```
 ***************************          ************************
 * JADE COMPUTER NOTE 24 A *          *  FORMAT OF TP BANKS *
 ***************************          ************************

   S.YAMADA   01-06-79
   LAST UPDATE 12-08-81   S.YAMADA
   CHANGED POSITIONS ARE INDICATED BY <<
   THIS NOTE CAN BE LISTED BY LIST 'F22YAM.TPSOURCE($JADENOT)'
      OR BY SUBMITTING THE JOB 'JADEPR.TEXT(JBJCN24)'


               EVENT TP-BANKS


     THERE WILL BE 3 BANKS TO STORE THE FULLY ANALYSED RESULTS.THEY ARE

'TPEV'     SUMMARY INFORMATION FOR THE EVENT

'TPTR'     ONE TRACK INFORMATION IS STORED IN EACH 'TPTR'/N BANK. HERE
           NEUTRAL PARTICLES(GAMMA,K0 ETC.) ARE ALSO TREATED AS TRACKS.

'TPVX'     VERTEX INFORMATION IS STORED.THE ORIGINAL EVENT VERTEX IS
           RECORDED IN THE 'TPVX'/1 BANK.IF ANY SECONDARY VERTICES ARE
           FOUND,THEY ARE PUT INTO THE SUBSEQUENT 'TPVX' BANKS.


     VARIABLES IN EACH BANK ARE DESCRIBED IN THE FOLLOWING,WHERE IDATA,

ADATA AND HDATA ARE INTEGER *4,REAL AND INTEGER *2 WORDS RESPECTIVELY,

EQUIVALENCED TO THE COMMON /BCS/. THE INDEX IN THE BRACKETS IS COUNTED

FROM THE BOS POINTER.  NOTICE THAT THE INDEX FOR THE INT.*2 VARIABLES

INCREASES TWICE AS FAST AS THE OTHERS AND THAT THE BOS POINTER FOR

THE INT.*2 VARIABLES MUST BE MULTIPLIED BY 2.  IN THE FOLLOWING THE TWO

KINDS OF INDICES ARE TREATED SEPARATELY.

   SEE

   IDATA,ADATA
         'NAME',  NO.,NEXTP,LNGTH,    1,    2,    3,    4, .....

   HDATA
         'NAME',  NO.,NEXTP,LNGTH, 1, 2, 3, 4, 5, 6, 7, 8, .........



*************************************************************************



'TPEV'/1 BANK

IDATA( 1)  THE VERSION NO.
  "  ( 2)  THE PRODUCTION DATE AND TIME (THE TIME IS FIXED  AT THE
           BIGINNING OF THE TP-JOB).
HDATA( 5)  # OF RECORDED TRACKS
  "  ( 6)  # OF POSITIVE RECORDED TRACKS
  "  ( 7)  # OF NEGATIVE RECORDED TRACKS
  "  ( 8)  # OF AMBIGUOUS CHARGE TRACKS (I.E. SIG(RHO) > RHO)
  "  ( 9)  # OF NEUTRAL TRACKS (INCLUDES GAMMAS)
  "  (10)  # OF TRACKS/CLUSTERS IN THE BACKWARD TAGGER(Z<0)
  "  (11)  # OF TRACKS/CLUSTERS IN THE FORWARD TAGGER(Z>0)

  "  (12)  # OF VERTICES IN THE 'TPVX' INCLUDING THE EVENT VERTEX
  "  (13)  # OF NEUTRAL VERTICES IN THE 'TPVX'
```



```
           ( HERE THE EVENT VERTEX IS NOT INCLUDED. )
  "  (14)  # OF CHARGED VERTICES IN THE 'TPVX'

  "  (15)  # OF GAMMAS IN THE 'TPTR'
  "  (16)  # OF E+          "
  "  (17)  # OF E-          "
  "  (18)  # OF M+          "
  "  (19)  # OF M-          "
  "  (20)  # OF PI+         "
  "  (21)  # OF PI-         "
  "  (22)  # OF PI0         "
  "  (23)  # OF K+          "
  "  (24)  # OF K-          "
  "  (25)  # OF K0/S        "
  "  (26)  # OF ETA-0       "
  "  (27)  # OF PROTONS     "
  "  (28)  # OF ANTI-PROT.  "
  "  (29)  # OF LAMDA-0     "
  "  (30)  # OF UNDEFINED   "
  "  (31)  A FLAG OF SEEN PARTICLE TYPES (ADDITIVE)
           ( 1=GAMMA, 10=E+-, 100=MU+-, 1000=HADRONS)
  "  (32)  NOT USED
  "  (33)   "
  "  (34)   "

ADATA(18)  VISIBLE CHARGE ENERGY (E VIS,CH)
  "  (19)  SIG(E VIS,CH)
  "  (20)  VISIBLE NEUTRAL ENERGY (E VIS,NEU)
  "  (21)  SIG(E VIS,NEU)

  "  (22)  MISSING MOMENTUM (P,MISS) X
  "  (23)      "                     Y
  "  (24)      "                     Z
  "  (25)  SIG(P,MISS) X
  "  (26)   "          Y
  "  (27)   "          Z

HDATA(55)  CHARGE SPHERICITY FLAG
              =0,IF ALL TRACKS ARE INCLUDED.
