```
                        .TITLE GROUP   ADD, DELETE, RENAME GROUPS IN REDAL 3
/-------------------------------------------------------------------------
/
/     REDAC SOFTWARE LIMITED
/
/1    SUITE          :   P.C.B. LAYOUT
/2    PROGRAM TITLE:   REDAL 3 MARK 7
/3    ROUTINE TITLE:   GROUP
/
/    THIS PROGRAM SOURCE FILE IS SUPPLIED IN CONFIDENCE
/    TO THE CUSTOMER; THE CONTENTS OR DETAILS OF ITS
/    OPERATION MAY ONLY BE DISCLOSED TO PERSONS EMPLOYED
/    BY THE CUSTOMER WHO REQUIRE A KNOWLEDGE OF THE
/    SOFTWARE CODING TO CARRY OUT THEIR JOB. DISCLOSURE TO
/    ANY OTHER PERSON MUST HAVE PRIOR AUTHORISATION FROM THE
/    DIRECTORS OF REDAC SOFTWARE LIMITED
/
/
/4    AUTHOR         :   D. J. ELLIS
/5    DATE           :   20TH FEBRUARY 1974
/
/6    PURPOSE        :   TO ENABLE A GROUP OF COMPONENTS (ALL INTER-
/     CONNECTED) TO BE DELETED OR REPRODUCED AT SOME SPECIFIED POSITION
/     TOGETHER WITH THEIR INTERCONNECTION PATTERN AND ROUTES.   TO
/     ALSO ALLOW THE RENAMING OF INDIVIDUAL COMPONENTS.
/
        .EJECT
```

```
28                          /
29                          /7    CALLING SEQUENCE AND DESCRIPTION OF ARGUMENTS:
30                          /
31                          /     JMS*    GROUP
32                          /     JMP     .+1+1
33                          /     .DSA    ARG7    /MODE OF USE (3 DELETE, 4 REPRODUCE, 5 RENAME)
34                          /
35                          /8    I/O DEVICES AND FUNCTIONS:
36                          /
37                          /     LPA.    .DAT+4          DETAILS OF MODIFICATIONS MADE TO DATA
38                          /     TTA.    .DAT+4          CONDITIONAL ASSEMBLY (ASS4) WITH LPA.
39                          /     TTA.    .DAT-3          COMMUNICATION WITH USER, ERRORS.
40                          /
41                          /9    REGISTERS USED:
42                          /
43                          /     ACCUMULATOR
44                          /     LINK
45                          /     MULTIPLIER/QUOTIENT (EAE)
46                          /     AUTOINCREMENTS 10, 11, 12 AND 13
47                          /     INDEX
48                          /     LIMIT
49                          /
50                          /10   EXTERNAL COMMON AREAS:
51                          /
52                          /     .XX              FORTRAN BLANK COMMON
53                          /
54                          /11   INTERNAL COMMON AREAS:
55                          /
56                          /     PUSBUT,SIZE,EOCOMP,EOCONN,EOROUT
57                          /
58                          /12   EXTERNAL GLOBALS:
59                          /
60                          /     ASS4    .DA     DRAWCP  BUTTON  MESS1   DFLPK
61                          /     NAME1   NUMBER
62                          /
63                          /13   INTERNAL GLOBALS:
64                          /
65                          /     GROUP           SUBROUTINE NAME
66                          /
67                          /14   CONDITIONAL ASSEMBLY PARAMETERS:
68                          /
69                          /     %DOC            ONLY MAIN COMMENTS LISTED WHEN DEFINED
70                          /
71                            .EJECT
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                        /
                        /15  METHOD       :   THE PARAMETERS OF THE ROUTINE ARE FETCHED USING
                        /    .DA AND DAT SLOT 4 IS ASSIGNED WITH ASS4 AND THEN INITIALISED.
                        /    THE USER IS NEXT ASKED TO SELECT A COMPONENT WITH THE LIGHT PEN
                        /    AND AT THIS STAGE IT IS POSSIBLE FOR HIM TO EXIT FROM THE ROUTINE
                        /    BY SELECTING THE FRAME.   FOLLOWING THIS A DISPATCH TABLE IS USED
                        /    TO SELECT THE APPROPRIATE FUNCTION FROM THE MODE PARAMETER IN THE
                        /    ORIGINAL CALL AFTER DISPLAYING A BUSY MESSAGE.
                        /
                        /      THE DELETE GROUP FUNCTION IS IMPLEMENTED AS FOLLOWS.   THE
                        /    SELECTED COMPONENT IS FIRST DELETED FROM THE DISPLAY AND THE USER
                        /    REQUESTED TO CONFIRM THIS ACTION.   IF A RESET IS REQUESTED A JUMP
                        /    TO 'REPLAC' IS MADE WHICH RECONNECTS THE DISPLAY OF THIS ITEM AND
                        /    EXITS FROM 'GROUP'.   ALTERNATIVELY, THE MESSAGE STATING 'GROUP
                        /    DELETED:-' IS OUTPUT ON DAT SLOT 4 AND ALL COMPONENTS ON THE TREE
                        /    ARE LOCATED USING LOCAL SUBROUTINE 'TREE'.
                        /
                        /      FOLLOWING THIS TREE MARKING A SERIES OF NESTED SCANS OF THE
                        /    COMPONENTS, CONNECTIONS AND ROUTES ARRAYS ARE MADE TO DELETE THE
                        /    ITEMS.   FIRSTLY A SCAN OF THE COMPONENTS IS MADE TO FIND A MARKED
                        /    COMPONENT.   THIS GIVES A POINTER TO A CONNECTION BLOCK WHICH IS
                        /    SCANNED TO FIND ALL ROUTED CONNECTIONS IN THE BLOCK.   WHEN A
                        /    ROUTED CONNECTION IS FOUND THE ROUTES ARRAY IS COLLAPSED OVER THE
                        /    ROUTE AND THEN THE CONNECTIONS ARRAY AS A WHOLE IS SCANNED TO UPDATE
                        /    ALL ROUTES ARRAY POINTERS TO THAT SECTION OF THE ROUTES ARRAY THAT
                        /    HAS BEEN MOVED.   WHEN THE BLOCK SCAN OF THE CONNECTIONS ON THIS
                        /    COMPONENT IS COMPLETED THE CONNECTIONS ARRAY IS COLLAPSED OVER THE
                        /    CONNECTION BLOCK AND A SCAN OF THE COMPONENTS ARRAY AS A WHOLE IS
                        /    MADE TO UPDATE ALL CONNECTION POINTERS TO THAT REGION OF THE
                        /    CONNECTIONS ARRAY THAT HAS BEEN MOVED.   FINALLY THE COMPONENTS
                        /    ARRAY IS COLLAPSED OVER THE MARKED COMPONENT AND THE INITIAL SCAN
                        /    CONTINUED.   WHEN THE SCAN IS COMPLETED THE PICTURE IS REDRAWN AND
                        /    AN EXIT FROM SUBROUTINE 'GROUP' IS MADE.
                        /
                        /      THE REPRODUCE GROUP FUNCTION IS IMPLEMENTED AS FOLLOWS.   THE
                        /    SELECTED GROUP IS FIRST MARKED AND LISTED BY CALLING TREE.
                        /    FOLLOWING THIS THE USER IS ASKED TO TYPE IN THE X AND Y SHIFT IN
                        /    POSITION FOR THE NEW GROUP.   THE ARRAY LIMITS AND POINTERS USED
                        /    IN ADDING THE NEW DATA ARE NEXT SET UP.   (THE ADDITION OF DATA
                        /    TO THE COMPONENTS, CONNECTIONS AND ROUTES ARRAYS IS PERFORMED BY
                        /    THREE SMALL SUBROUTINES SO THAT THE ARRAY OVERFLOW CHECKS MAY BE
                        /    MADE IN ONE PLACE ONLY.)
                        /
                        /      THE MAIN COPYING FUNCTION STARTS AT LABEL LOC01.   A SCAN OF THE
                        /    COMPONENTS ARRAY IS MADE TO FIND MARKED COMPONENTS.   WHEN SUCH
                        /    A COMPONENT IS FOUND IT IS DUPLICATED AT THE END OF THE COMPONENTS
                        /    ARRAY.   AT THIS TIME A NEW POINTER TO THE CONNECTIONS BLOCK, FOR
                        /    THE COPY, IS ADDED AND THE MARKERS REMOVED FROM THE MASTER
                        /    COMPONENT.   A POINTER TO THE COPY IS PLACED IN WORD TWO OF THE
                        /    MASTER AND A BACK POINTER TO THE MASTER IS PLACED IN WORD ONE OF
                        /    THE COPY.   (THE NAME OF THE MASTER IS THUS STORED HALF IN THE
                        /    MASTER AND HALF IN THE COPY.)   THE COMPONENT POSITION IS ALSO
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124                         /   UPDATED.   AT THIS POINT AN EXIT TO THE FINAL COMPONENT SCAN IS
125                         /   POSSIBLE IF THIS IS THE ONLY COMPONENT ON THE TREE.   I.E. IT HAS
126                         /   NO CONNECTIONS.   WHEN THE COMPONENT HAS BEEN COPIED THE HEADER WORD
127                         /   OF THE CONNECTION BLOCK IS COPIED AND EACH CONNECTION IN THE BLOCK
128                         /   IS EXAMINED IN TURN.   IN THIS THE ROUTES POINTER, TOGETHER WITH
129                         /   THE POINTER TO THE OTHER COMPONENT, IS EXAMINED AND ONE OF THREE
130                         /   ACTIONS IS TAKEN.   IF UNROUTED THE CONNECTION IS COPIED WITH A
131                         /   ZERO ROUTES POINTER.   IF ROUTED AND THE ROUTE HAS NOT YET BEEN
132                         /   COPIED THEN THE ROUTE IS COPIED UPDATING TO ITS NEW POSITION AND
133                         /   THE CONNECTION WITH ITS NEW ROUTE POINTER IS COPIED.   IF THE ROUTE
134                         /   WAS PREVIOUSLY COPIED (I.E. THE OTHER COMPONENT ON THE CONNECTION
135                         /   HAD BEEN PREVIOUSLY COPIED) THE A NEW ROUTE POINTER IS FOUND FROM
136                         /   THIS OTHER COMPONENT AND THE CONNECTION IS COPIED.   AT THIS STAGE
137                         /   THE POINTER TO THE OTHER COMPONENT IS NOT UPDATED.
138                         /
139                         /     WHEN THE ENTIRE COMPONENTS ARRAY HAS BEEN SCANNED A SEARCH OF
140                         /   THE CONNECTIONS THAT HAVE BEEN COPIED IS MADE AND THE COMPONENT
141                         /   POINTERS ARE UPDATED TO THE POINTER HELD IN WORD TWO OF THE MASTER
142                         /   COMPONENT WHICH IS ADDRESSED FROM WORD ZERO OF EACH INDIVIDUAL
143                         /   CONNECTION.   FINALLY A SCAN OF THE NEW COMPONENTS IS MADE TO RESET
144                         /   THE NAME IN THE MASTER AND TO NULL THE NAME IN THE COPY.   AFTER
145                         /   THIS THE END OF ARRAY POINTERS ARE SAVED AND UPDATED AND THE PICTURE
146                         /   IS REDRAWN.   AT THIS STAGE THE USER IS ASKED TO CONFIRM THE ACTION
147                         /   TAKEN BY A KEY HIT.   SELECTION OF KEY 6 IS USED TO RESET THE ARRAY
148                         /   POINTERS THUS DELETING THE GROUP REPRODUCED.
