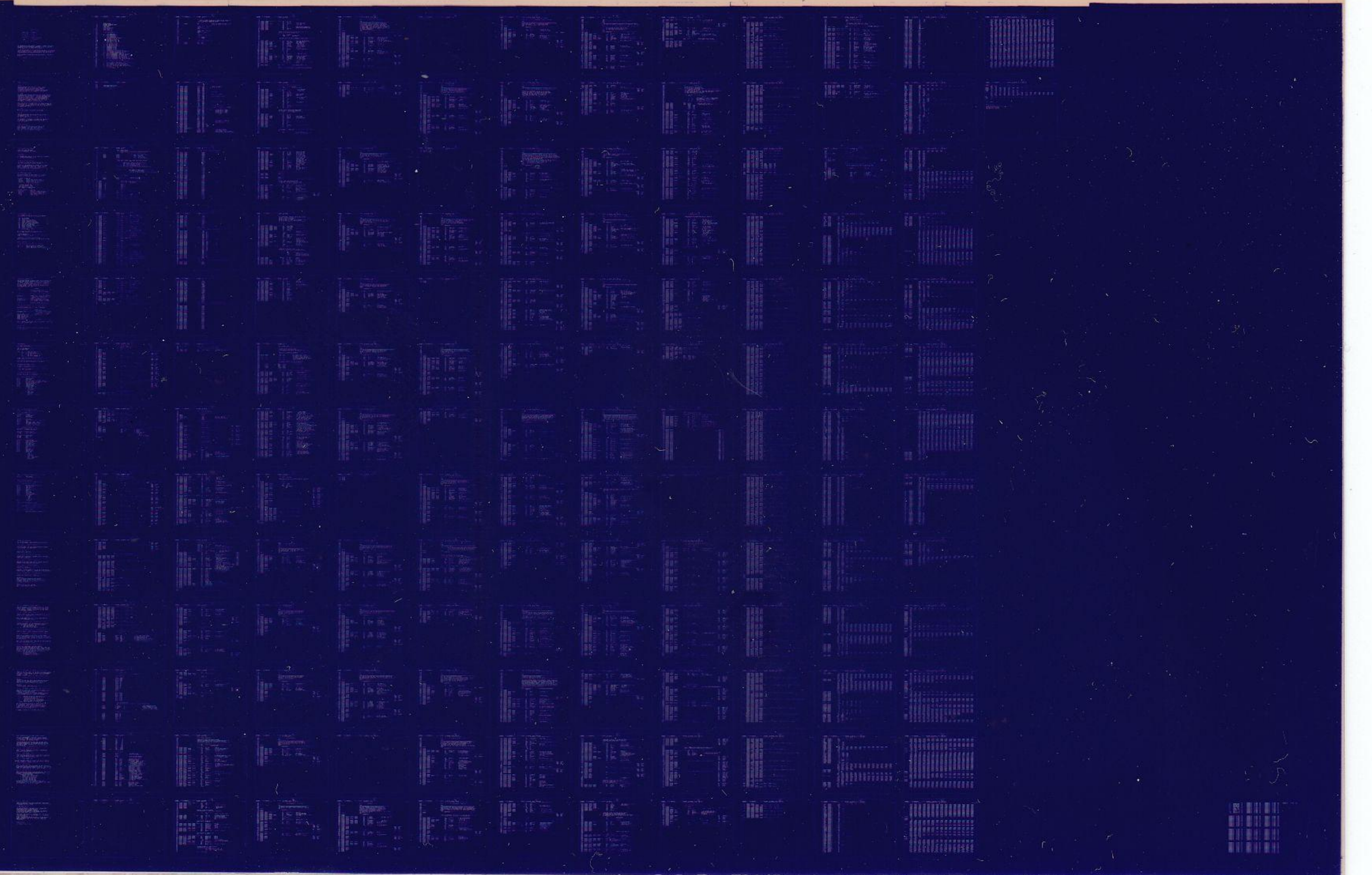


M8061 RL11
RLV11/12

RLV12 DISKLESS
CVRLBB0

AH-S827B-MC
1 OF 1 JUL 1985
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IDENTIFICATION
- - -

PRODUCT CODE: AC-S825B MC
PRODUCT NAME: CVRL880 RLV12 DISKLESS
DATE CREATED: FEB 1982
MAINTAINER: DIAGNOSTIC ENGINEERING
AUTHOR: G. PASQUANTONIO
DATE REVISED: MAR 1985

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06
1.0GENERAL INFORMATION

SEQ 0002

1.1

ABSTRACT

THE RLV12 DISKLESS TEST IS AN LSI 11 (PDP 11) BASED PROGRAM THAT WILL TEST THE RLV12, RLV11 AND/OR RL11 DISK CONTROLLERS WITH OR WITHOUT DRIVE ATTACHED. THE PROGRAM IS AN ADAPTATION OF "CVRLABO RLV11 RLO1 DSKLS" RETAINING ALL PREVIOUS TEST CAPABILITIES, AND UPGRADED TO INCLUDE ADDITIONAL TESTING IN SUPPORT OF THE RLV12.

RLV12 MODE

THE PROGRAM TESTS THE BASIC INTERFACE LOGIC, CONTROL REGISTER MANIPULATION, AND FUNCTIONALITY. THE RLV12 MAINTENANCE MODE FUNCTION IS EXECUTED TO TEST THE CONTROLLER WRITE/READ DATA PATHS WITHOUT A DRIVE PRESENT. THE EXTENDED ADDRESSING CAPABILITY IS TESTED IN 18 OR 22 BIT MODE DEPENDING ON THE TYPE AND AMOUNT OF MEMORY INSTALLED IN THE TEST SYSTEM. ADDITIONALLY, THE DRIVE BUS INTERFACE LOGIC IS TESTED PROVIDED THE G5388 TEST LOOP MODULE (TLM) IS INSTALLED.

NOTE. THE TLM IS AN IN HOUSE SPECIAL TEST DEVICE DESIGNED FOR MANUFACTURING USE. IT PROBABLY WILL NOT BE GENERALLY AVAILABLE IN THE FIELD. THE CODE FOR TESTING WITH THE TLM IS INCLUDED IN THIS PROGRAM (BYPASSED BY DEFAULT) TO MAINTAIN CONSISTENCY WITH THE MANUFACTURING VERSION.

RLV11 MODE

SAME AS ABOVE EXCEPT THAT EXTENDED ADDRESSING IS LIMITED TO 18 BITS, AND DRIVE INTERFACE IS NOT TESTED.

RL11 MODE

SINCE THE MAINTENANCE FUNCTION DOES NOT EXIST ON THE RL11, THIS PROGRAM WILL ONLY TEST THE BASIC INTERFACE LOGIC, AND REGISTER FUNCTIONALITY. THE "NOP" COMMAND IS THE ONLY FUNCTION EXECUTED ON THE RL11.

THIS DIAGNOSTIC IS DESIGNED TO RUN UNDER XXDP, AND REQUIRES THE SERVICES OF THE DIAGNOSTIC SUPERVISOR (DRS REV D). IT WILL RUN STANDALONE UNDER XXDP, AND IS CHAINABLE UNDER XXDP, ACT, OR APT.

1.2

HARDWARE REQUIREMENTS

LSI-11 (PDP 11) PROCESSOR WITH 16K OR MORE OF CORE.
MEMORY MANAGEMENT, KT11 OR EQUIVALENT (OPTIONAL).
CONSOLE TERMINAL (LA30, LA36, VT52, VT100, ETC.).
XXDP, LOAD DEVICE AND DIAGNOSTIC MEDIA (RX01, RX02, ETC.)
RLV12, RLV11, OR RL11 CONTROLLER(S) UNDER TEST (1 8).
G5388 RLV12 TEST LOOP MODULE (1 8, OPTIONAL).

06

1.3

RELATED DOCUMENTS AND STANDARDS

 CHQUSE XXDP+ / SUPR USER MANUAL.
 RLV12 DISK CONTROLLER USERS GUIDE.
 G5388 TLM ENGINEERING SPEC (OPTIONAL).

1.4

MISCELLANEOUS

 ALL HARDWARE OTHER THAN THE UNIT(S) UNDER TEST IS ASSUMED TO
 BE IN PROPER WORKING ORDER. IF NOT (OR YOU DON'T KNOW) RUN
 ALL APPLICABLE SYSTEM DIAGNOSTICS.

2.0

LOADING AND STARTING PROCEDURES

 THIS PROGRAM IS LOADED AND STARTED FROM ANY XXDP+ MEDIA
 USING THE STANDARD XXDP+ OPERATING PROCEDURES.

AT START UP, THE SUPERVISOR WILL IDENTIFY ITSELF AND THE
 NAME OF THIS PROGRAM ON THE CONSOLE TERMINAL, AND THEN
 DISPLAY A COMMAND MODE PROMPT (DR>) WHICH INDICATES
 READY TO ACCEPT ANY OF THE COMMANDS DESCRIBED IN 2.1 BELOW.
 THE GENERALIZED COMMAND STRING FORMAT IS:

DR>COM(MAND)/SWITCH:VALUE/SWITCH:VALUE ... <CR>

2.1

SUPERVISOR COMMAND SUMMARY

 THIS SECTION PRESENTS A BRIEF OVERVIEW OF THE COMMANDS
 NECESSARY TO CONTROL THE OPERATION OF THIS PROGRAM
 UNDER THE XXDP+ DIAGNOSTIC SUPERVISOR (REV D).

THE PRIMARY COMMANDS ARE:

STA(RT)	INITIAL START, BUILD P-TABLES (SEE 2.4).
RES(TART)	RESTART USING EXISTING P-TABLES.
CON(TINUE)	CONTINUE AFTER <+C> OR ERROR HALT.
PRO(CCEED)	PROCEED (FROM ERROR HALT ONLY).
EXI(T)	RETURN TO XXDP+ MONITOR.

THE FOLLOWING SWITCHES APPLY TO THE ABOVE:

/TEST:<TEST NUMBERS TO RUN>
 /FLAG:<SEE FLAG LIST BELOW>
 /EOP:<NUMBER OF PASSES 'TIL END OF PASS REPORT>
 /PASS:<NUMBER OF PASSES TO RUN>

ADDITIONAL COMMANDS AVAILABLE ARE:

DRO(P)/UNIT:N	REMOVE UNIT N FROM TEST LIST.
ADD/UNIT:N	ADD UNIT N (PREVIOUSLY DROPPED).
DIS(PLAY)/UNIT:N	PRINT UNITS P-TABLE ENTRIES.
PRI(NT)	PRINT OPTIONAL REPORTS (IF ANY).
FLA(GS)	PRINT CURRENT FLAG SETTINGS.
ZFL(AGS)	CLEAR ALL FLAGS.

06
2.2

SEQ 0004

RUN TIME OPTIONS (FLAGS)

THE FOLLOWING FLAGS ARE USED IN LIEU OF THE HARDWARE SWITCH REGISTER TO FURTHER DEFINE PROGRAM BEHAVIOUR:

```

HOE  HALT ON ERROR
LOE  LOOP ON ERROR
IER  INHIBIT ALL ERROR REPORTS
IBR  INHIBIT BASIC ERROR REPORTS
IXR  INHIBIT EXTENDED ERROR REPORTS
PRI  DIRECT OUTPUT TO A LINE PRINTER
PNT  PRINT TEST NUMBERS AS EXECUTED
BOE  GOOD OLD "BELL ON-ERROR"
UAM  RUN IN "UNATTENDED MODE" ( UNUSED )
ISR  INHIBIT STATISTICAL REPORTS
IDR  INHIBIT "AUTO-DROP"
ADR  EXECUTE "AUTO-DROP" IF DEVICE NOT READY
LOT  LOOP ON TEST
FVL  EVALUATE ERRORS ( UNUSED )

```

FLAG SETTINGS ARE ALTERED BY USING THE /FLAGS: SWITCH IN ANY COMMAND STRING. TWO EXAMPLES FOLLOW:

STA/FLA:IER:BOE<CR>
START THE PROGRAM, RUN ALL TEST IN ORDER, INHIBIT ERROR REPORTS AND RING BELL INSTEAD.

RES/TES:1 5,7,9-29/PAS:10/FLA:HOE:BOE<CR>
RESTART AND RUN ALL TESTS EXCEPT 6, 8, AND 30 FOR 10 PASSES.
RING THE BELL AND HALT (RETURN TO COMMAND MODE) ON ANY ERROR.

2.3

CONTROL CHARACTERS

THE FOLLOWING CONTROL CHARACTERS ARE RECOGNIZED:

```

CTRL C <+C>  ABORT AND RETURN TO COMMAND MODE.
CTRL O <+O>  SUPPRESS TTY OUTPUT UNTIL NEXT <+O>.
CTRL Z <+Z>  DURING START/RESTART PARAMETER ENTRY ONLY.
              IMPLIES TAKE DEFAULTS ON ALL REMAINING QUERIES.

```

HARD AND SOFT PARAMETER SETUP

THE FOLLOWING DIALOGUE IS TAKEN AT START TIME TO ESTABLISH THE HARDWARE AND SOFTWARE PARAMETER TABLES (P-TABLES) REQUIRED BY THE PROGRAM. DEFAULT VALUES, WHEN APPLICABLE, APPEAR JUST TO THE LEFT OF THE QUESTION MARK (?). TYPE <CR> TO ACCEPT THE DEFAULT, OR ANSWER THE QUERY APPROPRIATELY. A <+Z> TYPED AT ANY POINT DURING THE SESSION IMPLIES TAKE DEFAULTS FOR ALL REMAINING QUERIES. NOTE THAT ON RESTART OR CONTINUE, ONLY THE SOFTWARE DIALOGUE IS TAKEN.

QUERY	RESPONSE
CHANGE HW (L) ?	NO DEFAULT, ANSWER Y OR N. IF N, ASSUME 1 UNIT IN THE DEFAULT CONFIGURATION, AND GO TO "CHANGE SW".
# UNITS (D) ?	NO DEFAULT, ENTER # OF UNITS TO TEST.
RLV12 (L) Y ?	ANSWER Y OR N. IF N, SKIP NEXT QUERY.
BAE ENABLED (L) Y ?	ON RLV12, BAE IS ENABLED BY DEFAULT... ...ANSWER Y OR N, AND SKIP NEXT QUERY.
RLV11 (L) N ?	ANSWER Y IF RLV11, N IF RL11.
CSR ADDRESS (O) 174400 ?	ENTER RL CSR ADDRESS IF DIFFERENT.
VECTOR (O) 160 ?	ENTER INTERRUPT VECTOR IF DIFFERENT.
BR LEVEL (O) 4 ?	ENTER INTERRUPT PRIORITY IF DIFFERENT.
CHANGE SW (L) ?	NO DEFAULT, ANSWER Y OR N. IF N, BYPASS ALL REMAINING QUERIES.
ERROR LIMIT FOR AUTO DROP (O) 0 ? SET ERROR LIMIT (IF ANY).	
ALL REMAINING QUERIES ARE FOR OPTIONAL (MANUFACTURING) G5388 TEST-LOOP MODULE SET UP. USE <+Z> TO BYPASS.	
G5388 TLM INSTALLED (L) N ?	ANSWER Y OR N. IF NO, BYPASS THE REST.
CSR ADDRESS (UNIT 0) (O) 160010	? BASE TLM CSR (SEE NOTE BELOW).
DUMP PROM ON TTY: (L) N ?	IF Y, GO DIRECTLY TO THE DUMP... ...UTILITY (SEE 7.16.7 BELOW).
PROM ID NUMBER (O) 401 ?	ENTER PROM ID IF DIFFERENT.
INHIBIT MAX PEAK SHIFT (L) N ?	ANSWER Y OR N...
INHIBIT MIN PEAK SHIFT (L) N ?	
INHIBIT NOMINAL CLOCK (L) N ?	
INHIBIT FAST CLOCK (L) N ?	
INHIBIT SLOW CLOCK (L) N ?	
SECTOR NUMBER (O) 0 ?	SECTOR NUMBER TO TEST (0 = ALL).

NOTE: IF RUNNING MULTIPLE UNITS WITH TLM'S (UNLIKELY), THE PROGRAM EXPECTS THAT EACH ADDITIONAL TLM CSR IS OFFSET BY 10 (OCTAL).
I.E. 160010, 160020, 160030, ETC...

EXECUTION TIME

EXECUTION TIME IS DEPENDANT UPON CPU TYPE, MEMORY SIZE, AND BUS TYPE (18 VS 22 BIT), BUT SHOULD NOT EXCEED 30 SECONDS IN ANY CONFIGURATION.

06
3.0

SEQ 000h

ERROR REPORTING

ALL ERRORS ARE REPORTED ON THE CONSOLE TERMINAL AS THEY OCCUR.
THE GENERAL ERROR FORMAT IS:

CVRLB XXX ERR NNNNN UNIT NN TEST TTT SUB SSS PC: PPPPP
ONE LINE DESCRIPTION.....
EXP'D: 000000 REC'D: 177777

WHERE: XXX IS ERROR TYPE (HRD OR SFT),
NNNNN IS THE ERROR NUMBER,
NN IS THE FAILING UNIT NUMBER,
TTT IS THE TEST...
SSS ...AND SUBTEST NUMBERS, AND
PPPPPP IS THE PC OF THE ERROR CALL.

IN MANY CASES, THE ENTIRE CONTROLLER STATE (ALL REGISTERS
BEFORE AND AFTER THE FACT) IS ALSO DISPLAYED.

ERROR REPORTING AND RECOVERY MAY BE ALTERED AND/OR INHIBITED
VIA THE /FLAG: SWITCH AS DESCRIBED IN 2.2 ABOVE.

4.0

PERFORMANCE AND PROGRESS REPORTS

THE OPERATING ENVIRONMENT IS DISPLAYED ON THE CONSOLE
TERMINAL AT START/RESTART TIME.

A TOTAL (CUMULATIVE) ERROR COUNT IS DISPLAYED AT THE END
OF EVERY PASS, THEREAFTER.

5.0

RLV12 CONTROLLER REGISTER DEFINITION

THE RLV12, RLV11, AND RL11 CONTROLLERS UTILIZE THE FOLLOWING
REGISTERS FOR CONTROL OF THE SUBSYSTEM:

5.1

RLCS - CONTROL AND STATUS REGISTER (174400)

BIT<15> COMPOSITE ERROR
BIT<14> DRIVE ERROR
BIT<13> NON EX MEM (OPI=0), OR PARITY (OPI=1)
BIT<12> DATA LATE (OPI=0), OR HEADER NOT FOUND (OPI=1)
BIT<11> DATA CRC (OPI=0), OR HEADER CRC (OPI=1)
BIT<10> OPERATION INCOMPLETE (OPI)
BIT<9:8> DRIVE SELECT (3 TO 0)
BIT<7> CONTROLLER READY (OR DONE)
BIT<6> INTERRUPT ENABLE
BIT<5:4> EXTENDED ADDRESS BITS<17:16>
BIT<3:1> FUNCTION CODE:
0 = MAINT (RLV12/11), NOP (RL11)
1 = WRITE CHECK
2 = GET DRIVE STATUS
3 = SEEK
4 = READ HEADER
5 = WRITE DATA
6 = READ DATA
7 = READ WITHOUT HEADER CHECK
BIT<0> DRIVE READY

06
5.2

SEQ 000

RLBA -- BUS ADDRESS REGISTER (174402)

BIT<15:0> BUS ADDRESS FOR DMA DATA EXCHANGE.

5.3

RLDA -- DISK ADDRESS REGISTER (174404)

FOR READ/WRITE FUNCTIONS:

BIT<15:7> CYLINDER NUMBER

BIT<6> HEAD SELECT

BIT<5:0> SECTOR NUMBER

FOR SEEK/STATUS FUNCTIONS:

BIT<15:7> SEEK DIFFERENCE (SEEK), UNUSED (STATUS)

BIT<6:5> ZERO

BIT<4> HEAD SELECT (SEEK), ZERO (STATUS).

BIT<3> ZERO (SEEK), RESET (STATUS)

BIT<2> SEEK DIRECTION (SEEK), ZERO (STATUS)

BIT<1> 0 = SEEK, 1 = GET STATUS

BIT<0> MARKER, MUST BE 1 FOR EITHER FUNCTION.

5.4

RLMP -- MULTIPURPOSE REGISTER (174406)

WRITE BEFORE READ/WRITE DATA FUNCTIONS:

BIT<15:0> NEGATIVE WORD COUNT

READ AFTER MAINTENANCE FUNCTION:

1ST WORD: CRC OF INITIAL (DA)+3

2ND WORD: CRC OF CRC OF INITIAL (DA)+4

READ AFTER READ-HEADER FUNCTION:

1ST WORD: DISK ADDRESS.

2ND WORD: ZERO.

3RD WORD: HEADER CRC.

READ AFTER GET STATUS FUNCTION:

BIT<15> WRITE DATA ERROR (WDE)

BIT<14> CURRENT HEAD ERROR (CHE)

BIT<13> WRITE LOCK (WL)

BIT<12> SEEK TIME OUT (SKTO)

BIT<11> SPIN ERROR (SPE)

BIT<10> WRITE GATE ERROR (WGE)

BIT<9> VOLUME CHECK (VC)

BIT<8> DRIVE SELECT ERROR (DSE)

BIT<7> ZERO

BIT<6> HEAD SELECT (HS)

BIT<5> COVER OPEN (CO)

BIT<4> HEADS OUT (HO)

BIT<3> BRUSHES HOME (BH)

BIT<2:0> DRIVE STATE:

0 - LOAD

1 - SPIN UP

2 - BRUSH CYCLE

3 - LOAD HEADS

4 - SEEK TRACK COUNTING

5 - SEEK LINEAR MODE

6 - UNLOAD HEADS

7 - SPIN DOWN

06
5.5

RLBAE -- BUS ADDRESS EXTENSION (174410) RLV12 ONLY

SEQ 000H

BIT<15:6> ZERO (UNUSED)
 BIT<5:0> EXTENDED ADDRESS BITS<21:16>

6.0

G5388 TLM REGISTER DEFINITION

THE G5388 TLM UTILIZES THE FOLLOWING REGISTERS:

6.1

TCSR -- CONTROL AND STATUS (160010)

BIT<15> NEW SEEK/STATUS COMMAND RECEIVED.
 BIT<14> WRITE GATE ERROR.
 BIT<13> WRITE GATE.
 BIT<12> WRITE DATA (LATCH).
 BIT<11> SYS CLK.
 BIT<10:9> DRIVE NUMBER SELECTED.
 BIT<8> PWR OK.
 BIT<7> DRIVE READY.
 BIT<6> DRIVE ERROR.
 BIT<5> PEAK SHIFT ENABLE.
 BIT<4> SECTOR GENERATOR ENABLE.
 BIT<3:2> CLOCK SELECT:
 0 - SLOW
 1 - NOMINAL
 2 - FAST
 3 - PROM READ MODE
 BIT<1> CLEAR FLAGS.
 BIT<0> TLM RESET.

6.2

TSKGS -- SEEK/STATUS REGISTER (160012)

BIT<15:0> HOLDS DRIVE COMMAND RECEIVED FROM RLV12.

6.3

TPDS -- PSUEDO-DRIVE STATUS REGISTER (160014)

BIT<15:0> SENDS PSUEDO-DRIVE STATUS TO THE RLV12.

6.4

TPROM -- PROM REGISTER (160016)

BIT<15:0> HOLDS PROM ID DURING "TLM RESET" AND/OR
 PROM DATA DURING "READ PROM" MODE.

- 06
7.0 HARDWARE TEST DESCRIPTION

THIS SECTION PROVIDES A BRIEF DESCRIPTION OF THE HARDWARE TESTS.
REFER TO THE PROGRAM LISTING (8.0) FOR FURTHER DETAILS.
- 7.1 TESTS 1 THRU 5 -- REGISTER ADDRESSABILITY.

THESE TESTS VERIFY THAT EACH CONTROLLER REGISTER ANSWERS TO
IT'S BUS ADDRESS. BOTH READ AND WRITE ACCESS IS VERIFIED
USING "MOV" AND "TST" INSTRUCTIONS.
- 7.2 TEST 6 - BUS RESET.

VERIFIES THAT A "BUS-RESET" PLACES THE CONTROLLER IF THE
PROPER "INITIALIZED" STATE.
- 7.3 TESTS 7 THRU 10 -- READ AND WRITE REGISTERS.

VERIFIES THAT WE CAN WRITE TO AND READ FROM ALL REGISTERS
(EXCEPT MPR). VARIOUS DATA PATTERNS ARE WRITTEN AND VERIFIED
USING "MOV" INSTRUCTIONS.
- 7.4 TESTS 11 THRU 14 -- BIS AND BIC REGISTERS.

VERIFIES THAT WE CAN SET AND CLEAR ALL WRITEABLE BITS IN ALL
REGISTERS (EXCEPT MPR) USING "BIS" AND "BIC" INSTRUCTIONS.
VARIOUS DATA PATTERNS ARE EMPLOYED HERE TOO.
- 7.5 TESTS 15 THRU 19 - REGISTER UNIQUENESS.

VERIFIES THAT WRITING TO ANY REGISTER HAS NO AFFECT ON ANY
OTHER (NO DUAL-ADDRESSING).

EXCEPTION: EXTENDED ADDRESS BITS<17:16> MAY BE WRITTEN VIA
EITHER RLCS<5:4> OR RLBAE<1:0>. REGARDLESS OF WHICH REGISTER IS
ACTUALLY WRITTEN, THOSE BITS ARE COPIED INTO THE OTHER REGISTER.
- 7.6 TEST 20 - FUNCTION CODE 0, MAINTENANCE OR NOP.

VERIFIES THAT FUNCTION CODE 0 EXECUTES AS A "MAINTENANCE"
FUNCTION (RLV12 AND RLV11), OR "NOP" (RL11).

FOR RLV12/11:
EXPECT TO EXECUTE A MAINTENANCE MODE SEQUENCE.
CHECK THAT THE MAINTENANCE FUNCTION COMPLETES WITH NO
CONTROLLER ERRORS, AND THAT THE FINAL VALUE IN THE RLDA
IS CORRECT, INDICATING THAT THE INTERNAL MAINTENANCE
MODE SEQUENCER FINISHED IT'S CYCLE.

FOR RL11:
EXPECT TO EXECUTE A "NOP" FUNCTION.
CHECK THAT ALL ERROR BITS ARE CLEAR (RLCS<13:10>)
AND ALL OTHER REGISTERS UNAFFECTED.

06
7.7

SEQ 0010

TEST 21 -- INTERRUPT ON FUNCTION COMPLETE.

THIS TEST EXECUTES A NOP/MAINTENANCE FUNCTION WITH INTERRUPT ENABLED, AND VERIFIES THAT AN INTERRUPT THRU THE RL VECTOR ACTUALLY OCCURS. INCORRECT VECTORS UNDER 1000 ARE TRAPPED BY THE SUPERVISOR. INCORRECT VECTORS TO ANY OTHER ADDRESS WILL YIELD UNPREDICTABLE RESULTS.

7.8

TEST 22 -- INTERRUPT PRIORITY LEVEL TEST.

SIMILAR TO THE LAST TEST, EXCEPT THAT WE REITERATE AT ALL CPU LEVELS (7 TO 0), VERIFYING THAT THE INTERRUPT IS HELD OFF WHEN THE CPU LEVEL => CONTROLLER LEVEL.

NOTE: IF UNIT UNDER TEST IS RL11, YOU'LL SEE AN END-PASS AT THE COMPLETION OF THIS TEST. ALL FOLLOWING TESTS UTILIZE THE RLV12/11 MAINTENANCE FUNCTION.

.9

TEST 23 -- MAINTENANCE, FORCE OPI ERROR (RLV12/11 ONLY).

THIS TEST WILL VERIFY THAT THE CONTROLLER WILL SET THE OPI (OPERATION INCOMPLETE) BIT ON A MAINTENANCE FUNCTION IF THE INITIAL WORD COUNT IS INCORRECT. WE'LL DO 2 PASSES.

1. WORD COUNT LESS THAN 510.
2. WORD COUNT GREATER THAN 511.

BOTH CASES SHOULD CAUSE AN OPI ERROR IN THE CONTROLLER.

7.10

TEST 24 - MAINTENANCE, FORCE OPI AND INTERRUPT (RLV12/11 ONLY).

SIMILAR TO THE LAST, EXCEPT EXECUTE WITH INTERRUPT ENABLED. EXPECT OPI ERROR TO CAUSE AN INTERRUPT THRU THE RL VECTOR.

7.11

TEST 25 -- MAINTENANCE, OPI TIMING TEST (RLV12/11 ON LSI ONLY).

VERIFY THAT THE SETTING OF THE OPI BIT IS TIMED CORRECTLY. EXECUTE A MAINTENANCE FUNCTION IN FLAG MODE WITH INVALID WORD COUNT TO FORCE OPI ERROR. MEASURE THE TIME FROM "GO" UNTIL THE OPI ERROR FLAG SETS AND CHECK THAT TIME AGAINST THE SPEC LIMITS (155 TO 650 MSECS.).

NOTE: THIS TEST EMPLOYS A SOFT TIMER THAT HAS BEEN CALIBRATED FOR LSI11/2,/23,/73 CPUS ONLY. IF YOUR CPU IS NOT ONE OF THESE THIS TEST IS AUTOMATICALLY BYPASSED.

7.12

TEST 26 -- MAINTENANCE, FIFO AND DMA TRANSFER (RLV12/11 ONLY).

VERIFIES THAT "MAINTENANCE" FUNCTIONS CORRECTLY. EXECUTE A MAINTENANCE MODE FUNCTION IN FLAG MODE. VERIFY THE FINAL BA, DA, AND BAE REGISTERS ARE CORRECT. CHECK THE SERIAL WRITE/READ DATA PATHS BY READING THE TWO MAINTENANCE CRC WORDS (CRC OF DA+3, AND CRC OF DA+4) FROM THE FIFO VIA THE MP REGISTER. VERIFY THAT 256 WORDS WERE TRANSFERRED FROM MEMORY TO THE FIFO, AND 255 WORDS FROM FIFO BACK TO MEMORY. REPEAT 57 TIMES USING VARIOUS DATA.

1. 28 DIFFERENT DATA PATTERNS.
2. THE COMPLIMENT OF THOSE PATTERNS.
3. ONE RANDOM 256 WORD PATTERN.

06

SEQ 0011

7.13 TEST 27 - MAINTENANCE, FIFO ADDRESS TEST (RLV12/11 ONLY).

 SIMILAR TO THE LAST, EXCEPT THAT THE DATA IS AN ADDRESS PATTERN
 WHERE EACH FIFO LOCATION WILL BE WRITTEN WITH IT'S OWN ADDRESS
 (0 TO 255.). REPEAT A SECOND TIME WITH A COMPLIMENT ADDRESS
 PATTERN (-1 TO -256.).
 INTERRUPT ON DONE IS ENABLED AND EXPECTED DURING THIS TEST.

7.14 TEST 28 -- MAINTENANCE, BANK SELECT 7 AND NXM (RLV12/11 ONLY).

 FOR RLV12:
 VERIFIES THAT BBS7 WILL SELECT THE I/O PAGE AND THAT ACCESS TO
 LOCATION 0 IN THAT PAGE WILL GENERATE NXM AND OPI ERRORS.
 NOTE: IF BANK 7 IS NOT PROPERLY SELECTED, 1000 BYTES
 STARTING AT XXXX1000 WILL PROBABLY GET CRUNCHED !!!

FOR RLV11:
 SINCE RLV11 DOESN'T ASSERT BBS7, WE'LL EXECUTE THIS TEST ONLY
 IF MEMORY SIZE IS LESS THAN 124K WORDS.

7.15 TEST 29 -- MAINTENANCE, EXTENDED MEMORY ACCESS (RLV12/11 ONLY).

 THIS TEST WILL VERIFY THAT THE CONTROLLER CAN ADDRESS EXTENDED
 MEMORY UP TO 124K (18 BIT) OR 2044K (22 BIT) DEPENDING UPON
 CONTROLLER TYPE AND CONFIGURATION.
 IT REQUIRES THE SERVICES OF THE MEMORY MANAGEMENT FACILITY
 (KT11 OR EQUIVALENT IN 11/23) TO ESTABLISH AND VERIFY DATA
 BUFFERS IN MEMORY FROM 32K TO 2044K, IN 4K INCREMENTS.

1. SETUP -- USING MMU, INITIALIZE A WRITE BUFFER WITH A RANDOM
DATA PATTERN, AND CLEAR THE READ BUFFER.
2. EXECUTE - RLV12/11 MAINTENANCE MODE.
WRITE BUFFER => FIFO => READ BUFFER.
3. VERIFY USING MMU, VERIFY THAT THE READ BUFFER RECEIVED A
COPY OF THE DATA IN THE WRITE BUFFER.
4. INCREMENT BUFFER ADDRESS BY 4K, AND REPEAT.

NOTE THAT THE ENTIRE 18 (OR 22) BIT ADDRESS SPACE IS TESTED
 ON 4K BOUNDARIES, WHETHER MEMORY EXISTS THERE OR NOT.
 IF MEMORY EXISTS VERIFY THE DATA EXCHANGE AS DESCRIBED.
 IF NOT, VERIFY THAT THE CONTROLLER GOT A "NXM ERROR".
 CONTINUE ALL THE ABOVE UNTIL THE I/O PAGE IS REACHED AT
 760000 (18 BIT) OR 17760000 (22 BIT).

OF COURSE, IF AN MMU ISN'T AVAILABLE, THEN ALL THIS
 IS ACADEMIC, AND WE'LL JUST FALL THRU TO THE NEXT TEST.

7.16

DRIVE INTERFACE TESTS (RLV12 ONLY, G5388 TLM REQ'D).

THIS IS AN ASSORTMENT OF 6 TESTS AND 1 UTILITY DESIGNED TO VERIFY THE INTEGRITY OF THE DRIVE INTERFACE SECTION OF THE RLV12 CONTROLLER. ALL REQUIRE THE SERVICES OF THE SPECIAL TEST-LOOP-MODULE (TLM) DESIGNATED G5388.

FROM THE CONTROLLERS POINT OF VIEW, THE TLM LOOKS LIKE A 6 SECTOR RLO1/RLO2 DISK. VARIOUS HEADER AND DATA PATTERNS ARE STORED IN PROM ON THE TLM, AND ARE ACCESSABLE THRU THE EXECUTION OF "NORMAL" READ/WRITE AND STATUS FUNCTIONS IN THE RLV12 CONTROLLER.
REFER TO THE G5388 TLM ENGINEERING SPEC FOR FURTHER DETAILS.

7.16.1 TEST 30 -- STATIC CONTROL AND STATUS BITS.

CHECK THE STATIC CONTROL AND STATUS BITS TO AND FROM THE RLV12. THESE BITS INCLUDE SYS-CLK, PWR-OK, DRIVE-ERROR, DRIVE-READY, AND DRIVE-SELECTS.

7.16.2 TEST 31 -- DRIVE COMMAND, STATUS.

VERIFY THE DRIVE COMMAND AND STATUS CLOCK LOGIC BY EXECUTING A GET-STATUS COMMAND IN THE RLV12. CHECK THAT A DUMMY STATUS WORD IS CORRECTLY RECEIVED FROM THE TLM.

7.16.3 TEST 32 -- DRIVE COMMAND, SEEK.

VERIFY THE DRIVE COMMAND AND SECTOR PULSE LOGIC BY EXECUTING A SEEK COMMAND IN THE RLV12. CHECK THAT THE SEEK DIFFERENCE WORD WAS CORRECTLY TRANSMITTED TO THE TLM.

7.16.4 TEST 33 -- WRITE DATA PATH.

VERIFY THE WRITE GATE, WRITE GATE ERROR, AND WRITE DATA PATH BY EXECUTING A WRITE-DATA FUNCTION IN THE RLV12. THIS TEST ONLY PROVES THAT TRANSITIONS ARE TAKEING PLACE ON THE WRITE DATA LINE SINCE THE PSUEDO SECTORS ARE ACTUALLY READ-ONLY (PROM).

7.16.5 TEST 34 - READ DATA PATHS.

VERIFY THE READ DATA PATHS BY EXECUTING READ-DATA, READ HEADER, AND READ-DATA-WITHOUT-HEADER FUNCTIONS IN THE RLV12. BY DEFAULT, EACH PSUEDO-SECTOR IS EXERCISED SIX TIMES, USEING THE FOLLOWING CLOCK VARIATIONS:

1. NOMINAL CLOCK, MIN PEAK SHIFT.
2. NOMINAL CLOCK, MAX PEAK SHIFT.
3. FAST CLOCK, MIN PEAK SHIFT.
4. FAST CLOCK, MAX PEAK SHIFT.
5. SLOW CLOCK, MIN PEAK SHIFT.
6. SLOW CLOCK, MAX PEAK SHIFT.

RETURNED DATA AND STATUS ARE VERIFIED IN EVERY CASE. PEAK SHIFT AND CLOCKS MAY BE SELECTIVELY INHIBITED AND A SINGLE SECTOR EXERCISED (VS ALL OF THEM) AS DESCRIBED IN THE P-TABLE SOFT PARAMETER SFTUP (SECTION 2.4) ABOVE.

06

7.16 6 TEST 35 -- WRITE CHECK.

SEQ 0013

VERIFY THE READ/WRITE DATA PATHS BY EXECUTING A WRITE CHECK
FUNCTION IN THE RLV12. EXECUTE USEING CLOCK AND SECTOR OPTIONS
AS DESCRIBED FOR TEST 34 ABOVE.

7.16.7 TLM PROM DUMP UTILITY.

THE FINAL SECTION IS A "PROM DUMP UTILITY" ROUTINE WHICH
CAN BE USED TO PRINT THE CONTENTS OF ANY OF THE 6 TLM
PSUEDO-SECTORS ON THE CONSOLE TERMINAL.
THIS ROUTINE IS NOT INCLUDED IN THE NORMAL TEST SEQUENCE.
IT MUST BE CALLED DIRECTLY AT START/RESTART TIME VIA THE
SOFTWARE CHANGE QUERY "DUMP TLM PROM ON TTY: ?"

WHEN CALLED, THE PROGRAM WILL INTRODUCE ITSELF, AND ASK FOR
A TLM UNIT NUMBER (0 - 7), SECTOR NUMBER (1 - 6), AND DUMP
FORMAT (OCTAL OR HEX).
IT WILL THEN READ THAT SECTOR AND PRINT IT IN THE SPECIFIED
FORMAT, 8 WORDS PER LINE FOR 20 LINES (160. WORDS TOTAL).
WHEN YOU'RE DONE, TYPE <↑C> TO EXIT BACK TO SUPERVISOR
COMMAND MODE.

8.0

PROGRAM LISTING

THE PROGRAM LISTING FOLLOWS:

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1193	3 -- RLDA ADDRESSABILITY.
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1464	12 - BIS AND BIC OF RLBA.
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1652	17 -- UNIQUENESS OF RLDA.
1693	18 -- UNIQUENESS OF RLMP.
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1777	20 -- FUNCTION CODE 0, NOP (RL11), OR MAINT (RLV11/12).
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2123	27 - RLV11/12 MAINTENANCE, FIFO ADDRESSING.
2215	28 -- RLV11/12 MAINTENANCE, BANK 7 SELECT AND NEXM TEST.
2261	29 - RLV11/12 MAINTENANCE, EXTENDED MEMORY ACCESS TEST.
2386	
2387	RLV12 DRIVE INTERFACE TESTS (G5388 TLM REQUIRED).
2388	
2392	30 -- SYS CLK, PWR OK, DRIVE SELECT, READY, AND ERROR BITS.
2453	31 -- DRIVE COMMAND, STATUS AND STATUS CLOCK.
2490	32 - DRIVE COMMAND, SEEK DIFF AND SECTOR PULSE.
2521	33 -- WRITE GATE, WRITE GATE ERROR, AND WRITE DATA.
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2697	35 - WRITE CHECK.
2895	TLM PROM DUMP UTILITY.

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SEQ 0015

3102
3103 SUPERVISOR DISPATCH TABLE.
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3374 DEVELOPMENT/DEBUG AIDS
3375
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PROGRAM HEADER

SEQ 0016

```

14      .SBTTL PROGRAM HEADER
15      ;*****
16      .MCALL SVC
17      SVC ; INITIALIZE SUPERVISOR MACROS
18
19      000001 SVCGBL= 1 ; LIST GLOBAL TAGS AT RIGHT MARGIN.
20      000001 SVCTST= 1 ; DITTO TEST TAGS.
21      000001 SVCSUB= 1 ; DITTO SUBTEST TAGS.
22      000001 SVCTAG= 1 ; DITTO ANY OTHER TAGS.
23      000001 SVCINS= 1 ; DITTO INSTRUCTIONS AND DATA.
24
25      ; THESE SYMBOLS CONTROL THE LISTING FIELD OF ALL SVC MACRO
26      ; EXPANSIONS. YOU MAY CHANGE THEM AT ANY TIME OR PLACE.
27
28      ; 1 = RIGHT-JUSTIFY (MAKES IT EASY TO DISTINGUISH
29      ; SVC'S MACRO CODE FROM YOUR OWN).
30      ; 0 = LEFT-JUSTIFY (ALIGN IN A NORMAL FASHION).
31      ; 1 = DON'T LIST THE EXPANSIONS AT ALL.
32      ;*****
33
34      ; HISTORY
35
36      ; 27 MAR-85 - LWL01 - ;MADE CHANGE TO SIZER TO ALLOW FOR 11/73 TIMING
37      ; ;TO CORRECT OPI TIMING ERROR.
38      ; ;ALSO, MADE CHANGES TO CORRECT TEST 20. MP REGISTER
39      ; ;WAS NOT BEING COMPARED CORRECTLY TO INITIAL SETTING.
40
41
42      .ENABL ABS,AMA
43      002000 . = 2000
44
45      000101 PRGSIZ= +H<L$LAST> ; PROGRAM SIZE IN 1/8 K UNITS (OCTAL).
46      000000 SVCGBL= 0 ; ALIGN THE HEADER STUFF.
47      000000 SVCINS= 0
48
49      002000 POINTER BGNSFT,BGNSW,BGNDU,BGNAU,BGNRPT,BGNSETUP
50      002000 HEADER CVRLB,B,0,30.,0,340
(4) 002000 L$NAME:: ;DIAGNOSTIC NAME
(4) 002000 103 .ASCII /C/
(4) 002001 126 .ASCII /V/
(4) 002002 122 .ASCII /R/
(4) 002003 114 .ASCII /L/
(4) 002004 102 .ASCII /B/
(6) 002005 000 .BYTE 0
(6) 002006 000 .BYTE 0
(5) 002007 000 .BYTE 0
(5) 002010 L$REV:: ;REVISION LEVEL
(4) 002010 102 .ASCII /B/
(5) 002011 L$DEPO:: ;0
(4) 002011 060 .ASCII /O/
(5) 002012 L$UNIT:: ;NUMBER OF UNITS
(4) 002012 000001 .WORD T$PTHV
(5) 002014 L$TIML:: ;LONGEST TEST TIME
(4) 002014 000036 .WORD 30.
(5) 002016 L$HPCP:: ;POINTER TO H.W. QUES.
(4) 002016 002172 .WORD L$HARD

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PROGRAM HEADER

SEQ 0017

(5) 002020	L\$SPCP::		;PTR. TO S.W. QUES.
(4) 002020 002412	.WORD	L\$SOFT	
(5) 002022	L\$HPTP::		;PTR. TO DEF. H.W. PTABLE
(4) 002022 002376	.WORD	L\$HW	
(5) 002024	L\$SPTP::		;PTR. TO S.W. PTABLE
(4) 002024 003304	.WORD	L\$SW	
(5) 002026	L\$LADP::		;DIAG. END ADDRESS
(4) 002026 040416	.WORD	L\$LAST	
(5) 002030	L\$STA::		;RESERVED FOR APT STATS
(4) 002030 000000	.WORD	0	
(5) 002032	L\$CO::		
(4) 002032 000000	.WORD	0	
(5) 002034	L\$DTYP::		;DIAGNOSTIC TYPE
(4) 002034 000000	.WORD	0	
(5) 002036	L\$APT::		;APT EXPANSION
(4) 002036 000000	.WORD	0	
(5) 002040	L\$DTP::		;PTR. TO DISPATCH TABLE
(4) 002040 026124	.WORD	L\$DISPATCH	
(5) 002042	L\$PRIO::		;DIAGNOSTIC RUN PRIORITY
(4) 002042 000340	.WORD	340	
(5) 002044	L\$ENVI::		;FLAGS DESCRIBE HOW IT WAS SETUP
(4) 002044 000000	.WORD	0	
(5) 002046	L\$EXP1::		;EXPANSION WORD
(4) 002046 000000	.WORD	0	
(5) 002050	L\$MREV::		;SVC REV AND EDIT #
(4) 002050 003	.BYTE	C\$REVISION	
(3) 002051 003	.BYTE	C\$EDIT	
(5) 002052	L\$EF::		;DIAG. EVENT FLAGS
(4) 002052 000000	.WORD	0	
(5) 002054 000000	.WORD	0	
(5) 002056	L\$SPC::		
(4) 002056 000000	.WORD	0	
(5) 002060	L\$DEVP::		;PTR. TO DEVICE TYPE LIST
(4) 002060 002142	.WORD	L\$DVTYP	
(5) 002062	L\$REPP::		;PTR. TO REPORT CODE
(4) 002062 011722	.WORD	L\$RPT	
(5) 002064	L\$EXP4::		
(4) 002064 000000	.WORD	0	
(5) 002066	L\$EXP5::		
(4) 002066 000000	.WORD	0	
(5) 002070	L\$AUT::		;PTR. TO ADD UNIT CODE
(4) 002070 007476	.WORD	L\$AU	
(5) 002072	L\$DUT::		;PTR. TO DROP UNIT CODE
(4) 002072 007414	.WORD	L\$DU	
(5) 002074	L\$LUN::		;LUN FOR EXERCISERS TO FILL
(4) 002074 000000	.WORD	0	
(5) 002076	L\$DESP::		;PTR. TO DIAG. DESCRIPTION
(4) 002076 002122	.WORD	L\$DESC	
(5) 002100	L\$LOAD::		;GENERATE SPECIAL AUTOLOAD EMT
(4) 002100 104035	EMT	E\$LOAD	
(5) 002102	L\$ETP::		;PTR. TO ERRTABL
(4) 002102 000000	.WORD	0	
(5) 002104	L\$ICP::		;PTR. TO INIT CODE
(4) 002104 006376	.WORD	L\$INIT	
(5) 002106	L\$CCP::		;PTR. TO CLEAN-UP CODE
(4) 002106 007336	.WORD	L\$CLEAN	

CVRLB80 RLV12 DISKLESS.
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PROGRAM HEADER

SEQ 0018

(5)	002110				L\$ACP::		;PTR. TO AUTO CODE
(4)	002110	007260			.WORD	L\$AUTO	
(5)	002112				L\$PRT::		;PTR. TO PROTECT TABLE
(4)	002112	006370			.WORD	L\$PROT	
(5)	002114				L\$TEST::		;TEST NUMBER
(4)	002114	000000			.WORD	0	
(5)	002116				L\$DLY::		;DELAY COUNT
(4)	002116	000000			.WORD	0	
(5)	002120				L\$HIME::		;PTR. TO HIGH MEM
(4)	002120	000000			.WORD	0	
51							
52	002122				DESCRIPT <RLV12 DISKLESS>		
(4)	002122				L\$DESC::		
(3)	002122	046122	030526	020062	.ASCIZ	/RLV12 DISKLESS/	
(3)	002130	044504	045523	042514			
(3)	002136	051523	000				
(2)	002142				.EVEN		
53							
54	002142				DEV TYP	<RLV12, RLV11, OR RL11>	
(4)	002142				L\$DVTYP::		
(3)	002142	046122	030526	026062	.ASCIZ	/RLV12, RLV11, OR RL11/	
(3)	002150	051040	053114	030461			
(3)	002156	020054	051117	051040			
(3)	002164	030514	000061				
(2)					.EVEN		
55							
56	000001				SVCGBL= 1		; SHOVE EVERYTHING BACK TO THE RIGHT.
57	000001				SVCINS= 1		

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HARDWARE PARAMETER CODING

SEQ 0019

```

59      .SBTTL  HARDWARE PARAMETER CODING
60      ;
61      ; GEI PARAMETERS FROM OPERATOR.
62      ;
63      BGNHRD
64      (3) 002170 000036
65      (3) 002172
66      (4) 002172 004130
67      (4) 002174 002266
68      (4) 002176 000002
69      (5) 002200 005044
70      (6) 002202
71      (4) 002202 004130
72      (4) 002204 002276
73      (4) 002206 000001
74      (6) 002210
75      (5) 002210 004004
76      (6) 002212
77      (4) 002212 004130
78      (4) 002214 002313
79      (4) 002216 000001
80      (6) 002220
81      (4) 002220 000031
82      (4) 002222 002323
83      (4) 002224 160000
84      (4) 002226 177776
85      (7) 002230
86      (4) 002230 001031
87      (4) 002232 002340
88      (4) 002234 000000
89      (4) 002236 000776
90      (7) 002240
91      (4) 002240 002032
92      (4) 002242 002351
93      (4) 002244 000340
94      (4) 002246 000000
95      (4) 002250 000007
96      (7) 002252
97      (5) 002252 006004
98      (7) 002254
99      (4) 002254 003032
100     (4) 002256 002363
101     (4) 002260 003400
102     (4) 002262 000000
103     (4) 002264 000007
104     (7) 002266
105     (2)
106     (3) 002266
107     (7)
108     (7)
109     (7)
110     (7) 002266 046122 030526 004462 RL1: .ASCIZ 'RLV12'
111     (7) 002274 000011
112     (7) 002276 040502 020105 047105 RL1A: .ASCIZ 'BAE ENABLED'

```

.WORD L10000-L#HARD/2
L#HARD::

.WORD T\$CODE
.WORD RL1
.WORD BIT1

.WORD T\$CODE

.WORD T\$CODE
.WORD RL1A
.WORD BIT0

.WORD T\$CODE

.WORD T\$CODE
.WORD RL2
.WORD BIT0

.WORD T\$CODE
.WORD CSRA
.WORD T\$LOLIM
.WORD T\$HILIM

.WORD T\$CODE
.WORD VECA
.WORD T\$LOLIM
.WORD T\$HILIM

.WORD T\$CODE
.WORD BRL
.WORD 340
.WORD T\$LOLIM
.WORD T\$HILIM

.WORD T\$CODE
.WORD DRN
.WORD 3400
.WORD T\$LOLIM
.WORD T\$HILIM

.EVEN
L10000:

; THESE ARE THE HARDWARE QUERIES...

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HARDWARE PARAMETER CODING

SEQ 0020

