$BSEG
32 023630 104404 MOV #1,R4 ;OVERALL LOOP COUNTER
33 023632 012704 000001 MOV #PATT1,R2 ;INPUT POINTER
34 023636 012702 002344 2$: TRAP C$BSEG
35 023642 104404 MOV R2,-(SP) ;SAVE THE INPUT START ADDRESS
36 023644 010246 MOV #8.,R3 ;SET UP TO WRITE 8 TIMES
37 023646 012703 000010 3$: JSR PC,IRLOCK ;POLL IR AND WAIT FOR IT
38 023652 004737 017672 MOV (R2)+,@RPDB ;LOAD THE BUFFER
39 023656 012277 156652 DEC R3 ;REDUCE THE # OF ITERATIONS
40 023662 005303 BNE 3$ ;AND CONTINUE
41 023666 001372 MOV (SP)+,R2 ;RESTORE THE ORIGINAL POINTER
42 023668 012602 MOV #8.,R3 ;AND THE ITERATION COUNTERS
43 023670 012703 000010 4$: JSR PC,ORLOCK ;POLL OR AND WAIT FOR IT
44 023674 004737 017706 CMP (R2)+,@RPDB ;DOES THE DATA MATCH
45 023700 022277 156630 BEQ 5$ ;IF IT DOES, SKIP ERROR DISPATCH
46 023704 001414 MOV @RPDB,RCVEC ;GET THE BAD DATA
47 023706 017737 156622 002452 MOV -2(R2),EXPTED ;AND THE EXPECTED DATA
48 023714 016237 177776 002454 TRAP C$ERHRD
49 023722 104456 .WORD 17
50 023724 000021 .WORD EM14
51 023726 012454 .WORD ERRO
52 023730 014172 .WORD ITCOUN
53 023732 005037 002402 5$: CLR ITCOUN ;RESET FURTHER ITERATIONS
54 023736 005303 5$: DEC R3 ;ONE LESS ITERATION TO GO
55 023740 001355 5$: BNE 4$ ;NOT FINISHED, CHECK NEXT PATTERN
56 10001$:

```

53	023742	104405		TRAP	C\$ESEG	
54	023744	005704		TST	R4	;DONE?
55	023746	001404		BEQ	6\$	;IF 0, YES
56	023750	012702	002346	MOV	#PATT2,R2	;GET NEXT PATTERN
57	023754	005004		CLR	R4	;AND INDICATE 2ND HALF OF TEST
58	023756	000731		BR	2\$	;NOW DO IT!
	023760					
	023760		6\$:			
	023760	104405	10000\$:	TRAP	C\$ESEG	
59	023762	005337		DEC	ITCOUN	;ONE LESS ITERATION TO GO
60	023766	003320		BGT	1\$	;KEEP GOING UNTIL <= 0
61	023770		L10030:			
	023770	104401		TRAP	C\$ETST	

```

1      .SBTTL  TEST 11 MDPE, SC & TRE TEST (RH70 TEST)
2
3      ;%      TEST 11 MDPE, SC & TRE TEST (RH70 TEST)
4      ;%      SET RPCS2:  CLR = 1
5      ;%      LOAD THE UNIT-UNDER-TEST # INTO RPCS2
6      ;%      SET RPCS2:  PAT = 1
7      ;%      IF RPCS2:  IR <> 1
8      ;%      :      THEN
9      ;%      :      WAIT UNTIL RPCS2:  :  IR = 1
10     ;%      :      ELSE
11     ;%      :      WRITE RPDB ONCE, WITH PATTERN #3
12     ;%      :      ENDIF
13     ;%      :      IF RPCS2:  MDPE <> 1
14     ;%      :      THEN
15     ;%      :      OUTPUT ERROR MESSAGE (MDPE DIDN'T SET WHEN EXPECTED)
16     ;%      :      ELSE
17     ;%      :      IF (RPCS1:  SC & RPCS1:  TRE <> 1)
18     ;%      :      :      THEN
19     ;%      :      :      OUTPUT ERROR MESSAGE (FAILED TO DETECT RPCS1:  SC OR TRE)
20     ;%      :      :      ENDIF
21     ;%      :      ENDIF
22     ;%      END TEST 11
23
24 023772      T11::
25 023772      005737 002504      TST      RHTYPE      ;WHICH CONTROLLER TYPE?
26 023776      003002              BGT      1$          ;IF > 0, RH70...
27 024000      104432              TRAP     C$EXIT
28 024002      000146              .WORD    L10031-
29 024004      005037 002404      CLR      ERRWD1      ;CREATE THE MODULE CALLOUT
30 024010      012737 000002 002406  MOV     #BIT1,ERRWD2 ;FOR THIS TEST
31 024016      012737 000012 002402  MOV     #10,,ITCOUN ;LOAD THE ITERATION COUNT
32 024024      104404              2$:      TRAP     C$BSEG
33 024026      052777 000040 156466  BIS     #CLR,@RPCS2 ;START OUT WITHOUT ERRORS!
34 024034      013777 002506 156460  MOV     DRVNO,@RPCS2 ;LOAD THE DRIVE NUMBER
35 024042      052777 000020 156452  BIS     #PAT,@RPCS2 ;NOW INVERT PARITY
36 024050      004737 017672              JSR     PC,IRLOCK ;WAIT FOR IR TO SET!
37 024054      013777 002350 156452  MOV     PATT3,@RPDB ;WRITE THIS DATA
38 024062      032777 000400 156432  BIT     #MDPE,@RPCS2 ;DID WE FORCE A MASSBUS PARITY ERROR?
39 024070      001005              BNE     3$          ;IF SET, YES!!
40 024072      004737 017372              JSR     PC,BISEXP ;FORM THE REPORT DATA
41 024076      002522              RPCS2   ;THIS REGISTER
42 024100      000400      MDPE      ;THIS BIT FAILED TO SET
43 024102      000410      BR      4$          ;NOW TAKE THE CALL!
44 024104      032777 140000 156400 3$:      BIT     #SC!TRE,@RPCS1 ;DID WE GET TRANSFER ERROR AND SPECIAL CONDITION?
45 024112      001012              BNE     5$          ;YES, TEST PASSES!
46 024114      004737 017372              JSR     PC,BISEXP ;GET THE FAILING DATA
47 024120      002512              RPCS1   ;THIS REGISTER
48 024122      140000      SC!TRE  ;THESE BITS FAILED TO SET!
49 024124      104456              4$:      TRAP     C$ERHRD
50 024126      000022              .WORD    18
51 024130      013441              .WORD    EM33
52 024132      014172              .WORD    ERRO
53 024134      005037 002402      CLR      ITCOUN      ;NO FURTHER ITERATIONS
54 024140      10000$:

```

024140 104405
51 024142 005337 002402
52 024146 003326
53 024150
024150 104401

L10031:

TRAP C\$ESEG
DEC ITCOUN
BGT 2\$
TRAP C\$ETST

;ONE LESS ITERATION TO GO
;KEEP GOING IF NOT <= 0!

```

1      .SBTTL  TEST 12 RPCS3 READ/WRITE TEST
2
3      :%      TEST 09 (RH70 TEST ONLY)  RPCS3 RE, -WRITE TEST
4      :%      :  WRITE RPCS3 WITH DATA PATTERNS 1..4, ONE AT A TIME
5      :%      :  BITS TO TEST = 0..3, 6
6      :%      :  IF RPCS3 BIT(S) UNDER TEST DIDN'T SET
7      :%      :  :  THEN
8      :%      :  :  OUTPUT ERROR MESSAGE (BIT(S) DIDN'T SET)
9      :%      :  :  ELSE
10     :%      :  :  SET RPCS2:  CLR = 1
11     :%      :  :  ENDF
12     :%      :  IF RPCS3 BIT(S) UNDER TEST DIDN'T CLEAR
13     :%      :  :  THEN
14     :%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST DIDN'T CLEAR)
15     :%      :  :  ENDF
16     :%      :  END TEST 12
17
18     024152      T12::
19     024152      005737  002504      TST      RHTYPE      ;IF RHTYPE=+1 CONTROLLER IS AN RH70
20     024156      003002
21     024160      104432      BGT      1$
22     024162      000150      TRAP     C$EXIT
23     024164      005037  002404      .WORD   L10032-
24     024170      012737  000002  002406  1$:      CLR      ERRWD1      ;MODULE CALLOUT
25     024176      012737  000012  002402      MOV     #BIT1,ERRWD2    ;FOR THIS TEST
26     024204      012700  000340      MOV     #10.,ITCOUN    ;SET UP THE ITERATION COUNTER
27     024210      104441      2$:      TRAP     #PRI07,R0      ;SET PRIORITY TO 7
28     024212      004737  017744      JSR      PC,SETUP
29     024216      004232      :LOAD I/O POINTERS
30     024220      013737  002444  002436  64$:      TST11      :FROM THIS TABLE
31     024226      104404      :SET UP FOR POSSIBLE LOOP
32     024230      004737  020034      MOV     SRCTMP,TEMP
33     024234      000403      TRAP     C$BSEG
34     024236      013737  002436  002444      JSR      PC,FLOAT    ;FLOAT THE PATTERN
35     024244      65$:      BR      65$      ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
36     024244      10000$:      MOV     TEMP,SRCTMP    ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
37     024246      005737  002446      TRAP     C$ESEG
38     024252      001362      TST      MASK      ;IF MASK = 0, WE'RE DONE
39     024254      004737  020330      BNE      64$
40     024260      005737  002434      JSR      PC,CONSET    ;GET NEXT PATTERN
41     024264      002355      TST      PATCNT    ;IF PATTERN COUNT UNDERFLOWED, DONE!
42     024266      104404      BGE      64$      ;NOT DONE YET, GO-ON
43     024270      004737  020202      TRAP     C$BSEG
44     024274      002352      JSR      PC,COMPAR    ;WRITE THE NEXT PATTERN
45     024276      10001$:      PATT4      ;WHICH IS PATTERN
46     024276      104405      TRAP     C$ESEG
47     024300      104404      TRAP     C$BSEG
48     024302      104404      TRAP     C$BSEG
49     024304      004737  020202      JSR      PC,COMPAR    ;DO ANOTHER DATA COMPARISON
50     024310      002350      PATT3      ;USING PATTERN #3
51     024312      10003$:      TRAP     C$ESEG
52     024314      004737  017474      JSR      PC,RESET    ;RESET THE DEVICE
53     024320      002564      RPCS3      ;CLEAR RPCS3 BY SETTING MASSBUS CLEAR
54     024322      10002$:

```

28 024322 104405
29 024324 005337 002402
30 024330 003325
024332 104401

L10032:

TRAP C\$ESEG
DEC ITCOUN
BGT 2\$
TRAP C\$ETST

;ONE LESS ITERATION TO GO
;KEEP GOING IF NOT <= 0!

```

1      .SBTTL  TEST 13 RPBAE READ/WRITE TEST
2
3      :%      TEST 13 (RH70 TEST ONLY)  RPBAE READ-WRITE TEST
4      :%      :  WRITE RPBAE WITH DATA PATTERNS 1..4, ONE AT A TIME
5      :%      :  BITS TO TEST = 0..5
6      :%      :  IF RPBAE BIT(S) UNDER TEST DIDN'T MATCH EXPECTED DATA
7      :%      :  THEN
8      :%      :  :  OUTPUT ERROR MESSAGE (BIT(S) DIDN'T SET)
9      :%      :  ELSE
10     :%      :  :  SET RPCS2:  CLR = 1
11     :%      :  :  ENDF
12     :%      :  IF RPBAE BIT(S) UNDER TEST DIDN'T CLEAR
13     :%      :  THEN
14     :%      :  :  OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST DIDN'T CLEAR)
15     :%      :  ENDF
16     :%      END TEST 13
17
18 024334      T13::
19 024334      005737 002504      TST      RHTYPE      ;TEST CONTROLLER TYPE
20 024340      003002      BGT 1$      ;IF > 0, IT IS AN RH70
21 024342      104432      TRAP      C$EXIT
22 024344      000142      .WORD      L10033-
23 024346      005037 002404      CLR      ERRWD1      ;MODULE CALLOUT
24 024352      012737 000002 002406  MOV      #BIT1,ERRWD2  ;FOR THIS TEST
25 024360      012737 000012 002402  MOV      #10.,ITCOUN  ;LOAD THE ITERATION COUNTER
26 024366      004737 017744      JSR      PC,SETUP      ;LOAD I/O POINTERS
27 024372      004244      TST12      ;FROM THIS TABLE
28 024374      013737 002444 002436  MOV      SRCTMP,TEMP  ;SET UP FOR POSSIBLE LOOP
29 024402      104404      TRAP      C$BSEG
30 024404      004737 020034      JSR      PC,FLOAT      ;FLOAT THE PATTERN
31 024410      000403      BR 65$      ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
32 024412      013737 002436 002444  MOV      TEMP,SRCTMP  ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
33 024420      65$:
34 024420      10000$:
35 024420      104405      TRAP      C$ESEG
36 024422      005737 002446      TST      MASK      ;IF MASK = 0, WE'RE DONE
37 024426      001362      BNE 64$
38 024430      004737 020330      JSR      PC,CONSET      ;GET NEXT PATTERN
39 024434      005737 002434      TST      PATCNT      ;IF PATTERN COUNT UNDERFLOWED, DONE!
40 024440      002355      BGE 64$      ;NOT DONE YET, GO-ON
41 024442      104404      TRAP      C$BSEG
42 024444      004737 020202      JSR      PC,COMPAR      ;WRITE THE NEXT PATTERN
43 024450      002352      PAT14      ;WHICH IS PATTERN #4
44 024452      10001$:
45 024452      104405      TRAP      C$ESEG
46 024454      104404      TRAP      C$BSEG
47 024456      104404      TRAP      C$BSEG
48 024460      004737 020202      JSR      PC,COMPAR      ;DO ANOTHER DATA COMPARISON
49 024464      002350      PAT13      ;USING PATTERN #3
50 024466      10003$:
51 024466      104405      TRAP      C$ESEG
52 024470      004737 017474      JSR      PC,RESET      ;RESET THE DEVICE
53 024474      002562      RPBAE      ;CLEAR RPBAE BY SETTING MASSBUS CLEAR
54 024476      10002$:
55 024476      104405      TRAP      C$ESEG
56 024500      005337 002402      DEC      ITCOUN      ;ONE LESS ITERATION

```

27 024504 003330
28 024506
024506 104401

L10033: BGT 2\$
TRAP C\$E*ST

;IF NOT <= 0, KEEP GOING

```

1      .SBTTL TEST 14 RPBAE DUPLICATED A16 TEST
2
3      :% TEST 14 (RH70 TEST ONLY) RPBAE DUPLICATED A16 TEST
4      :% : WRITE RPCS1: A16 (BIT 08) = 1
5      :% : IF RPCS1: A16 <> 1
6      :% : : THEN
7      :% : : OUTPUT ERROR MESSAGE (BIT DIDN'T SET AS EXPECTED)
8      :% : : ELSE
9      :% : : IF RPCS1: A17 = 1
10     :% : : : THEN
11     :% : : : OUTPUT ERROR MESSAGE (BIT SET WHEN NOT EXPECTED)
12     :% : : : ENDF
13     :% : : IF RPBAE: BIT 0 <> 1
14     :% : : : THEN OUTPUT ERROR MESSAGE (BIT STUCK AT 0)
15     :% : : : ELSE
16     :% : : : SET RPCS2: CLR = 1
17     :% : : : ENDF
18     :% : : ENDF
19     :% : IF ((RPCS1: A16) AND (RPBAE: BIT 0)) <> 0
20     :% : : THEN OUTPUT ERROR MESSAGE (BIT(S) STUCK AT 1)
21     :% : ENDF
22     :% END TEST 14
23
24 024510 T14:: MOV #BIT1,ERRWD2 ;MODULE CALLOUT, THIS TEST
25 024510 012737 000002 002406 CLR ERRWD1 ;NO RP07 BOARDS
26 024516 005037 002404 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNTER
27 024522 012737 000012 002402 1$: TRAP C$BSEG
28 024530 104404 MOV #A16,ARPC1 ;SET RPCS1:A16=1
29 024532 012777 000400 155752 BIT #A16,ARPC1 ;TEST RPCS1:A16
30 024540 032777 000400 155744 BNE 2$ ;IF =2, GO ON
31 024546 001012 JSR PC,BISEXP ;LOAD FAILING DATA
32 024550 004737 017372 RPCS1 ;FAILING REGISTER
33 024554 002512 A16 ;BIT UNDER TEST
34 024556 000400 TRAP C$ERHRD
35 024560 104456 .WORD 18
36 024570 005037 002402 .WORD EM22
37 024574 032777 001000 155710 2$: .WORD ERRO
38 024602 001412 CLR ITCOUN ;NO FURTHER ITERATIONS
39 024604 004737 017422 BIT #A17,ARPC1 ;DID A17 ALSO SET?
40 024610 002512 BEQ 3$ ;IF ZERO, IT'S OK!
41 024612 001000 JSR PC,BICEXP ;LOAD THE OFFENDING BIT
42 024614 104456 RPCS1 ;FOR THIS REGISTER
43 024624 005037 002402 A17 ;THIS BIT!
44 024630 000023 TRAP C$ERHRD
45 024630 012454 .WORD 19
46 024632 014172 .WORD EM14
47 024634 005737 002504 .WORD ERRO
48 024640 003002 CLR ITCOUN ;ITERATIONS = 0
49 024642 104432 3$: TRAP C$ESEG
10000$: TRAP C$BSEG
          TST RHTYPE ;TEST CONTROLLER TYPE
          BGT 4$ ;IF > 0, IT IS AN RH70
          TRAP C$EXIT

```

```

50 024644 000036 .WORD 10001$-
51 024646 032777 000001 155706 4$: BIT #BIT0, @RPBAE ;TEST RPBA4:BIT0.(PARALLELS RPCS1=A16)
52 024654 001012 BNE 5$ ;IF SET, GO ON
53 024656 004737 017372 JSR PC, BISEXP ;LOAD FAILING DATA
54 024662 002562 RPBAE ;FAILING REGISTER
55 024664 000001 BIT0 ;BIT UNDER TEST
56 024666 104456 TRAP C$ERHRD
57 024670 000024 .WORD 20
58 024672 012776 .WORD EM22
59 024674 014172 .WORD ERRO
60 024676 005037 002402 CLR ITCOUN ;ITERATION COUNT = 0
61 024702 5$:
62 024704 10001$: TRAP C$ESEG
63 024706 104405 TRAP C$BSEG
64 024708 052777 000040 155606 BIS #CLR, @RPCS2 ;CLEAR OUT THE DEVICE
65 024710 032777 000400 155570 BIT #A16, @RPCS1 ;TEST RPCS1:A16
66 024712 001412 BEQ 6$ ;IF ZERO, GO ON
67 024714 004737 017422 JSR PC, BICEXP ;LOAD FAILING DATA
68 024716 002512 RPCS1 ;FAILING REGISTER
69 024718 000400 A16 ;BIT UNDER TEST
70 024720 104456 TRAP C$ERHRD
71 024722 000025 .WORD 21
72 024724 013051 .WORD EM23
73 024726 014172 .WORD ERRO
74 024728 005037 002402 CLR ITCOUN ;NO FURTHER ITERATIONS
75 024730 6$:
76 024732 10002$: TRAP C$ESEG
77 024734 104405 TRAP C$BSEG
78 024736 005737 002504 TST RHTYPE ;TEST CONTROLLER TYPE
79 024738 003002 BGT 7$ ;IF > 0, IT IS AN RH70
80 024740 104432 TRAP C$EXIT
81 024742 000036 .WORD 10003$-
82 024744 032777 000001 155566 7$: BIT #BIT0, @RPBAE ;TEST RPBAE:BIT0
83 024746 001412 BEQ 8$ ;IF 0, GO ON
84 024748 004737 017422 JSR PC, BICEXP ;LOAD FAILING DATA
85 024750 002562 RPBAE ;FAILING REGISTER
86 024752 000001 BIT0 ;BIT UNDER TEST
87 024754 104456 TRAP C$ERHRD
88 024756 000026 .WORD 22
89 024758 013051 .WORD EM23
90 024760 014172 .WORD ERRO
91 024762 005037 002402 CLR ITCOUN ;RESET THE ITERATION COUNTER
92 024764 8$:
93 024766 10003$: TRAP C$ESEG
94 024768 005337 002402 DEC ITCOUN ;ONE LESS ITERATION TO GO
95 024770 003237 BGT 1$ ;DO UNTIL <= 0
96 024772 104401 L10034: TRAP C$ETST

```

```

1      .SBTTL TEST 15 RPBAE DUPLICATED A17 TEST
2
3      :% TEST 15 (RH70 TEST C JLY) RPBAE DUPLICATED A17 TEST
4      :% : WRITE RPCS1: A17 (BIT 09) = 1
5      :% : IF RPCS1: A17 <> 1
6      :% : THEN
7      :% : OUTPUT ERROR MESSAGE (BIT FAILED TO SET)
8      :% : ELSE
9      :% : IF RPCS1: A16 = 1
10     :% : THEN
11     :% : OUTPUT ERROR MESSAGE (BIT SET WHEN NOT EXPECTED)
12     :% : ENDIF
13     :% : IF RPBAE: BIT01 DIDN'T SET
14     :% : THEN
15     :% : OUTPUT ERROR MESSAGE (BIT FAILED TO SET)
16     :% : ELSE
17     :% : SET RPCS2: CLR = 1
18     :% : ENDIF
19     :% : IF ((RPCS1: A17) AND (RPBAE: BIT01)) <> 0
20     :% : THEN
21     :% : OUTPUT ERROR MESSAGE (BIT(S) DIDN'T CLEAR)
22     :% : ENDIF
23     :% : ENDIF
24     :% END TEST 15
25
26 025034      T15::
27 025034      005037 002404      CLR      ERRWD1      ;MODULE CALLOUT FOR THIS TEST
28 025040      012737 000002 002406  MOV      #BIT1,ERRWD2 ;CONTROLLER ONLY
29 025046      012737 000012 002402  MOV      #10.,ITCOUN ;LOAD THE ITERATION COUNT
30 025054      1$:
31 025054      104404      TRAP      C$BSEG
32 025056      012777 001000 155426  MOV      #A17,@RPCS1 ;SET RPCS1:A17=1
33 025064      032777 001000 155420  BIT      #A17,@RPCS1 ;TEST RPCS1:A17
34 025072      001012      BNE      2$ ;IF =2, OK
35 025074      004737 017372      JSR      PC,BISEXP ;LOAD FAILING DATA
36 025100      002512      RPCS1 ;FAILING REGISTER
37 025102      001000      A17 ;BIT UNDER TEST
38 025104      104456      TRAP      C$ERHRD
39 025106      000027      .WORD    23
40 025110      012776      .WORD    EM22
41 025112      014172      .WORD    ERRO
42 025114      005037 002402      CLR      ITCOUN ;NO ITERATIONS
43 025120      032777 000400 155364 2$: BIT      #A16,@RPCS1 ;DID A16 ALSO SET?
44 025126      001412      BEQ      3$ ;IF ZERO, NO-IT'S OK!
45 025130      004737 017422      JSR      PC,BICEXP ;LOAD THE FAILING DATA
46 025134      002512      RPCS1 ;THIS REGISTER
47 025136      000400      A16 ;THIS BIT FAILED TO REMAIN CLEAR!
48 025140      104456      TRAP      C$ERHRD
49 025142      000030      .WORD    24
50 025144      012454      .WORD    EM14
51 025146      014172      .WORD    ERRO
52 025150      005037 002402      CLR      ITCOUN ;ITERATIONS = 0
53 025154      3$:
54 025154      10000$:
55 025154      104405      TRAP      C$ESEG
56 025156      104404      TRAP      C$BSEG
57 025160      005737 002504      TST      RHTYPE ;TEST CONTROLLER TYPE

```

50	025164	003002		BGT	4\$	;IF > 0, = RH70
51	025166	104432		TRAP	C\$EXIT	
	025170	000036		.WORD	10001\$-	
52	025172	032777	000002 155362 4\$:	BIT	#BIT1, @RPBAE	;TEST RPBAE:BIT1
53	025200	001012		BNE	5\$	;IF =1, OK
54	025202	004737	017372	JSR	PC, BISEXP	;LOAD FAILING DATA
55	025206	002562		RPBAE		;FAILING REGISTER
56	025210	000002		BIT1		;BIT UNDER TEST
57	025212	104456		TRAP	C\$ERHRD	
	025214	000031		.WORD	25	
	025216	012776		.WORD	EM22	
	025220	014172		.WORD	ERRO	
58	025222	005037	002402	CLR	ITCOUN	;ITERATIONS = 0
59	025226					
60	025226					
	025226	104405				
61	025230	104404		TRAP	C\$ESEG	
62	025232	052777	000040 155262	TRAP	C\$BSEG	
63	025240	032777	001000 155244	BIS	#CLR, @RPCS2	;SET RPCS2:CLR=1
64	025246	001412		BIT	#A17, @RPCS1	;TEST RPCS1:A17
65	025250	004737	017422	BEQ	6\$	;IF 0, OK
66	025254	002512		JSR	PC, BICEXP	;LOAD FAILING DATA
67	025256	001000		RPCS1		;FAILING REGISTER
68	025260	104456		A17		;BIT UNDER TEST
	025262	000032		TRAP	C\$ERHRD	
	025264	013051		.WORD	26	
	025266	014172		.WORD	EM23	
69	025270	005037	002402	.WORD	ERRO	
70	025274			CLR	ITCOUN	;ITERATIONS = 0
71	025274					
	025274	104405				
72	025276	104404		TRAP	C\$ESEG	
73	025300	005737	002504	TRAP	C\$BSEG	
74	025304	003002		TST	RHTYPE	;TEST CONTROLLER TYPE
75	025306	104432		BGT	7\$	;IF =+1, IS RH70
	025310	000036		TRAP	C\$EXIT	
76	025312	032777	000002 155242 7\$:	.WORD	10003\$-	
77	025320	001412		BIT	#BIT1, @RPBAE	;TEST RPBAE:BIT1
78	025322	004737	017422	BEQ	8\$	;IF =0, OK
79	025326	002562		JSR	PC, BICEXP	;LOAD FAILING DATA
80	025330	001000		RPBAE		;FAILING REGISTER
81	025332	104456		A17		;BIT UNDER TEST
	025334	000033		TRAP	C\$ERHRD	
	025336	013051		.WORD	27	
	025340	014172		.WORD	EM23	
82	025342	005037	002402	.WORD	ERRO	
83	025346			CLR	ITCOUN	;ITERATIONS = 0
84	025346					
	025346	104405				
85	025350	005337	002402	TRAP	C\$ESEG	
86	025354	003237		DEC	ITCOUN	;ONE LESS ITERATION
87	025356			BGT	1\$	;IF NOT <= 0, KEEP GOING
	025356	104401				
				L10035:		
				TRAP	C\$ETST	

```

1      .SBTTL TEST 16 INTERRUPT ENABLE - BIT TEST
2
3      ;% TEST 16 INTERRUPT ENABLE BIT SET-CLEAR TEST
4      ;% : SET PROCESSOR PRIORITY = 7 (LOCK OUT ALL INTERRUPTS)
5      ;% : SET RPCS1: IE (BIT 06) = 1
6      ;% : IF RPCS1: IE <> 1
7      ;% : THEN
8      ;% : OUTPUT ERROR MESSAGE (BIT DIDN'T SET)
9      ;% : ELSE
10     ;% : SET RPCS2: CLR = 1
11     ;% : ENDIF
12     ;% : IF RPCS1: IE <> 0
13     ;% : THEN
14     ;% : OUTPUT ERROR MESSAGE (BIT DIDN'T CLEAR)
15     ;% : ENDIF
16     ;% END TEST 16
17
18 025360 T16:: CLR ERRWD1 ;MODULE CALLOUT
19 025360 005037 002404 MOV #BIT1,ERRWD2 ;FOR THIS TEST
20 025364 012737 000002 002406 MOV #10,,ITCOUN ;LOAD THE ITERATION COUNT
21 025372 012737 000012 002402 1$: ;SET PRIORITY TO 7
22 025400 MOV #PRI07,R0
23 025400 012700 000340 TRAP C$SPRI
24 025404 104441 TRAP C$BSEG
25 025406 104404 TRAP C$BSEG
26 025410 052777 000100 155074 BIS #IE,@RPCS1 ;WRITE RPCS1: INTERRUPT ENABLE=1
27 025416 032777 000100 155066 BIT #IE,@RPCS1 ;TEST RPCS1:IE
28 025424 001012 BNE 2$ ;IF 2, GO ON
29 025426 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
30 025432 002512 RPCS1 ;FAILING REGISTER
31 025434 000100 IE ;BIT UNDER TEST
32 025436 104456 TRAP C$ERHRD
33 025440 000034 .WORD 28
34 025442 012776 .WORD EM22
35 025444 014172 .WORD ERRO
36 025446 005037 002402 CLR ITCOUN ;ITERATIONS = 0
37 025452 2$:
38 025452 10000$: TRAP C$ESEG
39 025454 104405 TRAP C$BSEG
40 025456 052777 000040 155036 BIS #CLR,@RPCS2 ;SET RPCS2:CLR=1
41 025464 032777 000100 155020 BIT #IE,@RPCS1 ;TEST RPCS1:IE
42 025472 001412 BEQ 3$ ;IF 0, TEST PASSES
43 025474 004737 017422 JSR PC,BICEXP ;LOAD FAILING DATA
44 025500 002512 RPCS1 ;FAILING REGISTER
45 025502 000100 IE ;BIT UNDER TEST
46 025504 104456 TRAP C$ERHRD
47 025506 000035 .WORD 29
48 025510 013051 .WORD EM23
49 025512 014172 .WORD ERRO
50 025514 005037 002402 CLR ITCOUN ;RESET FURTHER ITERATIONS
51 025520 3$:
52 025520 10001$: TRAP C$ESEG
53 025522 104405 DEC ITCOUN ;ONE LESS ITERATION TO-GO
54 025524 005337 002402 BGT 1$ ;IF NOT <= 0, WE'RE NOT DONE
55 025526 003324
56 025530 012700 000000 MOV #0,R0

```

025534	104441		TRAP	C\$SPRI
49 025536		L10036:		
025536	104401		TRAP	C\$ETST

```

1      .SBTTL  TEST 17 RH70 DUPLICATE INTERRUPT ENABLE TEST
2
3      :%      TEST 17 (RH70 TEST ONLY) RPCS3 DUPLICATE INTERRUPT ENABLE TEST
4      :%      : SET PROCESSOR PRIORITY = 7
5      :%      : SET RPCS1: IE (BIT 06) = 1
6      :%      : IF RPCS3: IE (BIT 06) <> 1
7      :%      : THEN
8      :%      :   OUTPUT ERROR MESSAGE
9      :%      :   ELSE SET RPCS2: CLR = 1
10     :%      : ENDIF
11     :%      : IF ((RPCS1: IE) AND (RPCS3: IE)) <> 0
12     :%      : THEN
13     :%      :   OUTPUT ERROR MESSAGE (BIT(S) DIDN'T CLEAR)
14     :%      : FNDIF
15     :%      ENL TEST 17
16
17 025540 T17::
18 025540 005737 002504 TST RHTYPE ;CAN WE DO THIS TEST
19 025544 003002 BGT 1$ ;IF RH TYPE =+1, CONTROLLER IS RH70
20 025546 104432 TRAP C$EXIT
21 025550 000160 .WORD L1C037-
22 025552 005037 002404 1$: CLR ERRWD1 ;MODULE CALLOUT
23 025556 012737 000002 002406 MOV #BIT1,ERRWD2 ;FOR THIS TEST
24 025572 012737 000012 0C2402 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
25 025572 104404 2$: TRAP C$BSEG
26 025574 012700 000340 MOV #FRI07,R0 ;SET PRIORITY TO 7
27 025600 104441 TRAP C$SPRI
28 025602 012777 000100 154702 MOV #IE,@RPCS1 ;SET RPCS1:IE=1
29 025610 032777 000100 154746 BIT #IE,@RPCS3 ;TEST RPCS3:IE
30 025616 001012 BNE 3$ ;IF SET, GO ON
31 025620 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
32 025624 002564 RPCS3 ;FAILING REGISTER
33 025626 000100 IE ;BIT UNDER TEST
34 025630 104456 TRAP C$ERHRD
35 025632 000036 .WORD 30
36 025634 012776 .WORD EM22
37 025636 014172 .WORD F1A0
38 025640 005037 002402 CLR ITCOUN ;NO ITERATIONS NECESSARY
39 025644 3$: 10000$:
40 025644 104405 TRAP C$ESEG
41 025646 104404 TRAP C$BSEG
42 025650 052777 000040 154644 BIS #CLR,@RPCS2 ;CLEAR OUT THE DEVICE
43 025656 032777 000100 154700 BIT #IE,@RPCS3 ;TEST RPCS3:IE
44 025664 001412 BEQ 4$ ;IF CLEAR, TEST PASSES
45 025666 004737 017422 JSR PC,BICEXP ;LOAD FAILING DATA
46 025672 002564 RPCS3 ;FAILING REGISTER
47 025674 000100 IE ;BIT UNDER TEST
48 025676 104456 TRAP C$ERHRD
49 025700 000037 .WORD 31
50 025702 013051 .WORD EM23
51 025704 014172 .WORD ERRO
52 025706 005037 002402 CLR ITCOUN ;NO ITERATIONS
53 025712 4$: 10001$:
54 025712

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025712 104405
48 025714 005337 002402
49 025720 003324
50 025722 012700 000000
025726 104441
51 025730
025730 104401

L10037:

TRAP C\$ESEG
DEC ITCOUN
BGT 2\$
MOV #0,R0
TRAP C\$SPRI
TRAP C\$ETST

;ONE LESS ITERATION TO GO
;>0 ?? DO AGAIN!!

```

1      .SBTTL TEST 18 IPCK0 TEST
2
3      :% TEST 18 (RH70 TEST ONLY) MDPE TEST 1
4      :% : SET RPCS3: IPCK0 (BIT 0) = 1
5      :% : IF RPCS3: IPCK0 <> 1
6      :% : : THEN
7      :% : : OUTPUT ERROR MESSAGE (BIT DIDN'T SET)
8      :% : : ELSE
9      :% : : IF RPCS2: IR <> 1
10     :% : : : THEN
11     :% : : : WAIT
12     :% : : : ENDF
13     :% : : WRITE DATA TO RPDB
14     :% : ENDF
15     :% : IF ((RPCS1: TRE) AND (RPCS1: SC) AND (RPCS2: MCPE)) <> 1
16     :% : : THEN
17     :% : : OUTPUT ERROR MESSAGE (SHOULD HAVE DETECTED A PARITY ERROR)
18     :% : : ELSE
19     :% : : SET RPCS2: CLR = 1
20     :% : : IF ((RPCS2: MCPE) OR (RPCS1: SC) OR (RPCS1: TRE)) = 1
21     :% : : : THEN
22     :% : : : OUTPUT ERROR MESSAGE (ERROR STATUS DIDN'T CLEAR)
23     :% : : : ENDF
24     :% : : ENDF
25     :% : ENDF
26     :% END TEST 18
27
28 025732 T18::
29 025732 005737 002504 TST RH7YPE ;IS THE CONTROLLER AN RH70?
025736 003002 BGT 64$ ;IF > 0, YES,
025740 104432 TRAP C$EXIT
025742 000264 .WORD L10040-
025744 005037 002404 64$: CLR ERRWD1 ;SET THE MODULE CALLOUT
025750 012737 000002 002406 MOV #BIT1,ERRWD2 ;FOR THIS TEST
025756 012737 000012 002402 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
025764
025766 104404 66$: TRAP C$BSEG
025766 052777 000001 154570 BIS #BIT0,@RPCS3 ;SET THE BIT0-UNDER-TEST
025774 032777 000001 154562 BIT #BIT0,@RPCS3 ;DID BIT0 SET IN RPCS3?
026002 001012 BNE 65$ ;YES, SKIP ERROR DISPATCH
026004 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
026010 002564 RPCS3 ;FAILING REGISTER
026012 000001 BIT0 ;BIT UNDER TEST
026014 104456 TRAP C$,RHRD
026016 000040 .WORD 32
026020 012776 .WORD EM22
026022 014172 .WORD ERRO
026024 005037 002402 CLR ITCOUN ;RESFT FURTHER ITERATIONS
026030
026030 65$:
026030 10000$: TRAP C$ESEG
026032 104404 TRAP C$BSEG
026034 004737 017672 JSR PC,IRLOCK ;POLL INPUT READY IN RPCS2
026040 005077 154470 CLR @RPDB ;WRITE RPDB WITH 0'S
026044 004737 017706 JSR PC,ORLOCK ;NOW WAIT FOR OUTPUT READY IN RPCS2
026050 005777 154460 TST @RPDE ;NOW DO A ONE WORD READ OF RPDB
026054 004737 017000 JSR PC,WAIT ;WAIT FOR THE RP07 MICROPROCESSOR

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026060 032777 140000 154424 BIT #SC!TRE,@RPCS1 ;LOOK FOR SC AND TRE
026066 001012 BNE 67$ ;THEY BOTH SET, GO-ON
026070 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
026074 002512 RPCS1 ;FAILING REGISTER
026076 140000 SC!TRE ;BIT UNDER TEST
026100 104456 TRAP C$ERHRD
026102 000041 .WORD 33
026104 012776 .WORD EM22
026106 014172 .WORD ERRO
026110 005037 002402 CLR ITCOUN ;RESET FURTHER ITERATIONS
026114 032777 000400 154400 67$: BIT #MDPE,@RPCS2 ;DID WE DETECT PARITY ERROR?
026122 001012 BNE 68$ ;YES, GO-ON
026124 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
026130 002522 .PCS2 ;FAILING REGISTER
026132 000400 MDPE ;BIT UNDER TEST
026134 104456 TRAP C$ERHRD
026136 000042 .WORD 34
026140 012776 .WORD EM22
026142 014172 .WORD ERRO
026144 005037 002402 CLR ITCOUN ;RESET FURTHER ITERATIONS
026150 052777 000040 154344 68$: PLS #CLR,@RPCS2 ;CLEAR OUT THE DEVI
026156 104405 10001$: TRAP C$ESEG
026160 104404 TRAP C$BSEG
026162 032777 000001 154374 BIT #BIT0,@RPCS3 ;NOW CHECK TO SEE THAT #BIT0 DID CLEAR
026170 001412 BEQ 69$ ;= 0, TEST OK!!
026172 004737 017422 JSR PC,BICEXP ;LOAD FAILING DATA
026176 002564 RPCS3 ;FAILING REGISTER
026200 000001 BIT0 ;BIT UNDER TEST
026202 104456 TRAP C$ERHRD
026204 000043 .WORD 35
026206 013051 .WORD EM23
026210 000000 .WORD 0
026212 005037 002402 CLR ITCOUN ;RESET FURTHER ITERATIONS
026216 69$: 10002$: TRAP C$ESEG
026216 104405 TRAP C$ESEG
026220 005337 000000 DEC ITC'UN ;ONE LESS ITERATION TO-GO
026224 003257 BGT 66$ ;TAKE BRANCH IF NOT DONE
30 026226 L10040: TRAP C$ETST
026226 1044.1

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```

1      .SBTTL TEST 19 IPCK1 TEST
2
3      :% TEST 19 (RH70 TEST ONL:) MDPE TEST 2
4      :% : SET RPCS3: BIT 01 (IPCK1) = 1
5      :% : IF RPCS3: IPCK1 <> 1
6      :% : THEN
7      :% : OUTPUT ERROR MESSAGE (BIT DIDN'T SET)
8      :% : ELSE
9      :% : IF RPCS2: IR <> 1
10     :% : THEN
11     :% : WAIT FOR RPCS2: IR TO SET
12     :% : ENDIF
13     :% : WRITE RPDB ONCE
14     :% : ENDIF
15     :% : IF ((RPCS1: TRE) AND (RPCS1: SC) AND (RPCS2: MDPE)) <> 1
16     :% : THEN
17     :% : OUTPUT ERROR MESSAGE (UNDETECTED PARITY ERROR)
18     :% : ELSE
19     :% : SET RPCS2: CLR = 1
20     :% : IF ((RPCS1: TRE) OR (RPCS1: SC) OR (RPCS2: MDPE)) = 1
21     :% : THEN
22     :% : OUTPUT ERROR MESSAGE (ERROR STATUS FAILED TO CLEAR)
23     :% : ENDIF
24     :% : ENDIF
25     :% END TEST 19
26
27 026230 T19::
28 026230 005737 002504 TST RHTYPE ;IS THE CONTROLLER AN RH7C?
    026234 003002 BGT 64$ ;IF > 0, YES,
    026236 104432 TRAP C$EXIT
    026240 000264 .WORD L10041-.
    026242 005037 002404 64$: CLR ERRWD1 ;SET THE MODULE CALLOUT
    026246 012737 000002 002406 MOV #BIT1,ERRWD2 ;FOR THIS TEST
    026254 012737 000012 002402 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
    026262 66$:
    026262 104404 TRAP C$BSEG
    026264 052777 000002 154272 BIS #BIT1,@RPCS3 ;SET THE BIT1-UNDER-TEST
    026272 032777 000002 154264 BIT #BIT1,@RPCS3 ;DID BIT1 SET IN RPCS3?
    026300 001012 BNE 65$ ;YES, SKIP L'RROR DISPATCH
    026302 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
    026306 002564 RPCS3 ;FAILING REGISTER
    026310 000001 BIT0 ;BIT UNDER TEST
    026312 104456 TRAP C$ERHRD
    026314 000044 .WORD 36
    026316 012776 .WORD EM22
    026320 014172 .WORD ERRO
    026322 005037 002402 CLR ITCOUN ;RESET FURTHER ITERATIONS
    026326 65$:
    026326 10000$:
    026326 104405 TRAP C$ESEG
    026330 104404 TRAP C$BSEG
    026332 004737 017672 JSR PC,IRLOCK ;POLL INPUT READY IN RPCS2
    026336 005077 154172 CLR @RPDB ;WRITE RPDB WITH 0'S
    026342 004737 017706 JSR PC,ORLGCK ;NOW WAIT FOR OUTPUT READY IN RPCS2
    026346 005777 154162 TST @RPDB ;NOW DO A ONE WORD READ OF RPDB
    026352 004737 017000 JSR PC,WAIT ;WAIT FOR THE RP07 MICROPROCESSOR
    026356 032777 140000 154126 BIT #SC!TRE,@RPCS1 ;LOOK FOR SC AND TRE
  
```

026364	001012			BNE	67\$		;THEY BOTH SET, GO-ON
026366	004737	017372		JSR	PC,BISEXP		;LOAD FAILING DATA
026372	002512			RPCS1			;FAILING REGISTER
026374	140000			SC!TRE			;BIT UNDER TEST
026376	104456			TRAP	C\$ERHRD		
026400	000045			.WORD	37		
026402	012776			.WORD	EM22		
026404	014172			.WORD	ERRO		
026406	005037	002402		CLR	ITCOUN		;RESET FURTHER ITERATIONS
026412	032777	000400	154102	BIT	#MDPE,@RPCS2		;DID WE DETECT PARITY ERROR?
026420	001012			BNE	68\$		;YES, GO-ON
026422	004737	017372		JSR	PC,BISEXP		;LOAD FAILING DATA
026426	002522			RPCS2			;FAILING REGISTER
026430	000400			MDPE			;BIT UNDER TEST
026432	104456			TRAP	C\$ERHRD		
026434	000046			.WORD	38		
026436	012776			.WORD	EM22		
026440	014172			.WORD	ERRO		
026442	005037	002402		CLR	ITCOUN		;RESET FURTHER ITERATIONS
026446	052777	000040	154046	BIS	#CLR,@RPCS2		;CLEAR OUT THE DEVICE!
026454							
026454	104405			TRAP	C\$ESEG		
026456	104404			TRAP	C\$BSEG		
026460	032777	000002	154076	BIT	#BIT1,@RPCS3		;NOW CHECK TO SEE THAT #BIT1 DID CLEAR
026466	001412			BEQ	69\$		;= 0, TEST OK!!
026470	004737	017422		JSR	PC,BICEXP		;LOAD FAILING DATA
026474	002564			RPCS3			;FAILING REGISTER
026476	000001			BIT0			;BIT UNDER TEST
026500	104456			TRAP	C\$ERHRD		
026502	000047			.WORD	39		
026504	013051			.WORD	EM23		
026506	000000			.WORD	0		
026510	005037	002402		CLR	ITCOUN		;RESET FURTHER ITERATIONS
026514							
026514							
026514	104405			TRAP	C\$ESEG		
026516	005337	002402		DEC	ITCOUN		;ONE LESS ITERATION TO-GO
026522	003257			BGT	66\$		;TAKE BRANCH IF NOT DONE
29 026524							
026524	104401			TRAP	C\$ETST		

```

1      .SBTTL TEST 20 IPCK2 TEST
2
3      :% TEST 20 (RH70 TEST ONLY) MDPE TEST 3
4      :% : SET RPCS3: IPCK2 (BIT2) = 1
5      :% : IF RPCS3: IPCK2 <> 1
6      :% : THEN
7      :% : : OUTPUT ERROR MESSAGE (BIT DIDN'T SET)
8      :% : : ELSE
9      :% : : IF RPCS2: IR <> 1
10     :% : : THEN
11     :% : : : WAIT FOR RPCS2: IR TO SET
12     :% : : ENDF
13     :% : WRITE DATA TO RPDB
14     :% : ENDF
15     :% : IF ((RPCS1: TRE) AND RPCS1: SC) AND (RPCS2: MCPE)) <> 1
16     :% : THEN
17     :% : : OUTPUT ERROR MESSAGE (UNDETECTED PARITY ERROR)
18     :% : : ELSE
19     :% : : SET RPCS2: CLR = 1
20     :% : : IF ((RPCS1: SC) OR (RPCS1: TRE) OR (RPCS2: MCPE)) = 1
21     :% : : THEN
22     :% : : : OUTPUT ERROR MESSAGE (ERROR STATUS FAILED TO CLEAR)
23     :% : : ENDF
24     :% : ENDF
25     :% END TEST 20
26
27 026526 T20::
28 026526 005737 002504 TST RHTYPE ;IS THE CONTROLLER AN RH70
026532 003002 BGT 64$ ;IF > 0, YES,
026534 104432 TRAP C$EXIT
026536 000304 .WORD L10042-.
026540 005037 002404 64$: CLR ERRWD1 ;SET THE MODULE CALLOUT
026544 012737 000002 002406 MOV #BIT1,ERRWD1 ;FOR THIS TEST
026552 012737 000012 002402 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
026560 66$:
026560 104404 TRAP C$BSEG
026562 052777 000004 153774 BIS #BIT2,@RPCS3 ;SET THE BIT2-UNDER-TEST
026570 032777 000004 153766 BIT #BIT2,@RPCS3 ;DID BIT2 SET IN RPCS3?
026576 001012 BNE 65$ ;YES, SKIP ERROR DISPATCH
026600 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
026604 002564 RPCS3 ;FAILING REGISTER
026606 000001 BIT0 ;BIT UNDER TEST
026610 104456 TRAP C$ERHRD
026612 000050 .WORD 40
026614 012776 .WORD EM22
026616 014172 .WORD ERRO
026620 005037 002402 CLR ITCOUN ;RESET FURTHER ITERATIONS
026624 65$:
026624 10000$:
026624 104405 TRAP C$ESEG
026626 104404 TRAP C$BSEG
026630 004737 017672 JSR PC,IRLOCK ;POLL INPUT READY IN RPCS2
026634 005077 153674 CLR @RPDB ;WRITE RPDB WITH 0'S
026640 004737 017672 JSR PC,IRLOCK ;WAIT FOR IR TO SET AGAIN
026644 005077 153664 CLR @RPDB ;WRITE RPDB = 0, AGAIN
026650 004737 017706 JSR PC,IRLOCK ;NOW WAIT FOR OUTPUT READY IN RPCS2
026654 005777 153654 TST @RPDB ;NOW DO A ONE WORD READ OF RPDB

```

026660	004737	017706		JSR	PC,ORLOCK	;WAIT FOR OUTPUT READY TO SET IN RPCS2 AGAIN!
026664	004777	153644		TST	@RPDB	;DO A SECOND READ OF RPDB
026670	004737	017000		JSR	PC,WAIT	;WAIT FOR THE RP07 MICROPROCESSOR
026674	032777	140000	153610	BIT	#SC!TRE,@RPCS1	;LOOK FOR SC AND TRE
026702	001012			BNE	67\$	;THEY BOTH SET, GO-ON
026704	004737	017372		JSR	PC,BISEXP	;LOAD FAILING DATA
026710	002512			RPCS1		;FAILING REGISTER
026712	140000			SC!TRE		;BIT UNDER TEST
026714	104456			TRAP	C\$ERHRD	
026716	000051			.WORD	41	
026720	012776			.WORD	EM22	
026722	014172			.WORD	ERRO	
026724	005037	002402		CLR	ITCOUN	;RESET FURTHER ITERATIONS
026730	032777	000400	153564	BIT	#MDPE,@RPCS2	;DID WE DETECT PARITY ERROR?
026736	001012			BNE	68\$	;YES, GO-ON
026740	004737	017372		JSR	PC,BISEXP	;LOAD FAILING DATA
026744	002522			RPCS2		;FAILING REGISTER
026746	000400			MDPE		;BIT UNDER TEST
026750	104456			TRAP	C\$ERHRD	
026752	000052			.WORD	42	
026754	012776			.WORD	EM22	
026756	014172			.WORD	ERRO	
026760	005037	002402		CLR	ITCOUN	;RESET FURTHER ITERATIONS
026764	052777	000040	153530	BIS	#CLR,@RPCS2	;CLEAR OUT THE DEVICE!
026772						
026772	104405			TRAP	C\$ESEG	
026774	104404			TRAP	C\$BSEG	
026776	032777	000004	153560	BIT	#BIT2,@RPCS3	;NOW CHECK TO SEE THAT #BIT2 DID CLEAR
027004	001412			BEQ	69\$	;= 0, TEST OK!!
027006	004737	017422		JSR	PC,BICEXP	;LOAD FAILING DATA
027012	002564			RPCS3		;FAILING REGISTER
027014	000001			BIT0		;BIT UNDER TEST
027016	104456			TRAP	C\$ERHRD	
027020	000053			.WORD	43	
027022	013051			.WORD	EM23	
027024	000000			.WORD	0	
027026	005037	002402		CLR	ITCOUN	;RESET FURTHER ITERATIONS
027032						
027032						
027032	104405			TRAP	C\$ESEG	
027034	005337	002402		DEC	ITCOUN	;ONE LESS ITERATION TO-GO
027040	003247			BGT	66\$	;TAKE BRANCH IF NOT DONE
29 027042						
027042	104401			TRAP	C\$ETST	

```

1      .SBTTL TEST 21 IPCK3 TEST
2
3      :% TEST 21 (RH70 TEST ONLY) MDPE TEST 4
4      :% : SET RPCS3: IPCK3 (BIT 03) = 1
5      :% : IF RPCS3: IPCK3 <> 1
6      :% : THEN
7      :% : OUTPUT ERROR MESSAGE (BIT FAILED TO SET)
8      :% : ELSE
9      :% : IF RPCS2: IR <> 1
10     :% : THEN
11     :% : WAIT FOR RPCS2: IR TO SET
12     :% : ENDIF
13     :% : ELSE
14     :% : WRITE DATA TO RPDB
15     :% : WAIT FOR PPCS2: IR TO SET AGAIN (USING A TIMER)
16     :% : WRITE RPDB WITH DATA AGAIN
17     :% : ENDIF
18     :% : IF ((RPCS1: SC) AND (RPCS1: TRE) AND (RPCS2: MCPE)) <> 1
19     :% : THEN
20     :% : OUTPUT ERROR MESSAGE (UNDETECTED PARITY ERROR)
21     :% : ELSE
22     :% : SET RPCS2: CLR = 1
23     :% : ENDIF
24     :% : IF ((RPCS1: SC) OR (RPCS1: TRE) OR (RPCS2: MCPE)) = 1
25     :% : THEN
26     :% : OUTPUT ERROR MESSAGE (ERROR STATUS FAILED TO CLEAR)
27     :% : ENDIF
28     :% END TEST 21
29
30 027044 T21::
31 027044 005737 002504 TST RHTYPE ;IS THE CONTROLLER AN RH70?
027050 003002 BGT 64$ ;IF > 0, YES,
027052 104432 TRAP C$EXIT
027054 000304 .WORD L10043-
027056 005037 002404 64$: CLR ERRWD1 ;SET THE MODULE CALLOUT
027062 012737 000002 002406 MOV #BIT1,ERRWD2 ;FOR THIS TEST
027070 012737 000012 002402 MOV #10,,ITCOUN ;LOAD THE ITERATION COUNT
027076 66$:
027076 104404 TRAP C$BSEG
027100 052777 000010 153456 BIS #BIT3,@RPCS3 ;SET THE BIT3-UNDER-TEST
027106 032777 000010 153450 BIT #BIT3,@RPCS3 ;DID BIT3 SET IN RPCS3?
027114 001012 BNE 65$ ;YES, SKIP ERROR DISPATCH
027116 004737 017372 JSR PC,BISEXP ;LOAD FAILING DATA
027122 002564 RPCS3 ;FAILING REGISTER
027124 000001 BIT0 ;BIT UNDER TEST
027126 104456 TRAP C$ERHRD
027130 000054 .WORD 44
027132 012776 .WORD EM22
027134 014172 .WORD ERRO
027136 005037 002402 CLR ITCOUN ;RESET FURTHER ITERATIONS
027142 65$:
027142 10000$:
027142 104405 TRAP C$ESEG
027144 104404 TRAP C$BSEG
027146 004737 017672 JSR PC,IRLOCK ;POLL INPUT READY IN RPCS2
027152 005077 153356 CLR @RPDB ;WRITE RPDB WITH 0'S
027156 004737 017672 JSR PC,IRLOCK ;WAIT FOR IR TO SET AGAIN

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027162	005077	153346		CLR	@RPDB	;WRITE RPDB = 0, AGAIN
027166	004737	017706		JSR	PC,ORLOCK	;NOW WAIT FOR OUTPUT READY IN RPCS2
027172	005777	153336		TST	@RPDB	;NOW DO A ONE WORD READ OF RPDB
027176	004737	017706		JSR	PC,ORLOCK	;WAIT FOR OUTPUT READY TO SET IN RPCS2 AGAIN!
027202	005777	153326		TST	@RPDB	;DO A SECOND READ OF RPDB
027206	004737	017000		JSR	PC,WAIT	;WAIT FOR THE RP07 MICROPROCESSOR
027212	032777	140000	153272	BIT	#SC!TRE,@RPCS1	;LOOK FOR SC AND TRE
027220	001012			BNE	67\$	;THEY BOTH SET, GO-ON
027222	004737	017372		JSR	PC,BISEXP	;LOAD FAILING DATA
027226	002512			RPCS1		;FAILING REGISTER
027230	140000			SC!TRE		;BIT UNDER TEST
027232	104456			TRAP	C\$ERHRD	
027234	000055			.WORD	45	
027236	012776			.WORD	EM22	
027240	014172			.WORD	ERRO	
027242	005037	002402		CLR	ITCOUN	;RESET FURTHER ITERATIONS
027246	032777	000400	153246	BIT	#MDPE,@RPCS2	;DID WE DETECT PARITY ERROR?
027254	001012			BNE	68\$	;YES, GO-ON
027256	004737	017372		JSR	PC,BISEXP	;LOAD FAILING DATA
027262	002522			RPCS2		;FAILING REGISTER
027264	000400			MDPE		;BIT UNDER TEST
027266	104456			TRAP	C\$ERHRD	
027270	000056			.WORD	46	
027272	012776			.WORD	EM22	
027274	014172			.WORD	ERRO	
027276	005037	002402		CLR	ITCOUN	;RESET FURTHER ITERATIONS
027302	052777	000040	153212	BIS	#CLR,@RPCS2	;CLEAR OUT THE DEVICE!
027310						
027310	104405			TRAP	C\$ESEG	
027312	104404			TRAP	C\$BSEG	
027314	032777	000010	153242	BIT	#BIT3,@RPCS3	;NOW CHECK TO SEE THAT #BIT3 DID CLEAR
027322	001412			BEQ	69\$	;= 0, TEST OK!!
027324	004737	017422		JSR	PC,BICEXP	;LOAD FAILING DATA
027330	002564			RPCS3		;FAILING REGISTER
027332	000001			BIT0		;BIT UNDER TEST
027334	104456			TRAP	C\$ERHRD	
027336	000057			.WORD	47	
027340	013051			.WORD	EM23	
027342	000000			.WORD	0	
027344	005037	002402		CLR	ITCOUN	;RESET FURTHER ITERATIONS
027350						
027350						
027350	104405			TRAP	C\$ESEG	
027352	005337	002402		DEC	ITCOUN	;ONE LESS ITERATION TO-GO
027356	003247			BGT	66\$	;TAKE BRANCH IF NOT DONE
32 027360						
027360	104401			TRAP	C\$ETST	

