

DataGeneral

**TECHNICAL
STATEMENT**

TEXT LISTING

068-000520-01

PROGRAM

ECLIPSE POWER SHUT DOWN TEST

TEXT TAPE

097-000520-01

ABSTRACT

POWER SHUT DOWN TEST IS A MAINTENANCE PROGRAM DESIGNED TO TEST THE ECLIPSE POWER MONITOR AND AUTO RESTART OPTION. THE PROGRAM ALSO TESTS FOR MEMORY RETENTION AFTER POWER SHUT DOWN. IT IS TO BE USED WITH OR WITHOUT THE POWER MONITOR OPTION.

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OPERATING PROCEEDUME/OPERATOR INPUT

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14.4.1
14.4.2
14.4.3
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14.5.1
14.5.2

LOAD THE PROGRAM VIA THE BINARY LOADER.
SET THE SWITCHES TO 000200
PRESS START
OPERATION WITHOUT THE POWER MONITOR.
THE PROGRAM WILL REQUEST THE OPERATOR
TO TURN THE COMPUTER OFF,ON,AND TO
RESTART IT.
NOTE:
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THE RESTART ADDRESS WITHOUT POWER MONITOR
IS LOC. 10 (OCTAL).
UPON RESTART THE PROGRAM WILL PRINT "OK"
ON THE TELETYPE.
NOTE:
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THE "O.K." DISPLAY SIGNIFIES THAT THE
POWER WAS SHUTDOWN AND RESTORED AND
MUST BE FOLLOWED BY THE QUESTION MARK
"?" PROMPTER WITHIN "5 SECONDS" MINIMUM.
THE OPERATOR SHOULD REPEATEDLY PERFORM
THE POWER OFF-RESTART SEQUENCE. AFTER
EACH RESTART ALLOW 5 SECONDS FOR A
POSSIBLE ERROR MESSAGE.
OPERATION WITH THE POWER MONITOR OPTION.
INITIALLY:
THE PROGRAM WILL REQUEST THE OPERATOR
TO TURN THE COMPUTER OFF,ON,AND TO RE-
START IT.
CAUTION !!!
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THE USER (OPERATOR) SHOULD WAIT FOR
THE PROMPTER CHARACTER QUESTION MARK "?".
AFTER SEVERAL RESTARTS LOCK THE CONSOLE
AND REMOVE THE WALL PLUG.
SUCCESSFUL COMPLETION OF AUTO-RESTART WILL
RESULT IN THE FOLLOWING OUTPUT:
O.K. > "AUTO RESTART"

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TEST#1 & TEST#2

WHEN COMPUTER POWER IS RESTORED THE
PROGRAM WILL BE RESTARTED WITHOUT
OPERATOR INTERVENTION. THE MESSAGE "OK"
WILL BE PRINTED EACH TIME POWER IS RESTORED
IN TEST 1 AND TEST 2. A PROMPTER QUESTION
MARK "?" WILL BE DISPLAYED SIGNIFYING THAT
THE PROGRAM IS AWAITING POWER SHUTDOWN.

CAUTION:
-----
ALWAYS WAIT FOR THE "?" PROMPTER DISPLAY
BEFORE REMOVING POWER !!!

TEST#3

FOR ECLIPSE CPU'S THE PROMPTER "?" WILL BE DIS-
PLAYED AS ABOVE. FOR EACH PHASE OF MODE "A"
VECTOR INSTRUCTION TESTING. ALSO IF MONITOR
AUTO RESTART TAKES PLACE THE FOLLOWING TYPICAL
OUTPUT WILL BE DISPLAYED.

? INTERRUPT > POWER > O.K. "AUTO RESTART"

SUCCESSFUL COMPLETION OF ALL MODE "A" ECLIPSE
VECTOR INSTRUCTION TESTING WILL BE SIGNIFIED
BY THE FOLLOWING TYPICAL DISPLAY OUTPUT:

MODE "A" OK!

NOTE:
MANY COMPLETE CYCLES OF THE POWER SHUTDOWN TEST ARE
REQUIRED TO COMPLETELY CHECK OUT EACH ECLIPSE CPU.
SOME WITHOUT POWER MONITOR AUTO RESTART RECOVERY,
AND SOME WITH POWER MONITOR AUTO RESTART RECOVERY.

