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DECUS NO.	8-355
TITLE	PAL III.75
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SOURCE LANGUAGE	PAL III

PAL III.75

DECUS Program Library Write-up DECUS NO. 8-355

ABSTRACT

This program is an overlay to PAL III (DEC-08-ASB1) which enables PAL III to generate links for off-page references automatically in a manner similar to MACRO-8. The overlay uses only two pages of memory, thus more space is available for the user's symbol table than with MACRO-8.

Every time the assembler detects an off-page reference, a link is generated on the current page, starting at the top and working down. Only one link is generated for each off-page operand even if that operand is referenced more than once. In contrast to MACRO-8, no message is printed for the links generated.

OPERATING INSTRUCTIONS

Load PAL III and then load the overlay tape using the binary loader. Assembler operation is the same as with PAL III.

RESTRICTIONS

(1) The user may not reference an off-page operand indirectly. Should he try, the assembler will type the error message IR AT (value of CLC).

(2) All instructions to be assigned to the same page must be assembled together. Coding such as:

```
*0200
A=5000
B=5001
C=5002
CLA CLL
TAD A
TAD B
JMP I .+1
0400
*0400
CMA IAC
JMP I .+1
0310
*0310
TAD B
TAD C
TAD A
HLT
$
```

will not assemble properly.

(3) During PASS II and PASS III the assembler will check to see if the space reserved for links overlaps the program area. If overlap has occurred, the assembler will stop. Assembly will continue if the user presses the CONT switch on the console. However, the binary object tape generated will not be usable. The action taken by the assembler at this point differs depending on which PASS it is. If this error is detected in PASS III, the current location counter is set to the first address of the next page. In PASS II, it is not so set. In neither case is a usable object program produced; however, assembly is continued in an effort to discover if there are any more occurrences of this error.

(4) With the overlay, PAL III works only with the low speed reader and teletype.

LISTING.
THIS LISTING WAS PRODUCED BY THE MODIFIED ASSEMBLER.