149                         /
150                         /     THREE LOCAL SUBROUTINES FOR ADDING DATA TO THE END OF THE ARRAYS
151                         /   EXIST.   EACH DETECTS THE VARIOUS OVERFLOW STATES.   IF OVERFLOW
152                         /   OCCURS A RESET IS MADE BY SCANNING THE NEW COMPONENTS ADDED AND
153                         /   RESETING THE NAMES IN THE MASTERS.   FOLLOWING THIS THE FULL
154                         /   COMPONENTS ARRAY IS SCANNED TO RESET ANY REMAINING CONNECTIONS
155                         /   POINTERS BEFORE AN EXIT IS MADE.   TWO SUBROUTINES FOR UPDATING
156                         /   THE X AND Y COORDINATES IN THE BOTTOM TEN BITS OF A WORD ARE ALSO
157                         /   USED AND THESE CALL A FURTHER SUBROUTINE, ADDZ, WHICH CHECKS THAT
158                         /   THE RESULTING COORDINATE IS LEGAL AND ABORTS THE TASK OF AN ERROR
159                         /   IS FOUND.
160                         /
161                         /     THE RENAME FUNCTION IS IMPLEMENTED AS FOLLOWS.   THE NAME OF THE
162                         /   COMPONENT SELECTED IS PRINTED ON THE TELETYPE WITH AN INSTRUCTION
163                         /   TO TYPE IN THE NEW NAME.   THIS NEW NAME IS READ WITH GLOBAL
164                         /   SUBROUTINE NAME1 WHICH CHECKS FOR A VALID FORMAT AND FOR NAME
165                         /   DUPLICATION.   IF NO ERROR IS DETECTED THE NEW NAME IS INSERTED
166                         /   IN THE DATA STRUCTURE AND THE COMPONENT IS REDRAWN.   THE ROUTINE
167                         /   EXITS TO LABEL STAR1 SO THAT FURTHER RENAMING OF COMPONENTS MAY
168                         /   TAKE PLACE WITH A MINIMUM OF USER ACTION.
169                         /
170                         /     LOCAL ROUTINE TREE SETS BIT 1 OF THE CONNECTIONS POINTER WORD OF
171                         /   ALL COMPONENTS THAT ARE INTERCONNECTED.   AN ABSOLUTE POINTER TO
172                         /   ONE COMPONENT IS REQUIRED IN COMPTR.   THE PARAMETERS COMPAD,
173                         /   EOCOMP AND CONNAD OF GROUP ARE ASSUMED TO BE SET UP.   THE INDEX
174                         /   REGISTER, LIMIT REGISTER AND EAE UNIT ARE USED.   A CONTINUOUS
175                         /   SCAN OF THE COMPONENTS ARRAY IS MADE MARKING NEW COMPONENTS
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176                         /   FOUND BY EXAMINATION OF THE CONNECTIONS ON AN EXISTING COMPONENT.
177                         /   BIT 1 OF THE CONNECTIONS POINTER IS SET IF A COMPONENT IS ON THIS
178                         /   TREE AND BIT 0 IS SET IF IT IS PENDING EXAMINATION.   THE SEARCH
179                         /   STOPS WHEN THE NUMBER FOUND EQUALS THE NUMBER EXAMINED.   THE NAMES
180                         /   OF COMPONENTS ON THE TREE ARE WRITTEN TO DAT SLOT 4.
181                         /
182                         /16   AMMENDMENTS  : CHANGE FROM RL3 MK7 D.S. TO RL3 MK8
183                         /                    K. FOSTER   JAN 1975
184                         /
185                         /-------------------------------------------------------------------------
186                                 .IFUND  %DOC
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                                    .TITLE  GROUP   NMEMONIC ASSIGNMENTS
                660000 A    SHAL=660000             /GET AC00 INTO LINK
                660000 A    ECLL=660000             /CLEAR LINK - EAE
                641000 A    ECLA=641000             /CLEAR ACCUMULATOR - EAE
                642000 A    OAC=642000              /OR AC INTO MQ
                440000 A    INC=ISZ                 /INCREMENT POINTER (NO SKIP)
                235176 A    DSKP=235176             /DISPLAY SKIP (NAMED)
                201004 A    SPACE=201004            /SPACES IN 5/7 ASCII
                020372 A    ALTMOD=020372           /SPACES ALT IN 5/7 ASCII
        00000 R 000000 A    PUSBY .CBD PUSBUT 1
        00001 R 000000 A    SIZE .CBD SIZE 1
        00002 R 000000 A    EOCOMP .CBD EOCOMP 1
        00003 R 000000 A    EOCONN .CBD EOCONN 1
        00004 R 000000 A    EOROUT .CBD EOROUT 1
        00005 R 000000 A    NAMES .CBD NAMES 1
        00006 R 000000 A    EONAME .CBD EONAME 1
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                                        .TITLE  GROUP   CONTROLLING SEGMENT
                                        .GLOBL  ASS4,.DA,DRAWCP,BUTTON,MESS1,DFLPK,NAME1,NUMBER
                                        .GLOBL  GROUP
00007 R 740040 A    GROUP   XX
00010 R 122015 E            JMS*    .DA     /FETCH THE PARAMETERS
00011 R 600013 R            JMP     START
00012 R 000000 A    MODE            0
00013 R 201547 R    START   LAC     .XXMON
00014 R 723003 A            AAC     3
00015 R 042005 R            DAC     TEMP#
00016 R 222005 R            LAC*    TEMP
00017 R 041575 R            DAC     CONNAD
00020 R 442005 R            ISZ     TEMP
00021 R 222005 R            LAC*    TEMP
00022 R 041574 R            DAC     COMPAD
00023 R 442005 R            ISZ     TEMP
00024 R 222005 R            LAC*    TEMP
00025 R 041576 R            DAC     ROUTAD
00026 R 122006 E            JMS*    ASS4    /ASSIGN DAT SLOT 4 FOR OUTPUT
                                        .INIT   4,1,GROUP+1
00027 R 001004 A *G         CAL+1*1000 4&777
00030 R 000001 A *G         1
00031 R 000010 R *G         GROUP+1+0
00032 R 000000 A *G         0
00033 R 202016 R    STAR1   LAC     (.      /SET UP THE INDEX ADJUSTER
00034 R 502017 R            AND     (070000
00035 R 740031 A            TCA
00036 R 041550 R            DAC     XADJ
00037 R 220000 R            LAC*    PUSBY
00040 R 041555 R            DAC     PUSBUT  /GET POSN. OF MESSAGE BUFFER
00041 R 652000 A            LMQ
00042 R 201601 R            LAC     MESSA   /DISPLAY 'SELECT COMPONENT'
00043 R 161555 R            DZM*    PUSBUT
00044 R 122012 E            JMS*    MESS1
00045 R 122010 E            JMS*    DFLPK   /WAIT FOR THE USERS CHOICE
00046 R 741000 A            SKP
00047 R 002020 R            .DSA    (000001 /INDICATOR FOR COMPONENT SELECTION
00050 R 741100 A            SPA
00051 R 620007 R            JMP*    GROUP   /EXIT IF FRAME SELECTED
00052 R 041551 R            DAC     DISFAD
00053 R 221551 R            LAC*    DISFAD
00054 R 723774 A            AAC     -4
00055 R 041554 R            DAC     COMPTR  /CALCULATE THE COMPONENT POINTER
00056 R 201555 R            LAC     PUSBUT  /DISPLAY A BUSY MESSAGE
00057 R 652000 A            LMQ
00060 R 201631 R            LAC     BUSY
00061 R 161555 R            DZM*    PUSBUT
00062 R 122012 E            JMS*    MESS1
00063 R 220012 R            LAC*    MODE
00064 R 341577 R            TAD     DISPAT  /XCT DISP-2
00065 R 040066 R            DAC     DISP
00066 R 740040 A    DISP    XX
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     GROUP  SRC     GROUP       CONTROLLING SEGMENT

251  00067 R 600072 R           JMP     DELETE  /DELETE GROUP OF COMPONENTS
252  00070 R 600464 R           JMP     REPROD  /REPRODUCE A GROUP OF COMPONENTS
253  00071 R 601356 R           JMP     RENAME  /RENAME A COMPONENT
```

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                                        .TITLE  GROUP   DELETE A GROUP FUNCTION
00072 R 750030 A    DELETE  CLA!IAC
00073 R 652000 A            LMQ
00074 R 201551 R            LAC     DISFAD  /REMOVE SELECTED COMPONENT FROM SCREEN
00075 R 740031 A            TCA
00076 R 122011 E            JMS*    DRAWCP
00077 R 201555 R            LAC     PUSBUT
00100 R 652000 A            LMQ
00101 R 201614 R            LAC     MESSB   /DISPLAY 'HIT BUTTON - 6 TO RESET'
00102 R 161555 R            DZM*    PUSBUT
00103 R 122012 E            JMS*    MESS1
00104 R 122007 E            JMS*    BUTTON
00105 R 542021 R            SAD     (000006
00106 R 600422 R            JMP     REPLAC  /RESET DATA STRUCTURE IF BUTTON 6 HIT
                                        .WRITE  4,2,MESSC,34
00107 R 002004 A *G         CAL+2*1000 4&777
00110 R 000011 A *G         11
00111 R 001640 R *G         MESSC
                  *G        .DEC
00112 R 777736 A *G         -34
00113 R 101435 R            JMS     TREE    /FIND THE COMPONENT TREE
00114 R 201574 R            LAC     COMPAD  /SET UP A SCAN OF THE COMPONENTS ARRAY
00115 R 341550 R            TAD     XADJ
00116 R 721000 A            PAX             /LIMIT REGISTER STILL SET BY TREE
00117 R 210000 A    LAB00   LAC     0,X
00120 R 740010 A            RAL
00121 R 740120 A            SMA!RAR
00122 R 600415 R            JMP     LAB12   /COMPONENT NOT ON TREE
00123 R 724000 A            PXA             /SAVE INDEX REGISTER
00124 R 041557 R            DAC     INDEX
00125 R 210000 A            LAC     0,X
00126 R 502022 R            AND     (177777
00127 R 741200 A            SNA
00130 R 600326 R            JMP     LAB10   /NO CONNECTIONS ON THIS TREE
00131 R 041552 R            DAC     CONPTR  /RELATIVE POINTER TO CONNECTIONS BLOCK
00132 R 723776 A            AAC     -2      /START OF SECTION TO DELETE CONNECTIONS
00133 R 341575 R            TAD     CONNAD  /ABSOLUTE POINTER TO CONNECTIONS
00134 R 062023 R            DAC*    (000013
00135 R 062024 R            DAC*    (000012
00136 R 220012 A            LAC*    12
00137 R 502025 R            AND     (000777 /NUMBER OF CONNECTIONS IN BLOCK
00140 R 740031 A            TCA
00141 R 041551 R            DAC     COUNT1
00142 R 740031 A            TCA
00143 R 673122 A            ECLL!MUL
00144 R 000003 A                    +3
00145 R 641006 A            ECLA!CMQ!OMQ
00146 R 041554 R            DAC     SHIFT1  /NEGATED LENGTH OF BLOCK
00147 R 220012 A    LAB01   LAC*    12
00150 R 220012 A            LAC*    12      /CALCULATE ROUTES POINTER
00151 R 652000 A            LMQ
00152 R 220012 A            LAC*    12
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 301          00153 R 740010 A              RAL
 302          00154 R 742010 A              RTL
 303          00155 R 640614 A              LLS     +14
 304          00156 R 502026 R              AND     (037777
 305          00157 R 741200 A              SNA
 306          00160 R 600262 R              JMP     LAB06
 307          00161 R 041556 R              DAC     ROUTPT  /START OF SECTION TO DELETE A ROUTE
 308          00162 R 723776 A              AAC     -2
 309          00163 R 341576 R              TAD     ROUTAD