```

      002304 041101 042514 004504
      002312      000
80    002313      122 053114 030461 RL2:  .ASCIZ  'RLV11
      002320 004411      000
81    002323      103 051123 040440 CSRA:  .ASCIZ  'CSR ADDRESS
      002330 042104 042522 051523
      002336 000011
82    002340 042526 052103 051117 VECA:  .ASCIZ  'VECTOR
      002346 004411      000
83    002351      102 020122 042514 BRL:  .ASCIZ  'BR LEVEL
      002356 042526 004514      000
84    002363      104 044522 042526 DRN:  .ASCIZ  'DRIVE          ; UNUSED.
      002370 004411      000
85                                .EVEN
86                                ;
87                                ;...AND THESE ARE THE SINGLE UNIT DEFAULTS (HARD P TABLE).
88                                ;
89                                BGNHW
(3) 002374 000005                                .WORD  L10001 L$HW/2
(3) 002376                                L$HW::
90 002376 174400                                .WORD  174400      ; (0) CSR BUS ADDRESS.
91 002400 000160                                .WORD  160          ; (2) VECTOR
92 002402 000200                                .WORD  PRI04       ; (4) PRIORITY
93 002404 000000                                .WORD  0           ; (6) DRIVE (BITS 8,9,10)
94 002406 000003                                .WORD  3           ; (10) CONTROLLER TYPE...
95                                ;.....0 = RL11...
96                                ;.....1 = RLV11...
97                                ;.....2 = RLV12, BAE DISABLED...
98                                ;.....3 = RLV12, BAE ENABLED.
99 002410                                ENDHW
(3) 002410                                L10001:

```

```

101      .SBTTL SOFTWARE PARAMETER CODING
102      ;
103      ; GET SOFT PARAMETERS FROM OPERATOR.
104      ;
105      BGNSFT
106      (3) 002410 000054      .WORD L10002-L$SOFT/2
107      (3) 002412      L$SOFT::
108      (4) 002412 000052      GPRMD ADLIM,0,D, 1,0,-1,YES ; GET AUTO-DROP ERROR LIMIT.
109      (4) 002414 002542      .WORD T$CODE
110      (4) 002416 177777      .WORD ADLIM
111      (4) 002420 000000      .WORD -1
112      (4) 002422 177777      .WORD T$LOLIM
113      (4) 002424 000003      .WORD T$HILIM
114      (4) 002426 002575      DISPLAY TLMBP ; BYPASS MESSAGE.
115      (4) 002430 005130      .WORD T$CODE
116      (4) 002432 002751      GPRML TLMIN,12,BIT0,YES ; TLM ON THIS UNIT ??
117      (4) 002434 000001      .WORD TLMIN
118      (4) 002436 042044      .WORD BIT0
119      (5) 002436 042044      XFERF 1$
120      (4) 002440 006031      GPRMA TCSU0,14,0,160000,177776,YES ; TLM CSR FOR UNIT 0.
121      (4) 002442 002776      .WORD T$CODE
122      (4) 002444 160000      .WORD TCSU0
123      (4) 002446 177776      .WORD T$LOLIM
124      (4) 002450 001130      GPRML PRMDMP,2,BIT0,YES ; PROM DUMP ??
125      (4) 002452 003024      .WORD T$CODE
126      (4) 002454 000001      .WORD PRMDMP
127      (4) 002456 032024      .WORD BIT0
128      (5) 002456 032024      XFERT 1$
129      (4) 002460 002032      GPRMD PRM,4,0,-1,0,-1,YES ; PROM ID.
130      (4) 002462 003047      .WORD T$CODE
131      (4) 002464 177777      .WORD PRM
132      (4) 002466 000000      .WORD 1
133      (4) 002470 177777      .WORD T$LOLIM
134      (4) 002472 003130      GPRML INHMP,6,BIT15,YES ; INHIBIT MAX PEAK...
135      (4) 002474 003070      .WORD T$CODE
136      (4) 002476 100000      .WORD INHMP
137      (4) 002500 003130      GPRML INHMNP,6,BIT14,YES ; ...MIN PEAK...
138      (4) 002502 003120      .WORD T$CODE
139      (4) 002504 040000      .WORD INHMNP
140      (4) 002506 003130      GPRML INHNC,6,BIT2,YES ; ..NOMINAL CLOCK...
141      (4) 002510 003150      .WORD T$CODE
142      (4) 002512 000004      .WORD INHNC
143      (4) 002514 003130      GPRML INHFC,6,BIT1,YES ; ...FAST CLOCK...
144      (4) 002516 003177      .WORD T$CODE
145      (4) 002520 000002      .WORD INHFC
146      (4) 002522      GPRML INHSC,6,BIT0,YES ; ...SLOW CLOCK.
147      .WORD BIT1

```

J2

(4)	002522	003130				.WORD	T#CODE
(4)	002524	003223				.WORD	INMSC
(4)	002526	000001				.WORD	BIT0
119	002530			GPRMD	SEC1,10,0,7,0,6,YES		; SINGLE SECTOR OPTION.
(4)	002530	004032				.WORD	T#CODE
(4)	002532	003247				.WORD	SEC1
(4)	002534	000007				.WORD	7
(4)	002536	000000				.WORD	T#LOLIM
(4)	002540	000006				.WORD	T#HILIM
120	002542			1\$:	ENDSFT		
(2)							.EVEN
(3)	002542						L10002.
121							
122							
123							
124	002542	051105	047522	020122			
	002550	044514	044515	020124			
	002556	047506	020122	052501			
	002564	047524	042055	047522			
	002572	020120	000				
125							
126	002575	101	046114	051040	TLMBP:	.ASCIZ	'ALL REMAINING QUERIES ARE FOR OPTIONAL (MANUFACTURING)'
	002602	046505	044501	044516			
	002610	043516	050440	042525			
	002616	044522	051505	040440			
	002624	042522	043040	051117			
	002632	047440	052120	047511			
	002640	040516	020114	046450			
	002646	047101	043125	041501			
	002654	052524	044522	043516			
	002662	000051					
127	002664	032507	034063	020070		.ASCIZ	'G5388 TEST-LOOP-MODULE SET-UP. USE <+Z> TO BYPASS.'
	002672	042524	052123	046055			
	002700	047517	026520	047515			
	002706	052504	042514	051440			
	002714	052105	052455	027120			
	002722	020040	051525	020105			
	002730	057074	037132	052040			
	002736	020117	054502	040520			
	002744	051523	000056				
128	002750	000				.BYTE	0
129	002751	107	031465	034070	TLMIN:	.ASCIZ	'G5388 TLM INSTALLED
	002756	052040	046514	044440			
	002764	051516	040524	046114			
	002772	042105	000011				
130	002776	051503	020122	042101	TCSU0:	.ASCIZ	'CSR ADDRESS (UNIT 0)
	003004	051104	051505	020123			
	003012	052450	044516	020124			
	003020	024460	000011				
131	003024	052504	050115	050040	PRMDMP:	.ASCIZ	'DUMP PROM ON TTY:
	003032	047522	020115	047117			
	003040	052040	054524	004472			
	003046	000					
132	003047	120	047522	020115	PRM:	.ASCIZ	'PROM ID NUMBER
	003054	042111	047040	046525			
	003062	042502	004522	000011			

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SOFTWARE PARAMETER CODING

SEQ 0023

```

133 003070 047111 044510 044502 INHMPX: .ASCIZ 'INHIBIT MAX PEAK SHIFT '
      003076 020124 040515 020130
      003104 042520 045501 051440
      003112 044510 052106 000011
134 003120 047111 044510 044502 INHMNP: .ASCIZ 'INHIBIT MIN PEAK SHIFT '
      003126 020124 044515 020116
      003134 042520 045501 051440
      003142 044510 052106 000011
135 003150 047111 044510 044502 INHNC: .ASCIZ 'INHIBIT NOMINAL CLOCK '
      003156 020124 047516 044515
      003164 040516 020114 046103
      003172 041517 004513 000
136 003177 111 044116 041111 INHFC: .ASCIZ 'INHIBIT FAST CLOCK '
      003204 052111 043040 051501
      003212 020124 046103 041517
      003220 004513 000
137 003223 111 044116 041111 INHSC: .ASCIZ 'INHIBIT SLOW CLOCK '
      003230 052111 051440 047514
      003236 020127 046103 041517
      003244 004513 000
138 003247 123 041505 047524 SEC1: .ASCIZ 'SECTOR NUMBER (0=USE ALL)'
      003254 020122 052516 041115
      003262 051105 024040 036460
      003270 051525 020105 046101
      003276 024514 000
139 003302 .EVEN

```

; ... AND THESE ARE THE DEFAULT SOFT PARAMETERS.

; BGNSW

```

143 003302
(3) 003302 000007
(3) 003304
144 003304 000000
145 003306 000000
146 003310 000401
147 003312 000000
148 003314 000000
149 003316 000000
150 003320 160010
151 003322
(3) 003322

```

```

ERRLMT: .WORD 0
PDSW: .WORD 0
PRJID: .WORD 401
MPXCLK: .WORD 0
SNGLSEC: .WORD 0
TLMF: .WORD 0
TCSO: .WORD 160010
ENDSW

```

```

; (00) NZ = DROP AFTER N ERRORS.
; (02) PROM DUMP SWITCH (BIT0).
; (04) CURRENT PROM SET ID.
; (06) PEAK SHIFT AND CLOCK INHIBITS.
; (10) SINGLE SECTOR TO USE (0 - ALL 6).
; (12) G5388 TLM FLAG (1 = INSTALLED).
; (14) G5388 TLM CSR ADDRESS.

```

.WORD L10003 L\$SW/2

L\$SW::

L10003:

L2

```

153      .SBITL GLOBAL EQUATES
154
155      003322      EQUALS      ; GET STANDARD EQUATES.
(1)      ;
(1)      ; BIT DIFINITIONS
(1)      ;
(1)      100000      BIT15== 100000
(1)      040000      BIT14== 40000
(1)      020000      BIT13== 20000
(1)      010000      BIT12== 10000
(1)      004000      BIT11== 4000
(1)      002000      BIT10== 2000
(1)      001000      BIT09== 1000
(1)      000400      BIT08== 400
(1)      000200      BIT07== 200
(1)      000100      BIT06== 100
(1)      000040      BIT05== 40
(1)      000020      BIT04== 20
(1)      000010      BIT03== 10
(1)      000004      BIT02== 4
(1)      000002      BIT01== 2
(1)      000001      BIT00== 1
(1)      ;
(1)      001000      BIT9== BIT09
(1)      000400      BIT8== BIT08
(1)      000200      BIT7== BIT07
(1)      000100      BIT6== BIT06
(1)      000040      BIT5== BIT05
(1)      000020      BIT4== BIT04
(1)      000010      BIT3== BIT03
(1)      000004      BIT2== BIT02
(1)      000002      BIT1== BIT01
(1)      000001      BIT0== BIT00
(1)      ;
(1)      ; EVENT FLAG DEFINITIONS
(1)      ; EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
(1)      ;
(1)      000040      EF.START== 32.      ; START COMMAND WAS ISSUED
(1)      000037      EF.RESTART== 31.    ; RESTART COMMAND WAS ISSUED
(1)      000036      EF.CONTINUE== 30.   ; CONTINUE COMMAND WAS ISSUED
(1)      000035      EF.NEW== 29.        ; A NEW PASS HAS BEEN STARTED
(1)      000034      EF.PWR== 28.        ; A POWER-FAIL/POWER UP OCCURRED
(1)      ;
(1)      ;
(1)      ; PRIORITY LEVEL DEFINITIONS
(1)      ;
(1)      000340      PRI07== 340
(1)      000300      PRI06== 300
(1)      000240      PRI05== 240
(1)      000200      PRI04== 200
(1)      000140      PRI03== 140
(1)      000100      PRI02== 100
(1)      000040      PRI01== 40
(1)      000000      PRI00== 0
(1)      ;
(1)      ; OPERATOR FLAG BITS

```

CVRL880 - RLV12 DISKLESS.
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GLOBAL EQUATES

SEQ 00.

```

(1)      000004      ;
(1)      000010      EVL==      4
(1)      000020      LOT==      10
(1)      000040      ADR==      20
(1)      000100      IDU==      40
(1)      000200      ISR==     100
(1)      000400      UAM==     200
(1)      001000      BOE==     400
(1)      002000      PNT==    1000
(1)      004000      PRI==    2000
(1)      010000      IXE==    4000
(1)      020000      IBE==   10000
(1)      040000      IER==   20000
(1)      100000      LOE==   40000
(1)      100000      HOE==  100000
156      ;
157      ; RL/RLV EQUATES.
158      ;
159      000004      ERRVEC= 4      ; BUS-ERROR VECTOR.
160      000000      RL11= 0      ; EQUATE THE CONTROLLER TYPES.
161      000001      RLV11= 1
162      000002      RLV12= 2      ; RLV12 WITH BAE DISABLED.
163      000003      RLV12X= 3    ; RLV12 WITH BAE ENABLED.
164
165      100000      ERR= BIT15      ; COMPOSITE ERROR (RLCS)
166      040000      DERR= BIT14    ; DRIVE ERROR (RLCS)
167      020000      NXM= BIT13    ; NON-EXISTANT MEMORY (IF OPI = 0)...
168      020000      PAR= BIT13    ; ...OR PARITY ERROR (IF OPI = 1).
169      010000      DLT= BIT12    ; DATA LATE ERROR (IF OPI=0)...
170      010000      HNF= BIT12    ; ...OR HEADER NOT FOUND (IF OPI=1).
171      004000      DCRC= BIT11    ; DATA CRC ERROR (IF OPI=0)...
172      004000      HCRC= BIT11    ; ...OR HEADER CRC ERROR (IF OPI=1).
173      002000      OPI= BIT10    ; OPERATION INCOMPLETE (RLCS)
174      000000      DSO= 0        ; DRIVE SELECT 0 (RLCS)
175      000400      DS1= BIT8     ; DRIVE SELECT 1 (RLCS)
176      001000      DS2= BIT9     ; DRIVE SELECT 2 (RLCS)
177      001400      DS3= BIT8!BIT9 ; DRIVE SELECT 3 (RLCS)
178      000200      CRDY= BIT7    ; CONTROLLER READY (RLCS)
179      000100      INTEN= BIT6   ; INTERRUPT ENABLE (RLCS)
180      000000      NOOP= 0       ; (0) NO-OP - RL11 ONLY.
181      000000      MAINT= 0      ; (0) MAINTENANCE - RLV11 AND RLV12.
182      000002      WRCHK= BIT1   ; (1) WRITE CHECK FUNCTION
183      000004      GSTAT= BIT2   ; (2) GET STATUS FUNCTION
184      000006      SEEK= BIT2!BIT1 ; (3) SEEK FUNCTION
185      000010      RDHDR= BIT3    ; (4) READ HEADER FUNCTION
186      000012      WRITE= BIT3!BIT1 ; (5) WRITE DATA FUNCTION
187      000014      READ= BIT3!BIT2 ; (6) READ DATA FUNCTION
188      000016      RDNHDR= BIT3!BIT2!BIT1 ; (7) READ DATA WITHOUT HEADER CHECK.
189      000001      DRDY= BIT0    ; DRIVE READY.
190
191      000010      DRST= BIT3      ; DRIVE RESET (RLDA)
192      000002      GSBIT= BIT1    ; GET STATUS BIT (RLDA)
193      000001      MK= BIT0       ; MARKER BIT (RLDA)
194      000004      SIGN= BIT2     ; SIGN BIT (RLDA)
195      000100      RHHS= BIT6     ; HEAD SELECT IN READ HEADER
196      000100      STHS= BIT6     ; HEAD SELECT IN STATUS BACK

```

N2

CVRL880 - RLV12 DISKLESS.
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MACY11 30(1046) 12-JUN-85 15:42 PAGE 5 2
GLOBAL EQUATES

SEQ 0026

197

000020

DAHS= BIT4

;HEAD SELECT IN SEEK

CVRL880 RLV12 DISKLESS.
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GLOBAL EQUATES

SEQ 0027

```
199      ;
200      ; A COUPLE OF MACROS TO REDEFINE THE ERROR CALLING CONVENTIONS
201      ; SO THAT SEQUENTIAL ERRORS ARE ASSIGNED AT ASSEMBLY TIME,
202      ; AND I DON'T HAVE TO BOTHER WITH THEM !!
203      ;
204      000000      SFN=      0      ; SYSTEM FATAL ERRORS RUN FROM 1 TO 99.
205      000143      DFN=      99.    ; DEVICE FATAL ERRORS RUN FROM 100. UP.
206
207      .MACRO SFERR ADDR,PNTR
208      SFN=SFN+1
209      ERRSF SFN,ADDR,PNTR
210      .ENDM
211
212      .MACRO DFERR ADDR,PNTR
213      DFN=DFN+1
214      ERRDF DFN,ADDR,PNTR
215      .ENDM
216
217      ;
218      ; ANOTHER TO START EACH TEST.
219      .MACRO BEGIN.TEST
220      BGNTST
221      .ENDM
222
223      ;
224      ; AND A COUPLE OF HANDY SKIPS.
225      000401      ;
226      000402      SKP1=      BR+1
227      000403      SKP2=      BR+2
                      SKP3=      BR+3
```

```

229      .SBTTL  GLOBAL DATA
230
231 003322 000000 UNITST: .WORD 0 ; CURRENT UNIT UNDER TEST.
232 003324 000000 RLCS: .WORD 0 ; REGISTER ADDRESSES.
233 003326 000000 RLBA: .WORD 0
234 003330 000000 RLDA: .WORD 0
235 003332 000000 RLMP: .WORD 0
236 003334 000000 RLBAE: .WORD 0
237 003336 000000 BCSR: .WORD 0 ; BASE ADDRESS
238 003340 000000 BPRIOR: .WORD 0
239 003342 000000 BVEC: .WORD 0
240 003344 000000 TCSR: .WORD 0 ; G5388 TLM CSR ADDRESS.
241 003346 000000 DRIVE: .WORD 0
242 003350 000000 B.CS: .WORD 0 ; REGISTERS BEFORE FUNCTION.
243 003352 000000 B.BA: .WORD 0
244 003354 000000 B.DA: .WORD 0
245 003356 000000 B.MP: .WORD 0
246 003360 000000 B.BAE: .WORD 0
247 003362 000000 DERFLG: .WORD 0
248 003364 000000 E.CS: .WORD 0 ; REGISTERS AFTER FUNCTION.
249 003366 000000 E.BA: .WORD 0
250 003370 000000 E.DA: .WORD 0
251 003372 000000 E.MP: .WORD 0
252 003374 000000 E.MP1: .WORD 0 ; MAINT MODE CRC CHECK ONLY.
253 003376 000000 E.BAE: .WORD 0
254 003400 000000 CPUTYP: .WORD 0 ; 0 = 11/03, .NZ = 11/23, 1 = UNKNOWN.P
255 003402 000000 RLTY: .WORD 0 ; RL TYPE - 0 = RL11, 1 = RLV11, 2(3) = RLV12.
256 003404 120001 XPOLY: .WORD 120001
257 003406 000000 BCCFBK: .WORD 0 ; LOCATION USED BY "SIMBCC"
258 003410 000000 CALBCC: .WORD 0 ; LOCATION USED BY "SIMBCC"
259 003412 000000 TEMP2: .WORD 0 ; LOCATION USED BY "SIMBCC"
260 003414 000000 TEMP3: .WORD 0 ; LOCATION USED BY "SIMBCC"
261 003416 000000 TEMP4: .WORD 0 ; LOCATION USED BY "SIMBCC"
262 003420 000000 TEMP5: .WORD 0 ;
263 003422 000000 TEMP1: .WORD 0 ; DITTO
264 003424 000000 TMP0: .WORD 0 ; DITTO
265 003426 000000 TMP1: .WORD 0
266 003430 000000 TMP2: .WORD 0
267 003432 000000 GDDAT: .WORD 0
268 003434 000000 BDDAT: .WORD 0
269 003436 000000 INIMP: .WORD 0 ; HOLDS INITIAL MP WORD COUNT.
270 003440 000000 INIDA: .WORD 0 ; HOLDS CURRENT DA TEST WORD.
271 003442 000000 GDCRC3: .WORD 0 ; HOLDS CRC OF DA+3
272 003444 000000 GDCRC4: .WORD 0 ; HOLDS CRC OF DA+4
273 003446 000233 OPIMN: .WORD 155.
274 003450 001212 OPIMX: .WORD 650.
275 003452 176543 HINUM: .WORD 176543
276 003454 123456 LONUM: .WORD 123456
277 003456 000000 TEMLO: .WORD 0
278 003460 000000 TEMHI: .WORD 0
279 003462 000000 DLYCNT: .WORD 0 ; 1 MSEC DELAY COUNTER.
280 003464 000000 DROPPED: .WORD 0 ; UNITS DROPPED COUNTER.
281 003466 000000 ERPOINT: .WORD 0 ; POINTS TO ONE OF THE FOLLOWING:
282 003470 000100 ERCOUNT: .BLKW 64 ; ERROR COUNTERS (ENOUGH FOR 64 UNITS).
283 003670 000000 CACREG: .WORD 0 ; IF 1, CACHE INSTALLED BUT DISABLED (11-73).
284

```

CVRLB80 RLV12 DISKLESS.
CVRLB8.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN 85 15:42 PAGE 6 1
GLOBAL DATA

SEQ 0029

```
285 ;PATTERNS USED FOR LOADING/READING REGISTERS
286 ;
287 003672 000000 BEGPAT: 000000 ;GROWING 1
288 003674 000001 000001
289 003676 000003 000003
290 003700 000007 000007
291 003702 000017 000017
292 003704 000037 000037
293 003706 000077 000077
294 003710 000177 000177
295 003712 000377 000377
296 003714 000777 000777
297 003716 001777 001777
298 003720 003777 003777
299 003722 007777 007777
300 003724 017777 017777
301 003726 037777 037777
302 003730 077777 077777
303 003732 177777 177777
304 003734 177776 177776 ;GROWING 0
305 003736 177774 177774
306 003740 177770 177770
307 003742 177760 177760
308 003744 177740 177740
309 003746 177700 177700
310 003750 177600 177600
311 003752 177400 177400
312 003754 177000 177000
313 003756 176000 176000
314 003760 174000 174000
315 003762 170000 170000
316 003764 160000 160000
317 003766 140000 140000
318 003770 100000 100000
319 003772 000000 000000
320 003774 000001 000001 ;WALKING 1
321 003776 000002 000002
322 004000 000004 000004
323 004002 000010 000010
324 004004 000020 000020
325 004006 000040 000040
326 004010 000100 000100
327 004012 000200 000200
328 004014 000400 000400
329 004016 001000 001000
330 004020 002000 002000
331 004022 004000 004000
332 004024 010000 010000
333 004026 020000 020000
334 004030 040000 040000
335 004032 100000 100000
336 004034 177777 177777 ;WALKING 0
337 004036 177776 177776
338 004040 177775 177775
339 004042 177773 177773
340 004044 177767 177767
```

CVRLB80 -- RLV12 DISKLESS.
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GLOBAL DATA

SEQ 0030

341	004046	177757	177757
342	004050	177737	177737
343	004052	177677	177677
344	004054	177577	177577
345	004056	177377	177377
346	004060	176777	176777
347	004062	175777	175777
348	004064	173777	173777
349	004066	167777	167777
350	004070	157777	157777
351	004072	137777	137777
352	004074	077777	077777
353	004076	177777	177777
354	004100	000000	ENDPAT: 000000

; PATTERNS FOR TESTING THE READ/WRITE BITS <9:1> OF THE CSR.

355			
356			
357			
358	004102	000000	CSPAT: .WORD 0 ;SHIFTING 1
359	004104	000002	.WORD BIT1
360	004106	000004	.WORD BIT2
361	004110	000010	.WORD BIT3
362	004112	000020	.WORD BIT4
363	004114	000040	.WORD BITS
364	004116	000100	.WORD BIT6
365	004120	000400	.WORD BIT8
366	004122	001000	.WORD BIT9
367	004124	001576	.WORD 1576 ;GROWING 0
368	004126	001574	.WORD 1574
369	004130	001570	.WORD 1570
370	004132	001560	.WORD 1560
371	004134	001540	.WORD 1540
372	004136	001500	.WORD 1500
373	004140	001400	.WORD 1400
374	004142	001576	.WORD 1576 ;SHIFT 0
375	004144	001574	.WORD 1574
376	004146	001566	.WORD 1566
377	004150	001556	.WORD 1556
378	004152	001536	.WORD 1536
379	004154	001436	.WORD 1436
380	004156	001136	.WORD 1136
381	004160	000076	.WORD 76
382	004162	000006	.WORD 6 ;GROWING 1
383	004164	000016	.WORD 16
384	004166	000036	.WORD 36
385	004170	000076	.WORD 76
386	004172	000176	.WORD 176 ;
387	004174	000576	.WORD 576
388	004176	001576	.WORD 1576
389	004200	000000	CSEND: .WORD 0

; TABLE OF DA TEST WORDS FOR MAINTENANCE MODE CRC CALCULATIONS.

390			
391			
392			
393	004202	155552	PATCRC: 155552
394	004204	133330	133330
395	004206	066663	066663
396	004210	125247	125247

CVRLBB0 - RLV12 DISKLESS.
CVRLBB.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN 85 15:42 PAGE 6 3
GLOBAL DATA

SEQ 0031

397	004212	052522	052522
398	004214	177774	177774
399	004216	000374	000374
400	004220	022217	022217
401	004222	044441	044441
402	004224	166663	166663
403	004226	144441	144441
404	004230	033330	033330
405	004232	011106	011106
406	004234	070704	070704
407	004236	107065	107065
408	004240	111106	111106
409	004242	167353	167353
410	004244	156732	156732
411	004246	146311	146311
412	004250	135670	135670
413	004252	114626	114626
414	004254	104205	104205
415	004256	073564	073564
416	004260	063143	063143
417	004262	042101	042101
418	004264	031460	031460
419	004266	021037	021037
420	004270	010416	010416
421	004272	000000	000000
422			
423			
424			
425	004274	155555	155555
426	004276	133333	133333
427	004300	066666	066666
428	004302	125252	125252
429	004304	052525	052525
430	004306	177777	177777
431	004310	000000	000000
432	004312	107070	107070
433	004314	070707	070707
434	004316	144444	144444
435	004320	033333	033333
436	004322	011111	011111
437	004324	022222	022222
438	004326	044444	044444
439	004330	111111	111111
440	004332	166666	166666
441	004334	010421	010421
442	004336	021042	021042
443	004340	031463	031463
444	004342	042104	042104
445	004344	063146	063146
446	004346	073567	073567
447	004350	104210	104210
448	004352	114631	114631
449	004354	135673	135673
450	004356	146314	146314
451	004360	156735	156735
452	004362	167356	167356

CRCEND: 000000

: 28 TEST WORDS IN THE TABLE.

:
: TABLE OF DATA PATTERNS FOR MAINTENANCE MODE FIFO TESTS.

:
PATDAT: 155555

CVRLB80 - RLV12 DISKLESS.
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MACY11 30(1046) 12 JUN 85 15:42 PAGE 6-4
GLOBAL DATA

SEQ 0032

453 004364 000000

454

455

456

457 004366 000400

458 005366 000400

459 006366 000000

ENDDAT: 000000 ; 28 OF THESE TOO.

; BUFFERS FOR RLV11 MAINTENANCE FUNCTION

BUF1: .BLKW 256. ; MAINTENANCE MODE, DMA BUF1 => FIFO...

BUF2: .BLKW 256. ; ...AND FIFO => BUF2.

BUFEND: 0

CVRL880 RLV12 DISKLESS.
CVRL88.P11 12-JUN 85 15:33

MACY11 30(1046) 12 JUN 85 15:42 PAGE 7
INITIALIZATION CODE

SEQ 0033

```

461 .SBTTL  INITIALIZATION CODE
462 ;
463 ; LOAD DEVICE PROTECTION NOT REQUIRED.
464 ;
465 BGNPROT
466 (3) 006370 L$PROT::
467 006370 177777 .WORD 1 ;CSR OFFSET MAKE NOP
468 006372 177777 .WORD 1 ;MASS BUS OFFSET MAKE NOP
469 006374 177777 .WORD 1 ;DRIVE OFFSET MAKE NOP
470 ENDPROT
471 ; ENTER HERE FROM DRS ON START, RESTART, CONTINUE, ETC...
472 ;
473 BGNINIT
474 (3) 006376 L$INIT::
475 006376 012700 000034 READEF #EF.PWR ; POWER UP ??
476 (3) 006402 104447 MOV #EF.PWR,RO
477 006404 103423 BCST TRAP C$REFG
478 (2) 006404 103423 BCOMPLETE RESTART
479 006406 012700 000040 READEF #EF.START ; START ??
480 (3) 006412 104447 MOV #EF.STAPT,RO
481 006414 103417 BCST TRAP C$REFG
482 (2) 006414 103417 BCOMPLETE START
483 006416 012700 000037 READEF #EF.RESTART ; RESTART ??
484 (3) 006422 104447 MOV #EF.RESTART,RO
485 006424 103413 BCST TRAP C$REFG
486 006426 012700 000035 READEF #EF.NEW ; NEW PASS ??
487 (3) 006432 104447 MOV #EF.NEW,RO
488 006434 103472 BCST TRAP C$REFG
489 006436 012700 000036 READEF #EF.CONTINUE ; CONTINUE ??
490 (3) 006442 104447 MOV #EF.CONTINUE,RO
491 006444 103401 BCST TRAP C$REFG
492 006446 000506 BCOMPLETE 1$
493 006450 000137 007114 BR NXTU ; NONE OF THE ABOVE.
494 1$: JMP CONT
495 START:RESTART:
496 RESET
497 TST PDSW ; PROM DUMP ??
498 BEQ 1$ ; BR IF NOT.
499 JMP ROMDUMP ; *** PROM DUMPER, NO RETURN ***
003452 1$: MOV #176543,HINUM ;RANDOM GEN. PRIMES.
003454 MOV #123456,LONUM
CLR DROPPED ; CLEAR UNITS DROPPED COUNTER.
MOV #ERCOUNT,R1 ; GET ERROR COUNTER POINTER.
MOV #64.,RO
2$: CLR (R1). ; CLEAR ALL ERROR COUNTERS.
DEC RO
BNE 2$

```

CVRLB80 RLV12 DISKLESS.
CVRLB8.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN 85 15:42 PAGE 7 1
INITIALIZATION CODE

SEQ 0034

```

500 006526 013746 000004      ENVIRN: MOV    @#4, (SP)      ; SAVE VECTOR 4...
501 006532 013746 000010      MOV    @#10, (SP)      ; ...AND 10...
502 006536 010605              MOV    SP,R5          ; ...AND THE STACK POINTER.
503 006540 012737 006576 000004 MOV    @LSI,@#4      ; SET BUS TRAP.
504 006546 005000              CLR    R0
505 006550 005737 177776      TST    @#177776      ; PSW ADDRESS VALID ??
506 006554 000240              NOP
507 006556 012737 006572 000010 MOV    @NLSI,@#10    ; TRAP THRU 4 IF NOT (LSI11 OR 11/2).
508 000007                    MFPT=    7              ; SET ILLEGAL TRAP.
509 006564 000007              MFPT
510 006566 000240              NOP
511 006570 000402              SKP2
512 006572 012700 177777      NLSI:  MOV    #-1,R0      ; CPU TYPE UNKNOWN.
513 006576 010037 003400      LSI:   MOV    R0,CPUTYP    ; CPU IS LSI SOMETHING 'R OTHER.
514 006602 010506              MOV    R5,SP          ; RESTORE STACK...
515 006604 012637 000010      MOV    (SP)+,@#10      ; ...AND VECTORS.
516 006610 012637 000004      MOV    (SP)+,@#4
517 006614 004737 011306      JSR    PC,,SIZE        ; SIZE AVAILABLE MEMORY.
518 006620              DORPT      ; REPORT OPERATING ENVIRONMENT.
(3) 006620 104424              TRAP    C$DRPT
519
520 006622 023737 003464 002012 NEWPAS: CMP    DROPPED,L$UNIT ; UNITS STILL ALIVE ??
521 006630 002401              BLT
522 006632              DOCLN      ; NO. ABORT
(3) 006632 104444              TRAP    C$DCLN
523 006634 012737 003466 003466 1$:  MOV    @ERCOUNT-2,ERPOINT ; INIT THE UNIT ERROR POINTER.
524 006642 013737 003454 003456      MOV    LONUM,TEMLO
525 006650 013737 003452 003460      MOV    HINUM,TEMHI
526 006656 012737 177777 003322      MOV    #-1,UNITST
527 006664 005237 003322      NXTU:  INC    UNITST      ; NEW PRIMES FOR NEW PASS.
528 006670 062737 000002 003466      ADD    @2,ERPOINT    ; RESET UNIT NUMBER.
529 006676 023737 003322 002012      CMP    UNITST,L$UNIT ; BUMP NIT NUMBER...
530 006704 002346              BGE    NEWPAS          ; ...AND ERROR COUNT POINTER.
531 006706              1$:  GPHARD UNITST,R0
(3) 006706 013700 003322              MOV    UNITST,R0
(3) 006712 104442              TRAP    C$GPHRD
532 006714              BNCOMPLETE NXTU      ; BR IF UNIT NOT THERE (DROPPED).
(2) 006714 103363              BCC    NXTU
533 006716 012037 003336      2$:  MOV    (R0)+,BCSR      ; SET UP RUN TIME P TABLE...
534 006722 005737 036756      TST    MIMIC          ; ***** IF MIMIC
535 006726 001403              BEQ    3$              ; *****
536 006730 012737 037276 003336      MOV    @DUMMY,BCSR    ; ***** USE DUMMY REGISTERS
537 006736 012037 003342      3$:  MOV    (R0)+,BVEC      ; ...FOR THIS UNIT.
538 006742 012037 003340      MOV    (R0)+,BPRIOR
539 006746 012037 003346      MOV    (R0)+,DRIVE
540 006752 012037 003402      MOV    (R0)+,RLTYP      ; SET CONTROLLER TYPE.
541
542 006756 013737 003316 003344      MOV    TLMF,TCSR      ; RUNNING WITH TLM'S ??
543 006764 001412              BEQ    5$              ; BR IF NOT.
544 006766 013737 003320 003344      MOV    TCS0,TCSR      ; YES, GET BASE TLM CSR...
545 006774 013700 003322      MOV    UNITST,R0        ; ...AND CURRENT UNIT NUMBER.
546 007000 001404              BEQ    5$              ; BR IF UNIT IS ZERO.
547 007002 062737 000010 003344 4$:  ADD    @10,TCSR      ; OTHERWISE, ADJUST FOR CURRENT UNIT.
548 007010 077004              SOB    R0,4$
549
550              ; THE FOLLOWING CODE WAS DELETED IN ORDER TO CHANGE THE SIZING FOR ;LWL01

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J3

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551      ;CPU TYPE SO THAT KDJ11-CPU TIMING LOOP COULD BE ACCOMODATED.      ;LWL01
552      ;
553      ;LWL01 5$:      TST      CPUTYP
554      ;LWL01 BGT      6$      ; BR IF 11/23.
555      ;LWL01 BEQ      7$      ; BR IF LSI 11 OR 11/2.
556      ;LWL01 MOV      #500.,RO ; IF NEITHER, DELAY IS UNCALIBRATED.
557      ;LWL01 BR       8$
558      ;LWL01 6$:      MOV      #291.,RO      ; 1MS DELAY FOR 11/23.
559      ;LWL01 SKP2
560      ;LWL01 7$:      MOV      #120.,RO      ; 1MS DELAY FOR LSI11 OR 11/2.
561      ;LWL01 8$:      MOV      RO,DLYCNT      ; SET DELAY COUNTER.
562      5$:      CLR      RO      ; START WITH CLEAR RO      ;LWL01
563      007012 005000      TST      CPUTYP      ;LWL01
564      007014 005737 003400 BEQ      6$      ; BR IF LSI 11 OR 11/2      ;LWL01
565      007020 001427      BMI      8$      ; IF MINUS, DELAY IS UNCALIBRATED      ;LWL01
566      007022 100422      CMP      #3,CPUTYP      ; IS IT AN 11/23?      ;LWL01
567      007024 022737 000003 003400 BEQ      7$      ; BR IF IT IS      ;LWL01
568      007032 001420      MOV      @#4,-(SP)      ; STORE LOC 4 CONTENTS      ;LWL01
569      007034 013746 000004      MOV      #9$,@#4      ; PREPARE FOR NON-EXISTANT TRAP      ;LWL01
570      007040 012737 007062 000004 177746 BIS      #1000,177746      ; TURN OF CACHE      ;LWL01
571      007046 052737 001000 177746 MOV      #1,CACREG      ; SET CACHE OFF INDICATOR      ;LWL01
572      007054 012737 000001 003670 MOV      (SP)+,@#4      ; RESTORE LOC 4      ;LWL01
573      007062 012637 000004 9$:      BR       7$      ; IT MUST BE A KDJ11 (11/73)      ;LWL01
574      007066 000402      ADD      #209.,RO      ; TO MAKE 500. (UNCALIBRATED)      ;LWL01
575      007070 062700 000321 8$:      ADD      #171.,RO      ; TO MAKE 291. (11/23 + 11/73) (1MSEC)      ;LWL01
576      007074 062700 000253 7$:      ADD      #120.,RO      ; TO MAKE 120. (LSI-11 + 11/2) (1MSEC)      ;LWL01
577      007100 062700 000170 6$:      ADD      #120.,RO      ; TO MAKE 120. (LSI-11 + 11/2) (1MSEC)      ;LWL01
578      007104 010037 003462 10$:      MOV      RO,DLYCNT      ; SET DELAY COUNTER.      ;LWL01
579      007110 004737 026052      JSR      PC,ADJTN      ; ADJUST THE NUMBER OF TESTS TO RUN...
580      007114 013737 003456 003454 CONT:      MOV      TEMLO,LONUM      ;...ACCORDING TO CURRENT CONFIGURATION.
581      007122 013737 003460 003452      MOV      TEMHI,HINUM      ;RESTORE RANDOM FOR NEXT UUT
582      007130 012737 004366 010416      MOV      #BUF1,BA16      ;RESTORE PRIME FOR NEXT UUT
583      007136 005037 010420      CLR      BA22      ; INIT 16 BIT BUFFER ADDRESS...
584      007142 013700 003336      MOV      BCSR,RO      ;...AND 6 BIT EXTENSION (22 BITS).
585      007146 010037 003324      MOV      RO,RLCS      ; SET UNIT'S ADDRESSES.
586      007152 062700 000002      ADD      #2,RO
587      007156 010037 003326      MOV      RO,RLBA
588      007162 062700 000002      ADD      #2,RO
589      007166 010037 003330      MOV      RO,RLDA
590      007172 062700 000002      ADD      #2,RO
591      007176 010037 003332      MOV      RO,RLMP
592      007202 062700 000002      ADD      #2,RO
593      007206 010037 003334      MOV      RO,RLBAE
594      007212 013700 003342      MOV      BVEC,RO
595      007216 012720 010676      MOV      @RLINT,(RO)+      ; SET RL VECTOR.
596      007222 013710 003340      MOV      BPRIOR,(RO)
597      007226 012737 010670 000004      MOV      #TRAP4,ERRVEC      ; SET TIME OUT TRAP CATCHER.
598      007234 012737 000340 000006      MOV      #PRIO7,ERRVEC+2
599      007242 012737 010702 000100      MOV      #CLKRTI,@#100      ; NULL THE CLOCK VECTOR.
600      007250 012737 000340 000102      MOV      #PRIO7,@#102
601      007256      ENDINIT
(3) 007256      L10005:      TRAP      C$INIT
(3) 007256 104411
602      ;
603      ; AUTO DROP IF FLA:ADR AND UNIT DOESN'T RESPOND.
604      ;

```

K3

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605 007260          BGNAUTO
(3) 007260
606 007260 023737 003322 002012    CMP    UNITST,L$UNIT    ; VALID UNIT NUMBER ??
607 007266 002022                BGE     1$                ; NO, DON'T TRY IT !!!
608 007270 005037 010672          CLR     TRPFLG            ; CLEAR TRAP FLAG.
609 007274 005777 174024          TST     @RLCS             ; TRY TO ACCESS CONTROLLER.
610 007300 000240                240
611 007302 005737 010672          TST     TRPFLG            ; DID IT TRAP ??
612 007306 001412                BEQ     1$                ; NO, WE'RE OK.
613 007310 013737 003324 003432    MOV     RLCS,GDDAT
614 007316                SFERR    EMO,ERR1                ; REPORT NO CONTROLLER...
(5) 007316 104454
(6) 007320 000001
(6) 007322 030710
(6) 007324 026242
615 007326          DODU    UNITST                ;...AND TELL SUPER TO DROP UNIT.
(3) 007326 013700 003322
(3) 007332 104451
616 007334          1$:    ENDAUTO
(3) 007334
(3) 007334 104461
617
618          ; CLEAN-UP CODING SECTION (DO AT END-PASS (OR SUB PASS)).
619          ;
620 007336          BGNCLN
(3) 007336
621 007336 012700 000012
622 007342 032777 000200 173754 1$:    MOV     @10.,RO
623 007350 001004                BIT     @CRDY,@RLCS        ; GIVE HIM ABOUT 100 MSEC...
624 007352 004537 010224          BNE     2$                ;...TO FINISH UP.
625 007356 000012                JSR     RS,WDELAY
626 007360 077010                10.
627 007362 012777 000200 173734 2$:    SOB     RO,1$
628 007370 023727 003402 000003    MOV     @CRDY,@RLCS        ; THEN CLEAR ALL OPTION BITS.
629 007376 001002                CMP     RLTP,@RLV12X        ; BAE IN USE ??
630 007400 005077 173730          BNE     3$
631 007404                CLR     @RLBAE
632 007412                3$:    SETPRI  @PRI07
(3) 007404 012700 000340
(3) 007410 104441
632 007412          ENDCLN
(3) 007412
(3) 007412 104412
633
634          ; DROP UNITS -- AND KEEP TRACK OF 'EM.
635          ;
636 007414          BGNDU
(3) 007414
637 007414 023737 002012 003464    CMP     L$UNIT,DROPPED    ; ALL UNITS DROPPED ??
638 007422 001424                BEQ     2$                ; YUP, DO NOTHING.
639 007424 005237 003464          INC     DROPPED            ; NOT YET, BUMP COUNT...
640 007430                PRINTF  @1$
(7) 007430 012746 007452
(6) 007434 012746 000001
(3) 007440 010600
(4) 007442 104417
(4) 007444 062706 000004

; L$AUTO::
TRAP    C$ERSF
        .WORD 1
        .WORD EMO
        .WORD ERR1
MOV     UNITST,RO
TRAP    C$DODU

L10006:
TRAP    C$AUTO

; L$CLEAN::
MOV     @PRI07,RO
TRAP    C$SPRI

L10007:
TRAP    C$CLEAN

; L$DU::
MOV     @1$,-(SP)
MOV     @1$,-(SP)
MOV     SP,RO
TRAP    C$PNTF
ADD     @4,SP

```

L3

CVRL880 RLV12 DISKLESS.
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INITIALIZATION CODE

SEQ 0037

```

641 007450 000411
642 007452 040445 047125 052111 1$: BR 2$
    007460 042040 047522 050120 .ASCIZ /#AUNIT DROPPED#N/
    007466 042105 047045 000
643 007474 .EVEN
644 007474 2$: ENDDU
(3) 007474 L10010: TRAP C$DU
(3) 007474 104453
645 ;
646 ; IF THEY'RE PICKED UP AGAIN, TWEAK THE COUNTER.
647 ;
648 007476 BGNAU
(3) 007476 L$AU::
649 007476 005737 003464 TST DROPPED ; ALL UNITS BACK IN PLACE ??
650 007502 001423 BEQ 2$ ; JUST EXIT IF SO.
651 007504 005337 003464 DEC DROPPED ; NOT YET, ADJUST COUNT...
652 007510 PRINTF #1$ ....AND TELL HIM.
(7) 007510 012746 007532 MOV #1$, (SP)
(6) 007514 012746 000001 MOV #1, -(SP)
(3) 007520 010600 MOV SP, RO
(4) 007522 104417 TRAP C$PNTF
(4) 007524 062706 000004 ADD #4, SP
653 007530 000410
654 007532 040445 047125 052111 1$: BR 2$
    007540 040440 042104 042105 .ASCIZ /#AUNIT ADDED#N/
    007546 047045 000
655 007552 .EVEN
656 007552 2$: ENDAU
(3) 007552 L10011: TRAP C$AU
(3) 007552 104452

```

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658 .SBTTL GLOBAL SUBROUTINES
659 ;
660 ; SUBROUTINE TO CHECK FOR CONTROLLER ERRORS.
661 ; TRANSLATE THE ERROR BITS INTO PLAIN LANGUAGE AND MERGE THEM
662 ; INTO THE ERROR BUFFER (EM99) FOR SUBSEQUENT PRINTING.
663 ; DRIVE ERROR IS INCLUDED, BUT IS IGNORED IN THE DISKLESS TESTS.
664 ;
665 ; CALL: JSR R5,GETERR
666 ; BR XX ; NO ERRORS FOUND, RETURN.
667 ; ERRXX ; ERROR, RETURN.
668 ;
669 GETERR: MOV R1,-(SP) ; SAVE R1.
670 007554 010146 CLR DERFLG ; CLEAR OUT DRIVE ERROR FLAG
671 007556 005037 003362 MOV #EM99,R1 ; SET TEXT BUFFER POINTER.
672 007562 012701 034456 BIT #176000,E.CS ; ANY ERRORS THERE ??
673 007566 032737 176000 003364 BNE 1$ ; BR IF SO.
674 007574 001004 JSR R5,FIX ; NO, JUST SAY "NONE"...
675 007576 004537 010050 NON
676 007602 030702 BR 10$ ; ...AND RETURN.
677 007604 000516
678 007606 005737 003364 1$: TST E.CS ; IS COMPOSITE ERROR SET ? (BETTER BE)
679 007612 100003 BPL 2$ ; IF NOT SOMETHING'S WRONG !!!
680 007614 004537 010050 JSR R5,FIX ; YES, PUT "CERR" IN STRING.
681 007620 030623 CERR
682 007622 032737 040000 003364 2$: BIT #DERR,E.CS ; DRIVE ERROR SET?
683 007630 001411 BEQ 3$ ; BR IF NOT.
684 007632 005237 003362 INC DERFLG ; YES, SET DRV ERROR FLAG
685 007636 004537 010050 JSR R5,FIX ; ADD "DRV" TO STRING.
686 007642 030630 DEMES
687 007644 032737 036000 003364 BIT #036000,E.CS ; ANY OTHERS ???
688 007652 001473 BEQ 10$ ; NO, IGNORE THE DRIVE ERROR (DISKLESS).
689 007654 005725 3$: TST (R5). ; YES, BUMP PC TO TAKE ERROR RETURN.
690 007656 032737 020000 003364 BIT #NXM!PAR,E.CS ; NON-EX OR PARITY ??
691 007664 001415 BEQ 5$ ; BR IF NOT.
692 007666 012737 030635 007716 MOV #NXMMES,4$
693 007674 032737 002000 003364 BIT #OPI,E.CS
694 007702 001403 BEQ .+10
695 007704 012737 030642 007716 MOV #PARMES,4$
696 007712 004537 010050 JSR R5,FIX ; ADD "NXM" OR "PAR".
697 007716 030635 4$: NXMMES
698 007720 032737 010000 003364 5$: BIT #DLT!HNF,E.CS ; DATA LATE OR HEADER NOT FOUND ??
699 007726 001415 BEQ 7$ ; BR IF NOT.
700 007730 012737 030647 007760 MOV #DLTMES,6$
701 007736 032737 002000 003364 BIT #OPI,E.CS
702 007744 001403 BEQ .+10
703 007746 012737 030654 007760 MOV #HNFMES,6$
704 007754 004537 010050 JSR R5,FIX ; ADD "DLT" OR "HNF".
705 007760 030647 6$: DLTMES
706 007762 032737 004000 003364 7$: BIT #DCRC!HCRC,E.CS ; EITHER CRC ??
707 007770 001415 BEQ 9$ ; BR IF NOT.
708 007772 012737 030661 010022 MOV #DCRCMES,8$
709 010000 032737 002000 003364 BIT #OPI,E.CS
710 010006 001403 BEQ .+10
711 010010 012737 030667 010022 MOV #HRCRCMES,8$
712 010016 004537 010050 JSR R5,FIX ; ADD "DCRC" OR "HCRC".
713 010022 030661 8$: DCRCMES

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GLOBAL SUBROUTINES

SEQ 0039

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714 010024 032737 002000 003364 9$: BIT @OPI,E.CS ; "OPI" SET ??
715 010032 001403 BEQ 10$
716 010034 004537 010050 JSR R5,FIX ; ADD "OPI" TO STRING.
717 010040 030675 OPIMES
718 010042 105011 10$: CLRB (R1) ; TERMINATE ERROR LIST...
719 010044 012601 MOV (SP)+,R1 ; ...AND RESTORE R1.
720 010046 000205 RTS R5 ; RETURN.
721 ;
722 ; ROUTINE TO MOVE ASCII STRINGS
723 ; USES REGISTERS R1 - WHERE STRING IS BEING BUILT
724 ;
725 ; CALL JSR R5,FIX
726 ; .WORD ; ADDRESS OF STRING TO MOVE
727 ;
728 010050 012500 FIX: MOV (R5)+,R0 ; GET ADDRESS AND MOVE RETURN
729 010052 112021 1$: MOVB (R0)+,(R1)+ ; GET BYTE AND UPDATE
730 010054 001376 BNE 1$ ; WATCH 0 BYTE TERMINATOR
731 010056 105741 TSTB -(R1) ; BACK UP OVER ZERO BYTE
732 010060 000205 RTS R5 ; EXIT
733 ;
734 ; LOAD REGISTERS BEFORE FUNCTION
735 ; CALL: JSR R5,BEFORE
736 ;
737 010062 017737 173236 003350 BEFORE: MOV @RLCS,B.CS ; READ CS...
738 010070 042737 176000 003350 BIC @176000,B.CS ; ...ERRORS WILL BE CLEARED ON XCT.
739 010076 017737 173224 003352 MOV @RLBA,B.BA ; READ BA
740 010104 017737 173220 003354 MOV @RLDA,B.DA ; READ DA
741 ; LWLO1 MOV INIMP,B.MP ; INITIAL MP IS THE WORD COUNT.
742 010112 017737 173214 003356 MOV @RLMP,B.MP ; READ MP ; LWLO1
743 010120 023727 003402 000003 CMP RLTP,@RLV12X
744 010126 001003 BNE 1$
745 010130 017737 173200 003360 MOV @RLBAE,B.BAE ; READ BAE IF ENABLED.
746 010136 000205 1$: RTS R5
747 ;
748 ; LOAD REGISTERS AT ERROR OR DONE.
749 ; CALL: JSR R5,AFTER
750 ;
751 010140 017737 173160 003364 AFTER: MOV @RLCS,E.CS ; READ CS
752 010146 017737 173154 003366 MOV @RLBA,E.BA ; READ BA
753 010154 017737 173150 003370 MOV @RLDA,E.DA ; READ DA
754 010162 017737 173144 003372 MOV @RLMP,E.MP ; READ MP
755 010170 005737 036756 TST MIMIC ; ***** IF MIMIC
756 010174 001003 BNE 1$ ; ***** BYPASS 2ND MP READ
757 010176 017737 173130 003374 MOV @RLMP,E.MP1 ; READ MP (MAINT 2ND CRC CHECK ONLY).
758 010204 023727 003402 000003 1$: CMP RLTP,@RLV12X
759 010212 001003 BNE 2$
760 010214 017737 173114 003376 MOV @RLBAE,E.BAE ; READ BAE IF ENABLED.
761 010222 000205 2$: RTS R5
762 ;
763 ; ROUTINE TO DELAY IN 1 MSEC INCREMENTS.
764 ; CALIBRATED FOR LSI'S ONLY.
765 ; DELAY COUNT IS 291. (4438) FOR LSI 11/23.
766 ; 120. (1700) FOR LSI 11 OR 11/2.
767 ; 500. (7648) IF CPU TYPE IS UNKNOWN.
768 ;
769 ; CALL: JSR R5,WDELAY

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CVRLB80 -- RLV12 DISKLESS.
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GLOBAL SUBROUTINES

SEQ 0040

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770      ;      N      ; DELAY N MSEC.
771      ;
772      WDELAY: MOV    R1,-(SP)
773      MOV      R2,-(SP)
774      MOV      (R5),R2      ; APPROX MSEC DELAY
775      2$: MOV      DLYCNT,R1      ; GET 1 MSEC TIMER.
776      3$: DEC      R1      ; START LOOP
777      BNE      3$
778      DEC      R2      ; CHECK ON MSECs REQUESTED
779      BNE      2$      ; BRANCH AND DO ANOTHER LOOP
780      4$: MOV      (SP),R2      ; SETUP FOR RETURN AFTER DELAY
781      MOV      (SP),R1
782      RTS      R5
783      ;
784      ; ROUTINE TO LOAD RLCS WITH RLV11/12 MAINTENANCE FUNCTION
785      ; EITHER FLAG DRIVEN OR INTERRUPT MODE.
786      ;
787      ; CALL: JSR      R5,LODFUN
788      ;      .WORD    MAINT      ; OR MAINT!INTEN
789      ;      .WORD    N      ; WORD COUNT.
790      ;
791      ; LOCATIONS "BA16" AND "BA22" COMPRISE A 22 BIT PHYSICAL BUS ADDRESS
792      ; AND MUST BE SET BY THE CALLING ROUTINE PRIOR TO ENTRY.
793      ;
794      LODFUN: MOV      (R5),R0      ; BUILD THE FUNCTION IN R0.
795      MOV      (R5),INIMP      ; SAVE WORD COUNT FOR LATER.
796      BIC      #177661,R0      ; MASK GARBAGE BITS.
797      BIS      DRIVE,R0      ; INSERT DRIVE (0)...
798      BIS      #CRDY,R0      ; ...AND THE READY BITS.
799      MOV      R0,@RLCS      ; LOAD UP THE CSR.
800      MOV      BA16,@RLBA      ; LOAD BUS ADDRESS <15:0>.
801      CMP      RLTP,@RLV12X      ; RLV12 WITH BAE ??
802      BEQ      1$      ; BR IF SO.
803      MOV      BA22,R0      ; NO, GET EXTENSION IF ANY...
804      BIC      #1C3,R0      ; ...KEEP <17:16> ONLY...
805      ASL      R0
806      ASL      R0
807      ASL      R0
808      ASL      R0      ; ...MOVE 'EM TO <5:4>...
809      BIS      R0,@RLCS      ; ...AND INSERT INTO CS.
810      BR      2$
811      1$: MOV      BA22,@RLBAE      ; RLV12X, SET BA EXTENSION <21:16>.
812      2$: MOV      INIDA,@RLDA      ; LOAD DISK ADDRESS.
813      MOV      INIMP,@RLMP      ; LOAD WORD COUNT.
814      JSR      R5,BEFORE      ; SAVE STATE BEFORE FUNCTION.
815      BIC      #CRDY,@RLCS      ; XCT MAINT FUNCTION.
816      TST      MIMIC      ; ***** IF MIMIC
817      BEQ      3$      ; *****
818      JSR      PC,EMURLV      ; ***** EMULATE THE RLV FUNCTION
819      3$: RTS      R5      ; RETURN
820      ;
821      BA16: BUF1      ; 16 BIT BUFFER ADDRESS <15:0>.
822      BA22: 0      ; 6 BIT EXTENSION <21:16> IN <5:0>.
823      ;
824      ; ROUTINE TO FILL BUFFER WITH DATA PATTERNS FOR RLV MAINTENANCE.
825      ; BUF1 IS FILLED WITH 256 WORD PATTERN (OR COMPLEMENTING PATTERN).

