

DataGeneral

**TECHNICAL
STATEMENT**

TEXT LISTING

068-000067-09

PROGRAM

TYPE 4065,4066,4067,4068
DIAGNOSTIC

TEXT TAPE

097-000067-09

ABSTRACT

THE TYPE 4065,4066,4067,4068 DIAGNOSTIC IS A MAINTENANCE
PROGRAM DESIGNED TO TEST THE TYPE 4065,4066,4067,4068 OPTIONS.

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0001 .MAIN          MACRO REV 06.30          09:32:11 09/19/79
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? NAME: T4D.TX          PART NUMBER: 097-000067
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? DESCRIPTION: TYPE 4065,4066,4067,4068 DIAGNOSTIC
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? REVISION HISTORY:
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? REV.          DATE
? 00          11/15/72
? 01          03/22/73
? 02          05/02/73
? 03          07/13/73
? 04          04/26/74
? 05          09/05/75
? 06          XX/XX/XX
? 07          06/25/76
? 08          08/19/77
? 09          01/19/79
?
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PROGRAM NAME
TYPE 4065, 4066, 4067, 4068 DIAGNOSTIC
DIRT NAME: 4065 D
SOURCE NAME: T4D

REVISION HISTORY
09 DL1B, DGC, SOFT CONSOLE UPDATE
CHANGES:
1. CHANGE DIRT (DTOS) NAME FROM "4065 DIAG" TO "4065 D"
2. STANDARDIZE START ADDRESS TO LOCATION 200
3. INSERT I/O MODULE POINTER
4. REPLACE PREVIOUS SETUP, ERROR, LOOP ROUTINES WITH
DL1B EQUIVALENTS.
5. TESTS WITH "IORS" USE L20PX RATHER THAN LOOP
6. USE DL1B P260U, P25TM MACROS FOR STANDARDIZATION
7. DELETE IORS FROM SETUP AND LOOP ROUTINES
8. USE DL1B TYPACK, SWPACK, ODT (OCTAL DERUGGER)
9. PROGRAM NOW PRINTS PASS X AT END OF PASS
10. REPLACE ALL "HALT" WITH EXIT TO ODT AND MESSAGE
INDICATING FAULT

MACHINE REQUIREMENTS
13. ANY DGC CPU(EXCEPT MICRO NOVA)
13.1 4K READ/WRITE MEMORY
13.2
13.3
13.4 TELETYPE

TEST REQUIREMENTS
14.
IN ORDER TO RUN THE DIAGNOSTIC THE TYPE 4065,4066,
4067,4068 TEST CONNECTOR MUST BE CONNECTED TO THE
COMPUTER BACK PANEL CONNECTOR FOR THE SLOT WHICH
THE BOARD IS IN.
ALSO THE FOLLOWING JUMPER SELECTION ON THE BOARD
IS REQUIRED FOR EACH OPTION TO RUN THE DIAGNOSTIC.

4065 STANDARD JUMPER SELECTION:
W1,W2,W6,W10,W11,W12,W18,W20,W28,W33,W43,W52
4066 STANDARD JUMPER SELECTION:
W39,W50
4067 STANDARD JUMPER SELECTION:
W29,W30
4068 STANDARD JUMPER SELECTION:
W24,W57

ABSTRACT
THE TYPE 4065,4066,4067,4068 DIAGNOSTIC IS A
MAINTENANCE PROGRAM DESIGNED TO TEST THE TYPE
4065,4066,4067, AND 4068 OPTIONS.
THE STANDARD DEVICE CODE IS 42, HOWEVER THE DIAGNOSTIC
WILL CHECK A BOARD JUMPERED FOR ANY EVEN DEVICE CODE
BETWEEN 22 AND 64.

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0003 .MAIN

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? ? ?
RESTRICTIONS
N/A

10004 .MAIN

17.
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PROGRAM DESCRIPTION/THEORY OF OPERATION
THE DIAGNOSTIC STARTS AT LOCATION 200 AND WILL ASK
SEVERAL QUESTIONS IN ORDER TO DETERMINE THE JUMPER
SELECTION AND OPTIONS PRESENT.

