

IDENTIFICATION

PRODUCT CODE: MAINDEC-X8-DJFPA-A-D
PRODUCT NAME: DEC/X8 MODULE "FPP8-A"
PRODUCT DATE: NOVEMBER, 1976
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MAINTAINER: DIAGNOSTIC ENGINEERING

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1. MODULE DESCRIPTION

"FPP8A" IS A DEC/X8 SOFTWARE MODULE WHICH EXERCISES THE FLOATING POINT PROCESSOR OPTION, THE FPP8A IS A SUBPROCESSOR WITH SINGLE CYCLE DATA BREAK DIRECT MEMORY ACCESS. THIS MODULE OPERATES IN THE FOLLOWING WAY: ASSIGN A RANDOM BUFFER THEN MODIFY THE FPP8A INSTRUCTION SET AS TO THE MEMORY FIELD AND ADDRESS OF THE BUFFER, THEN LOAD THE "APT" TABLE INTO MEMORY AND LOAD THE FPP BUFFER FIELD AND STARTING ADDRESS POINTER REGISTERS AND START THE FPP8A. WHEN AN INTERRUPT OCCURS (NORMALLY AFTER FIVE SECONDS) CHECK THE FPP ANSWER, INCREMENT THE MODULE COUNTER AND THEN RELEASE THE BUFFER JUST TESTED. THEN ASSIGN A NEW BUFFER AND REPEAT THIS CYCLE. THIS RESULTS IN TESTING THE FPP8A CODE IN ALL EXISTING MEMORY FIELDS.

2. REQUIREMENTS

1. PROCESSORS: PDP-8A, 8/E
2. OPTIONS: FPP8A
3. SPECIAL: NONE

3. RESTRICTIONS

NONE

4. OPERATING INFORMATION

4.1 SPECIAL CONSIDERATIONS

THIS MODULE REQUIRES EXTERNAL BUFFERS.

4.2 BUILDING

1. JOB TYPE: INTERRUPT DRIVEN
2. PRIORITY: NON-CRITICAL
3. JOB SLOT: JF1 OR JF2 ONLY, 4 PAGES REQUIRED.
4. STANDARD DEVICE CODE: 0550

4.3 • INITIALIZING

AFTER "FPP8A" IS PRINTED TYPE THE FOLLOWING PARAMETER:

FOR RANDOM BUFFER USAGE (NORMAL):
FPP8A [0]

FOR A SPECIFIC BUFFER ONLY:
FPP8A [1] [NNNN]
WHERE NNNN IS A LEGAL BUFFER DESIGNATOR

4.4 DEVICE SETUP

NONE

4.5 RUNNING

1. CNTR: UPDATED UPON EACH FPP8A INTERRUPT
2. SR10: WHEN SET TO A 1, THE BUFFER CURRENTLY ASSIGNED IS RETAINED.
3. SR11: NO EFFECT

5. ERROR INFORMATION

ERRSA ■ INCORRECT EXPONENT
ERRSB ■ INCORRECT MOST SIGNIFICANT WORD
ERRSC ■ INCORRECT LEAST SIGNIFICANT WORD
ERRSD ■ CORRECT EXPONENT
ERRSE ■ CORRECT MOST SIGNIFICAT WORD
ERRSF ■ CORRECT LEAST SIGNIFICANT WORD
CODE ■ BUFFER DESIGNATOR

6. LISTING (ATTACHED)

/DEC/X8 EXTERNAL SYMBOL TABLE "EXTSYM"
 /FOR USE IN ASSEMBLING DEC/X8 SOFTWARE MODULES.
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 PAUSE

