

DataGeneral

TECHNICAL STATEMENT

TEXT LISTING

068-000475-03

PROGRAM

DG/DAC ANALOG CONVERSION
SYSTEM DIAGNOSTIC

TEXT TAPE

097-000475-03

ABSTRACT

THIS IS A DIAGNOSTIC PROGRAM FOR THE ANALOG CONVERSION DEVICES OF THE DG/DAC PROGRAMMED I/O SYSTEM. THE ANALOG CONVERSION SECTION INCLUDES: 1) 4280 SERIES ANALOG TO DIGITAL CONVERTERS, 2) 4281/82 SERIES ANALOG MULTIPLEXORS AND 3) 4288/89 SERIES DIGITAL TO ANALOG CONVERTERS.

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PROGRAM NAME:DACAD.SR, DG/DAC ANALOG CONVERSION
SYSTEM DIAGNOSTIC

REVISION HISTORY:
REV. 05 WAS CREATED FOR THE FOLLOWING:

1. TO ALLOW THE PROGRAMS TO RUN SUCCESSFULLY ON
   SYSTEMS WITH A SOFT CONSOLE;
2. TO ENABLE THE USE OF I/O MODULES;
3. TO ALLOW THE PROGRAMS TO RUN SUCCESSFULLY ON
   BOTH THE DGC AND M400L SYSTEMS;
4. TO STANDARDIZE PROGRAM SWITCHES, STARTING
   ADDRESSES, SIZING ROUTINES, ETC.;
5. TO ENABLE THE PROGRAMS TO RUN IN A REMOTE
   DIAGNOSTIC MODE IN THE FUTURE.
6. TO ENABLE THE PROGRAMS TO RUN WITH A 1K AND
   4K DCU.

MACHINE REQUIREMENTS
1. NOVA CPU WITH AT
   LEAST 4K READ/WRITE MEMORY
2. 4300 DG/DAC CHASSIS CONTROL CARD
3. 4300 DG/DAC I/O CHASSIS
4. BASIC I/O TELETYPE INTERFACE AND CONTROL

OPTIONAL EQUIPMENT TABLE
BOARD TYPE      ID      BOARD #
-----
A/D CONVERTERS:
(+/- 10 VOLTS)  41      4280
(+/- 5 VOLTS)   41      4280-A
(0 - 10 VOLTS)  41      4280-B
(0 - 5 VOLTS)   41      4280-C

ANALOG MIX GATES:
-----
50 MA DIFFERENTIAL  42      4281-C
CURRENT INPUTS
DIFFERENTIAL VOLTAGE
INPUTS              42      4281
DIFFERENTIAL VOLTAGE
INPUTS (PROG. GAIN)  42      4281-G
SINGLE-ENDED VOLTAGE
INPUTS              42      4282

3-2 THIS PROGRAM MAY BE RUN IN A HOST/DCU COMPUTER
CONFIGURATION.

3-3 ALL NUMERIC INPUTS TO THE PROGRAM SUCH AS STARTING
ADDRESSES, SLOT #'S, DEVICE CODES ETC. ARE
EXPECTED TO BE IN OCTAL UNLESS OTHERWISE NOTED.

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NAME: DACAD.TX          PART NUMBER: 097-000475
DESCRIPTION: DG/DAC ANALOG CONVERSION SYSTEM DIAGNOSTIC
REVISION HISTORY
REV.          DATE
00           02/04/77
01           05/27/77
02           01/13/78
03           01/27/79