 310          00164 R 062027 R              DAC*    (000011 /ABSOLUTE POINTER TO ROUTE
 311          00165 R 062030 R              DAC*    (000010
 312          00166 R 220010 A              LAC*    10
 313          00167 R 220010 A              LAC*    10
 314          00170 R 640512 A              LRS     +12
 315          00171 R 502031 R              AND     (000377 /NO OF WORDS IN ROUTE
 316          00172 R 740031 A              TCA
 317          00173 R 041560 R              DAC     SHIFT2  /NEGATED LENGTH OF BLOCK
 318          00174 R 740031 A              TCA
 319          00175 R 362027 R              TAD*    (000011
 320          00176 R 062030 R              DAC*    (000010 /ABSOLUTE POINTER TO NEXT ROUTE
 321          00177 R 740031 A              TCA
 322          00200 R 341576 R              TAD     ROUTAD
 323          00201 R 360004 R              TAD*    EOROUT  /LENGTH OF REMAINING ROUTES ARRAY
 324          00202 R 740031 A              TCA
 325          00203 R 041553 R              DAC     COUNT2
 326          00204 R 220010 A    LAB02     LAC*    10      /COLLAPSE ROUTES ARRAY
 327          00205 R 060011 A              DAC*    11
 328          00206 R 441553 R              ISZ     COUNT2
 329          00207 R 600204 R              JMP     LAB02
 330          00210 R 201576 R              LAC     ROUTAD
 331          00211 R 740031 A              TCA
 332          00212 R 362027 R              TAD*    (000011
 333          00213 R 060004 R              DAC*    EOROUT  /UPDATE LENGTH OF ROUTES ARRAY
 334          00214 R 201575 R              LAC     CONNAD  /SET UP CONNECTION ARRAY SCAN
 335          00215 R 341550 R              TAD     XADJ
 336          00216 R 721000 A              PAX
 337          00217 R 360003 R              TAD*    EOCONN
 338          00220 R 723777 A              AAC     -1
 339          00221 R 722000 A              PAL
 340          00222 R 210000 A    LAB03     LAC     0,X
 341          00223 R 502025 R              AND     (000777 /NUMBER OF CONNECTIONS
 342          00224 R 740031 A              TCA
 343          00225 R 041553 R              DAC     COUNT2
 344          00226 R 210002 A    LAB04     LAC     2,X     /FORM ROUTES POINTER
 345          00227 R 652000 A              LMQ
 346          00230 R 210003 A              LAC     3,X
 347          00231 R 740010 A              RAL
 348          00232 R 742010 A              RTL
 349          00233 R 640614 A              LLS     +14
 350          00234 R 502026 R              AND     (037777
 351          00235 R 740031 A              TCA
 352          00236 R 341556 R              TAD     ROUTPT
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353         00237 R 741200 A            SNA                 /CHECK IF ROUTE DELETED
354         00240 R 600245 R            JMP     LAB.4       /MARK ROUTE AS DELETED
355         00241 R 740131 A            SMA!TCA
356         00242 R 600255 R            JMP     LAB05       /POINTER IS LESS THAN ROUTES COLLAPSE
357         00243 R 341556 R            TAD     ROUTPT
358         00244 R 341560 R            TAD     SHIFT2      /NEW ROUTES POINTER
359         00245 R 670514 A    LAB.4   ECLL!CLQ!LRS+14
360         00246 R 740020 A            RAR
361         00247 R 742020 A            RTR
362         00250 R 050003 A            DAC     3,X         /DRAWCP WILL RECALCULATE DF ADDRESS
363         00251 R 210002 A            LAC     2,X
364         00252 R 502032 R            AND     (000077
365         00253 R 640002 A            OMQ
366         00254 R 050002 A            DAC     2,X
367         00255 R 737003 A    LAB05   AXR     +3
368         00256 R 441553 R            ISZ     COUNT2
369         00257 R 600226 R            JMP     LAB04       /TRY NEXT CONNECTION IN THE BLOCK
370         00260 R 725001 A            AXS     +1
371         00261 R 600222 R            JMP     LAB03       /TRY NEXT BLOCK
372         00262 R 441551 R    LAB06   ISZ     COUNT1      /CONTINUE DELETION OF CONNECTIONS
373         00263 R 600147 R            JMP     LAB01
374         00264 R 220003 R            LAC*    EOCONN
375         00265 R 341575 R            TAD     CONNAD
376         00266 R 740031 A            TCA
377         00267 R 362024 R            TAD*    (000012
378         00270 R 041551 R            DAC     COUNT1      /LENGTH OF REMAINING DATA IN ARRAY
379         00271 R 220012 A    LAB07   LAC*    12
380         00272 R 060013 A            DAC*    13          /COLLAPSE THE ARRAY
381         00273 R 441551 R            ISZ     COUNT1
382         00274 R 600271 R            JMP     LAB07
383         00275 R 201575 R            LAC     CONNAD
384         00276 R 740031 A            TCA
385         00277 R 362023 R            TAD*    (000013
386         00300 R 060003 R            DAC*    EOCONN      /UPDATE LENGTH OF CONNECTIONS ARRAY
387         00301 R 201574 R            LAC     COMPAD
388         00302 R 341550 R            TAD     XADJ
389         00303 R 721000 A            PAX
390         00304 R 360002 R            TAD*    EOCOMP
391         00305 R 723777 A            AAC     -1
392         00306 R 722000 A            PAL                 /SET UP LIMITS FOR COMPONENTS ARRAY
393         00307 R 210000 A    LAB08   LAC     0,X
394         00310 R 502022 R            AND     (177777
395         00311 R 740031 A            TCA
396         00312 R 341552 R            TAD     CONPTR
397         00313 R 740131 A            SMA!TCA
398         00314 R 600324 R            JMP     LAB09
399         00315 R 341552 R            TAD     CONPTR
400         00316 R 341554 R            TAD     SHIFT1      /NEW CONNECTION POINTER
401         00317 R 652000 A            LMQ
402         00320 R 210000 A            LAC     0,X
403         00321 R 502033 R            AND     (600000 /SAVE GROUP MARKER BITS
404         00322 R 640002 A            OMQ
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00323 R 050000 A            DAC     0,X
00324 R 725006 A    LAB09   AXS     +6
00325 R 600307 R            JMP     LAB08   /MORE COMPONENTS IN THE SCAN
00326 R 201550 R    LAB10   LAC     XADJ    /CALCULATE THE PRESENT COMPONENT NUMBER
00327 R 341574 R            TAD     COMPAD
00330 R 740031 A            TCA
00331 R 341557 R            TAD     INDEX
00332 R 653000 A            LMQ!ECLA
00333 R 660323 A            ECLL!DIV
00334 R 000006 A                    +6
00335 R 641002 A            LACQ
00336 R 041554 R            DAC     SHIFT1
00337 R 201575 R            LAC     CONNAD  /SET UP A SCAN OF THE CONNECTIONS ARRAY
00340 R 341550 R            TAD     XADJ
00341 R 721000 A            PAX
00342 R 360003 R            TAD*    EOCONN
00343 R 723777 A            AAC     -1
00344 R 722000 A            PAL
00345 R 100450 R    LAB.10  JMS     CHGPTR  /UPDATE COMPONENTS POINTER
00346 R 210000 A            LAC     0,X     /CALCULATE NUMBER OF CONNECTIONS
00347 R 502025 R            AND     (000777
00350 R 741231 A            SNA!TCA         /TRAP A ZERO COUNT AS THIS CODE
00351 R 777777 A            LAW     -1      /IS EXECUTED WITH NO DATA FOR CONNS
00352 R 041551 R            DAC     COUNT1
00353 R 737001 A            AXR     +1
00354 R 100450 R    LAB.11  JMS     CHGPTR  /UPDATE COMPONENTS POINTER
00355 R 737003 A            AXR     +3
00356 R 441551 R            ISZ     COUNT1
00357 R 600354 R            JMP     LAB.11  /MORE CONNECTIONS IN THIS BLOCK
00360 R 725000 A            AXS     +0
00361 R 600345 R            JMP     LAB.10  /MORE CONNECTION BLOCKS TO DO
00362 R 201557 R            LAC     INDEX
00363 R 721000 A            PAX
00364 R 740031 A            TCA
00365 R 341550 R            TAD     XADJ    /TAKE OFF INDEX ADJUSTER
00366 R 740001 A            CMA             /START OF THIS COMPONENT
00367 R 062030 R            DAC*    (000010
00370 R 723006 A            AAC     +6      /START OF NEXT COMPONENT
00371 R 062027 R            DAC*    (000011
00372 R 740031 A            TCA
00373 R 360002 R            TAD*    EOCOMP
00374 R 341574 R            TAD     COMPAD  /LENGTH OF REMAINING ARRAY
00375 R 740031 A            TCA
00376 R 740030 A            IAC
00377 R 041551 R            DAC     COUNT1
00400 R 220011 A    LAB11   LAC*    11      /COPY DOWN THE ARRAY
00401 R 060010 A            DAC*    10
00402 R 441551 R            ISZ     COUNT1
00403 R 600400 R            JMP     LAB11   /MORE TO COPY
00404 R 222030 R            LAC*    (000010
00405 R 341550 R            TAD     XADJ
00406 R 722000 A            PAL             /RESET THE LIMIT REGISTER
```

```
                GROUP  SRC     GROUP       DELETE @GROUP FUNCTION

 457    00407 R 740001 A             CMA
 458    00410 R 341574 R             TAD     COMPAD
 459    00411 R 341550 R             TAD     XADJ
 460    00412 R 740031 A             TCA
 461    00413 R 060002 R             DAC*    EOCOMP
 462    00414 R 737772 A             AXR     -6       /RESET THE INDEX REGISTER
 463    00415 R 725006 A     LAB12   AXS     +6
 464    00416 R 600117 R             JMP     LAB00    /MORE COMPONENTS IN THE ARRAY
 465    00417 R 651000 A             ECLA!CLQ
 466    00420 R 122011 E             JMS*    DRAWCP
 467    00421 R 620007 R             JMP*    GROUP
 468    00422 R 201551 R     REPLAC  LAC     DISFAD   /REPLACE COMPONENT IN DISPLAY FILE
 469    00423 R 723777 A             AAC     -1       /ONLY 1ST TWO WORDS OF DISPLAY WERE ALTERED
 470    00424 R 041551 R             DAC     DISFAD
 471    00425 R 202034 R             LAC     (DSKP    /REPLACE THE SKIP IN THE FIRST WORD
 472    00426 R 061551 R             DAC*    DISFAD
 473    00427 R 441551 R             INC     DISFAD
 474    00430 R 201554 R             LAC     COMPTR
 475    00431 R 723004 A             AAC     +4
 476    00432 R 041554 R             DAC     COMPTR   /REPLACE THE DATA STRUCTURE POINTER IN 2ND WORD
 477    00433 R 061551 R             DAC*    DISFAD
 478    00434 R 201551 R             LAC     DISFAD
 479    00435 R 742010 A             RTL              /STORE MOST SIGNIFICANT 8 BITS OF DISPLAY POINTER
 480    00436 R 502035 R             AND     (776000  /IN THE COMPONENTS ARRAY
 481    00437 R 361554 R             TAD*    COMPTR
 482    00440 R 061554 R             DAC*    COMPTR
 483    00441 R 441554 R             INC     COMPTR
 484    00442 R 201551 R             LAC     DISFAD
 485    00443 R 640612 A             LLS     +12      /STORE LEAST SIGNIFICANT 8 BITS OF DISPLAY POINTER
