NEWTRAP, A PDP-8 MONITOR, DEBUGGING PROGRAM

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DISCLAIMER

NEWTRAP, A PDP-8 MONITOR DEBUGGING PROGRAM

NEWTRAP is a utility program for the AGS PDP-8; it is of assistance in debugging other programs. It uses and is fully compatible with our MONITOR Program. NEWTRAP allows a user to halt the progress of a program at any point and display, on the teletype, the contents of the Accumulator, Link, up to six randomly selected core locations and a dump of core between any two addresses. The random list and sequencial dump may be called together, separately, or not at all.

NEWTRAP is loaded with the MONITOR binary loading routine[1]. NEWTRAP's present version uses core locations 7400-7574, but other versions could be made to be compatible with core usage of the future.

NEWTRAP is called by typing a "#" sign (3 + shift) on the keyboard. The next legal instructions are an octal number, a "C", or any other character. The octal number represents the new trapped core location; if any trap had been set previously, it will be restored and the random core list and sequential dump will be cleared. The "C" sets the trap address to zero without restoring any previous trap. In connection with this see "warnings

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1 J. Alderman, M. Barton, Monitor Program for the PDP-8, AADD Tech Note #18.

and caveats" below. Any other character will just restore a previous trap without seting a new one.

If the first command is not an octal number, control returns to MONITOR after it is completed. If it is an octal number, the teletype carriage will tab three spaces and wait for the next command which can be another octal number or a "D." If it is an octal number, it represents the first of the six possible random core locations to be listed; the carriage will tab three spaces and wait for yet another octal number which represents the second of the six core locations to be listed, or again a "D." This process continues until six octal numbers have been typed; upon the sixth the carriage will tab three spaces and wait for the next command which may only be a "D".

The "D" command, of course, represents the dump call and on this command NEWTRAP will cause a carriage return-line feed and wait for two octal numbers separated by a three space tab. These numbers are the beginning and end of the desired core dump. After this control returns to monitor.

When the program under test comes to the trapped location, a carriage return-line feed will occur and a line will be typed of the following format:

TRAP   LINK   ACCR   XXXX   XXXX   ....

The "XXXX's" will be the random core location that the user has requested; none will be typed if none has been asked for and only those requested will be typed. Under this line the trapped location, the contents of the link, the accumulator and the requested core locations will be typed each under its name.

If then a dump has been called too, another carriage return-line feed will occur and the dump will start. Each line of the dump will start off with an octal core address followed by up to eight octal numbers which are the contents of the address heading the line and those of the next seven

sequencial core locations. When the dump is finished, control returns to MONITOR.

Warnings and Caveats

The term "octal number" refers to a four-place octal number and none other.

The "C" command should be used only as the first command in a debugging operation and never after a trap has been set. It is included so a user need not run the risk of over-writing his program if a trap had been set, but not restored by a previous user. After the first trap of a debugging operation, a user cannot over-write his program because a previous trap is automatically restored in calling for a new one; but he would be unable to restore a trap by using the "C" command out of season. The last trap may be restored without setting a new one by calling NEWTRAP and typing anything but an octal number or a "C."

Appendix

To use NEWTRAP as a core dump only exclusive of the trapping feature, it is only necessary to trap NEWTRAP itself. This may be done by trapping location 7447(8) and calling the dump in the normal manner. The dump will begin immediately and the "self-trap" will be restored by setting the next trap.

Listing

The listing of the present version of NEWTRAP follows:

cc: J. Alderman
     M. Barton
     A. Carlucci
     R. Frankel
     B. Garfinkle
     A. Maschke
     A. Watts