/MAINDEC-X8-DJFPA-A-L "DEC/X8" FPP8A

	/MODULE TABLE		
0200	*200		
0201	JOB, 0		/JOB NUMBER
0202	TEXT1, TEXT "FPP8A "		/DEVICE NAME
0203			
0204			
0205	TEXT "DJFPA-A"		/MODULE DESIGNATOR
0206			
0207			
0210			
0211	HOMEDF, 0		
0212	HLT/CDP		
0213	JMP I HOMEDF		
0214	INTACK, CIF 0		
0215	JMS I IHRETP		
0216			
0217	KILL, -1		
0220	KILLED, -1		
0221	CNTR, 0		
0222	ERROR, 0		
0223	OCA, +11		
0224	LAS		
0225	AND, K4		
0226	SZA		
0227	OCA, KILL		
0230	JMS, HOMEDF		
0231	IOF, 0		
0232	CIF, 0		
0233	JMS I ERFP		
0234			
0235	JMP I ERROR		
0236	CODE, 0		/BUFFER AND FIELD POINTER
0237			
0240	ERRSA, -6		
0241	ERRSB, 0		/INCORRECT EXPONENT
0242	ERRSC, 0		/INCORRECT MSW
0243	ERRSD, 0015		/INCORRECT LSW
0244	ERRSE, 2000		/CORRECT EXPONENT
0245	ERRSF, 0001		/CORRECT MSW
0246	FFELD, 0		/CORRECT LSW
0247	RETRY, 7777		/FPP FIELD POINTER
0250	FPPW, 0		/FPP INSTRUCTION ADDRESS
0251	FPPX, 0		/FPP APT ADDRESS
0252	FPPY, 0		/FPP IN ADDRESS
0253	FPPZ, 0		/FPP BASE ADDRESS
0254	FPPZA, 0		/FPP ANSWER POINTER

```

/FPP-8A ROUTINES
/REINITIALIZE ROUTINE

0255 0000 STFPP, 0
0256 4770 JMS I BUFGEV /ASSIGN A BUFFER
0257 1217 TAD KILL
0260 7450 SNA
0261 5265 JMP .+4
0262 3220 DCA KILLED
0263 4777 JMS RELEASE
0264 5004 SERVEX
0265 4776 JMS MFLD /FIX THE FPP FIELD
0266 7340 CLA CLL CMA
0267 1251 TAD FPPX /GET THE APT ADDRESS
0270 3017 AI13A, DCA AUTO /SAVE IT
0271 4775 JMS CHNFD /CHANGE MEMORY FIELDS
0272 1246 TAD FPELD /GET THE FIELD NUMBER
0273 3417 AI13B, DCA I AUTO /FPP-8A P
0274 1250 TAD FPPX /STARTING ADDRESS OF FPP CODE
0275 3417 AI13C, DCA I AUTO / P+1
0276 1252 TAD FPPY /GET THE IR POINTER
0277 3417 AI13D, DCA I AUTO / P+2
0300 1253 TAD FPPZ /GET THE BASE POINTER
0301 3417 AI13E, DCA I AUTO / P+3
0302 3417 AI13F, DCA I AUTO / P+4
0303 3417 AI13G, DCA I AUTO / P+5
0304 3417 AI13H, DCA I AUTO / P+6
0305 3417 AI13I, DCA I AUTO / P+7
0306 4211 JMS HOMEDF
0307 1246 TAD FPELD /GET THE FIELD NUMBER AGAIN
0310 0075 AND K7 /MASK TO BITS 9-11
0311 1121 TAD K400 /ADD INTERRUPT ENABLE
0312 6553 DC55B, FPCOM /
0313 6002 IOF
0314 7340 CLA CLL CMA
0315 3247 DCA MENTRY
0316 1251 TAD FPPX /GET THE STARTING ADDRESS OF APT TABLE
0317 6555 DC55C, FPST /START FPP-8A
0320 7000 NOP
0321 5655 JMP I STFPP /EXIT
    
```

```

/FPP-8A INTERRUPT SERVICE ROUTINE
/TEST IF THE CORRECT FPP ANSWER

0322 0000 INT, 0
0323 2247 ISZ MENTRY
0324 7402 HLT /UNEXPECTED INTERRUPT
0325 4211 JMS HOMEDF /RESET DATA FIELD
0326 6552 DC55A, FPICL /RESET FLAG
0327 1374 TAD (FPP1 /GET INTERRUPT SERVICE POINTER
0330 5214 JMP INTACK /EXIT
0331 7300 FPP1, CLA CLL
0332 1254 TAD FPPZA /GET THE APT EXPONENT ADDRESS
0333 3017 AI13K, DCA AUTO /SAVE IT
0334 4775 JMS CHNFD /CHANGE MEMORY FIELDS
0335 1417 AI13L, TAD I AUTO /GET THE EXPONENT VALUE
0336 3240 DCA ERKSA /SAVE THE EXPONENT
0337 1417 AI13M, TAD I AUTO /GET THE MSW
0340 3241 DCA ERSSB /SAVE IT IN BAD
0341 1417 AI13N, TAD I AUTO /GET THE LSW
0342 3242 DCA ERSSC /SAVE IT IN BAD
0343 4211 JMS HOMEDF
0344 1240 TAD ERKSA /GET EXPONENT
0345 7041 CIA /NEGATE IT
0346 1243 TAD ERKSD /ADD CORRECT VALUE OF EXPONENT
0347 7640 SZA CLA /ARE THEY EQUAL ?
0350 5362 JMP FPP2 /NO, EXPONENT ERROR
0351 1241 TAD ERSSB /GET MSW
0352 7041 CIA /NEGATE IT
0353 1244 TAD ERKSE /ADD CORRECT VALUE OF MSW
0354 7640 SZA CLA /ARE THEY EQUAL ?
0355 5362 JMP FPP2 /NO, MSW ERROR
0356 1242 TAD ERSSC /GET LSW
0357 7041 CIA /NEGATE IT
0360 1245 TAD ERKSF /ADD CORRECT VALUE OF LSW
0361 7640 SZA CLA /ARE THEY EQUAL ?
0362 4222 FPP2, JMS ERROR /NO, LSW ERROR
0363 4255 JMS STFPP /OK NOW RESTART THE FPP
0364 7300 CLA CLL
0365 2221 ISZ CNTR
0366 7400 H400, T400
0367 5004 SERVEX

0370 *
0370 0400 BUFGEV, BUFRAN

0374 0331
0375 1106
0376 0424
0377 0416
0400 PAGE
    
```