 486    00444 R 502035 R             AND     (776000
 487    00445 R 361554 R             TAD*    COMPTR
 488    00446 R 061554 R             DAC*    COMPTR
 489    00447 R 620007 R             JMP*    GROUP    /EXIT ROUTINE TO RESET CONDITIONS
 490    00450 R 740040 A     CHGPTR  XX
 491    00451 R 210000 A             LAC     0,X      /CHECK IF POINTER NEEDS UPDATING
 492    00452 R 502036 R             AND     (777000
 493    00453 R 742030 A             SWHA
 494    00454 R 740031 A             TCA
 495    00455 R 341554 R             TAD     SHIFT1
 496    00456 R 740100 A             SMA
 497    00457 R 620450 R             JMP*    CHGPTR   /NO UPDATE NEEDED
 498    00460 R 210000 A             LAC     0,X      /UPDATE THE POINTER
 499    00461 R 342036 R             TAD     (777000
 500    00462 R 050000 A             DAC     0,X
 501    00463 R 620450 R             JMP*    CHGPTR
```

```
                                        .TITLE  GROUP   REPRODUCE A GROUP FUNCTION
00464 R                    REPROD       .WRITE  4,2,MESSF,34
00464 R 002004 A *G                     CAL+2*1000 4&777
00465 R 000011 A *G                     11
00466 R 001676 R *G                     MESSF
                 *G                     .DEC
00467 R 777736 A *G                     -34
00470 R 101435 R                        JMS     TREE    /TYPE GROUP REPRODUCED:-
                                        .INIT   -3,1,STAR1
00471 R 001775 A *G                     CAL+1*1000 -3&777
00472 R 000001 A *G                     1
00473 R 000033 R *G                     STAR1+0
00474 R 000000 A *G                     0
                                        .WRITE  -3,2,MESSE,34
00475 R 002775 A *G                     CAL+2*1000 -3&777
00476 R 000011 A *G                     11
00477 R 001666 R *G                     MESSE
                 *G                     .DEC
00500 R 777736 A *G                     -34
                                        .WAIT   -3      /TYPE DELTA X DELTA Y
00501 R 000775 A *G                     CAL -3&777
00502 R 000012 A *G                     12
00503 R 122014 E                        JMS*    NUMBER  /READ IN VALUES
00504 R 041564 R                        DAC     XSHIFT
00505 R 122014 E                        JMS*    NUMBER
00506 R 041565 R                        DAC     YSHIFT
00507 R 200001 R                        LAC     SIZE
00510 R 723004 A                        AAC     4
00511 R 041571 R                        DAC     MAXCOM
00512 R 221571 R                        LAC*    MAXCOM
00513 R 740031 A                        TCA
00514 R 360002 R                        TAD*    EOCOMP
00515 R 740100 A                        SMA
00516 R 777777 A                        LAW     -1      /IF ALREADY FULL SET TO DETECT IT
00517 R 041561 R                        DAC     COMLIM
00520 R 200001 R                        LAC     SIZE
00521 R 723003 A                        AAC     3
00522 R 041572 R                        DAC     MAXCON
00523 R 221572 R                        LAC*    MAXCON
00524 R 740031 A                        TCA
00525 R 360003 R                        TAD*    EOCONN
00526 R 740100 A                        SMA
00527 R 777777 A                        LAW     -1
00530 R 041562 R                        DAC     CONLIM
00531 R 200001 R                        LAC     SIZE
00532 R 723005 A                        AAC     5
00533 R 041573 R                        DAC     MAXRUT
00534 R 221573 R                        LAC*    MAXRUT
00535 R 740031 A                        TCA
00536 R 360004 R                        TAD*    EOROUT
00537 R 740100 A                        SMA
00540 R 777777 A                        LAW     -1
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00541 R 041563 R            DAC     RUTLIM
00542 R 220002 R            LAC*    EOCOMP  /SET UP ARRARY POINTERS
00543 R 341574 R            TAD     COMPAD
00544 R 723776 A            AAC     -2
00545 R 062030 R            DAC*    (000010
00546 R 220003 R            LAC*    EOCONN
00547 R 341575 R            TAD     CONNAD
00550 R 723776 A            AAC     -2
00551 R 062027 R            DAC*    (000011
00552 R 220004 R            LAC*    EOROUT
00553 R 341576 R            TAD     ROUTAD
00554 R 723776 A            AAC     -2
00555 R 062024 R            DAC*    (000012
00556 R 220006 R            LAC*    EONAME
00557 R 360005 R            TAD*    NAMES
00560 R 723776 A            AAC     -2
00561 R 062023 R            DAC*    (000013
00562 R 201574 R            LAC     COMPAD  /START SCAN OF COMPONENTS
00563 R 341550 R            TAD     XADJ
00564 R 721000 A            PAX             /THE LIMIT REGISTER IS STILL SET
00565 R 210000 A    LOC01   LAC     0,X     /CHECK IF NEXT COMPONENT MARKED
00566 R 740010 A            RAL
00567 R 740120 A            SMA!RAR
00570 R 601066 R            JMP     LOC13   /COMPONENT UNMARKED
00571 R 502022 R            AND     (177777
00572 R 050000 A            DAC     0,X     /RESET COMPONENT
00573 R 741200 A            SNA
00574 R 600601 R            JMP     LOC02   /COMPONENT HAS NO CONNECTIONS
00575 R 201575 R            LAC     CONNAD  /FORM NEW CONNECTION POINTER
00576 R 740031 A            TCA
00577 R 723002 A            AAC     +2
00600 R 362027 R            TAD*    (000011
00601 R 101270 R    LOC02   JMS     STORCM  /STORE CONNECTION POINTER
00602 R 724000 A            PXA
00603 R 041554 R            DAC     COMPTR  /SAVE INDEX REGISTER
00604 R 740031 A            TCA
00605 R 341550 R            TAD     XADJ
00606 R 740031 A            TCA
00607 R 101270 R            JMS     STORCM  /POINTER TO MASTER IN COPY
00610 R 210002 A            LAC     2,X
00611 R 101270 R            JMS     STORCM  /2ND WORD OF NAME
00612 R 210003 A            LAC     3,X
00613 R 101270 R            JMS     STORCM  /LIBRARY WORD
00614 R 210004 A            LAC     4,X
00615 R 101326 R            JMS     ADDX    /X POSITION
00616 R 101270 R            JMS     STORCM
00617 R 210005 A            LAC     5,X
00620 R 101333 R            JMS     ADDY    /Y POSITION
00621 R 101270 R            JMS     STORCM
00622 R 160013 A            DZM*    000013  /NULL NAMES ARRAY
00623 R 201574 R            LAC     COMPAD  /COMPUTE COMPONENT NUMBER
00624 R 740031 A            TCA             /OF THE COPY
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590  00625 R 362030 R            TAD*    (000010
591  00626 R 653000 A            LMQ!ECLA
592  00627 R 660323 A            ECLL!DIV
593  00630 R 000006 A                    +6
594  00631 R 660611 A            ECLL!LLS+11     /SAVE COMPONENT NUMBER IN MQ
595  00632 R 641002 A            LACQ
596  00633 R 050002 A            DAC     2,X     /STORE IN WORD 2 OF MASTER
597  00634 R 210000 A            LAC     0,X     /CHECK FOR ONLY ITEM ON TREE
598  00635 R 741200 A            SNA
599  00636 R 601130 R            JMP     LOC16   /NO CONNECTIONS
600  00637 R 341575 R            TAD     CONNAD
601  00640 R 723777 A            AAC     -1
602  00641 R 341550 R            TAD     XADJ
603  00642 R 721000 A            PAX             /POINTER TO CONNECTION BLOCK
604  00643 R 210000 A            LAC     0,X
605  00644 R 502025 R            AND     (000777 /NUMBER OF CONNECTIONS
606  00645 R 740031 A            TCA
607  00646 R 041551 R            DAC     COUNT1
608  00647 R 740031 A            TCA
609  00650 R 640002 A            OMQ
610  00651 R 101302 R            JMS     STORCN  /COPY CONNECTION HEADER
611  00652 R 210000 A            LAC     0,X
612  00653 R 744000 A            CLL
613  00654 R 640511 A            LRS     +11
614  00655 R 041567 R            DAC     BACKPT  /SAVE BACK POINTER TO MASTER
615  00656 R 210002 A    LOC03   LAC     2,X     /CALCULATE ROUTE POINTER
616  00657 R 652000 A            LMQ
617  00660 R 210003 A            LAC     3,X
618  00661 R 740010 A            RAL
619  00662 R 742010 A            RTL
620  00663 R 640614 A            LLS     +14
621  00664 R 502026 R            AND     (037777
622  00665 R 041556 R            DAC     ROUTPT
623  00666 R 141566 R            DZM     NEWPTR  /ZERO NEW ROUTES POINTER
624  00667 R 741200 A            SNA
625  00670 R 601045 R            JMP     LOC12   /CONNECTION NOT ROUTED
626  00671 R 724000 A            PXA
627  00672 R 041552 R            DAC     CONPTR  /SAVE INDEX REGISTER
628  00673 R 201567 R            LAC     BACKPT  /BUILD COPY OF OTHER ENTRY OF CONNECTION
629  00674 R 650511 A            CLQ!LRS +11
630  00675 R 210001 A            LAC     1,X
631  00676 R 502037 R            AND     (000700
632  00677 R 642000 A            OAC
633  00700 R 210002 A            LAC     2,X
634  00701 R 502032 R            AND     (000077
635  00702 R 640002 A            OMQ
636  00703 R 041557 R            DAC     WORD0
637  00704 R 210001 A            LAC     1,X
638  00705 R 502032 R            AND     (000077
639  00706 R 041560 R            DAC     WORD1
640  00707 R 210001 A            LAC     1,X     /CHECK IF ROUTE COPIED YET
641  00710 R 744000 A            CLL
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00711 R 640511 A            LRS     +11
00712 R 740031 A            TCA
00713 R 341567 R            TAD     BACKPT
00714 R 741331 A            SPA!SNA!TCA
00715 R 600765 R            JMP     LOC06   /ROUTE NOT YET COPIED
00716 R 341567 R            TAD     BACKPT  /CALCULATE POINTER TO OTHER COMP
00717 R 673122 A            ECLL!MUL
00720 R 000006 A                    +6
00721 R 641002 A            LACQ
00722 R 341574 R            TAD     COMPAD
00723 R 341550 R            TAD     XADJ
00724 R 721000 A            PAX
00725 R 210002 A            LAC     2,X     /CALCULATE POINTER TO COPY OF THIS
00726 R 744000 A            CLL             /COMPONENT
00727 R 640511 A            LRS     +11
00730 R 653122 A            MUL
00731 R 000006 A                    +6
00732 R 641002 A            LACQ
00733 R 341574 R            TAD     COMPAD
00734 R 341550 R            TAD     XADJ
00735 R 721000 A            PAX
00736 R 210000 A            LAC     0,X     /CALCULATE CONNECTIONS POINTER
00737 R 341575 R            TAD     CONNAD
00740 R 341550 R            TAD     XADJ
00741 R 721000 A            PAX
00742 R 210000 A    LOC04   LAC     0,X     /CHECK IF WE HAVE FOUND THE OTHER ENTRY
00743 R 541557 R            SAD     WORD0
00744 R 741000 A            SKP
00745 R 600752 R            JMP     LOC.4
00746 R 210001 A            LAC     1,X
00747 R 502032 R            AND     (000077