THE OPERATOR SHOULD REPEATEDLY REMOVE AND
RESTORE POWER. AT EACH RESTORATION OF
POWER ALLOW 5 SECONDS FOR POSSIBLE
ERROR MESSAGES.

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01 01 MESSAGE:
02 02 "PROGRAM SUM CHECK"
03 03
04 04 THE PROGRAM IS SUSPECTED OF HAVING BEEN MODIFIED
05 05 DURING THE POWER UP-DOWN SEQUENCE. SEE NOTE AND
06 06 THE EXCEPTION BELOW !!!
07 07
08 08 *NOTE:
09 09 MEMORY MODIFICATION ERRORS WILL RESULT
10 10 IN THE FOLLOWING TYPICAL DISPLAY WHEN
11 11 SWI<2> = 0 :
12 12
13 13 PROG COPY
14 14 LOC. CONTENTS LOC. CONTENTS
15 15
16 16 XXXXX (NNNNNN) YYYYY (NNNNNN)
17 17
18 18
19 19 WHERE: "XXXXX" AND "YYYYY" ARE UCTAL MEMORY
20 20 ADDRESSES AND "NNNNNN" ARE THE CONTENTS OF
21 21 THE ASSOCIATED LOCATIONS.
22 22
23 23 EXCEPTION
24 24 *****
25 25 THE ABSENCE OF THE MEMORY MODIFICATION ERROR
26 26 DISPLAY ABOVE SIGNIFIES THAT THE ARITHMETIC UNIT MAY
27 27 HAVE FAILED DURING THE CHECK SUM GENERATION. I.E. THE
28 28 NEW CALCULATION AND ORIGINAL CALCULATION DO NOT AGREE,
29 29 HOWEVER THE AREA SUSPECTED HAS BEEN VERIFIED ON A WORD
30 30 FOR WORD BASIS AND NO DISPARITY (ERROR) HAS BEEN FOUND.
31 31
32 32
33 33
34 34
35 35 5.4.1 RESTRICTION
36 36 *****
37 37 "THIS FAILURE INDICATES THAT THE
38 38 PROGRAM HAS BEEN MODIFIED AND THE USE IS
39 39 ADVISED TO RELOAD THE PROGRAM" !!!
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01 01
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03 03
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05 05 5.5
06 06 MESSAGE:
07 07 "C(ADDRESS)=XXXXXX"
08 08
09 09 IF LOCATIONS IN THE MEMORY ADDRESS PATTERN
10 10 ARE MODIFIED THE PROGRAM WILL TYPE:
11 11 C(ADDRESS)=XXXXX. THIS MESSAGE INDICATES
12 12 MEMORY DATA DISPLAYED IS BEING MODIFIED
13 13 ON POWER SHUT DOWN.
14 14 WHERE C(ADDRESS) SHOULD EQUAL "XXXXX".
15 15 "THESE LOCATIONS ARE REGENERATED FOLLOWING
16 16 ERROR DETECTION" !!!
17 17
18 18 NOTE:
19 19 *****
20 20 "ON SYSTEMS WITHOUT BATTERY POWER BACKUP
21 21 THAT THESE ERRORS ARE NOT FATAL BUT ONLY SUGGEST
22 22 THAT MEMORY RETENTION DURING POWER SHUT-DOWN HAS
23 23 FAILED". CONTINUATION HOWEVER MAY RESULT IN
24 24 FAILURES WITHIN THE PROGRAM AREA, WHICH WOULD BE
25 25 FATAL !!!
26 26
27 27 5.5.1 CAUTION:
28 28 *****
29 29 ON SYSTEMS WITH BATTERY POWER BACKUP,
30 30 "THAT THESE ERRORS INDICATE A PROBLEM EXISTS",
31 31 "AND SHOULD BE CORRECTED" !!!
32 32
33 33 5.5.6 TESTS FAILURES
34 34 FOLLOWING SUCCESSFUL EXECUTION OF
35 35 TEST1 & TEST2 WITHOUT ERRORS, WILL RESULT IN THE
36 36 EXECUTION OF TEST3 IF RUN ON AN ECLIPSE PROCESSOR.
37 37 FAILURES ENCOUNTERED DURING TESTS, EXECUTION WILL
38 38 RESULT IN UNIQUE ERROR INFORMATION BEING DISPLAYED.
39 39 THE ASSOCIATED TEXT SHOULD BE SELF EXPLANATORY.
40 40 SEE 6.4 BELOW

