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DELPHI Extended ShortDST Content

Version 1.08

Description

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Abstract

Extended ShortDST is the main data format of Delphi collaboration for the LEP2 data analysis. Its content may be subject to improvement and development. A regularly updated version of this note could be found at http://delphiwww.cern.ch/~spassoff/des/xshortdes.ps.

Contents

1 INTRODUCTION **3**

2 PILOT RECORD **13**

2.01 Blocklet DAS (0.0) 13
2.02 Blocklet VERS (1.0) 14
2.03 Blocklet IDEN (7.0) 15
2.04 Blocklet DANA (8.0) 18
2.05 Blocklet DANF (8.2) 23
2.06 Blocklet DPHY (9.1) 25
2.07 Blocklet TRIG (12.0) 27
2.08 Blocklet TRGR (12.1) 29
2.09 Blocklet DETV (13.4) 30
2.10 Blocklet DETP (13.5000) 31
2.11 Blocklet LEP (14.0) 32
2.12 Blocklet TAG (15.0) 34
2.13 Blocklet DTAG (15.15) 35

3 DATA RECORD **41**

3.01 DTOP BANK 41
3.02 DFIX BANK 44
3.03 PV BANK 45
3.04 PA BANK 48
3.04.01 PA extra-module MAIN(0) 54
3.04.02 PA extra-module EMCA(2) 56
3.04.03 PA extra-module HCAL(3) 57
3.04.04 PA extra-module MTPC(7) 59
3.04.05 PA extra-module TRAC(8) 61
3.04.06 PA extra-module TOF(9) 62
3.04.07 PA extra-module TEID(12) 63
3.04.08 PA extra-module TETP(13) 65
3.04.09 PA extra-module TEOD(14) 67
3.04.10 PA extra-module TEFA(15) 69
3.04.11 PA extra-module TEFB(16) 71
3.04.12 PA extra-module TDID(17) 73
3.04.13 PA extra-module STIC(19) 74
3.04.14 PA extra-module TERF(21) 77
3.04.15 PA extra-module EMNC(22) 79
3.04.16 PA extra-module HCNC(23) 81
3.04.17 PA extra-module MUID(24) 82
3.04.18 PA extra-module ELID(25) 84
3.04.19 PA extra-module HAID(26) 86
3.04.20 PA extra-module MUFI(27) 90
3.04.21 PA extra-module ELTR(28) 92

3.04.22 PA extra-module ODHI(29) 93
3.04.23 PA extra-module PHOT(30) 94
3.04.24 PA extra-module NMUS(32) 96
3.04.33 PA extra-module SSTC(33) 98
3.04.25 PA extra-module HCRO(34) 99
3.04.26 PA extra-module HCMU(35) 100
3.04.27 PA extra-module TEST(41) 101
3.04.28 PA extra-module TEVF(42) 103
3.04.29 PA extra-module TERB(43) 105
3.05 SH BANK(3) 107
3.06 INITIAL e^+e^- BANK(4) 108
3.07 FINAL e^+e^- BANK(5) 109
3.08 $l\bar{l}$ / $q\bar{q}$ BANK(6) 110
3.09 Unassociated TE BANK(10) 111
3.09.01 ID unassociated TE BANK 112
3.09.02 TOF unassociated TE BANK 114
3.09.03 HOF unassociated TE BANK 116
3.09.04 VFT unassociated TE BANK 118
3.10 HPC trigger BANK(14) 120
3.11 HCAL cathode readout BANK(18) 121
3.12 STIC trigger BANK(20) 123
3.13 μVD HITS BANK(21) 125
3.14 V0ID BANK(22) 126
3.15 B TAGGING BANK(25) 127
3.16 V0TK BANK(27) 132
3.17 EFLO BANK(30) 133
3.18 DSTR BANK(31) 135
3.19 VSAT BANK(32) 137
3.20 EMCL BANK(33) 138
3.21 PXTD BANK(42) 139
3.22 STTD BANK(43) 140

1 INTRODUCTION

The general structure of the DELPHI extended ShortDST data follows the rules of the ZEBRA I/O package FZ [1] and in this respect it is not different from the general structure of the other DELPHI data sets (RAW, TANAGRA, DST [3] etc.). For every data structure there are two logical records – a pilot record in integer format followed by a data record containing the actual data as ZEBRA banks. These records may be related either to event data or to status information.

The event data records provide all data relative to the events. In this case the pilot records held an event summary while the ZEBRA data records contain more detailed information about the events. The XShortDST event data are written in the form of a single ZEBRA structure – one pilot record followed by one data record.

Interleaved with the actual event data some status records are written out at each change of a run. They provide a technical information on the running conditions of the detector modules or software processors. The status records are valid for all the events which follow until another status record is encountered.

The DELPHI XShortDST content may be subject to improvement and development reflecting the increasing ability of the Delphi analysis software to identify particles and secondary interactions in a reliable way. With any important change of the content of the XShortDST its version number is changing as well. The present description should indicate in a clear way the new material of each consecutive version.

Pilot Record

The ZEBRA pilot record is aimed to contain sufficient information to determine if the data contained in the ZEBRA data record which follows are of any use for a given topic of interest. It includes information about the status of the processing, the event quality and topology as well as its global physics characteristics. The ZEBRA I/O package [2] reads first the pilot record and allows the user to examine its contents and to decide whether to load into the memory or skip the following record containing the actual ZEBRA data banks. This feature speeds up considerably the scanning through a sequential medium if only few events have to be selected. Subsequently when the list of these events is known the direct access organization of the DELPHI XShortDST data should be used instead.

All pilot records, whether containing status information or event data, have the same structure. They are formatted as a set of "blocklets" which are the minimum units of information accessed by a standard software. Each blocklet consists of a set of actual data words surrounded by a 3-word header defining the size of the blocklet and the origin of its data, and a 1-word trailer. The definition of a blocklet leaves the possibility not only to create an arbitrary number of levels of nesting for the blocklets, but also to drop or add blocklets to the original content without disturbing the rest of the pilot record.

The blocklet header consists of the blocklet wordcount WC which is a single word giving the total number of the 32-bit words in the blocklet, and two words identifying the blocklet (identifier and sub-identifier), giving the type and the source of the data and reporting errors if any. The blocklet type can be identified as well by a mnemonic character name (e.g. DAS, DANA, LEP etc.) atributted to each combination of identifier and subidentifier. The blocklet trailer contains once again the wordcount WC (as the first word of the blocklet) which allows the scan of the pilot record in forward and backward direction.

After the end of the last blocklet the pilot record contains a *zero* to indicate the end of the record.

The PILOT blocklets are created either at previous stages of the Delphi data processing and then copied to the XShortDST, or during the XShortDST production itself. The XShortDST pilot record contains the following blocklets :

- DAS blocklet (0.0) written on the main Raw data pilot by the Data Acquisition System during the data taking and copied subsequently on the XShortDST. It contains the experiment, run, file (tape) and event number, as well as the event date and time defined by the on-line system (or by the simulation). The processing status describes the stages of processing through which the event has passed and the corresponding information which exists in the event record. Set to 0 by DAS it is updated at the processing stages. The calibration status gives the list of detector modules for which a calibration has been done by setting bits to 0 or 1. The last two words are not always present in the blocklet.

- VERS blocklet (1.0) written on the pilot during the XShortDST creation. It contains the version numbers of the main identification packages used to produce the XShortDST as well as the general data processing identifier.

- IDEN blocklet (7.0) written in the pilot during the XShortDST creation. It contains the global results (for the event as a whole) of the processors for the identification of the muons, electrons, hadrons and other particles.

- DANA blocklet (8.0) created by the DELANA reconstruction program at the stage of the main event processing and copied on the XShortDST pilot. It contains the main results of the event reconstruction including the event quality and topology, as well as flags classifying the event as belonging to a given type.

- DPHY blocklet (9.1) is a reduced version of the full DST blocklet DPHA (9.0) containing information about the event type and team tagging as defined by the DELANA reconstruction program.

- TRIG blocklet (12.0) containing a trigger information and created by the TRIGGER system during the data acquisition.

- TRGR blocklet (12.1) containing a higher level trigger information for T4 and T3 triggers. Created by the TRIGGER system during the data acquisition as well.
- DETV blocklet (13.4) containing the transformation matrix from the OD detector reference frame to the Delphi general frame.
- DETP blocklet (13.5000) containing special information for the TPC detector.
- LEP blocklet (14.0) created by the Data Acquisition System and containing information about the configuration and the status of LEP at the moment of the data taking.
- TAG blocklet (15.N) where N is the number of Delphi physics teams (N$\leq$14), containing tagging words for each team.
- DTAG blocklet (15.15) created by the DAFNE (Delphi Analysis For New Events) package when run on the XShortDST. It contains additional physics tagging of the events.

Pilot blocklet access

When reading the XShortDST the pilot record information is contained in the vector IPILOT of the sequence /PHCDE/ of the ZEBRA I/O package PHDST [2]. The users can easily access different pilot blocklets using PHDST tools.

The following pilot record access tools are most appropriate :

- **IPHPIL** – search a blocklet address in the PILOT record by the integer blocklet type. The function allows to find the address of a given blocklet using the numerical blocklet identifiers :

  IADDR = IPHPIL (IDN1, IDN2)

  where

Input :	IDN1	–	blocklet identifier
	IDN2	–	blocklet sub-identifier
Output:	IADDR	–	blocklet address in the pilot
			-1 = not found
			-13 = contradiction encountered

- **IPHPIC** – search a blocklet address in the PILOT record by the character blocklet type. The function allows to find the address of a given blocklet using the mnemonic names logically connected to the numerical blocklet types.

  IADDR = IPHPIC (CTYPE, DUMMY)

  where

Input :	CTYPE	–	character blocklet identifier
	DUMMY	–	not used
Output:	IADDR	–	blocklet address in the pilot
			-1 = not found
			-13 = contradiction encountered

The address IADDR is pointing in front of the respective blocklet in the vector IPILOT, i.e. IPILOT (IADDR + 1) = Wordcount

Data Record

The XShortDST data record has the form of a very simple ZEBRA structure. Each event has one DTOP bank supporting a linear chain of vertex banks PV at its first structural link. In the same way each PV bank is supporting a chain of PA banks with information for the tracks going out from this vertex, one bank per track.

