NA50

DIMUREC USER'S GUIDE

Version 2.00/03

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This document refers to the NA50 reconstruction program DIMUREC, version 3.00/04

Contents

Chapter 1

INTRODUCTION

1.1 Public disks or directories

The official NA50 files needed for the reconstruction program DIMUREC are :

- On IBM, at FRCPN11, under userid NA50SERV, disk 191. They are the following (fn ft):

Filename	Filemode	Description
DIMUREC	CAR	: DIMUREC Pam-file
NA50UTIL	CAR	: NA50UTIL Car-file
LIBNA50	TXTLIB	: NA50 Library
PARAMS	NA50	: Parameter file
CONSTADC	NA50	: Hardware file
DIMUREC	LATEX or PS	: This documentation

- On UNIX :
  - On cernsp, under directory $GROUP_DIR/na50, alias /afs/cern.ch/home/throng/group/wf/na50.
  - On Basta, under directory $GROUP_DIR/na50, alias /home/na50/na50.
  - On Anastasie, under directory $THRONG_DIR/na50, alias /afs/in2p3.fr/home/throng/na50/na50.

  They are the following (fn ft):

Filename	Description
dimurec.car	: DIMUREC Car-file
na50util.car	: NA50UTIL Car-file
libna50_hp.a	: NA50 Library under HP
libna50_rs.a	: NA50 Library under AIX
params.na50	: Parameter file
constadc.na50	: Hardware file
dimurec.latex	: This documentation (subdirectory manuals)

1.2 DIMU Exec

DIMUREC is easily sent to batch (or run interactively) with dimu Exec (**dimu rec**). For more information about DIMU Exec, see NA50 FRIEND'S GUIDE or type HELP NA38 DIMU (IBM) or xhelp (Unix). You can also hit the PF1 key once you have accessed the DIMU panels.

1.3 LIBNA50 library

LIBNA50 library is on the public disk (see NA50 FRIEND'S GUIDE). It contains routines used by several NA50 programs.

In particular, it allows the reading and the decoding of the geometrical (PARAMS NA50) and hardware (CONSTADC NA50) parameters, and fills the corresponding commons (see NA50 FRIEND'S GUIDE).

1.4 NA50UTIL CAR

DIMUREC CAR needs the call of another CAR file, named NA50UTIL, in which are defined some commons and quantities involved in the different NA50 programs (see NA50 FRIEND'S GUIDE).

1.5 CRADLE

The miminum cradle to run DIMUREC is :

```
+PATCH,INSTAL,T=DATA.
+USE,NA50CDKS,NA50BLDA.
+USE,*system.
+USE,*NORMAL.
+EXE.
+PAM,11,T=C.
+PAM,12,T=C.
+QUIT.
```

where system can be IBM, VAX or UNIX.

On Unix, the two +PAM cards must be written as :

```
+PAM,11,t=c,a. (util)
+PAM,12,t=c,a. (thecar)
```

Chapter 2

DESCRIPTION OF THE DIMUREC CAR FILE

2.1 Patchs and Decks

P = STORY	1	
P = INSTAL	2	
P = *IBM	3	
P = *LIP	4	
P = *VAX	5	
P = *UNIX	6	
P = *NORMAL	7	
P = MINI	8	
P = FULL	9	
P = DEBUG	10	
P = *DISPLAY	11	
P = TESTICH	12	
P = *SPY	13	
P = *TESTMUL	14	
P = *LASTMOD	15	
P = MODCOMS	16	
P = COMDECKR	17	
P = DESCRIBE	18	
	19	D = ROUTIN
	20	D = COMCOM
	21	D = OPTIONS
	22	D = COUNTS
	23	D = FAILS
	24	D = MDST
	25	D = RAWDAT
	26	D = SCALER1
	27	D = SCALER2
	28	D = SELECT
P = DIMUREC	29	
	30	D = DIMUREC
	31	D = BLKDAT
	32	D = INIT
	33	D = ALIGNI
	34	D = HBKALI

35 D = HBKCUT
36 D = HBP1P2
37 D = INIRMH
38 D = POPTRA
39 D = READCD
40 D = USERI
41 D = PROCES
42 D = ADCCOR
43 D = BEGRUN
44 D = BGRUPR
45 D = CALMUL
46 D = CALZDC
47 D = CEFFBH
48 D = CHMTRX
49 D = CINEMA
50 D = CLEANH
51 D = CUTS
52 D = CUTTRK
53 D = DBEVT
54 D = DBMAGN
55 D = DBSIM
56 D = DBSPAC
57 D = DBSPOT
58 D = DBTRPR
59 D = DBTRSP
60 D = DBUPDE
61 D = DECCAL
62 D = DECODE
63 D = DECOFF
64 D = DIMCOU
65 D = DRWARR
66 D = DRWBOX
67 D = DRWCON
68 D = DRWDET
69 D = DRWEVT
70 D = DRWGEO
71 D = DRWHEX
72 D = DRWHOD
73 D = DRWINI
74 D = DRWKIN
75 D = DRWP12
76 D = DRWSEX
77 D = DRWSPO
78 D = DRWTRK
79 D = ENDRUN
80 D = FIDCUT
81 D = GANIL
82 D = HBKADC

83	D = HBKPED
84	D = HFIADC
85	D = HFIALI
86	D = HFIPED
87	D = HISBUK
88	D = HISFIL
89	D = HISGLO
90	D = HISMUL
91	D = HITR
92	D = HODHIT
93	D = HVOLTG
94	D = IMAGE
95	D = IMPMGT
96	D = INEFRM
97	D = INEFV
98	D = INEPT
99	D = INPTEN
100	D = INR12
101	D = INR34
102	D = INT32
103	D = MAGCDA
104	D = MAGNET
105	D = MDCLUS
106	D = MDFILT
107	D = MDSSET
108	D = MOMDET
109	D = MTARNO
110	D = MULDCD
111	D = MULNOI
112	D = MULRES
113	D = MULTTH
114	D = NORM
115	D = OUTGLO
116	D = OUTICH
117	D = PDEDX
118	D = PILEUP
119	D = PIUTDC
120	D = PINDEX
121	D = PROTRK
122	D = PRSCAL
123	D = PTASS
124	D = PTRAK1
125	D = PUCALO
126	D = PUCARF
127	D = PUTDC
128	D = PU2TDC
129	D = PUPZDC
130	D = RDSCAL

131 D = READEV
132 D = RECRAW
133 D = RESETV
134 D = RUNSUM
135 D = SELDIM
136 D = SETGEO
137 D = SETTAR
138 D = SIMULE
139 D = SPACE
140 D = SPACPR
141 D = SPSPOT
142 D = TESCUT
143 D = TESICH
144 D = TGTCTR
145 D = TGTSIM
146 D = TRACK
147 D = TRIGSX
148 D = TRKID
149 D = TSP1P2
150 D = USER
151 D = VERCHI
152 D = VERDET
153 D = VERFIT
154 D = VERINT
155 D = VRTRED
156 D = WRIMIC
157 D = WRITEV
158 D = WRSCAL
159 D = WRTRUN
160 D = YUV
161 D = FINISH
162 D = HSIGNA
163 D = OUTADC
164 D = OUTAD2
165 D = OUTALI
166 D = OUTPED
167 D = OUP1P2
168 D = OUTRMH
169 D = PROALI
170 D = RETRNF
171 D = USERF

2.2 History

Start from DIMUREC PAM, version 2.00/10, last update 29/09/93
Define pilot patches *IBM, *VAX and *UNIX.
Suppresses old NA38 set-up dependent features (NEWACQ,NEWDST)

Updates TGTCTR to run with S-U 92 data (include TGTMOD92)
Uses comdecks and data defined in NA50UTIL CAR
Fortran to be created with a cradle including NA50UTIL,
and where the system (*IBM, *VAX or *UNIX) has to be defined
(cf Patch,INSTAL, below)
Suppresses the use of a laser file (RDADCC)
Suppresses the recovery common (not used)
Defines block sizes in NA50UTIL and PARAMS files
Includes a patch DESCRIBE for program descriptions
Modifies option DEBUG (call DETAILS automatically)
Modifies the subroutine WRIMIC (4 mDST allowed)
Modifies the WRITE CARD (see READCD), allowing to write
simultaneously split, DST and (up to 4) microDST(s)
Suppresses the ONL and OFF cards and defines an EXE card
to define the routines to process (see READCD)
Merges commons KINEMA and PARVER, suppresses distinction
between opposite sign and like sign dimuons.
Modifies the subroutine PROCES
Writing onto split, DST or microDST defined by SELDIM only
Modifies the subroutine HISFIL, called only once by PROCES
Modifies the subroutine HFIADC, called only once by PROCES
Modifies the subroutine WRITEV, essentially for DST
Modifies the subroutine DECOFF, essentially for DST
Forbids writing for laser events
Merges calibration constants, pedestals,
high voltages and target radiation damage into a single file
Inserts pointers for scalers in params na50
Inserts option OLDEPIO to read tapes with blksize 13500
instead of 32760 (new EPIO standard for NA50)
Introduces routine CALZDC for ZDC study
Suppresses OB variables and routines
Refreshes BH routines (pileup and H**ADC)
Adds HSA card in READCD for storage of HBKADC histograms
VERSION 3.00/02 (03/06/95)
Modifies READCD in order to define more than 7 output tapes
Reduces the number dimuons per event from 10 to 8 in order
to be compatible with NVSEL encoding
Modifies WRIMIC to write up to 6 microDST simultaneously
Modifies HBKADC, HFIADC and WRTRUN
for a better definition of CALIBRE FILOUT
Adds NIZDC and CENTR(2) in the standard microDST
Moves CALL WRIMIC (1) from BEGRUN to READEV (because FIELD)
Suppresses OFFIMA routine (obsolete)
Modifies CLEANH and CHMTRX for a better recovery efficiency
Adds counters in CLEANH
Modifies commons and routine names to be called by DIMUJET
(option RECSIM)
Modifies decks names in common with DIMUJET ones (RECSIM)

COMDECKS, INIT, BEGRUN, HISBUK, HISFIL, FINISH
Modifies subroutine CALZDC (E. Scomparin)
Modifies subroutine TSP1P2 (Cagliari group)
Creates a common and logical flag for Ntuple creation
Modifies definition of flgs (NVSEL) in WRIMIC
VERSION 3.00/03 (26/10/95 ===> 02/02/96)
Includes modifications for multiplicity detector
Includes modifications for mob processing (option MOB)
Includes modifications for 95 new hardware
Deletes BHBADC and BHBTDC (7 and 8)
Transfer BHTADC and BHTTDC (7 and 8) into BHIADC (1 and 2)
Introduce BHINEW as BHIADC and BHITDC (3 to 6) and BAH
Put all trigger flags in ITCOUN instead of ITTYPE, JITR...
Suppresses HBKPHY, HFIPHY, OUTPHY (done with microDST)
Change subroutine CALZDC (E. Scomparin, 25/01/96)
Update subroutine MULDCD (M. Masera, 25/01/96)
Change subroutine TGTCTR, using reference file for NOCIBR
Modify content of select file (see DESCRIBE,SELECT)
Modify content of microDST's (see DESCRIBE,SELECT)
Two-pass reconstruction without updating IUSPOT
Changes in ADCCOR and CALZDC (Enrico, 26/01/96)
Add subroutines for M.D. (Luciano, 26/01/96)
VERSION 3.00/04 (26/07/96 ===> 25/11/96)
Modify format in OUTALI
Modify DRWHOD for R4
Insert histograms of R hodoscope profiles
Allow ISTOR(1) = -2 to avoid HINDEX
Allow HSTO(I) = -2 to avoid PINDEX (option TESTADC)
Correct mass calculation for active target
Add ETOTRA new calculation and histogram for signal
Add PUPZDC routine for pileup seen by ZDC (see also PILUCU)
Modify TGTCTR for new NOCIBR algorithm
Modify standard microDST content (RNGCOR instead of ETOTRC)
Modify global cut additional microDST for dphi precision
Modifs for multiplicity detector, 1995 and 1996 Pb-Pb runs :
Add normalization of MD histos 9501-04 (D=FINISH)
Remove inconsist. in MULRES (IDMAP undef. if TESTADC)
Put MAXTOS in common (Z=MULDET)
Renumber chip_id, col_no, hit_mult/sector histos
Add PRIBUR, ABSBUR, NTUPLE(2) (see READCD)

Chapter 3

DESCRIPTION OF THE PROGRAM

PROGRAM DIMURC

NA50 DIMUON EXPERIMENT RECONSTRUCTION PROGRAM

This program decodes raw data and simulated data tapes, performs a pattern recognition, computes the momentum of the reconstructed tracks, fits the vertex and compensates the energy lost in the absorber.
It decodes and analyses information from the detectors located in front of the NA10 absorber (called upstream detectors), namely beam hodoscope, beam counters, electromagnetic calorimeter, interaction and multiplicity counters.
The results are optionnally written on split tape or data summary tape (DST) or microDST.
The program is steered by command cards (see subr. READCD)

Logical units :	LFIN	= input (1)
	LFOUT	= output (2)
	LFHIS	= histograms or plots (3)
	LFTIM	= execution time output (4)
	LFTERM	= terminal output (6)
	LFPAR	= geometric parameters (7)
	LFSCA	= scaler summary for run selection (8)
	LFSEL	= selected runs (9)
	LFMETA	= metafile or postscript (10)
	LFTMS	= information for tape-management (11)
	LFTAPS	= input/output information (20)
	LFCONS	= ADC constants input (21)
	LFPEDO	= ADC pedestal output (31)
	LFCALO	= ADC calibration output (32)
	LFTIN	= data input (41)
	LFTOUT(I)	= result output (50+I)
	LFTRM	= terminal output for display (61)

The reference frame is right-handed,with the z-axis along the beam direction.
Units are :

energy, momentum, mass : GeV, GeV/c, GeV/c^2
length : cm
angle : radian (or locally degree)

BLOCK DATA BLKDAT

Initialises constants of general use :
- -file names
- -flags
- -default values
- -event counters
- -information for file I/O
- -physical constants

SUBROUTINE INIT

Job initialisation : computes numerical constants,initialises I/O files

SUBROUTINE ALIGNI

Initialises variables for alignment

SUBROUTINE HBKALI

Histogram booking for survey of offline tracking and alignment

SUBROUTINE HBKCUT

Histogram booking for testing the offline cuts

SUBROUTINE HBP1P2

Histogram booking for test of validation by P1 and P2(called by INIT)

SUBROUTINE INICAL

Initialises the calculation of dE/deta from calorimeter (called by INIT)

SUBROUTINE INIRMH

Initialises the tests of the RMH efficiency

SUBROUTINE POPTRA

Prints the contents of common OPTRAC (called by INIT)

SUBROUTINE READCD

Reads the command cards in format A3, A7, 7F10.3.
A second card (in the same format) may follow; the cards can appear in any order, except for the last one, which must be 'END'.
Only the first three letters of the keyword are checked.

ALI -	alignment option	
	1st parameter :	1st reference chamber
	2nd parameter :	2nd reference chamber
	3rd parameter :	1st secondary reference chamber
	4th parameter :	2nd secondary reference chamber
	5th parameter :	0 or 1: if 1, 3 cards follow
	with each 8 coefficients CORRCH(PLANE,CH) in 8F6.3	
BUR -	selection of bursts to process	
	1st parameter :	1st burst to process (def: 1)
	2nd parameter :	last burst to process (def: 1000000)
CAL -	flag to print some beam calibration and scaler blocks	
	1st parameter :	number of bursts to be printed (def: 10)
	2st parameter :	number of bob to be printed (MD,def: 10)
	3nd parameter :	histogramming absolute burst number
CUT -	cuts on target quantities and on association of tracks in space	
	1st parameter :	transverse cut at Z = 0. (DCIBLE)
	2nd parameter :	closest distance of approach in air (CDACUT(1))
	3rd parameter :	closest distance of approach in iron (CDACUT(2))
	4th parameter :	deviation of Z-position of crossing point in air (ZCRCUT(1))
	5th parameter :	deviation of Z-position of crossing point in iron (ZCRCUT(2))
	6th parameter :	Phi difference (Fwd - Bwd) in air (DPHCUT(1))
	7th parameter :	Phi difference (Fwd - Bwd) in iron (DPHCUT(2))
	8th parameter :	cut on Z-position of the vertex (CUTZV)
DEB -	debug print-out	
	1st parameter :	1st current event to be printed
	2nd parameter :	last current event to be printed
	3rd parameter :	total number of pathological events to print (def : 10)
	4th parameter :	1st event number to be printed
	5th parameter :	last event number to be printed
	6th parameter :	number of accepted events to be printed (cancels previous parameters)
EXE -	generic routines to be called in 7A10 format	

		Allowed routines are : DECADC,DECMUL, TGTCTR,CALCUL,PILEUP,DECODE,TRACK,VERDET N.B. Once you have an EXE card, program executes only the called routines, even if your choice is crazy!
EFC -	chamber inefficiency simulation (INCFF)	
GLO -	cuts to be applied offline	
	1st parameter :	cut on χ^2 proba for target (def. 1.0)
	2nd parameter :	cut on χ^2 proba for magnet (def. 1.0)
	3rd parameter :	cut on χ^2 proba for delphi (def. 1.0)
	4th parameter :	cut on χ^2 proba for all 3 (def. 1.0)
	5th parameter :	nb of vertex per event (MAXDIM)
	6th parameter :	cut on minimum mass (CUTMA1)
	7th parameter :	cut on maximum mass (CUTMA2)
	8th parameter :	selection flag on dimuons in SELDIM 1 = sel FIDCHA,FIDR12,VR3R4C 2 = same as 1 + sel IMAGE
	9th parameter :	selection flag on NOCIBI (see CUCIBI)
	10th parameter :	selection flag on NOCIBR (see CUCIBR)
	11th parameter :	selection flag on pileup (see PILUCU)
	12th parameter :	selection flag on only one vertex
	14th parameter :	flag for an effective selection of events in SELDIM (1 = .T.) (def: 0)
HBO -	histogram request for options	
	1) when option ALIGN is selected :	
	1st parameter :	1 select statistics of reconst. quality per half-plane
	3rd parameter :	1 select histograms of alignment control
	4th parameter :	1 select histograms of "spot - projected spot" per half-plane
	2) when option TESTADC is selected :	
	1st parameter :	select BH histograms
	2nd parameter :	select BIBO and laser histograms
	3rd parameter :	select target histograms
	4th parameter :	select calorimeter histograms
	5th parameter :	select ZDC histograms
	6th parameter :	select trigger histograms
	7th parameter :	select MD histograms
	parameter = 1 :	first level of histograms
	parameter = 2 :	second level of histograms (if any)
	parameter = 4 :	third level of histograms (if any)
HIS -	histogram request for general purpose	
	1st parameter :	histograms of mass and vertex

	2nd parameter :	histograms of energy
	3rd parameter :	histograms of other things
	4th parameter :	histograms of image cut
	5th parameter :	histograms of ZDC results
HSA -	TESTADC histogram storage request	
	all parameter :	same as in HBO card when TESTADC option is requested
		parameter = 1 : HPRINT and HSTORE
		parameter = -1 : HSTORE only
HST -	standard histogram storage request	
	1st parameter :	1st histogram ident to store (¡= 0 : all, < 0 : not HISTDO)
	2nd parameter :	last histogram ident to store
	3rd parameter :	1st histogram ident to store,second set
	4th parameter :	last histogram ident to store,second set
LIS -	read a list of events to process : the list must be placed after the END command card ; the event numbers are integers, separated by commas or blanks; there are 20 event numbers per line; the list ends with a zero	
NTU -	Ntuple histogram storage request	
	1st parameter :	ntuple for general purpose :
	the content of the histogram(s) is given as an example and has to be modified by user	
	2nd parameter :	ntuple for MD (with option TESTADC)
PDE -	switch to print	details of tracking
	1st parameter :	1 reconstruction in projection
	2nd parameter :	1 reconstruction in space
PRI -	printout of ADC	constants
	1st parameter :	flag (printout if > 0) (def: false)
PRO -	events to process	
	1st parameter :	1st current event to process (def: 1)
	2nd parameter :	last current event to process (def: 10**6
	3rd parameter :	1st raw event to process (def: 1)
	4th parameter :	last raw event to process (def: 10**6)
RLI -	read a list of runs to process	
	1st parameter :	0 ==> LISTRN=.TRUE. the list is after the END card; there is one run number per line, free format the list ends with a zero
	1st parameter :	1 ==> CHOIX=.TRUE.

		read selected runs from file LFSEL
ROA -	road width parameters	
	1st parameter :	multiplicative coefficient of variance in projection reconstruction Fwd (ROADPR)
	2nd parameter :	idem for Bwd telescope
	3rd parameter :	road width in space association Fwd (ROADSP)
	4th parameter :	idem for Bwd telescope
	5th parameter :	road width in space association recovery Fwd (ROADRE)
	6th parameter :	idem for Bwd telescope
	7th parameter :	distance of the Fwd-Bwd association in air (ROADMA)
RUN -	selection of runs to process	
	1st parameter :	1st run to process (def: 1)
	2nd parameter :	last run to process (def: 100000)
SEL -	selection according to various criteria	
	1st parameter :	target :length * 1000 + NZHTAR
	2nd parameter :	minimum argonium *E-5
	3rd parameter :	strength of magnetic field (MAGFLD)
	4th parameter :	sign of magnetic field (MAGCUR)
	5th parameter :	trigger type (TRIGG) bit 1 : dimuon bit 2 : laser bit 3 : piedestal bit 4 : minimum bias
	6th parameter :	selection of bursts (CRIBUR) 1 = empty bursts 2 = bursts with nb of bursts > 1 4 = bursts with FIELDF = 0
	7th parameter :	sampling of unbiased events (UNBSAM)
TRA -	tracking switches	
	1st parameter :	1st reconstructed telescope (LOGTEL)
	2nd parameter :	2nd " "
	3rd parameter :	association type (IASSTY) 0 = projection, 1 = space (def: 1)
	4th parameter :	idem
	5th parameter :	magnet constraint (KONSPAC) 0 = no, 1 = yes (def: 1)
	6th parameter :	recup. in space reconstruction (KRECUP) -1 = no, 0 = all spots 1 = spots not used in space 2 = spots not used in projection
	7th parameter :	minimum number of spots required to

recover the missing projection (NBRECU)

WRI -	write results on output file(s)	
	1st parameter :	write a split tape (and version number)
	2nd parameter :	write a DST (and its version number)
	3rd parameter :	write a standard mDST (version number)
	4th parameter :	write global cut mDST (version number)
	5th parameter :	write target mDST (version number)
	6th parameter :	write calo mDST (version number)
	7th parameter :	write ZDC mDST (version number), and if parameter > 1000 read continuation card :
	8th parameter :	write BH mDST (version number)
END -	last command card. This card must be present	

SUBROUTINE USERI

Subroutine for user's own calculation at initialisation time

SUBROUTINE PROCES

Process the requested number of events (this is the main reconstruction routine)

SUBROUTINE ADCCOR

Corrects the ADC content (/NA50DA/) using the calibration information to get the calibrated corresponding values (/NA50CO/) (called by PROCES)
Set ACCEPT to .F. if laser trigger

SUBROUTINE BEGRUN_REC

Beginning of run handling (called by READEV or ENDRUN)

SUBROUTINE BGRUPR

Print-out of the Beginning-of-run informations (called by BEGRUN_REC)

SUBROUTINE CALCUL

Computes the dE/deta and the deposit energy in the calorimeter (called by PROCES)

SUBROUTINE CALMUL

Computes the standard microdst variables for the multiplicity detector (called by PROCES)
Outputs : MULT1, MULT2, NSEC1, NSEC2
Created 22/01/1996 (L.R.), last mod 25/01/1996 (M.M.)