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CVRLB80 RLV12 DISKLESS.
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GLOBAL SUBROUTINES

SEQ 0041

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826      ;BUF2 IS FILLED WITH 255 ZEROS AND 123456.
827
828      ;CALL: JSR      R5,SETPAT(SETCMP)
829      ;      .WORD    N          ;PATTERN FOR BUFFER
830
831      SETPAT: CLR      R0          ; SET NO COMPLIMENT...
832      BR      .+6                ;...AND SKIP NEXT.
833      SETCMP: MOV      # 1,R0      ; SET COMPLIMENT.
834      MOV      R1,(SP)
835      MOV      R2,-(SP)
836      MOV      (R5)+,TMP0         ; DATA TO STORE.
837      MOV      #BUF1,R1          ;BUFFER POINTER.
838      MOV      #256.,R2          ;WORD COUNT
839      1$: MOV      TMP0,(R1)+
840      TST      R0                ; ARE WE COMPLIMENTING ??
841      BEQ      2$                ; NO, SKIP NEXT.
842      COM      TMP0              ; YES, COMPLIMENT IT.
843      2$: DEC      R2
844      BNE      1$
845      MOV      #255.,R2          ; NOW CLEAR THE REST OF...
846      3$: CLR      (R1)+         ;...THE BUFFER.
847      DEC      R2
848      BNE      3$
849      MOV      #123456,(R1)+     ;STORE IN LAST BUFFER WORD.
850      MOV      (SP)+,R2
851      MOV      (SP)+,R1
852      RTS      R5
853
854      ;ROUTINE TO SETUP BUFFER WITH RANDOM NUMBERS FOR RLV11 MAINT. FUNCTION
855      ;SAME PATTERN IS USED FOR EACH CONTROLLER
856      ;END OF PASS WILL CHANGE RANDOM PATTERN PRIMES
857      CALL     JSR      R5,SETRAN
858
859      SETRAN: MOV      R1,-(SP)
860      MOV      R2,-(SP)
861      MOV      #BUF1,R1          ;FIRST BUFFER START
862      MOV      #256.,R2          ;BUFFER COUNT
863      1$: JSR      R5,RAND        ;GET RANDOM NUMBER
864      MOV      HINUM,(R1)+       ;STORE IN BUFFER
865      DEC      R2
866      BNE      1$
867      MOV      #255.,R2          ; NOW CLEAR THE REST.
868      2$: CLR      (R1)+
869      DEC      R2
870      BNE      2$
871      MOV      #123456,(R1)+     ;STORE IN LAST BUFFER WORD
872      MOV      (SP)+,R2
873      MOV      (SP)+,R1
874      RTS      R5
875
876      ;THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
877      ;WITH A RANGE OF 0 TO 2(.33) 1.
878      ;CALL:
879      ;      JSR      R5,RAND      ;CALL THE ROUTINE
880      ;      RETURN              ;RETURN HERE THE RANDOM NUMBER
881      ;      ;WILL BE IN HINUM,LONLM

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```

882      ;
883      010572 010146      ; RAND:  MOV R1, (SP)      ; PUSH R1 ON STACK
884      010574 010246      ;          MOV R2, -(SP)      ; PUSH R2 ON STACK
885      010576 010346      ;          MOV R3, (SP)      ; PUSH R3 ON STACK
886      010600 013703 003454 ;          MOV LONUM,R3      ; SET R3 WITH LOW
887      010604 013701 003452 ;          MOV HINUM,R1      ; SET R1 WITH HIGH
888      010610 012702 177771 ;          MOV #-7,R2        ; SET SHIFT COUNTER
889      010614 006303      ; 1$:  ASL R3                ; SHIFT R3 LEFT AND
890      010616 006101      ;          ROL R1            ; ROTATE CARRY INTO R1 AND
891      010620 005202      ;          INC R2            ; CHECK FOR DONE
892      010622 001374      ;          BNE 1$           ; CONTINUE SHIFT LOOP
893      010624 063703 003454 ;          ADD LONUM,R3      ; ADD NUMBER TO MAKE X 129
894      010630 005501      ;          ADC R1            ; PROPOGATE CARRY
895      010632 063701 003452 ;          ADD HINUM,R1      ; ADD NUMBER TO MAKE X 129
896      010636 062703 001057 ;          ADD #1057,R3      ; ADD LOW CONSTANT
897      010642 005501      ;          ADC R1            ; PROPOGATE CARRY
898      010644 062701 047401 ;          ADD #47401,R1     ; ADD HIGH CONSTANT
899      010650 010337 003454 ;          MOV R3,LONUM      ; SAVE R3
900      010654 010137 003452 ;          MOV R1,HINUM      ; SAVE R1
901      010660 012603      ;          MOV (SP)+,R3      ; POP STACK INTO R3
902      010662 012602      ;          MOV (SP)+,R2      ; POP STACK INTO R2
903      010664 012601      ;          MOV (SP)+,R1      ; POP STACK INTO R1
904      010666 000205      ;          RTS R5            ; RETURN
905      ;
906      ; ROUTINES TO SET A FLAG ON BUS ERROR AND/OR RL INTERRUPT.
907      ;
908      010670 005227      ; TRAP4: INC (PC)+
909      010672 000000      ; TRPFLG: 0
910      010674 000002      ;          RTI
911      ;
912      010676 005227      ; RLINT: INC (PC)+
913      010700 000000      ; INTFLG: 0
914      010702 000002      ; CLKRTI: RTI      ; USE TO DISMISS FREE RUNNING CLOCK.
915      ;
916      ; ROUTINE TO WAIT FOR CONTROLLER READY
917      ; THE 800 MSEC INTERVAL APPLIES TO LSI'S ONLY !!!
918      ; IN ANY CASE, IT'S JUST A KEEP-ALIVE TIMER.
919      ; ON EXIT, 4(SP) HOLDS THE REMNANTS OF THE 800. MS COUNT.
920      ;
921      010704 012746 001440 ; WTCRDY: MOV #800,-(SP)      ; SFT 800 MSEC TIMER.
922      010710 032777 000200 172406 ; 1$:  BIT #CRDY,0RLCS      ; CONTROLLER READY ??
923      010716 001014      ;          BNE 2$           ; YES, EXIT
924      010720 004537 010224 ;          JSR R5,WDELAY      ; WAIT A WHILE
925      010724 000001      ;          1                     ; APPROX A MILLISECOND
926      010726 005316      ;          DEC (SP)          ; CHECK IF TIME UP
927      010730 001367      ;          BNE 1$           ; NO GO BACK
928      010732 004537 010140 ;          JSR R5,AFTER      ; GET REGISTERS FOR ERROR.
929      010736      ;          DFERR CRTIM,ERRO ; CONTROLLER TIMED OUT
930      (5) 010736 104455      ; TRAP C$ERDF
931      (6) 010740 000144      ; .WORD 100
932      (6) 010742 030550      ; .WORD CRTIM
933      (6) 010744 026236      ; .WORD ERRO
934      010746 000402      ;
935      010750 004537 010140 ; 2$:  JSR R5,AFTER      ; GET REGISTERS
936      010754 005726      ;          TST (SP)+        ; CLEAN THE STACK...
937      010756 000205      ;          RTS R5            ; ...AND RETURN.

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GLOBAL SUBROUTINES

SEQ 0043

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934 ;
935 ;RLV11 MAINTENANCE SUBROUTINE FOR CRC CALCULATIONS
936 ;ROUTINE TO RETRIEVE PATTERN AND CALCULATE CRC OF PATTERN+3
937 ;AND CRC OF CRC OF PATTERN+4.
938 ;PATTERN IS SAVED IN "INIDA" FOR SUBSEQUENT LOADING FOR DA.
939 ;CRC OF PATTERN+3 WILL BE STORED IN "GDCRC3".
940 ;CRC OF CRC OF PATTERN+4 WILL BE STORED IN "GDCRC4".
941 ;
942 ;CALL: JSR R5,CALCRC
943 ; .WORD N ;PATTERN FOR INITIAL DA
944 ;
945 010760 012537 003440 CALCRC: MOV (R5)+,INIDA ;STORE PATTERN
946 010764 013737 003440 003422 MOV INIDA,TEMP1
947 010772 113737 003422 003420 MOVB TEMP1,TEMP5
948 011000 062737 000003 003420 ADD #3,TEMP5 ;ADD 3 TO PATTERN
949 011006 113737 003420 003422 MOVB TEMP5,TEMP1
950 011014 013737 003422 011030 MOV TEMP1,1$
951 011022 004537 011124 JSR R5,SIMBCC ;CALCULATE EXPECTED CRC
952 011026 000020 16. ;DATA BITS
953 011030 000000 1$: .WORD 0 ;INITIAL PATTERN+3
954 011032 000000 .WORD 0
955 011034 013737 003410 003442 MOV CALBCC,GDCRC3 ;SAVE CRC OF PATTERN+3
956 011042 005237 003420 INC TEMP5 ;VALUE=PATTERN+4
957 011046 113737 003420 003422 MOVB TEMP5,TEMP1
958 011054 013737 003422 011070 MOV TEMP1,2$
959 011062 004537 011124 JSR R5,SIMBCC ;CALCULATE EXPECTED CRC
960 011066 000020 16. ;DATA BITS
961 011070 000000 2$: .WORD 0 ;INITIAL PATTERN+4
962 011072 000000 .WORD 0 ;STARTING CRC=0
963 011074 013737 003410 011110 MOV CALBCC,3$ ;STORE CRC FOR NEXT CALL
964 011102 004537 011124 JSR R5,SIMBCC ;CAL. CRC OF CRC OF DA+4
965 011106 000020 16. ;DATA BITS
966 011110 000000 3$: .WORD 0 ;CRC OF DA+4
967 011112 000000 .WORD 0 ;STARTING CRC=0
968 011114 013737 003410 003444 MOV CALBCC,GDCRC4 ;SAVE CRC OF CRC OF DA+4
969 011122 000205 RTS R5
970 ;
971 ; SUBROUTINE TO CALCULATE A CRC.
972 ;ROUTINE WILL CALCULATE A CRC-16 CRC ON A WORD OF
973 ;1 16 BITS IN LENGTH, RESULT IS RETURNED IN "CALBCC"
974 ;
975 ; CALL: JSR R5,SIMBCC
976 ; .WORD ;NUMBER OF BITS (1 16)
977 ; .WORD ;DATA FOR CRC CALCULATION
978 ; .WORD ;PREVIOUS OR STARTING CRC
979 ; (SHOULD BE ZEROED FOR START)
980 ;
981 011124 010046 SIMBCC: MOV R0,(SP) ;SAVE R0
982 011126 010146 MOV R1,-(SP) ;SAVE R1
983 011130 010246 MOV R2,-(SP) ;SAVE R2
984 011132 012537 003412 MOV (R5)+,TEMP2 ;GET NUMBER OF BITS
985 011136 012537 003414 MOV (R5)+,TEMP3 ;GET DATA FOR CRC CALCULATION
986 011142 012537 003416 MOV (R5)+,TEMP4 ;GET STARTING CRC
987 011146 005037 003406 1$: CLR BCCFBK ;
988 011152 013700 003416 MOV TEMP4,R0 ;GET PRESENT CRC
989 011156 006037 003414 ROR TEMP3 ;ROTATE NEW DATA

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GLOBAL SUBROUTINES

SEQ 0044

990	011162	005500		ADC	R0	;MERGE NEW WITH OLD
991	011164	032700	000001	BIT	#1,R0	;BIT 0 SET
992	011170	001402		BEQ	2\$	;IF NOT CONTINUE
993	011172	005137	003406	COM	BCCFBK	;
994	011176	013700	003404	2\$: MOV	XPOLY,R0	;GET CRC POLYNOMIAL (CRC 16)
995	011202	005100		COM	R0	;COMPLIMENT POLYNOMIAL
996	011204	040037	003406	BIC	R0,BCCFBK	
997	011210	000241		CLC		;CLEAR CARRY
998	011212	006037	003416	ROR	TEMP4	
999	011216	013700	003406	MOV	BCCFBK,R0	
1000	011222	013701	003416	MOV	TEMP4,R1	
1001	011226	010102		MOV	R1,R2	
1002	011230	040100		BIC	R1,R0	
1003	011232	043702	003406	BIC	BCCFBK,R2	
1004	011236	050200		BIS	R2,R0	
1005	011240	043737	003404 003416	BIC	XPOLY,TEMP4	
1006	011246	050037	003416	BIS	R0,TEMP4	
1007	011252	005337	003412	DEC	TEMP2	
1008	011256	001333		BNE	1\$	
1009	011260	013737	003416 003410	MOV	TEMP4,CALBCC	
1010	011266	012602		MOV	(SP)+,R2	
1011	011270	012601		MOV	(SP)+,R1	
1012	011272	012600		MOV	(SP)+,R0	
1013	011274	000205		RTS	R5	;RETURN

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MEMORY SIZER

SEQ 0045

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1015 .SBTTL MEMORY SIZER
1016 ;*****
1017 ;
1018 ; ROUTINE TO SIZE AVAILABLE MEMORY.
1019 ; FREELY ADAPTED FROM ".SIZE" IN SYSMAC.SML (C3).
1020 ; THIS ROUTINE MUST RESIDE WITHIN THE FIRST 24K (0-137776).
1021 ;
1022 ; USE KT IF IT'S AVAILABLE, OTHERWISE SIZE UP TO 30K IN THE
1023 ; TRADITIONAL FASHION. RETURN WITH:
1024 ;
1025 .MSIZE: .WORD 0 ; TOTAL MEMORY SIZE (K WORDS).
1026 .LSTPG: .WORD 0 ; PAGE ADDRESS (PAF) OF LAST 1K PAGE...
1027 ;...OR ZERO IF KT NOT AVAILABLE.
1028 .LSTAD: .WORD 0 ; LAST VIRTUAL ADDRESS IN LAST PAGE...
1029 ;...OR LAST ADDRESS UNDER 30K (IF NO KT).
1030 .ABUSW: .WORD 16. ; ADDRESS BUS WIDTH, 16, 18, OR 22.
1031 ;
1032 ; ALL GENERAL REGISTERS ARE USED BUT NOT SAVED.
1033 ; MEMORY PARITY ERRORS (IF ANY) ARE IGNORED.
1034 ;
1035 MMR0= 177572 ; KT CONTROL REGISTERS.
1036 MMR1= 177574
1037 MMR2= 177576
1038 MMR3= 172516
1039 KIPAR0= 172340 ; KERNAL, I SPACE, PAR 0.
1040 KIPDR0= KIPAR0-40 ; PDR 0.
1041 ;
1042 ;*****
1043
1044 011306 012737 000020 011304 .SIZE: MOV #16,.ABUSW ; ASSUME 16 BIT ADDRESSING.
1045 011314 013746 000004 MOV @#4,-(SP) ; SAVE BUS-ERROR...
1046 011320 013746 000006 MOV @#6,-(SP)
1047 011324 013746 000114 MOV @#114,-(SP) ;...AND PARITY VECTORS.
1048 011330 013746 000116 MOV @#116,-(SP)
1049 011334 010605 MOV SP,R5 ; SAVE STACK POINTER IN R5.
1050
1051 011336 012737 000116 000114 MOV #116,@#114 ; IGNORE PARITY ERRORS.
1052 011344 012737 000002 000116 MOV #RTI,@#116
1053 011352 012737 011376 000004 MOV #1$,@#4 ; SIZE USING "1$" IF KT ISN'T THERE.
1054 011360 012737 000340 000006 MOV #340,@#6
1055 011366 005737 177572 TST MMR0
1056 011372 000240 240
1057 011374 000417 BR .SIZKT ; OTHERWISE, SIZE USING THE KT.
1058
1059 011376 012737 011424 000004 1$: MOV #3$,@#4 ; NO KT - SET TRAP CATCHER.
1060 011404 005002 CLR R2 ; FIRST ADDRESS (0).
1061 011406 005003 CLR R3
1062 011410 005712 2$: TST (R2) ; SIZE FROM 0 UP...
1063 011412 000240 240
1064 011414 062702 004000 ADD #4000,R2 ;...IN 1K STEPS...
1065 011420 005203 INC R3
1066 011422 000772 BR 2$ ;...UNTIL WE TRAP.
1067 011424 162702 000002 3$: SUB #2,R2 ; R2 = LAST VIRTUAL ADDRESS.
1068 011430 005001 CLR R1 ; R1 = 0 (PAF DOESN'T APPLY).
1069 011432 000513 BR .SIZXIT ; RETURN.
1070

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MEMORY SIZER

SEQ 0046

1071	011434	012701	172340			.SIZKT: MOV	#KIPAR0,P1	; 1ST "PAR" ADDRESS...
1072	011440	012702	172300			MOV	#KIPDR0,R2	; ...AND IT'S "PDR"...
1073	011444	012703	000010			MOV	#8.,R3	; ...AND THERE ARE 8 OF EACH.
1074	011450	005000				CLR	R0	; 1ST PAGE IS ZERO.
1075	011452	010021			1\$:	MOV	R0,(R1)+	; SET PAR'S = 0, 4K, 8K ... 28K.
1076	011454	012722	077406			MOV	#77406,(R2)+	; SET PDR'S = 4K, EX-UP, RFAD/WRITE.
1077	011460	062700	000200			ADD	#200,R0	; SET NEXT PAGE PAF (+4K)...
1078	011464	077306				SOB	R3,1\$	; ...AND LOOP UNTIL ALL LOADED.
1079	011466	012741	177600			MOV	#177600,-(R1)	; PAR7 IS THE I/O PAGE (PAF).
1080	011472	005041				CLR	-(R1)	; PAR6 WILL DO THE SIZING.
1081	011474	005003				CLR	R3	; R3 WILL COUNT THE K'S.
1082								
1083	011476	012737	011550	000004		MOV	#2\$,@#4	; TRAP TO 2\$ IF NO 22 BIT SUPPORT.
1084	011504	005737	172516			TST	MMR3	; 22 BITS SUPPORTED ??
1085	011510	012737	000020	172516		MOV	#20,MMR3	; MUST BE, SET 22 BIT MODE...
1086	011516	012737	011564	000004		MOV	#3\$,@#4	; ...TRAP TO 3\$ IF 22 BIT ADDRESS IS NXM.
1087	011524	005237	177572			INC	MMR0	***** KT ON *****
1088	011530	012711	010000			MOV	#10000,(R1)	; SET PAR6 AT START OF 22 BIT LAND...
1089	011534	023737	000200	140200		CMP	@#200,140200	; ...AND LOOK FOR WRAP-AROUND.
1090	011542	001010				BNE	3\$	; WE'RE HERE IF IT DIDN'T TRAP...
1091								; ...BRANCH IF IT DIDN'T WRAP AROUND.
1092	011544	005037	172516			CLR	MMR3	; WRAP-AROUND - MUST BE 18 BITS ONLY.
1093	011550	012737	000022	011304	2\$:	MOV	#18...ABUSW	; SET THE BUS WIDTH = 18.
1094	011556	012704	007600			MOV	#7600,R4	; SET SIZER LIMIT = 124K.
1095	011562	000405				BR	4\$	
1096	011564	012737	000026	011304	3\$:	MOV	#22...ABUSW	; WE HAVE A REAL 22 BIT ADDRESS SPACE.
1097	011572	012704	170000			MOV	#170000,R4	; SET SIZER LIMIT = 1920K.
1098	011576				4\$:			
1099	011576	012737	011624	000004		.SIZMEM: MOV	#2\$,@#4	; TRAP TO 2\$ WHEN DONE SIZING.
1100	011604	005011				CLR	(R1)	; SET PAR6 AT 1ST PAGE (0).
1101	011606	005737	140000		1\$:	TST	140000	; SIZE USING PAR6 (+0)...
1102	011612	062711	000040			ADD	#40,(R1)	; ...IN 1K STEPS.
1103	011616	005203				INC	R3	
1104	011620	021104				CMP	(R1),R4	; REACHED LIMIT ??
1105	011622	103771				BLO	1\$	; LOOP IF NOT.
1106	011624	011100			2\$:	MOV	(R1),R0	; DONE, SAVE FINAL PAR6...
1107	011626	012711	001400			MOV	#1400,(R1)	; ...AND RESET IT TO BANK 6 (24K).
1108	011632	005037	177572			CLR	MMR0	***** KT OFF *****
1109	011636	012737	011650	000004		MOV	#3\$,@#4	; THERE MAY NOT BE AN MMR3
1110	011644	005037	172516			CLR	MMR3	; 22 BIT ADDRESSING OFF
1111	011650	010001			3\$:	MOV	R0,R1	; RECOVER SIZING RESULT.
1112	011652	162701	000040			SUB	#40,R1	; R1 = LAST 1K PAGE (PAF).
1113	011656	012702	003776			MOV	#3776,R2	; R2 = LAST ADDR IN THAT PAGE.
1114								
1115	011662	010137	011300			.SIZXIT: MOV	R1..LSTPG	; RETURN LAST PAGE (PAF)...
1116	011666	010237	011302			MOV	R2..LSTAD	; ...LAST VIRTUAL ADDRESS...
1117	011672	010337	011276			MOV	R3..MSIZE	; ...AND TOTAL MEMORY SIZE (K).
1118	011676	010506				MOV	R5,SP	; RECOVER OUR STACK POINTER...
1119	011700	012637	000116			MOV	(SP)+,@#116	; ...AND THE ERROR VECTORS.
1120	011704	012637	000114			MOV	(SP)+,@#114	
1121	011710	012637	000006			MOV	(SP)+,@#6	
1122	011714	012637	000004			MOV	(SP)+,@#4	
1123	011720	000207				RTS	PC	; ...AND RETURN.

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REPORT ENVIRONMENT

SEQ 0047

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1125 .SBTTL REPORT ENVIRONMENT
1126 ;
1127 ; SUBROUTINE TO DISPLAY THE CURRENT OPERATING ENVIRONMENT.
1128 ; CALLED ON EVERY START/RESTART, OR DIRECTLY VIA "PRI".
1129 ;
1130 BGNRPT
1131 (3) 011722
1132 011722 105037 012162 1$: CLRB MSGNOT
1133 011726 005737 011300 TST .LSTPG
1134 011732 001003 BNE 2$
1135 011734 112737 000040 012162 MOV8 #40,MSGNOT
1136 011742 2$: PRINTF #MSG2,#MSGNOT ; MMU
1137 (8) 011742 012746 012162 MOV #MSGNOT, -(SP)
1138 (7) 011746 012746 012042 MOV #MSG2, (SP)
1139 (6) 011752 012746 000002 MOV #2, -(SP)
1140 (3) 011756 010600 MOV SP, R0
1141 (4) 011760 104417 TRAP C$PNTF
1142 (4) 011762 062706 000006 ADD #6, SP
1143 PRINTF #MSG3,.MSIZE ; MEM SIZE.
1144 (8) 011766 013746 011276 MOV .MSIZE, -(SP)
1145 (7) 011772 012746 012072 MOV #MSG3, (SP)
1146 (6) 011776 012746 000002 MOV #2, -(SP)
1147 (3) 012002 010600 MOV SP, R0
1148 (4) 012004 104417 TRAP C$PNTF
1149 (4) 012006 062706 000006 ADD #6, SP
1150 3$: PRINTF #MSG4,.ABUSW ; ADDRESS SPACE.
1151 (8) 012012 013746 011304 MOV .ABUSW, (SP)
1152 (7) 012016 012746 012125 MOV #MSG4, (SP)
1153 (6) 012022 012746 000002 MOV #2, (SP)
1154 (3) 012026 010600 MOV SP, R0
1155 (4) 012030 104417 TRAP C$PNTF
1156 (4) 012032 062706 000006 ADD #6, SP
1157 EXIT RPT
1158 (4) 012036 000167 .WORD J$JMP
1159 (3) 012040 000126 .WORD L10012 2
1160 1139 012042 047045 040445 020040 MSG2: .ASCIZ 'N/A MMU AVAILABLE'
1161 012050 046515 022525 022524
1162 012056 020101 053101 044501
1163 012064 040514 046102 000105
1164 1140 012072 047045 040445 020040 MSG3: .ASCIZ 'N/A MEMORY SIZE D4 A KW'
1165 012100 042515 047515 054522
1166 012106 051440 055111 020105
1167 012114 042045 022464 020101
1168 012122 053513 000
1169 1141 012125 045 022516 020101 MSG4: .ASCIZ 'N/A D2 A BIT ADDRESSING N'
1170 012132 022440 031104 040445
1171 012140 041040 052111 040440
1172 012146 042104 042522 051523
1173 012154 047111 022507 000116
1174 1142 012162 047040 052117 000 MSGNOT: .ASCIZ ' NOT'
1175 1143 012170 .EVEN
1176 1144 012170 ENDRPT
1177 (3) 012170
1178 (3) 012170 104425

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L10012: TRAP C\$RPT

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1146 .SBTTL
1147 .SBTTL RL DISKLESS CONTROLLER TESTS.
1148 .SBTTL
1149 .SBTTL 1 - RLCS ADDRESSABILITY.
1150
1151 012172 STARS
(2) ;*****
1152 ;TEST TO SEE IF WE CAN ADDRESS THE CONTROL
1153 ;AND STATUS REGISTER IF WE TRAP WE WILL REPORT
1154 ;THE ERROR AND ABORT. AFTER THIS TEST WE ONLY KNOW
1155 ;THAT WE CAN ADDRESS THE REGISTER.
1156 012172 STARS
(2) ;*****
1157 012172 BEGIN.TEST
(4) 012172 T1::
1158 012172 005037 010672 1$: CLR TRPFLG ;CLEAR TRAP OCCURANCE
1159 012176 012777 177777 171120 MOV #177777,@RLCS ;WRITE RLCS.
1160 012204 000240 000240 240,240 ;
1161 012210 005777 171110 TST @RLCS ;READ RLCS.
1162 012214 000240 000240 240,240 ;
1163 012220 005737 010672 TST TRPFLG ;EITHER ONE TRAP ??
1164 012224 001413 BEQ 3$ ;NO, PROCEED.
1165 012226 013737 003324 003432 MOV RLCS,GDDAT ;SET UP ERROR DATA
1166 012234 SFERR EM1,ERR1 ;BUS TIMEOUT IN ADDRESSING RLCS
(5) 012234 104454 TRAP C$ERSF
(6) 012236 000002 .WORD 2
(6) 012240 030760 .WORD EM1
(6) 012242 026242 .WORD ERR1
1167 012244 DODU UNITST ;DROP...
(3) 012244 013700 003322 MOV UNITST,R0
(3) 012250 104451 TRAP C$DODU
1168 012252 DOCLN ;...AND ABORT.
(3) 012252 104444 TRAP C$DCLN
1169 012254 3$: ENDTST L10013:
(3) 012254 TRAP C$ETST
(3) 012254 104401

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[illegible]

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1193 .SBTTL      3 -- RLDA ADDRESSABILITY.
1194
1195 012342 STARS
(2) ;*****
1196 ;TEST TO SEE IF WE CAN ADDRESS THE DISK ADDRESS
1197 ;REGISTER IF WE TRAP WE WILL REPORT THE ERROR
1198 ;AND ABORT. AFTER THIS TEST WE ONLY KNOW THAT
1199 ;WE CAN ADDRESS THE REGISTER.
1200 012342 STARS
(2) ;*****
1201 012342 BEGIN.TEST
(4) 012342 T3::
1202 012342 005037 010672 1$: CLR TRPFLG ;CLEAR TRAP OCCURANCE
1203 012346 012777 177777 170754 MOV #177777,@RLDA ; WRITE RLDA
1204 012354 000240 000240 240,240
1205 012360 005777 170744 TST @RLDA ; READ RLDA
1206 012364 000240 000240 240,240
1207 012370 005737 010672 TST TRPFLG ; ANY TRAPS ??
1208 012374 001413 BEQ 3$ ;NO, CONTINUE
1209 012376 013737 003330 003432 MOV RLDA,GDDAT ;SETUP ERROR INFO
1210 012404 SFERR EM3,ERR1 ;BUS TIMEOUT IN ADDRESSING RLDA
(5) 012404 104454 TRAP C$ERSF
(6) 012406 000004 .WORD 4
(6) 012410 031032 .WORD EM3
(6) 012412 026242 .WORD ERR1
1211 012414 DODU UNITST ; DROP...
(3) 012414 013700 003322 MOV UNITST,R0
(3) 012420 104451 TRAP C$DODU
1212 012422 DOCLN ;...AND ABORT.
(3) 012422 104444 TRAP C$DOCLN
1213 012424 3$: ENDTST L10015:
(3) 012424 TRAP C$ETST
(3) 012424 104401

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4 -- RLMP ADDRESSABILITY.

SEQ 0051

```

1215      .SBTTL      4 -- RLMP ADDRESSABILITY.
1216
1217 012426      STARS
(2)      ;*****
1218      ;TEST TO SEE IF WE CAN ADDRESS THE MULTIPURPOSE
1219      ;REGISTER. IF WE TRAP WE WILL REPORT THE ERROR AND
1220      ;ABORT. AFTER THIS TEST WE ONLY KNOW THAT WE CAN
1221      ;ADDRESS THE REGISTER.
1222 012426      STARS
(2)      ;*****
1223 012426      BEGIN.TEST
(4) 012426      T4::
1224 012426 005037 010672 1$: CLR      TRPFLG      ;CLEAR TRAP OCCURANCE
1225 012432 012777 177777 170672 MOV      #177777,@RLMP ;WRITE RLMP
1226 012440 000240 000240      240,240
1227 012444 005777 170662      TST      @RLMP      ; READ RLMP
1228 012450 000240 000240      240,240
1229 012454 005737 010672      TST      TRPFLG      ; ANY TRAPS ??
1230 012460 001413      BEQ      3$      ;NO, CONTINUE
1231 012462 013737 003332 003432 MOV      RLMP,GDDAT ;SET UP ERROR INFO
1232 012470      SFERR      EM4,ERR1 ;BUS TIMEOUT IN ADDRESSING RLMP
(5) 012470 104454      TRAP      C$ERSF
(6) 012472 000005      .WORD      5
(6) 012474 031057      .WORD      EM4
(6) 012476 026242      .WORD      ERR1
1233 012500      DODU      UNITST      ; DROP...
(3) 012500 013700 003322      MOV      UNITST,R0
(3) 012504 104451      TRAP      C$DODU
1234 012506      DOCLN      ;...AND ABORT.
(3) 012506 104444      TRAP      C$DCLN
1235 012510 3$:      ENDTST
(3) 012510      L10C16:
(3) 012510 104401      TRAP      C$ETST

```

1237		.SBTTL	5 - RLBAE ADDRESSABILITY (RLV12 ONLY).	
1238				
1239	012512	STARS		
(2)		::*****		
1240		; THE DEFAULT (SHIP) CONFIGURATION REQUIRES THAT THE		
1241		; BAE REGISTER BE ENABLED. CHECK IT AND REPORT ACCORDINGLY.		
1242	012512	STARS		
(2)		::*****		
1243	012512	BEGIN.TEST		
(4)	012512		T5::	
1244	012512	023727 003402 000002	CMP RLTYP,#RLV12 ; RLV12 ??	
1245	012520	103444	BLO 4\$; NO, SKIP THIS TEST.	
1246	012522	005037 010672	CLR TRPFLG ; CLEAR TRAP OCCURANCE	
1247	012526	013737 003334 003432	MOV RLBAE,GDDAT ; SET ADDRESS IN CASE OF ERROR.	
1248	012534	012777 177777 170572	MOV #-1,@RLBAE ; WRITE BAE.	
1249	012542	000240 000240	240,240	
1250	012546	005777 170562	TST @RLBAE ; READ BAE.	
1251	012552	000240 000240	240,240	
1252	012556	023727 003402 000003	CMP RLTYP,#RLV12X ; DEFAULT CONFIG (W/BAE) ??	
1253	012564	001013	BNE 3\$; BR IF NOT.	
1254				
1255	012566	005737 010672	2\$: TST TRPFLG ; BAE SHOULD HAVE ANSWERED - DID IT ??	
1256	012572	001417	BEQ 4\$; BR IF SO.	
1257	012574		SFERR EM4A,ERR1 ;BUS TIMEOUT IN ADDRESSING RLBAE	
(5)	012574	104454		TRAP C\$ERSF
(6)	012576	000006		.WORD 6
(6)	012600	031104		.WORD EM4A
(6)	012602	026242		.WORD ERR1
1258	012604		DODU UNITST ; DROP...	
(3)	012604	013700 003322		MOV UNITST,R0
(3)	012610	104451		TRAP C\$DODU
1259	012612		DOCLN ;...AND ABORT.	
(3)	012612	104444		TRAP C\$DCLN
1260				
1261	012614	005737 010672	3\$: TST TRPFLG ; BAE SHOULD HAVE TRAPPED DID IT ??	
1262	012620	001004	BNE 4\$; BR IF SO.	
1263	012622		DFERR EM4B,ERR1 ; BAE IS NOT DISABLED.	
(5)	012622	104455		TRAP C\$ERDF
(6)	012624	000145		.WORD 101
(6)	012626	031132		.WORD EM4B
(6)	012630	026242		.WORD ERR1
1264	012632		4\$: ENDTST	
(3)	012632			L10017:
(3)	012632	104401		TRAP C\$ETST

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6 - BUS RESET OF ALL REGISTERS.

SEQ 0053

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1266 .SBTTL 6 - BUS RESET OF ALL REGISTERS.
1267
1268 012634 STARS
(2) ;*****
1269 ;TEST THAT A BUS RESET WILL CLEAR THE PROPER BITS.
1270 ;IN THE CONTROL AND STATUS REGISTER, THOSE BITS ARE
1271 ;1-6,8,9,10,11,12,13,15. BIT 15 WILL CLEAR ONLY
1272 ;IF BIT 14 (DRIVE ERROR IS NOT SET). BIT 0 (DRIVE READY)
1273 ;IS A DON'T CARE. IF AT THE START UP THIS TEST BIT
1274 ;14 (DRIVE ERROR) IS SET WE WILL INSIST IF IS THERE AFTER
1275 ;THE "RESET" ALONG WITH BIT 15 (COMPOSITE ERROR). BITS
1276 ;15-10 ARE NOT WRITEABLE.
1277 ; THE OTHER REGISTERS SHOULD GO TO ZERO.
1278 012634 STARS
(2) ;*****
1279 012634 BEGIN.TEST
(4) 012634 T6::
1280 012634 SETPRI #PRI07 ;PRIORITY TO SEVEN
(3) 012634 012700 000340 MOV #PRI07,R0
(3) 012640 104441 TRAP C$SPRI
1281 012642 012777 000377 170454 MOV #377,@RLCS ;LOAD ALL RLCS LOADABLE BITS
1282 012650 012737 000200 003432 MOV #CRDY,GDDAT ;SETUP EXPECTED CSR.
1283 012656 032777 040000 170440 BIT @DERR,@RLCS ;DRIVE ERR SET?
1284 012664 001403 BEQ 1$ ;IF NOT DON'T EXPECT IT
1285 012666 052737 140000 003432 BIS @DERR!ERR,GDDAT ;IT'S SET, INIT BETTER NOT CLR
1286 012674 012777 177777 170424 1$: MOV #-1,@RLBA ; LOAD ALL BITS IN THE OTHERS.
1287 012702 012777 177777 170420 MOV #-1,@RLDA
1288 012710 023727 003402 000003 CMP RLTP,@RLV12X ; RLV12X ??
1289 012716 001003 BNE 2$ ; NO. SKIP NEXT.
1290 012720 012777 177777 170406 MOV #-1,@RLBAE
1291 012726 004537 010224 2$: JSR R5,WDELAY ; DELAY BEFORE...
1292 012732 000372 250.
1293 012734 000005 RESET
1294 012736 004537 010224 3$: JSR R5,WDELAY ;...AND AFTER.
1295 012742 000372 250.
1296 012744 017737 170354 003434 MOV @RLCS,BDDAT ;READ RLCS
1297 012752 042737 000001 003434 BIC @DRDY,BDDAT ;CLEAR OUT DRDY - DON'T CARE
1298 012760 023737 003434 003432 CMP BDDAT,GDDAT ;DID INIT WORK ON CSR.
1299 012766 001404 BEQ 4$ ;YES, BRANCH
1300 012770 DFERR EM69,ERR2 ;BUS INIT FAILED ON CSR.
(5) 012770 104455 TRAP C$ERDF
(6) 012772 000146 .WORD 102
(6) 012774 033363 .WORD EM69
(6) 012776 026272 .WORD ERR2
1301 013000 005037 003432 4$: CLR GDDAT ; EXPECT 0 IN THE OTHERS.
1302 013004 017737 170316 003434 MOV @RLBA,BDDAT
1303 013012 001404 BEQ 5$
1304 013014 DFERR EM70,ERR2 ; BUS-INIT FAILED ON RLBA.
(5) 013014 104455 TRAP C$ERDF
(6) 013016 000147 .WORD 103
(6) 013020 033417 .WORD EM70
(6) 013022 026272 .WORD ERR2
1305 013024 017737 170300 003434 5$: MOV @RLDA,BDDAT
1306 013032 001404 BEQ 6$
1307 013034 DFERR EM71,ERR2 ; BUS-INIT FAILED ON RLDA.
(5) 013034 104455 TRAP C$ERDF

```

Address	Offset	Value	Label	Instruction	Comment	Symbol	Value
(6)	013036	000150				.WORD	104
(6)	013040	033453				.WORD	EM71
(6)	013042	026272				.WORD	ERR2
1308	013044	023727	003402	000003	6\$:	CMP	RLTYP,#RLV12X ; RLV12X ??
1309	013052	001010				BNE	7\$; WE'RE DONE IF NOT.
1310	013054	017737	170254	003434		MOV	@RLBAE,BDDAT
1311	013062	001404				BEQ	7\$
1312	013064					DFERR	EM71A,ERR2 ; BUS INIT FAILED ON RLBAE.
(5)	013064	104455				TRAP	C\$ERDF
(6)	013066	000151				.WORD	105
(6)	013070	033507				.WORD	EM71A
(6)	013072	026272				.WORD	ERR2
1313	013074				7\$:	ENDTST	
(3)	013074						L10020:
(3)	013074	104401				TRAP	C\$ETST

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7 READ WRITE OF RLCS.

SEQ 0055

.SBTTL 7 - READ WRITE OF RLCS.

```

1315
1316
1317 013076
(2)
1318
1319
1320
1321
1322 013076
(2)
1323 013076
(4) 013076
1324 013076 012703 004102
1325 013102
(3) 013102 104404
1326 013104 011337 003432
1327 013110 052737 000200 003432
1328 013116 013777 003432 170200
1329 013124 032777 040000 170172
1330 013132 001403
1331 013134 052737 140000 003432
1332 013142 017737 170156 003434
1333 013150 042737 000001 003434
1334 013156 023737 003432 003434
1335 013164 001404
1336 013166
(5) 013166 104455
(6) 013170 000152
(6) 013172 031201
(6) 013174 026272
1337 013176
(3) 013176 104410
(3) 013200 000012
1338 013202 005723
1339 013204 020327 004200
1340 013210 001335
1341 013212
(3) 013212
(3) 013212 104405
1342 013214
(3) 013214
(3) 013214 104401

STARS
;*****
;TEST THAT WE CAN WRITE/READ BITS 8,9 AND BITS 6-1
;OF THE CONTROL AND STATUS REGISTER. BITS 15-10 AND 0
;ARE DON'T CARE BITS AT THIS TIME AND BIT 7
;(CONTROLLER READY) IS ALWAYS WRITTEN TO A ONE.
STARS
;*****
BEGIN.TEST
T7::
MOV #CSPAT,R3 ;SET UP TABLE POINTER OF PATTERNS
BGNSEG ;****START OF SEGMENT**** TRAP C$BSEG
1$: MOV (R3),GDDAT ;GET PATTERN INTO GDDAT
BIS #200,GDDAT ;INSURE GO IS SET
MOV GDDAT,@RLCS ;LOAD RLCS (CONTROL AND STATUS)
BIT #DERR,@RLCS ;IF DRIVE ERROR PRESENT
BEQ 2$ ;THEN EXPECT DRIVE AND
BIS #ERR!DERR,GDDAT ;COMPOSITE ERROR
2$: MOV @RLCS,BDDAT ;READ RLCS BACK
BIC #DRDY,BDDAT ;IGNORE DRIVE READY
CMP GDDAT,BDDAT ;DID WE READ WHAT WE LOADED
BEQ 3$ ;YES, THEN BRANCH
DFERR EMS,ERR2 ;WRONG DATA IN RLCS
TRAP C$ERDF
WORD 106
WORD EMS
WORD ERR2
3$: ESCAPE SEG ; ESCAPE AND LOOP (IF FLA:LOE).
TRAP C$ESCAPE
WORD 10000$ .
TST (R3)+ ;BUMP FOR NEXT PATTERN
CMP R3,#CSEND ;CHECK FOR END
BNE 1$ ;NOT END, LOAD NEXT PATTERN
ENDSEG ;****END OF SEGMENT****
10000$:
TRAP C$ESEG
L10021:
TRAP C$ETST
ENDTST

```

Address	Offset	Value	Label	Instruction	Comment	Trap	Value
1344				.SBTTL	8 READ WRITE OF RLBA.		
1345							
1346	013216			STARS			
(2)				;	*****		
1347				;	TEST THAT WE CAN WRITE/READ BITS 15 THRU 1 OF THE		
1348				;	BUS ADDRESS REGISTER. FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,		
1349				;	GROWING 0 AND SHIFTING 0. BIT 0 IS ALSO LOADED BUT		
1350				;	SHOULD ALWAYS COME BACK AS 0		
1351	013216			STARS			
(2)				;	*****		
1352	013216			BEGIN.TEST			
(4)	013216						
1353	013216	012703	003672	MOV	#BEGPAT,R3		
1354	013222			BGNSEG			
(3)	013222	104404					
1355	013224	011337	003432	1\$: MOV	(R3),GDDAT		
1356	013230	023727	003402	CMP	RLTYP,#RL11		
1357	013236	001003		BNE	2\$		
1358	013240	042737	000001	BIC	#BIT0,GDDAT		
1359	013246	013777	003432	2\$: MOV	GDDAT,@RLBA		
1360	013254	017737	170046	MOV	@RLBA,BDDAT		
1361	013262	023737	003432	CMP	GDDAT,BDDAT		
1362	013270	001404		BEQ	3\$		
1363	013272			DFERR	EM6,ERR2		
(5)	013272	104455					
(6)	013274	000153					
(6)	013276	031252					
(6)	013300	026272					
1364	013302			3\$: ESCAPE	SEG		
(3)	013302	104410					
(3)	013304	000012					
1365	013306	005723		TST	(R3)+		
1366	013310	020327	004100	CMP	R3,#ENDPAT		
1367	013314	001343		BNE	1\$		
1368	013316			ENDSEG			
(3)	013316						
(3)	013316	104405					
1369	013320			ENDTST			
(3)	013320						
(3)	013320	104401					

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9 READ WRITE OF RLDA.

SEQ 0057

1371
1372
1373 013322
(2)
1374
1375
1376
1377 013322
(2)
1378 013322
(4) 013322
1379 013322 012703 003672
1380 013326
(3) 013326 104404
1381 013330 011337 003432
1382 013334 013777 003432 167766
1383 013342 017737 167762 003434
1384 013350 023737 003432 003434
1385 013356 001404
1386 013360
(5) 013360 104455
(6) 013362 000154
(6) 013364 031300
(6) 013366 026272
1387 013370
(3) 013370 104410
(3) 013372 000012
1388 013374 005723
1389 013376 020327 004100
1390 013402 001352
1391 013404
(3) 013404
(3) 013404 104405
1392 013406
(3) 013406
(3) 013406 104401

.SBTTL 9 -- READ WRITE OF RLDA.

STARS

;TEST THAT WE CAN WRITE/READ THE DISK ADDRESS REGISTER
;ALL BIT POSITIONS ARE WRITTEN USING FOUR PATTERNS:
;GROWING 1, SHIFTING 1. GROWING 0 AND SHIFTING 0
STARS

BEGIN.TEST

T9::

MOV #BEGPAT,R3 ;SET UP POINTER TO PATTERN LIST
BGNSEG ;****START OF SEGMENT****

TRAP C\$BSEG

1\$: MOV (R3),GDDAT ;GET PATTERN
MOV GDDAT,@RLDA ;LOAD PATTERN IN DA
MOV @RLDA,BDDAT ;READ PATTERN BACK
CMP GDDAT,BDDAT ;IS IT CORRECT?
BEQ 2\$;BRANCH IF CORRECT
OFERR EM7,ERR2 ;WRONG DATA IN RLDA

TRAP C\$ERDF
.WORD 108
.WORD EM7
.WORD ERR2

2\$: ESCAPE SEG ; ESCAPE AND LOOP (IF FLA:LOE).

TRAP C\$ESCAPE
.WORD 10000\$.

TST (R3). ;BUMP POINTER
CMP R3,#ENDPAT ;AT END OF PATTERNS?
BNE 1\$;NO, BRANCH BACK
ENDSEG ;****END OF SEGMENT****

10000\$:

TRAP C\$ESEG

ENDTST

L10023:

TRAP C\$ETST

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10 - READ WRITE OF RLBAE (RLV12 ONLY).

SEQ 0058

```

1394
1395
1396 013410
(2)
1397
1398
1399
1400
1401 013410
(2)
1402 013410
(4) 013410
1403 013410 023727 003402 000003      CMP      RLTP, #RLV12X      ; BAE ENABLED ??
1404 013416 001035                      BNE      3$                ; NO, DON'T EVEN TRY.
1405 013420 012703 003672      MOV      #BEGPAT, R3      ; SET UP POINTER TO PATTERN LIST
1406 013424                      BGNSEG                      ; ****START OF SEGMENT****
(3) 013424 104404                      TRAP      C$BSEG
1407 013426 011337 003432      1$: MOV      (R3), GDDAT      ; GET PATTERN
1408 013432 013777 003432 167674      MOV      GDDAT, @RLBAE      ; LOAD PATTERN IN BAE
1409 013440 017737 167670 003434      MOV      @PLBAE, BDDAT      ; READ PATTERN BACK
1410 013446 042737 177700 003432      BIC      #C77, GDDAT      ; ** ONLY 5:0 ARE VALID BITS.
1411 013454 023737 003432 003434      CMP      GDDAT, BDDAT      ; IS IT CORRECT?
1412 013462 001404                      BEQ      2$                ; BRANCH IF CORRECT
1413 013464                      DFERR      EM8, ERR2      ; WRONG DATA IN RLBAE
(5) 013464 104455                      TRAP      C$ERDF
(6) 013466 000155                      .WORD    109
(6) 013470 031326                      .WORD    EM8
(6) 013472 026272                      .WORD    ERR2
1414 013474      2$: ESCAPE SEG      ; ESCAPE AND LOOP (IF FLA; LOE).
(3) 013474 104410                      TRAP      C$ESCAPE
(3) 013476 000012                      .WORD    10000$
1415 013500 005723                      TST      (R3),
1416 013502 020327 004100      CMP      R3, #ENDPAT      ; BUMP POINTER
1417 013506 001347                      BNE      1$                ; AT END OF PATTERNS?
1418 013510                      ENDSEG                      ; NO. BRANCH BACK
(3) 013510                      ; ****END OF SEGMENT****
(3) 013510 104405                      10000$: TRAP      C$ESEG
1419 013512      3$: ENDTST                      L10024: TRAP      C$ETST
(3) 013512
(3) 013512 104401

```

```

1421 .SBTTL 11 -- BIS AND BIC OF RLCS.
1422
1423 013514 STARS
(2) ;*****
1424 ;TEST THAT WE CAN USE THE "BIS" AND "BIC" INSTRUCTIONS ON THE CONTROL
1425 ;AND STATUS REGISTER. BITS 8,9 AND 6-1 ARE TESTED TO
1426 ;SET INDIVIDUALLY AS WELL AS COLLECTIVELY WITHOUT DESTROYING
1427 ;ANY PREVIOUS DATA PATTERN
1428 013514 STARS
(2) ;*****
1429 013514 BEGIN.TEST
(4) 013514 T11::
1430 013514 012703 004102 MOV #CSPAT,R3 ;GET BEGINNING OF LIST
1431 013520 BGNSEG ;**** START SEGMENT ****
(3) 013520 104404 TRAP C$BSEG
1432 013522 012777 000200 167574 1$: MOV #CRDY,@RLCS ;INSURE GO IS THERE
1433 013530 011337 003432 MOV (R3),GDDAT ;SET UP EXPECTED RLCS...
1434 013534 052737 000200 003432 BIS #CRDY,GDDAT ;...IN GDDAT.
1435 013542 051377 167556 BIS (R3),@RLCS ; *** BIT SET PATTERN IN RLCS
1436 013546 032777 040000 167550 BIT #DERR,@RLCS ;IF ERROR BIT SET THEN...
1437 013554 001403 BEQ 2$ ;...EXPECT IT ON THE READ BACK.
1438 013556 052737 140000 003432 BIS #ERR!DERR,GDDAT
1439 013564 017737 167534 003434 2$: MOV @RLCS,BDDAT ;READ RLCS TO CHECK "BIS"
1440 013572 042737 000001 003434 BIC #DRDY,BDDAT ;CLEAR OUT DRIVE READY
1441 013600 023737 003434 003432 CMP BDDAT,GDDAT ;DID BIS WORK?
1442 013606 001404 BEQ 3$ ;BRANCH IF OKAY
1443 013610 DFERR EM61,ERR2 ;WRONG DATA IN RLCS ON BIS.
(5) 013610 104455 TRAP C$ERDF
(6) 013612 000156 .WORD 110
(6) 013614 032671 .WORD EM61
(6) 013616 026272 .WORD ERR2
1444 013620 3$: ESCAPE SEG ; ESCAPE AND LOOP (IF FLA;LOE).
(3) 013620 104410 TRAP C$ESCAPE
(3) 013622 000114 .WORD 10000$ .
1445 013624 012777 001776 167472 4$: MOV #1776,@RLCS ;SET ALL SETTABLE BITS
1446 013632 012737 001776 003432 MOV #1776,GDDAT ;SET UP EXPECT DATA IN...
1447 013640 041337 003432 BIC (R3),GDDAT ;...GDDAT
1448 013644 041377 167454 BIC (R3),@RLCS ; *** XCT BIC ON RLCS.
1449 013650 032777 040000 167446 BIT #DERR,@RLCS ;IF DRIVE ERROR BIT SET...
1450 013656 001403 BEQ 5$ ;...EXPECT IT SET WHEN WE READ.
1451 013660 052737 140000 003432 BIS #ERR!DERR,GDDAT
1452 013666 017737 167432 003434 5$: MOV @RLCS,BDDAT ;MOVE RLCS TO BDDAT FOR COMPARE
1453 013674 042737 000001 003434 BIC #DRDY,BDDAT ;CLEAR DRIVE READY
1454 013702 023737 003434 003432 CMP BDDAT,GDDAT ;DID "BIC" WORK PROPERLY
1455 013710 001404 BEQ 6$ ;BRANCH IF OKAY
1456 013712 DFERR EM62,ERR2 ;WRONG DATA IN RLCS ON BIC.
(5) 013712 104455 TRAP C$ERDF
(6) 013714 000157 .WORD 111
(6) 013716 032737 .WORD EM62
(6) 013720 026272 .WORD ERR2
1457 013722 6$: ESCAPE SEG ; ESCAPE AND LOOP (IF FLA;LOE).
(3) 013722 104410 TRAP C$ESCAPE
(3) 013724 000012 .WORD 10000$ .
1458 013726 005723 TST (R3)+ ;GET NEXT PATTERN
1459 013730 020327 004200 CMP R3,#CSEND ;AT END OF LIST
1460 013734 001272 BNE 1$ ;NO. GO BACK WITH NEXT PATTERN

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CVRLBBO - RLV12 DISKLESS.
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11 BIS AND BIC OF RLCS.