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/NEWTRAP, AN ON-LINE DEBUGGING
/PROGRAM, ASSEMBLED WITH MAL
*7400
7400    0000    TRAP,   0           /TRAP STARTS; ALSO A COUNTER
7401    4524            ROCT        /READ THE KEYBOARD AND LOOK FOR:
7402    5205            JMP .+3
7403    4250            JMS RSTR    /RESTORE THE PREVIOUS TRAP
7404    5212            JMP STRT    /AND SET THE NEW ONE
7405    1264            TAD MC      /RESTORE THE TRAP ONLY?
7406    7640            SZA CLA
7407    4250            JMS RSTR    /YES
7410    3261            DCA LOC     /NO, JUST ZERO "LOC"
7411    5774            BOMB        /AND BOMB OUT.
7412    3261    STRT,   DCA LOC     /STORE THE TRAP LOCATION
7413    1661            TAD I LOC   /GET THE CONTENTS OF THAT
7414    3262            DCA SAVE    /LOCATION AND SAVE THEM
7415    1266            TAD TINS    /PUT THE TRAP CALL IN
7416    3661            DCA I LOC   /THE TRAPPED LOCATION
7417    4523    LIST,   TAB
7420    4524            ROCT        /READ THE KEYBOARD AGAIN
7421    5232            JMP HIC     /LOOK FOR A DUMP CALL,
7422    3670            DCA I LST   /OR AN OCTAL NUMBER, WHICH
7423    2270            ISZ LST     /IS THE FIRST LOCATION ON
7424    1277            TAD FULL    /THE LIST.  GO BACK FOR MORE
7425    1270            TAD LST     /IF THE LIST ISN'T FULL,
7426    7440            SZA         /OTHERWISE...
7427    5217            JMP LIST
7430    4523            TAB
7431    4517            READ
7432    1265    HIC,    TAD MD      /LOOK FOR THE DUMP CALL.
7433    7440            SZA
7434    5774            BOMB        /NOT A DUMP CALL, BOMB OUT.
7435    4531            LINE
7436    4524            ROCT        /TO MONITOR
7437    5530            BURP
7440    3341            DCA DP1     /DUMP CALL, GET THE FIRST
7441    4523            TAB         /ADDRESS
7442    4524            ROCT
7443    5530            BURP        /AND THE SECOND.
7444    3342            DCA DP2
7445    7040            CMA         /NOW SET THE
7446    3263            DCA DPSW    /DUMP SWITCH,
7447    5774            BOMB        /AND BOMB OUT.
7450    0000    RSTR,   0
7451    3371            DCA PNTR    /TEMPORARY TRAP STORAGE
7452    1262            TAD SAVE    /RESTORE THE TRAPPED LOCATION
7453    3661            DCA I LOC   /TO ITS FORMER SELF
7454    1267            TAD CLST    /RESET THE LIST POINTER
7455    3270            DCA LST
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7 455    3263         DCA DPSW     /ZERO THE DUMP SWITCH.
7 457    1371         TAD PNTR
7 460    5650         JMP I RSTR.
7 461    0000    LOC,     0
7 462    0000    SAVE,    0
7 463    0000    DPSW,    0
7 464    7475    MC,     -303
7 465    7474    MD,     -304
7 466    5402    TINS,    JMP I 2
7 467    7471    CLST,    .+2
7 470    7471    LST,     .+1
7 471    0000         0
7 472    0000         0
7 473    0000         0
7 474    0000         0
7 475    0000         0
7 476    0000         0
7 477    0301    FULL,    -.
7 500    3372    DO,      DCA ACC      /STORE
7 501    7004         RAL          /THE ACCUMULATOR AND THE
7 502    3373         DCA LNK      /LINK.
7 503    4531         LINE
7 504    4536         [TRAP  LINK  ACC]
7 505    2422
7 506    0120
7 507    4040
7 510    4014
7 511    1116
7 512    1340
7 513    4040
7 514    0103
7 515    0322
7 516    4040
7 517    4000
7 520    1365         TAD INS1     /FIRST INSTRUCTION FOR THE
7 521    4346         JMS DO1      /"DO1" SUBROUTINE.
7 522    4531         LINE
7 523    1261         TAD LOC      /GET THE TRAPPED LOCATION
7 524    4526         TOCT         /PRINT IT
7 525    7200         CLA
7 526    1373         TAD LNK      /GET THE CONTENTS OF THE LINK
7 527    4526         TOCT         /PRINT IT
7 530    7200         CLA
7 531    1372         TAD ACC      /AND THAT OF THE ACCUMULATOR
7 532    4526         TOCT         /AND PRINT THAT.
7 533    7200         CLA
7 534    1360         TAD INS2     /TIME FOR THE SECOND PASS
7 535    4346         JMS DO1      /THROUGH "DO1".
7 536    2263         ISZ DPSW     /CALL FOR A DUMP?
7 537    5774         BOMB         /NO, BOMB OUT.
7 540    4540         DUMP         /YES, CALL IT UP
7 541    0000    DP1,     0            /FIRST ADDRESS
7 542    0000    DP2,     0        /SECOND ADDRESS
7 543    7240         CLA CMA      /RESET DUMP SWITCH
7 544    3263         DCA DPSW
7 545    5774         BOMB         /DONE, BOMB OUT.
7 546    0000    DO1,     0            /"DO1" SUBROUTINE PRINTS
7 547    3362         DCA INST     /OUT THE LIST ADDRESSES OR
7 550    1270         TAD LST      /THEIR CONTENTS, ACCORDING
7 551    7041         CMA IAC      /AS THE "INST" INSTRUCTION
7 552    1267         TAD CLST     /CONTAINS A "CLA" OR
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7553    7500              SMA          /A "DCA PNTR".
7554    5746              JMP I DO1     /HANDLE A "NO LIST CALL"
7555    3200              DCA TRAP
7556    1270    LP1,      TAD LST
7557    1200              TAD TRAP
7560    3371    INS2,     DCA PNTR
7561    1771              TAD I PNTR
7562    0000    INST,     0
7563    1771              TAD I PNTR
7564    4526              TOCT
7565    7200    INS1,     CLA
7566    2200              ISZ TRAP
7567    5356              JMP LP1
7570    5746              JMP I DO1
7571    0000    PNTR,     0
7572    0000    ACC,      0
7573    0000    LNK,      0
7574    0303    BM,       0303.
BOMB=JMP I BM
*0002
0002    7500.             DO
*0203
0203    7400              TRAP
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