SUBROUTINE CALZDC

Routine for handling informations from zero-degree calorimeter.

SUBROUTINE CEFFBH (IGO)

Computes the BH efficiency (called by ENDRUN (IGO = 1) and FINISH (IGO = 2))

SUBROUTINE CHMTRX (KS,KW)

Checks all combinations of counters hit in one sextant, saving only those consistent with the PT and the matrix (called by CLEANH)

SUBROUTINE CINEMA

Computes the kinematical parameters of the dimuon and its decay products (called by PROCES)

SUBROUTINE CLEANH

Checks V, R3, R4, PT, for consistency with the matrix. If one is missing, use the matrix condition to recover it; fill the common GCTHIT (called by PROCES)

SUBROUTINE CUTS

Defines a flag NVSEL in terms of geometrical, fiducial and trigger cuts (called by PROCES)
Coding of NVSEL is :
JBIT (NVSEL,XXX) = result of SELDIM (= 1 if accepted)
(with XXX = XT+4*(XN-1) , where :
.... XN = vertex number
.... XT = 1 FIDCUT chamber test result
.... XT = 2 FIDCUT counter test result
.... XT = 3 D-D test
.... XT = 4 V-R3-R4 test)

SUBROUTINE CUTTRK

Computes the geometrical variables DTAR, DMAG and DPHI for each track and defines the NVSEL flag if the χ^2 probability of these variables are lower than PRBCUT (called by PROCES)

SUBROUTINE DBEVT

Debug print-out of selected events (called by PROCES)

SUBROUTINE DBMAGN

Prints common IMPMAG (called by DBEVT)

SUBROUTINE DBSIM

Print-out of simulation information for debug (called by DBEVT)

SUBROUTINE DBSPAC

Prints common ASSPAC (called by DBEVT)

SUBROUTINE DBSPOT (ITEL)

Prints common SPOTCH and common SEXTANT (called by DBEVT)

SUBROUTINE DBTRPR

Prints common TRAPRO (called by DBEVT)

SUBROUTINE DBTRSP

Prints common TRASPA (called by DBEVT)

SUBROUTINE DBUPDE

Prints common NA50DA (ADC's and PU for new detectors) (called by DBEVT)

SUBROUTINE DECCAL (IGO)

Decodes beam calibration blocks

SUBROUTINE DECODE (ISTEP,NFLAG)

Decodes the raw data block (called by PROCES)
If ISTEP = 1, according to NFLAG, decodes the NA50 ADC branch and fill the common NA50DA (NFLAG = 1) or decode the multiplicity detector branch (NFLAG = 2)
If ISTEP = 2 decodes the hodoscope information and fill /CTHIT/
If ISTEP > 2 decodes the chamber information for telescope ISTEP - 2

SUBROUTINE DECOFF (INDEX)

Decode the offline information read from a split tape (called by READEV)

SUBROUTINE DIMCOU (ID1ST,IPR)

Counts the number of dimuons in different mass bins from histograms (called by WRTRUN and FINISH)

SUBROUTINE DRWARR (XMIN,XMAX,YMIN,YMAX,NLINE)

Draws an arrow (called by display routines)

SUBROUTINE DRWBOX (XMIN,XMAX,YMIN,YMAX,NCOLO,NFILL,NLIN

Draws a box (called by display routines)

SUBROUTINE DRWDET (NUMVUE,IBID)

Display the upstream detectors (called by DRWEVT)

SUBROUTINE DRWEVT

Steering routine of display of events (called by PROCES)

SUBROUTINE DRWGEO (NUMVUE,NUMPRO)

Draws the layout to be displayed, using the geometrical parameters given by the setup number (called by DRWEVT)

SUBROUTINE DRWHEX (RMIN,RMAX,ANGLE,NLINE)

Draws an hexagone, starting from ANGLE (called by display routines)

SUBROUTINE DRWHOD (NUMHOD,NPROJ)

Subroutine to draw hits in R-hodoscopes in a given projection (called by DRWEVT and DRWTRK)

SUBROUTINE DRWINI

Initialisation routine of display (called by INIT)

SUBROUTINE DRWKIN

Displays some kinematical parameters of event (called by DRWEVT)

SUBROUTINE DRWP12 (RMIN,RMAX,ANGLE,NFILL,NLINE)

Subroutine to draw a hit scintillator of P1 or P2 over R2 or R4 (called by DRWHOD)

SUBROUTINE DRWSEX (RMIN,RMAX,ANGLE,NFILL,NLINE)

Subroutine to draw a sextant of a given angle and aperture (called by DRWHOD)

SUBROUTINE DRWSPO (IGO,IPROJ,Y,RMAX)

Displays the MWPC hit wires (called by DRWEVT and DRWTRK)

SUBROUTINE DRWTRK (NUMPRO)

Subroutine to draw tracks and MWPC hits in a given projection (called by DRWEVT)

SUBROUTINE ENDRUN

End of run handling (called by READEV)

SUBROUTINE ERREC (NERROR)

System error recovery (On LIBNA10 for IBM)

SUBROUTINE FIDCUT (N,I,IFID)

Fiducial cuts at beam killer (called by SELDIM)
The outer chamber fidcuts are automatic (no ampli in data, not coded wire number for M.C.; results are :
... IFID = 0 not reconstructable track after fiducial cuts
... IFID = 1 track reconstructable but outside at least one chamber
... IFID = 2 track reconstructable and inside everywhere
... IFID = 3 track outside scintillators in R1 or R2

SUBROUTINE GANIL

Fills the histograms of GANIL chambers (called by READEV)

FUNCTION GAUFTR (X)

Gaussian of given mean value and sigma given in CALDAT (called by INTEGR)

FUNCTION GAUFTO (X)

Gaussian of given mean value and sigma given in CALDAT, divided by
sin(2Arctg(exp(-X))) (called by INTEGR)

SUBROUTINE HBKADC

Histogram booking for survey of ADC's (called by BEGRUN_REC)

SUBROUTINE HBKPED

Histogram booking for survey of ADC pedestals (called by BEGRUN_REC)

SUBROUTINE HFIADC

Fills the ADC's histograms (called by PROCES)

SUBROUTINE HFIALI

Histogram filling for alignment (called by PROCES)

SUBROUTINE HFIPED

Histogram filling for ADC pedestal measurement (called by PROCES)

SUBROUTINE HISBUK_REC

User's routine for general histogram booking (called by BEGRUN_REC)

SUBROUTINE HISFIL_REC

User's routine for general histogram filling (called by PROCES, whatever the rejection flag, which is taken into account in the subroutine HISFIL_REC itself)

SUBROUTINE HISGLO (IGO)

Histogram filling for survey of CUTS

SUBROUTINE HISMUL (IGO,ITEL)

Histogram booking, filling and printing (according to IGO) for multiplicity studies; ITEL = telescope (called by INIT, TRACK, PROCES, ENDRUN and FINISH)

SUBROUTINE HITR_REC (NN,ITEL)

Determines the scint. and sext. hits by a track from the parameters of the track (called by IMAGE)

SUBROUTINE HODHIT (NT,ITEL)

Checks that the reconstructed tracks correspond to a hit scintillator (called by SPACPR)

SUBROUTINE HVOLTG (IGO)

Computes calo calibration coefficients and prints them (called by READEV if HV block is found or by BEGRUN_REC if not)

SUBROUTINE IMAGE

Computes the parameters of the reflected track, and the scint. and sextants hit by this track (called by CUTTRK)

SUBROUTINE IMPMGT (ITEL)

Computes impact in mid-plane of the magnet for all reprojected space tracks (called by TRACK)

SUBROUTINE INEFRM

Computes RMH inefficiencies (called by PROCES)

SUBROUTINE INEFV (ISEXT)

Searches for V's inefficiencies over sextant ISEXT of R1-R2 (called by INEFRM)

SUBROUTINE INEPT (ISEXT)

Searches for PT's inefficiencies over sextant ISEXT (called by INEFRM)

SUBROUTINE INPTEN (ISEXT)

Searches for encoded-PT's inefficiencies over sextant ISEXT (called by INEFRM)

SUBROUTINE INR12 (ISEXT)

Searches for R1-R2 inefficiencies over sextant ISEXT (called by INEFRM)

SUBROUTINE INR34 (ISEXT)

Searches for R3 and R4 inefficiencies over sextant ISEXT (called by INEFRM)

SUBROUTINE INTEGR (FONCT,BORNE,SOM)

Computes integral of a given gaussian function FONCT within limits BORNE (called by INICAL). Warning : the limits are in decreasing order.

SUBROUTINE MAGCDA (N1,N2,CROSS,CDA)

Computes cross-point and CDA of front / back tracks (called by MAGNET)

SUBROUTINE MDCLUS (IDET,ISECT)

See Luciano (called by MULRES)

SUBROUTINE MDFILT

See Luciano (called by MULDCD)

SUBROUTINE MDSSET (NRUN,PRFL)

MD setup determination based on run number (12/12/1995 M.M., modified 22/01/96 L.R.) (called by BEGRUN)

SUBROUTINE MAGNET

Fwd-Bwd space association in magnet middle plane (called by TRACK)

SUBROUTINE MOMDET

Computes the momentum of the particles (called by PROCES)

SUBROUTINE MTARNO (NTRACE)

Internal routine for momentum calculation (called by MOMDET)

SUBROUTINE MULDCD

Decodes M.D. info : created (4-SEP-1995) by Massimo Masera
Sector multiplicity (20-OCT-1995) Bruno Alessandro
last update 24-OCT-1995 M.M.
(called by DECODE)

SUBROUTINE MULNOI (NUMER,NBUSIF,NSLOT,NCDP,NSTR,IDET,ISTR

Decode address of the noisy strip pointed by NUMER (called by MULDCD)

SUBROUTINE MULRES

Fill histograms on multiplicity detectors, compute the total multiplicity and the total timeout for each detector (called by HFIADC)

SUBROUTINE MULTTH

Treat threshold scan vectors HITCDP and EVCDP at the end of a group of bursts and write output on threshold scan (Version 06.01/1995, LRA)
(called by MULDCD)

SUBROUTINE NORM (ISEXT)

Computes final RMH and counter inefficiencies (called by INEFRM)

SUBROUTINE OUTGLO

Puts the global cut histograms into a file (called by ENDRUN and FINISH)

SUBROUTINE OUTICH

Prints the chamber efficiency control results (called by ENDRUN)

SUBROUTINE PDEDX

Corrects for the average energy loss by ionisation,bremsstrahlung and pair creation in the target, the absorber and the iron pieces, if relevant (called by PROCES)

SUBROUTINE PILEUP (IGO)

Gives pile-up information in word FPILUP (called by PROCES) : pile-up information is taken from BH PU, BH ADC's, BI PU,BI ADC's, flash calo ADC's

SUBROUTINE PINDEX (ID1,ID2)

Draws an HBOOK-style index for histograms between ID1 and ID2

SUBROUTINE PIUTDC (BINF,BSUP,T0BH,DTMIN,DT2MIN,NTDC)

Computes the time of arrival of ion in BH in order to adjust the flash calo interaction algorithm (called by PILEUP)

SUBROUTINE PRSCAL (IGO)

Prints the scaler sums and their average per burst (IGO < 4, called by RDSCAL) or per run (IGO $= 4$, called by RUNSUM) or per job (IGO $= 5$, called by FINISH)

SUBROUTINE PUCALO

Interaction pile-up determination from calorimeter (called by PILEUP)

SUBROUTINE PUCARF (IGO,NVOIE,PUNORM)

Interaction pile-up reference for calorimeter (called by PUCALO)

SUBROUTINE PUTDC (BINF,BSUP,DTMIN,DT2MIN,NTDC)

Computes the time of arrival of ion in BH in order to adjust the flash calo interaction algorithm (called by PUCALO)

SUBROUTINE PU2TDC

Called by PUTDC

SUBROUTINE PROTRK (ITEL)

Interface routine for projection reconstruction (called by TRACK)

SUBROUTINE PTASS (ISEXT)

PT assembly in sextant ISEXT, using KTRKCB (called by INEFRMH routines).

SUBROUTINE PTRAK1 (ITEL,IPR)

Finds straight lines from coordinates in each projection; all planes are assumed parallel and perpendicular to Z-axis; sparks are used only once (called by PROTRK)

SUBROUTINE RDSCAL (IGO)

Handles Pattern units and scalers (called by READEV)

SUBROUTINE READEV

Reads and decodes blocks from input file

SUBROUTINE RESETV

Resets all relevant variables for each event (called by PROCES)

SUBROUTINE RUNSUM

Prints the end-of-run summary (called by ENDRUN)

SUBROUTINE SELDIM

Selects dimuons according to various criteria for standard cuts and cuts on reflected tracks (called by PROCES)

SUBROUTINE SETGEO_REC (NSTSAM)

Computes geometrical additional quantities and limits of each absorber and modifies some geometrical parameters according to the run number

SUBROUTINE SETTAR

Computes coordinates and material of the target (heavy or segmented) (called by BEGRUN_REC)

SUBROUTINE SIMULE (IFLAG,DSTMC)

Decodes information related to a simulated event (called by READEV)

SUBROUTINE SPACE (ITEL)

Space reconstruction for linear tracks (called by TRACK)

SUBROUTINE SPACPR (ITEL,NBREQ,LTT,KP,NNN,JONI)

Track reconstruction in space (called by SPACE)

SUBROUTINE SPSPOT (NT,LPR,ITEL)

Updates the IUSPOT value to 2 (called by PTRAK1)

SUBROUTINE TESCUT

Tests the online cuts (called by PROCES)

SUBROUTINE TESICH

Controls the chamber efficiency (called by PROCES, after TRACK if MINTR = 1, after CINEMA if MINTR = 2)

SUBROUTINE TSP1P2

Controls the online validation by P1 and P2 (called by PROCES)

SUBROUTINE TRACK

Track reconstruction and Fwd-Bwd association (called by PROCES); this is the main routine for pattern recognition

SUBROUTINE TRIGSX

Decodes the event trigger type (called by INEFRM)

SUBROUTINE TRKID (ISEXT)

Identifies tracks-counters for complete sextants (called by INEFRM)

SUBROUTINE TGTCTR

Computes the subtarget(s) where primary (and eventually secondary) interaction(s) occurs (called by PROCES)

SUBROUTINE TGTSIM

Computes the subtarget where primary interaction has been generated in case of simulated tape (called by PROCES)

SUBROUTINE USER_REC (IGO)

For user's own calculations at processing time (called by PROCES after READEV (IGO = 0), after upstream detector handling routines (1), after CLEANH (2), after TRACK (3), after MOMDET (4) and after CINEMA (5)

FUNCTION VERCHI (Z,N1,N2)

Computes χ^2 for vertex fit (called by VERFIT)

SUBROUTINE VERDET

Searches the vertex coordinates for each couple of tracks and compute the kinematical parameters at the vertex (called by PROCES)

SUBROUTINE VERFIT (N1,N2)

Fit of the vertex (NA3 style) (called by VERDET)

SUBROUTINE VERINT

Computes the moments of the function 1. / RADL0(Z)

SUBROUTINE VRTRED

Suppresses one vertex if a previous one is done almost with the same tracks and has the same mass (called by VERDET)

SUBROUTINE WRIMIC

Writes the required information onto microDST (called by PROCES)

SUBROUTINE WRTBLK (IGO,JCUR)

Fills the output tape buffer with blocks (called by several routines)
If IGO = 1, copy one block onto the 1st logical output file only
If IGO = 2, copy one block onto the 2nd logical output file only
If IGO = 3, copy one block onto the two logical output files
If IGO > 3, copy one block created in WRTEVT (IRAW)
If IGO > 3, IGO = IGO - 3

SUBROUTINE WRTEVT

Fills the output tape buffer with event (called by PROCES)

SUBROUTINE WRSCAL

Writes the scaler sum blocks (as calculated offline) onto output tape (called by ENDRUN)

SUBROUTINE WRTRUN

Computes the number of Psi's and HMA's from histograms; if option FICHIER is selected, writes the run summary onto LFSCA (called by ENDRUN)

SUBROUTINE YUV (ITEL,IP,K,K2,L,K3,KS,W)

Computes impact W on KS for K,L association (called by several routines)

SUBROUTINE FINISH

Prints job summary, edits histograms, ends job and closes files (called by several routines)

SUBROUTINE OUTADC

Makes operations on ADC histograms and edits them (called by FINISH)
Writes mean values of calo raw ADC's if option FICHIER

FUNCTION OUTAD2

Used to superimpose ADC histograms (called by OUTADC)

SUBROUTINE OUTALI

Prints the result of alignment routines (called by FINISH)

SUBROUTINE OUTPED

Edits histograms of ADC pedestal and writes result on LFPEDO (called by FINISH)

SUBROUTINE OUP1P2

Prints results of P1-P2 validation tests (called by FINISH)

SUBROUTINE OUTRMH

Prints results of RMH and counter efficiency control routines (called by FINISH)

SUBROUTINE PROALI (ID,TIT,NX,XMI,XMA,NY,YMI,YMA,V)

Profiles histogram for alignment scatter plots (called by OUTALI)

SUBROUTINE USERF

For user's own calculations at termination time (called by FINISH)

Chapter 4

DESCRIPTION OF ALL VARIABLES

SUBROUTINE COMCOM

BLANK COMMON

```
      PARAMETER (IWSMAX = 13000)
       COMMON // IWS(IWSMAX)
```

IWS	working space
IWSMAX	length of working space

NEEDED QUANTITIES FOR ALIGNMENT

```
      COMMON /ALIGNE/ NOREF(2,2),CORRCH(4,8),OLDPCH(4,8)
     1  ,DLS(8),NLS(8),DDY(48),NBY(48),DDPROJ(48),NBPROJ(48)
     2  ,DDPIVO(48),NBPIVO(48),ALICIB(5)
```

NOREF	Number of reference chambers for alignment
CORRCH	Correction values for YPOCH (CACH in PARAMS)
OLDPCH	Old values for YPOCH (to print in summary)
DLS	Y+U+V per chamber
NLS	Number of tracks used to measure DLS
DDY	(U+V)reproj - Y
NBY	Number of tracks used to measure DDY
DDPROJ	Diff trace projection - spot
NBPROJ	Number of tracks used to measure DDPROJ
DDPIVO	Diff trace pivot in projection - spot
NBPIVO	Number of tracks used to measure DDPIVO

SPACE BWD-FWD ASSOCIATION

```
      PARAMETER (MXASS = 15)
      COMMON /ASSPAC/ MINTR,MINTRD
     1  ,NBTRK,PTRF(MXASS),CUT(MXASS,3,2),NASEXT(MXASS)
     2  ,LOGSPA(MXASS,2),PTRSP(MXASS),DPTRSP(MXASS)
     3  ,DPTRF(MXASS),PTTRSP(MXASS),ISBISP(MXASS,2)
     4  ,VARCUT(MXASS,5,2),ACCFL(MXASS,2),MAGNOK(MXASS)
      LOGICAL ACCFL,MAGNOK
      COMMON /ASSPCC/ TYPT(MXASS)
```

```
CHARACTER*4 TYPT
COMMON /ASSPC2/ COORT(MXASS,3,8),DCOORT(MXASS,3,8)
```

MXASS	max number of associations
NBTRK	number of associated tracks (Fwd-Bwd)
MINTR	minimum number of tracks to continue processing (def : MINTRD)
MINTRD	minimum number of tracks given in BLKDAT
TYPT	type of the track (air-air;air-iron;iron-iron)
PTRSP	momentum*charge (after MOMDET)
DPTRSP	error on ptrsp (not used)
PTRF	momentum*charge (after PDEDX)
DPTRF	error on ptrf (not used)
PTTRSP	Pt*charge (after MOMDET)
LOGPR	logical number of projected tracks in TRAPRO 1st index = logical space track number 2nd index = projection number (1 to 6) 3rd index = telescope number
LOGSPA	logical number of projected tracks in TRASPA 1st index = logical space track number 2nd index = telescope number
ACCFL	flag for track satisfying the global cut 2nd index = direct or reflected track
ISBISP	Pt-superbin (track nb,direct and image)
COORT	coordinate of hit in MWPC (nb track,plane,cham)
DCOORT	error on coort (ERRCO)
MAGNOK	flag for track having its reflected track in the acceptance of the Bwd tel. (track nb)
VARCUT	variable used for global cut study I,J,K : track I, K = 1 for direct, 2 for image J = 1,2 target delta x, delta y J = 3,4 magnet delta x, delta y J = 5 delta phi
CUT	another variable used for global cut study I,J,K : track I, K = 1 for direct, 2 for image J = 2 dmag ; J = 3 dphi

BURST INFORMATION AND MONITORS

```
      PARAMETER (MSCAL = 256, MWSCA = 256)
      COMMON /BURST/ NBURST,NBURSR,IBURST,NBRJOB(4),NBBISC
     1  ,NBRRUN(4),NBRISC,NEVREJ,NBNWBR
     2  ,SCALR(MSCAL),SCALS(MSCAL),WSCLR(MWSCA),WSCLS(MWSCA)
     4  ,BEAMR(4),BEAMS(4),NLINKR,NLINKS,ASYMDG,ASYMHB
     5  ,BURHUR,BURMIN
      INTEGER BURHUR,BURMIN
```

NBURST	number of bursts

NBURSR	number of bursts in current run
IBURST	current burst number
BURHUR	burst time (hour)
BURMIN	burst time (minute)
NTRNDR	number of undeadtimed triggers in run
NBRJOB	number of rejected bursts in job
	I = 2 number of bursts with ACM = 0
	I = 3 number of bursts with pause
	I = 4 number of empty bursts
NBRRUN	number of rejected bursts in run
	I = 2 number of rejected bursts with ACM = 0
	I = 3 number of rejected bursts with pause
	I = 4 number of empty bursts
NBBISC	number of scaler blocks read
NBRISC	number of scaler blocks read in this run
NEVREJ	number of rejected events (see SELECT param 7)
SCALS	scaler sum
SCALR	scaler sum in current run
BEAMS	beam link scaler sum
BEAMR	beam link scaler sum in current run
ASYMDG	left-right assymetry given by BI quadrants
ASYMHB	top-bottom assymetry given by BI quadrants
NLINKS	number of beam link blocks read
NLINKR	number of beam link blocks read in current run
WSCLS	NA50 new scaler sum
WSCLR	NA50 new scaler sum in current run
NBNWBR	number of NA50 scaler blocks read

PHYSICAL AND NUMERICAL CONSTANTS

```
COMMON /CONST/ ALAIR,ALFER,ALAPF,TEL(2),ALPHAN(32),RHOD(9)
DIMENSION TYPAF(3)
CHARACTER*4 ALAIR,ALFER,ALAPF,TEL,TYPAF
CHARACTER ALPHAN*2,RHOD*2
EQUIVALENCE (TYPAF(1),ALAIR),(TYPAF(2),ALFER),(TYPAF(3),AFAPF)
```