For some events there are only two vertices on the XShortDST data structure for the real data (see PV BANK, page 45) as on the original fullDST :

- primary vertex (as defined by DELANA [4]) collecting all well converging to it tracks (particles) PA. This vertex is identified by no status bit of the respective PV bank set and a mass code of the origin particle Q(LPV + 4) = 0.

- dummy vertex collecting the rest of the tracks (particles) PA which do not converge to the primary one. For this vertex the status bit 1 is set and the mass code is Q(LPA + 4) = 999.

During the XShortDST production additional PV-PA structures are created for many well identified secondary interactions and decays as photon conversion, secondary hadronic interaction, V0 decay etc. While the format of the new PV and PA banks corresponds to the general one they have some particularities :

- photon conversion - a new PV vertex is build up at the photon conversion point as well as a photon track PA between the primary vertex and the new one which becomes an end vertex of that track. The status bit 3 of the new PV bank is set to 1 to indicate that the vertex is secondary and the photon identification bits 19-25 of the PA mass ambiguity code (see PA BANK, page 48) have a value of 21 to 24 for photon converted in front of the TPC. The charged tracks PA from the photon conversion are moved from the primary or dummy vertex to the new one without any changes of their parameters.

- secondary hadronic interaction - a new PA bank is lifted with an end PV vertex in the interaction point. The PA banks of the outgoing particles are moved to this PV. The new end PV is flagged as an hadronic one by setting up the third status bit. The bits 19-25 of the mass ambiguity code of the incoming PA are equal to 120. The incoming PA bank contains only the extra-module MAIN(0).

- VD only track - created when there is at least one hit in each Vertex Detector layer and no measurements in any other detector. A new PA bank supported by the dummy PV vertex of the event is lifted containing the MAIN(0) and TRAC(8) extra-modules. It can be identified by the bits 19-25 of its mass ambiguity code which are equal to 75 if the Z information is measured, or 77 otherwise.

- VD only track with hadronic vertex - a combination of the previous two cases. The PA bank of the incoming particle to the secondary hadronic interaction is dropped when a VD only track is found to match better this interaction and its end vertex is moved to the VD only track. The mass ambiguity code bits 19-25 are then changed from 75 to 124 or from 77 to 126.

- V^0 decay - a new PA bank is lifted for the V_0 neutral track (K^0 or Λ^0) with an end PV vertex to it at the V_0 decay point. The PV bank status bits 2 is set as for a secondary vertex and the mass ambiguity code bits 19-25 have the value 111 for K^0 and 112 for Λ^0. The PA banks of the decay particles are moved to the new V^0 vertex bank without any change of their parameters.

  This modification of the structure is done only if the V_0 is defined as "very tight" (see V0ID BANK, page 126) and the charged outgoing tracks are not considered as candidates for a secondary interaction. On the other hand tracks identified by the DELPHI analysis software as electrons (mass ambiguity code bits 19-25 equal to 28, 29 or 30) are not considered as possible V^0 decay products.

- HAC only track - a neutral track created when there is an appropriate shower in the Hadron Calorimeter. A new PA bank supported by the dummy PV vertex of the event is lifted. It contains the MAIN(0) and TRAC(8) extra-modules. The mass ambiguity code bits 19-25 are equal to 115 and the TANAGRA identifier is set to 7777777.

- reconstructed electromagnetic cluster - a new PA bank is lifted for every barrel cluster or forward isolated one corresponding to an electron, photon or not identified object with zero charge. The PA is linked to the origin vertex of the cluster's primary PA, except for neutral forward clusters which are always attached to the primary vertex (if any) if the primary PA is an EMF shower, or to the dummy vertex if the primary PA is a STIC shower. A dummy end vertex PV is created and all PAs used to build the cluster are moved to it preserving the previously existing multi-vertex structure, i.e. if one of the PAs used to build the cluster has an end vertex with other PAs attached to it, the whole tree is rigidly moved at the cluster PA end vertex.

  The PA mass ambiguity code bits 26-28 of all PAs involved in the cluster, including the newly created one, are filled with an identification code of the particle (see PA BANK, page 48). The electromagnetic cluster bank (see EMCL BANK, page 138) is always filled with an information updated after the change of the PV-PA structure.

The TANAGRA identifier of the new tracks is unique but negative to indicate that the track has been created on the XShortDST level. It is composed by the mass ambiguity code plus thousand multiplied by the sequential number of the track if there is more than one particle with the same code in the event.

The PA bank includes information from different processors or detectors. This information is organized inside the bank in separate linear sections following one after another and called extra-modules. Each PA extra-module has an unique numerical label and a corresponding mnemonic character name. It contains the results of one processor or detector having a distinct physical nature. This internal organization of the PA bank contents is similar to the the pilot record blocklets and allows the flexibility to add or drop modules without disturbing the rest of the bank.

The following PA extra-modules are written on the XShortDST :

- MAIN (0) − contains the main kinemathical characteristics of the track obtained by the DELANA reconstruction program.

- EMCA (2) − contains the electromagnetic showers information in HPC and EMF.

- HCAL (3) − contains the hadronic showers information in HCAL.

- MTPC (7) – contains the dE/dx information for the track measured by the TPC.
- TRAC (8) – contains the main track parameters after fitting, including their weight matrix.
- TOF (9) – contains time of flight information for the track.
- TEID (12) – contains track elements TER in the Inner Detector.
- TETP (13) – contains track elements TER in the TPC Detector.
- TEOD (14) – contains track elements TER in the Outer Detector.
- TEFA (15) – contains track elements TER in the Forward Chamber A.
- TEFB (16) – contains track elements TER in the Forward Chamber B.
- TDID (17) – contains TD tracks for the Inner Detector calibration.
- STIC (19) – contains information for the STIC detector showers.
- TERF (21) – contains track elements TER in the Forward RICH.
- EMNC (22) – contains condensed results of the electromagnetic calorimetry (HPC and EMF) after fixing.
- HCNC (23) – contains condensed results of the hadron calorimetry (HCAL) after fixing (package HACFIX) and neutral shower correction (package HACCOR).
- MUID (24) – contains muon identification information after fixing (packages MUCFIX and MUFLAG).
- ELID (25) – contains electron identification information also after fixing (package ELEPHANT).
- HAID (26) – contains hadron identification information and tagging (package HADSIGN).
- MUFI (27) – contains muon chamber information after refitting.
- ELTR (28) – contains the track parameters (as module TRAC) refitted for the electron tracks.
- ODHI (29) – contains information for the Outer Detector hits.
- PHOT (30) – contains results of the photon and π^0 identification in HPC.
- NMUS (32) – contains information from the surrounding muon chambers.

- HCRO (34) – contains HCAL cathode read-out information.
- TEST (41) – contains track elements TER in the Straw Tubes.
- TEVF (42) – contains track elements TER in the Very Forward Tracker.
- TERB (43) – contains track elements TER in the Barrel RICH.

The extra-modules with labels between 22 and 40 are created during the XShortDST production. The others are created at previous stages of data processing and copied to the XShortDST. While the extra-module MAIN is always present, as well as the extra-modules TRAC for the charged tracks, the others are written out only if the respective information exists.

Besides the PA bank several other banks are created or copied during the XShortDST production. They contain an information which could not be reffered to one PA track only but concerns the event as a whole. As for the PA bank their supporting bank is DTOP.

Data structure access

When reading the XShortDST the data record information is contained in the ZEBRA storage residing in the /PHCDE/ sequence of the ZEBRA I/O package PHDST [2]. The users can access different banks using the ZEBRA structural links, e.g. the primary vertex is at address LPV = LQ(LDTOP–1) and each consecutive vertex (if any) at LPV = LQ(LPV) along the linear chain of vertex banks. The particle banks PA are supported by the vertex from which they are comming out and their address is LPA = LQ(LPV–1) the next particle from the same vertex being at LPA = LQ(LPA).

The PA bank extra-modules can be accessed using the PHDST tools :

- **LPHPA** – get the address of a PA bank extra-module using the character module type (name). The calling syntax of this function is :

  L = LPHPA (CHID, LPA, NUM)

  where

Input :	CHID	–	character string specifying the extra-module name
	LPA	–	ZEBRA address of the PA bank
	NUM	–	module number (if many)
Output:	L	–	address of the extra-module = 0 if not found

- **LPHPAB** – get the address of a PA bank extra-module using its integer label. The calling syntax of this function is :

  L = LPHPAB (LABEL, LPA)

  where

Input :	LABEL	–	integer module label
	LPA	–	ZEBRA address of the PA bank
Output:	L	–	address of the extra-module
			= 0 if not found

The address L is pointing in front of the respective extra-module in the Q vector of ZEBRA, i.e. Q (L + 1) = Label of the module.

Status Records

Status records are written out by DAS for a change of run or file, and by the off-line to indicate the start/end of a program run. The start records provide information remaining unchanged for all events which follow until a new start record is encountered. The end records point out the end of validity of the current start information and contain some statistics related to the events since the last start record.

On the XShortDST the following status records are written :

– SOR (Start Of Run), start status at each start of a new DAS run

– BOF (Begining Of File), start status at each start of a new file (tape)

– SOS (Start Of Simulation), start status for simulation

– EOS (End Of Simulation), end status for simulation

The other status records created during the data taking, as COR (Continuation Of Run), CPT (Check Point), etc., are not written out on the XshortDST files. They are purely technical and do not contain any information usefull for the analysis.