              =1,IF ONLY CHARGED TRACKS ARE USED.
  "  (56)  # OF TRACKS USED FOR THE SPHERICITY CALCULATION

ADATA(29)  SMALLEST MOM.ELLIPSE EIGEN VALUE ( I.E. SPERICITY)
  "  (30)   MIDDLE     "
  "  (31)  BIGGEST     "

  "  (32)  DIR.COS X  OF THE EIGEN VECTOR CORRESPONDING ADATA(29)
  "  (33)      "    Y          "
  "  (34)      "    Z          "

  "  (35)  DIR.COS X  OF THE EIGEN VECTOR CORRESPONDING ADATA(30)
  "  (36)      "    Y          "
  "  (37)      "    Z          "

  "  (38)  DIR.COS X  OF THE EIGEN VECTOR CORRESPONDING ADATA(31)
  "  (39)      "    Y          "
  "  (40)      "    Z          "

HDATA(81)  # OF TRACKS USED FOR THE THRUST CALCULATION
  "  (82)  MAX.# OF TRACKS ACCEPTED BY THE THRUST-PROGRAM
ADATA(42)  THRUST
  "  (43)  DIR.COS X OF THE THRUST AXIS
  "  (44)      "    Y          "
  "  (45)      "    Z          "
  "  (46)  NOT USED
  "  (47)   "
  "  (48)   "
  "  (49)   "
  "  (50)   "

  "  (51)  TOF OF THE BEAM COUNTER
```

```
  *  (52)  HIT TIME DIFFERENCE FOR 2-PRONG EVENTS
  *  (53)  COLLINEARITY OF 2-PRING EVENTS
  "  (54)  ACOPLANARITY OF 2-PRONG EVENTS
  *  (55)  NOT USED

          THE FOLLOWING 10 INT*2 WORDS ARE ERROR FLAGS FOR EACH STEP
          GENERAL ERROR CODES
                    10000  THE NECESSARY RAW DATA IS MISSING.
                     4000  CORRESPONDING TP-SUBROUTINE IS NOT CALLED
                     2000  /BCS/ SPACE IS NOT ENOUGH TO PUT A NEWBANK.
                     1000  THE NECESSARY RESULT BANK IS MISSING OR
                           IT HAS ERROR.
                       -1  ANALYSIS OR TP PROGRAM IS NOT READY YET.

HDATA(111)    ERROR FLAG FOR PAT.REC.
  "  (112)       "          VERTEX FIT
  "  (113)       "          TOF
  "  (114)       "          DE/DX
  "  (115)       "          LEAD GLASS
                       100  2-ND STEP ANALYSIS IS NOT DONE.
                        10  INNER-LG CONNECTION IS NOT DONE.
                         1  LG-CLUSTER ENERGY CORRECTION IS NOT DONE.
  "  (116)       "          MU-DET.
  "  (117)       "          FORW.DET
  "  (118)       "          PAIRS AND VEES
  "  (119)       "          JET ANALYSIS
  *  (120) NOT USED




**********************************************************************

'TPTR'   BANK

      'TPTR' BANK IS MADE FOR EACH TRACK.
      THE LENGTH OF THE BANK IS DIFFERENT FOR DIFFERENT KIND OF TRACKS.
