

RLV11/12
RL01/02/11

RL11/RLV11/CTRL1
CZRLGE0

AH-F110E-MC
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IDENTIFICATION

PRODUCT CODE: AC F111E-MC
PRODUCT NAME: CZRLGEO RL11/RLV11 CONTROLLER TEST 1
DATE CREATED: 5-JAN-79
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MAINTAINER: DIAGNOSTIC ENGINEERING COLORADO
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TABLE OF CONTENTS

	1.0	GENERAL INFORMATION
	1.1	PROGRAM ABSTRACT
	1.1.1	STRUCTURE OF PROGRAM
	1.1.2	DIAGNOSTIC INFORMATION
3	1.1.	DIAGNOSTIC HISTORY
	1.2	SYSTEM REQUIREMENTS
	1.2.1	HARDWARE REQUIREMENTS
	1.2.2	SOFTWARE REQUIREMENTS
	1.3	RELATED DOCUMENTS AND STANDARDS
	1.4	DIAGNOSTIC HIERARCHY PREREQUISITE.
	1.5	ASSUMPTIONS
	2.0	OPERATING INSTRUCTIONS
	2.1	HOW TO RUN THIS DIAGNOSTIC
	2.1.1	THE FIVE STEPS OF EXECUTION
	2.1.2	SAMPLE RUN-THROUGH
	2.2	CHAIN MODE OPERATION
	2.3	DETAILS OF COMMANDS AND SYNTAX
	2.3.1	TABLE OF COMMAND VALIDITY
	2.3.2	COMMAND SYNTAX
	2.4	EXTENDED P-TABLE DIALOGUE
	2.5	HARDWARE PARAMETERS
	2.6	SOFTWARE PARAMETERS
	3.0	ERROR INFORMATION
	3.1	ERROR REPORTING
	3.2	ERROR HALTS
	4.0	PERFORMANCE AND PROGRESS REPORTS
CE REPORTS	4.1	PERFORMAN
	4.2	PROGRESS REPORTS
	5.0	DEVICE INFORMATION TABLES
	6.0	TEST SUMMARIES

1.0 GENERAL INFORMATION
-----1.1 PROGRAM ABSTRACT
-----1.1.1 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC IS COMPATIBLE WITH BOTH XXDP+ AND ACT. IT CAN BE RUN STANDALONE UNDER XXDP+, AND CAN BE CHAINED UNDER XXDP+, ACT AND APT IN ACT MODE (SEE 2.2 "CHAIN MODE OPERATION" FOR DETAILS OF CHAINING PROCEDURE). IT IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, WHICH AT RUN TIME IS APPENDED TO A COMMON FRONT-END PIECE OF SUPERVISOR SOFTWARE THROUGH WHICH THE DIAGNOSTIC INTERFACES TO THE ENVIRONMENT AS IT EXECUTES. USING THE DEFAULT VALUES IN THE P TABLES, PROGRAM EXECUTES ONE PASS IN 11 SECONDS.

WHEN THIS DIAGNOSTIC IS STARTED, CONTROL GOES FIRST TO THE SUPERVISOR PORTION, WHICH WILL ASK CERTAIN "HARD CORE" QUESTIONS ABOUT THE ENVIRONMENT. THEN IT WILL ENTER COMMAND MODE, INDICATED BY A PROMPT CHARACTER (DR>). AT COMMAND MODE THE OPERATOR MAY ENTER ANY OF SEVERAL COMMANDS AS DESCRIBED IN 2.0 "OPERATING INSTRUCTIONS".

THE DIAGNOSTIC PROGRAM IS LOADED IN THE LOWER 8K OF MEMORY. THE DIAGNOSTIC SUPERVISOR CODING OCCUPIES 6.25K OF THE UPPER PART OF MEMORY JUST BELOW THE XXDP+ MONITOR WHICH RESIDES IN THE UPPERMOST 1.5K OF MEMORY SPACE.

1.1.2 DIAGNOSTIC INFORMATION

THE RL11/RLV11 CONTROLLER TEST (PART 1) IS A PDP-11 (LSI-11) BASED PROGRAM THAT WILL TEST THE CONTROLLER. IT STARTS BY TESTING BASIC INTERFACE LOGIC, REGISTER MANIPULATION AND FUNCTIONALITY WHICH INCLUDES NOOP, GET STATUS, READ HEADERS AND SEEK OPERATIONS. IT IS AIMED AT FULLY TESTING THE CONTROLLER IN THESE AREAS, BUT BY DEFAULT ALSO EXERCISES THE DRIVE.

1.1.3 DIAGNOSTIC HISTORY

REVISION A UPDATE CZRLAB TO INCORPORATE THE RL02.

REVISION B MAKE PROGRAM XXDP+ COMPATIBLE.

REVISION C CORRECT NUMEROUS AIDS REPORTS ISSUED AGAINST THE DIAGNOSTIC.

REVISION D EXPAND TEST TO INCLUDE THE RLV12. ADD THIS DIAGNOSTIC HISTORY TO THE DOCUMENTATION.

REVISION E FIX TESTS 21,22 FOR RLV CONTROLLERS

1.2

SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

- * PDP-11/LSI-11 PROCESSOR WITH 16K OR MORE OF MEMORY
- * CONSOLE DEVICE (LA30,LA36,VT50,ETC.)
- * 1 OR 2 RL11/RLV11/RLV12 CONTROLLER(S) WITH:

GES CONTAINING 1 - 8 RLO1 DRIVES WITH RLO1K CARTRID
 A 'BAD SECTOR FILE'
 1 - 8 RLO2 DRIVES WITH RLO2K CARTRIDGES CONTAINING A 'BAD
 SECTOR FILE'

- * LINE PRINTER (OPTIONAL)

1.2.2 SOFTWARE REQUIREMENTS

CZRLGEO RL11/RLV11 CTLR TST 1
 (FORMERLY CZRLAB)

1.3 RELATED DOCUMENTS AND STANDARDS

RL01 DISK SUBSYSTEM USER'S GUIDE
 (EK-RL01-UG-002)
 XXDP+/SUPERVISOR USER'S MANUAL

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

THE RLO1/02 SUBSYSTEM SHOULD HAVE SUCCESSFULLY RUN THE FOLLOWING
 PROGRAMS:

CVRLABO RLV11 RLO1 DISKLESS TEST (RLV11 ONLY)

1.5 ASSUMPTIONS

IF THE HARDWARE OTHER THAN THE RLO1/02 SUBSYSTEM IS ASSUMED TO WORK
 PROPERLY. FALSE ERRORS MAY BE REPORTED
 IF THE PROCESSOR, ETC., DO
 NOT FUNCTION PROPERLY.

2.0 OPERATING INSTRUCTIONS

2.1 HOW TO RUN THIS DIAGNOSTIC

2.1.1 THE FIVE STEPS OF EXECUTION

THIS DIAGNOSTIC SHOULD BE LOADED AND STARTED USING NORMAL XXDP+ PROCEDURES. START THE EXECUTION OF THE XXDP+ MONITOR BY USING THE APPROPRIATE BOOTSTRAP PROGRAM. THE MONITOR WILL PRINT A MESSAGE IDENTIFYING ITSELF AND REQUESTING THAT THE CURRENT DATE BE ENTERED. AN EXAMPLE OF THIS MESSAGE IS GIVEN BELOW FOR THE XXDP+ MONITOR.

CHMDKAO XXDP+ DK MONITOR NNK
BOOTED VIA UNIT#: 0

ENTER DATE (DD MMM-YY):

AFTER THE DATE HAS BEEN ACCEPTED BY THE MONITOR. THE RESTART ADDRESS OF THE MONITOR IS PRINTED. THEN THE FOLLOWING TWO QUESTIONS ARE ASKED:

50 HZ? N
LSI? N

THE DEFAULTS ARE BOTH "NO". TYPE "R" AND THE PROGRAM NAME TO RUN THE PROGRAM. DO NOT TYPE THE EXTENSION.

WHEN THIS DIAGNOSTIC IS STARTED, THE FOLLOWING STEPS WILL OCCUR:

* STEP 1 *

THE DIAGNOSTIC WILL ISSUE THE PROMPT "DR>". FROM THIS POINT UNTIL THE TIME WHEN YOU RESTART XXDP+, YOU WILL BE TALKING TO THE DIAGNOSTIC, NOT XXDP+. WE WILL REFER TO THE PRESENCE OF THIS PROMPT AS BEING IN DIAGNOSTIC COMMAND MODE, AS OPPOSED TO XXDP+ COMMAND MODE.

AT THIS POINT YOU WILL ENTER A "START" COMMAND. THIS IS NOT THE SAME AS THE XXDP+ "START" COMMAND, WHICH YOU ALREADY ISSUED IN RESPONSE TO THE XXDP+ DOT PROMPT. THIS "START" COMMAND CAN TAKE A NUMBER OF SWITCHES AND FLAGS (ALL OPTIONAL) AND THE DETAILS OF THESE ARE SET FORTH IN 2.3 "DETAILS OF COMMANDS AND SYNTAX". HOWEVER, IN ORDER TO USE THE PROGRAM, ALL YOU NEED TO SAY IS SOMETHING LIKE THIS:

STA/PASS:1/FLAGS:HOE

THINGS TO NOTE HERE:

1. ONLY THE FIRST THREE CHARACTERS OF THIS OR ANY COMMAND AT THE "DR>" LEVEL NEED TO BE TYPED.
2. THE "PASS" SWITCH SPECIFIES HOW MANY PASSES YOU DESIRE. A PASS CONSISTS OF RUNNING THE FULL DIAGNOSTIC AGAINST ALL UNITS BEING TESTED (THIS WILL BE EXPLAINED SHORTLY). ONE PASS IS SPECIFIED IN THE ABOVE EXAMPLE.
3. THE "FLAGS" SWITCH MAY SPECIFY ANY OF A NUMBER OF FLAGS, BUT THE MAIN USEFUL ONES ARE:

PNT	PRINT NUMBER OF TEST BEING EXECUTED
LOE	LOOP ON ERROR
HOE	HALT ON ERROR
IER	INHIBIT ERROR PRINTOUT

THE HOE FLAG IS SPECIFIED IN THE ABOVE EXAMPLE (WE'LL SEE WHY SHORTLY).

* STEP 2 *

WHEN YOU HAVE TYPED IN A "START" COMMAND, THE DIAGNOSTIC WILL COME BACK WITH THE QUESTION "# UNITS?" TO WHICH YOU SHOULD RESPOND BY TYPING IN THE NUMBER OF DEVICES YOU WISH TO TEST.

A WORD OF WARNING HERE: THE NUMBER OF UNITS DEPENDS ON THE TARGET DEVICE OF THE DIAGNOSTIC. FOR EXAMPLE, IF THE DIAGNOSTIC IS DIRECTED AT A DISK DRIVE, THEN THE NUMBER OF UNITS WOULD BE THE NUMBER OF DRIVES TO BE TESTED. WHEREAS IF THE DIAGNOSTIC WAS DIRECTED AT THE DISK CONTROLLER, THEN THE NUMBER OF UNITS WOULD BE THE NUMBER OF CONTROLLERS. THE TARGET DEVICE OF A DIAGNOSTIC CAN ALWAYS BE DETERMINED BY INSPECTING THE "HEADER" STATEMENT NEAR THE BEGINNING OF THE SOURCE CODE. ONE OF THE 0 PERANDS OF THIS "HEADER" STATEMENT SHOULD BE THE DEVICE TYPE OF THE DIAGNOSTIC.

* STEP 3 *

WHEN YOU HAVE TYPED IN THE NUMBER OF UNITS TO BE TESTED, THE DIAGNOSTIC WILL ASK YOU THE "HARDWARE QUESTIONS". THE ANSWERS TO THESE QUESTIONS ARE USED TO BUILD TABLES IN CORE, CALLED "HARDWARE P-TABLES". ONE HARDWARE P TABLE WILL BE BUILT FOR EACH UNIT TO BE TESTED.

THERE ARE SEVERAL HARDWARE QUESTIONS AND THE ENTIRE SERIES WILL BE POSED N TIMES, WHERE N IS THE NUMBER OF UNITS.

THIS REPRESENTS A NEW PHILOSOPHY IN DIAGNOSTIC ENGINEERING. DIAGNOSTICS IN THE FUTURE WILL NOT BE WRITTEN TO AUTOSIZE OR ASSUME STANDARD ADDRESSES; INSTEAD, THEY WILL ASK THE OPERATOR FOR ALL THE INFORMATION THEY NEED TO TEST THE DEVICE.

* STEP 4 *

AFTER YOU HAVE ANSWERED ALL THE HARDWARE QUESTIONS (SEC 2.5) FOR ALL THE UNITS, YOU WILL BE ASKED "CHANGE SW?" IF YOU WANT TO BE ASKED THE SOFTWARE QUESTIONS THAT DETERMINE THE BEHAVIOR OF THIS PROGRAM, TYPE "Y". IF YOU WANT TO TAKE ALL THE DEFAULTS TO THESE QUESTIONS, TYPE "N". IF YOU TYPE "Y" YOU WILL BE ASKED THE SOFTWARE QUESTIONS (SEC 2.6), AND THE ANSWERS WILL BE PUT INTO THE SOFTWARE P-TABLE IN THE PROGRAM. THE SERIES OF QUESTIONS WILL BE ASKED JUST ONCE, REGARDLESS OF THE NUMBER OF UNITS TO BE TESTED.

* STEP 5 *

AFTER YOU HAVE ANSWERED THE SOFTWARE QUESTIONS, THE DIAGNOSTIC WILL BEGIN TO EXECUTE THE HARDWARE TEST CODE. THERE ARE SEVERAL THINGS THAT CAN HAPPEN NEXT, DEPENDING ON WHETHER A HARDWARE ERROR IS ENCOUNTERED AND ALSO ON WHAT SWITCH VALUES YOU SELECTED ON THE START COMMAND. CONSIDER THE POSSIBILITIES:

1. IF NO ERROR IS ENCOUNTERED, THEN THE DIAGNOSTIC WILL SIMPLY EXECUTE THE DESIRED NUMBER OF PASSES AND RETURN TO COMMAND MODE (PROMPT DR>).

2. IF AN ERROR IS ENCOUNTERED, THEN ONE OF THREE THINGS HAPPENS, DEPENDING ON THE SETTINGS OF THE HOE AND LOE FLAGS.

HOE SET: THE ERROR WILL BE REPORTED ON THE CONSOLE AND THE DIAGNOSTIC WILL RETURN TO COMMAND MODE.

LOE SET: THE DIAGNOSTIC WILL LOOP ENDLESSLY ON THE BLOCK OF CODE THAT DETECTED THE ERROR.

NEITHER HOE NOR LOE SET: THE ERROR WILL BE REPORTED ON THE CONSOLE AND NORMAL EXECUTION WILL RESUME AS IF NO ERROR HAD OCCURRED.

2.1.2
SAMPLE RUN-THROUGH

LET'S SEE HOW ALL THIS WORKS IN A REAL SITUATION. RECALL THAT WE ENTERED THE COMMAND "STA/PASS:1/FLAGS:HOE". THIS WOULD BE A VERY TYPICAL WAY TO RUN THE DIAGNOSTIC. IF NO ERRORS ARE ENCOUNTERED, THE SINGLE REQUESTED PASS WILL BE EXECUTED AND THE PROMPT WILL BE RE-ISSUED.

IF AN ERROR IS ENCOUNTERED, THE ERROR WILL BE REPORTED AND THE PROMPT WILL BE REISSUED (BECAUSE THE HOE FLAG IS SET). AT THIS POINT THERE ARE FOUR DIFFERENT WAYS YOU CAN GET THE PROGRAM GOING AGAIN:

1. ISSUE ANOTHER "START" COMMAND (THUS GOING THRU ALL OF STEPS 1, 2, 3, 4, AND 5 AGAIN).
2. ISSUE A "RESTART" COMMAND (SAME AS START COMMAND EXCEPT THAT THE HARDWARE QUESTIONS ARE NOT ASKED)
3. ISSUE A "CONTINUE" COMMAND (EXECUTION WILL RESUME AT THE BEGINNING OF THE PARTICULAR HARDWARE TEST (MOST DIAGNOSTICS CONSIST OF A NUMBER OF THESE) THAT IT WAS IN WHEN THE ERROR HALT OCCURRED. NO QUESTIONS ASKED).
4. ISSUE A "PROCEED" COMMAND: EXECUTION WILL RESUME AT THE INSTRUCTION FOLLOWING THE ERROR REPORT (THIS IS A SPECIAL COMMAND AND CAN BE ISSUED ONLY AT A HALT)

THE MOST TYPICAL THING TO DO HERE IS TO ISSUE THE PROCEED, BUT WITH DIFFERENT FLAG SETTINGS. PROBABLY YOU WOULD WANT TO SAY:

PRO/FLAGS:IER:LOE:HOE=0

THIS WILL DO THE FOLLOWING:

1. TURN ON THE IER (INHIBIT ERROR PRINTOUT) FLAG
2. TURN ON THE LOE FLAG
3. TURN OFF THE HOE FLAG
4. RESUME EXECUTION AT INSTRUCTION AFTER ERROR REPORT

THE DIAGNOSTIC WILL NOW LOOP ON THE BLOCK OF CODE THAT DETECTED AND REPORTED THE ERROR, BUT NO ERROR PRINTOUT WILL OCCUR. THUS YOU CAN STUDY THE ERROR OR SCOPE IT OR WHATEVER.

WHEN YOU'VE SEEN ENOUGH, YOU MAY HIT CONTROL/C. THIS WILL TAKE YOU OUT OF THE LOOP AND PUT YOU BACK INTO COMMAND MODE. YOU NOW HAVE THREE CHOICES:

1. START
2. RESTART
3. CONTINUE

LET'S SAY YOU'VE REPAIRED THE DEFECT FOUND ABOVE AND WANT TO FINISH RUNNING THE DIAGNOSTIC. YOU WOULD TYPE

CON/FLAGS:HOE:IER=0:LOE=0

THIS WILL RESTORE THE FLAGS TO THEIR ORIGINAL VALUES AND RESUME EXECUTION AT THE BEGINNING OF THE HARDWARE TEST YOU WERE IN. IF THE ERROR DOES NOT RECUR, THE EXECUTION WILL FLOW RIGHT ON THRU TO THE NEXT ERROR OR TO END OF PASS.

IF AT END OF PASS YOU WANT TO RUN THE DIAGNOSTIC AGAIN, YOU HAVE TWO CHOICES:

1. START
2. RESTART

YOU WOULD CHOOSE ONE, DEPENDING ON WHETHER YOU WANTED TO ANSWER THE HARDWARE QUESTIONS AGAIN.

THE FULL
PRINT OUT FROM THE ABOVE DIALOGUE MIGHT LOOK LIKE THIS
(O=OPERATOR, D=DIAGNOSTIC):

	BY WHOM ENTERED:
	- - - -
.R CZRLGB	O
DRS LOADED	D
DIAG. RUN-TIME SERVICES REV D APR 79	D
CZRLG-B-0	
D	
CZRLG TESTS CONTROLLER FUNCTIONS, INTERFACE LOGIC, REGISTER OPERATION	D
UNIT IS RLO1, RLO2	D
DR>STA/PASS:1/FLAGS:HOE	D.O
# UNITS (D) ? 2	D.O
UNIT 0	D
RL11 (L) Y ?	D.O
BUS ADDRESS (O) 174400 ?	D.O
VECTOR (O) 160 ?	
D.O	
BR LEVEL (O) 5 ?	D.O
DRIVE TYPE = RLO1 (L) Y ?	D.O (N=RLO2)
DRIVE (O) 0 ?	D.O
UNIT 1	D
RL11 (L) Y ?	D.O
BUS ADDRESS (O) 174400 ?	D.O
VECTOR (O) 160 ?	D.O
BR LEVEL (O) 5 ?	D.O
DRIVE TYPE = RLO1 (L) ? Y	
D.O (N=RLO2)	
DRIVE (O) 0 ? 1	D.O
CHANGE SW (L) ? Y	D.O
DROP ON ERROR LIMIT (L) N ?	D.O
CZRLG HRD ERR 00004 TST 003 SUB 002 PC:004130 ERR HLT	
DR>PRO/FLAGS:IER:LOE:HOE=0	D.O

 AT THIS POINT THE DIAGNOSTIC IS LOOPING ON THE
 ERROR WITHOUT PRINTING ANYTHING. YOU CAN SCOPE
 THE ERROR UN
 TIL YOU HAVE LOCATED IT, THEN +C OUT.
 TYPING +C ABORTS THE FUNCTION IN PROGRESS AND
 RETURNS THE XXDP. MONITOR TO COMMAND MODE.

```

+C                                0
DR>CON/FLAGS:HOE:IER:LOE=0
    D,0
CHANGE SW (L) ? N                D.0
CZRLG EOP 1                       D
+C
DR>RESTART/PASS:1                D.0
CHANGE SW (L) ? N                D.0
-----
-----
-----

```

2.2 CHAIN MODE OPERATION

CHAIN MODE OPERATION CONSISTS OF THE SEQUENTIAL EXECUTION OF PROGRAMS WITHOUT OPERATOR INTERVENTION. ONLY PROGRAMS THAT HAVE BEEN MODIFIED TO RUN IN CHAIN MODE CAN BE CHAINED. CHAINABLE PROGRAMS ARE IDENTIFIED IN THE DIRECTORY BY A BIC EXTENSION.

TO RUN CHAIN MODE, THE XXDP. MONITOR USES AN ASCII FILE (KNOWN AS A CHAIN FILE) LISTING THE PROGRAMS TO BE RUN AND THE NUMBER OF PASSES EACH PROGRAM SHOULD RUN. THIS FILE MUST BE ON THE SYSTEM DEVICE.

A CHAIN FILE MAY BE GENERATED BY US E OF THE XTECO TEXT EDITOR. THE FILE MUST HAVE A CCC EXTENSION. THE CHAIN FILE MAY CONTAIN ANY OF THE COMMANDS SUPPORTED BY THE XXDP. MONITOR. THE COMMANDS IN THE ASCII FILE ARE EXECUTED IN THE ORDER IN WHICH THEY ARE ENCOUNTERED. COMMENTS MAY BE INCLUDED IN THE FILE.

TO EXECUTE A CHAIN FILE THE USER TYPES:

```

C FILNAM <CR> OR
C FILNAM/QV<CR>

```

IN THE FIRST CASE THE PASS COUNT SPECIFIED IN THE CHAIN FILE

15 USED BY THE XXDP. MONITOR TO DETERMINE THE NUMBER OF PASSES TO EXECUTE EACH PROGRAM. IN THE SECOND CASE THE PASS COUNT IS NOT USED AND EACH PROGRAM IS EXECUTED ONLY ONCE. THE /QV SWITCH PROVIDES A SINGLE EXECUTION MODE OF OPERATION OF QUICK VERIFY.

4 AN ERROR WAS ENCOUNTERED WITH THE HOE FLAG SET

START
RESTART
CONTINUE
PROCEED

PRINT

DISPLAY
FLAGS
ZFLAGS
EXIT

2.3.2 COMMAND SYNTAX

START) TESTS: TEST-LIST:PASS:PASS-CNT:FLAGS:FLAG-LIST:EOB:EOB-INCR

THE DIAGNOSTIC IN CORE IS EXECUTED IN ACCORDANCE WITH THE SWITCHES SPECIFIED. THE MESSAGE "# UNITS?" IS PRINTED. THE START COMMAND MAY BE ISSUED WHEN DIAGNOSTIC COMMAND MODE HAS BEEN ENTERED VIA ONE OF THE FOLLOWING: A) OPERATOR TYPED "RUN DIAGNOSTIC" B) DIAGNOSTIC FINISHED EXECUTING C) ERROR WAS ENCOUNTERED WITH HOE FLAG SET D) OPERATOR ENTERED CONTROL/C. AFTER THE OPERATOR RESPONDS TO "# UNITS?", THE HAR

DWARE DIALOGUE IS INITIATED. WHEN IT IS COMPLETED, THE QUESTIONS "CHANGE SW?" IS ISSUED, AND THE ANSWERS, IF GIVEN, BECOME THE NEW DEFAULTS. THEREFORE IT IS NECESSARY TO RELOAD THE PROGRAM IN ORDER TO RETURN TO THE LOAD DEFAULTS.

THE SWITCH ARGUMENTS ARE AS FOLLOWS:

"TEST-LIST" IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) THAT SPECIFY THE TESTS TO BE EXECUTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS RANGE FROM 1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC. THEY MAY BE SPECIFIED IN ANY ORDER. TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF THE ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS.

"PASS-CNT" IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES. A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS) AGAINST ALL UNITS SUBMITTED. THE DE

FAULT IS NON-ENDING TEST EXECUTION. "FLAG-LIST" IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS. WHERE <FLAG> HAS ONE OF THE FOLLOWING VALUES:

HOE HAL ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN ERROR IS ENCOUNTERED

LOE LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT, SUB

T, OR TEST) CONTAINING THE ERROR

IER INHIBIT ERROR REPORTING
 IBE INHIBIT BASIC ERROR REPORTS
 IXE INHIBIT EXTENDED ERROR REPORTS
 PRI DIRECT ALL MESSAGES TO A LINE PRINTER
 PNT PRINT NUMBER OF TEST BEING EXECUTED

BOE BELL ON ERROR

UAM RUN IN UNATTENDED MODE, BYPASSING MANUAL INTERVENTION TESTS
 ISR INHIBIT STATISTICAL REPORTS
 IDU INHIBIT DROPPING OF UNITS BY DIAGNOSTIC
 ADR EXECUTE AUTODROP CODE
 LOT LOOP ON TEST
 EVL EVALUATE

THESE FLAGS REPLACE THE USE OF THE HARDWARE SWITCH REGISTER. UNDER THE SUPERVISOR THERE IS NO ACCESS TO THE HARDWARE SWITCH REGISTER.

THOSE THE FLAGS NAMED OR EQUATED TO 1 ARE SET
 EQUATED TO 0 ARE
 CLEARED. A FLAG NOT SPECIFIED IS CLEARED. IF THE FLAGS SWITCH IS NOT GIVEN ALL FLAGS ARE CLEARED.

"EOP-INCR" IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF PASSES) IT IS DESIRED THAT THE END OF PASS MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS.

 RES(TART)/TEST:TEST LIST/PASS:PASS-CNT/FLAGS:FLAG-LIST/EOP:EOP-INCR/

UNITS:UNIT-LIST

THE DIAGNOSTIC IN CORE IS EXECUTED IN ACCORDANCE WITH THE SWITCHES SPECIFIED. HOWEVER, NEW "P-TABLES" ARE NOT BUILT. INSTEAD, THE ONES IN CORE ARE USED.

THE QUESTION "CHANGE SW?" IS ASKED AND THE ANSWERS GIVEN BECOME THE NEW DEFAULTS. THE COMMAND MAY BE ISSUED WHEN COMMAND MODE HAS BEEN ENTERED VIA A) DIAGNOSTIC IS FINISHED B) HALT ON ER

ROR C) CONTROL/C.

THE SWITCH ARGUMENTS ARE AS IN THE START COMMAND EXCEPT:

1. "UNIT-LIST" IS A SEQUENCE OF LOGICAL UNIT NUMBERS RANGING FROM 1 THRU N (N = NUMBER OF UNITS BEING TESTED) SPECIFYING WHICH UNITS ARE TO BE TESTED. THE LOGICAL UNIT NUMBER DESIGNATES THE POSITION OF THE P-TABLE IN CORE, ACCORDING TO THE ORDER IN WHICH THEY WERE BUILT. THE UNITS SPECIFIED MUST NOT HAVE BEEN DROPPED BY THE OPERATOR DROP COMMAND. THE UNIT-LIST DEFAULTS TO "ALL THAT HAVE NOT BEEN DROPPED BY OPERATOR COMMAND". THE EFFECT OF THE UNIT-LIST LASTS UNTIL THE NEXT START (WHERE IT IS AUTOMATICALLY RESET TO "ALL") OR THE NEXT RESTART.

2. ALL UNSPECIFIED FLAG SETTINGS ARE UNCHANGED.

CON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>

COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C. THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE. SOFTWARE DIALOGUE MAY OPTIONALLY BE RE-EXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

THE SWITCH ARGUMENTS ARE AS IN THE START COMMAND EXCEPT:

1. DEFAULT FOR PASS CNT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART
2. UNSPECIFIED FLAG SETTINGS ARE UNCHANGED

PRO(CEED)/FLACS:<FLAG-LIST>

COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EFFECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

THE SWITCH ARGUMENTS ARE THE SAME AS THE START COMMAND EXCEPT:

1. UNSPECIFIED FLAG SETTINGS ARE UNCHANGED

EXIT

RETURN TO
XXDP. PROMPT MODE.

 DRO(P)/UNITS:UNIT-LIST

THE UNITS SPECIFIED ARE DROPPED FROM TESTING UNTIL THEY ARE ADDED BACK OR UNTIL A START COMMAND IS GIVEN. A DROP CANNOT BE FOLLOWED BY A PROCEED.

THERE IS ALSO A "DROP" MACRO INTERNAL TO THE DIAGNOSTIC, WHICH GIVES THE FACILITY OF AUTO-DROPPING. THE DURATION OF A PROGRAM DROP, HOWEVER, IS ONLY UNTIL THE NEXT START OR RESTART.

 ADD/UNITS:UNIT-LIST

THE UNITS SPECIFIED ARE ADDED BACK (THEY MUST HAVE BEEN PREVIOUSLY DROPPED BY THE DROP COMMAND) TO THE TEST SEQUENCE. AN ADD CANNOT BE FOLLOWED BY A PROCEED.

 PRI(NT)

ALL STATISTICS TABLES ACCUMULATED BY THE DIAGNOSTIC ARE PRINTED. THE ISR (INHIBIT STATISTICAL REPORTING) FLAG IS CLEARED.

 DIS(PLAY)/UNITS:<UNIT-LIST>

THE HARDWARE P-TABLES FOR ALL UNITS UNDER TEST ARE PRINTED OUT IN THE FORMAT IN WHICH THEY WERE ENTERED. ANY UNITS THAT WERE DROPPED BY THE OPERATOR "DROP" COMMAND ARE SO DESIGNATED.

ED.

 FLA(GS)

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.

 ZFL(AGS)

ALL FLAGS ARE CLEARED.

2 4

EXTENDED P TABLE DIALOGUE

THE FULL CAPABILITY OF THE HARDWARE DIALOGUE IS REVEALED BY THE FOLLOWING DISCUSSION OF WHAT HAPPENS INTERNALLY.

AS SOON AS THE QUESTION "# UNITS?" IS ANSWERED (WITH THE NUMBER N), SPACE IN CORE IS ALLOCATED FOR "N" P-TABLES. ALL OF THE P-TABLES ARE OF THE SAME FORMAT, AND THERE IS A ONE-TO-ONE CORRESPONDENCE BETWEEN THE HARDWARE PARAMETER QUESTIONS AND THE SLOTS IN THE P TABLE FORMAT.

IN GIVING A STRING OF VALUES, COM
MAS WITHOUT INTERVENING VALUES MAY
BE USED TO INDICATE A REPETITION OF THE LAST NAMED VALUE.

A STRING OF VALUES MAY BE GIVEN AS A RANGE (6-10 FOR EXAMPLE). IF THE VALUES REPRESENT PURE NUMERICAL DATA, THIS SAMPLE RANGE TRANSLATES TO THE STRING 6,7,8,9,10 (AN INCREMENT OF 1). IF THE VALUES ARE ADDRESSES, THE SAMPLE RANGE TRANSLATES TO THE STRING 6,8,10 (AN INCREMENT OF 2).

T A NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO CONSTRUCT SET OF P TABLES. ASSUME THAT WE HAVE 8 RL UNITS, AND THAT THERE ARE FIVE (5) HARDWARE PARAMETERS FOR EACH (5 SLOTS IN THE P-TABLE, 5 HARDWARE QUESTIONS IN THE DIALOGUE).

FOLLOWING IS THE DIALOGUE FOR THIS 8 RLOX DRIVE SYSTEM. THIS SYSTEM HAS TWO (2) RL11 TYPE CONTROLLERS ALL TO BE SET AT "BR LEVEL" 5. THE FIRST 4 DRIVES ARE RLO1'S AND THE LAST 4 DRIVES ARE RLO2'S (ON THE SECOND CONTROLLER):

UNITS (D) ? 8

UNIT 0
RL11 (L) Y ?
BUS ADDRESS (0) 174400 ?
VECTOR (0) 160 ?
BR LEVEL (0) 5 ?
DRIVE TYPE = RLO1 (L) Y ?
DRIVE (0) ? 0-3

UNIT 4
RL11 (L) Y ?
BUS ADDRESS (0) 174400 ? 175400
VECTOR (0) 160 ? 164
BR LEVEL (0) 5 ?
DRIVE TYPE = RLO1 (L) Y ? N
DRIVE (0) ? 0-3

THE FIRST TIME THRU THE P TABLE QUESTIONS THE DEFAULT VALUES ARE USED FOR THE CONTROLLER TYPE (QUESTION #1), CSR ADDRESS OF THE CONTROLLER (QUESTION #2), THE CONTROLLER VECTOR ASSIGNMENT (QUESTION #3), THE DRIVE TYPE (QUESTION #5), AND THE "BR LEVEL" (QUESTION #4). THE ACTUAL UNIT NUMBERS OF THE RLO1'S FOR QUESTION #6 WAS AS SIGNED 0 THRU 3 F OR THE FIRST 4 P-TABLE SLOTS.

THE SECOND TIME THRU THE P TABLE QUESTIONS (FOR THE RLO2 ASSIGNMENT ON THE SECOND CONTROLLER), THE FIRST QUESTION DEFAULTED TO "RL11" TYPE CONTROLLER. THE SECOND QUESTION WAS ANSWERED TO REFLECT THE CHANGE IN CSR ADDRESS FOR THE RLO2 CONTROLLER (175400). THE SECOND CONTROLLER'S VECTOR WAS ALSO CHANGED TO 164 IN QUESTION #3. THE RLO2 TEST UNIT NUMBERS WERE ASSIGNED VALUES 0 TO 3 IN QUESTION #6 AND THE DRIVE TYPE WAS SET FOR RLO2'S FOR THE REMAINING 4 UNITS IN QUESTION #5. QUESTION #4 WAS DEFAULTED USING THE "BR LEVEL" FROM THE FIRST PASS.

2.5 HARDWARE PARAMETERS

THE FOLLOWING QUESTIONS WILL BE ASKED ON A START COMMAND. THE VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONSE.

RL11 (L) Y?

ANSWER 1 IF YOU HAVE AN RL11 CONTROLLER, 2 IF YOU HAVE AN RLV11 CONTROLLER, AND 3 IF YOU HAVE AN RLV12 CONTROLLER.

BUS ADDRESS (0) 174400?

ANSWER WITH THE BUS ADDRESS OF THE CONTROLLER.

VECTOR (0) 160?

ANSWER WITH THE INTERRUPT VECTOR OF THE CONTROLLER.

BR LEVEL (0) 5?

ANSWER WITH THE INTERRUPT PRIORITY OF THE CONTROLLER.

DRIVE TYPE = RLO1 (L) ?

ANSWER NO (N) IF DRIVE IS AN RLO2

DRIVE (0) 0?

ANSWER WITH THE DRIVE(S) CONNECTED TO THE CONTROLLER.

2.6 SOFTWARE PARAMETERS

THE FOLLOWING QUESTIONS ARE ASKED IF REQUESTED ON A START, RESTART, OR CONTINUE. THEY ALLOW FLEXIBILITY IN THE WAY THE PROGRAM BEHAVES. THE SOFTWARE PARAMETERS GIVE THE PROGRAM FLEXIBILITY IN THE WAY IT RUNS. THE PARAMETERS CAN BE MODIFIED ON A START, RESTART, OR CONTINUE BY ANSWERING (Y)ES TO THE FOLLOWING QUESTION:

"CHANGE SW ?"

A YES ANSWER WILL ASK THE FOLLOWING SOFTWARE PARAMETER QUESTION, WITH THE PRESENT DEFAULT VALUE PRINTED TO THE LEFT OF THE QUESTION MARK. (THE LAST ANSWER GIVEN IS THE DEFAULT) THE DEFAULT IS TAKEN ON A <CR>.

"DROP ON
ERROR LIMIT (L) Y?"

TO ALLOW THE UNIT TO BE DROPPED ONCE A PREDETERMINED NUMBER OF ERRORS ARE ENCOUNTERED.

3.0 ERROR INFORMATION

ALL ERRORS ARE PRINTED VIA CONSOLE DEVICE. THE ERROR INCLUDES ERROR NUMBER, TYPE AND PROGRAM LOCATION. ERRORS INCLUDE REGISTERS BEFORE AND AT ERROR WITH RELEVANT DATA.

3.1 ERROR REPORTING

ALL ERROR INFORMATION IS PRINTED ON THE CONSOLE DEVICE. ERROR REPORTS ARE AIMED AT BEING SELF EXPLANATORY. THE GENERAL FORMAT IS:

DZRL? XXX ERR YYYYY TST ZZZ SUB PPP PC: RRRRRR

WHERE:

? IS PROGRAM LETTER
 XXX IS SFT - SOFT ERROR
 HRD - HARD ERROR
 DV FAT - DEVICE FATAL ERROR
 SYS FAT - SYSTEM FATAL ERROR
 YYYYY IS THE ERROR NUMBER
 ZZZ IS THE TEST NUMBER

PPP IS THE SUBTEST NUMBER
 RRRRRR IS THE PROGRAM LISTING LOCATION

ERRORS GIVE THE REGISTER CONTENTS BEFORE AND AFTER THE ERROR ALONG WITH A ONE LINE DESCRIPTION AND RELEVANT DATA.

EXAMPLE:

ONE LINE DESCRIPTIO

(OPTIONAL SECOND LINE)

(OPTIONAL THIRD LINE)

BEFORE COMMAND: CS:XXXXXX BA:XXXXXX DA:XXXXXX MP:XXXXXX

TIME OF ERROR: CS:XXXXXX BA:XXXXXX DA:XXXXXX MP:XXXXXX XXXXXX
XXXXXX

3.2 ERROR HALTS

ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION WITH /FLAG:HOE. THERE ARE NO OTHER HALTS.

4.0 PERFORMANCE AND PROGRESS REPORTS

4.1 PERFORMANCE REPORTS

THIS PROGRAM WILL NOT GIVE ANY PERFORMANCE REPORTS.

4.2 PROGRESS REPORTS

THIS PROGRAM WILL NOT GIVE ANY PROGRESS REPORTS.

5.0 DEVICE INFORMATION TABLES

THE RL11/RLV11 CONTROLLER HAS THE FOLLOWING FOUR(4) REGISTERS FOR CONTROL OF THE SUBSYSTEM.

RLCS - CO
CONTROL AND STATUS REGISTER (XXXXX0)

BIT 15 - COMPOSITE ERROR
BIT 14 - DRIVE ERROR
BIT 13 - NON EXISTANT MEMORY ERROR
BIT 12 - HEADER NOT FOUND (WITH BIT 10 SET)
 - DATA LATE (WITH BIT 10 CLEAR)
BIT 11 - HEADER CRC (WITH BIT 10 SET)
 DATA CRC (WITH BIT 10 CLEAR)
BIT 10 - OPERATION INCOMPLETE
BIT 9/8 - DRIVE SELECT (0-3)
BIT 7 - CON

CONTROLLER READY

BIT 6 - INTERRUPT ENABLE
BIT 5 - EXTENDED BUS ADDRESS (BIT 17)
BIT 4 - EXTENDED BUS ADDRESS (BIT 16)

BIT 3-1 FUNCTION CODE

0 - NOP (PDP 11) MAINT (LSI-11)
 1 - WRITE CHECK
 2 - GET DRIVE STATUS
 3 - SEEK
 4 - READ HEADER
 5 - WRITE DATA
 6 - READ DATA
 7 - READ WITHOUT HEADER COMPARE

BIT 0 DRIVE READY

RLBA BUS ADDRESS REGISTER (XXXXX2)

BITS 15-1 BUS ADDRESS OF DATA TRANSFER
 BIT 0 SHOULD BE 0

RLDA DISK ADDRESS REGISTER (XXXXX4)

FOR READ/WRITE FUNCTIONS

BIT 15-7 - CYLINDER ADDRESS FOR TRANSFER
 BIT 6 - SURFACE FOR TRANSFER
 BIT 5-0 - SECTOR FOR TRANSFER (1-40.)