00750 R 541560 R            SAD     WORD1
00751 R 600754 R            JMP     LOC05   /THIS IS THE COPY
00752 R 737003 A    LOC.4   AXR     +3      /INDEX TO NEXT CONNECTION
00753 R 600742 R            JMP     LOC04
00754 R 210001 A    LOC05   LAC     1,X     /CALCULATE ROUTES POINTER
00755 R 652000 A            LMQ
00756 R 210002 A            LAC     2,X
00757 R 740010 A            RAL
00760 R 742010 A            RTL
00761 R 640614 A            LLS     +14
00762 R 502026 R            AND     (037777
00763 R 041566 R            DAC     NEWPTR  /SAVE ROUTES POINTER AND
00764 R 601043 R            JMP     LOC11   /CONTINUE WITH CONNECTION
00765 R 201576 R    LOC06   LAC     ROUTAD  /MAKE COPY OF NEW ROUTE
00766 R 740031 A            TCA
00767 R 362024 R            TAD*    (000012
00770 R 723002 A            AAC     +2
00771 R 041566 R            DAC     NEWPTR  /SAVE NEW ROUTES POINTER
00772 R 201556 R            LAC     ROUTPT
00773 R 341576 R            TAD     ROUTAD
00774 R 723777 A            AAC     -1
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                00775 R 341550 R                TAD     XADJ
                00776 R 721000 A                PAX             /POINTER TO ROUTE TO BE COPIED
                00777 R 210000 A                LAC     0,X     /CALCULATE NUMBER OF POINTS
                01000 R 744000 A                CLL             /LESS ONE
                01001 R 640512 A                LRS     +12
                01002 R 502032 R                AND     (000077
                01003 R 740031 A                TCA
                01004 R 740030 A                IAC
                01005 R 041553 R                DAC     COUNT2
                01006 R 210000 A                LAC     0,X     /COPY AND UPDATE ROUTE
                01007 R 740100 A                SMA
                01010 R 242040 R                XOR     (400000 /MARK ROUTE AS INVALID
                01011 R 101326 R                JMS     ADDX    /HEADER
                01012 R 101314 R                JMS     STORRT
                01013 R 210001 A                LAC     1,X
                01014 R 101333 R                JMS     ADDY
                01015 R 101314 R                JMS     STORRT
                01016 R 210002 A    LOC07       LAC     2,X     /GET TYPE OF NEXT SEGMENT
                01017 R 640512 A                LRS     +12
                01020 R 502041 R                AND     (000003
                01021 R 341600 R                TAD     DISPT1  /XCT DISP1
                01022 R 041024 R                DAC     DISP1
                01023 R 210002 A                LAC     2,X
                01024 R 740040 A    DISP1       XX              /DISPATCH TABLE FOR SEGMENT TYPE
                01025 R 601036 R                JMP     LOC10   /X LINE
                01026 R 601034 R                JMP     LOC09   /Y LINE
                01027 R 601030 R                JMP     LOC08   /ANGLED LINE
                01030 R 101326 R    LOC08       JMS     ADDX    /UPDATE 1ST WORD OF ANGLED
                01031 R 101314 R                JMS     STORRT  /LINE AND GET 2ND WORD
                01032 R 737001 A                AXR     +1
                01033 R 210002 A                LAC     2,X
                01034 R 101333 R    LOC09       JMS     ADDY    /UPDATE Y COORDINATE
                01035 R 741000 A                SKP
                01036 R 101326 R    LOC10       JMS     ADDX    /UPDATE X COORDINATE
                01037 R 101314 R                JMS     STORRT
                01040 R 737001 A                AXR     +1
                01041 R 441553 R                ISZ     COUNT2
                01042 R 601016 R                JMP     LOC07   /ANOTHER SEGMENT TO DO
                01043 R 201552 R    LOC11       LAC     CONPTR  /RESET CONNECTION POINTER
                01044 R 721000 A                PAX
                01045 R 210001 A    LOC12       LAC     1,X     /COPY THE CONNECTION UPDATING
                01046 R 101302 R                JMS     STORCN  /THE ROUTES POINTER ONLY
                01047 R 210002 A                LAC     2,X
                01050 R 650506 A                CLQ!LRS +6
                01051 R 201566 R                LAC     NEWPTR
                01052 R 640606 A                LLS     +6
                01053 R 101302 R                JMS     STORCN
                01054 R 201566 R                LAC     NEWPTR
                01055 R 742010 A                RTL
                01056 R 742010 A                RTL
                01057 R 502033 R                AND     (600000
                01060 R 101302 R                JMS     STORCN  /DISPLAY FILE ADDRESS NOT NEEDED
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746         01061 R 737003 A            AXR     +3      /INDEX TO NEXT CONNECTION
747         01062 R 441551 R            ISZ     COUNT1
748         01063 R 600656 R            JMP     LOC03   /ANOTHER CONNECTION EXISTS
749         01064 R 201554 R            LAC     COMPTR  /RESET INDEX REGISTER
750         01065 R 721000 A            PAX
751         01066 R 725006 A    LOC13   AXS     +6
752         01067 R 600565 R            JMP     LOC01   /ANOTHER COMPONENT TO CHECK
753         01070 R 220003 R            LAC*    EOCONN  /START SCAN OF NEW CONNECTIONS
754         01071 R 341575 R            TAD     CONNAD
755         01072 R 723777 A            AAC     -1
756         01073 R 341550 R            TAD     XADJ
757         01074 R 721000 A            PAX
758         01075 R 222027 R            LAC*    (000011 /LIMIT OF SCAN
759         01076 R 341550 R            TAD     XADJ
760         01077 R 722000 A            PAL
761         01100 R 210000 A    LOC14   LAC     0,X
762         01101 R 502025 R            AND     (000777 /NUMBER OF CONNECTIONS
763         01102 R 740031 A            TCA
764         01103 R 041551 R            DAC     COUNT1
765         01104 R 210001 A    LOC15   LAC     1,X     /CALCULATE POINTER TO THE OTHER
766         01105 R 744000 A            CLL             /COMPONENT
767         01106 R 640511 A            LRS     +11
768         01107 R 653122 A            MUL
769         01110 R 000006 A                    +6
770         01111 R 641002 A            LACQ
771         01112 R 341574 R            TAD     COMPAD
772         01113 R 723002 A            AAC     +2
773         01114 R 041554 R            DAC     COMPTR
774         01115 R 221554 R            LAC*    COMPTR  /POINTER TO COPY OF THIS COMPONENT
775         01116 R 652000 A            LMQ
776         01117 R 210001 A            LAC     1,X
777         01120 R 502025 R            AND     (000777 /WIDTH AND PAD NUMBER
778         01121 R 640002 A            OMQ
779         01122 R 050001 A            DAC     1,X     /UPDATE THE POINTER
780         01123 R 737003 A            AXR     +3      /INDEX TO NEXT CONNECTION
781         01124 R 441551 R            ISZ     COUNT1
782         01125 R 601104 R            JMP     LOC15   /ANOTHER CONNECTION TO DO
783         01126 R 725001 A            AXS     +1      /INDEX TO NEXT BLOCK
784         01127 R 601100 R            JMP     LOC14   /ANOTHER BLOCK TO DO
785         01130 R 220002 R    LOC16   LAC*    EOCOMP  /RESET COMPONENT NAMES
786         01131 R 341574 R            TAD     COMPAD  /START SCAN OF NEW COMPONENTS
787         01132 R 341550 R            TAD     XADJ
788         01133 R 721000 A            PAX
789         01134 R 222030 R            LAC*    (000010 /LIMIT OF SCAN
790         01135 R 341550 R            TAD     XADJ
791         01136 R 722000 A            PAL
792         01137 R 210000 A    LOC17   LAC     0,X     /THIS IS WORD 1 OF THE COMPONENT
793         01140 R 723002 A            AAC     +2
794         01141 R 041554 R            DAC     COMPTR
795         01142 R 210001 A            LAC     1,X     /2ND WORD OF NAME
796         01143 R 061554 R            DAC*    COMPTR
797         01144 R 202042 R            LAC     (SPACE
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 798          01145 R 050000 A            DAC     0,X     /NULL NAME FOR THE COPY
 799          01146 R 202043 R            LAC     (ALTMOD
 800          01147 R 050001 A            DAC     1,X
 801          01150 R 725006 A            AXS     +6      /INDEX TO NEXT COMPONENT
 802          01151 R 601137 R            JMP     LOC17   /ANOTHER COMPONENT TO DO
 803          01152 R 220002 R            LAC*    EOCOMP  /SAVE END OF ARRAY POINTERS
 804          01153 R 041554 R            DAC     COMPTR
 805          01154 R 220003 R            LAC*    EOCONN
 806          01155 R 041552 R            DAC     CONPTR
 807          01156 R 220004 R            LAC*    EOROUT
 808          01157 R 041556 R            DAC     ROUTPT
 809          01160 R 220006 R            LAC*    EONAME
 810          01161 R 042004 R            DAC     NAMEPT#
 811          01162 R 201574 R            LAC     COMPAD  /UPDATE END OF ARRAY POINTERS
 812          01163 R 740031 A            TCA
 813          01164 R 362030 R            TAD*    (000010
 814          01165 R 723002 A            AAC     +2
 815          01166 R 060002 R            DAC*    EOCOMP
 816          01167 R 201575 R            LAC     CONNAD
 817          01170 R 740031 A            TCA
 818          01171 R 362027 R            TAD*    (000011
 819          01172 R 723002 A            AAC     +2
 820          01173 R 060003 R            DAC*    EOCONN
 821          01174 R 201576 R            LAC     ROUTAD
 822          01175 R 740031 A            TCA
 823          01176 R 362024 R            TAD*    (000012
 824          01177 R 723002 A            AAC     +2
 825          01200 R 060004 R            DAC*    EOROUT
 826          01201 R 220005 R            LAC*    NAMES
 827          01202 R 740031 A            TCA
 828          01203 R 362023 R            TAD*    (000013
 829          01204 R 723002 A            AAC     +2
 830          01205 R 060006 R            DAC*    EONAME
 831          01206 R 651000 A            ECLA!CLQ
 832          01207 R 122011 E            JMS*    DRAWCP  /REDRAW THE PICTURE
 833          01210 R 201555 R            LAC     PUSBUT  /DISPLAY THE RESET MESSAGE
 834          01211 R 652000 A            LMQ
 835          01212 R 201614 R            LAC     MESSB
 836          01213 R 161555 R            DZM*    PUSBUT
 837          01214 R 122012 E            JMS*    MESS1
