

TEXT LISTING

068-001077-00

PROGRAM

AP INTERGER/STORAGE DIAGNOSTIC

TEXT TAPE

097-001077-00

ABSTRACT

THIS PROGRAM IS A HARDWARE DIAGNOSTIC FOR THE ARRAY PROCESSOR. THE PROGRAM IS EXECUTED BY THE HOST COMPUTER CONTROLLING THE AP AND IS A GATE BY GATE TEST OF THE LOGIC IN THE ARRAY PROCESSOR. THE PROGRAM ASSSUMES ONLY THAT THE HOST COMPUTER IS FLNCTIONING PROPERLY.

1:0003 .MAIN

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6. RESTRICTIONS:
THIS PROGRAM CAN NOT BE RUN IN AN ICF-1P CONFIGURATION
AS THE IOP DOES NOT SUPPORT THE MTS MICRON-CODE.

7. PROGRAM DESCRIPTION/THEORY OF OPERATION
THIS PROGRAM UTILIZES THE MAINTENANCE INSTRUCTION
SET) OF THE ARRAY PROCESSOR TO EXERCISE AND PROVIDE
DIAGNOSTIC INFORMATION ABOUT THE FOLLOWING SECTIONS
OF THE ARRAY PROCESSOR:

- AP2 REGISTOR FILES
- AP2 ALU AND LATCH FUNCTIONS
- API WREG LOGIC
- API, AP2 TAB, TAR, FREG, XREG, YREG, AND ZREG LOGIC
- API RAM, PAR
- API, AP3 CRAM MEMORY AND I/O

THE MTS PROVIDES A MEANS FOR EXERCISING WELL DEFINED
HARDWARE AREAS OF THE ARRAY PROCESSOR. A COMPLETE
SET OF INSTRUCTIONS, DEFINITIONS AND EXPLANATIONS
IS FOUND IN SECTION IIC OF THIS TEST FILE AS WELL AS
IN THE ACTUAL PROGRAM LISTING.

1:0004 .MAIN

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8. SWITCH SETTINGS

LOCATION "SWREG" IS USED TO SELECT THE PROGRAM OPTIONS
(NOT SYSTEM CONFIGURATION). WHILE PLACING UNDER DTOS,
THIS LOCATION WILL BE LOADED BY THE MONITOR.
HOWEVER UNDER STAND ALONE AND PROGRAM LOAD MODES THIS
LOCATION WILL BE SET ACCORDING TO THE ANSWERS SUPPLIED
BY THE OPERATOR. IN ANY CASE THE OPTIONS CAN BE CHANGED
OR VERIFIED BY USING ONE OF THE COMMANDS GIVEN IN SEC.
A.2

A.1 SWITCH OPTIONS
DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION
"SWREG" IS AS FOLLOWS:

BIT	OCTAL VALUE	BINARY VALUE	INTERPRETATION
1	40000	1	LOOP ON ERROR SKIP LOOPING ON ERROR
2	20000	1	PRINT TO CONSOLE ABORT PRINT CLT TO CONSOLE
3	10000	1	DO NOT PRINT _X FAILURE PRINT _X FAILURE
4	04000	1	ALLOW END OF PASS PRINT OUT SUPPRESS END OF PASS PRINT OUT
5	02000	1	DO NOT PRINT ON THE LINE PRINTER PRINT ON THE LINE PRINTER
6	01000	1	DO NOT HALT ON ERROR HALT ON ERROR
10	00040	1	PRINT ERROR WORDS IN OCTAL FORM PRINT ERROR WORDS IN HEX FORMAT

10005 .MAIN

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01 SWITCH COMMANDS
02 ONCE THE PROGRAM STARTS EXECUTING THE STATE OF ANY OF
03 THE BITS CAN BE CHANGED BY HITTING KEYS 1-9, A-F. THE
04 PROGRAM WILL CONTINUE RUNNING AFTER LEAVING THE OPTIONS
05 EACH KEY WILL COMPLEMENT THE STATE OF THE BIT AFFILIAT-
06 ED WITH IT, THUS BIT 4 CAN BE ALTERED BY HITTING KEY 4.
07 SETTING OF ANY BIT OF LOCATION "SMREG" WILL SET BIT 0.
08 (DEFAULT MODE IS DEFINED AS ALL BITS OF SMREG SET TO 0)
09 THE PROGRAM CAN BE LOCKED INTO SWITCH-MODIFICATION MODE
10 BY TYPING A 0, IN WHICH CASE MORE THAN ONE BIT CAN BE
11 CHANGED BEFORE CONTROL IS ALLOWED TO RETURN TO THE
12 MAIN PROGRAM.
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8.2.1 OTHER COMMANDS