```

1      .SBTTL TEST 22 INTERRUPT TEST #1
2
3      :% TEST 22 INTERRUPT TEST 1
4      :% : WRITE RPCS1: RDY (BIT 07) = 1
5      :% : IF RPCS1: RDY <> 1
6      :% : THEN
7      :% : : OUTPUT ERROR MESSAGE (RPCS1: RDY STUCK AT 0)
8      :% : ENDF
9      :% : SET PROCESSOR PRIORITY = 7 DOWNT0 THE DEVICE PRIORITY, ONE LEVEL AT A TIME
10     :% : SET RPCS1: RDY AND RPCS1: IE = 1
11     :% : IF INTERRUPT IS RECEIVED
12     :% : THEN
13     :% : : OUTPUT ERROR MESSAGE (RHXX INTERRUPTED TO WRONG PRIORITY)
14     :% : ENDF
15     :% END TEST 22
16
17 027362 T22::
18 027362 005037 002404 CLR ERRWD1 ;CREATE THE MODULE CALLOUT
19 027366 012737 000002 002406 MOV #BIT1,ERRWD2 ;FOR THIS TEST
20 027374 012737 000012 002402 MOV #10,,ITCOUN ;LOAD THE ITERATION COUNT
21 027402 1$:
22 027402 104404 TRAP C$BSEG
23 027404 005037 002462 CLR INTFLG ;RESET THE INTERRUPT STATUS FLAG
24 027410 052777 000200 153074 BIS #RDY,@RPCS1 ;SET RDY = 1 IN RPCS1
25 027416 032777 000200 153066 BIT #RDY,@RPCS1 ;IS IT = 1 ?
26 027424 001012 BNE 2$ ;YES, SKIP ERROR DISPATCH
27 027426 004737 017372 JSR PC,BISEXP ;LOAD UP THE ERROR POINTERS
28 027432 002512 RPCS1 ;THIS REGISTER
29 027434 000200 RDY ;THIS BIT
30 027436 104456 TRAP C$ERHRD
31 027440 000060 .WORD 48
32 027442 012776 .WORD EM22
33 027444 014172 .WORD ERRO
34 027446 005037 002402 CLR ITCOUN ;RESET THE ITERATION COUNTER
35 027452 2$:
36 027452 10000$:
37 027452 104405 TRAP C$ESEG
38 027454 012746 000340 MOV #PRI07,-(SP)
39 027460 012746 020630 MOV #INTSRV,-(SP)
40 027464 013746 002476 MOV RPVEC,-(SP)
41 027470 012746 000003 MOV #3,-(SP)
42 027474 104437 TRAP C$SVEC
43 027476 062706 000010 ADD #10,SP
44 027502 012702 000340 MOV #PRI07,R2 ;SET THE PRIORITY TO 7
45 027506 3$:
46 027506 104404 TRAP C$BSEG
47 027510 010200 MOV R2,R0
48 027512 104441 TRAP C$SPRI
49 027514 052777 000300 152770 BIS #RDY!IE,@RPCS1 ;FORCE AN INTERRUPT, BUT DON'T HONOR IT!
50 027522 012727 000020 MOV #20,(PC)+
51 027526 000000 .WORD 0
52 027530 013727 002116 MOV L$DLY,(PC)+
53 027534 000000 .WORD 0
54 027536 005367 177772 DEC -6(PC)
55 027542 001375 BNE .-4
56 027544 005367 177756 DEC -22(PC)
57 027550 001367 BNE .-20

```

38	027552	005737	002462	TST	INTFLG			
39	027556	001406		BEQ	4\$			;IF INTFLG > 0, WRONG PRIORITY!!
40	027560	104456		TRAP	C\$ERHRD			;IT'S OK IF ZERO!
	027562	000061		.WORD	49			
	027564	013126		.WORD	EM24			
	027566	000000		.WORD	0			
41	027570	005037	002402	CLR	ITCOUN			;NO ITERATIONS NECESSARY
42	027574							
	027574			4\$: 10001\$:				
	027574	104405		TRAP	C\$ESEG			
43	027576	162702	000040	SUB	#40,R2			;REDUCE THE PRIORITY LEVEL
44	027602	020237	002500	CMP	R2,RPVEC+2			;AT THE DEVICE PRIORITY YET?
45	027606	103337		BHIS	3\$			;NOT IF HIGHER OR SAME...
46	027610	052777	000040	BIS	#CLR,ARPCS2			;NOW DISARM INTERRUPTS
47	027616	005337	002402	DEC	ITCOUN			;ONE LESS
48	027622	003267		BGT	1\$			;DO UNTIL <= 0
49	027624	013700	002476	MOV	RPVEC,R0			
	027630	104436		TRAP	C\$CVEC			
50	027632			L10044:				
	027632	104401		TRAP	C\$ETST			

```

1      .SBTTL  TEST 23 INTERRUPT TEST #2
2
3      :%      TEST 23 ,NTERUPT TEST 2
4      :%      :  WRITE RPCS2:  CLR = 1
5      :%      :  SET PROCESSOR PRIORITY = 0
6      :%      :  IF ((RPCS1:  SC) OR (RPDS:  ATA)) = 1
7      :%      :  :  THEN
8      :%      :  :  OUTPUT ERROR MESSAGE (PERSISTENT ATA OR SC-CANNOT PERFORM INTERRUPT TEST)
9      :%      :  :  EXIT TEST 19
10     :%      :  ENDF
11     :%      :  WRITE RPCS1:  IE = 1
12     :%      :  IF RHXX INTERRUPTS
13     :%      :  :  THEN
14     :%      :  :  OUTPUT ERROR MESSAGE (RECEIVED FALSE INTERRUPT)
15     :%      :  ENDF
16     :%      END TEST 23
17
18 027634      T23::
19 027634      MOV      #BIT10!BIT11!BIT12,ERRWD1;J11-J13 CALLOUT
20 027642      MOV      #BIT1!BIT2!BIT8,ERRWD2;CONTROLLER, CABLE, TERMINATOR
21 027650      MOV      #10,,ITCOUN      ;LOAD THE ITERATION COUNT
22 027656      1$:
23 027656      TRAP      C$BSEG
24 027660      CLR      INTFLG      ;RESET THE INTERRUPTS RECEIVED FLAG
25 027664      BIS      #CLR,@RPCS2      ;CLEAR OUT THE CONTROLLER
26 027672      MOV      DRVNO,@RPCS2      ;LOAD THE DRIVE NUMBER
27 027700      BIT      #SC!TRE!MCPE,@RPCS1;DO WE HAVE A SPECIAL CONDITION, MCPE, OR TRANSFER ERROR?
28 027706      BEQ      2$      ;IF ZERO, NO!!
29 027710      JSR      PC,BICEXP      ;LOAD THE ERROR POINTERS
30 027714      RPCS1      ;THIS REGISTER FAILED,
31 027716      SC!TRE!MCPE      ;THIS DATA SHOULD BE CLEAR
32 027720      TRAP      C$ERHRD
33 027722      .WORD      50
34 027724      .WORD      EM16
35 027726      .WORD      ERRO
36 027730      TRAP      C$EXIT
37 027732      .WORD      L10045-.
38 027734      2$:
39 027734      10000$:
40 027734      TRAP      C$ESEG
41 027736      MOV      #PRI07,-(SP)
42 027742      MOV      #INTSRV,-(SP)
43 027746      MOV      RPVEC,-(SP)
44 027752      MOV      #3,-(SP)
45 027756      TRAP      C$SVEC
46 027760      ADD      #10,SP
47 027764      TRAP      C$BSEG
48 027766      MOV      #0,R0
49 027772      TRAP      C$SPRI
50 027774      MOV      #IE,@RPCS1      ;ARM THE DEVICE, BUT DON'T EXPECT AN INTERRUPT
51 030002      MOV      #20,(PC)+
52 030006      .WORD      0
53 030010      MOV      L$DLY,(PC)+
54 030014      .WORD      0
55 030016      DEC      -6(PC)
56 030022      BNE      -4
57 030024      DEC      -22(PC)

```



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1      .SBTTL TEST 24 INTERRUPT TEST #3
2
3      :% TEST 24 INTERRUPT TEST 3
4      :% : SET RPCS2: CLR = 1
5      :% : SET ((RPCS1: IE) AND (RPCS1: RDY)) = 1
6      :% : CLEAR PROCESSOR STATUS
7      :% : IF INTERRUPT DOESN'T OCCUR
8      :% : THEN
9      :% : OUTPUT ERROR MESSAGE (DEVICE FAILED TO INTERRUPT)
10     :% : ENDF
11     :% END TEST 24
12
13 030102 T24:: MOV #10,ITCCUN ;LOAD THE ITERATION COUNTER
14 030102 012737 00001. 002402 MOV #PRI07,-(SP)
15 030110 012746 000340 MOV #INTSRV,-(SP)
16 030114 012746 020630 MOV #INTSRV,-(SP)
17 030120 013746 002476 MOV RPVEC,-(SP)
18 030124 012746 000003 MOV #3,-(SP)
19 030130 104437 TRAP C$SVEC
20 030132 062706 000010 ADD #10,SP
21
22 16 030136 104'04 1$: TRAP C$BSEG
23 030136 005037 002462 CLR INTFLC ;RESET THE INTERRUPTS RECEIVED MARKER
24 030140 052777 000040 152350 BIS #CLR,@RPCS2 ;FLUSH OUT THE CONTROLLER
25 030144 013777 002506 152342 MOV DRVNO,@RPCS2 ;LOAD THE DRIVE NUMBER TO AVOID A TRANSFER ERROR!
26 030152 005737 002500 TST RPVEC-2 ;GET THE DEVICE PRIORITY
27 030164 001002 BNE 2$ ;IT'S > ZERO, SET UP TO LOWER THE PROCESSOR STATUS
28 030166 005046 CLR -(SP) ;IT'S AT PRIORITY 0!
29 030170 000404 BR 3$ ;GO NOW!
30 030172 013746 002500 2$: MOV RPVEC+2,-(SP) ;GET THE PRIORITY
31 030176 162716 000040 SUB #40,(SP) ;AND LOWER IT
32
33 26 030202 012600 3$: MOV (SP)+,R0
34 030204 104441 TRAP C$SPRI
35 27 030206 052777 000300 152276 BIS #RDY!IE,@RPCS1 ;FORCE AN INTERRUPT!!
36 28 030214 012727 000020 MOV #20,(PC)+
37 030220 000000 .WORD 0
38 030222 013727 002116 MOV L$DLY,(PC)+
39 030226 000000 .WORD 0
40 030230 005367 177772 DEC -6(PC)
41 030234 001375 BNE -1
42 030236 005367 177756 DEC -22(PC)
43 030242 001367 BNE -20
44 29 030244 005737 002462 TST INTFLG ;IF WE RECEIVED AN INTERRUPT. THIS > 0
45 30 030250 003006 BGT 4$ ;GOT IT, TEST OK!
46 31 030252 104456 TRAP C$ERHRD
47 030254 000064 .WORD 52
48 030256 013224 .WORD EM26
49 030260 000000 .WORD 0
50 32 030262 005037 002402 CLR ITCCUN ;NO ITERATIONS NECESSARY
51 33 030266 104405 4$: TRAP C$ESEG
52 030266 052777 000040 152224 BIS #CLR,@RPCS2 ;NOW MOVE ALL INTERRUPT STATUS
53 030270 005337 002402 DEC ITCCUN ;ONE LESS ITERATION TO GO
54 030302 003315 BGT 1$ ;IF 0, DO AGAIN
55 37 030304 013700 002476 MOV RPVEC,R0

```

38	030310	104436		TRAP	C\$CVEC	
39	030312	012700	000340	MOV	#PRI07,R0	;SET PRIORITY TO 7
	030316	104441		TRAP	C\$SPRI	
40	030320		L10046:			
	030320	104401		TRAP	C\$ETST	

```

1      .SBTTL TEST 25 BASIC DRIVE TEST
2
3      :% TEST 25 (RP07 REMOTE REGISTER TESTS)-BASIC DRIVE SELECT TEST
4      :% : CHECK MASSBUS INTERFACE SWITCH TEST LOCATION 'SWTTST'
5      :% : IF 'SWTTST' = 0
6      :% : : THEN EXIT TEST
7      :% : ENDF
8      :% : PRINT MESSAGE ASKING USER TO DISCONNECT THE DRIVE-UNDER-TEST
9      :% : FROM THE MASSBUS BY USING THE DISABLE SWITCH
10     :% : THIS TEST CANNOT BE RUN REMOTELY.
11     :% : SET RPCS2. CLR = 1
12     :% : LOAD THE DRIVE-UNDER-TEST DEVICE NUMBER INTO RPCS2
13     :% : IF REGISTER 06 (RPDT) <> 0
14     :% : : THEN
15     :% : : OUTPUT ERROR MESSAGE (DUAL RESPONSE FOUND)
16     :% : : OUTPUT FAULT LIST = ANOTHER DRIVE RESPONDING,
17     :% : : RHXX, CABLES, DRIVE SELECT, XMIT ERS-RECEIVERS FOR DRIVE,
18     :% : : J11 / J13, TERMINATOR
19     :% : ENDF
20     :% END TEST 25
21
22 030322 T25::
23 030322 005737 002332 TST SWTTST ;SHOULD WE DO MASSBUS INTERFACE SWITCH TEST ?
24 030326 001002 BNE 1$ ;BR IF = 1, YES
28 030330 104432 TRAP C$EXIT
29 030332 00016 .WORD L10047-.
30 030334 104450 1$: TRAP C$MANI
31 030336 103402 BCS 2$
32 030340 104432 TRAP C$EXIT
33 030342 000150 .WORD L10047-.
34 030344 104443 2$: ;TYPE 'PLACE INTERFACE SWITCH A12-S01 IN DOWN POSITION (L)'
35 030346 000404 TRAP C$GMAN
36 030350 002464 BR 10000$
37 030352 000120 .WORD UNABLE
38 030354 011607 .WORD T$CODE
39 030356 000001 .WORD MSG13
40 030360 10000$: .WORD 1
41 030360 005737 002464 TST UNABLE ;DID OPERATOR RESPOND YES?
42 030364 003002 BGT 3$ ;IF > 0, YES
43 030366 104432 TRAP C$EXIT
44 030370 000122 .WORD L10047-.
45 030372 104404 3$: TRAP C$BSEG
46 030374 013777 002506 152120 MOV DRVNO, @RPCS2 ;LOAD THE DRIVE NUMBER
47 030402 005777 152132 TST @RPDT ;LOOK AT THE DRIVE TYPE REGISTER
48 030406 001422 BEQ 4$ ;SHOULD BE ALL 0'S
49 030410 013777 002540 002456 MOV RPDT, TESTRG ;FAILING REGISTER
50 030416 017737 152116 002457 MOV @RPDT, RCVD ;FAILING DATA
51 030424 005037 002454 CLR EXPTED ;EXPECTED DATA
52 030430 012737 016000 002404 MOV #BIT10!BIT11!BIT12, ERRWD1 ;MARK J11, J12 & J13 FOR CALLOUT
53 030436 012737 030424 002406 MOV #BIT1!BIT2!BIT4!BIT8, ERRWD2 ;MARK RH, CABLE, TERMINATOR, ANOTHER DRIVE
54 030444 104456 TRAP C$ERHRD
55 030446 000065 .WORD 53
56 030450 012523 .WORD EM15
57 030452 014172 .WORD ERRO

```

47 030454
 030454
 030454 104405
 48 030456
 49 030456 104443
 ^30460 000404
 030462 002464
 030464 000120
 030466 011667
 030470 100000
 030472
 50 030472 005737 002464
 51 030476 ^02403
 52 030500 004737 017000
 53 030504 000764
 54
 55 030506 005037 002464
 56 030512
 030512 104401

4\$:
 10001\$:
 TRAP C\$ESEG
 5\$:
 TRAP C\$GMAN
 BR 10002\$
 .WORD UNABLE
 .WORD T\$CODE
 .WORD MSG14
 .WORD 100000
 10002\$:
 TSI UNABLE
 BLT 6\$
 JSR PC, WAIT
 BR 5\$
 6\$:
 CLR UNABLE
 L10047:
 TRAP C\$ETST

;TYPE 'PLACE . .TERFACE SWITCH A12-S01 IN UP POSITION (L)

;DID OPERATOR RESPOND YES ?
 ;IF < 0, YES
 ;SPIN FOR A STALL LOOP
 ;NOW ASK THE QUESTION AGAIN!

;INITIALIZE THIS

```

1      .SBTTL TEST 26 DEMAND AND TRANSFER TEST
2
3      :%      TEST 26 DEMAND AND TRANSFER TEST
4      :%      : LOAD THE DRIVE-UNDER-TEST'S NUMBER INTO RPCS2
5      :%      : READ RPDY REGISTER
6      :%      : IGNORE DATA AND ERRORS
7      :%      : IF REGISTER DOESN'T RESPOND
8      :%      : THEN
9      :%      : OUTPUT ERROR MESSAGE (DEMAND AND TRANSFER LOGIC NOT WORKING)
10     :%      : OUTPUT FAULT LOG, CABLES, J11 / J13, REMOTE POSSIBILITY OF
11     :%      : JCB, CTOD REGISTER SELECT LINES, DISABLE SWITCH, TERMINATOR.
12     :%      : ENDF
13     :%      END TEST 26
14
15 030514      T26::
16 030514 012737 000012 002402      MOV      #10,,ITCOUN      ;LOAD THE ITERATION COUNT
17 030522      1$:
18 030522 104404      TRAP      C$BSEG
19 030524 013777 002506 151770      MOV      RPDT,RCVED      ;LOAD THE DRIVE NUMBER
20 030532 017737 152002 002452      MOV      #20042,EXPTED      ;LOOK AT RPDY
21 030540 005137 002452      TST      RCVED      ;IF IT IS > 0, DRIVE IS THERE
22 030546 012737 020042 002454      BNE      2$      ;> 0, OK
23 030554 013737 002540 002456      MOV      #20042,EXPTED      ;CREATE THE CORRECT DRIVE TYPE CONTENTS
24 030562 012737 012200 002404      MOV      RPDT,TESTRG      ;GET THE FAILING REGISTER
25 030570 012737 000416 002406      MOV      #BIT7!BIT10!BIT12,ERRWD1;SET MODULE CALLOUT MASK
26 030576 104456      MOV      #BIT1!BIT2!BIT3!BIT8,ERRWD2;FOR BOTH WORDS
27 030600 000066      TRAP      C$ERHRD
28 030602 012776      .WORD      54
29 030604 014172      .WORD      EM22
30 030606 005037 002402      .WORD      ER
31 030612      CLR      ITCOUN      ;RESET THE ITERATION COUNT
32 030612 10000$:
33 030612 104405      TRAP      C$ESEG
34 030614 005337 002402      DEC      ITCOUN      ;ONE LESS ITERATION
35 030620 003340      BGT      1$      ;IF >0, DO AGAIN
36 030622      L1005C:
37 030622 104401      TRAP      C$ETST
  
```

```

1      .SBTTL  TEST 27 UNIQUE UNIT UNDER TEST
2
3      :%      TEST 27 UNIQUE UNIT UNDER TEST
4      :%      : WRITE #46 TO RPCS1 FOR THE DRIVE UNDER TEST
5      :%      : WRITE DATA PATTERN #4 TO RPCS1 FOR ALL OTHER DRIVES ON THE BUS
6      :%      : IF RPCS1 FOR THE DRIVE UNDER TEST <> #46
7      :%      : THEN
8      :%      :   OUTPUT ERROR MESSAGE (DRIVE SELECT LOGIC FAILURE)
9      :%      :   OUTPUT FAULT LIST: RHXX, CABLE, 11/J13, TERMINATOR
10     :%      : ENDIF
11     :%      END TEST 27
12
13 030624      T27::
14 030624      012737 000012 002402      MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
15 030632      1$:
16 030632      04404      TRAP      C$BSEG
17 030634      3777 002506 151660      MOV      DRVNO,@RPCS2      ;LOAD THE DRIVE UNDER TEST
18 030642      012777 000046 151642      MOV      #46,@RPCS1      ;SET SOME COMMAND FUNCTION BITS
19 030650      005002      CLR      R2      ;SET UP TO DO ALL DRIVES
20 030652      020237 002506      2$:      CMP      R2,DRVNO      ;DRIVE UNDER TEST?
21 030656      001405      BEQ      3$      ;IF SO, WE ALREADY WROTE IT.
22 030660      010277 151636      MOV      R2,@RPCS2      ;LOAD THIS DRIVE #
23 030664      013777 002352 151620      MOV      PATT4,@RPCS1      ;AND WRITE A PATTERN
24 030672      005202      3$:      INC      R2      ;NEXT DRIVE
25 030674      020227 000010      CMP      R2,#10      ;DONE
26 030700      103764      BLO      2$      ;IF <10, NO
27 030702      013777 002506 151612      MOV      DRVNO,@RPCS2      ;RELOAD ORIGINAL DRIVE UNDER TEST
28 030710      012737 000046 002454      MOV      #46,EXPTED      ;CREATE DATA FILE
29 030716      017737 151570 002452      MOV      @RPCS1,RCVED      ;GET RESULTS
30 030724      012702 000046      MOV      #46,R2      ;AND STRIP UNUSED DATA
31 030732      005102      COM      R2      ;FOR A POSSIBLE ERROR REPORT
32 030736      040237 002452      BIC      R2,RCVED      ;DATA SHOULD MATCH NOW
33 030744      023737 002454 002452      CMP      EXPTED,RCVED      ;DO THE COMPARISON
34 030746      001417      BEQ      4$      ;IF EQUAL, IT'S OK
35 030754      013737 002512 002456      MOV      RPCS1,TESTRG      ;LOG FAILING REGISTER
36 030754      017737 012000 002404      MOV      #BIT10!BIT12,ERRWD1 ;FORM MODULE CALL-OUT
37 030762      012737 000406 002406      MOV      #BIT1!BIT2!BIT8,ERRWD2 ;BOTH WORDS
38 030770      104456      TRAP      C$ERHRD
39 030772      000076      .WORD      62
40 030774      012454      .WORD      EM14
41 030776      014172      .WORD      ERRO
42 031000      005037 002402      CLR      ITCOUN      ;ITERATIONS = 0
43 031004      4$:
44 031004      10000$:
45 031004      104405      TRAP      C$FSEG
46 031006      005337 002402      DEC      ITCOUN      ;ONE LESS ITERATION
47 031012      003301      BGT      1$      ;DO UNTIL <= 0
48 031014      L 0051:
49 031014      104401      TRAP      C$ETST

```

```

1      .SBTTL TEST 28  RPDT REGISTER TEST
2
3      :%      TEST 28 TEST DRIVE TYPE REGISTER
4      :%      : SET RPCS2: CLR = 1
5      :%      : LOAD DRIVE-UNDER-TEST'S NUMBER INTO RPCS2
6      :%      : READ RPDT
7      :%      : IF RPDT DOESN'T = ONE OF THE FOLLOWING: 20042, 24042
8      :%      : THEN
9      :%      :   OUTPUT ERROR MESSAGE (RP07 NOT FOUND, RPDT = (RPDT CONTENTS))
10     :%      :   OUTPUT FAULT LIST: RHXX, CABLE, J11/J13, J12, CTOD, RS, MASSBUS,
11     :%      :   JOB, TERMINATOR.
12     :%      : ENDIF
13     :%      END TEST 28
14
15 031016      T28::
16 031016      012737 000012 002402      MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
17 031024      104404      1$:      TRAP      C$BSEG
18 031026      052777 000040 151466      BIS      #CLR,@RPCS2      ;START OUT WITH AN INITIALIZED CONTROLLER
19 031034      053777 002506 151460      BIS      DRVNO,@RPCS2      ;LOAD THE DRIVE #
20 031042      017737 151472 002452      MOV      @RPDT,RCVED      ;GET RPDT AND STORE IT
21 031050      012737 020042 002454      MOV      #20042,EXPTED      ;CREATE EXPECTED DATA
22 031056      032737 004000 002452      BIT      #DRQ, RCVED      ;DUAL PORTED?
23 031064      001403      BEQ      2$      ;NO, IF NOT SET!
24 031066      052737 004000 002454      BIS      #DRQ, EXPTED      ;SET DUAL-PORT
25 031074      023737 002452 002454      CMP      RCVED, EXPTED      ;DOES DATA MATCH?
26 031102      001417      BEQ      3$      ;YES, TEST OK!
27 031104      013737 002540 002456      MOV      RPDT, TESTRG      ;AND LOAD FAILING REGISTER
28 031112      012737 016200 002464      MOV      #BIT7!BIT10!BIT11!BIT12, ERRWD1;CREATE MODULE CALLOUT LIST
29 031120      012737 000406 002406      MOV      #BIT1!BIT2!BIT8, ERRWD2;FOR BOTH MASK WORDS
30 031126      104456      TRAP      C$LRHRD
31 031130      000067      .WORD      55
32 031132      012454      .WORD      EM14
33 031134      014172      .WORD      ERRO
34 031136      005037 002402      CLR      ITCOUN      ;RESET FURTHER ITERATIONS
35 031142      031142      3$:
36 031142      104405      10C00$:
37 031144      065337 002402      TRAP      C$ESEG
38 031150      003325      DEC      ITCOUN      ;ONE LESS ITERATION
39 031152      104401      BGT      1$      ;IF >0, DO AGAIN
40 031152      L10052:      TRAP      C$ETST

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1      .SBTTL TEST 29  RPDA READ WRITE TEST
2
3      :%      TEST 29 RPDA READ WRITE TEST
4      :%      :   WRITE RPDA WITH DATA PATTERNS 1-4, ONE AT A TIME
5      :%      :   IF RPDA DATA DOESN'T MATCH EXPECTED
6      :%      :   :   THEN
7      :%      :   :   OUTPUT ERROR MESSAGE (RPDA BIT(S) UNDER TEST DON'T MATCH EXPECTED)
8      :%      :   :   OUTPUT FAULT LIST:  RHXX, CABLES, STUCK DATA BITS, J11/J13,
9      :%      :   :   CTOD STUCK AT 0, J12, J8, TERMINATOR
10     :%      :   ENDIF
11     :%      :   WRITE RPDA WITH DATA PATTERN #4
12     :%      :   IF RPDA DOESN'T = 0
13     :%      :   :   THEN
14     :%      :   :   OUTPUT ERROR MESSAGE (RPDA BITS STUCK AT 1)
15     :%      :   :   OUTPUT FAULT LIST:  RHXX, CABLES, STUCK DATA BITS, J11/J13,
16     :%      :   :   J12, REMOTE POSSIBILITY OF J8, TERMINATOR
17     :%      :   ENDIF
18     :%      END TEST 29
19
20 031154      129::      MOV      #10,ITCOUN      ;LOAD THE ITERATION COUNT
21 031154      012737 000012 002402      MOV      #BIT7!BIT10!BIT11!BIT12,ERRWD1;CREATE THE MODULE CALLOUT
22 031162      012737 016200 002404      MOV      #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MODULES
23 031170      012737 000406 002406      1$:      JSR      PC,SEIZE      ;LOAD THE DRIVE UNDER TEST
24 031176      004737 016662      JSR      PC,SETUP      ;LOAD I/O POINTERS
25 031202      004737 017744      TST28      ;FROM THIS TABLE
26 031206      004256      64$:      MOV      SRCTMP,TEMP      ;SET UP FOR POSSIBLE LOOP
27 031210      013737 002444 002436      TRAP      C$BSEG
28 031216      104404      JSR      PC,FLOAT      ;FLOAT THE PATTERN
29 031220      004737 020034      BR      65$      ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
30 031224      000403      MOV      TEMP,SRCTMP      ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
31 031226      013737 002436 002444      65$:
32 031234      10000$:
33 031234      TRAP      C$ESEG
34 031236      005737 002446      TST      MASK      ;IF MASK = 0, WE'VE DONE
35 031242      001362      BNE      64$
36 031244      004737 020330      JSR      PC,CONSET      ;GET NEXT PATTERN
37 031250      005737 002434      TST      PATCNT      ;IF PATTERN COUNT UNDERFLOWED, DONE!
38 031254      002355      BGE      64$      ;NOT DONE YET, GO-ON
39 031256      104404      TRAP      C$BSEG
40 031260      004737 020202      JSR      PC,COMPAR      ;WRITE THE NEXT PATTERN
41 031264      002352      PATT4      ;WHICH IS PATTERN #4
42 031266      10001$:
43 031266      104405      TRAP      C$ESEG
44 031270      104404      TRAP      C$BSEG
45 031272      104404      TRAP      C$BSEG
46 031274      004737 020202      JSR      PC,COMPAR      ;DO ANOTHER DATA COMPARISON
47 031300      002350      PATT3      ;USING PATTERN #3
48 031302      10003$:
49 031302      104405      TRAP      C$ESEG
50 031304      004737 017572      JSR      PC,LDZERO      ;WRITE RPDA TO 0 TO CLEAR IT!
51 031310      10002$:
52 031310      104405      TRAP      C$ESEG
53 26 031310      005337 002402      DEC      ITCOUN      ;ONE LESS ITERATION
54 27 031316      003327      BGT      1$      ;DO UNTIL <= 0!
55 28 031320      L10053:
56 031320      104401      TRAP      C$ESEG

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```

1      .SBTTL TEST 30  PARITY BIT TRANSITION TEST
2
3      :%      TEST 30 PARITY BIT TRANSITION TEST
4      :%      :   WRITE RPDA USING DATA PATTERN 4
5      :%      :   IF ((TRE) OR (MCPE)) = 1
6      :%      :   :   THEN
7      :%      :   :   OUTPUT ERROR MESSAGE (DETECTED FALSE PARITY ERROR)
8      :%      :   :   OUTPUT FAULT LIST:  RHXX, CABLES, J11/J13, J12, J08, TERMINATOR
9      :%      :   ENDIF
10     :%      :   WRITE RPDA USING DATA PATTERN #1, ONCE.
11     :%      :   IF ((TRE) OR (MCPE)) = 1
12     :%      :   :   THEN
13     :%      :   :   OUTPUT ERROR MESSAGE (DETECTED FALSE PARITY ERROR)
14     :%      :   :   OUTPUT FAULT LIST:  RHXX, CABLES, J11/J13, J12, J08, TERMINATOR
15     :%      :   ENDIF
16     :%      END TEST 30
17
18 031322      T30::      MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
19 031322      012737      000012      002402      1$:
20 031330      031330      104404      TRAP      C$BSEG
21 031332      012703      002352      MOV      #PATT4,R3      ;GET THE ZEROS PATTERN
22 031336      012702      000002      MOV      #2,R2      ;DO THE OPERATION TWICE
23 031342      004737      016662      JSR      PC,SEIZE      ;FLUSH ERRORS AND GET THE DRIVE
24 031346      014377      151146      2$:      MOV      -(R3),@RPDA      ;LOAD THE PATTERN
25 031352      004737      017000      JSR      PC,WAIT      ;WAIT FOR ANY ERRORS TO SET
26 031356      032777      060000      151126      BIT      #TRE!MCPE,@RPCS1;ERRORS?
27 031364      001420      BEQ      3$      ;NOT IF =0, TEST OK!
28 031366      004737      017422      JSR      PC,BICEXP      ;FORM DATA REPORT
29 031372      002512      RPCS1      ;FORM DATA REPORT
30 031374      060000      TRE!MCPE      ;THESE BITS FAILED TO BE CLEAR
31 031376      012737      016200      002404      MOV      #BIT7!BIT10!BIT11!BIT12,ERRWD1;FORM MODULE CALLOUT MASK
32 031400      012737      000406      002406      MOV      #BIT1!BIT2!BIT8,ERRWD2;BOTH WORDS
33 031412      031414      000070      TRAP      C$ERHRD
34 031422      005037      002402      .WORD      56
35 031426      005743      3$:      .WORD      EM23
36 031430      005302      DEC      R2      ;DO SECOND TIME
37 031432      003345      BGT      2$      ;IF R2=0, DONE
38 031434      031434      104405      10000$:      TRAP      C$ESEG
39 031436      005337      002402      DEC      ITCOUN      ;ONE LESS ITERATION
40 031442      003332      BGT      1$      ;IF <= 0, DONE!!
41 031444      031444      104401      L10054:      TRAP      C$ETST
  
```

```

1      .SBTTL TEST 31  FLOATING DATA PARITY TEST
2
3      ;%      TEST 31 FLOATING ONES AND ZEROS PARITY TEST
4      ;%      :   WRITE RPDA USING DATA PATTERNS 1 TO 9, ONE AT A TIME
5      ;%      :   IF RPER1:  PAR = 1 AFTER ANY WRITE OR ANY READ TO RPDA
6      ;%      :   :   THEN
7      ;%      :   :   OUTPUT ERROR MESSAGE (DETECTED FALSE PARITY ERROR)
8      ;%      :   :   OUTPUT FAULT LIST:  RHXX (PARITY NETWORK), DRIVE (PARITY NETWORK), J12, J08.
9      ;%      :   ENDIF
10     ;%      END TEST 31
11
12 031446      T31::      MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
13 031446      012737      000012      002402      1$:
14 031454      031454      104404      TRAP      C$BSEG
15 031456      012702      000011      MOV      #9.,R2      ;DO FOR 9 PATTERNS
16 031462      012703      002344      MOV      #PATT1,R3      ;GET FIRST PATTERN
17 031466      004737      016662      JSR      PC,SEIZE      ;FLUSH ERRORS AND GET THE DRIVE
18 031472      012377      151022      2$:      MOV      (R3)+,@RPDA      ;WRITE PATTERN TO RPDA
19 031476      032777      000010      151022      BIT      #PAR,@RPER1      ;PARITY ERROR?
20 031504      001006      BNE      3$      ;IF =1, YES - IT'S NOT OK
21 031506      005777      151006      TST      @RPDA      ;READ THE REGISTER JUST WRITTEN
22 031512      032777      000010      151006      BIT      #PAR,@RPER1      ;DID READ CAUSE ERRORS?
23 031520      001420      BEQ      4$      ;IF PAR = 0, NO!
24 031522      004737      017422      3$:      JSR      PC,BICEXP      ;FORM DATA REPORT
25 031526      002526      RPER1      ;FAILING REGISTER
26 031530      000010      PAR      ;THIS BIT FAILED TO CLEAR
27 031532      012737      004200      002404      MOV      #BIT7:BIT11,ERRWD1;FORM MODULE CALL OUT MASK
28 031540      012737      000002      002406      MOV      #BIT1,ERRWD2 ;BOTH WORDS
29 031546      104456      TRAP      C$ERHRD
30 031550      000071      .WORD      57
31 031552      013051      .WORD      E.23
32 031554      014172      .WORD      ERRO
33 031556      005037      002402      CLR      ITCOUN      ;RESET FURTHER ITERATIONS
34 031562      005302      4$:      DEC      R2      ;REDUCE ITERATIONS
35 031564      003342      BGT      2$      ;>0, DO AGAIN...
36 031576      104405      10000$:      TRAP      C$ESEG
37 031570      005337      002402      DEC      ITCOUN      ;ONE LESS ITERATION
38 031574      003327      BGT      1$      ;IF <= 0, DONE
39 031576      104401      L10055:      TRAP      C$ETST

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```

1      .SBTTL  TEST 32 REGISTER SELECT TEST #1
2
3      ;%      TEST 32 REGISTER SELECT TEST 1
4      ;%      :   USE DATA PATTERN #7
5      ;%      :   WRITE REGISTERS:  RPCS1, RPDA, RPDC, RPOF, ONE AT A TIME.
6      ;%      :   READ EACH REGISTER AFTER WRITING IT
7      ;%      :   IF REGISTER UNDER TEST DOESN'T MATCH TEST DATA
8      ;%      :   :   THEN
9      ;%      :   :   OUTPUT ERROR MESSAGE (BIT(S) FAILED TO SET)
10     ;%      :   :   OUTPUT FAULT LIST:  RHXX, CABLES, J11/J13, J12, J08, TERMINATOR
11     ;%      :   :   ENDIF
12     ;%      :   END TEST 32
13
14     031600      T32::      MOV      PATT7,MSK      ;CREAT BIT MASK
15     031600      013737      002360      002450      COM      MSK      ;UNUSED BITS = 1
16     031606      005137      002450      MOV      #BIT7!BIT10!BIT11!BIT12,ERRWD1;CREATE THE MODULE CALLOUT
17     031612      012737      016200      002404      MOV      #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
18     031620      012737      000406      002406      JSR      PC,SEIZE      ;FLUSH ERRORS AND GET THE DRIVE
19     031626      004737      016662      MOV      #10,,ITCOUN      ;LOAD THE ITERATION COUNT
20     031632      012737      000012      002402      1$:      TRAP      C$BSEG
21     031640      031640      104404      MOV      RPCS1,R1      ;GET THE FIRST ADDRESS
22     031642      013701      002512      2$:      MOV      R1,SNK      ;LOAD TEST REGISTER POINTER
23     031646      010137      002440      JSR      PC,COMPAR      ;DO THE COMPARISON
24     031652      004737      020202      PATT7      ;USING THIS DATA
25     031656      002360      CMP      R1,RPDA      ;SEE CURRENT REGISTER
26     031660      020137      002520      BHIS      3$      ;WE ALREADY DID RPCS1 & RPDA!
27     031664      103003      ADD      #6,R1      ;DO RPDA NEXT
28     031666      062701      000006      BR      2$      ;GO!
29     031672      000765      3$:      CMP      R1,RPOF      ;DID WE DO RPOF?
30     031674      020137      002544      BHIS      4$      ;YES, SKIP NEXT
31     031700      103003      ADD      #24,R1      ;DO # RPOF NOW
32     031702      062701      000024      BR      2$      ;GO!
33     031706      000757      4$:      CMP      R1,RPDC      ;DONE?
34     031710      020137      002546      BEQ      5$      ;IF EQUAL, YES
35     031714      001403      ADD      #2, P1      ;DO RPDC NOW!
36     031716      062701      000002      BR      2$      ;GO
37     031722      000751      5$:
38     031724      10000$:      TRAP      C$ESEG
39     031726      005337      002402      DEC      ITCOUN      ;ONE LESS ITERATION
40     031732      003342      BGT      1$      ;IF <= 0, DONE!!
41     031734      104401      L10056:      TRAP      C$ETST
  
```

```

1      .SBTTL  TEST 33 REGISTER SELECT TEST #2
2
3      :%      TEST 33 REGISTER SELECT TEST 2
4      :%      : USE DATA PATTERN #7
5      :%      : WRITE REGISTERS: RPCS1, RPDA, RPDC, RPOF, ONE AT A TIME.
6      :%      : WRITE ALL OTHER REGISTERS WITH 0'S
7      :%      : IF WRITING ALL OTHER REGISTERS WITH 0'S CHANGED THE REGISTER UNDER TEST
8      :%      : THEN
9      :%      : OUTPUT ERROR MESSAGE (REGISTER SELECT LINES CROSSED)
10     :%      : OUTPUT FAULT LIST: RH11, CABLE, J11/J13, J12, J08, TERMINATOR
11     :%      : ENDF
12     :%      END TEST 33
13
14 031736 T33:: MOV #BIT7!BIT'0!BIT11!BIT12,ERRWD1;CREATE THE MODULE CALLOUT
15 031736 012737 016200 002404 MOV #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
16 031744 012737 000406 002406 MOV PAT17,R2 ;GET THE TEST PATTERN
17 031752 013702 002360 JSR PC,SEIZE ;GET THE DRIVE, FIRST FLUSH ERRORS!
18 031756 004737 016662 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
19 031762 012737 000012 002402 1$: TRAP C$BSEG
20 031770 031770 104404 MOV #TST33,R1 ;GET FILE OF REGISTERS
21 031772 012701 004272 2$: MOV @ (R1)+,SNK ;GET THE TEST REGISTER
22 031776 013137 002440 MOV R2,@SNK ;WRITE THE TEST PATTERN TO THE REGISTER
23 032002 010277 150432 CMP SNK,RPDC ;DONE WRITING REGISTERS YET?
24 032006 023737 002440 002546 BLO 2$ ;NOT DONE YET, DO MORE
25 032014 103770 MOV #20.,R3 ;GET THE ITERATION COUNT
26 032016 012703 000024 MOV #TST33,R1 ;GET FILE OF REGISTERS AGAIN
27 032022 012701 004272 MOV RPCS1,R4 ;GET START OF REGISTER FILE
28 032026 013704 002512 3$: CMP R4,@ (R1) ;SHOULD WE CLEAR THIS REGISTER?
29 032032 020471 000000 BEQ 5$ ;IF THEY MATCH, NO
30 032036 001411 CLR (R4)+ ;WRITE THIS REGISTER TO A 0
31 032040 005024 CMP R4,RPDS ;DID WE JUST WRITE RPCS2?
32 032042 020437 002524 BNE 4$ ;IF <>, NO.
33 032046 001002 JSR PC,SEIZE ;GET THE DRIVE AGAIN!
34 032050 004737 016662 4$: DEC R3 ;REDUCE THE ITERATION COUNT
35 032054 005303 BGT 3$ ;DO UNTIL EQUAL TO 0
36 032056 003365 BR 6$ ;TAKE THIS BRANCH WHEN DONE..
37 032060 000402 5$: CMP (R4)+,(R1)+ ;POP THE POINTERS
38 032062 022421 BR 4$ ;GO ON
39 032064 000773 MOV #TST33,R1 ;GET FILE REGISTERS AGAIN
40 032066 012701 004272 MOV R2,MSK ;GET THE TESTING PATTERN
41 032072 010237 002450 COM MSK ;DON'T CARE BITS EQUAL 1
42 032076 005137 002450 7$: MOV @ (R1)+,SNK ;GET THE RESULTS
43 032102 013137 002440 JSR PC,COMPAR ;CHECK THE DATA FOR CORRECTNESS
44 032106 004737 020202 PAT17 ;USING THIS DATA PATTERN
45 032112 002360 8$: CMP SNK,RPDC ;DONE YET??
46 032114 023737 002440 002546 BLO 7$ ;NOT YET, IF LOWER
47 032122 103767 10000$: TRAP C$ESEG
48 032124 104405 DEC ITCOUN ;ONE LESS ITERATION
49 032126 005337 002402 BGT 1$ ;IF <= 0, DONE!!
50 032132 003316 L10057: TRAP C$ETST
51 032134 104401

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```

1      .SBTTL TEST 34 RPMR1 DATA TEST
2
3      :% TEST 34 RPMR1 DATA TEST
4      :% : USE DATA PATTERNS 1 TO 9, ONE AT A TIME
5      :% : BITS TO TEST 0 TO 15
6      :% : IF RPMR1 DOESN'T MATCH TEST DATA
7      :% : THEN
8      :% : OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST FAILED TO SET)
9      :% : OUTPUT FAULT LIST: JO8
10     :% : ELSE
11     :% : WRITE RPMR1 = 0
12     :% : IF RPMR1 <> 0
13     :% : THEN
14     :% : OUTPUT ERROR MESSAGE (BIT(S) UNDER TEST FAILED TO CLEAR)
15     :% : OUTPUT FAULT LIST: JO8
16     :% : ENDIF
17     :% : ENDIF
18     :% END TEST 34
19
20     032136      012737 000200 002404 T34:: MOV #BIT7,ERRWD1 ;CREATE THE MODULE CALLOUT
21     032136      005037 002406          CLR ERRWD2 ;FOR BOTH MASKS
22     032144      004737 016662          JSR PC,SETZE ;FLUSH ERRORS AND GET THE DRIVE
23     032154      012737 000012 002402 MOV #10.,ITCOUN ;LOAD THE ITERATION COUN
24     032162      004737 017744 1$: JSR PC,SETUP ;LOAD I/O POINTERS
25     032162      004302          TST34 ;FROM THIS TABLE
26     032170      013737 002444 002436 64$: MOV SRCTMP,TEMP ;SET UP OR POSSIBLE LOOP
27     032176      104404          TI,D C$BSEG
28     032200      004737 020034          JSR PC,FLOAT ;FLOAT THE PATTERN
29     032204      000403          BR 65$ ;PATTERN FLOATED OK, SKIP ERROR DSPATCH
30     032206      013737 002436 002444 65$: MOV TEMP,SRCTMP ;RESTORE THE OLD DATA PATTERN FOR ERROR LOOP
31     032214      100000$: TRAP C$ESEG ;IF MASK = 0, WE'RE DONE
32     032214      104405          TST MASK
33     032216      005737 002446          BN 64$
34     032222      001362          JS PC,CONSET ;GET NEXT ATTERN
35     032224      004737 020330          TST PATCNT ;IF PATTER.N COUNT UNDERFLOWED, DONE!
36     032230      005737 002434          BGE 64$ ;NOT DONE YET, GO-ON
37     032234      002355          TRAP C$BSEG
38     032236      104404          JS PC,COMPAR ;WRITE THE NEXT PATTERN
39     032240      004737 020202          PA T4 ;WHICH IS PATTERN #4
40     032244      002352          10001$: TRAP C$ESEG
41     032246      104405          TRAP $BSEG
42     032250      104404          TRAP $BSEG
43     032252      104404          TRAP $BSEG
44     032254      004737 020202          JSR C,COMPAR ;DO ANOTHER DATA COMPARISON
45     032260      002350          PATT3 ;USING PATTERN #3
46     032262      10003$: TRAP C$ESEG
47     032262      104405          JSR PC,LDZERO ;WRITE RPMR1 TO 0 TO CLEAR IT!
48     032264      004737 017572          10002$: TRAP C$ESEG
49     032270      104405          AD C$ESEG
50     032270      005337 002402          L ITCOUN ;ONE LESS ITERATION
51     032276      003331          BGT 1$ ;IF <= 0, DONE
52     032300      L10060:

```

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TEST 34 RPMR1 DATA TEST

SEQ 0145

032300 104401

TRAP C\$ETST

```

1      .SBTTL TEST 35 MASSBUS INITIALIZE DRIVE CLEAR TEST
2
3      :% TEST 35 MASSBUS INITIALIZE/DRIVE CLEAR RPMR1: DMD BIT TEST
4      :% : SET RPMR1: DMD = 1
5      :% : SET RPCS2: CLR = 1
6      :% : IF RPMR1: DMD = 0
7      :% : : THEN
8      :% : : MARK THE EVENT
9      :% : : ENDF
10     :% : SET RPMR1: DMD = 1 AGAIN
11     :% : ISSUE DRIVE CLEAR COMMAND
12     :% : IF RPMR1: DMD = 0
13     :% : : THEN
14     :% : : MARK THIS EVENT
15     :% : : ENDF
16     :% : IF RPMR1: DMD DIDN'T CLEAR WITH EITHER EVENT
17     :% : : THEN
18     :% : : OUTPUT ERROR MESSAGE (RPMR1: DMD NOT CLEARED BY RPCS2: CLR OR DRIVE CLEAR)
19     :% : : OUTPUT FAULT LIST: J12, J08.
20     :% : : ENDF
21     :% : IF RPMR1: DMD IS CLEARED BY DRIVE CLEAR COMMAND, BUT NOT RPCS2: CLR
22     :% : : THEN
23     :% : : OUTPUT ERROR MESSAGE (RPMR1: CLEARED BY DRIVE CLEAR BUT NOT RPCS2: CLR)
24     :% : : OUTPUT FAULT LIST: J12, CABLE, RHXX.
25     :% : : ENDF
26     :% : IF RPMR1: DMD CLEARED BY RPCS2: CLR BUT NOT DRIVE CLEAR COMMAND
27     :% : : THEN
28     :% : : OUTPUT ERROR MESSAGE (RPMR1: CLEARED BY RPCS2: CLR BUT NOT DRIVE CLEAR COMMA
29     :% : : OUTPUT FAULT LIST: J11, J12.
30     :% : : ENDF
31     :% END TEST 35
32
33     T35::
34     032302 005037 002466 CLR ERST 1 ;ERROR STATUS=0 FOR START-UP
35     032303 012737 000012 002402 MOV #10,ITCOUN ;LOAD THE ITERATION COUNT
36     032314 104404 1$: TRAP CSBSEG
37     032316 013777 002506 1501, J MOV DRVNO, @RPS2 ;LOAD THE DRIVE-UNDER-TEST
38     032324 052777 100000 150204 BIS #DMD, @RPS2 ;SET RPMR1-DMD=1
39     032332 052777 000040 150162 BIS #CLR, @RPS2 ;TRY TO CLEAR IT USING A CONTROLLER CLR
40     032340 013777 002506 150154 MOV DRVNO, @RPS2 ;RELOAD THE DRIVE NUMBER
41     032346 052777 100000 150162 BIT #DMD, @RPMR1 ;DID IT CLEAR?
42     032354 001403 BEQ 2$ ;YES, SKIP NEXT
43     032356 152737 000377 002466 BISB #377, ERSTAT ;MARK THIS FAILED STATE
44     032364 013777 002506 150130 2$: MOV DRVNO, @RPCS2 ;LOAD THE DRIVE #
45     032372 052777 100000 150136 BIS #DMD, @RPMR1 ;SET RPMR1-DMD=1
46     032400 012777 000011 150104 MOV #DRCLR, @RPCS1 ;ISSURE A DRIVE CLEAR COMMAND
47     032406 032777 100000 150122 BIT #DMD, @RPMR1 ;DID DMD CLEAR?
48     032414 001403 BEQ 3$ ;IF YES
49     032416 152737 000377 002467 BISB #377, ERSTAT 1 ;MARK THE FAILED STATE
50     032424 005737 002466 3$: TST ERSTAT ;TEST PASS?
51     032430 001445 BEQ 7$ ;IF 0 YES
52     032432 012737 004000 002404 MOV #BIT11, ERRWD1 ;LOAD PART OF THE MODULE CALL OUT
53     032440 022737 000377 002466 CMP #377, ERSTAT ;NOW DETERMINE WHAT FAILED
54     032446 001415 BEQ 5$ ;DRIVE CLEAR COMMAND WORKED, RH CLR FAILED
55     032450 005037 002406 CLR ERRWD2 ;FORM FURTHER MODULE CALL-OUT
56     032454 105737 002466 STB ERSTAT ;FURTHER CHECK RESULTS

