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                   I                            I
                  I   JADE COMPUTER NOTE NR. 27    I
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*                                                               *
*                  JADE DATA REDUCTION,  STEP 1                 *
*                                                               *
*****************************************************************
                                M.GODDARD  J.OLSSON  P.STEFFEN
                                                  05.10.197900003600
---------------------------------------------------------------------

GENERAL INFORMATION (BOOK-KEEPING):
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   THE START POINT FOR DATA REDUCTION ARE THE DATA TAPES FROM THE
REFORMATING STEP. THESE ARE FOUND IN THE DATA GENERATION GROUP

                                F11LHO.JDATA01.REFORM.G0NNNV00

CURRENT STATUS OF THESE TAPES IS FOUND IN THE MEMBER

                                JADEPR.YENLHO.S(RUNLST)

   BEFORE STARTING THE REDUCTION STEP, AN UPDATING OF "BAD LEAD GLASS"
INFORMATION HAS TO BE PERFORMED. BOOK-KEEPING OF THIS STEP IS FOUND IN

                                F22WAT.BADCHS(BADCH)

   DATA REDUCTION STEP 1 HAS TWO SERIES OF OUTPUT TAPES. DUE TO TIME
REASONS, TEMPORARY TAPES WITH THE NAMES
                                JADEPR.TNNNA
                                JADEPR.TNNNB  ETC.,
ARE FIRST CREATED, NORMALLY 3-4 PER REFORM-TAPE (WITH NUMBER NNN)
   THESE TEMPORARY TAPES ARE THEN GROUPED TOGETHER INTO PERMANENT
TAPES IN THE GENERATION GROUP
                                JADEPR.REDUC1.G00MMV00

   THE NUMBER MM HAS NO RELATION TO THE PREVIOUS NUMBER NNN OF THE
REFORMATING STEP. THE BOOK-KEEPING OF THIS STEP IS FOUND IN

                                JADEPR.JADESR(REDUC)

   IF POSSIBLE, THE GROUPING TO REDUC1 TAPES FOLLOWS THE VARIOUS
CM-ENERGIES.

THE DATA REDUCTION CUTS:
------------------------

   LEAD GLASS PULSER EVENTS ARE REJECTED (NORMALLY 13 EVENTS / RUN)

   AFTER THE EVENT IS READ AND BEFORE IT GOES ON TO ZVERTEX CALCULATION
AND PATTERN RECOGNITION, SEVERAL FLAGS ARE SET:

   1. OVERFLOW FLAG IFLW, 0 OR 1  (SHORTER OR LONGER THAN 3000 WORDS)
   2. TAGGING FLAG IFTG        BY CALLING SUBR. TAGFLG(IFTG), WHICH
         SETS FLAG FOR ENERGY IN FORWARD TAGGING BLOCKS
         IFTG = 0      NO ENERGY
         IFTG = 11     ENERGY ABOVE LIMIT IN NEG. FW ARM
         IFTG = 12     ENERGY ABOVE LIMIT IN POS. FW ARM
         IFTG = 113    ENERGY ABOVE LIMIT IN BOTH FW ARMS  (LUMI)
   3. TOKYO LEAD GLASS LABEL, IAC
         IAC = 0 IF ETOT < 7 GEV AND ECYL < 3.5 GEV
         IAC = 0 IF LGCALB GIVES ERROR RETURN
         IAC = 0 IF ETOT IS CONTAINED (>95%) IN ONE ENDCAP BLOCK
                 (THIS IS CHECKED ONLY IF ETOT > 6 GEV)
         IAC = 1 OTHERWISE

THESE THREE FLAGS ARE COMBINED INTO ONE WRITE FLAG, IWRT :
```



```
   IWRT = 1
   IF(IAC.EQ.0.AND.IFLW.EQ.0.AND.(IFTG.EQ.0.OR.ETOT.LT.300.)) IWRT=0

  THE LAST ETOT LIMIT SERVES TO REJECT PURE LUMI TRIGGERS
**********
OBS OBS
  THE WRITE FLAG IS USED TO SAVE THE EVENT IF IT WOULD OTHERWISE BE
REJECTED IN ONE OF THE FOLLOWING ZVERTEX OR PATREC STEPS.
**********

  EVENTS WITH NO INNER DETECTOR HITS ARE NOW REJECTED IF IWRT = 0
  EVENTS WITH NO INNER DETECTOR HITS ARE NOW WRITTEN  IF IWRT = 1

-----> Z-VERTEX CALCULATION

  EVENTS WITH NO Z-VERTEX (ZVTX) FOUND   ARE REJECTED IF IWRT = 0
  EVENTS WITH ABS(ZVTX) > 450. MM        ARE REJECTED IF IWRT = 0
  ALL OTHER EVENTS PROCEED TO PATTERN RECOGNITION

-----> PATTERN RECOGNITION

  EVENTS WITH NO 'PATR' BANK        ARE REJECTED  (PATHOLOGIC)
  NOTE: A RESULT BANK 'PATR' WITH MINIMUM LENGTH OF 8 I*4 WORDS IS
        ALWAYS CREATED, EVEN IF NO TRACK IS FOUND. THE ONLY EXCEPTION
        TO THIS IS WHEN COMMON /BCS/ HAS NOT ENOUGH FREE SPACE EVEN
        FOR THIS SHORT BANK. PRESENT SIZE OF /BCS/ IS 20000 I*4 WORDS
        ( MINUS ADMINISTRATIVE SPACE FOR "BOS")
  EVENTS WITH NO TRACKS (NTR = 0)   ARE REJECTED IF IWRT = 0
  EVENTS WITH NO TRACKS (NTR = 0)   ARE WRITTEN  IF IWRT = 1

THE REMAINING EVENTS WITH TRACKS (NTR > 0) ARE NOW SEPARATED INTO
TAGGED AND NONTAGGED EVENTS (IFTG > 0  AND  IFTG = 0). THEY ARE
TREATED DIFFERENTLY:

 TAGGED EVENTS:

  SEARCH FOR TRACKS WITH > 12 HITS AND PTRANS > 200 MEV
  EVENTS WITH AT LEAST ONE SUCH TRACK ARE WRITTEN
  EVENTS WITHOUT SUCH TRACKS          ARE REJECTED

 NOTAGGED EVENTS:

  THESE EVENTS ARE DIVIDED INTO THREE DIFFERENT CLASSES, ACCORDING TO
QUALITY OF TRACKS:
    ISTAR=0 MEANS ALL TRACKS SHORT  ( < 12 HITS IN THE R-Z FIT)
    ISTAR=1 MEANS AT LEAST ONE LONG HIGH PTRANS TRACK   ( > 600 MEV)
    ISTAR=2 MEANS AT LEAST ONE LONG TRACK BUT NOT HIGH PTRANS

 ISTAR = 0 EVENTS:

  EVENTS ARE WRITTEN  IF IWRT = 1
  IF IWRT = 0  THE EVENTS UNDERGO A FURTHER CHECK:
     EVENTS ARE WRITTEN IF THEY HAVE AT LEAST ONE LONG ( > 20 HITS)
                                    TRACK IN THE R-FI FIT

     EVENTS ARE REJECTED IF THEY DO NOT HAVE SUCH A TRACK

 ISTAR = 2 EVENTS:
     EVENTS ARE REJECTED IF IWRT = 0
     EVENTS ARE WRITTEN  IF IWRT = 1

 ISTAR = 1 EVENTS:
     EVENTS ARE WRITTEN  IF IWRT = 1
     IF IWRT = 0 THEN THE QUANTITY ZMIN IS CALCULATED:
      ZMIN IS THE SMALLEST Z-AXIS INTERCEPT OF ALL THE LONG TRACKS
     EVENTS ARE REJECTED IF  ZMIN > 450 MM
     IF ZMIN IS < 450 MM  THEN THE QUANTITY RMIN IS CALCULATED
      RMIN IS THE SMALLEST DISTANCE TO THE Z-AXIS OF ALL LONG TRACKS
     EVENTS ARE REJECTED IF    RMIN > 60 MM
     EVENTS ARE WRITTEN  IF    RMIN < 60 MM
```

REDUCTION STATISTICS

BELOW IS GIVEN THE TYPICAL STATISTICS FOR A DATA REDUCTION STEP 1 ACCORDING TO THE CUTS DESCRIBED ABOVE. PERCENTAGES GIVEN REFER TO THE TOTAL NUMBER OF READ EVENTS (- PULSER EVENTS) IN CASE OF REJECTS AND TO THE TOTAL NUMBER OF WRITTEN EVENTS IN CASE OF WRITTEN EVENTS.

```
     ++++++++   STATISTICS FOR RUN      0    ++++++++++
EVENTS READ       7000           PULSER EVENTS         13
OVERFLOW EVENTS    9       LGCALB ERROR RETURNS        0
6798 EVENTS FAILED LGLASS CUT      97.29%
 189 EVENTS PASSED LGLASS CUT       2.71%
  95 EVENTS HAD BAD LGLASS BLOCKS       1.36%    (E-CAP SPINNERS)
5966 EVENTS HAVE NO TAG TRIGGER     85.39%
1021 EVENTS HAVE TAG TRIGGER        14.61%
 149 EVENTS WITH TAG TRIGGER AND ETOT >  300. MEV      2.13%
6650 EVENTS WITH COMBINED WRITE FLAG OFF   95.18%
 337 EVENTS WITH COMBINED WRITE FLAG ON     4.82%
 110 EVENTS HAD NO ID HITS AND WRITE FLAG OFF      1.57%          (REJ)
   0 EVENTS HAD NO ID HITS AND WRITE FLAG ON      0.0 %          (WRI)
6877 EVENTS ENTERED ZVERTEX ROUTINE      98.43%
 821 EVENTS FAILED TO FIND Z VERTEX & HAD WRITE FLAG OFF  11.75% (REJ)
 122 EVENTS FAILED TO FIND Z VERTEX BUT HAD WRITE FLAG ON  1.75% (WRI)
3045 EVENTS HAD ZVTX > 450 AND WRITE FLAG OFF     43.58%         (REJ)
3011 EVENTS THROUGH PATREC      43.09%
  87 EVENTS WERE 0 PRONGS        1.25%
   6 EVENTS WERE 0 PRONGS AND HADE NO WRITE FLAG      0.09%      (REJ)
  81 EVENTS WERE 0 PRONGS AND HAD WRITE FLAG ON      6.61%       (WRI)
2924 EVENTS HAD AT LEAST ONE TRACK       41.85%
 222 EVENTS WITH TRACKS AND TAG FLAG       3.18%
  40 EVENTS WITH TRACKS AND TAG FLAG, LOW MOMENTUM       0.57%   (REJ)
 182 EVENTS WITH TRACKS AND TAG FLAG, HIGH MOMENTUM      14.86%  (WRI)
 103 EVENTS WERE ISTAR=0       1.47%
  46 EVENTS WERE ISTAR=0 AND HAD WRITE FLAG ON      3.76%        (WRI)
  11 EVENTS WERE ISTAR=0 BUT HAD LONG TRACK IN RFI  0.90%        (WRI)
  46 EVENTS WERE ISTAR=0 AND HAD NO LONG TRACK IN RFI      0.66% (REJ)
 990 EVENTS WERE ISTAR=2      14.17%
  30 EVENTS WERE ISTAR=2 AND HAD WRITE FLAG ON      2.45%        (WRI)
 960 EVENTS WERE ISTAR=2 AND HAD WRITE FLAG OFF     13.74%       (REJ)
1609 EVENTS WERE ISTAR=1      23.03%
 213 EVENTS HAD ZMIN > 450 AND HAD NO WRITE FLAG      3.05%       (REJ)
   5 EVENTS HAD ZMIN > 450 BUT HAD WRITE FLAG ON      0.41%       (WRI)
  36 EVENTS HAD ZMIN < 450 AND WRITE FLAG ON      2.94%          (WRI)
1355 EVENTS WENT INTO RMIN CUT     19.39%
 521 EVENTS REJECTED BY RMIN CUT       7.46%                     (REJ)
 834 EVENTS PASSED RMIN CUT AND ZMIN       68.08%                (WRI)

6987 EVENTS WERE READ AND A TOTAL OF  1225  EVENTS WERE WRITTEN
       REDUCTION FACTOR :     17.53%
```

REDUCTION STEP 1 FOR DATA FROM SUMMER 1979

THE STATISTICS GIVEN ABOVE IS TYPICAL FOR DATA TAKEN IN AUTUMN 79. DATA FROM THE PRECEDING RUN IN SUMMER 79 IS MUCH DIRTIER, DUE TO WORSE BEAM CONDITIONS. THUS THE PROPORTION OF COSMIC EVENTS IN THE AUTUMN DATA IS MUCH HIGHER; THIS IS MIRRORED IN THE VERY DIFFERENT FRACTIONS OF EVENTS THAT PROCEED TO PATTERN RECOGNITION, AS WELL AS IN THE VERY DIFFERENT OVERALL REDUCTION FACTORS. BELOW IS GIVEN THE SAME SUMMARY AS ABOVE, BUT FOR A TYPICAL SUMMER RUN.

```
     ++++++++   STATISTICS FOR RUN      0    ++++++++++
EVENTS READ       9011           PULSER EVENTS         12
OVERFLOW EVENTS    6       LGCALB ERROR RETURNS        0
8906 EVENTS FAILED LGLASS CUT     98.97%
  93 EVENTS PASSED LGLASS CUT      1.03%
  71 EVENTS HAD BAD LGLASS BLOCKS       0.79%    (E-CAP SPINNERS)
5724 EVENTS HAVE NO TAG TRIGGER     63.61%
3275 EVENTS HAVE TAG TRIGGER        36.39%
```



```
 115 EVENTS WITH TAG TRIGGER AND ETOT >  300. MEV      1.28%
8787 EVENTS WITH COMBINED WRITE FLAG OFF   97.64%
 212 EVENTS WITH COMBINED WRITE FLAG ON     2.36%
 140 EVENTS HAD NO ID HITS AND WRITE FLAG OFF      1.56%          (REJ)
   0 EVENTS HAD NO ID HITS AND WRITE FLAG ON      0.0 %          (WRI)
8859 EVENTS ENTERED ZVERTEX ROUTINE      98.44%
4633 EVENTS FAILED TO FIND Z VERTEX & HAD WRITE FLAG OFF  51.48% (REJ)
  93 EVENTS FAILED TO FIND Z VERTEX BUT HAD WRITE FLAG ON  1.03% (WRI)
2566 EVENTS HAD ZVTX > 450 AND WRITE FLAG OFF     28.51%         (REJ)
1660 EVENTS THROUGH PATREC      18.45%
 129 EVENTS WERE 0 PRONGS        1.43%
  60 EVENTS WERE 0 PRONGS AND HADE NO WRITE FLAG      0.67%      (REJ)
  69 EVENTS WERE 0 PRONGS AND HAD WRITE FLAG ON     19.44%       (WRI)
1531 EVENTS HAD AT LEAST ONE TRACK       17.01%
 158 EVENTS WITH TRACKS AND TAG FLAG       1.76%
 104 EVENTS WITH TRACKS AND TAG FLAG, LOW MOMENTUM       1.16%   (REJ)
  54 EVENTS WITH TRACKS AND TAG FLAG, HIGH MOMENTUM      15.21%  (WRI)
 227 EVENTS WERE ISTAR=0       2.52%
  33 EVENTS WERE ISTAR=0 AND HAD WRITE FLAG ON      9.30%        (WRI)
   0 EVENTS WERE ISTAR=0 BUT HAD LONG TRACK IN RFI   0.0%        (WRI)
 194 EVENTS WERE ISTAR=0 AND HAD NO LONG TRACK IN RFI      2.16% (REJ)
 708 EVENTS WERE ISTAR=2       7.87%
  15 EVENTS WERE ISTAR=2 AND HAD WRITE FLAG ON      4.23%        (WRI)
 693 EVENTS WERE ISTAR=2 AND HAD WRITE FLAG OFF     7.70%        (REJ)
 438 EVENTS WERE ISTAR=1       4.87%
 167 EVENTS HAD ZMIN > 450 AND HAD NO WRITE FLAG      1.86%       (REJ)
   3 EVENTS HAD ZMIN > 450 BUT HAD WRITE FLAG ON      0.85%       (WRI)
  19 EVENTS HAD ZMIN < 450 AND WRITE FLAG ON      5.35%          (WRI)
 249 EVENTS WENT INTO RMIN CUT      2.77%
  87 EVENTS REJECTED BY RMIN CUT       0.97%                     (REJ)
 162 EVENTS PASSED RMIN CUT AND ZMIN       45.63%                (WRI)