Record type access

The different data and status records are distinguished by the record identifier contained in the word 4 of their first Pilot blocklet (DAS) which is always present. The integer identifier could be converted into a character name by the PHDST function :

- **PHRTY** – get character record type

Example:

```
      SUBROUTINE USER02
*
      IMPLICIT NONE
+CDE, PHCDE.
      CHARACTER*4 PHRTY
      CHARACTER*4 RECTYP
      ...............
*
*--   Check the record type
      RECTYP = PHRTY()
      IF ( RECTYP .NE. 'DST' ) RETURN
      ...............
      END
```

PILOT RECORD
DAS blocklet(0.0)

+1	Wordcount		(12 or 14)
+2	Identifier (bits 1- 4)		(0)
	Error code (bits 5-32)		(usualy FF10)
+3	Sub-identifier		(0)
+4	Record type :	1 RAW (Raw Data)	
		2 SIM (Simulation)	
		3 TAN (Tanagra)	
		4 INT (Intermediate)	
		5 DST (or XShortDST)	
		11 SOR (Start Of Run)	
		16 SOS (Start Of Simulation)	
		56 EOS (End Of Simulation)	
		61 BOF (Beginning of file)	
+5	Experiment number		
+6	Run number		
+7	File sequence number		
+8	T2 (trigger level 2) event number		
+9	Event number		
+10	Event date (format 'yymmdd')		
+11	Event time (format 'hhmmss')		
+12	Processing status (if wordcount >12)		
+13	Calibration status (if wordcount >12)		
+14	Wordcount		(12 or14)

PILOT RECORD
VERS blocklet(1.0)

+1	Wordcount	(8)
+2	Identifier (bits 1- 4)	(0)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(0)
+4	bits 1-10 : DSTFIX version number	
	11-20 : AABTAG version number	
	21-30 : RECV0 version number	
+5	bits 1-10 : MUFLAG version number	
	11-20 : ELEPHANT version number	
	21-30 : HADIDENT version number	
+6	bits 1-10 : HACCOR version number	
	11-20 : DEDXID version number	
	21-30 : not used	
+7	Processing identifier 'YYLN' where :	
	YY is the year of data taking	
	L is the Full DST version letter	
	N is the XShort DST version number	
+8	Wordcount	(8)

PILOT RECORD
IDEN blocklet(7.0)

+1	Wordcount	(20)
+2	Identifier (bits 1- 4)	(7)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(0)
+4	XShort DST version number + 1000×date of production ('yymmdd')	
+5	Processing status bits (set to 1 or 0) :	

bits
- 1 : DSTFIX fixing code run
- 2 : Muon identification code run
- 3 : Electron identification code run
- 4 : Hadron identification cod run
- 5 : B tagging code run
- 6-32 : free

+6 Hadron selection bits (set to 0 or 1) :

bits
- 1 : team 4 selection, number of charged tracks ≥ 5
- 2 : team 4 selection, charged energy ≥ 0.12 E(LEP)
- 3 : free
- 4 : free
- 5 : open selection, number of charged tracks ≥ 5
- 6 : open selection, charged energy ≥ 0.10 E(LEP)
- 7 : open selection, event thrust axes ≤ 0.95
- 8 : free
- 9 : Pch $\geq$0.2 GeV, number of charged tracks ≥ 7
- 10 : Pch $\geq$0.2 GeV, charged energy ≥ 0.15 E(LEP)
- 11 : Pch $\geq$0.2 GeV, Ech + Eneut ≥ 0.30 E(LEP)
- 12 : Pch $\geq$0.2 GeV, Efor, Eback ≥ 0.03 E(LEP)
- 13 : Pch $\geq$0.4 GeV, number of charged tracks ≥ 7
- 14 : Pch $\geq$0.4 GeV, charged energy ≥ 0.15 E(LEP)
- 15 : Pch $\geq$0.4 GeV, Ech + Eneut ≥ 0.30 E(LEP)
- 16 : Pch $\geq$0.4 GeV, Efor, Eback ≥ 0.03 E(LEP)
- 7-32 : free

PILOT RECORD
IDEN blocklet(7.0)

cont.

+7	Muon identification (bitted word) :
	bits 1- 3 : number of muons (OR of all types, P > 2 GeV)
	4- 6 : number of muons loose, standard and tight
	7- 9 : number of muons loose
	10-12 : number of muons standard
	13-15 : number of muons tight
	16-18 : number of muons hadronic
	19-25 : most energetic muon momentum $\times$ 10, all types
	25-32 : most energetic muon momentum $\times$ 10, standard
+8	Electron identification (bitted word) :
	bits 1- 3 : number of electrons (OR of all types, P > 1 GeV)
	4- 6 : number of electrons loose
	7- 9 : number of electrons standard
	10-12 : number of electrons tight
	13-15 : number of electrons loose, standard and tight
	19-25 : most energetic electron momentum $\times$ 10, all types
	26-32 : most energetic electron momentum $\times$ 10, all types
+9	Hadron identification (bitted word) :
	bits 1- 3 : number of kaons loose
	4- 6 : number of kaons standard
	7- 9 : number of kaons tight
	10-12 : number of protons loose
	13-15 : number of protons standard
	16-18 : number of protons tight
	19-25 : most energetic Kaon momentum $\times$ 10, all types
	26-32 : most energetic Proton momentum $\times$ 10, standard
+10	V^0 reconstruction bits :
	bits 1- 4 : number of V^0 tight
	5- 9 : number of V^0 loose
	10-32 : free
+11	Charged multiplicity in hemispheres :
	bits 1- 6 : multiplicity in hemisphere 1
	7-23 : multiplicity in hemisphere 2
	13-32 : free

PILOT RECORD
IDEN blocklet(7.0)

cont.

+12	Energy in hemisphere 1, method 1 (Calorimeters) $\times 10^5$
+13	Energy in hemisphere 1, method 2 (Ch.tr.,neut.sh.) $\times 10^5$
+14	Energy in hemisphere 2, method 1 (Calorimeters) $\times 10^5$
+15	Energy in hemisphere 2, method 2 (Ch.tr.,neut.sh.) $\times 10^5$
+16	X)
+17	Y) $\Rightarrow$ components of the missing P
+18	Z)
+19	S' effective center of mass energy $\times 10^5$
+20	X)
+21	Y) $\Rightarrow$ boost vector components from the Lab frame
+22	Z) $\Rightarrow$ to the frame recoiling from the photons(s) $\times 10^8$
+23	E)
+24	Type of fit used : 0,1 constrained fit 2 triangle rule fit
+25	Quality flag from the fit : 1 transverse direction given in PTL has zero length. 2 transverse direction given in PTL is not transverse to the measured jet momentum given by PM. 3 one parameter become unphysical during the fit, the fit was stopped before a probable crash. 4 the constrained function was too large at a moment, the fit was stopped before a probable crash. 5 the error matrix was not unique (should not happen), the fit was stopped before a probable crash. 6 too big absolute value of a parameter, the fit was stopped before a probable crash. 7 the chi2 was too large, the fit was stopped before a probable crash. 8 the fit does not converge, this could happen if chi2 is very large.
+26	Wordcount (26)

PILOT RECORD
DANA blocklet(8.0)

+1	Wordcount	(58)
+2	Identifier (bits 1- 4)	(8)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(0)
+4	Detectors in the central partition (bitted word)	

+5 Reconstruction status bits − each bit indicates which detector/processor has been processed in DELANA :

bits 4 : VD	bits 14 : HAB	bits 24 : SAT
5 : ID	15 : MUB	25 : LUM
6 : TPC	18 : MUS	26 : FCB
7 : RIB	19 : STIC	27 : EMF
9 : OD	21 : FCA	30 : HOF
10 : HPC	22 : RIF	31 : MUF
12 : TOF	23 : HAF	

+6 Run statistics :

bits 1-16 : number of Z^0 hadronic so far in the run

17-32 : number of Bhabha so far in the run

+7 Atmospheric presure in Delphi (in mbar)

+8 X)

+9 Y) > coordinates of primary vertex (in μm)

+10 Z)

+11 Event topology at primary vertex (bitted word) :

bits 1- 8 : neutrals

9-16 : gammas

17-24 : negative particles

25-32 : positive particles

+12 Size of the Raw data (number of words

+13 Energy in the Center of Mass from LEP (in MeV)

+14 Date of processing ('yymmdd')

+15 Time of processing ('hhmmss')

+16 Magnetic filed measured (bitted word) :

bits 1-24 : magnet power supply current (Amps)

: or field (Gauss)

25 : 0 if the current measured

1 if the field measured

+17 Outer detector time flag :

−1 unknown

0 event in time with BCO

1 cosmic (not in time with BCO)

PILOT RECORD
DANA blocklet(8.0)

cont.

+18	DELANA tagging bits :
	bits 1 = 1 if Hadronic Z^0
	2 = 1 if Leptonic Z^0
	3 = 1 if Ambiguous Z^0
	4 = 1 if Cosmic or beam gas
	5 = 1 if SAT/STIC bhabha
	6 = 1 if Calibration (STP)
	7 = 1 if Calorimetric energy
	11 = 1 if Single e^+ or e^- (low energy)
	12 = 1 if Compton tag for HPC
	13 = 1 if STP event 2 tracks Barrel
	14 = 1 if STP event 2 elm. showers Barrel
	15 = 1 if STP event 2 tracks Forward
	16 = 1 if STP event 2 elm. showers Forward
	17 = 1 if Forward e^+e^- without tracks
	18 = 1 if Additional Tau event
	19 = 1 if Super hadronic for team 4
	20 = 1 if Team 3 tag from DELANA
	21 = 1 if gg-ll with SAT/VSAT tag
	22 = 1 if gg-ll without forward tag
	23 = 1 if gg-ll MUB/MUS in $\geq$ 1 track
	24 = 1 if gg-ll HAC in $\geq$ 1 track
	25 = 1 if Event fails gg filter
	26 = 1 if gg tag for LEP2 canceled due to noise
	27 = 1 if the event passes DELANA pre-filter
	28-32 = 0 free
+19	DELANA cradle date
+20	Timing data from OD or T^0 offset for cosmics
+21	LEP status
+22	LEP colimator status
+23	Status of Data Base and related information (bitted word) :
	bits 1 = 1 data base available
	2 = 1 trigger partition available
	3 = 1 discrepency in FILL number
	4 = 1 discrepency in LEP status
	5 = 1 discrepency in colimator status
	6 = 1 Ebeam from data base
	7 = 1 Ebeam from first estimate in Trigger Partition
	8 = 1 Ebeam from final estimate in Trigger Partition

PILOT RECORD
DANA blocklet(8.0)

cont.

