JADE - Computer Note No. 23

9.3.1979

W. Bartel

I B M - Data - Banks

This note contains a description of the raw data banks and the result bank on IBM - tapes as of March 13, 1979.

The format and the content of the data banks TRIG, SCAL and ATST have not yet been decided.

The relevant JADE computer notes, describing the various result banks are attached to this note. By the time this note was issued, the JADE computer notes No. 16 and No. 22 were still in preparation.

A JADE computer note describing the banks TPEV, TPVX, TPTR will be issued later by S. Yamada.

I*4 word	I*2 word	Type	Assignment
	23	I*2	0
	24		0
	25		MIPROC-16 action bits
	26		N50 action bits
	27		IBM action bits
	28		0
	29		beam energy (MeV)
	30		magnetic field
	31 - 100		free

Fixed pointer table

55	Pointer to bank	TRIG	three trigger banks, 1,2,3
56	" " "	SCAL	scaler bank
57	" " "	LATC	latch bank
58	" " "	ATST	Test ADC's
59	" " "	ATOF	TOF-counters ADC/TDC
60	" " "	ALGL	Lead glass ADC
61	" " "	JETC	Jet chamber data
62	" " "	CONC	conversion chamber - empty -
63	" " "	MUEV	Mu chamber data
64	" " "	ATBP	Beam pipe counters ADC/TDC
65	" " "	ATAG	Tagging ADC
66	" " "	TAGC	Tagging chambers
67		free	-
68	" " "	N50S	Nord 50 summary
69	" " "	JHTL	Hit label bank
70	" " "	PATR	Patrec results
71	" " "	ZVTX	Z-vertex
72	" " "	LGCL	Lead glass clusters

I*4 word	I*2 word	Type	bits	Assignment	
	12	I*2	0 - 6	lead glass row 1 - 7	along the barrel
	13		0 - 6	lead glass row 8 - 14	
	.				
	.				
	.				
	17		0 - 6	lead glass row 36 - 42	
	18		0 - 7	lead glass end cap quadrants 1 - 8	
	19		0,1	tagging trigger latches	
	20		0 - 15	luminosity scintillators and	
	21		0 - 15	lead glass blocks (see JADE computer note 16)	
	22		0 - 3	lead glass energy sum (3: highest)	

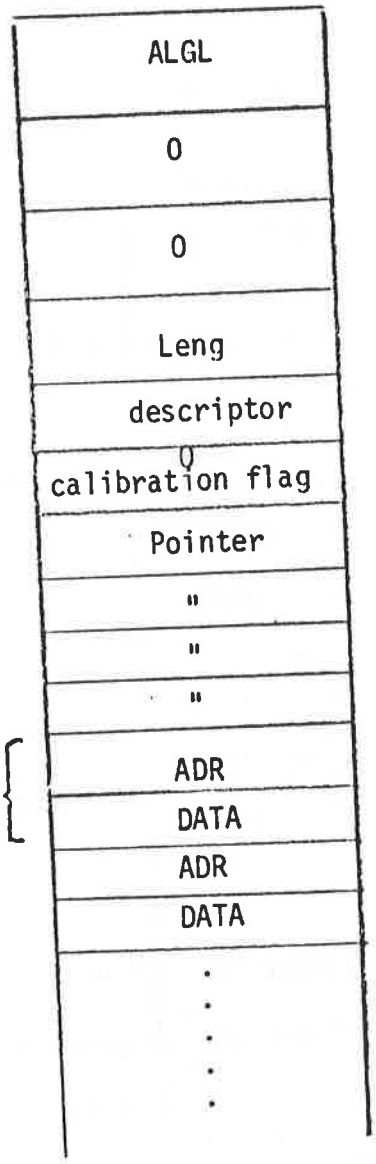
Note : The lead glass energy sum is the last word of the bank. That is different from the assignment in JADE Note No. 32.

see updat in JN 32 b

above is wrong!