8999 EVENTS WERE READ AND A TOTAL OF   355  EVENTS WERE WRITTEN
       REDUCTION FACTOR :      3.94%
```

THE DIFFERENT BEAM CONDITIONS ARE ALSO MIRRORED IN THE DEMAND ON CPU-TIME FOR THE REDUCTION STEP. FOR AUTUMN DATA THE TOTAL TIME SPENT IN PATTERN RECOGNITION IS C:A 50 % OF THE TOTAL JOBTIME AND AVERAGE CPU-TIME DEMAND IS 80 - 100 MSEC / EVENT. THIS MEANS THAT WITH AN L-JOB (15 MIN.) 9 - 10000 EVENTS CAN BE PROCESSED. THIS SHOULD BE COMPARED WITH 20 - 22000 EVENTS / L-JOB FOR THE SUMMER RUN.

PROGRAM CHANGES

THE DATA REDUCTION PROGRAM (SUBROUTINE USREDUC1 ON LIB JADEPR.JADESR) HAS CHANGED FROM THE VERSION USED IN THE SUMMER RUN, BOTH BECAUSE SOME OF THE CALLED PROGRAMS HAVE CHANGED (LEAD GLASS CALIBRATION, PATTERN RECOGNITION) AND BECAUSE OF THE INTRODUCTION OF NEW CONDITIONS. THESE NEW CONDITIONS ARE MAINLY THAT TAGGED EVENTS ARE NOW GIVEN SPECIAL ATTENTION AND THAT A RMIN-CUT IS PERFORMED. TEST RUNS OF THE OLD AND THE NEW PROGRAMS ON SUMMER DATA SHOW ONLY SMALL VARIATIONS, DUE TO THE FACT THAT THE INCLUSION OF TAGGED EVENTS IS BALANCED BY THE REJECTION BY THE RMIN CUT.

A COPY OF THIS INFORMATION CAN BE OBTAINED BY SUBMITTING THE JOB JBMEMRD1 ON THE LIBRARY JADEPR.JADESR

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                 I                            I
                I   JADE COMPUTER NOTE NR. 28    I
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 ************************************************************
 *  EDITING PATTERN RECOGNITION RESULTS IN THE JADE GRAPHICS  *
 ************************************************************
                ----------------------  J.OLSSON    M.GODDARD

                                          VERSION FROM 12.10.79
                                          *********************

GENERAL ABOUT PATTERN RECOGNITION:
**********************************

   PATTERN RECOGNITION PROCEEDS IN SEVERAL SEPARATE STEPS, NAMELY

   1/  CELL PATTERN RECOGNITION. TRACK ELEMENTS, I.E. PIECES OF TRACKS
       ARE FOUND IN THE 96 CELLS. VARIOUS INFORMATION FOR THE TRACK
       ELEMENTS IS STORED IN COMMON /CWORK/

   2/  BACKTRACING. TRACK ELEMENTS ARE CONNECTED TO FORM WHOLE TRACKS,
       USING THE INFORMATION IN /CWORK/. THE TRACKS NOW EXIST IN FORM
       OF CROSS REFERENCE ARRAYS IN /CWORK/, TELLING WHICH TRACK ELE-
       MENTS BELONG TO WHICH TRACKS AND WITH WHICH POLARITY (LEFT OR
       RIGHT OF THE WIRE PLANE).

   3/  TRACK FITTING AND FETCHING OF REMAINING POINTS WHICH ORIGINALLY
       WERE NOT ASSIGNED TO TRACK ELEMENTS. THE PROGRAMS HANDLING
       THESE OPERATIONS HAVE A CERTAIN CAPACITY TO JUDGE AND CORRECT
       THE RESULTS FROM POINTS 1/ AND 2/. THUS A TRACK ELEMENT MAY BE
       REJECTED IF IT MAKES A BAD CONTRIBUTION TO THE TRACK FIT. THIS
       TRACK ELEMENT MAY THEN BE PICKED UP BY ANOTHER TRACK OR FORM A
       TRACK BY ITSELF. IN SHORT, A CERTAIN EDITING OF CELL PATREC AND
       BACKTRACING TAKES PLACE.

   4/  FINAL RESULTS ARE STORED IN THE HITLABEL ARRAY (BANK 'JHTL')
       AND THE TRACK BANK 'PATR'.

GENERAL ABOUT EDITING:
**********************

 ALTHOUGH AUTOMATIC EDITING TAKES PLACE IN POINT 3/ ABOVE, ADDITIONAL
 MANUAL EDITING IS OFTEN REQUIRED. FOR THIS PURPOSE AN INTERACTIVE
 GRAPHICS EDITING PROGRAM HAS BEEN DEVELOPED TO ALLOW THE SCANNER TO
 ASSIST PATTERN RECOGNITION. THIS PROGRAM ENTERS BETWEEN POINTS 2/
 AND 3/ ABOVE AND HAS THE TASK TO EDIT THE OUTPUT OF THE BACKTRACING
 PROGRAM, I.E. THE ASSIGNMENT OF TRACK ELEMENTS TO TRACKS, IN SUCH A
 WAY THAT FITTING AND POINT FETCHING ARRIVES AT A CORRECT END RESULT.
    THUS THE SCANNER MAY REASSIGN TRACK ELEMENTS TO OTHER TRACKS OR
 TO COMPLETELY NEW TRACKS; HE MAY REVERSE THE LEFT/RIGHT AMBIGUITY
 SOLUTION FOR TRACK ELEMENTS OR WHOLE TRACKS; HE MAY DELETE TRACK ELE-
 MENTS OR WHOLE TRACKS AND HE MAY COMBINE SEVERAL TRACKS INTO ONE.
    THE SCANNER HAS THE POSSIBILITY AT EACH STAGE OF HIS EDITING TO
 MAKE A TEST CALL TO THE FIT AND FETCH PROGRAMS, TO SEE HOW THE FINAL
 RESULT WOULD LOOK, BASED ON THE CURRENT SITUATION OF TRACK ELEMENT /
 TRACK ASSIGNMENT.

EDITING IN PRACTICE:
********************
    THE EDITING PROGRAM IS ACTIVATED BY THE GRAPHICS COMMAND  'EDIT'.
 STEPS 1/ AND 2/ OF THE NORMAL PATTERN RECOGNITION ARE THEN PERFORMED
 AND THE EDIT PROGRAM IS ENTERED. THE SCANNER HAS NOW A NUMBER OF
 GRAPHICS SUBCOMMANDS TO AID THE EDITING. THESE SUBCOMMANDS ARE CALLED
 UP BY NUMBER CODES TO AVOID CONFUSION WITH REGULAR GRAPHICS COMMANDS;
   TO SIMPLIFY THE EDITING WORK, MANY OF THE SUBCOMMANDS CAN BE ABBRE-
 VIATED BY ENTERING ONE OR TWO TRAILING NUMBERS (INTEGERS), CORRESPON-
 DING TO THE NUMBERS THAT OTHERWISE WOULD BE PROMPTED FOR. THE NUMBERS
 MAY BE SEPARATED BY BLANKS OR COMMAS.
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  ANY SUBCOMMAND INVOLVING AN EVENT DISPLAY MAY HAVE THE DETECTOR
DISPLAYED IN ADDITION, IF THE NUMBER 100 IS ADDED TO THE SUBCOMMAND.
THUS THE SUBCOMMANDS 6 AND 106 WILL DISPLAY THE RAW EVENT WITHOUT AND
WITH THE DETECTOR IMPOSED.
  THE SUBCOMMANDS ARE DESCRIBED BELOW:

CODE  0:   LEAVE THE PROGRAM, SEE BELOW      (EQUIVALENT: JUST ENTER)

CODE  1:   DISPLAY FULL LIST OF ALL AVAILABLE COMMANDS

CODE  2:   MAKE A HARDCOPY OF CURRENT PICTURE

CODE  3:   MAGNIFICATION. THIS CORRESPONDS TO THE GRAPHICS COMMAND
           JOYS. TO MAGNIFY AN AREA, ENTER OPPOSITE CORNERS OF THE
           AREA WITH JOYSTICK INPUT (CONTROL + E).

CODE  4:   RESET THE MAGNIFICATION FROM 3.

CODE  5:   COMMENT OPTION. THE SCANNER CAN ENTER A PERSONAL COMMENT
           TO THE PICTURE (IF HE HAS A JOYSTICK !).

CODE  6:   DISPLAY THE RAW EVENT (ALL HITS, WITH MIRRORS).

CODE  7:   CHANGE THE VIEW.   UPON ENTERING THE EDITING PROGRAM, THE
           RA VIEW (LARGEST INNER DETECTOR VIEW) IS DEFAULT. BY CODE
           7, ANY OTHER VIEW CAN BE CHOSEN.
------>>>  (TRAILING NUMBER OPTIONAL)

CODE  8:   CALL THE GENERAL GRAPHICS DISPLAY/COMMAND PROCESSOR. THIS
           SUBCOMMAND SHOULD BE USED AS LITTLE AS POSSIBLE AS IT MAY
           LEAD TO UNEXPECTED OVERWRITING OF COMMON /CWORK/. MOST OF
           THE GENERAL GRAPHICS COMMANDS, LIKE CDTL,LIM OR TR ARE
           AVAILABLE INSIDE THE EDITING PROGRAM (SEE BELOW).
                 THE RETURN TO THE EDITING PROGRAM IS POSSIBLE WITH
           THE COMMAND 'RET', PROVIDED THAT ONLY COMMMANDS OF PURELY
           GRAPHICAL CHARACTER HAS BEEN GIVEN. IF NOT, E.G. IF A COM-
           MAND LIKE "EDIT" IS GIVEN, THE SCANNER IS RETURNED TO THE
           MAIN COMMAND PROCESSOR; PREVIOUS EDITING RESULTS ARE LOST.

CODE  9:   PRINT THE BACKTRACE RESULT ARRAYS. THIS IS USEFUL IN COMP-
           LICATED EVENTS WHERE IT MAY BE UNCLEAR WHICH ELEMENTS
           BELONG TO WHICH TRACK.
             IF INFORMATION IS DESIRED ONLY FOR ONE OF MANY TRACKS,
------>>>    THE TRACK NUMBER MAY BE ENTERED AS A TRAILING NUMBER.
             EXAMPLE: TO KNOW WHICH ELEMENTS BELONG TO TRACK 5,
                                    ENTER    9 5    (OR 9,5)

CODE 10-15:  VARIOUS DISPLAY OPTIONS FOR CELL PATTERN RECOGNITION.
             THESE COMMANDS ARE LESS USEFUL FOR EDITING BUT ARE OF
             INTEREST TO THE AUTHOR(S) OF CELL PATTERN RECOGNITION.

 CODES 16 - 19  BELOW AR DISPLAY OPTIONS FOR HITS BELONGING TO TRACK
                ELEMENTS ( AND THEREFORE ALSO WITH TRACKS). THESE
                CODES DO NOT DISPLAY ADDITIONAL HITS PICKED UP BY THE
                FIT AND FETCH PROGRAM (PATROL). FOR SUCH DISPLAYS, GO
                TO CODE 26 AND ITS SUBOPTIONS.
   THIS IS ALSO TRUE FOR CODE 27 WHICH HAS ITS CORRESPONDENCE IN
   CODE 26 WITH SUBOPTION 5.
                FOR CODES 16,18,19 AND 27, A SEQUENTIAL DISPLAY MODE
                HAS BEEN INSTALLED. THUS ENTERING OF THE CODE WILL
                BE FOLLOWED BY A PROMPTING FOR A TRACK NUMBER. GIVEN
                A VALID TRACK NUMBER, THE HITS OF THIS TRACK ARE DIS-
                PLAYED AND A NEW TRACK NUMBER IS PROMPTED FOR. THE
                SEQUENCE IS FINISHED BY ENTERING A NON-EXISTING TRACK
                NUMBER (E.G. 0 OR RETURN) AND THE REMAINING PART OF
                THE EVENT IS DISPLAYED.

 CODE 16:   DISPLAY ALL HITS ASSOCIATED WITH TRACKS. THE TRACK NUMBERS
            ARE ALSO WRITTEN AT THE ENDPOINTS OF THE TRACKS, AS WELL
            AS THE TRACK ELEMENT NUMBERS AT THEIR RESPECTIVE ENDPOINTS
              THIS VIEW (OR VIEW 19) IS THE MAIN REFERENCE VIEW AND
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            SHOULD BE DISPLAYED OFTEN IN THE EDITING PROCESS, IN PARTI
            CULAR AFTER DELETION OR JOINING OF TRACKS. THIS IS BECAUSE
            DELETION OF E.G. TRACK 10 WILL CAUSE A RENUMBERING OF ALL
            TRACKS 11,12 ETC. ADDITIONAL EDITING WITHOUT CONSULTING
            THE VIEW OF CODE 16 OR 19 WILL WITH HIGH PROBABILITY LEAD
            TO A MESS.

CODE 17:    DISPLAY ALL HITS NOT ASSOCIATED WITH TRACKS.

CODE 18:    DISPLAY ALL HITS ASSOCIATED WITH TRACKS, MARKING SELECTED
            TRACKS WITH SPECIAL SYMBOLS (SLASHES/CROSSES). THE DESIRED
            TRACK NUMBERS ARE ASKED FOR.
------>>>   (TRAILING NUMBER OPTIONAL)

CODE 19:    DISPLAY ALL HITS IN THE EVENT, MARKING TRACK ELEMENT
            ASSOCIATED HITS WITH SPECIAL SYMBOLS.

CODE 20:    CHANGE DISPLAY DETAILS.
              CORRESPONDS TO GRAPHICS COMMAND CDTL
              USEFUL ARE OPTIONS 9,17,19,20,28 (SEE GRAPHICS MANUAL)
              ENTERING CODE 20 DISPLAYS A LIST OF ALL AVAILABLE
              OPTIONS.
------>>>   (TRAILING NUMBER OPTIONAL)

CODE 21:    WRITE THE CONTENT OF THE "MIDOUT" PART OF COMMON/CWORK/
            THIS CODE IS ONLY FOR EXPERTS.

CODE 22:    MAKE A TEST CALL TO THE FIT AND FETCH PROGRAM AND DISPLAY
            THE RESULTS ON TOP OF THE CURRENT VIEW. THE RESULTS ARE
            DISPLAYED IN THE SAME WAY AS IN GRAPHICS COMMAND 'RES',
            I.E. A LIST OF TRACK PARAMETERS AND DISPLAY OF FITS.
      OBS:  THE DISPLAY OF THE TRACK PARAMETER LIST IS BY DEFAULT
            SUPRESSED IN THE EDIT PROGRAM. IT CAN BE REVOKED BY ANY
------>>>   TRAILING NUMBER FOLLOWING THE CODE 22.
            SETTING DISPLAY DETAIL 13 ( BY CODE 20 ) REVERSES THIS
            OPTION. THUS THE PARAMETER LIST ALWAYS APPEARS AND CAN
            BE SUPRESSED BY ENTERING A TRAILING NUMBER AFTER CODE 22.

CODE 23:    SAME AS 22, BUT NOW FOR SELECTED TRACKS,WHICH ARE PROMPTED
            FOR.
            IF ONLY ONE TRACK IS DESIRED, IT CAN BE ENTERED AS A
------>>>   TRAILING NUMBER.

CODE 24:    TRACK EDITING:        THIS AND THE FOLLOWING CODE ARE THE
                ACTUAL EDITING COMMANDS. THE EDIT PROGRAM PROMPTS
            THE SCANNER TO GIVE IN THE OLD AND THE NEW TRACK NUMBER.
            EXAMPLES:
               TO JOIN TRACKS 7 AND 5      ENTER 7 5    (OR 7,5)
               TO JOIN TRACKS 7 AND 5, THEREBY REVERSING LEFT/RIGHT
               AMBIGUITY FOR TRACK 7       ENTER 7 -5   (OR 7,-5)
               TO DELETE TRACK 10          ENTER 10 999
               TO CHANGE INTERNAL NUMBERING OF TRACK 10
                                           ENTER 10 NN  (NN > NTR)
               TO CHANGE LEFT/RIGHT AMBIGUITY FOR TRACK 8
                                           ENTER 8 -8
               TO DO NOTHING          E.G. ENTER 5 5
            SOME CONVENTIONS HAVE TO BE FOLLOWED. THUS IN JOINING TWO
            TRACKS (E.G. 3 AND 11), THE LARGER TRACK NUMBER MUST BE
            ENTERED FIRST.
            OBS!!! A DELETED TRACK CAN BE RECOVERED BY REINSTALLING
                THE CORRESPONDING TRACK ELEMENTS (SEE BELOW)
            THE CODE 24 MUST BE ENTERED BETWEEN EACH TRACK EDITING
            OPERATION.
------>>>   (TRAILING NUMBERS OPTIONAL)

CODE 25:    TRACK ELEMENT EDITING:  THIS COMMAND IS SIMILAR TO 24, BUT
            DEALS WITH TRACK ELEMENTS. THE EDIT PROGRAM NOW PROMPTS
            FOR TRACK ELEMENT NUMBER AND NEW TRACK NUMBER.
            SOME EXAMPLES:
               ASSIGN TRACK ELEMENT 48 TO TRACK 5       ENTER 48 5
               ASSIGN TRACK ELEMENT 48 TO TRACK 5 AND REVERSE ITS
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               LEFT / RIGHT AMBIGUITY                  ENTER 48 -5
               DELETE TRACK ELEMENT 36                 ENTER 36 999
            OBS!!! A DELETED TRACK ELEMENT CAN BE RECOVERED SIMPLY BY
            REASSIGNING THIS ELEMENT TO ANY TRACK. IT IS POSSIBLE TO
            ASSIGN THE TRACK ELEMENT TO A NONEXISTING TRACK, WHICH IS
            THEN AUTOMATICALLY GIVEN THE NUMBER:   NTR + 1.
            THE CODE 25 MUST BE ENTERED BETWEEN EACH TRACK ELEMENT
            EDITING OPERATION.
------>>>   (TRAILING NUMBERS OPTIONAL)

CODE 26:    DISPLAY HITS ACCORDING TO HITLABEL ARRAY FROM A TESTFIT.
             CORRESPONDS TO GRAPHICS COMMAND TR.

CODE 27:    DISPLAY RAW EVENT, MARKING SELECTED TRACKS WITH MIRRORS.
            THE PROGRAM PROMPTS FOR SELECTED TRACKS. ONLY HITS THAT
            BELONG TO TRACK ELEMENTS ARE SHOWN; FOR FULL TRACKS WITH
            EXTRA HITS PICKED UP IN THE FITTING, SEE CODE 26:5.
------>>>   (TRAILING NUMBER OPTIONAL)
     OBS:   SEE ALSO THE GENERAL INFORMATION FOR CODES  16 - 19

CODE 28:    CHANGE LIMITS IN COMMON /CPATLM/. THIS CORRESPONDS TO THE
            GRAPHICS COMMAND  'LIM'  AND IS FOR EXPERTS ONLY.

CODE 29:    CONTINUE EDITING OF ALREADY EXISTING RESULT BANKS 'JHTL'
            AND 'PATR'. THIS CODE WILL CREATE THE CORRESPONDING ARRAYS
            IN COMMON /CWORK/, BASED ON THE CONTENT OF THE RESULT
            BANKS. THUS THIS COMMAND OFFERS THE POSSIBILITY TO
            CONTINUE EDITING OF ALREADY EDITED EVENTS, WITHOUT GOING
            THROUGH ALL THE PREVIOUS WORK AGAIN  (THANK PETER STEFFEN
            FOR THIS VALUABLE OPTION).

CODE 30:    SHOW RESULTS OF ALREADY EXISTING 'PATR' BANKS. THIS GIVES
            A POSSIBILITY TO COMPARE THE EDITING RESULT WITH PREVIOUS
            EFFORTS. THE BOS BANK NUMBER OF THE PATR BANK IS PROMPTED
            FOR AND THE RESULT DISPLAY CORRESPONDS TO GRAPHICS 'RES'
            COMMAND.
            THE DESIRED BANK BOS NUMBER IS PROMPTED FOR, OR CAN BE
------>>>   ENTERED AS A TRAILING NUMBER.

CODE 31:    SHOW Z-PROJECTIONS; CORREPONDS TO GRAPHICS COMMAND PRO.
                PROJECTIONS ARE ALSO SHOWN AUTOMATICALLY IF DISPLAY
                DETAIL 17 IS SET. IN THIS CASE, THE RZ FIT RESULTS
                APPEARS AUTOMATICALLY IF CODE 22 OR 23 IS GIVEN. THE
                DETECTOR HITS CAN BE SUPRESSED IN THE PROJECTIONS BY
                SETTING DISPLAY DETAIL 20.

CODE 32:    CREATE AN 'ARTIFICIAL' TRACK ELEMENT, CONTAINING ONLY ONE
            HIT. THIS IS USEFUL WHEN TO A LARGE EXTENT A TRACK IS
            COVERED BY OTHER TRACKS AND ONLY HAS A FEW ISOLATED HITS.
            THE DESIRED HIT IS GIVEN BY A JOYSTICK INPUT IN THE CORRE-
            SPONDING PLACE. THE TRACK TO WHICH THE HIT IS TO BELONG
            IS PROMPTED FOR AND IS TO BE ENTERED WITH THE PROPER SIGN
            FOR LEFT/RIGHT AMBIGUITY : - FOR LEFT, + FOR RIGHT.
            SOME STEADINESS OF HAND IS REQUIRED IN STANDARD VIEWS; THE
            CLOSEST HIT WITHIN A RADIUS OF 10 MM IS SEARCHED FOR.
------>>>   (TRAILING NUMBER OPTIONAL)

CODE 33:    DELETE ALL TRACKS WITH TRANSVERSE MOMENTUM BELOW 40 MEV.
            THIS COMMAND SAVES THE EDITOR FROM THE OFTEN TIRESOME WORK
            TO GET RID OF SPIRALING ELECTRONS.

CODE 34:    SAVE OR RECOVER ALREADY SAVED EDITING WORK.
            THIS COMMAND CAUSES THE COMPLETE CONTENT OF COMMON /CWORK/
            TO BE WRITTEN OUT ONTO A SCRATCH FILE (WHICH IS IMMEDIA-
            TELY ENDOFFILED). SIMILARLY THE SCRATCH FILE CONTENT IS
            WRITTEN BACK INTO COMMON /CWORK/ IF SO DESIRED.
            GIVING THIS COMMAND STARTS A SMALL DIALOGUE IN WHICH IS
            SETTLED WHETHER TO SAVE OR TO RECOVER.
            A NEW SAVE ACTION WILL OVERWRITE ANY PREVIOUS SAVINGS.
            PRESENTLY ONLY ONE EVENT CAN BE SAVED ONTO THIS SCRATCH
            FILE, WHICH IS TO BE ALLOCATED IN THE INITIALIZATION STAGE
```

```
            OF THE GRAPHICS SESSION.
       OBS: THIS IS THE COMMAND TO BE GIVEN WHEN ON THE SCREEN APPEARS
            THE TEXT:    ***** BITTE LOG OFF ****
            IT IS ALSO WISE TO EXERCISE THIS COMMAND REGULARLY TO PRO-
            TECT ONESELF AGAINST IBM BREAKDOWNS, WHICH (AS EXPERIENCE
            SHOWS) TEND TO HAPPEN TOWARDS THE END OF COMPLICATED
            EVENT EDITING.
            (THANK LAWRENCE H. O'NEILL FOR THIS VALUABLE OPTION)

 CODE 35:   "AUTOMATIC EDITING" INVOKED. A VERY POWERFUL OPTION. THIS
            CAUSES THE INPUT TO THE FITTING AND HIT SEARCH ROUTINES
            TO BE UPDATED DEPENDING ON THE RESULTS OF THE PREVIOUS
            FIT. THIS RESULTS IN SOME PATERN RECOGNITION ERRORS
            BEING AUTOMATICALLY CORRECTED. IMMEDIATELY AFTER ENTRY
            INTO EDIT THE FIT AND HIT SEARCH ROUTINES HAVE NOT YET
            BEEN ENTERED AND THE TRACK ELEMENTS AND TRACKS ARE
            EXACTLY AS THEY COME OUT OF BACKTRACE. ENTERING ANY
            CODE WHICH CALLS THE FITTING AND HIT SEARCH ROUTINES
            (E.G. 22,26 ) CAUSES THE ASSOCIATION BETWEEN TRACK
            ELEMENTS AND TRACKS TO CHANGE AND SOME TRACKS MAY
            DISSAPPEAR IF THEY BECAME REDUNDANT AS A RESULT OF
            FITTING AND TRACK EXTRAPOLATION. SINCE THIS IS AN
            ITERATIVE PROCESS , SEVERAL ENTRIES INTO TRACK FITTING
            MAY SOMETIMES BE REQUIRED TO REACH CONVERGENCE.
            THUS IN USING THIS CODE THE USER SHOULD ENTER
            CODE 22 (OR CODE 26) SEVERAL TIMES BEFORE LOOKING
            AT THE TRACKS AND TRACK ELEMENTS (CODES 16,18,ETC.).
OBS OBS:  COMPLAINTS / COMMENTS   TO MALCOLM GODDARD ONLY.

 CODE 36:   DISPLAY HITS BELONGING TO TRACKS BY THE CORRESPONDING
            TRACK NUMBER. THIS OPTION IS USEFUL IN ENLARGED VIEWS OF
            COMPLICATED AREAS, WHERE THE ACTUAL TRACK NUMBER IS NOT
            VISIBLE. THIS OPTION IS SWITCHED OFF BY ENTERING CODE 36
            ONCE AGAIN. IT IS ONLY EFFECTIVE IN CODES 16 - 19, BUT
            WILL LATER BE IMPLEMENTED ALSO IN THE VIEWS OF CODE 26.

 CODE 37:   SIMILAR TO CODE 36 BUT INSTEAD DISPLAYING HITS BY THEIR
            TRACK ELEMENT NUMBER.

-------------------------------------------------------------------------

LEAVING THE EDIT PROGRAM:
*************************
     WHEN EDITING IS COMPLETED, ENTER 0 OR SIMPLY RETURN.
TO AVOID THE INVOLUNTARY LEAVING OF THE EDIT PROGRAM BY THE ACCIDENTAL
PUSHING OF THE RETURN BUTTON, THE SCANNER HAS TO CONFIRM HIS INTENTION
TO LEAVE BY ANSWERING YES BEFORE HE IS ALLOWED TO LEAVE.    BEFORE
LEAVING THE PROGRAM, THE SCANNER NOW HAS TO SETTLE A SMALL DIALOGUE:
    THE SCANNER IS ASKED WHETHER HE WANTS TO KEEP HIS EDITED RESULTS.
IF ANSWER IS NO: THE TEMPORARILY CREATED BANKS ARE DELETED AND RETURN
                 MADE TO THE MAIN COMMAND PROCESSOR.
                 THE INTENTION TO DESTROY THE EDITING WORK HAS TO BE
                 CONFIRMED BY ANSWERING YES, BEFORE PROCEEDING.
                 IN CASE OF SAVING RESULT, THE EDITOR IS ASKED FOR HIS
                 OPINION OF THE PATREC RESULTS IN THE EVENT, OKAY OR
                 NOT OKAY.
           IF ANSWER IS YES: RETURN TO MAIN COMMAND PROCESSOR.
           IF ANSWER IS NO: THE SCANNER IS ASKED TO SPECIFY WHICH
                            TRACKS HE CONSIDERS STILL TO BE WRONG.

       THE LATTER INFORMATION LEADS TO THE MARKING OF THE TRACK IN
THE BANK 'PATR' AND ALSO TO THE MARKING OF THE EVENT AS A WHOLE.

DURING THE EDITING, A LABEL FOR EACH TRACK IS SET ACCORDING TO THE
ACTION TAKEN AND ACCORDING TO A GIVEN BIT PATTERN. MOREOVER, SEVERAL
OTHER BITS IN THIS LABEL ARE SET IN OTHER STAGES OF THE PATTERN RE-
COGNITION, DEPENDING ON VARIOUS CONDITIONS. A DESCRIPTION OF THIS
LABEL WILL BE ISSUED SEPARATELY.

         A COPY OF THIS INFORMATION CAN BE OBTAINED BY SUBMITTING
         THE JOB   JBJCN28   ON THE LIBRARY     JADEPR.TEXT
```

```
                  ****************************
                 I                            I
                I   JADE COMPUTER NOTE NR. 29    I
                 I                            I
                  ****************************

*****************************************************************
HOW TO CREATE GRAPHICS MODULES WITHIN THE JADE GRAPHICS FRAMEWORK
*****************************************************************
                        G.PEARCE, J.OLSSON              21.10.79
                        ------------------------------------
```