"CR" A "RETURN" CAN BE TYPED TO CONTINUE THE PROGRAM AFTER ITS LOCKED IN A SWITCH-MODIFICATION MODE

"0" THIS COMMAND GIVEN AT ANY TIME WILL RESET "SMREG" TO DEFAULT MODE AND RESTART THE PROGRAM.

"R" THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE PROGRAM. SWITCHES ARE LEFT WITH THE VALUES THEY HAD BEFORE THE COMMAND WAS ISSUED.

"O" THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE PROGRAM CONTROL TO GO TO OCT (NOTE: THIS IS AN OPTIONAL COMMAND AND IS AVAILBLE ONLY IF OPTPK IS PRESENT)

M THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE CURRENT OPERATING MODES.

10006 .MAIN

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01 OPERATING PROCEDURE
02 1. LOAD THE PROGRAM IN THE MOST COMPLETER
03 USING THE BINARY LOADER OR DTOS TAPE.
04 2. SET SWITCHES EQUAL TO ONE OF THE FOLLOWING
05 STARTING ADDRESSES:
06 176 ENTER OCTAL DERUGGER (ODT)
07 177 ENTER MEMORY DUMP
08 200,500 RUNALL TESTS
09 501 AP2 REGISTER FILES AND ALU
10 502 API,AP2 WREG, TAB,TAR TESTS
11 503 API RAM,RAR TESTS
12 504 API,AP3 CRAM TESTS
13 3. PRESS START.
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PROGRAM OUTPUT/ERROR DESCRIPTION

WHEN AN ERROR IS DETECTED A PRINTOUT OF THE FOLLOWING GENERAL FORMAT IS OUTPUT TO EITHER THE TTY AND OR THE LINE PRINTER:

OPTION PRINTOUT ***EXPLAINED BELOW

PC NNNNN AC1= YYYYY AC2= 7ZZZ
AC0= XXXXX

THE PC VALUE MAY POINT TO ONE OF THE FOLLOWING:

1. A CALL OF EHALT
NO OPTION PRINTOUT; SIGNIFICANCE OF AC'S 0-2 (IF ANY) IS EXPLAINED IN THE PROGRAM LISTING AT OR NEAR THE EHALT CALL.

2. A CALL OF EITHER RNCOMP OR CACOMP
IN THE CASE OF RNCOMP, WHICH COMPARES 2 REAL (32 BITS) NUMBERS, THE OPTICA PRINTOUT IS THE ENTIRE GOOD AND BAD 32 BIT NUMBERS IN EITHER A HEX OR OCTAL FORMAT. (SEE SM10 OPTION)

IN THE CASE OF CACOMP, WHICH COMPARES 2 COMPLEX (64 BITS) NUMBERS, THE OPTICA PRINTOUT IS THE EN GOOD AND BAD 64 BIT NUMBERS IN EITHER A HEX OR OCTAL FORMAT.

FOR EITHER OF THE ABOVE, ACC CONTAINS THE GOOD 16 BITS, AC1 THE BAD 16 BITS CAUSING THE ERROR, AND AC2 POINTS TO THE START OF THE BAD 2 OR 4 WORD DATA BLOCK.


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"LF" LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR
WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
CELL.
~ CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION
AND OPEN THE PRECEDING CELL
/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
+ "ADR" / CLOSE THE OPEN CELL WITH MODIFICATION, AND
- "ADR" / CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
OPEN THE CELL POINTED TO BY ITS CONTENTS = "ADR"
MODIFICATION OF A CELL
:110.3.2 ONCE A CELL HAS BEEN OPENED ITS CONTENTS CAN BE MODIFIED
BY TYPING THE NEW VALUE THE CELL IS TO CONTAIN IN THE
FORM OF AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".
IF A + OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-
PRESSION THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR
SUBTRACTED FROM THE OLD CONTENTS OF THE CELL. THE
ADDRESS ITSELF OR AN EXPRESSION RELATIVE TO THE ADDRESS
CAN BE DEPOSITED BY TYPING A ". " OR ".+/-OCTAL EXPRES-
SION". A RURORT COMMAND GIVEN RIGHT AFTER OPENING A CELL
ALLOWS THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
TYPED IN JUST BEFORE THE COMMAND WAS ISSUED.