/ROUTINE TO ASSIGN A BUFFER OBSERVING SR10
/ENTRY REQUIRES DF=IF

```

0400 0000  BUFRAN, 0
0401 7674      LAS           /READ SWITCHES
0402 7012      RTN           /MOVE SR 10 IN LINK
0403 7220      CLA CML       /
0404 1777*    TAD CODE       /DESIGNATOR IN AC
0405 7460      SNL SZA       /
0406 5214      JMP .+6       /EXIT IF BUFFER ASSIGNED
0407 7640      SZA CLA       / AND SR10=1
0410 4216      JMS RELEAS    /RELEASE ASSIGNED BUFFER
0411 6002      IOF           /
0412 6202      CIF 0        /
0413 4460      ASSBUFF      /
0414 3777*    DCA CODE       /
0415 5600      JMP I BUFRAN   /EXIT
    
```

/ROUTINE TO RELEASE A BUFFER

```

0416 0000  RELEAS, 0
0417 1777* TAD CODE       /GET BUFFER
0420 6002  IOF           /DISABLE INTERRUPTS
0421 6202  CIF 0        /CHANGE TO FIELD 0
0422 4457  RLBUFF      /RELEASE THE BUFFER
0423 5616  JMP I RELEAS   /EXIT
    
```

/ROUTINE TO SET UP LOCATION "FPELD" PROPERLY

```

0424 0000  MFLD, 0
0425 7300  CLA CLL       /GET BUFFER DESIGNATOR
0426 1777* TAD CODE       /MOVE TO BITS 9=11
0427 7112  RTR CLL       /
0430 7110  RAR CLL       /
0431 0075  AND K7        /MASK TO BITS 9=11
0432 3776* DCA ERRSA     /SAVE THE VALUE
0433 1140  TAD M4        /SET UP A COUNTER
0434 3775* DCA ERRSB     / LOCATION
0435 1776* TAD ERRSA     /GET VALUE
0436 2775* ISZ ERRSB     /FINISHED ?
0437 7410  SKP           /NO
0440 5244  JMP .+4       /YES
0441 7106  RTL CLL       /MOVE LEFT 3
0442 7104  RAL CLL       /
0443 5235  JMP .+6       /TRY AGAIN
0444 3774* DCA FPELD     /SAVE THE FPP8A FIELD POINTER
    
```