SINCE INTERACTIVE GRAPHICS OFFER UNIQUE POSSIBILITIES OF PROGRAM CHECK OUT, PROGRAM TUNING ETC., SEVERAL USERS MAY WISH TO CREATE THEIR OWN PERSONAL EXECUTABLE GRAPHICS MODULES. THE FOLLOWING NOTE IS INTENDED TO HELP THE GENERAL USER TO DO THIS WHILE REMAINING WITHIN THE FRAMEWORK OF JADE GRAPHICS.

THE PRESENT FRAMEWORK ALLOWS SUCH A POSSIBILITY BY OFFERING THE GRAPHICS COMMAND "SPVA" (SPARE VIEW A). THIS COMMAND CAUSES A CALL TO

```
SUBROUTINE SPARE
```

WHICH ON THE GENERAL LIBRARY IS A DUMMY. THIS ROUTINE CAN BE REPLACED BY A USER WRITTEN ONE, CONTAINING ANY GRAPHICS FACILITY THE USER MAY WISH. FOR MORE DETAILS ON GRAPHICS, THE USER MAY CONSULT THE PLOT10 MANUAL AND NOTES ON TCS AT DESY (R02 GROUP). FOR INFORMATION ABOUT CONVENIENT SUBROUTINES TO USE IN THE DIALOGUE WITH THE SCREEN, PLEASE CONTACT L.O'NEILL OR J.OLSSON.

THE USER CAN MARK HIS SPECIAL MODULE BY INCLUDING A SUBROUTINE
SUBROUTINE NOTICE
WHICH ON THE GENERAL LIBRARY IS A DUMMY, CALLED BY THE GRAPHICS MAIN. THIS SUBROUTINE WOULD THEN HAVE THE FORM

```
SUBROUTINE NOTICE
CALL TRMOUT(80,' USERS PRIVATE MESSAGE ^')
RETURN
END
```

THE "PRIVATE MESSAGE" WILL THE APPEAR ON THE SCREEN IN THE SESSION.

```
**********************************************************************
**   OBS    OBS    OBS    OBS    OBS    OBS    OBS    OBS    OBS     **
**                                                                    **
**    NOTE ADDED 24.9.1982  (J. OLSSON)                               **
**                                                                    **
**                                                                    **
**     THE DESCRIPTION BELOW OF HOW TO LOAD A GRAPHICS MODULE IS      **
**     SEVERELY OUTDATED. USE INSTEAD THE MEMBER                      **
**                                                                    **
**               F11LHO.JADEGS(JBOVER)                                **
**                                                                    **
**     WHICH CONTAINS THE COMPLETE OVERLAY STRUCTURE FOR THE JADE     **
**     GRAPHICS PROGRAM, AS WELL AS THE JCL FOR CREATING A MODULE.    **
**                                                                    **
**                                                                    **
**********************************************************************
```

A CONVENIENT WAY TO COMPILE A MODULE IS BY EXECUTING A TSO CLIST, WHICH CAN BE DONE FROM ANY TSO TERMINAL, INCLUDING THE GRAPHICS TERMINALS. BEFORE STARTING OFF HOWEVER, THE USER HAS TO CREATE FOR HIMSELF A LOAD LIBRARY WITH THE NAME

```
USERID.GP.LOAD
```

WHICH IS THE LIBRARY WHERE THE NEWLY CREATED MODULE WILL BE LOADED. ONCE THIS LIBRARY EXISTS (AND IS FASTED), IT CAN OF COURSE BE USED

AGAIN AND THIS STEP CAN BE SKIPPED.

```
//
```

THIS LIBRARY CAN BE CREATED BY THE TSO COMMAND

```
ALLOC DA('USERID.GP.LOAD') NEW DIR
```

AND ANSWERING THE SYSTEM PROMPTS AS FOLLOWS:

```
  NUMBER OF DIRECTORY BLOCKS:          10
  UNIT OF SPACE KEYWORD:               TRACKS
  SPACE AND SPACE INCREMENT VALUES:    50,10
//
```

ENTER

```
    EX 'F11PEA.CLIST(STARTUP)'
```

(THIS COMMAND NEEDS TO BE GIVEN ONLY ONCE PER SESSION, THUS IT CAN BE SKIPPED IN YOUR SUBSEQUENT TRIALS.)

NOW ENTER

```
    NEWGP JADE 'USERID.XXXXXXXX'
```

THE 'USERID.XXXXXXXX' SHOULD BE A PRIVATE LOAD LIBRARY AND IT CAN HAVE ANY NAME. THE USERID NEED NOT BE THE SAME AS THAT OF THE PRESENT USER. NORMALLY THIS WOULD BE THE PRIVATE LIBRARY WHERE THE USER HAS HIS OWN SPECIAL ROUTINES (E.G. SUBROUTINE SPARE) WHICH HE IS GOING TO INCLUDE (SEE BELOW). THIS LIBRARY WILL NOW, TOGETHER WITH ALL THE STANDARD LOAD LIBRARIES OF JADE, BE ALLOCATED TO THE FILE "MEMBER".

AFTER SOME PRINTOUT THE USER IS NOW PROMPTED FOR HIS SPECIAL INCLUDES. THEY MUST BE ENTERED IN THE FORM

```
INCLUDE MEMBER(NAME1,NAME2,....)
```

WHERE NAME1,NAME2 ETC. ARE MEMBERS ON ANY OF THE LOAD LIBRARIES THAT HAVE BEEN ALLOCATED TO THE FILE MEMBER (NORMALLY THE LIBRARY USERID.XXXXXXXX). THE STANDARD INCLUDE OF THE GRAPHICS MAIN IS HERE DEFAULT AND NEEDS NOT BE GIVEN. AN EMPTY RETURN FINISHES THE INPUT, THAT MAY STRETCH OVER SEVERAL LINES.

THE MODULE WILL NOW BE LOADED. IN THIS PROCESS, THE LINKAGE EDITOR INSTRUCTIONS ARE LISTED ON THE SCREEN. THIS LIST ENDS WITH THE NAME OF THE MODULE (JADE). AFTER SOME WAITING TIME (BE PATIENT..) THE MODULE IS READY.

A DATA SET WITH NAME

```
USERID.JADE.LINKLIST
```

IS ALSO CREATED. IT CONTAINS THE LINKAGE EDITOR INPUT AND OUTPUT AND CAN LATER BE LISTED ON THE SCREEN OR SUBMITTED FOR TSO-PRINT WITH THE COMMANDS

```
L JADE    AND    DRUCK JADE
```

IF THIS DATA SET ALREADY EXISTS (E.G. FROM AN EARLIER SESSION), IT WILL HAVE BEEN OVERWRITTEN. IF IT HAS MEANWHILE MIGRATED OFF DISK, YOU WILL GET AN ABEND IN YOUR MODULE CREATING. THIS CAN BE OVERCOME BY SIMPLY DELETING 'JADE' AND STARTING NEWGP AGAIN. DO NOT TRY TO FAST THE DATASET IF YOU ARE GOING TO OVERWRITE IT ANYHOW.
TO DELETE JADE, GIVE THE COMMAND:

```
DELETE JADE NOSCRATCH
```

THE READY MODULE TYPICALLY OCCUPIES SOME 30 TRACKS ON THE LOAD LIBRARY. ONE SHOULD THEREFORE MAKE SURE THAT THERE IS ENOUGH SPACE AVAILABLE ON THE LOAD BEFORE STARTING THE NEWGP. FREQUENT MODULE LOADING UNFORTUNATELY REQUIRES FREQUENT LIBRARY COMPRESSING.