SEQ 0060

1461 013736
(3) 013736
(3) 013736 104405
1462 013740
(3) 013740
(3) 013740 104401

ENDSEG

ENDTST

100004: TRAP C#ESEG
L10025: TRAP C#ETST

J5

.SBTTL 12 - BIS AND BIC OF RLBA.

STARS

;;*****
;TEST THAT THE "BIS" AND "BIC" INSTRUCTIONS WILL WORK ON THE
;BUS 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

STARS

;;*****

BEGIN.TEST

T12::

MOV #BEGPAT,R3
BGNSEG

;GET START OF LIST
;**** START SEGMENT ****

TRAP C\$BSEG

1\$:

CLR @RLBA
MOV (R3),GDDAT
CMP RLTP,@RL11
BNE 2\$
BIC #1,GDDAT
2\$: BIS (R3),@RLBA
MOV @RLBA,BDDAT
CMP BDDAT,GDDAT
BEQ 3\$
DFERR EM63,ERR2

;CLEAR "BA"
;SET EXPECTED
; RL11 ??
; NO.
;BIT 0 CAN'T SET IN RLBA (UNIBUS)
; XCT BIS RLBA WITH PATTERN
;READ "BA"
;DID RLBA LOAD PROPERLY?
;BRANCH IF YES
;WRONG DATA IN RLBA ON BIS.

TRAP
.WORD
.WORD
.WORD
C\$ERDF
112
EM63
ERR2

3\$:

ESCAPE SEG

; ESCAPE AND LOOP (IF FLA;LOE).

TRAP
.WORD
C\$ESCAPE
10000\$.

4\$:

MOV #-2,@RLBA
MOV #-2,GDDAT
BIC (R3),GDDAT
BIC (R3),@RLBA
MOV @RLBA,BDDAT
CMP BDDAT,GDDAT
BEQ 5\$
DFERR EM64,ERR2

;SET RLBA TO ALL 1'S (BIT 0=0)
;SET UP EXPECTED RESULTS
;IN GDDAT
; XCT BIC RLBA
;READ RLBA
;BIC WORK OKAY?
;IF YES BRANCH
;WRONG DATA IN RLBA ON BIC.

TRAP
.WORD
.WORD
.WORD
C\$ERDF
113
EM64
ERR2

5\$:

ESCAPE SEG

; ESCAPE AND LOOP (IF FLA;LOE).

TRAP
.WORD
C\$ESCAPE
10000\$.

TST (R3)+
CMP R3,#ENDPAT
BNE 1\$
ENDSEG

;GET NEXT PATTERN
;HAVE WE COMPLETED LIST
;NO, GO BACK FOR NEXT

10000\$:

TRAP C\$ESEG

ENDTST

L10026:

TRAP C\$ETST

1464
1465
1466 013742
(2)
1467
1468
1469
1470
1471 013742
(2)
1472 013742
(4) 013742
1473 013742 012703 003672
1474 013746
(3) 013746 104404
1475 013750 005077 167352
1476 013754 011337 003432
1477 013760 023727 003402 000000
1478 013766 001003
1479 013770 042737 000001 003432
1480 013776 051377 167324
1481 014002 017737 167320 003434
1482 014010 023737 003434 003432
1483 014016 001404
1484 014020
(5) 014020 104455
(6) 014022 000160
(6) 014024 033007
(6) 014026 026272
1485 014030
(3) 014030 104410
(3) 014032 000070
1486 014034 012777 177776 167264
1487 014042 012737 177776 003432
1488 014050 041337 003432
1489 014054 041377 167246
1490 014060 017737 167242 003434
1491 014066 023737 003434 003432
1492 014074 001404
1493 014076
(5) 014076 104455
(6) 014100 000161
(6) 014102 033055
(6) 014104 026272
1494 014106
(3) 014106 104410
(3) 014110 000012
1495 014112 005723
1496 014114 020327 004100
1497 014120 001313
1498 014122
(3) 014122
(3) 014122 104405
1499 014124
(3) 014124
(3) 014124 104401

SEQ 0062

Address	Offset	Instruction	Comment	Trap	Value
1501		.SBTTL 13 - BIS AND BIC OF RLDA.			
1502		STARS			
1503	014126	;;*****			
1504		;;TEST THAT THE "BIS" AND "BIC" INSTRUCTIONS WILL WORK ON THE DISK			
1505		;;ADDRESS REGISTER. BITS 15 0 ARE TESTED WITH 4 PATTERNS, GROWING 1,			
1506		;;SHIFTING 1, GROWING 0, AND SHIFTING 0.			
1507	014126	STARS			
1508		;;*****			
1509	014126	BEGIN.TEST			
1510	014132	MOV #BEGPAT,R3	;GET START OF LIST		
1511	014132	BGNSEG	; **** START SEGMENT ****		
1512	014134	CLR @RLDA	;CLEAR "DA"		
1513	014140	MOV (R3),GDDAT	;SET EXPECTED		
1514	014144	BIS (R3),@RLDA	; XCT BIS RLDA		
1515	014150	MOV @RLDA,BDDAT	;READ RLDA		
1516	014156	CMP BDDAT,GDDAT	;IS RLDA CORRECT		
1517	014164	BEQ 2\$	;IF OKAY BRANCH		
1518	014166	DFERR EM65,ERR2	;WRONG DATA IN RLDA ON BIS.		
1519	014166			TRAP	C\$ERDF
1520	014170			.WORD	114
1521	014172			.WORD	EM65
1522	014174			.WORD	ERR2
1523	014176	ESCAPE SEG	; ESCAPE AND LOOP (IF FLA;LOE).		
1524	014176			TRAP	C\$ESCAPE
1525	014200			.WORD	10000\$
1526	014202	MOV #-1,@RLDA	;SET RLDA TO ALL 1'S		
1527	014210	MOV #-1,GDDAT	;SET EXPECTED DATA		
1528	014216	BIC (R3),GDDAT	;SET EXPECTED DATA		
1529	014222	BIC (R3),@RLDA	; XCT "BIC" RLDA		
1530	014226	MOV @RLDA,BDDAT	;READ RLDA		
1531	014234	CMP GDDAT,BDDAT	;DID "BIC" WORK?		
1532	014242	BEQ 4\$	;IF IT DID BRANCH		
1533	014244	DFERR EM66,ERR2	;WRONG DATA IN RLDA ON BIC.		
1534	014244			TRAP	C\$ERDF
1535	014246			.WORD	115
1536	014250			.WORD	EM66
1537	014252			.WORD	ERR2
1538	014254	ESCAPE SEG	; ESCAPE AND LOOP (IF FLA;LOE).		
1539	014254			TRAP	C\$ESCAPE
1540	014256			.WORD	10000\$
1541	014260	TST (R3)+	;GET NEXT PATTERN		
1542	014262	CMP R3,#ENDPAT	;DONE?		
1543	014266	BNE 1\$	;NO GO BACK		
1544	014270	ENDSEG			
1545	014270			10000\$:	
1546	014270			TRAP	C\$ESEG
1547	014272	ENDTST			
1548	014272			L10027:	
1549	014272			TRAP	C\$ETST

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14 BIS AND BIC OF RLBAE (RLV12 ONLY).

SEQ 0063

```

1534 .SBTTL 14 BIS AND BIC OF RLBAE (RLV12 ONLY).
1535
1536 014274 STARS
(2) ;*****
1537 ;TEST THAT THE "BIS" AND "BIC" INSTRUCTIONS WILL WORK ON THE
1538 ;BUS ADDRESS EXTENSION REGISTER. ALL BITS ARE LOADED BUT ONLY <5:0>
1539 ;ARE EXPECTED BACK. FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
1540 ;GROWING 0, AND SHIFTING 0.
1541 014274 STARS
(2) ;*****
1542 014274 BEGIN.TEST
(4) 014274 T14::
1543 014274 023727 003402 000003 CMP RLTP,#RLV12X ;BAE ENABLED ??
1544 014302 001070 BNE 5$ ;SKIP IT IF NOT.
1545 014304 012703 003672 MOV #BEGPAT,R3 ;GET START OF LIST
1546 014310 BGNSEG ;**** START SEGMENT **** TRAP C$BSEG
(3) 014310 104404
1547 014312 005077 167016 1$: CLR @RLBAE ;CLEAR "BAE"
1548 014316 011337 003432 MOV (R3),GDDAT ;SET EXPECTED...
1549 014322 042737 177700 003432 BIC #C77,GDDAT ;...ONLY <5:0> ARE VALID.
1550 014330 051377 167000 BIS (R3),@RLBAE ;XCT BIS RLBAE WITH PATTERN
1551 014334 017737 166774 003434 MOV @RLBAE,BDDAT ;READ "BAE"
1552 014342 023737 003434 003432 CMP BDDAT,GDDAT ;DID IT LOAD PROPERLY?
1553 014350 001404 BEQ 2$ ;BRANCH IF YES
1554 014352 DFERR EM67,ERR2 ;WRONG DATA IN RLBAE ON BIS. TRAP C$ERDF
(5) 014352 104455 .WORD 116
(6) 014354 000164 .WORD EM67
(6) 014356 033243 .WORD ERR2
(6) 014360 026272
1555 014362 2$: ESCAPE SEG ;ESCAPE AND LOOP (IF FLA;LOE). TRAP C$ESCAPE
(3) 014362 104410 .WORD 10000$
(3) 014364 000076
1556 014366 012777 177777 166740 3$: MOV #-1,@RLBAE ;SET RLBAE TO ALL 1'S
1557 014374 012737 177777 003432 MOV #-1,GDDAT ;SET UP EXPECTED RESULTS...
1558 014402 041337 003432 BIC (R3),GDDAT ;...IN GDDAT...
1559 014406 042737 177700 003432 BIC #C77,GDDAT ;...<5:0> ONLY.
1560 014414 041377 166714 BIC (R3),@RLBAE ;XCT BIC RLBAE
1561 014420 017737 166710 003434 MOV @RLBAE,BDDAT ;READ RLBAE
1562 014426 023737 003434 003432 CMP BDDAT,GDDAT ;BIC WORK OKAY?
1563 014434 001404 BEQ 4$ ;IF YES BRANCH
1564 014436 DFERR EM68,ERR2 ;WRONG DATA IN RLBAE ON BIC TRAP C$ERDF
(5) 014436 104455 .WORD 117
(6) 014440 000165 .WORD EM68
(6) 014442 033312 .WORD ERR2
(6) 014444 026272
1565 014446 4$: ESCAPE SEG ;ESCAPE AND LOOP (IF FLA;LOE). TRAP C$ESCAPE
(3) 014446 104410 .WORD 10000$
(3) 014450 000012
1566 014452 005723 TST (R3). ;GET NEXT PATTERN
1567 014454 020327 004100 CMP R3,#ENDPAT ;HAVE WE COMPLETED LIST
1568 014460 001314 BNE 1$ ;NO, GO BACK FOR NEXT
1569 014462 ENDSEG
(3) 014462 10000$: TRAP C$ESEG
(3) 014462 104405
1570 014464 5$: ENDTST L10030:
(3) 014464

```

M5

CVRLBBO - RLV12 DISKLESS.
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14 -- BIS AND BIC OF RLBAE (RLV12 ONLY).

SEQ 0064

(3) 014464 104401

TRAP C4ETST

L10031:

B6

CVRLB80 RLV12 DISKLESS.
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15 - UNIQUENESS OF RLCS.

SEQ 0066

(3) 014666 104401

TRAP C#ETST

CVRLB80 RLV12 DISKLESS.
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16 -- UNIQUENESS OF RLBA.

SEQ 0067

```

1611 .SBTTL 16 - UNIQUENESS OF RLBA.
1612
1613 014670 STARS
(2) ;*****
1614 ;TEST THE UNIQUENESS OF THE BUS ADDRESS REGISTER. THE
1615 ;RLCS AND RLDA ARE LOADED WITH XXX20X AND 177777
1616 ;RESPECTIVELY. THE RLBA IS THEN WRITTEN TO INSURE
1617 ;THAT NEITHER THE RLCS OR RLDA ARE MODIFIED.
1618 ; IF RLV12, CHECK THAT BAE IS UNAFFECTED ALSO.
1619 014670 STARS
(2) ;*****
1620 014670 BEGIN.TEST
(4) 014670 T16::
1621 014670 012737 0C0200 003432 MOV #CRDY,GDDAT ;CONTROLLER READY
1622 014676 032777 040000 166420 BIT #DERR,@RLCS ;IF DRIVE ERROR IS SET...
1623 014704 001403 BEQ 1$
1624 014706 052737 140000 003432 BIS #ERR!DERR,GDDAT ;...EXPECT IT BACK.
1625 014714 013777 003432 166402 1$: MOV GDDAT,@RLCS ;LOAD RLCS
1626 014722 012777 177777 166400 MOV #-1,@RLDA ;LOAD RLDA
1627 014730 023727 003402 000003 CMP RLTP,#RLV12X
1628 014736 001003 BNE 2$
1629 014740 012777 000074 166366 MOV #74,@RLBAE ;LOAD RLBAE.
1630 014746 005077 166354 2$: CLR @RLBA ;WRITE TO RLBA
1631 014752 017737 166346 003434 MOV @RLCS,BDDAT ;READ RLCS
1632 014760 042737 000001 003434 BIC #DRDY,BDDAT ;IGNORE DRIVE READY
1633 014766 023737 003432 003434 CMP GDDAT,BDDAT
1634 014774 001405 BEQ 3$ ;BR IF CS UNCHANGED.
1635 014776 DFERR EM74,ERR2 ;BA MODIFIED CS
(5) 014776 104455 TRAP C$ERDF
(6) 015000 000171 .WORD 121
(6) 015002 033671 .WORD EM74
(6) 015004 026272 .WORD ERR2
1636 015006 CKLOOP
(3) 015006 104406 TRAP C$CLP1
1637 015010 012737 177777 003432 3$: MOV #1,GDDAT ;SET EXPECTED DA.
1638 015016 017737 166306 003434 MOV @RLDA,BDDAT ;READ IT.
1639 015024 023737 003432 003434 CMP GDDAT,BDDAT
1640 015032 001405 BEQ 4$ ;BR IF DA UNCHANGED.
1641 015034 DFERR EM75,ERR2 ;BA MODIFIED DA
(5) 015034 104455 TRAP C$ERDF
(6) 015036 000172 .WORD 122
(6) 015040 033723 .WORD EM75
(6) 015042 026272 .WORD ERR2
1642 015044 CKLOOP
(3) 015044 104406 TRAP C$CLP1
1643 015046 023727 003402 000003 4$: CMP RLTP,#RLV12X
1644 015054 001016 BNE 5$
1645 015056 012737 000074 003432 MOV #74,GDDAT ;SET EXPECTED BAE.
1646 015064 017737 166244 003434 MOV @RLBAE,BDDAT ;READ IT.
1647 015072 023737 003432 003434 CMP GDDAT,BDDAT
1648 015100 001404 BEQ 5$ ;BR IF BAE UNCHANGED.
1649 015102 DFERR EM75A,ERR2 ;BA MODIFIED BAE
(5) 015102 104455 TRAP C$ERDF
(6) 015104 000173 .WORD 123
(6) 015106 033755 .WORD EM75A
(6) 015110 026272 .WORD ERR2

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CVRL880 - RLV12 DISKLESS.
CVRL98.P11 12 JUN-85 15:33

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16 -- UNIQUENESS OF RLBA.

D6

SEQ 0068

1650 015112
(3) 015112
(3) 015112 104401

54: ENDTST

L10032: TRAP C4ETST

```
TRAP      C$ERDF
.WORD     126
.WORD     EM77A
.WORD     ERR2
```

76

CVRLB80 -- RLV12 DISKLESS.
CVRLB8.P11 12-JUN 85 15:33

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17 -- UNIQUENESS OF RLDA.

SEQ 0070

1691 015336
(3) 015336
(3) 015336 104401

54: ENDTST

L10033: TRAP C4ETST

CVRL880 -- RLV12 DISKLESS.
CVRL88.P11 12-JUN-85 15:33

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18 UNIQUENESS OF RLMP.

SEQ 0071

```

1693          .SBTTL 18 UNIQUENESS OF RLMP.
1694
1695 015340     STARS
(2)           ;*****
1696           ;TEST THE UNIQUENESS OF THE MULTI PURPOSE REGISTER
1697           ;WE WILL WRITE THE RLCS, RLBA, AND THE RLDA, THEN THE
1698           ;RLMP IS WRITTEN. WE THEN GO BACK AN VERIFY THE CONTENTS
1699           ;OF THE RLCS, RLBA, RLDA.
1700           ; IF RLV12, INCLUDE THE RLBAE ALSO.
1701 015340     STARS
(2)           ;*****
1702 015340     BEGIN.TEST
(4) 015340     T18::
1703 015340 012737 000200 003432     MOV      #CRDY,GDDAT      ;CONTROLLER READY
1704 015346 032777 040000 165750     BIT      #DERR,@RLCS      ;IF DRIVE ERROR IS SET...
1705 015354 001403                      BEQ      1$
1706 015356 052737 140000 003432     BIS      #ERR!DERR,GDDAT ;...EXPECT IT BACK LATER.
1707 015364 013777 003432 165732 1$: MOV      GDDAT,@RLCS      ;LOAD CS
1708 015372 012777 177776 165726     MOV      #-2,@RLBA      ;LOAD BA WITH ALL 1'S
1709 015400 012777 177777 165722     MOV      #-1,@RLDA      ;LOAD RLDA
1710 015406 023727 003402 000003     CMP      RLTP,#RLV12X
1711 015414 001003                      BNE      2$
1712 015416 012777 000074 165710     MOV      #74,@RLBAE      ;LOAD RLBAE.
1713 015424 005077 165702 003434 2$: CLR      @RLMP      ;WRITE TO RLMP
1714 015430 017737 165670 003434     MOV      @RLCS,BDDAT      ;READ RLCS
1715 015436 042737 000001 003434     BIC      #DRDY,BDDAT      ;IGNORE DRIVE READY
1716 015444 023737 003432 003434     CMP      GDDAT,BDDAT
1717 015452 001405                      BEQ      3$
1718 015454                      DFERR      EM44,ERR2      ;MP MODIFIED CS
(5) 015454 104455                      TRAP      C$ERDF
(6) 015456 000177                      .WORD      127
(6) 015460 032405                      .WORD      EM44
(6) 015462 026272                      .WORD      ERR2
1719 015464                      CKLOOP
(3) 015464 104406                      TRAP      C$CLP1
1720 015466 012737 177776 003432 3$: MOV      #-2,GDDAT      ; SET EXPECTED BA.
1721 015474 017737 165626 003434     MOV      @RLBA,BDDAT      ; READ IT.
1722 015502 023737 003432 003434     CMP      GDDAT,BDDAT
1723 015510 001405                      BEQ      4$
1724 015512                      DFERR      EM45,ERR2      ; BR IF BA OK.
(5) 015512 104455                      ;MP MODIFIED BA
(6) 015514 000200                      TRAP      C$ERDF
(6) 015516 032440                      .WORD      128
(6) 015520 026272                      .WORD      EM45
1725 015522                      .WORD      ERR2
(3) 015522 104406                      TRAP      C$CLP1
1726 015524 012737 177777 003432 4$: MOV      #-1,GDDAT      ; SET EXPECTED DA.
1727 015532 017737 165572 003434     MOV      @RLDA,BDDAT      ; READ IT.
1728 015540 023737 003432 003434     CMP      GDDAT,BDDAT
1729 015546 001405                      BEQ      5$
1730 015550                      DFERR      EM46,ERR2      ; BR IF DA OK.
(5) 015550 104455                      ;MP MODIFIED DA
(6) 015552 000201                      TRAP      C$ERDF
(6) 015554 032473                      .WORD      129
(6) 015556 026272                      .WORD      EM46
1731 015560                      .WORD      ERR2
                      CKLOOP

```

CVRLBBO RLV12 DISKLESS.
CVRLB8.P11 12-JUN-85 15:33MACY11 30(1046) 12-JUN 85 15:42 PAGE 26 1
18 UNIQUENESS OF RLMP.

SEQ 0072

(3) 01556 104406
1732 015562 023727 003402 000003 5\$: CMP RLTP,#RLV12X
1733 015570 001016 BNE 6\$
1734 015572 012737 000074 003432 MOV #74,GDDAT ; SET EXPECTED BAE.
1735 015600 017737 165530 003434 MOV @RLBAE,BDDAT ; READ IT.
1736 015606 023737 003432 003434 CMP GDDAT,BDDAT
1737 015614 001404 BEQ 6\$; BR IF BAE OK.
1738 015616 DFERR EM47,ERR2 ; MP MODIFIED BAE.
(5) 015616 104455
(6) 015620 000202
(6) 015622 032526
(6) 015624 026272
1739 015626 6\$: ENDTST
(3) 015626
(3) 015626 104401

TRAP C\$CLP1

TRAP C\$ERDF
.WORD 130
.WORD EM47
.WORD ERR2

L10034:

TRAP C\$ETST

CVRL880 - RLV12 DISKLESS.
CVRL88.P11 12-JUN-85 15:33

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19 UNIQUENESS OF RLBAE (RLV12 ONLY).

SEQ 0073

```

1741 .SBTTL 19 -- UNIQUENESS OF RLBAE (RLV12 ONLY).
1742
1743 015630 STARS
(2) ;*****
1744 ;TEST THAT WRITING TO THE RLBAE HAS NO AFFECT ON
1745 ;THE RLBA AND RLDA REGISTERS. THE RLCS REGISTER WILL
1746 ;BE AFFECTED, BUT ONLY IN THE EXTENDED ADDRESS BITS <5:4>,
1747 ;WHICH SHOULD MIRROR RLBAE<1:0>.
1748 015630 STARS
(2) ;*****
1749 015630 BEGIN.TEST
(4) 015630 T19::
1750 015630 023727 003402 000003 CMP RLTP,#RLV12X ; RLV12 WITH BAE ??
1751 015636 001071 BNE 4$ ; EXIT IF NOT.
1752 015640 012737 000200 003432 MOV #CRDY,GDDAT ;CONTROLLER READY
1753 015646 032777 040000 165450 BIT #DERR,@RLCS ;IF DRIVE ERROR IS SET...
1754 015654 001403 BEQ 1$
1755 015656 052737 140000 003432 BIS #ERR!DERR,GDDAT ;...EXPECT IT BACK LATER.
1756 015664 013777 003432 165432 1$: MOV CDDAT,@RLCS ;LOAD CS, NOTE THAT <5:4> = 0
1757 015672 005077 165430 CLR @RLBA ; 0 => BA
1758 015676 005077 165426 CLR @RLDA ; 0 => DA
1759 015702 012777 000077 165424 MOV #77,@RLBAE ; WRITE TO RLBAE.
1760 (15710 052737 000060 003432 BIS #60,GDDAT ; SET EXPECTED CS.
1761 015716 017737 165402 003434 MOV @RLCS,BDDAT ; READ IT.
1762 015724 042737 000001 003434 BIC #DRDY,BDDAT ; IGNORE DRIVE READY BIT.
1763 015732 023737 003432 003434 CMP GDDAT,BDDAT
1764 015740 001405 BEQ 2$ ; BR IF CS IS RIGHT.
1765 015742 DFERR EM50,ERR2 ; CS WRONG AFTER WRITING BAE.
(5) 015742 104455 TRAP C$ERDF
(6) 015744 000203 .WORD 131
(6) 015746 032562 .WORD EM50
(6) 015750 026272 .WORD ERR2
1766 015752 CKLOOP
(3) 015752 104406 TRAP C$CLP1
1767 015754 005037 003432 2$: CLR GDDAT ; EXPECT ZERO ON THE REST.
1768 015760 017737 165342 003434 MOV @RLBA,BDDAT ; READ BA
1769 015766 001405 BEQ 3$ ; BR IF UNAFFECTED.
1770 015770 DFERR EM51,ERR2 ; BAE MODIFIED BA.
(5) 015770 104455 TRAP C$ERDF
(6) 015772 000204 .WORD 132
(6) 015774 032621 .WORD EM51
(6) 015776 026272 .WORD ERR2
1771 016000 CKLOOP
(3) 016000 104406 TRAP C$CLP1
1772 016002 017737 165322 003434 3$: MOV @RLDA,BDDAT ; READ DA.
1773 016010 001404 BEQ 4$ ; BR IF UNAFFECTED.
1774 016012 DFERR EM52,ERR2 ; BAE MODIFIED DA.
(5) 016012 104455 TRAP C$ERDF
(6) 016014 000205 .WORD 133
(6) 016016 032645 .WORD EM52
(6) 016020 026272 .WORD ERR2
1775 016022 4$: ENDTST
(3) 016022 L10035: TRAP C$ETST
(3) 016022 104401

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CVRL880 - RLV12 DISKLESS.
CVRL88.P11 12-JUN-85 15:33

J6
MACY11 30(1046) 12-JUN-85 15:42 PAGE 28
20 - FUNCTION CODE 0, NOP (RL11), OR MAINT (RLV11/12).

SEQ 0074

```
1777 .SBTTL 20 - FUNCTION CODE 0, NOP (RL11), OR MAINT (RLV11/12).
1778
1779 016024 STARS
(2) ;*****
1780 ; TEST FUNCTION CODE 0.
1781 ; IF RL11 -- NOP. EXPECT CS<13:10> CLEAR, OTHER REGISTERS UNAFFECTED.
1782 ; IF RLVXX -- MAINT. SETUP IN NORMAL FASHION, BUT ONLY CHECK FOR
1783 ; FUNCTION COMPLETE (NO ERRORS AND DA = INITIAL DA+6).
1784 ; WE'LL CHECK THE REST OF THE MAINT FUNCTION LATER.
1785 016024 STARS
(2) ;*****
1786 016024 BEGIN.TEST
(4) 016024 T20::
1787
1788 ; INITIAL SETUP ASSUMES THAT WE HAVE AN RLV.
1789 ; IF NOT -- NOT TO WORRY -- IT SHOULD JUST NO-OP.
1790 ; ALL WE CARE ABOUT IS THAT WE GET NO ERRORS (OR HUNG RL).
1791
1792 016024 004537 010760 1$: JSR R5,CALCRC ; MAKE A CRC EVEN THO WE WON'T CHECK IT.
1793 016030 000000 .WORD 0 ; THIS WILL BE THE INITIAL DA WORD.
1794 016032 004537 010254 JSR R5,LDFUN ; LOAD UP THE FUNCTION.
1795 016036 000000 177001 0, 511. ; FUNCTION 0, WC -511.
1796 016042 004537 010704 JSR R5,WTCRDY ; WAIT FOR CONTROLLER.
1797 016046 023727 003402 000000 CMP RLTP,RL11 ; NOW ARE WE RL11 ??
1798 016054 001045 BNE 6$ ; CHECK "MAINT" FINAL STATE IF NOT.
1799
1800 ; RL11 -- CHECK FOR ERRORS AFTER THE NO OP.
1801
1802 ;LWLOI 2$: CLR B.MP ; MPR WILL BE 0.
1803 016056 013737 003350 003432 2$: MOV B.CS,GDDAT ; EXPECT "NO-OP" SHOULD HAVE...
1804 016064 042737 036000 003432 BIC #036000,GDDAT ; ...CLEARED ANY ERROR BITS <13:10>...
1805 016072 013737 003364 003434 MOV E.CS,BDDAT ; ...THAT MIGHT HAVE BEEN ON.
1806 016100 023737 003432 003434 CMP GDDAT,BDDAT ; IS THAT WHAT WE HAVE ??
1807 016106 001405 BEQ 3$ ; YES.
1808 016110 DFERR EM14,ERR2 ; CS WRONG AFTER NOP.
(5) 016110 104455 TRAP C$ERDF
(6) 016112 000206 .WORD 134
(6) 016114 031457 .WORD EM14
(6) 016116 026272 .WORD ERR2
1809 016120 CKLOOP TRAP C$CLP1
(3) 016120 104406
1810 016122 023737 003366 003352 3$: CMP E.BA,B.BA ; BA UNALTERED ??
1811 016130 001010 BNE 4$
1812 016132 023737 003370 003354 CMP E.DA B.DA ; DA UNALTERED ??
1813 016140 001004 BNE 4$
1814 016142 023737 003372 003356 CMP E.MP,B.MP ; MP UNALTERED ??
1815 016150 001405 BEQ 5$ ; EXIT IF ALL THREE WERE OK.
1816 016152 4$: DFERR EM14A,ERRO ; REGISTERS ALTERED BY NOP.
(5) 016152 104455 TRAP C$ERDF
(6) 016154 000207 .WORD 135
(6) 016156 031512 .WORD EM14A
(6) 016160 026236 .WORD ERRO
1817 016162 CKLOOP TRAP C$CLP1
(3) 016162 104406
1818 016164 5$: EXIT TST ; RL NOP TEST DONE. TRAP C$EXIT
(3) 016164 104432
```

(3)	016166	000042				.WORD	L10036
1819					; RLV11 OR 12 -- CHECK SEQUENCER STATE AFTER INTERNAL DIAGNOSTIC.		
1820							
1821							
1822	016170	013737	003370	003434	6\$: MOV E.DA,BDDAT ; GET FINAL SEQUENCER STATE.		
1823	016176	023727	003434	000C06	CMP BDDAT,#6 ; FINAL STATE RIGHT ??		
1824	016204	001004			BNE 7\$;NO, ERROR.		
1825	016206	032737	002000	003364	BIT #OPI,E.CS ; YES, OPI SHOULD BE CLEAR.		
1826	016214	001405			BEQ 8\$; IF IT IS, WE'RE FAT !!		
1827	016216				7\$: DFERR EM14B,ERR3 ; MAINT FAILURE, DA = SEQUENCER STATE.		
(5)	016216	104455				TRAP	C\$ERDF
(6)	016220	000210				.WORD	136
(6)	016222	031554				.WORD	EM14B
(6)	016224	026326				.WORD	ERR3
1828	016226				CKLOOP		
(3)	016226	104406				TRAP	C\$CLP1
1829	016230				8\$: ENDTST		
(3)	016230						L10036:
(3)	016230	104401				TRAP	C\$ETST

CVRL880 - RLV12 DISKLESS.
CVRL88.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 29
21 TEST INTERRUPT ON FUNCTION (0) COMPLETE.

SEQ 0076

.SBTTL 21 -- TEST INTERRUPT ON FUNCTION (0) COMPLETE.

STARS

```

;*****
;TEST THAT THE RL CAN INTERRUPT THE CPU.
;WE'LL SET CPU PRIORITY AT 0, AND EXECUTE NOP/MAINT, AS BEFORE.
;THE INTERRUPT SERVICE DOES NOTHING BUT SET A FLAG.
;WE'LL WAIT 800 MSEC FOR THAT FLAG, BEFORE DECLARING AN ERROR.
;WRONG VECTORS UNDER 1000 ARE TRAPPED BY THE DRS.
;WRONG VECTORS ABOVE 1000 ARE BIG TROUBLE !!!!

```

STARS

;*****

BEGIN.TEST

T21::

```

CLR      INTFLG      ;CLEAR INTERRUPT FLAG
SETPRI   #PRI00      ;SET PSW TO 0

```

```

MOV      #PRI00,R0
TRAP     C$SPRI

```

```

JSR      R5,CALCRC    ; AGAIN, CRC WON'T BE CHECKED.

```

```

        .WORD 0
JSR      R5,LDFUN

```

```

; LOAD UP AND EXECUTE...

```

```

INTEN!0. 511.

```

```

; NOP/MAINT AND INTERRUPT.

```

```

JSR      R5,WTCRDY

```

```

;WAIT FOR CONTROLLER READY.

```

```

TST      INTFLG

```

```

;DID INTERRUPT OCCUR ??

```

```

BNE      1$

```

```

; BR IF SO.

```

```

CLR      TMP0

```

```

; CPU LEVEL FOR ERROR MSG.

```

```

DFERR    EM15,ERR7

```

```

; INTERRUPT NOT REC'D.

```

```

TRAP     C$ERDF
        .WORD 137
        .WORD EM15
        .WORD ERR7

```

1\$: SETPRI #PRI07

```

MOV      #PRI07,R0
TRAP     C$SPRI

```

ENDTST

L10037:

```

TRAP     C$ETST

```

```

1831
1832
1833 016232
(2)
1834
1835
1836
1837
1838
1839
1840 016232
(2)
1841 016232
(4) 016232
1842 016232 005037 010700
1843 016236
(3) 016236 012700 000000
(3) 016242 104441
1844 016244 004537 010760
1845 016250 000000
1846 016252 004537 010254
1847 016256 000100 177001
1848 016262 004537 010704
1849 016266 005737 010700
1850 016272 001006
1851 016274 005037 003424
1852 016300
(5) 016300 104455
(6) 016302 000211
(6) 016304 031616
(6) 016306 026442
1853 016310
(3) 016310 012700 000340
(3) 016314 104441
1854 016316
(3) 016316
(3) 016316 104401

```

TRAP CSETST

(3) 016464 104401

CVRLB80 - RLV12 DISKLESS.
CVRLB8.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 31
23 -- RLV11/12 MAINTENANCE, FORCED OPI (WC <> 511.)

SEQ 0078

```

1894
1895
1896 016466
(2)
1897
1898
1899
1900
1901 016466
(2)
1902 016466
(4) 016466
1903
1904
1905
1906
1907 016466 004537 010760
1908 016472 000000
1909 016474 012737 177003 016524
1910 016502 112737 000074 032323
1911 016510 112737 000060 032327
1912 016516 004537 010254
1913 016522 000000
1914 016524 177003
1915 016526 004537 010704
1916 016532 012700 112000
1917 016536 043700 003364
1918 016542 001410
1919 016544 004537 007554
1920 016550 000240
1921 016552
(5) 016552 104455
(6) 016554 000213
(6) 016556 032223
(6) 016560 026472
1922 016562
(3) 016562 104406
1923 016564 023727 016524 177000 4$:
1924 016572 001412
1925 016574 012737 177000 016524
1926 016602 112737 000076 032323
1927 016610 112737 000061 032327
1928 016616 000737
1929 016620
(3) 016620
(3) 016620 104401

.SBTTL 23 - RLV11/12 MAINTENANCE, FORCED OPI (WC <> 511.)

STARS
;*****
;EXECUTE MAINTENANCE MODE WITH AN INCORRECT INITIAL WORD COUNT.
;FIRST PASS WC < 510. AND SECOND PASS WC > 511. BOTH CASES SHOULD
;FORCE OPI ERRORS. THE TEST SHOULD FORCE COMPOSITE ERROR(BIT 15).
;HEADER NOT FOUND(BIT12) AND OPI(BIT 10). DRIVE ERROR IS IGNORED.
STARS
;*****
BEGIN.TEST
T23::

;*
;* NOTE: IF CONTROLLER TYPE IS RL11, YOU HAVE END-PASS AT THIS POINT.
;* ALL REMAINING TESTS ARE UNIQUE TO RLV11 AND/OR RLV12.
;*
1$: JSR R5,CALCRC ;DO CRC CALCULATION FOR...
.WORD 0 ;...INITIAL DA OF ZERO.
MOV #509.,3$ ; 1ST WC < 510.
MOVB #'<,EM27X ; ADJUST ERROR TEXT.
MOVB #'0,EM27X+4
2$: JSR R5,LDFUN ;PERFORM MAINT FUNCTION
MAINT
3$: -509. ; TEST WORD COUNT.
JSR R5,WTCRDY
MOV #ERR!HNF!OPI,RO ;EXPECT AT LEAST THESE ERRORS.
BIC E.CS,RO
BEQ 4$ ; EXIT IF WE'RE OK.
JSR R5,GETERR ; OTHERWISE, GET THEM ALL...
NOP ;...NONE IS EQUALLY BAD NEWS.
DFERR EM27,ERR10 ; STATUS INCORRECT, WC <> 511.

TRAP C$ERDF
.WORD 139
.WORD EM27
.WORD ERR10

CKLOCP
TRAP C$CLP1

4$: CMP 3$,#512. ; 2ND PASS ??
BEQ 5$ ; WE'RE DONE IF SO.
MOV #512.,3$ ; OTHERWISE, SET WC > 511.
MOVB #'>,EM27X ; ADJUST ERROR TEXT.
MOVB #'1,EM27X+4
BR 2$ ; AND GO 'ROUND.

5$: ENDTST

L10041:
TRAP C$ETST

```

CVRLB80 - RLV12 DISKLESS.
CVRLB8.P11 12-JUN-85 15:33

MACY11 30(1046) 12-JUN-85 15:42 PAGE 33
24 - RLV11/12 MAINTENANCE, FORCED OPI INTERRUPT.

SEQ 0079

1932
1933
1934 016622
(2)
1935
1936
1937
1938 016622
(2)
1939 016622
(4) 016622
1940 016622 004537 010760
1941 016626 000000
1942 016630
(3) 016630 012700 000000
(3) 016634 104441
1943 016636 005037 010700
1944 016642 004537 010254
1945 016646 000100 177003
1946 016652 004537 010704
1947 016656 005737 010700
1948 016662 001005
1949 016664
(5) 016664 104455
(6) 016666 000214
(6) 016670 031713
(6) 016672 026236
1950 016674
(3) 016674 104406
1951 016676
(3) 016676 012700 000340
(3) 016702 104441
1952 016704
(3) 016704
(3) 016704 104401

.SBTTL 24 -- RLV11/12 MAINTENANCE, FORCED OPI INTERRUPT.

STARS

;;*****
;PERFORM TEST OF INTERRUPT BY ISSUING RLV11 MAINTENANCE FUNCTION
;WITH A WORD COUNT OF -509. TO FORCE AN OPI ERROR.
;CHECK THAT INTERRUPT OCCURS, REPORT ERROR IF NOT.

STARS

;;*****

BEGIN.TEST

T24::

1\$: JSR R5,CALCRC ;CALCULATE CRC FOR...
.WORD 0 ;...INITIAL DA OF ZERO.
SETPRI #PRI00 ;SET PRIORITY TO ZERO
MOV #PRI00,R0
TRAP C\$SPRI
CLR INTFLG ;CLEAR INT. FLAG
JSR R5,LDFUN
MAINT!INTEN, -509. ; INVALID WC TO FORCE OPI ERROR.
JSR R5,WTCRDY ;WAIT FOR READY
TST INTFLG ; DID IT INTERRUPT ??
BNE 4\$; YES, THAT'S ALL.
DFERR EM17,ERRO ; NO INTERRUPT RECEIVED.
TRAP C\$ERDF
.WORD 140
.WORD EM17
.WORD ERRO
CKLOOP
TRAP C\$CLP1
4\$: SETPRI #PRI07
MOV #PRI07,R0
TRAP C\$SPRI
ENDTST
L10042:
TRAP C\$ETST

CVRLB80 RLV12 DISKLESS.
CVRLB8.P11 12 JUN-85 15:33

MACY11 30(1046) 12-JUN-85 15:42 PAGE 34
25 RLV11/12 MAINTENANCE, OPI TIMING TEST.

SEQ 0080

```

1954 .SBTTL 25 - RLV11/12 MAINTENANCE, OPI TIMING TEST.
1955
1956 016706 STARS
(2) ;*****
1957 ;NOTE: THE SOFT TIMFR EMPLOYED HERE IS CALIBRATED FOR LSI'S ONLY.
1958 ; IF THE CPU TYPE IS UNKNOWN (NOT LSI), BYPASS THIS TEST.
1959 ;
1960 ;PERFORM RLV11 MAINTENANCE FUNCTION (0) IN FLAG MODE.
1961 ;FORCE AN OPI TIMEOUT BY SETTING AN INVALID WORD COUNT.
1962 ;MEASURE THE TIME UNTIL THE ERROR FLAG SETS AND COMPARE THAT
1963 ;TIME AGAINST THE SPEC LIMITS (155 TO 650 MSEC).
1964 ; NOTE: SINCE THE TIMING LOOP IS SO GROSS, WE'LL GIVE IT
1965 ; A SECOND CHANCE BEFORE WE DECLARE AN ERROR.
1966 016706 STARS
(2) ;*****
1967 016706 BEGIN.TEST
(4) 016706 T25::
1968 016706 005737 003400 TST CPUTYP ; LSI CPU ???
1969 016712 100447 BMI 5$ ; IF NOT, DON'T EVEN TRY !!!
1970 016714 004537 010760 1$: JSR R5,CALCRC ; MAKE CRC FOR ZERO.
1971 016720 000000 .WORD 0
1972 016722 012704 000002 MOV #2,R4
1973 016726 004537 010254 2$: JSR R5,LDFUN ;PERFORM MAINT. FUNCTION
1974 016732 000000 177003 MAINT, 509. ; MAINT WITH INVALID WC.
1975 016736 004537 010704 JSR R5,WTCRDY ; WAIT FOR DONE.
1976 016742 012737 001440 003434 MOV #800.,BDDAT ; CALCULATE OPI TIME...
1977 016750 166637 177774 003434 SUB 4(SP),BDDAT ;...IN BDDAT.
1978 016756 032777 002000 164340 BIT #OPI,@RLCS ; OPI ERROR ??
1979 016764 001005 BNE 3$ ; YES, CHECK TIMING.
1980 016766 DFERR EM31,ERRO ; OPI FLAG NOT RECEIVED.
(5) 016766 104455 TRAP C$ERDF
(6) 016770 000215 .WORD 141
(6) 016772 032332 .WORD EM31
(6) 016774 026236 .WORD ERRO
1981 016776 000415 BR 5$
1982 017000 023737 003434 003450 3$: CMP BDDAT,OPIMX
1983 017006 003004 BGT 4$
1984 017010 023737 003434 003446 CMP BDDAT,OPIMN
1985 017016 002005 BGE 5$ ; OK IF TIME WITHIN LIMITS.
1986 017020 077436 4$: SOB R4,2$ ; TRY ONCE MORE.
1987 017022 DFERR EM32,ERR11 ;OPI TIMING INCORRECT
(5) 017022 104455 TRAP C$ERDF
(6) 017024 000216 .WORD 142
(6) 017026 032360 .WORD EM32
(6) 017030 026522 .WORD ERR11
1988 017032 5$: ENDTST L10043:
(3) 017032 TRAP C$ETST
(3) 017032 104401

```

CVRLB80 RLV12 DISKLESS.
CVRLB8.P11 12-JUN 85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 35
26 - RLV11/12 MAINTENANCE, FIFO DMA AND CRC CHECK.

SEQ 0081

.SBTTL 26 -- RLV11/12 MAINTENANCE, FIFO DMA AND CRC CHECK.

STARS

```

;*****
;PERFORM RLV11/12 MAINTENANCE FUNCTION 0 IN FLAG MODE AND CHECK
;FOR PROPER INCREMENT OF THE DA AND BA REGISTERS. CHECK THE SERIAL
;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
;RESULTS. CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
;A VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
;DMA 1 - USES 28 DATA PATTERNS IN "PATCRC" AND "PATDAT".
;DMA 2 -- USES COMPLIMENT OF THOSE DATA PATTERNS.
;DMA 3 - USES A RANDOM 256 WORD PATTERN.

```

STARS

```

;*****
;*****

```

BEGIN.TE

T26::

; SUBTEST 1 28 DIFFERENT DATA PATTERNS.

; DMA1: BGNSUB

T26.1:

TRAP C\$BSUB

```

;SET TABLE POINTER.
; GET TEST DATA...
;...AND FILL THE BUFFER.
; GET DA TEST WORD...
;...AND CALCULATE CRC'S.
; XCT MAINT MODE AND CHECK RESULTS.
; LAST PATTERN DONE ??
; LOOP IF NOT.

```

L10045:

TRAP C\$ESUB

; SUBTEST 2 -- THE COMPLIMENT OF THE ABOVE 28 PATTERNS.

; DMA2: BGNSUB

T26.2:

TRAP C\$BSUB

```

;RESET TABLE POINTER.
; FILL WITH COMPLIMENT DATA.
; CALCULATE CRC'S.
; XCT
; LAST ONE DONE ??
; LOOP IF NOT.

```

L10046:

1990
1991
1992 017034
(2)
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004 017034
(2)
2005 017034
(4) 017034
2006
2007
2008
2009 017034
(3) 017034
(3) 017034 104402
2010 017036 012704 004202
2011 017042 016437 000072 017054 1\$
2012 017050 004537 010422
2013 017054 000000 2\$
2014 017056 012437 017066
2015 017062 004537 010760
2016 017066 000000 3\$
2017 017070 004737 017204
2018 017074 005714
2019 017076 001361
2020 017100
(3) 017100
(3) 017100 104403
2021
2022
2023
2024 017102
(3) 017102
(3) 017102 104402
2025 017104 012704 004202
2026 017110 016437 000072 017122 1\$
2027 017116 004537 010426
2028 017122 000000 2\$
2029 017124 012437 017134
2030 017130 004537 010760
2031 017134 000000 3\$
2032 017136 004737 017204
2033 017142 005714
2034 017144 001361
2035 017146
(3) 017146

CVRLBBO RLV12 DISKLESS.
CVRLB8.P11 12 JUN 85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 35-1
26 RLV11/12 MAINTENANCE, FIFO DMA AND CRC CHECK.