ALAIR	Alphanumeric for 'AIR '
ALFER	Alphanumeric for 'FER '
ALAPF	Alphanumeric for 'APF ' (air ou fer)
TEL	Alphanumeric telescope number
ALPHAN	Alphanumeric numbers from 1 to 32

MOMENTUM CALCULATION

```
COMMON /CHAMP/ ZMIL,ZBEG,ZBEGF,ZENDF,B02,UB02,BOEFF,AC,RES
```

ZMIL	Z middle of magnetic field
ZBEG	Z beginning of non-zero magnetic field

ZBEGF	Z beginning of magnetic field
ZENDF	Z end of magnetic field
B02	field constant
UB02	1./B02
BOEFF	used for momentum calculation
AC	used for momentum calculation
DSLOT	middle point of iron slots
RES	used for momentum calculation

HITS IN HODOSCOPES

```
 PARAMETER (MAXCO = 200,NVCTH=247)
 COMMON /CTHIT/ NTCO,NTCOR,NEVPRE,IRAWLG
1   ,NSEXT(11),IASEXT(6,11),NSCINT(6,11),IPSCIN(6,11)
3   ,ISXTCB(15),ITCOUN,KOMHOD(6),IORHV(2,6),IASCIN(MAXCO)
```

MAXCO	max. allowed number of hit scint. (all hods.)
NTCO	total number of hits
NTCOR	total number of hits in R1, R2, R3, R4
NSEXT	number of hit sextants (hod) (hod = R1, R2, R3, R4, V, PT, P1,P2,P1P2,P2I,P2E)
IASEXT	address of hit sextant (number,hod)
NSCINT	number of hit scint. (sext,hod)
IPSCIN	pointer to 1st hit scint. in IASCIN
IASCIN	address of hit scint.
ISXTCB	sextant combinations
KOMHOD	hodoscope combinations (for efficiency checks)
ITCOUN	Trigger information (from RMH, saying trigger unbias,external,single,2P1P2,2mus,3mus,ZDC, laser,ORP1P2,master,synchro,TSJ,TSJ SOS,T0J, and TSJ,SOS,T0J,laser,ZDC,ORP2PT,ORBH from ADC branch)
NEVPRE	Number of offline prescaled events
IRAWLG	length of raw data block
IORHV	OR of V's per half-sextant (half-sext,sextant)

DATA TO TEST THE CUTS OF THE PROGRAM

```
 COMMON /CUTTES/ CIBMX,MAGMX,ROPMX,SPAMX,CDAMX,ZCRMX
1   ,DPHMX,VRTMX
```

CIBMX	maximum value for DCIBLE
MAGMX	maximum value for ROADMA
ROPMX	maximum value for ROADPR
SPAMX	maximum value for ROADSP
CDAMX	maximum value for CDA (closest dist. of appr.)
ZCRMX	maximum value for ZCR (z-intersection in magnet)
DPHMX	maximum value for DPHI (delta phi in magnet)

VRTMX	maximum value for Z-vertex

CUTS FROM THE DATA ACQUISITION SYSTEM

```
COMMON /DASCUT/ CUTRAW,CUTHOD,MATCUT
INTEGER CUTRAW,CUTHOD
```

CUTRAW	cut on number of raw data words (integer)
CUTHOD	cut on number of hodoscope words (integer)
MATCUT	mass cut from matrix

SOME ALPHANUMERIC NAMES

```
COMMON /DATNAM/ PTNAM(4),SELNAM(4),SELTRI,AMUMU(3)
CHARACTER PTNAM*1,SELNAM*10,SELTRI*52,AMUMU*6
```

PTNAM	alphanumeric for Pt-bins
SELNAM	alphanumeric for possible selected triggers
SELTRI	alphanumeric for selected trigger types
AMUMU	alphanumeric for opp sign and like sign

INFORMATION CONCERNING READ BLOCKS

```
PARAMETER (NBLMAX = 40)
COMMON /BLOCS/ NBLKTR,IDBLKS(NBLMAX),NOCBLK(NBLMAX)
```

NBLKTR	number of different block idents found
IDBLKS	ident of each encountered block
NOCBLK	number of occurences of each block

AT USER'S CONVENIENCE

```
COMMON /DUMMY/ DUM(50)
DIMENSION IDUM(50)
EQUIVALENCE (DUM(1),IDUM(1))
```

DUM	free

COMMON FOR CHAMBER EFFICIENCY CONTROL

```
      COMMON /EFFCH/ EPS2MU,NOEFF(24,2),IEF(6,2)
     1  ,ITENRE,ISUCRE,RECCOF,IVS,INF
```

EPS2MU	Reconstruction efficiency for dimuons For an explicit definition, see Paulo Strolin

COMMON FOR COUNTING OF END-OF-FILE

```
      PARAMETER (MXNFIL = 20)
      COMMON /ENDOF/ IEOF,NFIL
      LOGICAL IEOF
```

MXNFIL	Maximum number of successive found files
IEOF	Logical flag for detected end-of-file
NFIL	Number of successive found files

PROGRAM STEERING FLAGS

```
      COMMON /FLAGC/ EXITFL,TIMEXE,TIMLIM,HISTOS,ISTOS(7)
     1   ,DEBFL,IDEBI,IDEBF,PATHO,MAXPAT,NPAT,ENLOSS,MUSCAT
     2   ,FIELD,FIELDF,TRIGFL,HSTOR,ISTOR(4),BKGFL,NTUPLE(2)
      LOGICAL EXITFL,HISTOS,DEBFL,PATHO,ENLOSS,MUSCAT
     1   ,TRIGFL,HSTOR,BKGFL,NTUPLE
      PARAMETER (NWNTUP = 3)
      COMMON /NTUPL/ IDNTU,VARNTU(NWNTUP),TAGNTU(NWNTUP)
      CHARACTER*8 TAGNTU
      COMMON /FLAGS/ IFEVE,ILEVE,NFEVE,NLEVE,LISTEV,ISRUN,LISTRN
     1   ,NDEBI,NDEBF,NDEBA,NACCDB,ISTO(7),HSTO(7),EORBLK
     2   ,SIMUFL,HALLPR,CHOIX,LSTRUN,HISTOD(7)
     3   ,CALIFL,ALIGFL,REJBUR,PRFL,ABSBUR,PRIBUR,NBURPR
     4   ,MCACPT,MCPHSP,NCALIB,NFBUR,NLBUR,RDRAW,RDSPLT,RDSTFL
     5   ,MULFLG,TSTADC,NSTOLD,FLRDHV,DEFEXE
     6   ,DECADC,DECMUL,TARGET,CALETR,HODOS,PATREC,EPILUP,VERTEX
      LOGICAL SIMUFL,LISTEV,EORBLK,CHOIX,LISTRN,HISTOD
     1   ,CALIFL,ALIGFL,REJBUR,FLRDHV,PRFL,ABSBUR,PRIBUR
     2   ,MCACPT,MCPHSP,RDRAW,RDSTFL,RDSPLT,MULFLG,TSTADC,DECADC
     3   ,DECMUL,TARGET,CALETR,HODOS,PATREC,EPILUP,VERTEX,DEFEXE
```

IFEVE	first event to process (DAS number)
ILEVE	last event to process (DAS number)
IDEBI	first event for debug print-out (DAS number)
IDEBF	last event for debug print-out (DAS number)
NFEVE	first event to process (incr. number = NEVENT)
NLEVE	last event to process (incr. number = NEVENT)
NDEBI	first event to debug (compared with NEVENT)
NDEBF	last event to debug (compared with NEVENT)
NDEBA	maximum number of accepted events to debug
NACCDB	current number of accepted events to debug
LSTRUN	last run to process (see ENDRUN)
LISTRN	flag for run selection
ISRUN	selected run number
CHOIX	selection of runs from LFSEL requested
MAXPAT	max. number of pathological events to be printed
PATHO	pathological event flag
PRFL	flag of printout of constants

DEBFL	debug flag
NPAT	current number of pathological event
HSTOR	storage of histograms requested
TAPOUT	write-on-output-tapes flag
EXITFL	end-of-job flag
EORBLK	flag for existing end-of-run block (T if exists)
FIELDF	field factor
FIELD	magnet current / 10000.
HALLPR	Hall probe value
SIMUFL	simulated-event flag
LISTEV	list-of-events flag
CALIFL	print-out-of-scaler-info flag
NCALIB	nb of bursts to be printed with CALIFL (def: 10)
ABSBUR	definition of absolute burst number (for MD)
PRIBUR	print-out of burst block (for MD)
NBURPR	nb of bursts to be printed with PRIBUR (def: 10)
ISTO	activation of preselected histograms
ISTOR	first and last histogram number to store (2 sets)
HISTOS	flag of general histograms
NTUPLE	flag of ntuple histogram(s)
NWNTUP	number of words in Ntuple 1
VARNTU	variables filled in Ntuple 1
TAGNTU	variable names filled in Ntuple 1
HISTOD	flags to separate standard histograms 1 : histos-at-vertex 2 : histos of electromagnetic energy 3 : histos of miscellaneous 4 : histos of image cut 5 : histos of global cut variables (if option TESTGLO not selected) 6 : histos of ZDC (not yet implemented)
NFBUR	first burst to process (incr.)
NLBUR	last burst to process (incr.)
DEFEXE	flag to inhibit the choice of defaut routines
DECADC	flag to decode the ADC branch
DECMUL	flag to decode the multiplicity detector branch
TARGET	flag to compute the hit subtarget
CALETR	flag to compute transverse calorimeter energy
HODOS	flag to compute clean hodoscopes and trigger
PATREC	flag to make full pattern recognition
EPILUP	flag to make pile-up calculation
VERTEX	flag to make vertex determination
ENLOSS	Monte-Carlo-generated-with-energy-loss flag
MUSCAT	M.C.-generated with multiple scattering flag
ALIGFL	alignment flag
FLRDHV	flag of good reading of the HV in CONSTADC
TSTADC	flag of option TESTADC
MULFLG	flag of multiplicity study

REJBUR	rejected-burst flag (see CRIBUR in READCD)
TRIGFL	.true. if MC event passed the trigger
MCACPT	.true. if MC event was accepted
MCPHSP	.true. if MC event was in phase space
RDRAW	read-a-raw-data-file flag
RDSTFL	read-a-DST flag
RDSPLT	read-a-split-file flag
BKGFL	flag to run on a background simulation tape
TIMLIM	time limit before end of execution (def. 20s)
TIMEXE	maximum time of execution (for interactive)
NSTOLD	number of previous setup

GANIL CHAMBERS

```
COMMON /GANICH/ MGANIX(48),MGANIY(48)
```

MGANIX	48 words of GANIL chamber x-direction
MGANIY	48 words of GANIL chamber y-direction

HODOSCOPES CLEANED BY MATRIX CONDITION

```
 PARAMETER (MASCIN = 32, MCOMB = 30)
 COMMON /GCTHIT/ MGSEX,IGSEXT(6),KWSEXT(6)
1  ,NGSCIN(6,4),IGSCIN(MASCIN,6,3),IGPT(8,6)
2  ,NCOMB(6),ITRKCB(4,MCOMB,6),ITIJCL(15),CLEADD,CLEACD
 LOGICAL CLEADD,CLEACD
```

MASCIN	max. nb. of hit scint. per sextant and hod.
MCOMB	max. nb. of associations per sextant
MGSEX	number of good sextants
IGSEXT	address of hit sextant (number)
KWSEXT	quality of a sextant:
	1 = complete - 2 = recovered -
	0 = matrix unsatisfied
	4 = flag to bypass HODHIT
NGSCIN	number of hit scint. (sextant,hod)
	hod = V, R3, R4, PT
IGSCIN	address of hit scint. (number,sextant,hod)
IGPT	PT superbin (number,sextant)
NCOMB	nb. of V,R3,R4,PT associations per sextant
ITRKCB	V,R3,R4,PT associations per sextant
ITIJCL	clean sextant combinations
CLEADD	flag for DD trigger as seen by CLEANH
CLEACD	flag for CD trigger as seen by CLEANH

GEOMETRICAL PARAMETERS FOR CHAMBERS

```
COMMON /GEOM/ ZOR(24,2)
```

ZOR	Z-position of chamber i = 1,24 half-plane ; j = 1,2 telescope

COMMON FOR HISTOGRAMMING AND HBOOK4

```
      PARAMETER (NHMEM = 400000)
      COMMON /PAWC/ HMEM(NHMEM)
      COMMON /HIBOKR/ J27,J35,J40,J100,ENESUP,ETRSUP,CORSUP
     1   ,NSTEPH,IDDIM1,IDDIM2,IDCAL,IDTAR
```

NHMEM	number of words in common PAWC
HMEM	words of common PAWC
NSTEPH	number of steps for dimuon histograms
IDDIM1	reference histogram number for dimuon counting
IDDIM2	last histogram number for dimuon counting
IDTAR	histogram number to define NOCIBI per run
IDCAL	histogram number to define ETOTRC per run
J27	number of the bin 2.7 in histo 403
J35	number of the bin 3.5 in histo 403
J40	number of the bin 4.0 in histo 403
J100	number of bins in histo 403
ENESUP	maximum value for histo of total energy
ETRSUP	maximum value for histo of transverse energy
CORSUP	maximum value for histo of corrected calo ADC's

HIGH VOLTAGES ON UPSTREAM DETECTORS

```
PARAMETER (MWHVOL = 128)
COMMON /HIVOLT/ NHVOL,IHVOL(MWHVOL)
COMMON /HVSIZ/ NWHVOL,IPWHV
```

IHVOL	high voltage value

EVENT COUNTERS

```
      COMMON /ICOUNC/ NRUN,NSETUP,NEVENT,IEVENT,ACCEPT(2),IPART
      LOGICAL ACCEPT
      COMMON /ICOUNR/ NVERSR,NVERRA,NVERSS,NVERSM,LSTBLK,NBLOCS
     1   ,IEVTIM,IEVBUR,ITRTP,IFRUN,TIME,NEVRUN,IFRUNJ
     2   ,NTRIGG,MINBIA,RUNPED,RUNLAS
     3   ,LCUT(50),ISXCB(6,6),NSPS,RUNMIN,RUNHUR,RUNDAY
     4   ,RUNMON,RUNYER,LEVRUN,NVEROF,NYVEOF,NVERON,NRCODE,NPER
      INTEGER RUNMIN,RUNHUR,RUNDAY,RUNMON,RUNYER
      CHARACTER NPER*1,NVERRA*8
```

```
      LOGICAL MINBIA,RUNLAS,RUNPED
      PARAMETER (MERRMH = 30,MCOUNT = 320,MCOTMP = 20)
      COMMON /COUNTS/ IFAIL,NCOUNT(MCOUNT),IERRMH(MERRMH),IRECOV
     1  ,NITTEL,KITTEL,N0SELD,KURTMP(MCOTMP)
```

NRUN	run number
NSETUP	set-up number
NEVENT	current (incremented) event number
IEVENT	original (DAS) event number
IPART	number of particles in the current event (M.C.)
ACCEPT	.true. if the event is accepted
ACCEPT(2)	same as accept for image track study
IEVTIM	event time in burst (as given by Etienne)
IEVBUR	event number in burst
ITRTP	trigger type selected (raw from tape)
IFRUN	first processed run in current tape
IFRUNJ	first processed run in job
TIME	total processing time
NEVRUN	current event number in run
NTRIGG	trigger number
MCOUNT	number of event counters
NCOUNT	event counters
NITTEL	separation between Bwd and Fwd in TRACK
KITTEL	separation between Bwd and Fwd in TRACK
N0SELD	pointer to 1st counter in SELDIM
KURTMP	empty counters (to be used in cradle)
MERRMH	number of counters for RMH read-out errors
IERRMH	RMH read-out errors
LCUT	values of cuts and parameters used for processing
IFAIL	rejection type of events (see NCOUNT)
IRECOV	recovery type in RECRAW
ISXCB	sextant combination
NSPS	SPS period
NPER	SPS subperiod
LEVRUN	last event in run
NVEROF	offline version number (read from tape)
NYVEOF	offline version year (read from tape)
MINBIA	flag for minimum bias run (trigger bit 11 or 12)
RUNLAS	flag for pure laser run (trigger type bit 14)
RUNPED	flag for pedestal run (trigger type bit 15)
RUNDAY	day of data taking of the run
RUNMON	month of data taking of the run
RUNYER	year of data taking of the run
RUNMIN	minute of data taking of the run
RUNHUR	hour of data taking of the run

MAGNET IMPACT

```
      PARAMETER (MXTRPI = 15)
```

```
 COMMON /IMPMAG/ NBIMP(6),ZIMP(MXTRPI,6),DZIMP(MXTRPI,6)
1  ,NOTRES(MXTRPI,6)
```

NBIMP	number of calculated impacts per projection
ZIMP	impact value (log.nb,proj)
DZIMP	error on ZIMPR
NOTRES	number of the track which gives the impact

COMMON FOR RMH EFFICIENCY CONTROL

```
 COMMON /INEF/ INEF(32,6,5),INEFPT(16,8,6)
1   ,NORINF(32,6,3),IVPTPD(16,8,6),EFM(6,5),EFPTM(8,6)
2   ,INEPTE(32,5,6),NORPTE(32,5,6),EFPTEM(5,6),NEVANL
3   ,NSXTG,NSXANL,KSEXTG,KTRKCB(5,12,6),KCOMB(6),IGTV(6)
4   ,IGTR4(6),IGTSB(6),IGTPT(6),IPTASS(6),IPTRMH(6)
 DIMENSION EF(32,6,5),EFPT(16,8,6),EFPTE(32,5,6)
 EQUIVALENCE (EF,INEF),(EFPT,INEFPT),(EFPTE,INEPTE)
```

INEF	For an explicit definition of all these variables, see Joao Varela

KINEMATIC PARAMETERS

```
 COMMON /KINEMC/ IMOM,RUNTYP,RUNSTY,BTYPE,TRITYP,TRISTY
 CHARACTER RUNTYP*16,BTYPE*8,TRITYP*16,RUNSTY*16,TRISTY*16
 COMMON /BEATGT/ BEAMAS,PBEAM(5),TGTMAS,PTGT(5),CDM(4),ETOTAL
1  ,IBEAM,TARLEN
 PARAMETER (MAXVER = 8,NVARKI=74)
 COMMON /KINEMR/
1   NBDIMU,PARDIM(3,2,MAXVER),IPDIMU(2,MAXVER),VERDIM(4,MAXVER)
2  ,CCIBLE(3,2,MAXVER),DIMASS(MAXVER),XDIM(MAXVER)
3  ,PTDIM(MAXVER),PDIMCM(4,MAXVER),COSTCM(MAXVER),PHICM(MAXVER)
4  ,COSTGJ(MAXVER),PHIGJ(MAXVER),PGJ(4,2,MAXVER),PLAB(4,2,MAXVER)
5  ,PCMMAX(MAXVER),PCS(4,2,MAXVER),PUC(4,2,MAXVER),COSTCS(MAXVER)
6  ,COSTUC(MAXVER),PHICS(MAXVER),PHIUC(MAXVER),PBEAD(3,MAXVER)
7  ,PTGTD(3,MAXVER),RAPID(MAXVER),OSLS(MAXVER),NBDIMS
8  ,NVSEL(2),NBEST(2),CMUREF,NOSLS(3),ACCGLO(MAXVER,2)
9  ,NZHTAR,ARGO,CNORM(9)
 LOGICAL ARGO,ACCGLO
 INTEGER OSLS
```

PBEAM	beam particle 4-vector (PX,PY,PZ,E)
BEAMAS	beam particle mass
PTGT	target particle 4-vector (PX,PY,PZ,E)
TGTMAS	target particle mass
ETOTAL	center-of-mass energy
CDM	center-of-mass 4-vector (PX,PY,PZ,E)
NZHTAR	atomic number of the target

TARLEN	target length
IBEAM	type of beam particle (1-4 = pi+,pi-,p,pbar) (6-9 = d,O,S,Pb) (0 = no beam)
CNORM	normalisation coefficients as read from LFSEL pi/burst - lifetime - Psi in air - total Arg - target lgt * FIELD - MWPC efficiency - Gespro efficiency - normalisation factor - flag of good (2) or badly normalised (1) or bad run (0)
ARGO	flag to use argo instead of BH scalers
MAXVER	maximum number of allowed vertices
NBDIMU	total number of dimuons
IPDIMU	log. number of track I in /ASSPAC/ for vertex J
PARDIM	(I,J,K) I = 1,3 PX,PY,PZ*sign of track J at vertex K
CCIBLE	coord of each track at Znocibi
VERDIM	I = 1,2,3 = X,Y,Z of vertex J
OSLS	sign of dimuon (+-,++,–)
NOSLS	number of +-, ++ and – dimuons
DIMASS	mass of dimuon
ACCGLO	Flag of global cut satisfied for vertex I
XDIM	dimuon Feynman x
PTDIM	dimuon transverse momentum in c.m.s.
PDIMCM	dimuon 4-vector in c.m.s. (PX,PY,PZ,E)
COSTCM	cosine of dimuon azimutal angle in c.m.s.
PHICM	dimuon polar angle in c.m.s.
COSTGJ	cos of +ve particle azimutal angle (G.J. frame)
COSTCS	same definition in C.S. frame
COSTUC	same definition in u-channel
PHIGJ	+ve particle polar angle (G.J. frame)
PHICS	same definition in C.S. frame
PHIUC	same definition in u-channel
PGJ	dimuon decay product 4-vector (PX,PY,PZ,E) in G.J. frame
PCS	same definition in C.S. frame
PUC	same definition in u-channel
PLAB	dimuon decay product 4-vector (PX,PY,PZ,E) in lab. frame
PCMMAX	maximum c.m.s. momentum
PBEAD	unit vector of beam direction in dimuon frame
PTGTD	unit vector of target direction in dimuon frame
RAPID	dimuon rapidity in c.m.s.
NVSEL	result of SELDIM selection (see SELDIM)
NBDIMS	number of dimuons after SELDIM selection
NBEST	"best" dimuon (direct, image) (see SELDIM)
CMUREF	flag to reference the muon used for frame def.