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PROGRAM DESCRIPTION/THEORY OF OPERATION
TEST1=
*6.1.0 THE CONTENTS OF MEMORY IS FILLED WITH AN ADDRESS PATTERN. THIS PATTERN IS CONTINUALLY CHECKED DURING THE POWER UP-DOWN SEQUENCE PERFORMED BY THE OPERATOR. ANY LOSS OF DATA IS DETECTED AND PRINTED AS AN ERROR. THE ADDRESS PATTERN IS NOT REWRITTEN UNLESS AN ERROR IS DETECTED. SEE EXCEPTION 6.1.2 BELOW
*6.1.1 DURING INITIAL EXECUTION A COPY OF THE PROGRAM IS MADE IN THE NEXT 4K. SECTION OF MEMORY WITH THE EXCEPTION OF VARIABLE STORAGE LOCATIONS "0" THRU "337" OCTAL. THE ORIGINAL PROGRAM CODE AND THE COPY ARE CHECKED FOLLOWING POWER RESTORATION, SEE 5.4 ABOVE !!!
*6.1.2 WITH THE USE OF SWT <1> = 1 (3.2.1) AND THEN IF THE PROGRAM IS LOADED USING THE "OTOS DEBUG COMMAND" THE UPPER LIMIT OF THE MEMORY ADDRESS PATTERN IS FIXED AT 27200 OCTAL TO PROTECT THE DEBUGGER. MEMORY RETENTION VERIFICATION IS THEN LIMITED TO 27200 (OCTAL). THIS MAY BE USEFUL AT TIMES TO ENABLE THE USER THE ABILITY TO CHECKOUT POWER SHUT-DOWN LOGIC ON SYSTEMS WITH MEMORY RETENTION PROBLEMS. BE ADVISED HOWEVER THAT THE PROGRAM SHOULD BE RELOADED AND THE SYSTEM SHOULD BE CHECKED OUT AT MAXIMUM CAPACITY" !!!

*6.2 TEST2=
*6.2.1 THE TIME FROM A POWER-FAIL INTERRUPT TO LOSS OF POWER IS COUNTED, AND PRINTED WHEN POWER IS RESTORED.
NOTE:
ANY CHANGE IN HARDWARE DISTRIBUTION WILL THEN REQUIRE RESTARTING TEST #2 WITH SWT <0> = 1. (3.2.1)
*6.2.1 ECLIPSE SHUTDOWN TIMING VERIFICATION (TEST2)
*6.2.2 PLACE A SCOPE PROBE ON SLOT#2 PIN # 70 (IORST) AND SYNC CHANNEL # 1 (POSITIVE). USE SYNC CODE AT LOCATION "SYNC:" TO SETUP SCOPE TRIGGER.
*6.2.3 PLACE CHANNEL#2 PROBE ON TEST POINT#1 ON CPU BACK PANEL.
*6.2.3 PLACE ADDRESS COMPARE SWITCH IN MONITOR POSITION, THEN,
*6.2.4 PLACE OCTAL EQUIVALENT OF SYMBOLIC ADDRESS "SYNC1:" IN THE CONSOLE SWITCH REGISTER IF USING "SYNC" SETUP CODE! SEE 6.2.2 ABOVE. SYNC1 = 1335 (OCTAL)
START "SYNC:" CODE EXECUTION AT LOC. "1334" OCTAL AND TRIGGER SCOPE FOR DISPLAY. REMEMBER THAT A TIME BASE OF 5 TO 10 MILLISECOND IS USED AND THAT THE SYNC PULSE GENERATED BY IORST IS LESS THAN A MICROSECOND IN DURATION.
*6.2.5 START TEST#2 SA = 441 (OCTAL)
PLACE OCTAL EQUIVALENT OF SYMBOLIC ADDRESS "TIME1:" IN THE CONSOLE SWITCH REGISTER AND PROCEED WITH TEST#2 FOR ACTUAL TIMING EVALUATION PROCESS AS DESCRIBED BELOW:
TIME1 = 1305 (OCTAL)
"WAIT FOR PROMPTER" "?" !!!
SHUT-DOWN POWER !!!
THE POSITIVE TRACE ON CHANNEL#2 REPRESENTS THE ACTUAL SHUTDOWN TIME. NOTE: THE TIME BASE SHOULD BE SET IN THE RANGE OF 5 TO 10 MILLISECOND PER CENTIMETER.
THIS TIME SHOULD CLOSELY APPROXIMATE THE VALUE OF TIME THAT IS DISPLAYED BY THE PROGRAM ON POWER RESTORATION.
WHEN A REAL TIME CLOCK IS PRESENT ON THE SYSTEM I.E. "RTC" A TIMING TOLERANCE OF +-5% IS ASSUMED BUT THE PROCESSOR MUST MAINTAIN POWER FOR AT LEAST 1 MILLISECOND DURING THE POWER SHUT-DOWN SEQUENCE !!!
WHEN A REAL TIME CLOCK IS NOT PRESENT ON THE SYSTEM I.E. THE "RTY" IS USED A TOLERANCE OF +-12.5% IS ASSUMED BUT NOTE THE PROCESSOR MUST MAINTAIN POWER AS ABOVE, FOR MILLISECOND MINIMUM DURING POWER SHUT-DOWN SEQUENCE !!!
MEMORY CAN BE MONITORED INSTEAD OF MATCH TEST POINT#1 ON CHANNEL#2 FOR NOVA CLASS PROCESSOR TIMING VERIFICATION !!!