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:4. TEST REQUIREMENTS: N/A
:5. SUMMARY:
: THIS IS A DIAGNOSTIC PROGRAM FOR THE ANALOG CONVERSION DEVICES OF THE DG/DAC PROGRAMMED I/O SYSTEM. THE ANALOG CONVERSION SECTION INCLUDES: 1) 4280 SERIES ANALOG TO DIGITAL CONVERTERS, 2) 4281/82 SERIES ANALOG MULTIPLEXORS AND 3) 4288/89 SERIES DIGITAL TO ANALOG CONVERTERS.
: THE PROGRAM ASSUMES ONLY THE EXISTENCE OF A DG/DAC I/O CHASSIS AND CHASSIS CONTROLLER. A STAND-ALONE CHASSIS CONTROLLER SURVEY IS INCLUDED AND IS RUN BEFORE ANY OTHER TESTS.
: THIS DIAGNOSTIC INCLUDES LOGIC LEVEL TESTING FOR THE DG/DAC ANALOG TO DIGITAL CONVERTERS AND ANALOG INPUT MULTIPLEXORS. NO ANALOG SECTIONS ARE TESTED ON EITHER THE A/D OR MULTIPLEXORS IN THIS DIAGNOSTIC. NOTE THAT THE ANALOG MULTIPLEXORS MUST BE USED IN CONJUNCTION WITH AN A/D CONVERTER.
: NO D/A CONVERTER TESTS ARE CONTAINED IN THIS PROGRAM.
: TESTS AND CALIBRATION PROCEDURES FOR THE ANALOG SECTIONS OF THE A/D CONVERTERS, ANALOG MULTIPLEXORS AND THE D/A CONVERTERS ARE CONTAINED IN THE DG/DAC ANALOG CONVERSION SYSTEM EXERCISER PROGRAM (LISTING = 096-476;AR TAPE = 095-476).
: INDIVIDUAL TEST OPERATIONS ARE INCLUDED IN SECTION 7.
:6. RESTRICTIONS: SEE SECTION 5

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:7. PROGRAM DESCRIPTIONS/THEORY OF OPERATION:
:7.0: INITIALIZATION
: IN THE ARSENAL OF A REAL-TIME CLOCK, THE FOLLOWING IS ASKED TO ESTABLISH THE TIME BASE -
: "TTO BAUD RATE?" (3-DIGIT DECIMAL #)
: ALL TEST SET-UPS ARE PROCEEDED BY THE CHASSIS INITIALIZATION SEQUENCE, UNLESS SPECIFICALLY SKIPPED BY ANSWERING "NO" TO THE FOLLOWING QUESTION-
: "INITIALIZE? - "
: THIS IS THE FIRST QUESTION ASKED WHEN STARTING ANY TEST. IF NO IS THE RESPONSE, THE FOLLOWING QUESTIONS ARE OMITTED (RETAINING THE PREVIOUS CONFIGURATION) AND THE PROGRAM PROCEEDS TO THE INDIVIDUAL TEST SET-UP. OTHERWISE THE FOLLOWING WILL BE ASKED-
: "CHASSIS DEVICE CODE - "
: (VALID RANGE = 40 - 76)
: "CHASSIS MASK BIT - " (0 - 17)
: THIS IS THE DEVICE MASK BIT FOR THE 'CPU MASKO' INSTRUCTION AND IS JUMPER SELECTED ON THE CONTROL CARD.
: "DCU? - " (YES OR NO)
: YES INDICATES THAT THE DG/DAC CHASSIS IS BEING CONTROLLED BY A DCU-50 (DATA CONTROL UNIT) AND THE FOLLOWING IS ASKED-
: "DCU DEVICE CODE - "
: (VALID RANGE=20-76: PRIMARY DEVICE CODE=34)
: QUESTIONS ARE RE-TYPED IF INCORRECT RESPONSES ARE MADE. THE PROGRAM PROCEEDS TO THE INDIVIDUAL TEST SET-UPS AFTER INITIALIZATION.
: NOTE THAT THE INITIALIZATION SEQUENCE MUST BE DONE WHEN STARTING THIS DIAGNOSTIC FOR THE FIRST TIME (I.E. ON INITIAL PROGRAM LOADING). WHEN DOING MULTIPLE TESTS, THE INITIALIZATION CAN GENERALLY BE SKIPPED AFTER THE FIRST TEST SET-UP.
: "DCU HALTED" WILL BE TYPED IF THE DCU IS EITHER NOT IN THE SYSTEM OR THE INCORRECT DEVICE CODE WAS INPUT.