		9 = 1	Ebeam from data cards
		10 = 1	Magnet current from data base
		11 = 1	Magnet current from Trigger Partition
		12 = 1	Magnet current from data cards
		13-32 = 0	free
+24	MUB information		
+25	MUB information		
+26	VD status word (bitted) :		
	bits	1- 4 :	status flag 1
		5- 8 :	status flag 2
		9-32 :	detector user bits
+27	ID status word (bitted) :		
	bits	1- 4 :	status flag 1
		5- 8 :	status flag 2
		9-32 :	detector user bits
+28	TPC status word (bitted) :		
	bits	1- 4 :	status flag 1
		5- 8 :	status flag 2
		9-32 :	detector user bits
+29	RIB status word (bitted) :		
	bits	1- 4 :	status flag 1
		5- 8 :	status flag 2
		9-32 :	detector user bits
+30	free		
+31	OD status word (bitted) :		
	bits	1- 4 :	status flag 1
		5- 8 :	status flag 2
		9-32 :	detector user bits
+32	HPC status word (bitted) :		
	bits	1- 4 :	status flag 1
		5- 8 :	status flag 2
		9-32 :	detector user bits
+33	HPC information		
+34	TOF status word (bitted) :		
	bits	1- 4 :	status flag 1
		5- 8 :	status flag 2
		9-32 :	detector user bits

PILOT RECORD
DANA blocklet(8.0)

cont.

+35	HAB status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+36	HAB information
+37	MUB status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+38	MUB information
+39	MUB information
+40	MUB information
+41	VSAT status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+42	HAC status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+43	FCA status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+44	RIF status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+45	HAF status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+46	SAT status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+47	VSAT status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits

PILOT RECORD
DANA blocklet(8.0)

cont.

+48	FCB status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+49	EMF status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+50	FCB information
+51	SAT information
+52	HOF status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+53	MUF status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+54	VFT Pixels status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+55	VFT Ministrips status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+56	MUS status word (bitted) :
	bits 1- 4 : status flag 1
	5- 8 : status flag 2
	9-32 : detector user bits
+57	TPC missing fips (bitted) :
	bits 1- 6 : TPC-CPx1 x=0-5 (blue fip)
	bits 7-12 : TPC-CPx5 x=0-5 (blue fip)
	bits 13-18 : TPC-CPx3 x=0-5 (red fip)
	bits 19-24 : TPC-WCPx x=0-5 (wire fip)
	bits 25 : TPC0 missing in start of run
	bits 26 : TPC1 missing in start of run
+58	Wordcount (58)

PILOT RECORD
DANF blocklet(8.2)

+1	Wordcount	(23)
+2	Identifier (bits 1- 4)	(8)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(2)
+4	Number of tracks passing the Super Team 1 cuts	
+5	Sum of |P| for tracks passing the Super Team 1 cuts	
+6	Number of tracks passing the $\gamma\gamma$ team selection	
+7	Maximum momentum P for $\gamma\gamma$ selected tracks	
+8	Maximum momentum P_t for $\gamma\gamma$ selected tracks	
+9	Maximum energy of any STIC or VSAT TE	
+10	Maximum energy of any HPC TE	
+11	Maximum energy of any EMF TE	
+12	Not yet used	
+13	Not yet used	
+14	Not yet used	
+15	Not yet used	
+16	Not yet used	
+17	Not yet used	
+18	Not yet used	
+19	Not yet used	
+20	Not yet used	

PILOT RECORD
DANF blocklet(8.2)

cont.

+21	DELANA event pre-filter bits :		
	bits	1 = 1	if Event passes Super Team 1 selection
		2 = 1	if Single tagged $\gamma\gamma$ event
		3 = 1	if Anti-tagged $\gamma\gamma$ event
		4 = 1	if Shower in HPC/FEMC with E > 5 GeV
		5 = 1	if Calibration event flagged by DELANA
		6 = 1	if Soft event for degenerate searches
		7 = 1	if Single lepton event
		8-12 = 1	if 'Hadronic' event selection
		13 = 1	if Soft event for $\widetilde{\tau}$ (S tau) searches
		14-32 = 0	free
+22	DELANA event pre-filter bits for calibration :		
	bits	1 = 1	if Back to back high energy tracks or showers ($e^+e^- \rightarrow \mu^+\mu^-$ or e^+e^-)
		2 = 1	if Back to back low multiplicity jets (τ selection)
		3 = 1	if $\gamma\gamma \rightarrow$ lepton lepton event
		4 = 1	if Single electron (ignored when filtering events)
		5 = 1	if Old Compton tag (ignored when filtering events)
		6 = 1	if New Compton tag (barrel)
		7 = 1	if New Compton tag (barrel) (alternative algorithm)
		8 = 1	if New Compton tag (forward)
		9-32 = 0	free
+23	Wordcount		(23)

PILOT RECORD
DPHY blocklet(9.1)

+1	Wordcount	(6)
+2	Identifier (bits 1- 4)	(9)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(1)
+4	Event type (bitted word):	

bits 1 = 1 the type is defined
2 = 1 background event
3 = 1 cosmic event
4 = 1 beam-gas interaction
5 = 1 $\gamma\gamma$ or 3γ candidate
6 = 0 free
7 = 0 free
8 = 1 $\mu^+\mu^-$ candidate
9 = 1 $\mathrm{e}^+\mathrm{e}^-$ candidate
10 = 1 $\tau^+\tau^-$ candidate
11 = 0 free
12 = 0 free
13 = 1 $\mathrm{e}^+\mathrm{e}^- \to \gamma\gamma$ candidate
14 = 0 free
15 = 0 free
16 = 1 $q\bar{q}$ candidate
17 = 1 $u\bar{u}$ and $d\bar{d}$ candidate
18 = 1 $s\bar{s}$ candidate
19 = 1 $c\bar{c}$ candidate
20 = 1 $b\bar{b}$ candidate
21 = 1 $t\bar{t}$ candidate
22 = 0 free
23 = 0 free
24 = 1 large missing energy event
25 = 1 large sphericity event
26 = 1 high energy isolated γ event
27 = 1 high energy isolated lepton event
28 = 0 free
29 = 0 free
30 = 0 free
31 = 0 free
32 = 0 free

PILOT RECORD
DPHY blocklet(9.1)

cont.

+5	Team tagging (bitted word):		
	bits 1 = 1 event tagged by Team	1	
	2 = 1 event tagged by Team	2	
	3 = 1 event tagged by Team	3	
	4 = 1 event tagged by Team	4	
	5 = 1 event tagged by Team	5	
	6 = 1 event tagged by Team	6	
	7 = 1 event tagged by Team	7	
	8 = 1 event tagged by Team	8	
	9 = 1 event tagged by Team	9	
	10 = 1 event tagged by Team	10	
	11 = 1 event tagged by Team	11	
	12 = 1 event tagged by Team	12	
	13 = 1 event tagged by Team	13	
	14 = 1 event tagged by Team	14	
+6	Wordcount		(6)

PILOT RECORD
TRIG blocklet(12.0)

+1	Wordcount	(69)
+2	Identifier (bits 1- 4)	(12)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(0)
+4	B1 trigger (from scalers)	
+5	PYTHIA 1st level : input 1 from receiver	
+6	PYTHIA 1st level : input 2 from receiver	
+7	PYTHIA 1st level : input 3 from receiver	
+8	PYTHIA 1st level : input 4 from receiver	
+9	Output from A module, 1st level	
+10	Output from A module, 1st level	
+11	Output from A/B module, 1st level	
+12	Output from A/B module, 1st level	
+13	B1 forward majority trigger (from scalers)	
+14	PYTHIA 2nd level : input 1 from receiver	
+15	PYTHIA 2nd level : input 2 from receiver	
+16	PYTHIA 2nd level : input 3 from receiver	
+17	PYTHIA 2nd level : input 4 from receiver	
+18	Output from A module, 2nd level	
+19	Output from A module, 2nd level	
+20	Output from A/B module, 2nd level	
+21	Output from A/B module, 2nd level	
+22	Input module C, 1st level	
+23	Results from C, 1st level	
+24	Results from C after mask, 1st level	
+25	Results from C after scaling, 1st level	
+26	Trigger pattern, 1st level	
+27	Trigger pattern, 1st level	
+28	Trigger pattern, 1st level	
+29	Trigger pattern, 1st level	
+30	Majority pattern, 1st level	
+31	Majority pattern, 1st level	
+32	Input module C, 2nd level	
+33	Results from C, 2nd level	
+34	Results from C after mask, 2nd level	
+35	Results from C after scaling, 2nd level	
+36	Trigger pattern, 2nd level	
+37	Trigger pattern, 2nd level	
+38	Trigger pattern, 2nd level	
+39	Trigger pattern, 2nd level	

PILOT RECORD
TRIG blocklet(12.0)

cont.