```

57	032460	001404			BEQ	4\$		;RHCLR WORKED, DRIVE CLEAR FAILED
58	032462	052737	000200	002404	BIS	#BIT7,ERR 01		;NOTHING WORKED, DRIVE CLEAR OR RHCLR
59	032470	000407			BR	6\$		;REPORT THE FORM
60	032472	052737	012000	002404	4\$: BIS	#BIT10!BIT12,ERRWD1	;CREATE	CALL-OUT
61	032500	000403			BR	6\$		;REPORT IT
62	032502	012737	000006	002406	5\$: MOV	#BIT1!BIT2,ERRWD2	;CREAT	CALL-OUT
63	032510	013737	002535	002456	6\$: MOV	RP,RR1,TESTRG	;FORM	DATA
64	032516	005037	002454		CLR	EXPTED	;EXPECTED DATA	
65	032522	012737	100000	002452	MOV	*DMD,RCVED	;RECEIVED DATA	
66	032530	104456			TRAP	C\$ERHRD		
	032532	000075			.WORD	61		
	032534	013051			.WORD	EM23		
	032536	014172			.WORD	ERRO		
67	032540	005037	002402		CLR	ITCOUN		;NO ITERATIONS
68	032544				7\$:			
	032544				10000\$:			
	032544	104405			T	C\$ESEG		
69	032546	005037	002466		CLH	ERSTAT		;ERSTAT=0
70	032552	005337	002402		DEC	ITCOUN		;ONE LESS ITERATION
71	032556	003256			BGT	1\$		;IF <= 0, DONE!
72	032560				L10061:			
	032560	104401			TRAP	C\$ETSI		

```

1      .SBTTL  TEST 36 PARITY INITIALIZE TEST
2
3      :%      TEST 36 PARITY INITIALIZE TEST
4      :%      : SET RPER2: CLR = 1
5      :%      : IF (RPER1: PAR) = 1
6      :%      : THEN
7      :%      :   OUTPUT ERROR MESSAGE (DETECTED FALSE PARITY ERROR)
8      :%      :   OUTPUT FAULT LIST: J12, J09, J10. (CURRENT STATE OF 2901 = ?? )
9      :%      : ENDIF
10     :%      : IF (RPER1: ILF) = 1
11     :%      : THEN
12     :%      :   OUTPUT ERROR MESSAGE (DETECTED FALSE ILLEGAL FUNCTION ERROR)
13     :%      :   OUTPUT FAULT LIST: J12, J09, J10, (2901 ??)
14     :%      : ENDIF
15     :%      END TEST 36
16
17 032562 T36:: MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
18 032562 012737 000012 002402 1$: TRAP      C$BSEG
19 032570 104404 JSR      PC,SEIZE      ;GET CONTROL OF TPL DRIVE
20 032572 004737 016662 21 032576 013737 002526 002456 MOV      RPER1,TESTRG      ;FORM REPORT DATA
22 032604 005037 002454 CLR      EXPTED      ;EXPTED=0
23 032610 005037 002452 CLH      RCVED      ;RECEIVED=?
24 032614 032777 000010 147704 BIT      #PAR,@RPER1      ;IS PARITY ERROR=1?
25 032622 001403 BEQ      2$      ;IF 0, NO
26 032624 052737 000010 002452 BIS      #PAR,RCVED      ;MARK THE ERROR
27 032632 032777 000001 147712 2$: BIT      #ILF,@RPER2      ;IS ILLEGAL FUNCTION SET?
28 032640 001403 BEQ      3$      ;IF 0, NO
29 032642 052737 000001 002452 BIS      #ILF,RCVED      ;MARK IT!
30 032650 005737 002452 3$: TST      RCVED      ;ERRORS??
31 032654 001414 BEQ      4$      ;IF 0, TEST PASSES
32 032656 012737 012000 002404 MOV      #BIT10!BIT12,ERRWD1 ;FORM MODULE CALLOUT LIST
33 032664 012737 000005 002406 MOV      #BIT1!BIT2,ERRWD2 ;BOTH WORDS
34 032672 104456 TRAP      C$ERHRD
35 032674 000077 .WORD      63
36 032676 013051 .WORD      EM23
37 032700 014172 .WORD      ERRO
38 032702 005037 002402 CLR      ITCOUN      ;NO ITERATIONS
39 032706 4$: 10000$: TRAP      C$ESEG
40 032706 104405 DEC      ITCOUN      ;ONE LESS ITERATION
41 032710 005337 002400 BGT      1$      ;IF <= 0, DONE
42 032714 003325 L10062: TRAP      C$ETST
43 032716 104401

```

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1      .SBTTL TEST 37 PARITY ERROR DETECTION TEST
2
3      :* TEST 37 PARITY ERROR DETECTION TEST
4      :* : SET RPCS2: PAT = 1
5      :* : ISSUE A KNOWN ILLEGAL FUNCTION
6      :* : IF (RPER1: ILF = 1 AND RPER1: PAR = 0)
7      :* : THEN
8      :* : OUTPUT ERROR MESSAGE (PARITY ERROR NOT DETECTED.)
9      :* : OUTPUT FAULT LIST J12.
10     :* : ENDF
11     :* : IF ((RPER1: ILF AND RPER1: PAR) = 1 OR = 0)
12     :* : THEN
13     :* : OUTPUT ERROR MESSAGE (UNKNOWN FUNCTIONAL SEQUENCE)
14     :* : OUTPUT FAULT LIST: J09, J10, J12, (2901 GONE ??)
15     :* : ENDF
16     :* END TEST 37
17
18 032720 T37:: MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
19 032720 012737 000012 002402 1$:
20 032726 104404 TRAP CSBSEG
21 032730 004737 016662 JSR PC,SEIZE ;GET THE DRIVE UNDER TEST
22 032734 052777 000020 147560 BIS #PAT,@RPCS2 ;INVERT PARITY, FORCE ERRORS!!
23 032742 012777 000046 147542 MOV #46,@RPCS1 ;LOAD AN ILLEGAL FUNCTION CODE (WITHOUT SETTING GO)
24 032750 012737 000010 002452 MOV #PAR,RCVED ;FORM EXTENDED DATA
25 032756 013737 072452 002454 MOV RCVED,EXPTED ;IN CASE OF AN ERROR
26 032764 005037 072466 CLR ERSTAT ;RESET STATUS MARK
27 032770 004737 017000 JSR PC,WAIT ;STALL FOR SOME SETTLE TIME
28 032774 032777 000001 147524 BIT #ILF,@RPER1 ;DID ILLEGAL FUNCTION SET?
29 033002 001406 BEQ 2$ ;IF NOT, GO ON
30 033004 052737 000001 002452 BIS #ILF,RCVED ;LOG THIS ERROR IN THE RECEIVED BUFFER
31 033012 112737 000377 002466 MOVB #377,ERSTAT ;MARK THIS FAILURE
32 033020 032777 000010 147507 2$: BIT #PAR,@RPER1 ;DID PARITY ERROR SET?
33 033026 001006 BNE 3$ ;IF SO, GO ON
34 033030 042737 000010 002452 BIC #PAR,RCVED ;LOG FAILING RESULT
35 033036 112737 000377 002466 MOVB #377,ERSTAT ;MARK THIS FAILURE
36 033044 005737 000066 3$: TST ERSTAT ;ERRORS?
37 033050 001425 BEQ 5$ ;IF 0, NO
38 033052 013737 002526 002456 MOV RPER1,TESTRG ;GET FAILING REGISTER
39 033060 012737 004000 002404 MOV #BIT11,ERRWD1 ;AND FORM MODULE CALL-OUT
40 033066 005037 002406 CLR ERRWD2 ;BOTH WORDS
41 033072 023727 002466 000377 CMP ERSTAT,#377 ;ILLEGAL FUNCTION ONLY SET?
42 033100 001403 BEQ 4$ ;IF MATCH, THAT WAS ONLY ERROR
43 033102 052737 001400 002404 BIS #BIT8!BIT9,ERRWD1 ;FORM REST OF CALL OUT
44 033110 4$: TRAP CSERHRD
45 033110 104456 .WORD 64
46 033112 000100 .WORD EM14
47 033114 012454 .WORD ERRO
48 033116 014172 .WORD ITCOUN ;NO ITERATIONS NECESSARY
49 033120 005037 002402 J000$:
50 033124 033124 TRAP CSESEG
51 033124 104405 CLR ERSTAT ;ERSTAT=0
52 033126 005037 002466 DEC ITCOUN ;ONE LESS ITERATION
53 033132 005337 002402 BGT 1$ ;IF <= 0, WE'RE DONE!!
54 033136 003273 L10063:
55 033140

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CZRJMAO RP07 FE/HOST ISOLATOR MACRO V04 00 1-JAN-83 13:37:00 PAGE 72-1^{H 12}
TEST 37 PARITY ERROR DETECTION TEST

SEQ 0150

CZ
TE

033140 104401

TRAP CSETST

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1      .SBTTL  TEST 38 CORRECT PARITY TEST
2
3      :%      TEST 38 CORRECT PARITY TEST
4      :%      :   LOAD DATA PATTERNS 1 TO 4 INTO RPDA, ONE AT A TIME
5      :%      :   READ RPDA AFTER EACH WRITE FUNCTION
6      :%      :   IF ((RPCS1: MCPE) OR (RPCS1: TRE) OR (RPER1: PAR)) = 1
7      :%      :   THEN
8      :%      :   :   OUTPUT ERROR MESSAGE (PARITY LOGIC MALFUNCTION)
9      :%      :   :   OUTPUT FAULT LIST: J11, J12, J13, RHXX, CABLE, TERMINATOR
10     :%      :   ENDIF
11     :%      END TEST 38
12
13 033142 T38::
14 033142 012737 000012 002402 MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
15 033150 1$:
16 033150 104404 TRAP      C$BSEG
17 033152 004737 016662 JSR      PC,SEIZE      ;GET THE DRIVE UNDER TEST
18 033156 012702 002344 MOV      #PATT1,R2      ;GET THE PATTERN ADDRESS
19 033162 012701 000004 MOV      #4,R1          ;AND THE OVERALL ITERATION COUNT
20 033166 012277 147326 2$: MOV      (R2)+,@RPDA      ;WRITE THE DATA
21 033172 005777 147322 TST      @RPDA          ;READ THE REGISTER
22 033176 032777 060000 147306 BIT      #MCPE!TRE,@RPCS1 ;ERROR?
23 033204 001011 3$ BNE      3$          ;IF <>0, YES!
24 033206 004737 017000 JSR      PC,WAIT      ;STALL FOR SOME SETTLE TIME
25 033212 032777 000010 147306 BIT      #PAR,@RPER1    ;PARITY ERROR?
26 033220 001010 4$ BNE      4$          ;IF <>0, YES
27 033222 005301 DEC      R1          ;ONE LESS ITERATION
28 033224 003360 BGT      2$          ;IF >0, NOT FINISHED
29 033226 000431 BR       6$          ;GET OUT NOW!
30 033230 004737 017422 3$: JSR      PC,BICEXP      ;FORM UP THE FAILING DATA
31 033234 002512 RPCS1      ;THIS REGISTER
32 033236 060000 MCPE!TRE    ;THESE BITS FAILED TO CLEAR
33 033240 000410 BR       5$          ;REPORT THE ERROR
34 033242 013737 002526 002456 4$: MOV      RPER1,TESTRG    ;GET ADDRESS OF FAILING DATA
35 033250 017737 147252 002452 MOV      @RPER1,RCVED    ;GOT FAILED RESULTS
36 033256 005037 002454 CLR      EXPTED      ;FORM EXPECTED DATA
37 033262 012737 016000 002404 5$: MOV      #BIT10!BIT11!BIT12,ERRWD1 ;FORM MODULE CALL-OUT
38 033270 012737 000406 002406 MOV      #BIT1!BIT2!BIT8,ERRWD2 ;BOTH WORDS
39 033276 104456 TRAP      C$ERHRD
40 033300 000101 .WORD      65
41 033302 013051 .WORD      EM23
42 033304 014172 .WORD      ERRO
43 033306 005037 002402 CLR      ITCOUN      ;NO FURTHER ITERATIONS
44 033312 6$:
45 033312 10000$:
46 033312 104405 TRAP      C$ESEG
47 033314 005337 002402 DEC      ITCOUN      ;ONE LESS ITERATION
48 033320 003313 BGT      1$          ;IF <= 0, DONE!!
49 033322 L10064:
50 033322 104401 TRAP      C$ETST

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1				.SBTTL	TEST 39 CLEAR COMPOSITE ERROR TEST	
2						
3				:%	TEST 39 CLEAR COMPOSITE ERROR TEST	
4				:%	: SET RPCS2: CLR = 1	
5				:%	: IF RPDS: ERR = 1	
6				:%	: THEN	
7				:%	: IF ((RPER1 = 0) AND (RPER2 = 0) AND (RPER3 = 0))	
8				:%	: THEN	
9				:%	: OUTPUT ERROR MESSAGE (DETECTED A PERMANENT ERROR)	
10				:%	: ELSE	
11				:%	: OUTPUT ERROR MESSAGE (DETECTED COMPOSITE ERROR)	
12				:%	: ENDF	
13				:%	: OUTPUT FAULT LIST: J12	
14				:%	: ENDF	
15				:%	END TEST 39	
16						
17	033324			T39::		
18	033324	012737	000012	002402	MOV	#10.,ITCOUN ;LOAD THE ITERATION COUNT
19	033332				1\$:	
20	033332	104404			TRAP	C\$BSEG
21	033334	004737	016662		JSR	PC,SEIZE ;GET THE DRIVE UNDER TEST
22	033340	032777	040000	147156	BIT	#EKR,RPDS ;DID WE RECEIVE A COMPOSITE ERROR?
23	033346	001435			BEQ	4\$;IF 0, TEST OK
24	033350	004737	017422		JSR	PC,BICEXP ;FORM UP ERROR REPORT
25	033354	002524			RPDS	;THIS REGISTER
26	033356	040000			ERR	;THIS BIT FAILED TO CLEAR
27	033360	005037	002406		CLP	ERRWD2 ;CREATE MODULE CALL OUT
28	033364	012737	004000	002404	MOV	#BIT11,ERRWD1 ;BOTH WORDS
29	033372	005777	147130		TST	RPER1 ;DID WE HAVE A DETECTABLE HARDWARE BUG?
30	033376	001013			BNE	2\$;IF NOT 0, YES
31	033400	005777	147146		TST	RPER2 ;DID WE HAVE A DETECTABLE HARDWARE BUG??
32	033404	001010			BNE	2\$;IF NOT 0, YES
33	033406	005777	147142		TST	RPER3 ;DID WE HAVE A DETECTABLE HARDWARE BUG?
34	033412	001005			BNE	2\$;IF NOT 0, YES
35	033414	104456			TRAP	C\$E HRD
36	033416	000102			.WORD	66
37	033420	014075			.WORD	EM42
38	033422	014172			.WORD	ERRO
39	033424	000404			BR	3\$;SKIP NEXT MESSAGE
40	033426				2\$:	
41	033426	104456			TRAP	C\$ERHRD
42	033430	000103			.WORD	67
43	033432	011747			.WORD	EM1
44	033434	014172			.WORD	ERRO
45	033436	005037	002402		CLR	ITCOUN ;NO FURTHER ITERATIONS NECESSARY
46	033442				3\$:	
47	033442				4\$:	
48	033442				10000\$:	
49	033442	104405			TRAP	C\$ESEG
50	033444	005337	002402		DEC	ITCOUN ;ONE LESS ITERATION TO-GO
51	033450	003330			BGT	1\$;IF >0, DO AGAIN
52	033452				L10065:	
53	033452	104401			TRAP	C\$ETST

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1      .SBTTL  TEST 40 COMPOSITE ERROR SET - RESET TEST
2
3      :%      TEST 40 FORCE A COMPOSITE ERROR, THEN CLEAR IT
4      :%      : SET RPCS2: PAT = 1
5      :%      : WRITE DATA PATTERN #1 TO RPDA
6      :%      : READ RPDA AFTER PERFORMING THE WRITE OPERATION
7      :%      : IF ((RPDS: ERR) OR (RPER1: PAR)) = 0
8      :%      : THEN
9      :%      : OUTPUT ERROR MESSAGE (COMPOSITE ERROR DIDN'T SET WHEN EXPECTED)
10     :%      : OUTPUT FAULT LIST: J09, J10, J12
11     :%      : ELSE
12     :%      : SET RPCS2: CLR = 1
13     :%      : IF ((RPDS: ERR) OR (RPER1: PAR)) = 1
14     :%      : THEN
15     :%      : OUTPUT ERROR MESSAGE (ERROR STATUS FAILED TO CLEAR)
16     :%      : OUTPUT FAULT LIST: J12
17     :%      : ENDIF
18     :%      : ENDIF
19     :%      END TEST 40
20
21 033454 012737 000012 002402 T40:: MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
22 033454 012737 000012 002402 1$: TRAP C$BSEG
23 033462 104404 016662 147024 JSR PC,SEIZE ;GET THE DRIVE UNDER TEST
24 033464 004737 016662 147014 BIS #PAT,@RPCS2 ;INVERT PARITY - FORCE ERRORS!
25 033470 052777 000020 147014 MOV PATT1,@RPDA ;WRITE A PATTERN
26 033476 013777 002344 147014 TST @RPDA ;READ THE REGISTER JUST WRITTEN
27 033504 005777 017010 147004 JSR PC,WAIT ;STALL FOR THE RP07 MICROPROCESSOR
28 033510 004737 017000 147004 BIT #PAR,@RPER1 ;DID WE DETECT A PARITY ERROR?
29 033514 032777 000010 147004 BNE 2$ ;IF = 1, YES
30 033522 001005 017372 JSR PC,BISEXP ;FORM THE FAILING DATA
31 033524 004737 017372 RPER1 ;THIS REGISTER FAILED
32 033530 002526 040000 146760 PAR ;THIS BIT FAILED TO SET
33 033532 000010 040000 146760 BR 3$ ;AND REPORT IT
34 033534 000410 040000 146760 2$: BIT #ERR,@RPDS ;DID WE GET COMPOSITE ERROR?
35 033536 032777 040000 146760 BNE 4$ ;IF = 1, YES
36 033544 001017 017372 JSR PC,BISEXP ;FORM THE ERROR DATA
37 033546 004737 017372 RPDS ;FORM THE ERROR REPORT
38 033552 002524 040000 ERR ;FORM THE EXPECTED DATA
39 033554 040000
40
41 033556 012737 005400 002404 3$: MOV #BIT8!BIT9!BIT11,ERRWD1 ;FORM MODULE CALL-OUT LIST
42 033564 005037 002406 CLR ERRWD2 ;BOTH WORDS
43 033570 104456 TRAP C$ERHRD
44 033572 000104 .WORD 68
45 033574 012776 .WORD EM22
46 033576 014172 .WORD ERRO
47 033600 005037 002402 CLR ITCOUN ;NO FURTHER ITERATIONS NECESSARY
48 033604 052777 000040 146710 4$: BIS #CLR,@RPCS2 ;RESET THE DEVICE
49 033612 013777 002506 146702 MOV DRVNO,@RPCS2 ;RELOAD THE DRIVE - UNDER - TEST
50 033620 032777 000010 146700 BIT #PAR,@RPER1 ;ERROR STATUS GONE?
51 033626 001411 BEQ 5$ ;IF = 0, YES
52 033630 013737 002526 002456 MOV RPER1,TESTRG ;FORM THE ERROR REPORT DATA
53 033636 017737 146664 002452 MOV @RPER1,RCVED ;PAR SET AND SHOULD HAVE CLEARED
54 033644 005037 002454 CLR EXPTED ;SHOW 0 BITS EXPECTED DATA
55 033650 000410 BR 6$ ;AND REPORT THE ERROR
56 033652 032777 040000 146644 5$: BIT #ERR,@RPDS ;DID COMPOSITE ERROR CLEAR?

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54	033660	001417			BEQ	7\$		;IF 0, YES
55	033662	004737	017422		JSR	PC,BICEXP		;CREATE THIS INFORMATION
56	033666	002524			RPDS			;AND MAKE IT AVAILABLE FOR
57	033670	040000			ERR			;AN ERROR MESSAGE
58								
59	033672	012737	004000	002404	6\$:	MOV	#BIT11,ERRWD1	;CREATE MODULE CALL OUT
60	033700	005037	002406		CLR	ERRWD2		;FOR BOTH WORDS
61	033704	104456			TRAP	C\$ERHRD		
	033706	000105			.WORD	69		
	033710	011747			.WORD	EM1		
	033712	014172			.WORD	ERRO		
62	033714	005037	002402		CLR	ITCOUN		;RESET THE ITERATION COUNTER
63	033720				7\$:			
	033720				10000\$:			
	033720	104405			TRAP	C\$ESEG		
64	033722	005337	002402		DEC	ITCOUN		;ONE LESS ITERATION TO GO
65	033726	003255			BGT	1\$		;DO UNTIL <= 0
66	033730				L10066:			
	033730	104401			TRAP	C\$ETST		

```

1      .SBTTL  TEST 41 ATA CLEAR TEST
2
3      ;%      TEST 41 CLEAR ATA TEST
4      ;%      : SET RPCS2: CLR = 1
5      ;%      : IF RPDS: ATA = 1
6      ;%      : THE
7      ;%      : : OUTPUT ERROR MESSAGE (DETECTED FALSE ATA)
8      ;%      : : OUTPUT FAULT LIST: J12
9      ;%      : ENDF
10     ;%      END TEST 41
11
12 033732      T41::
13 033732      012737 000012 002402      MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
14 033740      104404      1$:
15 033742      004737 016662      TRAP      C$BSEG
16 033746      004737 017000      JSR       PC,SEIZE      ;GET THE DRIVE UNDER TEST
17 033752      032777 100000 146544      JSR       PC,WAIT      ;WAIT FOR THE RP07 MICROPROCESSOR
18 033760      001417      BIT      #ATA,RPDS      ;DOES THE ATTENTION SUMMARY BIT = 1
19 033762      004737 017422      BEQ       2$      ;IF IT DOES, IT'S WRONG.
20 033766      002524      JSR       PC,BICEXP      ;FORM THE FAILING DATA
21 033770      140000      RPDS      ;THIS REGISTER FAILED
22 033772      012737 004000 002404      ATA!ERR      ;THESE BITS FAILED TO CLEAR
23 034000      005037 002406      MOV      #BIT11,ERRWD1      ;FORM MODULE CALL - OUT
24 034004      104456      CLR      ERRWD2      ;BOTH WORDS
25 034010      000106      TRAP      C$ERHRD
26 034012      012454      .WORD      70
27 034014      005037 002402      .WORD      EM14
28 034020      014172      .WORD      ERRO
29 034022      002402      CLR      ITCOUN      ;RESET THE ITERATON COUNTER
30 034024      100000$:
31 034026      104405      TRAP      C$ESEG
32 034028      005337 002402      DEC      ITCOUN      ;ONE LESS ITERATION
33 034030      003344      BGT      1$      ;DO UNTIL <= 0
34 034032      104401      L10067:
35 034034      TRAP      C$ETST

```

```

1      .SBTTL  TEST 42 ATA SET - RESET TEST
2
3      :%      TEST 42 SET AND CLEAR ATA BIT
4      :%      : SET RPCS2: PAT = 1
5      :%      : WRITE RPDA WITH DATA PATTERN #1, ONCE
6      :%      : IF ((RPDS: ATA) AND (RPDS: ERR)) <> 1
7      :%      : THEN
8      :%      :   OUTPUT ERROR MESSAGE (ATA DIDN'T SET WHEN EXPECTED)
9      :%      :   OUTPUT FAULT LIST: J09, J10
10     :%      : ELSE
11     :%      :   ISSUE DRIVE CLEAR COMMAND
12     :%      : ENDIF
13     :%      : IF ((RPDS: ATA) AND (RPDS: ERR)) <> 0
14     :%      : THEN
15     :%      :   OUTPUT ERROR MESSAGE (ATA DIDN'T CLEAR WHEN EXPECTED)
16     :%      :   OUTPUT FAULT LIST: J12
17     :%      : ENDIF
18     :%      : SET RPCS2: PAT = 1
19     :%      : WRITE RPDA WITH DATA PATTERN #1, ONCE
20     :%      : SET RPCS2: CLR = 1
21     :%      : IF ((RPDS: ATA) OR (RPDS: ERR)) <> 0)
22     :%      : THEN
23     :%      :   OUTPUT ERROR MESSAGE (RPCS2: CLR DIDN'T CLEAR ATA AS EXPECTED)
24     :%      :   OUTPUT FAULT LIST: J12
25     :%      : ENDIF
26     :%      END TEST 42
27
28 034032      T42::
29 034032      012737 000012 002402      MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNTER
30 034040      1$:
31 034040      104404      TRAP      CSBSEG
32 034042      004737 016662      JSR      PC,SEIZE      ;GET THE DRIVE UNDER TEST
33 034046      052777 000020 146446      BIS      #PAT,@RPCS2      ;INVERT PARITY
34 034054      013777 002344 146436      MOV      PATT1,@RPDA      ;MOVE DATA TO RPDA
35 034062      005037 002406      CLR      ERRWD2      ;FORM SOME MODULE CALL - OUT
36 034066      004737 017000      JSR      PC,WAIT      ;WAIT FOR THE RP07 MICROPROCESSOR TO FINISH
37 034072      032777 140000 146424      BIT      #ATA!ERR,@RPDS      ;DID WE DETECT ATTENTION AND ERROR?
38 034100      001035      BNE      2$      ;IF = 1, YES
39 034102      012737 001400 002404      MOV      #BIT8!BIT9,ERRWD1      ;FORM BALANCE OF MODULE CALL OUT
40 034110      004737 017372      JSR      PC,BISEXP      ;SHOW DATA TO ERROR - REPORT
41 034114      002524      RPDS      ;THIS REGISTER
42 034116      140000      ATA!ERR      ;THESE BITS FAILED TO SET
43 034120      012737 001400 002404      MOV      #BIT8!BIT9,ERRWD1      ;LOG THE MODULE CALLOUT
44 034126      000452      BR      4$      ;REPORT IT!
45 034130      032777 010000 146366      BIT      #MOL,@RPDS      ;IS THE DRIVE ON-LINE
46 034136      001016      BNE      2$      ;YES, IT IS ONLINE!
47 034140      004737 017326      JSR      PC,SAVRPR      ;GET THE REGISTER SNAPSHOT
48 034144      013746 002114      MOV      L$TEST,-(SP)
49 034150      012746 006452      MOV      #MSGMOL,-(SP)
50 034154      012746 000002      MOV      #2,-(SP)
51 034160      010600      MOV      SP,RO
52 034162      104417      TRAP      C$PNT1
53 034164      062706 000006      ADD      #6,SP
54 034170      104432      TRAP      C$EXIT
55 034172      000124      .WORD      L10070-
56 034174      013777 002506 146320 2$:      MOV      DRVNO,@RPCS2      ;LOAD THE DRIVE #, CLEAR OUT PARITY INVERT
57 034202      012777 000011 146302      MOV      #DRCLR,@RPCS1      ;ISSUE A DRIVE CLEAR COMMAND
  
```

55	034210	032777	140000	146306	BIT	#ATA!ERR,@RPDS	;CHECK ATTENTION AND ERROR
56	034216	001016			BNE	4\$	;THEY'RE SET, ERROR!
57	034220	052777	000020	146274	BIS	#PAT,@RPCS2	;INVERT PARITY
58	034226	013777	002344	146264	MOV	PATT1,@RPDA	;WRITE DATA AGAIN
59	034234	004737	017000		JSR	PC,WAIT	;WAIT FOR THE MICRO PROCESSORS
60	034240	004737	016662		JSR	PC,SEIZE	;GET THE DRIVE NOW!
61	034244	032777	140000	146252	BIT	#ATA!ERR,@RPDS	;CHECK ATTENTION AND ERROR
62	034252	001415			BEQ	5\$	;IF 0, TEST PASSES
63	034254	004737	017422		JSR	PC,BICEXP	;FORM EXPECTED DATA
64	034260	002524			RPDS		;THIS REGISTER
65	034262	140000			ATA!ERR		;THESE BITS FAILED TO CLEAR
66	034264	012737	004000	002404	MOV	#BIT11,ERRWD1	;LOAD THIS MODULE CALLOUT
67	034272	104456			TRAP	C\$ERHRD	
	034274	000107			.WORD	71	
	034276	012454			.WORD	EM14	
	034300	0141~2			.WORD	ERRO	
68	034302	0050>7	002402		CLR	ITCOUN	;NO FURTHER ITERATIONS
69	034306						
	034306				5\$:		
	034306				10000\$:		
	034306	104405			TRAP	C\$ESEG	
70	034310	005337	002402		DEC	ITCOUN	;ONE LESS TO-GO
71	034314	003251			BGT	1\$	;IF <= 0, WE'RE DONE!
72	034316						
	034316	104401			L10070:		
					TRAP	C\$ETST	

```

1      .SBTTL  TEST 43 RPAS CLEAR TEST
2
3      :%      TEST 43 CLEAR RPAS REGISTER TEST
4      :%      : SET RPCS2: CLR = 1
5      :%      : IF RPAS <> 0
6      :%      : : THEN
7      :%      : : OUTPUT ERROR MESSAGE (RPAS DIDN'T CLEAR WHEN EXPECTED)
8      :%      : : OUTPUT CONTENTS OF RPAS
9      :%      : : OUTPUT FAULT LIST: J11 / J13, J12, ANOTHER DRIVE
10     :%      : ENDF
11     :%      END TEST 43
12
13 034320 012737 000012 002402 T43::
14 034320 012737 000012 002402 1$: MOV #10.,ITCOUN ;LOAD THE ITERATION COUNTER
15 034326 104404 016662 146170 TRAP C$BSEG
16 034330 004737 016662 146170 JSR PC,SEIZE ;GET THE DRIVE UNDER TEST
17 034334 005777 016662 146170 TST @RPAS ;RPAS = 0?
18 034340 001424 002454 002456 BEQ 2$ ;IF 0, TEST OK!
19 034342 005037 002454 002456 CLR EXPTED ;FORM ERROR DATA
20 034346 013737 002530 002456 MOV RPAS,TESTRG ;FOR AN ERROR DISPATCH
21 034354 017737 016150 002452 MOV @RPAS,RCVED ;GET RECEIVED DATA
22 034362 012737 016000 002404 MOV #BIT10!BIT11!BIT12,ERRWD1 ;FORM MODULE CALL OUT
23 034370 012737 000020 002406 MOV #BIT4,ERRWD2 ;BOTH WORDS
24 034376 104456 000110 TRAP C$ERHRD
    034400 000110 .WORD 72
    034402 012523 .WORD EM15
    034404 014172 .WORD ERRO
25 034406 005037 002402 CLR ITCOUN ;RESET THE ITERATION COUNTER
26 034412 104405 002402 2$:
    034412 104405 10000$: TRAP C$ESEG
27 034414 005337 002402 DEC ITCOUN ;ONE LESS TO-GO
28 034420 003342 002402 BGT 1$ ;IF >0, WE'RE NOT DONE
29 034422 104401 L10071: TRAP C$ETST
    034422 104401

```

```

1      .SBTTL  TEST 44 RPAS CORRECT POSITION TEST
2
3      :%      TEST 44 RPAS CORRECT POSITION DECODE TEST
4      :%      : SET RPCS2: CLR = 1
5      :%      : SET RPCS2: PAT = 1
6      :%      : WRITE RPDA WITH DATA PATTERN #1, ONCE
7      :%      : IF RPAS: ATA BIT IS NOT CORRECT POSITION FOR DRIVE UNDER TEST
8      :%      : THEN
9      :%      :   OUTPUT ERROR MESSAGE (RPAS DECODE LOGIC FAILURE)
10     :%      :   OUTPUT FAULT LIST: J11 / J13
11     :%      : ELSE
12     :%      :   WRITE RPAS WITH EXPECTED RESULTS
13     :%      : ENDIF
14     :%      : SET RPCS2: PAT = 0
15     :%      : IF RPAS: ATA BIT UNDER TEST <> 0
16     :%      : THEN
17     :%      :   OUTPUT ERROR MESSAGE (RPAS DECODE LOGIC FAILURE)
18     :%      :   OUTPUT FAULT LIST: J11 / J13, J12
19     :%      : ENDIF
20     :%      END TEST 44
21
22 034424      T44::
23 034424      012737 000012 002402      MOV      #10, ITCOUN      ;LOAD THE ITERATION COUNT
24 034432      104404      1$:      TRAP      C$BSEG
25 034434      004737 016662      JSR      PC, SEIZE      ;GET THE DRIVE UNDER TEST
26 034440      052777 000020 146054      BIS      #PAT, @RPCS2      ;INVERT PARITY (FORCE ERRORS)
27 034446      013777 002344 146044      MOV      PATT1, @RPDA      ;WRITE A PATTERN TO RPDA
28 034454      004737 017000      JSR      PC, WAIT      ;WAIT FOR THE RP07 MICROPROCESSOR TO FINISH
29 034460      013737 002400 002454      MOV      BITPOS, EXPTED      ;GET THE EXPECTED DATA
30 034466      023777 002454 146034      CMP      EXPTED, @RPAS      ;DID CORRECT ATN BIT SET?
31 034474      001417      BEQ      2$      ;IF EQUAL OK!
32 034476      013737 002530 002456      MOV      RPAS, TESTRG      ;FORM REGISTER DATA
33 034504      017737 146020 002452      MOV      @RPAS, RCVED      ;AND RECEIVED ERROR DATA
34 034512      012737 012000 002404      MOV      #BIT10!BIT12, ERRWD1      ;NOW GET MODULE CALL - OUT
35 034520      005037 002406      CLR      ERRWD2      ;BOTH WORDS
36 034524      104456      TRAP      C$ERHRD
37 034526      000111      .WORD      73
38 034530      012454      .WORD      EM14
39 034532      014172      .WORD      ERRO
40 034534      042777 000020 145760 2$:      BIC      #PAT, @RPCS2      ;INVERT PARITY AGAIN
41 034542      013777 002454 145760      MOV      EXPTED, @RPAS      ;TRY TO CLEAR RPAS
42 034550      005777 002454      CLR      EXPTED      ;SHOW EXPECTED RESULTS
43 034554      005777 145750      TST      @RPAS      ;DID RPAS CLEAR?
44 034560      001421      BEQ      3$      ;IF SO, SKIP ERROR DISPATCH
45 034562      013737 002530 002456      MOV      RPAS, TESTRG      ;FORM REGISTER DATA
46 034570      017737 145734 002452      MOV      @RPAS, RCVED      ;FORM RECEIVED DATA
47 034576      012737 016000 002404      MOV      #BIT10!BIT11!BIT12, ERRWD1      ;CREATE MODULE LIST
48 034604      005037 002406      CLR      ERRWD2      ;BOTH WORDS
49 034610      104456      TRAP      C$ERHRD
50 034612      000112      .WORD      74
51 034614      013051      .WORD      EM23
52 034616      014172      .WORD      ERRO
53 034620      005037 002402      CLR      ITCOUN      ;NO LOOPS NECESSARY
54 034624      104405      3$:
55 034624      10000$:      TRAP      C$ESEG
56 034624      104405

```

49 034526 005337 002402
50 034532 003277
51 034634 104401

DEC ITCOUN
BGT 1\$
L10072: TRAP C\$ETST

;ONE LESS TO-GO
;IF >0, WE'RE NOT DONE

```

1      .SBTTL TEST 45 UNIQUE POSITION DECODE TEST
2
3      :% TEST 45 RPAS UNIQUE POSITION DECODE TEST
4      :% : SET RPCS2: CLR = 1
5      :% : SET RPCS2: PAT = 1
6      :% : WRITE RPDA WITH DATA PATTERN #1, ONCE
7      :% : IF RPAS: ATA FOR THE DRIVE UNDER TEST <> 1
8      :% : THEN
9      :% : : OUTPUT ERROR MESSAGE (RPAS DECODE LOGIC FAILURE)
10     :% : : OUTPUT FAULT LIST: J11/J13
11     :% : ENDF
12     :% : IF RPDS: ATA <> 1
13     :% : THEN
14     :% : : OUTPUT ERROR MESSAGE (RPDS: ATA DIDN'T SET)
15     :% : ENDF
16     :% : WRITE RPAS WITH THE COMPLIMENT OF THE EXPECTED DATA
17     :% : IF RPAS: ATA FOR THE DRIVE UNDER TEST = 0
18     :% : THEN
19     :% : : OUTPUT ERROR MESSAGE (RPAS DECODE LOGIC FAILURE)
20     :% : : OUTPUT FAULT LIST: J11 / J13
21     :% : ENDF
22     :% END TEST 45
23
24 034636 012737 000012 002402 T45:: MOV #10,,I COUN ;LOAD THE ITERATION COUNT
25 034636 012737 000012 002402 1$:
26 034644 104404 TRAP CSBCEG
27 034646 004737 016662 JSR PC,SEIZ ;GET THE DRIVE UNDER TEST
28 034652 052777 000020 145642 BIS #PAT,@RPCS2 ;INVERT PARITY (FORCE ERRORS)
29 034660 013777 002344 145632 MOV PATT1,@RPDA ;WRITE RPDA WITH PATTERN1
30 034666 013737 002400 002454 MOV BITPOS,EXPTED ;GET THE CORRECT ATTENTION BIT POSITION
31 034674 004737 017000 JSR PC,WAIT ;WAIT FOR THE RP07 MICROPROCESSOR
32 034700 023777 002454 145622 CMP EXPTED,@RPAS ;MATCH?
33 034706 001421 BEQ 2$ ;IF EQUAL, OK!
34 034710 013737 002530 002456 MOV RPAS,TESTRG ;FORM FAILURE DATA
35 034716 017737 145606 002452 MOV @RPAS,RCVED ;AND LOG IT
36 034724 012737 012000 002404 MOV #BIT10!BIT12,ERRWD1 ;CREATE MODULE CALL - OUT
37 034732 005037 002406 CLR ERRWD2 ;BOTH WORDS
38 034736 104456 TRAP CSERHRD
39 034740 000113 .WORD 75
40 034742 012454 .WORD EM14
41 034744 014172 .WORD ERRO
42 034746 005037 002402 CLR ITCOUN ;NO LOOPS NECESSARY
43 034752 037777 100000 145544 2$: BIT #ATA,@RPDS ;DID ATA SET?
44 034760 000112 BNE 3$ ;IF NOT ZERO, YES!
45 034762 007737 017372 JSR PC,BISEXP ;LOAD THE FAILING INFORMATION
46 034766 002524 RPDS ;THIS REGISTER FAILED
47 034770 100000 ATA ;THIS BIT FAILED TO SET
48 034772 104456 TRAP CSERHRD
49 034774 000114 .WORD 76
50 034776 012776 .WORD EM22
035000 014172 .WORD ERRO
46 035002 005037 002402 CLR ITCOUN ;NO LOOP NECESSARY
47 035006 005137 002454 COM EXPTED ;COMPLIMENT THE EXPECTED DATA
48 035012 013777 002454 145510 MOV EXPTED,@RPAS ;AND WRITE TO RPDA (SHOULD DO NOTHING)
49 035020 005137 002454 COM EXPTED ;RE-INVERT EXPECTED DATA
50 035024 023777 002454 145476 CMP EXPTED,@RPAS ;AND SEE IF ATN CLEARD

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51	035032	001421			BEQ	4\$		;IF MATCH, IT DID NOT TEST OK!
52	035034	013737	002530	002456	MOV	RPAS,TESTRG		;FORM FAILING REGISTER
53	035042	017737	145462	002452	MOV	@RPAS,RCVED		;AND FAILING DATA
54	035050	012737	012090	002404	MOV	#BIT10!BIT12,ERRWD1		;CREATE MODULE CALLOUT
55	035056	005037	002406		CLR	ERRWD2		;BOTH WORDS
56	035062	104456			TRAP	C\$ERHRD		
	035064	000115			.WORD	77		
	035066	012454			.WORD	EM14		
	035070	014172			.WORD	ERRO		
57	035072	005037	002402		CLR	ITCOUN		;RESET THE ITERATION COUNTER
58	035076							
	035076							
	035076	104405			TRAP	C\$ESEG		
59	035100	005337	002402		DEC	ITCOUN		;ONE LESS ITERATION
60	035104	003257			BGT	1\$		;IF > 0, DO AGAIN!!
61	035106							
	035106	104401			TRAP	C\$ETST		

4\$:
10000\$:

L10073:

```

1      .SBTTL TEST 46 MASSBUS ATTENTION CLEAR TEST
2
3      ;% TEST 46 CLEAR MASSBUS ATTENTION TEST
4      ;% : SET RPCS2: CLR = 1
5      ;% : IF ((RPCS1: SC) OR (ON RH20-'ATTN') = 1
6      ;% : : THEN
7      ;% : : OUTPUT ERROR MESSAGE (DETECTED FALSE SPECIAL CONDITION)
8      ;% : : OUTPUT FAULT LIST: CABLE, RHXX, J11/J13, ANOTHER DRIVE, TERMINATOR
9      ;% : : ENDF
10     ;% END TEST 46
11
12 035110      T46:: MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
13 035110 012737 000012 002402 1$:
14 035116 104404 TRAP C$BSEG
15 035120 004737 016662 JSR PC,SEIZE ;GET THE DRIVE AFTER PURGING ERRORS!
16 035124 032777 100000 1453b0 BIT #SC,ARPC1 ;TEST RPCS1 = SPECIAL CONDITION
17 035132 001420 BEQ 2$ ;IF 0, TEST OK!
18 035134 004737 017422 JSR PC,BICEXP ;FORM UP FAILING DATA
19 035140 002512 RPCS1 ;THIS REGISTER
20 035142 100000 SC ;THIS BIT FAILED TO CLEAR
21 035144 012737 012000 002404 MOV #BIT10!BIT12,FRRWD1 ;FORM UP MODULE CALLOUT
22 035152 012737 000426 002406 MOV #BIT1!BIT2!BIT4!BIT8,ERRWD2;BOT WORDS
23 035160 104456 TRAP C$ERHRD
24 035162 000116 .WORD 78
25 035164 012562 .WORD EM16
26 035166 014172 .WORD ERRO
27 035170 005037 002402 CLR ITCOUN ;NO ITERATIONS NECESSARY
28 035174 035174 2$:
29 035174 104405 10000$: TRAP C$ESEG
30 035176 005337 002402 DEC ITCOUN ;ONE LESS ITERATION TO GO
31 035202 003345 BGT 1$ ;IF <= 0, DONE!!
32 035204 104401 L10074: TRAP C$ETST
  
```

```

1      .SBTTL  TEST 47 MASSBUS ATTENTION SET/CLEAR TEST
2
3      ;%      TEST 47 MASSBUS ATTN SET & CLEAR TEST
4      ;%      : SET RPCS2: CLR = 1
5      ;%      : SEI RPCS2: PAT = 1
6      ;%      : WRITE RPDA WITH DATA PATTERN #1, ONCE
7      ;%      : IF ((RPCS1: SC) OR (IN RH20-'ATTN')) <> 1
8      ;%      : THEN
9      ;%      :   OUTPUT ERROR MESSAGE (FAILED TO DETECT SPECIAL CONDITION WHEN EXPECTED)
10     ;%      :   OUTPUT FAULT LIST: RHXX, CABLES, J11 / J13, TERMINATOR
11     ;%      :   ENDIF
12     ;%      END TEST 47
13
14 035206      T47::
15 035206      012737 000012 002402      1$: MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
16 035214      035214 104404      TRAP      C$BSEG
17 035216      004737 016662      JSR      PC,SEIZE      ;FLUSH ERRORS THEN GET THE DRIVE
18 035222      052777 000020 145272      BIC      #PAT,@RPCS2      ;INVERT PARITY (FORCE ERRORS)
19 035230      113777 002344 145262      MO      PATT1,@RPDA      ;WRITE RPDA, ONCE
20 035236      004737 017000      JSR      PC,WAIT      ;WAIT FOR THE RPO7 MICROPROCESSOR
21 035242      032777 100000 145242      BIT      #SC,@RPCS1      ;DID SPECIAL CONDITION SET?
22 035250      001020      BNE      2$      ;IF = 2, YES
23 035252      004737 017372      JSR      PC,BISEXP      ;FORM ERROR DATA
24 035254      002512      RPCS1      ;FOR AN ERROR DIS. TCH
25 035260      100000      SC      ;THIS BIT FAILED TO SET
26 035262      012737 012000 002404      MOV      #BIT10!BIT12,ERRWD1      ;FORM MODULE LIST
27 035270      012737 000406 002406      MOV      #BIT1!BIT2!BIT8,ERRWD2      ;BOTH WORDS
28 035276      104456      TRAP      C$ERHRD
29 035300      000117      .WORD      79
30 035302      012725      .WORD      EM21
31 035304      014172      .WORD      ERRO
32 035306      005037 002402      CLR      ITCOUN      ;RESET THE ITERATION COUNTER
33 035312      100000$:
34 035312      104405      TRAP      C$ESEG
35 035314      005337 002402      DEC      ITCOUN      ;ONEW LESS ITERATION
36 035320      003335      BGT      1$      ;IF <= 0, DONE
37 035322      L10075:
38 035322      104401      TRAP      C$ETST

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```

1      .SBTTL  TEST 48 READ-IN-PRESET COMMAND TEST
2
3      ;%      TEST 48 READ-IN-PRESET BASIC COMMAND TEST
4      :%      : SET RPCS2: CLR = 1
5      :%      : ISSUE READ-IN-PRESET COMMAND
6      :%      : IF RPDS: ERR = 1
7      :%      : THEN
8      :%      :   OUTPUT ERROR MESSAGE (DETECTED FALSE COMPOSITE ERROR)
9      :%      :   OUTPUT FAULT LIST: J12
10     :%      : ENDF
11     :%      END TEST 48
12
13     035324      T48::
14     035324      012737 000012 002402      MOV      #10.,ITCOUN      ;LOAD THE ITERATION COUNT
15     035332      032777 010000 145164      BIT      #MOL,@RPDS      ;DRIVE ON LINE?
16     035340      001016                      BNE      1$      ;IF 1, YES
17     035342      004737 017326      JSR      PC,SAVRPR      ;GET THE REGISTER SNAPSHOT
18     035346      017746 002114      MOV      L$TEST,-(SP)
19     035352      012746 006452      MOV      #MSGMOL,-(SP)
20     035356      012746 000002      MOV      #2,-(SP)
21     035362      010600      MOV      SP,R0
22     035364      104417      TRAP     C$PNTF
23     035366      062706 000006      ADD      #6,SP
24     035372      104437      TRAP     C$EXIT
25     035374      000104      .WORD    L10076-.
26
27     035376      1$:
28     035376      104404      TRAP     C$BSEG
29     035400      004737 016662      JSR      PC,SEIZE      ;GET THE DRIVE UNDER TEST
30     035404      012777 000021 145100      MOV      #RIP,@RPCS1      ;ISSUE THE READ-IN-PRESET
31     035412      004737 017000      JSR      PC,WAIT      ;WAIT FOR THE RP07 MICROPROCESSOR
32     035416      032777 040000 145100      BIT      #ERR,@RPDS      ;DID IT CAUSE AN ERROR?
33     035424      001417      BEQ      2$      ;IF 0, NO!
34     035426      004737 017422      JSR      PC,BICEXP      ;LOAD FAILURE DATA
35     035432      002524      RPDS      ;THIS REGISTER
36     035434      040000      ERR      ;THIS BIT FAILED TO STAY CLEAR
37     035436      012737 004000 002404      MOV      #BIT11,ERRWD1      ;FORM MODULE CALLOUT
38     035444      005037 002406      CLR      ERRWD2      ;FOR BOTH WORDS
39     035450      104456      TRAP     C$ERHRD
40     035452      000120      .WORD    80
41     035454      013051      .WORD    EM23
42     035456      014172      .WORD    ERRO
43
44     035460      005037 002402      CLR      ITCOUN      ;NO ITERATIONS NECESSARY
45
46     035464      2$:
47     035464      10000$:
48     035464      104405      TRAP     C$ESEG
49     035466      005337 002402      DEC      ITCOUN      ;ONE LESS TO-GO
50     035472      003741      BGT      1$      ;UNTIL <= 0!!
51     035474      004737 017722      JSR      PC,PRELOD      ;RESET THE DRIVE TO 16 BIT MODE
52
53     035500      L10076:
54     035500      104401      TRAP     C$ETST

```

```

1      .SBTTL  TEST 49 RHXX UNIQUE REGISTER TEST
2
3      :%      : SET RPCS2: CLR = 1
4      :%      : LOAD DRIVE NUMBER INTO RPCS2
5      :%      : REPEAT
6      :%      :   WRITE A UNIQUE PATTERN INTO A SELECTED REGISTER
7      :%      :   REGISTERS TO TEST = RPCS1, RPWC, RPBA, RPDA, RPMR1, RPOF, RPDC
8      :%      :   OPTIONAL REGISTERS FOR AN RH70 = RPBAE, RPCS3
9      :%      :   UNTIL ALL REGISTERS HAVE BEEN WRITTEN
10     :%      : ENDREPEAT
11     :%      : IF REGISTER UNDER TEST DOESN'T MATCH EXPECTED DATA
12     :%      :   THEN
13     :%      :   OUTPUT ERROR MESSAGE (REGISTER SELECTION FAILURE)
14     :%      :   OUTPUT FAULT LIST: RHXX, CABLES, J11, J12, J13, TERMINATOR
15     :%      : ENDIF
16     :%      : END TEST 49
17
18 035502      T49::
19 035502      012737 000012 002402      MOV      #10,,ITCOUN      ;LOAD THE ITERATION COUNT
20 035510      004737 016662      JSR      PC,SEIZE      ;LOAD THE DRIVE UNDER TEST
21 035514      012737 000002 002436      1$:      MOV      #2,TEMP      ;LOAD THE FIRST DATA PATTERN
22 035522      012702 002652      MOV      #PSTACK,R2      ;CREATE THE CHECK BUFFER ADDRESS
23 035526      012701 004330      MOV      #TST49,R1      ;GET THE FILE OF REGISTERS
24 035532      012703 000004      MOV      #4,R3      ;GET THE FIRST SEGMENT COUNT
25 035536      013146      2$:      MOV      @ (R1)+, -(SP)      ;GET THE INITIAL STATE OF THE REGISTER
26 035540      017612 000000      MOV      @ (SP), (R2)      ;SAVE IT IN THE IMAGE FILE
27 035544      053736 002436      BIS      TEMP, @ (SP)+      ;WRITE THE UNIQUE TEST BIT
28 035550      053722 002436      BIS      TEMP, (R2)+      ;AND SET THE CORRECT MASK IN THE IMAGE FILE
29 035554      005237 002436      INC      TEMP      ;NEXT UNIQUE PATTERN
30 035560      005303      DEC      R3      ;REDUCE THE ITERATION COUNT
31 035562      003365      BGT      2$      ;IF > 0, KEEP GOING!
32 035564      012737 000010 002436      MOV      #10,TEMP      ;NEXT PATTERN
33 035572      012703 000004      MOV      #4,R3      ;AND THE NEXT SEGMENT COUNT
34 035576      005737 002504      TST      RHTYPE      ;WHICH CONTROLLER?
35 035602      001402      BEQ      4$      ;IF 0, RH11
36 035604      062703 000002      ADD      #2,R3      ;ADD 2 TO THE SEGMENT COUNT TO INCLUDE RPBAE & RPCS3
37 035610      013146      4$:      MOV      @ (R1)+, -(SP)      ;SAVE THE INITIAL STATE OF THE REGISTER
38 035612      017612 000000      MOV      @ (SP), (R2)      ;NOW GET THE INITIAL CONTENTS OF THE REGISTER
39 035616      053736 002436      BIS      TEMP, @ (SP)+      ;NOW WRITE THE TEST PATTERN
40 035622      053722 002436      BIS      TEMP, (R2)+      ;AND UPDATE THE IMAGE FILE
41 035626      005237 002436      INC      TEMP      ;NEXT PATTERN
42 035632      005303      DEC      R3      ;ONE LESS ITERATION TO GO
43 035634      003365      BGT      4$      ;IF > 0, NOT DONE YET!!
44 035636      012701 004330      MOV      #TST49,R1      ;GET THE REGISTER FILE AGAIN
45 035642      012702 002652      MOV      #PSTACK,R2      ;AND THE OUTPUT FILE AGAIN
46 035646      012703 000010      MOV      #8,,R3      ;GET THE OVERALL ITERATION COUNT
47 035652      005737 002504      TST      RHTYPE      ;WHICH CONTROLLER??
48 035656      001402      BEQ      5$      ;IF 0, IT'S AN RH11!!
49 035660      062703 000002      ADD      #2,R3      ;INCLUDE THE TWO EXTRA REGISTERS: RPBAE & RPCS3
50 035664      013146      5$:      MOV      @ (R1)+, -(SP)      ;GET THE ADDRESS OF THE REGISTER UNDER TEST
51 035666      023622      CMP      @ (SP)+, (R2)+      ;DOES THE DATA MATCH?
52 035670      001425      BEQ      6$      ;YES, GO-ON!
53 035672      017637 177776 002452      MOV      @ -2(SP), RCVD      ;GET THE FAILING DATA
54 035700      016637 177776 002456      MOV      -2(SP), TESTRG      ;AND THE FAILING REGISTER ADDRESS
55 035706      016237 177776 002454      MOV      -2(R2), EXPTED      ;NOW GET THE EXPECTED DATA
56 035714      012737 016000 002404      MOV      #BIT10!BIT11!BIT12,ERRWD1
57 035722      012737 000406 002406      MOV      #BIT11!BIT12!BIT18,ERRWD2;CREATE THE MODULE CALLOUT

```

58	035730	104456		TRAP	C\$ERHRD	
	035732	000121		.WORD	81	
	035734	013641		.WORD	EM36	
	035736	014172		.WORD	ERRO	
59	035740	005037	002402	CLR	ITCOUN	;RESET THE ITERATION COUNTER
60	035744	005303		6\$: DEC	R3	;ONE LESS REGISTER TO TEST
61	035746	003346		BGT	5\$	;IF > 0, KEEP GOING!
62	035750	005337	002402	DEC	ITCOUN	;ONE LESS ITERATION
63	035754	003257		BGT	1\$	;IF <= 0, DONE!!
64	035756			L10077:		
	035756	104401		TRAP	C\$ETST	