FOR SEEK FUNCTION

7 DIFFERENCE TO NEW CYLINDER
 BIT 15
 BIT 6-5 - MUST BE ZERO (0)
 BIT 4 SURFACE (0=UPPER, 1=LOWER)
 BIT 3 - MUST BE ZERO (0)
 BIT 2 SEEK DIRECTION(1=IN / 0=OUT)
 BIT 1 MUST BE ZERO (0)
 BIT 0 MUST BE ONE (1)

FOR GET STATUS FUNCTION

BIT 15-4 IGNORED SHOULD BE ZERO (0)
 BIT 3 - DRIVE RESET
 BIT 2 MUST BE ZERO (0)
 BIT 1 - MUST BE ONE (1)

BIT 0 MUST BE ONE (1)

RLMP MULTIPURPOSE REGISTER

FOR READ/WRITE FUNCTION

BIT 15 0 WORD COUNT (TWO'S COMPLIMENT)

FOR READ HEADER FUNCTION

BIT 15 0 DISK HEADER OF SECTOR (FIRST READ)
ZERO WO

CZRLGEO RL11/RLV11 CTLR TST 1 MACRO V05.01a Tuesday 12 Feb 85 13:58
Table of contents

2	76	GLOBAL DATA
2	207	PATTERNS FOR DIFFERENCE WORD
3	2	GLOBAL TEXT
4	1	GLOBAL ERRORS
5	2	LOAD PROTECTION TABLE
5		
9		INITIALIZATION CODE
5	107	AUTO DROP SECTION
6	2	GLOBAL SUBROUTINES
6	24	ROUTINE TO CHECK FOR CONTROLLER ERRORS
6	104	LOAD RLCS
6	206	ROUTINE TO CALCULATE CRC
7	1	**TEST 1** - RLCS ADDRESSABILITY
7	26	**TEST 2** - RLBA ADDRESSABILITY
7	52	**TEST 3** - RLDA ADDRESSABILITY
7	77	**TEST 4** - RLMP ADDRESSABILITY
7	102	**TEST 5** - READ WRITE OF RLCS
7	144	**TEST 6** - READ WRITE OF RLBA
8	11	**TEST 7** - READ WRITE OF RLDA
8	44	**TEST 8** - BIS OF RLCS
8	82	**TEST 9** - BIC OF RLCS
8	118	**TEST 10** - BIS OF RLBA
8	153	**TEST 11** - BIC OF RLBA
8	185	**TEST 12** - BIS OF RLDA
8	216	**TEST 13** - BIC OF RLDA
8	248	**TEST 14** - BUS RESET OF RLCS
8	284	**TEST 15** - BUS RESET OF RLBA
8	310	**TEST 16** - BUS RESET OF RLDA
8	333	**TEST 17** - UNIQUENESS OF RLCS
8	375	**TEST 18** - UNIQUENESS OF RLBA
8	417	**TEST 19** - UNIQUENESS OF RLDA
8	461	**TEST 20**
8	514	**TEST 21** - NOOP FUNCTION
8	556	**TEST 22** - TEST NOOP DOES NOTHING (RL11 ONLY)
8	610	**TEST 23** - TEST OF INTERRUPT (RL11 ONLY)
8	647	**TEST 24** - TEST PRIORITY BR LEVEL
8	698	**TEST 25** - GET STATUS FUNCTION
8	723	**TEST 26** - GET STATUS FUNCTION INTERRUPT
8	756	**TEST 27** - GET STATUS FUNCTION GENERATES OPI W/O GS BIT
8	786	**TEST 28** - OPI UNDER INTERRUPT
8	820	**TEST 29** - READ HEADER FUNCTION
8	836	**TEST
T	30**	READ HEADER FUNCTION INTERRUPT
8	862	**TEST 31** - REPEATED RD HDRS YIELD SAME CYL AND HD
8	910	**TEST 32** - CHECK OF HEADER CRC
8	953	**TEST 33** - CHECK CONSECUTIVE HEADERS
8	1027	**TEST 34** - SEEK FUNCTION
8	1051	**TEST 35** - CHECK DRIVE READY ON SEEK
8	1081	**TEST 36** - SEEK FUNCTION INTERRUPT
8	1127	**TEST 37** - TEST DIFFERENCE WORD TRANSMISSION
8	1250	**TEST 38** - VERIFY HEAD SELECT 0 VIA RD HDR
8	1298	**TEST 39** - VERIFY HEAD SELECT 1 VI
A	RD HDR	
8	1345	**TEST 40** - VERIFY HEAD SELECT 0 VIA GET STATUS
8	1392	**TEST 41** - VERIFY HEAD SELECT 1 VIA GET STATUS
8	1440	**TEST 42** - TEST TIME AT WHICH DIF WD GETS TRANSMITTED
8	1539	**TEST 43** - EXTENSIVE CHECK OF HEADER CRC
8	1674	**TEST 44** - VERIFY GET STATUS WHILE DRDY IS LOW

1			.TITLE CZRLGEO RL11/RLV11 CTLR TST 1
2			.ENABLE AMA
3	000000		.ENABLE ABS
4			.NLIST ME,CND,MD
5			.MCALL SVC
6			
7	000000		SVC
8		000000	SVCINS=0
9		000000	SVCTAG=0
10		002000	.=2000
11			
12			
13	002000		POINTER BGNSFT,BGNSW,BGNDU,BGNAU
14			
15	002000		BGNMOD MDHEDR
16			
17	002000		HEADER CZRLG,E,0,7,0
	002000	103	.ASCII /C/
	002001	132	.ASCII /Z/
	002002	122	.ASCII /R/
	002003	114	.ASCII /L/
002004	107		.ASCII /G/
	002005	000	.BYTE 0
	002006	000	.BYTE 0
	002007	000	.BYTE 0
	002010	105	.ASCII /E/
	002011	060	.ASCII /O/
	002012	000000	.WORD 0
	002014	000007	.WORD 7
	002016	026556	.WORD L\$HARD
	002020	026762	.WORD L\$SOFT
	002022	013654	.WORD L\$HW
	002024	013672	.WORD L\$SW
	002026	027050	.WORD L\$LAST
	002030	000000	.WORD 0
	002032	000000	.WORD 0
	002034	000000	.WORD 0
	002036	000000	.WORD 0
	002040		
	013702		.WORD L\$DISPATCH
	002042	000000	.WORD 0
	002044	000000	.WORD 0
	002046	000000	.WORD 0
	002050	003	.BYTE C\$REVISION
	002051	003	.BYTE C\$EDIT
	002052	000000	.WORD 0
	002054	000000	.WORD 0
	002056	000000	.WORD 0
	002060	002230	.WORD L\$DVTYP
	002062	000000	.WORD 0
	002064	000000	.WORD 0
	002066	000000	.WORD 0
	002070	015076	.WORD L\$AU
	002072	015072	.WORD L\$DU
	002074	000000	.WORD 0
	002076	002122	.WORD L\$DESC
	00		
2100	104035		EMT E\$LOAD
	002102	000000	.WORD 0

002104 014040
 002106 015024
 002110 014602
 002112 014032
 002114 000000
 002116 000000
 002120 000000

.WORD L\$INIT
 .WORD L\$CLEAN
 .WORD L\$AUTO
 .WORD L\$PROT
 .WORD 0
 .WORD 0
 .WORD 0

18
 19 002122

ENDMOD

20
 21 002122 IONS. INTERFACE LOGIC, REGISTER OPERATION> DESCRIPT <CZRLG TESTS CONTROLLER FUNCT

002122	103	132	122	.ASCIZ /CZRLG TESTS CONTROLLER FUNCTIONS, INTERFACE LOGIC, REGISTER OPERATION/
002125	114	107	040	
002130	124	105	123	
002133	124	123	040	
002136	103	117	116	
002141	124	122	117	
002144	114	114	105	
002147	122	040	106	
002152	125	116	103	
002155	124	111	117	
002160	116	123	054	
002163	040	111	116	

2166

002171	105	122	
002174	106	101	103
002177	105	040	114
002202	117	107	111
002205	103	054	040
002210	122	105	107
002213	111	123	124
002216	105	122	040
002221	117	120	105
002224	122	101	124
002227	111	117	116
002230	000		

22 002230				DEV TYP .EVEN
002230	122	114	060	<RL01,RL02>
002233	061	054	122	.ASCIZ /RL01,RL02/
002236				

114

002241	060	062	
002241	000		

23 002242				.EVEN
24 002242				BGNMOD GLBEQAT
25 002242				EQUALS
26 002242				

; BIT DEFINITIONS

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.
000037      EF.RESTART== 31.
000036      EF.CONTINUE== 30.
000035      EF.NEW== 29.
000034      EF.PWR== 28.
;

```

```

; START COMMAND WAS ISSUED
; RESTART COMMAND WAS ISSUED
; CONTINUE COMMAND WAS ISSUED
; A NEW PASS HAS BEEN STARTED
; A POWER-FAIL/POWER-UP OCCURRED

```

; PRIORITY LEVEL DEFINITIONS

```

000340      PRI07== 340
000300      PRI06== 300
000240      PRI05== 240
0
000140      PRI04== 200
000100      PRI03== 140
000040      PRI02== 100
000000      PRI01== 40
000000      PRI00== 0

```

00200

; OPERATOR FLAG BITS

```

000004      EVL== 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      H

```

OE** 100000

```

27      000001      DRDY=BIT0      ;DRIVE READY (RLCS)
28      000100      INTEN=BIT6     ;INTERRUPT ENABLE (RLCS)
29      100000      ERR=BIT15    ;RL11 ERROR (RLCS)
30      040000      DERR=BIT14   ;RLO1 DRIVE ERROR (RLCS)
31      002000      OPI=BIT10   ;OPERATION INCOMPLETE (RLCS)
32      000200      CRDY=BIT7    ;CONTROLLER READY (RLCS)
33      000040      BA17=BITS
;EXTENDED ADDRESS BIT 17 (RLCS)
34      000020      BA16=BIT4     ;EXTENDED ADDRESS BIT 16 (RLCS)
35      020000      NXM=BIT13    ;NON-EXISTANT MEMORY (RLCS)
36      000000      DSO=0        ;DRIVE SELECT 0 (RLCS)
37      000400      DS1=BIT8     ;DRIVE SELECT 1 (RLCS)
38      001000      DS2=BIT9     ;DRIVE SELECT 2 (RLCS)
39      001400      DS3=BIT8!BIT9 ;DRIVE SELECT 3 (RLCS)
40      000000      NOOP0=0      ;FUNCTION-NOOP(0)
41      000016      NOOP7=BIT1!BIT2!BIT3 ;FUNCTION-NOOP(7)
42      000002      WRCHK=BIT1   ;WRI
TE CHECK FUNCTION
43      000004      GSTAT=BIT2   ;GET STATUS FUNCTION
44      000006      SEEK=BIT2!BIT1 ;SEEK FUNCTION
45      000010      RDHDR=BIT3    ;READ HEADER FUNCTION
46      000012      WRITE=BIT3!BIT1 ;WRITE DATA FUNCTION
47      000014      READ=BIT3!BIT2 ;READ DATA FUNCTION
48      000202      GODRVR=BIT1!BIT7 ;CRDY AND DRDY
49      000010      DRS1=BIT3     ;DRIVE RESET (RLDA)
50      000002      GSBIT=BIT1    ;GET STATUS BIT (RLDA)
51      000001      MK=BIT0       ;MARKER BIT (RLDA)
52      000000      SIGN=BIT2     ;SIGN BIT (RLDA)
4 53      000100      RHHS=BIT6    ;HEAD SELECT IN READ HEADER
54      000100      STHS=BIT6    ;HEAD SELECT IN STATUS BACK
55      000020      DAHS=BIT4     ;HEAD SELECT IN SEEK
56
57      ;OFFSET FOR HARDWARE P-TABLE
58
59      000000      CSR=0
60      000002      VECT=2
61      000004      PRIOR=4
62      000006      TYPDR=6
63      000010      DRBT=10
64      000012      CNT=12
65
66      ;OFFSET FOR SOFTWARE P-TABLE
67
68      000000      DLT=0
69
70      000002      ELT=2
71      000004      SIZE=4
72 002242      ENDMOD
73
74 002242      BGNMOD  GLBDAT
75
76      .SBTTL  GLOBAL DATA
77
78 002242 000000  PWRFLG: .WORD 0
79 002244 000J00  UUT: .WORD 0
80 002246 000000  UNITST: .WORD 0
81 002250 000000  RLCS: .WORD 0 ;LOGICAL ADDRESS OF CS
82 002252 000000  RLBA: .WORD 0 ;LOGICAL ADDRESS OF BA
83 002254 000000  RLDA: .WORD 0 ;LOGICAL ADDRESS OF DA

```

```

84 002256 000000      RLMP:      .WORD      0      ;LOGICAL ADDRESS OF MP
85 002260 000000      RLBE:      .WORD      0      ;LOGICAL ADDRESS OF BE
86 002262 000000      BCSR:      .WORD      0
87 002264 000000      BPRIOR:    .WORD      0
88 002266 000000      BVEC:      .WORD      0
89 002270 000000      DRIVE:    .WORD      0      ;DRIVE UNDER TEST
90 002272 000000      B.CS:      .WORD      0      ;CS - BEFORE OPERATION

91 002274 000000      B.BA:      .WORD      0      ;BA - BEFORE OPERATION
92 002276 000000      B.DA:      .WORD      0      ;DA - BEFORE OPERATION
93 002300 000000      B.MP:      .WORD      0      ;MP - BEFORE OPERATION
94 002302 000000      B.BE:      .WORD      0      ;BE - BEFORE OPERATION
95 002304 000000      DERFLG:    .WORD
96 002306 000000      E.CS:      .WORD      0      ;CS - AT OCCURANCE OF ERROR
97 002310 000000      E.BA:      .WORD      0      ;BA - AT OCCRUANCE OF ERROR
98 002312 000000      E.DA:      .WORD      0      ;DA - AT OCCURANCE OF ERROR
99 0023      000000
14 000000      E.MP:      .WORD      0      ;MP AT OCCURANCE OF ERROR
100 002316 000000      E.MP1:     .WORD      0
101 002320 000000      E.MP2:     .WORD      0      ;MP - AT OCCURANCE OF ERROR READ HEADER
102 002322 000000      E.BE:      .WORD      0      ;BE - AT OCCURANCE OF ERROR RLV12 ONLY
103 002324 000000      PFLG:      .WORD      0      ;PROCESSOR TYPE, 0=UNIBUS, 1=Q-BUS
104 002326 000000      TRPFLG:    .WORD      0
105 002330 000000      INTFLG:    .WORD      0      ;INTERRUPT OCCURRENCE FLAG
106 002332 000000      LDCSR:     .WORD      0      ;LOCATION TO FORM RLCS

107 002334 000077      SECMSK:    .WORD      77      ;MASK OUT SECTOR
108 002336 120001      XPOLY:     .WORD     120001      ;POLYNOMIAL FOR CRC 16
109 002340 000004      ERRVEC:    .WORD      4
110 002342 000000      BCCFBK:    .WORD      0      ;LOCATION USED BY "SIMBCC"
111 002344 000000      CALBCC:    .WORD      0      ;LOCATION USED BY "SIMBCC"
112 002346 000000      TEMP2:     .WORD      0      ;LOCATION USED BY "SIMBCC"
113 002350 000000      TEMP3:     .WORD      0      ;LOCATION USED BY "SIMBCC"
114 002352 000000      TEMP4:     .WORD      0      ;LOCATION USED BY "
SIMBCC"
115 002354 000000      TMP0:      .WORD      0
116 002356 000000      TMP1:      .WORD      0
117 002360 000000      TMP2:      .WORD      0
118 002362 000000      GDDAT:     .WORD      0
119 002364 000000      BDDAT:     .WORD      0
120 002366 000000      FIRST:     .WORD      0      ;FIRST SECTOR READ
121 002370 177700      CYLMSK:    .WORD     177700      ;MASK CYLINDER AND HEAD SELECT
122 002372 000050      MXSEC1:    .WORD      40      ;MAX SECTOR ADDRESS +1
123 002374 000047      MAXSEC:    .WORD      39      ;MAX SECTOR ADDRESS
124 002376 000000      DWO
RD:      .WORD      0      ;DIFFERENCE WORD (SEEK)
125 002400 177600      MAXCYL:    .WORD     177600      ;MAXIMUM CYLINDER ADDRESS
126 002402 000000      SVHD:      .WORD      0      ;SAVE CURRENT HEAD SELECT
127 002404 000000      WHY:       .WORD      0      ;REASON FOR DROP UNIT
128
129 002406 000000      T.DRIVE:    .WORD      0      ;DRIVE TYPE
130 002410 000000      T.CNTRLR:  .WORD      0      ;CONTOLLER TYPE
131 002412 000000      TMPFNC:    .WORD      0
132 002414 000000      DLYCNT:    .WORD      0      ;DELAY COUNTER
133 002416      DBUFF:     .BLKW     512.      ;WORDS ;DA
TA BUFFER      B
134
135      ;PATTERNS USED FOR LOADING/READING REGISTERS
136
137 004416 000000      BEGPAT:    0      ;GROWING 1
138 004420 000001      1
139 004422 000003      3
140 004424 000007      7

```

141	004426	000017	17	
142	004430	000037	37	
143	004432	000077	77	
144	004434	000177	177	
145	0			
04436	000377		377	
146	004440	000777	777	
147	004442	001777	1777	
148	004444	003777	3777	
149	004446	007777	7777	
150	004450	017777	17777	
151	004452	037777	37777	
152	004454	077777	77777	
153	004456	177777	177777	
154	004460	177776	177776	:GROWING 0
155	004462	177774	177774	
156	004464	177770	177770	
157	004466	177760	177760	
158	004470	177740	177740	
159	004472	177700	177700	
160	00447			
4	177600		177600	
161	004476	177400	177400	
162	004500	177000	177000	
163	004502	176000	176000	
164	004504	174000	174000	
165	004506	170000	170000	
166	004510	160000	160000	
167	004512	140000	140000	
168	004514	100000	100000	
169				
170	004516	000000	000000	
171	004520	000001	1	:WALKING 1
172	004522	000002	2	
173	004524	000004	4	
174	004526	000010	10	
175	004530	000020	20	
176	004532	0		
00040			40	
177	004534	000100	100	
178	004536	000200	200	
179	004540	000400	400	
180	004542	001000	1000	
181	004544	002000	2000	
182	004546	004000	4000	
183	004550	010000	10000	
184	004552	020000	20000	
185	004554	040000	40000	
186	004556	100000	100000	
187	004560	177777	177777	
188	004562	177776	177776	:WALKING 0
189	004564	177775	177775	
190	004566	177773	177773	
191	004570	177767	1	
77767				
192	004572	177757	177757	
193	004574	177737	177737	
194	004576	177677	177677	
195	004600	177577	177577	
196	004602	177377	177377	
197	004604	176777	176777	

198	004606	175777	175777	
199	004610	173777	173777	
200	004612	167777	167777	
201	004614	157777	157777	
202	004616	1		
37777				137777
203	004620	077777	077777	
204	004622	177777	177777	
205	004624	000000	ENDPAT: 000000	
206				
207			.SBTTL PATTERNS FOR DIFFERENCE WORD	
208				
209	004626	000200	SKLST: .WORD BIT7	
210	004630	000400	.WORD BIT8	:SHIFTING 1
211	004632	001000	.WORD BIT9	
212	004634	002000	.WORD BIT10	
213	004636	004000	.WORD BIT11	
214	004640	010000	.WORD BIT12	
215	004642	020000	.WORD BIT13	
216	004644	040000	.WO	
RD	BIT14			
217	004646	077600	.WORD 77600	:SHIFTING 0
218	004650	077400	.WORD 77400	
219	004652	076600	.WORD 76600	
220	004654	075600	.WORD 75600	
221	004656	073600	.WORD 73600	
222	004660	067600	.WORD 67600	
223	004662	057600	.WORD 57600	
224	004664	037600	.WORD 37600	
225	004666	077600	.WORD 77600	
226	004670	000200	.WORD 200	
227	004672	000600	.WORD 600	:GROWING 1
228	004674	001600	.WORD 1600	
229	004676			
	003600		.WORD 3600	
230	004700	007600	.WORD 7600	
231	004702	017600	QUAMAX: .WORD 17600	
232	004704	037600	HALMAX: .WORD 37600	
233	004706	077600	.WORD 77600	
234	004710	077400	.WORD 77400	:GROWING 0
235	004712	077000	.WORD 77000	
236	004714	076000	.WORD 76000	
237	004716	074000	.WORD 74000	
238	004720	070000	.WORD 70000	
239	004722	060000	.WORD 60000	
240	004724	040000	.WORD 40000	
241	004726	000000	SKEND: .W	
ORD	00000			
242	004730	100000	RL2: .WORD BIT15	
243	004732	037600	QMAX: .WORD 37600	
244	004734	077600	HMAX: .WORD 77600	
245				
246	004736	177600	.WORD 177600	
247	004740	177400	.WORD 177400	
248	004742	176600	.WORD 176600	
249	004744	173600	.WORD 173600	
250	004746	167600	.WORD 167600	
251	004750	157600	.WORD 157600	
252	004752	137600	.WORD 137600	
253	004754	177000	.WORD 177000	
254	004756	176000	.WORD 176000	

255	004760	174000	.WORD	174000	
256	004762	170000	.WORD	170000	
257	004764	060000	.WORD	60000	
258	004766	040000	.WORD	40000	
259	004770	000000	SKEEND: .WORD	000000	
260					
261					
262					
263	004772	000000			
264	004774	000002	CSPAT: .WORD	0	;SHIFTING 1
	BIT1		.WOR		
265	004776	000004	.WORD	BIT2	
266	005000	000010	.WORD	BIT3	
267	005002	000020	.WORD	BIT4	
268	005004	000040	.WORD	BIT5	
269	005006	000100	.WORD	BIT6	
270	005010	000400	.WORD	BIT8	
271	005012	001000	.WORD	BIT9	
272	005014	001576	.WORD	1576	;GROWING 0
273	005016	001574	.WORD	1574	
274	005020	001570	.WORD	1570	
275	005022	001560	.WORD	1560	
276	005024	001540	.WORD	1540	
277	005026	001500	.WORD	1500	
278	005030	001400	.WORD	1400	
279	005032	001576	.WORD	1576	;SHIFT 0
280	005034	001574	.WORD	1574	
281	005036	001566	.WORD	1566	
282	005040	001556	.WORD	1556	
283	005042	001536	.WORD	1536	
284	005044	001436	.WORD	1436	
285	005046	001136	.WORD	1136	
286	005050	000076	.WORD	76	
287	005052	000006	.WORD	6	;GROWING 1
288	005054	000016	.WORD	16	
289	005056	000036	.WORD	36	
290	005060	000076	.WORD	76	
2					
91	005062	000176	.WORD	176	
292	005064	000576	.WORD	576	
293	005066	001576	.WORD	1576	
294	005070	000000	CSEND: .WORD	0	
295	005072	000000	ERPOINT: .WORD	0	
296	005074		ERCOUNT: .BLKW	64.	
297	005274		HDRBUF: .BLKW	160.	
298	005774		ENDMOD		
299					

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1 005774          BGNMOD GLB1XT
2
3      .SBTTL GLOBAL TEXT
7 005774      040      104      122 DEMES: .ASCIZ / DRV/
8 006001      040      116      130 NXMMES: .ASCIZ / NXM/
9 006006      040      117      120 OPIMES: .ASCIZ / OPI/
10 006013     040      110      103 HRCMES: .ASCIZ / HCRC/
11 006021     040      110      116 HNFMES: .ASCIZ / HNF/
12 006026     040      104      103 DCKMES: .ASCIZ / DCK/
13 006033     040      104      114 DLTMES: .ASCIZ / DLT/
14 006040     015      012      000 MSCRLF
    .ASCIZ <15><12>
15 006043     015      000          LF: .ASCIZ <15>
16 006045     040      103      117 COMP: .ASCIZ / COMP/
17 006053     106      117      122 OPIERR: .ASCIZ /FORCED OPI(GET STATUS) CAUSED OTHER ERRORS/
18 006126     116      117      117 NOPMES: .ASCIZ /NOOP OPERATION-FLAG MODE/
19 006157     116      117      117 NOPINT: .ASCIZ /NOOP OPERATION-INTR. MODE/
20 006211     127      122      111 WCKMES: .ASCIZ /WRITE CHECK OPERATION-FLAG MODE/
21 006251     127      122
    111 WCKINT: .ASCIZ /WRITE CHECK OPERATION-INTR. MODE/
22 006312     122      105      101 RHDMS: .ASCIZ /READ HEADER OPERATION-FLAG MODE/
23 006352     122      105      101 RHDINT: .ASCIZ /READ HEADER OPERATION-INTR. MODE/
24 006413     123      105      105 SEKMES: .ASCIZ /SEEK OPERATION-FLAG MODE/
25 006444     123      105      105 SEKINT: .ASCIZ /SEEK OPERATION-INTR. MODE/
26 006476     107      105      124 GSTMES: .ASCIZ /GET STATUS OPERATION-FLAG MODE/
27 006535     1          124 GSTINT: .ASCIZ /GET STATUS OPERATION-INTR MODE/
07 28 006574     105      124      072 ARLCS: .ASCIZ /CS: /
29 006601     103      123      101 ARLBA: .ASCIZ / BA: /
30 006607     040      102      101 ARLDA: .ASCIZ / DA: /
31 006615     040      104      101 ARLMP: .ASCIZ / MP: /
32 006623     040      115      120 ARLMP: .ASCIZ / MP: /
33 006623     102      105      106 BEREG: .ASCIZ /BEFORE COMMAND: /
34 006644     124      111      115 AFREG: .ASCIZ /TIME OF ERROR: /
35 006665     103      117      116 CRTIM: .ASC
IZ /CONTROLLER TIMED OUT/
35 006712     104      122      111 DRTIM: .ASCIZ /DRIVE READY TIMED OUT/
36 006740     103      101      116 EM1: .ASCIZ /CAN NOT ADDRESS RLCS/
37 006765     103      101      116 EM2: .ASCIZ /CAN NOT ADDRESS RLBA/
38 007012     103      101      116 EM3: .ASCIZ /CAN NOT ADDRESS RLDA/
39 007037     103      101      116 EM4: .ASCIZ /CAN NOT ADDRESS RLMP/
40 007064     122      114      103 EM5: .ASCIZ *RLCS READ/WRITE ERROR (BIT 0 DON'T CARE)*
41 0071          122      114      102 EM6: .ASCIZ *RLBA READ/WRITE ERROR*
35 42 007163     122      114      104 EM7: .ASCIZ *RLDA READ/WRITE ERROR*
43 007211     117      120      111 EM11: .ASCIZ /OPI WOULD NOT GENERATE INTERRUPT/
44 007252     116      117      040 EM13: .ASCIZ /NO INTERRUPT FROM NOOP(O)/
45 007304     116      117      117 EM14: .ASCIZ /NOOP(O) MODIFIED RLMP/
46 007332     116      117      117 EM15: .ASCIZ /NOOP(O) MODIFIED RLBA/
47 007360     116      117      117 EM16: .ASC
IZ /NOOP(O) MODIFIED RLDA/
48 007406     111      116      124 EM17: .ASCIZ /INTERRUPT PRIORITY FAILURE/
49 007441     107      105      124 EM30: .ASCIZ /GET STATUS WOULD NOT INTERRUPT/
50 007500     107      105      124 EM30A: .ASCIZ /GET STATUS SHOULD NOT INTERRUPT/
51 007540     122      114      115 EM32: .ASCIZ /RLMP CONTAINED WRONG STATUS/
52 007574     117      120      111 EM33: .ASCIZ /OPI DID NOT SET-GSTAT WITHOUT GS BIT/
53 007641     117      120      111 EM34: .ASCIZ /
OPI DID NOT SET-GSTAT WITHOUT GS AND MK BITS/
54 007716     122      105      101 EM37: .ASCIZ /READ HEADER WOULD NOT INTERRUPT/
55 007756     102      101      104 EM41: .ASCIZ /BAD CYLINDER OR HEAD SELECT IN REPEATED READ HEADER TEST/
56 010047     102      101      104 EM42: .ASCIZ /BAD HEADER CRC ON READ HEADER/
57 010105     123      105      103 EM43: .ASCIZ /SECTOR ADDRESS OUT OF SEQUENCE DURING CONSECUTIVE READ HEADERS/
58 010204     127      122      111 EM44: .ASCIZ /WRITING RL
MP MODIFIED RLCS/
59 010237     127      122      111 EM45: .ASCIZ /WRITING RLMP MODIFIED RLBA/
60 010272     127      122      111 EM46: .ASCIZ /WRITING RLMP MODIFIED RLDA/

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J3

61	010325	123	105	105	EM47:	.ASCIZ	/SEEK WOULD NOT INTERRUPT/
62	010356	104	122	111	EM52:	.ASCIZ	/DRIVE READY CAUSED EXTRANEIOUS INTERRUPT/
63	010426	102	101	104	EM54:	.ASCIZ	/BAD SEEK-TEST OF DIFFENCE WORD/
64	010465	102	101	104	EM55:	.ASCIZ	/BAD HEAD SELECT VIA RD HDR/
65	010520	102	101	104	EM56:	.ASCIZ	/BAD HEAD SELECT VIA GET STATUS/
66	010557	114	117	101	EM57:	.ASCII	/LOADING RLDA BEFORE DRIVE READY ON SEEK/<15><12>
67	010630	104	122	111		.ASCIZ	/DRIVE READY DID NOT SET/
68	010660	102	111	124	EM61:	.ASCIZ	/BIT SET INSTRUCTION ON RLCS YIELD
ED WRONG RESULT/							
69	010741	102	111	124	EM62:	.ASCIZ	/BIT CLEAR INSTRUCTION ON RLCS YIELDED WRONG RESULT/
70	011024	102	111	124	EM63:	.ASCIZ	/BIT SET INSTRUCTION ON RLBA YIELDED WRONG RESULT/
71	011105	102	111	124	EM64:	.ASCIZ	/BIT CLEAR INSTRUCTION ON RLBA YIELDED WRONG RESULT/
72	011170	102	111	124	EM65:	.ASCIZ	/BIT SET INSTRUCTION ON RLDA YIELDED WRONG RESULT/
73	011251	102	111	124	EM66:	.ASCIZ	/BIT CLEAR INSTRUCTION
ON RLDA YIELDED WRONG RESULT/							
74	011334	102	125	123	EM67:	.ASCIZ	/BUS RESET DID NOT CLEAR RLCS/
75	011371	102	125	123	EM70:	.ASCIZ	/BUS RESET DID NOT CLEAR RLBA/
76	011426	102	125	123	EM71:	.ASCIZ	/BUS RESET DID NOT CLEAR RLDA/
77	011463	127	122	111	EM72:	.ASCIZ	/WRITING RLCS MODIFIED RLBA/
78	011516	127	122	111	EM73:	.ASCIZ	/WRITING RLCS MODIFIED RLDA/
79	011551	127	122	111	EM74:	.ASCIZ	/WRITING RLB
A MODIFIED RLCS/							
80	011603	127	122	111	EM75:	.ASCIZ	/WRITING RLBA MODIFED RLDA/
81	011635	127	122	111	EM76:	.ASCIZ	/WRITING RLDA MODIFIED RLCS/
82	011670	127	122	111	EM77:	.ASCIZ	/WRITING RLDA MODIFIED RLBA/
83	011723	122	114	103	EM101:	.ASCIZ	/RLCS CONTAINED FOLLOWING ERROR(S): /
84	011770				EM102:	.BLKB	120.
85	012160	122	114	126	EM103:	.ASCIZ	/RLV11 OR RLV12 RLDA INCREMENTED WRONG/
86							
87							
88						.EVEN	
89							
93	012226					ENDMOD	
94							

:8

	1			.SBTTL	GLOBAL ERRORS	
	2					
	3	012226		BGNMOD	GLBERR	
	4					
	5	012226		BGNMSG	ERRO	
	6					
	7	012226	004737	012552	JSR	PC,LINE1
	8	012232	004737	012606	JSR	PC,LINE2
	9					
	10	012236	004537	015102	JSR	R5,CKERLT ;CHECK ERROR LIMIT
11		012242			ENDMSG	
		012242		L10000:		
		012242	104423		TRAP	C#MSG
	12					
	13	012244		BGNMSG	ERR1	
	14					
	15	012244	004737	012552	JSR	PC,LINE1
	16					
	17	012250	004537	015102	JSR	R5,CKERLT ;CHECK ERROR LIMIT
	18	012254			ENDMSG	
		012254		L10001:		
		012254	104423		TRAP	C#MSG
	19					
	20	012256		BGNMSG	ERR2	
	21					
	22	012256	004737	012552	JSR	PC,LINE1
	23	012262			PRINTB	#FRMT4,GDDAT,BDDAT
		012262	013746	002364	MOV	BDDAT,-(SP)
		012				
266		013746	002362		MOV	GDDAT,(SP)
		012272	012746	013205	MOV	#FRMT4,-(SP)
		012276	012746	000003	MOV	#3,-(SP)
		012302	010600		MOV	SP,R0
		012304	104414		TRAP	C#PNTB
		012306	062706	000010	ADD	#10,SP
	24					
	25	012312	004537	015102	JSR	R5,CKERLT ;CHECK ERROR LIMIT
	26	012316			ENDMSG	
		012316		L10002:		
		012316	104423		TRAP	C#MSG
	27					
	28	012320		BGNMSG	ERR3	
	29					
	30	012320	004737	012552	JSR	PC,LINE1
	31	012324	004737	012606	JSR	PC
.LINE2						
	32	012330			PRINTB	#FRMT5,TMPO,BDDAT,GDDAT
		012330	013746	002362	MOV	GDDAT,-(SP)
		012334	013746	002364	MOV	BDDAT,-(SP)
		012340	013746	002354	MOV	TMPO,-(SP)
		012344	012746	013243	MOV	#FRMT5,-(SP)
		012350	012746	000004	MOV	#4,-(SP)
		012354	010600		MOV	SP,R0
		012356	104414		TRAP	C#PNTB
		012360	062706	000012	ADD	#12,SP
	33					
	34	012364	004537	015102	JSR	R5,CKERLT ;CHECK ERROR LIMIT
	35	012370			ENDMSG	
		012370		L10003:		

	012370	104423		TRAP	C\$MSG	
36						
37	012372			BGNMSG	ERR4	
38						
39	012372	004737	012552	JSR	PC.LINE1	
40	012376	004737	012606	JSR	PC.LINE2	
41	012402			PRINTB	#FRMT4,GDDAT,BDDAT	
	012402	013746	002364	MOV	BDDAT,(SP)	
	012406	013746	002362	MOV	GDDAT, -(SP)	
	012412	012746	013205	MOV	#FRMT4,(SP)	
	012416	012746	000003	MOV		
	03,(SP)					
	012422	010600		MOV	SP,RO	
	012424	104414		TRAP	C\$PNTB	
	012426	062706	000010	ADD	#10,SP	
42						
43	012432	004537	015102	JSR	R5,CKERLT	;CHECK ERROR LIMIT
44	012436			ENDMSG		
	012436			L10004:		
	012436	104423		TRAP	C\$MSG	
45						
46	012440			BGNMSG	ERR5	
47						
48	012440	004737	012552	JSR	PC.LINE1	
49						
50	012444	004537	015102	JSR	R5,CKERLT	;CHECK ERROR LIMIT
51	012450			ENDMSG		
	012450			L10005:		
	012450	104423		TRAP	C\$MS	
52						
53	012452			BGNMSG	ERR6	
54						
55	012452	004737	012552	JSR	PC.LINE1	
56	012456	004737	013020	JSR	PC.LINE3	
57	012462	004737	012606	JSR	PC.LINE2	
58						
59						
60	012466			1\$:	PRINTB	#FRMT99
	012466	012746	013240	MOV	#FRMT99, -(SP)	
	012472	012746	000001	MOV	#1, -(SP)	
	012476	010600		MOV	SP,RO	
	012500	104414		TRAP	C\$PNTB	
	012502	062706	000004	ADD	#4,SP	
61	012506	004537	015102	JSR	R5,CKERLT	;CHECK ERROR LIMIT
62	0125					
				ENDMSG		
	012512			L10006:		
	012512	104423		TRAP	C\$MSG	
63						
64	012514			BGNMSG	ERR7	
65						
66	012514	004737	012552	JSR	PC.LINE1	
67	012520			PPINTB	#FRMT6,BDDAT	
	012520	013746	002364	MC /	BDDAT, -(SP)	
	012524	012746	013314	MOV	#FRMT6, -(SP)	
	012530	012746	000002	MOV	#2, (SP)	
	012534	010600		MOV	SP,RO	
	012536	104414		TRAP	C\$PNTB	
	012540	062706	000006	ADD	#6,SP	

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12

GLOBAL ERRORS

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68
69 012544 004537 015102          JSR      R5,CKERLT
70
71 012550          ENDMMSG
   012550          L10007:
   012550 104423          TRAP      C#MSG
72
73 012552          LINE1: PRINTB  #FRMT1,RLCS,<B,DRIVE*1>
   012552 005046          CLR      -(SP)
   012554 153716 002271          BISB    DRIVE*1,(SP)
   012560 013746 002250          MOV     RLCS,-(SP)
   012564 012746 013072          MOV     #FRMT1,-(SP)
   012570 012746 000003          MOV     #3,(SP)
   012574 010600          MOV     SP,RO
   012
576 104414          TRAP      C#PNTB
   012600 062706 000010          ADD     #10,SP
74 012604 000207          RTS      PC
75
76 012606          LINE2: PRINTB  #FRMT2,#BEREG,#ARLCS,B.CS,#ARLBA,B.BA
   012606 013746 002274          MOV     B.BA,-(SP)
   012612 012746 006601          MOV     #ARLBA,-(SP)
   012616 013746 002272          MOV     B.CS,-(SP)
   012622 012746 006574          MOV     #ARLCS,(SP)
   012626 012746 006623          MOV     #BEREG,-(SP)
   012632 012746 013132          MOV     #FRMT2,-(SP)
   012636 012746 000006          MOV     #6,-(SP)
   012642 010600          MOV     SP,RO
   0
12644 104414          TRAP      C#PNTB
   012646 062706 000016          ADD     #16,SP
77 012652          PRINTB  #FRMT2A,#ARLDA,B.DA,#ARLMP,B.MP
   012652 013746 002300          MOV     B.MP,-(SP)
   012656 012746 006615          MOV     #ARLMP,-(SP)
   012662 013746 002276          MOV     B.DA,-(SP)
   012666 012746 006607          MOV     #ARLDA,-(SP)
   012672 012746 013151          MOV     #FRMT2A,-(SP)
   012676 012746 000005          MOV     #5,-(SP)
   012702 010600          MOV     SP,RO
   012704 104414          TRAP      C#PNTB
   012706 062706 000014          ADD     #14,SP
78 012712          PRINTB  #F
RMT2,#AFREG,#ARLCS,E.CS,#ARLBA,E.BA
   012712 013746 002310          MOV     E.BA,-(SP)
   012716 012746 006601          MOV     #ARLBA,-(SP)
   012722 013746 002306          MOV     E.CS,-(SP)
   012726 012746 006574          MOV     #ARLCS,-(SP)
   012732 012746 006644          MOV     #AFREG,-(SP)
   012736 012746 013132          MOV     #FRMT2,-(SP)
   012742 012746 000006          MOV     #6,-(SP)
   012746 010600          MOV     SP,RO
   012750 104414          TRAP      C#PNTB
   012752 062706 000016          ADD     #16,SP
79 012756          PRINTB  #FRMT2B,#ARLDA,E.DA,#ARLMP,E.MP
   012756 013746          MOV     E.MP,(SP)
002314 012762 012746 006615          MOV     #ARLMP,-(SP)
   012766 013746 002312          MOV     E.DA,-(SP)
   012772 012746 006607          MOV     #ARLDA,-(SP)
   012776 012746 013164          MOV     #FRMT2B,-(SP)
   013002 012746 000005          MOV     #5,(SP)

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      013006 010600      MOV      SP,R0
      013010 104414      TRAP     C#PNTB
      013012 062706 000014  ADD      #14,SP
7  80 013016 00020      RTS      PC
      81
      82 013020      LINE3: PRINTB #FRMT3,#EM101
      013020 012746 011723      MOV      #EM101,(SP)
      013024 012746 013200      MOV      #FRMT3,-(SP)
      013030 012746 000002      MOV      #2,-(SP)
      013034 010600      MOV      SP,R0
      013036 104414      TRAP     C#PNTB
      83 013040 062706 000006  ADD      #6,SP
      013044      PRINTB #FRMT3,#EM102
      013044 012746 011770      MOV      #EM102,-(SP)
      013050 012746 013200      MOV      #FRMT3,-(SP)
      013054 012746 000002      MOV      #2,-(SP)
      013060 010600      MOV      SP,R0
      013062 104414
      TRAP     C#PNTB
      013064 062706 000006  ADD      #6,SP
      84 013070 000207      RTS      PC
      85
      89
      90 013072      045      101      103  FRMT1:  .ASCIZ  /*ACONTROLLER: #06#A DRIVE: #01/
      91 013132      045      116      045  FRMT2:  .ASCIZ  /*N#T#T#06#T#06/
      92 013151      045      124      045  FRMT2A: .ASCIZ  /*T#06#T#06/
      93 013164      045      124      045  FRMT2B: .ASCIZ  /*T#06#T#06#
      94 013200      045      116      045  FRMT3:  .ASCIZ  /*N#T/
      95 013205      045      116      045  FRMT4:  .ASC
II  /*N#AEXP'D: #06#A REC'D: #06/
      96 013240      045      116      000  FRMT99: .ASCIZ  /*N/
      97 013243      045      116      045  FRMT5:  .ASCIZ  /*N#ALAST: #06#A PRES: #06#A EXP'D: #06#N/
      98 013314      045      116      045  FRMT6:  .ASCIZ  /*N#AAT PROCESSOR LEVEL #06#N/
      99 013351      045      101      105  FRMT11: .ASCIZ  /*AERROR LIMIT EXCEEDED-DROPPED#N/
      100 013412      045      116      045  FRMT12: .ASCIZ  /*N#ADRIVE DID NOT RECOVER FROM POWER FAILURE#N/
      101 013471      045      116      045  FRM
T13: .ASCIZ  /*N#T#A - WILL NOT TEST#N/
      102 013522      045      116      045  FRMT14: .ASCIZ  /*N#ADRIVE DROPPED - NO CONTROLLER#N/
      103 013566      045      116      045  FRMT15: .ASCIZ  /*N#ADRIVE DROPPED - DID NOT RESPOND WITH "READY"#N/
      104
      105      .EVEN
      106
      107
      111
      112
      113
      114 013652      ENDMOD
      115
      116 013652      BGNMOD  HPTCODE
      117
      118      BGNHW
      013652      .WORD  L10010 L#HW/2      ;DEFAULT HARDWARE TABLE
      013652 000006
      119 013654 174400      .WORD
      174400      ;CSR
      120 013656 000160      .WORD  160      ;VECTOR
      121 013660 000240      .WORD  240      ;PRIORITY
      122 013662 000001      .WORD  1        ;RL01 = 1
      123 013664 000000      .WORD  0        ;DRIVE (BITS 8,9,10)
      124 013666 000001      .WORD  1        ;RL11 = 1, RLV11 = 2, RLV12 = 3
      125
      126 013670      ENDMOD