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10005 -MAIN

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01 : STARTING ADDRESS <500> - DETERMINE THE CHASSIS
02 :
03 : SLOT CONFIGURATION
04 :
05 :
06 : AFTER THE INITIALIZATION OF THE CHASSIS
07 : THE PROGRAM DETERMINES THE SLOT CONFIG-
08 : URATION BY SCANNING SLOT #'S 0 - 17
09 : INDIVIDUALLY WHILE CHECKING THE DEVICE
10 : CODES OF THE BOARDS (IF ANY) IN THEM.
11 : THE INFORMATION IS STORED IN A TABLE
12 : WHICH IS OUTPUT TO THE TTY. THE OUTPUT
13 : CONSISTS OF THE SLOT #'S AND THE DEVICE ID'S
14 : OF THE BOARDS IN THE SLOTS (IF ANY).
15 : IF THE BOARD IS A MULTIPLEXOR THAT
16 : HAS A PARENT A/D BOARD, THEN ITS MUX SELECT #
17 : IS ALSO GIVEN. IF THE MUX DOES NOT BELONG
18 : TO A VALID A/D-MUX SET-UP, THEN NO MUX
19 : SELECT # IS PRINTED. IF THERE IS AN ERROR
20 : WITH EITHER THE MUX SELECT LOGIC OR THE DEVICE
21 : STATUS LOGIC, THEN THE MUX SELECT # WILL = 20.
22 : THIS ROUTINE ASSUMES THAT ALL ID'S RECEIVED FROM
23 : THE SLOTS ARE CORRECT. ANY ERRORS MUST BE
24 : DETERMINED BY THE OPERATOR. AFTER OUTPUT OF THE
25 : TABLE, THE PROGRAM WILL HALT.
26 :
27 :
28 :
29 : STARTING ADDRESS <501> - A/D-MUX LOGIC TESTS
30 :
31 : THIS IS A STAND-ALONE, LOGIC LEVEL TEST FOR THE
32 : 4280 ANALOG TO DIGITAL CONVERTER & THE 4241/82 SERIES
33 : ANALOG MULTIPLEXORS. THE PROGRAM CHECKS THE FOLLOWING
34 : TTL LOGIC:
35 :
36 : A/D CONVERTER: ALL CONTROL LOGIC SUCH AS DEVICE ID,
37 : BUSY/DONE, INTERRUPT REQUEST/DISABLE,
38 : DEVICE STATUS BITS, DCH ADDRESS
39 : REGISTER (STATIC TEST ONLY), TRIGGER
40 : SELECT MODES AND MISC. LOGIC.
41 :
42 : TESTING UNDER DCU/HOST OPERATION
43 :
44 : IF THE DG/DAC CHASSIS IS CONTROLLED
45 : BY A DCU=50, THE FOLLOWING DATA CHANNEL
46 : (DCH) LOGIC & CONTROL SIGNALS WILL NOT
47 : BE TESTED DURING THE A/D LOGIC CHECK:
48 :
49 : DCHR,DCHA,DCHP,DCHT,DCHM0,INC DCH
50 : REGISTER,DCH REQ,DCH SEL,ZDCHP,ZDCHT,
51 : DCH CONVERSION COUNTER AND LAST
52 : CHANNEL STATUS SIGNAL.
53 :
54 : MULTIPLEXORS: CHECKS THE FOLLOWING LOGIC:
55 : DEVICE ID, MUX SELECTION STATUS (DIA)
56 : WORD, MUX #/CHANNEL # REGISTER, DATA BUS
57 : BITS 8-15, BUS ENABLE/DISABLE & BUS
58 : INCREMENT (REGISTER INCREMENTING).
59 :
60 : THE FOLLOWING MUX SIGNALS ARE NOT
61 : TESTED: 1ST MODE IN/OUT, MINUS IN/OUT.
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10006 -MAIN