 838          01215 R 122007 E            JMS*    BUTTON  /WAIT FOR A BUTTON HIT
 839          01216 R 542021 R            SAD     (000006
 840          01217 R 741000 A            SKP
 841          01220 R 620007 R            JMP*    GROUP   /EXIT IF NO RESET
 842          01221 R 201554 R            LAC     COMPTR  /RESET THE DATA STRUCTURE
 843          01222 R 060002 R            DAC*    EOCOMP
 844          01223 R 201552 R            LAC     CONPTR
 845          01224 R 060003 R            DAC*    EOCONN
 846          01225 R 201556 R            LAC     ROUTPT
 847          01226 R 060004 R            DAC*    EOROUT
 848          01227 R 651000 A            ECLA!CLQ
 849          01230 R 122011 E            JMS*    DRAWCP  /REDRAW THE PICTURE
```

```
 850          01231 R 620007 R              JMP*    GROUP
 851          01232 R 220002 R     RESET    LAC*    EOCOMP  /RESET ARRAYS AFTER AN ABORT
 852          01233 R 341574 R              TAD     COMPAD  /SET UP SCAN OF COPIED COMPONENTS
 853          01234 R 341550 R              TAD     XADJ
 854          01235 R 721000 A              PAX
 855          01236 R 222030 R              LAC*    (000010
 856          01237 R 341550 R              TAD     XADJ
 857          01240 R 722000 A              PAL
 858          01241 R 725003 A     RES1     AXS     +3      /RESET NAMES FIRST
 859          01242 R 741000 A              SKP
 860          01243 R 601254 R              JMP     RES2    /THIS ITEM NOT FULLY COPIED
 861          01244 R 737775 A              AXR     -3
 862          01245 R 210000 A              LAC     0,X
 863          01246 R 723002 A              AAC     +2
 864          01247 R 041554 R              DAC     COMPTR  /POINTER TO MASTER COMPONENT
 865          01250 R 210001 A              LAC     1,X     /NAME OF MASTER
 866          01251 R 061554 R              DAC*    COMPTR
 867          01252 R 725006 A              AXS     +6
 868          01253 R 601241 R              JMP     RES1    /ANOTHER COMPONENT TO DO
 869          01254 R 201574 R     RES2     LAC     COMPAD  /NOW RESET CONNECTION POINTERS
 870          01255 R 341550 R              TAD     XADJ
 871          01256 R 721000 A              PAX             /SET UP SCAN OF COMPONENTS
 872          01257 R 360002 R              TAD*    EOCOMP
 873          01260 R 723777 A              AAC     -1
 874          01261 R 722000 A              PAL
 875          01262 R 210000 A     RES3     LAC     0,X
 876          01263 R 502022 R              AND     (177777 /COLLATE OUT MARKERS
 877          01264 R 050000 A              DAC     0,X
 878          01265 R 725006 A              AXS     +6
 879          01266 R 601262 R              JMP     RES3    /ANOTHER COMPONENT TO DO
 880          01267 R 620007 R              JMP*    GROUP   /NO NEED TO REDRAW PICTURE
 881          01270 R 740040 A     STORCM   XX
 882          01271 R 441561 R              ISZ     COMLIM  /CHECK IF COMPONENTS ARRAY IS FULL
 883          01272 R 601300 R              JMP     STRCM1
 884                                        .WRITE  -3,2,COMFUL,34
              01273 R 002775 A *G           CAL+2*1000 -3&777
              01274 R 000011 A *G           11
              01275 R 001710 R *G           COMFUL
                              *G           .DEC
              01276 R 777736 A *G           -34
 885          01277 R 601232 R              JMP     RESET
 886          01300 R 060010 A     STRCM1   DAC*    10      /STORE NEXT WORD IN COMPONENTS ARRAY
 887          01301 R 621270 R              JMP*    STORCM
 888          01302 R 740040 A     STORCN   XX
 889          01303 R 441562 R              ISZ     CONLIM  /CHECK IF CONNECTIONS ARRAY IS FULL
 890          01304 R 601312 R              JMP     STRCN1
 891                                        .WRITE  -3,2,CONFUL,34
              01305 R 002775 A *G           CAL+2*1000 -3&777
              01306 R 000011 A *G           11
              01307 R 001726 R *G           CONFUL
                              *G           .DEC
              01310 R 777736 A *G           -34
```

```
                GROUP  SRC     GROUP       REPRODUCE A GROUP FUNCTION

 892    01311 R 601232 R                   JMP     RESET
 893    01312 R 060011 A     STRCN1        DAC*    11      /STORE NEXT WORD IN CONNECTIONS ARRAY
 894    01313 R 621302 R                   JMP*    STORCN
 895    01314 R 740040 A     STORRT        XX
 896    01315 R 441563 R                   ISZ     RUTLIM  /CHECK IF ROUTES ARRAY IS FULL
 897    01316 R 601324 R                   JMP     STRRT1
 898                                       .WRITE  -3,2,RUTFUL,34
        01317 R 002775 A *G                CAL+2*1000 -3&777
        01320 R 000011 A *G                11
        01321 R 001744 R *G                RUTFUL
                         *G                .DEC
        01322 R 777736 A *G                -34
 899    01323 R 601232 R                   JMP     RESET
 900    01324 R 060012 A     STRRT1        DAC*    12      /STORE NEXT WORD IN ROUTES ARRAY
 901    01325 R 621314 R                   JMP*    STORRT
 902    01326 R 740040 A     ADDX          XX
 903    01327 R 041570 R                   DAC     CURRNT  /SAVE CURRENT STATE
 904    01330 R 201564 R                   LAC     XSHIFT  /LOAD DISPLACEMENT
 905    01331 R 101340 R                   JMS     ADDZ    /COMBINE THE TWO
 906    01332 R 621326 R                   JMP*    ADDX
 907    01333 R 740040 A     ADDY          XX
 908    01334 R 041570 R                   DAC     CURRNT  /SAVE THE CURRENT STATE
 909    01335 R 201565 R                   LAC     YSHIFT  /LOAD THE DISPLACEMENT
 910    01336 R 101340 R                   JMS     ADDZ    /COMBINE THE TWO
 911    01337 R 621333 R                   JMP*    ADDY
 912    01340 R 740040 A     ADDZ          XX
 913    01341 R 341570 R                   TAD     CURRNT  /COMBINE SHIFT AND PRESENT POSITION
 914    01342 R 652000 A                   LMQ
 915    01343 R 241570 R                   XOR     CURRNT  /CHECK IF TOP BITS HAVE CHANGED
 916    01344 R 502035 R                   AND     (776000
 917    01345 R 741200 A                   SNA
 918    01346 R 601354 R                   JMP     ADD1    /TOP 8 BITS HAVE NOT CHANGED
 919                                       .WRITE  -3,2,RANGER,34
        01347 R 002775 A *G                CAL+2*1000 -3&777
        01350 R 000011 A *G                11
        01351 R 001770 R *G                RANGER
                         *G                .DEC
        01352 R 777736 A *G                -34
 920    01353 R 601232 R                   JMP     RESET
 921    01354 R 641002 A     ADD1          LACQ            /PUT NEW VALUE INTO ACCUMULATOR
 922    01355 R 621340 R                   JMP*    ADDZ
```

```
 923                                        .TITLE  GROUP   RENAME A COMPONENT FUNCTION
 924        01356 R 441554 R     RENAME     INC     COMPTR
 925        01357 R 221554 R                LAC*    COMPTR  /GET COMP. NAME
 926        01360 R 441554 R                INC     COMPTR  /STORE IN BUFFER
 927        01361 R 041762 R                DAC     RENAMB+2
 928        01362 R 221554 R                LAC*    COMPTR
 929        01363 R 502044 R                AND     (777400
 930        01364 R 723100 A                AAC     +100
 931        01365 R 041763 R                DAC     RENAMB+3
 932        01366 R 201554 R                LAC     COMPTR
 933        01367 R 723777 A                AAC     -1
 934        01370 R 041554 R                DAC     COMPTR
 935                                        .INIT   -3,1,STAR1
            01371 R 001775 A *G             CAL+1*1000 -3&777
            01372 R 000001 A *G             1
            01373 R 000033 R *G             STAR1+0
            01374 R 000000 A *G             0
 936                                        .WRITE  -3,2,RENAMB,34
            01375 R 002775 A *G             CAL+2*1000 -3&777
            01376 R 000011 A *G             11
            01377 R 001760 R *G             RENAMB
                             *G             .DEC
            01400 R 777736 A *G             -34
 937                                        .WAIT   -3      /OUTPUT RENAME MESSAGE
            01401 R 000775 A *G             CAL -3&777
            01402 R 000012 A *G             12
 938        01403 R 122013 E                JMS*    NAME1   /READ IN NEW NAME
 939        01404 R 601407 R                JMP     .+1+2
 940        01405 R 401574 R                .DSA    COMPAD!400000
 941        01406 R 400002 R                .DSA    EOCOMP!400000
 942        01407 R 740200 A                SZA
 943        01410 R 601426 R                JMP     ERR1    /DUPLICATE COMPONENT NAME
 944        01411 R 641002 A                LACQ
 945        01412 R 041552 R                DAC     LOC
 946        01413 R 221552 R                LAC*    LOC
 947        01414 R 061554 R                DAC*    COMPTR  /STORE IN COMP. ARRAY
 948        01415 R 441554 R                INC     COMPTR
 949        01416 R 441552 R                INC     LOC
 950        01417 R 221552 R                LAC*    LOC
 951        01420 R 723372 A                AAC     +372    /ADD AN ALT MODE
 952        01421 R 061554 R                DAC*    COMPTR
 953        01422 R 201554 R                LAC     COMPTR  /REDRAW THE COMPONENT
 954        01423 R 723776 A                AAC     -2
 955        01424 R 122011 E                JMS*    DRAWCP
 956        01425 R 600033 R                JMP     STAR1
 957        01426 R                 ERR1    .WRITE  -3,2,MESSD,34
            01426 R 002775 A *G             CAL+2*1000 -3&777
            01427 R 000011 A *G             11
            01430 R 001652 R *G             MESSD
                             *G             .DEC
            01431 R 777736 A *G             -34
 958                                        .WAIT   -3
```

```
     GROUP  SRC     GROUP       RENAME A COMPONENT FUNCTION

     01432 R 000775 A *G        CAL -3&777
     01433 R 000012 A *G        12
959  01434 R 600033 R           JMP     STAR1
```

```
                                        .TITLE  GROUP   TREE    MARK COMPONENTS IN A GROUP
                01435 R 740040 A    TREE    XX
                01436 R 141561 R            DZM     NTREAT  /SET UP NUMBER TREATED AND NUMBER FOUND
                01437 R 750030 A            CLA!IAC