```


127 013670
128 013670
129
130 013670
131
132 013670
013670 000003
133
134 013672 000000
135 013674 000012
136 013676 000000
137
138 013700
013700
139
140 013700
141
142 013700
143
144 013700
013700 000054
013702 016454
.WORD T1
013704 016550
013706 016644
013710 016740
013712 017034
013714 017154
013716 017260
013720 017346
013722 017472
013724 017616
013726 017724
013730 020024
013732 020114
013734 020214
013736 020324
013740 020400
013742 020436
013744 020562

013746 020722
013750 021062
013752 021266
013754 021402
013756 021610
013760 021676
013762 022044
013764 022074
013766 022246
013770 022334
013772 022462
013774 022504
013776 022564
014000 022730
014002 023066
014004 023404
014006 023500

L10010:

ENDMOD
BGNMOD SPTCODE
BGNSW .WORD L10011 L#SW/2 ;DEFAULT SOFTWARE TABLE
DROP: .WORD 0
MERLMT: .WORD 10.
T.SIZE: .WORD 0

ENDSW
L10011:

ENDMOD
BGNMOD DSPCODE
DISPATCH 44
.WORD 44

.WORD T2
.WORD T3
.WORD T4
.WORD T5
.WORD T6
.WORD T7
.WORD T8
.WORD T9
.WORD T10
.WORD T11
.WORD T12
.WORD T13
.WORD T14
.WORD T15
.WORD T16
.WORD T17
.WORD T18

.WORD T19
.WORD T20
.WORD T21
.WORD T22
.WORD T23
.WORD T24
.WORD T25
.WORD T26
.WORD T27
.WORD T28
.WORD T29
.WORD T30
.WORD T31
.WORD T32
.WORD T33
.WORD T34
.WORD T35

GLOBAL ERRORS

014010	023544	.WORD	T36
014012	023670	.WORD	T37
014014	024306	.WORD	T38
014016	024440	.WORD	T39
014020	024602	.WORD	T40
014022	024742	.WORD	T41
014024	025114	.WORD	T42
014026	025542	.WORD	T43
014030	026262	.WORD	T44
145			
146	014032	ENDMOD	
147			
148			

```

1
2
3 014032
4 014032 000000
5 014034 177777
6 014036 000011
7 014040
8
9
10 014040
11
12 014040
13
14 014040
15 014040 104433
16 014042 012700 000034
17 014046 104447
18 014050 103004
19 014052 013737 002012 002242
20 014060 000475
21 014062 01270
22 014062 000037
23 014066 104447
24 014070
25 014070 103404
26 014072
27 014072 012700 000040
28 014076 104447
29 014100
30 014100 103010
31 014102 012700 005074
32 014106 012701 000100
33 014112 005020
34 014114 005301
35 014116 001375
36 014120 000407
37 014122
38 014122 012700 000036
39 014126 104447
40 014130
41 014130 103451
42 014132 005737 002244
43 014136 001011
44 014140 012737 177777 002246
45 014146 013737 002012 002244
46 014154 012737 005072 005072
47 014162 005237 002246
48 014166 062737 000002 005072
49 014174 005337 002244
50 014200
51 014200 013700 002246
52 014204 104442

.SBTTL LOAD PROTECTION TABLE
BGNPROT
.WORD CSR ;P TABLE OFFSET OF CSR
.WORD -1 ;NOT A MASS-BUS DRIVE
.WORD DRBT+1 ;P-TABLE OFFSET OF DRIVE NUMBER IN BYTES
ENDPROT

.SBTTL INITIALIZATION CODE
BGNMOD INITCODE

BGNINIT
BRESET
TRAP C$RESET
READEF #EF.PWR ;POWER UP?????
MOV #EF.PWR,RO
TRAP C$REFG
BNCOMPLETE NOPWR ;NO,BRANCH
BCC NOPWR
MOV L$UNIT,PWRFLG ;YES, SET POWER FLAG
BR CONT ;GO TO CONTINUE POINT
NOPWR: READEF #EF.RESTART ;RESTART?
MOV #EF.RESTART,RO
TRAP C$REFG
BCOMPLETE START1
BCS START1
READEF #EF.START ;START???
MOV #EF.START,RO
TRAP C$REFG
BNCOMPLETE CONTINUE
BCC CONTINUE
START1: MOV #ERCOUNT,RO
MOV #64,R1
1$: CLR (R0)+
DEC R1
BNE 1$
BR START
CONTINUE: READEF #EF.CONTINUE ;CONTINUE????
MOV #EF.CONTINUE,RO
TRAP C$REFG
BCOMPLETE CONT
BCS CONT
NXT: TST UUT ;DONE ALL UUT'S
BNE XXX ;NO
START: MOV #-1,UNITST
MOV L$UNIT,UUT
MOV #ERCOUNT-2,ERPOINT
XXX: INC UNITST
ADD #2,ERPOINT
DEC UUT
REST: GPHARD UNITST,RO
MOV UNITST,RO
TRAP C$GPHRD
    
```

```

43 014206
BCOMPLETE 1$
  44 014206 103406          BCS 1$
  45 014210 005737 002242  TST PWRFLG ;POWER FLAG TO 0
  46 014214 001746          BEQ NXT ;YES, DONT DEC IT
  47 014216 005337 002242  DEC PWRFLG
  48 014222 000743          BR  NXT ;GET NEXT ONE
  49 014224 012037 002262  1$: MOV (R0)+,BCSR
  50 014230 012037 002266  MOV (R0)+,BVEC
  51 014234 012037 002264  MOV (R0)+,BPRIOR
  52 014240 012037 002406  MOV (R0)+,T.DRIVE
  53 014244 012037 002270  MOV (R0)+,D
RIVE
  54 014250 012037 002410  MOV (R0)+,T.CNTRL ;GET CONTROLLER TYPE
  55
  56 014254 013700 002262  CONT: MOV BCSR,RO ;BUILD LOGICAL ADDRESSES OF REGISTERS
  57 014260 010037 002250  MOV RO,RLCS
  58 014264 062700 000002  ADD #2,RO
  59 014270 010037 002252  MOV R?,RLBA
  60 014274 062700 000002  ADD #2,RO
  61 014300 010037 002254  MOV RO,RLDA
  62 014304 062700 000002  ADD #2,RO
  63 014310 010037 002256  MOV RO,RLMP
  64 014314 022
737 000003 002410          CMP #3,T.CNTRL ;IF THIS IS AN RLV12, BUILD LOGICAL
  65 014322 001004          BNE 1$ ;ADDRESS FOR BUS ADDRESS EXTENSION.
  66 014324 062700 000002  ADD #2,RO
  67 014330 010037 002260  MOV RO,RLBE
  68
  69 014334 005737 002242  1$: TST PWRFLG ;RECENT POWER FAILURE?
  70 014340 001476          BEQ  END ;NO
  71
  72 ;THERE WAS A RECENT POWER FAILURE, THEREFORE WE WILL WAIT
  73 ;FOR THE DRIVE TO COME READY
  74
  75 014342 012701          MOV #120.,R1 ;INITIALIZE WAIT COUNT
  76 000170          MOV 165674 ;SET CRDY
  77 014346 012777 000200 165666  BIS DRIVE,@RLCS ;SET IN DRIVE SELECT
  78 014354 053777 002270 165666  DRVRDY: BIT #DRDY,@RLCS ;DRIVE READY???
  79 014362 032777 000001 165660  BNE BGNTST ;YES, THEN START TEST
  80 014370 001042          MOV #40.,DLYCNT ;INITIALIZE DELAY COUNT
  81 014372 012737 000050 002414  WAITO: DELAY 1 ;IMPLEMENT 100-USEC DELAY
  81 014400 014400 012727 000001  MOV #1,(PC)+
  82 014404 000000          .WORD 0
  83 014406 013727 002116  MOV L$DLY,(PC)+
  84 014412 000000          .WORD 0
  85 014414 005367 177772  DEC -6(PC)
  86 014420 001375          BNE -.4
  87 014422 005367 177756  DEC -22(PC)
  88 014426 001367          BNE -.20
  89 014430 005337 002414  DEC DLYCNT ;DECREMENT DELAY COUNT
  90 014434 001361          BNE WAITO ;BRANCH IF TIME DELAY NOT EXPIRED
  91 014436 005301          DEC R1 ;SIXTY SECONDS GONE BY
  92 014440 001350          BNE DRVRDY ;NO, GO BACK
  93 01444 2
  94 014442 012746 013412  PRINTB #FRMT12 ;DROPPING DRIVE - DRIVE DID NOT RECOVER
  95 014446 012746 000001  MOV #FRMT12,-(SP)
  96 014452 010600          MOV #1,-(SP)
  97 014454 104414          MOV SP,RO
  98 TRAP C$PNTB

```

```

87 014456 062706 000004          ADD    #4,SP
88 014462 004737 012552          6$:   JSR    PC,LINE1          ;/FROM POWER FAILURE
89 014466 013700 002246          DODU   UNITST          ;GIVE DRIVE INFO
      014472 104451          MGV    UNITST,RO      ;TELL SUPERVISOR TO DROP IT
90 014474 104444          TRAP   C#DODU
      014474 104444          DOCLN
      014474 104444          TRAP   C#DCLN          ;FORCE AN ABORT
91 014476 012777 000013 165550  BGNTST: MOV    #13,@RLDA          ;SETUP DR RST
92 014504 012777 000204 165536  MOV    #204,@RLCS          ;GS FUNC
93 014512 053777 002270 165530  BIS    DRIVE,@RLCS          ;SELECT DRIVE
94 014520 042777 000200 165522  BIC    #200,@RLCS          ;ISSUE IT
95 014526 032
777 000200 165514 4$:   BIT    #200,@RLCS          ;WAIT FOR READY
96 014534 001774          BEQ    4$
97 014536 012746 000340          END:   SETVEC BVEC,@INTSRV,#340
      014542 012746 016260          MOV    #340,-(SP)
      014546 013746 002266          MOV    @INTSRV,-(SP)
      014552 012746 000003          MOV    BVEC,-(SP)
      014556 104437          MOV    #3,-(SP)
      014560 062706 000010          TRAP   C#SVEC
98 014564 005037 002324          ADD    #10,SP
99 014570 104407          CLR    PFLG          ;CLR PROCESSOR FLAG
      014570 104407          READBUS ;Q-BUS
      014570 104407          TRAP   C#RDBU
100 014572 103002          BNCOMPLETE 1$
101 014574 005237 002324          BCC    1$
102 014600          INC    PFLG          ;NO, Q-BUS THEN
103 014600          1$:   ENDINIT
      014600 104411          L10013: TRAP   C#INIT
104
105 014602          ENDMOD
106
107          .SBTTL AUTO DROP SECTION
108 014602          BGNAUTO
109 014602 005037 002326          CLR    TRPFLG          ;CLEAR TRAP FLAG
110          ;SET UP VECTOR TO DETECT NON EXISTENT
111          ;/CONTROLLER
112 014606          SETVEC ERR
VEC, #TRPHAN, #340
      014606 012746 000340          MOV    #340,-(SP)
      014612 012746 016252          MOV    @TRPHAN,-(SP)
      014616 013746 002340          MOV    ERRVEC,-(SP)
      014622 012746 000003          MOV    #3,-(SP)
      014626 104437          TRAP   C#SVEC
      014630 062706 000010          ADD    #10,SP
113 014634 012746 000340          MOV    #340,-(SP)
114 014640 012746 016252          MOV    @TRPHAN,-(SP)
115 014644 013746 002340          MOV    ERRVEC,-(SP)
116 014650 012746 000003          MOV    #3,-(SP)
117 014654 104037          EMT    C#SVEC
118 014656 0
62706 000010          ADD    #10,SP
119
120 014662 005777 165362          TST    @RLCS          ;ACCESS CONTROLLER
121 014666 013700 002340          CLRVEC ERRVEC          ;RELEASE VECTOR
      014666 013700 002340          MOV    ERRVEC,RO
      014672 104436          TRAP   C#CVEC

```

```

122 014674 013700 002340      MOV      ERRVEC,RO
123 014700 104036      EMT      C#CVEC
124 014702 005737 002326      TST      TRPFLG
;DID IT TRAP?
125 014706 001416      BEQ      1$
126 014710      PRINTB  #FRMT14
      014710 012746 013522      MOV      #FRMT14,-(SP)
      014714 012746 000001      MOV      #1,-(SP)
      014720 010600      MOV      SP,RO
      014722 104414      TRAP    C#PNTB
      014724 062706 000004      ADD     #4,SP
127 014730 004737 012552      JSR     PC,LINE1
128 014734 013700 002246      DODU    UNITST
      014734 013700 002246      MOV     UNITST,RO
;NO - CHECK ITS DRIVE
;ELSE, PRINT MSG. "DRIVE DROPPED - NO CONTROLLER"

129 014740 104451      TRAP    C#DODU
130 014742 000427      BR      2$
;EXIT

131 014744 012777 000200 165276 1$:      MOV     #200,@RLCS
132 014752 053777 002270 165270      BIS     DRIVE,@RLCS
133 014760 032777 000001 165262      BIT     #1,@RLCS
134 014766 001015      BNE     2$
;SET CONTROLLER READY
;SELECT DRIVE
;IS DRIVE READY?
;YES - EXIT
;ELSE, PRINT MSG. "DRIVE DROPPED - DID NOT
;/RESPOND WITH "READY"

137 014770      PRINTB  #FRMT15
      014770 012746 013566      MOV     #FRMT15,-(SP)
      014774 012746 000001      MOV     #1,-(SP)
      015000 010600      MOV     SP,RO
      015002 104414      TRAP    C#PNTB
      015004 062706 000004      ADD     #4,SP
138 015010 004737 012552      JSR     PC,LINE1
139 015014 013700 002246      DODU    UNITST
      015014 013700 002246      MOV     UNITST,RO
      015020 104451      TRAP    C#DODU
;PROVIDE DRIVE INFORMATION
;DO DROP UNIT ON DRIVE

140 015022      2$:
141 015022      ENDAUTO
      015022 104461      L10014:
      015022 104461      TRAP    C#AUTO

142
143 015024      BGNMOD  CLNCODE

44
145 015024      BGNCLN
146
147 015024      SETPRI  #PRI07
      015024 012700 000340      MOV     #PRI07,RO
      015030 104441      TRAP    C#SPRI

48
149 015032 032777 000200 165210 1$:      BIT     #CRDY,@RLCS
150 015040 001774      BEQ     1$
151
152 015042 042777 000100 165200      BIC     #INTEN,@RLCS
153
154 015050      CLRVEC  BVEC
      015050 013700 002266      MOV     BVEC,RO
      015054 104436      TRAP    C#CVEC

155
156
157
158 015056 005737 002242      TST     PWRFLG
ER FAILURE
;TREAT POW

```

159	015062	001402		BEQ	2+
160					
161	015064	005337	002242	DEC	PWRFLG
162					
163	015070			2+:	
164	015070			ENDCLN	
	015070			L10015:	
	015070	104412		TRAP	C+CLEAN
165					
166	015072			ENDMOD	
167					
168					
169					
170	015072			BGNMOD	DRPCODE
171					
172	015072			BGNDU	
173					
174	015072	000240		NOP	
175					
176	015074			ENDDU	
	015074			L10016:	
	015074	104453		TRAP	C+DU
177					
178	015076			ENDMOD	
179					
180	015076			BGNMOD	ADDCODE
181					
182	015076			BGNAU	
183					
184	015076	000240		NOP	
185					
186	015100			ENDAU	
	015100			L10017:	
	015100	104452		TRAP	C+AU
187					
188	015102			ENDMOD	
189					
190					
191					

AUTO DROP SECTION

```

1
2
3      .SBTTL  GLOBAL SUBROUTINES
4 015102  BGNMOD  GLBSUB
5
6
7      CKERLT: INLOOP
8 015102  104420      TRAP      C$INLP
9 015104  103427      BCOMPLETE 99$
10 015106 005737 013672  TST      DROP
11 015112 001424      BEQ      99$
12 015114 005277 167752  INC      @ERPOINT
13 015120 027737 167746 013674  CMP      @ERPOINT, MERLMT
14 015126 002416      BLT      99$
15
16 015130      PRINTF  #FRMT11
17 015130 012746 013351  MOV      #FRMT11, -(SP)
18 015134 012746 000001  MOV      #1, -(SP)
19 015140 010600      MOV      SP, R0
20 015142 104417      TRAP     C$PNTF
21 015144 062706 000004  ADD      #4, SP
22 015150 004737 012552  JSR      PC, LINE1
23 015154      DODU     UNITST          ;DROP THE UNIT
24 015154 013700 002246  MOV      UNITST, R0
25 015160 104451      TRAP     C$DODU
26 015162      DOCLN
27 015162 104444      TRAP     C$DCLN
28 015164      99$:
29 015164 000205      RTS      R5
30
31      .SBTTL  ROUTINE TO CHECK FOR CONTROLLER ERRORS
32
33      ;*****
34      ;*THIS ROUTINE WILL CHECK RLCS FOR ERRORS AND PRINT THEM
35      ;*ACCORDINGLY. IT WILL MERGE THE ERROR PRINTOUT WITH THE TEST
36      ;*ERROR MESSAGE.
37      ;*
38      ;*EXAMPLE:  RLCS CONTAINED FOLLOWING ERROR(S):
39      ;*          DRV  OPI  HCRC  HNF
40      ;*          SEEK UNDER INTE
41      ;*
42      ;*
43      ;*
44      ;*ROUTINE USES R0,R1 AND PICKS HEADER FROM R3
45      ;*
46      ;*      CALL      JSR      R5,CHERR
47      ;*
48      ;*
49      ;*
50      CHERR:  CLR      DERFLG          ;CLEAR OUT DRIVE ERROR FLAG
51             BIT      #176000,E.CS    ;ANY ERRORS SET
52             BNE     199$             ;IF YES, INVESTIGATE
53             RTS      R5              ;NO, EXIT

```

RRUPT

	48	015204	023727	002412	000004	199:	CMP	TMPFNC,#GSTAT	;FUNCTION NOP, RESET, GETSTATUS
	49	015212	002401				BLT	98:	;YES, GO CHECK IF ONLY DRIVE ERROR
	50	015214	000414				BR	1:	;YES SERVICE ERROR
	51	015216	023727	002412	000002	98:	CMP	TMPFNC,#WRCHK	
	52	015224	001410				BEQ	1:	
	53	015226	013700	002306			MOV	E.CS,R0	;GET E.
CS	54	015232	042700	001777			BIC	#1777,R0	
	55	015236	022700	140000			CMP	#140000,R0	;DRIVE ERROR ALONE?
	56	015242	001001				BNE	1:	;NO, GO SERVICE
	57	015244	000205			2:	RTS	R5	;YES, EXIT
	58								
	59	015246	012701	011770			MOV	#EM102,R1	;GET START OF STRING
	60	015252	005737	002306		1:	TST	E.CS	;IS COMPOSITE ERROR SET?(BETTER BE)
	61	015256	100003				BPL	99:	;IT'S NOT SOMETHING IS WRONG
	62	015260	004537	015732			JSR	R5,FIX	;YES, PUT "COMP" IN
STRING	63	015264	006045				COMP		; "COMP"
	64	015266	032737	040000	002306	99:	BIT	#DERR,E.CS	;DRIVE ERROR SET?
	65	015274	001405				BEQ	3:	;NO, CONTINUE
	66	015276	005237	002304			INC	DERFLG	;SET DRV ERROR FLAG
	67	015302	004537	015732			JSR	R5,FIX	;YES, PUT "DRV" INTO STRING
	68	015306	005774				DEMES		; "DRV"
	69	015310	032737	020000	002306	3:	BIT	#NXM,E.CS	;NON-EXISTENT MEMORY ERROR?
	70	015316	001403				BEQ	4:	;NO, CONTINUE
	71	015320	00						
4537		015732					JSR	R5,FIX	;YES, PUT "NXM" INTO STRING
	72	015324	006001				NXMMES		; "NXM"
	73	015326	032737	002000	002306	4:	BIT	#OPI,E.CS	;IS OPI SET?
	74	015334	001422				BEQ	6:	;NO, GO CHECK BITS 11 & 12
	75	015336	004537	015732			JSR	R5,FIX	;PUT "OPI" INTO STRING
	76	015342	006006				OPIMES		; "OPI"
	77	015344	032737	004000	002306		BIT	#BIT11,E.CS	;HEADERCRC ERROR?
	78	015352	001403				BEQ	5:	;NO, GO CHECK HEADER NOT FOUND
	79	015354	004537	015			JSR	R5,FIX	;GO PUT "HCRC" IN STRING
732	80	015360	006013				HCRMES		; "HCRC"
	81	015362	032737	010000	002306	5:	BIT	#BIT12,E.CS	;HEADER NOT FOUND?
	82	015370	001422				BEQ	8:	;NO, GO PUT "CRLF" IN STRING
	83	015372	004537	015732			JSR	R5,FIX	;PUT "HNF" IN STRING
	84	015376	006021				HNFMES		; "HNF"
	85	015400	000416				BR	8:	;PUT "CRLF" IN STRING
	86	015402	032737	004000	002306	6:	BIT	#BIT11,E.CS	;DATA CRC ERROR?
	87	015410	001403				BEQ	7:	;N
O, GO CHECK DATA LATE	88	015412	004537	015732			JSR	R5,FIX	;PUT "DCK" IN STRING
	89	015416	006026				DCKMES		; "DCK"
	90	015420	032737	010000	002306	7:	BIT	#BIT12,E.CS	;DATA LATE ERROR?
	91	015426	001403				BEQ	8:	;NO, GO PUT IN "CRLF"
	92	015430	004537	015732			JSR	R5,FIX	;PUT "DLT" IN STRING
	93	015434	006033				DLTMES		; "DLT"
	94	015436	004537	015732		8:	JSR	R5,FIX	
	95	015442	006040				MSCRLF		
	96	015444	004537	015732			JSR	R5,FIX	
	97								
	98	015450	000000				RESTMS:	.WORD	0
	99	015452	105011				CLRB	(R1)	;HEADER FROM TEST
	100	015454							;PUT TERMINATOR IN
		015454	104455				ERRDF	300,LF,ERR6	
		015456	000454				TRAP	C\$ERDF	
		015460	006043				.WORD	300	
		015462	012452				.WORD	LF	
							.WORD	ERR6	

```

101
102 015464 000205          RTS    R5          ;EXIT ROUTIN
E
103
104          .SBTTL  LOAD RLCS
105          ;*****
106          ;* ROUTINE TO LOAD RLCS WITH FUNCTION TO BE PERFORMED
107          ;* CALL: JSR    R5,LDFUNC
108          ;*          .WORD          ;BITS TO BE LOADED, FUNCTION
109          ;*          ;AND INTR ENABLE ONLY
110          ;*
111          ;
112          ;
113 015466 012537 002332    LDFUNC: MOV    (R5)+,LDCSR    ;GET BITS TO LOAD
114 015472 005737 002304    TST    DERFLG
115 015476 001424          BEQ    98$
116 015500 013746 002272    MOV    B.CS,-(SP)
117 015504 012777 000013 164542    MOV    #13,@RLDA
118 015512 012737 000004 002272    MOV    @GSTAT,B.CS
119 015520 053737 002270 002272    BIS    DRIVE,B.CS
120 015526 013777 002272 164514    MOV    B.CS,@RLCS
121 015534 012637 002272    MOV    (SP)+,B.CS
122 015540 032777 000200 164502 99$: BIT    #200,@RLCS
123 015546 001774          BEQ    99$
124 015550 010346          98$: MOV    R3,-(SP)          ;SAVE R3
125 015552 042737 177661 002332    BI
C          #177661,LDCSR ;CLEAR ALL BUT FUNC & INTR EN
126 015560 013737 002332 015704    MOV    LDCSR,FNDFNC    ;SAVE FUNCTION
127 015566 042737 000100 015704    BIC    @INTEN,FNDFNC    ;ONLY FUNCTION
128 015574 013737 015704 002412    MOV    FNDFNC,TMPFNC
129 015602 012703 015706    MOV    @HDRLST,R3
130 015606 006237 015704    ASR    FNDFNC
131 015612 001404          BEQ    2$
132 015614 022323          1$: CMP    (R3)+,(R3)+    ;BUMP R3 BY 4
133 015616 005337 015704    DEC
FNDFNC          ;FOUND IT
134 015622 001374          BNE    1$
135 015624 032737 000100 002332 2$: BIT    @INTEN,LDCSR    ;NO,KEEP LOOKING
136 015632 001401          BEQ    3$                ;YES,DO WE WANT FLAG OR INTR
137 015634 005723          TST    (R3)+            ;FLAG BRANCH
138 015636 011303          3$: MOV    (R3),R3        ;INTR POINT TO THAT ONE
139 015640 010337 015450    MOV    R3,RESTMS        ;SET HEADER
140 015644 053737 002270 002332    BIS    DRIVE,LDCSR      ;SET UP HEADER
141 015652 052737 000200 002332 4$: BIS    #200,
LDCSR          ;CONTROLLER READY
142 015660 013777 002332 164362    MOV    LDCSR,@RLCS
143 015666 004537 015744    JSR    R5,BEFORE
144 015672 042777 000200 164350 5$: BIC    #200,@RLCS
145 015700 012603          MOV    (SP)+,R3
146 015702 000205          RTS    R5                ;RESTORE R3
147          ;EXIT
148 015704 000000          FNDFNC: .WORD    0
149
150 015706 006126          HDRLST: NOPMES
151 015710 006157          NOPINT
152 015712 006211          WCKMES
153 015714 006251          WCKINT
154 015716 006476          OK
HDR:          GSTMES
155 015720 006535          GSTINT
156 015722 006413          SEKMES
157 015724 006444          SEKINT
    
```

L4

```

158 015726 006312          RHMES
159 015730 006352          RHDINT
160
161
162 ;*****
163 ;*ROUTINE TO MOVE ASCII STRINGS
164 ;*USES REGISTERS R1 WHERE STRING IS
165
166 ;*
167 ;*      CALL      JSR      R5, FIX
168 ;*      .WORD
169 ;*      ; ADDRESS OF STRING TO MOVE
170
171 FIX:  MOV      (R5), R0      ; GET ADDRESS AND MOVE RETURN
172 1$:  MOVB     (R0), (R1),    ; GET BYTE AND UPDATE
173      BNE     1$             ; WATCH 0 BYTE TERMINATOR
174      TSTB    -(R1)         ; BACK UP OVER ZERO BYTE
175      RTS     R5            ; EXIT
176
177 ;LOAD REGISTERS BEFORE OPERATION
178 ;CALL:  JSR
179
180 R5, BEFORE
181
182 177
183 178 015744 017737 164300 002272 BEFORE: MOV @RLCS, B.CS ; READ CS
184 179 015752 017737 164274 002274      MOV @RLBA, B.BA ; READ BA
185 180 015760 017737 164270 002276      MOV @RLDA, B.DA ; READ DA
186 181 015766 017737 164264 002300      MOV @RLMP, B.MP ; READ MP
187 182 015774 022737 000003 002410      CMP #3, T.CNTRL ; IF THE CONTROLLER IS AN RLV12
188 183 016002 001003 ; READ BE
189 184 016004 017737 164250 002302      MOV @RLBE, B.BE
190 185
191 186 016012 000205 1$:
192 R5
193
194 ;LOAD REGISTERS AT ERROR
195 ;CALL:  JSR      R5, AFTER
196
197 AFTER: MOV @RLCS, E.CS ; READ CS
198      MOV @RLBA, E.BA ; READ BA
199      MOV @RLDA, E.DA ; READ DA
200      MOV @RLMP, E.MP ; READ MP
201      MOV @RLMP, E.MP1 ; READ MP SECOND WORD IN SILO
202      ; READ MP THIRD WORD IN SILO
203
204 198 016060 022737 000003 002410      CMP #3, T.CNTRL ; IF THE CONTROLLER IS AN RLV12
205 199 016066 001003 ; READ BE
206 200 016070 017737 164164 002322      MOV @RLBE, E.BE
207 201
208 202 016076 000205 1$:  RTS      R5
209
210
211 ;SBTTL ROUTINE TO CALCULATE CRC
212 ;ROUTINE WILL CALCULATE A CRC 16 CRC ON A WORD OF
213 ;1-16 BITS IN LENGTH, RESULT IS RETURNED IN "CALBCC"
214 ;
215 ;      CALL:  JSR
216 ;
217 ;      .WORD ; NUMBER OF BITS (1-16)
218 ;      .WORD ; DATA FOR CRC CALCULATION
219 ;      .WORD ; PREVIOUS OR STARTING CRC
220
221 R5, SIMBCC
222
223
224
    
```

BEING BUILT

RTS

2

```

ROUTINE TO CALCULATE CRC
215
216 ; ROUTINE USES R0,F ,R2 (SHOULD BE ZEROED FOR START)
217
218 016100 010046 SIMBCC: MOV R0, (SP) ;SAVE R0
219 016102 010146 MOV R1, (SP) ;SAVE
R1
220 016104 010246 MOV R2, (SP) ;SAVE R2
221
222 016106 012537 002346 MOV (R5),TEMP2 ;GET NUMBER OF BITS
223 016112 012537 002350 MOV (R5),TEMP3 ;GET DATA FOR CRC CALCULATION
224 016116 012537 002352 MOV (R5),TEMP4 ;GET STARTING CRC
225
226 016122 005037 002342 14: CLR BCCFBK ;
227 016126 013700 002352 MOV TEMP4,R0 ;GET PREVIOUS CRC
228 016132 006037 002350 ROR TEMP3 ;ROTATE NEW DATA
229 016136 005500 ADC RO ;MERGE NEW
WITH OLD
230 016140 032700 000001 BIT #1,R0 ;BIT 0 SET
231 016144 001402 BEQ 24 ;IF NOT CONTINUE
232 016146 005137 002342 COM BCCFBK ;
233 016152 013700 002336 24: MOV XPOLY,R0 ;GET CRC POLYNOMIAL (CRC 16)
234 016156 005100 COM RO ;COMPLIMENT POLYNOMIAL
235 016160 040037 002342 BIC RO,BCCFBK
236 016164 000241 CLC ;CLEAR CARRY
237 016166 006037 002352 ROR TEMP4
238 016172 013700 002342 MOV BCCFBK,RO
239 016176 013701 MOV TEMP4,R1
002352
240 016202 010102 MOV R1,R2
241 016204 040100 BIC R1,RO
242 016206 043702 002342 BIC BCCFBK,R2
243 016212 050200 BIS R2,RO
244 016214 043737 002336 002352 BIC XPOLY,TEMP4
245 016222 050037 002352 BIS RO,TEMP4
246 016226 005337 002346 DEC TEMP2
247 016232 001333 BNE 14
248 016234 013737 002352 002344 MOV TEMP4,CALBCC
249
250 016242 012602 MOV (SP),R2 ;RESTORE REGISTERS FROM STACK
251 01 MOV (SP),R1
6244
252 016246 012600 MOV (SP),R0
253
254 016250 000205 RTS R5 ;RETURN
255
256
257
258 ;ROUTINE TO SET FLAG IF TRAP OCCURRED
259 ;"TRPHAN" IS IN LOCATION 4.
260
261
262 016252 005237 002326 TRPHAN: INC TRPFLG ;INDICATE TRAP
263 016256 0J0002 RTI ;RETURN
264
265 016260 BGNSRV
266
267 016260 005237 002330 INTSRV: INC INTFLG ;INDICATE INTERRUPT
268
269 016264
ENDSRV
016264
016264 000002 L10020: RTI

```

```

270
271 ;ROUTINE TO WAIT FOR DRIVE READY
272 016266 010146 WTD RDY: MOV R1, (SP) ;SAVE R1
273 016270 012701 003720 MOV #2000.,R1 ;TIME OUT OF 200 MILLISECONDS
274 016274 032777 J00001 163746 1$: BIT #DRDY, @RLCS ;DRIVE READY?
275 016302 001022 BNE 2$ ;
YES, EXIT
276 016304 DELAY 1 ;WAIT A WHILE
016304 C12727 000001 MOV #1,(PC)+
016310 000000 .WORD 0
016312 013727 002116 MOV L#DLY,(PC)+
016316 000000 .WORD 0
016320 005367 177772 DEC -6(PC)
016324 001375 BNE -4
016326 005367 177756 DEC -22(PC)
016332 001367 BNE -20
277 016334 005301 DEC R1 ;CHECK IF TIME UP
278 016336 001356 BNE 1$ ;NO, GO CHECK DRIVE READY
279
280 016340 ERRDF 200.,DRTIM,ERR5 ;DRIVE READY DID NOT
SET
016340 .J4455 TRAP C#ERDF
016342 000310 .WORD 200
016344 006712 .WORD DRTIM
016346 012440 .WORD ERR5
281
282 016350 012601 2$: MOV (SP)+,R1 ;RESTORE
283 016352 000205 RTS #5 ;EXIT
284
285 ;ROUTINE TO WAIT FOR CONTROLLER READY
286 016354 010146 WTC RDY: MOV R1, -(SP) ;SAVE R1
287 016356 012701 017500 MOV #8000.,R1 ;WAIT 800 MILLISECONDS
288 016362 032777 000200 163660 1$: BIT #CRDY, @RLCS ;CONTROLLER READY
289 016370 BNE 2$ ;YES, EXIT
001025
290 016372 DELAY 1 ;WAIT A WHILE
016372 012727 000001 MOV #1,(PC)+
016376 000000 .WORD 0
016400 013727 002116 MOV L#DLY,(PC)+
016404 000000 .WORD 0
016406 005367 177772 DEC -6(PC)
016412 001375 BNE -4
016414 005367 177756 DEC -22(PC)
016420 001367 BNE -20
291 016422 005301 DEC R1 ;CHECK IF TIME UP
292 016424 001356 BNE 1$ ;NO GO BACK
293
294 016426 004537 016014 JSR R5,AFTER ;GET REGIS
TERS
295
296 016432 ERRDF 100.,CRTIM,ERR6 ;CONTROLLER TIMED OUT
016432 104455 TRAP C#ERDF
016434 000144 .WORD 100
016436 006665 .WORD CRTIM
016440 012452 .WORD ERR6
297
298 016442 000402 BR 3$ ;EXIT
299
300 016444 004537 016014 2$: JSR R5,AFTER ;GET REGISTERS
301 016450 012601 3$: MOV (SP)+,R1
302 016452 000205 RTS R5 ;EXIT

```

ROUTINE TO CALCULATE CRC
SEQ 0053

303
304 016454
305
306

ENDMOD

C5

1
2
3 016454
4 016454
5
TO SEE IF WE CAN ADDRESS THE CONTROL
6
7
8
9 016454

.SBTTL **TEST 1** RLCS ADDRESSABILITY
BGNTST ;****START OF TEST****
STARS
;:*****
;TEST
;AND STATUS REGISTER. IF WE TRAP WE WILL REPORT
;THE ERROR AND ABORT. AFTER THIS TEST WE ONLY KNOW
;THAT WE CAN ADDRESS THE REGISTER.
STARS
;:*****