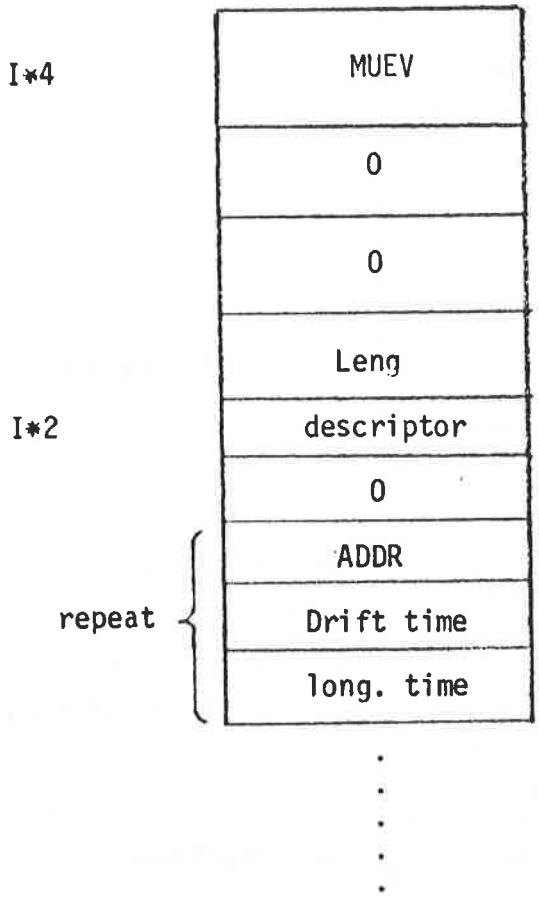
ALGL

Pointer : IDATA(60)
Lead glass data
(JADE computer Note 14a)



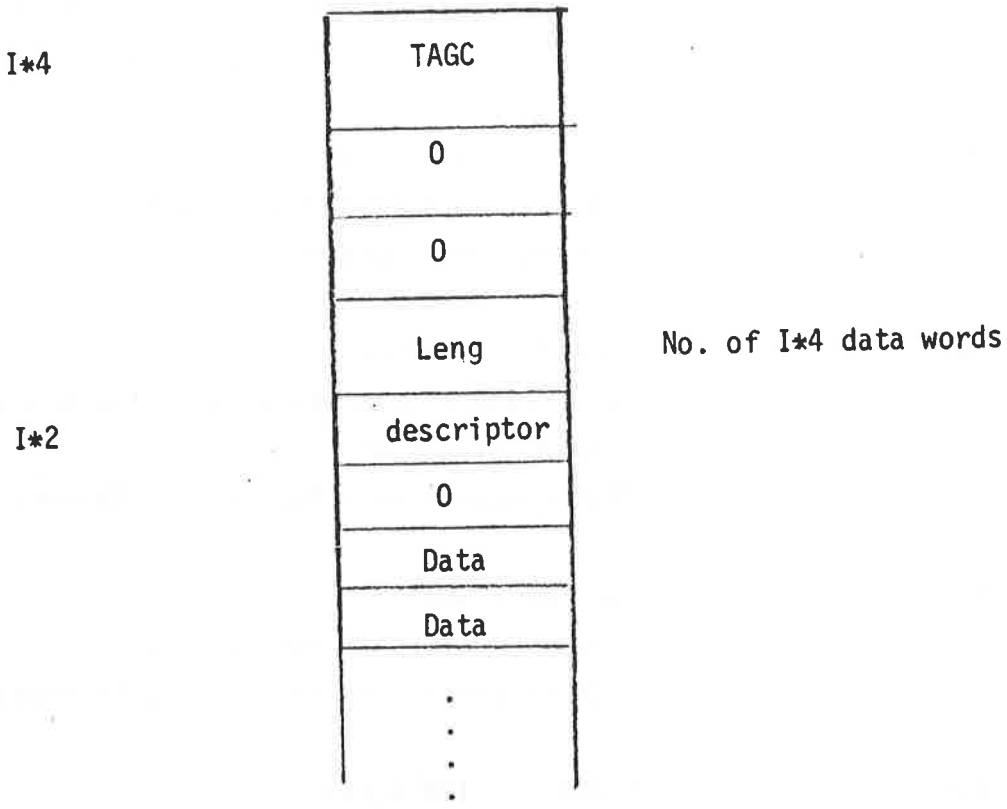
MUEV

Pointer : IDATA(63)
Mu chamber data
(JADE computer note 22)



TAGC

Pointer : IDATA(66)
Tagging System Chamber Data
(JADE computer note No. 16)



Data word : bit 0 - 3 = drift time
bit 8 - 15 = Address

TAGG

Pointer : IDATA(76)
Result banks from tagging system analysis.
5 banks.
JADE computer note No. 16 (G. Hughes, H. Wriedt)

ACLS

Pointer : IDATA(77)
Tagging ADC-data reorganized according to clusters.
JADE computer note No. 16 (G. Hughes, H. Wriedt)