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01 : INITIALIZATION: AFTER INITIALIZATION OF THE CHASSIS,
02 : THE FOLLOWING WILL BE ASKED:
03 :
04 : "INITIALIZE TEST = "
05 :
06 : IF NO IS THE RESPONSE, THE FOLLOWING
07 : QUESTIONS ARE SKIPPED. OTHERWISE
08 : THE FOLLOWING INFORMATION IS REQUESTED:
09 : (INFORMATION MUST BE INPUT ON INITIAL
10 : PROGRAM LOADING).
11 :
12 : "A/D SLOT # = "
13 :
14 : "SELECT # FOR FOLLOWING MUX'S
15 : (CR IF NONE):"
16 :
17 : AFTER THE ABOVE IS TYPED, THE PROGRAM
18 : WILL PRINT SUCCESSIVE SLOT #'S, STARTING
19 : WITH THE SLOT FOLLOWING THE PARENT A/D.
20 : IF THERE ARE NO MUX'S AT ALL IN THE
21 : SYSTEM, SIMPLY HIT CARRIAGE RETURN ON
22 : THE TTY KEYBOARD. IF THERE IS ONE OR
23 : MORE MUX'S IN THE SYSTEM, ENTER THE
24 : SELECT #'S (DETERMINED BY THE SELECT
25 : SWITCH SETTINGS ON THE MUX BOARDS)
26 : THAT CORRESPOND TO THE SLOTS IN QUESTION.
27 : IF THERE IS AN ERROR IN THE INPUT, THE
28 : PROMPT WILL BE RE-TYPED. NOTE THAT
29 : NO TWO MUX'S CAN HAVE THE SAME MUX
30 : SELECT # TO STOP THE INPUT SEQUENCE
31 : AFTER THE LAST MUX SELECT # IS
32 : INPUT, SIMPLY HIT RETURN. THE
33 : PROGRAM WILL THEN START RUNNING ALL
34 : APPLICABLE TESTS.
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10007 .MAIN

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1 OPERATION:ON THE FIRST PASS, THE STAND-ALONE CHASIS
2 CONTROLLER SURVEY IS RUN FIRST, THEN THE
3 LOGIC TEST FOR THE PARENT A/D, FOLLOWED BY
4 A LOGIC CHECK FOR EACH OF THE MUX'S IN THE
5 SYSTEM (IF ANY) SUCCESSIVELY BY SLOT # (IF
6 MORE THAN ONE MUX), UNTIL THE LAST MUX. IF
7 ANY LOGIC FAULTS ARE DETECTED IN
8 ANY OF THE TESTS, THEY WILL BE REPORTED, WITH
9 THE PROGRAM COUNTER & ACCUMULATOR CONTENTS 0-2
10 OUTPUT TO THE TTY. IF NO ERRORS ARE FOUND ON
11 THE FIRST PASS, "PASS" WILL BE PRINTED.
12 AFTER THE FIRST PASS, THE PROGRAM WILL RE-TEST
13 THE A/D LOGIC FOLLOWED BY THE SAME SEQUENCE OF
14 MUX LOGIC TESTS FOR ANY & ALL MUX'S IN SET-UP
15 SPECIFIED BY THE OPERATOR. "PASS" IS PRINTED
16 AFTER EVERY SUCCESSFUL LOOP THROUGH
17 THE ENTIRE A/D-MUX SET-UP.
18 THE PROGRAM WILL HALT AFTER REPORTING
19 ANY LOGIC ERRORS FOUND DURING TESTING.
20
21 NO ANALOG SECTIONS ON EITHER THE A/D
22 OR THE MULTIPLEXORS ARE TESTED IN THIS
23 TEST. CONVERSIONS ARE TRIGGERED (TO
24 SET DONE, REQUEST INTERRUPTS & TEST "EOC"
25 STATUS SIGNALS) BUT NO DATA IS READ IN
26 FROM THE A/D (DIR TO A/D SLOT) AFTER
27 THE CONVERSIONS ARE MADE.
28
29 NOTE: THE EXTERNAL CLOCK TRIGGERING
30 MODE IS NOT CHECKED DURING THE STAND
31 ALONE A/D LOGIC TEST. THIS FUNCTION
32 CAN BE TESTED USING THE A/D CALIBRATION
33 ROUTINE CONTAINED IN THE DG/DAC
34 ANALOG CONVERSION SYSTEM EXERCISER PROGRAM.
35
36 ALSO, ANY EXTERNAL TRIGGERING SOURCE
37 CONNECTED TO "EXT CLK" (PIN # 5R ON A/D)
38 MUST BE DISABLED DURING A/D-MUX LOGIC
39 TESTING. OTHERWISE TEST WILL NOT RUN
40 PROPERLY.
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10008 .MAIN