10
11
12 016454 005037 002326
13 016460 012746 000340
016460 012746 016252
016464 012746 002340
016470 013746 000003
016474 012746 000003
016500 104437
016502 062706 000010
14
15 016506 005777 163536
16 016512 013700 002340
016512 104436
016516 104436
17 016520 005737 002326
18 016524 001407
19 016526 013737 002250 002362
20
21 016534
016534 104454
016536 000000
016540 006740
016542 012244
22 016544
016544 104406
23 016546
016546
016546 104401
24
25
26

1\$: CLR TRPFLG ;CLEAR TRAP OCCURANCE
2\$: SETVEC ERRVEC, #TRPHAN, #340 ;SET TO CATCH TRAP
MOV #340, -(SP)
MOV #TRPHAN, -(SP)
MOV ERRVEC, -(SP)
MOV #3, (SP)
TRAP C#SVEC
ADD #10, SP
TST @RLCS ;ADDRESS RLCS
CLRVEC ERRVEC ;RELEASE TRAP VECTOR
MOV ERRVEC, R0
TRAP C#CVEC
TST TRPFLG ;TRAP OCCURRED???
BEQ #3 ;NO, IKAY PROCEED
MOV RLCS, GDDAT ;SET UP ERROR DATA
ERRSF 0, EM1, ERR1 ;BUS TIMEOUT IN ADDRESSING RLCS
TRAP C#ERSF
.WORD 0
.WORD EM1
.WORD ERR1
3\$: CKLOOP ;CHECK IF /FL:LOE IS SET
TRAP C#CLP1
ENDTST ;****END OF TEST****
L10021: TRAP C#ETST

** RLBA ADDRESSABILITY

27
28 016550
29
30
31 016550
32
33
34
35
36 016550

.SBTTL **TEST 2
BGNTST ;****START OF TEST****
STARS
;:*****
;TEST TO SEE IF WE CAN ADDRESS THE BUS ADDRESS
;REGISTER. IF WE TRAP WE WILL REPORT THE ERROR
;AND ABORT. AFTER THIS TEST WE ONLY KNOW THAT
;WE CAN ADDRESS THE REGISTER.
STARS
;:*****

37
38 016550 005037 002326

1\$: CLR TRPFLG ;CLEAR TRAP OCCURANCE

39	016554			2:	SETVEC	ERRVEC, #TRPHAN, #340	;SET TO CATCH TRAP
	016554	012746	000340		MOV	#340, (SP)	
	016560	012746	016252		MOV	#TRPHAN, (SP)	
	016564	013746	002340		MOV	ERRVEC, (SP)	
	016570	012746	000003		MOV	#3, (SP)	
	016574	10					
4437					C+SVEC		
	016576	062706	000010		ADD	#10, SP	
40							
41	016602	005777	163444		TST	@RLBA	;ADDRESS RLBA
42	016606				CLRVEC	ERRVEC	;RELEASE TRAP VECTOR
	016606	013700	002340		MOV	ERRVEC, R0	
	016612	104436			TRAP	C+SVEC	
43	016614	005737	002326		TST	TRPFLG	;TRAP OCCURRED???
44	016620	001407			BEQ	3:	;NO, CONTINUE
45	016622	013737	002252	002362	MOV	RLBA, GDDAT	;SETUP ERROR DATA
46							
47	016630				ERRSF	1., EM2, ERR1	;BUS TIMEOUT IN ADDRES
SING	RLBA						
	016630	104454			TRAP	C+ERSF	
	016632	000001			.WORD	1	
	016634	006765			.WORD	EM2	
	016636	012244			.WORD	ERR1	
48	016640			3:	CKLOOP		;CHECK IF /FL:LOE IS SET
	016640	104406			TRAP	C+CLP1	
49	016642			ENDTST			;****END OF TEST****
	016642			L10022:			
	016642	104401			TRAP	C+ETST	

.SBTTL **TEST 3** - RLDA ADDRESSABILITY

BGNTST ;****START OF TEST****
 STARS
 ;*****

 56 ;TEST TO SEE IF WE CAN ADDRESS THE DISK ADDRESS
 57 ;REGISTER IF WE TRAP WE WILL REPORT THE ERROR
 58 ;AND ABORT. AFTER THIS TEST WE ONLY KNOW THAT
 59 ;WE CAN ADDRESS THE REGISTER.
 60 016644 STARS
 ;*****

61				1:	CLR	TRPFLG	;CLEAR TRAP OCCURANCE
62				2:	SETVEC	ERRVEC, #TRPHAN, #340	;SET TO CATCH
63	016644	005037	002326				
TRAP					MOV	#340, -(SP)	
	016650	012746	000340		MOV	#TRPHAN, -(SP)	
	016654	012746	016252		MOV	ERRVEC, -(SP)	
	016660	013746	002340		MOV	ERRVEC, -(SP)	
	016664	012746	000003		MOV	#3, -(SP)	
	016670	104437			TRAP	C+SVEC	
	016672	062706	000010		ADD	#10, SP	
65							
66	016676	005777	163352		TST	@RLDA	;ADDRESS RLDA
67	016702				CLRVEC	ERRVEC	;RELEASE TRAP VECTOR
	016702	013700	002340		MOV	ERRVEC, R0	
	016706	104436			TRAP	C+SVEC	
68	016710	005737	002326		TST	TRPFLG	;TRAP OCCURRED???
69					BEQ	3:	;NO, CONTINUE
70	016714	001407					

E5

```

71 016716 013737 002254 002362      MOV      RLDA,GDDAT      ;SETUP ERROR INFO
72 016724      ERRSF      2,EM3,ERR1      ;BUS TIMEOUT IN ADDRESSING RLDA
   016724 104454      TRAP      C$ERSF
   016726 000002      .WORD      2
   016730 007012      .WORD      EM3
   016732 012244      .WORD      ERR1
73 016734      3$:
CKLOOP 016734 104406      ;CHECK IF /FL:LOE IS SET
   016736      TRAP      C$CLP1
   016736      ENDTST      ;****END OF TEST****
   016736      L10023:
   016736 104401      TRAP      C$ETST

75
76
77      .SBTTL  **TEST 4** - RLMP ADDRESSABILITY
78
79 016740      BGNTST      ;****START OF TEST****
80 016740      STARS
81      ;*****
82      ;TEST TO SEE IF WE CAN ADDRESS THE MULTIPURPOSE
83      ;REGISTER. IF WE TRAP WE WILL REPORT THE
84      ;ABORT. AFTER THIS TEST WE ONLY KNOW THAT WE CAN
85 016740      ;ADDRESS THE REGISTER.
86      STARS
87      ;*****
88 016740 005037 002326      1$:      CLR      TRPFLG      ;CLEAR TRAP OCCURANCE
89 016744      2$:      SETVEC   ERRVEC,#TRPHAN,#340 ;SET UP TO CATCH TRAP
   016744 012746 000340      MOV      #340,-(SP)
   016750 012746 016252      MOV      #TRPHAN,-(SP)
   016754 013746 002340      MOV      ERRVEC,-(SP)
746 016760 012      MOV      #3,-(SP)
   000003
   016764 104437      TRAP      C$SVEC
   016766 062706 000010      ADD      #10,SP

90
91 016772 005777 163260      TST      @RLMP      ;ADDRESS RLMP
92 016776      CLRVEC   ERRVEC      ;RELEASE TRAP VECTOR
   016776 013700 002340      MOV      ERRVEC,R0
   017002 104436      TRAP      C$CVEC
93 017004 005737 002326      TST      TRPFLG      ;TRAP OCCURRED???
94 017010 001407      BEQ      3$          ;NO, CONTINUE
95 017012 013737 002256 002362      MOV      RLMP,GDDAT      ;SET UP ERROR INFO
96
97 017020      3,EM4,ERR1      ;BUS TIMEOUT IN ADDRESSING RLMP
ERRSF 017020 104454      TRAP      C$ERSF
   017022 000003      .WORD      3
   017024 007037      .WORD      EM4
   017026 012244      .WORD      ERR1
98 017030      3$:      CKLOOP      ;CHECK IF /FL:LOE IS SET
   017030 104406      TRAP      C$CLP1
99 017032      ENDTST      ;****END OF TEST****
   017032      L10024:
   017032 104401      TRAP      C$ETST

100
101
102      .SBTTL  **TEST 5** - READ WRITE OF RLCS
103

```

TEST 5 - READ WRITE OF RLCS

```

104 017034          BGNTST                      ;****START OF TEST****
105
106
107
108 017034          STARS
109                ;:*****
110                ;:TEST THAT WE CAN WRITE/READ BITS 8,9 AND BITS 6-1
111                ;:OF THE CONTROL AND STATUS REGISTER. BITS 15-10 AND 0
112                ;:ARE DON'T CARE BITS AT THIS TIME AND BIT 7
113                ;:(CONTROLLER READY) IS ALWAYS WRITTE
113 017034          STARS
114                ;:*****
115
116 017034 012703 004772      MOV      #CSPAT,R3          ;SET UP TABLE POINTER OF PATTERNS
117
118 017040 104404          BGNSEG          ;****START OF SEGMENT****
119                TRAP      C#BSEG
120 017042          CSTEST:
121 017042 011337 002362      MOV      (R3),GDDAT        ;GET PATTERN INTO GDDAT
122 017046 052737 000200 002362  BIS      #200,GDDAT        ;INSURE GO IS SET
123 017054 013777
002362 163166          MOV      GDDAT,#RLCS      ;LOAD RLCS (CONTROL AND STATUS)
124 017062 032777 040000 163160  BIT      #DERR,#RLCS      ;IF DRIVE ERROR PRESENT
125 017070 001403          BEQ      99$              ;THEN EXPECT DRIVE AND
126 017072 052737 140000 002362  BIS      #ERR!DERR,GDDAT  ;COMPOSITE ERROR
127 017100 017737 163144 002364 99$:  MOV      #RLCS,BDDAT      ;READ RLCS BACK
128 017106 042737 000001 002364  BIC      #DRDY,BDDAT      ;IGNORE DRIVE READY
129 017114 023737 002362 002364  CMP      GDDAT,BDDAT      ;DID WE READ WHAT
WE LOADED
130 017122 001404          BEQ      1$              ;YES, THEN BRANCH
131
132 017124          ERRDF 4,EMS,ERR2          ;WRONG DATA IN RLCS
133 017124 104455          TRAP      C#ERDF
134 017126 000004          .WORD 4
135 017130 007064          .WORD EMS
136 017132 012256          .WORD ERR2
137 017134          1$:  ESCAPE SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
138 017134 104410          TRAP      C$ESCAPE
139 017136 000012          .WORD 10000$-
140
141 017140 005723          TST      (R3)+          ;BUMP FOR NEXT PATTERN
142 017142 020327 005070      CMP      R3,#          ;
143
144 017146 001335          BNE      CSTEST        ;NOT END, LOAD NEXT PATTERN
145
146 017150          ENDSEG          ;****END OF SEGMENT****
147 017150 104405          TRAP      C#ESEG
148 017152          ENDTST          ;****END OF TEST****
149 017152 104401          TRAP      C$ETST
150
151                .SBTTL  **TEST 6** - READ WRITE OF RLBA
152
153 017154          BGNTST                      ;****START OF TEST****
154
155
156
157
    
```

G5

TEST 6 - READ WRITE OF RLBA

148 017154
 149
 150
 151
 152
 153 017154

 154
 155
 156 017154 012703 004416
 157 017160 104404
 158 017162
 159 017162 011337 002362
 160 017166 022737 000001 002410
 161 017174 002403
 162 017176 042737 000001 002362
 163 017
 204 164 013777 002362 163040 2\$:
 165 017212 017737 163034 002364
 166 017220 023737 002362 002364
 167
 168 017230
 017230 104455
 017232 000005
 017234 007135
 017236 012256
 169 017240
 OP, ELSE EXIT SEG
 017240 104410
 017242 000012

STARS
 ;*****
 ;TEST THAT WE CAN WRITE/READ BITS 15-1 OF THE
 ;BUS ADDRESS REGISTER. FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
 ;GROWING 0 AND SHIFTING 0. BIT 0 IS ALSO LOADED BUT
 ;SHOULD ALWAYS COME BACK AS 0
 STARS
 ;*****
 BGNSEG MOV #BEGPAT,R3 ;GET START OF PATTERN LIST
 ;*****START OF SEGMENT*****
 TRAP C#BSEG
 BATEST:
 MOV (R3),GDDAT ;GET PATTERN TO SEND
 CMP #1,T.CNTRL ;RL11??
 BLT 2\$;NO,
 BIC #BIT0,GDDAT ;KEEP RLBA EVEN (UNIBUS)
 MOV GDDAT,@RLBA ;LOAD PATTERN TO BUS ADDRESS
 MOV @RLBA,BDDAT ;READ IT BACK
 CMP GDDAT,BDDAT ;IS IT CORRECT?
 BEQ 1\$;IF SO, BRANCH
 ERRDF 5,,EM6,ERR2 ;DATA WRONG IN RLBA
 TRAP C#ERRDF
 .WORD 5
 .WORD EM6
 .WORD ERR2
 1\$: ESCAPE SEG ;IF /FL:LOE SET LO
 TRAP C\$ESCAPE
 .WORD 10000\$-.

```

1
2
3 017244 005723          TST      (R3)+          ;BUMP FOR NEXT PATTERN
4 017246 020327 004624  CMP      R3,#ENDPAT      ;CHECK FOR END
5 017252 001343          BNE      BATEST          ;NOT END, BRANCH FOR NEXT
6
7 017254          ENDSEG          ;****END 0
F SEGMENT****
  017254          10000$:
  017254 104405      TRAP      C#ESEG
8 017256          ENDTST          ;****END OF TEST****
  017256 104401      L10026: TRAP      C#ETST
9
10
11          .SBTTL  **TEST 7** - READ WRITE OF RLDA
12
13 017260          BGNTST          ;****START OF TEST****
14
15 017260          STARS
16          ;:*****
17          ;TEST THAT WE CAN WRITE/READ THE DISK ADDRESS REGISTER
18          ;ALL BIT POSITIONS ARE WRI
TTEN USING FOUR PATTERNS:
19 017260          ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
20          STARS
21          ;:*****
22 017260 012703 004416  BGNSEG  MOV      #BEGPAT,R3      ;SET UP POINTER TO PATTERN LIST
23 017264          TRAP      C#BSEG      ;****START OF SEGMENT****
  017264 104404
24 017266          DATEST:
25 017266 011337 002362  MOV      (R3),GDDAT      ;GET PATTERN
26 017272 013777 002362  MOV      GDDAT,@
  ;LOAD PATTERN IN DA 162754
RLDA
27
28 017300 017737 162750 002364  MOV      @RLDA,BDDAT      ;READ PATTERN BACK
29 017306 023737 002362 002364  CMP      GDDAT,BDDAT      ;IS IT CORRECT?
30 017314 001404          BEQ      1$              ;BRANCH IF CORRECT
31
32 017316          ERRDF  6.,EM7,ERR2      ;WRONG DATA IN RLDA
  017316 104455      TRAP      C#ERRDF
  017320 000006      .WORD  6
  017322 007163      .WORD  EM7
  017324 012256      .WORD  ERR2
33 017326          1$: ESCAPE  SEG          ;IF /FL·LOE SET LOOP, ELSE EXIT SEG
  017326 104410      TRAP      C#ESCAPE
  017330 000012      .WORD  10000$-.
34
35
36 017332 005723          TST      (R3)+          ;BUMP POINTER
37 017334 020327 004624  CMP      R3,#ENDPAT      ;AT END OF PATTERNS?
38 017340 001352          BNE      DATEST          ;NO, BRANCH BACK
39
40 017342          ENDSEG          ;****END OF SEGMENT****
  017342          10000$:
  017342 104405      TRAP      C#ESEG
41 017344          ENDTST          ;****END OF TEST****
  017344          L10027:
  
```

TEST 7 - READ WRITE OF RLDA

```

017344 104401          TRAP    C$ETST
42
43
44          .SBTTL  **TEST 8** - BIS OF RLCS
45
46 017346          BGNSTST          ;****START OF TEST****
47 017346          STARS
;*****
;TEST THAT WE CAN USE THE "BIS" INSTRUCTION ON THE CONTROL
;AND STATUS REGISTER. BITS 8,9 AND 6-1 ARE TESTED TO
;SET INDIVIDUALLY
AS WELL AS COLLECTIVELY WITHOUT DESTROYING
;ANY PREVIOUS DATA PATTERN
51          STARS
52 017346          ;*****
53
54
55 017346 012703 004772          BGNSEG  MOV    #CSPAT,R3          ;GET BEGINNING OF LIST
56 017352 017352 104404          TRAP    C$BSEG          ;****START OF SEGMENT****
57 017354          1$:
58 017354 012777 000200 162666          MOV    #CRDY,@RLCS          ;INSURE GO IS THERE
59 017362 011337 002362          MOV    (R3),GDDAT          ;SET U
P EXPECTED RLCS
60 017366 052737 000200 002362          BIS    #CRDY,GDDAT          ;IN GDDAT
61 017374 051377 162650          BIS    (R3),@RLCS          ;BIT SET PATTERN IN RLCS
62 017400 032777 0+0000 162642          BIT    @DERR,@RLCS          ;IF ERROR BIT SET THEN
63 017406 001403          BEQ    99$          ;EXPECT IT ON THE READ
64 017410 052737 140000 002362          BIS    @ERR!DERR,GDDAT          ;BACK
65 017416 017737 162626 002364          99$: MOV    @RLCS,BDDAT          ;READ RLCS TO CHECK "BIS"
66 017424 042737 C00001 002364          BIC    @DRDY,BDDAT          ;CLEA
R OUT DRIVE READY
67 017432 023737 002364 002362          CMP    BDDAT,GDDAT          ;DID BIS WORK?
68 017440 001404          BEQ    2$          ;BRANCH IF OKAY
69
70 017442          ERRDF  7,EM61,ERP2          ;WRONG DATA IN RLCS
    017442 104455          TRAP    C$ERDF
    017444 000007          .WORD  7
    017446 010660          .WORD  EM61
    017450 012256          .WORD  ERR2
71 017452          2$: ESCAPE SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
    017452 104410          TRAP    C$ESCAPE
    017454 000012          .WORD  10000$-.
72
73
74 017456 005723          TST    (R3)+          ;GET NEXT PATTERN
75 017460 022703 005070          CMP    #CSEND,R3          ;AT END OF LIST
76 017464 001333          BNE    1$          ;NO GO BACK FOR TEST OF
77          ;NEXT PATTERN
78 017466          ENDSEG 10000$:          ;****END OF SEGMENT****
    017466          TRAP    C$ESEG
79 017470          ENDTST          ;****END OF TEST****
    017470          L10030:
    017470 104401          TRAP    C$ETST
80
81
82          .SBTTL  **TEST 9** - BIC OF RLCS
83
84 017          BGNSTST          ;****START OF TEST****
    
```

472

J5

```

85
86 017472          STARS
                   ;*****
                   ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE
                   ;CONTROL AND STATUS REGISTER. BITS 8-9 AND 6-1 ARE
                   ;TESTED.
                   STARS
                   ;*****
*****
91
92
93 017472 012703 004772          MOV      #CSPAT,R3          ;GET BEGINNING OF PATTERNS
94 017476          BGNSEG          TRAP      C#BSEG          ;****START OF SEGMENT****
95 017500          104404          1$:
96 017500 012777 001776 162542    MOV      #1776,@RLCS        ;SET ALL SETTABLE BITS
97 017506 012737 001776 002362    MOV      #1776,GDDAT        ;SET UP EXPECT DATA IN
98 017514 041337 002362          BIC      (R3),GDDAT        ;GDDAT
99 017520 041377 162524          BIC      (R3),@RLCS        ;
CLEAR BITS IN RLCS VIA "BIC"
100 017524 032777 040000 162516   BIT      #DERR,@RLCS        ;IF DRIVE ERROR BIT SET
101 017532 001403          BEQ      99$                ;EXPECT IT SET WHEN WE
102 017534 052737 140000 002362   BIS      #ERR!DERR,GDDAT    ;READ IT BACK
103 017542 017737 162502 002364   99$:  MOV      @RLCS,BDDAT        ;MOVE RLCS TO BDDAT FOR COMPARE
104 017550 042737 000001 002364   BIC      #DRDY,BDDAT        ;CLEAR DRIVE READY
105 017556 023737 002364 002362   CMP      BDDAT,GDDAT        ;DID "BIC" WORK PROPERLY
106 017564 0          BEQ      2$                ;BRANCH IF OKAY
01404
107
108 017566          ERRDF      8,EM62,ERR2          ;WRONG DATA IN RLCS
109 017576          TRAP      C#ERRDF
110 017570 000010          .WORD   8
111 017572 010741          .WORD   EM62
112 017574 012256          .WORD   ERR2
113 017600 000012          2$:  ESCAPE  SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
114 017602 005723          TRAP      C#ESCAPE
115 017604 020327 005070          .WORD   10000$-
116 017610 001          TST      (R3)          ;GET NEXT PATTERN
117 017612 001          CMP      R3,#CSEND        ;AT END OF LIST
333 118 017612          BNE      1$                ;NO. GO BACK WITH NEXT PATTERN
119 017614          ENDTST          ;****END OF SEGMENT****
120 017616          10000$:  TRAP      C#ESEG
121 017618          ENDTST          ;****END OF TEST****
122 017620          L10031:  TRAP      C#ETST
123 017622          .SBTTL  **TEST 10** - BIS OF RLBA
124 017624          BGNTST          ;****START OF TEST****
125 017626          STARS
126 017628          ;*****
127 017630          ;TEST THAT THE
                   ;ADDRESS REGISTER. BITS 15-0 ARE LOADED, ONLY BITS 15-1
                   ;ARE EXPECTED BACK. FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
                   ;GROWING 0, AND SHIFTING 0.
                   STARS

```

```

128
129
130 017616 012703 004416      BGNSEG  MOV    #BEGPAT,R3      ;GET START OF LIST
131 017622      104404      TRAP    C#BSEG              ;****START OF SEGMENT****
132 017624      005077 162422      1$:    CLR    @RLBA              ;CLEAR "BA"
133 017630      011337 002362      MOV    (R3),GDDAT          ;SET EXPECTED
134 017634      022737 000001 002410    CMP    #1,T.CNTRL         ;RL11
135 017642      002403      BLT    3$                  ;NO
136 017644      042737 000001 002362    BIC    #1,GDDAT           ;BIT 0 CAN'T SET IN RLBA (UNIBUS)
137 017652      051377 16
2374 138 017652      3$:    BIS    (R3),@RLBA         ;BIS RLBA WITH PATTERN
139 017656      017737 162370 002364    MOV    @RLBA,BDDAT        ;READ "BA"
140 017664      023737 002364 002362    CMP    BDDAT,GDDAT        ;DID RLBA LOAD PROPERLY?
141 017672      001404      BEQ    2$                  ;BRANCH IF YES
142
143 017674      104455      ERRDF  9.,EM63,ERR2       ;WRONG DATA IN RLBA
144 017674      000011      TRAP   C#ERDF
145 017676      011024      .WORD  9
146 017700      012256      .WORD  EM63
147 017702      012256      .WORD  ERR2
148 017704      2$:    ESCAPE SEG                ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
017704 149 017704      TRAP   C#ESCAPE
150 017706      000012      .WORD  10000$-.
151 017710      005723      TST    (R3)+              ;GET NEXT PATTERN
152 017712      020327 004624    CMP    R3,#ENDPAT         ;DID WE COMPLETE LIST
153 017716      001342      BNE    1$                  ;NO, GO BACK FOR NEXT.
154 017720      ENDSEG 10000$:            ;****END OF SEGMENT****
155 017720      104405      TRAP   C#ESEG
156 017722      ENDTST L10032:          ;****END OF TEST****
157 017722      104401      TRAP   C#ETST
158
159
160
161 017724      .SBTTL **TEST
162
163
164 0
11** - BIC OF RLBA
165 017724      BGNTST                ;****START OF TEST****
166
167 STARS
168 ;*****:*****
169 ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE BUS
170 ;ADDRESS REGISTER. BITS 15-1 ARE TESTED WITH 4 PATTERNS
171 ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0.
172 STARS
173 ;*****:*****
174
175 17724 012703 004416      MOV    #BEGPAT,R3        ;GET START OF LIST
176 017730      104404      BGNSEG TRAP    C#BSEG              ;****START OF SEGMENT****
177 017732      012777 177776 162312    1$:    MOV    #-2,@RLBA         ;SET RLBA TO ALL 1'S (BIT 0-0)
178 017732      012737 177776 002362    MOV    #-2,GDDAT         ;SET UP EXPECTED RESULTS
179 017746      041337 002362      BIC    (R3),GDDAT        ;IN GDDAT
  
```

L5

SEQ 0063

TEST 11 BIC OF RLBA

```

170 017752 041377 162274          BIC      (R3),@RLBA      ;BIC RLBA
171 017756 017737 162270 002364    MOV      @RLBA,BDDAT    ;READ RLBA
172 017764 023737 002364 002362    CMP      BDDAT,GDDAT   ;BIC WORK OKAY?
173 017772 001404                      BEQ      2$            ;IF YES BRANCH
174
175 017774                      ERRDF    10.,EM64,ERR2   ;WRONG DATA IN RLBA
    017774 104455                      TRAP    C$ERDF
    017776 000012                      .WORD  10
    020000 011105                      .WORD  EM64
    020002 012256                      .WORD  ERR2
APF 176 020004                      ESC     ;IF /FL:LOE SET 2$: LOOP, ELSE EXIT SEG
    SEG                                TRAP    C$ESCAPE
    020004 104410                                .WORD  10000$-.
    020006 000012
177
178 020010 005723                      TST     (R3).          ;GET NEXT PATTERN
179 020012 020327 004624            CMP     R3,@ENDPAT    ;HAVE WE COMPLETED LIST
180 020016 001345                      BNE    1$            ;NO, GO BACK FOR NEXT
181 020020                      ENDSEG  10000$:
    020020                                TRAP    C$ESEG
182 020022                      ENDTST L10033:
    020022 104401                                TRAP    C$E
TST 183
184
185 .SBTTL **TEST 12** - BIS OF RLDA
186
187 020024          BGNTST                      ;****START OF TEST****
188
189 020024          STARS
190 ;*****
191 ;TEST THAT THE "BIS" INSTRUCTION WILL WORK ON THE DISK ADDRESS
192 ;REGISTER. BITS 15-0 ARE TESTED WITH 4 PATTERNS, GROWING 1,
193 020024 ;SHIFTING 1, GROWING 0, AND SHIFTING 0.
          STARS
          ;*****
          *****
194
195
196 020024 012703 004416          BGNSEG MOV      @BEGPAT,R3      ;GET START OF LIST
197 020030                                TRAP    C$BSEG          ;****START OF SEGMENT****
    020030 104404
198 020032
199 020032 005077 162216          1$:    CLR     @RLDA          ;CLEAR "DA"
200 020036 011337 002362          MOV     (R3),GDDAT    ;SET EXPECTED
201 020042 051377 162206          BIS     (R3),@RLDA    ;BIS RLDA
202 020046 017737 162202 002364    MOV     @RLDA,BDDAT   ;READ RLDA
203 020054 023737 002364 002362    CMP     B
DDAT,GDDAT ;IS RLDA CORRECT
204 020062 001404                      BEQ     2$            ;IF OKAY BRANCH
205
206 020064                      ERRDF    11.,EM65,CRR2   ;WRONG DATA IN RLDA
    020064 104455                      TRAP    C$ERDF
    020066 000013                      .WORD  11
    020070 011170                      .WORD  EM65
    020072 012256                      .WORD  ERR2
207 020074                      2$:    ESCAPE SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
    020074 104410                                TRAP    C$ESCAPE
    020076 000012                                .WORD  10000$ .

```


••TEST 12•• BIS OF RLDA

```

208
209 020100 005723          TST      (R3).          ;GET NEXT PATTERN
210 020102 020327 004624  CMP      R3,#ENDPAT    ;HAVE WE FINISHED?
211 020106 001351          BNE      1$            ;NO GO BACK
212 020110          ENDSEG          ;****END OF SEGMENT****
      020110          10000$:
213 020110 104405          TRAP     C#ESEG
      020112          ENDTST          ;****END OF TEST****
      020112          L10034:
      020112 104401          TRAP     C#ETST
214
215
216          .SBTTL  ••TEST 13•• - BIC OF RLDA
217
218 020114          BGNTST          ;****START OF TEST****
219
220 020114          STARS
      ;:*****
221          ;TEST THAT THE "BIC" INSTRUCTION WORKS ON THE DISK
222          ;ADDRESS REGISTER. ALL BITS ARE TESTED WITH FOUR
223          ;PATTERNS: GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
224 020114          STARS
      ;:*****
225
226
227 020114 012703 004416  MOV      #BEGPAT,R3    ;GET START OF LIST
      MOV      BGNSEG          ;****START OF SEGMENT****
228 020120          104404          TRAP     C#BSEG
      020120          1$:
229 020122          1$:
230 020122 012777 177777 162124  MOV      #-1,@RLDA     ;SET RLDA TO ALL 1'S
231 020130 012737 177777 002362  MOV      #-1,GDDAT     ;SET EXPECTED DATA
232 020136 041337 002362          BIC      (R3),GDDAT     ;SET EXPECTED DATA
233 020142 041377 162106          BIC      (R3),@RLDA     ;"BIC" RLDA
234 020146 017737 162102 002364  MOV      @RLDA,BDDAT    ;READ RLDA
235 020154 0
23737 002362 002364          CMP      GDDAT,BDDAT    ;DID "BIC" WORK?
236 020162 001404          BEQ      2$            ;IF IT DID BRANCH
237
238 020164          ERRDF      12,EM66,ERR2  ;WRONG DATA IN RLDA
      020164          TRAP     C#ERRDF
      020166          .WORD     12
      020170          .WORD     EM66
      020172          .WORD     ERR2
239 020174          2$:          ESCAPE   SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
      ^0174          TRAP     C#ESCAPE
      J20176          .WORD     10000$
240
241 020200 005723          TST      (R3).          ;GET NEXT PATTERN
242 020202 020327 004624  CMP      R3,#ENDPAT    ;DONE?
243 020206 001345          BNE      1$            ;NO GO BACK
244 020210          ENDSEG          ;****END OF SEGMENT****
      020210          10000$:
      020210          104405          TRAP     C#ESEG
245 020212          ENDTST          ;****END OF TEST****
      020212          L10035:
      020212 104401          TRAP     C#ETST
246
247

```

```

248
**TEST 14** - BUS RESET OF RLCS
249
250 020214
251
252 020214

253
254
255
256
257
T UP THIS TEST BIT
258
259
260
261 020214

262
263
264 020214 012700 000340
020214 104441
020220 012777 000377 162020
OADABLE BITS
265 020222 012737 000200 002362
266 020230 032777 040000 162004
267 020236 001403
268 020244 052737 140000 002362
269 020246 012700 000100
270 020254
271 020260 104433
272 020262 005300
VE ERROR
273 020264 001376
274 020266 017737 161756 002364
275 020274 042737 000001 002364
276 020302 023737 002364 002362
277 020310 001404
278
279 020312
020312 104455
020314 000015
020316 011334
020320 012256

280 020322
281 020322
020322
020322 104401

282
283
284
285
286 020324
287
288 020324

289
290
291
IS EXPECTED TO BE ZERO AFTER THE RESET
292 020324

```

```

.SBTTL
BGNTST ;****START OF TEST****

STARS
;*****
;TEST THAT A BUS RESET WILL CLEAR THE PROPER BITS
;OF THE CONTROL AND STATUS REGISTER. THOSE BITS ARE
;BITS 6-1,8,9,10,11,12,13,15. BIT 15 WILL CLEAR ONLY
;IF BIT 14 (DRIVE ERROR IS NOT SET). BIT 0 (DRIVE READY)
;IS A DON'T CARE. IF AT THE STAR
;14 (DRIVE ERROR) IS SET WE WILL INSIST IF IS THERE AFTER
;THE "RESET" ALONG WITH BIT 15 (COMPOSITE ERROR). BITS
;15-10 ARE NOT WRITEABLE.
STARS
;*****

SETPRI @PRI07 ;PRIORITY TO SEVEN
MOV @PRI07,R0
TRAP C#SPRI
MOV #377,@RLCS ;LOAD ALL RLCS L

MOV @CRDY,GDDAT ;SETUP EXPECTED
BIT @DERR,@RLCS ;DRIVE ERR SET?
BEQ 1# ;IF NOT DON'T EXPECT IT
BIS @DERR!ERR,GDDAT ;IT'S SET, INIT BETTER NOT CLR
MOV @100,R0 ;SET UP A WAIT LOOP
BRESET ;BUS RESET
TRAP C#RESET
DEC R0 ;WAIT IN CASE OF DRI

BNE 2#
MOV @RLCS,BDDAT ;READ RLCS
BIC @DRDY,BDDAT ;CLEAR OUT DRDY - DON'T CARE
CMP BDDAT,GDDAT ;DID INIT WORK
BEQ 3# ;YES, BRANCH

ERRDF 13,EM67,ERR2 ;WRONG DATA IN RLCS
TRAP C#ERRDF
.WORD 13
.WORD EM67
.WORD ERR2

3#:
ENDTST
L10036: TRAP C#ETST

;****END OF TEST****

.SBTTL **TEST 15** - BUS RESET OF RLBA
L NTST
;****START OF TEST****

STARS
;*****
;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
;BUS ADDRESS REGISTER. THE BUS ADDRESS IS LOADED WITH 177776
;AND
STARS

```



```

333 .SBTTL
    **TEST 17** - UNIQUENESS OF RLCS
334
335 020436      BGNTST                      ;*****START OF TEST*****
336
337 020436      STARS
    ;*****
    ;TEST THE UNIQUENESS OF THE CONTROL AND STATUS
    ;REGISTER. THE RLBA AND RLDA ARE PRELOADED WITH
    ;177776 AND 177777 RESPECTIVELY. THE RLCS IS THEN
    ;LOADED TO INSURE THAT NEITHER THE RLBA OR RLDA
    ;ARE MODIFIED BY THE WRITING OF THE RLCS.
338
339
340
341
342
343
020436          STARS                      ;*****
344
345
346 020436      012737 000201 002332      MOV      #DRDY,CRDY,LDCSR      ;SET DRIVE AND CONTROLLER READY
347 020444      012777 177776 161600      MOV      #-2,@RLBA            ;SET RLBA TO ALL 1'S
348 020452      012777 177777 161574      MOV      #-1,@RLDA            ;SET RLDA TO ALL 1'S
349 020460      013777 002332 161562      MOV      LDCSR,@RLCS          ;WRITE RLCS
350
351
352          ;CHECK THAT RLBA REMAINS UNAFFECTED
353 020466      02277 177776 161556      CMP      #-2,@RLBA            ;RLBA OKAY?
    177776 001412      BEQ      1$                    ;YES, GO CHECK DA
354 020474
355
356 020476      012737 177776 002362      MOV      # 2,GDDAT            ;SET UP EXPECTED
357 020504      017737 161542 002364      MOV      @RLBA,BDDAT          ;READ RLBA
358
359 020512      ERRDF 16.,EM72,ERR2        ;CS MODIFIED BA
    020512 104455      TRAP  C$ERDF
    020514 000020      .WORD 16
    020516 011463      .WORD EM72
    020520 012256      .WORD ERR2
360 020522      1$: CKLOOP                    ;CHECK IF /FL·LOE IS SET
    020522 104406      TRAP  C$CLP1
361
362 020524      022777 177777 161522      CMP      #-1,@RLDA            ;RLDA OKAY?
363 020532      001412      BEQ      2$                    ;YES, CONTINUE
364
365 020534      012737 177777 002362      MOV      #-1,GDDAT            ;SET UP EXPECTED
366 020542      017737 161506 002364      MOV      @RLDA,BDDAT          ;READ DA
367
368 020550      ERRDF 17.,EM73,ERR2        ;CS MODIFIED DA
    020550 104455      TRAP  C$ERDF
    020552 000021      .WORD 17
    020554 011516      .WORD EM73
    020556 012256      .WORD ERR2
369 020560      2$:
370
371
372 020560      ENDTST                      ;*****END OF TEST*****
    020560      L10041:
    020560 104401      TRAP  C$ETST
373
374
375          .SBTTL **TEST 18** UNIQUENESS OF RLBA
376
  
```



```

421
422 020722          STARS
                    ;:*****
423                ;TEST THE UNIQUENESS OF THE DISK ADDRESS REGISTER.  THE R
LCS 424                ;AND RLBA ARE LOADED WITH XXX20X AND 177776
425                ;RESPECTIVELY.  THE RLDA IS THEN WRITTEN TO INSURE
426                ;THAT NEITHER THE RLCS OR THE RLBA ARE MODIFIED
427                ;BY WRITING THE RLDA.
428 020722          STARS
                    ;:*****
429
430
431 020722  012737  000200  002362          MOV  #CRDY,GDDAT  ;CONTROLLER READY
432 020730  032777  040000  161312          BIT  #DERR,@RLCS ;IF DRIVE ERROR SET
433 020736  001403
                    BEQ  99$
434 020740  052737  140000  002362          ;THEN EXPECT IT LATER
435 020746  013777  002362  161274  99$:  BIS  #ERR!DERR,GDDAT
436 020754  012777  177776  161270          MOV  GDDAT,@RLCS ;LOAD CS
437 020762  005077  161266          MOV  #-2,@RLBA  ;LOAD BA WITH ALL 1'S
438                CLR  @RLDA ;CLEAR RLDA
439                ;CHECK IF RLCS IS OKAY
440
441 020766  017737  161256  002364          MOV  @RLCS,BDDAT ;READ RLCS
442 020774  042737  000001  002364          BIC  #DRDY,BDDAT ;IGNORE DRIVE READY
443 02100
2 444 023737  002362  002364          CMP  GDDAT,BDDAT ;RLCS OKAY?
445 021010  001404          BEQ  1$ ;YES, THEN BRANCH
446 021012          ERRDF 20.,EM76,ERR2 ;DA MODIFIED CS
447 021012  104455          TRAP C$ERDF
448 021014  000024          .WORD 20
449 021016  011635          .WORD EM76
450 021020  012256          .WORD ERR2
451 021022          1$:  CKLOOP ;CHECK IF /FL:LOE IS SET
452 021022  104406          TRAP C$CLP1
453 021024  022777  177776  161220          CMP  #-2,@RLBA ;IS RLBA OKAY?
454 021032  001412          BEQ  2$ ;BRANCH IF OK
AY 455 021050          ERRDF 21.,EM77,ERR2 ;DA MODIFIED BA
456 021050  104455          TRAP C$ERDF
457 021052  000025          .WORD 21
458 021054  011670          .WORD EM77
459 021056  012256          .WORD ERR2
460 021060          2$:
461 021060          ENDTST ;****END OF TEST****
462 021060  104401          L10043: TRAP C$ETST
463 021062          .SBTTL
464                BGNTST ;****START OF TEST****