                01440 R 041551 R            DAC     NFOUND
                01441 R 201554 R            LAC     COMPTR  /SET UP THE SCAN LIMITS
                01442 R 341550 R            TAD     XADJ
                01443 R 721000 A            PAX
                01444 R 220002 R            LAC*    EOCOMP
                01445 R 723777 A            AAC     -1
                01446 R 341574 R            TAD     COMPAD
                01447 R 341550 R            TAD     XADJ
                01450 R 722000 A            PAL
                01451 R 202033 R            LAC     (600000 /MARK THE FIRST COMPONENT
                01452 R 261554 R            XOR*    COMPTR
                01453 R 061554 R            DAC*    COMPTR
                01454 R 542033 R            SAD     (600000
                01455 R 601521 R            JMP     TREE4   /END OF TREE IF NO CONNECTIONS
                01456 R 210000 A    TREE1   LAC     0,X
                01457 R 740100 A            SMA
                01460 R 601536 R            JMP     TREE5   /COMPONENT NOT ON THIS TREE
                01461 R 502045 R            AND     (377777 /MARK THE COMPONENT AS DONE
                01462 R 050000 A            DAC     0,X
                01463 R 502022 R            AND     (177777 /CONNECTIONS POINTER
                01464 R 723777 A            AAC     -1
                01465 R 341575 R            TAD     CONNAD
                01466 R 041552 R            DAC     CONPTR
                01467 R 221552 R            LAC*    CONPTR
                01470 R 502025 R            AND     (000777
                01471 R 740031 A            TCA
                01472 R 041553 R            DAC     COUNT   /NUMBER OF CONNECTIONS
                01473 R 441552 R            INC     CONPTR
                01474 R 221552 R    TREE2   LAC*    CONPTR
                01475 R 742030 A            SWHA
                01476 R 502025 R            AND     (000777
                01477 R 673122 A            ECLL!MUL
                01500 R 000006 A                    +6
                01501 R 641002 A            LACQ
                01502 R 341574 R            TAD     COMPAD  /POINTER TO ANOTHER COMPONENT
                01503 R 041554 R            DAC     COMPTR
                01504 R 221554 R            LAC*    COMPTR
                01505 R 502033 R            AND     (600000
                01506 R 740200 A            SZA
                01507 R 601514 R            JMP     TREE3   /OTHER COMPONENT ALREADY MARKED
                01510 R 441551 R            INC     NFOUND
                01511 R 202033 R            LAC     (600000 /MARK THIS NEW COMPONENT
                01512 R 261554 R            XOR*    COMPTR
                01513 R 061554 R            DAC*    COMPTR
                01514 R 201552 R    TREE3   LAC     CONPTR  /UPDATE CONNECTIONS POINTER
                01515 R 723003 A            AAC     +3
                01516 R 041552 R            DAC     CONPTR
                01517 R 441553 R            ISZ     COUNT
```

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                GROUP  SRC      GROUP        TREE    MARK COMPONENTS IN A GROUP

1012            01520 R 601474 R             JMP     TREE2   /MORE CONNECTIONS TO DO
1013            01521 R 441561 R     TREE4   INC     NTREAT  /UPDATE NUMBER TREATED
1014            01522 R 210001 A             LAC     1,X     /WRITE OUT COMPONENT NAME
1015            01523 R 041762 R             DAC     BUFFER+2
1016            01524 R 210002 A             LAC     2,X
1017            01525 R 502044 R             AND     (777400
1018            01526 R 723032 A             AAC     +32     /CARRIAGE RETURN TO TERMINATE NAME
1019            01527 R 041763 R             DAC     BUFFER+3
1020                                         .WAIT   4
                01530 R 000004 A *G          CAL 4&777
                01531 R 000012 A *G          12
1021                                         .WRITE  4,2,BUFFER,34
                01532 R 002004 A *G          CAL+2*1000 4&777
                01533 R 000011 A *G          11
                01534 R 001760 R *G          BUFFER
                                 *G          .DEC
                01535 R 777736 A *G          -34
1022            01536 R 201551 R     TREE5   LAC     NFOUND
1023            01537 R 541561 R             SAD     NTREAT
1024            01540 R 621435 R             JMP*    TREE    /END OF TREE WHEN ALL TREATED
1025            01541 R 725006 A             AXS     +6
1026            01542 R 601456 R             JMP     TREE1
1027            01543 R 201574 R             LAC     COMPAD  /END AROUND AT THE ARRAY END
1028            01544 R 341550 R             TAD     XADJ
1029            01545 R 721000 A             PAX
1030            01546 R 601456 R             JMP     TREE1
```

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1031                                        .TITLE  GROUP   DECLARATIONS OF VARIABLES AND PRESETS
1032        01547 R 000000 A    .XXMON      .CBD    .XX     1       /BLANK COMMON
1033        01550 R 740040 A    XADJ        XX                      /INDEX REGISTER ADJUSTER
1034        01551 R 740040 A    DISFAD      XX                      /DISPLAY POINTER
1035        01552 R 740040 A    CONPTR      XX                      /CONNECTIONS POINTER
1036        01553 R 740040 A    COUNT       XX                      /NUMBER OF CONNECTIONS COUNT
1037        01554 R 740040 A    COMPTR      XX                      /COMPONENT POINTER
1038        01555 R 740040 A    PUSBUT      XX                      /MESSAGE BUFFER POINTER
1039        01556 R 740040 A    ROUTPT      XX                      /ROUTES ARRAY POINTER
1040        01557 R 740040 A    INDEX       XX                      /TEMPORARY STORAGE LOCATION FOR INDEX REG.
1041        01560 R 740040 A    SHIFT2      XX                      /CONNECTIONS ARRAY COLLAPSE LENGTH
1042        01561 R 740040 A    COMLIM      XX                      /COUNT OF COMPONENTS WORDS LEFT
1043        01562 R 740040 A    CONLIM      XX                      /COUNT OF CONNECTIONS WORDS LEFT
1044        01563 R 740040 A    RUTLIM      XX                      /COUNT OF ROUTES WORDS LEFT
1045        01564 R 740040 A    XSHIFT      XX                      /X DISPLACEMENT
1046        01565 R 740040 A    YSHIFT      XX                      /Y DISPLACEMENT
1047        01566 R 740040 A    NEWPTR      XX                      /POINTER TO ROUTE COPIED
1048        01567 R 740040 A    BACKPT      XX                      /POINTER BACK TO MASTER COMPONENT
1049        01570 R 740040 A    CURRNT      XX                      /CURRENT DISPLACEMENT
1050        01571 R 000000 A    MAXCOM                              /COMP ARRAY SIZE
1051        01572 R 000000 A    MAXCON                              /CONN ARRAY SIZE
1052        01573 R 000000 A    MAXRUT                              /ROUTES ARRAY SIZE
1053        01574 R 000000 A    COMPAD                              /START OF COMPS ARRAY
1054        01575 R 000000 A    CONNAD                              /START OF CONNS ARRAY
1055        01576 R 000000 A    ROUTAD                              /START OF ROUTES ARRAY
1056        01577 R 400064 R    DISPAT      XCT     DISP-2          /DISPATCH TABLE PRESET
1057        01600 R 401024 R    DISPT1      XCT     DISP1           /DISPATCH TABLE PRESET
1058        01601 R 001602 R    MESSA       .DSA    .+1
1059        01602 R 001750 A                1750;   0
            01603 R 000000 A
1060        01604 R 201004 A                .ASCII  '    SELECT,COMPONENT_'
            01605 R 051612 A
            01606 R 462130 A
            01607 R 352130 A
            01610 R 416371 A
            01611 R 550236 A
            01612 R 472131 A
            01613 R 652276 A
1061        01614 R 001615 R    MESSB       .DSA    .+1
1062        01615 R 001750 A                1750;   0
            01616 R 000000 A
1063        01617 R 442232 A                .ASCII  'HIT BUTTON,6 TO RESET_'
            01620 R 420204 A
            01621 R 526512 A
            01622 R 447634 A
            01623 R 261544 A
            01624 R 052236 A
            01625 R 202450 A
            01626 R 551612 A
            01627 R 522760 A
            01630 R 000000 A
1064        01631 R 001632 R    BUSY        .DSA    .+1
```

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                    GROUP  SRC     GROUP       DECLARATIONS OF VARIABLES AND PRESETS

1065        01632 R 001750 A                    1750:   0
            01633 R 000000 A
1066        01634 R 201004 A                    .ASCII  '   BUSY_'
            01635 R 041252 A
            01636 R 516633 A
            01637 R 700000 A
1067        01640 R 002002 A    MESSC   2002:   0
            01641 R 000000 A
1068        01642 R 436451 A                    .ASCII  'GROUP DELETED:-'<15>
            01643 R 752640 A
            01644 R 202110 A
            01645 R 546212 A
            01646 R 522130 A
            01647 R 435132 A
            01650 R 064000 A
            01651 R 000000 A
1069        01652 R 002002 A    MESSD   2002:   0
            01653 R 000000 A
1070        01654 R 422532 A                    .ASCII  'DUPLICATE COMPONENT NAME'<15>
            01655 R 046222 A
            01656 R 416032 A
            01657 R 442500 A
            01660 R 416371 A
            01661 R 550236 A
            01662 R 472131 A
            01663 R 652100 A
            01664 R 472031 A
            01665 R 542432 A
1071        01666 R 002002 A    MESSE   2002:   0
            01667 R 000000 A
1072        01670 R 522632 A                    .ASCII  'TYPE DX DY'<15>
            01671 R 042500 A
            01672 R 422604 A
            01673 R 042262 A
            01674 R 064000 A
            01675 R 000000 A
1073        01676 R 002002 A    MESSF   2002:   0
            01677 R 000000 A
1074        01700 R 436451 A                    .ASCII  'GROUP REPRODUCED:-'<15>
            01701 R 752640 A
            01702 R 202450 A
            01703 R 550244 A
            01704 R 476112 A
            01705 R 541612 A
            01706 R 421645 A
            01707 R 506400 A
1075        01710 R 002002 A    COMFUL  2002:   0
            01711 R 000000 A
1076        01712 R 416371 A                    .ASCII  'COMPONENTS ARRAY OVERFLOW'<15>
            01713 R 550236 A
            01714 R 472131 A
            01715 R 652246 A
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                01716 R 202032 A