TOFR

Pointer : IDATA(78)
Results from TOF-counter analysis
JADE computer note No. 20a (S. Kawabata)

JADE - Computer Note No. 23a

6.6.79

M. Helm

B. Naroska

IBM TRIGGER BANKS

According to the CAMAC readout from different branches and the performance of the trigger in subsequent steps T1, T2, T3 there are three banks 'TRIG' (Pointer: IDATA(55)) distinguished by bank numbers 1,2,3. In these banks the event dependent information of the trigger sources is stored. The scheme of the banks is as follows:

TRIG	TRIG	TRIG	
1 (T1)	2 (T2)	3 (T3)	I * 4
Pointer to T2	Pointer to T3	0	
LENG	LENG	LENG	
descriptor	descriptor	descriptor	
0	0	0	
T1 word 1	T2 word 1	T3 word 1	I * 2
⋮	⋮	⋮	
T1 word 8*	T2 word 24	T3 word 36	

*may later on be extended

T2 bank (name 'TRIG', number 2)

The length is fixed to 26 I * 2 words.

word	bits	content			
1		BANK DESCRIPTOR		1	
2				0	
3	0 - 15	HIT CELL/WALL	R3	1 - 16	
4	0 - 7	" " "	R2	1 - 8	
	8 - 15	" " "	R1	1 - 8	$0^\circ < \phi < 60^\circ$
5	0 - 15	ALL TRACKS		1 - 16	
6	0 - 15	FAST TRACKS		1 - 16	
7	0 - 15	HIT CELL/WALL	R3	17 - 32	
8	0 - 7	" " "	R2	9 - 16	
	8 - 15	" " "	R1	9 - 16	$60^\circ < \phi < 120^\circ$
9	0 - 15	ALL TRACKS		17 - 32	
10	0 - 15	FAST TRACKS		17 - 32	
11 - 14	dito	dito			$120^\circ < \phi < 180^\circ$
15 - 18	"	"			$180^\circ < \phi < 240^\circ$
19 - 22	"	"			$240^\circ < \phi < 300^\circ$
23 - 26	"	"			$300^\circ < \phi < 360^\circ$

HIT CELL and HIT WALL define inner detector track elements which are linked through rings R1, R2 and R3 to give ALL or FAST TRACKS with momentum cutoff of 200 MeV/c or 1 GeV/c, respectively. The numbering starts at $\phi = 0^\circ$ and increases with ϕ. For more details see Jade Note No. 31.

outdated

T2 bank (name 'TRIG', number 2)

The length is fixed to 24 I * 2 words.

word	bits	content			
1	0 - 15	HIT CELL/WALL	R3	1 - 16	
2	0 - 7	" " "	R1	1 - 8	
	8 - 15	" " "	R2	1 - 8	$0^o < \phi < 60^o$
3	0 - 15	ALL TRACKS		1 - 16	
4	0 - 15	FAST TRACKS		1 - 16	
5	0 - 15	HIT CELL/WALL	R3	17 - 32	
6	0 - 7	" " "	R1	9 - 16	
	8 - 15	" " "	R2	9 - 16	$60^o < \phi < 120^o$
7	0 - 15	ALL TRACKS		17 - 32	
8	0 - 15	FAST TRACKS		17 - 32	
9 - 12	dito	dito			$120^o < \phi < 180^o$
13 - 16	"	"			$180^o < \phi < 240^o$
17 - 20	"	"			$240^o < \phi < 300^o$
21 - 24	"	"			$300^o < \phi < 360$

HIT CELL and HIT WALL define inner detector track elements which are linked through rings R1, R2 and R3 to give ALL or FAST TRACKS with momentum cutoff of 200 MeV/c or 1 GeV/c, respectively. The numbering starts at $\phi = 0^o$ and increases with ϕ. For more details see Jade Note No. 31.

TRIGGER SOURCE and NIM-AND-OR COMMAND WORD (21)

BITS	CONTENT	
0 - 3	TRIGGER SOURCE (BCD)	
4	CAMAC CONTROL	
5	EMPTY	
6 - 7	Setting of NIM-AND-OR (2 bit binary number)	00 AND 01 ONLY 2 10 ONLY 1 11 OR

TRIGGER ACTION and LOGICS CONDITION OF LAST ACCEPTED EVENT (22)

Bits	Content	
0 1 2	ACTUAL ACCEPT BY	T1 T2 T3
3 4	T1 LOGICS CONDITION	ACCEPT POSTPONE
5 6	T2 LOGICS CONDITION	ACCEPT POSTPONE
7	T3 LOGICS CONDITION	ACCEPT

For more details there exists a private note from H. Krehbiel: "Programming the master trigger box via CAMAC".