+40	Majority pattern, 2nd level	
+41	Majority pattern, 2nd level	
+42	B1 pattern	
+43	Internal T3 trigger pattern	
+44	Internal T3 trigger pattern	
+45	Internal T3 trigger pattern	
+46	Internal T3 trigger pattern	
+47	Internal T3 majority pattern	
+48	Internal T3 majority pattern	
+49	Internal T3 DF pattern	
+50	Output T3 trigger pattern	
+51	Output T3 trigger pattern	
+52	Output T3 trigger pattern	
+53	Output T3 trigger pattern	
+54	Output T3 majority pattern	
+55	Output T3 majority pattern	
+56	Output T3 DF pattern	
+57	TPC tagging	
+58	Bunch number from VSAT	
+59	Bunch number from UNG_CLK_BCO	
+60	Vernier scan (bitted) :	
	bits 1- 2 : start of scan	
	3- 4 : end of scan	
	5- 8 : detector identification	
	9-32 : step	
+61	First level prescaling factors	
+62	First level prescaling factors	
+63	First level prescaling factors	
+64	First level prescaling factors	
+65	Second level prescaling factors	
+66	Second level prescaling factors	
+67	Second level prescaling factors	
+68	Second level prescaling factors	
+69	Wordcount	(69)

PILOT RECORD
TRGR blocklet(12.1)

+1	Wordcount			(7)
+2	Identifier (bits 1- 4)			(12)
	Error code (bits 5-32)			(usualy FF10)
+3	Sub-identifier			(1)
+4	T4 tag :			
	bits	1 :	T4 HPC	
		5 :	T4 EMF	
		9 :	T4 TPC	
		13 :	T4 STIC	
		17 :	Team tag	
		21 :	T3 tag	
		25 :	T4 Pass	
		29 :	T4 Delana	
			or	
		1-32 :	= 0 if no Tag set by T4	
		1-32 :	=-1 if T4 not there	
+5	T3 single gamma bits :			
	bits	2 :	Bhabha	
		15-16 :	Single Gamma	
			or	
		1-32 :	=-1 if no T3 Trigger bank	
+6	T3 TPC tag :			
	bits	1- 8 :	HAD tag	
		9-16 :	LEP tag	
		17-24 :	LLB tag	
		25-32 :	TPC tag	
			or	
		1-32 :	=-1 if no T3 Trigger bank	
+7	Wordcount			(7)

PILOT RECORD
DETV blocklet(13.4)

+1	Wordcount	(16)
+2	Identifier (bits 1- 4)	(13)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier -	(ID)
	Module identifier ID of the detectors [1]	
	for which the transformation matrix is given :	
	3 : VD 8 : OD 14 : MUB 21 : RIF 25 : FCB	
	4 : ID 9 : HPC 17 : MUS 22 : HAF 26 : EMF	
	5 : TPC 11 : TOF 18 : STIC 23 : SAT 29 : HOF	
	6 : RIB 13 : HAB 20 : FCA 24 : LUM 30 : MUF	
	Transformation matrix from a detector reference frame to the DELPHI general reference frame[2]	
+4	Transformation matrix element 1	
⋮	⋮	
+15	Transformation matrix element 12	
+16	Wordcount	(16)

[1]The transformation matrix of the Inner Detector only is present in the XShortDST Pilot.
[2]The transformation matrix elements are multiplied by 1000000 before being stored as integers.

PILOT RECORD
DETP blocklet(13.5000)

+1	Wordcount	(7)
+2	Identifier (bits 1- 4)	(0)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(5000)
+4	Pressure in the TPC	
+5	Normalization used for the integerated dE/dx	
+6	Ratio (int.amplitude / max.amplitude)	
+7	Wordcount	(7)

PILOT RECORD
LEP blocklet(14.0)

+1	Wordcount	(variable)
+2	Identifier (bits 1- 4)	(14)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(0)
+4	Date of last update ('yymmdd')	
+5	Time of last update ('hhmmss')	
+6	Fill number	
+7	LEP status as given by the machine (from 1 to 9)	
+8	LEP status derived from current, energy and collimator (DELPHI evaluation) : 1 = No beam 2 = Setup 3 = Physics 4 = End of fill 5 = Unknown	
+9	Time of last change of LEP status ('hhmmss')	
+10	Collimators setting : 0 = Unknown 1 = Open 2 = Coarse 3 = Fine	
+11	Number of positron bunches in the machine	
+12	Actual ring energy in MeV	
+13	Flip coil energy	
+14	Current in the main coil (Amps)	
+15	Field in mids-NRM probe (Gauss)	
+16	Horizontal (X) beta value	
+17	Vertical (Y) beta value	
+18	X)	
+19	Y) ⇒ Beam spot position (used by DELANA)	
+20	Z)	
+21	σ_X)	
+22	σ_Y) ⇒ of the Beam spot position	
+23	σ_Z)	

PILOT RECORD
LEP blocklet(14.0)

cont.

+24	Positron stack current (μ amps)
+25	Positron stack current (μ amps)
+26	Positron stack current (μ amps)
+27	Positron stack current (μ amps)
+28	Electron stack current (μ amps)
+29	Electron stack current (μ amps)
+30	Electron stack current (μ amps)
+31	Electron stack current (μ amps)

If LEP works in a bunch mode −

For cosmic data:

+32	1 − no measurement available (-9999) or 2 − the crossing time in nsec. measured
+33	Crossing time wrt BCO from TOF
+34	Crossing time wrt BCO from OD
+35	Crossing time wrt BCO from FCB
+36	Crossing time wrt BCO from HOF
+37	Crossing time wrt BCO from ID straws

For physics data:

+32	Interacting bunch (used in DELANA)	
+33	Bunch number from ID	
+34	Bunch number from FCB	
+35	Bunch number from FCA	
+36	Bunch number from TOF	
+37	Bunch number from OD	
+38	Bunch number from HOF	
+39	Bunch number from STIC	
+40	Bunch number from ID straws	
+41	Number of wagons from LEP	
+42	Distance in RF buckets from LEP	
+43	Number of clock BCOs from ZEUS	
+44	Background 1 from LEP data base $\times$ 1000	
+45	Wordcount	(variable)

PILOT RECORD
TAG blocklet(15.0)

+1	Wordcount	(variable)
+2	Identifier (bits 1- 4)	(15)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier ≡ Number of teams	(N_{team})
	For each team :	
+4 to +3+N_{team}	Team tagging words (one per team)	
+4+N_{team}	Team tagging running (bitted word):	
	bits 1 = 1 Team 1 tagging effectively run	
	2 = 1 Team 2 tagging effectively run	
	3 = 1 Team 3 tagging effectively run	
	4 = 1 Team 4 tagging effectively run	
	5 = 1 Team 5 tagging effectively run	
	6 = 1 Team 6 tagging effectively run	
	7 = 1 Team 7 tagging effectively run	
	8 = 1 Team 8 tagging effectively run	
	9 = 1 Team 9 tagging effectively run	
	10 = 1 Team 10 tagging effectively run	
	11 = 1 Team 11 tagging effectively run	
	12 = 1 Team 12 tagging effectively run	
	13 = 1 Team 13 tagging effectively run	
+5+N_{team}	Team accepted for output even if not tagged by DELANA or other teams (bitted word) :	
	bits 1 = 1 Team 1 accepted for the output	
	2 = 1 Team 2 accepted for the output	
	3 = 1 Team 3 accepted for the output	
	4 = 1 Team 4 accepted for the output	
	5 = 1 Team 5 accepted for the output	
	6 = 1 Team 6 accepted for the output	
	7 = 1 Team 7 accepted for the output	
	8 = 1 Team 8 accepted for the output	
	9 = 1 Team 9 accepted for the output	
	10 = 1 Team 10 accepted for the output	
	11 = 1 Team 11 accepted for the output	
	12 = 1 Team 12 accepted for the output	
	13 = 1 Team 13 accepted for the output	
	14 = 1 Team 14 accepted for the output	
+6+N_{team}	Wordcount	(variable)

PILOT RECORD
DTAG blocklet(15.15)

Up to 1997 data

+1	Wordcount		(16)
+2	Identifier (bits 1- 4)		(15)
	Error code (bits 5-32)		(usualy FF10)
+3	Sub-identifier		(15)
+4	DAFNE[1] version number × 1000000		
	+ 6 digit creation date yymmdd		
+5	bits 1- 6 :	Missing energy	
	7-12 :	Topological tag	
	13-18 :	$\geq$3 jet tagging	
	19-24 :	$\tilde{\chi}^{\pm_i}$ (chargino) $JJl^{\mp}$ channel tag	
	25-30 :	$\tilde{\chi}^{\pm_i}$ (chargino) JJJJ channel tag	
	31-32 :	not used	
+6	bits 1- 6 :	$\tilde{\chi}^{\pm_i}$ (chargino) l^+l^- channel tag	
	7-12 :	$\tilde{\chi}^0_i$ (neutralino) tag	
	13-18 :	$\tilde{q}_t$ (scalar top) tag	
	19-24 :	$\tilde{q}_b$ (scalar bottom) tag	
	25-30 :	$\tilde{\tau}$ (scalar tau) tag	
	31-32 :	not used	
+7	bits 1- 6 :	Single lepton tag	
	7-12 :	SUSY degenerated tag	
	13-18 :	$H^0\nu\bar{\nu}$ tag	
	19-24 :	$H^0l^+l^-$ tag	
	25-30 :	$H^0e^+e^-$ tag	
	31-32 :	not used	
+8	bits 1- 6 :	H^+H^- tag	
	7-12 :	hA tag	
	13-18 :	Kink tag	
	19-24 :	$\gamma\gamma$ event tag	
	25-30 :	Bhabha tag	
	31-32 :	not used	
+9	bits 1- 6 :	Radiative Z^0 tag	
	7-12 :	$l^+l^-\gamma\gamma$ tag	
	13-18 :	Jet-jet $\gamma\gamma$ tag	
	19-24 :	$f\bar{f}$ (fermion-antifermion) tag	
	25-30 :	Acoplanar photons tag	
	31-32 :	not used	

[1]The blocklet DTAG is created by the DAFNE (Delphi Analysis For New Events) tagging package when run on the XShortDST structure.

PILOT RECORD
DTAG blocklet(15.15)

cont.