IF THE SYSTEM IN USE HAS NO REAL TIME CLOCK AVAILABLE,
THE TELETYPE (CONSOLE) WILL BE SUBSTITUTED AS THE TIME
BASE. IN THIS CASE, THE PROGRAM WILL ASK FOR THE TTY
BAUD RATE AND THE NUMBER OF BITS PER CHARACTER.
WHEN USING THE DASHES AT 110 BAUD, THE NUMBER OF BITS
PER CHARACTER EQUALS 10. OTHERWISE BITS/CHAR = 11.

AS AN EXAMPLE OF THE RESPONSES THAT SHOULD BE ENTERED
IN ORDER TO CHECK A BOARD WITH 4065,4066 OPTIONS
PRESENT:

ARE DIGITAL INPUTS AND OUTPUTS ON BOARD(TYPE Y OR N)? Y
OUTPUT REGISTER, I/O RESET WILL PRODUCE A (TYPE + OR -)
OUTPUT LEVEL +
INPUT REGISTER, A (0) INPUT IS PRODUCED BY A (TYPE +OR-)
LEVEL +
EXTERNAL INTERRUPTS PRESENT(TYPE Y OR N)? N
INTERNAL TIMER PRESENT(TYPE Y OR N)? N
TYPE 2 DIGIT DIO DEVICE THEN CARRIAGE 42

FOR INTERVAL TIMER OPTION(4068) THE DIAGNOSTIC
WILL TYPE THE PERIOD OF THE CLOCK, FOR STANDARD
JUMPER W57 THIS WILL BE AS SHOWN BELOW:

INTERVAL TIMER CLOCK IN US (99 OR 100)

A PRINT OUT OF 99 OR 100 IS SUFFICIENT, FOR ANY
OTHER TIME THE OPERATOR SHOULD SUSPECT WRONG
JUMPER SELECTION OR A PROBLEM IN THE CLOCK
CIRCUIT.

DATA OUTPUTS ARE SHORTED BACK AS DATA INPUTS
TO TEST 4065,4066,4067,4068 LOGIC.

0005 .MAIN

STWPD 8

SWITCH SETTINGS

18. LOCATION "SWREG" IS USED TO SELECT THE PROGRAM OPTIONS (NOT SYSTEM CONFIGURATION). WHILE RUNNING 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. 8.2

19. SWITCH OPTIONS

20. 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 OUT TO CONSOLE
3	10000	1	DO NOT PRINT % FAILURE PRINT % 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
7	00400	1	DO NOT PRINT SUMMARY AND/OR PASSING OF EACH SUBTEST PRINT SUMMARY AND/OR PASSING OF EACH SUBTEST
8	00200	1	PRINT ONLY THE FIRST ERROR PRINT EVERY ERROR

SWITCH COMMANDS

ONCE THE PROGRAM STARTS EXECUTING THE STATE OF ANY OF THE BITS CAN BE CHANGED BY HITTING KEYS 1-9, A-F. THE PROGRAM WILL CONTINUE RUNNING AFTER UPDATING THE OPTIONS. EACH KEY WILL COMPLEMENT THE STATE OF THE BIT AFFILIATED WITH IT, THUS BIT 4 CAN BE ALTERED BY HITTING KEY 4. SETTING OF ANY BIT OF LOCATION "SWREG" WILL SET BIT 0. (DEFAULT MODE IS DEFINED AS ALL BITS OF SWREG SET TO 0) BY TYPING A 0, IN WHICH CASE MORE THAN ONE BIT CAN BE CHANGED BEFORE CONTROL IS ALLOWED TO RETURN TO THE MAIN PROGRAM.

0006 .MAIN

8.2.1 OTHER COMMANDS

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

"D" THIS COMMAND GIVEN AT ANY TIME WILL RESET "SWREG" 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 ODT (NOTE: THIS IS AN OPTIONAL COMMAND AND IS AVAILBLE ONLY IF OODPK IS PRESENT)