```

```

465
466 021062          STARS
                    ;*****
467                ;TEST THE UNIQUNESS OF THE MULTI-PURPOSE REGISTER
468                ;WE WILL WRITE THE RLCS, RLBA, AND THE RLDA, THEN THE
                    ;RLMP IS WRITTEN. WE THEN GO BACK AND VERIFY THE CONTENTS
469                ;OF THE RLCS AND RLDA.
470                STARS
471 021062          ;*****
                    ;*****
472
473
474 021062 012737 000200 002362      MOV    #CRDY,GDDAT    ;CONTROLLER READY
475 021070 032777 040000 161152      BIT    #DERR,@RLCS    ;IF DRIVE ERROR SET
476 021076 001403                    BEQ    99$            ;THE EXPECT IT LATER
477 021100 052737 140000 002362      BIS    #ERR!DERR,GDDAT
478 021106 0137
77 021106 002362 161134 99$: MOV    GDDAT,@RLCS    ;LOAD CS
479 021114 012777 177776 161130      MOV    #-2,@RLBA    ;LOAD BA WITH ALL 1'S
480 021122 012777 177777 161124      MOV    #-1,@RLDA    ;LOAD RLDA
481 021130 005077 161122              CLR    @RLMP        ;WRITE RLMP
482
483                ;CHECK IF RLCS IS OKAY
484
485 021134 017737 161110 002364      MOV    @RLCS,BDDAT  ;READ RLCS
486 021142 042737 000001 002364      BIC    #DRDY,BDDAT  ;IGNORE DRIVE READY
487 021150 023737 002362 002364      CMP    GDDAT,BDDAT  ;RLCS
OKAY?
488 021156 001404                    BEQ    1$            ;YES, THEN BRANCH
489
490 021160                    ERRDF  201.,EM44,ERR2  ;MP MODIFIED CS
    021160 104455                    TRAP  C$ERDF
    021162 000311                    .WORD 201
    021164 010204                    .WORD EM44
    021166 012256                    .WORD ERR2
491 021170 1$: CKLOOP                ;CHECK IF /FL:LOE IS SET
    021170 104406                    TRAP  C$CLP1
492
493 021172 022777 177776 161052      CMP    #-2,@RLBA    ;IS RLBA OKAY?
494 021200 001412                    BEQ    2$            ;BRANCH IF OKAY
495
362 496 021202 012737 177776 002      ;SET UP EXPECTED
    MOV    #-2,GDDAT
497 021210 017737 161036 002364      MOV    @RLBA,BDDAT  ;READ RLBA
498
499 021216                    ERRDF  211.,EM45,ERR2  ;MP MODIFIED BA
    021216 104455                    TRAP  C$ERDF
    021220 000323                    .WORD 211
    021222 010237                    .WORD EM45
    021224 012256                    .WORD ERR2
500 021226 2$: CKLOOP                ;CHECK IF /FL:LOE IS SET
    021226 104406                    TRAP  C$CLP1
501 021230 022777 177777 161016      CMP    #-1,@RLDA    ;DISK ADDRESS OKAY
502 021236 001412                    BEQ    3$            ;YES, CONTINUE
503
504 021240 017737 161010 002364      MOV    @RLDA,BDDAT  ;SET UP BAD
505 021246 012737 177777 002364      MOV    #-1,GDDAT    ;SET UP EXPECTED
506
507 021254                    ERRDF  212.,EM46,ERR2  ;MP MODIFIED DA
    021254 104455                    TRAP  C$ERDF
    021256 000324                    .WORD 212

```

```

021260 010272
021262 012256          .WORD  EM46
                          .WORD  ERR2
08  5
509 021264          3$:
510
511
512 021264          ENDTST          ;****END OF TEST****
    021264          L10044:
    021264 104401    TRAP  C$ETST
513
514          .SBTTL  **TEST 21** - NOOP FUNCTION
515
516 021266          BGNTST          ;****START OF TEST****
517
518
519
520 021266          STARS
521          ;:*****
522          ;TEST THAT NOOP WILL FUNCTION. WE WILL ISSUE THE
523          ;NOOP AND WAIT FOR CONTROLLER READY TO SET. A
524          ;TIMEOUT OF 200 MILLISECS IS ALLOWED. DRIVE 0 IS ALWAYS
525 021266          ;SELECTED SINCE THE DRIVE IS NOT NECESSARY.
                    STARS
                    ;:*****
526
527
528
529 021266 012777 002416 160756    MOV  #DBUFF,@RLBA    ;SET UP RLBA FOR TRANSFER
530 021274 012700 000000          MOV  #0,R0          ;
531 021300 010077 160750          MOV  R0,@RLDA      ;SET DISK ADDRESS
532 021304 012777 177001 160744    MOV  #-511        B
    @RLMP ;WORD COUNT
533 021312 010046          MOV  R0,-(SP)      ;SAVE R0
534 021314 004537 015466          JSR  R5,LDFUNC    ;ISSUE FUNCTION OF FOLLOWING WORD
535 021320 000000          NOOPO          ;NOOP(0) FUNCTION
536 021322 004537 016354          JSR  R5,WTCRDY   ;WAIT FOR CONTROLLER READY HIGH
537 021326 004537 015166          JSR  R5,CHERR    ;CHECK CONTROLLER FOR ERRORS
538 021332 012600          MOV  (SP)+,R0     ;RESTORE R0
539 021334 020077 160714          CMP  R0,@RLDA    ;SEE IF RLDA IS THE SAME FOR 'RL11'
540
541 021340 001417          BEQ  99$         ;BRANCH IF SO,ELSE
542 021342 062700 000006          ADD  #6,R0       ;ASSUME THAT PROCESSOR IS AN LSI11.
543 021346 020077 160702          CMP  R0,@RLDA    ;GET EXPECTED RLDA AFTER RLV11 'NOP' COMMAND
544 021352 001412          BEQ  99$         ;THE RLDA SHOULD HAVE INCREMENTED BY 6
545 021354 010037 002362          MOV  R0,GDDAT    ;SAVE EXPECTED
546 021360 017737 160670 002364    MOV  @RLDA,BDDAT ;SAVE RESULTS
547 021366          ERRDF 213..EM103,ERR2 ;PRINT RESULTS ERROR
                    TRAP  C$ERDF          B
                    .WORD  213
                    .WORD  EM103
                    .WORD  ERR2
548 021376          2$:    CKLOOP          ;CHECK IF /FL:LOE IS SET
    021376 104406    TRAP  C$CLP1
549
550
551
552 021400          99$:
553 021400          ENDTST          ;****END OF TEST****

```


TEST 21
NOOP FUNCTION

```

021400          L10045:
021400 104401    TRAP    C#ETST

554
555
556             .SBTTL  **TEST 22** - TEST NOOP DOES NOTHING (RL11 ONLY)
557
558 021402      BGNTST                      ;****START OF TEST****
559
560 021402      STARS
561             ;*****
562             ;TEST THAT ISSUING A NOOP FUNCTION DOES NOTHING. THIS IS DONE BY WRITING
563 021402      ;THE RLBA, AND RLDA, READING THE RLMP AND MAKING SURE NOTHING CHANGES.

                    STARS
                    ;*****
564
565 021402 022737 000001 002410          CMP    #1,T.CNTRL    ;RLV11, OR RLV12?
566 021410 001076                                BNE    3$            ;YES SKIP TEST.
567
568 021412 012777 000001 160634          MOV    #1,@RLDA      ;LOAD DISK ADDRESS
569 021420 012777 002416 160624          MOV    #DBUFF,@RLBA ;LOAD BUS ADDRESS      B
570 021426 005077 160624                                CLR    @RLMP
571 021432 017737 160620 002362          MOV    @RLMP,GDDAT  ;READ RLMP
572
004537 021440          JSR    R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
573 015466          NOOPO
574 021444 000000          JSR    R5,WTCRDY    ;WAIT FOR CONTROLLER READY HIGH
575 021446 004537 016354          CKLOOP
576 021452 104406          TRAP   C#CLP1      ;CHECK IF /FL:LOE IS SET
577
578 021454 004537 015166          JSR    R5,CHERR     ;CHECK CONTROLLER FOR ERRORS
579 021460          ESCAPE  TST                ;IF /FL:LOE SET LOOP, ELSE EXIT TST
580 021460 104410          TRAP   C#ESCAPE
581 021462 000124          .WORD  L10046-.

017737 021464          MOV    @RLMP,BDDAT    ;READ RLMP
582 160566 002364          CMP    GDDAT,BDDAT  ;RLMP OK?
583 021472 023737 002362 002364          BEQ    1$
584 021500 001404
585 021502          ERRDF  202.,EM14,ERR2
586 021502 104455          TRAP   C#ERDF
587 021504 000312          .WORD  202
588 021506 007304          .WORD  EM14
589 021510 012256          .WORD  ERR2

586
587 021512          1$:  CKLOOP
588 021512 104406          TRAP   C#CLP1      ;CHECK IF /FL:LOE IS SET
589 021514 012737 002416 002362          MOV    #DBUFF,GDDAT ;SET UP EXP'D BA

590 021522 017737 160524 002364          MOV    @RLBA,BDDAT ;READ BA
591 021530 023737 002362 002364          CMP    GDDAT,BDDAT ;BA OK?
592 021536 001404          BEQ    2$            ;YES
593
594 021540          ERRDF  203.,EM15,ERR2
595 021540 104455          TRAP   C#ERDF
596 021542 000313          .WORD  203
597 021544 007332          .WORD  EM15
598 021546 012256          .WORD  ERR2
    
```

```

595
596 021550          2$: CKLOOP          ;CHECK IF /FL:LOE IS SET
    021550 104406  TRAP          C$CLP1
597
598 021552 012737 000001 002362  MOV      #1,GDDAT          ;SET UP EXP'D DA
599 021560 017737 160470 002364  MOV      @RLDA,BDDAT       ;READ DA
600 021566 023737 002362 002364  CMP      GDDAT,BDDAT       ;DA OKAY
601 021574 001404          BEQ      3$
602
603 021576          ERRDF      204.,EM16,ERR2
    021576 104455  TRAP          C$ERDF
    021600 000314  .WORD      204
    021602 007360  .WORD      EM16
    021604
012256          .WORD      ERR2
604
605 021606          3$:
606
607 021606          ENDTST
    021606          L10046:          ;****END OF TEST****
    021606 104401  TRAP          C$ETST
608
609
610          .SBTTL  **TEST 23** - TEST OF INTERRUPT (RL11 ONLY)
611
612 021610          BGNTST          ;****START OF TEST****
613
614 021610          STARS
    ;*****
    ;CHECK THE INTERRUPT WITH A NOOP. WE WILL SET UP THE
    ;INTERRUPT VECTOR,
    ;A NOOP. THE INTERRUPT SERVICE ROUTINE WILL SET A
    ;FLAG UPON INTERRUPT AND RETURN IN LINE. WE WAIT 200 MILLISECONDS
    ;LOOKING FOR THAT FLAG TO BE SET BEFORE CALLING IT
    ;AN ERROR. IF THE INTERRUPT SENDS US TO ANOTHER
    ;VECTOR ADDRESS THEN THE ERROR HANDLER WILL REPORT
    ;"TRAP TO XXXX FROM YYYY" AND RETURN TO DIAG SUP MONITOR. IF THE
    ;INTERRUPT GOES TO ABOVE 1000 WHO KNOWS WHAT WILL HA
615
616          LOWER THE PSW TO ZERO AND ISSUE
617
618
619
620
621
622
623
PPEN.
624 021616
625
626
627 021616 022737 000001 002410  CMP      #1,T.CNTRL       ;RLV11 OR RLV12?
628 021616 001026          BNE      99$              ;YES SKIP TEST.
629
630 021620 005037 002330          CLR      INTFLG          ;CLEAR INTERRUPT OCCURRENCE FLAG
631 021624          SETPRI     @PRI00          ;SET PSW TO 0
    021624 012700 000000  MOV      @PRI00,R0
    021630 104441  TRAP          C$SPRI
632 021632 004537 015466  JSR      R5,LDFUNC        ;ISSUE F
FUNCTION OF FOLLOWING WORD
633 021636 000100          NOOPO!INTEN          ;NOOP AND INTERRUPT ENABLE
634 021640 004537 016354  JSR      R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
635 021644 005737 002330  TST      INTFLG          ;DID INTERRUPT OCCUR
636 021650 001004          BNE      2$              ;IF SO BRANCH
637 021652          ERRDF      22.,EM13,ERR0
    021652 104455  TRAP          C$ERDF
    021654 000026  .WORD      22
    021656 007252  .WORD      EM13
  
```

J6

SEQ 0074

TEST 23 - TEST OF INTERRUPT (RL11 ONLY)

```

638 021660 012226          .WORD  ERRO
639 021662 005037 002330  2$: CLR  INTFLG
    021666          .FKLOOP
640 021666 104406          TRAP  C$CLP1
    021670 004537 015166  JSR   R5,CHERR          ;CHECK IF /FL:LOE IS SET
641
642
643 021674          99$:
644 021674          ENDTST
    021674          L10047:          ;****END OF TEST****
    021674 104401          TRAP  C$ETST
645
646
647

```

TEST 24 - TEST PRIORITY BR LEVEL

```

648
649 021676          .SBTTL
    BGNTST          ;****START OF TEST****
650
651 021676          STARS
    ;*****
    ;TEST THAT PRIORITY GIVEN IS ACTUAL PRIORITY OF CONTROLLER. WE KNOW
    ;THE BOARD WILL INTERRUPT. WE WILL START TRYING TO INTERRUPT AT 7
    ;AND WORK DOWN TIL IT DOES INTERRUPT.
    STARS
    ;*****
652
653
654
655 021676

```

**

```

656
657 021676 022737 000001 002410  CMP  #1,T.CNTRLR          ;RLV11 OR RLV12?
658 021704 001056          BNE  6$                  ;YES, SKIP TEST
659
660 021706 012737 000340 002364  MOV  #340,BDDAT          ;SET UP INITIAL OF 7
661 021714 013737 002264 002362  MOV  BPRIOR,GDDAT        ;GET GIVEN PRIORITY
662
663 021722          BGNSEG          ;****START OF SEGMENT****
    021722 104404          TRAP  C$BSEG
664
665 021724 005037 002330  5$: CLR  INTFLG          ;CLEAR INTERRUPT OCCURRENCE
666 021730          SETPRI  BD
    ;SET PRIORITY
    021730 013700 002364  MOV  BDDAT,R0
    021734 104441          TRAP  C$SPRI
667
668 021736 004537 015466  JSR  R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
669 021742 000100          NOOPO!INTEN
670
671 021744 004537 016354  JSR  R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
672 021750          ESCAPE  TST          ;IF /FL:LOE SET LOOP, ELSE EXIT TST
    021750 104410          TRAP  C$ESCAPE
    021752 000070          .WORD  L10050-.
673
674 021754 004537 015166  JSR  R5,CHERR          ;CHECK CO
    NTROLLER FOR ERRORS
675 021760          ESCAPE  TST          ;IF /FL:LOE SET LOOP, ELSE EXIT TST
    021760 104410          TRAP  C$ESCAPE
    021762 000060          .WORD  L10050-.
676
677 021764 023737 002364 002362  CMP  BDDAT,GDDAT          ;SHOULD IT INTERRUPT
678 021772 002012          BGE  1$                  ;NO, BRANCH
679
680 021774 005737 002330  TST  INTFLG          ;DID INTERRUPT OCCUR
681 022000 001004          BNE  2$                  ;YES, OK

```

TEST 24 - TEST PRIORITY BR LEVEL

```

682
683 022002      3$:  ERRDF  204.,EM17,ERR7
      022002      TRAP  C$ERDF
      022004      .WORD  204
      022006      .WORD  EM17
      022010      .WORD  ERR7
684
685 C22012      2$:  ESCAPE  SEG          ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
      022012      TRAP  C$ESCAPE
      022014      .WORD  10000$-.
686 022016      BR    4$
687 022020      1$:  TST    INTFLG      ;DID INTERRUPT OCCUR
      005737      002330
688 0
22024 001772      BEQ    2$          ;NO, OK
689 022026      BR    3$          ;YES, ERROR
690
691 022030      ENDSEG
      022030      10000$:      ;****END OF SEGMENT****
      022030      104405
692 022032      000040 002364 4$:  TRAP  C$ESEG
      022040      100331      SUB  #40,BDDAT      ;NEXT LEVEL
      022042      BPL  5$
694
695 022042      6$:
696 022042      ENDTST
      022042      L10050:      ;****END OF TEST****
      022042      104401      TRAP  C$ETST
697
698
699
700
022044      .SBTTL  **TEST 25** - GET STATUS FUNCTION
701      BGNTST
702
703 022044      ;****START OF TEST****
704
705      STARS
706      ;:*****
707      ;TEST GET STATUS FUNCTION. THE GET STATUS FUNCTION WILL
708      ;WORK IF DRIVE IS LOADED AND READY OR NOT. THE RLDA
709 0220      ;IS LOADED WITH THE GET STATUS AND MARKER BITS (BITS 1,0)
44      ;AND THE FUNCTION IS ISSUED. WE WAIT 200 MILLISECONDS
710      ;FOR CONTROLLER READY. VERIFY THAT NO ERRORS OCCUR.
711      STARS
712      ;:*****
713 022044 012777 000013 160202      MOV    #GSBIT!MK!DRST,@RLDA      ;SET GET STATUS AND MARKER BIT
714 022052 004537 015466      JSR    R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
715 022056 000004      GSTAT      ;GET STATUS
716 022060 004537 016354      JSR    R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
717 022064 104406      2$:  CKLOOP
718      TRAP  C$CLP1      ;CHECK IF /FL:LOE IS SET
719
18 719 022066 004537 015166      JSR    R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
720 022072      ENDTST
721 022072      L10051:      ;****END OF TEST****
722      TRAP  C$ETST
723
      .SBTTL  **TEST 26** - GET STATUS FUNCTION INTERRUPT

```

```

724
725 022074          BGNTST                      ;****START OF TEST****
726
6
727                ;CHECK GET STATUS UNDER INTERRUPT
728
729 022074 005037 002330 CLR INTFLG ;CLEAR INTERRUPT OCCURANCE
730 022100 012700 000000 SETPRI @PRI00 ;PSW TO LEVEL 0
      022100 104441      MOV @PRI00,R0
      022104 104441      TRAP C$SPRI
731 022106 012777 000003 160140 MOV @GSBIT!MK,@RLDA ;SET UP DA
732 022114 004537 015466 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
733 022120 000104      GSTAT!INTEN ;GET STATUS, INT ENABLE
734 022122 004537 016354 JSR R
5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
735 022126 012700 000340 SETPRI @PRI07
      022126 104441      MOV @PRI07,R0
      022132 104441      TRAP C$SPRI
736 022134 005737 002330 TST INTFLG ;DID INTERRUPT OCCUR
737 022140 001004      BNE 2$ ;YES-BRANCH
738 022142 104455      ERDF 28.,EM30,ERRO
      022144 000034      TRAP C$ERDF
      022146 007441      .WORD 28
      022150 012226      .WORD EM30
739 022152 2$: CKLOOP ;CHECK IF /FL:LOE IS SET
      022152 104406      TRAP C$CLP
1
740 022154 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
741 022160 005037 002330 CLR INTFLG ;CLEAR INTERRUPT OCCURANCE
742 022164 012700 000000 SETPRI @PRI00 ;PSW TO LEVEL 0
      022164 104441      MOV @PRI00,R0
      022170 104441      TRAP C$SPRI
743 022172 012777 000003 160054 MOV @GSBIT!MK,@RLDA ;SET UP DA FOR GET STATUS CMD
744 022200 004537 015466 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
745 022204 000004      GSTAT ;GET STATUS - SHOULD NOT CAUS
E AN INTERRUPT
746 022206 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
747 022212 012700 000340 SETPRI @PRI07
      022212 104441      MOV @PRI07,R0
      022216 104441      TRAP C$SPRI
748 022220 005737 002330 TST INTFLG ;DID INTERRUPT OCCUR (SHOULD NOT)
749 022224 001404      BEQ 3$ ;NO - BRANCH (OK)
750 022226 104455      ERDF 281.,EM30A,ERRO
      022226 000431      TRAP C$ERDF
      022230 007500      .WORD 281
      022232 012226      .WORD EM30A
      022234 012226      .WORD ERRO
751 0
22236 3$: CKLOOP ;CHECK IF /FL:LOE IS SET
      022236 104406      TRAP C$CLP1
752 022240 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
753 022244 104401      ENDTST ;****END OF TEST****
      022244 010052: L10052:
      022244 104401      TRAP C$ETST
754
755
756 .SBTTL **TEST 27** - GET STATUS FUNCTION GENERATES OPI W/O GS BIT
757
758 022246          BGNTST                      ;****START OF TEST****
759
760 022246          STARS
  
```

```

761
762
763
764
765
S AND OPI SETS
766 022246
767
768
769 022246 012777 000001 160000
770 022254 004537 015466
771 022260 000004
772 022262 004537 016354
773 022266 032737 074000 002306
774 022274 001405
775 022276 J12737 006053 015450
776 022304 004537 015166
777 022310
778 022312 104406
779 022320 032737 002000 002306
780 022322 001004
781 022322 104455
782 022322 000035
783 022324 007574
784 022326 012226
785 022330
786 022332
787 022332
788 022332
789 022332 104401
790
791
792
793 022334
794 022334
795
796
797 022334 012700 000000
798 022340 104441
799 022342 005037 002330
800 022346 012777 000001 157700
801 022354 004537 015466
802 022362 000104
803 022366 016354
804 022366 012700 000340

;*****
;VERIFY THAT GET STATUS FUNCTION WILL NOT COMPLETE
;WITHOUT SENDING OUT THE GET STATUS BIT IN THE RLDA.
;WE SET MARKER BUT NO GET STATUS BIT IN THE RLDA AND
;ISSUE A GET STATUS WE SHOULD RECIEVE AN OPI ERROR.
;VERIFY THAT CONTROLLER READY SET
STARS
;*****
MOV #MK,@RLDA ;SET ONLY MARKER BIT!!
JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
GSTAT ;GET STATUS
JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
BIT #74000,E.CS
BEQ 1$
1$:
MOV #OPIERR,RESTMS
JSR R5,CHERR
CKLOOP
TRAP C#CLP1
BIT #OPI,E.CS ;IS OPI SET?
BNE 2$ ;YES-BRANCH NO-CHECK TIMEOUT
ERRDF 29,EM33,ERRO
TRAP C#ERDF
.WORD 29
.WORD EM33
.WORD ERRO
2$:
E
;****END OF TEST****
L10053:
TRAP C#ETST
.SBTTL **TEST 28** - OPI UNDER INTERRUPT
BGNTST ;****START OF TEST****
STARS
;*****
;FORCE AN OPI ERROR UNDER INTERRUPT TO VERIFY THAT
;AN INTERRUPT WILL OCCUR FROM OPI. THE OPI IS FORCED
;USING A GET STATUS WITHOUT THE GET STATUS BIT SET
;IN RLDA.
STARS
;*****
SETPRI #PRI00
MOV #PRI00,R0
TRAP C#SPRI
CLR INTFLG
MOV #MK,@RLDA ;SET ONLY MARKER BIT!!
JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
GSTAT!INTEN ;GET STATUS
JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
SETPRI #PRI07
MOV #PRI07,R0
    
```

```

804 022372 104441 TRAP C$SPRI
805 022374 005737 002330 TST INTFLG ;INTERRUPT OCCUR
806 022400 001004 BNE 2$
022402 104455 ERRDF 30,EM11,ERRO
TRAP C$ERDF

022404 000036 .WORD 30
022406 007211 .WORD EM11
022410 012226 .WORD ERRO
807 022412 2$: CKLOOP ;CHECK IF /FL:LOE IS SET
022412 104406 TRAP C$CLP1
808 022414 032737 074000 002306 BIT #74000,E.CS
809 022422 001405 BEQ 1$
810 022424 012737 006053 015450 MOV #OPIERR,RESTMS
811 022432 004537 015166 JSR R5,CHERR
812 022436 1$: CKLOOP
022436 104406 TRAP C$CLP1
813 022440 032737 002000 002306 BIT #OPI,E.CS ;IS OPI SET?

814 022446 001004 BNE 3$ ;YES-BRANCH NO CHECK TIMEOUT
815 022450 ERRDF 31,EM33,ERRO
022450 104455 TRAP C$ERDF
022452 000037 .WORD 31
022454 007574 .WORD EM33
022456 012226 .WORD ERRO
816 022460 3$:
817
818 022460 ENDTST ;****END OF TEST****
022460 L10054:
022460 104401 TRAP C$ETST
819
820 .SBTTL **TEST 29** - READ HEADER FUNCTION
821
822 022462 BGNTST ;****START OF TEST****
823 022462 STARS

;*****
824 ;CHECK THAT READ HEADER WORKS, THAT WE CAN ISSUE
825 ;IT, GET READY BACK WITHOUT ANY ERRORS SETTING.
826 022462 STARS
;*****

827
828 022462 004537 015466 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
829 022466 000010 RDHDR ;READ HEADER
830 022470 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH READY

831 022474 2$: CKLOOP ;CHECK IF /FL:LOE IS SET
022474 104406 TRAP C$CLP1
832 022476 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
833
834 022502 ENDTST ;****END OF TEST****
022502 L10055:
022502 104401 TRAP C$ETST
835
836 .SBTTL **TEST 30** - READ HEADER FUNCTION INTERRUPT
837
838 022504 BGNTST ;****START OF TEST****
839 STARS
840 022504 ;*****
;*****
841 ;CHECK THAT READ HEADER WILL GENERATE AN INTERRUPT

```

```

842                                     ;UPON COMPLETION WITHOUT ANY ERRORS SETTING
843 022504 STARS
844                                     ;:*****
845
846 022504 012700 000000 SETPRI @PRI00 ;PSW TO 0
      022504 MOV @PRI00,RO
022510 104441 TRAP C$SPRI
847 022512 005037 002330 CLR INTFLG ;CLEAR INTERRUPT OCCURENCE
848 022516 004537 015466 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
849 022522 000110 RDHDR:INTEN ;READ HEADER, INTR. ENA
850 022524 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
851 022530 SETPRI @PRI07
      022530 MOV @PRI07,RO
      022534 104441 TRAP C$SPRI
852 022536 005737 002330 TST INTFLG ;INTERRUPT HAPPEN
853 022
542 001004 BNE 2$ ;YES CONTINUE
854 022544 ERRDF 35,EM37,ERRO
      022544 104455 TRAP C$ERDF
      022546 000043 .WORD 35
      022550 007716 .WORD EM37
      022552 012226 .WORD ERRO
855 022554 2$: CKLOOP ;CHECK IF /FL:LOE IS SET
      022554 104406 TRAP C$CLP1
856
857 022556 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
858
859 022562 ENDTST
      022562 L10056: ;****END OF TEST****
      022562 104401 TRAP C$ETST
860
861
862
      .SBTTL **TEST 31** - REPEATED RD HDRS YIELD SAME CYL AND HD
863
864 022564 BGNSTST ;****START OF TEST****
865
866
867 022564 STARS
868                                     ;:*****
869                                     ;CHECK THAT READ HEADERS WILL RELIABLY READ THE SAME
870                                     ;CYLINDER AND HEAD SELECT. WE WILL READ HEADERS VERIFYING
871 022564 STARS ;THAT WE ALWAYS READ THE SAME CYLINDER AND HEAD SELECT.
                                     ;:*****
*****
872
873
874 022564 012701 000144 MOV #100,R1 ;SET UP TO DO 100 RD HDR'S
875 022570 004537 015466 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
876 022574 000010 RDHDR ;READ HEADER
877 022576 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
878 022602 99$: ESCAPE TST ;IF /FL:LOE SET LOOP, ELSE EXIT TST
      022602 104410 TRAP C$ESCAPE
      022604 000122 .WORD L10057-.
879
66 880 022606 004537 0151 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
881 022612 ESCAPE TST ;IF /FL:LOE SET LOOP, ELSE EXIT TST
      022612 104410 TRAP C$ESCAPE
  
```


C7

```

022614 000112 .WORD L10057 .
882
883 022616 013737 002314 002362 MOV E.MP,GDDAT ;READ FIRST HEADER (ASSUME GOOD)
884 022624 043737 002334 002362 BIC SECMSK,GDDAT ;MASK AWAY SECTOR BITS
885 022632 ;BGNSEG ;****START OF SEGMENT****
022632 104404 TRAP C#BSEG
886 022634 2$: JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
887 022634 004537 015466 RDHDR
888 022640 000010 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
889 022642 004537 016354 ESCAPE SEG ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
890 022646 104410 TRAP C#ESCAPE
022646 000054 .WORD 10000$-.
891
892 022652 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
004537 015166 ESCAPE SEG ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
893 022656 TRAP C#ESCAPE
022656 104410 .WORD 10000$-.
022660 000044
894
895 022662 013737 002314 002364 MOV E.MP,BDDAT ;READ HEADER
896 022670 043737 002334 002364 BIC SECMSK,BDDAT ;MASK AWAY SECTOR BITS
897 022676 023737 002362 002364 CMP GDDAT,BDDAT ;IS HEADER CORRECT
898 022704 001404 BEQ 4$
899
900 022706 ERRDF 36 ,EM41.E
RR4
022706 104455 TRAP C#ERDF
022710 000044 .WORD 36
022712 007756 .WORD EM41
022714 012372 .WORD ERR4
901
902 022716 104406 4$: CKLOOP ;CONSTANT CYL & HS
TRAP C#CLP1 ;CHECK IF /FL:LOE IS SET
903
904 022720 005301 DEC R1 ;PERFORM ALL READ HDR S
905 022722 001344 BNE 2$ ;IF NOT GO BACK AND DO ANOTHER
906 022724 ENDSEG ;****END OF SEGMENT****
10000$: TRAP C#ESEG
907 022726 EN
DTST :****END OF TEST****
022726 L10057: TRAP C#ETST
022726 104401
908
909
910 .SBTTL **TEST 32** - CHECK OF HEADER CRC
911
912 022730 BGNSTST ;****START OF TEST****
913
914 022730 STARS
;*****
;CHECK THAT WE CAN READ THE HDCRC AFTER A
;READ HEADER AND THAT IT IS THE CORRECT CRC
;FOR THE HEADER.
915 STARS
916 ;*****
917
918 022730
*****
919
920
921 022730 005037 023000 CLR 3$
  
```

D7

```

922 022734 004537 015466 JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
923 022740 000010 RDHDR ;READ HEADER
924 022742 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
925 022746 TST ;IF /FL:LOE SET LOOP, ELSE EXIT TST
E 022746 104410 TRAP C$ESCAPE
022750 000114 .WORD L10060-.

926 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
927 022752 004537 015166 TST ;IF /FL:LOE SET LOOP, ELSE EXIT TST
928 022756 104410 TRAP C$ESCAPE
022760 000104 .WORD L10060 .

929 MOV E.MP,2$ ;READ HEADER WORD CONTAINS SEC. HD, CYL
930 022762 013737 002314 022776
931 JSR R5,SIMBCC ;GO CALCULATE CRC
932 022770 004537 016100

933 022774 000020 16. ;16 BITS
934 022776 000000 2$: .WORD 0 ;HEADER GOES HERE
935 023000 000000 3$: .WORD 0 ;START WITH 0 CRC
936 023002 013737 002344 023026 MOV CALBCC,5$
937 023010 013737 002316 023024 MOV E.MP1,4$ ;GET SECOND WORD IN SILO, CONTAINS 0'S
938 023016 004537 016100 JSR R5,SIMBCC
939 023022 000020 16.
940 023024 000000 4$: .WORD 0
941 023026 000000 5$: .WORD 0
942 023030 013737 002344 002362 MOV CALBCC,G
DDAT ;STORE CALCULATED CRC AS GOOD
943 023036 013737 002320 002364 MOV E.MP2,BDDAT ;THIRD READ OF MP SILO GETS CRC
944 023044 023737 002362 002364 CMP GDDAT,BDDAT ;IS CRC CORRECT?
945 023052 001404 BEQ 6$ ;IF SO CONTINUE
946
947 023054 ERRDF 37.,EM42,ERR4
023054 104455 TRAP C$ERDF
023056 000045 .WORD 37
023060 010047 .WORD EM42
023062 012372 .WORD ERR4
948 023064 6$:
949
950 023064 ENDTST ;****END OF TEST****
023064

023064 104401 L10060: TRAP C$ETST

951
952
953 .SBTTL **TEST 33** - CHECK CONSECUTIVE HEADERS
954
955 023066 BGNTST ;****START OF TEST****
956
957
958 023066 STARS
;*****
;CHECK THAT THE HEADERS AKE CONSECUTIVE. WE WILL DO
;40 (FORTY) READ HEADERS AND STORE EACH. AFTER WE HAVE
;READ THE FORTIETH HEADER WE WILL VERIFY THAT
;THEY CA
;THAT THERE WERE NO ERRORS.
959 STARS
960 ;*****
961
962 MF IN SEQUENTIAL, THAT 0 FOLLOWS 39.
963
964 023066
965
966
  
```

E /

967	023066	005037	002366		CLR	FIRST		;CLEAR FIRST READ DONE FLAG	
968	023072	012703	005274		MOV	#HDRBUF,R3		;STORE HEADERS	
969	023076	012701	000050		MOV	#40,R1		;FORTY HEADERS	
970	023102	012737	000210	002272	MOV	#RDHDR!CRDY,B.CS			
971	023110	053737	002270	002272	BIS	DRIVE,B.CS			
972	023116	013777	002272	157124	MOV	B.CS,@RLCS			
973	023124	042777	000200	157116	2\$: BIC	#200,@RLCS			
974	023132	032777	000200	157110	1\$: BIT	#200,@RLCS		;DONE?	
975	023140	001774			BEQ	1\$			
976	023142	017723	157102		MOV	@RLCS,(R3)+			
977	023146	017723	157104		MOV	@RLMP,(R3)+			
978	023152	017723							
	157100				MOV	@RLMP,(R3)+			
979	023156	017723	157074		MOV	@RLMP,(R3)+			
980	023162	005301			DEC	R1		;HAVE WE READ FORTY HEADERS	
981	023164	001357			BNE	2\$;GO BACK UNTIL FOURTY DONE	
982	023166	012703	005274		MOV	#HDRBUF,R3		;GET LIST OF HEADERS	
983	023172	012701	000050		MOV	#40,R1		;CHECK FORTY OF THEM	
984	023176	011337	002306		MOV	(R3),E.CS			
985	023202	005737	002306		TST	E.CS			
986	023206	100016			BPL	99\$			
987	023210	012737	006312	015450	MOV				
*RHDMS, RESTMS									
988	023216	005723			TST	(R3)+			
989	023220	012337	002314		MOV	(R3)+,E.MP			
990	023224	012337	002316		MOV	(R3)+,E.MP1			
991	023230	012337	002320		MOV	(R3)+,E.MP2			
992	023234	004537	015166		JSR	R5,CHERR		;CHECK CONTROLLER FOR ERRORS	
993	023240	000137	023402		JMP	7\$			
994	023244	005723			99\$: TST	(R3)+			
995	023246	011337	002364		MOV	(R3),BDDAT		;GET HEADER	
996	023252	005737	002366		TST	FIRST		;IS THIS FIRST READ?	
997	023256	001007							
	BNE	4\$							
998	023260	012737	000001	002366				;NO, BRANCH	
999	023266	013737	002364	002362	3\$: MOV	#1,FIRST		;SET FIRST READ DONE FLAG	
1000	023274	000435			MOV	BDDAT,GDDAT		;SET UP NEXT READ EXPECTED	
1001	023276	005237	002362		BR	6\$;GO SEE IF TEST IS DONE	
1002	023302	023737	002364	002362	4\$: INC	GDDAT		;INCREMENT EXP'D HEADER	
1003	023310	001766			CMP	SDDAT,GDDAT		;IS NEW HEADER SEQUENTIAL?	
1004	023312	033737	002334	002364	BEQ	3\$;YES THEN BRANCH	
; IS NEW HEADER ZERO?									
1005	023320	001015			BIT	SECMSK,BDDAT			
1006	023322	013737	002362	002346	BNE	5\$;NO, THEN ERROR GO REPORT IT	
1007	023330	043737	002370	002346	MOV	GDDAT,TEMP2		;YES, CHECK IF LAST HEADER WAS	
1008	023336	023737	002372	002346	BIC	CYLSK,TEMP2		;MAX ADDRESS, IF SO BRANCH	
1009	023344	001750			CMP	MXSEC1,TEMP2		;STORE NEW DATA AS OLD	
1010	023346	043737	002334	002362	BEQ	3\$;AND PERFORM NEW RD HDR	
1011					BIC	SECMSK,GDDAT		;EXPECTING ZERO SECTOR	
1012	023354								
1013					5\$:				
1014	023354	005037	002366		CLR	FIRST		;ERROR WILL MAKE US MISS	
1015								;NEXT SECTOR SEQUENTIALLY	
1016								;START OVER; CLEAR FIRST FLAG	
1017	023360				ERRDF	38,EM43,ERR2			
	023360	104455			TRAP	C#ERRDF			
	023362	000046			.WORD	38			
	023364	010105			.WORD	EM43			
	023366	012256			.WORD	ERR2			
1018	023370				6\$: CKLOOP				
	023370	104406			TRAP	C#CLP1		;CHECK IF /FL:LOE IS SET	

SEQ 0083

TEST 33 - CHECK CONSECUTIVE HEADERS

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1019
1020 023372 062703 000006          ADD    #6,R3
1021 023376 005301                DEC    R1          ;HAVE WE DONE THIS ENOUGH
1022 023400 001321                BNE   99$         ;NO, GO BACK DO IT AGAIN
1023 023402
1024 023402          7$:          ;*****END OF TEST*****
      023402          ENDTST
      023402 104401          L10061:
                                TRAP   C$ETST

1025
1026
1027          .SBTTL  **TEST 34** - SEEK FUNCTION
1028
1029 023404          BGNTST          ;*****START OF TEST*****

1030 023404          STARS
      ;*****
      ;CHECK THE SEEK FUNCTION RETURNS CONTROLLER READY
      ;WITH NO ERRORS WE ISSUE A ONE TRACK IN WORD SEEK.
      ;WE DO NOT CHECK THE RESULT FOR POSITION
1031          STARS
1032          ;*****
1033
1034 023404

1035
1036
1037 023404 012777 000205 156642          MOV    #BIT7!MK!SIGN,@RLDA ;SET UP DA-DIFF=1,MARKER,TOWARDS
1038 023412 00          JSR    R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
4537 015466
1039 023416 000006          SEEK          ;SEEK
1040 023420 004537 016354          JSR    R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
1041 023424 012737 000010 002414          MOV    #8.,DLYCNT ;INITIALIZE DELAY COUNT
1042 023432          WAIT1: DELAY 250. ;IMPLEMENT TIME DELAY
      023432 012727 000372          MOV    #250.,(PC)+
      023436 000000          .WORD 0
      023440 013727 002116          MOV    L$DLY,(PC)+
      023444 000000          .WORD 0
      023446 005367 177772          DEC    -6(PC)
      023452
      001375          BNE   .-4
      023454 005367 177756          DEC    -22(PC)
      023460 001367          BNE   .-20
1043 023462 005337 002414          DEC    DLYCNT ;DECREMENT DELAY COUNT
1044 023466 001361          BNE   WAIT1 ;BRANCH IF DELAY NOT EXPIRED
1045 023470          2$:          CKLOOP ;CHECK IF /FL:LOE IS SET
      023470 104406          TRAP  C$CLP1
1046 023472 004537 015166          JSR    R5,CHERR ;CHECK CONTROLLER FOR ERRORS
1047
1048 023476          ENDTST          ;*****END OF TEST*****
      023476          L10062:
      023476 104401          TRAP   C$ETST

1049

```

```

1050
1051          .SBTTL  **TEST 35** - CHECK DRIVE READY ON SEEK
1052
1053 023500          BGNTST          ;*****START OF TEST*****

1054
1055
1056 023500          STARS
      ;*****
      ;CHECK THE SEEK FUNCTION RETURNS DRIVE READY WITH
      ;NO ERRORS. WE ISSUE A ONE TRACK INWARD SEEK. WE DO
1057          ;NOT CHECK THE RESULT FOR POSITION
1058
1059

```

SEQ 0084

TEST 35 - CHECK DRIVE READY ON SEEK