+10	bits 1- 6 :	ν counting tag	
	7-12 :	Compton tag	
	13-18 :	Cosmic tag	
	19-24 :	γ lost in a crack tag	
	25-30 :	Single W tag	
	31-32 :	not used	
+11	bits 1- 6 :	Neutral current 4f tag	
	7-12 :	W^+W^- tag	
	13-32 :	not used	
+12	bits 1- 6 :	Empty event tag (no DAFNE tags)	
	7-32 :	not used	
+13	bits 1-32 :	not used	
+14	bits 1-32 :	not used	
+15	bits 1-32 :	not used	
+16	Wordcount		(16)

PILOT RECORD
DTAG blocklet(15.15)

Up to the version 1.06 (1998 data)

+1	Wordcount	(16)
+2	Identifier (bits 1- 4)	(15)
	Error code (bits 5-32)	(usualy FF10)
+3	Sub-identifier	(15)
+4	DAFNE[1] version number × 1000000	
	+ 6 digit creation date yymmdd	
+5	bits 1- 6 : Missing energy	
	7-12 : Topological tag	
	13-18 : ≥3 jet tagging	
	19-24 : $\widetilde{\chi}^{\pm_{\mathrm{i}}}$ (chargino) $\mathrm{JJl}^{\mp}$ channel tag	
	25-30 : $\widetilde{\chi}^{\pm_{\mathrm{i}}}$ (chargino) JJJJ channel tag	
	31-32 : not used	
+6	bits 1- 6 : $\widetilde{\chi}^{\pm_{\mathrm{i}}}$ (chargino) $\mathrm{l}^+\mathrm{l}^-$ channel tag	
	7-12 : $\widetilde{\chi}^0_{\mathrm{i}}$ (neutralino) tag	
	13-18 : $\widetilde{\mathrm{q}}_t$ (scalar top) tag	
	19-24 : $\widetilde{\mathrm{q}}_b$ (scalar bottom) tag	
	25-30 : $\widetilde{\tau}$ (scalar tau) tag	
	31-32 : not used	
+7	bits 1- 6 : not used	
	7-12 : SUSY degenerated tag	
	13-18 : $\mathrm{H}^0\nu\bar{\nu}$ tag	
	19-24 : $\mathrm{H}^0\mathrm{l}^+\mathrm{l}^-$ tag	
	25-30 : $\mathrm{H}^0\mathrm{e}^+\mathrm{e}^-$ tag	
	31-32 : not used	
+8	bits 1- 6 : $\mathrm{H}^+\mathrm{H}^-$ tag	
	7-12 : hA tag	
	13-18 : Kink tag	
	19-24 : Displaced vertices tag	
	25-30 : 4 taus tag	
	31-32 : not used	
+9	bits 1-32 : not used	
+10	bits 1- 6 : $\gamma\gamma$ event tag	
	7-12 : Bhabha tag	
	13-18 : Radiative Z^0 tag	
	19-24 : $f\bar{f}\ \gamma\gamma$ tag	
	25-32 : not used	

[1]The blocklet DTAG is created by the DAFNE (Delphi Analysis For New Events) tagging package when run on the XShortDST structure.

PILOT RECORD
DTAG blocklet(15.15)

cont.

+11		1- 6 :	Acoplanar photons tag	
		7-12 :	ν counting tag	
		13-18 :	Compton tag	
		19-24 :	Cosmic tag	
		25-32 :	not used	
+12		1- 6 :	γ lost in a crack tag	
		7-12 :	Single W tag	
		13-18 :	Neutral current 4f tag	
		19-24 :	W^+W^- tag	
		25-30 :	Hadronic tag	
		31-32 :	not used	
+13	bits	1- 6 :	Empty event tag (no DAFNE tags)	
		7-12 :	Cross section tag	
		13-32 :	not used	
+14	bits	1-32 :	not used	
+15	bits	1 :	Event send to output stream 1 (analysis stream)	
		2 :	Event send to output stream 2 (rare events stream for scanning)	
		3 :	Event send to output stream 3 (STIC events stream)	
		4 :	Event send to output stream 4 (hadronic events stream)	
		5-32 :	not used	
+16	Wordcount			(16)

PILOT RECORD
DTAG blocklet(15.15)

Since the version 1.07 (1999 data)

+1	Wordcount		(13)
+2	Identifier (bits 1- 4)		(15)
	Error code (bits 5-32)		(usualy FF10)
+3	Sub-identifier		(15)
+4	DAFNE[1] version number $\times$ 1000000		
	+ 6 digit creation date yymmdd		
		Internal tags	
+5	bits 1- 6 :	Topological tag	
	7-12 :	Topological tag	
	13-18 :	Veto (Bhabha, Compton, $\gamma\gamma$ fusion)	
	19-24 :	Veto (Bhabha, Compton, $\gamma\gamma$ fusion)	
	25-30 :	Low maximum Pt	
	31-32 :	not used	
		Standard and stream tags	
+6	bits 1- 6 :	Hadronic tag	
	7-12 :	STIC tag	
	13-18 :	W^+W^- tag	
	19-24 :	4-lepton tag	
	25-32 :	not used	
		Higgs tags	
+7	bits 1- 6 :	4 jets tag	
	7-12 :	hA tag	
	13-18 :	$H^0l^+l^-$ tag	
	19-24 :	$H^0\nu\bar{\nu}$ tag	
	25-32 :	not used	
		SUSY tags	
+8	bits 1- 6 :	Tsusy tag	
	7-12 :	Tsusy tag	
	13-18 :	3-jet tag	
	19-24 :	SUSY degenerated tag	
	25-30 :	$\tilde{\tau}$ (scalar tau) tag	
	31-32 :	not used	
		Other tags	
+9	bits 1- 6 :	Photon tag	
	7-12 :	Monojet tag	
	13-18 :	Displaced vertices tag	
	19-32 :	not used	

[1] The blocklet DTAG is created by the DAFNE (Delphi Analysis For New Events) tagging package when run on the XShortDST structure.

PILOT RECORD
DTAG blocklet(15.15)

cont.

			Other tags
+10	bits	1- 6 :	Cosmic tag
		7-12 :	γ lost in a crack tag
		13-18 :	Missing energy tag
		19-24 :	Empty event tag (no DAFNE tags)
		25-32 :	not used
+11	bits	1-32 :	not used
			Stream bits
+12	bits	1 :	Event send to output stream 1 (analysis stream)
		2 :	Event send to output stream 2 (rare events stream for scanning)
		3 :	Event send to output stream 3 (STIC events stream)
		4 :	Event send to output stream 4 (hadronic events stream)
		5-32 :	not used
+13	Wordcount		(13)

DTOP BANK

43	Structural links
0	Reference links
35	Data (format 4I 1B −F)

Link LDTOP

LINKS

0	Next DTOP bank (DFIX bank)
-1	PV banks from reconstruction
-4	Initial e^+e^- system
-5	Final e^+e^- system (after gamma radiation)
-6	$l\bar{l}$ or $q\bar{q}$ system before gluon radiation
-10	Unassociated TE information
-14	HPC trigger bank
-18	HAC cathode read-out information
-21	Micro Vertex Detector hits
-22	Reconstructed V0's
-24	Reconstructed photons
-25	B tagging information
-27	Reconstructed V0's tracks
-30	Energy flow information
-31	Reconstructed D*'s
-42	VFT Pixel data
-43	VFT Ministrip data

STATUS BITS

bit 1 = 1 if a D^* canditate is tagged in the event
from the channel $D^* \to D^0\pi$, $D^0 \to K\pi$

2 = 1 if the event contains a $(K\pi)\pi$ baclground
combination to D^*

3 = 1 if a D^0 canditate is tagged in the event
from the channel $D^0 \to K\pi$

4 = 1 if the event contains a $(K\pi)$ background
combination to D^0

5 = 1 if a loose D_s canditate is tagged in the event
from the channel $D_s \to K^+K^-\pi$

6 = 1 if a tight D_s canditate is tagged in the event
from the channel $D_s \to K^+K^-\pi$

DTOP BANK

cont.

DATA	CONTENT
+1	Date of processing (format 'yymmdd')
+2	Time of processing (format 'hhmm')
+3	Version number of PXDST $\times$ 100
+4	Laboratory identifier[1]:

WIEN	BELG	NBI	HELS	CCPN	CDF	LAL
LPNH	SACL	STRA	LYON	GREN	MARS	BAST
KARL	WUPP	LIVE	OXFO	RAL	ATHE	ANTU
DEMO	BOLO	GENO	MILA	PADU	ROMA	TRIE
TORI	NIKH	BERG	OSLO	CRAC	WARS	SANT
VALE	LUND	STOC	UPPS	AMES	SERP	DUBN
LISB	PRAG	BRAT	SNAK	FARM	CERN	LJUB
BRAZ						

+5 List of activated Extra Modules (bitted word):

bits		
2 :	EMCA	Electromagnetic calorimetry
3 :	HCAL	Hadron calorimetry
7 :	MTPC	TPC information (dE/dx)
8 :	TRAC	Track parameters
9 :	TOF	Time of flight information
12 :	TEID	Tracks from ID
13 :	TETP	Tracks from TPC
14 :	TEOD	Tracks from OD
15 :	TEFA	Tracks from FCA
16 :	TEFB	Tracks from FCB
17 :	TDID	Drift times in ID
19 :	STIC	STIC information
22 :	EMNC	Electromagnetic new calorimetry
23 :	HCNC	Hadron calorimeter new calorimetry
24 :	MUID	Muon identification
25 :	ELID	Electron identification
26 :	HAID	Hadron identification
27 :	MUFI	Muon track refitting
28 :	ELTR	Electron track refitting
29 :	ODHI	Outer detector hits
30 :	PHOT	Photon identification
32 :	NMUS	New surounding muon chambers

[1] The conversion of the hollerith laboratory identifier to a character variable can be done using the CERNLIB routine CFROMI

DTOP BANK

cont.

For Monte Carlo data[2] :

+6	Incoming electromagnetic	energy for HPC
+7	Outgoing electromagnetic	energy for HPC
+8	Incoming muon	energy for HPC
+9	Outgoing muon	energy for HPC
+10	Incoming hadronic	energy for HPC
+11	Outgoing hadronic	energy for HPC
+12	Incoming electromagnetic	energy for EMF
+13	Outgoing electromagnetic	energy for EMF
+14	Incoming muon	energy for EMF
+15	Outgoing muon	energy for EMF
+16	Incoming hadronic	energy for EMF
+17	Outgoing hadronic	energy for EMF
+18	Incoming electromagnetic	energy for COI
+19	Outgoing electromagnetic	energy for COI
+20	Incoming muon	energy for COI
+21	Outgoing muon	energy for COI
+22	Incoming hadronic	energy for COI
+23	Outgoing hadronic	energy for COI
+24	Incoming electromagnetic	energy for HAB
+25	Outgoing electromagnetic	energy for HAB
+26	Incoming muon	energy for HAB
+27	Outgoing muon	energy for HAB
+28	Incoming hadronic	energy for HAB
+29	Outgoing hadronic	energy for HAB
+30	Incoming electromagnetic	energy for HAF
+31	Outgoing electromagnetic	energy for HAF
+32	Incoming muon	energy for HAF
+33	Outgoing muon	energy for HAF
+34	Incoming hadronic	energy for HAF
+35	Outgoing hadronic	energy for HAF

[2]For the Real data the words from 6 to 35 are set to zero.