/ROUTINE TO MODIFY THE FPP INSTRUCTION FIELD BITS
/ AND ADDRESSES

```

0445 1774*  TAD FPELD
0446 0075  AND K7        /MASK TO BITS 9=11
0447 3776*  DCA ERRSA     /SAVE THE VALUE
0450 1324  TAD PNT1     /GET A POINTER
0451 3316  DCA FSAVE1    /SAVE IT
0452 1777*  TAD CODE       /GET THE BUFFER DESIGNATOR
0453 0131  AND K7000     /MASK TO BITS 0=4
0454 3320  DCA FSAVE3    /SAVE THE VALUE
0455 1322  TAD M23     /SET UP A COUNT
0456 3321  DCA FSAVE4    / LOCATION
0457 1716  FIXITA, TAD I FSAVE1 /GET A VALUE
0460 3317  DCA FSAVE2    /OF THE TABLE
0461 1717  TAD I FSAVE2  /GO INDIRECT
0462 0315  AND K7770    /MASK TO BITS 0=8
0463 1776*  TAD ERRSA     /ADD "FIELD BITS"
0464 3717  DCA I FSAVE2  /SAVE IT
0465 2317  ISZ FSAVE2    /INCREMENT THE POINTER
0466 1717  TAD I FSAVE2  /GET THE NEXT VALUE
0467 0130  AND K177     /MASK TO BITS 5=11
0470 1320  TAD FSAVE3    /ADD HIGH ORDER ADDRESS
0471 3717  DCA I FSAVE2  /SAVE VALUE
0472 2316  ISZ FSAVE1    /INCREMENT POINTER
0473 2321  ISZ FSAVE4    /FINISHED ALL CHANGES ?
0474 5257  JMP FIXITA   /NO, MORE INSTRUCTIONS TO CHANGE
0475 4773*  JMS FIXAG    /FIX SOME MORE FPP INSTRUCTIONS
    
```

/ROUTINE TO MOVE 400 LOCATIONS IN THIS MODULE
/ TO THE BUFFER ASSIGNED

```

0476 1323  MOVEIT, TAD PNT2     /GET A POINTER
0477 3316  DCA FSAVE1    /SAVE IT
0500 1772*  TAO M400     /SET UP A COUNT
0501 3771*  DCA ERRBC     / LOCATION
0502 4770*  JMS HOMEDF    /RESET DATA FIELD
0503 1716  TAD I FSAVE1  /GET A VALUE
0504 4767*  JMS CHNFD     /CHANGE TO THE BUFFER FIELD
0505 3720  DCA I FSAVE3  /SAVE VALUE IN THE NEW FIELD
0506 4770*  JMS HOMEDF    /RESET DF=IF
0507 2316  ISZ FSAVE1    /INCREMENT POINTER
0510 2320  ISZ FSAVE3    /INCREMENT POINTER
0511 2771*  ISZ ERRSC     /FINISHED ?
0512 5302  JMP MOVEA     /NO MORE LOCATIONS TO MOVE
0513 4766*  JMS MFLDA    /SET UP SOME MORE LOCATIONS
0514 5624  JMP I MFLD    /EXIT
    
```

```

0515 7770 K7770, 7770
0516 0000 FSAVE1, 0
0517 0000 FSAVE2, 0
0520 0000 FSAVE3, 0
0521 0000 FSAVE4, 0
0522 7755 M23, -23
      0523 A,
0523 0000 PNT2, FPPRG
0524 0525 PNT1, .+1
0525 0002 TAG0
0526 0005 TAG1
0527 0010 TAG2
0530 0034 TAG3
0531 0042 TAG4
0532 0052 TAG5
0533 0056 TAG6
0534 0060 TAG7
0535 0065 TAG10
0536 0070 TAG11
0537 0712 TAG12
0540 0714 TAG13
0541 0717 TAG14
0542 0723 TAG15
0543 0733 TAG16
0544 0751 TAG17
0545 0031 TAG20
0546 0710 TAG21
0547 1057 TAG22
0566 1064
0567 1106
0570 0211
0571 0242
0572 0366
0573 0760
0574 0246
0575 0241
0576 0240
0577 0236
      0600 PAGE
    
```