OBS OBS OBS: FOR THE TIME BEING, TSO SPACE REQUIREMENTS FORCES US TO USE SOME DEGREE OF OVERLAY IN THE LINK STRUCTURE.THIS OVERLAY CAN HAVE MANY DIFFERENT FORMS AND IS NOT YET OPTIMIZED. ONE VERSION OF OVERLAY IS ALSO AVAILABLE IN THE ABOVE-MENTIONED CLIST, UNDER THE NAME "JADEOVLY". THE LINK COMMAND WOULD THEN BE

```
NEWGP JADEOVLY 'USERID.XXXXXXXX'
```

AND THEN PROCEED IN THE NORMAL WAY.

THE FOLLOWING COMMENTS CONTAIN SMALL VARIATIONS ON THE ABOVE PROCEDURE AND ARE INTENDED FOR THE MORE EXPERIENCED TSO-USER. THEY NEED NOT BE READ BY THE BEGINNER:

IF ONE DOESN'T WANT TO USE THE COMMAND EX 'F11PEA.CLIST(STARTUP)' ONE CAN START DIRECTLY BY THE COMMAND

EX 'F11PEA.CLIST(NEWGP)'

THE USER WILL NOW BE PROMPTED FOR

TYPE ANSWER JADE OR JADEOVLY
LIB ANSWER 'USERID.XXXXXXXX'

AND LOADING THE MODULE PROCEEDS AS ABOVE.

THE LIBRARY FOR LOAD OUTPUT, GP.LOAD , IS A DEFAULT. IF THE USER WISHES TO USE A DIFFERENT LOAD LIBRARY, HE SHOULD ENTER

NEWGP JADE 'USERID.XXXXXXXX' LOAD(''USERID.SPECIAL.LOAD'')

THE THREE QUOTES ARE UNFORTUNATELY NECESSARY, SINCE THE SYSTEM OTHERWISE WILL ADD A 'LOAD' ONTO THE END OF THE NAME. HOWEVER, IF THE TRUE NAME OF THE LIBRARY WOULD BE USERID.SPECIAL.LOAD, THE LOAD PARAMETER CAN BE ENTERED AS

LOAD(SPECIAL)

HOWEVER,THIS IS TRUE ONLY IF USERID IS IDENTICAL TO THE LOGON USERID

IF THE USER WISHES TO INCLUDE SPECIAL MEMBERS FROM SEVERAL DIFFERENT LOAD LIBRARIES (NOT IN THE LIST OF STANDARD JADE LOAD LIBRARIES), HE MAY DO SO BY ALLOCATING THESE LIBRARIES TO THE FILE MEMBER OR ANY OTHER FILE NAME, BY THE COMMAND:

ALLOC F(NAME) DA('USERID.LIBRARY') SHR

AND LATER, IN THE INCLUDE PART OF NEWGP:

INCLUDE NAME(MEMBER1,MEMBER2,...)

LASTLY, AT TIMES WITH HIGH LOAD ON THE IBM AND SLOW TSO-RESPONSE, THE USER MAY FIND IT CONVENIENT TO USE THE ADDITIONAL OPTION

NEWGP JADE 'USERID.XXXXXXXX' LOGOFF(YES)

WHICH IS COMPLETELY IDENTICAL TO THE PROCEDURE NEWGP ABOVE, BUT HAS THE ADDITIONAL FEATURE OF MAKING A LOGOFF WHEN LINKING IS READY. THE USER MUST HOWEVER FIRST FOLLOW THE LISTING OF THE LINKAGE EDITOR INPUT DOWN TO THE NAME OF THE MODULE TO BE CREATED. AFTER THAT HE MAY LEAVE THE TERMINAL, DEVOTING HIMSELF TO OTHER TASKS.
IF AN ERROR OCCURS IN COURSE OF THE LINKING AND LOADING, THIS LOGOFF OPTION IS OVER-RIDDEN AND RETURN IS MADE INTO TSO READY MODE.

A COPY OF THIS INFORMATION CAN BE OBTAINED BY SUBMITTING THE JOB JBMODULE ON THE LIBRARY F11OLS.JADESR

Jade Computer Note No. 30
15.11.1979
Y. Watanabe

"SPINNING LEAD GLASS" ANALYSIS

Having a compact system of about 3000 ADC channels, it is next to impossible to make the operation perfect. This is a description of the nature of "spinning blocks" and of the method developed in handling them.

I. The nature of "spinning blocks"

The problem of "spinning blocks" originates from various hardware causes.

(1) Hot channels

There are 2 to 3 ADC channels which are always on with pulse heights of more than 3000 counts. The FAST CLEAR of these channels has ceased functioning and charges on a capacitor keep accumulating, thus giving overflow.

(2) Change of pedestals

Pedestals for each ADC channel are measured at the beginning of each run and are subtracted. To be written into IBM, channels have to have more than 5 counts. The pedestal values could change gradually or suddenly during a run by some defective operations of ADC as described in Appendix.

(3) Faulty ADC modules

During runs 1500 and 1521, one of the ADC modules behaved crazily. This was due to a drift of one of power voltages. Much less drastic drifts of pedestals may also happen due to a momentary change of power voltages.

(4) Faulty crates

During summer runs, the pedestals of a whole crate shifted time to time. This seems to have been cured by the installation of an AVR in the 220 V line. Similar effect may be still with us because one of the power voltages is overloaded and just at the edge of regulation.

In histogramming the quantities for each channel, only the events where none of the energy bits for lead glass are set (i.e. $E_{LG} < 1$ GeV) are used to reduce biases from rather frequent Bhabhas and energetic beam gas events. When an event is of type (1), (2) or (3), then the rest of analysis is not done for the event to avoid double counting.
Those quantities above some thresholds are written to disk. The values for the thresholds are empirically decided and are summarized in Table I.

III. The use of the "spinning block data"

The data of "spinning blocks" written on disk are added into 'F11LHO.AUPDAT1', one of the general constant files of O'Neill's. Then in the stage of reduction 1, a subroutine LGCALB is called, whose primary function is to create a calibrated bank of 'ALGN'/1 out of 'ALGL'/1, i.e. counts are converted to MeV. On the process of doing so, a subroutine LGERSE is called, which subtracts some constants from "spinning blocks". These constants are prepared at the beginning of a new run, obtaining the information from the common CALIBR, which is updated at a new run, reading the file 'F11LHO.AUPDAT1'. The constants to be subtracted depend on the "spinningness", and are again decided empirically as summarized in Table II. When the pulse heights after subtraction are zero or negative, then the blocks are deleted in creating 'ALGN'/1 bank. Also deleted are the ADC channels corresponding to the ring 1 and 32, and two dead channels, where high voltage cables have been shorted. In this case the calibration factors in the common CALIBR are zero, thus the deletion is automatic. Typical subtraction constants are 10 to 15 counts (about 5.4 MeV/count), and only 2 to 3 channels are really killed.

If a run is too short (# events < 500), the information of "spinning blocks" for that run is <u>not</u> included in AUPDAT1. Then Reduction 1 jobs use that of the previous run which contains statistically more meaningful quantities.

The treatment of "spinning blocks" has to be effective, but at the same time safe enough not to distort the real events. The procedure described here is still primitive and any constructive criticisms and advices are most welcome.

TABLE I Thresholds to write to disk

CATEGORY	#hits	f	APH
"monopole"	>600	0.2%	0
each crate	> 80	0.2	0
each ADC	> 24	0.2	0
each channel	-	5.0	5 counts
	-	0.5	20 counts.

where f = frequency

APH = average pulse heights

TABLE II Subtraction Constants

CATEGORY	CASE	subtraction constants
"monopole"	f > 0.2%	APH + 3σ
(#hits > 600)	f < 0.2	0
each crate	f > 0.2	APH + 3σ
(#hits > 80)	f < 0.2	0
each ADC	f > 0.2	APH + 3σ
(#hits > 24)	f < 0.2	0
each channel	f > 5%.AND.APH > 5	APH + 3σ
	f > 1%.AND.APH > 100	APH + 3σ
	f > 5%.AND.APH > 100	9999 (i.e. to kill)

Note For safety reason, σ is arbitrarilly limited to

$6 < \sigma < 60$ counts.

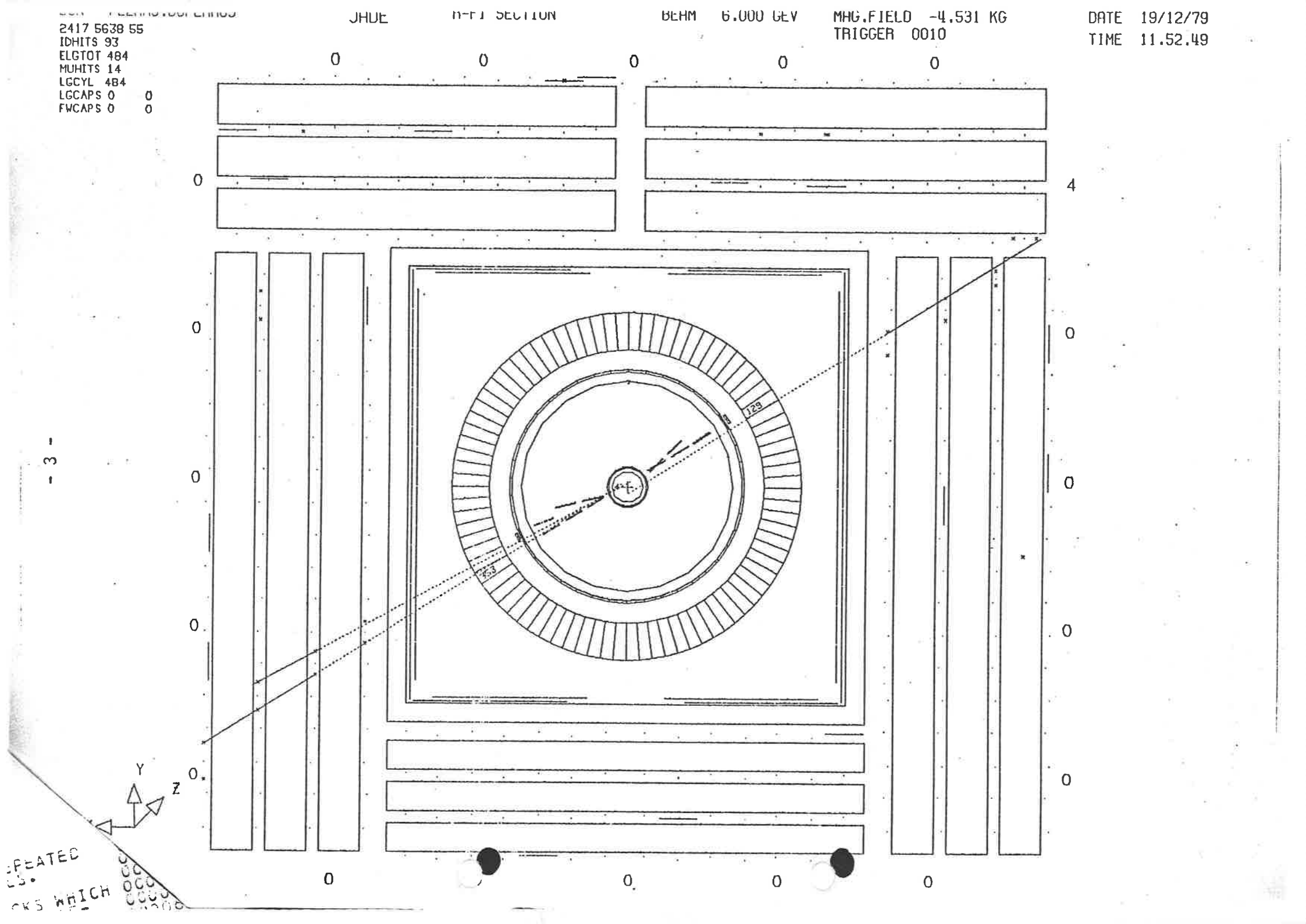
JADE Computer Note No. 31

20/12. 1979

Harry Prosper

MEMBER &MLR3

```
================================================================================0000
  JADE NOTE XX                                                                  0000
  DECEMBER 1979                                                                 0000
  DESCRIPTION OF PHILOSOPHY (3) MUON FILTER TRACKS PATTERN RECOGNITION          0000
  PROGRAM  'TRACK',DEVELOPED AND WRITTEN BY HARRISON B. PROSPER                 0000
 ================================================================================0000
  THE LIBRARIES CONTAINING THE APPROPRIATE PROGRAMS ARE MAINTAINED BY           0000
                JOHN HASSARD                                                    0000
                                                                                0000
   INTRODUCTION                                                                 0000
   ============                                                                 0000
                                                                                0000
            THE PRIMARY AIM OF PHILOSOPHY (3) IS TO FIND TRACKS                 0000
   WHICH ORIGINATE ROUGHLY FROM THE INTERACTION POINT,USING ONLY                0000
   THE INFORMATION CONTAINED IN THE MUON FILTER COORDINATE BANK                 0000
   'MLR1' BANK NUMBER 1. THIS ENSURES THAT PHIL. 3 CAN BE USED TO               0000
   LOOK FOR TRACKS IN THE MUON FILTER WITHOUT USING DATA FROM THE               0000
   REST OF THE JADE DETECTOR.                                                   0000
            THE SECONDARY AIM OF PHILOSOPHY (3) IS TO PROVIDE                   0000
   A FAST AND SIMPLE PROGRAM WHICH CAN BE USED IN DATA REDUCTION.               0000
                                                                                0000
   PHILOSOPHY (3) IN A NUTSHELL                                                 0000
   ============================                                                 0000
                                                                                0000
   PHILOSOPHY 3 (HEREAFTER REFERRED TO AS P3) CAN BE INVOKED WITH               0000
   A CALL TO A ROUTINE CALLED 'TRACK' AS FOLLOWS:                               0000
                                                                                0000
      CALL TRACK(CUT1,CUT2)                                                     0000
                                                                                0000
   'TRACK' CALLS THE FOLLOWING ROUTINES:                                        0000
                                                                                0000
    1)      MUANAC                                                              0000
    2)      FIDO                                                                0000
    3)      TRACK0                                                              0000
    4)      TRACK1                                                              0000
    5)      TRACK2                                                              0000
    6)      TRACK3                                                              0000
                                                                                0000
                                                                                0000
    1)      MUANAC  IS THE STANDARD MUON FILTER ANALYSIS PROGRAM,               0000
            ======  WHICH CHECKS THE RAW DATA IN THE BOS BANK 'MUEV'            0000
   AND CONVERTS THE DRIFT TIMES ETC. INTO CARTESIAN COORDINATES. THE            0000
   ROUTINE IS ONLY CALLED IF THE COORDINATE BANK 'MLR1' BANK NUMBER '1'         0000
   DOES NOT YET EXIST FOR THE EVENT. NORMALLY IT WOULD NOT BE CALLED            0000
   SINCE P1 & P2 ARE RUN AUTOMATICALY AT LEVEL '8' IN THE SUPERVISOR.           0000
                                                                                0000
    2)      FIDO  CONVERTS THE CARTESIAN COORDINATES INTO SPHERICAL             0000
            ====  POLAR COORDINATES (WITH THE AXES CHOSEN CONVENTIONALY).       0000
   FURTHERMORE IT ORDERS THE  DATA FOR THE HITS,BOTH 'LEFT' AND 'RIGHT'         0000
   AMBIGUITIES,WITH RESPECT TO PHI.                                             0000
                                                                                0000
    3)      TRACK0  DECIDES WHERE IN PHI TO START SCANNING THROUGH THE          0000
            ======  HITS. IT ALWAYS CHOOSES TO START AT A POSITION WITH         0000
   A GAP IN PHI BETWEEN TWO ADJACENT HITS OF GREATER THAN 'CUT1'DEGREES.        0000
                                                                                0000
    4)      TRACK1  SCANS THROUGH THE HITS AND TRYS TO FIND LOOSE               0000
            ======  CLUSTERINGS OF HITS IN PHI. THE LOOSENESS OF THE            0000
   CLUSTERING IS DETERMINED BY CUT1,WHICH IS TYPICALLY 5 DEGREES.               0000
                                                                                0000
    5)      TRACK2  SCANS THROUGH THE 'TRACKS' FOUND BY TRACK1,AND              0000
```


2417 5638 55
IDHITS 93
ELGTOT 484
MUHITS 14
LGCYL 484
LGCAPS 0 0
FWCAPS 0 0
JHUE
BEHM 6.000 GEV
MAG.FIELD -4.531 KG
TRIGGER 0010
DATE 19/12/79
TIME 11.52.49
129
Y
Z

****
*
* MESSAGE FROM F22ELS 30/01/80 105335
*
****

E.ELSEN
30/01/80

STATUS OF TP-DATASETS

STARTING AT 18.00 HRS TODAY THE FOLLOWING FIVE DATASETS CONTAINING MULTIHADRONIC EVENTS WILL BE MOVED TC TAPE

DATASET	EVENTS	CMS ENERGY	UNIT	FIT
F22ELS.TPMH.SC1131	213	31.0 GEV	FAST	OLD
F22ELS.TPMH.SC1231	233	31.0 GEV	FAST	NEW
F22ELS.TPMH.SC1331	206	31.0 GEV	FAST	NEW
F22ELS.TPMH.SC1431	102	31.0 GEV	FAST	NEW
F22ELS.TPMH112	230	12.0 GEV	FAST	NEW

THE FIRST FOUR WILL BE REPLACED BY ONE BIG DATASET:

F22ELS.TPMH331	754	31.0 GEV	FAST	NEW

THIS DATA CAN ALREADY BE ACCESSED CN TAPE:

F22ELS.TPSCANO	754	31.C GEV	TAPE	NEW

THE COMBINED DATASET F22ELS.TPMH331 WILL BE ORDERED ACCORDING TO RUN NUMBERS. ALL CALIBRATIONS ARE NEW. THE NEW FIT PROGRAM WITH THE EXTENDED PATR BANK IS USED. PARTICLE IDENTIFICATION IS BASED ON THE COMBINED RESULTS OF TOF-, DEDX- AND LG-ANALYSIS NOW. ADDITIONAL VERTEX AND TRACK BANKS ARE GENERATED TO INCLUDE CONVERTED PHOTONS AND V - PARTICLES.