Trigger-Parameters

It seems to be necessary to have a complete list on tape with all the trigger parameters which may be changed by an operator either via CAMAC commands or manual switches.

Jade Computer Note 23b

9.8.79

B. Naroska

TRIGGER WORDS

The trigger word is the 10th (contrary to J.C.N. 23a) half word after the bank length in the bank "TRIG", number 1.
It tells you the T1 condition of the trigger.
At the moment the bits have the following meaning (bits 1 - 8 are T1 POSTPONE, bits 9 - 16 T1 ACCEPT)

BIT	OCTAL(NORD-DISPL)	HEX(IBM-DISPL)	CONTENT	
1	1	1	2TOF•LG>1GeV	T1 POSTPONE
2	2	2	TAGG	
5	20	10	2TOF•≥4TOF COLL	
9	400	100	LUMI	T1 ACCEPT
10	1000	200	LG>4GeV	
11	2000	400	TAGG•LG>2GeV	

(TAGG is the "OR" of the 2 tagging leadglass arrays, LUMI the "AND")

All combinations of these bits are also possible, eg bit 9 automatically implies bit 2.
To find out what caused the trigger (especially if it was caused by T2), you may also use the "TRIGGER ACTION & LOGICS CONDITIONS" word, which is read out for each event. It is half word 22 after the banklength in the bank "HEAD" number 0.

BIT	CONTENT
1	T1 ACTUAL ACCEPT
2	" " "
3	" " "
4	T1 LOGICS CONDITION ACCEPT
5	T1 " " POSTPONE
6	T2 " " ACCEPT
7	T2 " " POSTPONE
8	T3 " " ACCEPT

T2 LOGICS CONDITION is true for

2TOF•LG>1GeV • 1 track

TAGG • 1 track

2TOF •≥4TOF • 2 fast tracks
COLL

JADE COMPUTER NOTE No 24

14/3/79
J. Allison

PRINTING HALF-WORD BANKS

CALL HPRS (NAME, NUMBER)

where NAME is a 4-character alphanumeric bank name, and NUMBER is the bank number.

Example CALL HPRS ('MUEV', 0)

Uses CLOC

Location 'FIILHO.JADEGS' (source)
'FIILHO.JADEGL' (load.

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 ***************************          ************************
 * 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'
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           ( 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
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  *  (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
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             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
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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   "
```

Olsson

JADE Computer Note 25

17.5.79

E. Elsen

J. Olsson

Reading and Writing of Real and MTC-event data

Since MTC events are generally written with a very fine resolution in the JETC-bank they have to be smeared out in the reading step. This also affects the χ^2-values in the 'PATR' bank. MTC-Data therefore contain two additional records for actual calibration data, which also have to be recorded for rewritten smeared data. Thus there are 3 different types of events.

1) no constants - records	usually real data
2) data with constants-records (fine resolution)	original MTC-data
3) data with constants-records (smeared)	rewritten MTC-data

All three types can be handled by the same routines if the following rules are followed:

a) Any occurence of the constants'record causes the appropriate COMMONs to be overwritten. (They can be recognized by their special fixed pointer banks MTCO and MUCO.)

b) Only those data ~~are~~ will be smeared that contain the 'MTCO' bank (as first record) with first non-BOS-word being 0. This "smear flag" has to be set if smeared data are written out again, e.g. by the graphics module.

The following sample program shows the logic for reading and gives the names of the saving and smearing routines. They are on FILLHO.JADEGS and FILLHO.JADEGL.

The logic may have to be modified in different applications. But the above rules should always be taken care of.