      E.G.FOR GAMMAS THE TOF AND DE/DX INFORMATION IS OMITTED.

HDATA( 1)  THE INDEX(=THE BANK #) OF THE VERTEX FOR THE TRACK
  "  ( 2)  THE INDEX(=THE BANK #) OF THE SECONDARY VERTEX IF ANY
  "  ( 3)  FLAG OF THE DETECTORS WHERE THE TRACK IS SEEN
           1000  INNER CHAMBER
            100  LEAD GLASS
             10  MU-DET.
              1  FORWARD DET.
  *  ( 4)  THE INDEX OF THE TRACK IN THE 'PATR'-BANK,IF IT IS SEEN THERE
             (OTHERWISE 0)
  *  ( 5)  NUMBER OF L-G CLUSTERS CONNECTED TO THE TRACK
              0  NOT DETECTED BY THE L-G AND IT IS NOT EXPECTED TO BE
             -1       "                 ALTHOUGHIT IS EXPECTED.
                (THE EXTRAPOLATED HIT POSITION IS NEAR THE EDGE)
             -2  NOT DETECTED BY THE L-G ALTHOUGH L-G HIT IS EXPECTED
                 WITHIN THE FIDUTIAL DETECTION REGION.
  *  ( 6)  THE INDEX OF THE 1-ST CONNECTED L-G CLUSTER
  *  ( 7)       "          2-ND     "
  *  ( 8)  NUMBER OF THE CONNECTED MU-DET.CLUSTERS
  *  ( 9)  THE INDEX OF THE 1-ST CONNECTED MU-CLUST.IN THE 'MUR1'
  "  (10)       "          2-ND          "
  "  (11)      "3-RD               "
  "  (12)       "          4-TH          "
  *  (13)      THE INDEX OF THE FORWARD TAGGER TRACK/CLUSTER
  *  (14)  NOT USED YET
  *  (15)       "
  *  (16)       "
  "  (17)  TYPE OF THE STORED TRACK ORIGIN
              1  FIRST OBSERVED POINT IN THE INNER CHAMBER
              2  THE FIXED POINT (X,Y,Z)=(0,0,0)
              3  THE CLOSEST POINT FROM THE BEAM AXIS ON THE TRACK
                 EXTRAPOLATION
```



```
             20  ON THE BEAM BEAM AXIS,AT Z=Z-VERTEX OF THE EVENT
                 (USED FOR GAMMAS)
             30  CLOSEST POINT ON THE TRACK FROM THE FITTED EVENT VERTEX
  "  (18)  ORIGINAL TRACK FLAG.
              1  IF THE TRACK IS USED TO FIT THE EVENT VERTEX.
              0  OTHERWISE.
ADATA(10)  X COORDINATE OF THE TRACK ORIGIN  =X(ORIGIN)
  "  (11)  Y       "                       =Y(ORIGIN)
  "  (12)  Z       "                       =Z(ORIGIN)
  *  (13)  SIG(X(ORIGIN))
  "  (14)  SIG(Y(ORIGIN))
  "  (15)  SIG(Z(ORIGIN))
  "  (16)  THE SHORTEST EDISTANCE FROM THE VERTEX TO THE TRACK=DIS
  *  (17)  D(R)/SIG(R)
  "  (18)  D(Z)/SIG(Z)

  "  (19)  CHI-SQUARE OF THE (R-PHI) FIT
IDATA(20)  DEG.OF FREEDOM OF THE (R-PHI) FIT
ADATA(21)  CHI-SQUARE OF THE (R-Z) FIT
IDATA(22)  DEG.OF FREEDOM OF THE (R-Z) FIT

ADATA(23)  CHARGE  =100 IF NOT KNOWN.....
  "  (24)  MOMENTUM (GEV/C)    =P
  "  (25)  SIG(P)
IDATA(26)  TYPE OF THE STORED TRACK DIRECTION
             1 THE LINE DIRECTION FROM THE VERTEV TO THE FIRST HIT POINT
             2 THE TANGENT DIRECTION ON THE TRACK AT THE CLOSEST POINT
               FROM THE VERTEX
ADATA(27)  X-COMP.OF THE DIRECTION COSIN  ALPHA-X
  "  (28)  Y-COMP.       "              ALPHA-Y
  "  (29)  Z-COMP.       "              ALPHA-Z
  "  (30)  SIG(ALPHA-X)
  "  (31)  SIG(ALPHA-Y)
  "  (32)  SIG(ALPHA-Z)

  "  (33)  NOT USED

HDATA(67)  INPUT MASS TYPE (AVAILABLE ONLY FOR M.C.TEST DATA)
             FOR THE MASS CODE SEE BELOW.