DFIX BANK

0	Structural links
0	Reference links
5	Data (format 4I −1B)

Link LDFIX = LQ(LDTOP)

DATA	CONTENT
+1	Date of processing (format 'yymmdd')
+2	Time of processing (format 'hhmmss')
+3	Version numer of DSTFIX × 100
+4	Laboratory identifier of DSTFIX processing (as in DTOP bank)
+5	List of activated Fixing processors (bitted word):

bits 1 : VD	bits 9 : HPCC
2 : ID	10 : HPCN
3 : TPC	11 : EMFC
4 : OD	12 : EMFN
5 : FCA	13 : HACB
6 : FCB	14 : HACF
7 : RIB	15 : MUB
8 : RIF	16 : MUF

PV BANK

1	Structural links
1	Reference links
16	Data (format 3B −F)

Link LPV = LQ(LDTOP-1)

LINKS

0	Next PV bank
-1	PA of the outgoing particles
-2	PA of the incoming particle

STATUS BITS

bits 1 = 1 if a dummy vertex
2 = 1 if a secondary vertex
3 = 1 if a secondary hadronic vertex
4 = 1 if a vertex with simulation data

If a D^0 or D^* is tagged :
5 = 1 if a K from D^0 is linked to this vertex

If a D_s is tagged :
5 = 1 if a K from Φ is linked to this vertex

DATA CONTENT

+1	TANAGRA identifier of the TV bank
+2	Number of the outgoing particles
+3	Number of the degrees of freedom
+4	Mass code of the origin particle Special cases: 0. for primary vertex 999. for dummy vertex
+5	X)
+6	Y) > vertex coordinates
+7	Z)
+8	χ^2 of the vertex fit

$\boxed{\textbf{PV BANK}}$

cont.

+9	xx)	
+10	xy)	
+11	yy) >	error matrix
+12	xz)	
+13	yz)	
+14	zz)	

If tracks attached to this vertex
are found to form a D^0 or D^* candidate :

+15 (Kπ) mass of D^0 candidate
+16 (K$\pi\pi$ − Kπ) mass difference of D^* candidate

If tracks attached to this vertex
are found to form a D_s candidate :

+15 (K^+K^-) mass of Φ candidate
+16 ($K^+K^-\pi$) mass of D^* candidate

SIMULATED PV BANK

1	Structural links
1	Reference links
14	Data (format 3B −F)

Link LSPV = LQ(LDTOP-2)[1]

LINKS

0	Next PV bank
-1	PA of the outgoing particles
-2	PA of the incoming particles

STATUS BITS

bits 1 = 1 if a dummy vertex
2 = 1 if a secondary vertex
3 = 1 if a secondary hadronic vertex
4 = 1 **if a vertex with simulation data**

DATA	CONTENT		
+1	TANAGRA identifier of the TV bank		
+2	Number of the outgoing particles		
+3	Number of the degrees of freedom		
+4	Mass code of the origin particle		
	Special cases:	0.	for primary vertex
		999.	for dummy vertex
+5	X	)	
+6	Y	) >	vertex coordinates
+7	Z	)	
+8	χ^2 of the vertex fit		
+9	xx	)	
+10	xy	)	
+11	yy	) >	error matrix
+12	xz	)	
+13	yz	)	
+14	zz	)	

[1]The PV bank at LDTOP-2 exists for the simulated data only. It is supporting a chain of simulated vertices and tracks corresponding to those of the reconstructed chain at LDTOP-1. The status bit 4 of the simulated PV banks is set to 1.

PA BANK

0	Structural links
4	Reference links
N	Data (format 3B $*$I $-$F)

Link LPA = LQ(LPV-1)

LINKS

0	Next PA bank
-1	PV bank of the end vertex (if any)
-2	Matching simulated PA (if any)

STATUS BITS

bits 1 = 1 if the track is discarded
2 = 1 if the correlation matrix is given
3 = 1 if the track has an unresolved TE
4 = 1 if the track is made with overlapping showers
5 = 1 if the track contains results from CCA
6 = 1 if the track is given by the forward combined fit
7 = 1 if the energy is obtained from substraction in the calorimeters
8 = 1 if the match with simulated track is good
9 = 1 if the match is O.K., ambiguity solved
10 = 1 if matched with showers
11 = 1 if unmatched track
12 = 1 if remaining TER from calorimeters
13 = 1 if remaining TER from OD not associated to TKX (this track is attached to a dummy vertex)
14 = 1 when multiple scattering from the first measured point is included
15 = 1 for a track tagged as a V^0 branch candidate by the TPCANA algorithm

If a D^0 or D^* is tagged :
16-17 = 1 if the track is a K candidate from a $D^0 \rightarrow K\pi$
= 2 if the track is a π candidate from a $D^0 \rightarrow K\pi$
= 3 if the track is a π candidate from a $D^* \rightarrow D^0\pi$

PA BANK

cont.

If a D_s is tagged :

bits 16-17 = 1 if the track is a K^+ candidate from a $\Phi \rightarrow K^+K^-$
= 2 if the track is a K^- candidate from a $\Phi \rightarrow K^+K^-$
= 3 if the track is a π candidate from a $D_s \rightarrow \Phi\pi$

DATA	CONTENT
+1	TANAGRA identifier of the TA bank, or Label for simulated tracks
+2	Detectors used in the reconstruction (bitted word) :

bits 4 : VD	bits 14 : HAB	bits 24 : SAT
5 : ID	15 : MUB	25 : LUM
6 : TPC	18 : MUS	26 : FCB
7 : RIB	19 : STIC	27 : EMF
9 : OD	21 : FCA	30 : HOF
10 : HPC	22 : RIF	31 : MUF
12 : TOF	23 : HAF	

+3 Mass ambiguity code (bitted word) :

Muon identification

bits 1 = 1 very loose μ
2 = 1 loose μ
3 = 1 standard μ
4 = 1 tight μ
5 = 1 HCAL μ
6 = 0 free

Electron identification

7- 9 = 0 no identification run on this track
= 1 identified NOT to be an electron
= 2 very loose electron
= 3 loose electron
= 4 standard electron
= 5 tight electron

PA BANK

cont.

		Electron from γ-convertion (veto)
bits 10-12	= 0	no identification run on this track
	= 1	loose electron
	= 2	standard electron
	= 3	tight electron
		Kaon signature with RICH
13-15	= 0	no measurement available
	= 1	track compatible with π
	= 2	loose K
	= 3	standard K
	= 4	tight K
		Proton signature with RICH
16-18	= 0	no measurmenet available
	= 1	track compatible with π
	= 2	loose proton
	= 3	standard proton
	= 4	tight proton
		HPC photon identification
19-25	= 1	good HPC photon
	= 6	HPC shower, failed transverse profile cuts
	= 7	HPC shower, failed longitudinal profile cuts
	= 8	HPC shower, failed both cuts
		HPC photon with linked OD shower TE
	=11	HPC good photon
	=16	HPC shower, failed transverse profile cuts
	=17	HPC shower, failed longitudinal profile cuts
	=18	HPC shower, failed both cuts
		Photon converted in front of the TPC
	=21	convertion from 2 TPC tracks (type I pair)
	=22	convertion from 2 TPC tracks (type II pair)
	=23	convertion from 2 TPC tracks (type III pair)
	=24	convertion from 1 TPC track (type I pair)

PA BANK

cont.

Electron from converted photon
19-25 = 28 electron forming a single track converted photon
= 29 electron forming a double track converted photon

Electron radiation
= 30 electron radiating a photon in front of TPC
= 40 electron radiating a photon behind the TPC

Photon from electron radiation behind TPC
= 39 photon linked to electron

Photon from electron radiation in front of TPC
= 49 photon linked to electron

Photon converted behind of the TPC
= 50 convertion from 2 OD TEs with a HPC link
= 51 convertion from 2 OD TEs one with HPC
= 52 convertion from 2 OD TEs without HPC link
= 53 convertion from 1 OD TE with a HPC link
= 56 as 53 but failed transverse profile cuts
= 57 as 53 but failed longitudinal profile cuts
= 58 as 53 but failed both cuts
= 59 shower linked to a OD TEs used in (50)-(58)

Photon which is part of a shower cluster
= 61 HPC good photon
= 66 HPC shower, failed transverse profile cuts
= 67 HPC shower, failed longitudinale profile cuts
= 68 HPC shower, failed both cuts
= 69 HPC shower, rejected (from curling electron)

IDVD track
= 72 IDVD track without Z information
= 73 IDVD track with one VD Z-hit
= 74 IDVD track with at least two VD Z-hits

VD only track
= 75 VD only track, Z information measured
= 77 VD only track, Z information not measured

PA BANK

cont.

19-25 = 78 track with only ID and VD information,
but not from the IDVD search
(e.g. TPC and/or OD removed as outlayers)

Incoming track to hadronic interaction

=120 track to a secondary hadronic interaction (not seen)
=121 incoming track to hadronic interaction,
formely type 72
=122 incoming track to hadronic interaction,
formely type 73
=123 incoming track to hadronic interaction,
formely type 74
=124 incoming track to hadronic interaction,
formely type 75
=125 incoming track to hadronic interaction,
formely type 76
=126 incoming track to hadronic interaction,
formely type 77

Shower unambiguously identified as a clean π^0

=101 good π^0 (unlikely to be a single photon)

Neutral tracks

=111 very tight K^0
=112 very tight Λ^0
=115 track to a shower in HAC

Since the version 1.07

IDVD/VD/VFT only tracks

= 72 IDVD track with at least two VD Z-hits
with an hadronic shower from DELANA
= 73 IDVD track with one VD Z-hit,
a primary vertex or hadronic shower
used for θ determination
= 74 IDVD track with at least two VD Z-hits
= 75 VD only track with at least two VD Z-hits
= 76 IDVFT track
= 77 VFT only track

PA BANK

cont.