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1 OPERATING MODES/SWITCH SETTINGS:
2
3 SWITCH SETTINGS
4
5 LOCATION "SWREG" IS USED TO SELECT THE PROGRAM OPTIONS
6 (NOT SYSTEM CONFIGURATION). WHILE RUNNING UNDER DTDS,
7 THIS LOCATION WILL BE LOADED BY THE MONITOR.
8 HOWEVER UNDER STAND ALONE AND PROGRAM LOAD MODES THIS
9 LOCATION WILL BE SET ACCORDING TO THE ANSWERS SUPPLIED
10 BY THE OPERATOR. IN ANY CASE THE OPTIONS CAN BE CHANGED
11 OR VERIFIED BY USING ONE OF THE COMMANDS GIVEN IN SEC.
12 A.3
13
14 SWITCH OPTIONS
15 DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION
16 "SWREG" IS AS FOLLOWS:
17
18 BIT OCTAL BINARY INTERPRETATION
19 VALUE VALUE
20
21 1 40000 1 LOOP ON ERROR
22
23 2 20000 1 SKIP LOOPING ON ERROR
24
25 PRINT TO CONSOLE
26
27 ABORT PRINT OUT TO CONSOLE
28
29 DO NOT PRINT % FAILURE
30
31 PRINT % FAILURE
32
33 DO NOT PRINT ON THE LINE PRINTER
34
35 PRINT ON THE LINE PRINTER
36
37 DO NOT HALT ON ERROR
38
39 HALT ON ERROR
40
41 SWITCH COMMANDS
42 ONCE THE PROGRAM STARTS EXECUTING THE STATE OF ANY OF
43 THE BITS CAN BE CHANGED BY HITTING KEYS 1-9, A-F. THE
44 PROGRAM WILL CONTINUE RUNNING AFTER UPDATING THE OPTIONS.
45 EACH KEY WILL COMPLEMENT THE STATE OF THE BIT AFFILIAT-
46 ED WITH IT, THUS BIT "0" CAN BE ALTERED BY HITTING KEY "1".
47 SETTING OF ANY BIT OF LOCATION "SWREG" WILL SET BIT 0.
48 (DEFAULT MODE IS DEFINED AS ALL 8 BITS OF SWREG SET TO 0)
49
50 OTHER COMMANDS (" = CONTROL KEY)
51
52 "CR" A "RETURN" CAN BE TYPED TO CONTINUE THE PROGRAM
53 AFTER ITS LOCKED IN A SWITCH MODIFICATION MODE
54
55 "D THIS COMMAND GIVEN AT ANY TIME WILL RESET "SWREG"
56 TO DEFAULT MODE AND RESTART THE PROGRAM.
57
58 "R THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE
59 PROGRAM. SWITCHES ARE LEFT WITH THE VALUES THEY
60 HAD BEFORE THE COMMAND WAS ISSUED.
61
62 "O THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE
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0009 .MAIN
01 :
02 : PROGRAM CONTROL TO GO TO ODT (NOTE: THIS IS AN
03 : OPTIONAL COMMAND AND IS AVAILBLE ONLY IF
04 : ODTPK IS PRESENT)
05 :
06 : M
07 : THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE
08 : CURRENT OPERATING MODES.
09 :
10 : 0
11 : THIS COMMAND GIVEN AT ANY TIME WILL LOCK THE
12 : PROGRAM INTO SWITCH MODIFICATION MODE WHERE
13 : MORE THAN 1 BIT CAN BE CHANGED.
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:9. OPERATING PROCEEDURE/OPERATOR INPUT:
:9.1
: 1.A LOAD PROGRAM VIA BINARY LOADER
: 1.B MAKE NECESSARY HARDWARE CONNECTIONS
: PERTAINING TO THE INPUT/OUTPUT TYPES AND/OR
: SYSTEM CONFIGURATION.
: 1.C SET SWITCHES EQUAL TO ONE OF THE STARTING
: ADDRESSES SHOWN BELOW
: PRESS START
: 1.D STARTING ADDRESS
: 70 ODT DIRECT ENTRY ONLY
: 500 CHASSIS CONFIGURATION
: 501 A/D-MUX LOGIC TEST
:10. PROGRAM OUTPUT/ERROR DESCRIPTION:
: WHEN AN ERROR IS DETECTED, THE PROGRAM PRINTS THE
: VALUE OF THE PC ON THE CALL TO EHALT AND THE
: CONTENTS OF AC'S 0-2, AND THEN LOOPS ALLOWING THE
: OPERATOR TO SET SWPAK (SEE SWITCH SETTINGS).
: DEPENDING UPON SWPAK SETTINGS, THE PROGRAM MAY EITHER CONTINUE
: ON TO THE NEXT TEST OR GO INTO A SCOPE LOOP BETWEEN THE
: LAST CALLS TO .LOOP AND .SETUP.
: THE PARTICULAR SIGNIFICANCE OF AC'S 0-2 IS EXPLAINED IN
: THE LISTING FOR THE PARTICULAR TEST INVOLVED.
: IF A DG/DAC CHASSIS POWER FAIL INTERRUPT IS DETECTED
: (FLAG=21) THE PROGRAM WILL HALT. THIS IS DONE TO AVOID
: POSSIBLE PROGRAM DESTRUCTION. IF THIS OCCURS,
: RE-START THE PROGRAM AFTER DG/DAC CHASSIS POWER-UP.
:11. DEBUG HELP:
:020D 11
: OCTAL DEBUG TOOL (ODT)
: THE DIAGNOSTIC IS EQUIPED 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 PARA-
: METERS).
: ON ENTERING ODT THE ADDRESS OF THE LOCATION HAVING THE
: NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.
:11.1
: CONVENTIONS AND SYMBOLS
: THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:
: ? PRESSED ANY ILLEGAL KEY CAUSES THE ODT TO RES-
: POND WITH A "P".
: @ ODT IS READY AND AT YOUR SERVICE.
:11.2
: COMMAND STRUCTURE
: AN ODT COMMAND HAS THE FOLLOWING FORMAT:

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0011 .MAIN
01
02 (ARGUMENT) (COMMAND)
03 AN ARGUMENT MAY BE ONE OF THE FOLLOWING:
04 "EXP" AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS
05 SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEAD-
06 ING ZEROS NEED NOT BE TYPED.
07 "ADR" AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT
08 THAT BIT 0 IS NEGLECTED.
09 A COMMAND IS A SINGLE TELETYPE CHARACTER
10
11 ODT COMMANDS
12 THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE
13 USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:
14 INTERNAL CPU CELLS AND MEMORY LOCATIONS.
15
16 11.3.1 OPENING INTERNAL CELLS
17 THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF
18 THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN
19 0 AND 7
20 0-3 FOR ACCUMULATORS 0-3
21 THE EVENT OF A "P" COMMAND.
22 CPU AND TIO STATUS.
23 BIT INTERPRETATION
24 STATUS OF TIO DONE FLAG
25 STATUS OF INTERRUPTS (ION FLAG)
26 STATUS OF CARRY BIT
27 ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF
28 ANY)
29 INSTRUCTION AT THE BREAK POINT LOCATION
30
31 OTHER COMMANDS TO OPEN CELLS ARE:
32
33 "ADR"/ OPEN THE CELL AND PRINT ITS CONTENTS.
34 / OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER
35 AND PRINT ITS CONTENTS.
36 *"ADR"/ ADD "ADR" TO THE POINTER, OPEN THE CELL
37 AND PRINT ITS CONTENTS.
38 ="ADR"/ SUBTRACT "ADR" FROM THE POINTER, OPEN
39 THE CELL AND PRINT ITS CONTENTS.
40 "CR" THE RETURN KEY IS USED TO CLOSE THE OPEN CELL
41 WITH OR WITHOUT MODIFICATION.
42 "LF" LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR
43 WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
44 CELL.
45 CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION
46 AND OPEN THE PRECEDING CELL
47 / CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
48 OPEN THE CELL POINTED TO BY ITS CONTENTS.
49 +"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
50 OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADR".
51 ="ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
52 OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".
53
54 11.3.2 MODIFICATION OF A CELL
55 ONCE A CELL HAS BEEN OPENED ITS CONTENTS CAN BE MODIFIED
56 BY TYPING THE NEW VALUE THE CELL IS TO CONTAIN IN THE
57 FORM OF AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".
58 IF A + OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-
59 PRESSION THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR
60 SUBTRACTED FROM THE OLD CONTENTS OF THE CELL. THE