THE 12 GEV DATA WILL BE REPLACED BY

F22ELS.TPMH312	230	12.0 GEV	FAST	NEW

WITH THE SAME FEATURES.

JADE Computer Note No. 32
P. Dittmann
11.2.80

VTX INI must be changed for VTX ch pipe!
done in VTXpre

How to use the Vertex fit program

The Vertex program package contains 9 routines:

VTXINI	initialisation
VTXPRE(IH,IP)	preparation
VTXSRC	vertex search
VTXEE	photon conversions
VERTEX	vertex fit
VTXPNT	support routines
VTXAFT	track correction
VTXBNK(IP)	'GVTX' bank creation (needs BOSLIB)
SMINVD	matrix inversion

These routines communicate via COMMON/CWORK1/X(2103). VTXPRE needs the 'HEAD' and 'PATR' banks, the pointers to these banks are passed via subroutine arguments. The results appear in /CWORK1/, and if one calls VTXBNK(IP), in bank 'GVTX'. The routines may be copied from F11LHO.JADEGS or linked from F11LHO.JADEGL.

The track and vertex parameters used in the package are described in a source comment in subroutine VERTEX.
This comment is given below:

The V-array is ordered such that the first vertex is the one nearest to the beam.

The vertex package needs several constants in COMMON/CVTXC/ which are initialized in VTXINI and listed below. They may be changed by the user.

```
      SUBROUTINE VTXINI
C*800124*DITTMANN*************************************************
C*                                                               *
C* I N I T I A L I S A T I O N   O F   X Y Z   V E R T E X   F I T *
C*                                                               *
C*      TO BE CALLED ONCE AND BEFORE FIRST CALL TO VTXPRE, VERTEX *
C*****************************************************************
      COMMON /CVTXC/ XB,YB,ZB,RTANK,DTANK,XOINN,SIGX0,SIGZ0,PNTMIN,
     *               DISTB,COLL2,NITER,DSCONV,PRCUT,IREJTR,EEDPMN,
     *               EEDPMX,EEDTMX,EEDRMX,SEMAX,SIMAX,SIGFAC
C
C        MEAN VERTEX COORDINATES
      XB = 0.
      YB = 0.
      ZB = 0.
C        OUTER RADIUS OF INNER TANK WALL
      RTANK = 174.
C        OUTER DISTANCE BEAM PIPE TO TANK WALL
      DTANK = 50.
C        RADIATION LENGTH BETWEEN BEAM AND FIRST WIRE
      XOINN = 0.16
C        MEAN TRACK RESIDUAL IN XY AND ZR PLANE
      SIGX0 = 0.55
      SIGZ0 = 30.
C        ARTIFICIAL FACTOR TO ACCOUNT FOR SYSTEMATIC ERRORS
      SIGFAC = 2.0
      SIGX0 = SIGX0 * SIGFAC
      SIGZ0 = SIGZ0 * SIGFAC
C        MINIMUM NUMBER OF POINTS IN XY AND Z TRACK
      PNTMIN = 5.
C        MAXIMUM DISTANCE OF TRACKS TO AVERAGE BEAM
C        USED IN PRIMARY VERTEX SEARCH
      DISTB = 20.
C        MAXIMUM OPENING ANGLE OF COLLINEAR 2-PRONGS
      COLL2 = 0.98
C        MAXIMUM NUMBER OF ITERATIONS IN VERTEX FIT
      NITER = 7
C        CONVERGENCE PARAMETER
      DSCONV = 0.1
C        MINIMUM PROBABILITY FOR GOOD VERTEX
      PRCUT = 0.001
C        REJECT BAD TRACKS DURING VERTEX FIT (0=NO, 1=YES)
      IREJTR = 1
C        EE PAIRS: MINIMUM AND MAXIMUM MEASURED PHI DIFFERENCE (RADIAN)
      EEDPMN = -0.07
      EEDPMX =  0.6
C        EE PAIRS: MAXIMUM THETA DIFFERENCE (STD.DEV.)
      EEDTMX = 3.
C        EE PAIRS: MAXIMUM DISTANCE WHERE TRACKS ARE PAPALLEL (STD.DEV.)
      EEDRMX = 3.
C        MAXIMUM TRACK EXTRAPOLATION AND INTRAPOLATION
      SEMAX = -200.
      SIMAX = 25.
C
      RETURN
      END
```

JADE COMPUTER NOTE 33

JADE NORD SOFTWARE NEWS

H.E. Mills

15 February 1980

SMALL PROGRAMS WITH VERY LARGE :PROG FILES

THE DUMP <name> command in NRL sometimes produces :PROG files which are far too large for the program. Usually these files are 59 pages long. This does not affect the program when running but it uses up the filestore, which is in short supply, and takes a very long time for the program to be dumped or loaded. The problem has been traced to programs with COMMONs which are initialised by DATA statements. The reason is as follows: - NRL places instructions from the bottom of the virtual store (usually after the loader i.e. the 6th page) upwards, and COMMONs from the top downwards. The :PROG file contains contiguous memory. If COMMONs are not used or are not initialised, they are not saved on the :PROG file and hence the file corresponds to the program size. If the COMMONs are initialised, they have to be saved hence the whole virtual store (except for the loader itself) is saved which results in an enormous :PROG file.

The solution is to lower the top COMMON address so that the wasted gap between instructions and commons is reduced to less than one page. The command UPPER-LIMIT <address> does this. The address should be on a page boundary to optimise filestore use. The value of <address> has to be determined by trying! See the following example.

```
@NRL                        (using default settings)
EN-UN
FREE: 013665-177777
LOAD EXAMPLE,FTNLIB
FREE: 026537-177633
DUMP "EXAMPLE"
EXIT                        EXAMPLE:PROG is 59 pages long !!

@NRL                        (using upper limit)
UPPER-LIMIT 027777
EN-UN
FREE: 026537-027777         common top address lowered
LOAD EXAMPLE,FTNLIB
FREE: 026537-027633
DUMP "EXAMPLE"
EXIT                        EXAMPLE:PROG is now 7 pages !!
```

If your program is subsequently increased in size so that the program and commons overlap, the address supplied to UPPER-LIMIT should be raised.

OTHER NRL INFORMATION

If you get the NRL message LOADER TABLE OVERFLOW this is due to more entries (subroutines) than it can handle. The table size can be increased by the SIZE command (see manual) and then repeat load sequence.

Since the loader resides in the first 6 pages of the virtual store, program and data space is normally limited to 59 pages. If you really need the last 6 pages the IMAGE-FILE 100 command can be used to force the loader to link the program on a file before bringing it back into memory with RUN or DUMP. Since the disc is used instead of memory, the time taken to perform a load sequence is increased.