```

1      .SBTTL TEST 50 RPLA STATIC TEST
2
3      :% TEST 50 RPLA STATIC TEST
4      :% : SET UP FOR A SECTOR MATCH IN RPLA
5      :% : SET UP A WATCHDOG TIMER
6      :% : REPEAT
7      :% : : IF DESIRED SECTOR DOESN'T MATCH CONTENTS OF RPLA
8      :% : : : THEN
9      :% : : : DECREMENT THE WATCHDOG TIMER
10     :% : : : IF WATCHDOG TIMER = 0
11     :% : : : : THEN
12     :% : : : : OUTPUT ERROR MESSAGE (CAN'T FIND DESIRED SECTOR IN TIME)
13     :% : : : : OUTPUT FAULT LIST: J8, J11, J12, J13, RHXX, CONTROLLER, CABLES, TERMINA
14     :% : : : : ELSE
15     :% : : : : RE-READ RPLA LOOKING FOR A SECTOR MATCH
16     :% : : : : ENDIF
17     :% : : : ELSE
18     :% : : : GET NEXT LEGAL SECTOR ADDRESS
19     :% : : : REFRESH THE WATCHDOG TIMER
20     :% : : : ENDIF
21     :% : : UNTIL ALL LEGAL SECTOR ADDRESSES HAVE BEEN USED
22     :% : : ENDREPEAT
23     :% : : END TEST 50
24
25 035760 012737 000012 002402 T50:: MOV #10.,ITCOUN ;LOAD THE OVERALL ITERATION COUNTER
26 035760 005001 000003 002402 1$: CLR R1 ;R1 IS USED FOR THE SECTOR ADDRESS
27 035766 012703 000003 002456 MOV #3,R3 ;OVERALL ITERATION COUNTER
28 035770 013737 002532 002404 MOV RPLA,TESTRG ;THIS REGISTER MIGHT FAIL
29 035774 012737 016200 002406 MOV #BIT7!BIT10!BIT11!BIT12,ERRWD1
30 036002 012737 000406 002406 MOV #BIT1!BIT2!BIT8,ERRWD2
31 036010 004737 016662 002436 JSR PC,SEIZE ;GET THE DRIVE NOW!
32 036016 012737 177777 002436 2$: MOV #-1,TEMP ;USED FOR A WATCHDOG T. ?
33 036022 027701 144476 002452 3$: CMP @RPLA,R1 ;NOW LOOK FOR SECTOR 0
34 036030 001421 002436 BEQ 6$ ;MATCH, GO-ON
35 036034 005337 002436 DEC TEMP ;1.2 LESS MICROSECONDS TO GO
36 036042 001372 002452 BNE 3$ ;KEEP GOING IF NOT ZERO
37 036044 005303 002452 DEC R3 ;ONE LESS ITERATION TO GO
38 036046 003365 002452 BGT 2$ ;IF NOT ZERO, KEEP GOING
39 036050 017737 144456 002452 4$: MOV @RPLA,RCVED ;GET THE RECEIVED DATA
40 036056 010137 002454 5$: MOV R1,EXPTED ;GET THE EXPECTED DATA
41 036062 104456 TRAP C$ERHRD
42 036064 000122 .WORD 82
43 036066 012454 .WORD EM14
44 036070 014172 .WORD ERRO
45 036072 005037 002402 CLR ITCOUN ;RESET THE ITERATION COUNTER
46 036076 000454 002652 BR 14$ ;TAKE EARLY RETURN
47 036100 012703 000100 6$: MOV #F ACK,R3 ;GET THE 2 OUT OF 3 BUFFER
48 036104 062701 006200 ADD #100,R1 ;SET UP FOR THE NEXT SECTOR ADDRESS
49 036110 020127 006200 CMP R1,#6200 ;DONE? (SECTOR 50)
50 036114 001442 000002 BEQ 13$ ;IF MATCH, YES
51 036116 012702 000003 MOV #2,R2 ;WE MUST HAVE TWO MATCHES
52 036122 012704 000003 MOV #3,R4 ;USE THIS FOR AN OVERALL ITERATION COUNT
53 036126 012737 177777 002436 7$: MOV #-1,TEMP ;USE THIS AS A WATCHDOG TIMER
54 036134 005337 002436 8$: DEC TEMP ;1.2 MICRO SECONDS LESS WINDOW
55 036140 001404 BEQ 9$ ;IF ZERO, FIND OUT WHICH ITERATION
56 036142 027701 144364 CMP @RPLA,R1 ;MATCH?

```

55	036146	001372		BNE	8\$	:IF NOT, KEEP TRYING
56	036150	001403		BEQ	10\$	:IF SO, TRY AGAIN
57	036152	005304		9\$: DEC	R4	:ONE LESS ITERATION TO GO
58	036154	003364		BGT	7\$	:IF NOT ZERO, KEEP TRYING
59	036156	001734		BEQ	4\$	:IF ZERO, WE HAVE AN ERROR
60	036160	017723	144346	10\$: MOV	@RPLA,(R3)+	:GET THE FIRST OF THREE READINGS
61	036164	017723	144342	MOV	@RPLA,(R3)+	:GET THE SECOND OF THREE READINGS
62	036170	017723	144336	MOV	@RPLA,(R3)+	:GET THE FINAL READING
63	036174	024301		11\$: CMP	-(R3),R1	:DO WE MATCH?
64	036176	001003		BNE	12\$	:IF NOT, CHECK IT FOR ERRORS
65	036200	005302		DEC	R2	:OK ONCE, TRY AGAIN
66	036202	003374		BGT	11\$	:TAKE BRANCH IF NOT 0
67	036204	000406		BR	13\$	:TEST OK, SO-FAR
68	036206	020327	002650	12\$: CMP	R3,#PSIACK-2	:DID WE RUN OUT OF BUFFER?
69	036212	101370		BHI	11\$	:NOT YET
70	036214	011337	002454	MOV	(R3),EXPTED	:GET THE EXPECTED DATA FOR THE REPORT
71	036220	000716		BR	5\$	:NOW REPORT THE ERROR
72	036222	005337	002402	13\$: DFC	ITCOUN	:ONE LESS ITERATION.....
73	036226	003257		BGT	1\$	:IF <= 0, DONE!!
74	036230			14\$:		
	036230			L10100:		
	036230	104401		TRAP	C\$ETST	

```

1      .SBTTL TEST 51 RPMR1 - RPER2 WRAP AROUND TEST
2
3      :% TEST 51 RPMR1 - RPER2 WRAP AROUND TEST
4      :% : USING PATTERNS 1-4, ONE AT A TIME,
5      :% : W TE RPMR1, LOW BYTE WITH TEST PATTERN
6      :% : Wk 'E RPMR1, HIGH BYTE WITH 'FE'(HEX)
7      :% : ISS A DIAGNOSTIC COMMAND
8      :% : WAI, FOR THE COMMAND COMPLETION
9      :% : IF R R2, LOW BYTE ONLY, DOESN'T MATCH THE TEST PATTERN
10     :% : : TH
11     :% : : OUT, IT ERROR MESSAGE (REGISTER CONTENTS DON'T MATCH EXPECT DATA)
12     :% : : OUT, JT FAULT LIST: J7, J8
13     :% : ENDF
14     :% END TEST 51
15
16 036232 T51:: MOV #2,,ITCOUN ;LOAD THE ITERATION COUNT
17 036232 012737 000002 002402 MOV #DIAG,FUNCTN ;LOAD THE DIAGNOSTIC COMMAND FUNCTION
18 036240 012737 000035 002420 MOV #BIT6,BIT7,ERRWD1 ;LOAD THE CALLOUT LIST
19 036246 012737 000300 002404 CLR ERRWD2 ;NO MODULE FOR THIS MASK
20 036254 005037 002406 JSR PC,SEIZE ;LOAD THE DRIVE NUMBER
21 036260 004737 016662 MOV RPER2,TESTRG ;THIS REGISTER MAY FAIL
22 036264 013737 002552 002456 1$: MOV #177000,R1 ;SET UP FOR A 0'S WRITE WRAP TO RPER2
23 036272 012701 177000 TRAP C$BSEG
24 036276 104404 MOV R1,@RPMR1 ;LOAD THE MAINTENANCE REGISTER NOW
25 036300 010177 144232 JSR PC,DRIVER ;ISSUE THE DIAGNOSTIC COMMAND
26 036304 004737 015146 MOV @RPER2,-(SP) ;GET THE RESULTS
27 036310 017746 144236 BIC #177400,(SP) ;AND REMOVE THE UNWANTED BITS
28 036314 042716 177400 CMPB R1,(SP)+ ;MATCH?
29 036320 120126 BEQ 2$ ;TAKE BRANCH IF SO...
30 036322 001415 CLR EXPTED ;RESET THE EXPECTED DATA
31 036324 005037 002454 MOVB R1,EXPTED ;LOAD THE EXPECTED STATUS
32 036330 110137 002454 MOV -2(SP),RCVED ;AND THE FAILING STATUS
33 036334 016637 177776 002452 TRAP C$ERHRD
34 036342 104456 .WORD 83
35 036352 005037 002402 .WORD EM14
36 036356 004737 015400 .WORD ERRO
37 036362 104405 2$: CLR ITCOUN ;NO ITERATIONS NECESSARY
38 036364 104404 10000$: JSR PC,DRVCLR ;PURGE ERRORS
39 036366 012701 177377 TRAP C$ESEG
40 036372 010177 144140 TRAP C$BSEG
41 036376 004737 015146 MOV #177377,R1 ;WRITE AN ALL ONES PATTERN TO RPER2
42 036402 017746 144144 MOV R1,@RPMR1 ;WRITE THE MAINTENANCE REGISTER NOW
43 036406 042716 177400 JSR PC,DRIVER ;ISSUE THE DIAGNOSTIC COMMAND
44 036412 120126 MOV @RPER2,-(SP) ;GET THE RESULTS
45 036414 001415 BIC #177400,(SP) ;STRIP THE HIGH BITS OUT
46 036416 005037 002454 CMPB R1,(SP)+ ;MATCH?
47 036422 110137 002454 BEQ 3$ ;IF SO, TAKE BRANCH
48 036426 016637 177776 002452 CLR EXPTED ;SET UP FOR AN ERROR MESSAGE
49 036434 104456 MOVB R1,EXPTED ;SET THE EXPECTED DATA
50 036444 005037 002402 MOV -2(SP),RCVED ;SET THE RECEIVED DATA
    TRAP C$ERHRD
    .WORD 84
    .WORD EM14
    .WORD ERRO
    CLR ITCOUN ;NO FURTHER ITERATIONS NECESSARY
  
```

51	036450	004737	015400	3\$:	JSR	PC,DRVCLR	;NO LEFT-OVER ERRORS
52	036454			10001\$:			
	036454	104405			TRAP	C\$ESEG	
53	036456	012701	000001		MOV	#BIT0,R1	;LOAD THE NEXT PATTERN NOW
54	036462	052701	177000	4\$:	BIS	#177000,R1	;AND SET THE DIAGNOSTIC START MASK
55	036466	104404			TRAP	C\$BSEG	
56	036470	010177	144042		MOV	R1,@RPMR1	;LOAD THE WRAP TEST NOW
57	036474	004737	015146		JSR	PC,DRIVER	;ISSUE THE COMMAND NOW!
58	036500	017746	144046		MOV	@RPER2,-(SP)	;GET THE RESULTS
59	036504	042716	177400		BIC	#177400,(SP)	;STRIP UNWANTED DATA
60	036510	120126			CMPB	R1,(SP)+	;MATCH??
61	036512	001415			BEQ	5\$	;IF SO, SKIP ERROR MESSAGE
62	036514	005037	002454		CLR	EXPTED	;RESET THE EXPECTED DATA
63	036520	110137	002454		MOVB	R1,EXPTED	;GET THE EXPECTED DATA
64	036524	016637	177776	002452	MOV	-2(SP),RCVED	;AND THE FAILED RESULTS
65	036532	104456			TRAP	C\$ERHRD	
	036534	000125			.WORD	85	
	036536	012454			.WORD	EM14	
	036540	014172			.WORD	ERRO	
66	036542	005037	002402		CLR	ITCOUN	;NO ITERATIONS NECESSARY
67	036546	004737	015400	5\$:	JSR	PC,DRVCLR	;NO ERRORS!
68	036552			10002\$:			
	036552	104405			TRAP	C\$ESEG	
69	036554	042701	177200		BIC	#177200,R1	;DONE?
70	036560	001402			BEQ	6\$	;IF ZERO, YES!!!
71	036562	006301			ASL	R1	;NEXT BIT POSTIION, NOW!
72	036564	000736			BR	4\$	;KEEP GOING!
73	036566	012701	000376	6\$:	MOV	#376,R1	;LAST PATTERN
74	036572	052701	177000	7\$:	BIS	#177000,R1	;LOAD THE DIAGNOSTIC START AGAIN
75	036576	104404			TRAP	C\$BSEG	
76	036600	010177	143732		MOV	R1,@RPMR1	;LOAD THE WRAP DATA NOW
77	036604	004737	015146		JSR	PC,DRIVER	;EXECUTE THE DIAGNOSTIC COMMAND NOW
78	036610	017746	143736		MOV	@RPER2,-(SP)	;GET THE RESULTS
79	036614	042716	177400		BIC	#177400,(SP)	;STRIP UNWANTED DATA
80	036620	120126			CMPB	R1,(SP)+	;MATCH??
81	036622	001415			BEQ	8\$	;IF SO, SKIP ERROR REPORT
82	036624	005037	002454		CLR	EXPTED	;RESET THE EXPECTED DATA
83	036630	110137	002454		MOVB	R1,EXPTED	;LOG THE GOOD DATA
84	036634	016637	177776	002452	MOV	-2(SP),RCVED	;LOG THE BAD DATA
85	036642	104456			TRAP	C\$ERHRD	
	036644	000126			.WORD	86	
	036646	012454			.WORD	EM14	
	036650	014172			.WORD	ERRO	
86	036652	005037	002402		CLR	ITCOUN	;RESET THE ITERATIONS COUNTER
87	036656	004737	015400	8\$:	JSR	PC,DRVCLR	;RESET ANY ERRORS
88	036662			10003\$:			
	036662	104405			TRAP	C\$ESEG	
89	036664	042701	177400		BIC	#177400,R1	;REMOVE THE MASK
90	036670	000261			SEC		;CARRY = 1
91	036672	006101			ROL	R1	;SHIFT LEFT (ONE TIME!!)
92	036674	042701	177400		BIC	#177400,R1	;CLEAR THE UNUSED BITS FOR THE FINAL TEST
93	036700	022701	000377		CMP	#377,R1	;DONE??
94	036704	001332			BNE	7\$	;IF NOT, KEEP GOING
95	036706	005337	002402		DEC	ITCOUN	;ONE LESS ITERATION TO-GO
96	036712	003402			BLE	9\$	;IF <= 0, DONE
97	036714	000137	036272		JMP	1\$	;DO UNTIL = 0
98	036720	004737	015400	9\$:	JSR	PC,DRVCLR	;ELIMINATE ANY ERRORS!!

CZRJMA0 RP07 FE/HOST ISOLATOR MACRO V04.00 1-JAN-83 13:37:00 PAGE 86-2^{D 14}
TEST 51 RPRM1 - RPER2 WRAP AROUND TEST

SEQ 0172

99 036724 004737 015312
100 036730
036730 104401

L10101: JSR PC,DIAGEN
TRAP C\$ETST

;SHUT THE DIAGNOSTIC MONITOR OFF.

```

1      .SBTTL TEST 52 ERROR LOG DUMP
2
3      :% TEST 52 ERROR LOG DUMP
4      :% : THIS TEST DOES NO DATA CHECKING
5      :% : LOAD #17(HEX) INTO RPRM1, HIGH BYTE
6      :% : LOAD LOW BYTE OF RPRM1 WITH RAM LOCATION TO BE DUMPED:
7      :% : 71-72(HEX) FOR REVISION LEVEL
8      :% : 32-37(HEX) FOR THE ERROR LOG
9      :% : 88(HEX) FOR FAILED RECAL ATTEMPTS
10     :% : 38-4A(HEX) FOR LAST 20. UNIQUE ERROR LOG ENTRIES
11     :% : REPEAT
12     :% : : LOAD A DIAGNOSTIC COMMAND
13     :% : : WHEN COMMAND EXECUTION COMPLETES GET CONTENTS OF RPER2
14     :% : : CONVERT TO HEX OR DECIMAL (AS REQUIRED)
15     :% : : PRINT OUTPUT TO USER
16     :% : : UNTIL ALL CONTENTS HAVE BEEN DUMPED
17     :% : ENDREPEAT
18     :% END TEST 52
19
20 036732 T52:: TST ERRDMP ;DUMP THE ERROR LOG?
21 036732 005737 002334 BGT 1$ ;IF >0, YES
22 036736 003C02 TRAP C$EXIT
26 036740 104432 .WORD L10102-
    036742 000736
27 036744 004737 016662 1$: JSR PC,SEIZE ;LOAD THE DRIVE NUMBER
28 036750 012702 002652 MOV #PSTACK,R2 ;GET THE OUTPUT BUFFER
29 036754 012737 000035 002420 MOV #DIAG,FUNCTN ;SET UP FOR A DIAGNOSTIC COMMAND
30 036762 012701 000161 MOV #161,R1 ;THIS IS THE FIRST LOW BYTE PARAMETER (71 HEX)
31 036766 012704 000027 MOV #27,R4 ;THIS IS THE DUMP ROUTINE NUMBER (17 HEX)
32 036772 000304 SWAB R4 ;PUT THIS AS THE COMMAND NUMBER
33 036774 004737 015260 JSR PC,DIAGST ;START THE DIAGNOSTIC MONITOR
34 037000 050104 2$: BIS R1,R4 ;LOAD THE RAM ADDRESS
35 037002 004737 015400 JSR PC,DRVCLR ;NO ERRORS INITIALLY
36 037006 004737 015352 JSR PC,DIAGLD ;ISSUE THE COMMAND
37 037012 017712 143534 MOV @RPER2,(R2) ;GET THE RESULTS (8080/2901 REV'S)
38 037016 042722 177400 BIC #177400,(R2)+ ;STRIP OUT UNWANTED DATA
39 037022 040104 BIC R1,R4 ;REMOVE THE LOW BYTE ARGUMENT
40 037024 020127 000162 CMP R1,#162 ;DONE BOTH LOCATIONS? (72 HEX)
41 037030 001402 BEQ 3$ ;IF MATCH, YES
42 037032 005201 INC R1 ;SET THE 2901 REV LEVEL REQUEST
43 037034 000761 BR 2$ ;AND GO TO THE RAM AND GET IT
44 037036 3$: MOV PSTACK+2,-(SP) ;PRINT 8080 AND 2901 REVISION LEVELS
45 037036 C13746 002654 MOV PSTACK,-(SP)
    037042 013746 002652 MOV #FRMT20,-(SP)
    037046 012746 010202 MOV #3,-(SP)
    037052 012746 000003 MOV SP,R0
    037056 010600 TRAP C$PNTF
    037060 104417 ADD #10,SP
    037062 062706 000010 MOV #61,R1 ;SET UP FOR THE NEXT RAM DUMP (31 HEX)
46 037066 012701 000061 JSR PC,DRVCLR ;NO ERRORS NOW!
47 037072 004737 015400 JSR PC,NEXLOC ;NOW GET THE DATA
48 037076 004737 017252 MOV @RPER2,-(SP) ;GET THE RAM OUTPUT
49 037102 017746 143444 BIC #177400,(SP)+ ;STRIP UNUSED DATA
50 037106 042726 177400
51
52 037112 016646 177776 MOV -2(SP),-(SP)
    037116 012746 007574 MOV #FRMT07,-(SP)
  
```

	037122	012746	000002	MOV	#2,-(SP)	
	037126	010600		MOV	SP,R0	
	037130	104417		TRAP	C\$PNTF	
	037132	062706	000006	ADD	#6,SP	
53	037136	004737	015400	JSR	PC,DRVCLR	:NO RESIDUAL ERRORS
54	037142	004737	017252	JSR	PC,NEXLOC	:GET THE NEXT RAM CONTENTS
55	037146	017746	143400	MOV	@RPER2,-(SP)	:GET THE RESULTS
56	037152	042726	177400	BIC	#177400,(SP)+	:STRIP UNWANTED DATA
57						:PRINT NUMBER OF SEEK OVER SHOTS
58	037156	016646	177776	MOV	-2(SP),-(SP)	
	037162	012746	007624	MOV	#FRMT10,-(SP)	
	037166	012746	000002	MOV	#2,-(SP)	
	037172	010600		MOV	SP,R0	
	037174	104417		TRAP	C\$PNTF	
	037176	062706	000006	ADD	#6,SP	
59	037202	004737	015400	JSR	PC,DRVCLR	:NO ERRORS
60	037206	004737	017252	JSR	PC,NEXLOC	:NEXT CONTENTS, PLEASE..
61	037212	017746	143334	MOV	@RPER2,-(SP)	:GET THE RESULTS
62	037216	042726	177400	BIC	#177400,(SP)+	:STRIP UNUSED DATA
63						:PRINT NUMBER OF SOFT SEEK OVERSHOTS
64	037222	016646	177776	MOV	-2(SP),-(SP)	
	037226	012746	007655	MOV	#FRMT11,-(SP)	
	037232	012746	000002	MOV	#2,-(SP)	
	037236	010600		MOV	SP,R0	
	037240	104417		TRAP	C\$PNTF	
	037242	062706	000006	ADD	#6,SP	
65	037246	004737	015400	JSR	PC,DRVCLR	:NO FURTHER ERRORS
66	037252	004737	017252	JSR	PC,NEXLOC	:GET THE NEXT CONTENTS PLEASE..
67	037256	017746	143270	MOV	@RPER2,-(SP)	:GET THE RESULTS
68	037262	042726	177400	BIC	#177400,(SP)+	:STRIP THE UNUSED DATA
69						:PRINT GUARD-BAND DETECTED SKI'S
70	037266	016646	177776	MOV	-2(SP),-(SP)	
	037272	012746	007713	MOV	#FRMT12,-(SP)	
	037276	012746	000002	MOV	#2,-(SP)	
	037302	010600		MOV	SP,R0	
	037304	104417		TRAP	C\$PNTF	
	037306	062706	000006	ADD	#6,SP	
71	037312	004737	015400	JSR	PC,DRVCLR	:NO FURTHER ERRORS
72	037316	004737	017252	JSR	PC,NEXLOC	:NEXT RAM LOCATION...
73	037322	017746	143224	MOV	@RPER2,-(SP)	:GET THE RESULTS
74	037326	042726	177400	BIC	#177400,(SP)+	:STRIP THE UNUSED DATA
75						:PRINT NUMBER OF INDEX ERRORS
76	037332	016646	177776	MOV	-2(SP),-(SP)	
	037336	012746	007756	MOV	#FRMT13,-(SP)	
	037342	012746	000002	MOV	#2,-(SP)	
	037346	010600		MOV	SP,R0	
	037350	104417		TRAP	C\$PNTF	
	037352	062706	000006	ADD	#6,SP	
77	037356	004737	015400	JSR	PC,DRVCLR	:NO FURTHER ERRORS
78	037362	004737	017252	JSR	PC,NEXLOC	:NEXT RAM LOCATION
79	037366	017746	143160	MOV	@RPER2,-(SP)	:GET THE RESULTS
80	037372	042726	177400	BIC	#177400,(SP)+	:STRIP THE 'WHO CARES' BITS
81						:PRINT NUMBER OF PLO UNSAFES
82	037376	016646	177776	MOV	-2(SP),-(SP)	
	037402	012746	010004	MOV	#FRMT14,-(SP)	
	037406	012746	000002	MOV	#2,-(SP)	
	037412	010600		MOV	SP,R0	

	037414	104417		TRAP	C\$PNTF	
	037416	062706	000006	ADD	#6,SP	
83	037422	012701	000210	MOV	#210,R1	:GET THE SET-UP FOR THE #OF RECAL ATTEMPTS(88 HEX)
84	037426	004737	015400	JSR	PC,DRVCLR	:NO FURTHER ERRORS
85	037432	004737	017252	JSR	PC,NEXLOC	:GET THE DATA NOW
86	037436	017746	143110	MOV	@RPER2,-(SP)	:GET THE RESULTS
87	037442	042726	177400	BIC	#177400,(SP)+	:STRIP THE UNWANTED DATA
88						:PRINT THE NUMBER OF RECAL ATTEMPTS
89	037446	016646	177776	MOV	-2(SP),-(SP)	
	037452	012746	010031	MOV	#FRMT15,-(SP)	
	037456	012746	000002	MOV	#2,-(SP)	
	037462	010600		MOV	SP,R0	
	037464	104417		TRAP	C\$PNTF	
	037466	062706	000006	ADD	#6,SP	
90						:PRINT ERROR LOG ENTRIES, IF ANY
91	037472	012746	010070	MOV	#FRMT16,-(SP)	
	037476	012746	000001	MOV	#1,-(SP)	
	037502	010600		MOV	SP,R0	
	037504	104417		TRAP	C\$PNTF	
	037506	062706	000004	ADD	#4,SP	
92	037512	012702	000004	MOV	#4,R2	:GET A 4 ITERATION COUNT
93	037516	012701	000067	MOV	#67,R1	:GET THE FIRST RAM LOCATION-1 FOR THE LAST 20 ERRORS
94	037522	012703	000005	MOV	#5,R3	:5 ENTRIES / ROW
95						:CR-LF
96	037526	012746	006420	MOV	#CRLF,-(SP)	
	037532	012746	000001	MOV	#1,-(SP)	
	037536	010600		MOV	SP,R0	
	037540	104417		TRAP	C\$PNTF	
	037542	062706	000004	ADD	#4,SP	
97	037546	004737	015400	JSR	PC,DRVCLR	:NO FURTHER ERRORS
98	037552	004737	017252	JSR	PC,NEXLOC	:GET THE RAM DATA
99	037556	017746	142770	MOV	@RPER2,-(SP)	:GET THE RESULTS
100	037562	042716	177400	BIC	#177400,(SP)	:STRIP THE UNUSED RESULTS
101	037566	005726		TST	(SP)+	:LOOK FOR NULL DATA
102	037570	001427		BEQ	6\$	:TAKE BRANCH IF 0
103	037572	005746		TST	-(SP)	:RESTORE THE STACK FOR OCTHEX
104	037574	004737	015416	JSR	PC,OCTHEX	:CONVERT TO HEX
105						:DUMP THE RAM CONTENTS
106	037500	012746	002660	MOV	#PSTACK+6,-(SP)	
	037604	012746	002656	MOV	#PSTACK+4,-(SP)	
	037610	012746	002654	MOV	#PSTACK+2,-(SP)	
	037614	012746	002652	MOV	#PSTACK,-(SP)	
	037620	012746	010161	MOV	#FRMT17,-(SP)	
	037624	012746	000005	MOV	#5,-(SP)	
	037630	010600		MOV	SP,R0	
	037632	104417		TRAP	C\$PNTF	
	037634	062706	000014	ADD	#14,SP	
107	037640	005303		DEC	R3	:ONE LESS ROW TO GO
108	037642	003341		BGT	5\$	:KEEP GOING
109	037644	005302		DEC	R2	:ONE LESS COLUMN TO GO
110	037646	003325		BGT	4\$	:KEEP GOING
111	037650					:CR-LF
112	037650	012746	006420	MOV	#CRLF,-(SP)	
	037654	012746	000001	MOV	#1,-(SP)	
	037660	010600		MOV	SP,R0	
	037662	104417		TRAP	C\$PNTF	
	037664	062706	000004	ADD	#4,SP	

4\$:

5\$:

6\$:

113 037670 004737 015400
114 037674 004737 015312
115 037700
037700 104401

L10102:

JSR PC,DRVCLR
JSR PC,DIAGEN
TRAP C\$ETST

;RESET RPER2 TO 0
;SHUT OFF THE DIAGNOSTIC MONITOR

TEST 53 COMPOSITE MICROCODE TEST

```
1 .SBTTL TEST 53 COMPOSITE MICROCODE TEST
2
3 :% TEST 53 COMPOSITE MICROCODE TEST
4 :% : THIS TEST RUNS TWO SEQUENCES OF MICRODIAGNOSTICS THROUGH THE
5 :% : RPC7. THE FIRST SEQUENCE IS COMPRISED OF ROUTINES 24 - 38
6 :% : THE SECOND SEQUENCE IS COMPRISED OF ROUTINES 18 - 23. IF THE
7 :% : LOOP ON ERROR OPTION IS SELECTED, THE ROUTINE WHICH WAS RUNNING
8 :% : AT THE TIME OF THE ERROR WILL BE 'FROZEN' SO THAT THE ERROR MAY
9 :% : BE ANALYZED FURTHER TO IDENTIFY THE FAILURE MECHANISM.
10 :% : TEST ALGORITHM IS AS FOLLOWS:
11 :% : TURN ON THE DIAGNOSTIC MONITOR
12 :% : LOAD RPMR1 WITH A DIAGNOSTIC NUMBER (AND HEAD NUMBER IF NECESSARY)
13 :% : REPEAT
14 :% : : ISSUE A DIAGNOSTIC COMMAND
15 :% : : IF RPER2 (LOW BYTE) <> 0
16 :% : : : THEN
17 :% : : : REPORT THE ERROR (IN HEX), AND THE MODULE CALLOUT
18 :% : : : ENDF
19 :% : : UNTIL ALL ROUTINES HAVE BEEN RUN
20 :% : ENDREPEAT
21 :% : TURN OFF THE DIAGNOSTIC MONITOR
22 :% : END TEST 53
23
24 037702 T53:: MOV #44,R4 ;SET UP THE FIRST ROUTINE NUMBER
25 037702 012704 000044 JSR PC,SEIZE ;LOAD THE DRIVE NUMBER
26 037706 004737 016662 JSR PC,DIAGST ;AND THEN THE 'HANDSHAKE'
27 037712 004737 015260 CLR R2 ;R2 USED FOR THE TRACK ADDRESS
28 037716 005002 1$ : SWAB R4 ;R4 HIGH BYTE USED FOR THE ROUTINE #
29 037720 000304 2$ :
30 037722 104404 TRAP C$BSEG
31 037724 004737 015352 JSR PC,DIAGLD ;NOW EXECUTE THE ROUTINE NUMBER
32 037730 017746 142616 MOV @RPER2,-(SP) ;GET THE RESULTS OF THE TEST
33 037734 042726 177400 BIC #177400,(SP)+ ;STRIP JUNK
34 037740 001414 BEQ 3$ ;IF 0, YES!!
35 037742 104456 TRAP C$ERHRD
36 037744 000620 .WORD 400
37 037746 013564 .WORD EM35
38 037750 014310 .WORD ERR1
39 037752 012737 040011 002420 MOV #TRE!DRCLR,FUNCTN ;LOAD THE DRIVE CLEAR AND CONTROLLER CLEAR COMMAND
40 037754 004737 015146 JSR PC,DRIVER ;NOW EXECUTE THE DRIVE CLEAR COMMAND
41 037756 052777 100000 142544 BIS #DMD,@RPMR1 ;SET THE DIAGNOSTIC MODE BIT AGAIN
42 037758 03$ :
43 037760 10000$ :
44 037762 104405 TRAP C$ESEG
45 037764 000304 SWAB R4 ;RESTORE R4
46 037766 005204 INC R4 ;GET NEXT ROUTINE #
47 040000 120427 000037 CMPB R4,#37 ;IS THIS A READ/WRITE ROUTINE?
48 040004 103745 BLO 1$ ;VALID ROUTINE, KEEP GOING
49 040006 120427 000043 CMPB R4,#43 ;READ-WRITE ROUTINE?
50 040012 101035 BHI 5$ ;IF HIGHER, NO
51 040014 000304 SWAB R4 ;ROUTINE # IN HIGH BYTE
52 040016 005737 002336 TST SELTRK ;USER SPECIFIED TRACK ADDRESS??
53 040022 001411 BEQ 4$ ;IF ZERO, NO-DO THEM ALL!!
54 040024 010446 MOV R4,-(SP) ;GET R4 ON THE STACK FOR SOME CHECKING
55 040026 042716 000377 BIC #377,(SP) ;STRIP THE TRACK ADDRESS
56 040032 022627 021400 CMP (SP)+,#21400 ;WAS THIS THE LAST ROUTINE?
```

52	040036	001431		BEQ	6\$	:IF =, YES IT WAS!!
53	040040	053704	002340	BIS	TRAKAD,R4	:SET THE USER SPECIFIED TRACK ADDRESS
54	040044	000726		BR	2\$	:AND GO-ON
55	040046	162704	000400	4\$: SUB	#400,R4	:GET THE LAST ROUTINE # (WE MAY NOT BE DONE)
56	040052	040204		BIC	R2,R4	:RESET THE TRACK ADDRESS
57	040054	005202		INC	R2	:NEXT TRACK ADDRESS, PLEASE
58	040056	050204		BIS	R2,R4	:LOAD THE NEW TRACK ADDRESS
59	040060	020227	000037	CMP	R2,#31.	:WAS IT LEGAL?
60	040064	101716		BLOS	2\$	:YES IT WAS, GO-ON
61	040066	105004		CLRB	R4	:RESET TO TRACK 0
62	040070	005002		CLR	R2	:AND RESET THE TRACK TO 0
63	040072	062704	000400	ADD	#400,R4	:GET NEXT ROUTINE #
64	040076	020427	021400	CMP	R4,#21400	:IS THIS ROUTINE #43 (HIGH BYTE INFO)?
65	040102	103707		BLO	2\$	:IF LESS, NO
66	040104	000406		BR	6\$	:DONE, TURN OFF THE MONITOR
67	040106	120427	000073	5\$: CMPB	R4,#73	:END ROUTINE?
68	040112	101702		BLOS	1\$	:NOT YET, IF LOWER
69	040114	012704	000030	MOV	#30,R4	:LOAD THE NEXT SEQUENCE OF ROUTINES
70	040120	000677		BR	1\$	:AND KEEP GOING
71	040122	004737	015312	6\$: JSR	PC,DIAGEN	:ALL DONE, SHUT-OFF THE DIAGNOSTIC MONITOR
72	040126			L10103:		
	040126	104401		TRAP	C\$ETST	

```

1      .SBTTL TEST 54 READ-IN-PRESET FUNCTIONAL TEST
2
3      :% TEST 54 READ-IN-PRESET FUNCTIONAL TEST
4      :% : WRITE RPDA WITH DATA PATTERN #3
5      :% : WRITE RPDC WITH DATA PATTERN #3
6      :% : SET RPOF: FMT = 1
7      :% : ISSUE A READ-IN-PRESET COMMAND
8      :% : : IF ((RPDA) OR (RPDC) OR (RPOF: FMT) <> 0
9      :% : : THEN
10     :% : : OUTPUT ERROR MESSAGE (RIP COMMAND FAILED TO EXECUTE PROPERLY)
11     :% : : OUTPUT FAULT LIST: J12
12     :% : : ENDF
13     :% : ENDF
14     :% : ENDF
15     040130      T54::
16     040130      012737 000012 002402      MOV #10.,ITCOUN :LOAD THE ITERATION COUNT
17     040136      032777 010000 142360      BIT #MOL,@RPDS :DRIVE ON-LINE?
18     040144      001016      BNE 1$ :IF = 1, YES
19     040146      004737 017326      JSR PC,SAVRPR :GET THE REGISTER IMAGE
20     040152      013746 002114      MOV L$TEST,-(SP)
      040156      012746 006452      MOV #MSGMOL,-(SP)
      040162      012746 000002      MOV #2,-(SP)
      040166      010600      MOV SP,R0
      040170      104417      TRAP C$PNTF
      040172      062706 000006      ADD #6,SP
24     040176      104432      TRAP C$EXIT
      040200      000162      .WORD L10104-.
25     040202      1$:
      040202      104404      TRAP C$BSEG
26     040204      004737 016662      JSR PC,SEIZE :GET THE DRIVE UNDER TEST
27     040210      013777 002350 142302      MOV PATT3,@RPDA :WRITE PRDA = -1
28     040216      013777 002350 142322      MOV PATT3,@RPDC :WRITE RPDC = -1
29     040224      052777 010000 142312      BIS #FMT,@RPOF :FMT 16 = 1
30     040232      012777 000021 142252      MOV #RIP,@RPCS1 :ISSUE THE READ-IN-PRESET COMMAND
31     040240      005777 142254      TST @RPDA :DID RPDA CLEAR?
32     040244      001405      BEQ 2$ :IF 0, YES!
33     040246      004737 017422      JSR PC,BICEXP :FORM THE FAILING DATA
34     040252      002520      RPDA :THIS REGISTER
35     040254      177777      177777 :THESE BITS FAILED TO CLEAR
36     040256      000420      BR 4$ :GO-ON
37     040260      005777 142262      2$: TST @RPDC :DID RPDC CLEAR?
38     040264      001405      BEQ 3$ :IF = 0, YES!
39     040266      004737 017422      JSR PC,BICEXP :FORM THE FAILING DATA
40     040272      002546      RPDC :THIS REGISTER
41     040274      177777      177777 :THESE BITS FAILED TO CLEAR
42     040276      000410      BR 4$ :NOW REPORT THE ERROR
43     040300      032777 010000 142236      3$: BIT #FMT,@RPOF :DID FMT16 CLEAR
44     040306      001417      BEQ 5$ :IF 0, YES
45     040310      004737 017422      JSR PC,BICEXP :FORM THE FAILING DATA FOR THIS FAILURE
46     040314      002544      RPOF :THIS REGISTER
47     040316      010000      FMT :THIS BIT FAILED TO CLEAR
48     040320      012737 004000 002404      4$: MOV #BIT11,ERRWD1 :FORM MODULE CALL-OUT
49     040326      005037 002406      CLR ERRWD2 :BOTH WORDS
50     040332      104456      TRAP C$ERHRD
      040334      000127      .WORD 87
      040336      013326      .WORD EM30
      040340      014172      .WORD ERRO
  
```

51	040342	005037	002402		CLR	ITCOUN		;NO ITERATIONS NOW!!
52	040346			5\$:				
	040346			10000\$:				
	040346	104405			TRAP	C\$ESEG		
53	040350	005337	002402		DEC	ITCOUN		;ONE LESS ITERATION
54	040354	003312			BGT	1\$		;IF <= 0, DONE!!
55	040356	004737	017722		JSR	PC,PRELOD		;PUT DRIVE BACK IN 16 BIT MODE
56	040362			L10104:				
	040362	104401			TRAP	C\$ETST		

```

1      .SBTTL TEST 55 COMMAND REJECT TEST
2
3      :% TEST 55 COMMAND REJECT TEST
4      :% : SET RPCS2: PAT = 1
5      :% : WRITE RPDA WITH DATA PATTERN #3, ONCE
6      :% : WRITE RPAS WITH DATA PATTERN #3, ONCE
7      :% : ISSUE A READ-IN-PRESET COMMAND
8      :% : IF ((RPDS: ATA <> 1) OR (RPDA <> DATA PATTERN #3))
9      :% : : THEN
10     :% : : OUTPUT ERROR MESSAGE (COMMAND EXECUTED WITH ERRORS PRESENT)
11     :% : : OUTPUT FAULT LIST: J12
12     :% : : ENDF
13     :% : ENDF
14     :% : ENDF
15     040364 T55::
16     040364 012737 000012 002402 MOV #10.,ITCOUN ;LOAD THE ITERATION COUNT
17     040372 032777 010000 142124 BIT #MOL,ARPD ;DRIVE ON-LINE?
18     040400 001016 BNE 1$ ;IF = 1, YES
19     040402 004737 017326 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
20     040406 013746 002114 MOV L$TEST,-(SP)
      040412 012746 006452 MOV #MSGMOL,-(SP)
      040416 012746 000002 MOV #2,-(SP)
      040422 010600 MOV SP,R0
      040424 104417 TRAP C$PNTF
      040426 062706 000006 ADD #6,SP
24     040432 104432 TRAP C$EXIT
      040434 000166 .WORD L10105-.
25     040436 1$:
      040436 104404 TRAP C$BSEG
26     040440 004737 016662 JSR PC,SEIZE ;GET THE DRIVE UNDER TEST
27     040444 052777 000020 142050 BIS #PAT,ARPCS2 ;INVERT PARITY (FORCE ERRORS)
28     040452 013777 002350 142040 MOV PATT3,ARPD ;WRITE RPDA = - 1
29     040460 013777 002350 142042 MOV PATT3,ARPD ;WRITE RPAS = - 1
30     040466 007737 017000 JSR PC,WAIT ;NOW WAIT FOR THE 8080 TO DETECT THE PARITY ERROR
31     040472 012777 000021 142012 MOV #RIP,ARPCS1 ;ISSUE A READ-IN-PRESET
32     040500 023777 002350 142012 CMP PATT3,ARPD ;MATCH??
33     040506 001412 BEQ 2$ ;IF OK, (MATCH) GO-ON
34     040510 013737 002350 002454 MOV PATT3,EXPTED ;FORM THE EXPECTED DATA
35     040516 013737 002520 002456 MOV RPDA,TESTRG ;GET THE FAILING REGISTER
36     040524 017737 141770 002452 MOV ARPD,RCVED ;NOW THE FAILING RESULTS
37     040532 000412 BR 3$ ;NOW REPORT IT!
38     040534 004737 017000 2$: JSR PC,WAIT ;STALL FOR RP07 MICROPROCESSOR DELAY
39     040540 032777 100000 141756 BIT #ATA,ARPD ;DID ATA CLEAR
40     040546 001017 BNE 4$ ;IF SET, NO - IT'S OK
41     040550 004737 017372 JSR PC,BISEXP ;FORM ERROR DATA
42     040554 002524 RPDS ;THIS REGISTER
43     040556 100000 ATA ;THIS BIT FAILED TO SET
44     040560 012737 004000 002404 3$: MOV #BIT11,ERRWD1 ;FORM MODULE CALL-OUT
45     040566 005037 002406 CLR ERRWD2 ;BOTH WORDS
46     040572 104456 TRAP C$ERHRD
      040574 000130 .WORD 88
      040576 013326 .WORD EM30
      040600 014172 .WORD ERRO
47     040602 005037 002402 CLR ITCOUN ;NO ITERATIONS NEEDED
48     040606 4$:
      040606 10000$:
      040606 104405 TRAP C$ESEG
  
```

49	040610	005337	002402	DEC	ITCO 'N	;ONE LESS ITERATION TO-GO
50	040614	003310		BGT	'S	;IF <= 0, DONE
51	040616	004737	017722	JSR	PC,PRELOD	;16/BIT MODE
52	040622					
	040622	104401		L10105:	TRAP	CSETST