SEQ 0082

(3)	017146	104403						TRAP	C\$ESUB
2036									
2037									
2038									
2039	017150								
(3)	017150								
(3)	017150	104402							
2040	017152	004537	010516						
2041	017156	013737	003456	017170					
2042	017164	004537	010760						
2043	017170	000000							
2044	017172	004737	017204						
2045	017176								
(3)	017176								
(3)	017176	104403							
2046	017200								
(3)	017200	104432							
(3)	017202	000530							
2047									
2048									
2049									
2050	017204								
(3)	017204	104404							
2051	017206	004537	010254						
2052	017212	000000	177001						
2053	017216	004537	010704						
2054	017222	004537	007554						
2055	017226	000405							
2056	017230								
(5)	017230	104455							
(6)	017232	000217							
(6)	017234	034421							
(6)	017236	026412							
2057	017240								
(3)	017240	104406							
2058	017242	032737	022000	003364	11\$:				
2059	017250	001402							
2060	017252								
(3)	017252	104432							
(3)	017254	000452							
2061	017256	012737	006364	003432	12\$:				
2062	017264	013737	003366	003434					
2063	017272	023737	003432	003434					
2064	017300	001405							
2065	017302								
(5)	017302	104455							
(6)	017304	000220							
(6)	017306	031355							
(6)	017310	026356							
2066	017312								
(3)	017312	104406							
2067	017314	013737	003354	003432	1\$:				
2068	017322	013737	003370	003434					
2069	017330	005037	003424						
2070	017334	113737	003354	003424					
2071	017342	062737	000006	003424					

7

```
2072 017350 113737 003424 003432      MOVB    TMP0,GDDAT      ;STORE LOW BYTE OF DA
2073 017356 023737 003432 003434      CMP      GDDAT,BDDAT    ; FINAL DA CORRECT ??
2074 017364 001405                BEQ      2$
2075 017366                DFERR    EM12,ERR4      ; FINAL DA INCORRECT.
(5) 017366 104455                TRAP      C$ERDF
(6) 017370 000221                .WORD    145
(6) 017372 031416                .WORD    EM12
(6) 017374 026356                .WORD    ERR4
2076 017376                CKLOOP
(3) 017376 104406                TRAP      C$CLP1
2077 017400 013737 003442 003432 2$:    MOV      GDCRC3,GDDAT    ;GET EXPECTED CRC OF DA+3 VALUE
2078 017406 013737 003372 003434      MOV      E.MP,BDDAT    ;GET CONTROLLER CRC OF DA+3
2079 017414 023737 003432 003434      CMP      GDDAT,BDDAT
2080 017422 001405                BEQ      3$
2081 017424                DFERR    EM20,ERR4      ;CRC DA+3 INCORRECT.
(5) 017424 104455                TRAP      C$ERDF
(6) 017426 000222                .WORD    146
(6) 017430 031760                .WORD    EM20
(6) 017432 026356                .WORD    ERR4
2082 017434                CKLOOP
(3) 017434 104406                TRAP      C$CLP1
2083 017436 013737 003444 003432 3$:    MOV      GDCRC4,GDDAT
2084 017444 013737 003374 003434      MOV      E.MP1,BDDAT
2085 017452 023737 003432 003434      CMP      GDDAT,BDDAT    ; DITTO CRC OF CRC OF DA+4.
2086 017460 001405                BEQ      4$
2087 017462                DFERR    EM21,ERR4      ;CRC OF CRC OF DA+4 INCORRECT.
(5) 017462 104455                TRAP      C$ERDF
(6) 017464 000223                .WORD    147
(6) 017466 032031                .WORD    EM21
(6) 017470 026356                .WORD    ERR4
2088 017472                CKLOOP
(3) 017472 104406                TRAP      C$CLP1
2089 017474 005037 003430                4$:    CLR      TMP2          ;CLEAR BAD WORD COUNTER
2090 017500 012703 004366                MOV      #BUF1,R3      ;GOOD DATA STORED IN BUF1
2091 017504 012702 005366                MOV      #BUF2,R2      ;DATA BUFFER WRITTEN INTO BY MAINT.
2092 017510 005001                CLR      R1            ; WORD COUNT.
2093 017512 011337 003432                5$:    MOV      (R3),GDDAT    ;EXPECTED DATA
2094 017516 011237 003434                MOV      (R2),BDDAT    ;GET DATA FROM BUFFER
2095 017522 023737 003432 003434      CMP      GDDAT,BDDAT
2096 017530 001436                BEQ      7$            ;BR IF DATA IS RIGHT.
2097 017532 010237 003424                MOV      R2,TMP0      ; GET ERROR ADDRESS...
2098 017536 010137 003426                MOV      R1,TMP1      ; ..AND WORD NUMBER.
2099 017542 005737 003430                TST      TMP2          ; 1ST ERROR ENCOUNTERED ??
2100 017546 001004                BNE      6$            ;NO, SKIP THE ERROR HEADER.
2101 017550                DFERR    EM22,ERR0      ;ERROR MESSAGE ON 1ST ERROR...
(5) 017550 104455                TRAP      C$ERDF
(6) 017552 000224                .WORD    148
(6) 017554 032111                .WORD    EM22
(6) 017556 026236                .WORD    ERRO
2102 017560 005237 003430                6$:    INC      TMP2          ;...FOLLOWED BY FAILING DATA.
2103 017564                PRINTX   #FRMT14,TMP1,TMP0,GDDAT,BDDAT
(11) 017564 013746 003434                MOV      BDDAT,-(SP)
(10) 017570 013746 003432                MOV      GDDAT,-(SP)
(9) 017574 013746 003424                MOV      TMP0,-(SP)
(8) 017600 013746 003426                MOV      TMP1,-(SP)
(7) 017604 012746 030103                MOV      #FRMT14,(SP)
```

```

MOV      #5, -(SP)
MOV      SP, R0
TRAP     C$PNTX
ADD      #14, SP

TRAP     C$CLP1


MOV      TMP2, -(SP)
MOV      #FRMT15, -(SP)
MOV      #2, -(SP)
MOV      SF, R0
TRAP     C$PNTB
ADD      #6, SP


TRAP     C$ERDF
.WORD    149
.WORD    EM23
.WORD    ERR4


:
TRAP     C$ESEG


:
TRAP     C$ETST

```

CVRLB80 - RLV12 DISKLESS.
C/RLBB.P11 12-JUN-85 15:33

MACY11 30(1046) 12-JUN-85 15:42 PAGE 36
27 RLV11/12 MAINTENANCE, FIFO ADDRESSING.

SEG 0085

```

2123 .SBTTL 27 -- RLV11/12 MAINTENANCE, FIFO ADDRESSING.
2124
2125 017734 STARS
(2) ;*****
2126 ;TEST THAT FIFO OPERATES CORRECTLY. STORE ADDRESS PATTERN
2127 ;IN BUF1 (0 255) THAT CONTAINS A UNIQUE PATTERN IN EACH LOCATION.
2128 ;PERFORM MAINTENANCE FUNCTION AND TEST BUF2 FOR PROPER FIFO
2129 ;ADDRESSING. NOTE THAT CRC'S ARE NOT CHECKED IN THIS TEST.
2130 ;REPEAT A SECOND TIME USING A COMPLIMENT ADDRESS PATTERN.
2131 ; ALSO USE AND TEST FOR INTERRUPT ON MAINT DONE
2132 017734 STARS
(2) ;*****
2133 017734 BEGIN.TEST
(4) 017734 T27::

;
; SUBTEST 1 -- FIFO ADDRESS PATTERN.
;
FIF01 BGNSUB
(3) 017734 T27.1:
(3) 017734 104402 TRAP C$BSUB
2138 017736 005001 CLR R1
2139 017740 012702 000400 MOV #256.,R2
2140 017744 012703 004366 MOV #BUF1,R3 ;SETUP TO STORE PATTERN IN BUF1
2141 017750 010123 1$: MOV R1,(R3)+ ;INC. PATTERN
2142 017752 005201 INC R1
2143 017754 005302 DEC R2
2144 017756 001374 BNE 1$
2145 017760 004737 020026 JSR PC,XFIFO ; EXECUTE AND CHECK FIFO DATA.
2146 017764 ENDSUB
(3) 017764 L10051:
(3) 017764 104403 TRAP C$ESUB
2147
; SUBTEST 2 -- FIFO COMPLIMENT ADDRESS PATTERN.
2148
;
FIF02: BGNSUB
(3) 017766 T27.2:
(3) 017766 104402 TRAP C$BSUB
2151 017770 012701 177777 MOV #-1,R1
2152 017774 012702 000400 MOV #256.,R2
2153 020000 012703 004366 MOV #BUF1,R3
2154 020004 010123 1$: MOV R1,(R3)+ ; STORE COMPLIMENT ADDRESS PATTERN.
2155 020006 005301 DEC R1
2156 020010 005302 DEC R2
2157 020012 001374 BNE 1$
2158 020014 004737 020026 JSR PC,XFIFO ; EXECUTE AND CHECK FIFO DATA.
2159 020020 ENDSUB
(3) 020020 L10J52:
(3) 020020 104403 TRAP C$ESUB
2160 020022 EXIT TST ; ALL DONE.
(3) 020022 104432 TRAP C$EXIT
(3) 020024 000332 .WORD L10050
2161
; THIS SUBROUTINE EXECUTES THE MAINT FUNCTION AND TESTS RESULTS.
2162
;
2163 XFIFO: BGNSEG ;*** LOOP SEGMENT ***
2164 020026 TRAP C$BSEG
(3) 020026 104404

```

CVRL880 - RLV12 DISKLESS.
CVRL88.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN 85 15:42 PAGE 36 1
27 - RLV11/12 MAINTENANCE, FIFO ADDRESSING.

SEQ 0086

2165	020030	012702	000400		MOV	#256.,R2	;SETUP TO CLEAR BUF2		
2166	020034	012703	005366		MOV	#BUF2,R3			
2167	020040	005023		1\$:	CLR	(R3)+			
2168	020042	005302			DEC	R2			
2169	020044	001375			BNE	1\$			
2170	020046	005037	010700		CLR	INTFLG	;CLEAR INT. FLAG		
2171	020052				SETPRI	#PRI00			
(3)	020052	012700	000000					MOV	#PRI00,R0
(3)	020056	104441						TRAP	C\$SPRI
2172	020060	004537	010254		JSR	R5,LDFUN	;LOAD FUNCTION		
2173	020064	000100	177001		MAINT!INTEN, -511.				
2174	020070	004537	010704		JSR	R5,WTCRDY	;WAIT FOR READY		
2175	020074	004537	007554		JSR	R5,GETERR	;CHECK CONTROLLER FOR ERRORS		
2176	020100	000405			BR	2\$	; BR IF NONE.		
2177	020102				DFERR	EM98,ERR6	;UNEXPECTED CONTROLLER ERRORS.		
(5)	020102	104455						TRAP	C\$ERDF
(6)	020104	000226						.WORD	150
(6)	020106	034421						.WORD	EM98
(6)	020110	026412						.WORD	ERR6
2178	020112				CKLOOP				
(3)	020112	104406						TRAP	C\$CLP1
2179	020114	032737	022000	003364	2\$:	BIT	#OPI!NXM,E.CS	; OPI OR NXM ??	
2180	020122	001110			BNE	8\$	; QUIT IF SO.		
2181	020124	005737	010700		TST	INTFLG	;CHECK FOR INTERRUPT		
2182	020130	001005			BNE	4\$			
2183	020132				DFERR	EM15,ERRO	; DIDN'T INTERRUPT.		
(5)	020132	104455						TRAP	C\$ERDF
(6)	020134	000227						.WORD	151
(6)	020136	031616						.WORD	EM15
(6)	020140	026236						.WORD	ERRO
2184	020142				CKLOOP				
(3)	020142	104406						TRAP	C\$CLP1
2185	020144	005037	003430		4\$:	CLR	TMP2	;CLEAR BAD WORD COUNTER	
2186	020150	012703	004366		MOV	#BUF1,R3	;GOOD DATA STORED IN BUF1		
2187	020154	012702	005366		MOV	#BUF2,R2	;DATA BUFFER WRITTEN INTO BY MAINT.		
2188	020160	005001			CLR	R1	; WORD COUNT.		
2189	020162	011337	003432		5\$:	MOV	(R3),GDDAT	;EXPECTED DATA	
2190	020166	011237	003434		MOV	(R2),BDDAT	;GET DATA FROM BUFFER		
2191	020172	023737	003432	003434	CMP	GDDAT,BDDAT			
2192	020200	001436			BEQ	7\$	;BR IF DATA IS RIGHT.		
2193	020202	010237	003424		MOV	R2,TMP0	; GET ERROR ADDRESS...		
2194	020206	010137	003426		MOV	R1,TMP1	;...AND WORD NUMBER.		
2195	020212	005737	003430		TST	TMP2	; 1ST ERROR ENCOUNTERED ??		
2196	020216	001004			BNE	6\$	;NO, SKIP THE ERROR HEADER.		
2197	020220				DFERR	EM22,ERRO	;ERROR MESSAGE ON 1ST ERROR...		
(5)	020220	104455						TRAP	C\$ERDF
(6)	020222	000230						.WORD	152
(6)	020224	032111						.WORD	EM22
(6)	020226	026236						.WORD	ERRO
2198	020230	005237	003430		6\$:	INC	TMP2	;...FOLLOWED BY FAILING DATA.	
2199	020234				PRINTX	#FRMT14,TMP1,TMP0,GDDAT,BDDAT			
(11)	020234	013746	003434					MOV	BDDAT, (SP)
(10)	020240	013746	003432					MOV	GDDAT, -(SP)
(9)	020244	013746	003424					MOV	TMP0, -(SP)
(8)	020250	013746	003426					MOV	TMP1, -(SP)
(7)	020254	012746	030103					MOV	#FRMT14, (SP)

L10050:

```

MOV      05, -(SP)
MOV      SP, R0
TRAP     C$PNTX
ADD      014, SP

TRAP     C$CLP1


MOV      TMP2, -(SP)
MOV      0FRMT15, -(SP)
MOV      02, -(SP)
MOV      SP, R0
TRAP     C$PNTB
ADD      06, SP

:
TRAP     C$ESEG

MOV      0PRI07, R0
TRAP     C$SPRI


:
TRAP     C$ETST

```

Address	OpCode	OpName	OpData	OpComment	OpStatus	OpTrap	OpExit
2215				.SBTTL 28 -- RLV11/12 MAINTENANCE, BANK 7 SELECT AND NEXM TEST.			
2216				STARS			
2217	020360			;;*****			
2218	(2)			;;*****			
2219				;;* FOR RLV12:			
2220				;;* TEST THAT BBS7 WILL SELECT THE I/O PAGE AND THAT ACCESS TO			
2221				;;* LOCATION 0 IN THAT PAGE WILL GENERATE NXM AND OPI ERRORS.			
2222				;;* NOTE -- IF BANK 7 IS NOT PROPERLY SELECTED, 1000 BYTES			
2223				;;* STARTING AT XXXX1000 WILL PROBABLY GET CRUNCHED !!!!			
2224				;;* FOR RLV11:			
2225				;;* RLV11 DOESN'T ASSERT BBS7, SO WE'LL THIS TEST			
2226	020360			;;* IF PHYSICAL MEMORY SIZE IS 124K OR GREATER.			
2227	(2)			STARS			
2228	020360			;;*****			
2229	(4)			BEGIN.TEST			
2230	020360	023727	003402	000001	CMP	RLTYP,#RLV11	
2231	020366	003006			BGT	1\$	; EXECUTE ALWAYS ON RLV12...
2232	020370	023727	011276	000174	CMP	.MSIZE,#124.	
2233	020376	002406			BLT	2\$	;...AND ON RLV11 IF < 124KW.
2234	020400				EXIT	TST	
2235	(3)	020400	104432				TRAP
2236	(3)	020402	000150				.WORD
2237	020404	112737	000054	034164	1\$:	MOVB	#',,EMBOX ; ADJUST ERROR TEXT FOR RLV12...
2238	020412	000402					
2239	020414	105037	034164		2\$:	CLRB	EMBOX ;...OR FOR RLV11.
2240	020420	004537	010760			JSR	R5,CALCRC ; DO CRC FOR INITIAL...
2241	020424	000000				.WORD	0 ;...DA OF 0.
2242	020426	012737	160000	010416		MOV	#160000,BA16 ; POINT TO LOC 0 IN LAST 4K.
2243	020434	012700	000003			MOV	#3,R0 ; SET AN 18 BIT...
2244	020440	023727	011304	000026		CMP	.ABUSW,#22
2245	020446	001002				BNE	3\$
2246	020450	012700	000077			MOV	#77,R0 ;...OR 22 BIT EXTENSION.
2247	020454	010037	010420		3\$:	MOV	R0,BA22
2248	020460	004537	010254			JSR	R5,LDFUN ; XCT MAINTENANCE...
2249	020464	000000	177001			MAINT,	-511. ;...WITH VALID WORD COUNT.
2250	020470	004537	010704		BB7:	JSR	R5,WTCRDY
2251	020474	012700	120000			MOV	#ERR!NXM,R0 ; EXPECT AT LEAST THESE ERRORS.
2252	020500	043700	003364			BIC	E.CS,R0
2253	020504	001415				BEQ	4\$; EXIT IF WE'RE OK.
2254							
2255	020506	004537	007554			JSR	R5,GETERR ; OTHERWISE, GET WHAT'S THERE.
2256	020512	000240				NOP	
2257	020514	013737	010420	003426		MOV	BA22,TMP1 ; AND GET PHYSICAL ADDRESS.
2258	020522	013737	010416	003430		MOV	BA16,TMP2
2259	020530					DFERR	EM80,ERR12 ; BBS7 AND/OR NXM FAILURE.
2260	(5)	020530	104455				TRAP
2261	(6)	020532	000231				.WORD
2262	(6)	020534	034133				.WORD
2263	(6)	020536	026552				.WORD
2264							
2265	020540	012737	004366	010416	4\$:	MOV	#BUF1,BA16 ; RESET BA16 AND 22.
2266	020546	005037	010420			CLR	BA22
2267	020552					ENDTST	
2268	(3)	020552					L10053:
2269	(3)	020552	104401				TRAP
2270							C\$ETST

CVRL080 - RLV12 DISKLESS.
CVRL08.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 38
29 -- RLV11/12 MAINTENANCE, EXTENDED MEMORY ACCESS TEST.

SEQ 0089

.SBTTL 29 -- RLV11/12 MAINTENANCE, EXTENDED MEMORY ACCESS TEST.

STARS

```

;*****
;* BYPASS THIS TEST IF NO KT SUPPORT.
;* OTHERWISE, MEMORY HAS ALREADY BEEN SIZED.
;* PAR'S 0 TO 6 ARE MAPPED TO THE 1ST 28K, AND PAR7 TO THE I/O PAGE.
;*
;* NOW ACCESS EXTENDED MEMORY IN 4K INCREMENTS. STORE A RANDOM DATA
;* PATTERN IN BUF1 (RELOCATED). EXECUTE MAINTENANCE MODE, AND CHECK
;* BUF2 (RELOCATED) FOR CORRECT DATA TRANSFER. ALSO CHECK THAT THE FINAL
;* BUS ADDRESS INCREMENTED CORRECTLY (OVERFLOWING INTO THE BAE).
;* WHEN THE END OF PHYSICAL MEMORY IS REACHED, A BUS-ERROR WILL OCCUR
;* DURING THE BUFFER SET-UP PHASE AND WE'LL LOOK FOR A NXM ERROR AT
;* THE SAME PHYSICAL ADDRESS. CONTINUE UNTIL WE REACH THE I/O PAGE
;* AT 760000 (18 BIT), OR 17760000 (22 BIT).

```

STARS

```

;*****
PAR4= KIPAR0+10 ; USE KIPAR4 FOR ACCESSING.
      BEGIN.TEST

```

T29::

```

      CLR      TRPFLG      ; CLEAR TRAP FLAG.
      TST      MMRO        ; KT AVAILABLE ??
      240
      TST      TRPFLG
      BEQ      EXMTST      ; PROCEED IF SO...
1$: EXIT      TST          ; ...EXIT OTHERWISE.

```

TRAP C\$EXIT
WORD L10054

```

EXMTST: MOV      #7400,IOPAG      ; ASSUME 18 BITS, SET LIMIT AT 124K...
      CMP      .ABUSW,#22        ; 22 BITS AVAILABLE ??
      BNE      1$                ; BR IF NOT.
      CMP      RLTP,#RLV12X      ; CAN WE HANDLE THEM ALL ??
      BNE      1$                ; BR IF NOT.
      MOV      #20,MMR3          ; YES, SET KT IN 22 BIT MODE...
      MOV      #177400,IOPAG     ; ...AND RAISE LIMIT TO 2044K.
1$: CLR      BA22
      MOV      #177000,BA16      ; SET PHYSICAL ADDRESS AT 32K 256 WORDS.
      MOV      #1770,PAR4        ; SET PAR4 TO THE SAME POINT.
EXMLUP: JSR      R5,SETRAN       ; RANDOM DATA TO BUF1, ZERO BUF2.
      BGNSEG

```

TRAP C\$BSEG

```

      MOV      #BUF1,R1          ; SETUP TO COPY FROM BUF1...
      MOV      #100000,R2        ; ...TO (PAR4)+0
      MOV      #512,R3
      MOV      #22$,ERRVEC      ; SOONER OR LATER WE'LL TRAP.
      CLR      TRPFLG
      INC      MMRO
      MOV      (R1)+,(R2)+      ; ***** KT ON *****
2$: MOV      240,240            ; COPY BUFFERS VIA PAR4.
      SOB      R3,2$            ;
      BR       3$              ; LOOP 'TIL DONE.
22$: MOV      R2,TRPFLG         ; NXM TRAP, SAVE ADDRESS...
      MOV      #3$,(SP)        ;
      RTI                     ; ...AND CONTINUE.
3$: CLR      MMRO              ; ***** KT OFF *****

```

2261
2262
2263 020554
(2)
2264
2265
2266
2267
2268
2269
2270
2271
2272
2273
2274
2275
2276 020554
(2)
2277 172350
2278 020554
(4) 020554
2279 020554 005037 010672
2280 020560 005737 177572
2281 020564 000240
2282 020566 005737 010672
2283 020572 001402
2284 020574
(3) 020574 104432
(3) 020576 000550
2285 020600 012737 007400 021324
2286 020606 023727 011304 000026
2287 020614 001012
2288 020616 023727 003402 000003
2289 020624 001006
2290 020626 012737 000020 172516
2291 020634 012737 177400 021324
2292 020642 005037 010420
2293 020646 012737 177000 010416
2294 020654 012737 001770 172350
2295 020662 004537 010516
2296 020666
(3) 020666 104404
2297 020670 012701 004366
2298 020674 012702 100000
2299 020700 012703 001000
2300 020704 012737 020734 000004
2301 020712 005037 010672
2302 020716 005237 177572
2303 020722 012122
2304 020724 000240 000240
2305 020730 077304
2306 020732 000405
2307 020734 010237 010672
2308 020740 012716 020746
2309 020744 000002
2310 020746 005037 177572

CVRLBBO RLV12 DISKLESS.
CVRLBB.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 38-1
29 -- RLV11/12 MAINTENANCE, EXTENDED MEMORY ACCESS TEST.

SEQ 0090

2311	020752	012737	010670	000004	MOV	#TRAP4,ERRVEC	; RESET TRAP.		
2312	020760	004537	010760		JSR	R5,CALCRC	; JUST TO BE CONSISTENT.		
2313	020764	000000			0				
2314	020766	004537	010254		JSR	R5,LDFUN			
2315	020772	000000	177001		MAINT,	-511.	; EXECUTE MAINT MODE DMA TO EXT MEM.		
2316	020776	004537	010704		JSR	R5,WTCRDY			
2317	021002	023727	003402	000003	CMP	RLTYP,#RLV12X	; BAE IN USE ??		
2318	021010	001411			BEQ	33\$	; BR IF SO.		
2319	021012	013700	003364		MOV	E.CS,R0	; NO, GET EA<17:16> FROM FINAL CSR.		
2320	021016	006200			ASR	R0			
2321	021020	006200			ASR	R0			
2322	021022	006200			ASR	R0			
2323	021024	006200			ASR	R0			
2324	021026	042700	177774		BIC	#C3,R0			
2325	021032	000402			SKP2				
2326	021034	013700	003376	33\$:	MOV	E.BAE,R0	; GET EA<21:16> FROM BAE.		
2327	021040	010037	003426		MOV	R0,TMP1	; SAVE FINAL PA IN CASE...		
2328	021044	013737	003366	003430	MOV	E.BA,TMP2	; ...WE HAVE A STATUS ERROR.		
2329	021052	005737	010672		TST	TRPFLG	; NOW, ARE WE EXPECTING NXM ??		
2330	021056	001415			BEQ	4\$	; BR IF NOT.		
2331	021060	012700	120000		MOV	#ERR:NXM,R0	; YES, DO WE HAVE IT ??		
2332	021064	043700	003364		BIC	E.CS,R0			
2333	021070	001501			BEQ	8\$	; BR IF SO.		
2334	021076	004537	007554		JSR	R5,GETERR	; NO, GET WHATEVER'S THERE.		
2335	021076	000240			NOP				
2336	021100				DFERR	EM90,ERR12	; EXTENDED NXM STATUS WRONG.	TRAP	C\$ERDF
(5)	021100	104455						.WORD	154
(6)	021102	000232						.WORD	EM90
(6)	021104	034221						.WORD	ERR12
(6)	021106	026552							
2337	021110	000471			BR	8\$			
2338									
2339	021112	004537	007554	4\$:	JSR	R5,GETERR	; ANY OTHER STATUS ERRORS ??		
2340	021116	000405			BR	44\$	; BR IF NOT.		
2341	021120				DFERR	EM91,ERR13	; STATUS INCORRECT ON EXT MEMORY ACCESS.	TRAP	C\$ERDF
(5)	021120	104455						.WORD	155
(6)	021122	000233						.WORD	EM91
(6)	021124	034275						.WORD	ERR13
(6)	021126	026606							
2342	021130	000461			BR	7\$			
2343									
2344	021132	012701	100000	44\$:	MOV	#100000,R1	; POINT TO BUF1 IN EXT MEMORY.		
2345	021136	012702	101000		MOV	#101000,R2	; DITTO BUF2.		
2346	021142	005003			CLR	R3	; WORD NUMBER.		
2347	021144	012704	000377		MOV	#255.,R4	; LOOP COUNT.		
2348	021150	005237	177572		INC	MMR0	; ***** KT ON *****		
2349	021154	012137	003432	5\$:	MOV	(R1)+,GDDAT			
2350	021160	012237	003434		MOV	(R2)+,BDDAT			
2351	021164	023737	003432	003434	CMP	GDDAT,BDDAT	; COMPARE DATA.		
2352	021172	001002			BNE	6\$	; BR IF WRONG.		
2353	021174	005203			INC	R3	; BUMP WORD COUNT.		
2354	021176	077412			SOB	R4,5\$	; LOOP.		
2355	021200	005037	177572	6\$:	CLR	MMR0	; ***** KT OFF *****		
2356	021204	005704			TST	R4	; LOOP COMPLETED (NO ERRORS) ??		
2357	021206	001432			BEQ	8\$	; BR IF SO.		
2358	021210	010337	003424		MOV	R3,TMP0	; NO, SAVE FAILING WORD NUMBER.		

CVRL880 RLV12 DISKLESS.
CVRL88.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 38 2
29 - RLV11/12 MAINTENANCE, EXTENDED MEMORY ACCESS TEST.