LOGICAL UNITS AND INFORMATION ABOUT INPUT/OUTPUT

```
      COMMON /LFILE/ LFIN,LFOUT,LFTERM,LFPAR,LFCONS,LFHIST,LFTIM,LFTMS
     1   ,LFNTUP
      COMMON /INFTAP/ NTAPI,NTAPO,IFSEQ(8),LFSEQ(8),CHAIN(8),MULTIF(8)
     1   ,CCPN,NCHAIN(8),COMAND,FNTAPI(8),FTTAPI(8),FMTAPI(8),LABELD(8)
     2   ,FNTAPO(9),FTTAPO(9)
      CHARACTER FMTAPI*2,FNTAPI*8,FTTAPI*8,COMAND*80,FNTAPO*8,FTTAPO*8
      LOGICAL CHAIN,CCPN,LABELD,MULTIF
      COMMON /INFADD/ FNHIST,JOBID,USSER
      CHARACTER*12 FNHIST,JOBID,USSER
      PARAMETER (MINFCO = 6)
      COMMON /IOBLKS/ IDCONT(9),IDPUSC(9),IDOFFL(9),IDBTGT,IDMUK
     1   ,IDHODS,IDWCHS,IDCCH,IDRAW,IDTRAK,IDBEAM,IDCUT
     2   ,IDKUR,IDWGHT,IDBKG,IDBGEO(30),IDMICR(5),IDCONS(MINFCO)
      EQUIVALENCE (IDCONT(1),IDBRUN),(IDCONT(2),IDERUN)
      EQUIVALENCE (IDCONT(3),IDBBUR),(IDCONT(4),IDEBUR)
      EQUIVALENCE (IDCONT(5),IDBEV ),(IDCONT(6),IDEEV )
      EQUIVALENCE (IDCONT(7),IDPUBH),(IDCONT(8),IDHVOL)
      EQUIVALENCE (IDCONT(9),IDCORN)
      EQUIVALENCE (IDPUSC(1),IDSCAL),(IDPUSC(2),IDSCAT)
      EQUIVALENCE (IDPUSC(3),IDSCNA),(IDPUSC(4),IDSCNS)
      EQUIVALENCE (IDPUSC(5),IDCABA),(IDPUSC(6),IDCABS)
      EQUIVALENCE (IDPUSC(7),IDLASE),(IDPUSC(8),IDLASR)
      EQUIVALENCE (IDPUSC(9),IDGANI)
      EQUIVALENCE (IDOFFL(1),IDASSP),(IDOFFL(2),IDTRSP)
      EQUIVALENCE (IDOFFL(3),IDTRPR),(IDOFFL(4),IDTRPM)
      EQUIVALENCE (IDOFFL(5),IDKINE),(IDOFFL(6),IDSCIN)
      EQUIVALENCE (IDOFFL(7),IDCHIT),(IDOFFL(8),IDDST)
      EQUIVALENCE (IDOFFL(9),IDDST2)
      EQUIVALENCE (IDMICR(3),IDMIEV)
      EQUIVALENCE (IDCONS(1),IDCALC),(IDCONS(2),IDPEDC)
      EQUIVALENCE (IDCONS(3),IDTHRC),(IDCONS(4),IDHVC)
      EQUIVALENCE (IDCONS(5),IDTGTR),(IDCONS(6),IDMULC)
      COMMON /CONNAM/ NINFCO,INFORS(MINFCO),ABREV(MINFCO)
      CHARACTER INFORS*12, ABREV*1
      COMMON /IOINFS/ MSIGN,MMAX,LRCIN,LRCPAR,LRCOUT,LRCONS
      COMMON /MICPO1/ JC1,JC2,JC3,JC4,JC5,JC6,JC7,JC8,JC9,JC10,
     1  JC11,JC12,JC13,JC14,JC15,JC16,JC17,JC18,JC19,JC20,JC21,
     2  JC22,JC23,JC24,JC25
      COMMON /MICPO2/ NWVER(4),JCSTAN(25,4),JCSIMU(20,4)
      DIMENSION JCC(25)
      EQUIVALENCE (JC1,JCC(1))
      PARAMETER (NINFRX=1000)
      COMMON /RXXINF/ INFRXI,RXINFI(NINFRX)
      CHARACTER RXINFI*80
      PARAMETER (MXLUIN = 1, MXLUOU = 9)
      COMMON /LFILEC/ LFTIN(MXLUIN)
     1   ,LFTAPS,NTOUT,NTAPES,NMIC,LFTOUT(MXLUOU),TAPOUT(MXLUOU)
```

```
      COMMON /EPBUFF/ IBUF(8190),OBUF(8190,MXLUOU)
      INTEGER OBUF,TAPOUT
      COMMON /LFILER/ LFSCA,LFSEL,LFCALO,LFPEDO,LFMETA,LFTRM
```

LFIN	input file (command cards)
LFTAPS	file for input/output information
LFOUT	output file (printer)
LFTIN	data input file
LFTOUT	result output file(s)
NTOUT	number of output files (split and/or DST)
NTAPES	total number of output files (including mDST)
NMIC	number of simultaneous microDST
LFHIST	histogram saving file
LFNTUP	logical unit for ntuple
LFPAR	geometric parameter file
LFSCA	file for scaler summary (option FICHIER)
LFSEL	file of selected runs
LFCONS	ADC constant file
LFPEDO	ADC pedestal file (written in OUTPED)
LFCALO	ADC calo mean values file (written in OUTADC)
LFTERM	message file for interactive running
LFTRM	message file for interactive display
LFMETA	logical unit for metafile or postscript
LFTIM	file for execution time information
LFTMS	information for TMS automatic update
IBUF	input file buffer
OBUF	output file buffer
NVERRA	program version
NVERSR	program version date
NVERSM	microDSt version number (can be changed in data)
NVERSS	scaler file version number (to be changed in BLKDAT)
NBLOCS	total number of read blocks
LSTBLK	last run number where NBLOCS has been updated

LUMINOSITY

```
      COMMON /LUMEN/ ALUMI(6,4),ALVTIM(6),ALUMJ(6,4),ALUB1,ALUB2
     1  ,ALIVE,OLIVE,TSJSCA(4),TELSCA(24)
```

ALUMI	luminosity per run
	1 = Beam hodoscope 1
	2 = Beam hodoscope 2
	3 = Beam In
	4 = 90 degrees telescope HJ
	5 = 90 degrees telescope HS
	6 = 90 degrees telescope V
	J = 1,3 free,burst gated,trigger gated

	J = 4 BH high threshold
ALUMJ	luminosity per job (same comments)
ALVTIM	livetime per run, then per job (same comments)
OLIVE	livetime per run, then per job (same comments)
ALIVE	luminosity per run, then per job (same comments)
ALUB1	luminosity BH 1 / NBURST
ALUB2	luminosity BH 2 / NBURST
TSJSCA	trigger without jitter scalers per run
TELSCA	telescope triple delayed

TRACKING INSIDE MAGNET (FOR IMAGE)

```
      COMMON /MAGNAC/ INSEC,INSLOT,MGFAIL,SECIN,SECOUT
      LOGICAL MGFAIL,INSEC,INSLOT
```

INSEC	flag for track stopped in an iron sector
INSLOT	flag for track hitting an iron sector
MGFAIL	flag for tracking in NYSTRK failed
SECIN	position of track when hitting iron
SECOUT	position of track when emerging from iron

PARAMETERS TO WRITE A MICRODST

```
      PARAMETER (LGTMIC = 3000)
      COMMON /MICDST/ IMICRO(LGTMIC,MXLUOU),NWMDST(MXLUOU)
     1  ,LBLMIC(MXLUOU)
```

LGTMIC	number of words per logical record
IMICRO	content of microDST blocks
NWMDST	actual number of words per event

VARIABLES FOR MULTIPLICITY DETECTOR (PART 1)

```
      COMMON /MULDET/ HITMAP(216,2),MULNHW(2,12,3,6),ITISTA(12,3,6)
     1  ,TOTMLD(2),TOTIOU(2),SECMUL(2),ICOLNU(12,3,6),SECM(36,2)
     2  ,SECT(36,2),ICIPID(12,3,6),ITISTN(12,3,6),JSTOFF(6912,2)
     3  ,ITISTC(12,3,6),ITISTS(12,3,6),IMDTDC,M1C,M3B,M4A
      INTEGER HITMAP
      COMMON /MULTHR/ JTHR,HITCDP(10,108,2),EVCDP(10,108,2),NBIN(10)
     1  ,NBFI(10),VT2(10),NDETID,NTAPID
      COMMON /MULFLG/ MDGRUN,USETMO,THRSCA,REDETO,LSPREV,MAXTOS,IABSBU
      LOGICAL USETMO,THRSCA,REDETO
      COMMON /CLSTR/ NOCLUS,ICLBEG(192),ICLSIZ(192)
```

NWPCDP	number of 16-bit words per CDP
NTCDP	number of CDP's per slot
NTSLOT	number of slots per BUSIF
NTBUSI	number of BUSIF's in whole mult. detector

HITMAP	hit map of one event: bit string (1bit=1strip with S/W numeration scheme, for detector idet
MULNHW	hit map of one event: bit string with H/W numeration scheme (2x32 bits) (CDP,SLOT,BUSIF)
ITISTA	time outs per CDP,SLOT,BUSIF
TOTMLD	total multiplicity for detector idet (1,2)
TOTIOU	total CDPs in timeout for detector idet (1,2)
SECMUL	average multiplicity in 10 degree azim. sector for detector idet (corrected for CDP in time out)
ICOLNU	column number (CDP,SLOT,BUSIF)
SECM	mult. of sector i, det. j
SECT	n. of timeouts for sector i, det. j
ICIPID	chip identifier (CDP,SLOT,BUSIF)
ITISTN	pseudo t.o. given by check on chip id. and column number
JSTOFF	set to 1 if strip i of det j is noisy or dead
JTHR	identifies group of bursts being readout - THR scan (-1 when out of wanted bursts)
HITCDP	total hits by Burst_group/CDP/Detector
EVCDP	accum. events by Burst_group/CDP/Detector
NBIN	initial burst for one threshold
NBFI	final burst for one threshold
VT2	threshold value
NDETID	detector id (1,2; 3 means MD1+MD2)
NTAPID	sequential tape number of a threshold scan
MDGRUN	run flag: 0=don't use, 1=standard, 2=non-std delay, 4=non-std MD1 thr., 8=non-std MD2 thr., 12=non-std MD1 and MD2 thr.
IABSBU	absolute burst number
USETMO	if .TRUE. use TIMEOUT to suppress hits
THRSCA	if .TRUE. threshold scan
REDETO	if .TRUE. use ITISTN instead of ITISTA
LSPREV	last H/W event number processed by MULCDC
NOCLUS	number of clusters in the current sector
ICLBEG	strip corresponding to the innermost segment of the i-th cluster
ICLSIZ	size of the i-th cluster

VARIABLES FOR MULTIPLICITY DETECTOR (PART 2)

```
COMMON/ MULINF/ MULT1,MULT2,NSEC1,NSEC2,NOOVSE
REAL MULT1,MULT2
```

MULT1	Multiplicity per sector in spectrometer accpt
MULT2	Mult. per sector using MD1 both MULT1 and MULT2 are corrected for suppressed strips and for multiple occupancy (poissonian corr.)
NSEC1	N. of sectors used to evaluate MULT1 (0-31)

NSEC2	N. of sectors used to evaluate MULT2 (0-31)
	when MULT1 cannot be evaluated, NSEC1 is =0
	(same for MULT2)
NOOVSE	numver of sector with too high occupancy

HITS IN THE PROPORTIONNAL CHAMBERS

```
      PARAMETER (MAXMWH = 1000)
      COMMON /MWHIT/ NTHIT
     1  ,NWHIT(3,8),IPWHIT(3,8),COORCH(MAXMWH),ERRCO(MAXMWH)
```

MAXMWH	max.number of hits in chambers
NTHIT	total number of hits
NWHIT	number of hits (plane,chamber)
IPWHIT	pointer to 1st coord. (plane,chamber)
COORCH	Y,U,V coordinate of hit
ERRCO	error on coordinate

DATA FROM UPSTREAM DETECTORS

```
      COMMON /ADCSIZ/ NWADC,NWPUA,NZDCA,NZDCT
      COMMON /CALIBR/ CALCAL(4,6),BINCAL(8),TGTCAL(24),ZDCCAL(48)
     1  ,ZDCCRN(48)
      COMMON /PEDEST/ CALPED(4,6),EARPED(16),LASPED(6),BINPED(4)
     1  ,ZDCPED(48),TGTPED(24),BHLPED(8),BHRPED(8),BHBPED(6),BHTPED(6)
     2  ,BHIPED(6),BAHPED(6),NRZDCP,IFRZDC,NWDPED,PEDMOY(233)
     3  ,EQPCAL(24),ZP(2,4,4),ZPL(2,4,24),ZTOGEV,PTOGEV
      DIMENSION ZDCPRN(250)
      EQUIVALENCE (ZDCPRN,EQPCAL)
      REAL LASPED
      COMMON /TOFDAT/ BHTDCW(8),HLTPED(8),HRTPED(8),HBTPED(6),HTTPED(6)
     1  ,BHITPD(6),BAHTPD(6)
      COMMON /TGTREF/ TGTMOY(7,7,20,2), TGTSIG(7,7,20,2)
      COMMON /THRESH/ THRCAL(40),THRPUA(16),THRLAS(6),THRBIN(4)
     1  ,THRZDC(48),THRTGT(24),THR1L1(8),THR1R1(8),THR2L1(8),THR2R1(8)
     2  ,THR1B2(6),THR1T2(6),THR2B2(6),THR2T2(6),BITHR1(4),BITHR2(4)
     3  ,TH1BHI(6),TH1BAH(6),TH2BHI(6),TH2BAH(6)
      PARAMETER (MDARNS = 500)
      COMMON /MULGEO/ MSETUP,MDGRNS(MDARNS),NTBUSI,NTSLOT,NTCDP,NWPCDP
     1  ,MDFRUN,MDLRUN,JBUSIF(36,2),JSLOTS(36,2),JCDPPS(36,2)
     2  ,JCDPOR(12),GDSECT(36,2),NUNOIS,ISENOI(800)
      INTEGER GDSECT
      PARAMETER (NVADC = 221)
      COMMON /NA50DA/ CALADC(4,6),EARADC(16),NORLAS,DIOLAS,FILTRL
     1  ,BINADC(4),ZDCADC(48),ZDCTDC(16),TGTADC(24)
     2  ,BHLADC(8),BHRADC(8),BHBADC(6),BHTADC(6),BHIADC(6),BAHADC(6)
     3  ,BHLTDC(8),BHRTDC(8),BHBTDC(6),BHTTDC(6),BHITDC(6),BAHTDC(6)
     4  ,BIDTDC(2),HLGSPU,HRGSPU,PUTRIG,BHGTDC
```

```
      INTEGER EARADC,CALADC,ZDCADC,ZDCTDC,BINADC,TGTADC,FILTRL,DIOLAS
      INTEGER BHLADC,BHBADC,BHRADC,BHTADC,BHIADC,BAHADC,BIDTDC
      INTEGER BHLTDC,BHRTDC,BHBTDC,BHTTDC,BHGTDC,BHITDC,BAHTDC
      INTEGER HLGSPU,HRGSPU,PUTRIG
      PARAMETER (NVCOR = 200)
      COMMON /NA50CO/ CALCOR(4,6),EARCOR(16),ZDCCOR(48),TGTCOR(24)
     1   ,RNGCOR(4),BINCOR(4),BHLCOR(8),BHRCOR(8),BHBCOR(6),BHTCOR(6)
     2   ,BHICOR(6),BAHCOR(6),BHITCO(6),BAHTCO(6)
     3   ,BHLTCO(8),BHRTCO(8),BHTTCO(6),BHBTCO(6)
      COMMON /PDSUBT/ TGTMPD(24)
      COMMON /ADCMOY/ CALVM(233),LASRVM(233),NWADC1
      REAL LASRVM
```

EARADC	Calo flash information (16 words)
CALADC	Calo ADC's (ring,sextant)
ZDCADC	Zero degree calorimeter ADC
ZDCTDC	Zero degree calorimeter TDC
BHLADC	BH left ADC's
BHRADC	BH right ADC's
BHBADC	BH bottom ADC's
BHTADC	BH top ADC's
BHIADC	BH int (2) and BHInew (4) ADC's
BAHADC	BAH ADC's
TGTADC	Quartz blades ADC's (left, right, antihalo)
BINADC	Beam-in ADC's
DIOLAS	Laser diode
NORLAS	Laser PM 2012 (calo)
FILTRL	Laser PM 2012 (target)
HLGSPU	BH left higher than S pattern unit
HRGSPU	BH right higher than S pattern unit
EARCOR	Calo ADC (early) after calibration (ring,sextant)
CALCOR	Calo ADC after calibration (ring,sextant)
RNGCOR	Calo ADC after calibration (ring)
BHLCOR	BH upstream left ADC after calibration
BHRCOR	BH upstream right ADC after calibration
BHBCOR	BH downstream left ADC after calibration
BHTCOR	BH downstream right ADC after calibration
BHLTCO	BH left TDC corrected time of flight
BHRTCO	BH right TDC corrected time of flight
BHBTCO	BH bottom TDC corrected time of flight
BHTTCO	BH top TDC corrected time of flight
TGTMPD	Target scintillator ADC, pedestal subtracted
TGTCOR	Active target scintillator ADC after calibration
ZDCCOR	Zero degree calorimeter ADC after calibration 1:4 Information on the deposited charge in the ADCs connected to the four sections. 5:48 Informations relative to pile-up rejection (not yet analysed)

BINCOR	Beam-in ADC after pedestal subtraction
BHLTDC	BH left TDC
BHRTDC	BH right TDC
BHBTDC	BH bottom TDC
BHTTDC	BH top TDC's
BHITDC	BH int (2) and BHInew (4) TDC's
BAHTDC	BAH TDC's
PUTRIG	pattern for laser, ZDC or bad trigger
CALVM	Calo mean values (written on CALIBRE file)
LASRVM	Laser mean values (written on CALIBRE file)

TRACKING RECONSTRUCTION OPTIONS

```
      COMMON /OPTRAC/ LOGTEL(2),IASSTY(2),KONSPA,KRECUP,NBRECU,REUSPO
     1  ,REUSPP,MXPLAN(2),MXPROJ,MINSOZ,ROADPR(2),ROADSP(2),ROADRE(2)
     2  ,ROADMA(2),CDACUT(2),ZCRCUT(2),DPHCUT(2),CUTZV,ANGX,ANGY
     3  ,DCIBLE,RMAGTO(2),ANGMIN,ANGMAX,RMGTPR,RMGT,REXT(2)
     4  ,RINT(2),CENCIB,TARCEN,CUTMA1,CUTMA2
     5  ,MAXDIM,EVTSEL,FIDR12,FIDCHA,VR3R4C,SELIMA,CIBICU
     6  ,CIBRCU,PILUCU,NDECV,NDECVF,NVR1R2,NVAHOD
      LOGICAL REUSPO,REUSPP,EVTSEL,FIDR12,FIDCHA,VR3R4C,CIBICU,CIBRCU
     1  ,SELIMA
      INTEGER PILUCU
      COMMON /OPTRCC/ AIRFER
      CHARACTER*4 AIRFER
```

LOGTEL	telescope number (1 = Fwd, 2 = Bwd)
IASSTY	association type (0 = projection, 1 = space)
KONSPA	Fwd-Bwd constraint in magnet (0 if not required)
KRECUP	recuperation level for 3rd missing track in space -1 = no recup, 0 = all spots, 1 = spots not used in space, 2 = spots not used in projection
NBRECU	minimum nb of spots required to build the (3rd) missing projection
REUSPP	flag requesting the reuse of used spots
REUSPO	temporary flag requesting the reuse of used spots
MXPLAN	maximum nb of planes per telescope (def: 4,4)
MXPROJ	maximum nb of projections (def: 6)
MINSOZ	minimum nb of spots required to build 1 linear projection (def: 3)
ROADPR	multiplicative coefficient ROADPR*VAR = road width in projection (def: 3)
ROADSP	road width in space association
ROADRE	road width in space association when recovery
ROADMA	multiplicative coefficient in magnet (air,iron) ROADMA*VAR = road width in magnet (def: 2.)
CDACUT	cut on front-back closest distance of approach
ZCRCUT	cut on bending point in magnet

DPHCUT	cut on PHI front track - PHI back track
AIRFER	selection of tracks in air and/or iron
DCIBLE	lateral size of target at Z = 0
CENCIB	lateral position of target center for DCIBLE
CUTZV	cut on vertex-Z
ANGX	beam angle in horizontal plane
ANGY	beam angle in vertical plane
CUTMA1	mass cut for histograms
RMAGTO	tolerance on coil radius in SPACPR (air,iron)
ANGMIN	Bwd minimum projection angle in PTRAK1
ANGMAX	Bwd maximum projection angle in PTRAK1
RMGTPR	tolerance on R in the magnet in PTRAK1
RMGT	RETOR + RMGTPR (see GEOMTD for RETOR)
REXT	(RETOR+RMAGTO (I))**2
RINT	(RITOR-RMAGTO (I))**2
MAXDIM	exact number of vertex per event to be accepted (def: all)
CUTMA2	maximum mass in SELDIM (def: 30.)
FIDR12	flag de rejet sur Fidcut R1R2
FIDCHA	flag de rejet sur Fidcut chambres
VR3R4C	flag de rejet des dimuons sur VR3R4
CIBICU	flag de rejet sur NOCIBI (0 ou NOCIOV)
CIBRCU	flag de rejet sur antihalo
PILUCU	flag de rejet sur pileup bit 1 = NIBHAD = 1, bit 2 = NPARAS = 0 bit 3 = NICALO = 1, bit 4 = ZDCPUP = 0
SELIMA	flag of requested selection wrt image track
EVTSEL	flag for real selection in SELDIM (def: .F.)
NDECV	coincidence R2i.(R1i OR R1i+ndecv)
NDECVF	coincidence R1i.(R2i OR R2i-ndecav)(FIDCUT)
NVR1R2	definition of V with R1 or R2
NVAHOD	number of hit hodoscopes to validate a track

PILE-UP INFORMATION

```
      PARAMETER (NVPIUP = 26)
      COMMON /PILUP/ IMASQ1(15)
     1  ,FPILUP,N1ADC,N2ADC,N1TDC,N2TDC,NIBHAD,NIBHTD
     2  ,NBHTDC,NICALO,NPARAS,ZDCPUP,EFFBH(6),DEFFBH(6),P1MA(3)
      INTEGER FPILUP,ZDCPUP
      COMMON /FLASHP/ NRT0J(2),DTM0(2),NREF(2),REF(12,2),REFM(12,2)
     1  ,GREF(2),T0BH(2)
```

FPILUP	pile-up information : bit 1 : NIBHAD > 1 bit 2 : NPARAS > 0 bit 3 : NIBHAD > 2 bit 4 : ZDCPUP > 0

	bit 5 : IABS(NICALO).NE.1
	bit 6 : NOCIBI .NOT. OK
	bit 7 : NOCIBR > 0
	bit 8 : NOHALO = .FALSE.
	bit 9 : NIBHTD > 1
	bit 10: .NOT. (bits 1 or 2 or 5 or 6 or 7 or 8)
IMASQ1	all masks for pattern unit studies
N1ADC	number of hits in BH plane 1 (from ADC's)
N2ADC	number of hits in BH plane 2 (from ADC's)
N1TDC	number of hits in BH plane 1 (from PU 's)
N2TDC	number of hits in BH plane 2 (from PU 's)
NIBHAD	number of ions in BH as seen by ADC's
NIBHTD	number of ions in BH as seen by PU's
EFFBH	efficiency of BH (plan1, plan2, total)
DEFFBH	error on BH efficiency
P1MA	controle du pileup BH (plan1, plan2, total)
DTMO	Mean time of BH TDC distribution
NRT0J	number of events used to compute DTMO
NBHTDC	number of BH2 ions outside +/- 15 ns
NICALO	Flag of pileup calo (ABS (NICALO) = 1 no pileup)
ZDCPUP	Flag of pileup ZDC (0 no pileup)
NPARAS	number of parasites in BHI and BHI NEW