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

0005 .MAIN

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0007 .MAIN

01 OPERATING PROCEDURE
02 CONNECT SHORTING CONNECTOR TO BACK PANEL
03 CONNECTOR FOR THE 4065, ET. AL. BOARD TO BE TESTED.
04 LOAD FROM DTOS OR
05 SET SWITCHES TO 200
06 PRESS RESET.
07 PRESS START.
08 IF THIS IS THE FIRST TIME THRU OR IF "R OR "D WAS INPUT,
09 THE PROGRAM WILL ASK SEVERAL QUESTIONS RELATING TO
10 OPTIONS PRESENT ON THE BOARD AND JUMPER CONFIGURATION.
11 ENTER THE SUITABLE RESPONSES TO THE QUESTIONS.
12 THE PROGRAM WILL THEN RUN UNTIL MANUALLY STOPPED
13 OR AN ERROR IS DETECTED. AT THE END OF EACH PROGRAM PASS
14 THE WORD "PASS" WILL BE PRINTED. ALLOW THE PROGRAM TO
15 COMPLETE SEVERAL PASSES.
16
17 PROGRAM OUTPUT/ERROR DESCRIPTION
18 IF A MALFUNCTION IS DETECTED THE PROGRAM WILL
19 EXIT TO THE ERROR ROUTINE. PC WILL CONTAIN THE
20 LOCATION OF THE ERROR +1. EXAMINE THE LISTING
21 TO DETERMINE IF OTHER AC CONTENTS ARE IMPORTANT.

0008 .MAIN

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070TD 11
OCTAL DEBUG TOOL (ODT)
THE DIAGNOSTIC IS EQUIPPED WITH A BUILT IN ODT WHICH CAN BE ACCESSED BY HITTING CONTROL 0 ("0") AT ANY TIME DURING THE EXECUTION OF THE PROGRAM (AFTER SETTING THE PARAMETERS) ON ENTERING ODT THE ADDRESS OF THE LOCATION HAVING THE NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.
CONVENTIONS AND SYMBOLS
THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:
? PRESSED ANY ILLEGAL KEY CAUSES THE ODT TO RESPOND WITH A "2".
@ ODT IS READY AND AT YOUR SERVICE.
COMMAND STRUCTURE
AN ODT COMMAND HAS THE FOLLOWING FORMAT:
[ARGUMENT] [COMMAND]
AN ARGUMENT MAY BE ONE OF THE FOLLOWING:
"EXP" AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEADING ZEROS NEED NOT BE TYPED.
"ADR" AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT THAT BIT 0 IS NEGLECTED.
A COMMAND IS A SINGLE TELETYPE CHARACTER
ODT COMMANDS
THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:
INTERNAL CPU CELLS AND MEMORY LOCATIONS.
OPENING INTERNAL CELLS
THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN 0 AND 7
0-3 FOR ACCUMULATORS 0-3
4 FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN CPU AND TIO STATUS
5 INTERPRETATION
15 STATUS OF TIO DONE FLAG
14 STATUS OF INTERRUPTS (ION FLAG)
13 STATUS OF CARRY BIT
6 ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF ANY)
7 INSTRUCTION AT THE BREAK POINT LOCATION
OTHER COMMANDS TO OPEN CELLS ARE:
"ADR"/ OPEN THE CELL AND PRINT ITS CONTENTS
./ OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER AND PRINT ITS CONTENTS.
."ADR"/ ADD "ADR" TO THE POINTER, OPEN THE CELL AND PRINT ITS CONTENTS.
.-"ADR"/ SUBTRACT "ADR" FROM THE POINTER, OPEN THE CELL AND PRINT ITS CONTENTS.
"CR" THE RETURN KEY IS USED TO CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION.

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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
OPEN THE CELL POINTED TO BY ITS CONTENTS.
+"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADDR".
-"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".

11.3.2 MODIFICATION OF A CELL
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 EXPRESS-
ION". A RUBOUT 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.

11.3.3 OTHER ODT COMMANDS
RUBOUT THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CELLS
CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
KEY WAS PRESSED.
"ADR"8 INSERT A BREAK POINT AT LOCATION "ADR".
ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
ENTRY TO ODT 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"R START EXECUTING THE PROGRAM AT "ADR" AFTER AN
IO-RESET.
K KILL THE STRING TYPED SO FAR. THE ODT RESPONDS
WITH A "?" 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
ORIGINAL PROGRAM AREA. IF A BREAK POINT IS
PLACED OUTSIDE THIS AREA THE RESULTS WILL
BE UNPREDICTABLE.

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MISC.
N/A
RUN TIME
N/A
.EOT

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0011 .MAIN

**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS

0012 .MAIN

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S2MPD 001075 MC 5/01