```

1      .SBTTL  TEST 56: DATA TEST #1
2
3      :%      TEST  DATA TEST #1 FIRST DATA TEST OF THE MASSBUS DATA LINES
4      :%      :   SET UP A (TOGGLE) BIT MAP FOR ALL EXPECTED BITS (BITS 0 TO 15)
5      :%      :   SET UP FOR A RETRY OF 20128 ITERATIONS (629 * 32)
6      :%      :   SET RPDC = 0
7      :%      :   SET RPDA = 255(.)
8      :%      :   REPEAT
9      :%      :   :   SET RPOF:  CMOD = 1
10     :%      :   :   ISSUE A READ TRACK DESCRIPTOR COMMAND
11     :%      :   :   IF (RPCS1:  TRE) OR (RPDS:  ERR) = 1
12     :%      :   :   :   THEN
13     :%      :   :   :   SET RPCS2:  CLR = 1
14     :%      :   :   :   INCREMENT THE RETRY COUNTER
15     :%      :   :   :   RELOAD THE DRIVE NUMBER
16     :%      :   :   :   IF RPDA < LAST TRACK ADDRESS (32-RP07)
17     :%      :   :   :   :   THEN INCREMENT RPDA (HIGH BYTE ONLY)
18     :%      :   :   :   :   ELSE CLEAR RPDA (HIGH BYTE)
19     :%      :   :   :   :   INCREMENT RPDC
20     :%      :   :   :   ENDIF
21     :%      :   :   ELSE
22     :%      :   :   :   STORE TD WORD #1 AND WORD #2
23     :%      :   :   :   MARK OFF BITS WHICH JUST TOGGLED FROM OFF TO ON, IN BIT MAP
24     :%      :   :   :   INCREMENT RPDA (HIGH BYTE ONLY)
25     :%      :   :   :   IF RPDA (HIGH BYTE) > LAST TRACK ADDRESS (32-RP07)
26     :%      :   :   :   :   THEN
27     :%      :   :   :   :   SET RPDA (HIGH BYTE) = 0
28     :%      :   :   :   :   INCREMENT RPDC
29     :%      :   :   :   :   ELSE
30     :%      :   :   :   :   INCREMENT RPDA (HIGH BYTE ONLY)
31     :%      :   :   :   ENDIF
32     :%      :   :   ENDIF
33     :%      :   :   UNTIL (BIT MAP-ALL BITS UNDER TEST HAVE TOGGLED) OR (RETRY MAX EXCEEDED)
34     :%      :   :   ENDREPEAT
35     :%      :   :   IF BIT MAP DIDN'T COMPLETELY TOGGLE, AND RETRY COUNT > MAXIMUM (20128)
36     :%      :   :   :   THEN
37     :%      :   :   :   :   OUTPUT ERROR MESSAGE (DATA LINES STUCK OR OPEN)
38     :%      :   :   :   :   OUTPUT FAULT LIST:  J11 / J13, CABLES, RHXX, J10, TERMINATOR
39     :%      :   :   :   ENDIF
40     :%      :   :   END TEST
41

```

42	040624				T56::	JSR	PC,SEIZE	;GET THE DRIVE UNDER TEST
43	040624	004737	016662			BIT	#MOL,RPDS	;IS THE DRIVE REALLY ON-LINE?
44	040630	032777	010000	141666		BNE	1\$	;IF SET, IT IS ON-LINE
45	040636	001016				JSR	PC,SAVRPR	;GET THE REGISTER SNAPSHOT
46	040640	004737	017326			MOV	L\$TEST,-(SP)	
47	040644	013746	002114			MOV	#MSGMOL,-(SP)	
	040650	012746	006452			MOV	#2,-(SP)	
	040654	012746	000002			MOV	SP,R0	
	040660	010600				TRAP	C\$PNTF	
	040662	104417				ADD	#6,SP	
	040664	062706	000006			TRAP	C\$EXIT	
51	040670	104432				.WORD	L10106-	
	040672	000262						
52	040674	012737	000012	002402	1\$:	MOV	#10,ITCOUN	;LOAD THE ITERATION COUNT
53	040702	012737	177777	002454		MOV	#-1,EXPTED	;SET UP FOR THE EXPECTED RESULTS
54	040710				2\$:			

55	040710	104404			TRAP	C\$BSEG	
56	040712	005037	002432		CLR	CSTORE	;CLEAR THE BITS RECEIVED COUNTER
57	040716	005037	002452		CLR	RCVED	;CLEAR THE RECEIVER OF THE DATA
58	040722	005037	002416		CLR	DESCYL	;START AT CYLINDER 0
59	040726	012737	000377	002414	MOV	#377,DESTRK	;AND TRACK 0
60	040734	012701	000006		MOV	#6,R1	;GET AN ITERATION COUNT
61	040740	012702	002652		MOV	#PSTACK,R2	;GET THE BUFFER ADDRESS
62	040744	005022		3\$:	CLR	(R2)+	;INITIALIZE THE BUFFER
63	040746	005301			DEC	R1	;ONE LESS ITERATION TO-GO
64	040750	003375			BGT	3\$	;IF NOT ZERO, KEEP GOING
65	040752	052777	100000	141564	4\$:	BIS	#CMOD,ARPOF
66	040760	012737	000075	002420	MOV	#RTD,FUNCTN	;SET COMMAND MODIFIER
67	040766	012737	002652	002366	MOV	#PSTACK,TABADD	;SET COMMAND = READ TRACK DESCRIPTOR
68	040774	012737	000006	002412	MOV	#6,NEGWRD	;LOAD BUFFER LINK
69	041002	004737	015146		JSR	PC,DRIVER	;SET WORD COUNT
70	041006	005237	002432		INC	CSTORE	;DO THE OPERATION NOW!
71	041012	032777	040000	141504	BIT	#ERR,ARPDS	;SHOW THIS ITERATION IN THE COUNTER
72	041020	001004			BNE	5\$	;DID WE GET AN ERROR?
73	041022	032777	040000	141462	BIT	#TRE,ARPCS1	;IF SET, YES
74	041030	001403			BEQ	6\$	;DID WE GET A TRANSFER ERROR?
75	041032	004737	016662		5\$:	JSR	PC,SEIZE
76	041036	000414			BR	8\$	;NO, THE TRANSFER WAS OK!
77	041040	012701	000006		6\$:	MOV	#6,R1
78	041044	012702	002652		MOV	#PSTACK,R2	;GET THE ITERATION COUNT
79	041050	052237	002452		7\$:	BIS	(R2)+,RCVED
80	041054	005301			DEC	R1	;AND THE BUFFER ADDRESS
81	041056	003374			BGT	7\$	;LOG THE BIT(S) TRANSITION(S)
82	041060	023737	002452	002454	CMP	RCVED,EXPTD	;REDUCE THE ITERATION COUNT
83	041066	001426			BEQ	10\$	;IF > 0, KEEP GOING!
84	041070	023727	002432	047200	8\$:	CMP	CSTORE,#<628.*32>
85	041076	103003			BHIS	9\$	;ALL BITS TOGGLE?
86	041100	004737	017266		JSR	PC,SPRAL	;IF SAME, YES
87	041104	000722			BR	4\$	;DONE ALL CYLINDERS?
88	041106	013737	002534	002456	9\$:	MOV	RPDB,TESTRG
89	041114	012737	013000	002404	MOV	#BIT9!BIT10!BIT12,ERRWD1	;YES, THERE IS AN ERROR
90	041122	012737	000406	002406	MOV	#BIT1!BIT2!BIT8,ERRWD2	;UPDATE THE DRIVER
91	041130	104456			TRAP	C\$ERHRD	;AND GO-ON!
92	041132	001440			.WORD	800	;LOAD FAILING 'REGISTER'
93	041134	013362			.WORD	EM31	;CREATE MODULE CALL-OUT
94	041136	014172			.WORD	ERRO	;BOTH WORDS
95	041140	005037	002402		CLR	ITCOUN	;NO FURTHER ITERATIONS NECESSARY
96	041144				10\$:		
97	041144				10000\$:		
98	041144	104405			TRAP	C\$ESEG	
99	041146	005337	002402		DEC	ITCOUN	;ONE LESS ITERATION TO GO
100	041152	003256			BGT	2\$	;DO UNTIL = 0
101	041154				L10106:		
102	041154	104401			TRAP	C\$ETST	

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1      .SBTTL TEST 57: DATA TEST #2
2
3      :% TEST DATA TEST #2 TEST INVALID ADDRESS ERROR, RECALIBRATE & SEEK COMMANDS
4      :% : SET RPDC = FE CYLINDER ADDRESS
5      :% : SET RPDA = 0
6      :% : SET RPOF: CMD
7      :% : CLEAR RMPM1: DMD
8      :% : ISSUE SEEK COMMAND
9      :% : IF RPER1: IAE <> 1
10     :% : THEN
11     :% : : OUTPUT ERROR MESSAGE (FAILED TO DETECT AN INVALID ADDRESS ERROR)
12     :% : : OUTPUT FAULT LIST: J09, J10, J08, J07, J12, RHXX, CABLES, TERMINATOR
13     :% : : ELSE
14     :% : : SET RPCS2: CLR = 1
15     :% : : ISSUE RECALIBRATE COMMAND
16     :% : : IF ((RPCS1: TRE) OR (RPDS: ERR)) = 1
17     :% : : THEN
18     :% : : : OUTPUT ERROR MESSAGE (DETECTED ERRORS AFTER ISSUING A RECALIBRATE COMMAND)
19     :% : : : OUTPUT FAULT LIST: J09, J10, J12, CABLES, RHXX, TERMINATOR
20     :% : : : ENDF
21     :% : : SET RPOF: CMD = 1
22     :% : : SET RMPM1: DMD = 1
23     :% : : SET RPDC = FE CYLINDER
24     :% : : ISSUE A SEEK COMMAND
25     :% : : IF RPDC <> RPCC AND ((RPDS: ERR <> 1) OR (RPCS1: TRE <> 1))
26     :% : : THEN
27     :% : : : OUTPUT ERROR MESSAGE (DIDN'T ACCESS FE CYLINDER PROPERLY, DIDN'T DETECT AN
28     :% : : : OUTPUT FAULT LIST: J09, J10, RHXX, CABLES, J12, TERMINATOR
29     :% : : : ELSE
30     :% : : : IF RPDC <> RPCC AND ((RPDS: ERR = 1) OR (RPCS1: TRE = 1))
31     :% : : : THEN
32     :% : : : : OUTPUT ERROR MESSAGE (DIDN'T ACCESS FE CYLINDER PROPERLY, DID DETECT FRR
33     :% : : : : OUTPUT FAULT LIST: J09, J10, J08, J07, RHXX, CABLES, J12
34     :% : : : : ENDF
35     :% : : : ENDF
36     :% : : ENDF
37     :% : ENDF
38     :% : ENDF
39
40 041156 013737 002376 002416 157:: MOV LASCYL,DESCYL ;FORM THE CE CYLINDER ADDRESS
41 041164 005237 002416 INC DESCYL ;IT IS ONE MORE THAN THE END CYLINDER
42 041170 005037 002414 CLR DESTRK ;START AT TRACK #0
43 041174 004737 016662 JSR PC,SEIZE ;GET THE DRIVE UNDER TEST
44 041200 032777 010000 141316 BIT #MOL,@RPDS ;IS THE DRIVE ON LINE??
45 041206 001016 BNE 1$ ;IF 1, IT IS
46 041210 004737 017326 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
47 041214 013746 002114 MOV L$TEST,-(SP)
48 041220 012746 006452 MOV #MSGMOL,-(SP)
49 041224 012746 000002 MOV #2,-(SP)
50 041230 010600 MOV SP,R0
51 041232 104417 TRAP C$PNTF
52 041234 062706 000006 ADD #6,SP
53 041240 104432 TRAP C$EXIT
54 041242 000432 .WORD L10107-.
55
56 041244 104404 1$: TRAP C$BSEG
57 041246 052777 100000 141270 BIS #CMOD,@RPOF ;SET COMMAND MODIFIER

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54	041254	042777	100000	141254	BIC	#DMD,@RPMR1	;AND FAIL TO SET DIAGNOSTIC MODE (FORCE ERRORS!!)
55	041262	012737	002652	002366	MOV	#PSTACK,TABADD	;DO THE LINK TRANSFER ADDRESS
56	041270	012737	000006	002412	MOV	#6,NEGWRD	;AND SET UP A WORD COUNT
57	041276	012737	000005	002420	MOV	#SEEK,FUNCTN	;LOAD A SEEK COMMAND
58	041304	004737	015146		JSR	PC,DRIVER	;NOW ISSUE THE COMMAND
59	041310	004737	017000		JSR	PC,WAIT	;WAIT FOR THINGS TO SETTLE DOWN
60	041314	022777	002000	141204	CMP	#IAE,@RPER1	;DID WE GET AN INVALID ADDRESS ERROR? (ONLY??)
61	041322	001423			BEQ	2\$	;IF = YES WE DID!
62	041324	012737	002000	002454	MOV	#IAE,EXPTED	;FORM THE EXPECTED DATA
63	041332	017737	141170	002452	MOV	@RPER1,RCVED	;FORM THE RECEIVED DATA
64	041340	013737	002526	002456	MOV	RPER1,TESTRG	;THIS REGISTER FAILED THE TEST
65	041346	012737	005700	002404	MOV	#BIT6!BIT7!BIT8!BIT9!BIT11,ERRWD1	;LIST THE MODULE CALLOUT
66	041354	012737	000406	002406	MOV	#BIT1!BIT2!BIT8,ERRWD2	;FOR BOTH MASKS
67	041362	104456			TRAP	C\$ERHRD	
	041364	001441			.WORD	801	
	041366	012454			.WORD	EM14	
	041370	014172			.WORD	ERRO	
68	041372						
	041372						
	041372	104405			TRAP	C\$ESEG	
69	041374	104404			TRAP	C\$BSEG	
70	041376	004737	016662		JSR	PC,SEIZE	;PURGE ERRORS, AND RELOAD THE DRIVE NUMBER
71	041402	012737	000007	002420	MOV	#RECAL,FUNCTN	;NOW SET A RECALIBRATE COMMAND IN THE QUEUE
72	041410	004737	015146		JSR	PC,DRIVER	;EXECUTE THE COMMAND NOW!
73	041414	004737	017000		JSR	PC,WAIT	;WAIT FOR SOME SETTLE TIME
74	041420	032777	040000	141064	BIT	#TRE,@RPCS1	;TRANSFER ERROR??
75	041426	001405			BEQ	3\$	;NOPE, NOT IF ZERO
76	041430	004737	017422		JSR	PC,BICEXP	;LOAD THIS FAILURE STATUS
77	041434	002512			RPCS1		;THIS REGISTER
78	041436	040000			TRE		;THIS BIT SET AND SHOULDN'T HAVE
79	041440	000410			BR	4\$	;NOW REPORT THE FIND
80	041442	032777	040000	141054	3\$: BIT	#ERR,@RPDS	;DID WE GET AN ERROR SUMMATION BIT??
81	041450	001420			BEQ	5\$	;NOT IF ZERO
82	041452	004737	017422		JSR	PC,BICEXP	;FORM THIS ERROR!!
83	041456	002524			RPDS		;THIS REGISTER FAILED
84	041460	040000			ERR		;THIS BIT SET AND SHOULDN'T HAVE
85	041462	012737	005400	002404	4\$: MOV	#BIT8!BIT9!BIT11,ERRWD1	;FORM THE MODULE CALLOUT
86	041470	012737	000406	002406	MOV	#BIT1!BIT2!BIT8,ERRWD2	;FOR BOTH MASKS
87	041476	104456			TRAP	C\$ERHRD	
	041500	001442			.WORD	802	
	041502	013051			.WORD	EM23	
	041504	014172			.WORD	ERRO	
88	041506	004737	016662		JSR	PC,SEIZE	;RESET THE ERROR CONDITION
89	041512						
	041512						
	041512	104405			TRAP	C\$ESEG	
90	041514	104404			TRAP	C\$BSEG	
91	041516	052777	100000	141012	BIS	#DMD,@RPMR1	;AND NOW SET DIAGNOSTIC MODE
92	041524	012737	000005	002420	MOV	#SEEK,FUNCTN	;LOAD A SEEK COMMAND
93	041532	004737	015146		JSR	PC,DRIVER	;DO THE SEEK NOW!
94	041536	004737	017000		JSR	PC,WAIT	;SETTLE TIME.....
95	041542	027777	141000	141000	CMP	@RPDC,@RPCC	;DID WE GET ON-CYLINDER??
96	041550	001446			BEQ	7\$	;YES, TEST PASSES
97	041552	017737	140770	002454	MOV	@RPDC,EXPTED	;LOAD THE ERROR STATUS
98	041560	017737	140764	002452	MOV	@RPCC,RCVED	;EXPECTED VS RECEIVED
99	041566	013737	002550	002456	MOV	RPCC,TESTRG	;AND THE 'FAILED' REGISTER
100	041574	032777	040000	140722	BIT	#ERR,@RPDS	;LOOK FOR ERROR BITS

101	041602	00 017			BNE	6\$		;WE DIDN'T GET ON-CYLINDER, BUT WE DETECTED AN ERROR
102	041604	03.777	040000	140700	BIT	#TRE, @RPCS1		;DID WE DETECT A TRANSFER ERROR?
103	041612	001013			BNE	6\$		;IF = 1, YES
104	041614	012737	005400	002404	MOV	#BIT8!BIT9!BIT11,ERRWD1		;LOAD THE MODULE CALLOUT
105	041622	012737	000406	002406	MOV	#BIT1!BIT2!BIT8,ERRWD2		;FOR BOTH MASKS
106	041630	104456			TRAP	C\$ERHRD		
	041632	001443			.WORD	803		
	041634	012725			.WORD	EM21		
	041636	014172			.WORD	ERR0		
107	041640	000412			BR	7\$		;NOW CHECK FOR LOOP...
108	041642	012737	005700	002404	MOV	#BIT6!BIT7!BIT8!BIT9!BIT11,ERRWD1		;LOAD ALL THESE BITS FOR MODULE CALLOUT
109	041650	012737	000006	002406	MOV	#BIT1!BIT2,ERRWD2		;THESE BITS ALSO!!
110	041656	104456			TRAP	C\$ERHRD		
	041660	001444			.WORD	804		
	041662	012454			.WORD	EM14		
	041664	014172			.WORD	ERR0		
111	041666	004737	016662		JSR	PC,SEIZE		;END WITHOUT ERRORS
112	041672							
	041672	104405			TRAP	C\$ESEG		
113	041674							
	041674	104401			TRAP	C\$ETST		

```

1      .SBTTL TEST 58: DATA TEST #3
2
3      :% TEST DATA TEST #3 READ TD'S, FORMAT, FORMAT VERIFY A SELECTED TRACK ON FE CYLINDER
4      :% THEN PERFORM DATA TESTING ON THAT TRACK
5      :% : VAR DO-REPEAT: BOOLEAN
6      :% : VAR RETRY-COUNTER: INTEGER
7      :% : SET RPDC = FE CYLINDER ADDRESS
8      :% : SET DO-REPEAT = TRUE
9      :% : SET RPDA = 255(.)
10     :% : ISSUE A SEEK COMMAND
11     :% : IF ((RPER2: ERR) OR (RPCS1: TRE)) = 1
12     :% : THEN
13     :% : : OUTPUT ERROR MESSAGE (DIDN'T EXECUTE SEEK PROPERLY)
14     :% : : OUTPUT FAULT LIST: J09, J10, J08, J07, CABLES, RHXX, TERMINATOR
15     :% : ENDIF
16     :% : REPEAT
17     :% : : SET RPOF: : CMD = 1
18     :% : : ISSUE A READ TRACK DESCRIPTOR COMMAND
19     :% : : IF TD WORD #3 <> 1 100 000 000 000 000 OR (RPCS2: ERR OR RPCS1: TRE = 1)
20     :% : : THEN
21     :% : : : IF RPDA (HIGH BYTE) < LAST TRACK ADDRESS
22     :% : : : : THEN
23     :% : : : : INCREMENT RPDA (HIGH BYTE ONLY)
24     :% : : : : SET RPCS2: CLR = 1
25     :% : : : : RELOAD THE DRIVE NUMBER FOR THE DRIVE-UNDER-TEST
26     :% : : : : ELSE
27     :% : : : : OUTPUT MESSAGE (INCORRECTLY FORMATTING TRACK #0, REFORMAT USING
28     :% : : : : FORMATTER UPON COMPLETION OF THIS DIAGNOSTIC)
29     :% : : : : SET DO-REPEAT = FALSE
30     :% : : : : ENDIF
31     :% : : : : ELSE
32     :% : : : : : SAVE TRACK NUMBER FOR FOUND NULLSET TD
33     :% : : : : : FORMAT TRACK FOUND WITH NULLSET TD INFORMATION
34     :% : : : : : IF ((RPDS: : ERR) OR (RPCS1: : TRE) = 1)
35     :% : : : : : THEN
36     :% : : : : : : OUTPUT ERROR MESSAGE (FAILED DURING A FORMAT TRACK OPERATION)
37     :% : : : : : : OUTPUT FAULT LIST: J09, J10, J11 / J13, J14, RHXX, CABLES, TERMINATOR
38     :% : : : : : : ENDIF
39     :% : : : : : : SET DO-REPEAT = FALSE
40     :% : : : : : : ENDIF
41     :% : : : : : : UNTIL NOT DO-REPEAT
42     :% : : : : : : ENDREPEAT
43     :% : : : : : : ISSUE A WRITE-CHECK HEADER COMMAND (WITH RPOF: CMD = 1)
44     :% : : : : : : IF ((RPDS: ERR) OR (RPCS1: TRE) = 1)
45     :% : : : : : : THEN
46     :% : : : : : : : OUTPUT ERROR MESSAGE (FAILED OPERATION: WRITE-CHECK HEADERS, RPOF: CMD = 1)
47     :% : : : : : : : OUTPUT FAULT LIST: J09, J10, J11 / J13, J14, RHXX, CABLES, TERMINATOR
48     :% : : : : : : : ENDIF
49     :% : : : : : : A:
50     :% : : : : : : WRITE A SECTOR USING DATA PATTERNS 1 TO 8, ONE AT A TIME
51     :% : : : : : : IF ((RPDS: ERR) OR (RPCS1: TRE) = 1)
52     :% : : : : : : : THEN
53     :% : : : : : : : INCREMENT RETRY-COUNTER
54     :% : : : : : : : IF RETRY COUNTER < 3
55     :% : : : : : : : : THEN
56     :% : : : : : : : : : GOTO A
57     :% : : : : : : : : : ELSE

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T58::

158.1:

106	042030	104402		TRAP	C\$BSUB	
107	042032	104404		TRAP	C\$BSEG	
108	042034	012737	000005 002420	MOV	#SEEK,FUNCTN	:LOAD UP A SEEK COMMAND
109	042042	012777	100000 140466	MOV	#DMD,@RPMR1	:SET FOR DIAGNOSTIC MODE
110	042050	004737	015146	JSR	PC,DRIVER	:ISSUE THE COMMAND
111	042054	004737	017000	JSR	PC,WAIT	:STALL FOR SOME SETTLE TIME
112	042060	012777	000377 140442	MOV	#377,@RPAS	:CLEAR OUT THE RESULTING ATTENTION BIT
113	042066	004737	017032	JSR	PC,ERRCK	:LOOK FOR ERRORS
114	042072	005737	002466	TST	ERSTAT	:IF ERRORS, THIS = -1
115	042076	001414		BEQ	3\$	:IF 0, NO
116	042100	012737	001700 002404	MOV	#BIT6!BIT7!BIT8!BIT9,ERRWD1	:FORM THE MODULE CALLOUT
117	042106	012737	000406 002406	MOV	#BIT1!BIT2!BIT8,ERRWD2	:FOR BOTH WORDS
118	042114	104456		TRAP	C\$ERHRD	
119	042116	001445		.WORD	805	
	042120	013411		.WORD	EM32	
	042122	014172		.WORD	ERRO	
118	042124	004737	015400	JSR	PC,DRVCLR	:RESET ERRORS
120	042130					
121	042132	104405		TRAP	C\$ESEG	
122	042134	104404		TRAP	C\$BSEG	
123	042140	012702	002652	MOV	#PSTACK,R2	:INITIALIZE A BUFFER
124	042144	012701	000006	MOV	#6,R1	:GET THE BUFFER SIZE
125	042146	005022		CLR	(R2)+	:BUFFER=0
126	042150	005301		DEC	R1	:ONE LESS WORD TO GO
127	042152	003375		BGT	5\$	:DO UNTIL = 0
128	042154	012737	000075 002420	MOV	#RTD,FUNCTN	:SET UP FOR A READ TRACK DESCRIPTOR OP
129	042160	052737	000377 002414	BIS	#377,DESTRK	:SECTOR ADDRESS=-1
130	042166	052777	100000 140350	BIS	#CMOD,@RPOF	:SET THE COMMAND MODIFIER FOR A READ TD OPERATION
131	042174	012737	000006 002412	MOV	#6,NEGWRD	:SET UP FOR A 6 WORD TRANSFER
132	042202	012737	002652 002366	MOV	#PSTACK,TABADD	:LOAD THE LINK ADDRESS
133	042210	004737	015146	JSR	PC,DRIVER	:ISSUE THE COMMAND
134	042214	023727	002656 140000	CMP	PSTACK+4,#140000	:IS TRACK DESCRIPTOR NULL?
135	042222	001431		BEQ	6\$	:IF EQUAL, YES!
136	042224	004737	015400	JSR	PC,DRVCLR	:RESET ANY ERROR!
137	042230	004737	017266	JSR	PC,SPIRAL	:GO TO NEXT TRACK
138	042234	105737	002415	TSTB	DESTRK+1	:DID WE TRY ALL TRACKS?
139	042240	001335		BNE	4\$	:IF NOT 0, NO TRY AGAIN
140	042242	012746	007062	MOV	#MSG15,-(SP)	
141	042246	012746	000001	MOV	#1,-(SP)	
142	042252	010600		MOV	SP,R0	
143	042254	104417		TRAP	C\$PNTF	
144	042256	062706	000004	ADD	#4,SP	
145	042262	012746	006763	MOV	#MSG12,-(SP)	
146	042266	012746	000001	MOV	#1,-(SP)	
147	042272	010600		MOV	SP,R0	
148	042274	104417		TRAP	C\$PNTF	
149	042276	062706	000004	ADD	#4,SP	
150	042302	004737	015400	JSR	PC,DRVCLR	:CLEAR OUT ANY ERRORS NOW!!
151	042306	013746	002416	MOV	DESCYL,-(SP)	:GET THE DESIRED CYLINDER ADDRESS
152	042312	052716	030000	BIS	#BIT13!BIT12,(SP)	:AND MASK IT TO REPRESENT A TD
153	042316	032737	040000 002652	BIT	#BIT14,PSTACK	:WAS THE TD MOVED?
154	042324	001402		BEQ	7\$	:IF ZERO, NO
155	042326	052716	040000	BIS	#BIT14,(SP)	:SET THE CORRECT BIT
156	042332	005737	002652	TST	PSTACK	:BIT 15 SET? (HEADER 0 MOVED)
157	042336	100002		BPL	8\$	:IF ZERO, NO
158	042340	052716	100000	BIS	#BIT15,(SP)	:SET THE SAME BIT IN THE MASK

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149 042344 022637 002652      8$:  CMP      (SP)+,PSTACK      ;MATCH?
150 042350 001423              BEQ      9$              ;IF EQUAL, YES
151 042352 012737 033400 002404  MOV      #BIT8!BIT9!BIT10!BIT12!BIT13,ERRWD1;SET UP THE MODULE CALLOUT
152 042360 012737 000406 002406  MOV      #BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
153 042366 013737 002652 002452  MOV      PSTACK,RCVED      ;FORM THE DATA FOR THE ERROR REPORT
154 042374 016637 177776 002454  MOV      -2(SP),EXPTED      ;AND THE EXPECTED DATA
155 042402 012737 011531 002470  MOV      #READTD,FATOF      ;LOAD THE FAILING FUNCTON
156 042410 104456              TRAP      C$ERHRD
      042412 001446              .WORD    806
      042414 013701              .WORD    EM37
      042416 014500              .WORD    ERR2
157 042420 012701 002730      9$:  MOV      #IOBUFF,R1      ;GET THE OUTPUT BUFFER ADDRESS
158 042424 042737 000377 002414  BIC      #377,DESTRK      ;SECTOR ADDRESS = 0!
159 042432 013702 002414      MOV      DESTRK,R2      ;LOAD THE BUFFER TRACK ADDRESS
160 042436 105002              CLRB      R2              ;FOR AN INTERLEAVED FORMAT
161 042440 010203              MOV      R2,R3          ;THIS IS THE HIGH OR 'ODD' SECTOR
162 042442 152703 000031      BISB     #25.,R3          ;IT STARTS AT SECTOR ADDRESS 25
163 042446 005004              CLR      R4              ;INITIALIZE THIS, IT'S A TOGGLE REGISTER
164 042450 012705 000062      MOV      #50.,R5          ;# OF SECTORS/TRACK
165 042454 013711 002416      10$:  MOV      DESCYL,(R1)      ;CYLINDER ADDRESS
166 042460 052721 150000      BIS      #150000,(R1)+    ;MARK SECTOR GOOD, IN 16 BIT MODE
167 042464 005704              TST      R4              ;DO THIS TO GET NEXT SECTOR
168 042466 100410              BMI      11$          ;IT'S -1, LOAD HIGH OR 'ODD' SECTOR
169 042470 010221              MOV      R2,(R1)+      ;LOAD LOW SECTOR
170 042472 005202              INC      R2              ;UPDATE THE SECTOR COUNT
171 042474 032777 000004 140022  BIT      #ILEV,ARPDS      ;DRIVE INTERLEAVED ENABLED?
172 042502 001405              BEQ      12$          ;IF ZERO, NO!
173 042504 005104              COM      R4              ;AND TOGGLE
174 042506 000403              BR      12$          ;MOVE ON...
175 042510 010321      11$:  MOV      R3,(R1)+      ;LOAD HIGH SECTOR
176 042512 005203              INC      R3              ;UPDATE SECTOR COUNT
177 042514 005004              CLR      R4              ;TOGGLE
178 042516 012721 140000      12$:  MOV      #140000,(R1)+    ;LOAD THE NULL-CASE
179 042522 012721 140000      MOV      #140000,(R1)+    ;FOR ALL FOUR WORDS
180 042526 012721 140000      MOV      #140000,(R1)+    ;THIRD WORD
181 042532 012721 140000      MOV      #140000,(R1)+    ;FOURTH WORD
182 042536 005305              DEC      R5              ;ONE LESS SECTOR TO DO
183 042540 003345              BGT      10$          ;BUT GO ON UNTIL 0
184 042542 012737 002730 002366  MOV      #IOBUFF,TABADD    ;RELOAD THE LINK ADDRESS
185 042550 012737 000063 002420  MOV      #FORTRK,FUNCTN    ;LOAD UP FOR A FORMAT TRACK OPERATION
186 042556 012737 000454 002412  MOV      #<50.*6>,NEGWRD    ;AND THE WORD COUNT (314<8> EFF1)
187 042564 052777 100000 137752  BIS      #CMOD,ARPOF      ;COMMAND MODIFIER=1
188 042572 004737 015146      JSR      PC,DRIVER        ;NOW DO THE TRANSFER
189 042576 004737 017032      JSR      PC,ERRCK        ;LOOK FOR ERRORS
190 042602 005737 002466      TST      ERSTAT          ;IF ERRORS, THIS = -1
191 042606 001414              BEQ      13$          ;LOOKS OK IF 0!!
192 042610 012737 033400 002404  MOV      #BIT8!BIT9!BIT10!BIT12!BIT13,ERRWD1 ;LOAD THE MODULE CALLOUT LIST
193 042616 012737 000406 002406  MOV      #BIT1!BIT2!BIT8,ERRWD2 ;FOR BOTH MASK WORDS
194 042624 104456              TRAP      C$ERHRD
      042626 001447              .WORD    807
      042630 014026              .WORD    EM41
      042632 014172              .WORD    ERRO
195 042634 004737 015400      13$:  JSR      PC,DRVCLR      ;RELOAD AND RESET ERRORS!
196 042640      10001$:  TRAP      C$ESEG
      042640 104405              TRAP      C$BSEG
197 042642 104404

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198 042644 012737 000053 002420      MOV      #WCKHD,FUNCTN ;LOAD UP A WRITE-CHECK HEADERS COMMAND
199 042652 012702 002732              MOV      #IOBUFF+2,R2 ;SET-UP TO REARRANGE THE BUFFER
200 042656 012703 000062              MOV      #50.,R3 ;THIS IS THE ITERATION COUNT
201 042662 005004              CLR      R4 ;THIS IS THE SECTOR ADDRESS
202 042664 110412              14$: MOV      R4,(R2) ;RELOAD THE SECTOR ADDRESS
203 042666 005204              INC      R4 ;NEXT SECTOR ADDRESS
204 042670 062702 000014              ADD      #14,R2 ;SKIP DATA IN CURRENT SECTOR MAP
205 042674 005303              DEC      R3 ;ONE LESS ITERATION TO GO
206 042676 003372              BGT      14$ ;IF > 0, GO-ON
207 042700 052777 100000 137636      BIS      #CMOD,@RPOF ;COMMAND MODIFIER=1
208 042706 012737 002730 002366      MOV      #IOBUFF,TABADD ;LOAD THE LINK ADDRESS
209 042714 012737 000454 002412      MOV      #<50.*6>,NEGWRD ;AND THE WORD COUNT (314<8> EFF1)
210 042722 004737 015146              JSR      PC,DRIVER ;NOW DO THE TRANSFER
211 042726 012737 011543 002470      MOV      #WCKHD,FATOF ;LOAD THE FAILING FUNCTION
212 042734 012737 033400 002404      MOV      #BIT8!BIT9!BIT10!BIT12!BIT13,ERRWD1 ;CREATE MODULE CALLOUT
213 042742 012737 000406 002406      MOV      #BIT1!BIT2!BIT8,ERRWD2 ;LIST FOR BOTH MASKS
214 042750 032777 040000 137534      BIT      #TRE,@RPCS1 ;DID WE GET A TRANSFER ERROR?
215 042756 001407              BEQ      1-$ ;IF ZERO, NO!
216 042760 004737 017150              JSR      PC,LOCATE ;FIND THE DATA FOR THE REPORT
217 042764 104456              TRAP      C$ERHRD
      042766 001450              .WORD      808
      042770 013441              .WORD      EM33
      042772 014500              .WORD      ERR2
218 042774 000411              BR      16$ ;SKIP THE NEXT DISPATCH
219 042776 004737 017032              15$: JSR      PC,ERRCK ;ANY ERRORS?
220 043002 005737 002466              TST      ERSTAT ;IF ZERO, NO
221 043006 001406              BEQ      17$ ;TAKE BRANCH IF NO ERRORS
222 043010 104456              TRAP      C$ERHRD
      043012 001451              .WORD      809
      043014 012454              .WORD      EM14
      043016 014172              .WORD      ERRO
223 043020 004737 015400              16$: JSR      PC,DRVCLR ;RESET ALL ERRORS
224 043024              17$:
225 043024              10002$:
      043024 104405              TRAP      C$ESEG
226 043026              L10111: TRAP      C$ESUB
      043026 104403
227 043030              T58.2: TRAP      C$BSUB
      043030 104402              CLRB      DESTRK ;SECTOR ADDRESS=0
228 043032 105037 002414              MOV      #BIT8!BIT9!BIT10!BIT12!BIT13,ERRWD1 ;SET UP THE MODULE CALLOUT
229 043036 012737 033400 002404      MOV      #BIT1!BIT2!BIT8,ERRWD2 ;FOR BOTH MASKS
230 043044 012737 000406 002406      MOV      #4,TEMP ;ALLOW FOR FOUR DATA ERRORS BEFORE REPORTING THE ERROR!
231 043052 012737 000404 002436      MOV      #PATT1,R3 ;GET THE TEST PATTERN
232 043060 012703 002344              1$: MOV      #IOBUFF,R1 ;CREATE THE OUTPUT BUFFER
233 043064 012701 002730              MOV      #256.,R2 ;GET THE BUFFER SIZE
234 043070 012702 000400              2$: MOV      (R3),(R1)+ ;START LOADING THE BUFFER
235 043074 011321              DEC      R2 ;ONE LESS WORD TO LOAD
236 043076 005302              BGT      2$ ;IF > 0, GO-ON
237 043100 003375              TRAP      C$BSEG
238 043102 104404              3$: MOV      #IOBUFF,TABADD ;LOAD THE LINK AGAIN
239 043104 012737 002730 002366      MOV      #WRDTA,FUNCTN ;SETUP FOR A WRITE DATA COMMAND
240 043112 012737 000061 002420      MOV      #256.,NEGWRD ;WRITE ONE SECTOR
241 043120 012737 000400 002412      JSR      PC,DRIVER ;NOW DO IT!
242 043126 004737 015146              JSR      PC,ERRCK ;LOOK FOR ERRORS
243 043132 004737 017032              TST      ERSTAT ;IF ERRORS, THIS = -1
244 043136 005737 002466              BEQ      4$ ;SKIP ERROR DISPATCH IF 0
245 043142 001424

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246	043144	005737	002436	TST	TEMP	;DID WE DO FOUR ITERATIONS?
247	043150	003021		BGT	4\$	;IF NOT 0, NO!!
248	043152	104456		TRAP	C\$ERHRD	
	043154	001452		.WORD	810	
	043156	013753		.WORD	EM40	
	043160	014172		.WORD	ERRO	
249	043162	012746	007315	MOV	#FRMT02,-(SP)	
	043166	012746	000001	MOV	#1,-(SP)	
	043172	010600		MOV	SP,R0	
	043174	104414		TRAP	C\$PNTB	
	043176	062706	000004	ADD	#4,SP	
250	043202	012737	177777	MOV	#-1,FASTAT	;MARK THIS SECTOR AS FAILED
251	043210	004737	015400	JSR	PC,DRVCLR	;GET RID OF ANY ERRORS
252	043214	012702	003030	MOV	#IOBUFF+64.,R2	;GET ONE BUFFER LOCATION
253	043220	005112		COM	(R2)	;AND LOUSE IT UP!
254	043222	012737	000051	MOV	#WCKD,FUNCTN	;LOAD THE WRITE CHECK FUNCTION
255	043230	012737	002730	MOV	#IOBUFF,TABADD	;LOAD THE LINK ADDRESS
256	043236	012737	000400	MOV	#256.,NEGWRD	;AND THE WORD COUNT
257	043244	004737	015146	JSR	PC,DRIVER	;NOW DO THE COMMAND EXECUTION
258	043250	004737	017000	JSR	PC,WAIT	;WAIT FOR A SETTLE TIME
259	043254	032777	040000	BIT	#WCE,@RPCS2	;DID WE GET A WRITE CHECK ERROR?
260	043262	001014		BNE	5\$	;IF = 1, YES!
261	043264	004737	017372	JSR	PC,BISEXP	;FORM THE FAILING DATA
262	043270	002522		RPCS2		;THIS REGISTER FAILED
263	043272	040000		WCE		;THIS BIT FAILED TO SET
264	043274	104456		TRAP	C\$ERHRD	
	043276	001453		.WORD	811	
	043300	012776		.WORD	EM22	
	043302	014172		.WORD	ERRO	
265	043304	012737	177777	MOV	#-1,FASTAT	;MARK THIS FAILURE
266	043312	000424		BR	7\$	;NOW GO-ON
267	043314	017746	137214	MOV	@RPDB,-(SP)	;GET THE ACTUAL DATA
268	043320	005112		COM	(R2)	;INVERT THE EXPECTED DATA
269	043322	022612		CMP	(SP)+,(R2)	;MATCH?
270	043324	001417		BEQ	7\$	;LOOKS OK, GO-ON
271	043326	016637	177776	MOV	-2(SP),RCVED	;AND LOG THE RESULTS FOR ERROR REPORTING
272	043334	011237	002454	MOV	(R2),EXPTED	;NOW GET THE EXPECTED DATA
273	043340	005737	002436	TST	TEMP	;WHICH ITERATION?
274	043344	003007		BGT	7\$	;IF > 0, NOT THE LAST
275	043346	012737	011566	MOV	#WTCKD,FATOF	;LOAD THE FUNCTION AT TIME OF FAILURE
276	043354	104456		TRAP	C\$ERHRD	
	043356	001454		.WORD	812	
	043360	013505		.WORD	EM34	
	043362	014500		.WORD	ERR2	
277	043364	017746	137122	MOV	@RPCS1,-(SP)	;SAVE RPCS1 ON S CK
278	043370	042716	037777	BIC	#^C<SC!TRE>,(SP)	;GET RID OF THE UNNECESSARY BITS
279	043374	022726	140000	CMP	#SC!TRE,(SP)+	;DID SC AND TRE SET?
280						
281	043400	001410		BEQ	8\$	;IF SET, SKIP ERROR REPORT
282	043402	004737	017372	JSR	PC,BISEXP	;LOAD THE FAILING DATA
283	043406	002512		RPCS1		;THIS REGISTER
284	043410	140000		SC!TRE		;THESE BITS DIDN'T SET
285	043412	104456		TRAP	C\$ERHRD	
	043414	001455		.WORD	813	
	043416	012776		.WORD	EM22	
	043420	014172		.WORD	ERRO	
286	043422	004737	015400	JSR	PC,DRVCLR	;RELOAD AND RESET

287	043426	012737	002730	002366	MOV	#IOBUFF,TABADD	:NOW VERIFY DATA FOR CORRECTNESS
288	043434	012737	000400	002412	MOV	#256.,NEGWRD	:DO 256 WORD (1 SECTOR) TRANSFER
289	043442	012737	000051	002420	MOV	#WCKD,FUNCTN	:SET UP FOR A WRITE CHECK
290	043450	004737	015146		JSR	PC,DRIVER	:DO THE COMMAND NOW!
291	043454	004737	017032		JSR	PC,ERRCK	:ERRORS?
292	043460	005737	002466		TST	ERSTAT	:IF ERRORS, THIS = - 1
293	043464	001452			BEQ	13\$	:SKIP ERROR DISPATCH IF 0
294	043466	005337	002436	9\$:	DEC	TEMP	:ALLOW ONE LESS ERROR!
295	043472	002404			BLT	10\$	:IF < 0, REPORT THE ERROR NOW!!
296	043474	105237	002414		INCB	DESTRK	:GO TO THE NEXT SECTOR
297	043500	000137	043104		JMP	@#3\$	:AND FOR NOW, SKIP THE ERROR DISPATCH!
298	043504	012737	011566	002470	10\$:	MOV	#WTCKD,FATOF
299	043512	005037	002436		CLR	TEMP	:LOAD THE FAILING FUNCTION
300	043516	032777	040000	136766	BIT	#TRE,@RPCS1	:TEMP = 0, FOR A POSSIBLE LOOP
301	043524	001417			BEQ	11\$	:DID WE GET A TRANSFER ERROR?
302	043526	004737	017150		JSR	PC,LOCATE	:IF 0, NO
303	043532	104456			TRAP	C\$ERHRD	:FIND THE ERROR
	043534	001456			.WORD	814	
	043536	013441			.WORD	EM33	
	043540	014500			.WORD	ERR2	
304	043542	012746	007315		MOV	#FRMT02,-(SP)	
	043546	012746	000001		MOV	#1,-(SP)	
	043552	010600			MOV	SP,R0	
	043554	104414			TRAP	C\$PNTB	
	043556	062706	000004		ADD	#4,SP	
305	043562	000411			BR	12\$	:SKIP NEXT REPORT
306	043564	004737	017032	11\$:	JSR	PC,ERRCK	:LOOK FOR ANY ERROR
307	043570	005737	002466		TST	ERSTAT	:IF ONE FOUND, THIS = - 1
308	043574	001406			BEQ	13\$	:NO ERRORS, GO-ON
309	043576	104456			TRAP	C\$ERHRD	
	043600	001457			.WORD	815	
	043602	012454			.WORD	EM14	
	043604	014172			.WORD	ERR0	
310	043606	004737	015400	12\$:	JSR	PC,DRVCLR	:RESET AND RELOAD
311	043612	005737	002430	13\$:	TST	FASTAT	:ANY ERROR?
312	043616	001403			BEQ	14\$	:IF ZERO, NO
313	043620	005037	002430		CLR	FASTAT	:RESET THE FAILED MARKER
314	043624	000720			BR	9\$	:AND GO TO NEXT SECTOR
315	043626			14\$:			
	043626			10000\$:			
	043626	104405			TRAP	C\$ESEG	
316	043630	005723			TST	(R3)+	:POP R3 TO THE NEXT DATA TABLE ENTRY
317	043632	020327	002362		CMP	R3,#PATT8	:DONE YET
318	043636	101002			BHI	15\$	:IF R3 > # PATT8, YES
319	043640	000137	043064		JMP	@#1\$	:DO MORE!!
320	043644			15\$:			
	043644			L10112:			
	043644	104403			TRAP	C\$ESUB	
321	043646	104404			TRAP	C\$BSEG	
322	043650	012737	000021	002420	MOV	#RIP,FUNCTN	:SET UP FOR ANOTHER READ IN PRESET
323	043656	004737	015146		JSR	PC,DRIVER	:ISSUE THE COMMAND
324	043662	012737	000073	002420	MOV	#RDHDTA,FUNCTN	:NOW PREPARE TO READ A HEADER
325	043670	052777	100000	136646	BIS	#CMOD,@RPOF	:ONLY SIX WORDS / TRANSFER
326	043676	012737	000006	002412	MOV	#6,NEGWRD	:LIKE I SAID, SIX WORDS ONLY!
327	043704	012737	002652	002366	MOV	#PSTACK,TABADD	:TRANSFER TO START AT THIS BUFFER ADDRESS
328	043712	004737	015146		JSR	PC,DRIVER	:THIS SHOULD CAUSE A FORMAT ERROR
329	043716	022777	000020	136602	CMP	#FER,@RPER1	:DID IT??

330	043724	001423			BEG	1\$		; IF MATCH, IT DID!
331	043726	012737	000020	002454	MOV	#FER,EXPTD		; FORM THE EXPECTED DATA
332	043734	017737	13,566	002452	MOV	@RPER1,RC/ED		; FORM THE RECEIVED DATA
333	043742	013737	002526	002456	MOV	RPER1,TESTRG		; THIS REGISTER FAILED THE TEST
334	043750	012737	004400	002404	MOV	#BIT8!BIT11,ERRWD1		; LOAD THE MODULE CALLOUT
335	043756	012737	000406	002406	MOV	#BIT11!BIT2!BIT8,ERRWD2		; FOR BOTH MASKS
336	043764	104456			TRAP	C\$ERHRD		
	043766	001460			.WORD	816		
	043770	012454			.WORD	EM14		
	043772	014176			.WORD	ERRO		
337	043774	004737	017722		JSR	PC,PRELCD		; RESET FOR 16 BIT MODE
338	044000							
	044000	104405			TRAP	C\$ESEG		
339	044002							
	044002	104401			TRA	C\$ETST		

1\$:
 10000\$:
 L10110:

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1      .SBTTL  TEST 59 RPER1 NEGATIVE BIT TESTS
2
3      :%      TEST 59 RPER1 NEGATIVE BIT TESTS
4      :%      : SET UP AN ILLEGAL COMMAND (#43 - OCTAL)
5      :%      : ISSUE THE COMMAND
6      :%      : IF RPER1: ILF = 0
7      :%      : THEN
8      :%      : OUTPUT ERROR MESSAGE (FAILED TO DETECT RPER1: ILF)
9      :%      : OUTPUT FAULT LIST: J12
10     :%      : ENDF
11     :%      : ISSUE A DRIVE CLEAR COMMAND
12     :%      : SET UP FOR SECTOR ADDRESS 50(DECIMAL)
13     :%      : SET UP FOR TRACK ADDRESS 31(DECIMAL)
14     :%      : ISSUE SEEK COMMAND
15     :%      : IF RPER1: IAE = 0
16     :%      : THEN
17     :%      : OUTPUT ERROR MESSAGE (FAILED TO DETECT RPER1: IAE)
18     :%      : ENDF
19     :%      : ISSUE A DRIVE CLEAR
20     :%      : DECREMENT THE SECTOR ADDRESS (49 DECIMAL)
21     :%      : INCREMENT THE TRACK ADDRESS (32 DECIMAL)
22     :%      : ISSUE SEEK COMMAND
23     :%      : IF RPER1: IAE = 0
24     :%      : THEN
25     :%      : OUTPUT ERROR MESSAGE (FAILED TO DETECT RPER1: IAE)
26     :%      : OUTPUT FAULT LIST: J7, J8, RHXX, CABLES, TERMINATOR
27     :%      : ENDF
28     :%      : ISSUE DRIVE CLEAR COMMAND
29     :%      : END TEST 59
30
31     T59::
32     044004 104404      TRAP      C$BSEG
33     044006 004737 015400 JSR      PC,DRVCLR      ;START UP WITHOUT ERRORS
34     044012 032777 010000 136504 BIT      #MOL,@RPDS      ;DRIVE ONLINE?
35     044020 001016      BNE      1$      ;IF = 1, YES
36     044022 004737 017326 JSR      PC,SAVRPR      ;GET THE REGISTER SNAPSHOT
37     044026 013746 002114 MOV      L$TEST,-(SP)
38     044032 012746 006452 MOV      #MSGMOL,-(SP)
39     044036 012746 000C02 MOV      #2,-(SP)
40     044042 010600      MOV      SP,R0
41     044044 104417      TRAP      C$PNTF
42     044046 062706 000006 ADD      #6,SP
43     044052 104432      TRAP      C$EXIT
44     044054 000244      .WORD     L10113-
45     044056 012737 000043 002420 1$: MOV      #43,FUNCTN      ;LOAD UP AN ILLEGAL FUNCION
46     044064 013737 002526 002456 MOV      RPER1,TESTRG      ;FORM UP PART OF THE ERROR MESSAGE
47     044072 004737 015146 JSR      PC,DRIVER      ;ISSUE THAT ILLEGAL COMMAND
48     044076 022777 000001 136422 CMP      #ILF,@RPER1      ;DID ILLEGAL FUNCTION ONLY SET?
49     044104 001417      BEQ      2$      ;IF MATCH, YES
50     044106 012737 004000 002404 MOV      #BIT11,ERRWD1      ;LOAD THE MASK
51     044114 005037 002406 CLR      ERRWD2      ;FOR BOTH MASKS
52     044120 012737 000001 002454 MOV      #ILF,EXPTED      ;SET UP THE EXPECTED DATA
53     044126 017737 136374 002452 MOV      @RPER1,RCVED      ;REPORT THE RECEIVED DATA
54     044134 104456      TRAP      C$ERHRD
55     044136 001461      .WORD     817
56     044140 012454      .WORD     EM14
57     044142 014172      .WORD     ERRO

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52	044144			2\$:		
	044144			10000\$:		
	044144	104405			TRAP	C\$ESEG
53	044146	104404			TRAP	C\$BSEG
54	044150	004737	015400		JSR	PC,DRVCLR ;PURGE ANY ERRORS
55	044154	012737	005700 002404		MOV	#BIT6!BIT7!BIT8!BIT9!BIT11,ERRWD1;LOAD THE MODULE CALLOUT
56	044162	012737	000406 002406		MOV	#BIT1!BIT2!BIT8,ERRWD2;FOR BOTH MASKS
57	044170	012737	001165 002416		MOV	#629.,DESCYL ;LAST USER CYLINDER, PLEASE
58	044176	112737	000037 002415		MOVB	#31.,DESTRK+1 ;LAST USER TRACK, PLEASE
59	044204	112737	000C62 002414		MOVB	#50.,DESTRK ;ILLEGAL SECTOR ADDRESS, PLEASE
60	044212	012737	000C05 002420		MOV	#SEEK,FUNCTN ;LOAD UP A SEEK COMMAND
61	044220	004737	015146		JSR	PC,DRIVER ;ISSUE THE COMMAND, BUT EXPECT IT TO FAIL
62	044224	022777	002000 136274		CMP	#IAE,@RPER1 ;DID WE GET THE EXPECTED RESULTS?
63	044232	001413			BEQ	4\$;IF MATCH, YES
64	044234	012737	002000 002454	3\$:	MOV	#IAE,EXPTED ;FORM THE EXPECTED DATA
65	044242	017737	136260 002452		MOV	@RPER1,RCVED ;GET THE ACTUAL DATA
66	044250	104456			TRAP	C\$ERHRD
	044252	001462			.WORD	818
	044254	012454			.WORD	EM14
	044256	014172			.WORD	ERRO
67	044260	000414			BR	5\$;AND GET-OUT!
68	044262	105337	002414	4\$:	DECB	DESTRK ;LAST LEGAL SECTOR ADDRESS, PLEASE
69	044266	105237	002415		INCB	DESTRK+1 ;ILLEGAL TRACK ADDRESS, PLEASE
70	044272	004737	015400		JSR	PC,DRVCLR ;NO ERRORS, YET!!
71	044276	004737	015146		JSR	PC,DRIVER ;NOW ISSUE THE BOGUS SEEK COMMAND
72	044302	022777	002000 136216		CMP	#IAE,@RPER1 ;DID WE GET IAE ONLY??
73	044310	001351			BNE	3\$;TAKE BRANCH IF NOT
74	044312	004737	017722	5\$:	JSR	PC,PRELOD ;RESET FURTHER ERRORS
75	044316			10001\$:		
	044316	104405			TRAP	C\$ESEG
76	044320			L10113:		
	044320	104401			TRAP	C\$ETST

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1      .SBTTL TEST 60 USER SELECTED MICRODIAGNOSTIC ROUTINE
2
3      :% TEST 60 USER SELECTED MICRODIAGNOSTIC ROUTINE
4      :% : IF MANUAL TESTING IS NOT ALLOWED
5      :% : THEN
6      :% : : EXIT TEST
7      :% : ELSE
8      :% : IF USER SELECTED INPUT ALLOWS A HEX DATA SELECTION
9      :% : : THEN
10     :% : : A:
11     :% : : GET A 2 CHARACTER USER INPUT
12     :% : : IF THE USER INPUT IS NOT A VALID HEX CHARACTER
13     :% : : : THEN
14     :% : : : REJECT THE INPUT AND GOTO A
15     :% : : : ENDF
16     :% : : LEFT JUSTIFY THE INPUT DATA AND MAKE IT BYTE ORIENTED
17     :% : : BY PUTTING TWO HEX CHARACTERS IN ONE BYTE
18     :% : : MOVE THE USER DATA INTO R4
19     :% : : TURN ON THE DIAGNOSTIC MONITOR IN THE DRIVE
20     :% : : LOAD THE ROUTINE NUMBER INTO THE DRIVE
21     :% : : WAIT FOR THE COMMAND TO FINISH EXECUTION
22     :% : : IF RPER2 <> 0
23     :% : : : THEN
24     :% : : : REPORT THE ERROR (DRIVE FAILED A MICRODIAGNOSTIC ROUTINE)
25     :% : : : RESET ALL DRIVE AND CONTROLLER ERRORS
26     :% : : : ENDF
27     :% : : ENDF
28     :% END TEST 60
29
30 044322 T60:: TST SELRUN ;ALLOW A USER INPUT?
31 044322 005737 002342 BGT 1$ ;IF >0, YES
32 044326 003002 TRAP C$EXIT
36 044330 104432 .WORD L10114-.
37 044334 005737 002422 1$: TST ROUTDO ;USER PREVIOUSLY SELECTED INPUT??
38 044340 100470 BMI 6$ ;SKIP NEXT DIALOGUE
39 044342 104450 TRAP C$MANI
40 044344 103402 BCS 2$
41 044346 104432 TRAP C$EXIT
42 044350 000242 .WORD L10114-.
43 044352 012746 010271 2$: MOV #FRMT23,-(SP) ;PRINT 'ROUTINE NO. (2 CHAR 'HEX' INPUT)'
44 044356 012746 000001 MOV #1,-(SP)
45 044362 010600 MOV SP,R0
46 044364 104417 TRAP C$PNTF
47 044366 062706 000004 ADD #4,SP
48 044372 104443 TRAP C$GMAN
49 044374 000406 BR 10000$
50 044376 002652 .WORD PSTACK
51 044400 000142 .WORD T$CODE
52 044402 000000 .WORD
53 044404 000001 .WORD 1
54 044406 000002 .WORD T$LOLIM
55 044410 000002 .WORD T$HILIM
56 044412 10000$: MOV #PSTACK,R4 ;GET THE START OF THE STRING
57 044416 012702 000002 MOV #2,R2 ;SET AN ITERATION COUNT

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47	044422	112401		3\$:	MOVB	(R4)+,R1	;GET THE DATA CHARACTER
48	044424	020127	000071		CMP	R1,#71	;AND BEGIN TO SCALE IT
49	044430	101004			BHI	4\$	;TAKE BRANCH IF ALPHA, NOT NUMERIC
50	044432	162701	000060		SUB	#60,R1	;STRIP THE ASCII
51	044436	100745			BMI	2\$	;IF MINUS, THE USER GOOFED!! DO AGAIN!
52	044440	000406			BR	5\$	;OK SO-FAR, KEEP GOING
53	044442	162701	000067	4\$:	SUB	#67,R1	;STRIP THE ASCII
54	044446	100741			BMI	2\$	;IF MINUS, THE USER GOOFED! DO AGAIN!
55	044450	020127	000017		CMP	R1,#17	;LEGAL CHARACTER (IN HEX)??
56	044454	003336			BGT	2\$	;IF >, IT'S TOO LARGE
57	044456	110164	177777	5\$:	MOVB	R1,-1(R4)	;MOVE THE HEX BACK INTO THE BUFFER (SANS ASCII)
58	044462	005302			DEC	R2	;ONE LESS CHARACTER TO GO
59	044464	003356			BGT	3\$	;DO UNTIL R2 = 0
60	044466	124444			CMPB	-(R4),-(R4)	;BACK THE POINTER UP BY TWO BYTES
61	044470	106314			ASLB	(R4)	;TO LEFT JUSTIFY THE LOW BYTE
62	044472	106314			ASLB	(R4)	;SECOND SHIFT
63	044474	106314			ASLB	(R4)	;THIRD SHIFT
64	044476	106324			ASLB	(R4)+	;FOURTH SHIFT (POP POINTER)
65	044500	151437	002652		BISB	(R4),PSTACK	;FORM THE ENTIRE 2 CHAR HEX FIELD
66	044504	105037	002653		CLRB	PSTACK+1	;THROW THE HIGH BYTE OUT NOW!
67	044510	005137	002422		COM	ROUTDO	;MARK THE USER SELECTED INPUT
68	044514	013737	002652	002424	MOV	PSTACK,SELNUM	;SAVE THE USER ROUTINE NUMBER
69	044522	013704	002424		MOV	SELNUM,R4	;LOAD THE ROUTINE NUMBER
70	044526	004737	015260		JSR	PC,DIAGST	;TURN ON THE MONITOR
71	044532	000304			SWAB	R4	;HIGH BYTE = ROUTINE NUMBER
72	044534	104404			TRAP	C\$BSEG	
73	044536	004737	015352		JSR	PC,DIAGLD	;LOAD THE ROUTINE NUMBER
74	044542	017746	136004		MOV	@RPER2,-(SP)	;GET THE RESULTS OF THE TEST
75	044546	042726	177400		BIC	#177400,(SP)+	;STRIP JUNK
76	044552	001414			BEQ	7\$	;IF ZERO, NO!!
77	044554	104456			TRAP	C\$ERHRD	
	044556	000621			.WORD	401	
	044560	013564			.WORD	EM35	
	044562	014310			.WORD	ERR1	
78	044564	012737	040011	002420	MOV	#TRE!DRCLR,FUNCTN	;PREPARE TO RESET THE ERRORS
79	044572	004737	015146		JSR	PC,DRIVER	;PURGE ERRORS NOW!
80	044576	052777	100000	135732	BIS	#DMD,@RPMR1	;TURN ON THE DMD BIT AGAIN
81	044604				7\$:		
	044604				10001\$:		
	044604	104405			TRAP	C\$ESEG	
82	044606	004737	015312		JSR	PC,DIAGEN	;TURN OFF THE MONITOR
83	044612				L10114:		
	044612	104401			TRAP	C\$ETST	

```

1      .SBTTL TEST 61 NOP FUNCTIONAL TEST
2
3      :% TEST 61 NOP FUNCTIONAL TEST
4      :% : LOAD UNIT UNDER TEST INTO RPCS2
5      :% : IF RPDS: DRY <> 1
6      :% : THEN
7      :% : OUTPUT ERROR MESSAGE (RPDS: DRY NOT SET WHEN EXPECTED)
8      :% : ENDF
9      :% : WRITE NOP COMMAND TO RPCS1
10     :% : TIME RPDS: DRY
11     :% : IF TIME EXPIRES AND RPDS: DRY <> 1
12     :% : THEN
13     :% : OUTPUT ERROR MESSAGE (RPDS: DRY NOT SET IN TIME)
14     :% : ENDF
15     :% : IF RPDS: ERR = 1
16     :% : THEN
17     :% : OUTPUT ERROR MESSAGE (COMPOSITE ERROR SET WHEN NOT EXPECTED)
18     :% : ENDF
19     :% : IF RPCS1: TRE = 1
20     :% : THEN
21     :% : OUTPUT ERROR MESSAGE (RPCS1: TRE SET WHEN NOT EXPECTED)
22     :% : ENDF
23     :% END TEST 61
24
25 044614 012737 004000 002404 T61:: MOV #BIT11,ERRWD1 ;LOAD THE ERROR MASK
26 044614 005037 002406 CLR ERRWD2 ;FOR BOTH MASKS
27 044622 004737 016662 JSR PC,SEIZE ;GET THE DRIVE NOW!
28 044632 012701 000036 MOV #30,R1 ;GET AN OVERALL WATCHDOG TIMER
29 044636 012777 000015 135646 MOV #NOP,@RPCS1 ;WRITE A NOP COMMAND
30 044644 105777 135654 1$: TSTB @RPDS ;DO WE HAVE DRIVE READY?
31 044650 100413 BMI 2$ ;IF MINUS, YES!!
32 044652 004737 017000 JSR PC,WAIT ;STALL, AND WASTE SOME TIME
33 044656 005301 DEC R1 ;ONE LESS ITERATION TO-GO
34 044660 003371 BGT 1$ ;IF R1 <> 0, DO AGAIN
35 044662 004737 017326 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
36 044666 104456 TRAP C$ERHRD
37 044670 000622 .WORD 402
38 044672 012015 .WORD EM2
39 044674 014652 .WORD ERR3
40 044676 000425 BR 4$ ;AND SKIP NEXT PART OF TEST
41 044700 032777 040000 135616 2$: BIT #ERR,@RPDS ;COMPOSITE ERROR SET?
42 044706 001407 BEQ 3$ ;TAKE BRANCH IF NOT
43 044710 004737 017326 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
44 044714 104456 TRAP C$ERHRD
45 044716 000623 .WORD 403
46 044720 011747 .WORD EM1
47 044722 014652 .WORD ERR3
48 044724 000412 BR 4$ ;AND TAKE EARLY EXIT
49 044726 032777 040000 135556 3$: BIT #TRE,@RPCS1 ;TRANSFER ERROR SET?
50 044734 001410 BEQ 5$ ;IF ZERO, WE'RE OK
51 044736 004737 017326 JSR PC,SAVRPR ;GET THE REGISTER SNAPSHOT
52 044742 104456 TRAP C$ERHRD
53 044744 000624 .WORD 404
54 044746 012562 .WORD EM16
55 044750 014652 .WORD ERR3
56 044752 004737 016662 4$: JSR PC,SEIZE ;PURGE REMAINING ERRORS

```

49 044756
044756
044756 104401
50

58:
L10115:
TRAP C\$ETST

```

12
13
41
43
44
45
46
47
48
49
50
51
52 044760 000022
    044762
53
54 044762 000031
    044764 045026
    044766 160000
    044770 177777
55
56 044772 001031
    044774 045041
    044776 000000
    045000 000377
57
58 045002 002032
    045004 045055
    045006 000340
    045010 000000
    045012 000007
59
60 045014 003032
    045016 045066
    045020 000007
    045022 000000
    045024 000007
61
    045026
62
66 045026 122 120 103 MSG1: .ASCIZ /RPCS1 ADRS/
67 045041 126 105 103 MSG4: .ASCIZ /VECTOR ADRS/
68 045055 102 122 04 MSG5: .ASCIZ /BR LEVEL/
69 045066 104 122 111 MSG6: .ASCIZ /DRIVE #/
70
71

```

.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.
 :--

L\$HARD: .WORD L10116-L\$HARD/2

;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 'DRIVE #?'