VARIABLES FOR P1 P2 STUDY

```
COMMON /P1P2TS/ NEVAL,NBVAL,NIVAL,NBVIL,NEVTOT,NBTOT,KPPVAL(12)
```

NEVAL	nb of events validated by P1*P2 offline
NBVAL	nb of dimuons validated by P1*P2 offline
NIVAL	nb of events validated by P1*P2 online
NBVIL	nb of dimuons validated by P1*P2 online
NEVTOT	total number of studied events
NBTOT	total number of studied dimuons
KPPVAL	counters of different efficiencies

STORAGE OF THE EVENT FOR OUTPUT FILE

```
PARAMETER (MWADC = 240, MWRAW = 4096, MWBOE = 39, MWEOE = 6)
PARAMETER (MWBOB = 28,  MWBOR = 204, MWEOB = 70, MWEOR = 92)
COMMON /RAWDAT/ NRWADC(MWADC),IRAW(MWRAW),NRBOE(MWBOE)
1  ,NREOE(MWEOE),NRBOB(MWBOB),NRBOR(MWBOR)
```

IRAW	storage of raw data block
NRBOE	storage of beginning-of-event block
NREOE	storage of end-of-event block
NRBOB	storage of beginning-of-burst block
NRBOR	storage of beginning-of-run block

RUN STATISTICS

```
PARAMETER (MWDRUN = 14)
COMMON /RUNDAT/ MSUM(36),RUNWDS(MWDRUN)
INTEGER RUNWDS
```

MWDRUN	maximum number of words in RUNWDS
MSUM	sum of dimuons (as taken from histograms)
	I=1,3 All masses, +-,++,–, After VERDET
	I=4,6 Psi, +-,++,–, After VERDET
	I=7,9 HMA, +-,++,–, After VERDET
	I = I + 9 same as before for global cut accepted
	I = I + 18 same as before after SELDIM
	I = I + 27 same as before after SELDIM, weighted
RUNWDS	1 RMH fatal errors per run (ADC, HOD, MWPC)
	2-3 recoveries (ADC, other branch)
	4 number of events with non-zero NBDIMU
	5 number of opposite-sign dimuons
	6 number of like sign muon pairs
	7 number of events with NIBHAD eq 1
	8 number of events with NPARAS eq 0
	9 number of events with laser in run
	10 number of events with ZDC trigger
	11 number of events with pileup calo
	12 number of ZDC triggers with BH pileup
	13 number of ZDC tr., no pileup but paras
	13 number of ZDC tr., no pileup but paras halo

SELECTION CRITERIA AND REJECTION FLAG

```
      COMMON /SPLECT/ SELEC,REJECT,REJECR,CIBLE,BEAMIN,MAGFLD
     1  ,MAGCUR,TRIGG,CRIBUR,UNBSAM,VITRUN,VIBRUN,VICRUN
      LOGICAL SELEC,REJECT,REJECR
      INTEGER CIBLE,TRIGG,CRIBUR,VITRUN,VIBRUN,VICRUN,UNBSAM
      REAL MAGCUR,MAGFLD
```

SELEC	.T. if at least one selection is required
REJECT	.T. if the run is rejected (anywhere)
REJECR	.T. is the run is rejected in BEGRUN_REC
CIBLE	TARLEN * 1000 + NZHTAR
BEAMIN	minimum argonium requested (*E-5)
MAGFLD	strength of magnetic field
MAGCUR	sign of selected magnetic field
TRIGG	bit 1 for dimuon, 2 for laser, 3 for piedestal
	4 for minimum bias
CRIBUR	burst selection according to
	arg > 0 (1), NIM scaler.1 = 1 (2), field ne 0 (4)
UNBSAM	sampling rate of unbiased events
VIBRUN	flag of beg-of-run in READEV

VICRUN	flag of beg-of-run in TGTCTR
VITRUN	flag of beg-of-run in RDSCAL

SIMULATED EVENT DATA

```
      COMMON /SIMOPT/ NOWIRE,TRKMC(2,2)
      LOGICAL NOWIRE
      INTEGER TRKMC
      COMMON /BACKGD/ FLKAPI,FLPLMO,FLSEPR,NBHADR(8),VTXPAR(3,2),DVERT
     1  ,DHADRN(5,2),DSECDR(5,2),NBHPRI(2),NBHSEC(2)
     2  ,ATARBK,ABEABK,PBEABK,ETLOBK,ETHIBK,PARBBK
      INTEGER FLKAPI,FLPLMO,FLSEPR
      PARAMETER (MCNWGT = 25)
      COMMON /SIMUL/ PBMC(4),PTGTMC(4),ETOTMC,DMMC
     1  ,NSXTMC(11),IASXMC(6,11),NSCTMC(6,11),IASCMC(4,6,11)
     2  ,NWIRMC(2,8,3),WCORMC(2,8,3),WGHTMC(MCNWGT),FIXWGT(MCNWGT)
      COMMON /GENPAR/ VTXMC(3),DMASS(2),CH(2),PDIMLB(5)
     1  ,DIMMAS,RAPIMC,XFMC,PTDIMC,CTCSMC,PHCSMC,RTAU,TAU
     2  ,PDCMMC(4),CTCMMC,PHCMMC,PCSMC(4,2),PLBMC(4,2),REMDIM
     3  ,DMUMC(8,4,2),ATRMC(2,3,2),XTRMC(2,3,2),PTRMC(2)
```

NOWIRE	flag to use simulated coordinates rather than reconstructed ones
TRKMC	correspondance between rec. and sim. track
PBMC	beam momentum (PX, PY, PZ, P)
VTXMC	vertex coordinates (X, Y, Z)
DMMC	dimuon mass
RAPIMC	dimuon cm-pseudorapidity
XFMC	Feynmann-x of the dimuon
PTDIMC	transverse momentum
PTGTMC	target particle momentum
DMUMC	muon kinematics at several positions first index : X,Y,Z,PX,PY,PZ,P,CH 2nd index : position Z = vertex (1) ENDABS (2) BEGW1 (3) 3rd index : particle number
ETOTMC	total energy (= SQRT(s))
PDCMMC	dimuon momentum in cms(PX,PY,PZ,E)
CTCMMC	cosine of dimuon azimutal angle in cms
PHCMMC	dimuon polar angle in cms
PCSMC	coordinate of muons in CS frame
CTCSMC	cosine of dimuon azimutal angle in CS frame
PHCSMC	dimuon polar angle in CS frame
NSXTMC	number of hit sextants (hodo)
IASXMC	address of hit sextants (number,hodo)
NSCTMC	number of hit scint. (sextant,hodo)
IASCMC	address of hit scint. (number,sextant,hodo) (hodo = R1,R2,R3,R4,V,PT)

NWIRMC	number of hit wires (particle,chamber,gap)
WCORMC	coord. of hit (part.,chamber,gap) Y,U,V axis
ATRMC	angle of track (part.,coord,tel)
XTRMC	coord. of track (part.,coord,tel)
PTRMC	track momentum (part.) after absorber
MCNWGT	number of MC generation weigths
WGHTMC	MC generation weigths
FIXWGT	value of Fix for weights
DHADRN	definition of hadron (background study)
DSECDR	definition of sec hadron (background study)
VTXPAR	interaction point (background study)
NBHADR	generated multiplicities (background study)
NBHPRI	number of primaries (1 = pion, 2 = kaon)
NBHSEC	number of secondaries (1 = pion, 2 = kaon)
FLKAPI	requested decay (background study)
FLPLMO	requested decay (background study)
FLSEPR	requested decay (background study)
ABEABK	beam atomic mass number (background study)
ATARBK	target atomic mass number (background study)
PBEABK	beam momentum (background study)
ETLOBK	low value of Et range (background study)
ETHIBK	high value of Et range (background study)
PARBBK	centrality parameter (background study)

SIMULATION OF MWPC INEFFICIENCIES

```
      COMMON /SPEF/ INCFF
     1  ,SPEF(6,8)
      LOGICAL INCFF
```

INCFF	flag of requested inefficiency for MWPC's
SPEF	values of inefficiencies (proj,chamber) to be incorporated if INCFF is true

SPOTS IN CHAMBERS

```
      PARAMETER (MXSPOT = 500)
      COMMON /SPOTCH/ KONTRT,NDPV,NODPV(3),NTSPOT(2)
     1  ,NSPOTP(6,8),CSPOT(MXSPOT),DCSPOT(MXSPOT),IUSPOT(MXSPOT)
     2  ,IPSPOT(6,8)
      LOGICAL KONTRT
```

MXSPOT	maximum nb of spots per telescope (def: 500)
NSPOTP	number of spots (sextant,chamber)
CSPOT	spot coordinate (nb,sextant,chamber)
DCSPOT	error on CSPOT
IUSPOT	spot status (nb,sextant,chamber) 0 = not used, 1 = used in projection

	2 = used in space associations
KONTRT	flag of requested constraint at mid-magnet
NDPV	number of used half-planes for a given sextant
NODPV	number of the used half-planes
NTSPOT	number of hit wires per telescope

SEARCH OF SUBTARGET OF INTERACTION

```
COMMON /SUBTAC/ ISUBTG(12),NOCIBI,NOCIBF,N0CIBF
COMMON /SUBTAR/ NSUBTG,NOCICE,NOCIOV,NOCIBR,NOHALO,NTGBKG(2)
LOGICAL NOHALO
COMMON /SUBTG2/ MOYTGT(24),NCOTGT(24)
REAL MOYTGT
```

NOCIBI	number of the primary interaction subtarget
	0/10/20 interaction upstream the subtargets
	1-7/11-17/21-27 : number of the hit subtarget
	8 : interaction not recognized
NOCIBF	number of the primary interaction subtarget
	(between 0 and 8)
N0CIBF	number of the primary interaction subtarget
	(between 1 and 7)
NOCIOV	overflow value for NOCIBI
NOCICE	center of active target in NOCIBI units
NOCIBR	existence of secondary interaction
NOHALO	flag for event without particle in antihalos
NSUBTG	pattern of present subtargets
ISUBTG	decoded pattern of present subtargets
MOYTGT	content of target ADC's
NCOTGT	number of counts per target ADC
NTGBKG	existence of background in the PM photocathode

2-SPOT TRACKS (SEE SPACPR)

```
 PARAMETER (MXTRPM = 15)
 COMMON /TRAPRM/ NBTRPM(2),ATRPM(MXTRPM,2),DATRPM(MXTRPM,2),
1 XTRPM(MXTRPM,2),DXTRPM(MXTRPM,2),ZTRPM(MXTRPM,2)
```

Same definitions as for /TRAPRO/

TRACKS RECONSTRUCTED IN PROJECTION

```
  PARAMETER (MXTRPR = 15)
  COMMON /TRAPRO/ NBTRPR(6,2),ATRPR(MXTRPR,6,2)
1  ,DATRPR(MXTRPR,6,2),XTRPR(MXTRPR,6,2),DXTRPR(MXTRPR,6,2)
2  ,ZTRPR(MXTRPR,6,2),IQPRVT(MXTRPR,6),IQPRSP(MXTRPR,6,2)
3  ,CHI2PR(MXTRPR,6,2),IUSPRO(MXTRPR,6,2)
```

MXTRPR	maximum nb of reconstructed tracks per projection
	and per telescope (def: 15)
	sextant order is Y¡0, Y¿0, U¡0, U¿0, V¡0, V¿0
NBTRPR	nb. of reconstructed tracks (proj,tel)
ATRPR	angle value (track nb.,proj,tel)
DATRPR	error on ATRPR
XTRPR	coordinate value (track nb.,proj,tel)
DXTRPR	error on XTRPR
ZTRPR	Z-value (track nb.,proj,tel)
CHI2PR	χ^2 value (track nb.,proj,tel)
IQPRVT	bits 1-30 : log. nb. of constraining track
	(5 bits/track, 6 allowed)
IQPRSP	bits 1-28 = 4 (chamber) * 7 (bits)
	7 bits = logical nb.of the used spot per chamber
	(7 less significant bits = lowest chamber nb.)
	bits 29-32 = nb. of validating tracks
	If align, tel 2 is used for chambers 5 to 8
IUSPRO	multiplicity of projected track used in SPACE

TRACKS RECONSTRUCTED IN SPACE

```
      PARAMETER (MXTRSP = 15)
      COMMON /TRASPA/ NBTRSP(2),ATRSP(MXTRSP,3,3),DATRSP(MXTRSP,3,2)
     1  ,XTRSP(MXTRSP,3,3),DXTRSP(MXTRSP,3,2),IQSP0(2,MXTRSP,2)
     2  ,IQSPM(2,MXTRSP,2),CHI2SP(MXTRSP,2),NOSEXT(MXTRSP,2)
     3  ,ISEXSP(MXTRSP,2,4),ISCISP(MXTRSP,2,4),IHITSP(MXTRSP,2)
      COMMON /TRASPC/ TYPTRK(MXTRSP,2)
      CHARACTER*4 TYPTRK
```

MXTRSP	maximum nb. of tracks per proj and tel. (def: 15)
NBTRSP	nb. of tracks (proj,tel)
ATRSP	angle (track nb.,proj,tel)
	(tel = 3 for reflected track)
DATRSP	error on ATRSP
XTRSP	coordinate value (track nb.,proj,tel)
	(tel = 3 for reflected track)
DXTRSP	error on XTRSP
IQSP0	information word of space track
	I = 1 : 30 bits, log. proj nb (5bits/proj)
	I = 2 : 30 bits, log. nb of associated track
	(5 bits/track, 6 allowed)
IQSPM	information word of recovered track
	I = 1 : bits 1-3 missing projection
	bits 4-31 log. nb of used spot (7 bits/spot)
	I = 2 : log. nb of recovered projection track,
	i.e. NBTRPM (5 bits)
CHI2SP	χ^2 value (track nb.,proj,tel)
NOSEXT	sextant nb (track nb.,tel)

TYPTRK	type (air or iron) (track nb.,tel)
ISEXSP	hit sextant (track nb.,hodo,tel)
	(tel = 3 for reflected track)
ISCISP	hit scint. (track nb.,hodo,tel)
	(tel = 3,4 for reflected track)
IHITSP	validation by hodoscope (track nb.,tel)

COMMON FOR VERTEX DETERMINATION

```
      COMMON /PARVER/ DELZ,F0CTE,SIGB2,SFM(3)
```

SIGB2	error**2 on beam X or Y
F0CTE	.015**2*ZLDMP/X0
DELZ	ZBEGF (see /CHAMP/)
SFM	moments of the function 1 / RADL0(Z)

BLANK COMMON FOR CUT STUDY (COMDECK WORKCUT)

```
      COMMON // LEFF(3,2),IK1(3,2),IK2(3,2),ISPK1(3,2),ISPK2(3,2),YY(3)
     1   ,KPR(3),NPR(3),CROSS(3),DIS1(2),XROUT1(2),NPROT(2),KPRR(3)
     2   ,NPRR(3),CIBFL(3),RMAFL(3),RSPFL(2),RECFL(2),TRKFL(2),STRKFL(2)
     3   ,BBID(12932)
      LOGICAL FLAG,CIBFL,RMAFL,RSPFL,CDAFL,ZCRFL,DPHFL,ASSFL
     1   ,CIBFLS,RECFL,TRKFL,STRKFL,VRTFL,DIMFL,FIDFL
\subsection*{ BLANK COMMON FOR KINEMATICS (COMDECK WORKIN)}
      COMMON // QDIMLB(4),QDIMCM(4),PTEMP(4),PSCRAT(4),PMU1(4),PMU2(4)
     1   ,RMAT(3,3),BBID(12967)
\subsection*{ BLANK COMMON FOR HODOSCOPE CLEANING (COMDECK WORKHOD)}
      COMMON // KSCINT(6),KASCIN(32,6),IC(32,4),BBID(12674)
\subsection*{ BLANK COMMON FOR PROJECTION TRACK BUILDING (COMDECK WORKPTR)}
      COMMON // NPL,NSP(8),IRANK(8),IQUIV(8),NTR,NSPTR(8),XSPTR(8,8)
     1   ,ZSPTR(8,8),NSSPTR(8,8),NPSPTR(8,8),VSPTR(8,8)
     2   ,XA(8),ZA(8),VAR(8),MSP(8),NDX(8),BBID(12606)
\subsection*{ BLANK COMMON FOR SPACE TRACK BUILDING (COMDECK WORKSP)}
      COMMON // JOK(60,8),SPOTOK(60,8),DSPOTK(60,8),VFIT(8)
     1   ,XFIT(8),ZFIT(8),XTR(3),DXT(3),ATR(3),DAT(3)
     2   ,ZTR(3),NOPR(3),NOTR(3),LOGPR1(60,6,2),NBVA(3,30)
     3   ,LVALID(3,30,12),MVALID(12),BBID(9613)
\subsection*{ BLANK COMMON FOR MOMENTUM FIT (COMDECK WORKVRT)}
```

XIN	X,Y,Z,dir at beginning of magnetic field
XOUT	X,Y,Z,dir at end of magnetic field
NROT	number of Pi/3 rotations to be in 1st sextant
XI	X rotated in 1st sextant at beg. of field
YI	Y rotated in 1st sextant at beg. of field
XOU	X rotated in 1st sextant at end of field
XOU	X rotated in 1st sextant at end of field
AI	tg(α) rotated in 1st sextant at beg. of field

BI	tg(β) rotated in 1st sextant at beg. of field
AOU	tg(α) rotated in 1st sextant at end of field
BOU	tg(β) rotated in 1st sextant at end of field
RHO	sqrt (XI**2+YI**2)
PHIP	1/2 (atan(YI/XI)+atan(YOU/XOU))
GAM1	tg of projected angle in plane (XI,YI)
XIR,YIR	XI,YI rotated by -PHIP
XOUR,YOUR	XOU,YOU rotated by -PHIP

BLANK COMMON FOR P1P2 STUDY (COMDECK WORKP12)

```
      COMMON // NSCP(3),NSCSP(6,3),IASSP(6,3),IDSCP(8,6,3)
     1  ,NSCXP1(2),NSCXP2(2,2),XPRP2(2,2),YPRP2(2,2),XBGP2(2,2)
     2  ,XBDP2(2,2),IWR(2),IWSCR(6,2),NFLGP2(2,2)
```

NSCP	Number of hit sextants per hodoscope (P1,P2,P1P2)
IASSP	Address of hit sextants per hodoscope
NSCSP	Number of hit scintillators per sext/hodoscope
IDSCP	Address of hit scintillators per sext/hodoscope
NSCXP1	Sext. nb * 100 + scint. nb in P1
NSCXP2	Sext. nb * 100 + scint. nb in P2
IWSCR	Hit scintillators in R3 and R4

COMMON FOR ZDC HANDLING

```
      PARAMETER (CENEX = 0.46)
      COMMON /ZDCVAR/ SUMZDC,RATZDC(4),CENTR(2),CENNOR,NIZDC
     1  ,DIFTI(2)
      REAL SUMZDC,RATZDC,CENTR,CENNOR,DIFTI
```

SUMZDC	total deposited charge in the ZDC's ADCs
RATZDC	percentage of charge in each ZDC's ADC
CENTR	coordinates of the centroid of deposited energy
CENNOR	sum of weigths for determination of the centroid
NIZDC	number of ions seen by delayed ZDC
CENEX	exponent used to determinate centroid of energy

Chapter 5

DESCRIPTION OF THE AVAILABLE OPTIONS

5.1 Negative options

NODECOFF	delete the DECOFF routine (offline information decoding)
NOWRITE	delete all routines about writing on output tape
NOPATTERN	delete the pattern recognition routines : DECODE (MWPC), TRACK, MOMDET and VERDET
NOCLEANH	delete the hodoscope and trigger routines DECODE(2), CLEANH and HODHIT (all validated)
NOPRINT	delete most of the print-outs
RDDST	save only routines needed to read a DST

5.2 Positive options

*IBM	IBM version of DIMUREC, 32 bits
*LIP	some mods specific for LIP VAX (to be reduced, if possible)
*VAX	VAX version of DIMUREC, 32 bits
*UNIX	UNIX version of DIMUREC, 32 bits
*LASTMOD	use the last modifications of Lastmod Patch
DEBBLK	prints the first occurence of each logical block and the number of occurences of each of them
DETAILS	reinserts the total commons MWHIT and SPOTCH
DEBUG	call the routines of debug of events (automatically used with option DETAILS)
FICHIER	write scalers and run summary onto LFSEL file
MICRODST	loads routines needed to write a microDST
MODCOMS	increases the size of the tracking commons
*NORMAL	call Patches COMDECKR, LASTMOD and DIMUREC
RECSIM	allows DIMUREC to be called by DIMUJET (see DIMUJET)
RUNSUM	print-out of job summary run by run
SIMUL	decode the generation block of M.C. tapes

5.3 Test options

ALIGN	chamber alignment option (needs a specific ALIGN card)
	Nb : delete all previously booked histograms
*SPY	study of time spent in general routines
TESTADC	study of ADC's of NA50 new detectors
	(see READCD to know the meaning of the HBK card parameters)
TESTCUT	study of the pattern recognition cuts
	Nb. : road widths and CUT PAOLO to redefine
TESTGLO	creation of histograms to determine the global cuts
TESTICH	compute the chamber efficiency
	Nb : uses option DETAILS; can be used offline
TESTMUL	study of the hardware multiplicity cut
TESTP12	study of P1P2 efficiency
TESTRMH	study of the RMH efficiency (hodoscopes) : obsolete ?