  "  (68)  MOST LIKELY PARTICLE TYPE
             0=UNKNOWN,          1=GAMMA,
             2=ELECTRON,         3=MUON,
             4=PION,             5=KAON,
             6=PROTON/NEUTRON,   7=LAMDA
ADATA(35)  MOST LIKELY MASS OF THE PARTICLE IN GEV/C**2=AMASS

  "  (36)  TOTAL ENERGY       =ETOT=SQRT( P**2 + AMASS**2 )

  "  (37)  SHOWER ENERGY      =ESH
  "  (38)  SIG(ESH)
HDATA(77)  QUALITY OF THE SHOWER ENERGY MEASUREMENT
             -2  NOT DETECTED BY THE L-G ALTHOUGH L-G HIT IS EXPECTED
                 WITHIN THE FIDUCIAL DETECTION REGION.
             -1  NOT DETECTED BY THE L-G ALTHOUGH HIT IS EXPECTED
                 NEAR THE DETECTOR EDGE.
              0  NOT DETECTED AND A HIT IS NOT EXPECTED DUE TO
                 THE GAP IN THE L-G DETECTOR OR ABSORPTION IN THE COIL.
              1  THE CONNECTED L-G CLUSTER IS NEAR THE DETECTOR EDGE.
                 (ESH MAY NOT BE CORRECT)
              2  THE CONNECTED L-G CLUSTER IS IN THE FIDUCIAL REGION

  "  (78)  UNIQUENESS OF THE CLUSTER ASSIGNMENT
           = NUMBER OF OTHER TRACKS WHICH SHARE THE SAME CONNECTED
             CLUSTERS. =0,IF THE CONNECTION IS UNIQUE.
ADATA(40)  CHI-SQUARE DEVIATION OF THE ESH AND P FOR A SHOWER
           =((ESH-P)/SIG(ESH))**2
ADATA(41)  CHI-SQUARE DEVIATION OF ESH AND EXPECTED ESH FOR A
           NON-SHOWERING TRACK
           =((ESH-(EXPECTED ESH)/SIG(EXPECTED ESH))**2
           TEMPORARILY  EXPECTED ESH=0.25, SIG(EXPECTED ESH)=0.125
  "  (42)  NOT USED
```

```
HDATA(85)  NUMBER OF THE CONNECTED MU-DET HITS
  "  (86)  THE ACCEPTANCE FLAG
  0  NO HIT AND NO HIT IS EXPECTED
             1

  "  (87)  MU-CHAMBER QUALITY FLAG

  "  (88)  NUMBER OF TRACKS WHICH SHARE THE SAME HITS IN THE R1 CH.
  "  (89)  THE TRACK NUMBER OF THE 1-ST AMBIGUIOUS TRACK
  "  (90)        "                 2-ND    "
  "  (91)        "                 3-RD    "
  "  (92)  NUMBER OF TRACKS WHICH SHARE THE SAME HITS IN THE R2-R5CH.
  "  (93)  THE TRACK NUMBER OF THE 1-ST AMBIGUIOUS TRACK
  "  (94)        "                 2-ND    "
  "  (95)        "                 3-RD    "
  "  (96)  NOT USED

ADATA(49)  SUM OF (DISTANCE/SIG(MCS))**2
           DISTANCE IS MEASURED FROM THE INNER TRACK EXTRAPOLATION
           TO EACH MU-CH.SPARK.