PRINTING TEXT FILES CREATED BY A FORTRAN PROGRAM

When a FORTRAN program writes to a file using format statements, the control characters are stored in the file. If this is sent to the printer via the COPY command the control characters would appear on the output instead of being obeyed. To overcome this problem the PRINT-FILE program should be used to read the file and send it to the output device.

```
                    ****************************
                   I                            I
                  I   JADE COMPUTER NOTE NR. 34    I
                   I                            I
                    ****************************

  ********************************************************************
  *                                                                  *
  *      JADE GRAPHICS PROGRAM           VERSION FROM   3.09.1982    *
  *                                                                  *
  ********************************************************************
                                                  J.OLSSON  L.O'NEILL

              (THE CHANGED PARTS FROM LAST VERSION ARE MARKED BY A *)
                              (LAST VERSION WAS DATED 14.08.81)



   TO START A SESSION AT THE IBM TSO-GRAPHICS TERMINALS:
     (IF YOU ARE NOT ABLE TO LOGON, READ THE YELLOW TSOIPS FILE BEFORE
      CALLING FOR HELP...)
   FIRST LOGON UNDER TSO BY ENTERING:

                   LOGON IDENTIFIER SIZE(834)
                   KEYWORD

   OBS... THE SIZE PARAMETER IS NECESSARY, SINCE THE JADE GRAPHICS
          MODULE IS TOO BIG FOR THE DEFAULT TSO REGION (ABOUT 600K).
          IF YOU LEAVE THE SIZE PARAMETER OUT, YOUR SESSION WILL
          SOON ABEND WITH AN ERROR CODE 80A

   TO  ENTER THE GRAPHICS PROGRAM, NOW PROCEED WITH

                   IPS LIBRARYNAME(MODULENAME)

              EXAMPLE:    IPS 'F11LHO.GRAPHL(JADEZ)'
              OR          IPS GRAPHL(JADEZ)       IF YOU ARE F11LHO
   OBS.... THE LIBRARY F11LHO.GRAPHL IS KEPT AS STANDARD LIBRARY FOR
           GRAPHICS MODULES. IT IS FREQUENTLY UPDATED TO ACCOUNT FOR
           RECENT CHANGES AND IMPROVEMENTS.
           THE "STANDARD MODULE" HAS THE NAME  JADEZ

   AFTER PRINTING SOME GREETINGS AND OTHER GENERAL INFORMATION,
   THE GRAPHICS PROGRAM NOW REQUESTS THE NAME OF A CATALOGUED DATA SET.
   THIS HAS TO BE ENTERED WITH FULL IDENTIFIER, E.G. F22ELS.TPMH735C ;
   THE DATA SET MOREOVER HAS TO BE "ON DISK", OR IN MASS STORAGE, MSS.

*  IF THE DATA SET DOES NOT EXIST (NAME MISTYPED) OR IS NOT ACCESSIBLE
*  FOR OTHER REASONS (HMS MIGRATION NOT AVAILABLE OR MSS JAMMED) THE
*  PROGRAM GIVES AN ERROR MESSAGE. YOU CAN GIVE IN ANOTHER NAME OR END
*  THE SESSION BY THE EMERGENCY EXIT:
*
*                      CONTROL+G (PRESSED SIMULTANEOUSLY)

*  IF THE DATA SET HAS BEEN SUCCESFULLY ALLOCATED, THE PROGRAM GOES ON
*  TO ALLOCATE THE CALIBRATION FILE:          F11LHO.AUPDAT1
*  THIS CALIBRATION FILE IS DEFAULT, BUT IF YOU WANT THE LARGER FILES
*  F11LHO.BUPDAT0, BUPDAT1 (WHICH ARE NEEDED, IF YOU ARE CALIBRATING
*  THE LEAD GLASS, E.G. IN REFORM DATA), YOU CAN GET THEM ALLOCATED BY
*  PRESSING ANY CHARACTER INSTEAD OF THE BLANK RETURN, AT THE PROGRAMS
*  REQUEST.

*  IF YOU ARE HAPPY WITH THE AUPDAT1 FILE, JUST PRESS RETURN TO DISPLAY
*  THE FIRST EVENT.

*  THE PROGRAM IS BY DEFAULT STOPPING AT THE USER LEVELS 2 AND 6. THESE
*  DEFAULT VALUES CAN BE CHANGED AT ANY TIME BY THE COMMAND "CSTL" (SEE
*  BELOW).    FURTHERMORE, THE PROGRAM BY DEFAULT SHOWS THE "RB" VIEW,
*  INNER DETECTOR + LEAD GLASS, SEE BELOW. THIS CAN ALSO BE CHANGED AT
*  ANY TIME, BY DISPLAYING OTHER VIEWS AND "FREEZING" THEM TO STANDARD
*  VIEWS BY THE COMMAND "CSTV 1".
```



```
*     COMMENT ON USER LEVELS:
*     -----------------------
*     THE USER LEVELS CORRESPOND TO DIFFERENT ANALYSIS LEVELS IN THE
*     SUPERVISOR PROGRAM. THUS THE SCANNER CAN LOOK AT ANALYSIS RESULTS
*     OF A PARTICULAR PROGRAM BY STOPPING AT A CORRESPONDING LEVEL (OR
*     FURTHER DOWN); E.G. PATTERN RECOGNITION RESULTS CAN BE INSPECTED
*     AT LEVEL 5 ONWARDS. DATA WHICH HAVE ALREADY BEEN THROUGH THE FIRST
*     REDUCTION STEP (REDUC1) HAVE ALL ANALYSIS DONE UP TO AND INCLUDING
*     PATTERN RECOGNITION. IN THIS CASE STOPPING AT LEVEL 2 IS ENOUGH;
*     LEVEL 6 IF CLUSTER ANALYSIS OF THE LEAD GLASS DATA IS WANTED.

      THE USER LEVELS ARE:

              1   CALLED AT THE BEGINNING OF EACH NEW RUN.
*                 (THIS IS NOT A MEANINGFUL LEVEL FOR GRAPHICS).
              2   CALLED IMMEDIATELY AFTER EVENT IS READ INTO /BCS/.
              3   LEAD GLASS ENERGIES HAVE BEEN COMPUTED, CALIBRATION;
*                 (I.E. RAW PULSE HEIGHTS CONVERTED INTO ENERGY).
              4   FAST Z VERTEX RECONSTRUCTION HAS BEEN DONE.
              5   INNER DETECTOR PATTERN RECOGNITION HAS BEEN RUN.
              6   ENERGY CLUSTERS IN THE LEAD GLASS HAVE BEEN FOUND.
*                 (NECESSARY FOR PHOTON DISPLAY)
              7   UNUSED.
              8   MUON CHAMBER TRACKING HAS BEEN DONE.
*             9   ALREADY EXISTING MUON RESULTS ARE OVERWRITTEN BY A
*                 NEW CALL TO THE MUON ANALYSIS PROGRAM.
             10   UNUSED.

*   DEFAULT LEVELS ARE 2 AND 6, I.E. THE EVENTS ARE FIRST DISPLAYED AT
*   LEVEL 2. TO PROCEED TO LEVEL 6, USE THE COMMAND "C". TO GET TO THE
*   NEXT EVENT, AGAIN AT LEVEL 2, USE THE COMMAND "N".

*  IN EARLIER VERSIONS OF THE GRAPHICS PROGRAM, AN OUTPUT DATA FILE FOR
*  WRITING SELECTED OR EDITED EVENTS HAD TO BE ALLOCATED AT THE START OF
*  THE SESSION. IT WILL NOW BE ALLOCATED AT THE FIRST COMMAND "WRIT".
*  SIMILARLY, A BACKUP DATA SET IN EDITING WILL ONLY BE REQUESTED AT THE
*  FIRST "SAVE" ATTEMPT.

      THE FIRST EVENT ON THE FILE WILL NOW APPEAR ON THE SCREEN AND ALL
      COMMANDS LISTED BELOW ARE AVAILABLE TO THE SCANNER.

      EXPLANATION OF THE VARIOUS COMMANDS
      -----------------------------------

      MENU:   DISPLAYS LIST OF AVAILABLE COMMANDS WITH SHORT EXPLANATIONS.

      HELP:   DISPLAYS MORE DETAILED INFORMATION ON ANY COMMAND WHICH IS
              GIVEN IN UPON PROMPTING.
*             THIS COMMAND IS HIGHLY RUDIMENTARY; PRESENTLY HELP IS ONLY
*             AVAILABLE FOR THE MUPT AND AX COMMANDS.

      NEWS:   DISPLAYS NEWS OF RECENT CHANGES TO THE GRAPHICS.

------------ THE STANDARD VIEWS:

       RA:   DISPLAY EVENT IN R-PHI VIEW. ONLY INNER DETECTOR.

       RB:   DISPLAY EVENT IN R-PHI VIEW. INNER DETECTOR AND LEAD GLASS.

       RC:   DISPLAY EVENT IN R-PHI VIEW. INNER DETECTOR, LEAD GLASS AND
                                          MUON FILTER.

      ZXA:   DISPLAY EVENT IN Z-X VIEW. ONLY INNER DETECTOR.

      ZXB:   DISPLAY EVENT IN Z-X VIEW. INNER DETECTOR AND LEAD GLASS.

      ZXC:   DISPLAY EVENT IN Z-X VIEW. INNER DETECTOR, LEAD GLASS AND
                                        MUON FILTER.

      ZXD:   DISPLAY EVENT IN Z-X VIEW. INNER DETECTOR, LEAD GLASS, MUON
```

```
                                        FILTER AND FORWARD DETECTOR.

     ZYA:   DISPLAY EVENT IN Z-Y VIEW. ONLY INNER DETECTOR.

     ZYB:   DISPLAY EVENT IN Z-Y VIEW. INNER DETECTOR AND LEAD GLASS.

     ZYC:   DISPLAY EVENT IN Z-Y VIEW. INNER DETECTOR, LEAD GLASS AND
                                        MUON FILTER.

     ZYD:   DISPLAY EVENT IN Z-Y VIEW. INNER DETECTOR, LEAD GLASS, MUON
                                        FILTER AND FORWARD DETECTOR.

  OBS... THE ZX AND ZY VIEWS SHOW AS DEFAULT A ROTATED PROJECTION OF
         CHAMBER HITS. THIS IS TO SHOW CORRELATION WITH THE LEAD GLASS
         ENERGIES, WHICH ARE ALWAYS SHOWN IN THIS FASHION. THE TRUE
         PROJECTIONS OF CHAMBER HITS CAN BE OBTAINED IF DISPLAY DETAIL 900018400
         IS FLIPPED,  COMMAND "CDTL 9".
         THE ACTUAL MODE, PROJECT MODE OR ROTATE MODE, IS WRITTEN AT THE
         TOP OF THE PICTURE.

* OBS... IN THE ZX AND ZY VIEWS INNER DETECTOR HITS ARE SHOWN WITH
*       MIRRORS ONLY IN THE TRUE PROJECTIONS. IN THE ROTATED VIEWS ONLY
*       THE POSITION OF THE CORRESPONDING WIRE POSITION, I.E. THE MEAN
*       OF THE RIGHT AND LEFT HIT POSITION, IS SHOWN. THIS IS TO AVOID
*       CONFUSION IN THE ROTATED VIEWS.

      FW:   DISPLAY OVERALL VIEW OF THE FORWARD DETECTOR.
            LEAD GLASS BLOCK ENERGIES ARE DISPLAYED WITH THE SAME CODE
            AS IN THE FOLLOWING VIEW, RU.

      RU:   DISPLAY EVENT IN A ROLLED OUT VIEW OF ALL LEAD GLASS BLOCKS,
            INCLUDING ENDCAPS AND FORWARD DETECTOR. THE PULSE HEIGHTS
            ARE DISPLAYED WITH A NUMBER AND LETTER CODE AS FOLLOWS:
                 0:  LESS THAN 10 MEV
                 1:  BETWEEN 10 AND 20 MEV
                  .........
                 A:  BETWEEN 100 AND 200 MEV
                  .........
                 J:  BETWEEN 1000 AND 2000 MEV
                  .........
                 S:  BETWEEN 10000 AND 20000 MEV

            THE CODE IS AVAILABLE AT THE SCREEN VIA COMMAND "BL 6"
            IN MAGNIFIED VIEWS, THE PULSE HEIGHTS ARE WRITTEN OUT IN MEV

**    EC:   DISPLAYS LEADGLASS ENDCAP PULSE HEIGHTS ONTO RFI VIEWS. THE
**          CORRESPONDING HARDWARE DISPLAY IS DET 1.

**    FC:   DISPLAYS TAGGING COUNTER PULSE HEIGHTS ONTO RFI VIEWS. THE
**          CORRESPONDING HARDWARE DISPLAY IS DET 2.

     CYL:   DISPLAYS EVENT IN A PERSPECTIVE VIEW, INCLUDING INNER DETEC-
            TOR HITS AND LEAD GLASS HITS IN THE MAIN CYLINDER.

    FWMU:   DISPLAYS FORWARD MUON COUNTERS ONLY

---------- END OF STANDARD VIEWS

     STVW:  DISPLAYS EVENT IN THE STANDARD VIEW.
            THIS COMMAND IS USEFUL, IF A MAGNIFIED VIEW HAS BEEN CHOSEN
            AS STANDARD VIEW. THIS IS POSSIBLE BY THE COMMAND CSTV 1.

      DET:  DRAWS THE DETECTOR ONTO THE CURRENT EVENT DISPLAY.
**          THE OPTIONS DET 1, DET 2, DET 3 WILL DRAW THE HARDWARE OF
**          LEAD GLASS ENDCAPS AND FORWARD TAGGING ONTO RFI VIEWS.

      PRO:  DRAWS PROJECTIONS OF Z-X AND Z-Y VIEWS IN SMALLER SCALE ONTO
            R-FI VIEWS. AVAILABLE IN VIEWS RA,RB,RC AND CYL.
            IF DISPLAY DETAIL FLAG 17 IS .TRUE. PROJECTIONS APPEAR AUTO-
            MATICALLY. THIS IS OBTAINED WITH COMMAND 'CDTL 17'
            IF THE COMMAND IS GIVEN IN A MAGNIFIED R-FI VIEW, ONLY THOSE
```



```
            HITS WHICH HAVE THEIR R-FI COORDINATES INSIDE THE MAGNIFIED
            VIEW, APPEAR IN THE PROJECTIONS.
            THESE VIEWS ARE TRUE PROJECTIONS, NOT R - Z VIEWS.
            SWITCHING CDTL 9 WILL CAUSE THE R-Z MODE TO APPEAR IN THE
            PROJECTIONS.

       BW:  WRITES THE CONTENTS OF A SPECIFIED BANK ONTO THE SCREEN.
            THE BANK NAME IS PROMPTED FOR.
            EACH PAGE CAN BE SUBMITTED FOR HARDCOPY.
            THE STANDARD PRINT FORMAT IS INT*2 ; HOWEVER, MANY BANKS
            ARE NOW PRINTED WITH TAILOR MADE FORMATS
            IF SEVERAL BANKS WITH THE SAME NAME EXIST, THE SCANNER IS
            PROMPTED TO GIVE THE BOS BANK NUMBER.
            IF A BANK DISPLAY EXTENDS OVER SEVERAL PAGES, THE SCANNER
            IS GIVEN THE POSSIBILITY TO STOP AFTER EACH PAGE.
            IF A NEGATIVE TRAILING NUMBER, E.G. "BW -1" IS ENTERED, A
            LIST OF ALL BANKS IN THE EVENT IS DISPLAYED.

*   STOP,END,EXIT:
            THIS IS THE NORMAL WAY TO END A SESSION.
            THE "PANIC BUTTON" TO ABORT A SESSION:   CONTROL+G

       C:   CONTINUE. THE ANALYSIS PROGRAM CONTINUES TO THE NEXT LEVEL
            FLAG SET BY THE SCANNER. IF ONLY ONE FLAG WAS SET, THE NEXT
            EVENT IS READ.
            IF AN OUTPUT FILE HAS BEEN ALLOCATED, THIS COMMAND LEADS TO
            A WRITING OUT OF THE EVENT, WHEN GOING TO THE NEXT ONE.

     JUMP:  A USER LEVEL INDEX IS REQUESTED. THE ANALYSIS PROGRAM THEN
            PROCEEDS TO THE SPECIFIED LEVEL.
            THE LEVEL CAN BE ENTERED AS A TRAILING NUMBER, E.G. JUMP 6

       N:   READ NEXT EVENT. A TRAILING NUMBER CAN BE ENTERED TO SKIP
            SEVERAL EVENTS. EXAMPLE: IF THE PRESENT EVENT IS 16, THE
            COMMAND N 3 CAUSES THE READING OF EVENT 19, N -3 EVENT 13.

     JOYS:  THE JOYSTICK IS ACTIVATED, VISIBLE AS A HAIR CROSS ON SCREEN
            THE JOYSTICK INPUT IS GIVEN BY:       CONTROL + E
            THE COMMAND IS USED TO ENLARGE A PARTICULAR AREA OF THE PIC-
            TURE. TWO MODES ARE AVAILABLE:
            JOYS WITH A TRAILING NUMBER: ONE JOYSTICK INPUT; POSITION
                 WILL BE CENTER OF MAGNIFIED VIEW, TRAILING NUMBER GIVES
                 THE DEGREE OF MAGNIFICATION.
            JOYS WITHOUT TRAILING NUMBER: TWO JOYSTICK INPUTS SPECIFY
                 OPPOSITE CORNERS OF NEW VIEW; THIS AUTOMATICALLY GIVES
                 THE MAGNIFICATION.

       RS:  RESETTING THE SCALE, IF CHANGED BY COMMAND JOYS.

        H:  HARDCOPY OF THE PRESENT VIEW IS GENERATED ON GOULD PLOTTER
            AFTER SOME WAITING TIME A MESSAGE APPEAR: DATA SUBMITTED TO
            PLOTTER QUEUE.
            A TRAILING NUMBER (E.G. H 3) GENERATES SEVERAL IDENTICAL
            HARDCOPIES. MAXIMUM IS 4, HOWEVER.
*       HX:  SAME AS HARDCOPY COMMAND "H", BUT THE PICTURE APPEARS ON THE
*            EXTERNAL PLOTTER. SHOULD ONLY BE USED FOR URGENT PICTURES.

            IF SEVERAL COMMANDS HAVE BEEN GIVEN, LIKE COM,RES,PRO,ETC..
            AND THE END OF PAGE IS REACHED, ONE CAN CONTINUE ON NEXT
            PAGE; THE HARDCOPY WILL STILL HAVE ALL THE DRAWN INFORMA-
            TION. THE PICTURE IS CLOSED BY HARDCOPY REQUEST, OR BY THE
            SOFTWARE "CALL ERASE", E.G. WHEN GIVING ONE OF THE STANDARD
            VIEW COMMANDS.

*   WRIT:   WRITE THE CURRENT EVENT AND READ NEXT EVENT. AT THE FIRST
*           CALL TO THIS COMMAND, THE OUTPUT DATA SET WILL BE ALLOCATED
*           AND THE PROGRAM ASKS FOR THE NAME, IN THE SAME WAY AS FOR
*           THE INPUT DATA SET. THE OUTPUT DATA SET MUST BE A CATALOGED
*           DATA SET. IT MAY BE EMPTY, HOWEVER.
*           THE WRITE MODE IS "BOS S", I.E. ONE EVENT/RECORD. IT CANNOT
*           BE CHANGED. THE LENGTHY SAFETY CHECKS IN EARLIER VERSIONS OF
```

```
*           THE GRAPHICS PROGRAM HAVE NOW BEEN SKIPPED, SINCE /BCS/ HAS
*           BEEN MADE LARGER AND THE RISK TO LOOSE EVENTS SHOULD BE GONE

     COM:   GIVES THE SCANNER POSSIBILITY TO ADD HIS OWN COMMENTS TO THE
            PICTURE, IN ANY PLACE. THE COMMENTS APPEAR ON THE HARDCOPY.
            POSITION (BY JOYSTICK) AND COMMENT IS PROMPTED FOR.

    BDLS:   DELETE A BANK. THE NAME IS PROMPTED FOR AS WELL AS THE BOS
            BANK NUMBER IF MORE THAN ONE BANK WITH THE SAME NAME EXIST.
            IF THE BANK 'JETC' IS DELETED, A RENUMBERING OF THE RAW
            DATA BANK 'JETC' IS DONE, SO THAT PASSING LEVEL 4 WILL LEAD
            TO A PROPER RECALIBRATION. FOR THIS TO BE USEFUL, ONE SHOULD
            OF COURSE GIVE THE COMMAND AT LEVEL 2 OR 3

    CSTL:   COMMAND TO CHANGE THE USER-LEVEL FLAGS IN ANALYSIS PROGRAM.

    CSTV:   COMMAND TO CHANGE OPTIONS IN THE STANDARD VIEW.THE FOLLOWING
            CHANGES ARE AVAILABLE:
                        1 FREEZE STANDARD VIEW.
                          THE CURRENT VIEW WILL APPEAR AS STANDARD VIEW
                          IN THE NEXT EVENT, OR AT NEXT LEVEL ENTERED.
                        2 TURN ON/OFF AUTOMATIC DISPLAY OF NEW EVENT.
                        3 TURN ON/OFF DETECTOR WITH STANDARD VIEW.

            CSTV CAN BE ENTERED WITH A TRAILING NUMBER.

    CDTL:   COMMAND TO CHANGE DETAILS IN THE VARIOUS DISPLAY VIEWS. THE
            FOLLOWING CHANGES ARE AVAILABLE:
                  1 TURN ON/OFF DISPLAY OF INNER DETECTOR.
                  2 TURN ON/OFF DISPLAY OF LEAD GLASS.
                  3 TURN ON/OFF DISPLAY OF MUON FILTER.
                  4 TURN ON/OFF DISPLAY OF CHAMBER WALLS.
                  5 TURN ON/OFF DISPLAY OF CHAMBER WIRES.
                  6 TURN ON/OFF CROSSES FOR INNER DET. HITS.
                  7 TURN ON/OFF HISTOGRAMS OF LEAD GLASS ENERGY.
*                 8 TURN ON/OFF MUON HIT SYMBOLS.
                  9 TURN ON/OFF Z-RADIUS DISPLAY OF TRACKS.
                 10 TURN ON/OFF MIRROR HITS IN Z-RADIUS MODE.
                 11 TURN ON/OFF T2 TRIGGER DISPLAY.
                 12 TURN ON/OFF TRACK NUMBERS IN RESULT DISPLAY OF ID.
                 13 TURN ON/OFF TRACK BANK WRITING IN RESULT DISPLAYS.
                 14 TURN ON/OFF SINGLE TRACK DISPLAY IN COMMAND RES.
                 15 TURN ON/OFF DASH LINE DRAWING OF LEAD GLASS
                                AVAILABLE IN VIEWS CYL AND RU
                 16 TURN ON/OFF RESULT (TRACK FIT) DISPLAY.
                 17 TURN ON/OFF Z-X AND Z-Y PROJECTIONS.
                 18 TURN ON/OFF T3 TRIGGER DISPLAY
                 19 TURN ON/OFF FITTED TRACK DISPLAY FROM CLOSEST
                                APPROACH TO ORIGIN.
                 20 TURN ON/OFF HIT DISPLAY IN PROJECTIONS.
                 21 TURN ON/OFF HIT DISPLAY IN INNER DETECTOR
                 22 TURN ON/OFF MU-HIT NUMBER DISPLAY
                 23 TURN ON/OFF PROJECTION OF FITTED TRACKS TO LEAD
                                GLASS LIMIT.
                 24 TURN ON/OFF MU DISPLAY OF "OUT OF PLANE" HITS
                 25 TURN ON/OFF OVERLAP OF SCINTILLATORS IN FORWARD
                                DETECTOR DISPLAY  (COMMAND FW)
                 26 TURN ON/OFF SUPPRESSION OF ODD LAYER HITS IN JETC.
    (THIS IS USEFUL TO SPEED UP THE DISPLAY, AT SLOW RESPONSE TIME)
                 27 TURN ON/OFF DISPLAY OF MAIN VERTEX
                 28 TURN ON/OFF DISPLAY OF PHOTONS TOGETHER WITH
                                CHARGED TRACKS (COMM. RES,TR,VRES)
                 29 TURN ON/OFF DISPLAY OF PHOTONS WITHOUT CHARGED
                                TRACKS (COMMAND RES,TR,VRES)
                 30 TURN ON/OFF DISPLAY OF FORWARD MUON CNTR TOF VALUES
                 31 TURN ON/OFF DISPLAY OF TRACK NR IN TR DISPLAY
                 32 TURN ON/OFF DISPLAY OF TRACK NR IN VRES DISPLAY
                 33 TURN ON/OFF DISPLAY OF TOF NUMBERS, COUNTER NUMBERS
                 34 TURN ON/OFF DISPLAY OF SPINNING 1-BLOCK PHOTONS
                 35 TURN ON/OFF DISPLAY OF PHOTONS BELOW 200 MEV
*                36 TURN ON/OFF DISPLAY OF MUON MIRROR HITS, IN CASE
```



```
*                                AMBIGUITIES HAVE BEEN RESOLVED.
*                37 TURN ON/OFF DISPLAY ONLY OF MUON HITS BELONGING TO
*                                GOOD MUONS.
*                38 TURN ON/OFF DISPLAY OF TRACK NUMBERS IN COMMAND MUPT
*                39 TURN ON/OFF DISPLAY OF MUON CHAMBER NUMBERS AND RAW
*                                MUON HIT NUMBERS.

            CDTL CAN BE ENTERED WITH A TRAILING NUMBER.

*           DEFAULT VALUES: GENERALLY THESE FLAGS ARE OFF. THE FOLLOWING
*                   ARE ON, HOWEVER:  1,2,3,5,6,9,14,28 AND 38.


     CPAR:  COMMAND TO CHANGE PARAMETERS IN MONTE CARLO EVENTS.

     TRUE:  DISPLAYS THE "TRUE" TRACKS IN A MONTE CARLO EVENT. THE
            FOLLOWING TRAILING NUMBER OPTIONS ARE AVAILABLE:
                        0 ONLY CHARGED TRACKS ARE DISPLAYED.
                        1 ONLY PHOTONS ARE DISPLAYED.
                        2 BOTH CHARGED TRACKS AND PHOTONS ARE DISPLAYED.
                        3 THE PARTICLE CHARGES, ORIGIN COORDINATES AND
                          MOMENTUM VECTORS ARE WRITTEN TO THE SCREEN.
                          A HARD COPY CAN THEN BE MADE.
            THIS COMMAND IS UNFORTUNATELY ONLY WORKING IN MC EVENTS.

     CLUS:  DISPLAY THE RESULTS OF THE LEAD GLASS CLUSTER ROUTINES.
             THE COMMAND CAN BE GIVEN WITH THE FOLLOWING TRAILING
             NUMBERS:
                    NONE OR 0: DISPLAY CLUSTER STRUCTURE IN BARREL AND
                                 END CAPS.
                            1: DISPLAY CLUSTER STRUCTURE AND GAMMA
                                 DIRECTIONS DERIVED BY CLUSTER ANALYSIS
                                 ROUTINES.
                            2: WRITE TO SCREEN THE NUMERICAL RESULTS
                                 OF CLUSTER ANALYSIS.
                            3: EXECUTE CLUSTER ANALYSIS, E.G. IF THE
                                 SUPERVISOR HAS NOT YET CALLED IT. IF
                                 THE CLUSTER ANALYSIS BANK DOES EXIST
                                 IT IS DELETED AND REPLACED. NOTHING IS
                                 DISPLAYED FOLLOWING THIS COMMAND.

       ZV:  DISPLAY THE RESULTS OF THE Z-VERTEX ROUTINE.
                  A SMALL COMMAND (BY NUMBERS) MENU IS AVAILABLE

     MUPT:  DISPLAY THE RESULT OF PATTERN RECOGNITION IN THE MUON FILTER
             THE COMMAND CAN BE GIVEN WITH THE FOLLOWING TRAILING
             NUMBERS:
                    NONE OR 0: DISPLAY THE FITTED TRACKS FOUND BY MUON
                                 PATTERN RECOGNITION.
                           -N: REANALYSIS OF MUON PATTERN RECOGNITION
                                 AND DISPLAY OF ALL TRACKS.
                            N: DISPLAY OF TRACK NR N ONLY.
*                               1 < N < 100
*                         100: DRAW ONLY GOOD MUON TRACKS
*                              QUALITY BETWEEN 1 AND 99
*                         200: DRAW ALL MUONS WITH QUALITY 100 OR LARGER
*                              TRACKS ARE PROBABLY PENETRATING HADRONS
*                         300: DRAW ALL MUONS WITH QUALITY 0 AND WITH AN
*                              ASSOCIATED HIT OUTSIDE OF YOKE.
*                        1000: DRAW ONLY GOOD MUON TRACKS,AS IN MUPT 10000042700
*                              A MOMENTUM CUT AT 1.4 GEV IS PERFORMED.

*           MORE DETAILS IN JADE COMPUTER NOTES 22 AND 52.

      RES:  DISPLAY ANALYSIS RESULTS. PRESENTLY AVAILABLE FOR PATREC
            AND LEAD GLASS CLUSTER ANALYSIS RESULTS. THE BANK BOS NUMBER
            (FOR BANK PATR) CAN BE ENTERED AS A TRAILING NUMBER.
            IF NOT GIVEN, THE LOWEST BANK NUMBER IS LOOKED FOR.
              IF DISPLAY DETAIL 14 IS SET, SINGLE TRACK DISPLAY IS
                 AVAILABLE. THE WANTED TRACK IS SPECIFIED BY A TRAILING
                 NUMBER.
```