/FPP-8A INSTRUCTION CODE

```

0600 0002 FPPRG, FCLR
0601 0005          STARTF
0602 1011 TAG0, JGE 1
0603 0605          .+2
0604 0000          FEXIT
0605 1021 TAG1, JLE 1
0606 0610          .+2
0607 0000          FEXIT
0610 0212          FLOA 212
0611 0007          JAC
0612 0002 TJAC, FCLR
0613 0006          STARTD
0614 0005          STARTF
0615 0201 TAG2, FLOA 201
0616 1061          JGT 1
0617 0621          .+2
0620 0000          FEXIT
0621 4201          FMUL 201
0622 3201          FDIV 201
0623 0041          FNOP
0624 2201          FSUB 201
0625 6204          FSTA 204
0626 0002          FCLR
0627 0100          LDX 0
0630 0001          1
0631 1101 TAG20, SETX 1
0632 1010          IR
0633 0030          XTA 0
0634 1041 TAG3, JNE 1
0635 0637          .+2
0636 0000          FEXIT
0637 0110          ADDX 0
0640 7777          7777
0641 0030          XTA 0
0642 1001 TAG4, JEQ 1
0643 0645          .+2
0644 0000          FEXIT
0645 0002          FCLR
0646 0003          FNEG
0647 0020          ATX 0
0650 0002          FCLR
0651 0030 TAG5, XTA 0
0652 1001          JEQ 1
0653 0655          .+2
0654 0000          FEXIT
0655 0004          FNORM
0656 1121 TAG6, JSA 1
0657 0663          TJSA
    
```

```

0660 1001 TAG7, JEQ 1
0661 0667 TJSB
0662 0000 FEXIT
0663 0041 TJSA, FNOP
0664 0041 FNOP
0665 1031 TAG10, JA 1
0666 0660 ,+6
0667 0213 TJSB, FLDA 213
0670 1071 TAG11, JAL 1
0671 0673 ,+2
0672 0000 FEXIT
0673 0203 FLDA 203
0674 0003 FNEG
0675 3201 FDIV 201
0676 6211 FSTA 211
0677 0204 FLDA 204
0700 5211 FADDM 211
0701 0211 FLDA 211
0702 4201 FMUL 201
0703 1207 FADD 207
0704 2201 FSUB 201
0705 4202 FMUL 202
0706 6204 FSTA 204
0707 0002 FCLR
0710 1111 TAG21, SETB 1
0711 1020 BASE
0712 1131 TAG12, JSR 1
0713 0717 ,+4
0714 1031 TAG13, JA 1
0715 0722 ,+5
0716 0000 FEXIT
0717 1031 TAG14, JA 1
0720 1021 BASE+1
0721 0000 FEXIT
0722 0203 FLDA 203
0723 1051 TAG15, JLT 1
0724 0726 ,+2
0725 0000 FEXIT
0726 0210 FLDA 210
0727 0101 LDX 1
0730 0027 0027
0731 0011 ALN 1
0732 0003 FNEG
    
```

```

0733 1001 TAG16, JEQ 1
0734 0736 ,+2
0735 0000 FEXIT
0736 0207 FLDA 207
0737 6211 FSTA 211
0740 0202 FLDA 202
0741 7211 FMULM 211
0742 0211 FLDA 211
0743 6205 FSTA 205
0744 0002 FCLR
0745 0204 FLDA 204
0746 3205 FDIV 205
0747 1206 FADD 206
0750 6206 FSTA 206
0751 2171 TAG17, JNX 171
0752 0000 FPPRG
0753 6205 FSTA 205
0754 0002 FCLR
0755 6206 FSTA 206
0756 0205 FLDA 205
0757 0000 FEXIT
    
```