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01 IF SA=200 IS SELECTED, TEST1 AND TEST2 WILL
02 RUN ALTERNATELY. ON ECLIPSE PROCESSORS THE RUNN-
03 ING OF TEST3 IS NOT SELECTABLE AND WILL ONLY BE
04 EXECUTED IF THE PROGRAM IS STARTED AT SA=200 AND
05 TEST1 & TEST2 RUN SUCCESSFULLY WITHOUT ERRORS.
06 TEST1 OR TEST2 MAY BE SELECTED INDIVIDUALLY
07 BY SELECTING A NEW STARTING ADDRESS (440=TEST1,
08 441= TEST2).
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IF SA=200 IS SELECTED, TEST1 AND TEST2 WILL
RUN ALTERNATELY. ON ECLIPSE PROCESSORS THE RUNN-
ING OF TEST3 IS NOT SELECTABLE AND WILL ONLY BE
EXECUTED IF THE PROGRAM IS STARTED AT SA=200 AND
TEST1 & TEST2 RUN SUCCESSFULLY WITHOUT ERRORS.
TEST1 OR TEST2 MAY BE SELECTED INDIVIDUALLY
BY SELECTING A NEW STARTING ADDRESS (440=TEST1,
441= TEST2).

TEST3=

ECLIPSE VECTOR MODE "A" INSTRUCTION TEST (POWER=FAIL).
THIS TEST IS RUN ONLY IF THE PROGRAM IS STARTED AT
LOC. 200 (OCTAL) AND TEST 1 AND TEST 2 HAVE RUN TO
COMPLETION WITHOUT ERROR(S). IT VERIFIES THE SUCCESS=
FULL OPERATION OF THE ECLIPSE VECTOR INSTRUCTION
EXECUTION FOR MODE "A".

NOTE:
THIS TEST WILL BE RUN ONLY IF THE PROGRAM
RECOGNIZES IT IS ON AN ECLIPSE PROCESSOR.

THE PROMPTER CHARACTER "?" QUESTION MARK BELOW
SIGNIFIES THAT THE PROGRAM IS AWAITING OPERATOR
(USER) RESPONSE. I.E. "TURN THE CPU OFF"

? ? ? ?

THE ABOVE PROMPTER "?" WILL BE REPEATED PERIODICALLY
UNTIL THE OPERATOR RESPONDS BY TURNING THE CPU OFF.

IF THE CPU CONSOLE POWER ON/OFF SWITCH IS "NOT" IN
THE "LOCK" POSITION, "THE OPERATOR (USER) MUST
RESTART THE PROGRAM AT LOC. 10 (OCTAL)", FOLLOWING
THE RESTORATION OF POWER.

6.3.1 DURING INTERRUPTABLE TEST3 POWER SHUT DOWN TESTING,
THE ORIGINAL PROGRAM CODE AND THE COPY AREA ARE
CHECKED FOLLOWING POWER RESTORATION. SEE 5.4 AND 6.1.1
ABOVE FOR ERROR INFORMATION !!