Chapter 6

DESCRIPTION OF THE PROGRAM COUNTERS

6.1 Program counters

1	number of rejected events in READEV	PROCES
2	number of rejected events in DECODE ADC	PROCES
3	number of laser events	PROCES
4	number of rejected events in DECODE HODOS	PROCES
5	number of rejected events with MGSEX < 0	CLEANH
6	number of rejected events with MGSEX $<$ MINTR	CLEANH
7	number of rejected events in ADCCOR	PROCES
8	number of rejected events in TGTCTR	PROCES
9	number of rejected events in CALCUL	PROCES
10	number of rejected events in PILEUP	PROCES
11	number of rejected events in DECODE Bwd	TRACK
12	number of rejected events in Bwd telescope	TRACK
13	number of rejected events in Bwd telescope	TRACK
14	number of rejected events in DECODE Fwd	TRACK
15	number of rejected events in Fwd telescope	TRACK
16	number of rejected events in Fwd telescope	TRACK
17	number of rejected events in MAGNET	TRACK
18	number of rejected events in MOMDET	MOMDET
19	number of rejected events in VERDET	VERDET
20	number of rejected events in CINEMA	PROCES
21	number of rejected events in SELDIM	PROCES
22	number of rejected events in DECODE MUL. DET.	PROCES
23-29	free	
30	number of selected events	PROCES
31	number of events before READEV	PROCES
32	number of events read in READEV	PROCES
33	number of events after selection on event number	PROCES
34	number of events after READEV	PROCES
35	number of events after DECODE ADC	PROCES
36	number of events with dimuon trigger	PROCES
37	number of events after DECODE MUL DET	PROCES
38	number of events after DECODE HODOS	PROCES

39	number of events after CLEANH	PROCES
40	number of events after TGTCTR	PROCES
41	number of events after CALCUL	PROCES
42	number of events after PILEUP	PROCES
43	number of events after TRACK	PROCES
44	number of events after MOMDET	PROCES
45	number of events after VERDET	PROCES
46	number of events after CINEMA	PROCES
47	number of events after SELDIM	PROCES
49	number of events written on split or DST	PROCES
50	number of events written on microDST	PROCES
51	number of events with recovering	RECRAW
52	number of events where recovering failed	RECRAW
53	number of events with double recovering	RECRAW
54-62	number of events with branch 55-i recovered	RECRAW
63	number of events with ADC branch recovered	RECRAW
64-67	number of events with flag π or p	DECADC
68-72	free	DECADC
73	number of evts after TGTCTR with nohalo and no paras	PROCES
74	number of evts after VERDET with nohalo and no paras	PROCES
75-78	number of events with PUTRIG = 0 or 1 or 2 or 3	PROCES
79-85	free	DECHOD
86	overflow on trigger combinations per sextant	CHMTRX
87	overflow on number of good scint. per sextant	CLEANH
88	events with 0 good sextant given by CTHIT (R3,R4,V,PT)	CLEANH
89	events with 1 good sextant given by CTHIT (R3,R4,V,PT)	CLEANH
90-93	number of not recovered incomplete sextants (R3,R4,V,PT)	CLEANH
94	number of complete sextants with bad matrix	CHMTRX
95-100	free	PILEUP
101-103	number of events with IABS (NICALO) = 0,1,2	PILEUP
105	number of events accepted by DECODE(BWD)	TRACK
106-108	events with 2-3-4 spots used in projection (Bwd)	PTRAK1
109-114	events with overflow on NBTRPR (Bwd)	PTRAK1
115	number of tracks with 3 projections (Bwd)	SPACPR
116	tracks with 2 common projections Bwd	SPACPR
117	number of tracks with 2 projections (Bwd)	SPACPR
118-121	events with 1-2-3-4 spot in missing projection (Bwd)	SPACPR
122	number of tracks with overflow on LOGPR Bwd	SPACPR
123	number of tracks lost by overflow on LOGPR Bwd	SPACPR
124	number of tracks lost by overflow on MXTRSP (Bwd)	SPACPR
125	events with overflow on MXTRSP (Bwd)	SPACPR
126	number of tracks in space Bwd	SPACPR
127	number of tracks rejected by HODHIT (Bwd)	SPACPR
128-132	number of events with NBTRSP(2) = 0-1-2-3-4 (or more)	TRACK
133	number of events with NBTRSP(2) $\geq$ MINTR	TRACK
134	number of events with tracks in 2 different sextants	TRACK
135-140	number of space tracks in air per sextant Bwd	TRACK
145	number of events accepted by DECODE(Fwd)	TRACK

146-148	events with 2-3-4 spots used in projection (Fwd)	PTRAK1
149-154	events with overflow on NBTRPR (Fwd)	PTRAK1
155	number of tracks with 3 projections (Fwd)	SPACPR
156	tracks with 2 common projections Fwd	SPACPR
157	number of tracks with 2 projections (Fwd)	SPACPR
158-161	events with 1-2-3-4 spot in missing projection (Fwd)	SPACPR
162	number of tracks with overflow on LOGPR Fwd	SPACPR
163	number of tracks lost by overflow on LOGPR Fwd	SPACPR
164	number of tracks lost by overflow on MXTRSP (Fwd)	SPACPR
165	events with overflow on MXTRSP (Fwd)	SPACPR
166	number of tracks in space Fwd	SPACPR
167	number of tracks rejected by HODHIT (Fwd)	SPACPR
168-172	number of events with NBTRSP(1) = 0-1-2-3-4 (or more)	TRACK
173	number of events with NBTRSP(1) $\geq$ MINTR	TRACK
174	number of events with tracks in 2 different sextants	TRACK
175-180	number of space tracks in air per sextant Fwd	TRACK
181	overflow on IQPRVT (Bwd validation)	PTRAK1
185	number of tracks to be associated Bwd-Fwd	MAGNET
186	number of events with cda < CDACUT	MAGNET
187	number of events with dphi < DPHCUT	MAGNET
188	number of events with more than 6 associations per sext	MAGNET
189	number of associated tracks in air	MAGNET
190	number of associated tracks in iron	MAGNET
191-196	number of space tracks in air per sextant	MAGNET
197	number of events with NBTRK > MXASS	TRACK
198	number of tracks lost by NBTRK > MXASS	TRACK
199-203	number of events with NBTRK = 0,1,2,3,4,5 or more	TRACK
205	number of tracks studied in MOMDET	MOMDET
206	number of tracks without intersection in magnet	MOMDET
207	number of tracks inside magnet iron	MTARNO
208	negative logarithm argument	MTARNO
209-212	number of tracks with 1 ,2,3,4 or more iterations	MTARNO
213	number of tracks with non-zero momentum	MOMDET
216-217	number of tracks with IGO = 1,2	CUTTRK
218	number of studied tracks	IMAGE
219	number of tracks with P = 0.	IMAGE
220	number of tracks failed in NSTRK	IMAGE
221	number of tracks in magnet iron or coils	IMAGE
222	number of tracks outside magnet	IMAGE
223	number of tracks with sextant changing	IMAGE
224	number of tracks with sextant changing	IMAGE
225	number of tracks rejected by IMAGE	CUTTRK
230	number of events with NBTRK $\geq$ 2	VERDET
231	number of events with finite momentum	VERDET
232	number of couples of tracks with finite momenta	VERDET
233	number of couples of tracks in different sextants	VERDET
234	number of calculable vertices	VERDET
235	number of vertices with z $\geq$ CUTZV	VERDET

236	number of vertices with abs(z) $\leq$ CUTZV	VERDET
237	number of calculable vertices	VERDET
238	number of vertices with z $\geq$ CUTZV	VERDET
239	number of vertices with abs(z) $\leq$ CUTZV	VERDET
240	number of dimuons with negative or zero mass	VERDET
241	number of $\mu^+\mu^-$	VERDET
242	number of $\mu^+\mu^+$	VERDET
243	number of $\mu^-\mu^-$	VERDET
244	number of $\mu^+\mu^-$ synchronous	VERDET
245	number of $\mu^+\mu^+$ synchronous	VERDET
246	number of $\mu^-\mu^-$ synchronous	VERDET
247	number of $\mu^+\mu^-$ after reduction	VRTRED
248	number of $\mu^+\mu^+$ after reduction	VRTRED
249	number of $\mu^-\mu^-$ after reduction	VRTRED
255	number of studied vertex	CUTS
256	number of rejected tracks with image fidcut	CUTS
257	number of rejected tracks with fidcut	CUTS
258	number of rejected vertex for magnet not ok	CUTS
259	number of rejected vertex for VR3R4 not ok	CUTS
260	free	
261	number of studied events	SELDIM
262	number of events after NOCIBI selection	SELDIM
263	number of events after NOCIBR selection	SELDIM
264	number of events after pileup selection	SELDIM
265	number of events after NBDIMU selection	SELDIM
266	number of events with tracks in iron (direct)	SELDIM
267	number of events with global cut not satisfied (direct)	SELDIM
268	number of events with accidental DD trigger (direct)	SELDIM
269	number of events with V-R3-R4 not satisfied (direct)	SELDIM
270	number of events outside chamber fiducial cuts (direct)	SELDIM
271	number of events outside R1R2 fiducial cuts (direct)	SELDIM
272	number of events outside mass limits (direct)	SELDIM
273	number of events with nb dimuons gt MAXDIM (direct)	SELDIM
274	number of rejected events (direct)	SELDIM
275	number of selected events (direct)	SELDIM
278	number of events not reconst in magnet (image)	SELDIM
279	number of events with global cut not satisfied (image)	SELDIM
280	number of events with accidental DD trigger (image)	SELDIM
281	number of events with V-R3-R4 not satisfied (image)	SELDIM
282	number of events outside chamber fiducial cuts (image)	SELDIM
283	number of events outside R1R2 fiducial cuts (image)	SELDIM
284	number of events outside mass limits (image)	SELDIM
285	number of events with nb dimuons gt MAXDIM (image)	SELDIM
286	number of rejected events (image)	SELDIM
287	number of selected events (image)	SELDIM
288	empty	
289	accepted direct and image	SELDIM
290	accepted direct and not image	SELDIM

291	accepted image and not direct	SELDIM
292	accepted not image and not direct	SELDIM
293	accepted direct and image and nbest differents	SELDIM
294-295	empty	
296	number of events with dimuon trigger	PROCES
297	number of events after DECODE MUL DET	PROCES
298	number of events after DECODE HODOS	PROCES
299	number of events after CLEANH	PROCES
300	number of events after TGTCTR	PROCES
301	number of events after CALCUL	PROCES
302	number of events after PILEUP	PROCES
303	number of events after TRACK	PROCES
304	number of events after MOMDET	PROCES
305	number of events after VERDET	PROCES
306	number of events after CINEMA	PROCES
307	number of events after SELDIM	PROCES
308	number of events with 2 passes in TRACK Bwd	TRACK
309	number of recovered events with 2 passes in TRACK Bwd	TRACK
310	number of events with 2 passes in TRACK Fwd	TRACK
311	number of recovered events with 2 passes in TRACK Fwd	TRACK
312-320	free	

6.2 Rejection flags

1	rejected event by READEV	PROCES
2	rejected event by DECODE ADC	PROCES
3	laser event	PROCES
4	rejected by DECMUL	PROCES
5	rejected event by DECODE HODOS	PROCES
6	rejected event by CLEANH, MGSEX = 0	CLEANH
7	rejected event by CLEANH, MGSEX = 1	CLEANH
8	rejected event by TGTCTR	PROCES
9	rejected event by CALCUL	PROCES
10	rejected event by PILEUP	PROCES
11	rejected event by DECODE Bwd	TRACK
12	rejected event by Bwd telescope	TRACK
13	rejected event by Bwd telescope, nb sext < 2	TRACK
14	rejected event by DECODE Fwd	TRACK
15	rejected event by Fwd telescope	TRACK
16	rejected event by Fwd telescope, nb sext < 2	TRACK
17	rejected event by MAGNET	TRACK
18	rejected event by MOMDET	MOMDET
19	rejected event by VERDET	VERDET
20	rejected event by CUTS or CINEMA	PROCES
21	rejected event by SELDIM	PROCES

Chapter 7

DESCRIPTION OF THE SCALERS

7.1 Spectrometer scalers

NIM scaler 1

1	(1)	bursts	
2	(2)	Σ(BH1 + BH2) "burst gated"	1000
3	(3)	master acquisition (direct output from magic box)	
4	(4)	master without deadtime (direct output from magic box)	
5	(5)	master unbiased (direct output from magic box)	
6	(6)	TSJ SOS	
7	(7)	TSJ	
8	(8)	T0J	
9	(9)	start acquisition (**????**)	
10	(10)	reset magic box (old reset acquisition)	
11	(11)	trigger gate (for all scalers trigger gated)	
12	(12)	strobe hodoscopes	
13	(13)	strobe MWPC	
14	(14)	Argonion 1 "burst gated"	
15	(15)	Argonion 2 "burst gated"	
16	(16)	Argonion 3 "burst gated"	

NIM scaler 2 free

1	(17)	telescope HJ trigger gated
2	(18)	telescope HJ burst gated
3	(19)	telescope HJ free running
4	(20)	telescope HS trigger gated
5	(21)	telescope HS burst gated
6	(22)	telescope HS free running
7	(23)	telescope V trigger gated
8	(24)	telescope V burst gated
9	(25)	telescope V free running
10	(26)	free
11	(27)	free
12	(28)	trigger without jitter TSJ 2μ
13	(29)	trigger without jitter TSJ
14	(30)	trigger laser out of MB
15	(31)	trigger laser in MB

16	(32)	trigger hits in burst

NIM scaler 3 free

1	(33)	telescope triple HJ 1 *2del *3del
2	(34)	telescope triple HJ 1 *2 *3del
3	(35)	telescope triple HJ 1 *2del *3
4	(36)	telescope triple HJ 1del *2 *3
5	(37)	telescope triple V 1 *2del *3del
6	(38)	telescope triple V 1 *2 *3del
7	(39)	telescope triple V 1 *2del *3
8	(40)	telescope triple V 1del *2 *3
9	(41)	telescope triple HS 1 *2del *3del
10	(42)	telescope triple HS 1 *2 *3del
11	(43)	telescope triple HS 1 *2del *3
12	(44)	telescope triple HS 1del *2 *3
13	(45)	F R E E
14	(46)	Argonion 1 "free running"
15	(47)	Argonion 2 "free running"
16	(48)	Argonion 3 "free running"

NIM scaler 4 trigger gated

1	(49)	= same
2	(50)	=
3	(51)	=
4	(52)	= as
5	(53)	=
6	(54)	=
7	(55)	= NIM scaler 3
8	(56)	=
9	(57)	=
10	(58)	= but
11	(59)	=
12	(60)	= trigger gated
13	(61)	free
14	(62)	Argonion 1 trigger gated
15	(63)	Argonion 2 trigger gated
16	(64)	Argonion 3 trigger gated

NIM scaler 5 free

1	(65)	single/64 telescope HJ 1
2	(66)	single/64 telescope HJ 2
3	(67)	single/64 telescope HJ 3
4	(68)	single/64 telescope V 1
5	(69)	single/64 telescope V 2
6	(70)	single/64 telescope V 3
7	(71)	single/64 telescope HS 1
8	(72)	single/64 telescope HS 2
9	(73)	single/64 telescope HS 3

10	(74)	free
11	(75)	free
12	(76)	free
13	(77)	free
14	(78)	free
15	(79)	free
16	(80)	free

NIM scaler 6 trigger gated

1	(81)	=	same
2	(82)	=	
3	(83)	=	as
4	(84)	=	
5	(85)	=	NIM scaler 5
6	(86)	=	
7	(87)	=	but
8	(88)	=	
9	(89)	=	trigger gated
10	(90)	free	
11	(91)	free	
12	(92)	free	
13	(93)	free	
14	(94)	free	
15	(95)	free	
16	(96)	free	

NIM scaler 7 free

1	(97)	OR PT superbin half sextant 1a
2	(98)	OR PT superbin half sextant 2a
3	(99)	OR PT superbin half sextant 3a
4	(100)	OR PT superbin half sextant 4a
5	(101)	OR PT superbin half sextant 5a
6	(102)	OR PT superbin half sextant 6a
7	(103)	OR PT superbin half sextant 1b
8	(104)	OR PT superbin half sextant 2b
9	(105)	OR PT superbin half sextant 3b
10	(106)	OR PT superbin half sextant 4b
11	(107)	OR PT superbin half sextant 5b
12	(108)	OR PT superbin half sextant 6b
13	(109)	free
14	(110)	free
15	(111)	free
16	(112)	free

ECL scaler 1 free

1	(113)	PT superbin A half sextant 1a
2	(114)	PT superbin B half sextant 1a
3	(115)	PT superbin C half sextant 1a

4	(116)	PT superbin D half sextant 1a
5	(117)	PT superbin A half sextant 1b
6	(118)	PT superbin B half sextant 1b
7	(119)	PT superbin C half sextant 1b
8	(120)	PT superbin D half sextant 1b
9	(121)	PT superbin A half sextant 2a
10	(122)	PT superbin B half sextant 2a
11	(123)	PT superbin C half sextant 2a
12	(124)	PT superbin D half sextant 2a
13	(125)	PT superbin A half sextant 2b
14	(126)	PT superbin B half sextant 2b
15	(127)	PT superbin C half sextant 2b
16	(128)	PT superbin D half sextant 2b

ECL scaler 2 free

1	(129)	PT superbin A half sextant 3a
2	(130)	PT superbin B half sextant 3a
3	(131)	PT superbin C half sextant 3a
4	(132)	PT superbin D half sextant 3a
5	(133)	PT superbin A half sextant 3b
6	(134)	PT superbin B half sextant 3b
7	(135)	PT superbin C half sextant 3b
8	(136)	PT superbin D half sextant 3b
9	(137)	PT superbin A half sextant 4a
10	(138)	PT superbin B half sextant 4a
11	(139)	PT superbin C half sextant 4a
12	(140)	PT superbin D half sextant 4a
13	(141)	PT superbin A half sextant 4b
14	(142)	PT superbin B half sextant 4b
15	(143)	PT superbin C half sextant 4b
16	(144)	PT superbin D half sextant 4b

ECL scaler 3 free

1	(145)	PT superbin A half sextant 5a
2	(146)	PT superbin B half sextant 5a
3	(147)	PT superbin C half sextant 5a
4	(148)	PT superbin D half sextant 5a
5	(149)	PT superbin A half sextant 5b
6	(150)	PT superbin B half sextant 5b
7	(151)	PT superbin C half sextant 5b
8	(152)	PT superbin D half sextant 5b
9	(153)	PT superbin A half sextant 6a
10	(154)	PT superbin B half sextant 6a
11	(155)	PT superbin C half sextant 6a
12	(156)	PT superbin D half sextant 6a
13	(157)	PT superbin A half sextant 6b
14	(158)	PT superbin B half sextant 6b
15	(159)	PT superbin C half sextant 6b

16	(160)	PT superbin D half sextant 6b

ECL scaler 4 free

1	(161)	T_ij 1 2
2	(162)	T_ij 3 4
3	(163)	T_ij 5 6
4	(164)	T_ij 1 3
5	(165)	T_ij 1 5
6	(166)	T_ij 2 4
7	(167)	T_ij 2 6
8	(168)	T_ij 3 5
9	(169)	T_ij 4 6
10	(170)	T_ij 1 6
11	(171)	T_ij 3 6
12	(172)	T_ij 2 3
13	(173)	T_ij 2 5
14	(174)	T_ij 4 5
15	(175)	T_ij 1 4
16	(176)	free

ECL scaler 5 free

1	(177)	OR V half sextant 1a
2	(178)	OR V half sextant 1b
3	(179)	OR V half sextant 2a
4	(180)	OR V half sextant 2b
5	(181)	OR V half sextant 3a
6	(182)	OR V half sextant 3b
7	(183)	OR V half sextant 4a
8	(184)	OR V half sextant 4b
9	(185)	OR V half sextant 5a
10	(186)	OR V half sextant 5b
11	(187)	OR V half sextant 6a
12	(188)	OR V half sextant 6b
13	(189)	free
14	(190)	free
15	(191)	free
16	(192)	free

ECL scaler 6 free

1	(193)	PT*V half sextant 1a
2	(194)	PT*V half sextant 1b
3	(195)	PT*V half sextant 2a
4	(196)	PT*V half sextant 2b
5	(197)	PT*V half sextant 3a
6	(198)	PT*V half sextant 3b
7	(199)	PT*V half sextant 4a
8	(200)	PT*V half sextant 4b
9	(201)	PT*V half sextant 5a

10	(202)	PT*V half sextant 5b
11	(203)	PT*V half sextant 6a
12	(204)	PT*V half sextant 6b
13	(205)	free
14	(206)	free
15	(207)	free
16	(1)	spill

7.2 Scalers of the upstream detectors

Updated 02/01/96

ECL scaler 1 (free)

1-8	(2)	beam hodoscope left
9-16	(3)	beam hodoscope right

ECL scaler 2 (free)

1-6	(4)	beam hodoscope bottom
7-12	(5)	beam hodoscope top
13	(6)	BH int left
14	(7)	BH int right
15	(8)	BH int left-right coincidence
16	(9)	empty
ECL scaler 3 (free)	(10)	
1-4	(11)	BI
5-8	(12)	BHINEW (L,T,R,B)
9	(13)	laser
10	(14)	ZDC int
11	(15)	ZDC 1 Pb
12	(16)	ZDC 2 Pb
13-16	(17)	empty

ECL scaler 4 (burst gated)
1-16 (18) same content as ECL scaler 1 but burst gated

ECL scaler 5 (burst gated)
1-16 (19) same content as ECL scaler 2 but burst gated

ECL scaler 6 (burst gated)
1-16 (20) same content as ECL scaler 3 but burst gated

ECL scaler 7 (trigger gated)
1-16 (21) same content as ECL scaler 1 but trigger gated

ECL scaler 8 (trigger gated)
1-16 (22) same content as ECL scaler 2 but trigger gated

ECL scaler 8 (trigger gated)
1-16 (23) same content as ECL scaler 3 but trigger gated

Chapter 8

ALPHABETICAL INDEX OF VARIABLES

Variable	type	common	comdeck
ABEABK	REAL	BACKGD	SIMUL
ABSBUR	LOGICAL	FLAGS	FLAGR
AC	REAL	CHAMP	CHAMP
ACCEPT	LOGICAL	ICOUNC	ICOUNC
ACCFL	LOGICAL	ASSPAC	ASSPACE
ACCGLO	LOGICAL	KINEMR	KINEMR
AF	REAL		WORKVRT
AI	REAL		WORKVRT
AIR	REAL		WORKVRT
AIRFER	CHARACTER	OPTRCC	OPTRACK
ALAIR	CHARACTER	CONST	CONSTP
ALAPF	CHARACTER	CONST	CONSTP
ALFER	CHARACTER	CONST	CONSTP
ALICIB	REAL	ALIGNE	ALIGNE
ALIGFL	LOGICAL	FLAGS	FLAGR
ALIVE	REAL	LUMEN	LUMEN
ALLDEB	LOGICAL	DISPCO	DISPCOM
ALLMET	LOGICAL	DISPCO	DISPCOM
ALPHAN	REAL	CONST	CONSTP
ALTER	REAL	ALTER	ALTERN
ALUB1	REAL	LUMEN	LUMEN
ALUB2	REAL	LUMEN	LUMEN
ALUMI	REAL	LUMEN	LUMEN
ALUMJ	REAL	LUMEN	LUMEN
ALVTIM	REAL	LUMEN	LUMEN
AMUMU	REAL	DATNAM	DATNAM
ANGMAX	REAL	OPTRAC	OPTRACK
ANGMIN	REAL	OPTRAC	OPTRACK
ANGX	REAL	OPTRAC	OPTRACK
ANGY	REAL	OPTRAC	OPTRACK
ANMED	REAL	DISPCO	DISPCOM
AOU	REAL		WORKVRT
AOUR	REAL		WORKVRT
ARGO	LOGICAL	KINEMR	KINEMR
ASYMDG	REAL	BURST	BURST

