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DECUS NO.	8-528
TITLE	TIC-TAC-TOE: MODIFICATIONS TO TIC 5/8, DECUS NO. 8-173
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SOURCE LANGUAGE	PAL III

TIC-TAC-TOE: MODIFICATIONS TO TIC 5/8, DECUS NO. 8-173

DECUS Program Library Write-up DECUS NO. 8-528

ABSTRACT

This modification to TIC 5/8 (DECUS No. 8-173) make it possible to run TIC 5/8 on a LAB-8 System and to play TIC-TAC-TOE

REQUIREMENTS:

Software: TIC 5/8 , DECUS No. 8-173

Storage: The program TIC 5/8 and this modifications occupies the locations 1-3, 33-3053

Equipment: A 4 K PDP-8/I or PDP-8/E with an AXØ8 A/D-converter (with oscylloscope) and ASR-33 teletype (LAB-8 System).

LOADING PROCEDURE:

1) Load the DECUS-Program TIC 5/8 with the BIN-Loader.

2) Load the binary tape of TIC-TAC-TOE, modifications to TIC 5/8

3) Turn on the teletype and the oscylloscope of the AXØ8 A/D-converter

4) After loading, start the program at location Ø2ØØ.

PDP-8 Programming Note

TIC-TAC-TOE
Modifications to TIC 5/8, DECUS No. 8-173
for a PDP-8 Computer with AXØ8 A/D-Converter

It is impossible with the TIC 5/8 program to play TIC-TAC-TOE against a PDP-8 computer with an AXØ8 A/D-converter (LAB-8 System). The following modifications to TIC 5/8 make it possible to run this program on a LAB-8 System.

The oscylloscope of the AXØ8 A/D-converter cannot be controlled by commands of the 34D scope (scope of TIC 5/8). So it is necessary to modify all the operations to which the oscylloscope reacts. In addition to these modifications the calculation of the x- and y-coordinates for the oscylloscope of the AXØ8 must also be modified to a small extent. Then there are no difficulties to display the matrix

9 8 7
6 5 4
3 2 1

on the oscylloscope (listing of program, part 1).

To change this matrix to its normal form

1 2 3

4 5 6

7 8 9

the modifications of part 2 (listing of program) are necessary.

After loading the program TIC 5/8 (DECUS No. 8-173) and the modifications (listing below), the program will run when starting at location Ø2ØØ on a PDP-8 computer with an AXØ8 A/D-converter.

Listing of program:

Source Language: PAL III

```
/ MODIFICATIONS FOR THE DISPLAY ON THE OSCYLLOSCOPE
/ OF THE AXØ8

/ MATRIX:          9 8 7
/                  6 5 4
/                  3 2 1

/ SPECIFICATION FOR THE AXØ8
DXC=6301
DXL=6302
DIS1=6304
DYC=6311
DYL=6312
DIS2=6314
```

```
                *35
0035  3041      HELPI,    HELP
0036  3045      DISPLA,   DISPL
0037  0000                0
0040  0350                350

                *110
0110  0252                252
0111  7000                7000

                *114
0114  7603                7603

                *1004
1004  6343                DXC DXL

                *1011
1011  6317                DZC DZL DIS2
1012  7001                IAC

                *1024
1024  1114                TAD 114
1025  6313                DZC DZL

                *1033
1033  6347                DXC DXL DIS1
1034  7001                IAC

                *1042
1042  1040                TAD 40

                *1123
1123  4435                JMS I HELPI

                *1150
1150  4436                JMS I DISPLA

                *1154
1154  7000                NOP

                *3001
3001  0000      HELP,     0
3002  3037                DCA 37
3003  1037                TAD 37
3004  5601                JMP I HELP

3005  0000      DISPL,    0
3006  1215                TAD A1
3007  6313                DZC DZL
3010  7200                CLA
3011  1037                TAD 37
3012  1040                TAD 40
3013  6347                DXC DXL DIS1
3014  5605                JMP I DISPL

3015  0720      A1,       720
```

```
                    / MODIFICATIONS TO CHANGE THE MATRIX INTO        1 2 3
                    /                                                4 5 6
                    /                                                7 8 9


                    *33
0033    3016    IN,         INPUT
0034    3022    OUT,        OUTPUT

                    *263
0263    4434                JMS I OUT

                    *613
0613    4433                JMS I IN

                    *1213
1213    0262                262

                    *3016
3016    0000    INPUT,      0
3017    6036                KRB
3020    4230                JMS TEST
3021    5616                JMP I INPUT

3022    0000    OUTPUT,     0
3023    4230                JMS TEST
3024    6046                TLS
3025    7200                CLA
3026    1250                TAD A2
3027    5622                JMP I OUTPUT

3030    0000    TEST,       0
3031    3250                DCA A2
3032    1250                TAD A2
3033    1252                TAD M261
3034    7510                SPA
3035    5245                JMP GO
3036    1253                TAD M11
3037    7700                SMA CLA
3040    5245                JMP GO
3041    1251                TAD A3
3042    1250                TAD A2
3043    7041                CIA
3044    5630                JMP I TEST
3045    7200    GO,         CLA
3046    1250                TAD A2
3047    5630                JMP I TEST

3050    0000    A2,         0
3051    7226    A3,         -552
3052    7517    M261,       -261
3053    7767    M11,        -11
```

A1	3015
A2	3050
A3	3051
DISPL	3005
DISPLA	0036
DIS1	6304
DIS2	6314
DXC	6301
DXL	6302
DYC	6311
DYL	6312
GO	3045
HELP	3001
HELPI	0035
IN	0033
INPUT	3016
M11	3053
M261	3052
OUT	0034
OUTPUT	3022
TEST	3030