:110.3.3 OTHER OOT COMMANDS
RURORT THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT M
DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
THE RURORT KEY IS PRESSED RIGHT AFTER OPENING A
CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CE
CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CE
AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
KEY WAS PRESSED.
"ADR" INSERT A BREAK POINT AT LOCATION "ADR".
ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
ENTRY TO OOT AFTER EXECUTING A BREAK POINT WILL
CAUSE IT TO BE DELETED.
D DELETE THE BREAK POINT IF ANY.
P RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
POINTED BY 4A.
"ADR" START EXECUTING THE PROGRAM AT "ADR" AFTER AN
IO-RESET.
K KILL THE STRING TYPED SO FAR. THE OOT RESPONDS
WITH A "2" AND THE OPEN CELL IS CLOSED WITHOUT
MODIFICATION.
= PRINT THE OCTAL VALUE OF THE INPUT ONLY.
THIS WILL CLOSE ANY OPEN CELLS WITHOUT
MODIFICATION AND WILL NOT OPEN A CELL

NOTE: IN PROGRAMS WHICH RELOCATE THEMSELVES THE
THE USER SHOULD PLACE BREAK POINTS ONLY IN THE
THE ORIGINAL PROGRAM AREA. IF A BREAK POINT IS
PLACED OUTSIDE THIS AREA THE RESULTS WILL
BE UNPREDICTABLE.

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:11E.0 MEMORY DUMP UTILITY
:11E.0.1 THIS UTILITY AFFORDS THE USER THE CAPABILITY
OF DISPLAYING, IN OCTAL FORMAT, THE CONTENTS
OF CONTIGUOUS MEMORY LOCATIONS OF VARIABLE RLCK
LENGTHS.
:11E.0.2 BLOCKS OF CONTIGUOUS MEMORY THAT ARE IDENTICAL
AND GREATER THAN 64 ENTRIES IN LENGTH ARE OUT-
PUT IN AN ABBREVIATED FORMAT. (SEE PAR. 11E.3.2).
THIS FEATURE WILL CONSERVE HARD COPY AND EXECUTION
TIME.
:11E.0.3 THE USER MAY ALSO SPECIFY A SEARCH ACRO. THE
TOTAL NUMBER OF ENTRIES FOUND; MATCHING THIS
WORD; WILL BE DISPLAYED AT THE END OF THE PRINTOUT
AND WILL ALSO BE SAVED IN LOCATION M0370.
:11E.0.4 THIS PROGRAM MAY BE MANUALLY STARTED AT LOCATION
"MDM2P" SYMRCLIC (I.E. THE FIRST ADDRESS OF
THE UTILITY); OR DYNAMICALLY CALLED BY A USER
PROGRAM VIA THE D2MP MACRO.

:11E.1 DIALOGUE
:11E.1.1 PROGRAM DIALOGUE TERMINATED BY A "?" REQUIRES A
USER RESPONSE BEFORE PROGRAM EXECUTION CAN CON-
TINUE. IN THE FOLLOWING DIALOGUE USER RESPONSE IS
INDICATED BY " ":
FST ADR? "AAAAAA"
LST ADR? "BBBBBB"
WD? "CCCCCC"
WHERE:
"AAAAAA" IS ANY OCTAL NUMBER IN THE RANGE OF 00000
THRU 077776; AND EQUAL TO, OR LESS THAN "BBBBBB".
"BBBBBB" IS ANY OCTAL NUMBER IN THE RANGE OF 00001
THRU 077777; AND EQUAL TO, OR GREATER THAN "AAAAAA".
"CCCCCC" IS ANY OCTAL NUMBER IN THE RANGE OF 00000
THRU 177777.
:11E.1.2 A RESPONSE OF "0", "CR", "LF", "TAB", OR "SPACE"
TO ANY REQUEST WILL BE INTERPRETED AS A "0" RE-
SPONSE.
.EJEC