ASYMHB	REAL	BURST	BURST
ATARBK	REAL	BACKGD	SIMUL
ATR	REAL		WORKSP
ATRMC	REAL	GENPAR	GENPAR
ATRPM	REAL	TRAPRM	TRAPRM
ATRPR	REAL	TRAPRO	TRAPRO
ATRSP	REAL	TRASPA	TRASPA
AV	REAL		WORKVRT
BAHADC	INTEGER	NA50DA	NA38DA
BAHCOR	REAL	NA50CO	NA38DA
BAHTCO	REAL	NA50CO	NA38DA
BAHTDC	INTEGER	NA50DA	NA38DA
BBID	REAL		WORKCUT
BBID	REAL		WORKIN
BBID	REAL		WORKHOD
BBID	REAL		WORKPTR
BBID	REAL		WORKSP
BBID	REAL		WORKVRT
BEAMAS	REAL	BEATGT	KINEMR
BEAMIN	REAL	SPLECT	SELECT
BEAMR	REAL	BURST	BURST
BEAMS	REAL	BURST	BURST
BF	REAL		WORKVRT
BHBADC	INTEGER	NA50DA	NA38DA
BHBCOR	REAL	NA50CO	NA38DA
BHBTCO	REAL	NA50CO	NA38DA
BHBTDC	INTEGER	NA50DA	NA38DA
BHGTDC	INTEGER	NA50DA	NA38DA
BHIADC	INTEGER	NA50DA	NA38DA
BHICOR	REAL	NA50CO	NA38DA
BHITCO	REAL	NA50CO	NA38DA
BHITDC	INTEGER	NA50DA	NA38DA
BHLADC	INTEGER	NA50DA	NA38DA
BHLCOR	REAL	NA50CO	NA38DA
BHLTCO	REAL	NA50CO	NA38DA
BHLTDC	INTEGER	NA50DA	NA38DA
BHRADC	INTEGER	NA50DA	NA38DA
BHRCOR	REAL	NA50CO	NA38DA
BHRTCO	REAL	NA50CO	NA38DA
BHRTDC	INTEGER	NA50DA	NA38DA
BHTADC	INTEGER	NA50DA	NA38DA
BHTCOR	REAL	NA50CO	NA38DA
BHTTCO	REAL	NA50CO	NA38DA
BHTTDC	INTEGER	NA50DA	NA38DA
BI	REAL		WORKVRT
BIDTDC	INTEGER	NA50DA	NA38DA
BINADC	INTEGER	NA50DA	NA38DA
BINCOR	REAL	NA50CO	NA38DA

BIR	REAL		WORKVRT
BKGFL	LOGICAL	FLAGC	FLAGC
BOEFF	REAL	CHAMP	CHAMP
BOU	REAL		WORKVRT
BOUR	REAL		WORKVRT
BTYPE	REAL	KINEMC	KINEMC
BURHUR	INTEGER	BURST	BURST
BURMIN	INTEGER	BURST	BURST
BV	REAL		WORKVRT
B02	REAL	CHAMP	CHAMP
CALADC	INTEGER	NA50DA	NA38DA
CALCOR	REAL	NA50CO	NA38DA
CALETR	LOGICAL	FLAGS	FLAGR
CALIFL	LOGICAL	FLAGS	FLAGR
CALVM	REAL	ADCMOY	ADCMOY
CCIBLE	REAL	KINEMR	KINEMR
CDACUT	REAL	OPTRAC	OPTRACK
CDAMX	REAL	CUTTES	CUTTEST
CDM	REAL	BEATGT	KINEMR
CENCIB	REAL	OPTRAC	OPTRACK
CENNOR	REAL	ZDCVAR	ZDCVAR
CENTR	REAL	ZDCVAR	ZDCVAR
CH	REAL	GENPAR	GENPAR
CHH	REAL	DISPCO	DISPCOM
CHI2PR	REAL	TRAPRO	TRAPRO
CHI2SP	REAL	TRASPA	TRASPA
CHOIX	LOGICAL	FLAGS	FLAGR
CIBFL	LOGICAL		WORKCUT
CIBICU	LOGICAL	OPTRAC	OPTRACK
CIBLE	INTEGER	SPLECT	SELECT
CIBMX	REAL	CUTTES	CUTTEST
CIBRCU	LOGICAL	OPTRAC	OPTRACK
CLEACD	LOGICAL	GCTHIT	GCTHIT
CLEADD	LOGICAL	GCTHIT	GCTHIT
CMUREF	REAL	KINEMR	KINEMR
CNORM	REAL	KINEMR	KINEMR
COORT	REAL	ASSPC2	ASSPAC2
CORRCH	REAL	ALIGNE	ALIGNE
CORSUP	REAL	HIBOKR	HISBOKR
COSTCM	REAL	KINEMR	KINEMR
COSTCS	REAL	KINEMR	KINEMR
COSTGJ	REAL	KINEMR	KINEMR
COSTUC	REAL	KINEMR	KINEMR
CRIBUR	INTEGER	SPLECT	SELECT
CROSS	REAL		WORKCUT
CTCMMC	REAL	GENPAR	GENPAR
CTCSMC	REAL	GENPAR	GENPAR
CUT	REAL	ASSPAC	ASSPACE

CUTCOR	REAL	CUTPAR	CUTPAR
CUTHOD	INTEGER	DASCUT	DASCUT
CUTMA1	REAL	OPTRAC	OPTRACK
CUTMA2	REAL	OPTRAC	OPTRACK
CUTRAW	INTEGER	DASCUT	DASCUT
CUTZV	REAL	OPTRAC	OPTRACK
DAI	REAL		WORKVRT
DAO	REAL		WORKVRT
DAT	REAL		WORKSP
DATRPM	REAL	TRAPRM	TRAPRM
DATRPR	REAL	TRAPRO	TRAPRO
DATRSP	REAL	TRASPA	TRASPA
DBI	REAL		WORKVRT
DBO	REAL		WORKVRT
DCIBLE	REAL	OPTRAC	OPTRACK
DCOORT	REAL	ASSPC2	ASSPAC2
DDPIVO	REAL	ALIGNE	ALIGNE
DDPROJ	REAL	ALIGNE	ALIGNE
DDY	REAL	ALIGNE	ALIGNE
DEBFL	LOGICAL	FLAGC	FLAGC
DECADC	LOGICAL	FLAGS	FLAGR
DECMUL	LOGICAL	FLAGS	FLAGR
DEFEXE	LOGICAL	FLAGS	FLAGR
DEFFBH	REAL	PILUP	PILUP
DELZ	REAL	PARVER	PARVER
DETAIL	LOGICAL	DISPCO	DISPCOM
DHADRN	REAL	BACKGD	SIMUL
DIFTI	REAL	ZDCVAR	ZDCVAR
DIMASS	REAL	KINEMR	KINEMR
DIMMAS	REAL	GENPAR	GENPAR
DIOLAS	INTEGER	NA50DA	NA38DA
DISPFL	LOGICAL	DISPCO	DISPCOM
DIS1	REAL		WORKCUT
DLS	REAL	ALIGNE	ALIGNE
DMASS	REAL	GENPAR	GENPAR
DMMC	REAL	SIMUL	SIMUL
DMUMC	REAL	GENPAR	GENPAR
DPHCUT	REAL	OPTRAC	OPTRACK
DPHMX	REAL	CUTTES	CUTTEST
DPTRF	REAL	ASSPAC	ASSPACE
DPTRSP	REAL	ASSPAC	ASSPACE
DSECDR	REAL	BACKGD	SIMUL
DSPOTK	REAL		WORKSP
DTMO	REAL	FLASHP	PILUP
DUM	REAL	DUMMY	DUMMY
DVERT	REAL	BACKGD	SIMUL
DXI	REAL		WORKVRT
DXO	REAL		WORKVRT

DXR	REAL		WORKVRT
DXT	REAL		WORKSP
DXTRPM	REAL	TRAPRM	TRAPRM
DXTRPR	REAL	TRAPRO	TRAPRO
DXTRSP	REAL	TRASPA	TRASPA
DYI	REAL		WORKVRT
DYO	REAL		WORKVRT
DZIMP	REAL	IMPMAG	IMPMAG
EARADC	INTEGER	NA50DA	NA38DA
EARCOR	REAL	NA50CO	NA38DA
EFFBH	REAL	PILUP	PILUP
EFM	REAL	INEF	INEF
EFPTEM	REAL	INEF	INEF
EFPTM	REAL	INEF	INEF
ELTIME	REAL	SPY	SPYCO2
ENESUP	REAL	HIBOKR	HISBOKR
ENLOSS	LOGICAL	FLAGC	FLAGC
EORBLK	LOGICAL	FLAGS	FLAGR
EPILUP	LOGICAL	FLAGS	FLAGR
EPS2MU	REAL	EFFCH	EFFCH
ETHIBK	REAL	BACKGD	SIMUL
ETLOBK	REAL	BACKGD	SIMUL
ETOTAL	REAL	BEATGT	KINEMR
ETOTMC	REAL	SIMUL	SIMUL
ETRSUP	REAL	HIBOKR	HISBOKR
EVCDP	REAL	MULTHR	MULDET
EVTSEL	LOGICAL	OPTRAC	OPTRACK
EXITFL	LOGICAL	FLAGC	FLAGC
FIDCHA	LOGICAL	OPTRAC	OPTRACK
FIDR12	LOGICAL	OPTRAC	OPTRACK
FIELD	REAL	FLAGC	FLAGC
FIELDF	REAL	FLAGC	FLAGC
FILTRL	INTEGER	NA50DA	NA38DA
FIXWGT	REAL	SIMUL	SIMUL
FLKAPI	INTEGER	BACKGD	SIMUL
FLPLMO	INTEGER	BACKGD	SIMUL
FLRDHV	LOGICAL	FLAGS	FLAGR
FLSEPR	INTEGER	BACKGD	SIMUL
FPILUP	INTEGER	PILUP	PILUP
F0	REAL		WORKVRT
F0CTE	REAL	PARVER	PARVER
GAM1	REAL		WORKVRT
GREF	REAL	FLASHP	PILUP
HALLPR	REAL	FLAGS	FLAGR
HISTOD	LOGICAL	FLAGS	FLAGR
HISTOS	LOGICAL	FLAGC	FLAGC
HITCDP	REAL	MULTHR	MULDET
HITMAP	INTEGER	MULDET	MULDET

HLGSPU	INTEGER	NA50DA	NA38DA
HMEM	REAL	PAWC	HISBOKC
HODOS	LOGICAL	FLAGS	FLAGR
HRGSPU	INTEGER	NA50DA	NA38DA
HSTO	REAL	FLAGS	FLAGR
HSTOR	LOGICAL	FLAGC	FLAGC
IABSBU	INTEGER	MULFLG	MULDET
IASCIN	INTEGER	CTHIT	CTHIT
IASCMC	INTEGER	SIMUL	SIMUL
IASEXT	INTEGER	CTHIT	CTHIT
IASSP	INTEGER		WORKP12
IASSTY	INTEGER	OPTRAC	OPTRACK
IASXMC	INTEGER	SIMUL	SIMUL
IBEAM	INTEGER	BEATGT	KINEMR
IBUF	INTEGER	EPBUFF	LFILEC
IBURST	INTEGER	BURST	BURST
IC	INTEGER		WORKHOD
ICIPID	INTEGER	MULDET	MULDET
ICLBEG	INTEGER	CLSTR	MULDET
ICLSIZ	INTEGER	CLSTR	MULDET
ICOLNU	INTEGER	MULDET	MULDET
IDBLKS	INTEGER	BLOCS	DEBBL2
IDBLKS	INTEGER	BLOCS	DEBBLC
IDCAL	INTEGER	HIBOKR	HISBOKR
IDDIM1	INTEGER	HIBOKR	HISBOKR
IDDIM2	INTEGER	HIBOKR	HISBOKR
IDEBF	INTEGER	FLAGC	FLAGC
IDEBI	INTEGER	FLAGC	FLAGC
IDNTU	INTEGER	NTUPL	FLAGC
IDSCP	INTEGER		WORKP12
IDTAR	INTEGER	HIBOKR	HISBOKR
IEF	INTEGER	EFFCH	EFFCH
IEOF	LOGICAL	ENDOF	ENDOF
IERRMH	INTEGER	COUNTS	ICOUNR
IEVBUR	INTEGER	ICOUNR	ICOUNR
IEVENT	INTEGER	ICOUNC	ICOUNC
IEVTIM	INTEGER	ICOUNR	ICOUNR
IFAIL	INTEGER	COUNTS	ICOUNR
IFEVE	INTEGER	FLAGS	FLAGR
IFLASS	INTEGER	DISPCO	DISPCOM
IFRUN	INTEGER	ICOUNR	ICOUNR
IFRUNJ	INTEGER	ICOUNR	ICOUNR
IGPT	INTEGER	GCTHIT	GCTHIT
IGSCIN	INTEGER	GCTHIT	GCTHIT
IGSEXT	INTEGER	GCTHIT	GCTHIT
IGTPT	INTEGER	INEF	INEF
IGTR4	INTEGER	INEF	INEF
IGTSB	INTEGER	INEF	INEF

IGTV	INTEGER	INEF	INEF
IHITSP	INTEGER	TRASPA	TRASPA
IK1	INTEGER		WORKCUT
IK2	INTEGER		WORKCUT
ILEVE	INTEGER	FLAGS	FLAGR
IMASQ1	INTEGER	PILUP	PILUP
IMDTDC	INTEGER	MULDET	MULDET
IMICRO	INTEGER	MICDST	MICDS0
IMOM	INTEGER	KINEMC	KINEMC
INCFF	LOGICAL	SPEF	SPEF
INEF	INTEGER	INEF	INEF
INEFPT	INTEGER	INEF	INEF
INEPTE	INTEGER	INEF	INEF
INF	INTEGER	EFFCH	EFFCH
INSEC	LOGICAL	MAGNAC	MAGNAC
INSLOT	LOGICAL	MAGNAC	MAGNAC
IORHV	INTEGER	CTHIT	CTHIT
IPART	INTEGER	ICOUNC	ICOUNC
IPDIMU	INTEGER	KINEMR	KINEMR
IPSCIN	INTEGER	CTHIT	CTHIT
IPTASS	INTEGER	INEF	INEF
IPTRMH	INTEGER	INEF	INEF
IQPRSP	INTEGER	TRAPRO	TRAPRO
IQPRVT	INTEGER	TRAPRO	TRAPRO
IQSPM	INTEGER	TRASPA	TRASPA
IQSP0	INTEGER	TRASPA	TRASPA
IQUIV	INTEGER		WORKPTR
IRANK	INTEGER		WORKPTR
IRAW	INTEGER	RAWDAT	RAWDAP
IRAWLG	INTEGER	CTHIT	CTHIT
IRECOV	INTEGER	COUNTS	ICOUNR
ISBISP	INTEGER	ASSPAC	ASSPACE
ISCISP	INTEGER	TRASPA	TRASPA
ISEXSP	INTEGER	TRASPA	TRASPA
ISIGN	INTEGER	DISPCO	DISPCOM
ISPK1	INTEGER		WORKCUT
ISPK2	INTEGER		WORKCUT
ISRUN	INTEGER	FLAGS	FLAGR
ISTO	INTEGER	FLAGS	FLAGR
ISTOR	INTEGER	FLAGC	FLAGC
ISTOS	INTEGER	FLAGC	FLAGC
ISUBTG	INTEGER	SUBTAC	SUBTAC
ISUCRE	INTEGER	EFFCH	EFFCH
ISXCB	INTEGER	ICOUNR	ICOUNR
ISXTCB	INTEGER	CTHIT	CTHIT
ITCOUN	INTEGER	CTHIT	CTHIT
ITENRE	INTEGER	EFFCH	EFFCH
ITIJCL	INTEGER	GCTHIT	GCTHIT

ITISTA	INTEGER	MULDET	MULDET
ITISTC	INTEGER	MULDET	MULDET
ITISTN	INTEGER	MULDET	MULDET
ITISTS	INTEGER	MULDET	MULDET
ITRKCB	INTEGER	GCTHIT	GCTHIT
ITRTP	INTEGER	ICOUNR	ICOUNR
IUSPRO	INTEGER	TRAPRO	TRAPRO
IVPTPD	INTEGER	INEF	INEF
IVS	INTEGER	EFFCH	EFFCH
IWR	INTEGER		WORKP12
IWS	INTEGER		BLANK
IWSCR	INTEGER		WORKP12
JFLAG	INTEGER	ALTER	ALTERN
JOK	INTEGER		WORKSP
JSTOFF	INTEGER	MULDET	MULDET
JTHR	INTEGER	MULTHR	MULDET
J100	INTEGER	HIBOKR	HISBOKR
J27	INTEGER	HIBOKR	HISBOKR
J35	INTEGER	HIBOKR	HISBOKR
J40	INTEGER	HIBOKR	HISBOKR
KASCIN	INTEGER		WORKHOD
KCOMB	INTEGER	INEF	INEF
KITTEL	INTEGER	COUNTS	ICOUNR
KOMHOD	INTEGER	CTHIT	CTHIT
KONSPA	INTEGER	OPTRAC	OPTRACK
KONTRT	LOGICAL	SPOTCH	SPOTCH
KPPVAL	INTEGER	P1P2TS	P1P2TST
KPR	INTEGER		WORKCUT
KPRR	INTEGER		WORKCUT
KRECUP	INTEGER	OPTRAC	OPTRACK
KSCINT	INTEGER		WORKHOD
KSEXTG	INTEGER	INEF	INEF
KTRKCB	INTEGER	INEF	INEF
KURTMP	INTEGER	COUNTS	ICOUNR
KWMETA	INTEGER	DISPCO	DISPCOM
KWSEXT	INTEGER	GCTHIT	GCTHIT
KWTYPE	INTEGER	DISPCO	DISPCOM
LASRVM	REAL	ADCMOY	ADCMOY
LBLMIC	INTEGER	MICDST	MICDS0
LCUT	INTEGER	ICOUNR	ICOUNR
LEFF	INTEGER		WORKCUT
LEVRUN	INTEGER	ICOUNR	ICOUNR
LFCALO	INTEGER	LFILER	LFILER
LFMETA	INTEGER	LFILER	LFILER
LFPEDO	INTEGER	LFILER	LFILER
LFSCA	INTEGER	LFILER	LFILER
LFSEL	INTEGER	LFILER	LFILER
LFTAPS	INTEGER	LFILEC	LFILEC

LFTIN	INTEGER	LFILEC	LFILEC
LFTOUT	INTEGER	LFILEC	LFILEC
LFTRM	INTEGER	LFILER	LFILER
LISTEV	LOGICAL	FLAGS	FLAGR
LISTRN	LOGICAL	FLAGS	FLAGR
LOGPR1	INTEGER		WORKSP
LOGSPA	INTEGER	ASSPAC	ASSPACE
LOGTEL	INTEGER	OPTRAC	OPTRACK
LSPREV	INTEGER	MULFLG	MULDET
LSTBLK	INTEGER	ICOUNR	ICOUNR
LSTRUN	INTEGER	FLAGS	FLAGR
LVALID	INTEGER		WORKSP
MAGCUR	REAL	SPLECT	SELECT
MAGFLD	REAL	SPLECT	SELECT
MAGMX	INTEGER	CUTTES	CUTTEST
MAGNOK	LOGICAL	ASSPAC	ASSPACE
MATCUT	INTEGER	DASCUT	DASCUT
MAXDIM	INTEGER	OPTRAC	OPTRACK
MAXPAT	INTEGER	FLAGC	FLAGC
MAXTOS	INTEGER	MULFLG	MULDET
MCACPT	LOGICAL	FLAGS	FLAGR
MCOMB	INTEGER	GCTHIT	GCTHIT
MCPHSP	LOGICAL	FLAGS	FLAGR
MDGRUN	INTEGER	MULFLG	MULDET
METAFI	LOGICAL	DISPCO	DISPCOM
MGANIX	INTEGER	GANICH	GANICH
MGANIY	INTEGER	GANICH	GANICH
MGFAIL	LOGICAL	MAGNAC	MAGNAC
MGSEX	INTEGER	GCTHIT	GCTHIT
MINBIA	LOGICAL	ICOUNR	ICOUNR
MINSOZ	INTEGER	OPTRAC	OPTRACK
MINTR	INTEGER	ASSPAC	ASSPACE
MINTRD	INTEGER	ASSPAC	ASSPACE
MOYTGT	REAL	SUBTG2	SUBTG2
MSP	INTEGER		WORKPTR
MSUM	INTEGER	RUNDAT	RUNDAT
MULFLG	LOGICAL	FLAGS	FLAGR
MULNHW	INTEGER	MULDET	MULDET
MULT1	REAL	MULINF	MULINF
MULT2	REAL	MULINF	MULINF
MUSCAT	LOGICAL	FLAGC	FLAGC
MVALID	INTEGER		WORKSP
MXPLAN	INTEGER	OPTRAC	OPTRACK
MXPROJ	INTEGER	OPTRAC	OPTRACK
MXTRSP	INTEGER	TRASPA	TRASPA
MXTRSP	INTEGER	TRASPA	TRASPA
M1C	INTEGER	MULDET	MULDET
M3B	INTEGER	MULDET	MULDET

M4A	INTEGER	MULDET	MULDET
NACCDB	INTEGER	FLAGS	FLAGR
NASEXT	INTEGER	ASSPAC	ASSPACE
NBBISC	INTEGER	BURST	BURST
NBDIMS	INTEGER	KINEMR	KINEMR
NBDIMU	INTEGER	KINEMR	KINEMR
NBEST	INTEGER	KINEMR	KINEMR
NBFI	INTEGER	MULTHR	MULDET
NBHADR	INTEGER	BACKGD	SIMUL
NBHPRI	INTEGER	BACKGD	SIMUL
NBHSEC	INTEGER	BACKGD	SIMUL
NBHTDC	INTEGER	PILUP	PILUP
NBIMP	INTEGER	IMPMAG	IMPMAG
NBIN	INTEGER	MULTHR	MULDET
NBLKTR	INTEGER	BLOCS	DEBBL2
NBLKTR	INTEGER	BLOCS	DEBBLC
NBLOCS	INTEGER	ICOUNR	ICOUNR
NBNWBR	INTEGER	BURST	BURST
NBPIVO	INTEGER	ALIGNE	ALIGNE
NBPROJ	INTEGER	ALIGNE	ALIGNE
NBRECU	INTEGER	OPTRAC	OPTRACK
NBRISC	INTEGER	BURST	BURST
NBRJOB	INTEGER	BURST	BURST
NBRRUN	INTEGER	BURST	BURST
NBSPY	INTEGER	SPY	SPYCO2
NBTOT	INTEGER	P1P2TS	P1P2TST
NBTRK	INTEGER	ASSPAC	ASSPACE
NBTRPM	INTEGER	TRAPRM	TRAPRM
NBTRPR	INTEGER	TRAPRO	TRAPRO
NBTRSP	INTEGER	TRASPA	TRASPA
NBURPR	INTEGER	FLAGS	FLAGR
NBURSR	INTEGER	BURST	BURST
NBURST	INTEGER	BURST	BURST
NBVA	INTEGER		WORKSP
NBVAL	INTEGER	P1P2TS	P1P2TST
NBVIL	INTEGER	P1P2TS	P1P2TST
NBY	INTEGER	ALIGNE	ALIGNE
NCALIB	INTEGER	FLAGS	FLAGR
NCOMB	INTEGER	GCTHIT	GCTHIT
NCOTGT	INTEGER	SUBTG2	SUBTG2
NCOUNT	INTEGER	COUNTS	ICOUNR
NDEBA	INTEGER	FLAGS	FLAGR
NDEBF	INTEGER	FLAGS	FLAGR
NDEBI	INTEGER	FLAGS	FLAGR
NDECV	INTEGER	OPTRAC	OPTRACK
NDECVF	INTEGER	OPTRAC	OPTRACK
NDETID	INTEGER	MULTHR	MULDET
NDPV	INTEGER	SPOTCH	SPOTCH