SEQ 0091

2359	021214	012703	000006		MOV	#6,R3				
2360	021220	013737	172350	003430	MOV	PAR4,TMP2				
2361	021226	005037	003426		CLR	TMP1			; NOW ASSEMBLE BAD PA.	
2362	021232	006337	003430		ASL	TMP2			; ADJUST PAGE TO BIT 21...	
2363	021236	006137	003426	7\$:	ROL	TMP1				
2364	021242	077305			SOB	R3,7\$				
2365	021244	042702	160000		BIC	#C17777,R2			;...STRIP PAR BITS FROM VA...	
2366	021250	162702	000002		SUB	#2,R2				
2367	021254	060237	003430		ADD	R2,TMP2			;...AND COMBINE THE PIECES.	
2368	021260	005537	003426		ADC	TMP1				
2369	021264				DFERR	EM92,ERR14			; DATA ERROR IN EXTENDED MEM.	
(5)	021264	104455							TRAP	C\$ERDF
(6)	021266	000234							.WORD	156
(6)	021270	034352							.WORD	EM92
(6)	021272	026616							.WORD	ERR14
2370										
2371	021274			8\$:	CKLOOP					
(3)	021274	104406							TRAP	C\$CLP1
2372	021276				ENDSEG					
(3)	021276								10000\$:	
(3)	021276	104405							TRAP	C\$ESEG
2373	021300	062737	020000	010416	ADD	#20000,BA16			; INCR PHYSICAL ADDRESS BY 4K...	
2374	021306	005537	010420		ADC	BA22			;...AND OVERFLOW INTO BAE.	
2375	021312	062737	000200	172350	ADD	#200,PAR4			; INCR PAR4 BY 4K ALSO.	
2376	021320	023727	172350	9\$:	CMP	PAR4,(PC)+			; QUIT AT THE I/O PAGE...	
2377	021324	007400		IOPAG:	7400				;...007400 (124K)...	
2378									;...OR 177400 (2044K).	
2379	021326	103002			BHIS	EXMDUN			; EXIT IF DONE.	
2380	021330	000137	020662		JMP	EXMLUP			; LOOP OTHERWISE.	
2381										
2382	021334	012737	004366	010416	EXMDUN:	MOV	#BUF1,BA16		; RESET BA16 AND 22.	
2383	021342	005037	010420		CLR	BA22				
2384	021346				ENDTST					
(3)	021346								L10054:	
(3)	021346	104401							TRAP	C\$ETST

```

2386 .SBTTL
2387 .SBTTL RLV12 DRIVE INTERFACE TESTS (G5388 TLM REQUIRED).
2388 .SBTTL
2389 021350 STARS
(2) ;*****
2390 ;* ALL THESE TESTS REQUIRE THE SERVICES OF THE G5388 TEST LOOP MODULE.
2391 ;*
2392 .SBTTL 30 -- SYS CLK, PWR OK, DRIVE SELECT, READY, AND ERROR BITS.
2393 ;*
2394 ;* 1. TEST SYS CLOCK AND PWR OK FROM THE RLV12.
2395 ;* 2. TEST DRIVE READY AND DRIVE ERROR TO THE RLV12.
2396 ;* 3. TEST DRIVE SELECT BITS FROM THE RLV12.
2397 021350 STARS
(2) ;*****
2398 021350 TLM1: BEGIN.TEST
(4) 021350 T30::
2399 021350 004737 024034 JSR PC,TLMOK ; CHECK FOR V12 AND TLM OK...
2400 021354 102561 BVS 7$ ; ...AND EXIT IF NOT.
2401 021356 012777 000001 161760 MOV #1,@TCSR ; RESET...
2402 021364 005077 161754 CLR @TCSR ; ...AND CLEAR TLM CSR (LO BYTE).
2403 021370 017737 161750 003434 MOV @TCSR,BDDAT ; GET TLM STATUS.
2404 021376 012737 004400 003432 MOV #4400,GDDAT ; EXPECT SYSCLK<11> AND PWROK<8>.
2405 021404 023737 003432 003434 CMP GDDAT,BDDAT
2406 021412 001404 BEQ 1$ ; BR IF STATUS IS RIGHT.
2407 021414 DFERR EM101,ERR2 ; PWR-OK AND/OR SYS-CLK NOT SET IN TLM.
(5) 021414 104455 TRAP C$ERDF
(6) 021416 000235 .WORD 157
(6) 021420 035061 .WORD EM101
(6) 021422 026272 .WORD ERR2
2408 021424 017700 161674 1$: MOV @RLCS,R0 ; GET RLV12 CSR.
2409 021430 010037 003434 MOV R0,BDDAT ; REC'D RLV12 STATUS...
2410 021434 042700 000001 BIC #DRDY,R0 ; ...SHOULD HAVE DRDY CLEAR.
2411 021440 010037 003432 MOV R0,GDDAT
2412 021444 023737 003432 003434 CMP GDDAT,BDDAT
2413 021452 001404 BEQ 2$ ; BR IF SO.
2414 021454 DFERR EM102,ERR2 ; DRIVE READY NOT CLEAR IN RLV12.
(5) 021454 104455 TRAP C$ERDF
(6) 021456 000236 .WORD 158
(6) 021460 035142 .WORD EM102
(6) 021462 026272 .WORD ERR2
2415 021464 012777 000200 161652 2$: MOV #200,@TCSR ; SET DRIVE READY IN TLM.
2416 021472 017700 161626 MOV @RLCS,R0 ; GET RLV12 AGAIN.
2417 021476 010037 003434 MOV R0,BDDAT
2418 021502 052700 000001 BIS #DRDY,R0 ; DRDY SHOULD BE SET NOW.
2419 021506 010037 003432 MOV R0,GDDAT
2420 021512 023737 003432 003434 CMP GDDAT,BDDAT
2421 021520 001404 BEQ 3$ ; BR IF SO.
2422 021522 DFERR EM102,ERR2 ; DRIVE READY NOT SET IN RLV12.
(5) 021522 104455 TRAP C$ERDF
(6) 021524 000237 .WORD 159
(6) 021526 035142 .WORD EM102
(6) 021530 026272 .WORD ERR2
2423 021532 012777 000100 161604 3$: MOV #100,@TCSR ; CLEAR DRDY, SET DERR IN TLM.
2424 021540 017700 161560 MOV @RLCS,R0 ; ONE MORE TIME.
2425 021544 010037 003434 MOV R0,BDDAT
2426 021550 052700 140000 BIS #ERR!DERR,R0 ; SHOULD HAVE THESE ERROR BITS.

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CVRLB80 - RLV12 DISKLESS.
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MACY11 30(1046) 12 JUN 85 15:42 PAGE 39 1
30 SYS CLK, PWR OK, DRIVE SELECT, READY, AND ERROR BITS.

SEQ 0093

2427	021554	010037	003432		MOV	R0,GDDAT			
2428	021560	023737	003432	003434	CMP	GDDAT,BDDAT			
2429	021566	001404			BEQ	4\$		; BR IF SO.	
2430	021570				DFERR	EM103,ERR2		; DRIVE ERROR STATUS INCORRECT IN RLV12.	
(5)	021570	104455						TRAP	C\$ERDF
(6)	021572	000240						.WORD	160
(6)	021574	035217						.WORD	EM103
(6)	021576	026272						.WORD	ERR2
2431	021600	005077	161540		4\$: CLR	@TCSR		; CLEAR TLM.	
2432	021604	005001			CLR	R1		; INIT DRIVE SELECT BITS<9:8>...	
2433	021606	112737	000060	035307	MOVB	#'0,EM104X		;...AND ERROR TEXT.	
2434	021614	012703	000004		MOV	#4,R3		; LOOP CONTROL.	
2435	021620	012777	000200	161476	5\$: MOV	#CRDY,@RLCS		; INIT RLV CSR...	
2436	021626	050177	161472		BIS	R1,@RLCS		;...INSERT DRIVE BITS <9:8>.	
2437	021632	017702	161506		MOV	@TCSR,R2		; GET TLM CSR.	
2438	021636	010237	003434		MOV	R2,BDDAT		; RECV'D TLM SHOULD ECHO DRIVE...	
2439	021642	042702	003000		BIC	#BIT10!BIT9,R2		;...SELECTED IN TLM<10:9>.	
2440	021646	006301			ASL	R1			
2441	021650	050102			BIS	R1,R2		; SET EXPECTED VALUE.	
2442	021652	006201			ASR	R1			
2443	021654	010237	003432		MOV	R2,GDDAT			
2444	021660	023737	003432	003434	CMP	GDDAT,BDDAT			
2445	021666	001404			BEQ	6\$			
2446	021670				DFERR	EM104,ERR2		; DRIVE SELECT FAILS IN TLM.	
(5)	021670	104455						TRAP	C\$ERDF
(6)	021672	000241						.WORD	161
(6)	021674	035301						.WORD	EM104
(6)	021676	026272						.WORD	ERR2
2447	021700	062701	000400		6\$: ADD	#DS1,R1		; BUMP DRIVE SELECT NUMBER...	
2448	021704	105237	035307		INCB	EM104X		;...AND THE ERROR TEXT.	
2449	021710	077335			SOB	R3,5\$			
2450	021712	012777	000200	161404	MOV	#CRDY,@RLCS		; RESET DRIVE NUMBER IN RL.	
2451	021720				7\$: ENDTST				
(3)	021720							L10055:	
(3)	021720	104401						TRAP	C\$ETST

CVRLBBO - RLV12 DISKLESS.
CVRLBB.P11 12-JUN-85 15:33

MACY11 30(1046) 12-JUN 85 15:42 PAGE 40
31 DRIVE COMMAND, STATUS AND STATUS CLOCK.

SEQ 0094

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2453          .SBTTL 31 -- DRIVE COMMAND, STATUS AND STATUS CLOCK.
2454
2455 021722    STARS
(2)          ;*****
2456          ;* NOW TEST DRIVE COMMAND, STATUS, AND STATUS CLOCK
2457          ;* USING A "GET STATUS" COMMAND.
2458 021722    STARS
(2)          ;*****
2459 021722    TLM2: BEGIN.TEST
(4) 021722    T31::
2460 021722    004737 024034      JSR    PC,TLMOK
2461 021726    102476            BVS     5$          ; EXIT IF NO GOOD.
2462 021730    004737 024204      JSR    PC,CLRTLM      ; RESET TLM, AND SET DRDY.
2463 021734    005037 003436      CLR     INIMP
2464 021740    012765 125252 000004  MOV    #125252,4(R5) ; SET PHONEY STATUS WORD.
2465 021746    012777 000204 161350  MOV    #CRDY!GSTAT,@RLCS ; SET "GET STATUS" COMMAND...
2466 021754    012777 000013 161346  MOV    #DRST!GSBIT!MK,@RLDA ; ...AND RESET STATUS BITS.
2467 021762    004537 010062      JSR    R5,BEFORE
2468 021766    042777 000200 161330  BIC    #CRDY,@RLCS      ; XCT IT.
2469 021774    005000            CLR     R0
2470 021776    011501            1$: MOV    (R5),R1      ; GET TCSR...
2471 022000    100401            BMI     2$          ; ...PROCEED WHEN "NEW SKGS" SETS...
2472 022002    077003            SOB     R0,1$       ; ...BUT DON'T WAIT FOREVER !!!
2473 022004    016537 000002 003434  2$: MOV    2(R5),BDDAT ; SAVE RECV'D DRIVE COMMAND (SKGS)...
2474 022012    004537 010704      JSR    R5,WTCRDY
2475 022016    012737 000013 003432  MOV    #DRST!GSBIT!MK,GDDAT ; ...SHOULD LOOK LIKE THIS.
2476 022024    023737 003432 003434  CMP     GDDAT,BDDAT
2477 022032    001404            BEQ     3$          ; BR IF STATUS COMMAND WAS RIGHT.
2478 022034            DFERR      EM105,ERR4        ; GET STATUS COMMAND WRONG IN TLM.
(5) 022034    104455            TRAP     C$ERDF
(6) 022036    000242            .WORD    162
(6) 022040    035363            .WORD    EM105
(6) 022042    026356            .WORD    ERR4
2479 022044    013737 003372 003434  3$: MOV    E.MP,BDDAT ; RETURNED DRIVE STATUS...
2480 022052    012737 125252 003432  MOV    #125252,GDDAT ; ...SHOULD = PHONEY.
2481 022060    023737 003432 003434  CMP     GDDAT,BDDAT
2482 022066    001404            BEQ     4$          ; BR IF RETURNED STATUS IS RIGHT.
2483 022070            DFERR      EM106,ERR4        ; RETURNED STATUS INCORRECT IN RLMP.
(5) 022070    104455            TRAP     C$ERDF
(6) 022072    000243            .WORD    163
(6) 022074    035445            .WORD    EM106
(6) 022076    026356            .WORD    ERR4
2484 022100    004537 007554            4$: JSR    R5,GETERR ; FINAL CONTROLLER STATUS...
2485 022104    000407            BR      5$          ; ...SHOULD BE ERROR FREE.
2486 022106    012737 036742 003426  MOV    #EXPNON,TMP1
2487 022114            DFERR      EM107,ERR20A      ; RLV12 ERRORS AFTER RESET GET STATUS
(5) 022114    104455            TRAP     C$ERDF
(6) 022116    000244            .WORD    164
(6) 022120    035515            .WORD    EM107
(6) 022122    026740            .WORD    ERR20A
2488 022124            5$: ENDTST
(3) 022124            L10056: TRAP     C$ETST
(3) 022124    104401

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CVRLB80 RLV12 DISKLESS.
CVRLB8.P11 12-JUN 85 15:33

MACY11 30(1046) 12 JUN 85 15:42 PAGE 41
32 DRIVE COMMAND, SEEK DIFF AND SECTOR PULSE.

SEQ 0095

.SBTTL 32 DRIVE COMMAND, SEEK DIFF AND SECTOR PULSE.

STARS

;* TEST SECTOR PULSE USING A "SEEK" COMMAND.

STARS

TLM3: BEGIN.TEST

T32::

2490						JSR	PC,TLMOK						
2491						BVS	4\$						
2492	022126												
(2)													
2493													
2494	022126												
(2)													
2495	022126												
(4)	022126												
2496	022126	004737	024034			JSR	PC,TLMOK						
2497	022132	102457				BVS	4\$						
2498	022134	004737	024204			JSR	PC,CLRTLM						
2499	022140	005037	003436			CLR	INIMP						
2500	022144	052715	000024			BIS	#24,(R5)						
2501	022150	012777	000206	161146		MOV	#CRDY!SEEK,@RLCS						
2502	022156	012777	077601	161144		MOV	#77600!MK,@RLDA						
2503	022164	004537	010062			JSR	R5,BEFORE						
2504	022170	042777	000200	161126		BIC	#CRDY,@RLCS						
2505	022176	005000				CLR	R0						
2506	022200	011501			1\$:	MOV	(R5),R1						
2507	022202	100401				BMI	2\$						
2508	022204	077003				SOB	R0,1\$						
2509	022206	016537	000002	003434	2\$:	MOV	2(R5),BDDAT						
2510	022214	004537	010704			JSR	R5,WTCRDY						
2511	022220	012737	077601	003432		MOV	#77600!MK,GDDAT						
2512	022226	023737	003432	003434		CMP	GDDAT,BDDAT						
2513	022234	001404				BEQ	3\$						
2514	022236					DFERR	EM110,ERR4						
(5)	022236	104455											
(6)	022240	000245											
(6)	022242	035570											
(6)	022244	026356											
2515	022246	004537	007554		3\$:	JSR	R5,GETERR						
2516	022252	000407				BR	4\$						
2517	022254	012737	036742	003426		MOV	#EXPNON,TMP1						
2518	022262					DFERR	EM111,ERR20A						
(5)	022262	104455											
(6)	022264	000246											
(6)	022266	035651											
(6)	022270	026740											
2519	022272				4\$:	ENDTST							
(3)	022272												
(3)	022272	104401											

TRAP C\$ERDF
.WORD 165
.WORD EM110
.WORD ERR4

TRAP C\$ERDF
.WORD 166
.WORD EM111
.WORD ERR20A

L10057:

TRAP C\$ETST

CVRLBBO RLV12 DISKLESS.
CVRLBB.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 42
33 WRITE GATE, WRITE GATE ERROR, AND WRITE DATA.

SEQ 0096

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2521 .SBTTL 33 - WRITE GATE, WRITE GATE ERROR, AND WRITE DATA.
2522
2523 022274 STARS
(2) ;*****
2524 ;* TEST THE WRITE GATE, WRITE DATA ACTIVE, AND WRITE GATE ERROR.
2525 022274 STARS
(2) ;*****
2526 022274 TLM4: BEGIN.TEST
(4) 022274 T33::
2527 022274 004737 024034 JSR PC,TLMOK
2528 022300 102524 BVS 5$ ; BR IF NOT OK.
2529 022302 004737 024204 JSR PC,CLRTLM ; RESET TLM, SET DRDY.
2530 022306 052715 000024 BIS #24,(R5) ; ENABLE SECTOR GEN (NOM CLOCK).
2531 022312 004537 010224 JSR R5,WDELAY ; DELAY SO THAT WE ENTER THE TLM...
2532 022316 000002 2 ;...SEQUENCE ASYNCHRONOUSLY.
2533 022320 012777 000212 160776 MOV #CRDY!WRITE,@RLCS ; SET COMMAND TO WRITE...
2534 022326 012737 177600 003436 MOV #-128.,INIMP
2535 022334 013777 003436 160770 MOV INIMP,@RLMP ;...128 WORDS...
2536 022342 012777 004366 160756 MOV #BUF1,@RLBA ;...FROM BUF1...
2537 022350 012777 000205 160752 MOV #205,@RLDA ;...TO CYL 1, SECT 5.
2538 022356 004537 010062 JSR R5,BEFORE
2539 022362 042777 000200 160734 BIC #CRDY,@RLCS ; XCT IT.
2540 022370 005000 CLR R0
2541 022372 011501 1$: MOV (R5),R1 ; TLM STATUS => R1.
2542 022374 010137 003434 MOV R1,BDDAT ; RECV'D TLM STATUS...
2543 022400 052701 030000 BIS #BIT13!BIT12,R1 ;...WILL GET WRITE GATE AND DATA ACTIVE.
2544 022404 010137 003432 MOV R1,GDDAT
2545 022410 023737 003432 003434 CMP GDDAT,BDDAT
2546 022416 001410 BEQ 2$ ; BR IF AND WHEN THAT OCCURS...
2547 022420 077014 SOB R0,1$ ;...WITHIN REASON - OF COURSE.
2548 022422 004537 010704 JSR R5,WTCRDY
2549 022426 DFERR EM112,ERR4 ; WRITE GATE AND/OR DATA ACTIVE NOT SET.
(5) 022426 104455 TRAP C$ERDF
(6) 022430 000247 .WORD 167
(6) 022432 035716 .WORD EM112
(6) 022434 026356 .WORD ERR4
2550 022436 000402 SKP2
2551 022440 004537 010704 2$: JSR R5,WTCRDY
2552 022444 011537 003434 MOV (R5),BDDAT ; FINAL TLM STATUS...
2553 022450 013737 003434 003432 MOV BDDAT,GDDAT
2554 022456 042737 060000 003432 BIC #BIT14!BIT13,GDDAT ;...ERROR AND GATE SHOULD BE CLEAR.
2555 022464 023737 003432 003434 CMP GDDAT,BDDAT
2556 022472 001415 BEQ 4$ ; BR IF SO.
2557 022474 032737 020000 003434 BIT #BIT13,BDDAT ; IT'S NOT, IS GATE STILL SET ??
2558 022502 001405 BEQ 3$ ;
2559 022504 DFERR EM113A,ERR4 ; WRITE GATE STILL SET AFTER DONE.
(5) 022504 104455 TRAP C$ERDF
(6) 022506 000250 .WORD 168
(6) 022510 036062 .WORD EM113A
(6) 022512 026356 .WORD ERR4
2560 022514 000404 BR 4$
2561 022516 3$: DFERR EM113,ERR4 ; WRITE GATE ERROR IN TLM.
(5) 022516 104455 TRAP C$ERDF
(6) 022520 000251 .WORD 169
(6) 022522 036010 .WORD EM113
(6) 022524 026356 .WORD ERR4

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CVRLBBO - RLV12 DISKLESS.
CVRLBB.P11 12-JUN-85 15:33

MACY11 30(1046) 12-JUN 85 15:42 PAGE 42 1
33 WRITE GATE, WRITE GATE ERROR, AND WRITE DATA.

SEQ 0097

2562 022526 004537 007554 4\$: JSR R5,GETERR ; FINAL RLV STATUS...
2563 022532 000407 BR 5\$;...SHOULD BE ERROR FREE.
2564 022534 012737 036742 003426 MOV #EXPNON,TMP1
2565 022542 DFERR EM114,ERR20A ; RL ERROR AFTER WRITE.
(5) 022542 104455
(6) 022544 000252
(6) 022546 036140
(6) 022550 026740
2566 022552 5\$: ENDTST
(3) 022552
(3) 022552 104401

TRAP C\$ERDF
.WORD 170
.WORD EM114
.WORD ERR20A

L10060:
TRAP C\$ETST

2568				.SBTTL	34	- READ DATA, READ HEADER, AND READ DATA W/O HEADER.
2569						
2570	022554			STARS		
(2)				;*****		
2571				* READ AND VERIFY DATA ON EACH OF 6 TLM SECTORS.		
2572				* SECTOR 3 GETS A READ HEADER AND READ DATA W/O HEADER SEQUENCE.		
2573				* REPEAT USING ALTERNATE VCO SETTINGS (WITH MAX AND MIN PEAK SHIFT).		
2574				* VARIOUS PEAK SHIFT, CLOCK, AND SECTOR OPTIONS MAY BE SELECTED VIA		
2575				* THE "CHANGE SOFTWARE" DIALOGUE AT START/RESTART TIME.		
2576	022554			STARS		
(2)				;*****		
2577	022554			TLM5: BEGIN.TEST		
(4)	022554					T34::
2578	022554	004737	024040	JSR PC,TLMPID		; VERIFY TLM OK AND PROM ID.
2579	022560	102525		BVS 8\$		; EXIT IF NOT OK.
2580	022562	012737	177600 003436	MOV #-128.,INIMP		; INIT WORD COUNT.
2581	022570	013737	003314 022616	MOV SNGLSEC,12\$		; GET SECTOR NUMBER (IF ANY).
2582	022576	042737	177770 022616	BIC #C7,12\$		
2583	022604	001002		BNE 11\$		; NZ = SINGLE SECTOR MODE.
2584	022606	005237	022616 10\$:	INC 12\$		; OTHERWISE, USE ALL STARTING WITH 1.
2585	022612	004737	024266 11\$:	JSR PC,PSX		; SET BUFFERS AND DISK ADDRESS...
2586	022616	000001	12\$:	1		;...FOR THIS SECTOR NUMBER.
2587	022620	102010		BVC 1\$		; BR IF SECTOR FOUND.
2588	022622	113737	036604 036573	MOVB TSECX,EM119X		; SET ASCII SECTOR NUMBER.
2589	022630			DFERR EM119,NOSIG		; CAN'T FIND SECTOR.
(5)	022630	104455				TRAP C\$ERDFF
(6)	022632	000253				.WORD 171
(6)	022634	036526				.WORD EM119
(6)	022636	026232				.WORD NOSIG
2590	022640	000465		BR 7\$		
2591	022642	032737	000004 003312 1\$:	BIT #BIT2,MPXCLK		; NOMINAL CLOCK ENABLED ??
2592	022650	001006		BNE 2\$		; BR IF NOT.
2593	022652	012715	000224	MOV #224,(R5)		; YES, SET NOMINAL CLOCK, NO PEAK SHIFT.
2594	022656	012737	036610 003430	MOV #TCLK0,TMP2		
2595	022664	000423		BR 4\$		
2596	022666	032737	000002 003312 2\$:	BIT #BIT1,MPXCLK		; FAST CLOCK ENABLED ??
2597	022674	001006		BNE 3\$		; BR IF NOT.
2598	022676	012715	000230	MOV #230,(R5)		; YES, SET FAST CLOCK, NO PEAK SHIFT.
2599	022702	012737	036626 003430	MOV #TCLK1,TMP2		
2600	022710	000411		BR 4\$		
2601	022712	032737	000001 003312 3\$:	BIT #BIT0,MPXCLK		; SLOW CLOCK ENABLED ??
2602	022720	001035		BNE 7\$		; BR IF NOT.
2603	022722	012715	000220	MOV #220,(R5)		; YES, SET SLOW CLOCK, NO PEAK SHIFT.
2604	022726	012737	036641 003430	MOV #TCLK2,TMP2		
2605						
2606	022734	032737	040000 003312 4\$:	BIT #BIT14,MPXCLK		; MIN PEAK SHIFT ENABLED ??
2607	022742	001004		BNE 5\$		; BR IF NOT.
2608	022744	105037	036654	CLRB TPEAK		; YES, PEAK SHIFT IS OFF...
2609	022750	004737	023040	JSR PC,READSEC		;...READ SECTOR AND VERIFY DATA.
2610	022754	005737	003312 5\$:	TST MPXCLK		; MAX PEAK SHIFT ENABLED ??
2611	022760	100407		BMI 6\$		; BR IF NOT.
2612	022762	052715	000040	BIS #40,(R5)		; YES, MAX PEAK SHIFT ON...
2613	022766	112737	000040 036654	MOVB #40,TPEAK		;...EXTEND CLOCK MESSAGE...
2614	022774	004737	023040	JSR PC,READSEC		;...DO IT ALL AGAIN.
2615						
2616	023000	032715	000004 6\$:	BIT #4,(R5)		; NOMINAL DONE ??

CVRLB80 -- RLVI2 DISKLESS.
CVRLB8.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN 85 15:42 PAGE 43 1
34 - READ DATA, READ HEADER, AND READ DATA W/O HEADER.

SEQ 0099

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2617 023004 001330      BNE      2$      ; LOOP TO "FAST" IF SO.
2618 023006 032715 000010  BIT      #10,(R5) ; FAST DONE ??
2619 023012 001337      BNE      3$      ; LOOP TO "SLOW" IF SO...
2620                                ; ...OTHERWISE, THIS SECTOR IS DONE.
2621
2622 023014 032737 000007 003314 7$:  BIT      #7,SINGLSEC ; SINGLE SECTOR MODE ??
2623 023022 001004      BNE      8$      ; WE'RE DONE IF SO.
2624 023024 023727 022616 000006  CMP      12$,#6 ; NO, LAST SECTOR DONE ??
2625 023032 103665      BLO      10$     ; GO "ROUND AGAIN IF NOT...
2626 023034      8$:  EXIT      TST      ; ...OTHERWISE, NEXT TEST.
(3) 023034 104432                                TRAP      C$EXIT
(3) 023036 000376                                .WORD      L10061 .
2627
2628 ; SUBROUTINE TO READ DATA FROM TLM TO BUF2 AND VERIFY (AGAINST BUF1).
2629 ; DISK ADDRESS AND EXPECTED DATA (BUF1) MUST BE PRESET BEFORE CALL.
2630 ; WORD COUNT ( 128.) IS PRESET FOR ALL.
2631
2632 023040      READSEC: BGNSEG
(3) 023040 104404                                TRAP      C$BSEG
2633 023042 012700 005366      MOV      #BUF2,R0
2634 023046 012701 000200      MOV      #128.,R1
2635 023052 012720 177777 1$:  MOV      #-1,(R0). ; CLEAR RECEIVING BUFFER.
2636 023056 077103      SOB      R1,1$
2637 023060 105037 036257      CLRB     EM115X ; INIT ERROR TEXT FOR "READ".
2638 023064 105037 036427      CLRB     EM117X
2639 023070 012777 000214 160226  MOV      #CRDY!READ,@RLCS ; SET COMMAND TO READ...
2640 023076 013777 003436 160226  MOV      INIMP,@RLMP ; ...128 WORDS...
2641 023104 013777 003440 160216  MOV      INIDA,@RLDA ; ...FROM CYL X, SECT Y...
2642 023112 012777 005366 160206  MOV      #BUF2,@RLBA ; ...TO BUF2.
2643 023120 004537 010062 2$:  JSR      R5,BEFORE
2644 023124 042777 000200 160172  BIC      #CRDY,@RLCS ; XCT.
2645 023132 004537 010704      JSR      R5,WTCRDY ; WAIT FOR RL DONE.
2646 023136 123737 024560 003365  CMPB     PSERR,E.CS+1 ; FINAL STATUS RIGHT ??
2647 023144 001412      BEQ      3$      ; BR IF SO.
2648 023146 004537 007554      JSR      R5,GETERR ; NO, GET WHATEVER'S THERE.
2649 023152 000240      NOP
2650 023154 013737 024556 003426  MOV      PSETXT,TMP1
2651 023162      DFERR     EM115,ERR20 ; ERROR STATUS WRONG ON READ.
(5) 023162 104455                                TRAP      C$ERDF
(6) 023164 000254                                .WORD      172
(6) 023166 036211                                .WORD      EM115
(6) 023170 026734                                .WORD      ERR20
2652 023172 023727 024556 036676 3$:  CMP      PSETXT,#EXPHCRC ; NOW IS THIS THE BAD HEADER SECTOR ??
2653 023200 001062      BNE      CHKDATA ; BR IF NOT.
2654
2655 023202 012700 000007      READNH: MOV      #7,R0 ; YES IT IS, SET UP TO READ HEADERS.
2656 023206 112737 000040 036257  MOVB     #40,EM115X ; EXTEND ERROR TEXT TO "READ NH"
2657 023214 112737 000040 036427  MOVB     #40,EM117X
2658 023222 012777 000210 160074 1$:  MOV      #CRDY!RDHDR,@RLCS
2659 023230 042777 000200 160066  BIC      #CRDY,@RLCS ; XCT READ HEADER...
2660 023236 105777 160062 2$:  TSTB     @RLCS ; ...AND WAIT FOR DONE.
2661 023242 100375      BPL      2$
2662 023244 027727 160062 000206  CMP      @RLMP,#<1_7.>16 ; FOUND BAD SECTOR 1 ??
2663 023252 001406      BEQ      3$      ; BR IF SO.
2664 023254 077016      SOB      R0,1$
2665 023256      DFERR     EM116,ERR21 ; CAN'T FIND CYL 1, SECT 6

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34 -- READ DATA, READ HEADER, AND READ DATA W/O HEADER.

SEQ 0100

(5)	023256	104455					TRAP	C\$ERDF
(6)	023260	000255					.WORD	173
(6)	023262	036305					.WORD	EM116
(6)	023264	027014					.WORD	ERR21
2666	023266	000460				BR	READDUN	; ABORT THE REST
2667	023270	012777	000216	160C26	3\$:	MOV	#CRDY!RDNHDR,@RLCS	; OK, SET READ-NO HEADER COMMAND...
2668	023276	013777	003436	160026		MOV	INIMP,@RLMP	;...INSURE WORD COUNT IS STILL THERE...
2669	023304	004537	010062			JSR	R5,BEFORE	
2670	023310	042777	000200	160006		BIC	#CRDY,@RLCS	;...AND XCT IT.
2671	023316	004537	010704			JSR	R5,WTCRDY	
2672	023322	004537	007554			JSR	R5,GETERR	; SHOULD HAVE NO ERRORS...
2673	023326	000407				BR	CHKDATA	;...BR IF SO.
2674	023330	012737	036742	003426		MOV	#EXPNON,TMP1	
2675	023336					DFERR	EM115,ERR20	; ERROR STATUS INCORRECT AFTER READ NH
(5)	023336	104455					TRAP	C\$ERDF
(6)	023340	000256					.WORD	174
(6)	023342	036211					.WORD	EM115
(6)	023344	026734					.WORD	ERR20
2676								
2677	023346	012700	004446			CHKDATA: MOV	#BUF1+48.,R0	; EXPD DATA FIELD BEGINS AT WORD 24...
2678	023352	012701	005366			MOV	#BUF2,R1	;...RECVD DATA AT WORD 0.
2679	023356	005002				CLR	R2	;...AND WORD NUMBER.
2680	023360	021011			1\$:	CMP	(R0),(R1)	; COMPARE EXP'D VS REC'D DATA...
2681	023362	001415				BEQ	2\$	;...AND BR IF OK.
2682	023364	011037	003432			MOV	(R0),GDDAT	; IT'S NOT, SET EXP'D...
2683	023370	011137	003434			MOV	(R1),BDDAT	;...REC'D...
2684	023374	010137	003424			MOV	R1,TMP0	;...ADDRESS...
2685	023400	010237	003426			MOV	R2,TMP1	;...AND WORD NUMBER.
2686	023404					DFERR	EM117,ERR22	; DATA INCORRECT ON READ OR READ NH.
(5)	023404	104455					TRAP	C\$ERDF
(6)	023406	000257					.WORD	175
(6)	023410	036365					.WORD	EM117
(6)	023412	027024					.WORD	ERR22
2687	023414	000405				BR	3\$	
2688	023416	022021			2\$:	CMP	(R0)+,(R1)+	; BUMP ADDRESSES...
2689	023420	005202				INC	R2	;...AND WORD NUMBER.
2690	023422	032702	000177			BII	#177,R2	
2691	023426	001354				BNE	1\$	;...AND LOOP 'TIL DONE.
2692	023430				3\$:			
2693	023430					READDUN: ENDSEG		
(3)	023430							10000\$:
(3)	023430	104405					TRAP	C\$ESEG
2694	023432	000207				RTS	PC	
2695	023434					ENDTST		
(3)	023434							L10061:
(3)	023434	104401					TRAP	C\$ETST

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2697      .SBTTL 35 -- WRITE CHECK.
2698
2699 023436 STARS
(2)      ;*****
2700      ;* DO A WRITE CHECK USING SECTOR AND CLOCK OPTIONS AS BEFORE.
2701 023436 STARS
(2)      ;*****
2702 023436 TLM6: BEGIN.TEST
(4) 023436 T35::
2703 023436 004737 024040 JSR PC,TLMPID
2704 023442 102525 BVS 8$ ; EXIT IF NOT OK.
2705 023444 012737 177600 003436 MOV #-128.,INIMP ; INIT WORD COUNT.
2706 023452 013737 003314 023500 MOV SNGLSEC,12$ ; GET SECTOR NUMBER (IF ANY).
2707 023460 042737 177770 023500 BIC #C7,12$
2708 023466 001002 BNE 11$ ; NZ = SINGLE SECTOR MODE.
2709 023470 005237 023500 10$: INC 12$ ; OTHERWISE, USE ALL STARTING WITH 1.
2710 023474 004737 024266 11$: JSR PC,PSX ; SET BUFFERS AND DISK ADDRESS...
2711 023500 000001 12$: 1 ; ...FOR THIS SECTOR NUMBER.
2712 023502 102010 BVC 1$
2713 023504 113737 036604 036573 MOVB TSECX,EM119X ; SET ASCII SECTOR NUMBER.
2714 023512 DFERR EM119,NOSIG ; CAN'T FIND SECTOR.
(5) 023512 104455 TRAP C$ERDF
(6) 023514 000260 .WORD 176
(6) 023516 036526 .WORD EM119
(6) 023520 026232 .WORD NOSIG
2715 023522 000465 BR 7$
2716 023524 032737 000004 003312 1$: BIT #BIT2,MPXCLK ; NOMINAL CLOCK ENABLED ??
2717 023532 001006 BNE 2$ ; BR IF NOT.
2718 023534 012715 000224 MOV #224,(R5) ; YES, SET NOMINAL CLOCK, NO PEAK SHIFT.
2719 023540 012737 036610 003430 MOV #TCLK0,TMP2
2720 023546 000423 BR 4$
2721 023550 032737 000002 003312 2$: BIT #BIT1,MPXCLK ; FAST CLOCK ENABLED ??
2722 023556 001006 BNE 3$ ; BR IF NOT.
2723 023560 012715 000230 MOV #230,(R5) ; YES, SET FAST CLOCK, NO PEAK SHIFT.
2724 023564 012737 036626 003430 MOV #TCLK1,TMP2
2725 023572 000411 BR 4$
2726 023574 032737 000001 003312 3$: BIT #BIT0,MPXCLK ; SLOW CLOCK ENABLED ??
2727 023602 001035 BNE 7$ ; BR IF NOT.
2728 023604 012715 000220 MOV #220,(R5) ; YES, SET SLOW CLOCK, NO PEAK SHIFT.
2729 023610 012737 036641 003430 MOV #TCLK2,TMP2
2730
2731 023616 032737 040000 003312 4$: BIT #BIT14,MPXCLK ; MIN PEAK ENABLED ??
2732 023624 001004 BNE 5$ ; BR IF NOT.
2733 023626 105037 036654 CLRB TPEAK ; YES, PEAK SHIFT IS OFF...
2734 023632 004737 023722 JSR PC,WRITCHK ; ...WRITE-CHECK THIS SECTOR.
2735 023636 005737 003312 5$: TST MPXCLK ; MAX PEAK SHIFT ENABLED ??
2736 023642 100407 BMI 6$ ; BR IF NOT.
2737 023644 052715 000040 DIS #40,(R5) ; YES, MAX PEAK SHIFT ON...
2738 023650 112737 000040 036654 MOVB #40,TPEAK ; ...EXTEND CLOCK MESSAGE...
2739 023656 004737 023722 JSR PC,WRITCHK ; ...AND DO IT AGAIN.
2740
2741 023662 032715 000004 6$: BIT #4,(R5) ; NOMINAL DONE ??
2742 023666 001330 BNE 2$ ; LOOP TO "FAST" IF SO.
2743 023670 032715 000010 BIT #10,(R5) ; FAST DONE ??
2744 023674 001337 BNE 3$ ; LOOP TO "SLGW" IF SO...
2745 ; ...OTHERWISE, THIS SECTOR IS DONE.

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35 WRITE CHECK.

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2746
2747 023676 032737 000007 003314 7$: BIT #7,SNGLSEC ; SINGLE SECTOR MODE ??
2748 023704 001004 BNE 8$ ; WE'RE ALL DONE IF SO.
2749 023706 023727 023500 000006 CMP 12$,#6 ; NO, LAST SECTOR DONE ??
2750 023714 103665 BLO 10$ ; GO "ROUND AGAIN IF NOT...
2751 023716 8$: EXIT TST ; ...OTHERWISE, WE'RE ALL DONE.
(3) 023716 104432 TRAP C$EXIT
(3) 023720 000112 .WORD L10062 .
2752
2753 ; SUBROUTINE TO WRITE CHECK A SECTOR AGAINST THE DATA IN "BUF1".
2754 ;
2755 WRITCHK: BGNSEG TRAP C$BSEG
(3) 023722 104404
2756 023724 012777 000202 157372 MOV #CRDY!WRCHK,@RLCS ; SET COMMAND TO WRITE-CHECK...
2757 023732 013777 003436 157372 MOV INIMP,@RLMP ; ...128 WORDS...
2758 023740 013777 003440 157362 MOV INIDA,@RLDA ; ...FROM CYL X, SECT Y...
2759 023746 012777 004446 157352 MOV #BUF1+48,@RLBA ; ...AGAINST BUF1.
2760 023754 004537 010062 JSR R5,BEFORE
2761 023760 042777 000200 157336 BIC #CRDY,@RLCS ; XCT.
2762 023766 004537 010704 JSR R5,WTCRDY ; WAIT FOR RL DONE.
2763 023772 123737 024560 003365 CMPE PSERR,E.CS+1 ; FINAL STATUS RIGHT ??
2764 024000 001412 BEQ 1$ ; BR IF SO.
2765 024002 004537 007554 JSR R5,GETERR ; NO, GET WHATEVER'S THERE.
2766 024006 000240 NOP
2767 024010 013737 024556 003426 MOV PSETXT,TMP1
2768 024016 013737 024556 003426 DFERR EM118,ERR20 ; ERROR STATUS WRONG ON WRITE-CHECK
(5) 024016 104455 TRAP C$ERDF
(6) 024020 000261 .WORD 177
(6) 024022 036455 .WORD EM118
(6) 024024 026734 .WORD ERR20
2769 024026 1$: ENDSEG
(3) 024026 10000$: TRAP C$ESEG
(3) 024026 104405
2770 024030 000207 RTS PC
2771 024032 ENDTST
(3) 024032 L10062: TRAP C$ETST
(3) 024032 104401

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35 - WRITE CHECK.

SEQ 0103

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2773 ;
2774 ; SUBROUTINE TO SEE IF TLM IS THERE AND PROPERLY CABLED TO RLV12.
2775 ; ALSO CHECK THAT CORRECT PROM IS INSTALLED.
2776 ; REPORT ERROR AND RETURN WITH "V" SET IF NOT.
2777 ;
2778 024034 005000 TLMOK: CLR R0 ; DISABLE ID CHECK.
2779 024036 000401 SKP1
2780 024040 005200 TLMPID: INC R0 ; ENABLE ID CHECK.
2781 024042 013737 003344 003432 MOV TCSR,GDDAT ; GET CSR POINTER.
2782 024050 001453 BEQ 4$ ; ABORT IF IT'S NOT DEFINED.
2783 024052 005037 010672 CLR TRPFLG
2784 024056 005077 157262 CLR @TCSR ; TLM ARE YOU REALLY THERE ??
2785 024062 000240 240
2786 024064 005737 010672 TST TRPFLG
2787 024070 001025 BNE 1$ ; ERROR IF NOT.
2788 024072 012737 004400 003432 MOV #4400,GDDAT ; OTHERWISE, ...
2789 024100 017737 157240 003434 MOV @TCSR,BDDAT ; ...GET INITIAL STATUS.
2790 024106 001423 BEQ 2$ ; IF ZERO, CABLE ISN'T CONNECTED.
2791 024110 005700 TST R0 ; ID VERIFICATION REQUIRED ??
2792 024112 001413 BEQ 5$ ; WE'RE DONE IF NOT.
2793 024114 004737 024204 JSR PC,CLRTLM ; YES, RESET, ID => R0.
2794 024120 010037 003434 MOV R0,BDDAT
2795 024124 013737 003310 003432 MOV PROMID,GDDAT ; GET EXPECTED ID.
2796 024132 023737 003432 003434 CMP GDDAT,BDDAT
2797 024140 001013 BNE 3$ ; BR IF ID INCORRECT.
2798 024142 000207 5$: RTS PC ; RETURN, "V" = 0.
2799
2800 024144 1$: DFERR EM100,ERR1 ; TIME-OUT ON TLM ADDRESS.
(5) 024144 104455 TRAP C$ERDF
(6) 024146 000262 .WORD 178
(6) 024150 034646 .WORD EM100
(6) 024152 026242 .WORD ERR1
2801 024154 000411
2802 024156 2$: BR 4$
(5) 024156 104455 DFERR EM100A,ERR2 ; CABLE PROBABLY NOT INSTALLED.
(6) 024160 000263 TRAP C$ERDF
(6) 024162 034702 .WORD 179
(6) 024164 026272 .WORD EM100A
(6) 024166 000404 .WORD ERR2
2803 024166 000404
2804 024170 3$: BR 4$
(5) 024170 104455 DFERR EM100B,ERR2 ; PROM ID INCORRECT.
(6) 024172 000264 TRAP C$ERDF
(6) 024174 034765 .WORD 180
(6) 024176 026272 .WORD EM100B
(6) 024176 026272 .WORD ERR2
2805 024200 000262 4$: SEV ; SET "ERROR" FLAG...
2806 024202 000207 RTS PC ; ...AND RETURN.
2807
2808 ; SUBROUTINE TO RESET TEST LOOP MODULE.
2809 ; RETURN WITH "DRIVE READY" SET, TLM PROM ID IN R0,
2810 ; AND TLM CSR ADDRESS IN R5.
2811 ; AS LONG AS WE'RE HERE, CLEAR RLBA, RLMP, AND RLBAE AS WELL.
2812 ;
2813 024204 013705 003344 CLRTLM: MOV TCSR,R5 ; DEDICATE R5 TO THE TLM.
2814 024210 012715 000001 MOV #1,(R5) ; RESET...
2815 024214 016500 000006 MOV 6(R5),R0 ; ...PROM ID => R0.
2816 024220 005065 000002 CLR 2(R5) ; CLEAR SKGS...

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2817 024224 005065 000004          CLR      4(R5)          ;...AND PSUEDO STATUS REGISTERS.
2818 024230 012715 000002          MOV      #2,(R5)          ; CLEAR FLAGS ??
2819 024234 012715 000200          MOV      #200,(R5)        ; SET DRIVE READY.
2820 024240 005077 157062          CLR      @RLBA
2821 024244 005077 157062          CLR      @RLMP
2822 024250 023727 003402 000003    CMP      RLTP,@RLV12X
2823 024256 001002                  BNE      1$
2824 024260 005077 157050          CLR      @RLBAE
2825 024264 000207                  1$: RTS      PC
2826
2827          ;
2828          ; SUBROUTINE TO SET UP BUFFERS AND DISK ADDRESSES
2829          ; FOR READING EACH OF THE 6 PSUEDO SECTORS.
2830          ; USE HEADER TABLE AND SEARCH ROUTINE IN THE DUMP UTILITY.
2831          ; IF SUCCESSFUL, CONTENTS OF SELECTED SECTOR (160. WORDS) ARE IN "BUF1 .
2832          ; CALL: JSR PC,PSX
2833          ;
2834          ; N          ; SECTOR NUMBER.
2835          ; BVC      XX          ; ON RETURN, "V" IS SET IN SECTOR NOT FOUND.
2836          ; ERROR
2837          ; XX:          ; CONTINUE.
2838
2839          ;
2840          PSX: MOV      @ (SP),RO          ; GET SECTOR NUMBER (1 - 6)...
2841          DEC      RO          ; ...MAKE IT (0 - 5)...
2842          ASL      RO          ; ...SHIFT UP TO AN INDEX.
2843          ADD      #2,(SP)        ; ADJUST RETURN PC...
2844          JMP      @1$(RO)        ; ...AND DO ONE OF THE FOLLOWING:
2845          1$: PS1
2846          PS2
2847          PS3
2848          PS4
2849          PS5
2850          PS6
2851          PS7
2852          ; SOONER OR LATER SOME TURKEY WILL...
2853          ; ...TRY TO ACCFS SECTOR 7.
2854
2855          .ENABL  LSB
2856          PS1: MOVB     #'1,TSECX          ; TLM SECTOR 1...
2857          MOV      #<1_7.>!5,INIDA ; ...IS CYL 1 SECT 5...
2858          BR       1$          ; ...AND IS ERROR FREE.
2859
2860          PS2: MOVB     #'2,TSECX          ; TLM SECTOR 2...
2861          MOV      #<1_7.>!6,INIDA ; ...IS CYL 1, SECT 6...
2862          MOV      #H<ERR!DCRC>,PSERR
2863          MOV      #EXPDCRC,PSETXT ; ...AND HAS A BAD DATA CRC.
2864          BR       2$
2865
2866          PS3: MOVB     #'3,TSECX          ; TLM SECTOR 3...
2867          MOV      #<1_7.>!7,INIDA ; ...IS CYL 1, SECT 7...
2868          MOV      #H<ERR!HCRC!OPI>,PSERR
2869          MOV      #EXPHCRC,PSETXT ; ...AND HAS A BAD HEADER CRC.
2870          BR       2$
2871
2872          PS4: MOVB     #'4,TSECX          ; TLM SECTOR 4...
2873          MOV      #<525_7.>!52,INIDA ; ...IS CYL 525, SECT 52...
2874          BR       1$          ; ...AND IS ERROR FREE.
2875
2876          PS5: MOVB     #'5,TSECX          ; TLM SECTOR 5...

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35 -- WRITE CHECK.

SEQ 0105

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2873 024452 012737 135252 003440      MOV    #<565_7.>!52,INIDA ;...IS CYL 565, SECT 52...
2874 024460 000423                BR      1$ ;...AND IS ERROR FREE.
2875
2876 024462                PS7:  PRINTF  #TURKY      ; THERE ISN'T ANY SECTOR 7...
(7) 024462 012746 024562                MOV    #TURKY, (SP)
(6) 024466 012746 000001                MOV    #1, (SP)
(3) 024472 010600                MOV    SP,R0
(4) 024474 104417                TRAP   C$PNTF
(4) 024476 062706 000004                ADD    #4,SP
2877 024502 012737 000006 003314      MOV    #6,SNGLSEC ;...CHANGE IT TO 6...
2878 024510 162700 000002      SUB     #2,R0 ;...ADJUST INDEX AND FALL THRU
2879
2880 024514 112737 000066 036604 PS6:  MOVB   #'6,TSECX ; TLM SECTOR 6...
2881 024522 012737 155555 003440      MOV    #<666_7.>!155,INIDA ;...IS CYL 666, SECT 55, HEAD 1...
2882 024530 005037 024560      1$:  CLR    PSERR
2883 024534 012737 036742 024556      MOV    #EXPNON,PSETXT
2884 024542 016037 024644 024642 2$:  MOV    DTABL(R0),DHEAD ; SET HCRC TO SEARCH FOR.
2885 024550 004737 025246      JSR     PC,FINDSEC ; GO FIND AND READ IT TO BUF1.
2886 024554 000207                RTS     PC ; RETURN, "V" = 1 IF SECTOR NOT FOUND.
2887                .DSABL  LSB
2888
2889 024556 036742      PSETXT: EXPNON ; EXPECTED ERROR STATUS FOR EACH...
2890 024560 000000      PSERR:  0 ;...IS RETURNED IN THESE LOCATIONS.
2891
2892 024562 047045 040445 042523 TURKY: .ASCIZ /#N#ASECTOR 7 DOESN'T EXIST, USING 6 INSTEAD#N/
024570 052103 051117 033440
024576 042040 042517 047123
024604 052047 042440 044530
024612 052123 020054 051525
024620 047111 020107 020066
024626 047111 052123 040505
024634 022504 000116
2893                .EVEN

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2895 .SBTTL          TLM FROM DUMP UTILITY.
2896 ;
2897 ; ROUTINE TO DUMP TLM ROM CONTENTS.
2898 ; CALLED FROM "INIT" SECTION IF PDSW=1.
2899 ; GET UNIT NUMBER, SECTOR NUMBER, AND OUTPUT FORMAT FROM OPERATOR.
2900 ; <↑C> = ABORT AND RESTART DRS.
2901 ; LOAD SUBROUTINE USES "BUF2" AS A 256. WORD RING BUFFER FOR SEARCHING.
2902 ; IF FOUND, SECTOR CONTENTS (160. WORDS) ARE THEN COPIED TO "BUF1".
2903 ; THE LOAD SUBROUTINE IS ALSO USED IN TLM TESTS 5 AND 6
2904 ; TO ESTABLISH EXPECTED DATA PATTERNS.
2905 ;
2906 ; PSUEDO DISK (ROM) SECTOR FORMAT:
2907 ;
2908 ;          WORDS          FUNCTION
2909 ;          -----
2910 ;          1 - 17          SECTOR PULSE (12), T3(2), HEADER PREAMBLE (3).
2911 ;          18 - 20          DISK ADDRESS (1), ZERO (1), HEADER CRC (1).
2912 ;          21 - 24          HEADER POSTAMBLE (1), DATA PREAMBLE (3).
2913 ;          25 - 153         DATA (128.), DATA CRC (1).
2914 ;          154 - 160        DATA POSTAMBLE (1), AND GAP (6).
2915 ;
2916 ; DMODE: OCTMOD          ; DUMP MODE (OCTAL OR HEX).
2917 ; DHEAD: 006051          ; DESIRED HEADER CRC WORD (DEFAULT SECT 1)...
2918 ; DTABL: 006051 ; 0C29  ; ...SELECTED FROM THIS TABLE.
2919 ;          044051 ; 4829
2920 ;          132051 ; 8429
2921 ;          174001 ; F801
2922 ;          036400 ; 3D00
2923 ;          113554 ; 976C
2924 ROMDUMP: CLR          PDSW          ; CLEAR DUMP REQUEST.
2925 ;          CLR          RO
2926 ;          SOB          RO..          ; DELAY...
2927 ;          EMT+5         ; ...AND CLEAR KBD.
2928 1$: MOV B          HUNIT,R2          ; GET DEFAULT UNIT.
2929 ;          JSR          PC,KBDOUT      ; SAY "HELLO".
2930 ;          QO
2931 ;          JSR          PC,KBDIN       ; GET A UNIT NUMBER.
2932 ;          MOV B          BUF1,R0
2933 ;          BEQ          2$            ; IF NONE, USE DEFAULT (LAST).
2934 ;          CMP B          RO,#'0
2935 ;          BLO          1$            ; BR IF INVALID UNIT.
2936 ;          CMP B          RO,#'7
2937 ;          BHI          1$            ;
2938 ;          MOV B          RO,R2        ;
2939 ;          MOV B          R2,R1        ;
2940 2$: MOV          TCS0,R5          ; BASE CSR => R5.
2941 ;          BIC          #'C7,R1       ; STRIP UNIT NUM...
2942 ;          BEQ          3$            ; ...AND BR IF ZERO.
2943 22$: ADD          #10,R5          ; ELSE, ADJUST UP TO SELECTED UNIT.
2944 ;          SOB          R1,22$
2945 ;
2946 3$: MOV B          R2,HUNIT          ; OK, SET UNIT IN TEXT.
2947 ;          MOV          #4$,ERRVEC     ; SET A TRAP CATCHER.
2948 ;          MOV          #1,(R5)        ; RESET TLM...
2949 ;          240
2950 ;          BR          5$              ; ...AND PROCEED IF IT DIDN T TRAP.
2951
2915 024640 025376
2916 024642 006051
2917 024644 006051
2918 024646 044051
2919 024650 132051
2920 024652 174001
2921 024654 036400
2922 024656 113554
2923
2924 024660 005037 003306
2925 024664 005000
2926 024666 077001
2927 024670 104005
2928 024672 113702 025753
2929 024676 004737 025550
2930 024702 025633
2931 024704 004737 025504
2932 024710 113700 004366
2933 024714 001407
2934 024716 120027 000060
2935 024722 103763
2936 024724 120027 000067
2937 024730 101360
2938 024732 110002
2939 024734 110201
2940 024736 013705 003320
2941 024742 042701 177770
2942 024746 001403
2943 024750 062705 000010
2944 024754 077103
2945
2946 024756 110237 025753
2947 024762 012737 025000 000004
2948 024770 012715 000001
2949 024774 000240
2950 024776 000410

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CVRLBBO - RLV12 DISKLESS.
CVRLBB.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 44 6
TLM PROM DUMP UTILITY.

SEQ 0107

```

2951 025000 022626 4$: CMP (SP)+,(SP)+
2952 025002 113737 025753 025610 MOVH HUNIT,NOANS+6
2953 025010 004737 025550 JSR PC,KBDOUT ; SELECTED UNIT DOESN'T ANSWER
2954 025014 025602 NOANS
2955 025016 000720 BR ROMDUMP
2956
2957 025020 004737 025550 5$: JSR PC,KBDOUT ; GET A SECTOR NUMBER.
2958 025024 025664 Q1
2959 025026 004737 025504 JSR PC,KBDIN
2960 025032 113700 004366 MOVH BUF1,R0
2961 025036 001416 BEQ 6$ ; IF NONE, REDO LAST SECTOR.
2962 025040 120027 000060 CMPB R0,#'0
2963 025044 103765 BLO 5$
2964 025046 120027 000067 CMPB R0,#'7
2965 025052 101362 BHI 5$
2966 025054 110037 025766 MOVH R0,HSECT ; SET IN HEADER STRING.
2967 025060 042700 177770 BIC #1C7,R0
2968 025064 006300 ASL R0 ; SHIFT UP TO WORD OFFSET...
2969 025066 016037 024642 024642 MOV DHEAD(R0),DHEAD ; ...AND SET HEADER TO SEARCH FOR.
2970
2971 025074 004737 025550 6$: JSR PC,KBDOUT ; GET AN OUTPUT MODE.
2972 025100 025711 Q2
2973 025102 004737 025504 JSR PC,KBDIN
2974 025106 113700 004366 MOVH BUF1,R0
2975 025112 001411 BEQ 7$ ; IF NONE, USE CURRENT FORMAT.
2976 025114 012737 025376 024640 MOV #OCTMOD,DMODE ; ASSUME OCTAL...
2977 025122 120027 000131 CMPB R0,#'Y
2978 025126 001003 BNE 7$
2979 025130 012737 025422 024640 MOV #HEXMOD,DMODE ; ...CHANGE TO HEX IF REQUIRED.
2980 025136 7$:
2981 025136 016537 000006 003424 DOIT: MOV 6(R5),TMP0 ; GET PROM ID.
2982 025144 004737 025550 JSR PC,KBDOUT ; SHOW UNIT AND SECTOR...
2983 025150 025742 HEADR
2984 025152 012701 003424 MOV #TMP0,R1 ; ...AND PROM ID...
2985 025156 004777 177456 JSR PC,@DMODE ; ...IN THE CURRENT CONTEXT.
2986 025162 104007 EMT+7 ; <CRLF>
2987 025164 004737 025246 JSR PC,FINDSEC ; SEARCH FOR AND READ SECTOR.
2988 025170 102004 BVC 1$ ; BR IF SECTOR FOUND.
2989 025172 004737 025550 JSR PC,KBDOUT
2990 025176 026003 CANTFIND
2991 025200 000627 BR ROMDUMP
2992
2993 025202 012701 004366 1$: MOV #BUF1,R1 ; NOW FOUND SECTOR IS IN BUF1.
2994 025206 012702 000240 MOV #160.,R2 ; DUMP 160. WORDS AT 8 PER LINE.
2995 025212 104007 EMT+7 ; <CRLF>
2996 025214 004737 025550 2$: JSR PC,KBDOUT
2997 025220 026030 TAB
2998 025222 004777 177412 JSR PC,@DMODE ; PRINT FROM (R1) IN OCTAL OR HEX.
2999 025226 005302 DEC R2
3000 025230 032702 000007 BIT #7,R2
3001 025234 001367 BNE 2$ ; LOOP 'TIL LINE DONE...
3002 025236 104007 EMT+7 ; <CRLF>
3003 025240 005702 TST R2
3004 025242 001364 BNE 2$ ; ...AND LOOP 'TIL ALL DONE.
3005 025244 000605 BR ROMDUMP
3006

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3007      ; SEARCH FOR SELECTED SECTOR AND LOAD 160. WORD BLOCK TO BUF1.
3008      ; IF UNSUCCESSFUL, RETURN TO CALLER WITH "V" BIT SET.
3009      ;
3010      INDSEC: MOV    #1,(R5)      ; RESET TLM...
3011      MOV    #34,(R5)      ; ...AND SET PROM READ MODE.
3012      CLR    (SP)          ; CLEAR "FOUND" FLAG.
3013      CLR    R0            ; SET LOOP CONTROL...
3014      MOV    #BUFEND,R1      ; NOW, FILL BUF2 FROM TOP DOWN.
3015      1$: CMP    R1,#BUF2      ; IN LOOP  RESET RING POINTER ...
3016      BNE    2$            ; ...WHEN IT REACHES THE BOTTOM.
3017      MOV    #BUFEND,R1
3018      2$: INC    6(R5)        ; INCR ROM ADDRESS...
3019      MOV    6(R5),-(R1)      ; ...AND GET A WORD.
3020      CMP    (R1),DHEAD      ; IS THIS THE DESIRED HCRC WORD ??
3021      BNE    3$            ; BR IF NOT.
3022      INC    (SP)          ; YES, SET "FOUND" FLAG...
3023      MOV    #20,R0          ; ...AND SET TO READ 19 MORE.
3024      3$: SOB    R0,1$        ; LOOP 'TIL DONE...
3025      MOV    #1,(R5)        ; ...THEN, RESET TLM...
3026      MOV    #200,(R5)      ; ...AND RESTORE DRIVE READY.
3027      TST    (SP)+          ; SECTOR FOUND ??
3028      BNE    4$            ; BR IF SO.
3029      SEV     4$            ; NO, SET "V" BIT...
3030      RTS     PC            ; ...AND RETURN.
3031
3032      4$: MOV    #BUF1,R2      ; NOW COPY FOUND SECTOR TO BUF1.
3033      MOV    #160,R3
3034      5$: CMP    R1,#BUFEND    ; IN LOOP -- RESET RING POINTER...
3035      BNE    6$            ; ...WHEN IT REACHES THE TOP.
3036      MOV    #BUF2,R1
3037      6$: MOV    (R1)+,(R2)+  ; BUF2 => BUF1.
3038      SOB    R3,5$
3039      RTS     PC            ; RETURN, "V" IS CLEAR.
3040
3041      ; SUBROUTINES TO DUMP DATA IN OCTAL OR HEX.
3042      ;
3043      OCTMOD: PRINTF #OCTTXT,(R1)+
3044      (8) 025376 012146
3045      (7) 025400 012746 026042
3046      (6) 025404 012746 000002
3047      (3) 025410 010600
3048      (4) 025412 104417
3049      (4) 025414 062706 000006
3050      3044 025420 000207
3051      RTS     PC
3052
3053      HEXMOD: MOV    R5, -(SP)  ; SAVE TLM POINTER.
3054      1$: MOV    #HEXTXT,R0  ; SET HEY TEXT POINTER.
3055      MOV    (R1)+,R4        ; NEXT WORD => R4.
3056      2$: CLR    R5          ; ...AND PARSE EACH NIBBLE IN R5.
3057      MOV    #4,R3
3058      3$: ASL    R4
3059      ROL    R5              ; NIBBLE => R5<3:0>
3060      SOB    R3,3$
3061      ADD    #'0,R5          ; CONVERT TO ASCII 0 TO 9...
3062      CMPB   R5,#'9
3063      BLE    4$
3064      4$:

```

```

MOV    (R1)+,(SP)
MOV    #OCTTXT,-(SP)
MOV    #2,-(SP)
MOV    SP,R0
TRAP   C$PNTF
ADD    #6,SP

```

CVRLB80 - RLV12 DISKLESS.
CVRLB8.P11 12-JUN 85 15:33

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TLM PROM DUMP UTILITY.

SEQ 0109

3057	025460	062705	000007		ADD #7,R5	AND A(10) TO F(15)...	
3058	025464	110520		4\$:	MOVB R5,(R0)+	AND STUFF IT.	
3059	025466	105710			TSTB (R0)		
3060	025470	001360			BNE 2\$	; LOOP 'TIL 4 CHARS ASSEMBLED...	
3061	025472	004737	025550		JSR PC,KBDOUT	THEN DUMP IT.	
3062	025476	026035			HEXTXT		
3063	025500	012605			MOV (SP)+,R5	; RESTORE R5.	
3064	025502	000207			RTS PC		
3065							
3066	025504	012701	004366	KBDIN:	MOV #BUF1,R1	; TEMP ASCII BUFFER.	
3067	025510	104005		1\$:	EMT+5	; CHAR --> R0.	
3068	025512	110011			MOVB R0,(R1)		
3069	025514	001775			BEQ 1\$		
3070	025516	120027	000003		CMPB R0,#3		
3071	025522	001411			BEQ 3\$	; EXIT ON <+C>.	
3072	025524	120027	000015		CMPB R0,#15		
3073	025530	001403			BEQ 2\$	; BR ON TERMINATOR.	
3074	025532	104004			EMT+4	; OTHERWISE, ECHO...	
3075	025534	005201			INC R1	BUMP POINTER...	
3076	025536	000764			BR 1\$	AND LOOP.	
3077	025540	105011		2\$:	CLRB (R1)	; TERMINATE INPUT STRING...	
3078	025542	104007			EMT+7	ECHO CRLF...	
3079	025544	000207			RTS PC	AND RETURN TO CALLER.	
3080	025546			3\$:	DOCLN	; EXIT ON <+C>.	
(3)	025546	104444					TRAP C\$DCLN
3081							
3082	025550			KBDOUT:	PRINTF #PURE,@(SP)		
(8)	025550	017646	000000				MOV @(SP), (SP)
(7)	025554	012746	026046				MOV #PURE, (SP)
(6)	025560	012746	000002				MOV #2, (SP)
(3)	025564	010600					MOV SP,R0
(4)	025566	104417					TRAP C\$PNTF
(4)	025570	062706	000006				ADD #6,SP
3083	025574	062716	000002		ADD #2,(SP)		
3084	025600	000207			RTS PC		
3085							
3086	025602	020040	046124	035115	NOANS:	.ASCIZ / TLM:0 DOESN'T ANSWER/<15><12>	
	025610	020060	047504	051505			
	025616	023516	020124	047101			
	025624	053523	051105	005015			
	025632	000					
3087	025633	015	012		Q0:	.ASCII <15><12>	
3088	025635	040	052040	046514		.ASCIZ / TLM UNIT (0 TO 7) ? /	
	025642	052440	044516	020124			
	025650	030050	052040	020117			
	025656	024467	037411	000040			
3089	025664	020040	042523	052103	Q1:	.ASCIZ / SECTOR (1 TO 6) ? /	
	025672	051117	024040	020061			
	025700	047524	033040	004451			
	025706	020077	000				
3090	025711	040	044040	054105	Q2:	.ASCIZ / HEX OUTPUT (Y OR N) ? /	
	025716	047440	052125	052520			
	025724	020124	054450	047440			
	025732	020122	024516	037411			
	025740	000040					
3091	025742	005015	052411	044516	HEADR:	.ASCII <15><12><11>/UNIT: /	

CVRLB80 - RLV12 DISKLESS.
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TLM PROM DUMP UTILITY.

SFQ 0110

3092	025750	035124	040		
	025753	060	020040	042523	HUNIT: .ASCII /0 SECTOR: /
	025760	052103	051117	020072	
3093	025766	020061	050040	047522	HSECT: .ASCIZ /1 PROM ID: /
	025774	020115	042111	020072	
	026002	000			
3094	026003	011	040503	023516	CANTFIND: .ASCIZ <11>/CAN'T FIND HEADEP/<15><12>
	026010	020124	044506	042116	
	026016	044040	040505	042504	
	026024	006522	000012		
3095	026030	000011			TAB: .ASCIZ <11>
3096	026032	005015	000		CRLF: .ASCIZ <15><12>
3097	026035	101	041502	000104	HEXTXT: .ASCIZ /ABCD/
3098	026042	047445	000066		OCTTXT: .ASCIZ /#06/
3099	026046	052045	000		PURE: .ASCIZ /#T/
3100		026052			.EVEN

```

3102      .SBTTL
3103      .SBTTL  SUPERVISOR DISPATCH TABLE.
3104      ;
3105      ; SUBROUTINE TO ADJUST THE NUMBER OF TESTS TO RUN IAW CONTROLLER TYPE.
3106      ;
3107      026052 013700 003402      ADJTN:  MOV    RLTP,R0      ; GET RL TYPE.
3108      026056 001414              BEQ     2$              ; BR IF RL11.
3109      026060 020027 000002      CMP     R0,#RLV12
3110      026064 103406              BLO     1$              ; BR IF RLV11.
3111      026066 005737 003344      TST     TCSR
3112      026072 001403              BEQ     1$              ; BR IF TLM BYPASSED.
3113      026074 012700 000043      MOV     #35.,R0          ; RLV12 WITH TLM RUNS ALL.
3114      026100 000402              SKP2
3115      026102 012700 000035      1$:  MOV     #29.,R0          ; RLV12 OR RLV11 RUN THRU 29.
3116      026106 000402              SKP2
3117      026110 012700 000026      2$:  MOV     #22.,R0          ; RL11 RUN THRU 22.
3118      026114 010037 026122      MOV     R0,L$DISPATCH-2 ; ...AND SET LAST TEST NUMBER.
3119      026120 000207              RTS     PC
3120
3121      DISPATCH T$TESTNUM
(4) 026122 000043
(3) 026124
(6) 026124 012172
(6) 026126 012256
(6) 026130 012342
(6) 026132 012426
(6) 026134 012512
(6) 026136 012634
(6) 026140 013076
(6) 026142 013216
(6) 026144 013322
(6) 026146 013410
(6) 026150 013514
(6) 026152 013742
(6) 026154 014126
(6) 026156 014274
(6) 026160 014466
(6) 026162 014670
(6) 026164 015114
(6) 026166 015340
(6) 026170 015630
(6) 026172 016024
(6) 026174 016232
(6) 026176 016320
(6) 026200 016466
(6) 026202 016622
(6) 026204 016706
(6) 026206 017034
(6) 026210 017734
(6) 026212 020360
(6) 026214 020554
(6) 026216 021350
(6) 026220 021722
(6) 026222 022126
(6) 026224 022274
(6) 026226 022554

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      .WORD 35
L$DISPATCH::
      .WORD T1
      .WORD T2
      .WORD T3
      .WORD T4
      .WORD T5
      .WORD T6
      .WORD T7
      .WORD T8
      .WORD T9
      .WORD T10
      .WORD T11
      .WORD T12
      .WORD T13
      .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

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CVRL880 - RLV12 DISKLESS.
CVRL88.P11 12-JUN-85 15:33

MACY11 30(1046) 12-JUN-85 15:42 PAGE 45-1
SUPERVISOR DISPATCH TABLE.