```

1060 023500          STARS
;*****
1061
1062
1063
1064 023500 012777 000201 156546      MOV   #BIT7!MK,@RLDA ;SET DA, MARKER, DIFF=1.
1065 023506 004537 015466              JSR   R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
1066 023512 000006                      SEEK
1067 023514 004537 016354              JSR   R5,WTCRDY     ;WAIT FOR CONTROLLER READY HIGH
1068 023520
                                CKLOOP
                                ;CHECK IF /FL:LOE IS SET
                                C#CLP1
1069 023520 104406                      TRAP
1070 023522 004537 015166              JSR   R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
1071 023526 023526 104406              CKLOOP
                                ;CHECK IF /FL:LOE IS SET
                                TRAP   C#CLP1
1072
1073 023530 004537 016266              JSR   R5,WTCRDY     ;WAIT FOR DRIVE READY
1074 023534 023534 104406              CKLOOP
                                ;CHECK IF /FL:LOE IS SET
                                TRAP   C#CLP1
1075
1076 023536 004537 015166              JSR   R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
1077
1078 023          ENDTST
542 023542          L10063:          ;****END OF TEST****
023542 104401      TRAP   C#ETST
1079
1080
1081          .SBTTL **TEST 36** - SEEK FUNCTION INTERRUPT
1082
1083 023544      BGNTST          ;****START OF TEST****
1084
1085
1086 023544      STARS
;*****
;CHECK THAT CONTROLLER READY RESETTING WHEN THE SEEK IS
;INITIATED CAUSES AN INTERRUPT BUT DRIVE READY WILL
;NOT. WE ALSO MONITOR
1087
1088
1089          FOR ANY ERROR BITS SETTING.
1090 023544      STARS
;*****
1091
1092
1093
1094
1095 023544 005037 002330              CLR   INTFLG
1096 023550          SETPRI  #PRI00          ;SET PSW TO 0
023550 012700 000000              MOV   #PRI00,R0
023554 1044          TRAP   C#SPRI
1097 023556 012777 000205 156470      MOV   #BIT7!MK!SIGN,@RLDA ;SET UP RLDA
1098 023564 004537 015466              JSR   R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
1099 023570 000106
                                ;SEEK AND INTR. ENA.
                                JSR   R5,WTCRDY     ;WAIT FOR CONTROLLER READY HIGH
1100 023572 004537 016354              NOP
1101 023576 000240
1102 023600 005737 002330              TST  INTFLG          ;DID INTERRUPT OCCUR
1103 023604 001004          BNE  2$              ;YES, GO CHECK DRDY
1104 023606          ERRDF  40.,EM47,ERRO
                                TRAP   C#ERDF
                                .WORD  40
023606 104455
023610 000050

```

TEST 36 SEEK FUNCTION INTERRUPT

```

1105 023612 010325 .WORD EM47
      023614 012226 .WORD ERRO
      023616 104406 2$: CKLOOP C$CLP1 ;CHECK IF /FL:LOE IS SET
      023616 104406 TRAP
1106
1107
1108 023620 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
1109 023624 104406 023624 CKLOOP C$CLP1 ;CHECK IF /FL:LOE IS SET
      023624 104406 TRAP
1110
1111 023626 005037 002330 CLR INTFLG ;CLEAR INTERRUPT OCCURANCE
1112
1113
1114 023632 004537 016266 JSR R5
.WTDRDY ;WAIT FOR DRIVE READY
1115 023636 104406 023636 5$: CKLOOP C$CLP1 ;CHECK IF /FL:LOE IS SET
      023636 104406 TRAP
1116
1117 023640 012700 000340 SETPRI #PRI07
      023640 104441 023644 MOV #PRI07,RO
      023646 005737 002330 TRAP C$SPRI
1118 023652 001404 023652 TST INTFLG ;DID DRIVE READY CAUSE INTERRUPT
1119 023652 001404 BEQ 6$ ;NO. CONTINUE
1120
1121 023654 ERRDF 42.,EM52,ERRO
      023654 104455 TRAP C$ERDF
      023656 000052 .WORD 42
      023660 010356 .WORD EM52
      023662
      012226
1122 023664 104406 023664 6$: .WORD ERRO C$CLP1 ;CHECK IF /FL:LOE IS SET
      023664 104406 TRAP
1123
1124 023666 ENDTST ;****END OF TEST****
      023666 L10064: TRAP C$ETST
      023666 104401
1125
1126
1127 .SBTTL **TEST 37** - TEST DIFFERENCE WORD TRANSMISSION
1128
1129 023670 BGNTST ;****START OF TEST****
1130
1131
1132
1133
1134 023670 STARS
      ;:*****
1135
      ;VERIFY THAT THE DIFFERENCE WORD LOADS AND IS
1136 ;TRANSMITTED CORRECTLY. WE WILL ISSUE SEEKS WITH THE
1137 ;DIFFERENCE WORD CONTAINING ALL OF THE BIT PATTERNS FLOATING 1.
1138 ;GROWING 1, GROWING 0 AND SHITING 0. THE SEEK WILL
1139 ;START FROM TRACK 0 EACH TIME AND WILL RETURN THERE
1140 ;EACH, THUS BOTH DIRECTIONS FOR PATTERNS WILL BE CHECKED.
1141 ;READ HEADERS ARE USED TO VERIFY THE SEEK CORRECTNESS.
1142 ;ERRORS ARE MONITORED AND REPORTED.
1143 023670 STARS
      ;:*****
1144
1145

```

17

1146	023670	012703	004626		MOV	#SKLST,R3		;GET LIST OF DIFFERENCE WORDS
1147	023674			BGNSEG				;****START OF SEGMENT****
	023674	104404			TRAP	C#BSEG		
1148	023676						1\$:	
1149	023676	004537						
015466				JSR	RS,LDFUNC			;ISSUE FUNCTION OF FOLLOWING WORD
1150	023702	000010			RDHDR			;READ HEADER
1151	023704	004537	016354		JSR	RS,WTCRDY		;WAIT FOR CONTROLLER READY HIGH
1152	023710			98\$:	CKLCOP			;CHECK IF /FL:LOE IS SET
	023710	104406			TRAP	C#CLP1		
1153								
1154	023712	004537	015166		JSR	RS,CHERR		;CHECK CONTROLLER FOR ERRORS
1155	023716				CKLOOP			;CHECK IF /FL:LOE IS SET
	023716	104406			TRAP	C#CLP1		
1156								
1157	023720	013737	002314	002364	MOV	E.MP,BDDAT		
1158	023726	043737	002334	002364	BIC	SECMSK,BDDAT		;CLEAR OUT SECTOR
1159	023734	001462			BEQ	99\$;IF ON TRACK ZERO, H.S. ZERO, OK
1160								
1161								
1162								
1163								
1164	023736	042737	000100	002364	BIC	#RHHS,BDDAT		;CLEAR OUT HEAD SELECT
1165	023744	013777	002364	156302	MOV	BDDAT,#RLDA		;PUT CYLINDER AS DIFFERENCE WORD
1166	023752	052777	000001	156274	BIS	#MK,#RLDA		;SET MARKER BI
1167	023760	004537	015466		JSR	RS,LDFUNC		;ISSUE FUNCTION OF FOLLOWING WORD
1168	023764	000006			SEEK			;SEEK
1169	023766	004537	016354		JSR	RS,WTCRDY		;WAIT FOR CONTROLLER READY HIGH
1170	023772				CKLOOP			;CHECK IF /FL:LOE IS SET
	023772	104406			TRAP	C#CLP1		
1171								
1172	023774	004537	015166		JSR	RS,CHERR		;CHECK CONTROLLER FOR ERRORS
1173	024000				CKLOOP			;CHECK IF /FL:LOE IS SET
	024000	104406			TRAP	C#CLP1		
1174								
1175	024002	004537	016266		JSR	RS,W		
1176	024006				89\$:	CKLOOP		;CHECK IF /FL:LOE IS SET
	024006	104406			TRAP	C#CLP1		
1177								
1178	024010	004537	015166		JSR	RS,CHERR		;CHECK CONTROLLER FOR ERRORS
1179	024014				CKLOOP			;CHECK IF /FL:LOE IS SET
	024014	104406			TRAP	C#CLP1		
1180								
1181	024016	004537	015466		JSR	RS,LDFUNC		;ISSUE FUNCTION OF FOLLOWING WORD
1182	024022	000010			RDHDR			;READ HEADER
1183	024024	004537	016354		JSR	RS,WTCRDY		;WAIT FOR CONTROLLER READY HIGH
1184	024030				96\$:	CKLOOP		;CHECK IF /FL:LOE IS SET
	024030	104406			TRAP	C#CLP1		
1185								
1186	024032	004537	015166		JSR	RS,CHERR		;CHECK CONTROLLER FOR ERRORS
1187	024036				CKLOOP			;CHECK IF /FL:LOE IS SET
	024036	104406			TRAP	C#CLP1		
1188								
1189	024040	005037	002362		CLR	GDDAT		;CLEAR EXPECTED
1190	024044	013737	002364	002376	MOV	BDDAT,DWORD		;SAVE DIFFERENCE WORD
1191	024052	013737	002314	002364	MOV	E.MP,CDDAT		;READ HEADER
1192	024060	043737	002334	00236				
					BIC	SECMSK,BDDAT		;MASK OUT SECTOR BITS
1193	024066	001404			BEQ	5\$;BRANCH IF ON ZERO TRACK

4

J7

1194									
1195	024070					ERRDF	43	EM54,ERR3	
	024070	104455				TRAP	C#ERDF		
	024072	000053				.WORD	43		
	024074	010426				.WORD	EM54		
	024076	012320				.WORD	ERR3		
1196	024100				5\$:	CKLOOP			;CHECK IF /FL:LOE IS
SET									
	024100	104406				TRAP	C#CLP1		
1197									
1198	024102	011377	156146		99\$:	MOV	(R3),@RLDA		;GET DIFFERENCE WORD
1199	024106	052777	000005	156140		BIS	#SIGN!MK,@RLDA		;SET SIGN (TOWARDS SPINDLE) AND MARKER
1200	024114	004537	015466			JSR	R5,LDFUNC		;ISSUE FUNCTION OF FOLLOWING WORD
1201	024120	000006				SEEK			;SEEK
1202	024122	004537	016354			JSR	R5,WTCRDY		;WAIT FOR CONTROLLER READY HIGH
1203	024126					CKLOOP			;CHECK IF /FL:LOE IS SET
	024126	104406				TRAP	C#CLP1		
1									
204									
1205	024130	004537	015166			JSR	R5,CHERR		;CHECK CONTROLLER FOR ERRORS
1206	024134					CKLOOP			;CHECK IF /FL:LOE IS SET
	024134	104406				TRAP	C#CLP1		
1207									
1208	024136	004537	016266			JSR	R5,WTCRDY		;WAIT FOR DRIVE READY
1209	024142				87\$:	CKLOOP			;CHECK IF /FL:LOE IS SET
	024142	104406				TRAP	C#CLP1		
1210									
1211	024144	004537	015166			JSR	R5,CHERR		;CHECK CONTROLLER FOR ERRORS
1212	024150					CKLOOP			;CHECK IF /FL:LOE IS SET
	024150	104406				TRAP	C#CLP1		
12									
13									
1214	024152	004537	015466			JSR	R5,LDFUNC		;ISSUE FUNCTION OF FOLLOWING WORD
1215	024156	000010				RDHDR			;READ HEADER
1216									
1217	024160	004537	016354			JSR	R5,WTCRDY		;WAIT FOR CONTROLLER READY HIGH
1218	024164					CKLOOP			;CHECK IF /FL:LOE IS SET
	024164	104406				TRAP	C#CLP1		
1219									
1220	024166	004537	015166			JSR	R5,CHERR		;CHECK CONTROLLER FOR ERRORS
1221	024172					ESCAPE	SEG		;IF /FL:LOE SET LOOP, ELSE EXIT SEG
	024172	104410				TRAP	C#ESCAPE		
	024174	000106							
						.WORD	10000\$-		
1222									
1223	024176	011337	002362			MOV	(R3),GDDAT		;GET EXPECTED CYLINDER
1224	024202	011337	002376		8\$:	MOV	(R3),DWORD		;SET UP DIFFERENCE FOR SEEK
1225	024206	013737	002314	002364		MOV	E.MP,BDDAT		;READ HEADER FROM RLMP
1226	024214	043737	002334	002364		BIC	SECMSK,BDDAT		;CLEAR OUT SECTOR BITS
1227	024222	023737	002362	002364		CMP	GDDAT,BDDAT		;DID SEEK GO TO THE RIGHT
1228	024230	001404				BEQ	9\$;TRACK, IF SO, GO GET NEXT
1229									
1230	024232								
	ERRDF	44	EM54,ERR3						
	024232	104455				TRAP	C#ERDF		
	024234	000054				.WORD	44		
	024236	010426				.WORD	EM54		
	024240	012320				.WORD	ERR3		
1231	024242				9\$:	CKLOOP			;CHECK IF /FL:LOE IS SET
	024242	104406				TRAP	C#CLP1		
1232									
1233	024244	005723				TST	(R3)+		;BUMP PATTERN


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1234 024246 023727 002406 0
00001 00001 CMP T.DRIVE,#1
1235 024254 001005
1236 024256 020327 004726 BNE 2#
1237 024262 001407 CMP R3,#SKEND
1238 024264 000137 023676 BEQ 10#
1239 JMP 1#
1240 024270 020327 004770 2#: CMP R3,#SKEEND
1241 024274 001402 BEQ 10#
1242 024276 000137 023676 JMP 1#
1243
1244 024302 10#:
1245
1246 024302 ENDSEG ;****END OF SEGMENT****
024302 10000#:
024302 104405 TRAP C#ESEG
1247 024304 ENDTST ;****END OF TEST**
**
024304 L10065:
024304 104401 TRAP C#ETST
1248
1249
1250 .SBTTL **TEST 38** - VERIFY HEAD SELECT 0 VIA RD HDR
1251 BGNTST ;****START OF TEST****
1252 024306
1253
1254 ;
1255 STARS
1256 024306 ;*****
1257 ;CHECK THAT WE CAN SELECT HEAD SELECT ZERO. ISSUE
1258 ;SEEK TO HEAD SELECT 0 AND VERIFY WITH READ HEADER.
1259 024306 STARS
;*****
*****
1260
1261 024306 012777 000001 155740 99#: MOV #MK, @RLDA ;SET MARKER IN RLDA
1262 024314 005037 002362 CLR GDDAT ;SET EXPECTED
1263 ;LOAD HS=0 INTO RLDA
1264 024320 2#:
1265 024320 004537 015466 JSR R5, LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
1266 024324 000006 SEEK ;SEEK
1267 024326 004537 016354 JSR R5, WTCRDY ;WAIT FOR CONTROLLER READY HIGH
1268 024332 CKLOOP ;CHECK IF /FL:LOE IS SET
02
4332 104406 TRAP C#CLP1
1269
1270 024334 004537 015166 JSR R5, CHERR ;CHECK CONTROLLER FOR ERRORS
1271 024340 CKLOOP ;CHECK IF /FL:LOE IS SET
024340 104406 TRAP C#CLP1
1272
1273 024342 004537 016266 JSR R5, WTDROY ;WAIT FOR DRIVE READY
1274 024346 89#: CKLOOP ;CHECK IF /FL:LOE IS SET
024346 104406 TRAP C#CLP1
1275
1276 024350 004537 015166 JSR R5, CHERR ;CHECK CONTROLLER FOR ERRORS
1277 024354 CKLOOP ;CHECK IF /FL:LOE IS SET
024
354 104406 TRAP C#CLP1
1278
1279 024356 004537 015466 JSR R5, LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
1280 024362 000010 RDHDR ;READ HEADER
  
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L7

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1281 024364 004537 016354          JSR      R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
1282 024370 104406          96$:   CKLOOP      ;CHECK IF /FL:LOE IS SET
      024370          TRAP
C#CLP1
1283
1284 024372 004537 015166          JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
1285 024376 104410          ESCAPE   TST           ;IF /FL:LOE SET LOOP, ELSE EXIT TST
      024376 104400          TRAP     C#ESCAPE
      024400 000036          .WORD   L10066-.
1286
1287 024402 013737 002314 002364      MOV      E.MP,BDDAT    ;READ HEADER FOR HEAD SELECT
1288 024410 042737 177677 002364      BIC     #177677,BDDAT ;MASK ONLY HEAD SELECT
1289 024416 023737 002362 002364      CMP     GDDAT,BDDAT   ;COMPARE HEAD SELECTS
1290 024424 001404          B
      5$          ;IF EQUAL CONTINUE
EQ
1291
1292 024426          ERRDF    45.,EM55,ERR4
      024426 104455          TRAP   C#ERDF
      024430 000055          .WORD  45
      024432 010465          .WORD  EM55
      024434 012372          .WORD  ERR4
1293 024436          5$:
1294
1295 024436          ENDTST
      024436 104401          L10066: TRAP   C#ETST
      024436          ;****END OF TEST****
1296
1297
1298          .SBTTL  **TEST 39** - VERIFY HEAD SELECT 1 VIA RD HDR
1299
1300 024440          BGNTST
      1301          ;****START OF TEST****
      1302
      1303 024440          STARS
1304
1305          ;:*****
1306 024440          ;CHECK THAT WE CAN SELECT HEAD SELECT ONE. ISSUE
          ;SEEK TO HEAD SELECT 1 AND VERIFY WITH READ HEADER.
          STARS
          ;:*****
1307
1308
1309 024440 012777 000001 155606      99$:   MOV      #MK,@RLDA  ;SET MARKER IN RLDA
1310 024446 052777 000020 155600      BIS     #DAHS,@RLDA   ;LOAD HS=1 INTO RLDA
1311 024454 004537 015466          ;ISSUE FUNCTION OF FOLLOWING WORD
      2$:   JSR      R5,LDFUNC
1312 024460 000006          SEEK
1313 024462 004537 016354          JSR      R5,WTCRDY    ;WAIT FOR CONTROLLER READY HIGH
1314 024466 104406          CKLOOP   ;CHECK IF /FL:LOE IS SET
      024466          TRAP     C#CLP1
1315
1316 024470 004537 015166          JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
1317 024474 104406          CKLOOP   ;CHECK IF /FL:LOE IS SET
      024474          TRAP     C#CLP1
1318
1319 024476 004537 016266          JSR      R5,WTCRDY    ;WAIT FOR DRIVE CLEAR
1320 024502 104406          89$:   CKLOOP      ;CHECK IF /FL:LOE IS SET
      024502          TRAP   C#CLP1
1321
1322 024504 004537 015166          JSR      R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
1323 024510          CKLOOP   ;CHECK IF /FL:LOE IS SET
  
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M7

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1324 024510 104406 TRAP C#CLP1
1325 024512 004537 015466 JSR R5,LDFUNC ;ISSUE FUNCTIO
N OF FOLLOWING WORD
1326 024516 000010 RDHDR ;READ HEADER
1327 024520 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
1328 024524 104406 CKLOOP ;CHECK IF /FL:LOE IS SET
024524 104406 TRAP C#CLP1
1329
1330 024526 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
1331 024532 104410 ESCAPE TST ;IF /FL:LOE SET LOOP, ELSE EXIT TST
024532 104410 TRAP C#ESCAPE
024534 000044 .WORD L10067
1332
1333 024536 013737 002314 002364 MOV E.
MP,BDDAT ;READ HEADER
1334 024544 042737 177677 002364 BIC #177677,BDDAT ;MASK FOR H.S.
1335 024552 012737 000100 002362 MOV #RHMS,GDDAT ;SET EXPECTED
1336 024560 023737 002362 002364 CMP GDDAT,BDDAT ;CORRECT HEAD
1337 024566 001404 BEQ 5# ;YES, CONTINUE
1338
1339 024570 ERRDF 46,EM55,ERR4
024570 104455 TRAP C#ERDF
024572 000056 .WORD 46
024574 010465 .WORD EM55
024576 012372 .WORD ERR4
1340 024600 5#
1341
1342 024600 E
NOTST ;*****END OF TEST*****
024600 L10067:
024600 104401 TRAP C#ETST
1343
1344
1345 .SBTTL **TEST 40** - VERIFY HEAD SELECT 0 VIA GET STATUS
1346
1347 024602 BGNTST ;*****START OF TEST*****
1348
1349 024602 STARS
1350 ;*****
1351 ;CHECK THAT WE CAN READ BACK HEAD SELECT 0 WITH
1352 ;A GET STATUS FUNCTION. SELECT H.S. 0 WITH A SEEK
1353 0246 STARS
02 ;*****
1354
1355 024602 012777 000001 155444 MOV #MK,@RLDA ;SET MARKER IN RLDA
1356 ;LOAD HS=0 INTO RLDA
1357 024610 005037 002362 2# CLR GDDAT ;SET UP EXP'D
1358 024614 004537 015466 3# JSR R5,LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
1359 024620 000006 SEEK ;SEEK
1360 024622 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
1361 024626 CKLOOP ;CHECK IF
/FL:LOE IS SET
024626 104406 TRAP C#CLP1
1362
1363 024630 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
1364 024634 104406 CKLOOP ;CHECK IF /FL:LOE IS SET
024634 104406 TRAP C#CLP1
1365
1366 024636 004537 016266 JSR R5,WTCRDY ;WAIT FOR DRIVE READY
  
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1367 024642          CKLOOP
      ;CHECK IF /FL:LOE IS SET
      024642 104406      TRAP  C#CLP1
1368
1369 024644 004537 015166 JSR  R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
1370 024650          CKLOOP      ;CHECK IF /FL:LOE IS SET
      024650 104406      TRAP  C#CLP1
1371
1372 024652 012777 000003 155374 MOV  #GSBIT!MK,@RLDA ;SET UP FOR GET STATUS IN DA
1373 024660 004537 015466 JSR  R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
1374 024664 000004          GSTAT      ;GET STATUS
1375 024666 004537 016354 JSR  R5,WTCRDY      ;WAIT F
OR CONTROLLER READY HIGH
1376 024672          CKLOOP      ;CHECK IF /FL:LOE IS SET
      024672 104406      TRAP  C#CLP1
1377
1378 024674 004537 015166 JSR  R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
1379 024700          ESCAPE      ;IF /FL:LOE SET LOOP, ELSE EXIT TST
      024700 104410      TRAP  C#ESCAPE
      024702 000036      .WORD  L10070-.
1380
1381 024704 013737 002314 002364 MOV  .MP,BDDAT      ;READ STATUS FOR HEAD SELECT BIT
1382 024712 042737 177677 002364 BIC  #177677,BDDAT ;LEAVE ONLY H.S. BIT
1383 024720 023737 002362 002364 CMP  GDDAT,BDDAT    ;IS HEAD SELECT CORRECT?
1384 024726 001404          BEQ  6$      ;YES, CONTINUE
1385
1386 024730          ERRDF      47.,EM56,ERR4
      024730 104455      TRAP  C#ERDF
      024732 000057      .WORD  47
      024734 010520      .WORD  EM56
      024736 012372      .WORD  ERR4
1387 024740          6$:
1388
1389 024740          ENDTST      ;****END OF TEST****
      024740          L10070:
      024740 104401      TRAP  C#ETST
1390
1391
1392          .SBTTL  **TEST 41** - VERIFY HEAD SELECT 1 VI
A GET STATUS
1393
1394 024742          BGNTST      ;****START OF TEST****
1395
1396 024742          STARS
      ;*****
      ;CHECK THAT WE CAN READ BACK HEAD SELECT 1 WITH A GET
      ;STATUS FUNCTION. SELECT H.S. 1 WITH A SEEK AND VERIFY WITH
      ;GET STATUS
      STARS
      ;*****
1397
1398
1399
1400 024742
1401
1402
1403 024742 012777 000001 155304 MOV  #MK,@
RLDA ;SET MARKER IN RLDA
1404 024750 052777 000020 155276 BIS  #DAHS,@RLDA    ;LOAD HS=1 INTO RLDA
1405 024756 012737 000100 002362 2$: MOV  #STHS,GDDAT    ;SET UP EXP'D
1406 024764 004537 015466 3$: JSR  R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
1407 024770 000006          SEEK      ;SEEK
1408 024772 004537 016354 JSR  R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
1409 024776          CKLOOP      ;CHECK IF /FL:LOE IS SET
      024776 104406      TRAP  C#CLP1

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1410
1411 025000 004537 015166      JSR    R5,CHERR      ;CHECK CONTROLLER FOR ERRORS
1412 025004 104406             CKLOOP              ;CHECK IF /FL:LOE IS SET
                             TRAP    C#CLP1
1413
1414 025006 004537 016266      JSR    R5,WTRDY     ;WAIT FOR DRIVE READY
1415 025012 104406             CKLOOP              ;CHECK IF /FL:LOE IS SET
                             TRAP    C#CLP1
1416
1417 025014 004537             JSR    R5,CHERR     ;CHECK CONTROLLER FOR ERRORS
015166                             CKLOOP              ;CHECK IF /FL:LOE IS SET
1418 025020 104406             TRAP    C#CLP1
                             .WORD
1419
1420 025022 012777 000003 155224  MOV    #GSBIT!MK, @RLDA ;SET UP FOR GET STATUS IN DA
1421 025030 004537 015466      JSR    R5,LDFUNC    ;ISSUE FUNCTION OF FOLLOWING WORD
1422 025034 000004             GSTAT              ;GET STATUS
1423 025036 004537 016354      JSR    R5,WTRDY     ;WAIT FOR CONTROLLER READY HIGH
1424 025042             ESCAPE    TST        ;IF /FL:LOE SET LOOP, ELSE EXIT TS
                             .WORD
                             .WORD
1425
1426 025046 004537 015166      JSR    R5,CHERR     ;CHECK CONTROLLER FOR ERRORS
1427 025052             ESCAPE    TST        ;IF /FL:LOE SET LOOP, ELSE EXIT TST
                             TRAP    C#ESCAPE
                             .WORD    L10071-.
1428
1429 025056 013737 002314 002364  MOV    E.MP,BDDAT   ;READ STATUS FOR HEAD SELECT BIT
1430 025064 042737 177677 002364  BIC    #177677,BDDAT ;LEAVE ONLY H.S. BIT
1431 025072 023737 002362 002364  CMP    GDDAT,BDDAT  ;IS HEAD SELECT CORRECT?
1432 025100 001404             BEQ     6$          ;YES, CONTINUE
1433
1434 025102             ERRDF    48.,EM56,ERR4
                             TRAP    C#ERDF
                             .WORD    48
                             .WORD    EM56
                             .WORD    ERR4
1435 025112             6$:
1436
1437 025112             ENDTST
                             L10071: ;****END OF TEST****
                             TRAP    C#ETST
1438
1439
1440             .SBTTL **TEST 42** - TEST TIME AT WHICH DIF WD GETS TRANSMITTED
1441
1442 02             BGNTST ;****START OF TEST****
5114
1443
1444
1445 025114             STARS
                             ;*****
1446             ;VERIFY THAT THE DIFFERENCE WORD ON A SEEK IS
1447             ;TRANSMITTED PRIOR TO CONTROLLER READY SETTING. THIS
1448             ;IS DONE BY SETTING A KNOWN DIFFERENCE WORD IN
1449             ;THE RLDA ISSUING A A SEEK, WAITING FOR CONTROLLER READY
1450             ;(BUT NOT DRIVE READY), WRITING A DIFFERENT RLDA AND WAITING
1451             ;FOR DRIVE RE
ADY: THE RESULTANT POSITION SHOULD BE THAT
1452             ;OF THE FIRST RLDA ONLY.

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C8

1453 025114					STARS		:*****	
	1454							
	1455							
	1456	025114	004537	015466	JSR	R5, LDFUNC		:ISSUE FUNCTION OF FOLLOWING WORD
	1457	025120	000010		RDHDR			:REA
D	1458	025122	004537	016354	JSR	R5, WTCRDY		:WAIT FOR CONTROLLER READY HIGH
	1459	025126			99\$: CKLOOP			:CHECK IF /FL:LOE IS SET
		025126	104406		TRAP	C\$CLP1		
	1460							
	1461	025130	004537	015166	JSR	R5, CHERR		:CHECK CONTROLLER FOR ERRORS
	1462	025134			CKLOOP			:CHECK IF /FL:LOE IS SET
		025134	104406		TRAP	C\$CLP1		
	1463							
	1464	025136	013737	002314	MOV	E.MP, GDDAT		:READ HEADER
	1465	025144	043737	002334	BIC	SECMK, GDDAT		:CLEAR SECTOR BITS
	146							
6		025152	012777	000001	MOV	#MK, @RLDA		:SET MARKER IN RLDA
	1467	025160	032737	000100	BIT	#RHHS, GDDAT		:TEST H.S.
	1468	025166	001403		BEQ	2\$:IF ZERO, CONTINUE
	1469	025170	052777	000020	BIS	#DAHS, @RLDA		:ONE, SET SO WE WILL REMAIN THERE
	1470	025176	013737	002362	2\$: MOV	GDDAT, TmpU		:STORE HEADER
	1471	025204	042737	000100	BIC	#RHHS, TmpO		:CLEAR H.S. FROM STORED WORD
	1472	025212	023727	002406	CMP	T.DRIVE, #1		
	1473	025220	0					
01034					BNE		12\$	
	1474	025222	023737	002354	CMP	TmpO, HALMAX		
	1475	025230	101007		BHI	3\$		
	1476	025232	052777	000004	BIS	#SIGN, @RLDA		
	1477	025240	063737	004702	ADD	QUAMAX, GDDAT		
	1478	025246	000403		BR	4\$		
	1479	025250	163737	004702	3\$: SUB	QUAMAX, GDDAT		
	1480	025256	053777	004702	4\$: BIS	QUAMAX, @RLDA		
	1481	025264	012737	000001	MOV	#MK, Tmp1		
	1482	025272	032777	000020	BIT	#DAHS, @RLDA		
	1483	025300	001037					
					BNE		5\$	
	1484	025302	052737	000020	BIS	#DAHS, Tmp1		
	1485	025310	000433	002356	BR	5\$		
	1486	025312	023737	002354	12\$: CMP	TmpO, HMAX		
	1487	025320	101007		BHI	13\$		
	1488	025322	052777	000004	BIS	#SIGN, @RLDA		
	1489	025330	063737	004732	ADD	QMAX, GDDAT		
	1490	025336	000403		BR	14\$		
	1491	025340	163737	004732	13\$: SUB	QMAX, GDDAT		
	1492	025346	053777	004732	14\$: BIS	QMAX, @RLDA		
	1493	025354	012737	000001	MOV	#MK, T		
MP1								
	1494	025362	032777	000020	BIT	#DAHS, @RLDA		
	1495	025370	001003	154664	BNE	5\$		
	1496	025372	052737	000020	BIS	#DAHS, Tmp1		
	1497	025400	004537	015466	5\$: JSR	R5, LDFUNC		:ISSUE FUNCTION OF FOLLOWING WORD
	1498	025404	000006		SEEK			:SEEK
	1499	025406	004537	016354	JSR	R5, WTCRDY		:WAIT FOR CONTRCLLER READY HIGH
	1500	025412			CKLOOP			:CHECK IF /FL:LOE IS SET
		025412	104406		TRAP	C\$CLP1		
	1501							
	1502							
K	1503	025414	004537	015166	JSR	R5, CHERR		:CHEC
	1504	025420			CKLOOP			:CHECK IF /FL:LOE IS SET
		025420	104406		TRAP	C\$CLP1		

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1505
1506 025422 013777 002356 154624      MOV    TMP1,@RLDA      ;SEND IN NEW DIFFERENCE WORD
1507 025430 004537 016354              JSR    R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
1508 025434                                CKLOOP                ;CHEC
K IF /FL:LOE IS SET
  025434 104406              TRAP   C#CLP1
1509
1510 025436 004537 015166              JSR    R5,CHERR       ;CHECK CONTROLLER FOR ERRORS
1511 025442 104406              CKLOOP                ;CHECK IF /FL:LOE IS SET
  025442 104406              TRAP   C#CLP1
1512
1513 025444 004537 016266              JSR    R5,WTCRDY      ;WAIT FOR DRIVE READY
1514 025450 104406      8$:    CKLOOP                ;CHECK IF /FL:LOE IS SET
  025450 104406              TRAP   C#CLP1
1515
1516
1517 025452 004537 015166              JSR    R5,CHERR       ;CHECK CONTROLLER FOR ERRORS
1518 025456                                CKLOOP
  025456 ;CHECK IF /FL:LOE IS SET
  104406              TRAP   C#CLP1
1519
1520 025460 004537 015466              JSR    R5,LDFUNC      ;ISSUE FUNCTION OF FOLLOWING WORD
1521 025464 000010              RDHDR                ;READ HEADER
1522 025466 004537 016354              JSR    R5,WTCRDY      ;WAIT FOR CONTROLLER READY HIGH
1523 025472 104406              CKLOOP                ;CHECK IF /FL:LOE IS SET
  025472 104406              TRAP   C#CLP1
1524
1525 025474 004537 015166              JSR    R5,CHERR       ;CHECK CONTROLLER FOR ERRORS
1526 025500                                ESCAPE                ;IF /FL:LOE SET LOOP, ELSE EXIT
TST
  025500 104410              TRAP   C#ESCAPE
  025502 000036              .WORD  L10072-.
1527
1528 025504 013737 002314 002364      MOV    E.MP,BDDAT     ;READ HEADER
1529 025512 043737 002334 002364      BIC    SECMSK,BDDAT   ;CLEAR SECTOR ADDRESS
1530 025520 023737 002362 002364      CMP    GDDAT,BDDAT    ;IS HEADER CORRECT?
1531 025526 001404              BEQ    10$            ;IF SO BRANCH
1532
1533 025530                                ERRDF                 50,EM57,ERR4
  025530 104455              TRAP   C#ERRDF
  025532 000062              .WORD  50
  025534 010557              .WORD  EM57
  025536 012
372 .WORD  ERR4
1534 025540                                10$:
1535
1536 025540                                ENDTST
  025540 L10072: ;****END OF TEST****
  025540 104401              TRAP   C#ETST
1537
1538
1539 .SBTTL **TEST 43** - EXTENSIVE CHECK OF HEADER CRC
1540
1541 025542                                BGNTST
1542 025542                                STARS
  ;*****
  ;MORE EXTENSIVE CHECK OF HEADER CRC. WE WILL SEEK
  ;AND READ HEADERS VERIFYING HDR CRC ACROS
S THE
1543
1544
1545 ;PLATTER USING THE GROWING 0, GROWING 1, SHIFTING 0 AND
1546 ;GROWING 0 PATTERNS FOR TRACK ADDRESSES.
1547 025542                                STARS
  
```

```

1548
1549
1550 025542 012703 004626          MOV    #SKLST,R3          ;GET LIST OF DIFFERENCE WORDS
1551
025546          BGNSEG          ;****START OF SEGMENT****
1552 025546 104404          TRAP   C#BSEG
1553 025550          1$:   JSR    R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
1554 025554 004537 015466          RDHDR          ;READ HEADER
1555 025556 004537 016354          JSR    R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
1556 025562 104406          98$:  CKLOOP          ;CHECK IF /FL:LOE IS SET
1557 025562          TRAP   C#CLP1
1558 025564 004537 015166          JSR    R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
1559 025570          CKLOOP          ;CHECK IF /FL:LOE IS SET
1560 025570 104406          TRAP   C#CLP1
1561 025572 013737 002314 002364          MOV    E,MP,BDDAT          ;READ HEADER
1562 025600 043737 002334 002364          BIC    SECMSK,BDDAT          ;CLEAR OUT SECTOR
1563 025606 001461          BEQ    5$                ;IF ON TRACK ZERO, H.S. ZERO, OK
1564
1565          ;NOT ON TRACK ZERO CALCULATE DIFFERENCE WORD AND PUT IT BACK
1566          ;ON ZERO.
1567
1568 025610 042737 000100 002364          BIC    #RHMS,BDDAT          ;CLEAR OUT HEAD SELECT
1569 025616 013777 002364 154          MOV    BDDAT,@RLDA          ;PUT CYLINDER AS DIFFERENCE WORD
430 1570 025624 052777 000001 154422          BIS    #MK,@RLDA          ;SET MARKER BIT
1571 025632 004537 015466          JSR    R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
1572 025636 000006          SEEK          ;SEEK
1573 025640 004537 016354          JSR    R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
1574 025644          CKLOOP          ;CHECK IF /FL:LOE IS SET
1575 025644 104406          TRAP   C#CLP1
1576 025646 004537 015166          JSR    R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
1577 0256          CKLOOP          ;CHECK IF /FL:LOE IS SET
52 1578 025652 104406          TRAP   C#CLP1
1579 025654 004537 016266          JSR    R5,WTCRDY          ;WAIT FOR DRIVE READY
1580 025660          89$:  CKLOOP          ;CHECK IF /FL:LOE IS SET
1581 025660 104406          TRAP   C#CLP1
1582 025662 004537 015166          JSR    R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
1583 025666          CKLOOP          ;CHECK IF /FL:LOE IS SET
1584 025666 104406          TRAP   C#CLP1
1585
1586 025670 004537 015466          JSR    R5,LDFUNC          ;ISSUE FUNCTION OF FOLLOWING WORD
1587 025674 000010          RDHDR          ;READ HEADER
1588 025676 004537 016354          JSR    R5,WTCRDY          ;WAIT FOR CONTROLLER READY HIGH
1589 025702          96$:  CKLOOP          ;CHECK IF /FL:LOE IS SET
1590 025702 104406          TRAP   C#CLP1
1591 025704 004537 015166          JSR    R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
1592 025710          CKLOOP          ;CHECK IF /FL:LOE IS SET
1593 025710 104406          TRAP   C#CLP1
1594 025712 005037 002362          CLR    GDDAT          ;CLEAR EXPECTED

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1595	025716	013737	002364	002376	MOV	BDDAT,DWORD	;SAVE DIFFERENCE WORD
1596	025724	013737	002314	002364	MOV	E.MP,BDDAT	;READ HEADER
1597	025732	043737	002334	002364	BIC	SECMSK,BDDAT	;MASK OUT SECTOR BITS
1598	025740	001404			BEQ	5‡	;BRANCH IF ON ZERO TRACK
1599							
1600	025742				ERRDF	51.,EM54,ERR3	
	025742	104455			TRAP	C‡ERDF	
	025744	00006					
3			.WORD	51			
	025746	010426			.WORD	EM54	
	025750	012320			.WORD	ERR3	
1601	025752			5‡:	CKLOOP		;CHECK IF /FL:LOE IS SET
	025752	104406			TRAP	C‡CLP1	
1602							
1603	025754	011377	154274		MOV	(R3),@RLDA	;GET DIFFERENCE WORD
1604	025760	052777	000005	154266	BIS	@SIGN!MK,@RLDA	;SET SIGN (TOWARDS SPINDLE) AND MARKER
1605	025766	004537	015466		JSR	R5,LDFUNC	;ISSUE FUNCTION OF FOLLOWING WORD
1606	025772	000006			SEEK		;SEEK
1607	0257	004537	016354		JSR	R5,WTCRD	
Y							
1608	026000				CKLOOP		;CHECK IF /FL:LOE IS SET
	026000	104406			TRAP	C‡CLP1	
1609							
1610	026002	004537	015166		JSR	R5,CHERR	;CHECK CONTROLLER FOR ERRORS
1611	026006				CKLOOP		;CHECK IF /FL:LOE IS SET
	026006	104406			TRAP	C‡CLP1	
1612							
1613	026010	004537	016266		JSR	R5,WTCRDY	;WAIT FOR DRIVE READY
1614	026014				CKLOOP		;CHECK IF /FL:LOE IS SET
	026014	104406			TRAP	C‡CLP1	
1615							
1616							
1617	026016	004537	015166		JSR		
R5,CHERR							;CHECK CONTROLLER FOR ERRORS
1618	026022				CKLOOP		;CHECK IF /FL:LOE IS SET
	026022	104406			TRAP	C‡CLP1	
1619							
1620	026024	004537	015466		JSR	R5,LDFUNC	;ISSUE FUNCTION OF FOLLOWING WORD
1621	026030	000010			RDHDR		;READ HEADER
1622	026032	004537	016354		JSR	R5,WTCRDY	;WAIT FOR CONTROLLER READY HIGH
1623	026036				CKLOOP		;CHECK IF /FL:LOE IS SET
	026036	104406			TRAP	C‡CLP1	
1624							
1625							
1626	026040	004537	015166		JSR	R5,CHERR	;CHECK CONTROLLER
FOR ERRORS							
1627	026044				CKLOOP		;CHECK IF /FL:LOE IS SET
	026044	104406			TRAP	C‡CLP1	
1628							
1629	026046	011337	002362		MOV	(R3),GDDAT	;GET EXPECTED CYLINDER
1630	026052	011337	002376	8‡:	MOV	(R3),DWORD	;SET UP DIFFERENCE FOR SEEK
1631	026056	013737	002314	002364	MOV	E.MP,BDDAT	;READ HEADER FROM RLMP
1632	026064	043737	002334	002364	BIC	SECMSK,BDDAT	;CLEAR OUT SECTOR BITS
1633	026072	023737	002362	002364	CMP	GDDAT,BDDAT	;DID SEEK GO TO THE RIGHT
1634	02						
6100	001404				BEQ	9‡	;TRACK, IF SO, GO GET NEXT
1635							
1636	026102				ERRDF	52.,EM54,ERR3	
	026102	104455			TRAP	C‡ERDF	
	026104	000064			.WORD	52	
	026106	010426			.WORD	EM54	
	026110	012320			.WORD	ERR3	