  "  (50)  INTEGRAL MATERIAL THICKNESS IN MM
  "  (51)  INTEGRAL MATERIAL THICKNESS IN G/CM**2
  "  (52)  TOTAL ENERGY LOSS IN THE MATERIAL (GEV)
  "  (53)  INTEGRAL ABSORPTION LENGTH FOR A PION
  "  (54)  TOTAL ENERGY LOSS TO THE POSSIBLE NEXT HIT
  "  (55)  PROBABILITY OF BEING A MUON
  "  (56)  PROBABILITY OF BEING A PUNCH THROUGH PION
  "  (57)  NOT USED

IDATA(58)  QUALITY OF TOF
             1  ONE HIT AND UNIQUE SOLUTION
             2  TWO TRACKS HIT THE SAME COUNTER BUT RESOLVED
            -1  ONLY ONE HIT BUT LEFT/RIGHT TOF DOES NOT AGREE
            10  >=2 HITS AND CAN NOT BE RESOLVED
ADATA(59)  TOF IN NSEC (AFTER ALL CORRECTIONS)
  "  (60)  PATH LENGTH TO THE TOF COUNTER HIT POINT
  "  (61)  BETA
  "  (62)  SIG(BETA)
  "  (63)  CALCULATED MASS  (GEV/C**2)
  "  (64)  SIG(MASS)
  "  (65)  CHI-SQUARE TO BE A PROTON
  "  (66)        "           KAON
  "  (67)        "           PION/MUON
  "  (68)        "           ELECTRON
  "  (69)  DE/DX IN THE TOF COUNTER
  "  (70)  NOT USED
  "  (71)   "

IDATA(72)  QUALITY OF THE INNER-CH DE/DX MEASUREMENT
ADATA(73)  DE/DX
  "  (74)  SIG(DE/DX)
  "  (75)  CHI-SQUARE TO BE A PROTON
  "  (76)        "           KAON
  "  (77)        "           PION/MUON
  "  (78)        "           ELECTRON
IDATA(79)  NUMBER FOR PARTICLE WITH LOWEST CHI**2 ( NUMBERED AS ABOVE )
  "  (80)  NOT USED

*************************************************************************


'TPVX'   BANK

       'TPVX' BANK IS MADE FOR EACH VERTEX. THE FIRST BANK 'TPVX'/1 IS
     USED FOR THE EVENT VERTEX.  THE LENGTH OF THE BANK IS DIFFERENT
     FOR EACH BANK.
```



```
HDATA( 1)  THE BANK NO.OF THE PRIMARY TRACK WHICH ORIGINATES THE VERTEX.
           FOR THE 'TPVX'/1 IT IS 0.
  "  ( 2)  FLAG OF THE VERTEX CALCULATION
           = 10*(NUMBER OF USED TRACKS) + FITTING MODE
           FITTING MODE=0,1     THE VERTEX IS NOT CALCULATED.
                       =2       CLOSEST POINT FROM THE BEAM AXIS
                       =3       FITTED IN THE (X,Y) PROJECTION
                       =4       FITTED IN THE 3-DIM.SPACE
ADATA( 2)  X COORDINATE OF THE VERTEX      =XVTX
  "  ( 3)  Y      "                      =YVTX
  "  ( 4)  Z      "                      =ZVTX
  "  ( 5)  SIG( XVTX )
  "  ( 6)  SIG( YVTX )
  "  ( 7)  SIG( ZVTX )
  "  ( 8)  CHISQ OF THE VERTEX FIT
IDATA( 9)  DEG.OF FREEDOM
           ****** INPORTANT CAUTION ******                              <<
           IF THE FITTING MODE IS 3, THIS WORD IS REAL; ADATA(9).  <<
ADATA(10)  COST = < COS( ANGLE BETWEEN TRACKS ) > <<

HDATA(21)  CHARGE OF THE VERTEX(= CHARGE OF THE OIGINAL TRACK)
  "  (22)  # OF THE SECONDARY TRACKS EMITTED FROM THE VERTEX.=MULSEC
  "  (23)  # OF THE POSITIVE SECONDARY TRACKS
  "  (24)  # OF THE NEGATIVE SECONDARY TRACKS
  "  (25)  # OF THE NUETRAL SECONDARY TRACKS
           (GAMMA IS INCLUDED.)
  "  (26)  # OF AMBIGUOUS SECONDARY TRACKS
  "  (27)  # OF GAMMAS
  "  (28)  # OF ELECTRON/POSITRONS
  "  (29)  # OF MUONS
  "  (30)  # OF HADRONS (INCLUDING UMBIGUOUS TRACKS)

  "  (31)  THE BANK NO. OF THE 1-ST SECONDARY TRACK
  "  (32)        "           2-ND   "
  "  (33)        "           3-RD   "
  "
  ******
  "
  "  (30+MULSEC) "           LAST   "
```