BASE	7264
BP	731Ø
CH	7266
CH1	74ØØ
C72ØØ	7371
END	7366
F	7231
LGER	72ØØ
LPE	74Ø6
L1	724Ø
L2	72Ø6
L3	7341
L4	7346
L5	7313
N	7263
NF	7224
PC	7272
PE	7245
PRINT	7316
P3	7355
T	7265

```
                    *Ø164

Ø164    Ø477        Ø477
                    *Ø522
Ø522    5565        JMP I Ø165
                    *Ø165
Ø165    72ØØ        72ØØ
                    *72ØØ
72ØØ    73ØØ        LGER,           CLA CLL
72Ø1    1263                        TAD N
72Ø2    3265        DCA T
72Ø3    724Ø        STA
72Ø4    1264        TAD BASE
72Ø5    3Ø11        DCA ØØ11
72Ø6    2265        L2, ISZ T
72Ø7    5224        JMP NF
721Ø    724Ø        STA
7211    1264        TAD BASE
7212    3264        DCA BASE
7213    1143        TAD Ø143
7214    3664        DCA I BASE
7215    724Ø        STA
7216    1263
7217    3263        TAD N;DCA N
```

```
7220  4245  JMS PE
7221  1264  TAD BASE
7222  3011  DCA 0011
7223  5231  JMP F
7224  1411  NF, TAD I 0011
7225  7041  CMA IAC
7226  1143  TAD 0143
7227  7640  SZA CLA
7230  5206  JMP L2
7231  1140  F, TAD 0140
7232  0133  AND 0133
7233  7650  SNA CLA
7234  5240  JMP L1
7235  1134  TAD 0134
7236  5637  JMP I .+1
7237  0523  0523
7240  1140
7241  1133  L1, TAD 0140;TAD 0133
7242  3140  DCA 0140
7243  1011  TAD 0011
7244  5564  JMP I 0164
7245  0000  PE, 0
7246  1142  TAD 0142
7247  0122  AND 0122
7250  3111  DCA 0111
7251  1264  TAD BASE
7252  0071  AND 0071
7253  7041  CMA IAC
7254  1111  TAD 0111
7255  7700  SMA CLA
7256  5260  JMP .+2
7257  5645  JMP I PE
7260  4310
7261  7402
7262  5645  JMS BP;HLT;JMP I PE
7263  7777  N, -1
7264  7200  BASE, 7200
7265  0000  T, 0
7266  4245  CH, JMS PE
7267  7300  CLA CLL
7270  5671  JMP I .+1
7271  0333  0333
            *0332
0332  5566  JMP I 0166
            *0166
0166  7266  CH
            *0131
0131  7100  7100
```

```
                *2ØØ3
2ØØ3    5563    JMP I Ø163
                *Ø163
Ø163    7272    PC
                *7272
7272    Ø116    PC, AND Ø116
7273    3Ø11    DCA ØØ11
7274    1142    TAD Ø142
7275    Ø116    AND Ø116
7276    7Ø41    CMA IAC
7277    1Ø11    TAD ØØ11
73ØØ    764Ø    SZA CLA
73Ø1    1134    TAD Ø134
73Ø2    764Ø
73Ø3    431Ø    SZA CLA;JMS BP
73Ø4    114Ø    TAD Ø14Ø
73Ø5    3142    DCA Ø142
73Ø6    57Ø7    JMP I  .+1
73Ø7    2ØØ4    2ØØ4
731Ø    ØØØØ    BP,Ø
7311    2263    ISZ N
7312    5316    JMP PRINT
7313    724Ø    L5, STA
7314    3263    DCA N
7315    571Ø    JMP I BP
7316    724Ø    PRINT, STA
7317    1263    TAD N
732Ø    3265    DCA T
7321    724Ø    STA
7322    1264    TAD BASE
7323    3Ø11    DCA ØØ11
7324    1264    TAD BASE
7325    Ø122    AND Ø122
7326    3111    DCA Ø111
7327    1142    TAD Ø142
733Ø    Ø116    AND Ø116
7331    1111    TAD Ø111
7332    3142
7333    1134
7334    775Ø
7335    5341
7336    1142    DCA Ø142;TAD Ø134;SPA SNA CLA ;JMP L3;TAD Ø142
7337    712Ø    STL
734Ø    4427    JMS I ØØ27
7341    2265    L3, ISZ T
7342    5346    JMP L4
7343    1371    TAD C72ØØ
7344    3264    DCA BASE
7345    5313    JMP L5
```

```
7346    71ØØ    L4, CLL
7347    1134    TAD Ø134
735Ø    771Ø    SPA CLA
7351    5355    JMP P3
7352    1411    TAD I ØØ11
7353    4427    JMS I ØØ27
7354    5341    JMP L3
7355    1117    P3, TAD Ø117
7356    443Ø    JMS I ØØ3Ø
7357    1142    TAD Ø142
736Ø    4431    JMS I ØØ31
7361    443Ø    JMS I ØØ3Ø
7362    2142    ISZ Ø142
7363    1411    TAD I ØØ11
7364    4431    JMS I ØØ31
7365    5341    JMP L3
7366    431Ø    END, JMS BP
7367    1134    TAD Ø134
737Ø    5562    JMP I Ø162
7371    72ØØ    C72ØØ, 72ØØ
                *Ø162
Ø162    Ø6Ø1    Ø6Ø1
                *Ø6ØØ
Ø6ØØ    5561    JMP I Ø161
                *Ø161
Ø161    7366    END
                *Ø2ØØ
Ø2ØØ    3142    DCA Ø142
Ø2Ø1    1Ø65
Ø2Ø2    314Ø    TAD ØØ65;DCA Ø14Ø
Ø2Ø3    521Ø    JMP Ø21Ø
                *1676
1676    5677    JMP I .+1
1677    74ØØ    CH1
                *74ØØ
74ØØ    46Ø6    CH1, JMS I LPE
74Ø1    71ØØ    CLL
74Ø2    1142    TAD Ø142
74Ø3    4431    JMS I ØØ31
74Ø4    56Ø5    JMP I .+1
74Ø5    17ØØ    17ØØ
74Ø6    7245    LPE, PE
```