NDX	INTEGER		WORKPTR
NEVAL	INTEGER	P1P2TS	P1P2TST
NEVANL	INTEGER	INEF	INEF
NEVENT	INTEGER	ICOUNC	ICOUNC
NEVPRE	INTEGER	CTHIT	CTHIT
NEVREJ	INTEGER	BURST	BURST
NEVRUN	INTEGER	ICOUNR	ICOUNR
NEVTOT	INTEGER	P1P2TS	P1P2TST
NFBUR	INTEGER	FLAGS	FLAGR
NFEVE	INTEGER	FLAGS	FLAGR
NFIL	INTEGER	ENDOF	ENDOF
NFLGP2	INTEGER		WORKP12
NGSCIN	INTEGER	GCTHIT	GCTHIT
NIBHAD	INTEGER	PILUP	PILUP
NIBHTD	INTEGER	PILUP	PILUP
NICALO	INTEGER	PILUP	PILUP
NITTEL	INTEGER	COUNTS	ICOUNR
NIVAL	INTEGER	P1P2TS	P1P2TST
NIZDC	INTEGER	ZDCVAR	ZDCVAR
NLBUR	INTEGER	FLAGS	FLAGR
NLEVE	INTEGER	FLAGS	FLAGR
NLINKR	INTEGER	BURST	BURST
NLINKS	INTEGER	BURST	BURST
NLS	INTEGER	ALIGNE	ALIGNE
NMIC	INTEGER	LFILEC	LFILEC
NOCBLK	INTEGER	BLOCS	DEBBL2
NOCBLK	INTEGER	BLOCS	DEBBLC
NOCIBF	INTEGER	SUBTAC	SUBTAC
NOCIBI	INTEGER	SUBTAC	SUBTAC
NOCIBR	INTEGER	SUBTAR	SUBTRR
NOCICE	INTEGER	SUBTAR	SUBTRR
NOCIOV	INTEGER	SUBTAR	SUBTRR
NOCLUS	INTEGER	CLSTR	MULDET
NODPV	INTEGER	SPOTCH	SPOTCH
NOEFF	INTEGER	EFFCH	EFFCH
NOHALO	LOGICAL	SUBTAR	SUBTRR
NOOVSE	INTEGER	MULINF	MULINF
NOPR	INTEGER		WORKSP
NOREF	INTEGER	ALIGNE	ALIGNE
NORINF	INTEGER	INEF	INEF
NORLAS	INTEGER	NA50DA	NA38DA
NORPTE	INTEGER	INEF	INEF
NOSEXT	INTEGER	TRASPA	TRASPA
NOSLS	INTEGER	KINEMR	KINEMR
NOTR	INTEGER		WORKSP
NOTRES	INTEGER	IMPMAG	IMPMAG
NOWIRE	LOGICAL	SIMOPT	SIMOPT
NPARAS	INTEGER	PILUP	PILUP

NPAT	INTEGER	FLAGC	FLAGC
NPER	INTEGER	ICOUNR	ICOUNR
NPL	INTEGER		WORKPTR
NPR	INTEGER		WORKCUT
NPROT	INTEGER		WORKCUT
NPRR	INTEGER		WORKCUT
NPSPTR	INTEGER		WORKPTR
NRBOB	INTEGER	RAWDAT	RAWDAP
NRBOE	INTEGER	RAWDAT	RAWDAP
NRBOR	INTEGER	RAWDAT	RAWDAP
NRCODE	INTEGER	ICOUNR	ICOUNR
NREF	INTEGER	FLASHP	PILUP
NREOE	INTEGER	RAWDAT	RAWDAP
NROT	INTEGER		WORKVRT
NRT0J	INTEGER	FLASHP	PILUP
NRUN	INTEGER	ICOUNC	ICOUNC
NRWADC	INTEGER	RAWDAT	RAWDAP
NSCINT	INTEGER	CTHIT	CTHIT
NSCP	INTEGER		WORKP12
NSCSP	INTEGER		WORKP12
NSCTMC	INTEGER	SIMUL	SIMUL
NSCXP1	INTEGER		WORKP12
NSCXP2	INTEGER		WORKP12
NSEC1	INTEGER	MULINF	MULINF
NSEC2	INTEGER	MULINF	MULINF
NSETUP	INTEGER	ICOUNC	ICOUNC
NSEXT	INTEGER	CTHIT	CTHIT
NSP	INTEGER		WORKPTR
NSPS	INTEGER	ICOUNR	ICOUNR
NSPTR	INTEGER		WORKPTR
NSSPTR	INTEGER		WORKPTR
NSTEPH	INTEGER	HIBOKR	HISBOKR
NSTOLD	INTEGER	FLAGS	FLAGR
NSUBTG	INTEGER	SUBTAR	SUBTRR
NSXANL	INTEGER	INEF	INEF
NSXTG	INTEGER	INEF	INEF
NSXTMC	INTEGER	SIMUL	SIMUL
NTAPES	INTEGER	LFILEC	LFILEC
NTAPID	INTEGER	MULTHR	MULDET
NTCO	INTEGER	CTHIT	CTHIT
NTCOR	INTEGER	CTHIT	CTHIT
NTGBKG	INTEGER	SUBTAR	SUBTRR
NTHIT	INTEGER	MWHIT	MWHIT
NTOUT	INTEGER	LFILEC	LFILEC
NTR	INTEGER		WORKPTR
NTRIGG	INTEGER	ICOUNR	ICOUNR
NTSPOT	INTEGER	SPOTCH	SPOTCH
NTUPLE	LOGICAL	FLAGC	FLAGC

NVAHOD	INTEGER	OPTRAC	OPTRACK
NVEROF	INTEGER	ICOUNR	ICOUNR
NVERON	INTEGER	ICOUNR	ICOUNR
NVERRA	INTEGER	ICOUNR	ICOUNR
NVERSM	INTEGER	ICOUNR	ICOUNR
NVERSR	INTEGER	ICOUNR	ICOUNR
NVERSS	INTEGER	ICOUNR	ICOUNR
NVR1R2	INTEGER	OPTRAC	OPTRACK
NVSEL	INTEGER	KINEMR	KINEMR
NWADC1	INTEGER	ADCMOY	ADCMOY
NWIRMC	INTEGER	SIMUL	SIMUL
NWMDST	INTEGER	MICDST	MICDS0
NYVEOF	INTEGER	ICOUNR	ICOUNR
NZHTAR	INTEGER	KINEMR	KINEMR
N0CIBF	INTEGER	SUBTAC	SUBTAC
N0SELD	INTEGER	COUNTS	ICOUNR
N1ADC	INTEGER	PILUP	PILUP
N1TDC	INTEGER	PILUP	PILUP
N2ADC	INTEGER	PILUP	PILUP
N2TDC	INTEGER	PILUP	PILUP
OBUF	INTEGER	EPBUFF	LFILEC
OLDPCH	REAL	ALIGNE	ALIGNE
OLIVE	REAL	LUMEN	LUMEN
OSLS	INTEGER	KINEMR	KINEMR
P	REAL		WORKVRT
PARBBK	REAL	BACKGD	SIMUL
PARDIM	REAL	KINEMR	KINEMR
PATHO	LOGICAL	FLAGC	FLAGC
PATREC	LOGICAL	FLAGS	FLAGR
PBEABK	REAL	BACKGD	SIMUL
PBEAD	REAL	KINEMR	KINEMR
PBEAM	REAL	BEATGT	KINEMR
PBMC	REAL	SIMUL	SIMUL
PCMMAX	REAL	KINEMR	KINEMR
PCS	REAL	KINEMR	KINEMR
PCSMC	REAL	GENPAR	GENPAR
PDCMMC	REAL	GENPAR	GENPAR
PDIMCM	REAL	KINEMR	KINEMR
PDIMLB	REAL	GENPAR	GENPAR
PGJ	REAL	KINEMR	KINEMR
PHCMMC	REAL	GENPAR	GENPAR
PHCSMC	REAL	GENPAR	GENPAR
PHICM	REAL	KINEMR	KINEMR
PHICS	REAL	KINEMR	KINEMR
PHIGJ	REAL	KINEMR	KINEMR
PHIP	REAL		WORKVRT
PHIUC	REAL	KINEMR	KINEMR
PILUCU	INTEGER	OPTRAC	OPTRACK

PLAB	REAL	KINEMR	KINEMR
PLBMC	REAL	GENPAR	GENPAR
PMU1	REAL		WORKIN
PMU2	REAL		WORKIN
PRBCUT	REAL	CUTPAR	CUTPAR
PRFL	LOGICAL	FLAGS	FLAGR
PRIBUR	LOGICAL	FLAGS	FLAGR
PSCRAT	REAL		WORKIN
PT	REAL		WORKVRT
PTDIM	REAL	KINEMR	KINEMR
PTDIMC	REAL	GENPAR	GENPAR
PTEMP	REAL		WORKIN
PTGT	REAL	BEATGT	KINEMR
PTGTD	REAL	KINEMR	KINEMR
PTGTMC	REAL	SIMUL	SIMUL
PTNAM	REAL	DATNAM	DATNAM
PTRF	REAL	ASSPAC	ASSPACE
PTRMC	REAL	GENPAR	GENPAR
PTRSP	REAL	ASSPAC	ASSPACE
PTSP	REAL		WORKVRT
PTTRSP	REAL	ASSPAC	ASSPACE
PUC	REAL	KINEMR	KINEMR
PUTRIG	INTEGER	NA50DA	NA38DA
P1MA	REAL	PILUP	PILUP
QDIMCM	REAL		WORKIN
QDIMLB	REAL		WORKIN
RAPID	REAL	KINEMR	KINEMR
RAPIMC	REAL	GENPAR	GENPAR
RATZDC	REAL	ZDCVAR	ZDCVAR
RDRAW	LOGICAL	FLAGS	FLAGR
RDSPLT	LOGICAL	FLAGS	FLAGR
RDSTFL	LOGICAL	FLAGS	FLAGR
RECCOF	REAL	EFFCH	EFFCH
RECFL	LOGICAL		WORKCUT
REDETO	LOGICAL	MULFLG	MULDET
REF	REAL	FLASHP	PILUP
REFM	REAL	FLASHP	PILUP
REJBUR	LOGICAL	FLAGS	FLAGR
REJECR	LOGICAL	SPLECT	SELECT
REJECT	LOGICAL	SPLECT	SELECT
REMDIM	REAL	GENPAR	GENPAR
RES	REAL	CHAMP	CHAMP
REUSPO	LOGICAL	OPTRAC	OPTRACK
REUSPP	LOGICAL	OPTRAC	OPTRACK
REXT	REAL	OPTRAC	OPTRACK
RHO	REAL		WORKVRT
RHOD	REAL	CONST	CONSTP
RINT	REAL	OPTRAC	OPTRACK

RMAFL	LOGICAL		WORKCUT
RMAGTO	REAL	OPTRAC	OPTRACK
RMAT	REAL		WORKIN
RMGT	REAL	OPTRAC	OPTRACK
RMGTPR	REAL	OPTRAC	OPTRACK
RNGCOR	REAL	NA50CO	NA38DA
ROADMA	REAL	OPTRAC	OPTRACK
ROADPR	REAL	OPTRAC	OPTRACK
ROADRE	REAL	OPTRAC	OPTRACK
ROADSP	REAL	OPTRAC	OPTRACK
ROPMX	REAL	CUTTES	CUTTEST
RSPFL	LOGICAL		WORKCUT
RTAU	REAL	GENPAR	GENPAR
RUNDAY	INTEGER	ICOUNR	ICOUNR
RUNHUR	INTEGER	ICOUNR	ICOUNR
RUNLAS	LOGICAL	ICOUNR	ICOUNR
RUNMIN	INTEGER	ICOUNR	ICOUNR
RUNMON	INTEGER	ICOUNR	ICOUNR
RUNPED	LOGICAL	ICOUNR	ICOUNR
RUNSTY	REAL	KINEMC	KINEMC
RUNTYP	REAL	KINEMC	KINEMC
RUNWDS	INTEGER	RUNDAT	RUNDAT
RUNYER	INTEGER	ICOUNR	ICOUNR
SCALR	REAL	BURST	BURST
SCALS	REAL	BURST	BURST
SECIN	REAL	MAGNAC	MAGNAC
SECM	REAL	MULDET	MULDET
SECMUL	REAL	MULDET	MULDET
SECOUT	REAL	MAGNAC	MAGNAC
SECT	REAL	MULDET	MULDET
SELEC	LOGICAL	SPLECT	SELECT
SELIMA	LOGICAL	OPTRAC	OPTRACK
SELNAM	REAL	DATNAM	DATNAM
SELTRI	REAL	DATNAM	DATNAM
SF	REAL		WORKVRT
SFM	REAL	PARVER	PARVER
SIGB2	REAL	PARVER	PARVER
SIMUFL	LOGICAL	FLAGS	FLAGR
SPAMX	REAL	CUTTES	CUTTEST
SPECTR	LOGICAL	DISPCO	DISPCOM
SPOTOK	REAL		WORKSP
STRKFL	LOGICAL		WORKCUT
SUMZDC	REAL	ZDCVAR	ZDCVAR
SURMET	LOGICAL	DISPCO	DISPCOM
TAGNTU	CHARACTER	NTUPL	FLAGC
TAL	REAL		WORKVRT
TANALF	REAL		WORKVRT
TAPOUT	REAL	LFILEC	LFILEC

TARCEN	REAL	OPTRAC	OPTRACK
TARGET	LOGICAL	FLAGS	FLAGR
TARLEN	REAL	BEATGT	KINEMR
TAU	REAL	GENPAR	GENPAR
TEL	CHARACTER	CONST	CONSTP
TELSCA	REAL	LUMEN	LUMEN
TGTADC	INTEGER	NA50DA	NA38DA
TGTCOR	REAL	NA50CO	NA38DA
TGTMAS	REAL	BEATGT	KINEMR
TGTMPD	REAL	PDSUBT	NA38DA
THRSCA	LOGICAL	MULFLG	MULDET
TH1	REAL		WORKVRT
TH2	REAL		WORKVRT
TIME	REAL	ICOUNR	ICOUNR
TIMEXE	REAL	FLAGC	FLAGC
TIMLIM	REAL	FLAGC	FLAGC
TITRES	LOGICAL	DISPCO	DISPCOM
TOTARG	LOGICAL	DISPCO	DISPCOM
TOTIOU	REAL	MULDET	MULDET
TOTMLD	REAL	MULDET	MULDET
TRIGFL	LOGICAL	FLAGC	FLAGC
TRIGG	INTEGER	SPLECT	SELECT
TRISTY	REAL	KINEMC	KINEMC
TRITYP	REAL	KINEMC	KINEMC
TRKFL	LOGICAL		WORKCUT
TRKMC	INTEGER	SIMOPT	SIMOPT
TSJSCA	REAL	LUMEN	LUMEN
TSTADC	LOGICAL	FLAGS	FLAGR
TYPT	CHARACTER	ASSPCC	ASSPACE
TYPTRK	CHARACTER	TRASPC	TRASPA
T0	REAL	SPY	SPYCO2
T0BH	REAL	FLASHP	PILUP
UB02	REAL	CHAMP	CHAMP
UNBSAM	INTEGER	SPLECT	SELECT
USETMO	LOGICAL	MULFLG	MULDET
VAR	REAL		WORKPTR
VARCUT	REAL	ASSPAC	ASSPACE
VARNTU	REAL	NTUPL	FLAGC
VERDIM	REAL	KINEMR	KINEMR
VERT	REAL		WORKVRT
VERTEX	LOGICAL	FLAGS	FLAGR
VFIT	REAL		WORKSP
VIBRUN	INTEGER	SPLECT	SELECT
VICRUN	INTEGER	SPLECT	SELECT
VIRT	REAL		WORKVRT
VITRUN	INTEGER	SPLECT	SELECT
VRTMX	REAL	CUTTES	CUTTEST
VR3R4C	LOGICAL	OPTRAC	OPTRACK

VSPTR	REAL		WORKPTR
VTXMC	REAL	GENPAR	GENPAR
VTXPAR	REAL	BACKGD	SIMUL
VT2	REAL	MULTHR	MULDET
WCORMC	REAL	SIMUL	SIMUL
WGHTMC	REAL	SIMUL	SIMUL
WS	REAL	DISPCO	DISPCOM
WSCLR	REAL	BURST	BURST
WSCLS	REAL	BURST	BURST
XA	REAL		WORKPTR
XBDP2	REAL		WORKP12
XBGP2	REAL		WORKP12
XDIM	REAL	KINEMR	KINEMR
XFIT	REAL		WORKSP
XFMC	REAL	GENPAR	GENPAR
XI	REAL		WORKVRT
XIN	REAL		WORKVRT
XIR	REAL		WORKVRT
XM	REAL		WORKVRT
XMAXW	REAL	DISPCO	DISPCOM
XMINW	REAL	DISPCO	DISPCOM
XOU	REAL		WORKVRT
XOUR	REAL		WORKVRT
XOUT	REAL		WORKVRT
XPRP2	REAL		WORKP12
XROUT1	REAL		WORKCUT
XSPTR	REAL		WORKPTR
XTR	REAL		WORKSP
XTRMC	REAL	GENPAR	GENPAR
XTRPM	REAL	TRAPRM	TRAPRM
XTRPR	REAL	TRAPRO	TRAPRO
XTRSP	REAL	TRASPA	TRASPA
XV	REAL		WORKVRT
YI	REAL		WORKVRT
YIR	REAL		WORKVRT
YM	REAL		WORKVRT
YMAXW	REAL	DISPCO	DISPCOM
YMINW	REAL	DISPCO	DISPCOM
YOU	REAL		WORKVRT
YOUR	REAL		WORKVRT
YPRP2	REAL		WORKP12
YV	REAL		WORKVRT
YY	REAL		WORKCUT
ZA	REAL		WORKPTR
ZBEG	REAL	CHAMP	CHAMP
ZBEGF	REAL	CHAMP	CHAMP
ZCRCUT	REAL	OPTRAC	OPTRACK
ZCRMX	REAL	CUTTES	CUTTEST

ZDCADC	INTEGER	NA50DA	NA38DA
ZDCCOR	REAL	NA50CO	NA38DA
ZDCPUP	INTEGER	PILUP	PILUP
ZDCTDC	INTEGER	NA50DA	NA38DA
ZENDF	REAL	CHAMP	CHAMP
ZFIT	REAL		WORKSP
ZIMP	REAL	IMPMAG	IMPMAG
ZMIL	REAL	CHAMP	CHAMP
ZOR	REAL	GEOM	GEOM
ZSPTR	REAL		WORKPTR
ZTR	REAL		WORKSP
ZTRPM	REAL	TRAPRM	TRAPRM
ZTRPR	REAL	TRAPRO	TRAPRO
Z00	REAL		WORKVRT

Chapter 9

ORGANIGRAMME

```
DIMURC
——–> INIT_REC
        ——–>    READCD_REC
                ——–>    JUCOMP
                ——–>    LEFT
        ——–>    HBKCUT
        ——–>    HBKALI
        ——–>    USERI
        ——–>    ALIGNI
        ——–>    POPTRA
                ——–>    NFIX
        ——–>    WORD
        ——–>    INITRX
        ——–>    WRIMIC
                ——–>    NFIX
        ——–>    DRWINI
                ——–>    YESNO
                ——–>    ILECT
——–> PROCES_REC
        ——–>    RESETV
        ——–>    READEV
                ——–>    NEXTPI
                ——–>    DMPBLK
                ——–>    ENDRUN
                        ——–>    INT32
                        ——–>    WRSCAL
                                ——–>    FLOTIN
                                ——–>    WRTBLK
                        ——–>    OUTPED
                                ——–>    PINDEX
                        ——–>    CEFFBH
                        ——–>    WRTBLK
                        ——–>    WRIMIC
                        ——–>    OUTICH
                        ——–>    WRTRUN
                                ——–>    NFIX
                                ——–>    FLOTIN
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                          ——->    OUTGLO
                                  ——->    RIGHT
                          ——->    RUNSUM
                                  ——->    PRSCAL
                                  ——->    DIMCOU
                  ——->    BEGRUN_REC
                          ——->    INT32
                          ——->    CHAFRN
                          ——->    FLON
                          ——->    BGRUPR
                          ——->    IFRCHN
                          ——->    WRTBLK
                          ——->    GEOMET
                          ——->    SETTAR
                          ——->    INICAL
                          ——->    HBKPED
                          ——->    RDADCC
                          ——->    MDSSET
                          ——->    HISBUK_REC
                          ——->    HBKADC
                                  ——->    RIGHT
                          ——->    HISMUL
                                  ——->    PINDEX
                  ——->    INT32
                  ——->    HVOLTG
                  ——->    WRIMIC
                  ——->    WRTBLK
                  ——->    CHAFRN
                  ——->    RDSCAL
                          ——->    INT32
                          ——->    PRSCAL
                  ——->    GANIL
                  ——->    DECOFF
                          ——->    FLON
                  ——->    SIMULE
                          ——->    FLON
                  ——->    DECCAL
                          ——->    FLON
                  ——->    RESETV
          ——->    USER_REC
          ——->    RECRW1
                  ——->    RECRW2
          ——->    DECODE
                  ——->    MULDCD
                          ——->    MULTTH
                          ——->    MULNOI
                          ——->    MDFILT
          ——->    CLEANH
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              ———->         CHMTRX
———->         INEFRM
              ———->         TRIGSX
              ———->         NORM
———->         ADCCOR
———->         TGTSIM
———->         TGTCTR
———->         CALMUL
———->         CALCUL
———->         CALZDC
———->         PILEUP
              ———->         PUCALO
                            ———->         PUCARF
                                          ———->         PU2TDC
                            ———->         PUTDC
              ———->         PUPZDC
———->         TRACK
              ———->         DECODE
              ———->         PROTRK
                            ———->         PTRAK1
                                          ———->         LINFIP
              ———->         IMPMGT
              ———->         MAGNET
              ———->         HISMUL
———->         HISMUL
———->         HFIALI
              ———->         COORD
              ———->         YUV
———->         MOMDET
              ———->         ROTAT
              ———->         REROT
              ———->         MTARNO
                            ———->         RFIELD
———->         PDEDX
———->         CUTTRK
              ———->         CUT
              ———->         HISGLO
              ———->         HODHIT
              ———->         IMAGE
                            ———->         NYSTRK
                            ———->         HITR_REC
———->         CINEMA
———->         CUTS
              ———->         FIDCUT
———->         SELDIM
———->         HFIPED
———->         DBEVT
              ———->         DMPBLK
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                    ———->       DBSIM
                    ———->       DBUPDE
                    ———->       DBSPOT
                    ———->       DBTRSP
                    ———->       DBMAGN
        ———->       HISFIL_REC
        ———->       TESCUT
                    ———->       COORD
                    ———->       YUV
        ———->       HFIADC
                    ———->       MULRES
                                ———->       MDCLUS
        ———->       TESICH
        ———->       WRTEVT
                    ———->       WRTBLK
                    ———->       NFIX
        ———->       WRIMIC
———-> FINISH_REC
        ———->       ENDRUN
        ———->       USERF
        ———->       HSIGNA
        ———->       PRSCAL
        ———->       CEFFBH
```