.WORD T\$CODE
 .WORD MSG6
 .WORD 7
 .WORD T\$LOLIM
 .WORD T\$HILIM
 .EVEN

L10116:

.EVEN

```

1      .SBTTL  SOFTWARE PARAMETER CODING SECTION
2
3
4      ;++
5      ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
6      ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
7      ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
8      ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
9      ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
10     ; WITH THE OPERATOR.
11     ;--
12     045076 000022      .WORD L10117-L$SOFT/2
13     045100      L$SOFT::
14     045100 000130      .WORD  T$CODE      ;PRINT 'EXECUTE TEST 25., MASSBUS INTERFACE SWITCH TEST (L
15     045102 045144      .WORD  MSG17
16     045104 000001      .WORD  1
17     045106 001130      .WORD  T$CODE      ;PRINT 'EXECUTE TEST 52., PRINT CONTENTS OF INTERNAL ERROR L
18     045110 045224      .WORD  MSG18
19     045112 000001      .WORD  1
20     045114 002130      .WORD  T$CODE      ;PRINT 'SELECT A TRACK FOR THE RP07 INTERNAL RD-WRT TESTS (L
21     045116 045313      .WORD  MSG20
22     045120 000001      .WORD  1
23     045122 006044      .WORD  T$CODE      ;GO TO 1$ IF NO
24     045124 003052      .WORD  T$CODE      ;PRINT 'TRACK ADDRESS (D)  0 ?'
25     045126 045375      .WORD  MSG21
26     045130 000037      .WORD  37
27     045132 000000      .WORD  T$LOLIM
28     045134 000037      .WORD  T$HILIM
29     045136      1$:      .WORD  T$CODE      ;PRINT 'EXECUTE TEST 60., SELECT A MICRO-DIAGNOSTIC FOR EXEC
30     045136 004130      .WORD  MSG22
31     045140 045413      .WORD  1
32     045142 000001
33
34     045144      .EVEN
35     L10117:
36
37     045144      105      130      105  MSG17::ASCIZ  /EXECUTE TEST 25., MASSBUS INTERFACE SWITCH TEST/
38     045224      105      130      105  MSG18::ASCIZ  /EXECUTE TEST 52., PRINT CONTENTS OF INT. RNAL ERROR LOG/
39     045313      123      105      114  MSG20::ASCIZ  /SELECT A TRACK FOR THE RP07 INTERNAL RD-WRT TESTS/
40     045375      124      122      101  MSG21::ASCIZ  /TRACK ADDRESS/
41     045413      105      130      105  MSG22::ASCIZ  /EXECUTE TEST 60., SELECT A MICRO-DIAGNOSTIC FOR EXECUTION/
42
43     .EVEN
44
45     045506      $PATCH::BLKW  50.      ;PROGRAM PATCH AREA (50. WORDS)
46
47     .EVEN
48     045652 045672      .WORD  T$FREE
49     045654 000006      .WORD  T$SIZE
50     045656      L$LAST::

```

```
1
14
16 045656 000000
    045660 000004
    045662
17 045662 176700
18 045664 000254
19 045666 000240
20 045670 000000
21 045672
23 000001

L10120: .WORD 0
        .WORD L10122-. /2-1
        .WORD 176700
        .WORD 254
        .WORD 240
        .WORD 0

L10122:
.END
```

AD = 011074 G	CONSET = 020330	C\$SPRI= 000041	EM17 = 012622 G	FRMT03 = 007404 G
ADR = 000020 G	CPE = 040000	C\$SVEC= 000037	EM2 = 012015 G	FRMT04 = 007426 G
AOE = 001000	CPU = 020000	C\$TPRI= 000013	EM20 = 012661 G	FRMT05 = 007474 G
ASSEMB= 000010	CR = 000015 G	DCK = 100000	EM21 = 012725 G	FRMT06 = 007545 G
ATA = 100000	CREADY 015134	DCU = 000040	EM22 = 012776 G	FRMT07 = 007574 G
ATABIT 002566 G	CRLF = 006420 G	DECODE 020532	EM23 = 013051 G	FRMT10 = 007624 G
ATO = 000001	CSTORE 002432 G	DESCYL 002416 G	EM24 = 013126 G	FRMT11 = 007655 G
AT1 = 000002	C\$AU = 000052	DESTRK 002414 G	EM25 = 013167 G	FRMT12 = 007713 G
AT2 = 000004	C\$AUTO= 000061	DFPTBL 002320 G	EM26 = 013224 G	FRMT13 = 007756 G
AT3 = 000010	C\$BRK = 000022	DIAG = 000035	EM27 = 013266 G	FRMT14 = 010004 G
AT4 = 000020	C\$PSEG= 000004	DIAGEN 015312	EM3 = 012055 G	FRMT15 = 010031 G
AT5 = 000040	C\$BSUB= 000002	DIAGLD 015352	EM30 = 013326 G	FRMT16 = 010070 G
AT6 = 000100	C\$CEFG= 000045	DIAGMC= 000000	EM31 = 013362 G	FRMT17 = 010161 G
AT7 = 000200	C\$CLCK= 000062	DIAGST 015260 G	EM32 = 013411 G	FRMT20 = 010202 G
A16 = 000400	C\$CLEA= 000012	DLT = 100000	EM33 = 013441 G	FRMT23 = 010271 G
A17 = 001000	C\$CLOS= 000035	DMD = 100000	EM34 = 013505 G	FRMT40 = 010337 G
BAI = 000010	C\$CLP1= 000006	DMPREG 016212	EM35 = 013564 G	FRMT41 = 010430 G
BELL = 000007 G	C\$CVEC= 000036	DPE = 000010	EM36 = 013641 G	FRMT50 = 010510 G
BICEXP 017422 G	C\$DCLN= 000044	DPR = 000400	EM37 = 013701 G	FRMT51 = 010601 G
BISEXP 017372 G	C\$DODU= 000051	DRCLR = 000011	EM4 = 012100 G	FPMT60 = 010661 G
BITPOS 002400 G	C\$DRPT= 000024	DRIVER 015146	EM40 = 013753 G	FRMT61 = 010753 G
BIT0 = 000001 G	C\$DU = 000053	DRQ = 004000	EM41 = 014026 G	FRMT70 = 011035 G
BIT00 = 000001 G	C\$EDIT= 000003	DRT0 = 000001	EM42 = 014075 G	FRMT71 = 011055 G
BIT01 = 000002 G	C\$ERDF= 000055	DRT1 = 000002	EM43 = 014130 G	FUNCTION 002420 G
BIT02 = 000004 G	C\$ERHR= 000056	DRT2 = 000004	EM5 = 012116 G	F\$AU = 000015
BIT03 = 000010 G	C\$ERRO= 000060	DRT3 = 000010	EM6 = 012155 G	F\$AUTO= 000020
BIT04 = 000020 G	C\$ERSF= 000054	DRT4 = 000020	EM7 = 012217 G	F\$BGN = 000040
BIT05 = 000040 G	C\$ERSO= 000057	DRT5 = 000040	ENDCYL 002374 G	F\$CLEA= 000007
BIT06 = 000100 G	C\$ESCA= 000010	DRT6 = 000100	ENDTRK 002370 G	F\$DU = 000016
BIT07 = 000200 G	C\$ESEG= 000005	DRT7 = 000200	ERR = 040000	F\$END = 000041
BIT08 = 000400 G	C\$ESUB= 000003	DRT8 = 000400	ERRCK 017032	F\$HARD= 000004
BIT09 = 001000 G	C\$ETST= 000001	DRVBLT 011477 G	ERRDMP 002334	F\$HW = 000013
BIT1 = 000002 G	C\$EXIT= 000032	DRVCLR 015400	ERRVEC= 000004	F\$INIT= 000006
BIT10 = 002000 G	C\$GETB= 000026	DRVNO 002506 G	ERRWD1 002404 G	F\$JMP = 000050
BIT11 = 004000 G	C\$GETW= 000027	DRVSN 002510 G	ERRWD2 002406 G	F\$MOD = 000000
BIT12 = 010000 G	C\$GMAN= 000043	DRY = 000200	ERR0 014172 G	F\$MSG = 000011
BIT13 = 020000 G	C\$GPHR= 000042	DS = 011121 G	ERR1 014310 G	F\$PROT= 000021
BIT14 = 040000 G	C\$GPLO= 000030	DSE = 020000	ERR2 014500 G	F\$PWR = 000017
BIT15 = 100000 G	C\$GPRI= 000040	DSNMSG 006423 G	ERR3 014652 G	F\$RPT = 000012
BIT2 = 000004 G	C\$INIT= 000011	DTE = 010000	ERSTAT 002466 G	F\$SEG = 000003
BIT3 = 000010 G	C\$INLP= 000020	DVA = 004000	EVL = 000004 G	F\$SOFT= 000005
BIT4 = 000020 G	C\$MANI= 000050	DVC = 000200	EWN = 000002	F\$SRV = 000010
BIT5 = 000040 G	C\$MEM = 000031	ECH = 000100	EXPTED 002454 G	F\$SUB = 000002
BIT6 = 000100 G	C\$MSG = 000023	ECI = 004000	E\$END = 002100	F\$SW = 000014
BIT7 = 000200 G	C\$OPEN= 000034	EC.00 004354	E\$LOAD= 000035	F\$TEST= 000001
BIT8 = 000400 G	C\$PNTB= 000014	EF.CON= 000036 G	FASTAT 002430 G	F1 = 000002
BIT9 = 001000 G	C\$PNTF= 000017	EF.NEW= 000035 G	FATOF 002470 G	F2 = 000004
BLOWER 011361 G	C\$PNTS= 000016	EF.PWR= 000034 G	FAULTS 016556	F3 = 000010
BOE = 000400 G	C\$PNTX= 000015	EF.RES= 000037 G	FER = 000020	F4 = 000020
BSE = 100000	C\$QIO = 000377	EF.STA= 000040 G	FLOAT 020034	F5 = 000040
BYTCNT 002410 G	C\$RDBU= 000007	EM1 = 011747 G	FLST00 007273 G	GO = 000001
CA = 011151 G	C\$REFG= 000047	EM11 = 012272 G	FLST01 007312 G	G\$CNT0= 000200
CALMOD 016132	C\$RESE= 000033	EM12 = 012342 G	FMT = 010000	G\$DELM= 000372
CLKSTA 002426 G	C\$REVI= 000003	EM13 = 012410 G	FORTRK= 000063	G\$DISP= 000003
CLR = 000040	C\$RFLA= 000021	EM14 = 012454 G	FRMT00 007161 G	G\$EXCP= 000400
CMOD = 100000	C\$RPT = 000025	EM15 = 012523 G	FRMT01 007214 G	G\$HILI= 000002
COMPAR 020202	C\$SEFG= 000046	EM16 = 012562 G	FRMT02 007315 G	G\$LOLI= 000001

G\$NO = 000000	J1 011161 G	L\$EXP4 002064 G	L10034 025032	MCUTXT 002676 G
G\$OFFS= 000400	J10 011236 G	L\$EXP5 002066 G	L10035 025356	MDPE = 000400
G\$OF SI= 000376	J11 011243 G	L\$HARD 044762 G	L10036 025536	MSG1 045026
G\$PRMA= 000001	J12 011250 G	L\$HIME 002120 G	L10037 025730	MSG10 006577 G
G\$PRMD= 000002	J13 011255 G	L\$HPCF 002016 G	L10040 026226	MSG11 006671 G
G\$PRML= 000000	J14 011262 G	L\$HPTP 002022 G	L10041 026524	MSG12 006763 G
G\$RADA= 000140	J15 011267 G	L\$HW 002320 G	L10042 027042	MSG13 011607 G
G\$RADB= 000000	J16 011274 G	L\$ICP 002104 G	L10043 027360	MSG14 011667 G
G\$RADD= 000040	J17 011301 G	L\$INIT 020652 G	L10044 027632	MSG15 007062 G
G\$RADL= 000120	J2 011166 G	L\$LADP 002026 G	L10045 030100	MSG17 045144 G
G\$RADO= 000020	J20 011306 G	L\$LAST 045656 G	L10046 030320	MSG18 045224 G
G\$XFER= 000004	J21 011313 G	L\$LOAD 002100 G	L10047 030512	MSG20 045313 G
G\$YES = 000010	J3 011173 G	L\$LUN 002074 G	L10050 030622	MSG21 045375 G
HCE = 000200	J4 011200 G	L\$MREV 002050 G	L10051 031014	MSG22 045413 G
HCI = 002000	J5 011205 G	L\$NAME 002000 G	L10052 031152	MSG4 045041
HCRC = 000400	J6 011212 G	L\$PRIO 002042 G	L10053 031320	MSG5 045055
HDA 011320 G	J7 011217 G	L\$PROT 020644 G	L10054 031444	MSG6 045066
HELP = 000000	J8 011224 G	L\$PRT 002112 G	L10055 031576	MOH = 020000
HERTZ 015750	J9 011231 G	L\$REPP 002062 G	L10056 031734	MOL = 010000
HOE = 100000 G	KWSRV 016104	L\$REV 002010 G	L10057 032134	MSGMOL 006452 G
IAE = 002000	K1RELA 011443 G	L\$RPT 020636 G	L10060 032300	MSGWLO 006522 G
IBE = 010000 G	LASCYL 002376 G	L\$SOFT 045100 G	L10061 032560	MSK 002450 G
IDU = 000040 G	LASTRK 002372 G	L\$SPC 002056 G	L10062 032716	MTD = 040000
IE = 000100	LBC = 002000	L\$SPCP 002020 G	L10063 033140	MTRBRK 011421 G
IER = 020000 G	LBT = 002000	L\$SPTP 002024 G	L10064 033322	MXF = 001000
ILEV = 000004	LCE = 001000	L\$STA 002030 G	L10065 033452	NBA = 100000
ILF = 000001	LC!KTB 015740	L\$SW 002332 G	L10066 033730	NED = 010000
ILOCK 002460 G	LDZERO 017572	L\$TEST 002114 G	L10067 034030	NEGWRD 002412 G
ILR = 000002	LF = 000012 G	L\$TIML 002014 G	L10070 034316	NEM = 004000
INTFLG 002462 G	LKS 015742	L\$UNIT 002012 G	L10071 034422	NEXLOC 017252
INTSRV 020630 G	LKV 015744	L10000 002330	L10072 034634	NOP = 000015
IOBUFF 002730 G	LOCATE 017150	L10001 002344	L10073 035106	OCTHEX 015416
IR = 000100	LOE = 040000 G	L10002 014306	L10074 035204	OFFDIR= 000200
IRLOCK 017672	LOT = 000010 G	L10003 014476	L10075 035322	OM = 000001
ISR = 000100 G	L\$ACP 002110 G	L10004 014650	L10076 035500	ONEFIL= 000001
ITCOUN 002402 G	L\$APT 002036 G	L10005 014676	L10077 035756	OPI = 020000
IXE = 004000 G	L\$AU 021506 G	L10006 016130	L10100 036230	OPRPNL 011455 G
IXU = 000100	L\$AUT 002070 G	L10007 020634	L10101 036730	OR = 000200
ISAU = 000041	L\$AUTO 021346 G	L10010 020642	L10102 037700	ORLOCK 017706
ISAUTO= 000041	L\$CCP 002106 G	L10012 021344	L10103 040126	O\$APTS= 000000
ISCLN = 000041	L\$CLEA 021350 G	L10013 021346	L10104 040362	O\$AU = 000000
ISDU = 000041	L\$CO 002032 G	L10014 021476	L10105 040622	O\$BGNR= 000000
ISHRD = 000041	L\$CPO 002011 G	L10015 021504	L10106 041154	O\$BGNS= 000001
ISINIT= 000041	L\$CJC 006362 G	L10016 021512	L10107 041674	O\$DU = 000000
ISMOD = 000041	L\$DESP 002076 G	L10017 021610	L10110 044002	O\$ERRT= 000000
ISMSG = 000041	L\$DEVP 002060 G	L10020 021776	L10111 043026	O\$GNSW= 000001
ISPROT= 000040	L\$DISP 002124 G	L10021 022140	L10112 043644	O\$POIN= 000001
ISPTAB= 000041	L\$DLY 002116 G	L10022 022300	L10113 044320	O\$SETU= 000001
ISPR = 000041	L\$DTP 002040 G	L10023 022442	L10114 044612	PAR = 000010
ISRPT = 000041	L\$DTYP 002034 G	L10024 022772	L10115 044756	PAT = 000020
ISSEG = 000041	L\$DU 021500 G	L10025 023266	L10116 045026	PATCNT 002434 G
ISSETU= 000041	L\$CUT 002072 G	L10026 023440	L10117 045144	PATT1 002344 G
ISSFT = 000041	L\$DVTY 006354 G	L10027 023600	L10120 045662	PATT2 002346 G
ISSRV = 000041	L\$EF 002052 G	L10030 023770	L10122 045672	PATT3 002350 G
ISSUB = 000041	L\$ENVI 002044 G	L10031 024150	MASK 002446 G	PATT4 002352 G
ISTST = 000041	L\$ETP 002102 G	L10032 024332	MCPE = 020000	PATT5 002354 G
JSJMP = 000167	L\$EXP1 002046 G	L10033 024506	MCUTAB 004060 G	PATT6 002356 G

PATT7	002360	G	RPDS	002524	G	SSLSYM=	010000	TSSDU =	010015	T45	034636	G		
PATT8	002362	G	RPDT	002540	G	TABADD	002366	G	TSSHAR=	010116	T46	035110	G	
PATT9	002364	G	RPEC1	002556	G	TAP =	040000		TSSHW =	010000	T47	035206	G	
PCLKTB	015724		RPEC2	002560	G	TEMP	002436	G	TSSINI=	010012	T48	035324	G	
PGE =	100000		RPER1	002526	G	TERM	011325	G	TSSMSG=	010005	T49	035502	G	
PGM =	001000		RPER2	002552	G	TESTRG	002456	G	TSSPC =	000001	T5	022302	G	
PHF =	000400		RPER3	002554	G	TRAKAD	002340		TSSPRO=	010011	T50	035760	G	
PIP =	020000		RPLA	002532	G	TRE =	040000		TSSPTA=	010121	T51	036232	G	
PKB	015730		RPMA1	002536	G	TST03	004160	G	TSSRPT=	010010	T52	036732	G	
PKC	015732		RPOF	002544	G	TST04	004172	G	TSSSEG=	010001	T53	037702	G	
PKCS	015726		RPSN	002542	G	TST05	004204	G	TSSSOF=	010117	T54	040130	G	
PKV	015734		RPVEC	002476	G	TST08	004216	G	TSSSRV=	010007	T55	040364	G	
PNT =	001000	G	RPWC	002514	G	TST11	004232	G	TSSSUB=	010112	T56	040624	G	
PRELOD	017721		RTD =	000075		TST12	004244	G	TSSSW =	010001	T57	041156	G	
PRI =	002000	G	RWU1 =	002000		TST28	004256	G	TSSTES=	010115	T58	041676	G	
PRI00 =	000000	G	RWU2 =	004000		TST33	004272	G	T1	021514	G	T58.1	042030	
PRI01 =	000040	G	RWU3 =	010000		TS134	004302	G	T10	023602	G	T58.2	043030	
PRI02 =	000100	G	SAVRPR	017326		TST49	004330	G	T11	023772	G	T59	044004	G
PRI03 =	000140	G	SBE =	000004		T\$ARG =	000001		T12	024152	G	T6	022444	G
PRI04 =	000200	G	SC =	100000		T\$CODE=	004130		T13	024334	G	T60	044322	G
PRI05 =	000240	G	CCF =	000002		T\$ERRN=	000624		T14	024510	G	T61	044614	G
PRI06 =	000300	G	SC1 =	000100		T\$EXC=	000000		T15	025034	G	T7	022774	G
PRI07 =	000340	G	SC16 =	002000		T\$FLAG=	000040		T16	025360	G	T8	023270	G
PSEL =	002000		SC2 =	000200		T\$FREE=	045672		T17	025540	G	T9	023442	G
PSTACK	002652	G	SC32 =	004000		T\$GMAN=	000000		T18	025732	G	UAM =	000200	G
PTRANS	011376	G	SC4 =	000400		T\$HILI=	000037		T19	026230	G	UNABLE	002464	G
RCVED	002452	G	SC64 =	010000		T\$LAST=	000001		T2	021612	G	UNIT	002472	G
RDDTA =	000071		SC8 =	001000		T\$LOLI=	000000		T20	026526	G	UNS =	040000	
RDHDTA=	000073		SDF =	000020		T\$LSYM=	010000		T21	027044	G	UPE =	020000	
RDY =	000200		SEARCH=	000031		T\$LTNO=	000075		T22	027362	G	US1 =	000001	
READTD	011531	G	SEEK =	000005		T\$NEST=	177777		T23	027634	G	US2 =	000002	
READY	015122		SEIZE	016662		T\$NS0 =	000000		T24	030102	G	US4 =	000004	
RECAL =	000007		SELNUM	002424	G	T\$NS1 =	000005		T25	030322	G	VV =	000100	
REG	002576	G	SFLRUN	002342		T\$NS2 =	000003		T26	030514	G	WAIT	017000	
REGSET	017452		SELTRK	002336		T\$NS3 =	000003		T27	030624	G	WAITMS	016756	
RELEAS=	000013		SENSOR	011341	G	T\$PCNT=	000000		T28	031016	G	WATDRY	020372	
RESET	017474		SETUP	017744		T\$PTAB=	010121		T29	031154	G	WATIME	016776	
RH	011132	G	SFPTBL	002332	G	T\$PTHV=	000001		T3	022000	G	WCE =	040000	
RHEXT	002502	G	SIZE70	014700		T\$PTNU=	000001		T30	031322	G	WCF =	000040	
RHTYPE	002504	G	SKI =	040000		T\$SAVL=	177777		T31	031446	G	WCKD =	000051	
RIP =	000021		SNDIGT	006447	G	T\$SEGL=	177777		T32	031600	G	WCKHD =	000053	
RMR =	000004		SNK	002440	G	T\$SEK0=	010001		T33	031736	G	WLE =	004000	
ROUTDO	002422	G	SPIRAL	017266		T\$SEK1=	010003		T34	032136	G	WOR =	001000	
RPADR	002474	G	SRC	002442	G	T\$SIZE=	000006		T35	032302	G	WRDTA =	000061	
RPARDY	015042		SRCTMP	002444	G	T\$SUBN=	000000		T36	032562	G	WRL =	004000	
RPAS	002530	G	STOPCK	016054		T\$TAGL=	177777		T37	032720	G	WRTD =	000065	
RPBA	002516	G	ST.CLK	015550		T\$TAGN=	010123		T38	033142	G	WRU =	000400	
RPBAE	002562	G	ST.LCL	016016		T\$TEMP=	000000		T39	033324	G	WTCKD	011566	G
RPCC	002550	G	ST.PCL	015752		T\$TEST=	000075		T4	022142	G	WTCKHD	011543	G
RPCS1	002512	G	SVCGBL=	000000		T\$TSTM=	177777		T40	033454	G	X\$ALWA=	000000	
RPCS2	002522	G	SVCINS=	000000		T\$TSTS=	000001		T41	033732	G	X\$FALS=	000040	
RPCS3	002564	G	SVCSUB=	000000		T\$SAU =	010016		T42	034032	G	X\$OFFS=	000400	
RPDA	002520	G	SVCTAG=	000000		T\$SAUT=	010013		T43	034320	G	X\$TRUE=	000020	
RPDB	002534	G	SVCTST=	000000		T\$SCLE=	010014		T44	034424	G	\$PATCH	045506	G
RPDC	002546	G	SWTTST	002332		T\$SDAT=	010122							

. ABS. 045672 000

CZRJMA0 RP07 FE/HOST ISOLATOR MACRO V04.00 1-JAN-83 13:37:00 PAGE 99-4^{C 1}
SYMBOL TABLE

SEQ 0208

000000 001
ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 32256 WORDS (126 PAGES)
DYNAMIC MEMORY AVAILABLE FOR 70 PAGES
CZRJMA.BIC,CZRJMA/C=[20,0]SVC34R.MLB,[20,12]CZRJMA.DOC,CZRJMA.HIS,CZRJMA

\$\$\$ERR	14-531													
\$\$\$MFG	2-17	2-30	6-3	7-362	7-424									
\$\$\$NOT	15-42	60-25	87-23	95-33										
\$PATCH	98-55#													
A16	12-7#	17-33	17-38	49-29	49-30	49-34	49-61	49-65	50-39	50-43				
A17	12-8#	17-33	17-38	49-37	49-41	50-31	50-32	50-36	50-63	50-67	50-80			
AD	13-128	16-3#												
ADR	11-57#													
AOE	12-87#													
ASSEMB	7-373	7-373												
ATO	12-103#													
AT1	12-104#													
AT2	12-105#													
AT3	12-106#													
AT4	12-107#													
AT5	12-108#													
AT6	12-109#													
AT7	12-110#													
ATA	12-73#	76-17	76-21	77-36	77-41	77-55	77-61	77-65	80-40	80-44	90-39	90-43		
ATABIT	13-89#	30-75												
BAI	12-28#													
BELL	15-14													
BICEXP	23-65#	41-44	41-78	42-62	49-39	49-63	49-76	50-41	50-65	50-78	51-39	52-41	53-29	54-28
	55-28	56-31	58-28	65-28	66-24	73-29	74-23	75-55	76-19	77-63	81-18	83-29	89-33	89-39
	89-45	92-76	92-82											
BISEXP	23-58#	41-54	41-62	41-69	42-42	42-54	46-39	46-45	49-32	49-52	50-34	50-54	51-28	52-30
	53-29	53-29	53-29	54-28	54-28	54-28	55-28	55-28	55-28	56-31	56-31	56-31	57-26	75-31
	75-37	77-39	80-42	82-23	90-41	93-261	93-282							
BIT0	11-57#	14-68	14-138	14-162	14-259	14-435	14-489	14-499	14-501	20-59	27-15	49-50	49-54	49-74
	49-78	53-29	53-29	53-29	53-29	53-29	54-28	54-28	55-28	55-28	56-31	56-31	86-53	
BIT00	11-57	11-57#												
BIT01	11-57	11-57#												
BIT02	11-57	11-57#												
BIT03	11-57	11-57#												
BIT04	11-57	11-57#												
BIT05	11-57	11-57#												
BIT06	11-57	11-57#												
BIT07	11-57	11-57#												
BIT08	11-57	11-57#												
BIT09	11-57	11-57#												
BIT1	11-57#	14-68	14-84	14-132	14-136	14-138	14-156	14-162	14-164	14-174	14-178	14-234	14-236	37-29
	38-18	39-20	40-19	41-36	42-33	43-40	44-29	45-29	46-29	47-23	48-23	49-25	50-28	50-52
	50-56	50-76	51-20	52-22	53-29	54-28	54-28	54-28	54-28	55-28	56-31	57-19	58-20	61-25
	62-36	63-29	64-23	65-32	66-28	67-18	68-16	70-62	71-33	73-37	81-22	82-27	84-57	85-31
	91-89	92-66	92-86	92-105	92-109	93-116	93-152	93-193	93-213	93-230	93-335	94-56		
BIT10	11-57#	14-137	14-260	22-93	58-19	60-44	61-24	62-35	63-28	64-22	65-31	67-17	68-15	70-60
	71-32	73-36	78-22	79-34	79-44	80-36	80-54	81-21	82-26	84-56	85-30	91-88	93-151	93-192
	93-212	93-229												
BIT11	11-57#	14-139	14-206	14-208	14-218	14-258	14-260	14-270	14-290	14-294	14-296	14-298	14-300	14-302
	14-304	14-306	14-308	14-310	14-312	14-314	14-316	14-318	14-320	14-322	14-324	14-326	14-328	14-330
	14-332	14-334	14-336	14-338	14-340	14-342	14-344	14-346	14-348	14-350	14-352	14-354	14-356	14-358
	14-360	14-362	14-364	14-366	14-368	14-370	14-372	14-374	14-376	14-378	14-386	14-388	14-428	14-432
	14-442	22-90	58-19	60-44	63-28	64-22	65-31	66-27	67-17	68-15	70-52	72-39	73-36	74-27
	75-41	75-59	76-22	77-66	78-22	79-44	83-32	84-56	85-30	89-48	90-44	92-65	92-85	92-104
	92-108	93-334	94-47	94-55	96-26									
BIT12	11-57#	14-139	14-260	22-96	58-19	60-44	61-24	62-35	63-28	64-22	65-31	67-17	68-15	70-60

	71-32	73-36	78-22	79-34	79-44	80-36	80-54	81-21	82-26	84-56	85-30	91-88	93-142	93-151
	93-192	93-212	93-229											
BIT13	11-57#	14-139	14-258	14-270	14-290	14-424	14-430	14-432	14-434	14-446	14-448	14-450	14-452	14-454
	14-456	14-458	14-460	14-462	14-466	93-142	93-151	93-192	93-212	93-229				
BIT14	11-57#	14-199	14-258	14-290	14-434	14-446	14-448	14-466	14-468	14-470	14-498	93-143	93-145	
BIT15	11-57#	14-139	14-258	14-290	14-466	14-470	14-486	14-488	14-490	14-492	14-494	14-496	14-498	14-500
	14-502	14-504	20-25	93-148										
BIT2	11-57#	14-68	14-219	55-28	55-28	55-28	58-20	60-45	61-25	62-36	63-29	64-23	65-32	67-18
	68-16	70-62	71-33	73-37	81-22	82-27	84-57	85-31	91-89	92-66	92-86	92-105	92-109	93-116
	93-152	93-193	93-213	93-230	93-335	94-56								
BIT3	11-57#	14-60	14-62	14-64	14-66	14-86	14-88	14-90	14-92	14-94	14-96	14-98	14-100	14-142
	14-144	14-146	14-148	14-150	14-152	14-154	14-156	14-162	14-164	14-166	14-168	14-170	14-172	14-174
	14-176	14-178	14-180	14-182	14-184	14-186	14-188	14-190	14-192	14-194	14-196	14-198	14-200	14-202
	14-206	14-208	14-210	14-214	14-230	14-232	14-234	14-236	14-394	56-31	56-31	56-31	61-25	
BIT4	11-57#	14-60	14-62	14-64	14-66	14-84	14-88	14-92	14-98	14-100	14-142	14-144	14-146	14-148
	14-150	14-152	14-154	14-156	14-158	14-160	14-166	14-168	14-170	14-176	14-180	14-182	14-184	14-186
	14-188	14-190	14-192	14-194	14-196	14-198	14-200	14-204	14-206	14-210	14-222	14-224	14-226	14-228
	14-230	14-238	14-240	14-242	14-244	14-246	14-248	14-250	14-252	14-254	14-256	14-284	14-286	14-288
	14-390	14-392	14-394	14-396	14-398	14-400	14-402	60-45	78-23	81-22				
BIT5	11-57#	14-60	14-62	14-64	14-66	14-69	14-86	14-90	14-94	14-96	14-138	14-140	14-142	14-144
	14-146	14-148	14-154	14-162	14-166	14-168	14-170	14-172	14-176	14-200	14-202	14-206	14-208	14-210
	14-212	14-214	14-222	14-224	14-226	14-228	14-282	14-400						
BIT6	11-57#	14-38	14-40	14-42	14-44	14-46	14-48	14-50	14-52	14-54	14-56	14-58	14-70	14-72
	14-71	14-76	14-78	14-80	14-82	14-84	14-126	14-128	14-130	14-132	14-136	14-138	14-198	14-206
	14-269	14-222	14-224	14-230	14-258	14-262	14-268	14-304	14-376	14-480	86-19	92-65	92-108	93-115
	94-55													
BIT7	11-57#	14-61	14-63	14-65	14-67	14-138	14-139	14-141	14-143	14-145	14-147	14-149	14-155	14-167
	14-169	14-171	14-177	14-198	14-201	14-207	14-216	14-218	14-258	14-259	14-260	14-264	14-268	14-270
	14-276	14-280	14-282	14-290	14-291	14-296	14-300	14-304	14-310	14-312	14-314	14-316	14-318	14-336
	14-338	14-376	14-378	14-474	14-488	14-489	14-491	14-493	14-495	14-499	14-501	61-24	63-28	64-22
	65-31	66-27	67-17	68-15	69-21	70-58	85-30	86-19	92-65	92-108	93-115	94-55		
BIT8	11-57#	14-64	14-102	14-108	14-206	14-208	14-258	14-264	14-266	14-268	14-270	14-272	14-274	14-276
	14-292	14-422	14-424	14-428	14-432	14-442	14-474	58-20	60-45	61-25	62-36	63-29	64-23	65-32
	67-18	68-15	72-43	73-37	75-41	77-38	77-42	81-22	82-27	84-57	85-31	91-89	92-65	92-66
	92-85	92-81	92-104	92-105	92-108	93-115	93-116	93-151	93-152	93-192	93-193	93-212	93-213	93-229
	93-230	93-354	93-335	94-55	94-56									
BIT9	11-57#	14-102	14-104	14-106	14-108	14-110	14-112	14-114	14-116	14-118	14-120	14-122	14-124	14-132
	14-139	14-258	14-263	14-264	14-266	14-268	14-270	14-272	14-274	14-290	14-292	14-422	14-424	14-426
	14-428	14-430	14-432	14-434	14-438	14-448	14-470	14-472	14-498	72-43	75-41	77-38	77-42	91-88
	92-65	92-85	92-104	92-108	93-115	93-151	93-192	93-212	93-229	94-55				
BITPOS	13-23#	18-14	18-21	30-74*	30-75*	79-29	80-30							
BLOWER	13-134	16-30#												
BOE	11-57#													
BSE	12-181#													
BYTCNT	13-27#													
C\$AU	7-373#	34-35												
C\$AUTO	7-373#	31-18												
C\$BRK	7-373#	18-33	18-44	24-36	24-48									
C\$BSEG	7-373#	37-21	37-33	38-21	38-21	38-21	38-21	39-22	39-22	39-22	39-22	40-21	40-21	40-21
	40-21	41-38	41-39	41-50	42-35	42-36	43-42	43-42	43-42	43-42	44-31	45-31	45-34	46-31
	47-27	47-27	47-27	47-27	48-25	48-25	48-25	48-25	49-28	49-46	49-59	49-70	50-30	50-48
	50-61	50-72	51-24	51-35	52-24	52-37	53-29	53-29	53-29	54-28	54-28	54-28	55-28	55-28
	55-28	56-31	56-31	56-31	57-21	57-34	58-22	58-35	59-16	60-37	61-17	62-15	63-17	64-25
	64-25	64-25	64-25	65-20	66-14	67-21	68-20	69-25	69-25	69-25	69-25	70-36	71-19	72-20
	73-15	74-19	75-23	76-14	77-30	78-15	79-24	80-26	81-14	82-16	83-23	86-24	86-38	86-55
	86-75	88-30	89-25	90-25	91-54	92-52	92-69	92-90	93-106	93-120	93-197	93-238	93-321	94-32

C\$SUB	94-53	95-72												
C\$CEFG	7-373#	93-105	73-227											
C\$CLCK	7-373#	20-101	20-120											
C\$CLEA	7-373#	32-57												
C\$CLOS	7-373#													
C\$CLP1	7-373#													
C\$CVEC	7-373#	32-26	32-29	32-31	36-64	57-49	58-47	59-37						
C\$DCLN	7-373#													
C\$DODU	7-373#													
C\$DRPT	7-373#													
C\$DU	7-373#	33-34												
C\$EDIT	7-373#	7-427												
C\$ERDF	7-373#	22-21												
C\$ERHR	7-373#	18-20	23-101	24-26	25-69	25-106	36-67	37-30	37-41	41-47	41-57	41-65	41-72	41-81
	42-45	42-57	42-65	44-43	45-48	46-48	49-35	49-42	49-55	49-66	49-79	50-37	50-44	50-57
	50-68	50-81	51-31	51-42	52-33	52-44	53-29	53-29	53-29	53-29	54-28	54-28	54-28	54-28
	55-28	55-28	55-28	55-28	56-31	56-31	56-31	56-31	57-29	57-40	58-31	58-41	59-31	60-46
	61-26	62-37	63-30	65-33	66-29	70-66	71-34	72-44	73-38	74-34	74-36	75-43	75-61	76-24
	77-67	78-24	79-36	79-46	80-38	80-45	80-56	81-23	82-28	83-34	84-58	85-42	86-34	86-49
	86-65	86-85	88-35	89-50	90-46	91-90	92-67	92-87	92-106	92-110	93-117	93-156	93-194	93-217
	93-222	93-248	93-264	93-276	93-285	93-303	93-309	93-336	94-51	94-66	95-77	96-37	96-42	96-47
C\$ERRO	7-373#													
C\$ERSF	7-373#													
C\$ERSO	7-373#													
C\$ESCA	7-373#													
C\$ESEG	7-373#	37-32	37-43	38-21	38-21	38-21	38-21	39-22	39-22	39-22	39-22	40-21	40-21	40-21
	40-21	41-49	41-59	41-83	42-47	42-67	43-42	43-42	43-42	43-42	44-47	45-52	45-58	46-50
	47-27	47-27	47-27	47-27	48-25	48-25	48-25	48-25	49-45	49-58	49-69	49-82	50-47	50-60
	50-71	50-84	51-34	51-45	52-36	52-47	53-29	53-29	53-29	54-28	54-28	54-28	55-28	55-28
	55-28	56-31	56-31	56-31	57-31	57-42	58-33	58-43	59-33	60-47	61-28	62-39	63-32	64-25
	64-25	64-25	64-25	65-38	66-33	67-38	68-48	69-25	69-25	69-25	69-25	70-68	71-36	72-46
	73-40	74-38	75-63	76-26	77-69	78-26	79-48	80-58	81-25	82-30	83-36	86-37	86-52	86-68
	86-88	88-39	89-52	90-48	91-92	92-68	92-89	92-112	93-119	93-196	93-225	93-315	93-338	94-52
	94-75	95-81												
C\$ESUB	7-373#	93-226	93-320											
C\$ETST	7-373#	36-71	37-46	38-24	39-25	40-24	41-86	42-70	43-46	44-50	45-61	46-53	47-30	48-28
	49-85	50-87	51-49	52-51	53-30	54-29	55-29	56-32	57-50	58-48	59-40	60-56	61-31	62-42
	63-35	64-28	65-41	66-36	67-41	68-51	69-28	70-72	71-39	72-50	73-43	74-41	75-66	76-29
	77-72	78-29	79-51	80-61	81-28	82-33	83-40	84-64	85-74	86-100	87-115	88-72	89-56	90-52
	91-95	92-113	93-339	94-76	95-83	96-49								
C\$EXIT	7-373#	30-20	30-126	32-42	41-34	46-27	47-21	48-21	49-49	49-73	50-51	50-75	52-20	53-29
	54-28	55-28	56-31	58-32	60-28	60-31	60-36	77-52	83-22	87-26	89-24	90-24	91-51	92-51
	93-93	93-101	94-41	95-36	95-41									
C\$GETB	7-373#													
C\$GETW	7-373#													
C\$GMAN	7-373#	60-33	60-49	95-44										
C\$GPHR	7-373#	30-37												
C\$GPLO	7-373#													
C\$GPRI	7-373#													
C\$INIT	7-373#	30-141												
C\$INLP	7-373#													
C\$MANI	7-373#	60-29	95-39											
C\$MEM	7-373#													
C\$MSG	7-373#	16-105	16-124	16-136	16-142									
C\$OPEN	7-373#													

C\$PNTB	7-373# 21-12	16-99 21-18	16-100 93-249	16-104 93-304	16-112	16-117	16-123	16-128	16-129	16-130	16-132	16-135	16-141	21-9
C\$PNTF	7-373# 87-76 93-139	26-17 87-82 94-37	26-26 87-89 95-43	30-27 87-91	30-82 87-96	30-95 87-106	30-100 87-112	77-47 89-20	83-18 90-20	87-45 91-47	87-52 92-47	87-58 93-92	87-64 93-97	87-70 93-138
C\$PNTS	7-373#													
C\$PNTX	7-373#	20-218	20-219	20-221	20-222	20-224	20-225	20-229	20-230					
C\$QIO	7-373#													
C\$RDBU	7-373#													
C\$REFG	7-373#	30-12	30-16	30-22										
C\$RESE	7-373#	7-373#	30-10											
C\$REVI	7-373#	7-427												
C\$RFLA	7-373#													
C\$RPT	7-373#	28-75												
C\$SEFG	7-373#													
C\$SPRI	7-373#	32-18	47-26	51-23	51-48	52-26	52-50	57-35	58-36	59-26	59-39			
C\$SEEC	7-373#	20-154	20-161	36-62	57-32	58-34	59-15							
C\$TPRI	7-373#													
CA	13-126	16-6#												
CALMOD	16-119	20-193#												
CLKSTA	13-35#	20-98*	20-116*	20-131*	20-169	32-22								
CLR	12-30#	22-9	23-94	30-71	32-20	37-35	41-40	41-74	46-32	49-60	50-62	51-36	52-38	53-29
	54-28	55-28	56-31	57-46	58-24	58-44	59-18	59-34	63-18	70-39	75-45			
CMOD	12-156#	91-64	92-53	93-128	93-187	93-207	93-325							
COMPAR	25-87#	38-21	38-21	39-22	39-22	40-21	40-21	43-42	43-42	47-27	47-27	48-25	48-25	64-25
	64-25	67-24	68-44	69-25	69-25									
CONSET	25-118#	38-21	39-22	40-21	43-42	47-27	48-25	64-25	69-25					
CPE	12-192#													
CPU	12-191#													
CR	15-12													
CREADY	18-44#	18-46	19-26											
CRLF	15-39#	16-104	16-123	16-132	16-135	16-141	21-18	30-27	30-100	87-96	87-112			
CSTORE	13-37#	25-30*	25-52	25-76*	25-78*	25-120*	91-55*	91-69*	91-83					
DCK	12-93#													
DCU	12-173#													
DECODE	16-98	16-120	16-127	27-10#										
DESCYL	13-30#	19-17	23-20	23-22*	91-57*	92-40*	92-41*	93-103*	93-104*	93-141	93-165	94-57*		
DESTRK	13-29#	19-18	23-16	23-18*	23-23*	91-58*	92-42*	93-102*	93-127*	93-136	93-158*	93-159	93-228*	93-296*
	94-58*	94-59*	94-68*	94-69*										
DFPTBL	9-9#													
DIAG	12-212#	19-14	19-21	19-41	20-12	20-26	32-14	86-18	87-29					
DIAGEN	20-9#	32-16	86-99	87-114	88-71	95-82								
DIAGLD	20-24#	22-115	87-36	88-31	95-73									
DIAGMC	7-373	7-373												
DIAGST	19-39#	87-33	88-27	95-70										
DLT	12-40#													
DMD	12-98#	70-38	70-41	70-45	70-47	70-65	88-38	92-54	92-91	93-108	95-80			
DMPREG	16-101	16-118	16-139	20-217#										
DPE	12-171#													
DPR	12-66#													
DRCLR	12-207#	20-9	70-46	77-54	88-36	95-78								
DRIVER	19-12#	19-42	20-10	20-13	20-27	86-26	86-41	86-57	86-77	88-37	91-68	92-58	92-72	92-93
	93-109	93-131	93-188	93-210	93-242	93-257	93-290	93-323	93-328	94-44	94-61	94-71	95-79	
DRQ	12-128#	63-22	63-24											
DRT0	12-119#													
DRT1	12-120#													

[illegible]

EM34	16-73#	93-276												
EM35	16-74#	88-35	95-77											
EM36	16-75#	84-58												
EM37	16-76#	93-156												
EM4	16-47#													
EM40	16-78#	93-248												
EM41	16-79#	93-194												
EM42	16-80#	74-34												
EM43	16-81#	18-20												
EM5	16-48#	42-57												
EM6	16-49#	42-65												
EM7	16-50#													
ENDCYL	13-21#	30-60												
ENDTRK	13-19#	30-59												
ERR	12-72#	22-61	22-66	74-21	74-25	75-35	75-39	75-53	75-57	76-21	77-36	77-41	77-55	77-61
	77-65	83-27	83-31	91-70	92-80	92-84	92-100	96-39						
ERRC	16-96#	23-101	24-26	25-69	25-106	37-30	37-41	41-47	41-57	41-65	41-72	41-81	42-45	42-57
	42-65	44-43	45-48	46-48	49-35	49-42	49-55	49-66	49-79	50-37	50-44	50-57	50-68	50-81
	51-31	51-42	52-33	52-44	53-29	53-29	53-29	54-28	54-28	54-28	55-28	55-28	55-28	56-31
	56-31	56-31	57-29	58-31	58-41	60-46	61-26	62-37	63-30	65-33	66-29	70-66	71-34	72-44
	73-38	74-34	74-36	75-43	75-61	76-24	77-67	78-24	79-36	79-46	80-38	80-45	80-56	81-23
	82-28	83-34	84-58	85-42	86-34	86-49	86-65	86-85	89-50	90-46	91-90	92-67	92-87	92-106
	92-110	93-117	93-194	93-222	93-248	93-264	93-285	93-309	93-336	94-51	94-66			
ERR1	16-107#	18-20	88-35	95-77										
ERR2	16-126#	93-156	93-217	93-276	93-303									
ERR3	16-138#	96-37	96-42	96-47										
ERRCK	22-60#	93-112	93-189	93-219	93-243	93-291	93-306							
ERRDMP	10-11#	87-21												
ERRVEC	17-10	17-13	17-14*	17-41*										
ERRWD1	13-25#	20-199*	20-205*	27-10	30-64*	32-9*	37-28*	38-19*	39-19*	40-18*	41-35*	42-32*	43-39*	44-28*
	45-28*	46-28*	47-22*	48-22*	49-26*	50-27*	51-19*	52-21*	53-29*	54-28*	55-28*	56-31*	57-18*	58-19*
	60-44*	61-24*	62-35*	63-28*	64-22*	65-31*	66-27*	67-17*	68-15*	69-21*	70-52*	70-58*	70-60*	71-32*
	72-39*	72-43*	73-36*	74-27*	75-41*	75-59*	76-22*	77-38*	77-42*	77-66*	78-22*	79-34*	79-44*	80-36*
	80-54*	81-21*	82-26*	83-32*	84-56*	85-30*	86-19*	89-48*	90-44*	91-88*	92-65*	92-85*	92-104*	92-108*
	93-115*	93-151*	93-192*	93-212*	93-229*	93-334*	94-47*	94-55*	96-26*					
ERRWD2	13-26#	20-200*	20-206*	30-65*	32-10*	37-29*	38-18*	39-20*	40-19*	41-36*	42-33*	43-40*	44-29*	45-29*
	46-29*	47-23*	48-23*	49-25*	50-28*	51-20*	52-22*	53-29*	54-28*	55-28*	56-31*	57-19*	58-20*	60-45*
	61-25*	62-36*	63-29*	64-23*	65-32*	66-28*	67-18*	68-16*	69-22*	70-55*	70-62*	71-33*	72-40*	73-37*
	74-26*	75-42*	75-60*	76-23*	77-34*	78-23*	79-35*	79-45*	80-37*	80-55*	81-22*	82-27*	83-33*	84-57*
	85-31*	86-20*	89-49*	90-45*	91-89*	92-66*	92-86*	92-105*	92-109*	93-116*	93-152*	93-193*	93-213*	93-230*
	93-335*	94-48*	94-56*	96-27*										
ERSTAT	13-51#	22-60*	22-74*	30-69*	32-11*	70-34*	70-43*	70-49*	70-50	70-53	70-56	70-69*	72-26*	72-31*
	72-35*	72-36	72-41	72-47*	93-113	93-190	93-220	93-244	93-292	93-307				
EVL	11-57#													
EWN	12-62#													
EXPTED	13-46#	16-100	16-130	22-65*	22-66*	22-72*	22-73*	22-99*	23-61*	23-68*	23-75*	23-98*	23-100*	24-22*
	24-23*	24-24	25-54*	25-92*	37-27*	37-38*	44-27*	44-34	44-39	45-47*	60-43*	61-22*	62-27*	62-32
	63-21*	63-24*	63-25	70-64*	71-22*	72-25*	73-35*	75-51*	78-19*	79-29*	79-30	79-38	79-39*	80-30*
	80-32	80-47*	80-48	80-49*	80-50	84-55*	85-41*	85-70*	86-31*	86-32*	86-46*	86-47*	86-62*	86-63*
	86-82*	86-83*	90-34*	91-53*	91-81	92-62*	92-97*	93-154*	93-272*	93-331*	94-49*	94-64*		
FSAU	7-373#	34-9	34-35											
FSAUTO	7-373#	31-10	31-18											
F\$BGN	7-373#	7-399	10-26	11-51	16-96	16-107	16-126	16-138	20-179	27-39	27-43	28-40	28-46	29-8
	30-8	30-20	30-126	31-10	32-8	32-42	33-8	34-9	34-36	36-38	36-60	36-71	37-19	37-21
	37-33	37-46	38-17	38-21	38-21	38-21	38-21	38-24	39-18	39-22	39-22	39-22	39-22	39-25
	40-17	40-21	40-21	40-21	40-21	40-24	41-31	41-34	41-38	41-39	41-50	41-86	42-31	42-35