IF DISPLAY DETAIL 17 IS SET, THE FITTED TRACKS ALSO APPEAR IN THE PROJECTIONS.
IF DISPLAY DETAIL 28 OR 29 IS SET, PHOTONS ARE DISPLAYED AS HATCHED LINES. THE NUMBERS CORRESPOND TO THE TRUE PHOTON NUMBER, I.E. PHOTON NR 3 IS THE THIRD LEAD GLASS CLUSTER THAT IS NOT ASSOCIATED WITH A CHARGED TRACK. A LIST OF CLUSTER INFORMATION IS ALSO PRINTED, WITH INFORMATION ON THE PHOTON NUMBER OR ASSOCIATED CHARGED TRACK NUMBER. SEE ALSO CDTL 34,35.

IN THE VIEW RU (ROLLED OUT LEAD GLASS VIEW), THE IMPACT POINTS OF THE CHARGED TRACKS ARE DISPLAYED TOGETHER WITH THE NEUTRAL CLUSTERS. A LIST OF CLUSTER INFORMATION IS PROVIDED.

TR: COMMAND TO DISPLAY PATTERN RECOGNITION RESULTS AS STORED IN THE HIT LABEL ARRAY 'JHTL'.
THE BOS BANK NUMBER CAN BE ENTERED AS A TRAILING NUMBER. IF NO NUMBER IS ENTERED, THE LOWEST IS TAKEN.
THE SCANNER IS ASKED TO ENTER ONE OF THE FOLLOWING OPTIONS:
CODE 0 : CODE LIST
CODE 1 : DISPLAY ALL HITS ASSOCIATED WITH TRACKS
CODE 2 : DISPLAY ALL HITS NOT ASSOCIATED WITH TRACKS
CODE 3 : DISPLAY ALL HITS ASSOCIATED WITH TRACKS, MARKING SELECTED ONES
CODE 4 : DISPLAY ALL HITS,MARKING TRACK-ASSOCIATED ONES
CODE 5 : DISPLAY RAW EVENT, MARKING SELECTED TRACKS.

IF A TRAILING NR 1 TO 5 IS ENTERED, IT IS INTERPRETED AS THE CORRESPONDING VIEW OPTION, WITH THE LOWEST NUMBER JHTL AND PATR BANKS.
THIS COMMAND ENABLES THE SCANNER TO DISPLAY ID HITS WITH SUPRESSION OF MIRROR HITS.

MASS: COMMAND TO COMPUTE INVARIANT MASS OF A GIVEN SYSTEM OF PARTICLES. PARTICLE NUMBERS AND TYPES ARE PROMPTED FOR. THE COMMAND CAN BE USED FOR CHARGED TRACKS AS WELL AS FOR GAMMAS AND TRACK ASSOCIATED CLUSTERS. IF MORE THAN ONE CHARGED TRACK IS ENTERED, A VERTEX FIT IS PERFORMED, AND 4-VECTORS ARE TAKEN WITH RESPECT TO THE FOUND VERTEX. A LIST OF THE VARIOUS RESULTS IS WRITTEN ON THE SCREEN.

TRG2: COMMAND TO DISPLAY TRIGGER 2 INFORMATION ONTO THE INNER DETECTOR.

* TRLG: COMMAND TO DISPLAY VARIOUS LEAD GLASS TRIGGERS IN 1982 AND
* LATER DATA.

VX: DISPLAY THE RESULT OF THE VERTEX PROGRAM. SEVERAL OPTIONS ARE AVAILABLE, TO BE ENTERED AS TRAILING NUMBERS:
0 : MAIN VERTEX IS DISPLAYED AS A CROSS
1 : ALL VERTICES ARE DISPLAYED AS CROSSES, WITH THE NUMBERS WRITTEN CLOSE BY. A LIST OF VERTEX INFORMATION IS ALSO WRITTEN OUT AND APPEARS ON THE HARDCOPY.
2 : ALL E+E- (PHOTON CONVERSION) VERTICES ARE DISPLAYED.
3 : CREATE THE BANK 'GVTX' WITH THE RESULTS FROM THE VERTEX PROGRAM.
4 : SHOW THE RUN VERTEX POSITION IN RFI VIEWS.
SEE ALSO UNDER COMMAND CDTL FOR AUTOMATIC VERTEX DISPLAY.
FOR MORE INFORMATION, SEE JADE COMPUTER NOTE 32.

DEDX: DISPLAY THE RESULT OF THE DEDX PROGRAM. SEVERAL OPTIONS ARE AVAILABLE, TO BE ENTERED AS TRAILING NUMBERS:
0 : DEDX RESULTS FOR ALL CHARGED TRACKS ARE WRITTEN ON THE SCREEN (NOT ON HARDCOPY).
ITR : DEDX RESULT FOR TRACK ITR IS WRITTEN ON THE SCREEN (NOT ON THE HARDCOPY)
-1 : THE BANK 'DEDX' IS CREATED WITH DEDX RESULTS AND CAN BE INSPECTED WITH THE COMMAND BW. AT PRESENT, THE CONTENT OF BANK 'DEDX' CORRESPONDS EXACTLY TO THE CONTENT OF BANK 'TPTR'
-2 : A GRAPH DEDX VS MOMENTUM IS DRAWN, WITH ENTRIES FOR EACH TRACK. THE THEORETICAL CURVES USED IN ASSIGNING CHISQUARES FOR PARTICLE IDENTIFICATION ARE ALSO DRAWN.
* -4 : SAME GRAPH AS IN OPTION -2, BUT DRAWN IN THE
* LOWER LEFT CORNER OF THE CURRENT VIEW.

TOF: DISPLAY THE RESULT OF THE TOF PROGRAM. SEVERAL OPTIONS ARE AVAILABLE, TO BE ENTERED AS TRAILING NUMBERS:
0 : TOF RESULTS FOR ALL CHARGED TRACKS ARE WRITTEN ON THE SCREEN (NOT ON HARDCOPY).
ITR : TOF RESULTS FOR TRACK ITR IS WRITTEN ON THE SCREEN (NOT ON THE HARDCOPY)
-1 : THE BANK 'TOFR' IS CREATED AND CAN BE INSPECTED WITH THE COMMAND BW. THE FORMAT IS DESCRIBED IN JADE COMPUTER NOTE 20.
-2 : A GRAPH BETA VS MOMENTUM IS DRAWN, WITH ENTRIES FOR EACH TRACK. THE THEORETICAL CURVES USED IN ASSIGNING CHISQUARES FOR PARTICLE IDENTIFICATION ARE ALSO DRAWN.
* -3 : TOF INFORMATION FROM THE LEAD GLASS. ONLY
* AVAILABLE IN 1982 AND LATER DATA.
* -4 : SAME GRAPH AS IN OPTION -2, BUT DRAWN IN THE
* LOWER RIGHT CORNER OF THE CURRENT VIEW.

QP: THE Q-PLOT ANALYSIS PROGRAM OF KOBAYASHI IS CALLED UP.
SEVERAL DISPLAY OPTIONS EXIST, AS TRAILING NUMBERS:
1 : 3-VECTORS OF CHARGED TRACKS AND PHOTONS ARE DISPLAYED IN TWO DIFFERENT PLANES OF THE MOMENTUM ELLIPSOID. LEAD GLASS ENERGIES ARE SHOWN IN HISTOGRAM FASHION.
2 : 3-VECTORS OF CHARGED TRACKS AND PHOTONS ARE DISPLAYED IN THREE DIFFERENT PLANES OF THE MOMENTUM ELLIPSOID.
3 : THE TRIANGULAR Q-PLOT IS DRAWN, WITH THE POSITION OF THE EVENT MARKED. THIS Q-PLOT IS ALSO DRAWN IN OPTIONS 1 AND 2 ABOVE.

BL: THIS COMMAND CONTAINS SOME OPTIONS USEFUL IN LEAD GLASS ANALYSIS. THE CURRENT VIEW MUST BE 'RU OR FW'.
THE OPTIONS (CAN BE ENTERED AS TRAILING NUMBERS) ARE:
1 : DISPLAY LIST OF OPTIONS
2 : WRITE BLOCK NUMBERS FOR ALL BLOCKS THAT CONTAIN ENERGY. MAGNIFICATION IS NEEDED.
3 : SHOW ALL BLOCKS THAT WERE KILLED IN THE 'BAD LEADGLASS ANALYSIS', I.E. BLOCKS PRESENT IN BANK 'ALGL' BUT NOT IN BANK 'ALGN'.THE CORRESPONDING BLOCKS ARE MARKED WITH A CROSS.
4 : SHOW WHICH OF CURRENTLY HIT BLOCKS ARE KNOWN AS 'SPINNERS'.MARKING IS DONE BY A HEAVY BOX.
5 : SHOW CURRENT DEAD BLOCKS, I.E. BLOCKS WHICH WERE SWITCHED OFF IN THIS PERIOD.THE MARKING IS HERE DONE WITH A HEAVY CIRCLE.
6 : WRITE OUT THE CODE INFORMATION FOR DISPLAY OF PULSEHEIGHTS IN NON-MAGNIFIED VIEWS.
7 : PRINT CLUSTER NUMBERS FOR KNOWN SPINNING BLOCKS. AVAILABLE IN ALL VIEWS.

VRES: THIS COMMAND IS A VARIANT OF THE RES COMMAND. IT USES INFORMATION FROM THE VERTEX PROGRAM (COMMAND VX) AND DISPLAYS CHARGED TRACKS FROM THE CORRESPONDING VERTEX. PHOTONS ARE TAKEN TO COME FROM THE MAIN VERTEX. THE OPTIONS, ENTERED AS TRAILING NUMBERS, ARE:
0 : DISPLAY ALL TRACKS FROM THEIR VERTICES.
-N : DISPLAY ALL TRACKS FROM VERTEX NR N ONLY.
N : DISPLAY TRACK NR N ONLY. THIS IS ACTIVE ONLY IF CDTL 14 HAS BEEN ACTIVATED.