6.4 IT IS RECOMMENDED THAT THE USER OF THIS PROGRAM READ
THE FOLLOWING ENTRIES IN THE ECLIPSE LINE COMPUTER
PROGRAMMER'S REFERENCE MANUAL, 015-000024-05.

POWER FAIL/AUTO RESTART 4-11
VECTOR ON INTERRUPTING DEVICE CODE 4-7

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RESTRICTION(S)

SEE 3.2.1 AND 5. ABOVE

MESSAGE "MEMORY SIZED TO: "XXXXX"
NOTE, IF SWITCH <1> IS SET AND SWITCH <0> IS SET = 1
THAT MEMORY WILL BE SIZED TO "27200" OCTAL. OTHERWISE
THE TOP OF LOGICAL MEMORY -400 OCTAL WILL BE THE
VALUE DISPLAYED. SEE 6.1.2 ABOVE !!!

POWER SHUTDOWN TESTING CAN ONLY BE EXECUTED IN THE
MANUAL MODE UNDER "DTOS" AND WILL NOT RETURN TO
THE MONITOR CORRECTLY IN RUNALL OR SELECT MODES.
I.E. USE THE "DTOS" LOAD COMMAND TO EXECUTE POWER
SHUTDOWN TESTING.
SEE 6.1.2 ABOVE

NOTE:
ERROR HALT "CKSM" IS A FATAL ERROR
AND INDICATES THAT THE PROGRAM CODE HAS BEEN MODIF-
IED ON POWER SHUTDOWN. THE USER (OPERATOR) IS ADVI-
SED TO "RELOAD THE PROGRAM" !!!!!
SEE 5.4 ABOVE !!!!!

"EPFAIL" WILL NOT RUN WITH CAT/KITTEN .
THE USER IS ADVISED NOT TO "CRUN,"C"
SELECT ETC. UNDER DTOS, DDOOS !!!

"EPFAIL" IS DESIGNED SPECIFICALLY FOR ECLIPSE CLASS
PROCESSORS. IT IS NOT DESIGNED TO SUPPORT THE MICRO
NOVA AND WILL NOT SUPPORT THE NOVA STANDARD PROGRAM
DEBUGGER. SEE 6.1.2 ABOVE !!!

"PSDT" IS THE STANDARD NOVA POWER SHUT-DOWN TEST !!!

"EPFAIL" TESTS 32-K OF MEMORY MAXIMUM. AND THE MPMU/
MPMU1 MEMORY MAP OPTION(S) ARE NOT REQUIRED.

IF "ERCC" MEMORY WITH BATTERY POWER BACKUP ARE BEING
TESTED, THE PROGRAM RUNS IN MODE 01. I.E., ENABLE THE
CHECKING AND CORRECTING OF ERRORS, BUT DO NOT INTERRUPT.

ON SYSTEMS UTILIZING AN S/130 ECLIPSE PROCESSOR WITH
SC MEMORY AND BATTERY BACKUP, NO POWER FAIL IS DETECTED
WHEN THE POWER PLUG IS PULLED. THIS IS BECAUSE DURING
POWER FAILURES, THE COMPUTER CONTINUES RUNNING SINCE
POWER IS SUPPLIED BY THE BATTERIES. DURING THAT TIME,
ION AND POWER FAIL GO LOW BUT +5V REMAINS HIGH. THIS
CAUSES THE PROGRAM TO BEGIN ITS POWER DOWN ROUTINE
(SAVING CRITICAL DATA IN MEMORY). THE PROGRAM
THEN ENTERS A LOOP AND CONTINUES TO OUTPUT "P?"
UNTIL THE POWER DOWN CYCLE IS COMPLETED. WITH
BATTERY BACKUP, THE POWER DOWN CYCLE IS NOT
COMPLETED SINCE POWER IS PROVIDED BY THE BATTERIES

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FOR AN ADDITIONAL 60 SECONDS. AFTER THIS TIME, ALL
POWER IS LOST AS IS ALL MEMORY (SC MEMORY).

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** EPFAIL.SR ECLIPSE POWER SHUT DOWN TEST 094-000918 4/4/77
**
** EQUATES
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