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0012 .MAIN
01
02 ADDRESS ITSELF OR AN EXPRESSION RELATIVE TO THE ADDRESS
03 CAN BE DEPOSITED BY TYPING A " " OR " + " / - OCTAL EXPRESS-
04 ION". A REROUT COMMAND GIVEN RIGHT AFTER OPENING A CELL
05 ALLOWS THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
06 TYPED IN JUST BEFORE THE COMMAND WAS ISSUED.
07
08 11.3.3 OTHER ODT COMMANDS
09 RUBOUT THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
10 DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
11 DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
12 THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
13 CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CELL
14 CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
15 AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
16 KEY WAS PRESSED.
17 INSERT A BREAK POINT AT LOCATION "ADR".
18 ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
19 ENTRY TO ODT AFTER EXECUTING A BREAK POINT WILL
20 CAUSE IT TO BE DELETED.
21 DELETE THE BREAK POINT IF ANY.
22 RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
23 POINTED BY 4A.
24 START EXECUTING THE PROGRAM AT "ADR" AFTER AN
25 IO-RESET.
26 K KILL THE STRING TYPED SO FAR. THE ODT RESPONDS
27 WITH A "2" AND THE OPEN CELL IS CLOSED WITHOUT
28 MODIFICATION.
29 PRINT THE OCTAL VALUE OF THE INPUT ONLY.
30 THIS WILL CLOSE ANY OPEN CELLS WITHOUT
31 MODIFICATION AND WILL NOT OPEN A CELL
32
33 NOTE: IN PROGRAMS WHICH RELOCATE THEMSELVES THE
34 THE USER SHOULD PLACE BREAK POINTS ONLY IN THE
35 ORIGINAL PROGRAM AREA. IF A BREAK POINT IS
36 PLACED OUTSIDE THIS AREA THE RESULTS WILL
37 BE UNPREDICTABLE.
38
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40

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!0013 .MAIN

0014 .MAIN

**000000 TOTAL ERRORS, 000000 PASS 1 ERRORS

SPECIAL NOTES/SPECIAL FEATURES:

:!2.

: RUN TIME WILL VARY WITH SETUP FROM 1 MINUTE
 : TO 10 MINUTES. A LOOP DELAY OF 100MS. HAS BEEN
 : ADDED TO ALLOW SOFT CONSOLE INPUT DURING PROGRAM
 : EXECUTION. IF YOU ARE RUNNING UNDER A HOST/DCU
 : CONFIGURATION, THE TTY INPUT IS HANDLED ON AN
 : INTERRUPT BASIS, (I.E. THE DELAY IS NOT NEEDED)
 : TO IMPROVE RUN TIME WITHOUT A DCU THE DELAY MAY
 : BE REDUCED.

: START AT ADDRESS = 500
 : PROGRAM RESPONDS WITH "SET SWREG OR HIT (CR) TO CONTINUE"
 : YOU ENTER CONTROL 0 "0"
 : PROGRAM RESPONDS WITH "0"
 : YOU ENTER "10040/"
 : PROGRAM RESPONDS WITH "10040/10040.000144 "
 : YOU ENTER "0" ON SAME LINE, THEN "CR"
 : PROGRAM RESPONDS WITH "0"
 : YOU ENTER "500R"

RUN TIME:

:!3.

: WITHOUT DCU
 : S/A 500 1 INPUT SCAN = 0.5 MINUTES
 : S/A 501 1 PASS = 8.0 MINUTES
 : WITH DCU 50
 : S/A 500 1 INPUT SCAN = 0.5 MINUTES
 : S/A 501 3 PASSES = 3.5 MINUTES

.EOT

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0015 .MAIN

020TD 000454 MC 10/42