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:11E.2 ERRORS
:11E.2.1 AN ILLEGAL RESPONSE TO A REQUEST, (I.E. A NON-
: OCTAL CHARACTER), WILL RESULT IN A REPEAT OF THAT
: REQUEST.
:
:11E.2.2 A RANGE ERROR RESPONSE, (I.E. FIRST ADDRESS
: GREATER THAN LAST ADDRESS), WILL RESULT IN THE RE-
: START OF THE PROGRAM IF ENTERED MANUALLY; OR A
: RETURN TO PC +3 IF ENTERED DYNAMICALLY.
:
:11E.3 TYPICAL PROGRAM RESPONSE
:
:ADR=> 0 1 2 3 4 5 6 7
:0 NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN
:10 NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN
:SAME
:100 NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN
:110 NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN NN=NN
:WD'S FOUND= NN=NN
:
:11E.3.1 WHERE:
: THE "NN=NN" ENTRIES ABOVE CORRESPOND TO THE CON-
: TENTS OF THE ASSOCIATED ADDRESSES.
:
: THE "NN=NN" ENTRY ABOVE REPRESENTS THE TOTAL NUMBER OF
: WORDS (OCTAL) FOUND MATCHING THE SEARCH WORD.
:
:11E.3.2 IN THE EXAMPLE ABOVE IT IS ASSUMED THAT THE CON
: OF LOCATIONS 10 THRU 107 INCLUSIVE ARE IDENTICAL. THERE-
: FORE THE ABBREVIATED OUTPUT. (I.E. LOCATIONS 20 THRU 107
: INCLUSIVE) ARE REPLACED BY THE TEXT MESSAGE "SAME".
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: NOTE:
: FOR MANUAL MODE OF OPERATION SWITCH "2" IN LOCATION
: "SWREG" MUST BE "0" OR THE PROGRAM WILL HANG IN A
: LOOP.

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:0016 .MAIN

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: 12. SPECIAL NOTES/FEATURES
:
: 1. THIS PROGRAM REQUIRES MAPPING OF MEMORIES
: EXCEEDING 32K. FOR SYSTEMS OF LESS THAN 32K.,
: THE AP-DRAM IS THE LAST 4K OF LOGICAL MEMORY, AND
: A POINTER TO THE START OF THE AP-DRAM IS GENERATED
: IN THE LOCATION RAMPT. IF SYSTEM MEMORY IS GREATER
: THAN 32K, THE MEMORY IS MAPPED AS FOLLOWS:
:
: LOGICAL=1K PHYSICAL=1K
: 0-25.
: 26.-29. AP-DRAM PHYSICAL 4 8LCCCKS
: 30.,31.
:
: 4 POINTER TO THE LOGICAL AP-DRAM ADDRESS (64000) IS
: AGAIN STORED IN THE LOCATION RAMPT. THE MAPPING IS
: DONE VIA THE SUBROUTINE CALL MAPIT. THE MAPPING
: FEATURE IS ONLY REQUIRED BY THE C-SERIES TESTS
: WHICH EXERCISE THE AP-DRAM VIA THE AP MAIN MEMORY
: INTERFACE.
:
: 2. AGAIN, IT IS NOTED THAT NO CHECKING OF THE MICRO-
: CODE/CONTROL STORE USED FOR EXECUTED THE USER
: AP INSTRUCTIONS(SIS) IS DONE IN THIS PROGRAM.
:
: 3. THE CAT/KITTEN DATA CHANNEL EXERCISERS MAY BE RUN
: WITH THIS PROGRAM VIA A CLOAD COMMAND TO EITHER A
: DTOS TAPE OR A DDOOS DISK. IF THE CAT/KITTEN PROGRAM
: HAS BEEN LOADED MANUALLY BY A PAPER TAPE, A START
: MAY BE OBTAINED BY LOADING A -1 TO LCC. 62 VIA
: THE ODT PROGRAM.
:
: PROGRAM RUNTIME
: RUNTIME FOR ALL PASSES IS APPROXIMATELY 1 MIN 30 SEC

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10017 .MAIN

**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS

0018 .MAIN

M20MD 001526 MC 12/01
020TC 000454 MC 12/01