```

1637 026112          9$:  CKLOOP          ;CHECK IF /FL:LOE IS SET
      026112 104406 TRAP          C$CLP1
1638
1639 0
26114 013737 002314 026130 MOV      E.MP,10$ ;GET HEADER WORD
1640 026122 004537 016100 JSR      R5,SIMBCC ;GO CALCULATE HEADER CRC
1641 026126 000020          16. ;16 BITS
1642 026130 000000          10$: .WORD      0 ;HEADER GOES HERE
1643 026132 000000          .WORD      0 ;START WITH ZERO CRC
1644 026134 013737 002344 026160 MOV      CALBCC,20$
1645 026142 013737 002316 026156 MOV      E.MP1,21$
1646 026150 004537 016100 JSR      R5,SIMBCC
1647 026154 000020          16.
1648 026156 000000          21$:
.WORD      0
1649 026160 000000          20$: .WORD      0
1650 026162 013737 002344 002362 MOV      CALBCC,GDDAT ;MOVE CALCULATED CRC TO GDDAT
1651 026170 013737 002320 002364 MOV      E.MP2,BDDAT ;GET HEADER CRC FROM RLMP
1652 026176 023737 002362 002364 CMP      GDDAT,BDDAT ;IS CRC CORRECT?
1653 026204 001404          BEQ      11$ ;IF SO CONTINUE
1654
1655 026206          ERRDF      53,EM42,ERR4
      026206 104455 TRAP      C$ERDF
      026210 000065 .WORD      53
      026212 010047 .WORD      EM42
      026214 012372 .WORD      E
RR4
1656 026216          11$:  CKLOOP          ;CHECK IF /FL:LOE IS SET
      026216 104406 TRAP          C$CLP1
1657
1658
1659 026220 005723          TST      (R3). ;BUMP PATTERN
1660 026222 023727 002406 000001 CMP      T.DRIVE,#1
1661 026230 001005          BNE      2$
1662 026232 020327 004726 CMP      R3,#SKEND
1663 026236 001407          BEQ      12$
1664 026240 000137 025550 JMP      1$
1665 026244 020327 004770          2$:  CMP      R3,#SKEEND
1666 026250 001402          BEQ      12$
1667 026252 000137 025550 JMP      1$
16
68
1669 026256          12$:
1670 026256          ENDSEG          ;****END OF SEGMENT****
      026256 10000$ TRAP          C$ESEG
      026256 104405
1671 026260          ENDTST          ;****END OF TEST****
      026260 L10073: TRAP          C$ETST
      026260 104401
1672
1673
1674
1675          .SBTTL  **TEST 44** - VERIFY GET STATUS WHILE DRDY IS LOW
1676 026262          BGNTST          ;****START OF TEST****
1677
1678 026262          STARS
      ;*****
      ;VERIFY TH
1679
AT WE CAN ISSUE GET STATUS AND RECIEVE
1680
1681 026262          ;THE STATUS WORD WHILE THE DRIVE IS IN NOTION SEEKING
          STARS
      ;*****

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H8

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1682
1683
1684 026262
1685 026262 004537 015466 14: JSP R5.LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
1686 026266 000010 RDHDR ;READ HEADER
1687 026270 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
1688 026274 104406 CKLOOP ;CHECK IF /FL:LOE IS SET
      026274 TRAP C$CLP1
1689
1690 026276 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
1691 026302 104406 CKLOOP ;CHECK IF /FL:LOE IS SET
      026302 TRAP C$CLP1
1692
1693 026304 013737 002314 002364 MOV E.MP,BDDAT ;READ HEADER
1694 026312 043737 002334 002364 BIC SEC
MSK,BDDAT ;CLEAR OUT SECTOR
1695 026320 001461 BEQ 54 ;IF ON TRACK ZERO, H.S. ZERO, OK
1696
1697 ;NOT ON TRACK ZERO CALCULATE DIFFERENCE WORD AND PUT IT BACK
1698 ;ON ZERO.
1699
1700 026322 042737 000100 002364 BIC @RHHS,BDDAT ;CLEAR OUT HEAD SELECT
1701 026330 013777 002364 153716 MOV BDDAT,@RLDA ;PUT CYLINDER AS DIFFERENCE WORD
1702 026336 052777 000001 153710 BIS @MK,@RLDA ;SET MARKER BIT
1703 026344 004537 015466 JSR R5.LDFUNC ;ISSUE FUNCT
ION OF FOLLOWING WORD
1704 026350 000006 SEEK ;SEEK
1705 026352 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
1706 026356 104406 CKLOOP ;CHECK IF /FL:LOE IS SET
      026356 TRAP C$CLP1
1707
1708 026360 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
1709 026364 104406 CKLOOP ;CHECK IF /FL:LOE IS SET
      026364 TRAP C$CLP1
1710
1711 026366 004537 016266 JSR R5,WTCRDY ;WAIT FOR DRIVE READY
1712 026372 104406 CKLOOP ;CHEC
      026372 TRAP C$CLP1
K IF /FL,LOE IS SET
1713
1714 026374 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
1715 026400 104406 CKLOOP ;CHECK IF /FL:LOE IS SET
      026400 TRAP C$CLP1
1716
1717
1718 026402 004537 015466 JSR R5.LDFUNC ;ISSUE FUNCTION OF FOLLOWING WORD
1719 026406 000010 RDHDR ;READ HEADER
1720 026410 004537 016354 JSR R5,WTCRDY ;WAIT FOR CONTROLLER READY HIGH
1721 026414 104406 CKLOOP ;CHECK IF /FL:LOF IS SET
      02641 TRAP C$CLP1
4
1722
1723 026416 004537 015166 JSR R5,CHERR ;CHECK CONTROLLER FOR ERRORS
1724 026422 104406 CKLOOP ;CHECK IF /FL:LOE IS SET
      026422 TRAP C$CLP1
1725
1726 026424 005037 002362 CLR GDDAT ;CLEAR EXPECTED
1727 026430 013737 002364 002376 MOV BDDAT,DWORD ;SAVE DIFFERENCE WORD
1728 026436 013737 002314 002364 MOV E.MP,BDDAT ;READ HEADER
1729 026444 043737 002334 002364 BIC SECMSK,BDDAT ;MASK OUT SECTOR BITS
1730 026452 00
1404 BEQ 54 ;BRANCH IF ON ZERO TRACK
  
```

1731									
1732	026454					ERRDF	54,EM54,ERR3		
	026454	104455				TRAP	C\$ERDF		
	026456	000066				.WORD	54		
	026460	010426				.WORD	EM54		
	026462	012320				.WORD	ERR3		
1733	026464				S\$:	CKLOOP			;CHECK IF /FL:LOE IS SET
	026464	104406				TRAP	C\$CLP1		
1734									
1735	0264								
66	012777	077601	153560		MOV	#77601,@RLDA			;GET DIFFERENCE WORD
1736	026474	052777	000005	153552		BIS	#SIGN!MK,@RLDA		;SET SIGN (TOWARDS SPINDLE) AND MARKER
1737	026502	004537	015466			JSR	R5,LDFUNC		;ISSUE FUNCTION OF FOLLOWING WORD
1738	026506	000006				SEEK			;SEEK
1739	026510	004537	016354			JSR	R5,WTCRDY		;WAIT FOR CONTROLLER READY HIGH
1740	026514					CKLOOP			;CHECK IF /FL:LOE IS SET
	026514	104406				TRAP	C\$CLP1		
1741									
1742									
1743	026516	004537	015166			JSR	R5,		
CHERR									;CHECK CONTROLLER FOR ERRORS
1744	026522					CKLOOP			;CHECK IF /FL:LOE IS SET
	026522	104406				TRAP	C\$CLP1		
1745	026524	012777	000003	153522		MOV	#MK!GSBIT,@RLDA		
1746	026532	004537	015466			JSR	R5,LDFUNC		;ISSUE FUNCTION OF FOLLOWING WORD
1747	026536	000004				GSTAT			
1748	026540	004537	016354			JSR	R5,WTCRDY		;WAIT FOR CONTROLLER READY HIGH
1749	026544					CKLOOP			;CHECK IF /FL:LOE IS SET
	026544	104406				TRAP	C\$CLP1		
1750	026546	004537	015166			JSR	R5,CHERR		;C
HECK									;CHECK CONTROLLER FOR ERRORS
1751									
1752	026552				ENDTST				;****END OF TEST****
	026552				L10074:				
	026552	104401				TRAP	C\$ETST		
1753									
1754	026554				BGNMOD	HRDPRM			
1755									
1756	026554					BGNHRD			
	026554	000032				.WORD	L10075-L\$HARD/2		
1757									;WHAT TYPE OF CONTROLLER
1758									;RL11=1, RLV11-2, RLV12-3
1759	026556					GPRMD	CNTMSG,CNT,0,3,1,3,NO		
	026556	005022				.WORD	T\$CODE		
	026560	026656				.WORD	CNTMSG		
	026562	000003				.WORD	3		
	026564	000001				.WO			
RD									
	T\$LLOLIM					.WORD	T\$HILIM		
	026566	000003							
1760									;CONTOLLER BUS ADDRESS
1761	026570					GPRMA	CSRMSG,CSR,0,160000,177776,YES		
	026570	000031				.WORD	T\$CODE		
	026572	026642				.WORD	CSRMSG		
	026574	160000				.WORD	T\$LLOLIM		
	026576	177776				.WORD	T\$HILIM		
1762									;INTERRUPT VECTOR
1763	026600					GPRMA	VECMMSG,VECT,0,0,776,YES		
	026600	001031				.WORD	T\$CODE		
	026602	026720				.WORD	VECMMSG		
	026604	000000				.WORD	T\$LLOLIM		
	026606	000776				.WORD	T\$HILIM		

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1764
1765 026610          GPRMD  DRMSG,DRBT,0,03400,0,7,YES      ;DRIVE NUMBER
      026610 004032  .WORD  T$CODE
      026612 026751  .WORD  DRMSG
      026614 003400  .WORD  03400
      026616 000000  .WORD  T$LOLIM
      026620 000007  .WORD  T$HILIM

1766
1767 026622          GPRML  DRTYPE,TYPDR,1,YES      ;DRIVE TYPE
      026622 00
3130          .WORD  T$CODE
      026624 026727  .WORD  DRTYPE
      026626 000001  .WORD  1

1768
1769 026630          GPRMD  BRMSG,PRIOR,0,340,0,7,YES    ;BREAK LEVEL
      026630 002032  .WORD  T$CODE
      026632 026707  .WORD  BRMSG
      026634 000340  .WORD  340
      026636 000000  .WORD  T$LOLIM
      026640 000007  .WORD  T$HILIM

1770
1771 026642          ENDHRD
      026642          .EVEN
      026642          L10075:

1772
1773 026642          102      125      123  CSRMSG: .ASCIZ  /BUS ADDRESS/
      026645          040      101      104
      0

26650          104      122      105
1774 026653          123      123      000
      026656          122      114      061  CNTMSG: .ASCIZ  /RL11=1, RLV11=2, RLV12=3/
      026661          061      075      061
      026664          054      040      122
      026667          114      126      061
      026672          061      075      062
      026675          054      040      122
      026700          114      126      061
      026703          062      075      063
      026706          000
1775 026707          102      122      040  BRMSG: .ASCIZ  /BR LEVEL/
      026712          114      105      126
      026715          105      114      000

1776 026720          126      105      103  VECMSG: .ASCIZ  /VECTOR/
      026723          124      117      122
      026726          000
1777 026727          104      122      111  DRTYPE: .ASCIZ  /DRIVE TYPE = RL01/
      026732          126      105      040
      026735          124      131      120
      026740          105      040      075
      026743          040      122      114
      026746          060      061      000
1778 026751          104      122      111  DRMSG: .ASCIZ  /DRIVE/
      026754          126      105      000
      026754          .EVEN

1779
1780
1781 026760          ENDMOD
1782
178
3
1784

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1785 026760          BGNMOD  SFTPRM
1786
1787 026760          BGNSFT
      026760 000011  .WORD L10076 L$SOFT/2
1788 026762          GPRML  DMSG,DLT,1,YES
      026762 000130  .WORD  T$CODE
      026764 027004  .WORD  DMSG
      026766 000001  .WORD  1
1789 026770          XFERF  1$
      026770 006044  .WORD  T$CODE
1790
      026772          GPRMD  EMSG,ELT,0,177777,0,177777,YES
      026772 001032  .WORD  T$CODE
      026774 027030  .WORD  EMSG
      026776 177777  .WORD  177777
      027000 000000  .WORD  T$LOLIM
      027002 177777  .WORD  T$HILIM
1791 027004          1$:  ENDSFT
      027004          .EVEN
      027004          L10076:
1792
1796
1797 027004          104    122    117  DMSG:  .ASCIZ  /DROP ON ERROR LIMIT/
1798 027030          105    122    122  EMSG:  .ASCIZ  /ERROR LIMIT/
1799
1803
1804          .EVEN
1805
1806 027044          ENDMOD
1807 027044          LASTAD
      027044 000000  .EVEN
      027046 000000  .WORD  0
      027050          .WORD  0
      L$LAST::
1808
1809          000001  .END
  
```

ADDCOD = 015076 G	CLNCOD = 015024 G	C#RDBU = 000007	EM30 = 007441	E.DA = 002312
ADR = 000020 G	CNT = 000012	C#REFG = 000047	EM30A = 007500	E.MP = 002314
AFREG = 006644	CNTMSG = 026656	C		
#RESE = 000033	EM32 = 007540	E.MP1 = 002316		
AFTER = 016014	COMP = 006045	C#REVI = 000003	EM33 = 007574	E.MP2 = 002320
ARLBA = 006601	CONT = 014254	C#FLA = 000021	EM34 = 007641	FIRST = 002366
ARLCS = 006574	CONTIN = 014122	C#RPT = 000025	EM37 = 007716	FIX = 015732
ARLDA = 006607	CRDY = 000200	C#SEFG = 000046	EM4 = 007037	FNDFNC = 015704
ARLMP = 006615	CRTIM = 006665	C#SPRI = 000041	EM41 = 007756	FRMT1 = 013072
ASSEMB = 000010	CSE			
ND = 005070	C#SVEC = 000037	EM42 = 010047	FRMT11 = 013351	
BATEST = 017162	CSPAT = 004772	C#TPRI = 000013	EM43 = 010105	FRMT12 = 013412
BA16 = 000020	CSR = 000000	DAHS = 000020	EM44 = 010204	FRMT13 = 013471
BA17 = 000040	CSRMSG = 026642	DATEST = 017266	EM45 = 010237	FRMT14 = 013522
BCCFBK = 002342	CSTEST = 017042	DBUFF = 002416 G	EM46 = 010272	FRMT15 = 013566
BCSR = 002262	CYLSK = 002370	DCKMES = 006026	EM47 = 010325	FRMT2 = 013132
BDDAT				
002364	C#AU = 000052	DEMES = 005774	EM5 = 007064	FRMT2A = 013151
BEFORE = 015744	C#AUTO = 000061	DERFLG = 002304	EM52 = 010356	FRMT2B = 013164
BEGPAT = 004416	C#BRK = 000022	DERR = 040000	EM54 = 010426	FRMT3 = 013200
BEREG = 006623	C#BSEG = 000004	DIAGMC = 000000	EM55 = 010465	FRMT4 = 013205
BGNTST = 014476	C#BSUB = 000002	DLT = 000000	EM56 = 010520	FRMT5 = 013243
BIT0 = 000001 G	C#CEFG = 000045	DLTMES = 006033	EM57 = 010557	FRMT6 =
013314				
BIT00 = 000001 G	C#CLCK = 000062	DLYCNT = 002414	EM6 = 007135	FRMT99 = 013240
BIT01 = 000002 G	C#CLEA = 000012	DMSG = 027004	EM61 = 010660	F#AU = 000015
BIT02 = 000004 G	C#CLOS = 000035	DRBT = 000010	EM62 = 010741	F#AUTO = 000020
BIT03 = 000010 G	C#CLP1 = 000006	DRDY = 000001	EM63 = 011024	F#BGN = 000040
BIT04 = 000020 G	C#CVEC = 000036	DRIVE = 002270	EM64 = 011105	F#CLEA = 000007
BIT05 = 000040 G	C#DCLN = 000044	DRMSG = 026751	EM65 =	
011170	F#DU = 000016			
BIT06 = 000100 G	C#DODU = 000051	DROP = 013672	EM66 = 011251	F#END = 000041
BIT07 = 000200 G	C#DRPT = 000024	DRPCOD = 015072 G	EM67 = 011334	F#HARD = 000004
BIT08 = 000400 G	C#DU = 000053	DRST = 000010	EM7 = 007163	F#HW = 000013
BIT09 = 001000 G	C#EDIT = 000003	DRTIM = 006712	EM70 = 011371	F#INIT = 000006
BIT1 = 000002 G	C#ERDF = 000055	DRTYPE = 026727	EM71 = 011426	F#JMP = 000050
BIT10 = 002000 G	C#ERHR = 000056	DRVRDY = 0		
14362	011463	F#MOD = 000000		
BIT11 = 004000 G	C#ERRO = 000060	DSPCOD = 013700 G	EM73 = 011516	F#MSG = 000011
BIT12 = 010000 G	C#ERSF = 000054	DS0 = 000000	EM74 = 011551	F#PROT = 000021
BIT13 = 020000 G	C#ERSO = 000057	DS1 = 000400	EM75 = 011603	F#PWR = 000017
BIT14 = 040000 G	C#ESCA = 000010	DS2 = 001000	EM76 = 011635	F#RPT = 000012
BIT15 = 100000 G	C#SEGE = 000005	DS3 = 001400	EM77 = 011670	F#SEG = 000003
BIT2 = 000004 G	C#ESUB = 000			
003	END	F#SOFT = 000005		
BIT3 = 000010 G	C#ETST = 000001	EF.CON = 000036 G	ENDPAT = 004624	F#SRV = 000010
BIT4 = 000020 G	C#EXIT = 000032	EF.NEW = 000035 G	ERCOUN = 005074	F#SUB = 000002
BIT5 = 000040 G	C#GETB = 000026	EF.PWR = 000034 G	ERPOIN = 005072	F#SW = 000014
BIT6 = 000100 G	C#GETW = 000027	EF.RES = 000037 G	ERR = 100000	F#TEST = 000001
BIT7 = 000200 G	C#GMAN = 000043	EF.STA = 000040 G	ERRVEC = 002340	GDDAT = 002362
BIT8 = 00040				
0 G	C#GPHR = 000042	ELT = 000002	ERR0 = 012226 G	GLBDAT = 002242 G
BIT9 = 001000 G	C#GPLD = 000030	EMSG = 027030	ERR1 = 012244 G	GLBEQA = 002242 G
BOE = 000400 G	C#GPRI = 000040	EM1 = 006740	ERR2 = 012256 G	GLBERR = 012226 G
BPRIOR = 002264	C#INIT = 000011	EM101 = 011723	ERR3 = 012320 G	GLBSUB = 015102 G
BRMSG = 026707	C#INLP = 000020	EM102 = 011770	ERR4 = 012372 G	GLBTXT = 005774 G
BVEC = 002266	C#MANI = 000050	EM103 = 012160	ERR5 = 012440 G	GOD =
RVR = 000202				
B.BA = 002274	C#MEM = 000031	EM11 = 007211	ERR6 = 012452 G	GSBIT = 000002
B.BE = 002302	C#MSG = 000023	EM13 = 007252	ERR7 = 012514 G	GSTAT = 000004
B.CS = 002272	C#OPEN = 000034	EM14 = 007304	EVL = 000004 G	GSTINT = 006535
B.DA = 002276	C#PNTB = 000014	EM15 = 007332	E#END = 002100	GSTMES = 006476
B.MP = 002300	C#PNTF = 000017	EM16 = 007360	E#LOAD = 000035	G#CNT0 = 000200
CALBCC = 002344	C#PNTS = 000016	EM17 = 007406	E.BA =	
002310	G#DELM = 000372			
CHERR = 015166	C#PNTX = 000015	EM2 = 006765	E.BE = 002322	G#DISP = 000003
CKFRLT = 015102	C#QIO = 000377	EM3 = 007012	E.CS = 002306	G#EXCP = 000400

Symbol table									
G#HILI- 000002	LINE3	013020	L10002	012316	L10074	026552	RI MP	002256	
G#LOLI- 000001	LOE	- 040000 G	L10003	012370	L10075	026642			
RL2	004730								
G#ND - 000000	LOT	- 000010 G	L10004	012436	L10076	027004	_MSK	002334	
G#OFFS- 000400	L#ACP	002110 G	L10005	012450	MAXCYL	002400	JEK	000006	
G#OFFSI- 000376	L#APT	002036 G	L10006	012512	MAXSEC	002374	SEKINT	006444	
G#PRMA- 000001	L#AU	015076 G	L10007	012550	MDHEDR	002000 G	SEKMS	006413	
G#PRMD- 000002	L#AUT	002070 G	L10010	013670	MERLMT	013674	SFTPRM	026760 G	
G#PRML- 000000	L#AUTO	014602 G	L10011	013700					
MK	- 000001	SIGN	- 000004						
G#RADA- 000140	L#CCP	002106 G	L10013	014600	MSCRFL	006040	SIMBCC	016100	
G#RADB- 000000	L#CLEA	015024 G	L10014	015022	MXSEC1	002372	SIZE	- 000004	
G#RADD- 000040	L#CO	002032 G	L10015	015070	NOOP0	- 000000	SKEEND	004770	
G#RADL- 000120	L#DEPO	002011 G	L10016	015074	NOOP7	- 000016	SKEND	004726	
G#RADO- 000020	L#DESC	002122 G	L10017	015100	NOPINT	006157	SKLST	004626	
G#XFER- 000004	L#DESP	002076 G							
L10020	016264	NOPHES	006126	SPTCOD	013670 G				
G#YES - 000010	L#DEVP	002060 G	L10021	016546	NOPWR	014062	START	014140	
HALMAX	004704	L#DISP	013702 G	L10022	016642	NXM	- 020000	START1	014102
HCRME	006013	L#DLY	002116 G	L10023	016736	NXMMES	006001	STHS	- 000100
HDRBUF	005274	L#DTP	002040 G	L10024	017032	NXT	014132	SVCGBL	- 000000
HDRLST	015706	L#DTYP	002034 G	L10025	017152	OKHDR	015716	SVCINS	- 000000
HMAX	004734								
L#DU	015072 G	L10026	017256	OPI	- 002000	SVCSUB	- 177777		
HNFMS	006021	L#DUT	002072 G	L10027	017344	OPIERR	006053	SVCTAG	- 000000
HOE	- 100000 G	L#DVTY	002230 G	L10030	017470	OPIMES	006006	SVCTST	- 177777
HPTCOD	013652 G	L#EF	002052 G	L10031	017614	O#APTS	- 000000	SVHD	002402
HDRPRM	026554 G	L#ENVI	002044 G	L10032	017722	O#AU	- 000001	S#LSYM	010000
IBE	- 010000 G	L#ETP	002102 G	L10033	020022	O#BGNR	- 000000	TEMP2	002346
I									
DU	- 000040 G	L#EXP1	002046 G	L10034	020112	O#BGNS	- 000001	TEMP3	002350
IER	- 020000 G	L#EXP4	002064 G	L10035	020212	O#DU	- 000001	TEMP4	002352
INITCO	014040 G	L#EXP5	002066 G	L10036	020322	O#ERRT	- 000000	TMWFNC	002412
INTEN	- 000100	L#HARD	026556 G	L10037	020376	O#GNSW	- 000001	TMPO	002354
INTFLG	002330	L#HIME	002120 G	L10040	020434	O#POIN	- 000001	TMP1	002356
INTSRV	016260	L#HPCP	002016 G	L10041	020560	O#SETU	- 000000	T	
MP2	002360								
ISR	- 000100 G	L#HPTP	002022 G	L10042	020720	PFLG	002324	TRPFLG	002326
IXE	- 004000 G	L#HW	013654 G	L10043	021060	PNT	- 001000 G	TRPHAN	016252
I#AU	- 000041	L#ICP	002104 G	L10044	021264	PRI	- 002000 G	TYPDR	- 000006
I#AUTO	- 000041	L#INIT	014040 G	L10045	021400	PRIOR	- 000004	T#ARGC	- 000001
I#CLN	- 000041	L#LADP	002026 G	L10046	021606	PRI00	- 000000 G	T#CODE	- 001032
I#DU	- 000041	L#LAST	027050 G	L10047	021674	PRI			
O1	- 000040 G	T#ERRN	- 000066						
I#HRD	- 000041	L#LOAD	002100 G	L10050	022042	PRI02	- 000100 G	T#EXCP	- 000000
I#INIT	- 000041	L#LUN	002074 G	L10051	022072	PRI03	- 000140 G	T#FLAG	- 000040
I#MOD	- 000041	L#MREV	002050 G	L10052	022244	PRI04	- 000200 G	T#GMAN	- 000000
I#MSG	- 000041	L#NAME	002000 G	L10053	022332	PRI05	- 000240 G	T#HILI	- 177777
I#PROT	- 000040	L#PRIO	002042 G	L10054	022460	PRI06	- 000300 G	T#LAST	- 000001
I#PTAB	- 000041	L#PROT	014032 G	L1005					
5	022502	PRI07	- 000340 G	T#LOLI	- 000000				
I#PWR	- 000041	L#PRT	002112 G	L10056	022562	PWRFLG	002242	T#LSYM	- 010000
I#RPT	- 000041	L#REPP	002062 G	L10057	022726	QHAX	004732	T#LTNO	- 000054
I#SEG	- 000041	L#REV	002010 G	L10060	023064	QUAMAX	004702	T#NEST	- 177777
I#SETU	- 000041	L#SOFT	026762 G	L10061	023402	RDHDR	- 000010	T#NSO	- 000000
I#SFT	- 000041	L#SPC	002056 G	L10062	023476	READ	- 000014	T#NS1	- 000005
I#SRV	- 000041	L#SPCP							
002020 G	L10063	023542	REST	014200	T#PTNU	- 000000			
I#SUB	- 000041	L#SPTP	002024 G	L10064	023666	RESTMS	015450	T#SAVL	- 177777
I#TST	- 000041	L#STA	002030 G	L10065	024304	RHDINT	006352	T#SEGL	- 177777
J#JMP	- 000167	L#SW	013672 G	L10066	024436	RHDMS	006312	T#SEKO	- 010000
LDCSR	002332	L#TEST	002114 G	L10067	024600	RHHS	- 000100	T#SUBN	- 000000
LDFUNC	015466	L#TIML	002014 G	L10070	024740	RLBA	002252	T#TAGL	- 177777
LF	0								
06043		L#UNIT	002012 G	L10071	025112	RLBE	002260	T#TAGN	- 010077
LINE1	012552	L10000	012242	L10072	025540	RLCS	002250	T#TEMP	- 000000
LINE2	012606	L10001	012254	L10073	026260	RLDA	002254	T#TEST	- 000054


```

Symbol table
T#TSTM= 177777      T.DRIV 002406      T23      021610 G      T39      024440 G      VECT - 000002
T#TSTS= 000001      T      T24      021676 G      T4      016740 G      WAIT0   014400
.SIZE 013676      T1      016454 G      T25     022044 G      T40     024602 G      WAIT1   023432
T##AU = 010017      T10     017616 G      T26     022074 G      T41     024742 G      WCKINT  006251
T##AUT= 010014      T11     017724 G      T27     022246 G      T42     025114 G      WCKMES  006211
T##CLE= 010015      T12     020024 G      T28     022334 G      T43     025542 G      WHY     002404
T##DU = 010016      T13     020114 G      T29     022462 G      T44     026262 G      WRCHK - 000002
T##HAR= 010075
T##
HW = 010010      T14     020214 G      T3      016644 G      T5      017034 G      WRITE - 000012
T##INI= 010013      T15     020324 G      T30     022504 G      T6      017154 G      WTCRDY  016354
T##MSG= 010007      T16     020400 G      T31     022564 G      T7      017260 G      WTDRDY  016266
T##PRO= 010012      T17     020436 G      T32     022730 G      T8      017346 G      XPOLY   002336
T##SEG= 010000      T18     020562 G      T33     023066 G      T9      017472 G      XXX     014162
T##SOF= 010076      T19     020722 G      T34     023404 G      UAM - 000200 G      X#A
LWA= 000000
T##SRV= 010020      T2      016550 G      T35     023500 G      UNITST  002246      X#FALS= 000040
T##SW = 010011      T20     021062 G      T36     023544 G      UUT     002244      X#OFFS= 000400
T##TES= 010074      T21     021266 G      T37     023670 G      VECSMG  026720      X#TRUE= 000020
T.CNTL 002410      T22     021402 G      T38     024306 G

```

```

. ABS. 027050 000 (RW,I,GBL,ABS,OVR)
000000 001 (RW,I,LCL,REL,CON)

```

Errors detected: 0

*** Assembler statistics

```

Work file reads: 303
Work file writes: 3
05
Size of work file: 27969 Words ( 110 Pages)
Size of core pool: 17152 Words ( 67 Pages)
Operating system: RT-11 (Under RSTS/E)

```

```

Elapsed time: 00:05:38.03
CZRLGE.BIC,CZRLGE/C=SY:[20,0]SVC34R.MLB,CZRLGE.MAC

```


I#AUTO	2-7#	5														
108#	5-141#															
I#CLN	2-7#	5-145#	5-164#													
I#DU	2-7#	5-172#	5-176#													
I#HRD	8-A56#	8-A71#														
I#INIT	2-7#	5-12#	5-103#													
I#MOD	2-7#	2-15	2-15#	2-19	2-19#	2-24	2-24#	2-72	2-72#	2-74	2-74#	2-298	2-298#	3-1		
	3-1#	3-93	3-93#	4-3	4-3#	4-114	4-114#	4-116	4-116#	4-128	4-128#	4-130	4-130#	4-140		
	4-140#	4-142	4-142#	4-146	4-146#	5-10	5-10#	5-105	5-105#	5-143						
5-143#	5-166	5-166#	5-170													
	5-170#	5-178	5-178#	5-180	5-180#	5-188	5-188#	6-4	6-4#	6-304	6-304#	8-A54	8-A54#	8-A81		
	8-A81#	8-A85	8-A85#	8-806	8-806#											
I#MSG	2-7#	4-5#	4-11#	4-13#	4-18#	4-20#	4-26#	4-28#	4-35#	4-37#	4-44#	4-46#	4-51#	4-53#		
	4-62#	4-64#	4-71#													
I#PROT	2-7#	5-3#														
I#PTAB	2-7#															
I#PWR	2-7#															
I#RPT	2-7#															
I#SEG	2-7#	7-3	7-28	7-54												
7-79	7-104	7-118#	7-133	7-140#	7-146	7-157#	7-169	8-7#	8-13							
	8-23#	8-33	8-40#	8-46	8-56#	8-71	8-78#	8-84	8-94#	8-109	8-114#	8-120	8-131#	8-144		
	8-149#	8-155	8-165#	8-176	8-181#	8-187	8-197#	8-207	8-212#	8-218	8-228#	8-239	8-244#	8-250		
	8-286	8-312	8-335	8-377	8-419	8-463	8-516	8-558	8-612	8-649	8-663#	8-685	8-691#	8-700		
	8-725	8														
-758	8-788	8-822	8-838	8-864	8-885#	8-890	8-893	8-906#	8-912	8-955	8-:29	8-:53	8-:741	8-:751#	8-:70#	8-:76
	8-:83	8-:29	8-:47#	8-:21	8-:46#	8-:52	8-:00	8-:47	8-:94	8-:42						
I#SETU	2-7#															
I#SFT	8-A87#	8-A91#														
I#SRV	2-7#	6-265#	6-269#													
I#SUB	2-7#	7-3	7-28	7-54	7-79	7-104	7-146	8-13	8-46	8-84	8-120	8-155	8-187	8-218		
	8-250	8-286	8-312	8-335	8-377											
8-419	8-463	8-516	8-558	8-612	8-649	8-700	8-725	8-758								
	8-788	8-822	8-838	8-864	8-912	8-955	8-:29	8-:53	8-:83	8-:29	8-:52	8-:00	8-:47	8-:94		
	8-:42	8-:41	8-:76													
I#TST	2-7#	7-3	7-3#	7-23	7-23#	7-23#	7-28	7-28#	7-49	7-49#	7-49#	7-54	7-54#	7-74		
7-146#	7-74#	7-74#	7-79	7-79#	7-99	7-99#	7-99#	7-104	7-104#	7-141	7-141#	7-141#	7-146			
	8-8	8-8#	8-8#	8-13	8-13#	8-41	8-41#	8-41#	8-46	8-46#	8-79	8-79#	8-79#	8-84		
	8-84#	8-115	8-115#	8-115#	8-120	8-120#	8-150	8-150#	8-150#	8-155	8-155#	8-182	8-182#	8-182#		
	8-187	8-187#	8-213	8-213#	8-213#	8-218	8-218#	8-245	8-245#	8-245#	8-250	8-250#	8-250#	8-281	8-281#	
	8-281#	8-286	8-286#	8-307	8-307#	8-307#	8-312	8-312#	8-330	8-330#	8-3					
30#	8-335	8-335#	8-372													
	8-372#	8-372#	8-377	8-377#	8-414	8-414#	8-414#	8-419	8-419#	8-459	8-459#	8-459#	8-463	8-463#		
	8-512	8-512#	8-512#	8-516	8-516#	8-553	8-553#	8-553#	8-558	8-558#	8-579	8-607	8-607#	8-607#		
	8-612	8-612#	8-644	8-644#	8-649	8-649#	8-672	8-672#	8-675	8-696	8-696#	8-696#	8-700	8-700#		
	8-720	8-720#	8-720#	8-725	8-725#	8-753	8-753#	8-753#								
8-758	8-758#	8-783	8-783#	8-783#	8-788											
	8-788#	8-818	8-818#	8-818#	8-822	8-822#	8-834	8-834#	8-834#	8-838	8-838#	8-859	8-859#	8-859#		
	8-864	8-864#	8-878	8-881	8-907	8-907#	8-907#	8-912	8-912#	8-925	8-928	8-950	8-950#	8-950#		
	8-955	8-955#	8-:24	8-:24#	8-:24#	8-:29	8-:29#	8-:48	8-:48#	8-:48#	8-:53	8-:53#	8-:78	8-:78#		
	8-:78#	8-:83	8-:83#	8-:24	8-:24#											
8-:24#	8-:29	8-:29#	8-:47	8-:47#	8-:47#	8-:52	8-:52#	8-:85								
	8-:95	8-:95#	8-:95#	8-:00	8-:00#	8-:31	8-:42	8-:42#	8-:42#	8-:47	8-:47#	8-:79	8-:89	8-:89#		
	8-:89#	8-:94	8-:94#	8-:24	8-:27	8-:37	8-:37#	8-:37#	8-:42	8-:42#	8-:726	8-:736	8-:736#	8-:736#		
	8-:741	8-:741#	8-:71	8-:71#	8-:71#	8-:76	8-:76#	8-A52	8-A52#	8-A52#						
IBE	2-26#															
IDU	2-26#															
IER	2-26#															
INITCO	5-10#															
INTEN	2-28#	5-:52	6-127	6-135	8-633	8-669	8-733	8-801	8-849	8-:99						
INTFLG	2-105#	6-267*	8-630*	8-635	8-638*	8-665*	8-680	8-687	8-729*	8-736	8-741*	8-748	8-798*	8-804		
	8-847*	8-852	8-:95*	8-:02	8-:11*	8-:18										
INTSRV	5-97	6-267#														
ISR	2-26#															
IXE	2-26#															

TWA

L\$JMP	2-7#				
L\$ACP	2-17#				
L\$APT	2-17#				
L\$AU	2-17	5-182#			
L\$AUT	2-17#				
L\$AUTO	2-17	5-108#			
L\$CCP	2-17#				
L\$CLEA	2-17	5-145#			
L\$CO	2-17#				
L\$DEPO	2-17#				
L\$DESC	2-17	2-21#			
L\$DESP	2-17#				
L\$DEVP	2-17#				
L\$DISP	2-17	4-144#			
L\$DLY	2-17#	5-81	6-276	6-290	8-:42
L\$DTP	2-17#				
L\$DTYP	2-17#				
L\$DU	2-17	5-172#			
L\$DUT	2-17#				
L\$DVTY	2-17	2-22#			
L\$EF	2-17#				
L\$ENVI	2-17#				
L\$ETP	2-17#				
L\$EXP					
1	2-17#				
L\$EXP4	2-17#				
L\$EXP5	2-17#				
L\$HARD	2-17	8-A56		8-A56#	
L\$HIME	2-17#				
L\$HPCP	2-17#				
L\$HPTP	2-17#				
L\$HW	2-17	4-118		4-118#	
L\$ICP	2-17#				
L\$INIT	2-17	5-12#			
L\$LADP	2-17#				
L\$LAST	2-17	8-807#			
L\$LOAD	2-17#				
L\$LUN	2-17#				
L\$MREV	2-17#				
L\$NAME	2-17#				
L\$PRIO	2-17#				
L\$PROT	2-17	5-3#			
L\$PRT	2-17#				
L\$REPP	2-17#				
L\$REV	2-17#				
L\$SOFT	2-17	8-A87		8-A87#	
L\$SPC	2-17#				
L\$SPCP	2-17#				
L\$SPTP	2-17#				
L\$STA	2-				
17#					
L\$SW	2-17	4-132		4-132#	
L\$TEST	2-17#				
L\$TIML	2-17#				
L\$UNIT	2-17#	5-17		5-36	
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L10001	4-18#				
L10002	4-26#				