/ROUTINE TO MODIFY THE FPP INSTRUCTIONS REFERING
/ TO "IR AND BASE" REGISTERS

```

0760 0000 FIXAG, 0
0761 1232 TAD TAG20+1 /GET IR POINTER
0762 1110 TAD K200 /ADD 200
0763 3232 DCA TAG20+1 /SAVE IR POINTER
0764 1311 TAD TAG21+1 /GET BASE POINTER
0765 1110 TAD K200 /ADD 200
0766 3311 DCA TAG21+1 /SAVE BASE POINTER
0767 1320 TAD TAG14+1 /GET BASE+1 POINTER
0770 1110 TAD K200 /ADD 200
0771 3320 DCA TAG14+1 /SAVE BASE+1 POINTER
0772 5760 JMP I FIXAG /EXIT
    
```

0773 *.
1000 PAGE

```

1000 0000 APT, 0
1001 0000 0
1002 0000 0
1003 0000 0
1004 0000 0
1005 0000 0
1006 0000 0
1007 0000 0
1010 0000 IR, 0
1011 0000 0
1012 0000 0
1013 0000 0
1014 0000 0
1015 0000 0
1016 0000 0
1017 0000 0
1020 0000 BASE, 0
1021 0000 0
1022 0000 0000
1023 0001 0001
1024 2000 2000
1025 0000 0000
1026 7776 7776
1027 0002 0002
1030 0000 0000
1031 0001 0001
1032 5777 5777
1033 7777 7777
1034 0000 0000
1035 0000 0000
1036 0000 0000
1037 0000 0000
1040 0000 0000
1041 0000 0000
1042 0000 0000
1043 0000 BASA, 0000
1044 0000 0000
1045 0007 0007
1046 0002 0002
1047 0000 0000
1050 3000 3000
1051 2000 2000
1052 0000 0
1053 0000 0
1054 0000 0
1055 0000 0
1056 0000 0
1057 0001 TAG22, 1
1060 0612 TJAC
1061 0030 0030
1062 3777 3777
1063 7777 7777
    
```

```

1064 0000 /ROUTINE TO LOAD THE PROPER POINTER TO FPP LOCATIONS
MFLDA, 0
1065 7300 CLA CLL
1066 1777 TAD CODE
1067 0131 AND K7600
1070 3776 DCA FPPH /FPP INSTRUCTION ADDRESS
1071 1776 TAD FPPH
1072 1110 TAD K200
1073 3775 DCA FPPX /FPP APT ADDRESS
1074 1775 TAD FPPX
1075 1076 TAD K10
1076 3774 DCA FPPY /FPP IN ADDRESS
1077 1774 TAD FPPY
1080 1076 TAD K10
1081 3773 DCA FPPZ /FPP BASE ADDRESS
1082 1775 TAD FPPX
1083 1073 TAD K4
1084 3772 DCA FPPZA /FPP EXPONENT ADDRESS-1
1085 5684 JMP I MFLDA /EXIT

1106 0000 /ROUTINE TO CHANGE OF TO THE ASSIGNED BUFFER FIELD
CHNPD, 0
1107 3317 DCA CHNSA
1110 1777 TAD CODE
1111 0105 AND K70
1112 1064 TAD KCDF
1113 3314 DCA *+1
1114 6201 CDF /CHANGE MEMORY FIELDS
1115 1317 TAD CHNSA
1116 5706 JMP I CHNPD /EXIT
1117 0000 CHNSA, 0

1120 4454 /INIT ROUTINE TEST FOR INPUT
CRLF
1121 1371 INIT, TAD (TEXT1
1122 3324 DCA INITA
1123 4444 MESSAGE
1124 0000 INITA, 0
1125 4455 SPACE2
1126 4442 ONEOCT INIT=1
1127 5320 JMP
1130 7640 SZA CLA
1131 5334 JMP *+3
1132 1370 TAD (BUFRAN
1133 5341 JMP INITB
1134 4455 SPACE2
1135 4443 FOROCT
1136 5320 JMP INIT=1
1137 3353 DCA CONBUF
1140 1367 TAD (BUFCON
1141 3766 INITB, DCA BUFGEV
1142 5020 INITEX
    
```

/ROUTINE TO KEEP A CONSTANT BUFFER
/AS ASSIGNED BY THE INPUT PARAM.

```

1143 0000  BUFCON, 0
1144 1777*  TAD      CODE
1145 7041   CIA      CONBUF
1146 1353   TAD
1147 7650   SNA CLA
1150 5743   JMP I   BUFCON
1151 4770*  JMS   BUFRAN
1152 5344   JMP   BUFCON*1