                01717 R 251202 A
                01720 R 545011 A
                01721 R 753212 A
                01722 R 512151 A
                01723 R 447656 A
                01724 R 064000 A
                01725 R 000000 A
1077            01726 R 002002 A    CONFUL  2002:   0
                01727 R 000000 A
1078            01730 R 416371 A            .ASCII  'CONNECTIONS ARRAY OVERFLOW'<15>
                01731 R 647212 A
                01732 R 416511 A
                01733 R 147634 A
                01734 R 515010 A
                01735 R 151244 A
                01736 R 406624 A
                01737 R 047654 A
                01740 R 426450 A
                01741 R 646236 A
                01742 R 534320 A
                01743 R 000000 A
1079            01744 R 002002 A    RUTFUL  2002:   0
                01745 R 000000 A
1080            01746 R 512372 A            .ASCII  'ROUTES ARRAY OVERFLOW'<15>
                01747 R 552212 A
                01750 R 515010 A
                01751 R 151244 A
                01752 R 406624 A
                01753 R 047654 A
                01754 R 426450 A
                01755 R 646236 A
                01756 R 534320 A
                01757 R 000000 A
1081            01760 R 002002 A    RENAMB  2002:   0
                01761 R 000000 A
1082            01762 R 201004 A            .ASCII  '      IS NOW '<175>
                01763 R 020100 A
                01764 R 446464 A
                01765 R 047236 A
                01766 R 535017 A
                01767 R 500000 A
1083            01770 R 002002 A    RANGER  2002:   0
                01771 R 000000 A
1084            01772 R 436451 A            .ASCII  'GROUP POSITION ERROR'<15>
                01773 R 752640 A
                01774 R 202411 A
                01775 R 751622 A
                01776 R 522231 A
                01777 R 747100 A
                02000 R 426452 A
                02001 R 247644 A
```

```
            02002 R 064000 A
            02003 R 000000 A
1085                001760 R     BUFFER=RENAMB                  /NAME BUFFER USED BY TREE
1086                001552 R     LOC=CONPTR                     /PTR TO THE NEW NAME IN RENAME
1087                001551 R     NFOUND=DISFAD                  /NUMBER OF COMPONENTS FOUND IN TREE
1088                001561 R     NTREAT=COMLIM                  /NUMBER OF COMPONENTS TREATED IN TREE
1089                001551 R     COUNT1=DISFAD                  /SCAN VARIABLE
1090                001553 R     COUNT2=COUNT                   /SCAN VARIABLE
1091                001554 R     SHIFT1=COMPTR                  /ROUTES ARRAY COLLAPSE LENGTH (DELETE)
1092                001557 R     WORD0=INDEX                    /WORD ZERO OF CONNECTION
1093                001560 R     WORD1=SHIFT2                   /WORD ONE OF CONNECTION
1094                000007 R               .END    GROUP
            02006 R 002006 E *E
            02007 R 002007 E *E
            02010 R 002010 E *E
            02011 R 002011 E *E
            02012 R 002012 E *E
            02013 R 002013 E *E
            02014 R 002014 E *E
            02015 R 002015 E *E
            02016 R 000033 R *L
            02017 R 070000 A *L
            02020 R 000001 A *L
            02021 R 000006 A *L
            02022 R 177777 A *L
            02023 R 000013 A *L
            02024 R 000012 A *L
            02025 R 000777 A *L
            02026 R 037777 A *L
            02027 R 000011 A *L
            02030 R 000010 A *L
            02031 R 000377 A *L
            02032 R 000077 A *L
            02033 R 600000 A *L
            02034 R 235176 A *L
            02035 R 776000 A *L
            02036 R 777000 A *L
            02037 R 000700 A *L
            02040 R 400000 A *L
            02041 R 000003 A *L
            02042 R 201004 A *L
            02043 R 020372 A *L
            02044 R 777400 A *L
            02045 R 377777 A *L
                SIZE=02046     NO ERROR LINES
```

```
ADDX     01326   582     706     721     907     902*    906
ADDY     01333   585     709     725     907*    911
ADDZ     01340   905     910     912*    922
ADD1     01354   918     921*
ALTMOD  020372   195*    799
ASS4     02006   204     221
BACKPT   01567   614     628     644     647    1048*
BUFFER  001760  1015    1019    1021    1085*
BUSY     01631   244    1064*
BUTTON   02007   204     265     838
CHGPTR   00450   423     430     490*    497     501
COMFUL   01710   884    1075*
COMLIM   01561   520     882    1042*   1088
COMPAD   01574   217     270     387     409     446     458     540     555
                 588     651     660     771     786     811     852     869
                 940     970     998    1027    1053*
COMPTR   01554   241     474     476     481     482     483     487     488
                 572     749     773     774     794     796     804     842
                 864     866     924     925     926     928     932     934
                 947     948     952     953     965     974     975     999
                1000    1006    1007    1037*   1091
CONFUL   01726   891    1077*
CONLIM   01562   529     889    1043*
CONNAD   01575   214     285     334     375     383     417     544     566
                 600     664     754     816     985    1054*
CONPTR   01552   283     396     399     627     732     806     844     986
                 987     991     992    1008    1010    1035*   1086
COUNT    01553   990    1011    1036*   1090
COUNT1  001551   291     372     378     381     428     432     449     452
                 607     747     764     781    1089*
COUNT2  001553   325     328     343     368     702     730    1090*
CURRNT   01570   903     908     913     915    1049*
DELETE   00072   251     255*
DFLPK    02010   204     233
DISFAD   01551   238     239     257     468     470     472     473     477
                 478     484    1034*   1087    1089
DISP     00066   249     250*    1056
DISPAT   01577   248    1056*
DISPT1   01600   714    1057*
DISP1    01024   715     717*    1057
DRAWCP   02011   204     259     466     832     849     955
DSKP    235176   193*    471
ECLA    641000   190*    295     412     465     591     831     848
ECLL    660000   189*    293     359     413     592     594     648     995
EOCOMP   00002   198*    198     390     445     461     517     539     785
                 803     815     843     851     872     941     968
EOCONN   00003   199*    199     337     374     386     420     526     543
                 753     805     820     845
EONAME   00006   202*    202     551     809     830
EOROUT   00004   200*    200     323     333     535     547     807     825
                 847
ERR1     01426   943     957*
GROUP    00007     1     187     203     205     206*    222     237     254
```

		467	489	502	841	850	880	923	960
		1031	1094						
INC	440000	192*	473	483	924	926	948	949	991
		1004	1013						
INDEX	01557	278	411	436	1040*	1092			
LAB.10	00345	423*	435						
LAB.11	00354	430*	433						
LAB.4	00245	354	359*						
LAB00	00117	273*	464						
LAB01	00147	297*	373						
LAB02	00204	326*	329						
LAB03	00222	340*	371						
LAB04	00226	344*	369						
LAB05	00255	356	367*						
LAB06	00262	306	372*						
LAB07	00271	379*	382						
LAB08	00307	393*	407						
LAB09	00324	398	406*						
LAB10	00326	282	408*						
LAB11	00400	450*	453						
LAB12	00415	276	463*						
LOC	001552	945	946	949	950	1086*			
LOC.4	00752	670	675*						
LOC01	00565	558*	752						
LOC02	00601	565	570*						
LOC03	00656	615*	748						
LOC04	00742	667*	676						
LOC05	00754	674	677*						
LOC06	00765	646	686*						
LOC07	01016	711*	731						
LOC08	01030	720	721*						
LOC09	01034	719	725*						
LOC10	01036	718	727*						
LOC11	01043	685	732*						
LOC12	01045	625	734*						
LOC13	01066	561	751*						
LOC14	01100	761*	784						
LOC15	01104	765*	782						
LOC16	01130	599	785*						
LOC17	01137	792*	802						
MAXCOM	01571	514	515	1050*					
MAXCON	01572	523	524	1051*					
MAXRUT	01573	532	533	1052*					
MESSA	01601	230	1058*						
MESSB	01614	262	835	1061*					
MESSC	01640	268	1067*						
MESSD	01652	957	1069*						
MESSE	01666	506	1071*						
MESSF	01676	503	1073*						
MESS1	02012	204	232	246	264	837			
MODE	00012	209*	247						
NAMEPT	02004	810							
NAMES	00005	201*	201	552	826				

```
NAME1   02013   204    938
NEWPTR  01566   623    684    690    738    741   1047*
NFOUND 001551   964   1004   1022   1087*
NTREAT 001561   962   1013   1023   1088*
NUMBER  02014   204    508    510
OAC    642000   191*   632
PUSBUT  01555   196    228    231    242    245    260    263    833
                836   1038*
PUSBY   00000   196*   227
RANGER  01770   919   1083*
RENAMB  01760   927    931    936   1081*  1085
RENAME  01356   253    924*
REPLAC  00422   267    468*
REPROD  00464   252    503*
RESET   01232   851*   885    892    899    920
RES1    01241   858*   868
RES2    01254   860    869*
RES3    01262   875*   879
ROUTAD  01576   220    309    322    330    548    686    692    821
               1055*
ROUTPT  01556   307    352    357    622    691    808    846   1039*
RUTFUL  01744   898   1079*
RUTLIM  01563   538    896   1044*
SHAL   660000   188*
SHIFT1 001554   296    400    416    495   1091*
SHIFT2  01560   317    358   1041*  1093
SIZE    00001   197*   197    512    521    530
SPACE  201004   194*   797
START   00013   208    210*
STAR1   00033   223*   505    935    956    959
STORCM  01270   570    576    578    580    583    586    881*   887
STORCN  01302   610    735    740    745    888*   894
STORRT  01314   707    710    722    728    895*   901
STRCM1  01300   883    886*
STRCN1  01312   890    893*
STRRT1  01324   897    900*
TEMP    02005   212    213    215    216    218    219
TREE    01435   269    504    961*  1024
TREE1   01456   978*  1026   1030
TREE2   01474   992*  1012
TREE3   01514  1003   1008*
TREE4   01521   977   1013*
TREE5   01536   980   1022*
WORD0  001557   636    668   1092*
WORD1  001560   639    673   1093*
XADJ    01550   226    271    335    388    408    418    439    455
                459    556    574    602    652    661    665    694
                756    759    787    790    853    856    870    966
                971   1028   1033*
XSHIFT  01564   509    904   1045*
YSHIFT  01565   511    909   1046*
.DA     02015   204    207
.XXMON  01547   210   1032*
```