42-36	42-70	43-37	43-42	43-42	43-42	43-46	44-26	44-31	44-50	45-26	45-31	45-34
45-61	46-24	46-27	46-31	46-53	47-18	47-21	47-27	47-27	47-27	47-30	48-18	48-21
48-25	48-25	48-25	48-25	48-28	49-24	49-28	49-46	49-49	49-59	49-70	49-73	49-85
50-30	50-48	50-51	50-61	50-72	50-75	50-87	51-18	51-24	51-35	51-49	52-17	52-20
52-37	52-51	53-28	53-29	53-29	53-29	53-29	53-30	54-27	54-28	54-28	54-28	54-29
55-27	55-28	55-28	55-28	55-28	55-29	56-30	56-31	56-31	56-31	56-31	56-32	57-17
57-34	57-50	58-18	58-22	58-32	58-35	58-48	59-13	59-16	59-40	60-22	60-28	60-31
60-37	60-56	61-15	61-17	61-31	62-13	62-15	62-42	63-15	63-17	63-35	64-20	64-25
64-25	64-25	64-28	65-18	65-20	65-41	66-12	66-14	66-36	67-14	67-21	67-41	68-14
68-51	69-20	69-25	69-25	69-25	69-25	69-28	70-33	70-36	70-72	71-17	71-19	71-39
72-20	72-50	73-13	73-15	73-43	74-17	74-19	74-41	75-21	75-23	75-66	76-12	76-14
77-28	77-30	77-52	77-72	78-13	78-15	78-29	79-22	79-24	79-51	80-24	80-26	80-61
81-14	81-28	82-14	82-16	82-33	83-13	83-22	83-23	83-40	84-18	84-64	85-25	85-74
86-24	86-38	86-55	86-75	86-100	87-20	87-26	87-115	88-24	88-30	88-72	89-15	89-24
89-56	90-15	90-24	90-25	90-52	91-42	91-51	91-54	91-95	92-39	92-51	92-52	92-69
92-113	93-87	93-93	93-101	93-105	93-105	93-106	93-120	93-197	93-226	93-227	93-227	93-238
93-321	93-339	94-31	94-32	94-41	94-53	94-76	95-30	95-36	95-41	95-72	95-83	96-25
96-51	97-42	97-52	98-12	98-64	99-15	99-16	99-16	99-21	99-22			96-49
F\$CLEA	7-373#	32-8	32-57									
F\$DU	7-373#	33-8	33-34									
F\$END	7-373	7-373	7-373	7-373	7-373	7-373	7-373	7-373	7-373	7-373	7-373	7-373
	7-373	7-373	7-373#	7-399	10-26	11-51	16-105	16-124	16-136	16-142	20-185	27-41
28-60	28-75	30-20	30-126	30-141	31-18	32-42	32-57	33-19	33-34	34-20	34-35	34-36
36-60	36-60	36-60	36-71	36-71	37-19	37-19	37-19	37-32	37-43	37-46	37-46	38-17
38-17	38-21	38-21	38-21	38-24	38-24	39-18	39-18	39-18	39-22	39-22	39-22	39-25
40-17	40-17	40-17	40-21	40-21	40-21	40-24	40-24	41-31	41-31	41-31	41-34	41-83
41-86	42-31	42-31	42-31	42-67	42-70	42-70	43-37	43-37	43-37	43-42	43-42	43-42
43-46	44-26	44-26	44-26	44-47	44-50	44-50	45-26	45-26	45-26	45-58	45-61	45-61
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49-49	49-58	49-69	49-73	49-82	49-85	49-85	50-26	50-26	50-26	50-47	50-51	50-60
50-75	50-84	50-87	50-87	51-18	51-18	51-18	51-34	51-45	51-49	51-49	52-17	52-17
52-20	52-36	52-47	52-51	52-51	53-28	53-28	53-28	53-29	53-29	53-29	53-29	53-30
54-27	54-27	54-27	54-28	54-28	54-28	54-28	54-29	54-29	55-27	55-27	55-27	55-28
55-28	55-28	55-29	55-29	56-30	56-30	56-30	56-31	56-31	56-31	56-31	56-32	56-32
57-17	57-17	57-31	57-42	57-50	57-50	58-18	58-18	58-18	58-32	58-33	58-43	58-48
59-13	59-13	59-13	59-33	59-40	59-40	60-22	60-22	60-22	60-28	60-31	60-36	60-47
60-56	61-15	61-15	61-15	61-28	61-31	61-31	62-13	62-13	62-13	62-39	62-42	62-42
63-15	63-15	63-32	63-35	63-35	64-20	64-20	64-20	64-25	64-25	64-25	64-28	64-28
65-18	65-18	65-38	65-41	65-41	66-12	66-12	66-12	66-33	66-36	66-36	67-14	67-14
67-38	67-41	67-41	68-14	68-14	68-14	68-48	68-51	68-51	69-20	69-20	69-20	69-25
69-25	69-28	69-28	70-33	70-33	70-33	70-68	70-72	70-72	71-17	71-17	71-17	71-36
71-39	72-18	72-18	72-18	72-46	72-50	72-50	73-13	73-13	73-13	73-40	73-43	73-43
74-17	74-17	74-38	74-41	74-41	75-21	75-21	75-21	75-63	75-66	75-66	76-12	76-12
76-26	76-29	76-29	77-28	77-28	77-28	77-52	77-69	77-72	77-72	78-13	78-13	78-13
78-29	78-29	79-22	79-22	79-22	79-48	79-51	79-51	80-24	80-24	80-24	80-58	80-61
81-12	81-12	81-12	81-25	81-28	81-28	82-14	82-14	82-14	82-30	82-33	82-33	83-13
83-13	83-22	83-36	83-40	83-40	84-18	84-18	84-18	84-64	84-64	85-25	85-25	85-25
85-74	86-16	86-16	86-16	86-37	86-52	86-68	86-88	86-100	86-100	87-20	87-20	87-20
87-115	87-115	88-24	88-24	88-24	88-39	88-72	88-72	89-15	89-15	89-15	89-24	89-52
89-56	90-15	90-15	90-15	90-24	90-48	90-52	90-52	91-42	91-42	91-42	91-51	91-92
91-95	92-39	92-39	92-39	92-51	92-68	92-89	92-112	92-113	92-113	93-87	93-87	93-87
93-101	93-105	93-105	93-119	93-196	93-225	93-226	93-226	93-227	93-227	93-315	93-320	93-320
93-339	93-339	94-31	94-31	94-31	94-41	94-52	94-75	94-76	94-76	95-30	95-30	95-30
95-41	95-81	95-83	95-83	96-25	96-25	96-25	96-49	96-49	96-51	97-42	97-61	98-33
99-15	99-16	99-21	99-22									98-64

F\$HARD	7-373#	97-52	97-61	98-20										
F\$HW	7-373#	9-9	9-25											
F\$INIT	7-373#	30-8	30-141											
F\$JMP	7-373#	28-60	28-60	30-20	30-126	32-42	33-19	33-19	34-20	34-20	41-34	46-27	47-21	48-21
	49-49	49-73	50-51	50-75	52-20	53-29	54-28	55-28	56-31	58-32	60-28	60-31	60-36	77-52
	83-22	87-26	89-24	90-24	91-51	92-51	93-93	93-101	94-41	95-36	95-41			
F\$MOD	7-373#	7-399	10-26	11-51	27-43	28-40	34-36	36-38	96-51	97-42	98-64			
F\$MSG	7-373#	16-96	16-105	16-107	16-124	16-126	16-136	16-138	16-142					
F\$PROT	7-373#	29-8	29-12											
F\$PWR	7-373#													
F\$RPT	7-373#	28-46	28-75											
F\$SEG	7-373#	37-21	37-32	37-33	37-43	38-21	38-21	38-21	38-21	38-21	38-21	38-21	38-21	39-22
	39-22	39-22	39-22	39-22	39-22	39-22	39-22	40-21	40-21	40-21	40-21	40-21	40-21	40-21
	40-21	41-38	41-39	41-49	41-50	41-59	41-83	42-35	42-36	42-47	42-67	43-42	43-42	43-42
	43-42	43-42	43-42	43-42	43-42	44-31	44-47	45-31	45-34	45-52	45-58	46-31	46-50	47-27
	47-27	47-27	47-27	47-27	47-27	47-27	47-27	48-25	48-25	48-25	48-25	48-25	48-25	48-25
	48-25	49-28	49-45	49-46	49-58	49-59	49-69	49-70	49-82	50-30	50-47	50-48	50-60	50-61
	50-71	50-72	50-84	51-24	51-34	51-35	51-45	52-24	52-36	52-37	52-47	53-29	53-29	53-29
	53-29	53-29	53-29	54-28	54-28	54-28	54-28	54-28	54-28	55-28	55-28	55-28	55-28	55-28
	55-28	56-31	56-31	56-31	56-31	56-31	56-31	57-21	57-31	57-34	57-42	58-22	58-33	58-35
	58-43	59-16	59-33	60-37	60-47	61-17	61-28	62-15	62-39	63-17	63-32	64-25	64-25	64-25
	64-25	64-25	64-25	64-25	64-25	65-20	65-38	66-14	66-33	67-21	67-38	68-20	68-48	69-25
	69-25	69-25	69-25	69-25	69-25	69-25	69-25	70-36	70-68	71-19	71-36	72-20	72-46	73-15
	73-40	74-19	74-38	75-23	75-63	76-14	76-26	77-30	77-69	78-15	78-26	79-24	79-48	80-26
	80-58	81-14	81-25	82-16	82-30	83-23	83-36	86-24	86-37	86-38	86-52	86-55	86-68	86-75
	86-88	88-30	88-39	89-25	89-52	90-25	90-48	91-54	91-92	92-52	92-68	92-69	92-89	92-90
	92-112	93-106	93-119	93-120	93-196	93-197	93-225	93-238	93-315	93-321	93-338	94-32	94-52	94-53
	94-75	95-72	95-81											
F\$SOFT	7-373#	98-12	98-20	98-33										
F\$SRV	7-373#	20-179	20-185	27-39	27-41									
F\$SUB	7-373#	93-105	93-226	93-227	93-320									
F\$SW	7-373#	10-8	10-25											
F\$TEST	7-373#	36-60	36-71	37-19	37-46	38-17	38-24	39-18	39-25	40-17	40-24	41-31	41-86	42-31
	42-70	43-37	43-46	44-26	44-50	45-26	45-61	46-24	46-53	47-18	47-30	48-18	48-28	49-24
	49-85	50-26	50-87	51-18	51-49	52-17	52-51	53-28	53-30	54-27	54-29	55-27	55-29	56-30
	56-32	57-17	57-50	58-18	58-48	59-13	59-40	60-22	60-56	61-15	61-31	62-13	62-42	63-15
	63-35	64-20	64-28	65-18	65-41	66-12	66-36	67-14	67-41	68-14	68-51	69-20	69-28	70-33
	70-72	71-17	71-39	72-18	72-50	73-13	73-43	74-17	74-41	75-21	75-66	76-12	76-29	77-28
	77-72	78-13	78-29	79-22	79-51	80-24	80-61	81-12	81-28	82-14	82-33	83-13	83-40	84-18
	84-64	85-25	85-74	86-16	86-100	87-20	87-115	88-24	88-72	89-15	89-56	90-15	90-52	91-42
	91-95	92-39	92-113	93-87	93-339	94-31	94-76	95-30	95-83	96-25	96-49			
F1	12-51#													
F2	12-52#													
F3	12-53#													
F4	12-54#													
F5	12-55#													
FASTAT	13-36#	32-12*	93-250*	93-265*	93-311	93-313*								
FATOF	13-52#	16-129	93-155*	93-211*	93-275*	93-298*								
FAULTS	16-102	16-121	16-133	21-9#										
FER	12-82#	93-329	93-331											
FLOAT	25-51#	38-21	39-22	40-21	43-42	47-27	48-25	64-25	69-25					
FLST00	15-54#	21-9												
FLST01	15-55#	21-12												
FMT	12-154#	25-10	89-29	89-43	89-47									
FORTRK	12-216#	93-185												
FRMT00	15-52#	16-99												

[illegible]

HOE	11-57#													
ISAU	7-373#	34-9#	34-35#											
ISAUTO	7-373#	31-10#	31-18#											
ISCLN	7-373#	32-8#	32-42	32-57#										
ISDU	7-373#	33-8#	33-34#											
ISHRD	97-52#	97-61#												
ISINIT	7-373#	30-8#	30-20	30-126	30-141#									
ISMOD	7-373#	7-399	7-399#	10-26	10-26#	11-51	11-51#	27-43	27-43#	28-40	28-40#	34-36	34-36#	36-38
	36-38#	96-51	96-51#	97-42	97-42#	98-64	98-64#							
ISMSG	7-373#	16-96#	16-105#	16-107#	16-124#	16-126#	16-136#	16-138#	16-142#					
ISPROT	7-373#	29-8#												
ISPTAB	7-373#	99-16	99-16#	99-21	99-21#									
ISPR	7-373#													
ISRPT	7-373#	28-46#	28-75#											
ISSEG	7-373#	36-60	37-19	37-21#	37-32#	37-33#	37-43#	38-17	38-21#	38-21#	38-21#	38-21#	38-21#	38-21#
	38-21#	39-18	39-22#	39-22#	39-22#	39-22#	39-22#	39-22#	39-22#	40-17	40-21#	40-21#	40-21#	40-21#
	40-21#	40-21#	40-21#	41-31	41-38#	41-39#	41-50#	41-83#	42-31	42-35#	42-36#	42-67#	43-37	43-42#
	43-42#	43-42#	43-42#	43-42#	43-42#	43-42#	44-26	44-31#	44-47#	45-26	45-31#	45-34#	45-58#	46-24
	46-31#	46-50#	47-18	47-27#	47-27#	47-27#	47-27#	47-27#	47-27#	47-27#	48-18	48-25#	48-25#	48-25#
	48-25#	48-25#	48-25#	48-25#	49-24	49-28#	49-45#	49-46#	49-49	49-58#	49-59#	49-69#	49-70#	49-73
	49-82#	50-26	50-30#	50-47#	50-48#	50-51	50-60#	50-61#	50-71#	50-72#	50-75	50-84#	51-18	51-24#
	51-34#	51-35#	51-45#	52-17	52-24#	52-36#	52-37#	52-47#	53-28	53-29#	53-29#	53-29#	53-29#	53-29#
	53-29#	54-27	54-28#	54-28#	54-28#	54-28#	54-28#	54-28#	55-27	55-28#	55-28#	55-28#	55-28#	55-28#
	55-28#	56-30	56-31#	56-31#	56-31#	56-31#	56-31#	56-31#	57-17	57-21#	57-31#	57-34#	57-42#	58-18
	58-22#	58-33#	58-35#	58-43#	59-13	59-16#	59-33#	60-22	60-37#	60-47#	61-15	61-17#	61-28#	62-13
	62-15#	62-39#	63-15	63-17#	63-32#	64-20	64-25#	64-25#	64-25#	64-25#	64-25#	64-25#	64-25#	65-18
	65-20#	65-38#	66-12	66-14#	66-33#	67-14	67-21#	67-38#	68-14	68-20#	68-48#	69-20	69-25#	69-25#
	69-25#	69-25#	69-25#	69-25#	69-25#	70-33	70-36#	70-68#	71-17	71-19#	71-36#	72-18	72-20#	72-46#
	73-13	73-15#	73-40#	74-17	74-19#	74-38#	75-21	75-23#	75-63#	76-12	76-14#	76-26#	77-28	77-30#
	77-69#	78-13	78-15#	78-26#	79-22	79-24#	79-48#	80-24	80-26#	80-58#	81-12	81-14#	81-25#	82-14
	82-16#	82-30#	83-13	83-23#	83-36#	84-18	85-25	86-16	86-24#	86-37#	86-38#	86-52#	86-55#	86-68#
	86-75#	86-88#	87-20	88-24	88-30#	88-39#	89-15	89-25#	89-52#	90-15	90-25#	90-48#	91-42	91-54#
	91-92#	92-39	92-52#	92-68#	92-69#	92-89#	92-90#	92-112#	93-87	93-105	93-106#	93-119#	93-120#	93-196#
	93-197#	93-225#	93-227	93-238#	93-315#	93-321#	93-338#	94-31	94-32#	94-52#	94-53#	94-75#	95-30	95-72#
	95-81#	96-25												
ISSETU	7-373#	99-15	99-15#	99-16	99-22	99-22#								
ISSFT	98-12#	98-33#												
ISSRV	7-373#	20-179#	20-185#	27-39#	27-41#									
ISSUB	7-373#	36-60	37-19	38-17	39-18	40-17	41-31	42-31	43-37	44-26	45-26	46-24	47-18	48-18
	49-24	50-26	51-18	52-17	53-28	54-27	55-27	56-30	57-17	58-18	59-13	60-22	61-15	62-13
	63-15	64-20	65-18	66-12	67-14	68-14	69-20	70-33	71-17	72-18	73-13	74-17	75-21	76-12
	77-28	78-13	79-22	80-24	81-12	82-14	83-13	84-18	85-25	86-16	87-20	88-24	89-15	90-15
	91-42	92-39	93-87	93-105	93-105#	93-226	93-226#	93-226#	93-227	93-227#	93-320	93-320#	93-320#	94-31
	95-30	96-25												
ISTST	7-373#	36-60	36-60#	36-71	36-71#	36-71#	37-19	37-19#	37-46	37-46#	37-46#	38-17	38-17#	38-24
	38-24#	38-24#	39-18	39-18#	39-25	39-25#	39-25#	40-17	40-17#	40-24	40-24#	40-24#	41-31	41-31#
	41-34	41-86	41-86#	41-86#	42-31	42-31#	42-70	42-70#	42-70#	43-37	43-37#	43-46	43-46#	43-46#
	44-26	44-26#	44-50	44-50#	44-50#	45-26	45-26#	45-61	45-61#	45-61#	46-24	46-24#	46-27	46-53
	46-53#	46-53#	47-18	47-18#	47-21	47-30	47-30#	47-30#	48-18	48-18#	48-21	48-28	48-28#	48-28#
	49-24	49-24#	49-85	49-85#	49-85#	50-26	50-26#	50-87	50-87#	50-87#	51-18	51-18#	51-49	51-49#
	51-49#	52-17	52-17#	52-20	52-51	52-51#	52-51#	53-28	53-28#	53-29	53-30	53-30#	53-30#	54-27
	54-27#	54-28	54-29	54-29#	54-29#	55-27	55-27#	55-28	55-29	55-29#	55-29#	56-30	56-30#	56-31
	56-32	56-32#	56-32#	57-17	57-17#	57-50	57-50#	57-50#	58-18	58-18#	58-32	58-48	58-48#	58-48#
	59-13	59-13#	59-40	59-40#	59-40#	60-22	60-22#	60-28	60-31	60-36	60-56	60-56#	60-56#	61-15
	61-15#	61-31	61-31#	61-31#	62-13	62-13#	62-42	62-42#	62-42#	63-15	63-15#	63-35	63-35#	63-35#
	64-20	64-20#	64-28	64-28#	64-28#	65-18	65-18#	65-41	65-41#	65-41#	66-12	66-12#	66-36	66-36#

	66-36#	67-14	67-14#	67-41	67-41#	67-41#	68-14	68-14#	68-51	68-51#	68-51#	69-20	69-20#	69-28
	69-28#	69-28#	70-33	70-33#	70-72	70-72#	70-72#	71-17	71-17#	71-39	71-39#	71-39#	72-18	72-18#
	72-50	72-50#	72-50#	73-13	73-13#	73-43	73-43#	73-43#	74-17	74-17#	74-41	74-41#	75-21	75-21#
	75-21#	75-66	75-66#	75-66#	76-12	76-12#	76-29	76-29#	76-29#	77-28	77-28#	77-52	77-72	77-72#
	77-72#	78-13	78-13#	78-29	78-29#	78-29#	79-22	79-22#	79-51	79-51#	79-51#	80-24	80-24#	80-61
	80-61#	80-61#	81-12	81-12#	81-28	81-28#	81-28#	82-14	82-14#	82-33	82-33#	82-33#	83-13	83-13#
	83-22	83-40	83-40#	83-40#	84-18	84-18#	84-64	84-64#	84-64#	85-25	85-25#	85-74	85-74#	85-74#
	86-16	86-16#	86-100	86-100#	86-100#	87-20	87-20#	87-26	87-115	87-115#	87-115#	88-24	88-24#	88-72
	88-72#	88-72#	89-15	89-15#	89-24	89-56	89-56#	89-56#	90-15	90-15#	90-24	90-52	90-52#	90-52#
	91-42	91-42#	91-51	91-95	91-95#	91-95#	92-39	92-39#	92-51	92-113	92-113#	92-113#	93-87	93-87#
	93-93	93-101	93-105	93-227	93-339	93-339#	93-339#	94-31	94-31#	94-41	94-76	94-76#	94-76#	95-30
	95-30#	95-36	95-41	95-83	95-83#	95-83#	96-25	96-25#	96-49	96-49#	96-49#			
IAE	12-88#	92-60	92-62	94-62	94-64	94-72								
IBE	11-57#													
IDU	11-57#													
IE	12-5#	51-25	51-26	51-30	51-37	51-41	52-27	52-28	52-32	52-39	52-43	57-36	58-37	59-27
IER	11-57#													
ILEV	12-63#	93-171												
ILF	12-78#	71-27	71-29	72-28	72-30	94-45	94-49							
ILOCK	13-48#	24-13	24-17	25-55	25-59	25-93	25-97	30-66*	43-38*	43-45*				
ILR	12-79#													
INTFLG	13-49#	27-40*	30-67*	57-27*	57-38	58-23*	58-39	59-17*	59-29					
INTSRV	27-39#	57-32	58-34	59-15										
IOBUFF	13-104#	93-157	93-184	93-199	93-208	93-233	93-239	93-252	93-255	93-287				
IR	12-31#	24-37	42-37	42-40	42-44									
IRLOCK	24-15	24-36#	24-38	25-57	25-95	44-33	45-37	46-35	53-29	54-28	55-28	55-28	56-31	56-31
ISR	11-57#													
ITCOUN	13-24#	25-107*	36-61*	36-68*	36-69*	37-20*	37-31*	37-42*	37-44*	38-20*	38-22*	39-21*	39-23*	40-20*
	40-22*	41-37*	41-48*	41-58*	41-66*	41-73*	41-82*	41-84*	42-34*	42-46*	42-58*	42-66*	42-68*	43-41*
	43-43*	44-30*	44-44*	44-48*	45-30*	45-49*	45-59*	46-30*	46-49*	46-51*	47-24*	47-28*	48-24*	48-26*
	49-27*	49-36*	49-43*	49-56*	49-67*	49-80*	49-83*	50-29*	50-38*	50-45*	50-58*	50-69*	50-82*	50-85*
	51-21*	51-32*	51-43*	51-46*	52-23*	52-34*	52-45*	52-48*	53-29*	53-29*	53-29*	53-29*	53-29*	53-29*
	54-28*	54-28*	54-28*	54-28*	54-28*	54-28*	55-28*	55-28*	55-28*	55-28*	55-28*	55-28*	56-31*	56-31*
	56-31*	56-31*	56-31*	56-31*	57-20*	57-30*	57-41*	57-47*	58-21*	58-42*	58-45*	59-14*	59-32*	59-35*
	61-16*	61-27*	61-29*	62-14*	62-38*	62-40*	63-16*	63-31*	63-33*	64-21*	64-26*	65-19*	65-34*	65-39*
	66-13*	66-30*	66-34*	67-20*	67-39*	68-19*	68-49*	69-24*	69-26*	70-35*	70-67*	70-70*	71-18*	71-35*
	71-37*	72-19*	72-45*	72-48*	73-14*	73-39*	73-41*	74-18*	74-37*	74-39*	75-22*	75-44*	75-62*	75-64*
	76-13*	76-25*	76-27*	77-29*	77-68*	77-70*	78-14*	78-25*	78-27*	79-23*	79-47*	79-49*	80-25*	80-39*
	80-46*	80-57*	80-59*	81-13*	81-24*	81-26*	82-15*	82-29*	82-31*	83-14*	83-35*	83-37*	84-19*	84-59*
	84-62*	85-26*	85-43*	85-72*	86-17*	86-35*	86-50*	86-66*	86-86*	86-95*	89-16*	89-51*	89-53*	90-16*
	90-47*	90-49*	91-52*	91-91*	91-93*									
IXE	11-57#													
IXU	12-174#													
J\$JMP	7-373#	28-60	33-19	34-20										
J1	13-108	16-7#												
J10	13-117	16-16#												
J11	13-118	16-17#												
J12	13-119	16-18#												
J13	13-120	16-19#												
J14	13-121	16-20#												
J15	13-122	16-21#												
J16	13-123	16-22#												
J17	13-124	16-23#												
J2	13-109	16-8#												
J20	13-129	16-24#												
J21	13-130	16-25#												

J3	13-110	16-9#						
J4	13-111	16-10#						
J5	13-112	16-11#						
J6	13-113	16-12#						
J7	13-114	16-13#						
J8	13-115	16-14#						
J9	13-116	16-15#						
K1RELA	13-137	16-33#						
KWSRV	20-154	20-161	20-180#					
LSACP	7-427#							
LSAPT	7-427#							
LSAU	34-9#							
LSAUT	7-427#							
LSAUTO	7-427	31-10#						
LSCCP	7-427#							
LSCLEA	7-427	32-8#						
LSCO	7-427#							
LSDEPO	7-427#							
LSDESC	7-427	15-27#						
LSDESP	7-427#							
LSDEVP	7-427#							
LSDISP	7-427	8-8#						
LSDLY	7-427#	22-50	42-39	42-51	57-37	58-38	59-28	
LSDTP	7-427#							
LSDTYP	7-427#							
LSDU	33-8#							
LSDUT	7-427#							
LSDVTY	7-427	15-17#						
LSEF	7-427#							
LSENVI	7-427#							
LSETP	7-427#							
LSEXP1	7-427#							
LSEXP4	7-427#							
LSEXP5	7-427#							
LSHARD	7-427	97-52	97-52#					
LSHIME	7-427#							
LSHPCP	7-427#							
LSHPTP	7-427#							
LSHW	7-427	9-9	9-9#					
LSICP	7-427#							
LSINIT	7-427	30-8#						
LSLADP	7-427#							
LSLAST	7-427	98-63#	99-22					
LSLOAD	7-427#							
LSLUN	7-427#							
LSMREV	7-427#							
LSNAME	7-427#							
LSPRIO	7-427#							
LSPROT	7-427	29-8#						
LSPRT	7-427#							
LSREPP	7-427#							
LSREV	7-427#							
LSRPT	28-46#							
LSOFT	7-427	98-12	98-12#					
LSSPC	7-427#							
LSSPCP	7-427#							

[illegible]

MESG15	15-50#	93-138													
MESG17	98-14	98-38#													
MESG18	98-16	98-39#													
MESG20	98-18	98-40#													
MESG21	98-22	98-41#													
MESG22	98-24	98-42#													
MESG4	97-56	97-67#													
MESG5	97-58	97-68#													
MESG6	97-60	97-69#													
MOH	12-129#														
MOL	12-70#	26-12	77-44	83-15	89-17	90-17	91-44	92-44	93-89	94-34					
MSGMOL	15-45#	77-47	83-18	89-20	90-20	91-47	92-47	93-92	94-37						
MSGWLO	15-46#	93-97													
MSK	13-44#	23-90*	23-95	23-100	23-102*	24-21	24-22	25-38*	25-39*	25-53	25-63	25-91	25-101	25-122	
	67-15*	67-16*	68-41*	68-42*											
MTD	12-155#														
MTRBRK	13-136	16-32#													
MXF	12-34#	41-51	41-52	41-56											
NBA	12-131#														
NED	12-37#														
NEGWRD	13-28#	19-12*	19-16	91-67*	92-56*	93-129*	93-186*	93-209*	93-241*	93-256*	93-288*	93-326*			
NEM	12-36#														
NEXLOC	22-112#	87-48	87-54	87-60	87-66	87-72	87-78	87-85	87-98						
NOP	12-209#	96-30													
OSAPTS	7-373#	7-427													
OSAU	7-373#	7-427													
OSBGNR	7-373#	7-427													
OSBGNS	7-373#	7-405#	7-427												
OSDU	7-373#	7-427													
OSERRT	7-373#	7-427													
OSGNSW	7-373#	7-405#	7-427												
OSPOIN	7-373#	7-405	7-405#	7-405#	7-405#	7-427									
OSSETU	7-373#	7-405#	7-427	98-63											
OCTHEX	16-110	16-115	20-49#	87-104											
OFFDIR	12-151#														
OM	12-61#														
ONEFIL	2-4#	2-8	4--=43	5-1	7-358#	7-394	10-27	11-1	11-8#	11-13	28-7#	28-12	34-37	35-1	
	35-9#	36-3	96-52	97-1	97-8#	97-14									
OPI	12-91#														
OPRPNL	13-138	16-34#													
OR	12-32#	24-49	42-49	42-52	42-56	42-60	42-64								
ORLOCK	24-19	24-48#	24-50	25-61	25-99	44-38	45-43	53-29	54-28	55-28	55-28	56-31	56-31		
PAR	12-81#	66-19	66-22	66-26	71-24	71-26	72-24	72-32	72-34	73-24	75-29	75-33	75-47		
PAT	12-29#	46-34	72-22	75-25	77-32	77-57	79-26	79-37	80-28	82-18	90-27				
PATCNT	13-38#	25-32*	25-118*	38-21	39-22	40-21	43-42	47-27	48-25	64-25	69-25				
PATT1	13-8#	13-144	13-150	13-162	13-169	13-175	13-181	13-193	45-33	66-16	73-17	75-26	77-33	77-58	
	79-27	80-29	82-19	93-232											
PATT2	13-9#	13-145	13-151	13-157	13-163	13-170	13-176	13-182	13-194	37-22	37-27	45-55			
PATT3	13-10#	13-183	13-195	38-21	39-22	40-21	43-42	46-36	47-27	48-25	64-25	69-25	89-27	89-28	
	90-28	90-29	90-32	90-34											
PATT4	13-11#	38-21	39-22	40-21	43-42	47-27	48-25	62-22	64-25	65-21	69-25				
PATT5	13-12#	13-164	13-196	44-27											
PATT6	13-13#	13-197													
PATT7	13-14#	13-198	67-15	67-25	68-17	68-45									
PATT8	13-15#	13-199	93-317												
PATT9	13-16#	13-156	13-200												

PCLKTB	20-107*	20-137#												
PGE	12-35#	12-193#												
PGM	12-67#													
PHF	12-176#													
PIP	12-71#													
PKB	20-109*	20-110*	20-140#	20-155*										
PKC	20-111*	20-112*	20-141#											
PKCS	20-108*	20-139#	20-156*	20-172*										
PKV	20-114*	20-142#	20-154	32-26										
PNT	11-57#													
PRELOD	25-8#	83-39	89-55	90-51	93-88	93-337	94-74							
PRI	11-57#													
PRI00	11-57#													
PRI01	11-57#													
PRI02	11-57#													
PRI03	11-57#													
PRI04	11-57#													
PRI05	11-57#													
PRI06	11-57#	20-154	20-161											
PRI07	11-57#	32-18	47-26	51-23	52-26	57-32	57-33	58-34	59-15	59-39				
PSEL	12-9#													
PSTACK	13-102#	16-112	16-112	16-112	16-112	16-117	16-117	16-117	16-117	20-51	20-66	25-88	84-22	84-45
	85-45	85-68	87-28	87-45	87-45	87-106	87-106	87-106	87-106	91-60	91-66	91-77	92-55	93-121
	93-130	93-132	93-143	93-146	93-149	93-153	93-327	95-44	95-45	95-65*	95-66*	95-68		
PTRANS	13-135	16-31#												
RCVED	13-45#	16-100	16-130	22-64*	22-65	22-71*	22-72	22-100*	23-74*	23-75	23-99*	24-20*	24-21*	24-24
	25-64*	25-103*	37-26*	37-40*	44-42*	45-46*	60-42*	61-19*	61-20	62-28*	62-31*	62-32	63-20*	63-22
	63-25	70-65*	71-23*	71-26*	71-29*	71-30	72-24*	72-25	72-30*	72-34*	73-34*	75-50*	78-21*	79-33*
	79-43*	80-35*	80-53*	84-53*	85-40*	86-33*	86-48*	86-64*	86-84*	90-36*	91-56*	91-78*	91-81	92-63*
	92-98*	93-153*	93-271*	93-332*	94-50*	94-65*								
RDDTA	12-218#													
RDHDTA	12-219#	93-324												
RDY	12-6#	57-23	57-24	57-28	57-36	59-27								
READTD	16-37#	93-155												
READY	18-33#	18-35	19-13	19-24										
RECAL	12-206#	92-71												
REG	13-100#	20-219	20-219	20-219	20-219	20-219	20-219	20-222	20-222	20-222	20-222	20-222	20-222	20-222
	20-225	20-225	20-225	20-225	20-225	20-225	20-225	20-230	20-230	23-36				
REGSET	23-59	23-66	23-72#											
RELEAS	12-208#													
RESET	23-90#	38-21	40-21	47-27	48-25									
RH	13-125	16-5#												
RHEXT	13-57#	17-11*	17-20*	17-24*	17-30	30-48								
RHTYPE	13-58#	17-12*	17-40*	20-226	22-88	23-40	30-46	41-32	46-35	47-19	48-19	49-47	49-71	50-49
	50-73	52-18	53-29	54-28	55-28	56-31	84-34	84-47						
RIP	12-210#	25-9	83-25	89-30	90-31	93-322								
RMR	12-80#													
ROUTDO	13-32#	30-25*	95-37	95-67*										
RPADR	13-55#	30-55*												
RPARDY	18-11#	19-28												
RPAS	13-69#	18-14	18-21*	22-22*	78-17	78-20	78-21	79-30	79-32	79-33	79-38*	79-40	79-42	79-43
	80-32	80-34	80-35	80-48*	80-50	80-52	80-53	90-29*	93-111*					
RPBA	13-64#	13-154	13-204	19-19*	22-86	37-22*	37-23	37-25	37-26	37-34	37-36	37-39	37-40	40-21
RPBAE	13-82#	13-173	13-210	23-38	48-25	49-50	49-53	49-74	49-77	50-52	50-55	50-76	50-79	
PPCC	13-77#	92-95	92-98	92-99										
RPCS1	13-62#	13-185	13-202	18-45	19-20*	22-68	22-70	22-71	23-35	25-9*	30-35	36-63	41-42	41-45

	41-60	41-63	41-67	41-70	41-76	41-79	46-43	46-46	49-29*	49-30	49-33	49-37	49-40	49-61
	49-64	50-31*	50-32	50-35	50-39	50-42	50-63	50-66	51-25*	51-26	51-29	51-37	51-40	52-27*
	53-29	53-29	54-28	54-28	55-28	55-28	56-31	56-31	57-23*	57-24	57-27	57-36*	58-26	58-29
	58-37*	59-27*	62-17*	62-22*	62-28	62-34	65-26	65-29	67-22	68-28	70-46*	72-23*	73-21	73-30
	77-54*	81-16	81-19	82-21	82-24	83-25*	89-30*	90-31*	91-72	92-74	92-77	92-102	93-214	93-277
	93-283	93-300	96-30*	96-44										
RPCS2	13-66#	13-142	13-206	22-9*	22-10*	23-94*	24-37	24-49	26-11*	30-71*	30-73*	32-20*	32-21*	37-35*
	38-21	41-40*	41-41*	41-51*	41-52	41-55	41-74*	41-75*	42-37	42-40	42-43	42-49	42-52	42-55
	42-60	42-63	46-32*	46-33*	46-34*	46-37	46-40	49-60*	50-62*	51-36*	52-38*	53-29	53-29	53-29*
	54-28	54-28	54-28*	55-28	55-28	55-28*	56-31	56-31	56-31*	57-46*	58-24*	58-25*	58-44*	59-18*
	59-19*	59-34*	60-38*	61-18*	62-16*	62-21*	62-26*	63-18*	63-19*	70-37*	70-39*	70-40*	70-44*	72-22*
	75-25*	75-45*	75-46*	7-32*	77-53*	77-57*	79-26*	79-37*	80-28*	82-18*	90-27*	93-259	93-262	
RPCS3	13-83#	13-167	13-211	2-90	22-93	22-96	47-27	52-28	52-31	52-39	52-42	53-29	53-29	53-29
	53-29	53-29*	54-28	54-28	54-28	54-28	54-28*	55-28	55-28	55-28	55-28	55-28*	56-31	56-31
	56-31	56-31	56-31*											
RPDA	13-65#	13-179	13-186	13-205	19-18*	65-24*	66-18*	66-21	67-26	73-19*	73-20	75-26*	75-27	77-33*
	77-58*	79-27*	80-29*	82-19*	89-27*	89-31	89-34	90-28*	90-32	90-35	90-36			
RPDB	13-71#	13-160	22-100	42-48*	42-59	44-34*	44-39	44-41	44-42	45-27	45-38*	45-44	45-46	46-36*
	53-29	53-29*	54-28	54-28*	55-28	55-28	55-28*	55-28*	56-31	56-31	56-31*	56-31*	91-87	93-267
RPDC	13-76#	13-188	13-209	19-17*	67-34	68-24	68-46	89-28*	89-37	89-40	92-95	92-97		
RPDS	13-67#	18-34	22-11	22-13*	22-16	22-61	22-63	22-64	26-12	26-21	68-32	74-21	74-24	75-35
	75-38	75-53	75-56	76-17	76-20	77-36	77-40	77-44	77-55	77-61	77-64	80-40	80-43	83-15
	83-27	83-30	89-17	90-17	90-39	90-42	91-44	91-70	92-44	92-80	92-83	92-100	93-89	93-94
	93-171	94-34	96-31	96-39										
RPDT	13-73#	60-39	60-41	60-42	61-19	61-23	63-20	63-27						
RPEC1	13-80#													
RPEC2	13-81#													
RPER1	13-68#	66-19	66-22	66-25	71-21	71-24	72-28	72-32	72-38	73-24	73-33	73-34	74-28	75-29
	75-32	75-47	75-49	75-50	92-60	92-63	92-64	93-329	93-332	93-333	94-43	94-45	94-50	94-62
	94-65	94-72												
RPER2	13-78#	16-113	20-195	71-27	74-30	86-22	86-27	86-42	86-58	86-78	87-37	87-49	87-55	87-61
	87-67	87-73	87-79	87-86	87-99	88-32	95-74							
RPER3	13-79#	74-32												
RPLA	13-70#	85-29	85-34	85-40	85-54	85-60	85-61	85-62						
RPMR1	13-72#	13-191	13-207	18-19	19-40*	20-11*	20-14*	20-24*	20-25*	20-38	20-40*	70-38*	70-41	70-45*
	70-47	70-63	86-25*	86-40*	86-56*	86-76*	88-38*	92-54*	92-91*	93-108*	95-80*			
RPOF	13-75#	13-187	13-208	25-10*	67-30	89-29*	89-43	89-46	91-64*	92-53*	93-128*	93-187*	93-207*	93-325*
RPSN	13-74#	30-83												
RPVEC	13-56#	30-56*	30-57*	32-31	57-32	57-44	57-49	58-34	58-47	59-15	59-20	59-24	59-37	
RPWC	13-63#	13-148	13-203	19-16*										
RTD	12-220#	91-65	93-126											
RWU1	12-188#													
RWU2	12-189#													
RWU3	12-190#													
SSL SYM	7-373#	9-25#	10-25#	16-105#	16-124#	16-136#	16-142#	20-185#	27-41#	28-75#	30-141#	31-18#	32-57#	33-34#
	34-35#	36-71#	37-21	37-21	37-21#	37-33	37-33	37-33#	37-46#	38-21	38-21	38-21	38-21	38-21
	38-21	38-21	38-21	38-21#	38-21#	38-21#	38-21#	38-24#	39-22	39-22	39-22	39-22	39-22	39-22
	39-22	39-22	39-22#	39-22#	39-22#	39-22#	39-25#	40-21	40-21	40-21	40-21	40-21	40-21	40-21
	40-21	40-21#	40-21#	40-21#	40-21#	40-24#	41-38	41-38	41-38#	41-39	41-39	41-39#	41-50	41-50
	41-50#	41-86#	42-35	42-35	42-35#	42-36	42-36	42-36#	42-70#	43-42	43-42	43-42	43-42	43-42
	43-42	43-42	43-42	43-42#	43-42#	43-42#	43-42#	43-46#	44-31	44-31	44-31#	44-50#	45-31	45-31
	45-31#	45-34	45-34	45-34#	45-61#	46-31	46-31	46-31#	46-53#	47-27	47-27	47-27	47-27	47-27
	47-27	47-27	47-27	47-27#	47-27#	47-27#	47-27#	47-30#	48-25	48-25	48-25	48-25	48-25	48-25
	48-25	48-25	48-25#	48-25#	48-25#	48-25#	48-28#	49-28	49-28	49-28#	49-46	49-46	49-46#	49-59
	49-59	49-59#	49-70	49-70	49-70#	49-85#	50-30	50-30	50-30#	50-48	50-48	50-48#	50-61	50-61
	50-61#	50-72	50-72	50-72#	50-87#	51-24	51-24	51-24#	51-35	51-35	51-35#	51-49#	52-24	52-24

[illegible]

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21-9	21-9	21-9	21-9	21-9	21-9	21-12	21-12	21-12	21-12	21-12	21-12	21-12	21-12
21-12	21-12	21-12	21-12	21-18	21-18	21-18	21-18	21-18	21-18	21-18	21-18	21-18	21-18
22-21	22-21	22-21	22-21	22-21	22-21	22-21	22-21	22-50	22-50	22-50	22-50	22-50	22-50
22-50	22-50	22-50	22-50	22-50	22-50	22-50	22-50	22-50	22-50	22-50	22-50	22-50	22-50
23-101	23-101	23-101	23-101	24-26	24-26	24-26	24-26	24-26	24-26	24-26	23-101	23-101	23-101
24-48	24-48	25-69	25-69	25-69	25-69	25-69	25-69	25-69	25-69	25-69	25-106	25-106	25-106
25-106	25-106	25-106	25-106	26-17	26-17	26-17	26-17	26-17	26-17	26-17	26-17	26-17	26-17
26-17	26-17	26-26	26-26	26-26	26-26	26-26	26-26	26-26	26-26	26-26	26-26	26-26	26-26
27-41	27-41	28-60	28-60	28-60	28-60	28-75	28-75	30-10	30-10	30-10	30-12	30-12	30-12
30-14	30-14	30-16	30-16	30-16	30-16	30-18	30-18	30-20	30-20	30-20	30-20	30-22	30-22
30-22	30-22	30-24	30-24	30-27	30-27	30-27	30-27	30-27	30-27	30-27	30-27	30-27	30-27
30-37	30-37	30-37	30-37	30-37	30-37	30-38	30-38	30-82	30-82	30-82	30-82	30-82	30-82
30-82	30-82	30-82	30-82	30-82	30-82	30-95	30-95	30-95	30-95	30-95	30-95	30-95	30-95
30-95	30-95	30-95	30-95	30-100	30-100	30-100	30-100	30-100	30-100	30-100	30-100	30-100	30-100
30-126	30-126	30-126	30-126	30-141	30-141	30-141	30-141	30-141	30-141	30-141	30-141	30-141	30-141
32-26	32-26	32-29	32-29	32-29	32-29	32-31	32-31	32-31	32-31	32-31	32-42	32-42	32-42
32-57	32-57	33-19	33-19	33-19	33-19	33-34	33-34	34-20	34-20	34-20	34-20	34-35	34-35
36-62	36-62	36-62	36-62	36-62	36-62	36-62	36-62	36-62	36-62	36-62	36-62	36-64	36-64
36-64	36-64	36-67	36-67	36-67	36-67	36-67	36-67	36-67	36-67	36-67	36-71	37-21	37-21
37-30	37-30	37-30	37-30	37-30	37-30	37-30	37-30	37-32	37-32	37-32	37-33	37-41	37-41
37-41	37-41	37-41	37-41	37-41	37-41	37-43	37-43	37-46	37-46	37-46	38-21	38-21	38-21
38-21	38-21	38-21	38-21	38-21	38-21	38-21	38-21	38-21	38-21	38-21	38-21	38-24	38-24
39-22	39-22	39-22	39-22	39-22	39-22	39-22	39-22	39-22	39-22	39-22	39-22	39-22	39-22
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SVCSUB	7-373#	7-381#	93-105	93-105	93-105	93-227	93-227	93-227	93-227	16-105	16-105	16-105	16-124	16-124
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	96-25	96-25	96-25										
SWTTST	10-9#	60-23											
TSSAU	34-9#	34-20	34-35										
TSSAUT	31-10#	31-18											
TSSCLE	32-8#	32-42	32-57										
TSSDAT	99-16	99-16#	99-21										
TSSDU	33-8#	33-19	33-34										
TSSHAR	97-52	97-52#	97-61										
TSSHW	9-9	9-9#	9-25										
TSSINI	30-8#	30-20	30-126	30-141									
TSSMSG	16-96#	16-105	16-107#	16-124	16-126#	16-136	16-138#	16-142					
TSSPC	99-15#	99-22											
TSSPRO	29-8#												
TSSPTA	99-15#	99-16	99-16#										
TSSRPT	28-46#	28-60	28-75										
TSSSEG	37-21	37-21#	37-32	37-32#	37-33	37-33#	37-43	37-43#	38-21	38-21	38-21	38-21	38-21
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	39-22	39-22	39-22	39-22	39-22#	39-22#	39-22#	39-22#	39-22#	39-22#	39-22#	39-22#	40-21
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	42-36	42-36#	42-47	42-47#	42-67	42-67#	43-42	43-42	43-42	43-42	43-42	43-42	43-42
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	49-70#	49-73	49-82	49-82#	50-30	50-30#	50-47	50-47#	50-48	50-48#	50-51	50-60	50-61
	50-61#	50-71	50-71#	50-72	50-72#	50-75	50-84	50-84#	51-24	51-24#	51-34	51-34#	51-35
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	55-28#	55-28#	55-28#	55-28#	56-31	56-31	56-31	56-31	56-31	56-31	56-31#	56-31#	56-31#
	56-31#	56-31#	57-21	57-21#	57-31	57-31#	57-34	57-34#	57-42	57-42#	58-22	58-22#	58-33
	58-35	58-35#	58-43	58-43#	59-16	59-16#	59-33	59-33#	60-37	60-37#	60-47	60-47#	61-17
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	64-25	64-25	64-25	64-25	64-25#	64-25#	64-25#	64-25#	64-25#	64-25#	64-25#	64-25#	65-20
	65-38	65-38#	66-14	66-14#	66-33	66-33#	67-21	67-21#	67-38	67-38#	68-20	68-20#	68-48
	69-25	69-25	69-25	69-25	69-25	69-25	69-25	69-25	69-25#	69-25#	69-25#	69-25#	69-25#
	69-25#	69-25#	70-36	70-36#	70-68	70-68#	71-19	71-19#	71-36	71-36#	72-20	72-20#	72-46
	73-15	73-15#	73-40	73-40#	74-19	74-19#	74-38	74-38#	75-23	75-23#	75-63	75-63#	76-14
	76-26	76-26#	77-30	77-30#	77-69	77-69#	78-15	78-15#	78-26	78-26#	79-24	79-24#	79-48
	80-26	80-26#	80-58	80-58#	81-14	81-14#	81-25	81-25#	82-16	82-16#	82-30	82-30#	83-23
	83-36	83-36#	86-24	86-24#	86-37	86-37#	86-38	86-38#	86-52	86-52#	86-55	86-55#	86-68
	86-75	86-75#	86-88	86-88#	88-30	88-30#	88-39	88-39#	89-25	89-25#	89-52	89-52#	90-25
	90-48	90-48#	91-54	91-54#	91-92	91-92#	92-52	92-52#	92-68	92-68#	92-69	92-69#	92-89
	92-90	92-90#	92-112	92-112#	93-10	93-106#	93-119	93-119#	93-120	93-120#	93-196	93-196#	93-197
	93-225	93-225#	93-238	93-238#	93-31	93-315#	93-321	93-321#	93-338	93-338#	94-32	94-32#	94-52
	94-53	94-53#	94-75	94-75#	95-72	95-72#	95-81	95-81#					
TSS\$SOF	98-12	98-12#	98-33										
TSS\$SRV	20-179#	20-185	27-39#	27-41									
TSS\$SUB	93-105#	93-226	93-227#	93-320									

TSSU	10-8	10-8#	10-25											
TSSIES	36-60#	36-71	37-19#	37-46	38-17#	38-24	39-18#	39-25	40-17#	40-24	41-31#	41-34	41-86	42-31#
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	48-21	48-28	49-24#	49-85	50-26#	50-87	51-18#	51-49	52-17#	52-20	52-51	53-28#	53-29	53-30
	54-27#	54-28	54-29	55-27#	55-28	55-29	56-30#	56-31	56-32	57-17#	57-50	58-18#	58-32	58-48
	59-13#	59-40	60-22#	60-28	60-31	60-36	60-56	61-15#	61-31	62-13#	62-42	63-15#	63-35	64-20#
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	71-39	72-18#	72-50	73-13#	73-43	74-17#	74-41	75-21#	75-66	76-12#	76-29	77-28#	77-52	77-72
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	90-24	90-52	91-42#	91-51	91-95	92-39#	92-51	92-113	93-87#	93-93	93-101	93-339	94-31#	94-41
	94-76	95-30#	95-36	95-41	95-83	96-25#	96-49							
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	16-112#	16-117	16-117	16-117	16-117	16-117	16-117	16-117#	16-117#	16-117#	16-117#	16-117#	16-123	16-123
	16-123#	16-128	16-128	16-128	16-128#	16-128#	16-129	16-129	16-129	16-129#	16-129#	16-130	16-130	16-130
	16-130	16-130#	16-130#	16-130#	16-132	16-132	16-135	16-135	16-135	16-135#	16-141	16-141	16-141#	20-218
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	30-95	30-95	30-95	30-95#	30-95#	30-100	30-100	30-100#	77-47	77-47	77-47	77-47#	77-47#	83-18
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	87-52#	87-52#	87-58	87-58	87-58	87-58#	87-58#	87-64	87-64	87-64	87-64#	87-64#	87-70	87-70
	87-70	87-70#	87-70#	87-76	87-76	87-76	87-76#	87-76#	87-82	87-82	87-82	87-82#	87-82#	87-89
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	87-106	87-106	87-106#	87-106#	87-106#	87-106#	87-112	87-112	87-112	87-112#	89-20	89-20	89-20	89-20#
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	93-138#	93-139	93-139	93-139#	93-249	93-249	93-249#	93-304	93-304	93-304#	94-37	94-37	94-37	94-37#
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	97-56#	97-56#	97-58	97-58	97-58	97-58#	97-58#	97-58#	97-60	97-60	97-60	97-60#	97-60#	97-60#
	98-14	98-14	98-14	98-14#	98-14#	98-14#	98-16	98-16	98-16	98-16#	98-16#	98-16#	98-18	98-18
	98-18	98-18#	98-18#	98-18#	98-20	98-20	98-20	98-20	98-20	98-20	98-20#	98-20#	98-20#	98-20#
	98-22	98-22	98-22	98-22#	98-22#	98-22#	98-24	98-24	98-24	98-24#	98-24#	98-24#		
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	36-67#	37-30	37-30#	37-41	37-41#	41-47	41-47#	41-57	41-57#	41-65	41-65#	41-72	41-72#	41-81
	41-81#	42-45	42-45#	42-57	42-57#	42-65	42-65#	44-43	44-43#	45-48	45-48#	46-48	46-48#	49-35
	49-35#	49-42	49-42#	49-55	49-55#	49-66	49-66#	49-79	49-79#	50-37	50-37#	50-44	50-44#	50-57
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	60-46#	61-26	61-26#	62-37	62-37#	63-30	63-30#	65-33	65-33#	66-29	66-29#	70-66	70-66#	71-34
	71-34#	72-44	72-44#	73-38	73-38#	74-34	74-34#	74-36	74-36#	75-43	75-43#	75-61	75-61#	76-24
	76-24#	77-67	77-67#	78-24	78-24#	79-36	79-36#	79-46	79-46#	80-38	80-38#	80-45	80-45#	80-56
	80-56#	81-23	81-23#	82-28	82-28#	83-34	83-34#	84-53	84-58#	85-42	85-42#	86-34	86-34#	86-49
	86-49#	86-65	86-65#	86-85	86-85#	88-35	88-35#	89-50	89-50#	90-46	90-46#	91-90	91-90#	92-67
	92-67#	92-87	92-87#	92-106	92-106#	92-110	92-110#	93-117	93-117#	93-156	93-156#	93-194	93-194#	93-217
	93-217#	93-222	93-222#	93-248	93-248#	93-264	93-264#	93-276	93-276#	93-285	93-285#	93-303	93-303#	93-309