L10003	4 35#		
L10004	4-44#		
L10005	4 51#		
L10006	4-62#		
L10007	4-71#		
L10010	4-118	4-126#	
L10011	4-132	4-138#	
L10013	5-103#		
L10014	5-141#		
L10015	5-164#		
L10016	5-176#		
L10017	5-186#		
L10020	6-269#		
L10021	7-23#		
L10022	7-49#		
L10023	7-74#		
L10024	7-99#		
L10025	7-141#		
L10026	8-8#		
L10027	8-41#		
L10030	8-79#		
L10031	8-115#		
L10032	8-150#		
L10033	8-182#		
L10034	8-213#		
L10035	8-245#		
L10036	8-281#		
L10037	8-307#		
L10040	8-330#		
L10041	8-372#		
L10042	8-414#		
L10043	8-459#		
L10044	8-512#		
L10045	8-553#		
L10046	8-579	8-607#	
L10047	8-644#		
L10050	8-672	8-675	8-696#
L10051	8-720#		
L10052	8-753#		
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L10055	8-834#		
L10056	8-859#		
L10057	8-878	8-881	8-907#
L10060	8-925	8-928	8-950#
L10061	8-:24#		
L10062	8-:48#		
L10063	8-:78#		
L10064	8-;24#		
L10065	8-<47#		
L10066	8-<85	8-<95#	
L10067	8-#31	8-#42#	
L10070	8-#79	8-#89#	
L10071	8 >24	8->27	8->37#
L10072	8-?26	8-?36#	
L10073	8-@71#		

	8-<52	8-<52	8-<52	8-#00	8-#00	8-#00	8-#47	8-#47	8-#47	8-#94	8-#94	8-#94	8->42	8->42
SVHD	8->42	8-741	8-741	8-741	8-076	8-076	8-076							
T##AU	2-126#													
T##AUT	5-182#	5-186												
T##CLE	5-108#	5-141												
T##DU	5-145#	5-164												
T##HAR	5-172#	5-176												
8-A56	8-A56#	8-A71												
T##HM	4-118	4-118#	4-126											
T##INI	5-12#	5-103												
T##MSG	4-5#	4-11	4-13#	4-18	4-20#	4-26	4-28#	4-35	4-37#	4-44	4-46#	4-51	4-53#	4-62
T##PRO	4-64#	4-71												
T##SEG	5-3#													
1	7-118	7-118#	7-133	7-140	7-140#	7-157	7-157#	7-169	8-7	8-7#	8-23	8-23#	8-33	8-40
	8-40#	8-56	8-56#	8-71	8-78	8-78#	8-94	8-94#	8-109	8-114	8-114#	8-13		
	8-131#	8-144												
	8-149	8-149#	8-165	8-165#	8-176	8-181	8-181#	8-197	8-197#	8-207	8-212	8-212#	8-228	8-228#
	8-239	8-244	8-244#	8-663	8-663#	8-685	8-691	8-691#	8-885	8-885#	8-890	8-893	8-906	8-906#
T##SOF	8-;47	8-;47#	8-<21	8-<46	8-<46#	8-751	8-751#	8-070	8-070#					
T##SRV	8-A87	8-A67#	8-A91											
T##SW	6-265#	6-269												
T##TES	4-132	4-132#	4-138											
-49	7-3#	7-23	7-28#	7										
	7-54#	7-74	7-79#	7-99	7-104#	7-141	7-146#	8-8	8-13#	8-41				
	8-46#	8-79	8-84#	8-115	8-120#	8-150	8-155#	8-182	8-187#	8-213	8-218#	8-245	8-250#	8-281
	8-286#	8-307	8-312#	8-330	8-335#	8-372	8-377#	8-414	8-419#	8-459	8-463#	8-512	8-516#	8-553
	8-558#	8-579	8-607	8-612#	8-644	8-649#	8-672	8-675	8-696	8-700#	8-720	8-725#	8-753	8-758#
3	8-788#	8-818	8-822#	8-834	8-838#	8-859	8-864#	8-878	8-881	8-907	8-912#	8-925	8-928	
	8-950	8-955#	8-;24	8-;29#	8-;48	8-;53#	8-;78	8-;83#	8-;24	8-;29#	8-<47	8-<52#	8-<85	8-<95
	8-#00#	8-#31	8-#42	8-#47#	8-#79	8-#89	8-#94#	8->24	8->27	8->37	8->42#	8-?26	8-?36	8-?41#
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	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17				
	2-17#	2-17#	2-17#	2-17#	2-17#									
	4-32	4-32#	4-32#	4-32#	4-32#	4-41	4-41	4-41	4-41	4-41#	4-41#	4-41#	4-60	4-60
	4-60#	4-67	4-67	4-67	4-67#	4-67#	4-73	4-73	4-73	4-73	4-73#	4-73#	4-73#	4-76
	4-76	4-76	4-76	4-76	4-76	4-76	4	4	4	4	4	4	4	4
-76#	4-76#	4-76#	4-76#	4-76#	4-76#	4-77	4-77	4-77	4-77	4-77	4-77	4-77	4-77	4-77
	4-77	4-77	4-77	4-77	4-77#	4-77#	4-77#	4-77#	4-77#	4-77#	4-78	4-78	4-78	4-78
	4-78	4-78	4-78#	4-78#	4-78#	4-78#	4-78#	4-78#	4-78#	4-79	4-79	4-79	4-79	4-79
	4-79#	4-79#	4-79#	4-79#	4-79#	4-82	4-82	4-82	4-82	4-82#	4-82#	4-83	4-83	4-83
	4-83#	5-86	5-86	5-86	5-86									
#	5-126	5-126	5-126#	5-137	5-137	5-137#	6-15	6-15	6-15#					
T#CODE	8-A59	8-A59	8-A59	8-A59#	8-A59#	8-A59#	8-A61	8-A61	8-A61	8-A61#	8-A61#	8-A61#	8-A63	8-A63
	8-A63	8-A63#	8-A63#	8-A63#	8-A65	8-A65	8-A65	8-A65#	8-A65#	8-A65#	8-A65#	8-A67	8-A67	8-A67#
	8-A67#	8-A67#	8-A69	8-A69	8-A69	8-A69#	8-A69#	8-A69#	8-A69#	8-A88	8-A88	8-A88	8-A88#	8-A88#
	8-A89	8-A89	8-A89	8-A89	8-A89#	8-A89#	8-A89#	8-A89#	8-A90	8-A90	8-A90	8-A90#		
T#ERRN	8-A90#	8-A90#												
	2-7#	6-100	6-100#	6-280	6-280#	6-296	6-296#	7-21	7-21#	7-47	7-47#	7-72	7-72#	7-97
	7-97#	7-132	7-132#	7-168	7-168#	8-32	8-32#	8-70	8-70#	8-108	8-108#	8-143	8-143#	8-175
	8-175#	8-206	8-206#	8-238	8-238#	8-279	8-279#	8-304	8-304#	8-327	8-327#	8		
359	8-359#	8-368												
	8-368#	8-402	8-402#	8-412	8-412#	8-446	8-446#	8-455	8-455#	8-490	8-490#	8-499	8-499#	8-507
	8-507#	8-547	8-547#	8-585	8-585#	8-594	8-594#	8-603	8-603#	8-637	8-637#	8-683	8-683#	8-738
	8-738#	8-750	8-750#	8-780	8-780#	8-806	8-806#	8-815	8-815#	8-854	8-854#	8-900	8-900#	8-947
	8-947#	8-;17	8-;17#	8-;04	8-;04#	8-;21	8-;21#	8-;95	8-;9					
5#	8-<30	8-<30#	8-<92	8-<92#	8-#39									
	8-#39#	8-#86	8-#86#	8->34	8->34#	8-?33	8-?33#	8-000	8-000#	8-036	8-036#	8-055	8-055#	8-A32
	8-A32#													
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T#FLAG	7-133	7-133#	7-133#	7-169	7-169#	7-169#	8-33	8-33#	8-33#	8-71	8-71#	8-71#	8-109	8-109#
	8-109#	8-144	8-144#	8-144#	8-176	8-176#								
8-176#	8-207	8-207#	8-207#	8-239	8-239#	8-239#	8-579							
	8-579#	8-579#	8-672	8-672#	8-672#	8-675	8-675#	8-675#	8-685	8-685#	8-685#	8-685#	8-878	8-878#

	8-881	8-881#	8-881#	8-890	8-890#	8-890#	8-893	8-893#	8-893#	8-925	8-925#	8-925#	8-928	8-928#
	8-928#	8-<21	8-<21#	8-<21#	8-<85	8-<85#	8-<85#	8->31	8-31#	8-31#	8-79	8-79#	8-79#	8->24
T#GMAN	2-7#	8->24#	8->27	8->27#	8->27#	8-726	8-726#	8-726#						
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	4-11	4-18	4-26	4-35	4-44	4-51	4-62	4-71	4-126	4-138	5-103	5-141		
	5-164	5-176	5-186	6-269	7-23	7-49	7-74	7-99	7-141	8-8	8-41	8-79	8-115	8-150
	8-182	8-213	8-245	8-281	8-307	8-330	8-372	8-414	8-459	8-512	8-553	8-607	8-644	8-696
	8-720	8-753	8-783	8-818	8-834	8-859	8-907	8-950	8-:24	8-:48	8-:78	8-:24	8-<47	8-<95
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	2-72#	2-74	2-74	2-74#	2-298	2-298	2-298	2-298#	3-1	3-1	3-1#	3-93	3-93	3-93
	3-93#	4-3	4-3	4-3#	4-5	4-5	4-5#	4-11	4-11	4-11	4-11#	4-13	4-13	4-13#
18	4-18	4-18	4-18#	4-20	4-20	4-20#	4-26	4-26	4-26	4-26#	4-28	4-28	4-28#	
	4-35	4-35	4-35	4-35#	4-37	4-37	4-37#	4-44	4-44	4-44	4-44#	4-46	4-46	4-46#
	4-51	4-51	4-51	4-51#	4-53	4-53	4-53#	4-62	4-62	4-62	4-62#	4-64	4-64	4-64#
	4-71	4-71	4-71	4-71#	4-114	4-114	4-114	4-114#	4-116	4-116	4-116#	4-118	4-11	
8	4-118#													
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	4-138	4-138	4-138	4-138#	4-140	4-140	4-140	4-140#	4-142	4-142	4-142#	4-146	4-146	4-146#
	4-146#	5-3	5-3	5-3#	5-7	5-7	5-7	5-7#	5-10	5-10	5-10#	5-12	5-12	5-12#
	5-103	5-103	5-103	5-103#	5-105	5-105	5-105	5-105#	5-108	5-108				
	5-108#	5-141	5-141	5-141#										
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	5-166#	5-170	5-170	5-170#	5-172	5-172	5-172#	5-176	5-176	5-176	5-176#	5-178	5-178	5-178#
	5-178#	5-180	5-180	5-180#	5-182	5-182	5-182#	5-186	5-186	5-186	5-186#	5-188	5-188	5-188#
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	6-304#	7-3	7-3	7-3#	7-23	7-23	7-23#	7-28	7-28	7-28	7-28#	7-49	7-49	7-49#
	7-49#	7-54	7-54	7-54#	7-74	7-74	7-74#	7-79	7-79	7-79	7-79#	7-99	7-99	7-99#
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	7-141#	7-146	7-146	7-146#	7-15									
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	8-8#	8-13	8-13	8-13#	8-23	8-23	8-23#	8-40	8-40	8-40	8-40#	8-41	8-41	8-41#
	8-41#	8-46	8-46	8-46#	8-56	8-56	8-56#	8-78	8-78	8-78	8-78#	8-79	8-79	8-79#
	8-79#	8-84	8-84	8-84#	8-94	8-94	8-94#	8-114	8-114	8-114	8-114#	8-115	8-115	8-115#
	8-115#	8-120												
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	8-372#	8-377	8-377	8-377#	8-414	8-414	8-414#	8-419	8-419	8-419	8-419#	8-459	8-459	8-459#
	8-459#	8-463	8-463	8-463#	8-512	8-512	8-512#	8-516	8-516	8-516	8-516#	8-5	8-5	8-5#
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	8-644#	8-649	8-649	8-649#	8-663	8-663	8-663#	8-691	8-691	8-691	8-691#	8-696	8-696	8-696#
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	8-753#	8-758	8-758	8-758#	8-783	8-783	8-783#	8-788						
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	8-859#	8-864	8-864	8-864#	8-885	8-885	8-885#	8-906	8-906	8-906	8-906#	8-907	8-907	8-907#
	8-907#	8-912	8-912	8-912#	8-950	8-950	8-950#	8-955	8-955	8-955	8-955#	8-:24	8-:24	8-:24#
	8-:24#	8-:29	8-:29	8-:29#	8-:48	8-:48	8-:48							
	8-:48#	8-:53	8-:53	8-:53#	8-:78	8-:78	8-:78							
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	8-:95#	8-:00	8-:00	8-:00#	8-:42	8-:42	8-:42#	8-:47#	8-:52	8-:52	8-:52#	8-:95	8-:95	8-:95#
	8-:89#	8-:94	8-:94	8-:				8-:42#	8-:47	8-:47	8-:47#	8-:89	8-:89	8-:89#
94#	8->37	8->37	8->37	8->37#	8->42	8->42	8->42#	8-?36	8-?36	8-?36				
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	5-141#	5-164	5-164#	5-166	5-166#	5-176								
	5-176#	5-178	5-178#	5-186	5-186#	5-188	5-188#	6-269	6-269#	6-304	6-304#	7-4	7-4#	7-9
	7-9#	7-23	7-23#	7-31	7-31#	7-36	7-36#	7-49	7-49#	7-55	7-55#	7-60	7-60#	7-74
	7-74#	7-80	7-80#	7-85	7-85#	7-99	7-99#	7-108	7-108#	7-113	7-113#	7-133	7-133#	7-133#
	7-140	7-140#	7-141	7-141#	7-148									
	7-148#	7-153	7-153#	7-169	7-169#	7-169#	8-7	8-7#	8-8					
	8-8#	8-15	8-15#	8-19	8-19#	8-33	8-33#	8-33#	8-40	8-40#	8-41	8-41#	8-47	8-47#
	8-52	8-52#	8-71	8-71#	8-71#	8-78	8-78#	8-79	8-79#	8-86	8-86#	8-90	8-90#	8-109
	8-109#	8-109#	8-114	8-114#	8-115	8-115#	8-122	8-122#	8-127	8-127#	8-144	8-144#	8-144#	8-149
8-150#	8-149#	8-150												
	8-157	8-157#	8-161	8-161#	8-176	8-176#	8-176#	8-181	8-181#	8-182	8-182#			
	8-189	8-189#	8-193	8-193#	8-207	8-207#	8-207#	8-212	8-212#	8-213	8-213#	8-220	8-220#	8-224
	8-224#	8-239	8-239#	8-239#	8-244	8-244#	8-245	8-245#	8-252	8-252#	8-261	8-261#	8-281	8-281#
	8-288	8-288#	8-292	8-292#	8-307	8-307#	8-314	8-314#	8-318	8-318#	8-330	8-330#	8-337	8-337#
	8-343	8-343#	8-372	8-372#	8-378	8-378#	8-384	8-384#	8-414	8-414#	8-422	8-422#	8-428	8-428#
	8-459	8-459#	8-466	8-466#	8-471	8-471#	8-512	8-512#	8-520	8-520#	8-525	8-525#	8-553	8-553#
	8-560	8-560#	8-563	8-563#	8-579	8-579#	8-607	8-607#	8-614	8-614#	8-624	8-624#	8-644	8-644#
1	8-651	8-651#	8-655	8-655#	8-672	8-672#	8-675	8-675#	8 685	8-685#	8-685#	8-69		
	8-691#	8-696												
	8-696#	8-703	8-703#	8-709	8-709#	8-720	8-720#	8-753	8-753#	8-760	8-760#	8-766	8-766#	8-783
	8-783#	8-789	8-789#	8-794	8-794#	8-818	8-818#	8-823	8-823#	8-826	8-826#	8-834	8-834#	8-840
	8-840#	8-843	8-843#	8-859	8-859#	8-867	8-867#	8-871	8-871#	8-878	8-878#	8-881	8-881#	8-890
	8-890#	8-890#	8-893	8-893#	8-893#	8-906	8-906#	8-907	8-907#					
8-914	8-914#	8-918	8-918#	8-925										
	8-925#	8 928	8-928#	8-950	8-950#	8-958	8-958#	8-964	8-964#	8-:24	8-:24#	8-:30	8-:30#	8-:34
	8-:34#	8-:48	8-:48#	8-:56	8-:56#	8-:60	8-:60#	8-:78	8-:78#	8-:86	8-:86#	8-:90	8-:90#	8-:24
	8-:24#	8-:34	8-:34#	8-:43	8-:43#	8-<21	8-<21#	8-<21#	8-<46	8-<46#	8-<47	8-<47#	8-<56	8-<56#
	8 <59	8-<59#	8-<85	8-<85#	8-<95	8-<95#	8							
-03	8-03#	8-06	8-06#	8-31	8-31#	8-31#	8-42	8-42#	8-42#	8-96	8-96#	8->00	8->00#	8->24
	8-49	8-49#	8-53	8-53#	8-79	8-79#	8-89	8-89#	8-89#	8-96	8-96#	8->00	8->00#	8->24
	8->27	8->27#	8->37	8->37#	8->45	8->45#	8->53	8->53#	8-726	8-726#	8-736	8-736#	8-742	8-742#
	8-747	8-747#	8-870	8-870#	8-871	8-871#	8-878	8-878#	8-881	8-881#	8 A52	8 A52#	8 A59	8-A59
	8-A59	8-A59#	8-A59#	8-A5										
9#	8-A61	8-A61	8-A61	8-A61#	8-A61#	8-A61#	8-A63	8-A63	8-763	8-A63#				
	8-A63#	8-A63#	8-A65	8-A65	8-A65	8-A65#	8-A65#	8-A65#	8-A67	8-A67	8 A67	8 A67#	8 A67#	8-A67#
	8-A69	8-A69	8-A69	8-A69#	8-A69#	8-A69#	8-A71	8-A71#	8-A81	8-A81#	8 A88	8 A88#	8 A88	8-A88#
	8-A88#	8-A88#	8-A90	8-A90	8-A90	8-A90#	8-A90#	8-A90#	8-A91	8-A91#	8-B06	8-B06#	8-A88	8-A88#
T#TEST	2-7#	7-3	7-3											
7-3#	7-28	7-28	7-28#	7-54	7-54	7-54#	7-79	7-79	7-79#	7-104				
	7-104	7-104#	7-146	7-146	7-146#	8-13	8-13	8-13#	8-46	8-46	8-46#	8-84	8-84	8-84#
	8-120	8-120	8-120#	8-155	8-155	8-155#	8-187	8-187	8-187#	8-218	8-218	8-218#	8-250	8-250
	8-250#	8-286	8-286	8-286#	8-312	8-312	8-312#	8-335	8-335	8-335#	8-377	8-377	8-377#	8-419
	8													
-419	8-419#	8-463	8-463	8-463#	8-516	8-516	8-516#	8-558	8-558	8-558#	8-612	8-612	8-612#	
	8-649	8-649	8-649#	8-700	8-700	8-700#	8-725	8-725	8-725#	8-758	8-758	8-758#	8-788	8-788
	8-788#	8-822	8-822	8-822#	8-838	8-838	8-838#	8-864	8-864	8-864#	8-912	8-912	8-912#	8-955
	8-955	8-955#	8-:29	8-:29	8-:29#	8-:53	8-:53	8-:53#	8-:83	8-:83	8-:83#	8-:29	8-;	
29	8-:29#													
	8-<52	8-<52	8-<52#	8-00	8-00	8-00#	8-47	8-47	8-47#	8-94	8-94	8-94#	8->42	8->42
	8->42#	8-741	8-741	8-741#	8-876	8-876	8-876#	8-807	8-807					
T#TSTM	2-7#	4-11	4-18	4-23	4-26	4-32	4-35	4-41	4-44	4-51	4-60	4-62	4-67	4-71
	4-73	4-76	4-77	4-78	4-79	4-82	4-83	5-14	5-15	5-19	5-21	5-30	5-42	5-86
	5-89													
5-90	5-97	5-99	5-103	5-112	5-121	5-126	5-128	5-137	5-139	5-141	5-147	5-154		
	5-164	5-176	5-186	6-7	6-15	6-17	6-18	6-100	6-280	6-296	7-13	7 16	7 21	7-22
	7-23	7-39	7-42	7-47	7-48	7-49	7-64	7-67	7-72	7-73	7-74	7-89	7-92	7-97
8-32	7-98	7-99	7-118	7-132	7-133	7-140	7-141	7-157	7-168	7-169	8-7	8-8	8 23	
	8-33	8-40	8-41	8-56	8-70	8-71	8-78	8-79	8-94	8-108	8-109	8-114	8-115	8-131
	8-143	8-144	8-149	8-150	8 165	8-175	8-176	8-181	8-182	8 197	8-206	8-207	8-212	8-213
	8-228	8-238	8-239	8-244	8-245	8-264	8-271	8-279	8-281	8-300	8-304	8 307	8-323	8-327

Cross reference table (CREF V05.01)

ENDHW	1-465#	2-7#	4-126														
ENDINI	1-475#	2-7#	5-103														
ENDMOD	1-487#	2-7#	2-19	2-72	2-298	3-93	4-114	4-128	4-140	4-146	5 105	5 166	5-178	5-188			
	6-304	8-A81	8 B06														
ENDMSG	1-500#	2-7#	4-11	4 18	4-26	4 35	4-44	4-51	4-62	4-71							
ENDPRO	1-512#	2-7#	5-7														
ENDPTA	1-520#	2-7#															
ENDRPT	1-529#	2-7#															
ENDSEG	1-541#	2-7#															
	7-140	8-7	8-40	8-78	8-114	8-149	8-181	8-212	8-244	8-691	8-906	8-<46					
	8-#70																
ENDSET	1-555#	2-7#															
ENDSFT	1-568#	2-7#	8-A91														
ENDSRV	1-580#	2-7#	6-269														
ENDSUB	1-596#	2-7#															
ENDSW	1-614#	2-7#	4-138														
ENDTST	1-624#	2-7#	7-23	7-49	7-74	7-99	7 141	8-8	8-41	8-79	8-115	8-150	8 182	8-213			
	8-245	8-281	8-307	8-330	8-372	8-414	8-459	8-512	8-553	8-							
607	8-644	8-696	8-720	8-753													
	8-783	8-818	8-834	8-859	8-907	8-950	8-:24	8 :48	8-:78	8-;24	8-<47	8 <95	8 =42	8 =89			
	8->37	8-736	8-#71	8-A52													
EQUALS	1-642#	2-7#	2-26														
ERRDF	1-714#	2-7#	6-100	6-280	6-296	7-132	7-168	8-32	8-70	8-108	8-143	8-175	8-206	8-238			
	8-279	8-304	8-327	8-359	8-368	8-402	8-412	8-44f	8-455	8 490	8-499	8-507	8-547				
	8-585																
	8-594	8-603	8-637	8-683	8-738	8-750	8-780	8-806	8-815	8-854	8 900	8-947	8-:17	8 :04			
	8-;21	8-;95	8-<30	8-<92	8-#39	8-#86	8->34	8-733	8-#00	8-#36	8 #55	8-A32					
ERRHRD	1-718#	2-7#															
ERROR	1-722#	2-7#															
ERRSF	1-726#	2-7#	7-21	7-47	7-72	7-97											
ERRSOF	1-730#	2-7#															
ERRTBL	1-734#	2-7#															
ESCAPE	1-744#	2-7#	7-133	7-169	8-33	8-71	8-109	8-144	8-17								
6	8-207	8-239	8-579	8-672	8-675												
	8-685	8-878	8-881	8-890	8-893	8-925	8-928	8-<21	8 <85	8-#31	8 =79	8 >24	8->27	8-726			
EXIT	1-771#	2-7#															
FEQUAL	1-810#	2-7#															
GETBYT	1-824#	2-7#															
GETPRI	1-834#	2-7#															
GETWOR	1-829#	2-7#															
GMANIA	1-839#	2-7#															
GMANID	1-848#	2-7#															
GMANIL	1-859#	2-7#															
GPHARD	1-868#	2-7#	5-42														
GPRMA	1-874#	2-7#	8-A61	8-A63													
GPRMD	1-903#	2-7#	8-A59	8-A65													
	8-A69	8-A90															
GPRML	1-934#	2-7#	8-A67	8-A88													
HEADER	1-954#	2-7#	2-17														
INLOOP	1-962#	2-7#	6-7														
IOSETU	1-966#	2-7#															
IOSTAR	1-974#	2-7#															
KT11	1-982#	2-7#															
LASTAD	1-;47#	2-7#	8-B07														
M#BYTE	1 D00#	2-7#	2-17	2-17	2-17	2-17#											
M#CHEC	1-E18#	2-7#															
M#CNT0	1-E82#	2-7#	8-A59	8-A59#	8-A61	8-A61#	8-A63	8-A63#	8-A65	8-A65#	8-A67	8 A67#	8 A69	8 A69#			
	8-A88	8-A88#	8 A90	8-A90#													
M#COUN	1-066#	2-7#	4-23	4-23	4-23#	4-32	4-32	4-32	4-32#	4-41	4 41	4 41#	4-60	4 60#			
	4-67	4-67#	4-73	4-73	4-73#	4-76	4-76	4-76	4-76#	4-76	4 76#	4-77	4 77	4 77#			
	4-77	4-77#	4-78	4-78	4-78	4-78	4-78	4-78	4-78#	4-79	4 79	4 79	4 79#	4 79#	4 79#		

SEQ 0128

Cross reference table (CREF V05.01)

M#DATA	4-82#	4-83	4-83#	5-86	5-86#	5-126	5-126#	5-137	5-137#	6-15	6-15#	2-17	2-17	2-17
	1-867#	2-7#	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17
	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17	2-17
17	2-17	2-17	2-17	2-17#	2-17#	2-21	2-21	2	2					
M#DECR	2-21#	2-22	2-22#											
	1-029#	2-7#	2-19	2-19#	2-72	2-72#	2-298	2-298#	3-93	3-93#	4-11	4-11#	4-18	4-18#
	4-26	4-26#	4-35	4-35#	4-44	4-44#	4-51	4-51#	4-62	4-62#	4-71	4-71#	4-114	4-114#
	4-126	4-126#	4-128	4-128#	4-138	4-138#	4-140	4-140#	4-146	4-146#	5-7	5-7#	5-103	5-103#
	5-105													
5 105#	5-141	5-141#	5-164	5-164#	5-166	5-166#	5-176	5-176#	5-178	5-178#	5-186	5-186#		
	5-188	5-188#	6-269	6-269#	6-304	6-304#	7-23	7-23#	7-49	7-49#	7-74	7-74#	7-99	7-99#
	7-140	7-140#	7-140#	7-140#	7-141	7-141#	8-7	8-7	8-7#	8-7#	8-8	8-8#	8-40	8-40#
	8-40#	8-40#	8-41	8-41#	8-78	8-78	8-78#	8-78#	8-79	8-79#	8-114	8-114#	8-114#	
8-114#														
	8-115	8-115#	8-149	8-149#	8-149#	8-149#	8-150	8-150#	8-181	8-181#	8-181#	8-181#	8-182	8-182#
	8-212	8-212#	8-212#	8-212#	8-213	8-213#	8-244	8-244#	8-244#	8-244#	8-245	8-245#	8-281	8-281#
	8-307	8-307#	8-330	8-330#	8-372	8-372#	8-414	8-414#	8-459	8-459#	8-512	8-512#	8-553	8-553#
	8-607	8-607#	8-644	8-644#	8-691	8-691#	8-691#	8-691#	8-696	8-696#	8			
-720	8-720#	8-753	8-753#											
	8-783	8-783#	8-818	8-818#	8-834	8-834#	8-859	8-859#	8-906	8-906#	8-906#	8-906#	8-907	8-907#
	8-950	8-950#	8-:24	8-:24#	8-:48	8-:48#	8-:78	8-:78#	8-:24	8-:24#	8-:46	8-:46#	8-:46#	8-:46#
	8-:47	8-:47#	8-:95	8-:95#	8-:42	8-:42#	8-:89	8-:89#	8-:37	8-:37#	8-:36	8-:36#	8-:70	8-:70#
	8-:70#	8-:70#	8-:71	8-:71#	8-A52	8-A52#	8-A71	8-A7						
1#	8-A81	8-A81#	8-A91	8-A91#	8-B06	8-B06#								
M#DEFA	1-E70#	2-7#	8-A59	8-A59#	8-A61	8-A61#	8-A63	8-A63#	8-A65	8-A65#	8-A67	8-A67#	8-A69	8-A69#
	8-A88	8-A88#	8-A90	8-A90#										
M#ENDE	1-D74#	2-7#	2-19#	2-72#	2-298#	3-93#	4-11#	4-18#	4-26#	4-35#	4-44#	4-51#	4-62#	4-71#
	4-114#	4-126#	4-128#	4-138#	4-140#	4-146#	5-103#	5-105#	5-141#	5-164#	5-166#	5-176#	5-178#	5-186#
5-188#	6-269#	6-304#	7-23#	7-49#	7-74#	7-99#	7-140#	7-141#	8-7#	8-8#	8-40#	8-41#	8-78#	
	8-79#	8-114#	8-115#	8-149#	8-150#	8-181#	8-182#	8-212#	8-213#	8-244#	8-245#	8-281#	8-307#	8-330#
	8-372#	8-414#	8-459#	8-512#	8-553#	8-607#	8-644#	8-691#	8-696#	8-720#	8-753#	8-783#	8-818#	8-834#
	8-859#	8-906#	8-907#	8-950#	8-:24#	8-:48#	8-:78#	8-:24#	8-:46#	8-:47#	8-:95#	8-:42#	8	
--89#	8-:37#													
	8-736#	8-:70#	8-:71#	8-A52#	8-A71#	8-A81#	8-A91#	8-B06#						
M#ERRI	1-:49#	2-7#	6-100	6-100#	6-280	6-280#	6-296	6-296#	7-21	7-21#	7-47	7-47#	7-72	7-72#
	7-97	7-97#	7-132	7-132#	7-168	7-168#	8-32	8-32#	8-70	8-70#	8-108	8-108#	8-143	8-143#
	8-175	8-175#	8-206	8-206#	8-238	8-238#	8-279	8-279#	8-304	8-304#	8-327	8-327#	8-359	8-359#
	8-368													
	8-368#	8-402	8-402#	8-412	8-412#	8-446	8-446#	8-455	8-455#	8-490	8-490#	8-499	8-499#	
	8-507	8-507#	8-547	8-547#	8-585	8-585#	8-594	8-594#	8-603	8-603#	8-637	8-637#	8-683	8-683#
	8-738	8-738#	8-750	8-750#	8-780	8-780#	8-806	8-806#	8-815	8-815#	8-854	8-854#	8-900	8-900#
	8-947	8-947#	8-:17	8-:17#	8-:04	8-:04#	8-:21	8-:21#	8-:95	8-:95#	8-:30	8-:30#	8-:92	
8-:92#														
	8-:39	8-:39#	8-:86	8-:86#	8-:34	8-:34#	8-733	8-733#	8-:00	8-:00#	8-:36	8-:36#	8-:55	8-:55#
	8-A32	8-A32#												
M#ESCA	1-D06#	2-7#	7-133#	7-169#	8-33#	8-71#	8-109#	8-144#	8-176#	8-207#	8-239#	8-579	8-579#	8-672
	8-672#	8-675	8-675#	8-685#	8-878	8-878#	8-881	8-881#	8-890#	8-893#	8-925	8-925#	8-928	8-928#
	8-:21#	8-:85	8-:85#	8-:31	8-:31#	8-:79	8-:79#	8-						
>24	8-:24#	8-:27	8-:27#	8-726	8-726#									
M#ESCS	1-D10#	2-7#	7-133	7-133#	7-169	7-169#	8-33	8-33#	8-71	8-71#	8-109	8-109#	8-144	8-144#
	8-176	8-176#	8-207	8-207#	8-239	8-239#	8-579#	8-672#	8-675#	8-685	8-685#	8-878#	8-881#	8-890
	8-890#	8-893	8-893#	8-925#	8-928#	8-:21	8-:21#	8-:85#	8-:31#	8-:79#	8-:24#	8-:27#	8-726#	
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	2-17#	2-17#	2-17#	2-17#	2-17#	2-17#	2-17#	2-17#	2-17#	2-17#	2-21	2-21#	2-22	2-22#
	2-24													
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	8-182#	8-197	8-197#	8-206	8-206	8-206	8-206	8-206#	8 206#	8-206#	8-206#	8-206#	8-207	8 207
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7#	8 547#	8-548	8-548#	8-553	8-553#	8-576	8-576#							
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	8-696#	8-716	8-716#	8-720	8-720#	8-730	8-730	8-730#	8-730#	8-735	8-735	8-735#	8-735#	8-738
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	8-747	8-747	8-747#	8-747#	8-750	8-750	8-750	8-750	8 750#	8-750#	8-750#	8 750#	8-750#	8-750#
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06														
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	8-:71#	8-:74	8-:74#	8-:78	8-:78#	8-:96	8-:96	8-:96#	8-:96#	8-:04	8-:04	8-:04	8-:04#	8-:04#
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	8-:21	8-:21	8-:21	8-:21	8-:21#	8-:								
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	8-:17	8-:17#	8-:20	8-:20#	8-:23	8-:23#	8-:28	8-:28#	8-:31	8-:31	8-:31#	8-:31#	8-:39	8-:39
8-39	8-:39	8-:39#	8-:39#	8-:39#	8-:39#	8-:39#	8-:42	8-:42#	8-:61	8-:61#	8-:64	8-:64#	8-:67	8-:67
	8-:67#	8-:70	8-:70#	8-:76	8-:76#	8-:79	8-:79	8-:79#	8-:79#	8-:86	8-:86	8-:86	8-:86	8-:86#
	8-:86#	8-:86#	8-:86#	8-:86#	8-:89	8-:89#	8->09	8->09#	8->12	8->12#	8->15	8->15#	8->18	8->18#
	8->24	8->24	8->24#	8->24#	8->27	8->27	8->27#	8->27#	8->34	8->34	8->34	8->34	8-	8-
>34#	8->34#	8->34#	8->34#	8->37	8->37#	8->59	8->59#	8->62	8->62#	8-?00	8-?00#	8-?04	8-?04#	8-?08
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	8-036#	8-036#	8-036											
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	8-055#	8-056	8-056#	8-070	8-070#	8-071	8-071#	8-088	8-088#	8-091	8-091#	8-A06	8-A06#	8-A09
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	8-A89	8-A89#	8-A90	8-A90	8-A90	8-A90	8-A90	8-A90#	8-A91	8-A91#	8-A91#	8-A91#	8	
B07	8-B07#	8-B07#												
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	4-62	4-62#	4-71	4-71#										
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	8-753	8-753#	8-783	8-783#	8-818	8-818#	8-834	8-834#	8-859	8-859#	8-907	8-907#	8-950	8-950#
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A91#														
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	8->42	8->42#	8-741	8-741#	8-076	8-076#								
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	4-46#	4-46#	4-51#	4-53	4-53	4-53#	4-53#	4-60#	4-62#	4-64	4-64	4-64#	4-64#	4-67#
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	5-143#													
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	8-789	8-789#	8-792	8-7										
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	8-499	8-499#	8-499#	8-500	8-500#	8-507	8-507#	8-507#	8-512	8-512#	8-547	8-547#	8-547#	8-548	8-548#	8-548#	8-548#	8-548#
	8-548#	8-553	8-553#	8-576	8-576#	8-579	8-579#	8-579#	8-585	8-585#	8-585#	8-587	8-587#	8-594	8-594#	8-594#	8-594#	8-594#
	8-594#	8-596	8-596#	8-603	8-603#	8-603#	8-607	8-607#	8-631	8-631#	8-637	8-637#	8-6	8-6#	8-6#	8-6#	8-6#	8-6#
37#	8-639	8-639#	8-644	8-644#	8-663	8-663#	8-666	8-666#	8-672	8-672#	8-675	8-675#	8-683	8-683#	8-683#	8-683#	8-683#	8-683#
	8-639#	8-644	8-644#	8-663	8-663#	8-666	8-666#	8-672	8-672#	8-675	8-675#	8-683	8-683#	8-683#	8-683#	8-683#	8-683#	8-683#
	8-685	8-685#	8-691	8-691#	8-696	8-696#	8-716	8-716#	8-720	8-720#	8-730	8-730#	8-735	8-735#	8-735#	8-735#	8-735#	8-735#
	8-738	8-738#	8-738#	8-739	8-739#	8-742	8-742#	8-747	8-747#	8-750	8-750#	8-750#	8-751	8-751#	8-751#	8-751#	8-751#	8-751#
	8-753	8-753#	8-777	8-777#	8-780	8-780#	8-780#	8-783	8-783#	8-797	8-797#	8-797#	8-797#	8-797#	8-797#	8-797#	8-797#	8-797#
	8-797#	8-803	8-803#	8-806	8-806#	8-806#	8-812	8-812#	8-815	8-815#	8-815#	8-818	8-818#	8-831	8-831#	8-831#	8-831#	8-831#
	8-806#	8-806#	8-807	8-807#	8-812	8-812#	8-815	8-815#	8-815#	8-818	8-818#	8-831	8-831#	8-834	8-834#	8-834#	8-834#	8-834#
	8-834#	8-846	8-846#	8-851	8-851#	8-854	8-854#	8-854#	8-854#	8-855	8-855#	8-859	8-859#	8-878	8-878#	8-878#	8-878#	8-878#
	8-881	8-881#	8-885	8-885#	8-890	8-890#	8-893	8-893#	8-900	8-900#	8-900#	8-900#	8-902	8-902#	8-902#	8-902#	8-902#	8-902#
	8-906#	8-907	8-907#	8-925	8-925#	8-928	8-928#	8-928#	8-928#	8-928#	8-928#	8-928#	8-928#	8-928#	8-928#	8-928#	8-928#	8-928#
8-947	8-947#	8-947#	8-950	8-950#	8-:17	8-:17#	8-:45	8-:45#	8-:48	8-:48#	8-:68	8-:68#	8-:71	8-:71#	8-:74	8-:74#	8-:74#	8-:74#
	8-:17#	8-:18	8-:18#	8-:24	8-:24#	8-:45	8-:45#	8-:48	8-:48#	8-:68	8-:68#	8-:71	8-:71#	8-:74	8-:74#	8-:74#	8-:74#	8-:74#
	8-:74#	8-:78	8-:78#	8-:96	8-:96#	8-:04	8-:04#	8-:04#	8-:04#	8-:05	8-:05#	8-:09	8-:09#	8-:15	8-:15#	8-:15#	8-:15#	8-:15#
	8-:17	8-:17#	8-:21	8-:21#	8-:21#	8-:22	8-:22#	8-:24	8-:24#	8-:24#	8-:47	8-:47#	8-:52	8-:52#	8-:55	8-:55#	8-:55#	8-:55#
	8-:55#	8-:70	8-:70#	8-:73	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#	8-:73#
73#	8-:76	8-:76#	8-:79	8-:79#	8-:84	8-:84#	8-:87	8-:87#	8-:95	8-:95#	8-:95#	8-:95#	8-:95#	8-:95#	8-:95#	8-:95#	8-:95#	8-:95#
	8-:95#	8-:95#	8-:96	8-:96#	8-:03	8-:03#	8-:06	8-:06#	8-:09	8-:09#	8-:12	8-:12#	8-:18	8-:18#	8-:21	8-:21#	8-:21#	8-:21#
	8-:21	8-:21#	8-:30	8-:30#	8-:30#	8-:31	8-:31#	8-:46	8-:46#	8-:46#	8-:47	8-:47#	8-:68	8-:68#	8-:71	8-:71#	8-:71#	8-:71#
	8-:71#	8-:74	8-:74#	8-:77	8-:77#	8-:82	8-:82#	8-:85	8-:85#	8-:92	8-:92#	8-:92#	8-:95	8-:95#	8-:95#	8-:95#	8-:95#	8-:95#
	8-:14	8-:14#	8-:14#	8-:14#	8-:14#</													

XFERT	1-0160	2-70	8-A89
XFERT	1-0200	2-70	