I9

SEQ 0112

(6) 026230 023436

.WORD T35

J9

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3123      .SBTTL GLOBAL ERROR HANDLERS AND ASCII TEXT
3124      ;
3125      ; THESE ARE THE HANDLERS FOR THE VARIOUS ERROR SIGNATURES.
3126      ;
3127      BGNMSG ERRSIG
3128      (3) 026232 000137 027360      NOSIG: JMP CKERLT      ; SOME HAVE NO SIGNATURE.
3129      (3) 026232 000137 027152      ERRO:  JMP ALLREGS      ; ALL REGISTERS.
3130      (3) 026236 000137 027152      ERR1:  PRINTB #FRMT2,GDDAT ; BUS-TIMEOUT REG ADDR.
3131      (8) 026242 013746 003432      MOV      GDDAT, -(SP)
3132      (7) 026246 012746 027553      MOV      #FRMT2, -(SP)
3133      (6) 026252 012746 000002      MOV      #2, -(SP)
3134      (3) 026256 010600      MOV      SP, R0
3135      (4) 026260 104414      TRAP     C$PNTB
3136      (4) 026262 062706 000006      ADD      #6, SP
3137      (4) 026266 000137 027360      JMP      CKERLT
3138      (9) 026272 013746 003434      ERR2:  PRINTB #FRMT4,GDDAT,BDDAT ; EXP'D VS REC'D.
3139      (8) 026276 013746 003432      MOV      BDDAT, (SP)
3140      (7) 026302 012746 027654      MOV      GDDAT, -(SP)
3141      (6) 026306 012746 000003      MOV      #FRMT4, -(SP)
3142      (3) 026312 010600      MOV      #3, (SP)
3143      (4) 026314 104414      MOV      SP, R0
3144      (4) 026316 062706 000010      TRAP     C$PNTB
3145      (4) 026322 000137 027360      ADD      #10, SP
3146      (4) 026326 000137 027360      JMP      CKERLT
3147      (8) 026332 012746 027710      ERR3:  PRINTB #FRMT5,BDDAT      ; MAINT SEQ FAILED STATE.
3148      (7) 026336 012746 000002      MOV      BDDAT, (SP)
3149      (6) 026342 010600      MOV      #FRMT5, (SP)
3150      (4) 026344 104414      MOV      #2, (SP)
3151      (4) 026346 062706 000006      MOV      SP, R0
3152      (4) 026352 000137 027152      TRAP     C$PNTB
3153      (4) 026356 000137 027152      ADD      #6, SP
3154      (9) 026362 013746 003434      ERR4:  PRINTB #FRMT4,GDDAT,BDDAT ; EXP'D VS REC'D...
3155      (8) 026366 012746 027654      MOV      BDDAT, (SP)
3156      (7) 026372 012746 000003      MOV      GDDAT, (SP)
3157      (6) 026376 010600      MOV      #FRMT4, (SP)
3158      (4) 026400 104414      MOV      #3, -(SP)
3159      (4) 026402 062706 000010      MOV      SP, R0
3160      (4) 026406 000137 027152      TRAP     C$PNTB
3161      (4) 026412 000137 027152      ADD      #10, SP
3162      (4) 026416 000137 027152      JMP      ALLREGS      ; ...AND REGISTERS.
3163      (8) 026422 012746 034456      ERR6:  PRINTB #FRMT3,#EM99      ; CS ERRORS.
3164      (7) 026426 012746 027571      MOV      #EM99, -(SP)
3165      (6) 026432 012746 000002      MOV      #FRMT3, (SP)
3166      (3) 026436 010600      MOV      #2, (SP)
3167      (4) 026440 104414      MOV      SP, R0
3168      (4) 026442 062706 000006      TRAP     C$PNTB
3169      (4) 026446 000137 027152      ADD      #6, SP
3170      (4) 026452 000137 027152      JMP      ALLREGS

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3146
3147 026442          ERR7:  PRINTB  #FRMT6,TMP0      ; CPU PRIORITY
(8) 026442 013746 003424
(7) 026446 012746 027742
(6) 026452 012746 000002
(3) 026456 010600
(4) 026460 104414
(4) 026462 062706 000006
3148 026466 000137 027360          JMP      CKERLT
3149
3150 026472          ERR10: PRINTB  #FRMT3A,#EM99    ; EXPECTED OPI ERRORS.
(8) 026472 012746 034456
(7) 026476 012746 027613
(6) 026502 012746 000002
(3) 026506 010600
(4) 026510 104414
(4) 026512 062706 000006
3151 026516 000137 027152          JMP      ALLREGS
3152
3153 026522          ERR11: PRINTB  #FRMT10,BDDAT    ; OPI TIMING ERROR.
(8) 026522 013746 003434
(7) 026526 012746 027775
(6) 026532 012746 000002
(3) 026536 010600
(4) 026540 104414
(4) 026542 062706 000006
3154 026546 000137 027360          JMP      CKERLT
3155
3156 026552 004737 026662          ERR12: JSR      PC,PRTPA      ; STAT WRONG ON NXM (ABOVE 32K)...
3157 026556          PRINTB  #FRMT21,#EM99          ; ...OR BBS7/NXM FAILURE.
(8) 026556 012746 034456
(7) 026562 012746 030313
(6) 026566 012746 000002
(3) 026572 010600
(4) 026574 104414
(4) 026576 062706 000006
3158 026602 000137 027152          JMP      ALLREGS
3159
3160 026606 004737 026662          ERR13: JSR      PC,PRTPA      ; UNEX STAT ERRORS (ABOVE 32K).
3161 026612 000137 026412          JMP
3162
3163 026616 004737 026662          ERR14: JSR      PC,PRTPA      ; DATA WRONG (ABOVE 32K).
3164 026622          PRINTB  #FRMT22,TMP0,GDDAT,BDDAT ; EXPD VS RECD.
(10) 026622 013746 003434
(9) 026626 013746 003432
(8) 026632 013746 003424
(7) 026636 012746 030350
(6) 026642 012746 000004
(3) 026646 010600
(4) 026650 104414
(4) 026652 062706 000012
3165 026656 000137 027152          JMP      ALLREGS
3166
3167          ; PACK AND PRINT 22 BIT PHYSICAL ADDRESS FROM TMP1.,TMP2.
3168          ;
3169 026662 005737 003430          PRTPA: TST      TMP2      ; BIT 15 ON ??

```

```

MOV  TMP0,-(SP)
MOV  #FRMT6,-(SP)
MOV  #2,-(SP)
MOV  SP,R0
TRAP C$PNTB
ADD  #6,SP

```

```

MOV  #EM99,(SP)
MOV  #FRMT3A,(SP)
MOV  #2,-(SP)
MOV  SP,R0
TRAP C$PNTB
ADD  #6,SP

```

```

MOV  BDDAT,(SP)
MOV  #FRMT10,-(SP)
MOV  #2,-(SP)
MOV  SP,R0
TRAP C$PNTB
ADD  #6,SP

```

```

MOV  #EM99,(SP)
MOV  #FRMT21,(SP)
MOV  #2,(SP)
MOV  SP,R0
TRAP C$PNTB
ADD  #6,SP

```

```

MOV  BDDAT,-(SP)
MOV  GDDAT,(SP)
MOV  TMP0,(SP)
MOV  #FRMT22,(SP)
MOV  #4,-(SP)
MOV  SP,R0
TRAP C$PNTB
ADD  #12,SP

```

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GLOBAL ERROR HANDLERS AND ASCII TEXT

SEQ 0115

```

3170 026666 100003      BPL      1$      ; NO, "C" = 0.
3171 026670 062737 100000 003430      ADD      %BIT15,TMP2      ; YES, "C" = 1.
3172 026676 006137 003426      ROL      TMP1      ; TMP1 = ADDR<21:15>...
3173 026702      PRINTB  #FRMT20,TMP1,TMP2 ; TMP2 = ADDR<14:00>.
      (9) 026702 013746 003430      MOV      TMP2,-(SP)
      (8) 026706 013746 003426      MOV      TMP1,(SP)
      (7) 026712 012746 030253      MOV      #FRMT20,(SP)
      (6) 026716 012746 000003      MOV      #3,-(SP)
      (3) 026722 010600      MOV      SP,R0
      (4) 026724 104414      TRAP     C$PNTB
      (4) 026726 062706 000010      ADD      #10,SP
3174 026732 000207      RTS      PC
3175      ;
3176      ; TLM UNIQUE ERROR SIGNATURES.
3177      ;
3178 026734 004737 027114  ERR20: JSR      PC,E2022      ; BAD STATUS AFTER READ,READNH,WRTCHK...
3179 026740      ERR20A:      ;...OR AFTER SEEK,GET STATUS,WRITE.
3180 026740      PRINTX  #FRMT26,TMP1,#EM99
      (9) 026740 012746 034456      MOV      #EM99,(SP)
      (8) 026744 013746 003426      MOV      TMP1,-(SP)
      (7) 026750 012746 030462      MOV      #FRMT26,-(SP)
      (6) 026754 012746 000003      MOV      #3,(SP)
      (3) 026760 010600      MOV      SP,R0
      (4) 026762 104415      TRAP     C$PNTX
      (4) 026764 062706 000010      ADD      #10,SP
3181 026770      PRINTX  #FRMT27      ; CRLF.
      (7) 026770 012746 030503      MOV      #FRMT27,-(SP)
      (6) 026774 012746 000001      MOV      #1,-(SP)
      (3) 027000 010600      MOV      SP,R0
      (4) 027002 104415      TRAP     C$PNTX
      (4) 027004 062706 000004      ADD      #4,SP
3182 027010 000137 027152      JMP      ALLREGS
3183      ;
3184 027014 004737 027114  ERR21: JSR      PC,E2022      ; READ HEADER FAILS.
3185 027020 000137 027360      JMP      CKERLT
3186      ;
3187 027024 004737 027114  ERR22: JSR      PC,E2022      ; DATA FROM TLM WRONG.
3188 027030      PRINTX  #FRMT14,TMP1,TMP0,GDDAT,BDDAT
      (11) 027030 013746 003434      MOV      BDDAT,(SP)
      (10) 027034 013746 003432      MOV      GDDAT,(SP)
      (9) 027040 013746 003424      MOV      TMP0,(SP)
      (8) 027044 013746 003426      MOV      TMP1,(SP)
      (7) 027050 012746 030103      MOV      #FRMT14,(SP)
      (6) 027054 012746 000005      MOV      #5,(SP)
      (3) 027060 010600      MOV      SP,R0
      (4) 027062 104415      TRAP     C$PNTX
      (4) 027064 062706 000014      ADD      #14,SP
3189 027070      PRINTX  #FRMT27      ; CRLF
      (7) 027070 012746 030503      MOV      #FRMT27,(SP)
      (6) 027074 012746 000001      MOV      #1,(SP)
      (3) 027100 010600      MOV      SP,R0
      (4) 027102 104415      TRAP     C$PNTX
      (4) 027104 062706 000004      ADD      #4,SP
3190 027110 000137 027152      JMP      ALLREGS
3191      ;
3192 027114      E2022: PRINTX  #FRMT25,#TSEC,TMP2,#TPEAK

```

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SEQ 0116

(10) 027114 012746 036654
(9) 027120 013746 003430
(8) 027124 012746 036575
(7) 027130 012746 030453
(6) 027134 012746 000004
(3) 027140 010600
(4) 027142 104415
(4) 027144 062706 000012
3193 027150 000207
3194
3195
3196
3197
3198 027152 005000
3199 027154 023727 003402 000003
3200 027162 001002
3201 027164 012700 000045
3202 027170 110037 027477
3203 027174 110037 027541
3204 027200
(7) 027200 012746 027440
(6) 027204 012746 000001
(3) 027210 010600
(4) 027212 104414
(4) 027214 062706 000004
3205 027220
(13) 027220 013746 003360
(12) 027224 013746 003356
(11) 027230 013746 003354
(10) 027234 013746 003352
(9) 027240 013746 003350
(8) 027244 012746 030506
(7) 027250 012746 027510
(6) 027254 012746 000007
(3) 027260 010600
(4) 027262 104414
(4) 027264 062706 000020
3206 027270
(13) 027270 013746 003376
(12) 027274 013746 003372
(11) 027300 013746 003370
(10) 027304 013746 003366
(9) 027310 013746 003364
(8) 027314 012746 030527
(7) 027320 012746 027510
(6) 027324 012746 000007
(3) 027330 010600
(4) 027332 104414
(4) 027334 062706 000020
3207 027340
(7) 027340 012746 027550
(6) 027344 012746 000001
(3) 027350 010600
(4) 027352 104414
(4) 027354 062706 000004
3208

RTS PC
;
; DISPLAY ALL REGISTERS BEFORE AND AFTER ERROR (IF REQ'D).
; CHECK IF ERROR LIMIT EXCEEDED AND EXIT ACCORDINGLY.

ALLREGS: CLR RO ; DISABLE...

CMP RLTP,RLV12X
BNE 1\$

MOV #'%,RO ;...OR ENABLE THE EXTRA REGISTER.
1\$: MOV RO,FRMT1A ; ENABLE/DISABLE BAE TEXT.

MOVB RO,FRMT1C
PRINTB #FRMT1 ; HEADER.

PRINTB #FRMT1B,#BEREG,B.CS,B.BA,B.DA,B.MP,B.BAE

PRINTB #FRMT1B,#AFREG,E.CS,E.BA,E.DA,E.MP,E.BAE

PRINTB #FRMT1D

; FALL THRU...

MOV #TPEAK,(SP)
MOV TMP2,(SP)
MOV #TSEC,(SP)
MOV #FRMT25,-(SP)
MOV #4,-(SP)
MOV SP,RO
TRAP C\$PNTX
ADD #12,SP

MOV #FRMT1,(SP)
MOV #1,-(SP)
MOV SP,RO
TRAP C\$PNTB
ADD #4,SP

MOV B.BAE,(SP)
MOV B.MP,(SP)
MOV B.DA,(SP)
MOV B.BA,-(SP)
MOV B.CS,-(SP)
MOV #BEREG,(SP)
MOV #FRMT1B,(SP)
MOV #7,(SP)
MOV SP,RO
TRAP C\$PNTB
ADD #20,SP

MOV E.BAE,(SP)
MOV E.MP,(SP)
MOV E.DA,-(SP)
MOV E.BA,-(SP)
MOV E.CS,(SP)
MOV #AFREG,(SP)
MOV #FRMT1B,(SP)
MOV #7,(SP)
MOV SP,RO
TRAP C\$PNTB
ADD #20,SP

MOV #FRMT1D,(SP)
MOV #1,-(SP)
MOV SP,RO
TRAP C\$PNTB
ADD #4,SP

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GLOBAL ERROR HANDLERS AND ASCII TEXT

SEQ 0117

```

3209      ;
3210      ;...AND CHECK ERROR LIMIT (IF ANY).
3211      ;
3212      CKERLT: INLOOP
3213      (3) 027360 104420      BCOMPLETE 3$      ; RETURN IF LOOPING...      TRAP      C$INLP
3214      (2) 027362 103425      ;
3215      027364 005737 003304      TST      ERRLMT      ;...OR NO ERROR LIMIT SET
3216      027370 001422      BEQ      3$      ;COUNT THE UNIT ERROR DETECTED
3217      027372 005277 154070      INC      @ERPOINT      ;REACHED THE ERROR LIMIT?
3218      027376 027737 154064 003304      CMP      @ERPOINT,ERRLMT      ;NO, RETURN
3219      027404 002414      BLT      3$      ; "ERROR LIMIT EXCEEDED"
3220      (7) 027406 012746 030422      PRINTF  @FRMT23      ;
3221      (6) 027412 012746 000001      MOV      @FRMT23,-(SP)
3222      (3) 027416 010600      MOV      @1,-(SP)
3223      (4) 027420 104417      MOV      SP,RO
3224      (4) 027422 062706 000004      TRAP      C$PNTF
3225      2$: DODU UNITST      ADD      @4,SP
3226      (3) 027426 013700 003322      ;DROP THE UNIT...      MOV      UNITST,RO
3227      (3) 027432 104451      TRAP      C$DODU
3228      DOCLN      ;...AND ABORT.      TRAP      C$DCLN
3229      3$: ENDMSG      ; OR RETURN TO CALLER.
3230      L10063:      TRAP      C$MSG
3231      (3) 027436 104423

```

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GLOBAL ERROR HANDLERS AND ASCII TEXT

SEQ 0118

```

3224      ;
3225      ; FORMATTED ASCII TEXT.
3226      ;
3227 027440 040445 042522 044507 FRMT1: .ASCII /*AREGISTERS CS BA DA MP/
      027446 052123 051105 004523
      027454 020040 051503 020011
      027462 041040 004501 020040
      027470 040504 020011 046440
      027476 120
3228 027477 045 004501 020040 FRMT1A: .ASCIZ /*A BAE/
      027504 040502 000105
3229 027510 047045 052045 047445 FRMT1B: .ASCII /*N#T#06#S2#06#S2#06#S2#06/
      027516 022466 031123 047445
      027524 022466 031123 047445
      027532 022466 031123 047445
      027540 066
3230 027541 045 031123 047445 FRMT1C: .ASCIZ /*S2#06/
      027546 000066
3231 027550 047045 000 FRMT1D: .ASCIZ /*N/
3232 027553 045 040501 042104 FRMT2: .ASCIZ /*AADDR: #06#N/
      027560 035122 022440 033117
      027566 047045 000
3233 027571 045 042501 051122 FRMT3: .ASCIZ /*AERRORS SET:#T#N/
      027576 051117 020123 042523
      027604 035124 052045 047045
      027612 000
3234 027613 045 042501 050130 FRMT3A: .ASCIZ /*AEXP'D: ERR HNF OPI REC'D:#T#N/
      027620 042047 020072 051105
      027626 020122 047110 020106
      027634 050117 020111 051040
      027642 041505 042047 022472
      027650 022524 000116
3235 027654 040445 054105 023520 FRMT4: .ASCIZ /*AEXP'D: #06#A REC'D: #06#N/
      027662 035104 022440 033117
      027670 040445 051040 041505
      027676 042047 020072 047445
      027704 022466 000116
3236 027710 040445 052101 044440 FRMT5: .ASCIZ /*AAT INTERNAL STATE #D2#N/
      027716 052116 051105 040516
      027724 020114 052123 052101
      027732 020105 042045 022462
      027740 000116
3237 027742 040445 052101 050040 FRMT6: .ASCIZ /*AAT PROCESSOR LEVEL #01#N/
      027750 047522 042503 051523
      027756 051117 046040 053105
      027764 046105 022440 030517
      027772 047045 000
3238 027775 045 047501 044520 FRMT10: .ASCII /*AOPI FLAG RECEIVED AT#D4#A MSEC.#N/
      030002 043040 040514 020107
      030010 042522 042503 053111
      030016 042105 040440 022524
      030024 032104 040445 046440
      030032 042523 027103 047045
3239 030040 040445 054105 042520 .ASCIZ /*AEXPECTED FROM 155 TO 650 MSEC.#N/
      030046 052103 042105 043040
      030054 047522 020115 032461

```

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GLOBAL ERROR HANDLERS AND ASCII TEXT

SEQ 0119

	030062	020065	047524	033040	
	030070	030065	046440	042523	
	030076	027103	047045	000	
3240	030103	045	022516	053501	FRMT14: .ASCIZ /%N%AWORD: %03%A ADDR: %06%A EXP'D: %06%A REC'D: %06/
	030110	051117	035104	022440	
	030116	031517	040445	020040	
	030124	042101	051104	020072	
	030132	047445	022466	020101	
	030140	042440	050130	042047	
	030146	020072	047445	022466	
	030154	020101	051040	041505	
	030162	042047	020072	047445	
	030170	000066			
3241	030172	047045	042045	022463	FRMT15: .ASCIZ /%N%D3%A WORDS BAD OUT OF 255 WORDS TRANSFERRED%N/
	030200	020101	047527	042122	
	030206	020123	040502	020104	
	030214	052517	020124	043117	
	030222	031040	032465	053440	
	030230	051117	051504	052040	
	030236	040522	051516	042506	
	030244	051122	042105	047045	
	030252	000			
3242	030253	045	040501	020124	FRMT20: .ASCIZ /%AAT PHYSICAL ADDRESS: %03%05%N/
	030260	044120	051531	041511	
	030266	046101	040440	042104	
	030274	042522	051523	020072	
	030302	047445	022463	032517	
	030310	047045	000		
3243	030313	045	042501	050130	FRMT21: .ASCIZ /%AEXP'D: ERR NXM REC'D: %T%N/
	030320	042047	020072	051105	
	030326	020122	054116	020115	
	030334	051040	041505	042047	
	030342	022472	022524	000116	
3244	030350	040445	047527	042122	FRMT22: .ASCIZ /%AWORD: %03%A EXP'D: %06%A REC'D: %06%N/
	030356	020072	047445	022463	
	030364	020101	042440	050130	
	030372	042047	020072	047445	
	030400	022466	020101	051040	
	030406	041505	042047	020072	
	030414	047445	022466	000116	
3245	030422	040445	051105	047522	FRMT23: .ASCIZ /%AERROR LIMIT EXCEEDED%N/
	030430	020122	044514	044515	
	030436	020124	054105	042503	
	030444	042105	042105	047045	
	030452	000			
3246					
3247	030453	045	022524	022524	FRMT25: .ASCIZ /%T%T%T/
	030460	000124			
3248	030462	047045	052045	040445	FRMT26: .ASCIZ /%N%T%A REC'D: %T/
	030470	020040	042522	023503	
	030476	035104	052045	000	
3249	030503	045	000116		FRMT27: .ASCIZ /%N/
3250					.EVEN
3251					;
3252					; PURE (UNFORMATTED) ASCII TEXT.
3253					;

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GLOBAL ERROR HANDLERS AND ASCII TEXT

SEQ 0120

3254	030506	042502	047506	042522	BEREG: .ASCIZ /BEFORE COMMAND: /
	030514	041440	046517	040515	
	030522	042116	020072	000	
3255	030527	101	052106	051105	AFREG: .ASCIZ /AFTER COMMAND: /
	030534	041440	046517	040515	
	030542	042116	020072	000040	
3256	030550	047503	052116	047522	CRTIM: .ASCIZ /CONTROLLER TIMED OUT/
	030556	046114	051105	052040	
	030564	046511	042105	047440	
	030572	052125	000		
3257	030575	104	044522	042526	DRTIM: .ASCIZ /DRIVE READY TIMED OUT/
	030602	051040	040505	054504	
	030610	052040	046511	042105	
	030616	047440	052125	000	
3258	030623	040	051105	000122	CERR: .ASCIZ / ERR/
3259	030630	042040	053122	000	DEMES: .ASCIZ / DRV/
3260	030635	040	054116	000115	NXMMES: .ASCIZ / NXM/
3261	030642	050040	051101	000	PARMES: .ASCIZ / PAR/
3262	030647	040	046104	000124	DLTMES: .ASCIZ / DLT/
3263	030654	044040	043116	000	HNFMES: .ASCIZ / HNF/
3264	030661	040	041504	041522	DCRCMES: .ASCIZ / DCRC/
	030666	000			
3265	030667	040	041510	041522	HCRCMES: .ASCIZ / HCRC/
	030674	000			
3266	030675	040	050117	000111	OPIMES: .ASCIZ / OPI/
3267	030702	047040	047117	000105	NON: .ASCIZ / NONE/
3268					
3269	030710	047503	052116	047522	EMO: .ASCIZ /CONTROLLER DOESN'T ANSWER CAN'T TEST/
	030716	046114	051105	042040	
	030724	042517	047123	052047	
	030732	040440	051516	042527	
	030740	020122	026455	041440	
	030746	047101	052047	052040	
	030754	051505	000124		
3270	030760	040503	020116	047516	EM1: .ASCIZ /CAN NOT ADDRESS RLCS/
	030766	020124	042101	051104	
	030774	051505	020123	046122	
	031002	051503	000		
3271	031005	103	047101	047040	EM2: .ASCIZ /CAN NOT ADDRESS RLBA/
	031012	052117	040440	042104	
	031020	042522	051523	051040	
	031026	041114	000101		
3272	031032	040503	020116	047516	EM3: .ASCIZ /CAN NOT ADDRESS RLDA/
	031040	020124	042101	051104	
	031046	051505	020123	046122	
	031054	040504	000		
3273	031057	103	047101	047040	EM4: .ASCIZ /CAN NOT ADDRESS RLMP/
	031064	052117	040440	042104	
	031072	042522	051523	051040	
	031100	046514	000120		
3274	031104	040503	020116	047516	EM4A: .ASCIZ /CAN NOT ADDRESS RLBAE/
	031112	020124	042101	051104	
	031120	051505	020123	046122	
	031126	040502	000105		
3275	031132	040502	020105	044123	EM4B: .ASCIZ /BAE SHOULD BE DISABLED - IT'S NOT !!!/
	031140	052517	042114	041040	

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SEQ 0121

	031146	020105	044504	040523	
	031154	046102	042105	026440	
	031162	020055	052111	051447	
	031170	047040	052117	020440	
	031176	020441	000		
3276	031201	122	041514	020123	EM5: .ASCIZ \RLCS READ/WRITE ERROR (BIT 0 DON'T CARE)\
	031206	042522	042101	053457	
	031214	044522	042524	042440	
	031222	051122	051117	024040	
	031230	044502	020124	020060	
	031236	047504	023516	020124	
	031244	040503	042522	000051	
3277	031252	046122	040502	051040	EM6: .ASCIZ \RLBA READ/WRITE ERROR\
	031260	040505	027504	051127	
	031266	052111	020105	051105	
	031274	047522	000122		
3278	031300	046122	040504	051040	EM7: .ASCIZ \RLDA READ/WRITE ERROR\
	031306	040505	027504	051127	
	031314	052111	020105	051105	
	031322	047522	000122		
3279	031326	046122	040502	020105	EM8: .ASCIZ \RLBAE READ/WRITE ERROR\
	031334	042522	042101	053457	
	031342	044522	042524	042440	
	031350	051122	051117	000	
3280	031355	122	041114	020101	EM10: .ASCIZ /RLBA ERROR AFTER MAINT. FUNCTION/
	031362	051105	047522	020122	
	031370	043101	042524	020122	
	031376	040515	047111	027124	
	031404	043040	047125	052103	
	031412	047511	000116		
3281	031416	046122	040504	042440	EM12: .ASCIZ /RLDA ERROR AFTER MAINT. FUNCTION/
	031424	051122	051117	040440	
	031432	052106	051105	046440	
	031440	044501	052116	020056	
	031446	052506	041516	044524	
	031454	047117	000		
3282	031457	122	041514	020123	EM14: .ASCIZ /RLCS INCORRECT AFTER NO OP/
	031464	047111	047503	051122	
	031472	041505	020124	043101	
	031500	042524	020122	047516	
	031506	047455	000120		
3283	031512	047516	047455	020120	EM14A: .ASCIZ /NO-OP ALTERED RLBA, RLDA, OR RLMP/
	031520	046101	042524	042522	
	031526	020104	046122	040502	
	031534	020054	046122	040504	
	031542	020054	051117	051040	
	031550	046514	000120		
3284	031554	040515	047111	042524	EM14B: .ASCIZ /MAINTENANCE MODE SEQUENCER FAILED/
	031562	040516	041516	020105	
	031570	047515	042504	051440	
	031576	050505	042525	041516	
	031604	051105	043040	044501	
	031612	042514	000104		
3285	031616	047516	044440	052116	EM15: .ASCIZ /NO INTERRUPT ON FUNCTION COMPLETE/
	031624	051105	052522	052120	
	031632	047440	020116	052506	

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SEQ 0122

	031640	041516	044524	047117	
	031646	041440	046517	046120	
	031654	052105	000105		
3286	031660	047111	042524	051122	EM16: .ASCIZ /INTERRUPT PRIORITY FAILURE/
	031666	050125	020124	051120	
	031674	047511	044522	054524	
	031702	043040	044501	052514	
	031710	042522	000		
3287	031713	106	051117	042503	EM17: .ASCIZ /FORCED OPI - INTERRUPT NOT RECEIVED/
	031720	020104	050117	020111	
	031726	026455	044440	052116	
	031734	051105	052522	052120	
	031742	047040	052117	051040	
	031750	041505	044505	042526	
	031756	000104			
3288	031760	051103	020103	043117	EM20: .ASCIZ /CRC OF DA+3 INCORRECT (SERIAL DATA PATH)/
	031766	042040	025501	020063	
	031774	047111	047503	051122	
	032002	041505	020124	051450	
	032010	051105	040511	020114	
	032016	040504	040524	050040	
	032024	052101	024510	000	
3289	032031	103	041522	047440	EM21: .ASCIZ /CRC OF CRC OF DA+4 INCORRECT (SERIAL DATA PATH)/
	032036	020106	051103	020103	
	032044	043117	042040	025501	
	032052	020064	047111	047503	
	032060	051122	041505	020124	
	032066	051450	051105	040511	
	032074	020114	040504	040524	
	032102	050040	052101	024510	
	032110	000			
3290	032111	106	046111	027514	EM22: .ASCIZ \FILL/EMPTY FIFO DATA TRANSFER ERROR\
	032116	046505	052120	020131	
	032124	044506	047506	042040	
	032132	052101	020101	051124	
	032140	047101	043123	051105	
	032146	042440	051122	051117	
	032154	000			
3291	032155	106	046111	027514	EM23: .ASCIZ \FILL/EMPTY FIFO LAST WORD+1 INCORRECT\
	032162	046505	052120	020131	
	032170	044506	047506	046040	
	032176	051501	020124	047527	
	032204	042122	030453	044440	
	032212	041516	051117	042522	
	032220	052103	000		
3292	032223	105	051122	051117	EM27: .ASCII /ERROR STATUS INCORRECT AFTER FORCED OPI/<15><12>
	032230	051440	040524	052524	
	032236	020123	047111	047503	
	032244	051122	041505	020124	
	032252	043101	042524	020122	
	032260	047506	041522	042105	
	032266	047440	044520	005015	
3293	032274	047111	052111	040511	.ASCII /INITIAL WORD COUNT WAS /
	032302	020114	047527	042122	
	032310	041440	052517	052116	
	032316	053440	051501	040	

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3294	032323	074	032440	030461	EM27X:	.ASCIZ	/< 511./
	032330	000056					
3295	032332	050117	020111	046106	EM31:	.ASCIZ	/OPI FLAG NOT RECEIVED/
	032340	043501	047040	052117			
	032346	051040	041505	044505			
	032354	042526	000104				
3296	032360	050117	020111	044524	EM32:	.ASCIZ	/OPI TIMING INCORRECT/
	032366	044515	043516	044440			
	032374	041516	051117	042522			
	032402	052103	000				
3297	032405	127	044522	044524	EM44:	.ASCIZ	/WRITING RLMP MODIFIED RLCS/
	032412	043516	051040	046514			
	032420	020120	047515	044504			
	032426	044506	042105	051040			
	032434	041514	000123				
3298	032440	051127	052111	047111	EM45:	.ASCIZ	/WRITING RLMP MODIFIED RLBA/
	032446	020107	046122	050115			
	032454	046440	042117	043111			
	032462	042511	020104	046122			
	032470	040502	000				
3299	032473	127	044522	044524	EM46:	.ASCIZ	/WRITING RLMP MODIFIED RLDA/
	032500	043516	051040	046514			
	032506	020120	047515	044504			
	032514	044506	042105	051040			
	032522	042114	000101				
3300	032526	051127	052111	047111	EM47:	.ASCIZ	/WRITING RLMP MODIFIED RLBAE/
	032534	020107	046122	050115			
	032542	046440	042117	043111			
	032550	042511	020104	046122			
	032556	040502	000105				
3301	032562	046122	051503	053440	EM50:	.ASCIZ	/RLCS WRONG AFTER WRITING RLBAE/
	032570	047522	043516	040440			
	032576	052106	051105	053440			
	032604	044522	044524	043516			
	032612	051040	041114	042501			
	032620	000					
3302	032621	122	041114	042501	EM51:	.ASCIZ	/RLBAE MODIFIED RLBA/
	032626	046440	042117	043111			
	032634	042511	020104	046122			
	032642	040502	000				
3303	032645	122	041114	042501	EM52:	.ASCIZ	/RLBAE MODIFIED RLDA/
	032652	046440	042117	043111			
	032660	042511	020104	046122			
	032666	040504	000				
3304	032671	042	044502	020124	EM61:	.ASCIZ	/"BIT SET" ON RLCS YIELDS WRONG RESULT/
	032676	042523	021124	047440			
	032704	020116	046122	051503			
	032712	054440	042511	042114			
	032720	020123	051127	047117			
	032726	020107	042522	052523			
	032734	052114	000				
3305	032737	042	044502	020124	EM62:	.ASCIZ	/"BIT CLEAR" ON RLCS YIELDS WRONG RESULT/
	032744	046103	040505	021122			
	032752	047440	020116	046122			
	032760	051503	054440	042511			
	032766	042114	020123	051127			

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SEQ 01.4

	032774	047117	020107	042522	
	033002	052523	052114	000	
3306	033007	042	044502	020124	EM63: .ASCIZ /"BIT SET" ON RLBA YIELDS WRONG RESULT/
	033014	042523	021124	047440	
	033022	020116	046122	040502	
	033030	054440	042511	042114	
	033036	020123	051127	047117	
	033044	020107	042522	052523	
	033052	052114	000		
3307	033055	042	044502	020124	EM64: .ASCIZ /"BIT CLEAR" ON RLBA YIELDS WRONG RESULT/
	033062	046103	040505	021122	
	033070	047440	020116	046122	
	033076	040502	054440	042511	
	033104	042114	020123	051127	
	033112	047117	020107	042522	
	033120	052523	052114	000	
3308	033125	042	044502	020124	EM65: .ASCIZ /"BIT SET" ON RLDA YIELDS WRONG RESULT/
	033132	042523	021124	047440	
	033140	020116	046122	040504	
	033146	054440	042511	042114	
	033154	020123	051127	047117	
	033162	020107	042522	052523	
	033170	052114	000		
3309	033173	042	044502	020124	EM66: .ASCIZ /"BIT CLEAR" ON RLDA YIELDS WRONG RESULT/
	033200	046103	040505	021122	
	033206	047440	020116	046122	
	033214	040504	054440	042511	
	033222	042114	020123	051127	
	033230	047117	020107	042522	
	033236	052523	052114	000	
3310	033243	042	044502	020124	EM67: .ASCIZ /"BIT SET" ON RLBAE YIELDS WRONG RESULT/
	033250	042523	021124	047440	
	033256	020116	046122	040502	
	033264	020105	044531	046105	
	033272	051504	053440	047522	
	033300	043516	051040	051505	
	033306	046125	000124		
3311	033312	041042	052111	041440	EM68: .ASCIZ /"BIT CLEAR" ON RLBAE YIELDS WRONG RESULT/
	033320	042514	051101	020042	
	033326	047117	051040	041114	
	033334	042501	054440	042511	
	033342	042114	020123	051127	
	033350	047117	020107	042522	
	033356	052523	052114	000	
3312	033363	102	051525	051055	EM69: .ASCIZ /BUS-RESET DIDN'T CLEAR RLCS/
	033370	051505	052105	042040	
	033376	042111	023516	020124	
	033404	046103	040505	020122	
	033412	046122	051503	000	
3313	033417	102	051525	051055	EM70: .ASCIZ /BUS-RESET DIDN'T CLEAR RLBA/
	033424	051505	052105	042040	
	033432	042111	023516	020124	
	033440	046103	040505	020122	
	033446	046122	040502	000	
3314	033453	102	051525	051055	EM71: .ASCIZ /BUS-RESET DIDN'T CLEAR RLDA/
	033460	051505	052105	042040	

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SEQ 0125

	033466	042111	023516	020124	
	033474	046103	040505	020122	
	033502	046122	040504	000	
3315	033507	102	051525	051055	EM71A: .ASCIZ /BUS-RESET DIDN'T CLEAR RLBAE/
	033514	051505	052105	042040	
	033522	042111	023516	020124	
	033530	046103	040505	020122	
	033536	046122	040502	000105	
3316	033544	051127	052111	047111	EM72: .ASCIZ /WRITING RLCS MODIFIED RLBA/
	033552	020107	046122	051503	
	033560	046440	042117	043111	
	033566	042511	020104	046122	
	033574	040502	000		
3317	033577	127	044522	044524	EM73: .ASCIZ /WRITING RLCS MODIFIED RLDA/
	033604	043516	051040	041514	
	033612	020123	047515	044504	
	033620	044506	042105	051040	
	033626	042114	000101		
3318	033632	046122	040502	020105	EM73A: .ASCIZ /RLBAE WRONG AFTER WRITING RLCS/
	033640	051127	047117	020107	
	033646	043101	042524	020122	
	033654	051127	052111	047111	
	033662	020107	046122	051503	
	033670	000			
3319	033671	127	044522	044524	EM74: .ASCIZ /WRITING RLBA MODIFIED RLCS/
	033676	043516	051040	041114	
	033704	020101	047515	044504	
	033712	042506	020104	046122	
	033720	051503	000		
3320	033723	127	044522	044524	EM75: .ASCIZ /WRITING RLBA MODIFIED RLDA/
	033730	043516	051040	041114	
	033736	020101	047515	044504	
	033744	042506	020104	046122	
	033752	040504	000		
3321	033755	127	044522	044524	EM75A: .ASCIZ /WRITING RLBA MODIFIED RLBAE/
	033762	043516	051040	041114	
	033770	020101	047515	044504	
	033776	044506	042105	051040	
	034004	041114	042501	000	
3322	034011	127	044522	044524	EM76: .ASCIZ /WRITING RLDA MODIFIED RLCS/
	034016	043516	051040	042114	
	034024	020101	047515	044504	
	034032	044506	042105	051040	
	034040	041514	000123		
3323	034044	051127	052111	047111	EM77: .ASCIZ /WRITING RLDA MODIFIED RLBA/
	034052	020107	046122	040504	
	034060	046440	042117	043111	
	034066	042511	020104	046122	
	034074	040502	000		
3324	034077	127	044522	044524	EM77A: .ASCIZ /WRITING RLDA MODIFIED RLBAE/
	034104	043516	051040	042114	
	034112	020101	047515	044504	
	034120	044506	042105	051040	
	034126	041114	042501	000	
3325	034133	116	046530	042440	EM80: .ASCII /NXM ERROR FLAG DIDN'T SET/
	034140	051122	051117	043040	

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SEQ 0126

	034146	040514	020107	044504	
	034154	047104	052047	051440	
	034162	052105			
3326	034164	020054	040502	045516	EM80X: .ASCIZ /. BANK SELECT 7 (BBS7) FAILS/
	034172	051440	046105	041505	
	034200	020124	020067	041050	
	034206	051502	024467	043040	
	034214	044501	051514	000	
3327	034221	123	040524	052524	EM90: .ASCIZ /STATUS INCORRECT AFTER NON-EX MEMORY ACCESS/
	034226	020123	047111	047503	
	034234	051122	041505	020124	
	034242	043101	042524	020122	
	034250	047516	026516	054105	
	034256	046440	046505	051117	
	034264	020131	041501	042503	
	034272	051523	000		
3328	034275	125	042516	050130	EM91: .ASCIZ /UNEXPECTED STATUS ERROR ON EXT MEMORY ACCESS/
	034302	041505	042524	020104	
	034310	052123	052101	051525	
	034316	042440	051122	051117	
	034324	047440	020116	054105	
	034332	020124	042515	047515	
	034340	054522	040440	041503	
	034346	051505	000123		
3329	034352	040504	040524	044440	EM92: .ASCIZ \DATA INCORRECT TO/FROM EXTENDED MEMORY\
	034360	041516	051117	042522	
	034366	052103	052040	027517	
	034374	051106	046517	042440	
	034402	052130	047105	042504	
	034410	020104	042515	047515	
	034416	054522	000		
3330	034421	125	042516	050130	EM98: .ASCIZ /UNEXPECTED CONTROLLER ERRORS/
	034426	041505	042524	020104	
	034434	047503	052116	047522	
	034442	046114	051105	042440	
	034450	051122	051117	000123	
3331	034456	000170			EM99: .BLKB 120.
3332					;
3333					; TLM UNIQUE ERROR TEXT.
3334					;
3335	034646	052502	020123	044524	EM100: .ASCIZ /BUS TIME-OUT ON TLM ADDRESS/
	034654	042515	047455	052125	
	034662	047440	020116	046124	
	034670	020115	042101	051104	
	034676	051505	000123		
3336	034702	046124	020115	052123	EM100A: .ASCII /TLM STATUS WRONG/<15><12>
	034710	052101	051525	053440	
	034716	047522	043516	005015	
3337	034724	044103	041505	020113	.ASCIZ /CHECK THAT CABLE IS IN PLACE !!!/
	034732	044124	052101	041440	
	034740	041101	042514	044440	
	034746	020123	047111	050040	
	034754	040514	042503	020440	
	034762	020441	000		
3338	034765	120	047522	020115	EM100B: .ASCII /PROM ID WRONG/<15><12>
	034772	042111	053440	047522	

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SEQ 0127

3339	035000	043516	005015		
	035004	044103	041505	020113	.ASCIZ /CHECK THAT CORRECT PROM SET IS INSTALLED !!!/
	035012	044124	052101	041440	
	035020	051117	042522	052103	
	035026	050040	047522	020115	
	035034	042523	020124	051511	
	035042	044440	051516	040524	
	035050	046114	042101	020440	
	035056	020441	000		
3340	035061	123	051531	46103	EM101: .ASCIZ \SYSClk<11> AND/OR PWROK<8> NOT SET IN TLM STATUS\
	035066	036113	030461	020076	
	035074	047101	027504	051117	
	035102	050040	051127	045517	
	035110	034074	020076	047516	
	035116	020124	042523	020124	
	035124	047111	052040	046514	
	035132	051440	040524	052524	
	035140	000123			
3341	035142	051104	053111	020105	EM102: .ASCIZ /DRIVE READY STATUS BIT<0> INCORRECT IN RLCSR/
	035150	042522	042101	020131	
	035156	052123	052101	051525	
	035164	041040	052111	030074	
	035172	020076	047111	047503	
	035200	051122	041505	020124	
	035206	047111	051040	041514	
	035214	051123	000		
3342	035217	104	044522	042526	EM103: .ASCIZ /DRIVE ERROR STATUS BITS<15:14> INCORRECT IN RLCSR/
	035224	042440	051122	051117	
	035232	051440	040524	052524	
	035240	020123	044502	051524	
	035246	030474	035065	032061	
	035254	020076	047111	047503	
	035262	051122	041505	020124	
	035270	047111	051040	041514	
	035276	051123	000		
3343	035301	104	044522	042526	EM104: .ASCII /DRIVE /
	035306	040			
3344	035307	060	051440	046105	EM104X: .ASCIZ /0 SELECT BITS<10:9> INCORRECT IN TLM STATUS/
	035314	041505	020124	044502	
	035322	051524	030474	035060	
	035330	037071	044440	041516	
	035336	051117	042522	052103	
	035344	044440	020116	046124	
	035352	020115	052123	052101	
	035360	051525	000		
3345	035363	104	044522	042526	EM105: .ASCIZ /DRIVE COMMAND (GET STATUS) INCORRECT IN TLM CSR+2/
	035370	041440	046517	040515	
	035376	042116	024040	042507	
	035404	020124	052123	052101	
	035412	051525	020051	047111	
	035420	047503	051122	041505	
	035426	020124	047111	052040	
	035434	046514	041440	051123	
	035442	031053	000		
3346	035445	122	052105	051125	EM106: .ASCIZ /RETURNED DRIVE STATUS INCORRECT IN RLMP/
	035452	042516	020104	051104	

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SEQ 0128

	035460	053111	020105	052123	
	035466	052101	051525	044440	
	035474	041516	051117	042522	
	035502	052103	044440	020116	
	035510	046122	050115	000	
3347	035515	105	051122	051117	EM107: .ASCIZ /ERRORS IN RLCSR AFTER "GET STATUS" COMMAND/
	035522	020123	047111	051040	
	035530	041514	051123	040440	
	035536	052106	051105	021040	
	035544	042507	020124	052123	
	035552	052101	051525	020042	
	035560	047503	046515	047101	
	035566	000104			
3348	035570	051104	053111	020105	EM110: .ASCIZ /DRIVE COMMAND (SEEK DIFF) INCORRECT IN TLM CSR.2/
	035576	047503	046515	047101	
	035604	020104	051450	042505	
	035612	020113	044504	043106	
	035620	020051	047111	047503	
	035626	051122	041505	020124	
	035634	047111	052040	046514	
	035642	041440	051123	031053	
	035650	000			
3349	035651	105	051122	051117	EM111: .ASCIZ /ERRORS IN RLCSR AFTER "SEEK" COMMAND/
	035656	020123	047111	051040	
	035664	041514	051123	040440	
	035672	052106	051105	021040	
	035700	042523	045505	020042	
	035706	047503	046515	047101	
	035714	000104			
3350	035716	051127	052111	020105	EM112: .ASCIZ /WRITE GATE<13> OR DATA ACTIVE<12> DIDN'T SET DURING WRITE/
	035724	040507	042524	030474	
	035732	037063	047440	020122	
	035740	040504	040524	040440	
	035746	052103	053111	036105	
	035754	031061	020076	044504	
	035762	047104	052047	051440	
	035770	052105	042040	051125	
	035776	047111	020107	051127	
	036004	052111	000105		
3351	036010	051127	052111	020105	EM113: .ASCIZ /WRITE GATE ERROR BIT<14> SET DURING WRITE/
	036016	040507	042524	042440	
	036024	051122	051117	041040	
	036032	052111	030474	037064	
	036040	051440	052105	042040	
	036046	051125	047111	020107	
	036054	051127	052111	000105	
3352	036062	051127	052111	020105	EM113A: .ASCIZ /WRITE GATE BIT<13> STILL SET AFTER WRITE DONE/
	036070	040507	042524	041040	
	036076	052111	030474	037063	
	036104	051440	044524	046114	
	036112	051440	052105	040440	
	036120	052106	051105	053440	
	036126	044522	042524	042040	
	036134	047117	000105		
3353	036140	051105	047522	051522	EM114: .ASCIZ /ERRORS IN RLCSR AFTER WRITE DATA COMMAND/
	036146	044440	020116	046122	

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GLOBAL ERROR HANDLERS AND ASCII TEXT

SEQ 0129

	036154	051503	020122	043101	
	036162	042524	020122	051127	
	036170	052111	020105	040504	
	036176	040524	041440	046517	
	036204	040515	042116	000	
3354	036211	105	051122	051117	EM115: .ASCII /ERROR STATUS INCORRECT AFTER READ DATA/
	036216	051440	040524	052524	
	036224	020123	047111	047503	
	036232	051122	041505	020124	
	036240	043101	042524	020122	
	036246	042522	042101	042040	
	036254	052101	101		
3355	036257	000	044527	044124	EM115X: .ASCIZ <0>/WITHOUT HEADER CHECK/
	036264	052517	020124	042510	
	036272	042101	051105	041440	
	036300	042510	045503	000	
3356	036305	122	040505	020104	EM116: .ASCIZ /READ HEADER CAN'T FIND TLM SECTOR 2 (CYL1,SEC6)/
	036312	042510	042101	051105	
	036320	041440	047101	052047	
	036326	043040	047111	020104	
	036334	046124	020115	042523	
	036342	052103	051117	031040	
	036350	024040	054503	030514	
	036356	051454	041505	024466	
	036364	000			
3357	036365	122	041505	044505	EM117: .ASCII /RECEIVED DATA INCORRECT AFTER READ/
	036372	042526	020104	040504	
	036400	040524	044440	041516	
	036406	051117	042522	052103	
	036414	040440	052106	051105	
	036422	051040	040505	104	
3358	036427	000	044527	044124	EM117X: .ASCIZ <0>/WITHOUT HEADER CHECK/
	036434	052517	020124	042510	
	036442	042101	051105	041440	
	036450	042510	045503	000	
3359	036455	105	051122	051117	EM118: .ASCIZ /ERROR STATUS INCORRECT AFTER WRITE-CHECK/
	036462	051440	040524	052524	
	036470	020123	047111	047503	
	036476	051122	041505	020124	
	036504	043101	042524	020122	
	036512	051127	052111	026505	
	036520	044103	041505	000113	
3360	036526	051120	046517	051040	EM119: .ASCII /PROM READ FAILURE/<15><12>
	036534	040505	020104	040506	
	036542	046111	051125	006505	
	036550	012			
3361	036551	103	047101	052047	.ASCII /CAN'T FIND SECTOR /
	036556	043040	047111	020104	
	036564	042523	052103	051117	
	036572	040			
3362	036573	061	000		EM119X: .ASCIZ /1/
3363	036575	123	041505	047524	TSEC: .ASCII /SECTOR /
	036602	020122			
3364	036604	026061	000040		TSECX: .ASCIZ /1. /
3365	036610	047516	044515	040516	TCLK0: .ASCIZ /NOMINAL CLOCK/
	036616	020114	046103	041517	

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GLOBAL ERROR HANDLERS AND ASCII TEXT

SEQ 0130

3366	036624	000113			
	036626	040506	052123	041440	TCLK1: .ASCIZ /FAST CLOCK/
	036634	047514	045503	000	
3367	036641	123	047514	020127	TCLK2: .ASCIZ /SLOW CLOCK/
	036646	046103	041517	000113	
3368	036654	026440	046440	054101	TPEAK: .ASCIZ / - MAX PEAK SHIFT/
	036662	050040	040505	020113	
	036670	044123	043111	000124	
3369	036676	054105	023520	035104	EXPHCRC: .ASCIZ /EXP'D: ERR HCRC OPI/
	036704	042440	051122	044040	
	036712	051103	020103	050117	
	036720	000111			
3370	036722	054105	023520	035104	EXPDCRC: .ASCIZ /EXP'D: ERR DCRC/
	036730	042440	051122	042040	
	036736	051103	000103		
3371	036742	054105	023520	035104	EXPNON: .ASCIZ /EXP'D: NONE/
	036750	047040	047117	000105	
3372					.EVEN

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DEVELOPMENT/DEBUG AIDS

SEQ 0131

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3374 .SBTTL DEVELOPMENT/DEBUG AIDS
3375 .SBTTL
3376 .SBTTL RLV12 EMULATOR
3377 ;
3378 ; FOR DEBUGGING (UNDER MIMIC) WE'LL EMULATE THE ACTION
3379 ; THAT WOULD OCCUR ON A MAINT/NOP FUNCTION.
3380 ;
3381 ;LWL01 .IIF P2, .PRINT . ; FOR DEBUG, MIMIC FLAG IS HERE...
3382 036756 000000 MI'TC: 0 ;...SET NZ TO ENABLE EMULATOR.
3383 ;
3384 036760 023727 003402 000000 EMURLV: CMP RLTP, @RL11
3385 036766 001004 BNE 1$ ; BR IF RLV
3386 036770 042777 036000 144326 BIC #36000, @RLCS ; RL11 -- NOP CLEAR ERROR BITS.
3387 036776 000517 BR 7$ ; AND THAT'S ALL.
3388 ;
3389 037000 027727 144326 177001 1$: CMP @RLMP, #-511. ; WORD COUNT RIGHT ??
3390 037006 001404 BFQ 2$ ; YES.
3391 037010 052777 112000 144306 BIS #ERR!HNF!OPI, @RLCS ; NO SET THE ERROR BITS...
3392 037016 000507 BR 7$ ;...AND RETURN.
3393 ;
3394 037020 020527 020470 2$: CMP R5, #887 ; CALLED FROM BBS7 TEST ??
3395 037024 001004 BNE 3$ ; SKIP IF NOT.
3396 037026 052777 120000 144270 BIS #ERR!NXM, @RLCS ; YES, SET ERROR BITS...
3397 037034 000500 BR 7$ ;...AND RETURN.
3398 ;
3399 037036 012701 004366 3$: MOV #BUF1, R1 ; STANDARD SRC...
3400 037042 012702 005366 MOV #BUF2, R2 ;...AND DST...
3401 037046 012703 037310 MOV #DFIFO, R3 ;...AND DUMMY FIFO POINTERS.
3402 037052 023701 010416 CMP BA16, R1 ; IS BA STANDARD (INTERNAL) ??
3403 037056 001411 BEQ 4$ ; BR IF SO.
3404 037060 012701 100000 MOV #100000, R1 ; POINT TO BUF1 IF EXT MEMORY.
3405 037064 012702 101000 MOV #101000, R2 ; DITTO BUF2 (RECEIVER).
3406 037070 012737 037160 000004 MOV #5$, ERRVEC ; SET TRAP CATCHER.
3407 037076 005237 177572 INC MMRO ; ***** KT ON *****
3408 037102 062777 000002 144216 4$: ADD #2, @RLBA ; SIMULATE INC BA...
3409 037110 005577 144220 ADC @RLBAE ;...OVERFLOWING INTO BAE.
3410 037114 012123 MOV (R1)+, (R3)+ ; MEM => FIFO (256 WORDS).
3411 037116 000240 240
3412 037120 020327 040310 CMP R3, #DFIFO+1000 ;
3413 037124 103766 BLO 4$ ;
3414 037126 012703 037310 MOV #DFIFO, R3 ; RESET FIFO POINTER.
3415 037132 062777 000002 144166 14$: ADD #2, @RLBA ;
3416 037140 005577 144170 ADC @RLBAE ; INC BA.
3417 037144 012322 MOV (R3)+, (R2)+ ; FIFO => MEM (255 WORDS).
3418 037146 000240 240
3419 037150 020327 040306 CMP R3, #DFIFO+776 ;
3420 037154 103766 BLO 14$ ; LOOP...
3421 037156 000406 BR 6$ ;...UNTIL DONE.
3422 037160 052777 120000 144136 5$: BIS #ERR!NXM, @RLCS ; ON NXM TRAP, SET ERROR BITS...
3423 037166 012716 037174 MOV #6$, (SP) ;...AND CONTINUE.
3424 037172 000002 RTI ;
3425 037174 005037 177572 6$: CLR MMRO ; ***** KT OFF *****
3426 037200 012737 010670 000004 MOV #TRAP4, ERRVEC ; RESET TRAP CATCHER.
3427 037206 017700 144116 MOV @RLDA, R0 ;
3428 037212 062700 000006 ADD #6, R0 ; ADJUST FINAL DA...
3429 037216 110077 144106 MOVB R0, @RLDA ;...LO BYTE ONLY.

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RLV12 EMULATOR

SEQ 0132

3430	037222	013777	003442	144102	MOV	GDCRC3,@RLMP	; FAKE THE 1ST...	
3431	037230	013737	003444	003374	MOV	GDCRC4,E.MP1	;...AND 2ND CRC WORDS.	
3432	037236	052777	000200	144060	BIS	#CRDY,@RLCS	; SET DONE BIT...	
3433	037244	032777	000100	144052	BIT	#INTEN,@RLCS	; INTERRUPT EXPECTED ??	
3434	037252	001410			BEQ	8\$	; NO.	
3435	037254				GETPRI	RO		
(3)	037254	104440						TRAP C\$GPRI
3436	037256	042700	177437		BIC	#+CPRI07,RO	; MASK PRIORITY BITS.	
3437	037262	020037	003340		CMP	RO,BPRIOR		
3438	037266	002002			BGE	8\$	; BR IF CPU >= RL BR LEVEL	
3439	037270	005237	010700		INC	INTFLG	; OTHERWISE, SET INT RECEIVED FLAG.	
3440	037274	000207			RTS	PC	;...AND RETURN.	
3441								
3442	037276	000005			DUMMY:	.BLKW 5	; THESE ARE THE DUMMY REGISTERS.	
3443	037310	000400			DFIFO:	.BLKW 256.	; AND A DUMMY FIFO.	

D11

```

3445      ;
3446      ; FINALLY, A SMALL PATCH BLOCK...
3447      ;
3448      040310 040310
3449      040412
3450      ;
3451      ;...AND THAT'S ALL THERE IS TO IT !!!
3452      ;
3453      040412      LASTAD      ; LAST USED ADDRESS.
(2)
(2) 040412 040434      .EVEN
(2) 040414 000007      .WORD T$FREE
(3) 040416      .WORD T$SIZE
3454      L$LAST::
3455      ;*****
3456      ;
3457      ; NOW CAN A SINGLE UNIT P TABLE, SO WE CAN RUN UNDER
3458      ; DEFAULT CONDITIONS, AND CALL THE BINARY A .BIC FILE.
3459      ;
3460      040416      BGNSETUP 1      ; 1 UNIT ONLY...
3461      040416      BGNPTAB      ;...USING THE FOLLOWING DEFAULTS.
(4) 040416 000000      .WORD C
(3) 040420 000005      .WORD L10066 ./2-1
(3) 040422      L10064:
3462      040422 174400      .WORD 174400      ; (0) CSR ADDRESS.
3463      040424 000160      .WORD 160      ; (2) VECTOR.
3464      040426 000200      .WORD PRI04      ; (4) PRIORITY.
3465      040430 000000      .WORD 0      ; (6) DRIVE (BITS 8,9,10).
3466      040432 000003      .WORD 3      ; (10) CONTROLLER TYPE (RLV12 W/BAE).
3467      040434      ENOPTAB
(3) 040434      L10066:
3468      040434      ENDSETUP
3469      ;
3470      ;*****
3471      000001      .END