```

1153 0000 CONBUF, 0

/RUN ROUTINE

```

1154 3765*  RUN,   DCA  CNTR
1155 3777*  DCA  CODE
1156 4764*  JMS  STFP
1157 7300   CLA  CLL
1160 5004   SERVEX

```

```

1161      *
1164 0255
1165 0221
1166 0370
1167 1143
1170 0400
1171 0201
1172 0254
1173 0253
1174 0252
1175 0251
1176 0250
1177 0236
0001  FIELD 1

```

```

0000
0100

0200 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
0300 11111111 11111111 11111111 11111111 11111111 11111111 11111111 10001111

0400 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
0500 11111111 11111111 11111111 11111111 11111111 00000000 00000011 11111111

0600 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
0700 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11100000

1000 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
1100 11111111 11111111 11111111 11111111 11111111 11111111 10001111 11111111

1200
1300

1400
1500

1600
1700

2000
2100

2200
2300

2400
2500

2600
2700

3000
3100

3200
3300

3400
3500

3600
3700

```

4000
4100

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700

/LOADER CALL

1200 1121 INIT
1201 1154 RUN
1202 0322 INT

/INTERUPT SERVICE

1203 6557 FPI3T
1204 0000 0
1205 0001 1
1206 7402 HLT
1207 7402 HLT
1210 7402 HLT

1211 7763 -15
1212 0270 AI13A
1213 0273 AI13B
1214 0275 AI13C
1215 0277 AI13D
1216 0301 AI13E
1217 0302 AI13F
1220 0303 AI13G
1221 0304 AI13H
1222 0305 AI13I
1223 0333 AI13K
1224 0335 AI13L
1225 0337 AI13M
1226 0341 AI13N

1227 7777 -1
1230 0550 0550
1231 7774 -4
1232 0001 1
1233 0326 DC55A
1234 0312 DC55B
1235 0317 DC55C

1236 0000 0
1237 0000 0

/IOT *S USED

6557 FP1ST=6557
 6552 FP1CL=6552
 6553 FP0CM=6553
 6555 FP3T=6555
 6000 FSTA=6000
 0002 FCLR=0002
 0000 FLUA=0000
 4000 FMUL=4000
 3000 FDIV=3000
 2000 FSUB=2000
 0003 FNEG=0003
 1000 FADD=1000
 2000 JNX=2000
 0000 FEXIT=0000
 0041 FNUP=0041
 5000 FADDM=5000
 7000 FMULM=7000
 1070 JAL=1070
 1110 SETB=1110
 1130 JSR=1130
 1030 JA=1030
 1050 JLT=1050
 0010 ALN=0010
 1000 JEQ=1000
 0100 LDX=0100
 1100 SETX=1100
 0030 XTA=0030
 1040 JNE=1040
 0110 ADDX=0110
 0020 ATX=0020
 0004 FNORM=0004
 1120 JSA=1120
 0005 STARTF=0005
 0006 STARTD=0006
 0007 JAC=0007
 1020 JLE=1020
 1010 JGE=1010
 1060 JGT=1060

0000
 0100

 0200
 0300

 0400
 0500

 0600
 0700

1000
 1100

1200 11111111 11111111 11111111 11111111 00000000 00000000 00000000 00000000
 1300 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