FIND: THIS COMMAND ENABLES THE SCANNER TO FIND A PARTICULAR EVENT. IF NOT ENTERED AS TRAILING NUMBERS (FIND NRUN NEVENT), THE

```
          RUN AND EVENT NUMBERS ARE PROMPTED FOR. THE PROGRAM PROCEEDS
          TO SEARCH FOR THE DESIRED EVENT AND DISPLAYS IT EVENTUALLY.

    SPVA:  USER DEVOTED COMMAND. THIS COMMAND CAUSES A CALL TO SUB-
           ROUTINE SPARE, WHICH CAN BE SUPPLIED BY THE USER IN A
           PRIVATE GRAPHICS MODULE. IN THE STANDARD MODULE THIS IS A
           DUMMY COMMAND. MORE ABOUT PRIVATE MODULES IN THE GENERAL
           COMMENTS BELOW.

---------- EDITING COMMANDS -----

    EDIT:  COMMAND TO EDIT RESULTS OF PATTERN RECOGNITION IN INNER
           DETECTOR.
           THIS COMMAND ENTERS THE SCANNER INTO A DISPLAY ROUTINE WITH
           A NUMBER OF SUBCOMMANDS. THESE AND EDITING IN GENERAL ARE
           DESCRIBED IN A SEPARATE NOTE (JADE COMPUTER NOTE 28)

     RET:  THIS COMMAND (RETURN) IS TO BE USED IF THE SCANNER CALLS THE
           GRAPHICS DISPLAY PROGRAM FROM THE EDITING PROGRAM (SEE THE
           DESCRIPTION OF EDITING IN JADE COMPUTER NOTE NR 28). THE
           COMMAND HAS NO EFFECT "OUTSIDE EDITING".

    SAVE:  COMMAND TO WRITE THE CONTENT OF COMMON /CWORK/ OUT TO A
           SCRATCH FILE, TOGETHER WITH HEAD BANK INFORMATION. THIS
           COMMAND IS HEAVILY USED IN EDITING. A CATALOGUED SCRATCH
           FILE MUST HAVE BEEN ALLOCATED AT SESSION BEGIN, OF COURSE.

-------- END EDITING COMMANDS ---

     LIM:  COMMAND TO CHANGE COMMON /CPATLM/, WHICH HOLDS ALL LIMITS
           THAT ARE USED IN PATREC ROUTINES.
           THE COMMON /CJDRCH/ CAN ALSO BE CHANGED BY THIS COMMAND
           THE TWO OPTIONS ARE PROMPTED FOR OR CAN BE OBTAINED AUTOMA-
           TICALLY BY A TRAILING NUMBER:
                        1 :    /CPATLM/
                        2 :    /CJDRCH/
           THIS COMMAND CAN OF COURSE ALSO BE USED FOR RESETTING TO
           DEFAULT VALUES OR SIMPLY TO INSPECT CURRENT VALUES.

*    DRAW:  COMMAND TO DRAW THE POSITION OF A POINT, LINE, CIRCLE ETC.
*           USEFUL IN DETAILED STUDIES OF EVENTS, COMPARISON WITH BATCH
*           PRINT OUT, ETC. THE OPTIONS AVAILABLE ARE:
*                       1 :    OPTION LIST
*                       2 :    DRAW POINT X,Y ON SCREEN
*                       3 :    DRAW CIRCLE WITH RADIUS RAD, CENTER X,Y
*                       4 :    DRAW LINE BETWEEN X1,Y1 AND X2,Y2
*           THE POINTS AND RADII ARE PROMPTED. THE OPTION CAN BE ENTERED
*           AS A TRAILING NUMBER IN THE COMMAND, E.G. DRAW 2

*      AX:  COMMAND TO DISPLAY THE RESULTS OF GODDARDS JET-AXIS PROGRAM.
*           THE FOLLOWING OPTIONS ARE AVAILABLE:
*                       1 :    SPHERICITY AXIS
*                       2 :    2-JET ANALYSIS, AXIS DISPLAY
*                       3 :    3-JET ANALYSIS, AXIS DISPLAY
*                       4 :    4-JET ANALYSIS, AXIS DISPLAY
*                     K L :    K-JET ANALYSIS AND DISPLAY OF TRACKS IN
*                              THE JET L ONLY
*                    K -1 :    K-JET ANALYSIS AND THRUST AXIS DISPLAY.
*           THE OPTION CAN BE ENTERED AS TRAILING NUMBERS, E.G. AX 2 1

*    FADC:  COMMAND TO DISPLAY THE FLASH ADC INFORMATION ON THE ID WIRES
*           WHICH HAVE BEEN SO EQUIPPED.

*    GVTX:  COMMAND TO MAKE A VERTEX FIT OF SELECTED CHARGED TRACKS. THE
*           DITTMANN VERTEX PROGRAM IS USED.
*           THE TRACK NUMBERS ARE PROMPTED FOR. THE RESULT OF THE FIT IS
*           DISPLAYED: VERTEX POSITION IS DRAWN AND VERTEX INFORMATION
*           IS WRITTEN ON SCREEN.
**         IF THE COMMAND GVTX IS FOLLOWED BY ANY TRAILING NR (NOT 0),
**         A PHOTON CONVERSION FIT WILL BE ATTEMPTED IF TWO TRACKS ARE
**         ENTERED IN THE INPUT.
```



```
**  PATR:  COMMAND TO SELECT PATR BANK NR, FOR USE IN VARIOUS COMMANDS.
**         THUS IF PATR BANKS 9 AND 10 BOTH ARE PRESENT, THE COMMAND
**         PATR 10 WILL CAUSE BANK NR 10 TO BE USED INSTEAD OF NR 9,
**         WHICH IS OTHERWISE DEFAULT, BEING THE LOWEST NR BANK.
**         AFFECTED ARE THE FOLLOWING COMMANDS (ALL INVOLVING VERTEX
**         FITS):  VRES, VX, GVTX, MASS.

  ------------------------------------------------------------

                        GENERAL COMMENTS:
                        -----------------

  TRAILING NUMBERS:     ANY VIEW COMMAND FOLLOWED BY A TRAILING NUMBER
                        (EXCEPT 0) WILL CAUSE THE CORRESPONDING DETECTOR
                        TO APPEAR WITH THE EVENT DISPLAY.

                        COMMANDS WITH VARIOUS OPTIONS CAN NORMALLY BE
                        GIVEN WITH THE OPTION AS TRAILING NUMBER.

  FAST DISPLAY:         THE DISPLAY OF A COMPLICATED EVENT CAN BE RATHER
                        SLOW AT HIGH OCCUPANCY TIME. FOR PURE SCANNING
                        PURPOSES, THE DISPLAY CAN BE SPEEDED UP BY:
                                    CDTL 6
                                    CDTL 26

* SLOW DISPLAY:         SOME TIMES THE GRAPHICS INTERFACE TO IBM (NOVA)
*                       IS GETTING DISTURBED. AS A RESULT THE PROGRAM
*                       IS HANGING AND NOTHING HAPPENS. YOU MAY THEN TRY
*                       RESETTING THE INTERFACE BY THE FOLLOWING COMMANDS
*                         CONTROL + SHIFT + K     (ALL THREE AT SAME TIME)
*                         RS     (RETURN)
*                         GO     (RETURN)
*                       IF IT DOES NOT WORK, COMPLAIN TO THE R2-GROUP OR
*                       TO THE OPERATORS.
*                       SEVERAL CONTROL/SHIFT/K COMMANDS WILL DESTROY THE
*                       CONNECTION TO IBM. HOWEVER, IBM STILL THINKS YOU
*                       ARE LOGGED ON. YOU HAVE TO ASK THE OPERATORS TO
*                       CANCEL YOUR SESSION. DO NOT DO IT TOO OFTEN..

  ANSWER YES OR NO:     IN ANSWERING QUESTIONS, WITH YES OR NO, THE
                        FOLLOWING ANSWERS ARE ACCEPTED AS POSITIVE:

                          YES,YE,Y   JA,JAWOHL,J    HAI,HA,H

                        ANYTHING ELSE, INCLUDING A SIMPLE RETURN, IS A
                        NEGATIVE ANSWER.

  REPEAT LAST COMMAND:  IF A SIMPLE RETURN IS GIVEN AS COMMAND, IT WILL
                        BE INTERPRETED IN THE SAME WAY AS THE LAST
                        COMMAND, I.E. IF THE LAST COMMAND GIVEN WAS N,
                        THEN A RETURN WILL AGAIN LEAD TO READING THE NEXT
                        EVENT. THIS SAVES SOME EFFORT IN SCANNING.

  PRIVATE MODULES:      THE GRAPHIC DISPLAY IS OFTEN A CONVENIENT WAY
                        TO INVESTIGATE THE DETAILED WORKING OF A PROGRAM.
                        FOR THIS PURPOSE, THE USER WILL OFTEN WISH TO
                        USE SPECIAL DISPLAY OPTIONS OR COMMUNICATE IN
                        SPECIAL WAYS WITH HIS PROGRAM. THIS CAN BE DONE
                        IN CREATING A PRIVATE MODULE WITH THE SPECIAL
                        CODE LINKED IN. THE PROTOTYPE JOB FOR DOING THIS
                        IS THE MEMBER JBOVER ON  F11LHO.JADEGS ; THIS
                        MEMBER CONTAINS THE RELEVANT OVERLAY STRUCTURE.
                        WHEN YOU USE IT, BE SURE TO CHANGE FILE NAMES
                        CORRESPONDINGLY. FOR MORE INFORMATION ON PRIVATE
                        MODULES, CONTACT J.OLSSON OR G.PEARCE.

                        THE GRAPHICS PROGRAM IS STILL BEING IMPROVED
                        AND CHANGES ARE SOMETIMES DONE.
                        UNFORESEEN RESULTS MAY OCCUR AND SHOULD BE
                        BROUGHT TO THE ATTENTION OF J.OLSSON.
```

ALSO SUGGESTIONS OF IMPROVEMENT ARE WELCOME...

A COPY OF THIS INFORMATION CAN BE OBTAINED BY
SUBMITTING THE JOB JBJCN34 ON THE LIBRARY
JADEPR.TEXT

Jade Computer Note No. 35

H. Takeda

Y. Watanabe

4.3.1980

LGCDIR
LGECOR < bar

Energy Corrections for showers in the lead glass counters

Shower energies observed by the lead glass counters have to be corrected for the following effects:

1) A loss of shower energy due to the presence of material (~1/2 rad. length of Al coil). When a shower starts in the material, part of the Cerenkov light is absorbed in the material. ENGLOS

2) Dependence on the incident angle. ANGBAR

3) Dependence on the hit position at each counter.
   This is due to the fact that a phototube only covers the small fraction of the area of the back face of corresponding lead glass block. This is particularly true for end cap counters where the fraction is smaller and longer light pipes are used. POSEND

+ΔE

L

Note that these corrections are only for electrons and photons. The corrections for nonshowering particles are entirely different. For them, the observed energies are just due to the Cerenkov light emission of a single track, so the correction no. 1 does not apply. The corrections of no. 2 and no. 3 may be similar, but are not known yet. Typical response expected for nonshowering particles is shown in Fig. 1, where the light yield is plotted as a function of particle momentum. It is normalized to the asymptotic pulse height, which is about 200 MeV.

Note also that the corrections no. 1, 2 and 3 are applied to all the observed shower energies because it is impossible in the program to separate showering and nonshowering particles in a bias free way. The difference must be included in Monte Carlo simulation in an appropriate way.

The corrections for photons and electrons are assumed to be the same. Only difference between them is the shower depth from which the direction cosines are calculated. The formula used in the program is

$$\text{depth} = 22.39 \exp(E/E_o) \text{ (mm)}$$

$E_o = 4.979$ for $e^{\pm}$

$E_o = 1.725$ for γ (E in MeV)

4a) The factor E_{obs}/E_{in} for an end cap counter at the back face of the counter depends not only on r, the distance of the hit point to the center of the counter, but also on the incident angle. The latter effect is put in by giving two values at each r (define -r to be closer to the beam axis), and by interpolating linearly between the two according to $R - R_c$ (see the figure for the definition : $r = |\vec{R} - \vec{R}_c|$).

4b) The factor E_{obs}/E_{in} for end cap as a function of r, the distance between the hit point and the center of the counter. See the definition of -r in the caption for Fig. 4a.

Fig. 2

Shower energy lost by the presence of Al. coil. for various Ein. (barrel) vs. incid. angle.

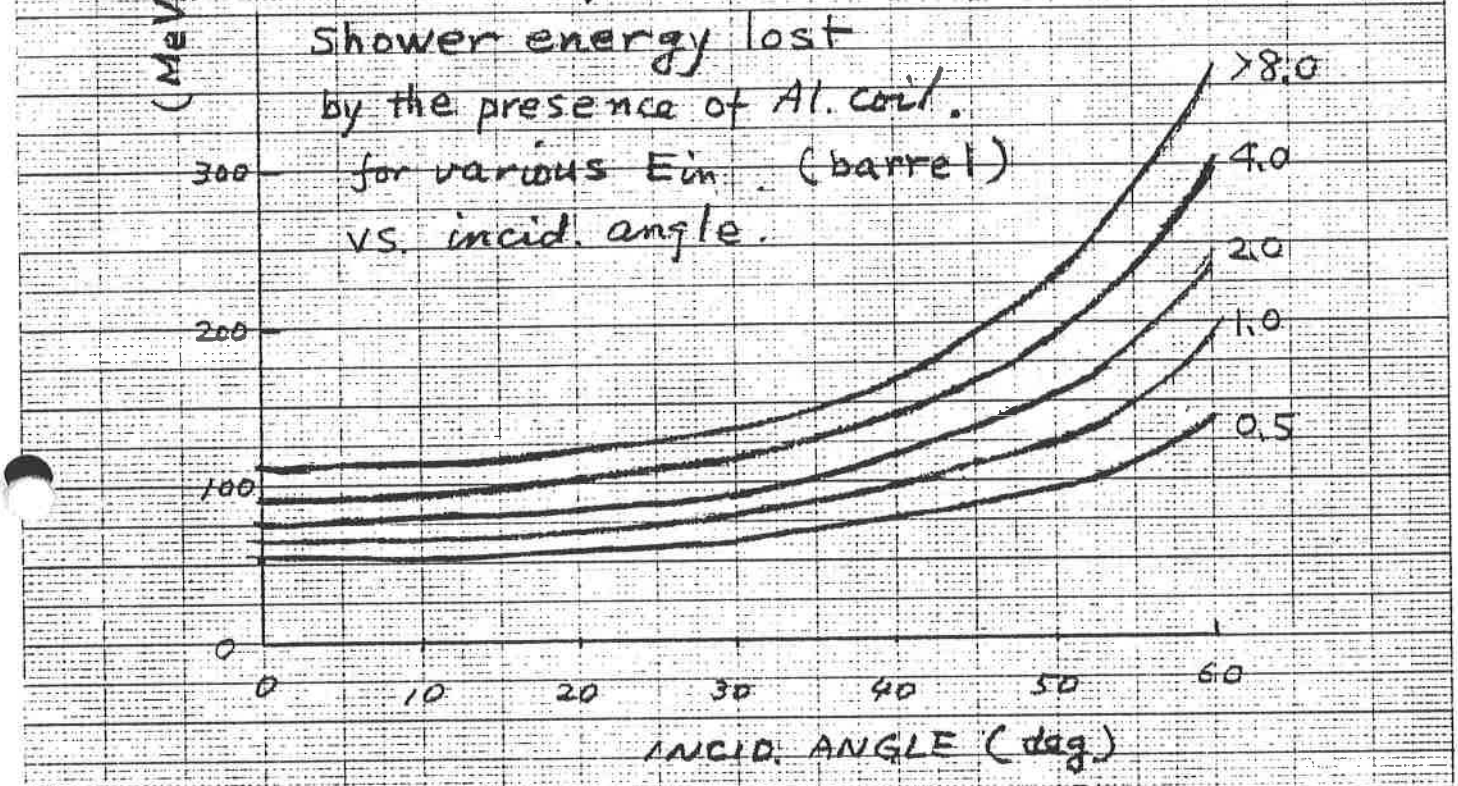
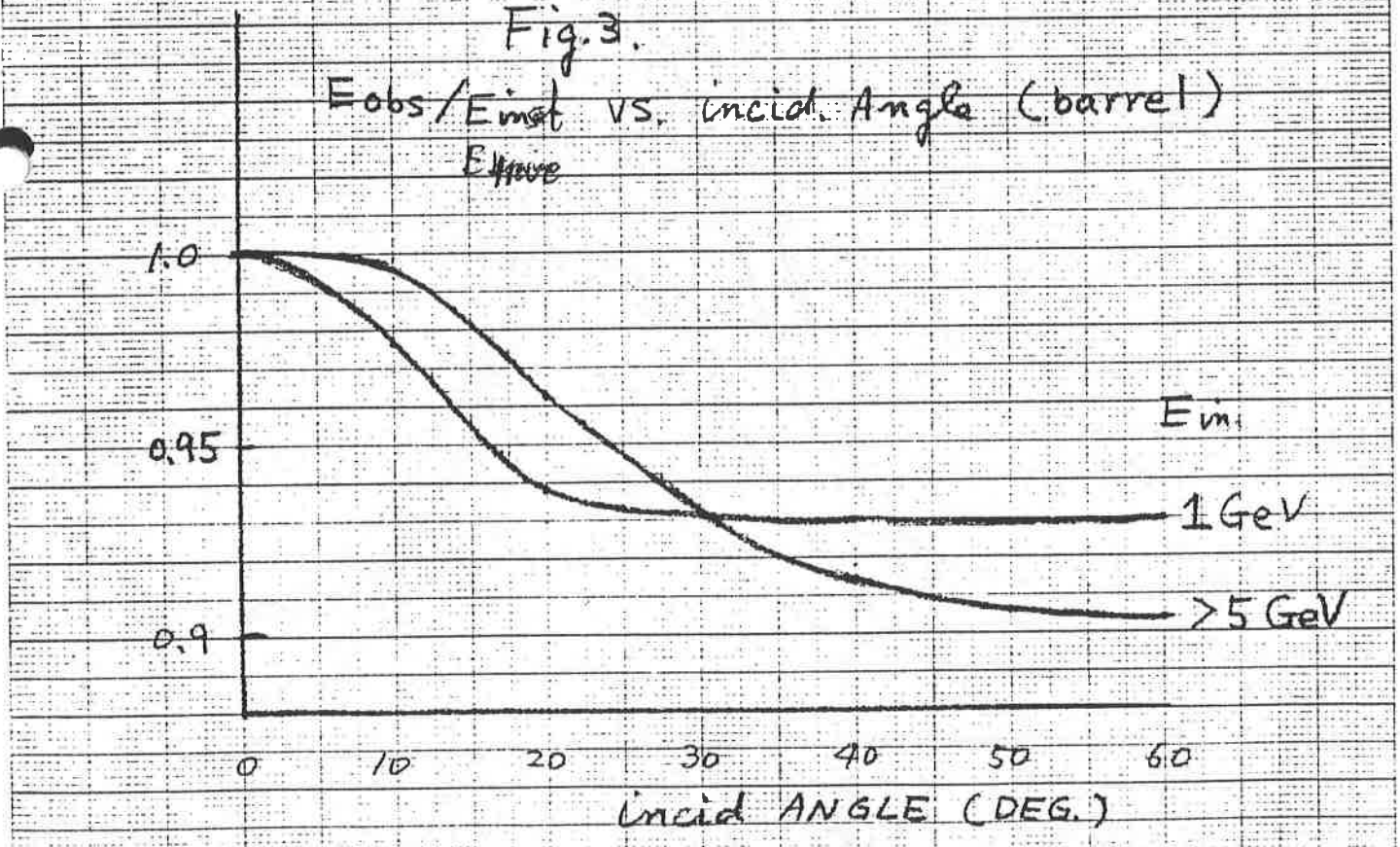


Fig. 3.

Eobs/Einst vs. incid. Angle (barrel)

E Move



Olsson

Computer Note No. 36
J. Olsson
April 11, 1980

The Function EBEAM

The beam energy is often used in analysis programs. It is available as the 29th halfword in the event bank "HEAD". However, the beam energy is one of the few parameters of the event that are put into the data by human hand and is therefore liable to be in error. Indeed, it frequently happened that the beam energy was entered in units of GeV rather than MeV, or plainly as zero.

For this reason the function EBEAM is provided. It returns the proper beam energy in MeV and is called as follows:

```
EBM = EBEAM(HRUN)
```

The argument HRUN is a halfword holding the run number. HRUN is obtained by the statements:

```
IPHEAD = IDATA(IBLN('HEAD'))
HRUN   = HDATA(2*IPHEAD + 10)
```

or, for SUPERVISOR users simply by including in the calling program the statements:

```
COMMON/CHEADR/HEAD(100)
EQUIVALENCE (HRUN,HEAD(18))
```

The function EBEAM may be used also in Monte Carlo data, as long as the run number is less than 100.
EBEAM resides on the "general library": F11LHO.JADEGL and is updated as datataking continues.

Okasan

JADE Computer Note 37

15.4.1980

P. Steffen

IBM Action Bits in the Bank 'HEAD'

From February 80 on the 27th I*2-word in the 'HEAD'-Bank is set in the first data reduction:

no bit	:	lumi event
$2^+ = 1$	:	event with high lead glass energy
$2^1 = 2$	:	overflow event
$2^2 = 4$	:	tagging event with high lead glass energy
$2^3 = 8$	:	not set
$2^4 = 16$	:	tagging event with ≥ 1 track from $z \approx 0$
$2^5 = 32$	:	event with only short tracks in the r-z-projection but long tracks in the r-ϕ-projection
$2^6 = 64$	:	event with ≥ 1 track from $z \approx 0$

There is no 'PATR'-bank for pure lumi and overflow event.

If 2^0-bit or 2^2-bits is set no other bit will be set.

Heide SUPERV