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CROSS REFERENCE TABLE USER SYMBOLS

SEQ 0134

ADJTN	026052	578	3107#											
ADLIM	002542	106	124#											
ADR	000020	155#												
AFREG	030527	3206	3255#											
AFTER	010140	751#	928	931										
ALLREG	027152	3130	3139	3142	3145	3151	3158	3165	3182	3190	3198#			
ASSEMB	000010	17												
BA16	010416	582*	800	821#	2238*	2254	2257*	2293*	2373*	2382*	3402			
BA22	010420	583*	803	811	822#	2243*	2253	2258*	2292*	2374*	2383*			
BB7	020470	2246#	3394											
BCCFBK	003406	257#	987*	993*	996*	999	1003							
BCSR	003336	237#	533*	536*	584									
BDDAT	003434	268#	1296*	1297*	1298	1302*	1305*	1310*	1332*	1333*	1334	1360*	1361	1383*
		1384	1409*	1411	1439*	1440*	1441	1452*	1453*	1454	1481*	1482	1490*	1491
		1514*	1515	1523*	1524	1551*	1552	1561*	1562	1591*	1592	1597*	1598	1605*
		1606	1631*	1632*	1633	1638*	1639	1646*	1647	1672*	1673*	1674	1679*	1680
		1687*	1688	1714*	1715*	1716	1721*	1722	1727*	1728	1735*	1736	1761*	1762*
		1763	1768*	1772*	1805*	1806	1822*	1823	1867*	1871	1878	1887*	1976*	1977*
		1982	1984	2062*	2063	2068*	2073	2078*	2079	2084*	2085	2094*	2095	2103
		2114*	2115	2190*	2191	2199	2350*	2351	2403*	2405	2409*	2412	2417*	2420
		2425*	2428	2438*	2444	2473*	2476	2479*	2481	2509*	2512	2542*	2545	2552*
		2553	2555	2557	2683*	2789*	2794*	2796	3135	3138	3141	3153	3164	3188
BEFORE	010062	737#	814	2467	2503	2538	2643	2669	2760					
BEGPAT	003672	287#	1353	1379	1405	1473	1509	1545						
BEREG	030506	3205	3254#											
BIT0	000001	66	68	108	111	118	155#	189	193	1358	2601	2726		
BIT00	000001	155#												
BIT01	000002	155#												
BIT02	000004	155#												
BIT03	000010	155#												
BIT04	000020	155#												
BIT05	000040	155#												
BIT06	000100	155#												
BIT07	000200	155#												
BIT08	000400	155#												
BIT09	001000	155#												
BIT1	000002	64	117	155#	182	184	186	188	192	359	2596	2721		
BIT10	002000	155#	173	2439										
BIT11	004000	155#	171	172										
BIT12	010000	155#	169	170	2543									
BIT13	020000	155#	167	168	2543	2554	2557							
BIT14	040000	115	155#	166	2554	2606	2731							
BIT15	100000	114	155#	165	3171									
BIT2	000004	116	155#	183	184	187	188	194	360	2591	2716			
BIT3	000010	155#	185	186	187	188	191	361						
BIT4	000020	155#	197	362										
BIT5	000040	155#	363											
BIT6	000100	155#	179	195	196	364								
BIT7	000200	155#	178											
BIT8	000400	155#	175	177	365									
BIT9	001000	155#	176	177	366	2439								
BOE	000400	155#												
BPRIOR	003340	238#	538*	596	1869	3437								
BRL	002351	71	83#											
BUFEND	006366	459#	2061	3014	3017	3034								
BUF1	004366	457#	582	821	837	861	2090	2140	2153	2186	2257	2297	2382	2536

BUF2	005366	2677	2759	2932	2960	2974	2993	3032	3066	3399				
BVEC	003342	458#	2091	2166	2187	2633	2642	2678	3015	3036	3400			
B.BA	003352	239#	537*	594										
B.BAE	003360	243#	739*	1810	3205									
B.CS	003350	246#	745*	3205										
B.DA	003354	242#	737*	738*	1803	3205								
B.MP	003356	244#	740*	1812	2067	2070	3205							
CACREG	003670	245#	742*	1814	3205									
CALBCC	003410	283#	571*											
CALCRC	010760	258#	955	963	968	1009*								
CANTFI	026003	945#	1792	1844	1873	1907	1940	1970	2015	2030	2042	2236	2312	
CERR	030623	2990	3094#											
CHKDAT	023346	681	3258#											
CKERLT	027360	2653	2673	2677#										
CLKRTI	010702	3128	3133	3136	3148	3154	3185	3212#						
CLRTL	024204	599	914#											
CONT	007114	2462	2498	2529	2793	2813#								
CPUTYP	003400	485	580#											
CRCEND	004272	254#	513*	563	566	1968								
CRDY	000200	421#												
		178#	622	627	798	815	922	1282	1432	1434	1589	1621	1662	1703
		1752	2435	2450	2465	2468	2501	2504	2533	2539	2639	2644	2658	2659
		2667	2670	2756	2761	3432								
		3096#												
CRLF	026032	929	3256#											
CRTIM	030550	389#	1339	1459										
CSEND	004200	358#	1324	1430										
CSPAT	004102	69	81#											
CSRA	002323	17#	656											
C\$AU	000052	17#	616											
C\$AUTO	000061	17#												
C\$BRK	000022	17#												
C\$BSEG	000004	17#	1325	1354	1380	1406	1431	1474	1510	1546	1870	2050	2164	2296
		2632	2755											
C\$BSUB	000002	17#	2009	2024	2039	2137	2150							
C\$CEFG	000045	17#												
C\$CLCK	000062	17#												
C\$CLEA	000012	17#	632											
C\$CLOS	000035	17#												
C\$CLP1	000006	17#	1595	1601	1636	1642	1677	1683	1719	1725	1731	1766	1771	1809
		1817	1828	1886	1922	1950	2057	2066	2076	2082	2088	2104	2178	2184
		2200	2371											
C\$CVEC	000036	17#												
C\$DCLN	000044	17#	522	1168	1190	1212	1234	1259	3080	3221				
C\$DODU	000051	17#	615	1167	1189	1211	1233	1258	3220					
C\$DRPT	000024	17#	518											
C\$DU	000053	17#	644											
C\$EDIT	000003	17#	50											
C\$ERDF	000055	17#	929	1263	1300	1304	1307	1312	1336	1363	1386	1413	1443	1456
		1484	1493	1517	1526	1554	1564	1594	1600	1608	1635	1641	1649	1676
		1682	1690	1718	1724	1730	1738	1765	1770	1774	1808	1816	1827	1852
		1885	1921	1949	1980	1987	2056	2065	2075	2081	2087	2101	2117	2177
		2183	2197	2255	2336	2341	2369	2407	2414	2422	2430	2446	2478	2483
		2487	2514	2518	2549	2559	2561	2565	2589	2651	2665	2675	2686	2714
		2768	2800	2802	2804									
C\$ERHR	000056	17#												
C\$ERRO	000060	17#												

[illegible]

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CVRLBB.P11 12-JUN-85 15:33 CROSS REFERENCE TABLE -- USER SYMBOLS

[illegible]

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CROSS REFERENCE TABLE - USER SYMBOLS

SEQ 0138

EM148	031554	1827	3284#				
EM15	031616	1852	2183	3285#			
EM16	031660	1885	3286#				
EM17	031713	1949	3287#				
EM2	031005	1188	3271#				
EM20	031760	2081	3288#				
EM21	032031	2087	3289#				
EM22	032111	2101	2197	3290#			
EM23	032155	2117	3291#				
EM27	032223	1921	3292#				
EM27X	032323	1910*	1911*	1926*	1927*	3294#	
EM3	031032	1210	3272#				
EM31	032332	1980	3295#				
EM32	032360	1987	3296#				
EM4	031057	1232	3273#				
EM4A	031104	1257	3274#				
EM4B	031132	1263	3275#				
EM44	032405	1718	3297#				
EM45	032440	1724	3298#				
EM46	032473	1730	3299#				
EM47	032526	1738	3300#				
EM5	031201	1336	3276#				
EM50	032562	1765	3301#				
EM51	032621	1770	3302#				
EM52	032645	1774	3303#				
EM6	031252	1363	3277#				
EM61	032671	1443	3304#				
EM62	032737	1456	3305#				
EM63	033007	1484	3306#				
EM64	033055	1493	3307#				
EM65	033125	1517	3308#				
EM66	033173	1526	3309#				
EM67	033243	1554	3310#				
EM68	033312	1564	3311#				
EM69	033363	1300	3312#				
EM7	031300	1386	3278#				
EM70	033417	1304	3313#				
EM71	033453	1307	3314#				
EM71A	033507	1312	3315#				
EM72	033544	1594	3316#				
EM73	033577	1600	3317#				
EM73A	033632	1608	3318#				
EM74	033671	1635	3319#				
EM75	033723	1641	3320#				
EM75A	033755	1649	3321#				
EM76	034011	1676	3322#				
EM77	034044	1682	3323#				
EM77A	034077	1690	3324#				
EM8	031326	1413	3279#				
EM80	034133	2255	3325#				
EM80X	034164	2233*	2235*	3326#			
EM90	034221	2336	3327#				
EM91	034275	2341	3328#				
EM92	034352	2369	3329#				
EM98	034421	2056	2177	3330#			
EM99	034456	671	3144	3150	3157	3180	3331#

[illegible]

[illegible]

17#	143	151										
17#	1157	1169	1179	1191	1201	1213	1223	1235	1243	1264	1279	1313
1323	1342	1352	1369	1378	1392	1402	1419	1429	1462	1472	1499	1508
1532	1542	1570	1583	1609	1620	1650	1661	1691	1702	1739	1749	1775
1786	1829	1841	1854	1866	1892	1902	1929	1939	1952	1967	1988	2005
2121	2133	2213	2227	2259	2278	2384	2398	2451	2459	2488	2495	2519
2526	2566	2577	2695	2702	2771							
271#	955*	2077	3430									
272#	968*	2083	3431									
267#	613*	1165*	1187*	1209*	1231*	1247*	1282*	1285*	1298	1301*	1326*	1327*
1328	1331*	1334	1355*	1358*	1359	1361	1381*	1382	1384	1407*	1408	1410*
1411	1433*	1434*	1438*	1441	1446*	1447*	1451*	1454	1476*	1479*	1482	1487*
1488*	1491	1512*	1515	1520*	1521*	1524	1548*	1549*	1552	1557*	1558*	1559*
1562	1590*	1592	1596*	1598	1604*	1606	1621*	1624*	1625	1633	1637*	1639
1645*	1647	1662*	1665*	1666	1674	1678*	1680	1686*	1688	1703*	1706*	1707
1716	1720*	1722	1726*	1728	1734*	1736	1752*	1755*	1756	1760*	1763	1767*
1803*	1804*	1806	1869*	1878	2061*	2063	2067*	2072*	2073	2077*	2079	2083*
2085	2093*	2095	2103	2113*	2115	2189*	2191	2199	2349*	2351	2404*	2405
2411*	2412	2419*	2420	2427*	2428	2443*	2444	2475*	2476	2480*	2481	2511*
2512	2544*	2545	2553*	2554*	2555	2682*	2781*	2788*	2795*	2796	3132	3135
3141	3164	3188										
669#	1919	2054	2175	2251	2334	2339	2484	2515	2562	2648	2672	2765
192#	2466	2475										
183#	2465											
17#												
17#												
17#	107											
17#												
17#												
17#												
17#												
17#	64	66	68	69	70	71	73	106	108	110	111	113
114	115	116	117	118	119							
17#	64	66	68	69	70	71	73	106	108	110	111	113
114	115	116	117	118	119							
17#	69	70	110									
17#	71	73	106	113	119							
17#	64	66	68	108	111	114	115	116	117	118		
17#												
17#												
17#	106											
17#	64	66	68	108	111	114	115	116	117	118		
17#	69	70	71	73	110	113	119					
17#	65	67	72	109	112							
17#	64	66	68	69	70	71						

[illegible]

N11

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CROSS REFERENCE TABLE - USER SYMBOLS

SEQ 0143

LONUM	003454	276#	493*	524	580*	886	893	899*
LUT	000010 G	155#						
LSI	006576	503	513#					
LACP	002110 G	50#						
LAPT	002036 G	50#						
LAU	007476 G	50	648#					
LAUT	002070 G	50#						
LAUTO	007260 G	50	605#					
LCCP	002106 G	50#						
LCLEA	007336 G	50	620#					
LCO	002032 G	50#						
LDEPO	002011 G	50#						
DESC	002122 G	50	52#					
DESP	002076 G	50#						
DEVP	002060 G	50#						
DISP	026124 G	50	3118*	3121#				
DLY	002116 G	50#						
DTP	002040 G	50#						
DTYP	002034 G	50#						
DU	007414 G	50	636#					
DUT	002072 G	50#						
DVTY	002142 G	50	54#					
EF	002052 G	50#						
ENVI	002044 G	50#						
ETP	002102 G	50#						
EXP1	002046 G	50#						
EXP4	002064 G	50#						
EXP5	002066 G	50#						
HARD	002172 G	50	63#					
HIME	002120 G	50#						
HPCP	002016 G	50#						
HPTP	002022 G	50#						
HW	002376 G	50	89#					
ICP	002104 G	50#						
INIT	006376 G	50	473#					
LADP	002026 G	50#						
LAST	040416 G	45	50	3453#	3468			
LOAD	002100 G	50#						
LUN	002074 G	50#						
MREV	002050 G	50#						
NAME	002000 G	50#						
PRI0	002042 G	50#						
PROT	006370 G	50	465#					
PRT	002112 G	50#						
REPP	002062 G	50#						
REV	002010 G	50#						
RPT	011722 G	50	1130#					
SOFT	002412 G	50	105#					
SPC	002056 G	50#						
SPCP	002020 G	50#						
SPTP	002024 G	50#						
STA	002030 G	50#						
SW	003304 G	50	143#					
TEST	002114 G	50#						
TIML	002014 G	50#						
UNIT	002012 G	50#	520	529	606	637		

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CROSS REFERENCE TABLE USER SYMBOLS

SEQ 0144

L10000	002266	63	740						
L10001	002410	89	990						
L10002	002542	105	1200						
L10003	003322	143	1510						
L10005	007256	6010							
L10006	007334	6160							
L10007	007412	6320							
L10010	007474	6440							
L10011	007552	6560							
L10012	012170	1138	11440						
L10013	012254	11690							
L10014	012340	11910							
L10015	012424	12130							
L10016	012510	12350							
L10017	012632	12640							
L10020	013074	13130							
L10021	013214	13420							
L10022	013320	13690							
L10023	013406	13920							
L10024	013512	14190							
L10025	013740	14620							
L10026	014124	14990							
L10027	014272	15320							
L10030	014464	15700							
L10031	014666	16090							
L10032	015112	16500							
L10033	015336	16910							
L10034	015626	17390							
L10035	016022	17750							
L10036	016230	1818	18290						
L10037	016316	18540							
L10040	016464	18920							
L10041	016620	19290							
L10042	016704	19520							
L10043	017032	19880							
L10044	017732	2046	21210						
L10045	017100	20200							
L10046	017146	20350							
L10047	017176	20450							
L10050	020356	2160	22130						
L10051	017764	21460							
L10052	020020	21590							
L10053	020552	2232	22590						
L10054	021346	2284	23840						
L10055	021720	24510							
L10056	022124	24880							
L10057	022272	25190							
L10060	022552	25660							
L10061	023434	2626	26950						
L10062	024032	2751	27710						
L10063	027436	32220							
L10064	040422	34610							
L10066	040434	3461	34670						
MAINT	000000	1810	1913	1945	174	2052	2177	2245	2315
MFPT	000007	5080	509						
MIMIC	036756	534	755	816	33820				

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CROSS REFERENCE TABLE - USER SYMBOLS

SEQ 0145

MK	= 000001	193#	2466	2475	2502	2511						
MMRO	= 177572	1035#	1055	1087*	1108*	2280	2302*	2310*	2348*	2355*	3407*	3425*
MMR1	= 177574	1036#										
MMR2	= 177576	1037#										
MMR3	= 172516	1038#	1084	1085*	1092*	1110*	2290*					
MPXCLK	003312	147#	2591	2596	2601	2606	2610	2716	2721	2726	2731	2735
MSGNOT	012162	1131*	1134*	1135	1142#							
MSG2	012042	1135	1139#									
MSG3	012072	1136	1140#									
MSG4	012125	1137	1141#									
NEWPAS	006622	481	520#	530								
NLSI	006572	507	512#									
NOANS	025602	2952*	2954	3086#								
NON	030702	675	3267#									
NOOP	= 000000	180#										
NOSIG	026232	2589	2714	3128#								
NXM	= 020000	167#	690	2058	2179	2247	2331	3396	3422			
NXMMES	030635	692	697	3260#								
NXTU	006664	484	527#	532								
OCTMOD	025376	2915	2976	3043#								
OCTTXT	026042	3043	3098#									
OPI	= 002000	173#	693	701	709	714	1825	1916	1978	2058	2179	2864 3391
OPIMES	030675	717	3266#									
OPIMN	003446	273#	1984									
OPIMX	003450	274#	1982									
O\$APTS	= 000000	17#	50									
O\$AU	= 000001	17#	49#	50								
O\$BGNR	= 000001	17#	49#	50								
O\$BGNS	= 000001	17#	49#	50								
O\$DU	= 000001	17#	49#	50								
O\$ERRT	= 000000	17#	50									
O\$GNSW	= 000001	17#	49#	50								
O\$POIN	= 000001	17#	49#	50								
O\$SETU	= 000001	17#	49#	50	3453							
PAR	= 020000	168#	690									
PARMES	030642	695	3261#									
PAR4	= 172350	2277#	2294*	2360	2375*	2376						
PATCH	040310	3448#										
PATCRC	004202	393#	2010	2025								
PATDAT	004274	425#										
PDSW	003306	145#	489	2924*								
PNT	= 001000 G	155#										
PRGSIZ	= 000101	45#										
PRI	= 002000 G	155#										
PRI00	= 000000 G	155#	1843	1942	2171							
PRI01	= 000040 G	155#										
PRI02	= 000100 G	155#										
PRI03	= 000140 G	155#										
PRI04	= 000200 G	92	155#	3464								
PRI05	= 000240 G	155#										
PRI06	= 000300 G	155#										
PRI07	= 000340 G	155#	598	600	631	1280	1853	1867	1891	1951	2210	3436
PRM	003047	113	132#									
PRMDMP	003024	111	131#									
PROMID	003310	146#	2-95									
PRTPA	026662	3156	3160	3163	3169#							

PSERR	024560	2646	2763	2858*	2864*	2882*	2890#							
PSETXT	024556	2650	2652	2767	2859*	2865*	2883*	2889#						
PSX	024266	2585	2710	2837#										
PS1	024324	2842	2852#											
PS2	024342	2843	2856#											
PS3	024374	2844	2862#											
PS4	024426	2845	2868#											
PS5	024444	2846	2872#											
PS6	024514	2847	2880#											
PS7	024462	2848	2876#											
PURE	026046	3082	3099#											
Q0	025633	2930	3087#											
Q1	025664	2958	3089#											
Q2	025711	2972	3090#											
RAND	010572	863	883#											
RDHOR *	000010	185#	2658											
RDNHOR *	000016	188#	2667											
READ *	000014	187#	2639											
READDU	023430	2666	2693#											
READNH	023202	2655#												
READSE	023040	2609	2614	2632#										
RESTAR	006454	475	479	487#										
RHMS *	000100	195#												
RLBA	003326	233#	587*	739	752	800*	1181*	1183	1187	1286*	1302	1359*	1360	1475*
		1480*	1481	1486*	1489*	1490	1584*	1591	1630*	1667*	1679	1708*	1721	1757*
		1768	2536*	2642*	2759*	2820*	3408*	3415*						
RLBAE	003334	236#	593*	630*	745	760	811*	1247	1248*	1250	1290*	1310	1408*	1409
		1547*	1550*	1551	1556*	1560*	1561	1588*	1605	1629*	1646	1670*	1687	1712*
		1735	1759*	2824*	3409*	3416*								
RLCS	003324	232#	585*	609	613	622	627*	737	751	799*	809*	815*	922	1159*
		1161	1165	1281*	1283	1296	1328*	1329	1332	1432*	1435*	1436	1439	1445*
		1448*	1449	1452	1589*	1622	1625*	1631	1663	1666*	1672	1704	1707*	1714
		1753	1756*	1761	1978	2408	2416	2424	2435*	2436*	2450*	2465*	2468*	2501*
		2504*	2533*	2539*	2639*	2644*	2658*	2659*	2660	2667*	2670*	2756*	2761*	3386*
		3391*	3396*	3422*	3432*	3433								
RLDA	003330	234#	589*	740	753	812*	1203*	1205	1209	1287*	1305	1382*	1383	1511*
		1513*	1514	1519*	1522*	1523	1585*	1597	1626*	1638	1671*	1709*	1727	1758*
		1772	2466*	2502*	2537*	2641*	2758*	3427	3429*					
RLINT	010676	595	912#											
RLMP	003332	235#	591*	742	754	757	813*	1225*	1227	1231	1713*	2535*	2640*	2662
		2668*	2757*	2821*	3389	3430*								
RLTYP	003402	255#	540*	628	743	758	801	1244	1252	1288	1308	1356	1403	1477
		1543	1586	1602	1627	1643	1668	1684	1710	1732	1750	1797	2228	2288
		2317	2822	3107	3199	3384								
RLV11 *	000001	161#	2228											
RLV12 *	000002	162#	1244	3109										
RLV12X*	000003	163#	628	743	758	801	1252	1288	1308	1403	1543	1586	1602	1627
		1643	1668	1684	1710	1732	1750	2288	2317	2822	3199			
RL1	002266	64	78#											
RL1A	002276	66	79#											
RL11 *	000000	160#	1356	1477	1797	3384								
RL2	002313	68	80#											
ROMDUM	024660	491	2924#	2955	2991	3005								
SEC1	003247	119	138#											
SEEK *	000006	184#	2501											
SETCMP	010426	833#	2027											

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 014

SETPAT 010422	831#	2012												
SETRAN 010516	859#	2040	2295											
SFN = 000006	204#	614#	1166#	1188#	1210#	1232#	1257#							
SIGN = 000004	194#													
SIMBCC 011124	951	959	964	981#										
SKP1 = 000401	225#	2779												
SKP2 = 000402	226#	511	930	2234	2325	2550	3114	3116						
SKP3 = 000403	227#													
SNGLSE 003314	148#	2581	2622	2706	2747	2877*								
START 006454	477	487#												
STHS = 000100	196#													
SVCGBL = 000000	17#	19#	46#	50	52	54	56#	63	89	105	143	465	473	
	605	620	636	648	1130	3121	3127	3453#						
SVCINS = 000001	17#	23#	47#	50	52	54	57#	63	64	65	66	67	68	
	69	70	71	72	73	74	89	105	106	107	108	109	110	
	111	112	113	114	115	116	117	118	119	120	143	474	475	
	476	477	478	479	480	481	482	483	518	522	531	532	601	
	614	615	616	631	632	640	644	652	656	929	1135	1136	1137	
	1138	1144	1166	1167	1168	1169	1188	1189	1190	1191	1210	1211	1212	
	1213	1232	1233	1234	1235	1257	1258	1259	1263	1264	1280	1300	1304	
	1307	1312	1313	1325	1336	1337	1341	1342	1354	1363	1364	1368	1369	
	1380	1386	1387	1391	1392	1406	1413	1414	1418	1419	1431	1443	1444	
	1456	1457	1461	1462	1474	1484	1485	1493	1494	1498	1499	1510	1517	
	1518	1526	1527	1531	1532	1546	1554	1555	1564	1565	1569	1570	1594	
	1595	1600	1601	1608	1609	1635	1636	1641	1642	1649	1650	1676	1677	
	1682	1683	1690	1691	1718	1719	1724	1725	1730	1731	1738	1739	1765	
	1766	1770	1771	1774	1775	1808	1809	1816	1817	1818	1827	1828	1829	
	1843	1852	1853	1854	1870	1871	1885	1886	1890	1891	1892	1921	1922	
	1929	1942	1949	1950	1951	1952	1980	1987	1988	2009	2020	2024	2035	
	2039	2045	2046	2050	2056	2057	2060	2065	2066	2075	2076	2081	2082	
	2087	2088	2101	2103	2104	2112	2117	2118	2121	2137	2146	2150	2159	
	2160	2164	2171	2177	2178	2183	2184	2197	2199	2200	2208	2209	2210	
	2213	2232	2255	2259	2284	2296	2336	2341	2369	2371	2372	2384	2407	
	2414	2422	2430	2446	2451	2478	2483	2487	2488	2514	2518	2519	2549	
	2559	2561	2565	2566	2589	2626	2632	2651	2665	2675	2686	2693	2695	
	2714	2751	2755	2768	2769	2771	2800	2802	2804	2876	3043	3080	3082	
	3121	3132	3135	3138	3141	3144	3147	3150	3153	3157	3164	3173	3180	
	3181	3188	3189	3192	3204	3205	3206	3207	3212	3213	3219	3220	3221	
	3222	3435	3453	3461										
SVCSUB = 000001	17#	21#	2009	2024	2039	2137	2150							
SVCTAG = 000001	17#	22#	74	99	120	151	601	616	632	644	656	1144	1151	
	1156	1169	1173	1178	1191	1195	1200	1213	1217	1222	1235	1239	1242	
	1264	1268	1278	1313	1317	1322	1341	1342	1346	1351	1368	1369	1373	
	1377	1391	1392	1396	1401	1418	1419	1423	1428	1461	1462	1466	1471	
	1498	1499	1503	1507	1531	1532	1536	1541	1569	1570	1574	1582	1609	
	1613	1619	1650	1654	1660	1691	1695	1701	1739	1743	1748	1775	1779	
	1785	1829	1833	1840	1854	1858	1865	1890	1892	1896	1901	1929	1934	
	1938	1952	1956	1966	1988	1992	2004	2020	2035	2045	2118	2121	2125	
	2132	2146	2159	2209	2213	2217	2226	2259	2263	2276	2372	2384	2389	
	2397	2451	2455	2458	2488	2492	2494	2519	2523	2525	2566	2570	2576	
	2693	2695	2699	2701	2769	2771	3222	3461	3467					
SVCTST = 000001	17#	20#	1157	1179	1201	1223	1243	1279	1323	1352	1378	1402	1429	
	1472	1508	1542	1583	1620	1661	1702	1749	1786	1841	1866	1902	1939	
	1967	2005	2133	2227	2278	2398	2459	2495	2526	2577	2702			
SLSYM = 010000	17#	74#	99#	120#	151#	601#	616#	632#	644#	656#	1144#	1169#	1191#	
	1213#	1235#	1264#	1313#	1325#	1342#	1354#	1369#	1380#	1392#	1406#	1419#	1431#	

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SEQ 0148

		1462#	1474#	1499#	1510#	1532#	1546#	1570#	1609#	1650#	1691#	1739#	1775#	1829#
		1854#	1870#	1892#	1929#	1952#	1988#	2020#	2035#	2045#	2050#	2121#	2146#	2159#
		2164#	2213#	2259#	2296#	2384#	2451#	2488#	2519#	2566#	2632#	2695#	2755#	2771#
		3222#												
TAB	026030	2997	3095#											
TCLKO	036610	2594	2719	3365#										
TCLK1	036626	2599	2724	3366#										
TCLK2	036641	2604	2729	3367#										
TCSR	003344	240#	542*	544*	547*	2401*	2402*	2403	2415*	2423*	2431*	2437	2781	2784*
		2789	2813	3111										
TCSUO	002776	110	130#											
TCSO	003320	150#	544	2940										
TEMHI	003460	278#	525*	581										
TEML0	003456	277#	524*	580	2041									
TEMP1	003422	263#	946*	947	949*	950	957*	958						
TEMP2	003412	259#	984*	1007*										
TEMP3	003414	260#	985*	988*										
TEMP4	003416	261#	986*	988	998*	1000	1005*	1006*	1009					
TEMP5	003420	262#	947*	948*	949	956*	957							
TLM8P	002575	107	126#											
TLMF	003316	149#	542											
TLMIN	002751	108	129#											
TLMOK	024034	2399	2460	2496	2527	2778#								
TLMPI0	024040	2578	2703	2780#										
TLM1	021350	2398#												
TLM2	021722	2459#												
TLM3	022126	2495#												
TLM4	022274	2526#												
TLM5	022554	2577#												
TLM6	023436	2702#												
TMPO	003424	264#	836*	839	842*	1851*	1868*	1888*	2069*	2070*	2071*	2072	2097*	2103
		2193*	2199	2358*	2684*	2981*	2984	3147	3164	3188				
TMP1	003426	265#	2098*	2103	2194*	2199	2253*	2327*	2361*	2363*	2368*	2486*	2517*	2564*
		2650*	2674*	2685*	2767*	3172*	3173	3180	3188					
TMP2	003430	266#	2089*	2099	2102*	2110	2112	2185*	2195	2198*	2206	2208	2254*	2328*
		2360*	2362*	2367*	2594*	2599*	2604*	2719*	2724*	2729*	3169	3171*	3173	3192
TPEAK	036654	2608*	2613*	2733*	2738*	3192	3368#							
TRAP4	010670	597	908#	2311	3426									
TRPFLG	010672	608*	611	909#	1158*	1163	1180*	1185	1202*	1207	1224*	1229	1246*	1255
		1261	2279*	2282	2301*	2307*	2329	2783*	2786					
TSEC	036575	3192	3363#											
TSECX	036604	2588	2713	2852*	2856*	2862*	2868*	2872*	2880*	3364#				
TURKY	024562	2876	2892#											
T\$ARGC=	000001	50#	640#	652#	1135#	1136#	1137#	2103#	2112#	2199#	2208#	2876#	3043#	3082#
		3132#	3135#	3138#	3141#	3144#	3147#	3150#	3153#	3157#	3164#	3173#	3180#	3181#
		3188#	3189#	3192#	3204#	3205#	3206#	3207#	3219#					
T\$CODE=	004032	64#	65#	66#	67#	68#	69#	70#	71#	72#	73#	106#	107#	108#
		109#	110#	111#	112#	113#	114#	115#	116#	117#	118#	119#		
T\$ERRN=	000264	17#	614#	929#	1166#	1188#	1210#	1232#	1257#	1263#	1300#	1304#	1307#	1312#
		1336#	1363#	1386#	1413#	1443#	1456#	1484#	1493#	1517#	1526#	1554#	1564#	1594#
		1600#	1608#	1635#	1641#	1649#	1676#	1682#	1690#	1718#	1724#	1730#	1738#	1765#
		1770#	1774#	1808#	1816#	1827#	1852#	1885#	1921#	1949#	1980#	1987#	2056#	2065#
		2075#	2081#	2087#	2101#	2117#	2177#	2183#	2197#	2255#	2336#	2341#	2369#	2407#
		2414#	2422#	2430#	2446#	2478#	2483#	2487#	2514#	2518#	2549#	2559#	2561#	2565#
		2589#	2651#	2665#	2675#	2686#	2714#	2768#	2800#	2802#	2804#			
T\$EXCP=	000000	69#	70#	71#	73#	106#	110#	113#	119#					

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CROSS REFERENCE TABLE - USER SYMBOLS

SEQ 0149

T\$FLAG= 000040	1138#	1337#	1364#	1387#	1414#	1444#	1457#	1485#	1494#	1518#	1527#	1555#	1565#
T\$FREE= 040434	1818#	2046#	2060#	2160#	2232#	2284#	2626#	2751#					
T\$GMAN= 000000	3453	3468#											
T\$HILI= 000006	17#												
T\$LAST= 000001	69#	70#	71#	73#	106#	110#	113#	119#					
T\$LOLI= 000000	17#	3453#	3460										
T\$LSYM= 010000	69#	70#	71#	73#	106#	110#	113#	119#					
	17#	74	99	120	151	601	616	632	644	656	1144	1169	1191
	1213	1235	1264	1313	1342	1369	1392	1419	1462	1499	1532	1570	1609
	1650	1691	1739	1775	1829	1854	1892	1929	1952	1988	2020	2035	2045
	2121	2146	2159	2213	2259	2384	2451	2488	2519	2566	2695	2771	3222
T\$LTNO= 000043	3453#												
T\$NEST= 177777	17#	63#	65	67	72	74#	89#	99#	105#	109	112	120#	143#
	151#	465#	469#	473#	601#	605#	616#	620#	632#	636#	644#	648#	656#
	1130#	1144#	1157#	1169#	1179#	1191#	1201#	1213#	1223#	1235#	1243#	1264#	1279#
	1313#	1323#	1325#	1341#	1342#	1352#	1354#	1368#	1369#	1378#	1380#	1391#	1392#
	1402#	1406#	1418#	1419#	1429#	1431#	1461#	1462#	1472#	1474#	1498#	1499#	1508#
	1510#	1531#	1532#	1542#	1546#	1569#	1570#	1583#	1609#	1620#	1650#	1661#	1691#
	1702#	1739#	1749#	1775#	1786#	1829#	1841#	1854#	1866#	1870#	1890#	1892#	1902#
	1929#	1939#	1952#	1967#	1988#	2005#	2009#	2020#	2024#	2035#	2039#	2045#	2050#
	2118#	2121#	2133#	2137#	2146#	2150#	2159#	2164#	2209#	2213#	2227#	2259#	2278#
	2296#	2372#	2384#	2398#	2451#	2459#	2488#	2495#	2519#	2526#	2566#	2577#	2632#
	2693#	2695#	2702#	2755#	2769#	2771#	3127#	3222#					
T\$NS0 = 000011	63#	65	67	72	74	89#	99	105#	109	112	120	143#	151
	465#	469	473#	601	605#	616	620#	632	636#	644	648#	656	1130#
	1144	1157#	1169	1179#	1191	1201#	1213	1223#	1235	1243#	1264	1279#	1313
	1323#	1342	1352#	1369	1378#	1392	1402#	1419	1429#	1462	1472#	1499	1508#
	1532	1542#	1570	1583#	1609	1620#	1650	1661#	1691	1702#	1739	1749#	1775
	1786#	1829	1841#	1854	1866#	1892	1902#	1929	1939#	1952	1967#	1988	2005#
	2121	2133#	2213	2227#	2259	2278#	2384	2398#	2451	2459#	2488	2495#	2519
	2526#	2566	2577#	2695	2702#	2771	3127#	3222					
T\$NS1 = 000003	1325#	1341	1354#	1368	1380#	1391	1406#	1418	1431#	1461	1474#	1498	1510#
	1531	1546#	1569	1870#	1890	2009#	2020	2024#	2035	2039#	2045	2050#	2118
	2137#	2146	2150#	2159	2164#	2209	2296#	2372	2632#	2693	2755#	2769	
T\$PCNT= 000000	3460#	3461#											
T\$PTAB= 010065	3461#												
T\$PTHV= 000001	50	3468#											
T\$PTNJ= 000001	17#	3461#	3468										
T\$SAVL= 177777	17#												
T\$SEGL= 177777	17#	1325#	1337	1341#	1354#	1364	1368#	1380#	1387	1391#	1406#	1414	1418#
	1431#	1444	1457	1461#	1474#	1485	1494	1498#	1510#	1518	1527	1531#	1546#
	1555	1565	1569#	1870#	1890#	2050#	2060	2118#	2164#	2209#	2296#	2372#	2632#
	2693#	2755#	2769#										
T\$SEKO= 010000	1325#	1337	1341	1354#	1364	1368	1380#	1387	1391	1406#	1414	1418	1431#
	1444	1457	1461	1474#	1485	1494	1498	1510#	1518	1527	1531	1546#	1555
	1565	1569	1870#	1890	2050#	2060	2118	2164#	2209	2296#	2372	2632#	2693
	2755#	2769											
T\$SIZE= 000007	3453	3468#											
T\$SUBN= 000000	17#	1157#	1179#	1201#	1223#	1243#	1279#	1323#	1352#	1378#	1402#	1429#	1472#
	1508#	1542#	1583#	1620#	1661#	1702#	1749#	1786#	1841#	1866#	1902#	1939#	1967#
	2005#	2009#	2024#	2039#	2133#	2137#	2150#	2227#	2278#	2398#	2459#	2495#	2526#
	2577#	2702#											
T\$TAGL= 177777	17#												
T\$TAGN= 010067	17#	63#	89#	105#	143#	465#	473#	605#	620#	636#	648#	1130#	1157#
	1179#	1201#	1223#	1243#	1279#	1323#	1352#	1378#	1402#	1429#	1472#	1508#	1542#
	1583#	1620#	1661#	1702#	1749#	1786#	1841#	1866#	1902#	1939#	1967#	2005#	2009#

2024#	2039#	2133#	2137#	2150#	2227#	2278#	2398#	2459#	2495#	2526#	2577#	2702#
3127#	3460#	3461#										
64#	66#	68#	69#	70#	71#	73#	74#	99#	106#	108#	110#	111#
113#	114#	115#	116#	117#	118#	119#	120#	151#	469#	601#	616#	632#
644#	656#	1138#	1144#	1151#	1156#	1169#	1173#	1178#	1191#	1195#	1200#	1213#
1217#	1222#	1235#	1239#	1242#	1264#	1268#	1278#	1313#	1317#	1322#	1337#	1341#
1342#	1346#	1351#	1364#	1368#	1369#	1373#	1377#	1387#	1391#	1392#	1396#	1401#
1414#	1418#	1419#	1423#	1428#	1444#	1457#	1461#	1462#	1466#	1471#	1485#	1494#
1498#	1499#	1503#	1507#	1518#	1527#	1531#	1532#	1536#	1541#	1555#	1565#	1569#
1570#	1574#	1582#	1609#	1613#	1619#	1650#	1654#	1660#	1691#	1695#	1701#	1739#
1743#	1748#	1775#	1779#	1785#	1818#	1829#	1833#	1840#	1854#	1858#	1865#	1890#
1892#	1896#	1901#	1929#	1934#	1938#	1952#	1956#	1966#	1988#	1992#	2004#	2020#
2035#	2045#	2046#	2060#	2118#	2121#	2125#	2132#	2146#	2159#	2160#	2209#	2213#
2217#	2226#	2232#	2259#	2263#	2276#	2284#	2372#	2384#	2389#	2397#	2451#	2455#
2458#	2488#	2492#	2494#	2519#	2523#	2525#	2566#	2570#	2576#	2626#	2693#	2695#
2699#	2701#	2751#	2769#	2771#	3121#	3222#						
17#	1157#	1179#	1201#	1223#	1243#	1279#	1323#	1352#	1378#	1402#	1429#	1472#
1508#	1542#	1583#	1620#	1661#	1702#	1749#	1786#	1841#	1866#	1902#	1939#	1967#
2005#	2009	2024	2039	2133#	2137	2150	2227#	2278#	2398#	2459#	2495#	2526#
2577#	2702#	3121	3453									
17#	474	476	478	480	482	518	522	531	601	614	615	616
631	632	640	644	652	656	929	1135	1136	1137	1144	1166	1167
1168	1169	1188	1189	1190	1191	1210	1211	1212	1213	1232	1233	1234
1235	1257	1258	1259	1263	1264	1280	1300	1304	1307	1312	1313	1325
1336	1337	1341	1342	1354	1363	1364	1368	1369	1380	1386	1387	1391
1392	1406	1413	1414	1418	1419	1431	1443	1444	1456	1457	1461	1462
1474	1484	1485	1493	1494	1498	1499	1510	1517	1518	1526	1527	1531
1532	1546	1554	1555	1564	1565	1569	1570	1594	1595	1600	1601	1608
1609	1635	1636	1641	1642	1649	1650	1676	1677	1682	1683	1690	1691
1718	1719	1724	1725	1730	1731	1738	1739	1765	1766	1770	1771	1774
1775	1808	1809	1816	1817	1818	1827	1828	1829	1843	1852	1853	1854
1870	1871	1885	1886	1890	1891	1892	1921	1922	1929	1942	1949	1950
1951	1952	1980	1987	1988	2009	2020	2024	2035	2039	2045	2046	2050
2056	2057	2060	2065	2066	2075							

T11	012172	G	1157#	3121
T10	013410	G	1402#	3121
T11	013514	G	1429#	3121
T12	013742	G	1472#	3121
T13	014126	G	1508#	3121
T14	014274	G	1542#	3121
T15	014466	G	1583#	3121
T16	014670	G	1620#	3121
T17	015114	G	1661#	3121
T18	015340	G	1702#	3121
T19	015630	G	1749#	3121
T2	012256	G	1179#	3121
T20	016024	G	1786#	3121
T21	016232	G	1841#	3121
T22	016320	G	1866#	3121
T23	016466	G	1902#	3121
T24	016622	G	1939#	3121
T25	016706	G	1967#	3121
T26	017034	G	2005#	3121
T26.1	017034		2009#	
T26.2	017102		2024#	
T26.3	017150		2039#	
T27	017734	G	2133#	3121
T27.1	017734		2137#	
T27.2	017766		2150#	
T28	020360	G	2227#	3121
T29	020554	G	2278#	3121
T3	012342	G	1201#	3121
T30	021350	G	2398#	3121
T31	021722	G	2459#	3121
T32	022126	G	2495#	3121
T33	022274	G	2526#	3121
T34	022554	G	2577#	3121
T35	023436	G	2702#	3121
T4	012426	G	1223#	3121
T5	012512	G	1243#	3121
T6	012634	G	1279#	3121
T7	013076	G	1323#	3121
T8	013216	G	1352#	3121
T9	013322	G	1378#	3121
LIAM	000200	G	155#	

[illegible]

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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0153

BCOMPL	475	477	479	481	483	3213									
BEGIN.	2190	1157	1179	1201	1223	1243	1279	1323	1352	1378	1402	1429	1472	1508	1542
	1583	1620	1661	1702	1749	1786	1841	1866	1902	1939	1967	2005	2133	2227	2278
	2398	2459	2495	2526	2577	2702									
BGNAU	648														
BGNAUT	605														
BGNCLN	620														
BGNDOU	636														
BGNHRD	63														
BGNHW	89														
BGNINI	473														
BGNMSG	3127														
BGNPRO	465														
BGNPTA	3461														
BGNRPT	1130														
BGNSEG	1325	1354	1380	1406	1431	1474	1510	1546	1870	2050	2164	2296	2632	2755	
BGNSET	3460														
BGNSFT	105														
BGNSUB	2009	2024	2039	2137	2150										
BGNSW	143														
BGNTST	1157	1179	1201	1223	1243	1279	1323	1352	1378	1402	1429	1472	1508	1542	1583
	1620	1661	1702	1749	1786	1841	1866	1902	1939	1967	2005	2133	2227	2278	2398
	2459	2495	2526	2577	2702										
BNCOMP	532														
CKLOOP	1595	1601	1636	1642	1677	1683	1719	1725	1731	1766	1771	1809	1817	1828	1836
	1922	1950	2057	2066	2076	2082	2088	2104	2178	2184	2200	2371			
DESCRI	52														
DEVTYP	54														
DFERR	2120	929	1263	1300	1304	1307	1312	1336	1363	1386	1413	1443	1456	1484	1493
	1517	1526	1554	1564	1594	1600	1608	1635	1641	1649	1676	1682	1690	1718	1724
	1730	1738	1765	1770	1774	1808	1816	1827	1852	1885	1921	1949	1980	1987	2056
	2065	2075	2081	2087	2101	2117	2177	2183	2197	2255	2336	2341	2369	2407	2414
	2422	2430	2446	2478	2483	2487	2514	2518	2549	2559	2561	2565	2589	2651	2665
	2675	2686	2714	2768	2800	2802	2804								
DISPAT	3121														
DISPLA	107														
DOCLN	522	1168	1190	1212	1234	1259	3080	3221							
DODU	615	1167	1189	1211	1233	1258	3220								
DORPT	518														
ENDAU	656														
ENDAUT	616														
ENDCLN	632														
ENDDU	644														
ENDHRD	74														
ENDHW	99														
ENDINI	601														
ENDMSG	3222														
ENDPRO	469														
ENDPTA	3467														
ENDRPT	1144														
ENDSEG	1341	1368	1391	1418	1461	1498	1531	1569	1890	2118	2209	2372	2693	2769	
ENDSET	3468														
ENDSFT	120														
ENDSUB	2020	2035	2045	2146	2159										
ENDSW	151														
ENDTST	1169	1191	1213	1235	1264	1313	1342	1369	1392	1419	1462	1499	1532	1570	1609

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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0154

	1650	1691	1739	1775	1829	1854	1892	1929	1952	1988	2121	2213	2259	2384	2451
EQUALS	2488	2519	2566	2695	2771										
ERRDF	155														
	929	1263	1300	1304	1307	1312	1336	1363	1386	1413	1443	1456	1484	1493	1517
	1526	1554	1564	1594	1600	1608	1635	1641	1649	1676	1682	1690	1718	1724	1730
	1738	1765	1770	1774	1808	1816	1827	1852	1885	1921	1949	1980	1987	2056	2065
	2075	2081	2087	2101	2117	2177	2183	2197	2255	2336	2341	2369	2407	2414	2422
	2430	2446	2478	2483	2487	2514	2518	2549	2559	2561	2565	2589	2651	2665	2675
ERRSF	2686	2714	2768	2800	2802	2804									
ESCAPE	614	1166	1188	1210	1232	1257									
EXIT	1337	1364	1387	1414	1444	1457	1485	1494	1518	1527	1555	1565			
GETPRI	1138	1818	2046	2060	2160	2232	2284	2626	2751						
GPHARD	3435														
GPRMA	531														
GPRMD	69	70	110												
GPRML	71	73	106	113	119										
HEADER	64	66	68	108	111	114	115	116	117	118					
INLOOP	50														
LASTAD	3212														
M#BYTE	3453														
M#CHEC	50#														
M#CNT0	1138#	1818#	2046#	2060#	2160#	2232#	2284#	2626#	2751#						
	64#	66#	68#	69#	70#	71#	73#	106#	108#	110#	111#	113#	114#	115#	116#
M#COUN	117#	118#	119#												
	640#	652#	1135#	1136#	1137#	2103#	2112#	2199#	2208#	2876#	3043#	3082#	3132#	3135#	3138#
	3141#	3144#	3147#	3150#	3153#	3157#	3164#	3173#	3180#	3181#	3188#	3189#	3192#	3204#	3205#
M#DATA	3206#	3207#	3219#												
M#DECR	50#	52#	54#												
	74#	99#	120#	151#	469#	601#	616#	632#	644#	656#	1144#	1169#	1191#	1213#	1235#
	1264#	1313#	1341#	1342#	1368#	1369#	1391#	1392#	1418#	1419#	1461#	1462#	1498#	1499#	1531#
	1532#	1569#	1570#	1609#	1650#	1691#	1739#	1775#	1829#	1854#	1890#	1892#	1929#	1952#	1988#
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M12

CVRLBBO - RLV12 DISKLESS.
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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0155

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CVRL880 -- RLV12 DISKLESS.
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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0156

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	1461#	1462#	1474#	1484#	1485#	1493#	1494#	1498#	1499#	1510#	1517#	1518#	1526#	1527#	1531#
	1532#	1546#	1554#	1555#	1564#	1565#	1569#	1570#	1594#	1595#	1600#	1601#	1608#	1609#	1635#
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	2341#	2369#	2371#	2372#	2384#	2407#	2414#	2422#	2430#	2446#	2451#	2478#	2483#	2487#	2488#
	2514#	2518#	2519#	2549#	2559#	2561#	2565#	2566#	2589#	2626#	2632#	2651#	2665#	2675#	2686#
	2693#	2695#	2714#	2751#	2755#	2768#	2769#	2771#	2800#	2802#	2804#	2876#	3043#	3080#	3082#
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	3192#	3204#	3205#	3206#	3207#	3212#	3219#	3220#	3221#	3222#	3435#				
M\$WORD	50#	64#	65#	66#	67#	68#	69#	70#	71#	72#	73#	106#	107#	108#	109#
	110#	111#	112#	113#	114#	115#	116#	117#	118#	119#	614#	929#	1138#	1166#	1188#
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	1724#	1730#	1738#	1765#	1770#	1774#	1808#	1816#	1818#	1827#	1852#	1885#	1921#	1949#	1980#
	1987#	2046#	2056#	2060#	2065#	2075#	2081#	2087#	2101#	2117#	2160#	2177#	2183#	2197#	2232#
	2255#	2284#	2336#	2341#	2369#	2407#	2414#	2422#	2430#	2446#	2478#	2483#	2487#	2514#	2518#
	2549#	2559#	2561#	2565#	2589#	2626#	2651#	2665#	2675#	2686#	2714#	2751#	2768#	2800#	2802#
	2804#	3121#	3461#												
M\$XFER	65#	67#	72#	109#	112#										

CVRLB80 RLV12 DISKLESS.
CVRLB8.P11 12-JUN-85 15:33

MACY11 30(1046) 12 JUN-85 15:42 PAGE 49-5
CROSS REFERENCE TABLE MACRO NAMES

SEQ 0158

POINTE	49														
PRINTB	2112	2208	3132	3135	3138	3141	3144	3147	3150	3153	3157	3164	3173	3204	3205
	3206	3207													
PRINTF	640	652	1135	1136	1137	2876	3043	3082	3219						
PRINTX	2103	2199	3180	3181	3188	3189	3192								
READEP	474	476	478	480	482										
SETPRI	631	1280	1843	1853	1871	1891	1942	1951	2171	2210					
SFERR	207#	614	1166	1188	1210	1232	1257								
STARS	1151	1156	1173	1178	1195	1200	1217	1222	1239	1242	1268	1278	1317	1322	1346
	1351	1373	1377	1396	1401	1423	1428	1466	1471	1503	1507	1536	1541	1574	1582
	1613	1619	1654	1660	1695	1701	1743	1748	1779	1785	1833	1840	1858	1865	1896
	1901	1934	1938	1956	1966	1992	2004	2125	2132	2217	2226	2263	2276	2389	2397
	2455	2458	2492	2494	2523	2525	2570	2576	2699	2701					
SVC	16#	17													
XFER	67	72	1138#	1818#	2046#	2060#	2160#	2232#	2284#	2626#	2751#				
XFERF	65	109													
XFERT	112														

. ABS. 040434 000

ERRORS DETECTED: 0

CVRLB8.BIC, CVRLB8.LST/LI:TOC/CRF=SVC33/ML, CVRLB8.P11
RUN-TIME: 33 34 4 SECONDS
RUN TIME RATIO: 128/72-1.7
CORE USED: 19K (38 PAGES)