1400
 1500

1600
 1700

2000
 2100

2200
 2300

2400
 2500

2600
 2700

3000
 3100

3200
 3300

3400
 3500

3600
 3700

4000
4100

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700

ADDX	0110	FIXITA	0457	K10	0076	L18N	4440
AI13A	0270	FLDA	0000	K100	0107	L18NP	0040
AI13B	0273	FNUL	4000	K11	0077	M20	0135
AI13C	0275	FNULM	7000	K110	0071	M200	0131
AI13D	0277	FNEG	0003	K13	0100	M23	0522
AI13E	0301	FNOP	0041	K17	0101	M240	0127
AI13F	0302	FNORH	0004	K177	0130	M260	0126
AI13G	0303	FOROCP	0043	K20	0102	M270	0125
AI13H	0304	FOROCT	4443	K200	0110	M3	0141
AI13I	0305	FPCOM	0553	K2000	0122	M30	0134
AI13K	0343	FELD	0246	K212	0111	M4	0140
AI13L	0335	FRICL	0552	K215	0112	M40	0133
AI13M	0337	FRIST	0557	K240	0113	M400	0366
AI13N	0341	FPP1	0331	K260	0114	M43	0132
ALN	0010	FPP2	0302	K272	0115	M5	0137
APY	1000	FPPRG	0600	K277	0116	M7	0136
ASBUFF	4460	FPPH	0250	K3	0072	MESSAGE	4444
ASBUFF	0060	FPPK	0251	K30	0103	MESSAGE	0044
ATX	0020	FPPY	0252	K301	0117	MFLD	0424
AUTO	0017	FPPZ	0253	K32	0067	MFLDA	1864
BABA	1043	FPPZA	0254	K323	0120	MOVEA	0502
BASE	1020	FPST	0555	K4	0073	MOVEIT	0476
BUFCON	1143	FSAVE1	0516	K40	0104	MUL26P	0065
BUFGV	0370	FSAVE2	0517	K400	0121	ONEOCP	0042
BUFRAN	0400	FSAVE3	0520	K5	0074	ONEUCT	4442
CMNFD	1106	FSAVE4	0521	K5200	0123	PNT1	0524
CMNSA	1117	FSTA	0000	K540	0124	PNT2	0523
CNTR	0221	FSUB	2000	K5402	0003	PRNT1	4451
CODE	0236	HOMEDF	0211	K64	0070	PRNT1P	0031
CONBUF	1153	IHRETP	0026	K7	0075	PRNT2	4452
CRLF	4454	INIT	1121	K70	0105	PRNT2P	0052
CRLEP	0054	INITA	1124	K7510	0125	PRNT4	4453
DC55A	0326	INITB	1141	K7520	0126	PRNT4P	0053
DC55B	0312	INITEX	5000	K7540	0127	RELEAS	0416
DC55C	0317	INT	0322	K7600	0131	RENTY	0247
ERROR	0222	INTACK	0214	K77	0106	RLBUFF	4457
ERRP	0061	IOFMSB	0056	K7735	0132	RLBUFF	0057
ERRSA	0240	IR	1010	K7740	0133	RUN	1154
ERRSB	0241	JA	1030	K7750	0134	SERVEX	5004
ERRSC	0242	JAC	0007	K7760	0135	SETB	1110
ERRSD	0243	JAL	1070	K7770	0515	SETX	1100
ERRSE	0244	JEG	1000	K7771	0136	SPACE2	4455
ERRSF	0245	JGE	1010	K7773	0137	SPACEP	0055
EXINIT	0020	JGT	1000	K7774	0140	STARTD	0006
EXSERV	0004	JLE	1020	K7775	0141	STARTP	0005
EXTMEM	0161	JLT	1050	KCDF	0064	STPPP	0255
FADD	1000	JNE	1040	KCIF	0005	TAG0	0002
FADDH	5000	JNX	2000	KCIFUF	0020	TAG1	0005
FCLR	0002	JOB	0200	KILL	0217	TAG10	0065
FDIV	3000	JSA	1120	KILLED	0220	TAG11	0070
FIXIT	0000	JSR	1150	KIOP	0004	TAG12	0712
FIXAG	0760	K0	0066	L0X	0100	TAG13	0714

TAB14 0717
TAB15 0723
TAB16 0733
TAB17 0751
TAG2 0016
TAG20 0031
TAG21 0710
TAG22 1057
TAG3 0034
TAG4 0042
TAG5 0052
TAG6 0056
TAG7 0060
TEXT1 0201
TJAC 0012
TJSA 0063
TJSS 0067
TMOOCF 0041
TMOOCF 4441
TYPE 4450
TYPEP 0050
XTA 0030

ERRORS DETECTED: 0

LINKS GENERATED: 42

RUN-TIME: 4 SECONDS

3K CORE USED