```
C  *----------------------------------------------------------
C  *
C  *  VERSION OF 16/05/79   LAST MOD 16/05/79
C  *  EXAMPLE OF A MAIN PROGRAM WITH NEW READING SEQUENCE
C  *  THIS EXAMPLE USES BOS.
C  *----------------------------------------------------------
C
      EXTERNAL BLDAT
      COMMON / BCS / IW(8000)
      DATA NSEC / 2 /
C
CCC   INITIALIZE BOS
      CALL BINT( 8000, 4500, 500, 0 )
C
CCC   READ DEFAULT MU CHAMBER CONSTANTS FROM UNIT 4, INNER DETECTOR
CCC   CONSTANTS HAVE BEEN SUPPLIED THROUGH BLOCKDATA IN BLDAT.
      CALL BREAD( 4, &93, &92 )
      CALL MUCON( 0 )
      CALL BSLT
      CALL BDLG
C
CCC   INITIALISE MT CARLO FLAG
      MFLAG = 0
C
C
CCC   START OF LOOP, READ DATA
   94 CALL BREAD( 2, &93, &92 )
C
CCC   IF MTCO BANK IS IN RECORD, STORE CONSTANTS
CCC   IF NON-DEFAULT PARAMETERS FOR SMEARING ARE TO BE TAKEN CALL RDMTCO
CCC   WITH 'SE' AND SUPPLY ALL NEW PARAMETERS THROUGH COMMON /CBIN/ .
        IPMTCO = IW( IBLN('MTCO') )
        IF( IPMTCO .EQ. 0 ) GO TO 1000
            CALL RDMTCO( 'DE' )
CCC   CHECK SMEAR FLAG
            IF( IW(IPMTCO+1) .EQ. 0 ) MFLAG = 1
            GO TO 95
C
CCC   IF MUCO BANK IS IN RECORD STORE CONSTANTS
 1000 IF( IW( IBLN( 'MUCO' ) ) .EQ. 0 ) GO TO 1100
            CALL MUCON( 0 )
            GO TO 95
C
CCC   SMEAR JET CHAMBER DATA, IF MONTE CARLO FLAG HAS BEEN SET
 1100 IF( MFLAG .EQ. 1 ) CALL RDJETC
C
CCC   PROCESS EVENT ( PRINTOUT OF JETC BANK IN THIS CASE )
      CALL HPRS( 'JETC', 8 )
C
CCC   END OF EVENT PROCESSING ( IN THIS CASE: BOS GARBAGE COLLECTION )
   95 CALL BSLT
      CALL BDLG
      GO TO 94
C
CCC   READ ERROR IN READ STATEMENT
   93 WRITE(6,9101)
 9101 FORMAT(' ****** READ ERROR IN BREAD *******')
      GO TO 94
C
   92 STOP
      END
```

JADE Computer Note 26

5.6.1979

E. Elsen

Monte Carlo Tracking

This now describes the usage of the standard tracking program for Monte Carlo events and the changes to the output format.

1) Tracking routine MCJADE

   SUBROUTINE MCJADE performs the tracking of photons and charged particles through the detector.

Calling sequence:

```
CALL  BINT (10.000, 6000, 500, 0)     BOS initialisation
CALL  MCJADE (NEVTS, NPRINT)          tracking routine
      where NEVTS = no. of evts. to be tracked
                    (NEVTS = 0 means until EOF of input or
                    TIME OUT.)
      and NPRINT = no. of events with printed four vectors
```

Additional libraries in LKED-Step:

```
DSN = F11BAR.JADE.LOAD
DSN = RO2BUT.CERNLIB
DSN = F1EBLO.BOSLIB.L
```

Datasets in GO-Step

UNIT	I/O	Name	Purpose
3	I	?	input four vectors
2	O	?	output for tracked particles
21	I	F22 ALL.MUCALIB.DATA0001	μ-chamber calibration data
22	I	NULLFILE	updates to μ-ch. calibration.

2. Output format

MCJADE generates the following record sequence:

Record	Name and No. of fixed printer bank		content of record	
1	MTCO	1	geometrical const. and chamber const.	
2	MUCO	1	μ-chamb. constants	
3	HEAD	1	event data	repeated
.	.	.	.	
.	.	.	.	
.	.	.	.	

Different from JADE.COMPUTER Note No. 10 the old four vector record is now contained in a separate bank VECT in the event record (see section 3) All records are generated in M-format.

3. Generated banks

The following banks build up the event record presently. Their formats have been described in Jade Computer Note No. 23.

Bank Name	No.	Fixed pointer in location	bank descriptor	prog. identifier
HEAD	1			
LATC	0	57	0	0
ATOF	0	59	0	0
ALGN	1	75	0	1
JETC	8	61	0	0
MUEV	0	63	0	0
PATR	12	70	result bank	
VECT	0	98	no raw data	

The old ALGL,7 bank has been replaced by the bank ALGN,1 for calibrated lead glass (see Jade Comp. Note No. 14).