	93-309#	93-336	93-336#	94-51	94-51#	94-66	94-66#	95-77	95-77#	96-37	96-37#	96-42	96-42#	96-47
TSEXCP	96-47#													
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	32-42#	33-19	33-19#	33-19#	34-20	34-20#	34-20#	41-34	41-34	41-34#	41-34#	46-27	46-27	46-27#
	46-27#	47-21	47-21	47-21#	47-21#	48-21	48-21	48-21#	48-21#	49-49	49-49	49-49#	49-49#	49-73
	49-73	49-73#	49-73#	50-51	50-51	50-51#	50-51#	50-75	50-75	50-75#	50-75#	52-20	52-20	52-20#
	52-20#	53-29	53-29	53-29#	53-29#	54-28	54-28	54-28#	54-28#	55-28	55-28	55-28#	55-28#	56-31
	56-31	56-31#	56-31#	58-32	58-32	58-32#	58-32#	60-28	60-28	60-28#	60-28#	60-31	60-31	60-31#
	60-31#	60-36	60-36	60-36#	60-36#	77-52	77-52	77-52#	77-52#	83-22	83-22	83-22#	83-22#	87-26
	87-26	87-26#	87-26#	89-24	89-24	89-24#	89-24#	90-24	90-24	90-24#	90-24#	91-51	91-51	91-51#
	91-51#	92-51	92-51	92-51#	92-51#	93-93	93-93	93-93#	93-93#	93-101	93-101	93-101#	93-101#	94-41
	94-41	94-41#	94-41#	95-36	95-36	95-36#	95-36#	95-41	95-41	95-41#	95-41#			
TSFREE	98-63	99-22#												
TSGMAN	7-373#	95-44	95-44#	95-44#										
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TSLAST	7-373#	98-63#	99-15											
TSLOLI	95-44	95-44#	97-54	97-54#	97-56	97-56#	97-58	97-58#	97-60	97-60#	98-22	98-22#		
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	33-34	34-35	36-71	37-46	38-24	39-25	40-24	41-86	42-70	43-46	44-50	45-61	46-53	47-30
	48-28	49-85	50-87	51-49	52-51	53-30	54-29	55-29	56-32	57-50	58-48	59-40	60-56	61-31
	62-42	63-35	64-28	65-41	66-36	67-41	68-51	69-28	70-72	71-39	72-50	73-43	74-41	75-66
	76-29	77-72	78-29	79-51	80-61	81-28	82-33	83-40	84-64	85-74	86-100	87-115	88-72	89-56
	90-52	91-95	92-113	93-226	93-320	93-339	94-76	95-83	96-49	97-61	98-33			
TSLTNO	98-63#													
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86-75	86-75	86-75#	86-88	86-88	86-88	86-88#	86-100	86-100	86-100#	86-100#	87-20	87-20	87-20#
87-115	87-115	87-115	87-115#	88-24	88-24	88-24#	88-30	88-30	88-30#	88-39	88-39	88-39	88-39#
88-72	88-72	88-72	88-72#	89-15	89-15	89-15#	89-25	89-25	89-25#	89-52	89-52	89-52	89-52#
89-56	89-56	89-56	89-56#	90-15	90-15	90-15#	90-25	90-25	90-25#	90-48	90-48	90-48	90-48#

	90-52	90-52	90-52	90-52#	91-42	91-42	91-42#	91-54	91-54	91-54#	91-92	91-92	91-92#
	91-95	91-95	91-95	91-95#	92-39	92-39	92-39#	92-52	92-52	92-52#	92-68	92-68	92-68#
	92-69	92-69	92-69#	92-89	92-89	92-89	92-89#	92-90	92-90	92-90#	92-112	92-112	92-112#
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	93-119	93-119	93-119#	93-120	93-120	93-120#	93-196	93-196	93-196	93-196#	93-197	93-197	93-197#
	93-225	93-225	93-225#	93-227	93-226	93-226#	93-226	93-227	93-227	93-227#	93-238	93-238	93-238#
	93-315	93-315	93-315#	93-320	93-320	93-320#	93-320	93-321	93-321	93-321#	93-338	93-338	93-338#
	93-339	93-339	93-339	93-339#	94-31	94-31	94-31#	94-32	94-32	94-32#	94-52	94-52	94-52#
	94-53	94-53	94-53#	94-75	94-75	94-75#	94-75	94-76	94-76	94-76#	94-76#	95-30	95-30#
	95-72	95-72	95-72#	95-81	95-81	95-81#	95-81	95-83	95-83	95-83#	95-83#	96-25	96-25#
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	97-61	97-61	97-61	97-61#	98-12	98-12	98-12#	98-20	98-33	98-33	98-33	98-33#	98-64
	98-64	98-64#											
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	27-39#	27-41	28-46#	28-75	29-8#	29-12	30-8#	30-141	31-10#	31-18	32-8#	32-57	33-8#
	34-9#	34-35	36-60#	36-71	37-19#	37-46	38-17#	38-24	39-18#	39-25	40-17#	40-24	41-31#
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	91-42#	91-95	92-39#	92-113	93-87#	93-339	94-31#	94-76	95-30#	95-83	96-25#	96-49	97-52#
	98-12#	98-20	98-33										97-61
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	39-22#	39-22#	40-21	40-21	40-21	40-21#	40-21#	40-21#	41-38#	41-83	42-35#	42-67	43-42
	43-42	43-42#	43-42#	43-42#	44-31#	44-47	45-31#	45-58	46-31#	46-50	47-27	47-27	47-27#
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	92-69#	92-89	92-90#	92-112	93-105#	93-226	93-227#	93-320	93-321#	93-338	94-32#	94-52	94-53#
	95-72#	95-81											94-75
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	93-197#	93-225	93-238#	93-315									93-196
T\$PCNT	99-15#	99-16	99-16	99-16#									
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T\$PTHV	7-427	99-22#											
T\$PTNU	7-373#	99-16	99-16#	99-22	99-22								
T\$SAVL	7-373#												
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92-112	92-112	92-112	92-112	92-112#	93-106	93-106	93-106#	93-119	93-119	93-119	93-119	93-119#	93-120
93-120	93-120#	93-196	93-196	93-196	93-196	93-196#	93-197	93-197	93-197#	93-225	93-225	93-225	93-225
93-225#	93-238	93-238	93-238#	93-315	93-315	93-315	93-315	93-315	93-315#	93-321	93-321	93-321#	93-338

TSSEKO	93-338	93-338	93-338#	94-32	94-32	94-32#	94-52	94-52	94-52	94-52	94-52#	94-53	94-53	94-53#	
	94-75	94-75	94-75	94-75	94-75#	95-72	95-72	95-72#	95-81	95-81	95-81	95-81#	95-81#	95-81#	
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	39-22#	39-22#	40-21	40-21	40-21	40-21#	40-21#	40-21#	41-38#	41-83	42-35#	42-67	43-42	43-42	
	43-42	43-42#	43-42#	43-42#	44-31#	44-47	45-31#	45-58	46-31#	46-50	47-27	47-27	47-27	47-27#	
	47-27#	47-27#	48-25	48-25	48-25	48-25#	48-25#	48-25#	49-28#	49-45	49-46#	49-49	49-58	49-59#	
	49-69	49-70#	49-73	49-82	50-30#	50-47	50-48#	50-51	50-60	50-61#	50-71	50-72#	50-75	50-84	
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	77-30#	77-69	78-15#	78-26	79-24#	79-48	80-26#	80-58	81-14#	81-25	82-16#	82-30	83-23#	83-36	
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	91-54#	91-92	92-52#	92-68	92-69#	92-89	92-90#	92-112	93-106#	93-119	93-120#	93-196	93-197#	93-225	
	93-238#	93-315	93-321#	93-338	94-32#	94-52	94-53#	94-75	95-72#	95-81					
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	91-42#	92-39#	93-87#	93-105	93-105	93-105#	93-227	93-227	93-227#	94-31#	95-30#	96-25#			
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	33-8#	34-9	34-9	34-9#	36-60	36-60	36-60#	37-19	37-19	37-19#	38-17	38-17	38-17#	39-18	39-18
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	20-224	20-225	20-229	20-230	21-9	21-12	21-18	22-21	23-101	24-26	24-36	24-48	25-69	25-106
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	30-141	31-18	32-18	32-26	32-29	32-31	32-42	32-57	33-34	34-35	36-62	36-64	36-67	36-71
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	87-26	87-45	87-52	87-58	87-64	87-70	87-76	87-82	87-89	87-91	87-96	87-106	87-112	87-115
	88-30	88-35	88-39	88-72	89-20	89-24	89-25	89-50	89-52	89-56	90-20	90-24	90-25	90-46
	90-48	90-52	91-47	91-51	91-54	91-90	91-92	91-95	92-47	92-51	92-52	92-67	92-68	92-69
	92-87	92-89	92-90	92-106	92-110	92-112	92-113	93-92	93-93	93-97	93-101	93-105	93-106	93-117
	93-119	93-120	93-138	93-139	93-156	93-194	93-196	93-197	93-217	93-222	93-225	93-226	93-227	93-238
	93-248	93-249	93-264	93-276	93-285	93-303	93-304	93-309	93-315	93-320	93-321	93-336	93-338	93-339
	94-32	94-37	94-41	94-51	94-52	94-53	94-66	94-75	94-76	95-36	95-39	95-41	95-43	95-44
	95-72	95-77	95-81	95-83	96-37	96-42	96-47	96-49						
T\$TSTS	7-373#	36-60#	37-19#	38-17#	39-18#	40-17#	41-31#	42-31#	43-37#	44-26#	45-26#	46-24#	47-18#	48-18#
	49-24#	50-26#	51-18#	52-17#	53-28#	54-27#	55-27#	56-30#	57-17#	58-18#	59-13#	60-22#	61-15#	62-13#
	63-15#	64-20#	65-18#	66-12#	67-14#	68-14#	69-20#	70-33#	71-17#	72-18#	73-13#	74-17#	75-21#	76-12#
	77-28#	78-13#	79-22#	80-24#	81-12#	82-14#	83-13#	84-18#	85-25#	86-16#	87-20#	88-24#	89-15#	90-15#
	91-42#	92-39#	93-87#	94-31#	95-30#	96-25#								
T1	8-8	36-60#												
T10	8-8	45-26#												
T11	8-8	46-24#												
T12	8-8	47-18#												
T13	8-8	48-18#												
T14	8-3	49-24#												
T15	8-8	50-26#												
T16	8-8	51-18#												
T17	8-8	52-17#												
T18	8-8	53-28#												
T19	8-8	54-27#												
T2	8-8	37-19#												
T20	8-8	55-27#												
T21	8-8	56-30#												

T22	8-8	57-17#												
T23	8-8	58-18#												
T24	8-8	59-13#												
T25	8-8	60-22#												
T26	8-8	61-15#												
T27	8-8	62-13#												
T28	8-8	63-15#												
T29	8-8	64-20#												
T3	8-8	38-17#												
T30	8-8	65-18#												
T31	8-8	66-12#												
T32	8-8	67-14#												
T33	8-8	68-14#												
T34	8-8	69-20#												
T35	8-8	70-33#												
T36	8-8	71-17#												
T37	8-8	72-18#												
T38	8-8	73-13#												
T39	8-8	74-17#												
T4	8-8	39-18#												
T40	8-8	75-21#												
T41	8-8	76-12#												
T42	8-8	77-28#												
T43	8-8	78-13#												
T44	8-8	79-22#												
T45	8-8	80-24#												
T46	8-8	81-12#												
T47	8-8	82-14#												
T48	8-8	83-13#												
T49	8-8	84-18#												
T5	8-8	40-17#												
T50	8-8	85-25#												
T51	8-8	86-16#												
T52	8-8	87-20#												
T53	8-8	88-24#												
T54	8-8	89-15#												
T55	8-8	90-15#												
T56	8-8	91-42#												
T57	8-8	92-39#												
T58	8-8	93-87#												
T58.1	93-105#													
T58.2	93-227#													
T59	8-8	94-31#												
T6	8-8	41-31#												
T60	8-8	95-30#												
T61	8-8	96-25#												
T7	8-8	42-31#												
T8	8-8	43-37#												
T9	8-8	44-26#												
TABADD	13-18#	19-19	91-66*	92-55*	93-130*	93-184*	93-208*	93-239*	93-255*	93-287*	93-327*			
TAP	12-130#													
TEMP	13-39#	38-21	38-21*	39-22	39-22*	40-21	40-21*	43-42	43-42*	47-27	47-27*	48-25	48-25*	64-25
	64-25*	69-25	69-25*	84-21*	84-27	84-28	84-29*	84-32*	84-39	84-40	84-41*	85-33*	85-36*	85-51*
	85-52*	93-231*	93-246	93-273	93-294*	93-299*								
TERM	13-132	16-28#												
TESTRG	13-47#	16-99	22-63*	22-70*	23-72*	23-97*	25-34*	25-102*	37-25*	37-39*	44-41*	45-27*	60-41*	61-23*

[illegible]

[illegible]

ENDHW	1-465#	7-373#	9-25												
ENDINI	1-475#	7-373#	30-141												
ENDMOD	1-487#	7-373#	10-26	27-43	34-36	96-51	98-64								
ENDMSG	1-500#	7-373#	16-105	16-124	16-136	16-142									
ENDPRO	1-512#	7-373#	29-12												
ENDPTA	1-520#	7-373#	99-21												
ENDRPT	1-529#	7-373#	28-75												
ENDSEG	1-541#	7-373#	37-32	37-43	38-21	38-21	38-21	38-21	39-22	39-22	39-22	39-22	40-21	40-21	
	40-21	40-21	41-49	41-59	41-83	42-47	42-67	43-42	43-42	43-42	43-42	44-47	45-52	45-58	
	46-50	47-27	47-27	47-27	47-27	48-25	48-25	48-25	48-25	49-45	49-58	49-69	49-82	50-47	
	50-60	50-71	50-84	51-34	51-45	52-36	52-47	53-29	53-29	53-29	54-28	54-28	54-28	55-28	
	55-28	55-28	56-31	56-31	56-31	57-31	57-42	58-33	58-43	59-33	60-47	61-28	62-39	63-32	
	64-25	64-25	64-25	64-25	65-38	66-33	67-38	68-48	69-25	69-25	69-25	69-25	70-68	71-36	
	72-46	73-40	74-38	75-63	76-26	77-69	78-26	79-48	80-58	81-25	82-30	83-36	86-37	86-52	
	86-68	86-88	88-39	89-52	90-48	91-92	92-68	92-89	92-112	93-119	93-196	93-225	93-315	93-338	
	94-52	94-75	95-81												
ENDSET	1-555#	7-373#	99-22												
ENDSFT	1-568#	7-373#	98-33												
ENDSRV	1-580#	7-373#	20-185	27-41											
ENDSUB	1-596#	7-373#	93-226	93-320											
ENDSW	1-614#	7-373#	10-25												
ENDTST	1-624#	7-373#	36-71	37-46	38-24	39-25	40-24	41-86	42-70	43-46	44-50	45-61	46-53	47-30	
	48-28	49-85	50-87	51-49	52-51	53-30	54-29	55-29	56-32	57-50	58-48	59-40	60-56	61-31	
	62-42	63-35	64-28	65-41	66-36	67-41	68-51	69-28	70-72	71-39	72-50	73-43	74-41	75-66	
	76-29	77-72	78-29	79-51	80-61	81-28	82-33	83-40	84-64	85-74	86-100	87-115	88-72	89-56	
	90-52	91-95	92-113	93-339	94-76	95-83	96-49								
EQUALS	1-642#	7-373#	11-57												
ERRDF	1-714#	7-373#	22-21												
ERRHRD	1-718#	7-373#	18-20	23-101	24-26	25-69	25-106	36-67	37-30	37-41	41-47	41-57	41-65	41-72	
	41-81	42-45	42-57	42-65	44-43	45-48	46-48	49-35	49-42	49-55	49-66	49-79	50-37	50-44	
	50-57	50-68	50-81	51-31	51-42	52-33	52-44	53-29	53-29	53-29	53-29	54-28	54-28	54-28	
	54-28	55-28	55-28	55-28	55-28	56-31	56-31	56-31	56-31	57-29	57-40	58-31	58-41	59-31	
	60-46	61-26	62-37	63-30	65-33	66-29	70-66	71-34	72-44	73-38	74-34	74-36	75-43	75-61	
	76-24	77-67	78-24	79-36	79-46	80-38	80-45	80-56	81-23	82-28	83-34	84-58	85-42	86-34	
	86-49	86-65	86-85	88-35	89-50	90-46	91-90	92-67	92-87	92-106	92-110	93-117	93-156	93-194	
	93-217	93-222	93-248	93-264	93-276	93-285	93-303	93-309	93-336	94-51	94-66	95-77	96-37	96-42	
	96-47														
ERROR	1-722#	7-373#													
ERRSF	1-726#	7-373#													
ERRSOF	1-730#	7-373#													
ERRTBL	1-734#	7-373#													
ESCAPE	1-744#	7-373#													
EXIT	1-771#	7-373#	28-60	30-20	30-126	32-42	33-19	34-20	41-34	46-27	47-21	48-21	49-49	49-73	
	50-51	50-75	52-20	53-29	54-28	55-28	56-31	58-32	60-28	60-31	60-36	77-52	83-22	87-26	
	89-24	90-24	91-51	92-51	93-93	93-101	94-41	95-36	95-41						
FEQUAL	1-810#	7-373#													
GETBYT	1-824#	7-373#													
GETPRI	1-834#	7-373#													
GETWOR	1-829#	7-373#													
GMANIA	1-839#	7-373#													
GMANID	1-848#	7-373#	95-44												
GMANIL	1-859#	7-373#	60-33	60-49											
GPHARD	1-868#	7-373#	30-37												
GPRMA	1-874#	7-373#	97-54	97-56											
GPRMD	1-903#	7-373#	95-44	95-44#	97-58	97-60	98-22								
GPRML	1-934#	7-373#	60-33	60-33#	60-49	60-49#	98-14	98-16	98-18	98-24					

HEADER	1-954#	7-373#	7-427											
INLOOP	1-962#	7-373#												
IOSETU	1-966#	7-373#												
IOSTAR	1-974#	7-373#												
IPCKTS	7-127#	53-29	54-28	55-28	56-31									
KT11	1-982#	7-373#												
LASTAD	1-:47#	7-373#	98-63											
MSBYTE	1-D00#	7-373#	7-427	7-427	7-427	7-427#								
MSCHEC	1-E18#	7-373#	28-60	28-60#	30-20	30-20#	30-126	30-126#	32-42	32-42#	33-19	33-19#	34-20	34-20#
	41-34	41-34#	46-27	46-27#	47-21	47-21#	48-21	48-21#	49-49	49-49#	49-73	49-73#	50-51	50-51#
	50-75	50-75#	52-20	52-20#	53-29	53-29#	54-28	54-28#	55-28	55-28#	56-31	56-31#	58-32	58-32#
	60-28	60-28#	60-31	60-31#	60-36	60-36#	77-52	77-52#	83-22	83-22#	87-26	87-26#	89-24	89-24#
	90-24	90-24#	91-51	91-51#	92-51	92-51#	93-93	93-93#	93-101	93-101#	94-41	94-41#	95-36	95-36#
	95-41	95-41#												
MSCNTO	1-E82#	7-373#	60-33	60-33#	60-49	60-49#	95-44	95-44#	97-54	97-54#	97-56	97-56#	97-58	97-58#
	97-60	97-60#	98-14	98-14#	98-16	98-16#	98-18	98-18#	98-22	98-22#	98-24	98-24#		
MSCOUN	1-D66#	7-373#	16-99	16-99#	16-100	16-100	16-100#	16-104	16-104#	16-112	16-112	16-112	16-112	16-112#
	16-117	16-117	16-117	16-117	16-117#	16-123	16-123#	16-128	16-128#	16-129	16-129#	16-130	16-130	16-130#
	16-132	16-132#	16-135	16-135#	16-141	16-141#	20-218	20-218#	20-219	20-219	20-219	20-219	20-219	20-219#
	20-219	20-219#	20-221	20-221#	20-222	20-222	20-222	20-222	20-222	20-222	20-222	20-222#	20-224	20-224#
	20-225	20-225	20-225	20-225	20-225	20-225	20-225	20-225#	20-229	20-229	20-230	20-230	20-230#	21-9
	21-9#	21-12	21-12#	21-18	21-18#	26-17	26-17#	26-26	26-26#	30-27	30-27#	30-82	30-82#	30-95
	30-95#	30-100	30-100#	77-47	77-47#	83-18	83-18#	87-45	87-45#	87-52	87-52#	87-58	87-58#	87-96
	87-64	87-64#	87-70	87-70#	87-76	87-76#	87-82	87-82#	87-89	87-89#	87-91	87-91#	87-96	87-96#
	87-106	87-106	87-106	87-106	87-106#	87-112	87-112#	89-20	89-20#	90-20	90-20#	91-47	91-47#	92-47
	92-47#	93-92	93-92#	93-97	93-97#	93-138	93-138#	93-139	93-139#	93-249	93-249#	93-304	93-304#	94-37
	94-37#	95-43	95-43#											
MSDATA	1-B67#	7-373#	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427
	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427
	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427#	7-427#	15-17
	15-17#	15-27	15-27#											
MSDECR	1-D29#	7-373#	9-25	9-25#	10-25	10-25#	10-26	10-26#	16-105	16-105#	16-124	16-124#	16-136	16-136#
	16-142	16-142#	20-195	20-195#	27-41	27-41#	27-43	27-43#	28-75	28-75#	29-12	29-12#	30-141	30-141#
	31-18	31-18#	32-57	32-57#	33-34	33-34#	34-35	34-35#	34-36	34-36#	36-71	36-71#	37-32	37-32#
	37-32#	37-32#	37-43	37-43	37-43#	37-43#	37-46	37-46#	38-21	38-21#	38-21	38-21#	38-21	38-21#
	38-21	38-21	38-21#	38-21#	38-21#	38-21#	38-21#	38-21#	38-21#	38-21#	38-24	38-24#	39-22	39-22#
	39-22	39-22	39-22	39-22	39-22	39-22	39-22#	39-22#	39-22#	39-22#	39-22#	39-22#	39-22#	39-22#
	39-25	39-25#	40-21	40-21	40-21	40-21	40-21	40-21	40-21	40-21	40-21#	40-21#	40-21#	40-21#
	40-21#	40-21#	40-21#	40-21#	40-24	40-24#	41-49	41-49	41-49#	41-49#	41-59	41-59	41-59#	41-59#
	41-83	41-83	41-83#	41-83#	41-86	41-86#	42-47	42-47	42-47#	42-47#	42-67	42-67	42-67#	42-67#
	42-70	42-70#	43-42	43-42	43-42	43-42	43-42	43-42	43-42	43-42	43-42#	43-42#	43-42#	43-42#
	43-42#	43-42#	43-42#	43-42#	43-46	43-46#	44-47	44-47	44-47#	44-47#	44-50	44-50#	45-52	45-52
	45-52#	45-52#	45-58	45-58	45-58#	45-58#	45-61	45-61#	46-50	46-50	46-50#	46-50#	46-53	46-53#
	47-27	47-27	47-27	47-27	47-27	47-27	47-27	47-27	47-27#	47-27#	47-27#	47-27#	47-27#	47-27#
	47-27#	47-27#	47-30	47-30#	48-25	48-25	48-25	48-25	48-25	48-25	48-25	48-25	48-25#	48-25#
	48-25#	48-25#	48-25#	48-25#	48-25#	48-25#	48-28	48-28#	49-45	49-45	49-45#	49-45#	49-58	49-58
	49-58#	49-58#	49-69	49-69	49-69#	49-69#	49-82	49-82	49-82#	49-82#	49-85	49-85#	50-47	50-47
	50-47#	50-47#	50-60	50-60	50-60#	50-60#	50-71	50-71	50-71#	50-71#	50-84	50-84	50-84#	50-84#
	50-87	50-87#	51-34	51-34	51-34#	51-34#	51-45	51-45	51-45#	51-45#	51-49	51-49#	52-36	52-36
	52-36#	52-36#	52-47	52-47	52-47#	52-47#	52-51	52-51#	53-29	53-29	53-29	53-29	53-29	53-29
	53-29#	53-29#	53-29#	53-29#	53-29#	53-29#	53-30	53-30#	54-28	54-28	54-28	54-28	54-28	54-28
	54-28#	54-28#	54-28#	54-28#	54-28#	54-28#	54-29	54-29#	55-28	55-28	55-28	55-28	55-28	55-28
	55-28#	55-28#	55-28#	55-28#	55-28#	55-28#	55-29	55-29	56-31	56-31	56-31	56-31	56-31	56-31
	56-31#	56-31#	56-31#	56-31#	56-31#	56-31#	56-32	56-32#	57-31	57-31	57-31#	57-31#	57-42	57-42
	57-42#	57-42#	57-50	57-50#	58-33	58-33	58-33#	58-33#	58-43	58-43	58-43#	58-43#	58-48	58-48#
	59-33	59-33	59-33#	59-33#	59-40	59-40#	60-47	60-47	60-47#	60-47#	60-56	60-56#	61-28	61-28

MSEXCP	1-E01#	7-373#	95-44	95-44	95-44#	97-54	97-54	97-54#	97-56	97-56	97-56#	97-58	97-58	97-58#	
MSEXIT	97-60	97-60	97-60#	98-22	98-22	98-22#	30-126	30-126#	32-42	32-42#	33-19#	34-20#	41-34	41-34#	46-27
	1-D14#	7-373#	28-60#	30-20	30-20#	30-126	30-126#	32-42	32-42#	33-19#	34-20#	41-34	41-34#	46-27	
	46-27#	47-21	47-21#	48-21	48-21#	49-49#	49-73#	50-51#	50-75#	52-20	52-20#	53-29	53-29#	54-28	
	54-28#	55-28	55-28#	56-31	56-31#	58-32	58-32#	60-28	60-28#	60-31	60-31#	60-36	60-36#	77-52	
	77-52#	83-22	83-22#	87-26	87-26#	89-24	89-24#	90-24	90-24#	91-51	91-51#	92-51	92-51#	93-93	
	93-93#	93-101	93-101#	94-41	94-41#	95-36	95-36#	95-41	95-41#						
MSEXSE	1-D22#	7-373#	28-60#	30-20#	30-126#	32-42#	33-19#	34-20#	41-34#	46-27#	47-21#	48-21#	49-49	49-49#	
	49-73	49-73#	50-51	50-51#	50-75	50-75#	52-20#	53-29#	54-28#	55-28#	56-31#	58-32#	60-28#	60-31#	
	60-36#	77-52#	83-22#	87-26#	89-24#	90-24#	91-51#	92-51#	93-93#	93-101#	94-41#	95-36#	95-41#		
MSEXTJ	1-D18#	7-373#	28-60	28-60#	30-20#	30-126#	32-42#	33-19	33-19#	34-20	34-20#	41-34#	46-27#	47-21#	
	48-21#	49-49#	49-73#	50-51#	50-75#	52-20#	53-29#	54-28#	55-28#	56-31#	58-32#	60-28#	60-31#	60-36#	
	77-52#	83-22#	87-26#	89-24#	90-24#	91-51#	92-51#	93-93#	93-101#	94-41#	95-36#	95-41#			
MSGEN	1-D38#	7-373#	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	
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[illegible]

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	98-63#												98-63
M\$GNIN	1-D49#	7-373#	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427	7-427
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50-71#	50-72	50-72#	50-75	50-75	50-75#	50-75#	50-81	50-81	50-81	50-81	50-81#	50-81#	50-81#
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	87-45	87-45	87-45#	87-45#	87-45#	87-45#	87-45#	87-45#	87-52	87-52	87-52	87-52	87-52	87-52
	87-52#	87-52#	87-52#	87-52#	87-52#	87-58	87-58	87-58	87-58	87-58	87-58	87-58#	87-58#	87-58#
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	87-76	87-76	87-76#	87-76#	87-76#	87-76#	87-76#	87-82	87-82	87-82	87-82	87-82	87-82	87-82#
	87-82#	87-82#	87-82#	87-82#	87-89	87-89	87-89	87-89	87-89	87-89	87-89#	87-89#	87-89#	87-89#
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	87-106#	87-106#	87-106#	87-106#	87-106#	87-106#	87-106#	87-106#	87-112	87-112	87-112	87-112	87-112	87-112#
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	89-50#	89-50#	89-50#	89-50#	89-52	89-52#	89-56	89-56#	90-20	90-20	90-20	90-20	90-20	90-20
	90-20#	90-20#	90-20#	90-20#	90-20#	90-24	90-24	90-24#	90-24#	90-25	90-25#	90-46	90-46	90-46
	90-46	90-46#	90-46#	90-46#	90-46#	90-46#	90-48	90-48#	90-52	90-52#	91-47	91-47	91-47	91-47
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	92-47	92-47	92-47	92-47	92-47#	92-47#	92-47#	92-47#	92-51	92-51	92-51#	92-51#	92-51#	92-52
	92-52#	92-67	92-67	92-67	92-67	92-67#	92-67#	92-67#	92-67#	92-67#	92-68	92-68#	92-69	92-69#
	92-87	92-87	92-87	92-87	92-87#	92-87#	92-87#	92-87#	92-87#	92-89	92-89#	92-90	92-90#	92-106
	92-106	92-106	92-106	92-106#	92-106#	92-106#	92-106#	92-106#	92-110	92-110	92-110	92-110	92-110#	92-110#
	92-110#	92-110#	92-110#	92-112	92-112#	92-113	92-113#	93-92	93-92	93-92	93-92	93-92	93-92	93-92#
	93-92#	93-92#	93-92#	93-92#	93-93	93-93	93-93#	93-93#	93-97	93-97	93-97	93-97	93-97	93-97
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	93-117	93-117	93-117	93-117#	93-117#	93-117#	93-117#	93-117#	93-119	93-119#	93-120	93-120#	93-138	93-138
	93-138	93-138	93-138	93-138#	93-138#	93-138#	93-138#	93-139	93-139	93-139	93-139	93-139	93-139#	93-139#
	93-139#	93-139#	93-156	93-156	93-156	93-156	93-156#	93-156#	93-156#	93-156#	93-156#	93-194	93-194	93-194
	93-194	93-194#	93-194#	93-194#	93-194#	93-194#	93-196	93-196#	93-197	93-197#	93-217	93-217	93-217	93-217
	93-217#	93-217#	93-217#	93-217#	93-217#	93-222	93-222	93-222	93-222	93-222#	93-222#	93-222#	93-222#	93-222#
	93-225	93-225#	93-226	93-226#	93-227	93-227#	93-238	93-238#	93-248	93-248	93-248	93-248	93-248#	93-243#
	93-248#	93-248#	93-248#	93-249	93-249	93-249	93-249	93-249	93-249#	93-249#	93-249#	93-249#	93-264	93-264
	93-264	93-264	93-264#	93-264#	93-264#	93-264#	93-264#	93-276	93-276	93-276	93-276	93-276#	93-276#	93-276#
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	93-303	93-303#	93-303#	93-303#	93-303#	93-303#	93-304	93-304	93-304	93-304	93-304	93-304#	93-304#	93-304#
	93-304#	93-309	93-309	93-309	93-309	93-309#	93-309#	93-309#	93-309#	93-309#	93-315	93-315#	93-320	93-320#
	93-321	93-321#	93-336	93-336	93-336	93-336	93-336#	93-336#	93-336#	93-336#	93-336#	93-338	93-338#	93-339
	93-339#	94-32	94-32#	94-37	94-37	94-37	94-37	94-37	94-37	94-37	94-37#	94-37#	94-37#	94-37#
	94-41	94-41	94-41#	94-41#	94-51	94-51	94-51	94-51	94-51#	94-51#	94-51#	94-51#	94-51#	94-52
	94-52#	94-53	94-53#	94-66	94-66	94-66	94-66	94-66#	94-66#	94-66#	94-66#	94-66#	94-75	94-75#
	94-76	94-76#	95-36	95-36	95-36#	95-36#	95-39	95-39#	95-40	95-40#	95-41	95-41	95-41#	95-41#
	95-43	95-43	95-43	95-43	95-43	95-43#	95-43#	95-43#	95-43#	95-44	95-44	95-44	95-44	95-44
	95-44	95-44	95-44	95-44#	95-44#	95-44#	95-44#	95-72	95-72#	95-77	95-77	95-77	95-77	95-77#
	95-77#	95-77#	95-77#	95-77#	95-81	95-81#	95-83	95-83#	96-37	96-37	96-37	96-37	96-37#	96-37#
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	97-54	97-54#	97-56	97-56	97-56	97-56	97-56#	97-58	97-58	97-58	97-58	97-58	97-58#	97-60
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	98-22#	98-24	98-24	98-24	98-24#	98-33	98-33#	98-63	98-63	98-63	98-63#	99-16	99-16	99-16#
	99-16#													
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	47-27	47-27	47-27	47-27	47-27	47-27	47-27	47-27	48-25	48-25	48-25	48-25	48-25	48-25
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	71-36	71-36#	72-46	72-46#	73-40	73-40#	74-38	74-38#	75-63	75-63#	76-26	76-26#	77-69	77-69#
	78-26	78-26#	79-48	79-48#	80-58	80-58#	81-25	81-25#	82-30	82-30#	83-36	83-36#	86-37	86-37#
	86-52	86-52#	86-68	86-68#	86-88	86-88#	88-39	88-39#	89-52	89-52#	90-48	90-48#	91-92	91-92#
	92-68	92-68#	92-89	92-89#	92-112	92-112#	93-119	93-119#	93-196	93-196#	93-225	93-225#	93-315	93-315#
	93-338	93-338#	94-52	94-52#	94-75	94-75#	95-44	95-44#	95-81	95-81#				
MSGNSU	1-B98#	7-373#	93-105	93-105#	93-227	93-227#								
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	34-35	34-35#	36-71	36-71#	37-46	37-46#	38-24	38-24#	39-25	39-25#	40-24	40-24#	41-86	41-86#
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	49-85	49-85#	50-87	50-87#	51-49	51-49#	52-51	52-51#	53-30	53-30#	54-29	54-29#	55-29	55-29#
	56-32	56-32#	57-50	57-50#	58-48	58-48#	59-40	59-40#	60-56	60-56#	61-31	61-31#	62-42	62-42#
	63-35	63-35#	64-28	64-28#	65-41	65-41#	66-36	66-36#	67-41	67-41#	68-51	68-51#	69-28	69-28#
	70-72	70-72#	71-39	71-39#	72-50	72-50#	73-43	73-43#	74-41	74-41#	75-66	75-66#	76-29	76-29#
	77-72	77-72#	78-29	78-29#	79-51	79-51#	80-61	80-61#	81-28	81-28#	82-33	82-33#	83-40	83-40#
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	91-95	91-95#	92-113	92-113#	93-226	93-226#	93-320	93-320#	93-339	93-339#	94-76	94-76#	95-83	95-83#
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	56-30	56-30#	57-17	57-17#	58-18	58-18#	59-13	59-13#	60-22	60-22#	61-15	61-15#	62-13	62-13#
	63-15	63-15#	64-20	64-20#	65-18	65-18#	66-12	66-12#	67-14	67-14#	68-14	68-14#	69-20	69-20#
	70-33	70-33#	71-17	71-17#	72-18	72-18#	73-13	73-13#	74-17	74-17#	75-21	75-21#	76-12	76-12#
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	84-18	84-18#	85-25	85-25#	86-16	86-16#	87-20	87-20#	88-24	88-24#	89-15	89-15#	90-15	90-15#
	91-42	91-42#	92-39	92-39#	93-87	93-87#	94-31	94-31#	95-30	95-30#	96-25	96-25#		
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MSHNAP	1-B24#	7-373#	7-427	7-427#										
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	16-123#	16-124#	16-126	16-126	16-126#	16-126#	16-128#	16-129#	16-130#	16-132#	16-135#	16-136#	16-138	16-138
	16-138#	16-138#	16-141#	16-142#	18-20#	18-33#	18-44#	20-101#	20-120#	20-154#	20-161#	20-179	20-179	20-179#
	20-179#	20-218#	20-219#	20-221#	20-222#	20-224#	20-225#	20-229#	20-230#	21-9#	21-12#	21-18#	22-21#	23-101#
	24-26#	24-36#	24-48#	25-69#	25-106#	26-17#	26-26#	27-39	27-39	27-39#	27-39#	28-40	28-40#	28-46
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	37-32#	37-43	37-43	37-43#	37-46	37-46#	38-21	38-21#	38-21	38-21#	38-21	38-21#	38-21	38-21#
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	90-48#	90-52	90-52#	91-92	91-92	91-92#	91-95	91-95#	92-68	92-68	92-68#	92-89	92-89	92-89#
	92-112	92-112	92-112#	92-113	92-113#	93-119	93-119	93-119#	93-196	93-196	93-196#	93-225	93-225	93-225#
	93-226	93-226#	93-315	93-315	93-315#	93-320	93-320#	93-338	93-338	93-338#	93-339	93-339#	94-52	94-52
	94-52#	94-75	94-75	94-75#	94-76	94-76#	95-81	95-81	95-81#	95-83	95-83#	96-49	96-49#	96-51
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	20-219	20-219#	20-221	20-221#	20-222	20-222#	20-224	20-224#	20-225	20-225#	20-229	20-229#	20-230	20-230#
	21-9	21-9#	21-12	21-12#	21-18	21-18#	26-17	26-17#	26-26	26-26#	30-27	30-27#	30-82	30-82#
	30-95	30-95#	30-100	30-100#	77-47	77-47#	83-18	83-18#	87-45	87-45#	87-52	87-52#	87-58	87-58#
	87-64	87-64#	87-70	87-70#	87-76	87-76#	87-82	87-82#	87-89	87-89#	87-91	87-91#	87-96	87-96#
	87-106	87-106#	87-112	87-112#	89-20	89-20#	90-20	90-20#	91-47	91-47#	92-47	92-47#	93-92	93-92#
	93-97	93-97#	93-138	93-138#	93-139	93-139#	93-249	93-249#	93-304	93-304#	94-37	94-37#	95-43	95-43#
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	52-24	52-24#	52-37	52-37	52-37#	53-28	53-28#	53-29	53-29	53-29	53-29	53-29	53-29	53-29#
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	62-15#	63-15	63-15#	63-17	63-17	63-17#	64-20	64-20#	64-25	64-25	64-25	64-25	64-25	64-25
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	20-154	20-154#	20-161	20-161	20-161	20-161	20-161#	20-218	20-218	20-218#	20-219	20-219	20-219	20-219
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	16-117#	16-117#	16-123	16-123	16-123#	16-123#	16-128	16-128	16-128	16-128#	16-128#	16-128#	16-129	16-129
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	30-95	30-95	30-95	30-95#	30-95#	30-95#	30-100	30-100	30-100#	30-100#	36-62	36-62	36-62	36-62
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	58-34	58-34	58-34#	58-34#	58-34#	58-34#	59-15	59-15	59-15	59-15	59-15#	59-15#	59-15#	59-15#
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	87-45	87-45	87-45#	87-45#	87-45#	87-45#	87-52	87-52	87-52	87-52#	87-52#	87-52#	87-58	87-58
	87-58	87-58#	87-58#	87-58#	87-64	87-64	87-64	87-64#	87-64#	87-64#	87-70	87-70	87-70	87-70#
	87-70#	87-70#	87-76	87-76	87-76	87-76#	87-76#	87-76#	87-82	87-82	87-82	87-82#	87-82#	87-82#
	87-89	87-89	87-89	87-89#	87-89#	87-89#	87-91	87-91	87-91#	87-91#	87-96	87-96	87-96#	87-96#
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	93-139	93-139	93-139#	93-139#	93-249	93-249	93-249#	93-249#	93-304	93-304	93-304#	93-304#	94-37	94-37
	94-37	94-37#	94-37#	94-37#	95-43	95-43	95-43#	95-43#						
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	97-60	97-60#	98-14	98-14#	98-16	98-16#	98-18	98-18#	98-22	98-22#	98-24	98-24#		
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MSRNRO	1-C62#	7-373#	20-101	20-101#	20-120	20-120#	30-37	30-37#						
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	16-126	16-126#	16-138	16-138#	20-179	20-179#	27-39	27-39#	28-40	28-40#	28-46	28-46#	29-8	29-8#
	30-8	30-8#	31-10	31-10#	32-8	32-8#	33-8	33-8#	34-9	34-9#	36-38	36-38#	36-60	36-60#
	37-19	37-19#	37-21	37-21#	37-21#	37-21#	37-33	37-33#	37-33#	37-33#	38-17	38-17#	38-21	38-21#
	38-21	38-21	38-21	38-21	38-21	38-21#	38-21#	38-21#	38-21#	38-21#	38-21#	38-21#	38-21#	38-21#
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	39-22#	39-22#	39-22#	39-22#	40-17	40-17#	40-21	40-21	40-21	40-21	40-21	40-21	40-21	40-21
	40-21#	40-21#	40-21#	40-21#	40-21#	40-21#	40-21#	40-21#	41-31	41-31#	41-38	41-38	41-38#	41-38#
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	42-36	42-36	42-36#	42-36#	43-37	43-37#	43-42	43-42	43-42	43-42	43-42	43-42	43-42	43-42
	43-42#	43-42#	43-42#	43-42#	43-42#	43-42#	43-42#	43-42#	44-26	44-26#	44-31	44-31	44-31#	44-31#
	45-26	45-26#	45-31	45-31	45-31#	45-31#	45-34	45-34	45-34#	45-34#	46-24	46-24#	46-31	46-31
	46-31#	46-31#	47-18	47-18#	47-27	47-27	47-27	47-27	47-27	47-27	47-27	47-27	47-27#	47-27#
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	49-28#	49-28#	49-46	49-46	49-46#	49-46#	49-59	49-59	49-59#	49-59#	49-70	49-70	49-70#	49-70#
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	71-17	71-17#	71-19	71-19	71-19#	71-19#	72-18	72-18#	72-20	72-20	72-20#	72-20#	73-13	73-13#
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	75-23#	75-23#	76-12	76-12#	76-14	76-14	76-14#	76-14#	77-28	77-28#	77-30	77-30	77-30#	77-30#
	78-13	78-13#	78-15	78-15	78-15#	78-15#	79-22	79-22#	79-24	79-24	79-24#	79-24#	80-24	80-24#

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MSVC

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86-24	86-24	86-24#	86-24#	86-38	86-38#	86-38#	86-38#	86-55	86-55#	86-55#	86-55#	86-75	86-75
86-75#	86-75#	87-20	87-20#	88-24	88-24#	88-30	88-30	88-30#	88-30#	89-15	89-15#	89-25	89-25
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93-87	93-87#	93-105	93-105#	93-106	93-106#	93-106#	93-106#	93-120	93-120#	93-120#	93-120#	93-197	93-197
93-197#	93-197#	93-227	93-227#	93-238	93-238#	93-238#	93-238#	93-321	93-321#	93-321#	93-321#	94-31	94-31#
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96-25	96-25#	97-42	97-42#	97-52	97-52#	98-12	98-12#						
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16-136	16-136#	16-141	16-141#	16-142	16-142#	18-20	18-33	18-33#	18-44	18-44#	20-101	20-101#	20-120
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	73-43	73-43#	74-19	74-19#	74-34	74-36	74-38	74-38#	74-41	74-41#	75-23	75-23#	75-43
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	77-47#	77-52	77-52#	77-67	77-69	77-69#	77-72	77-72#	78-15	78-15#	78-24	78-26	78-29
	78-29#	79-24	79-24#	79-36	79-46	79-48	79-48#	79-51	79-51#	80-26	80-26#	80-38	80-56
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	87-76#	87-82	87-82#	87-89	87-89#	87-91	87-91#	87-96	87-96#	87-106	87-106#	87-112	87-115
	87-115#	88-30	88-30#	88-35	88-39	88-39#	88-72	88-72#	89-20	89-20#	89-24	89-25	89-25#
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	92-47#	92-51	92-51#	92-52	92-52#	92-67	92-68	92-68#	92-69	92-69#	92-87	92-89	92-90
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	93-156	93-194	93-196	93-196#	93-197	93-197#	93-217	93-222	93-225	93-225#	93-226	93-226#	93-227
	93-238	93-238#	93-248	93-249	93-249#	93-264	93-276	93-285	93-303	93-304	93-304#	93-309	93-315
	93-320	93-320#	93-321	93-321#	93-336	93-338	93-338#	93-339	93-339#	94-32	94-32#	94-37	94-41
	94-41#	94-51	94-52	94-52#	94-53	94-53#	94-66	94-75	94-75#	94-76	94-76#	95-36	95-39
	95-39#	95-41	95-41#	95-43	95-43#	95-44	95-44#	95-72	95-72#	95-77	95-81	95-81#	95-83
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	20-222#	20-224#	20-225#	20-229#	20-230#	21-9#	21-12#	21-18#	22-21#	23-101#	24-26#	24-36#	24-48#
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34-20	34-20#	36-67	36-67	36-67	36-67#	37-30	37-30	37-30	37-30#	37-30#	37-41	37-41	37-41#
41-34#	41-47	41-47	41-47	41-47#	41-57	41-57	41-57	41-57#	41-65	41-65	41-65	41-65#	41-72
41-72	41-72	41-72#	41-81	41-81	41-81	41-81#	42-45	42-45	42-45	42-45#	42-57	42-57	42-57
42-57#	42-65	42-65	42-65	42-65#	44-43	44-43	44-43	44-43#	45-48	45-48	45-48	45-48#	46-27#
46-48	46-48	46-48	46-48#	47-21#	48-21#	49-35	49-35	49-35	49-35#	49-42	49-42	49-42	49-42#
49-49#	49-55	49-55	49-55	49-55#	49-66	49-66	49-66	49-66#	49-73#	49-79	49-79	49-79	49-79#
50-37	50-37	50-37	50-37#	50-44	50-44	50-44	50-44#	50-51#	50-57	50-57	50-57	50-57#	50-68
50-68	50-68	50-68#	50-75#	50-81	50-81	50-81	50-81#	51-31	51-31	51-31	51-31#	51-42	51-42
51-42	51-42#	52-20#	52-33	52-33	52-33	52-33#	52-44	52-44	52-44	52-44#	53-29	53-29	53-29
53-29	53-29	53-29	53-29	53-29	53-29	53-29	53-29	53-29	53-29#	53-29#	53-29#	53-29#	53-29#
54-28	54-28	54-28	54-28	54-28	54-28	54-28	54-28	54-28	54-28	54-28	54-28	54-28#	54-28#

	54-28#	54-28#	54-28#	55-28	55-28	55-28	55-28	55-28	55-28	55-28	55-28	55-28	55-28	55-28
	55-28	55-28#	55-28#	55-28#	55-28#	55-28#	56-31	56-31	56-31	56-31	56-31	56-31	56-31	56-31
	56-31	56-31	56-31	56-31	56-31#	56-31#	56-31#	56-31#	56-31#	57-29	57-29	57-29	57-29#	57-40
	57-40	57-40	57-40#	58-31	58-31	58-31	58-31#	58-32#	58-41	58-41	58-41	58-41#	59-31	59-31
	59-31	59-31#	60-28#	60-31#	60-33	60-33	60-33#	60-33#	60-36#	60-46	60-46	60-46	60-46#	60-49
	60-49	60-49#	60-49#	61-26	61-26	61-26	61-26#	62-37	62-37	62-37	62-37#	63-30	63-30	63-30
	63-30#	65-33	65-33	65-33	65-33#	66-29	66-29	66-29	66-29#	70-66	70-66	70-66	70-66#	71-34
	71-34	71-34	71-34#	72-44	72-44	72-44	72-44#	73-38	73-38	73-38	73-38#	74-34	74-34	74-34
	74-34#	74-36	74-36	74-36	74-36#	75-43	75-43	75-43	75-43#	75-61	75-61	75-61	75-61#	76-24
	76-24	76-24	76-24#	77-52#	77-67	77-67	77-67#	78-24	78-24	78-24	78-24#	79-36	79-36	79-36
	79-36	79-36#	79-46	79-46	79-46#	80-38	80-38	80-38	80-38#	80-45	80-45	80-45	80-45#	80-45#
	80-56	80-56	80-56	80-56#	81-23	81-23	81-23#	82-28	82-28	82-28	82-28#	83-22#	83-34	83-34
	83-34	83-34	83-34#	84-58	84-58	84-58	84-58#	85-42	85-42	85-42	85-42#	86-34	86-34	86-34
	86-34#	86-49	86-49	86-49	86-49#	86-65	86-65	86-65	86-65#	86-85	86-85	86-85	86-85#	87-26#
	88-35	88-35	88-35	88-35#	89-24#	89-50	89-50	89-50	89-50#	90-24#	90-46	90-46	90-46	90-46#
	91-51#	91-90	91-90	91-90	91-90#	92-51#	92-67	92-67	92-67#	92-67#	92-87	92-87	92-87	92-87#
	92-106	92-106	92-106	92-106#	92-110	92-110	92-110#	93-93#	93-101#	93-117	93-117	93-117	93-117	93-117#
	93-156	93-156	93-156	93-156#	93-194	93-194	93-194#	93-217	93-217	93-217	93-217#	93-222	93-222	93-222
	93-222	93-222#	93-248	93-248	93-248	93-248#	93-264	93-264	93-264#	93-276	93-276	93-276	93-276#	93-276#
	93-285	93-285	93-285	93-285#	93-303	93-303	93-303#	93-309	93-309	93-309	93-309#	93-336	93-336	93-336
	93-336	93-336#	94-41#	94-51	94-51	94-51	94-51#	94-66	94-66	94-66	94-66#	95-36#	95-41#	95-44
	95-44	95-44#	95-44#	95-77	95-77	95-77	95-77#	96-37	96-37	96-37	96-37#	96-42	96-42	96-42
	96-42#	96-47	96-47	96-47	96-47#	97-54	97-54#	97-56	97-56#	97-58	97-58#	97-60	97-60#	98-14
	98-14#	98-16	98-16#	98-18	98-18#	98-20	98-20#	98-22	98-22#	98-24	98-24#	99-16	99-16#	
MSXFER	1-82#	7-373#	98-20	98-20#										
MANUAL	1-62#	7-373#	60-29	95-39										
MEMORY	1-66#	7-373#												
OPEN	1-71#	7-373#												
POINTE	1-76#	7-373#	7-405											
POP	7-341#	21-19												
PRINTB	1-39#	7-373#	16-99	16-100	16-104	16-112	16-117	16-123	16-128	16-129	16-130	16-132	16-135	16-141
	21-9	21-12	21-18	93-249	93-304									
PRINTF	1-79#	7-373#	26-17	26-26	30-27	30-82	30-95	30-100	77-47	83-18	87-45	87-52	87-58	87-64
	87-70	87-76	87-82	87-89	87-91	87-96	87-106	87-112	89-20	90-20	91-47	92-47	93-92	93-97
	93-138	93-139	94-37	95-43										
PRINTS	1-19#	7-373#												
PRINTX	1-59#	7-373#	20-218	20-219	20-221	20-222	20-224	20-225	20-229	20-230				
PUSH	7-330#	21-10												
READBU	1-99#	7-373#												
REDEF	1-03#	7-373#	30-12	30-16	30-22									
RFLAGS	1-08#	7-373#												
SETPRI	1-13#	7-373#	32-18	47-26	51-23	51-48	52-26	52-50	57-35	58-36	59-26	59-39		
SETVEC	1-18#	7-373#	20-154	20-161	36-62	57-32	58-34	59-15						
SLASH	1-24#	7-373#												
STARS	1-38#	7-263#	7-373#	18-3	18-9	18-26	18-31	18-38	18-42	19-2	19-10	19-31	19-37	20-2
	20-7	20-17	20-22	20-32	20-36	20-43	20-47	20-85	20-96	20-187	20-191	20-211	20-215	21-2
	21-7	22-2	22-7	22-26	22-34	22-44	22-48	22-53	22-58	22-77	22-83	22-104	22-110	23-1
	23-14	23-26	23-31	23-48	23-56	23-78	23-88	24-2	24-11	24-29	24-34	24-41	24-46	25-2
	25-6	25-13	25-27	25-44	25-49	25-81	25-85	25-112	25-116	26-2	26-7	27-2	27-8	27-35
	27-38													
SVC	1-52#	7-372#	7-373											
TSTFL	7-53#	38-21	39-22	40-21	43-42	47-27	48-25	64-25	69-25					
WAIT.M	7-24#	30-77												
XFER	1-12#	7-373#	28-60#	30-20#	30-126#	32-42#	33-19#	34-20#	41-34#	46-27#	47-21#	48-21#	49-49#	49-73#
	50-51#	50-75#	52-20#	53-29#	54-28#	55-28#	56-31#	58-32#	60-28#	60-31#	60-36#	77-52#	83-22#	87-26#
	89-24#	90-24#	91-51#	92-51#	93-93#	93-101#	94-41#	95-36#	95-41#					

XFERF 1-a16# 7-373# 98-20
XFERT 1-a20# 7-373#