19-25	= 82	incoming track to a **kink**, formely type 72
	= 83	incoming track to a **kink**, formely type 73
	= 84	incoming track to a **kink**, formely type 74
	= 85	incoming track to a **kink**, formely type 75
	= 86	incoming track to a **kink**, formely type 76
	= 87	incoming track to a **kink**, formely type 77
	= 92	outgoing track from a **kink** of type 82
	= 93	outgoing track from a **kink** of type 83
	= 94	outgoing track from a **kink** of type 84
	= 95	outgoing track from a **kink** of type 85
	= 96	outgoing track from a **kink** of type 86
	= 97	outgoing track from a **kink** of type 87
	= 99	incoming track to a **kink** not being IDVD or VD only
	=109	outgoing track from a **kink** of type 99

Since the version 1.08

Reconstructed electromagnetic cluster

26-28 =	1	unknown
	2	tight electron
	3	tight photon
	4	loose electron
	5	loose photon
29 =	0	dE/dx defined
30-32 =	0	free

+4 Number of information modules (main + extra)
+5 Length of the main module (= 32)

For each extra-module

+1 Length of the extra-module

PA MODULES
MAIN MODULE (0)

LENGTH: 32 words

CONTENT

+1	Label of the module (=0)
+2	Particle mass
+3	Px)
+4	Py) $\Rightarrow$ At the closest distance approach to the vertex
+5	Pz)
+6	E, energy
+7	P, momentum (absolute value)
+8	Charge (0=neutral, 1=positive, 2=negative, 3=undefined)
+9	Track length (negative if incoming particle)
+10	Mass code
+11	Impact parameter (with sign): If VC is the distance of the vertex to the curvature center and R the curvature radius with sign opposite to the charge sign, then rp = sign(R)*(|R|-VC)
+12	Error on the impact parameter
+13	Error matrix on Px, Py, Pz (at the beam pipe inner surface)
$\vdots$	$\vdots$
+18	Error matrix on Px, Py, Pz
+19	Error on E
+20	Z impact parameter = ZP - ZV, where ZP is the z coordinate of the track extrapolation at the closest distance approach to the vertex in R-Rϕ plane
+21	Error on ZP
+22	Polar angle of the point of closest approach to the vertex
+23	X)
+24	Y) $\Rightarrow$ Coordinates of the first measured point of the track
+25	Z)
+26	χ^2 of the fit of the TK with VD hits
+27	Number of degrees of freedom with VD hits

PA MODULES
MAIN MODULE (0)

+28	Module identifier[1] of the track created in DELANA :		
	forward search		
	=	51	TPC below 40°
	=	52	VFT multipoints
	=	53	FCB
	=	54	FCA
	=	55	ID + VFT combined
	=	56	TPC + VD below 40°
	=	57	ID + VD below 40°
	=	58	TPC + ID below 40°
	=	59	2nd pass TE recovery
	=	60	FCA+FCB (not running)
	=	61	TPC only recovery or STRAW fix for barrel
	barrel search		
	=	101	ID + VD combined
	=	102	TPC + VD combined
	=	103	TPC
	miscellaneous		
	=	2xx	TE outlayer(s) in fit
	=	3xx	Modified at 2nd stage DELANA steerings
	=	nxxx	ID+VD(OD) only track
	=	nxxxx	Modified by ambiguity processor
+29	Track type (V0, had. interaction etc.)		
+30	not used		
+31	χ^2 of the VD hits associated with the track		
+32	Ambiguity track processor word :		
		$n1 =$	number of potential PA's having the same TPC TE
	+	$100 \times n2 =$	number of potential PA's having at least one VD or TPC TE in common
	+	$10000 \times n3 =$	the largest number of PA's which could be chosen from the n2 possibilities, so that any TE is assigned to only one PA
	+	$100000 \times n4 =$	number of ways to choose the n3 unique solutions from the n2 poosibilities

[1]The 'x' digits are filled-up by the processors earlier in the chain.

PA MODULES
EMCA MODULE (2)

LENGTH: variable

CONTENT

+1	Label of the module (=2)
+2	Number of associated showers
	For each associated shower
+1	Length of the shower information
+2	Detector identifier : 9 = HPC, 26 = EMF
+3	Energy of the shower[1]
+4	X)
+5	Y) $\Rightarrow$ coordinates of the shower
+6	Z)
+7	Mass identification (from DELANA)
+8	θ angle
+9	ϕ angle
	For HPC detector only :
+10	Number of clusters in the shower
+11	Length of the cluster information
	For each cluster
+1	bits 1- 6 : Layer number[2]
	7-20 : Energy (in MeV)
+2	1-12 : $\phi(\mathrm{rad})\times 2^9$
	13-20 : $(\mathrm{R(cm)}-205)\times 5$[3]
+3	1- 8 : (Width(cm) in Z)$\times$10
	9-20 : $(\mathrm{Z(cm)}+260)\times 8$[4]

[1]This energy is **not** corrected for non-linearities in the HPC. For the neutrals the energy given in the MAIN module is corrected for non-linearities and crack losses.

[2]The layer number has the range from 1 to 10, 4 is the trigger gap. It is set to -1 in case of error.

[3]The radius R of the cluster is offset by the inner radius of the HPC detector.

[4]The Z coordinate of the cluster is offset by 260 cm to be a positive number.

PA MODULES
HCAL MODULE (3)

LENGTH: variable

CONTENT

+1	Label of the module (=3)
+2	Number of associated showers N_{sho}
	For each associated shower
+1	Length of the shower information
+2	Detector identifier : 13 = HAB/HAF
+3	Energy of the shower
+4	X)
+5	Y) $\Rightarrow$ coordinates of the shower
+6	Z)
+7	Mass identification (from DELANA)
+8	θ angle
+9	ϕ angle
+10	Number of layers hit in the shower N_{lay}
+11	Layer hit pattern (bitted word) - each bit set indicates a layer hit
	For each layer hit
+1	Energy deposited in the layer (GeV)
+2	Number of channels active in the layer + 1000×Layer number
	TD information of the tower
+1	Number of towers hit N_{tow}
	For each tower
+1	Energy deposited in the tower (GeV)
+2	Tower coordinates - 10000 × layer number 100 × cell number along θ 1 × cell number along ϕ

PA MODULES
HCAL MODULE (3)

cont.

+1	Number of CRO clusters in the shower N_{clu}
	For each cluster
+1	Number of CRO tubes in the cluster N_{tub}
	For each tube
+1	Tube identifier (bitted) : bits 1- 7 : module number 8-12 : plane number 13-16 : tube number 17-32 : not used

PA MODULES
MTPC MODULE (7)

LENGTH: 29 words

CONTENT

+1	Label of the module (=7)
+2	dE/dx measured in the TPC − mean value of the 80% lowest amplitude (ampl.= maximum of the wire cluster) normalized to 1. for the MIPs
+3	σ of the 80% truncated Landau distribution
+4	dE/dx measured in the TPC − mean value of the 65% lowest amplitude (= maximum of the wire cluster) normalized to 1. for the MIPs
+5	σ of the 65% truncated Landau distribution
+6	dE/dx measured in the TPC − mean value of the 80% lowest amplitude (ampl.= integral of the wire cluster) normalized to 1. for the MIPs
+7	Number of pad points in the track + 100×TPC sector number of the track start + 10000×TPC sector number of the track end
+8	Number of wires crossed by the track + 1000×Number of hits with a "close cluster" + 1000000×method used for dE/dx calculation (=1 good hits only, =2 hits from TPC edge included)
+9	Number of wires considered in the dE/dx calculation + 1000×Number of usable hits at the TPC edge
+10	bits 1- 8 : Number of wires with saturated amplitude before truncation 9-16 : Number of empty hits kept before truncation 17-20 : Sector of the last wire seen (selected or not)
+11	Mean gap (cm) after 80% truncation
+12	Mean distance of the track (cm) to the edges of the sector in Rϕ plane (after 80% truncation)
+13	Number of wires used in the Z fit of the track
+14	χ^2 of the Z fit
+15	Track bit pattern for V^0 : bits 1-16 : pad rows hit by the track 17-20 : number of the first pad row if V^0 flagged : or 0 if no V^0 detected with this track

cont.

+16	Mean distance between wire clusters in Z (= average distance with n closest clusters, see +8)
+17	Contribution of the empty hits to the dE/dx 80%
+18	bits 1- 8 : First non empty wire seen for the track 9-12 : Sector of the first wire seen 13-20 : Last wire seen for the track (selected or not)
+19	Average undershoot correction for dE/dx 80%
	Information to compute the momenta of the Landau distribution up to order 3 :
+20	(dE/dx) / (gap correction)
+21	(dE/dx) / (gap correction)$^{1/2}$
+22	$(dE/dx)^2$ / (gap correction)
+23	(dE/dx) / (gap correction)$^{1/3}$
+24	$(dE/dx)^2$ / (gap correction)$^{2/3}$
+25	$(dE/dx)^3$ / (gap correction)
	For modules longer than 25 words :
+26	Number of hits common to 2 tracks + 1000×Number of saturated hits (full Landau)
+27	dE/dx full Landau for common hits of 2 tracks
+28	Corresponding σ
	or
+26	Average gap of the cluster contributing to the dE/dx 80%
+27	dE/dx 80% for common hits of 2 tracks
+28	Corresponding σ
+29	Index of the current track + 1000×Index of the track with common hits
	The last word is positive or negative depending on the content of the words 26 to 28

PA MODULES
TRAC MODULE (8)

LENGTH:
21 words

CONTENT[1]

+1	Label of the module (=8)	
+2	ε impact parameter	
+3	z impact parameter	
+4	θ angle	
+5	ϕ angle	
+6	1./R (R - radius of the curvature)	
+7	Weight matrix for these parameters :	$\varepsilon - \varepsilon$
+8		$z - \varepsilon$
+9		$z - z$
+10		$\varepsilon - \theta$
+11		$z - \theta$
+12		$\theta - \theta$
+13		$\varepsilon - \phi$
+14		$z - \phi$
+15		$\theta - \phi$
+16		$\phi - \phi$
+17		$\varepsilon - 1/R$
+18		$z - 1/R$
+19		$\theta - 1/R$
+20		$\phi - 1/R$
+21		$1/R - 1/R$

[1]The PA extra-module TRAC(8) does not exist for the neutral tracks.

PA MODULES
TOF MODULE (9)

LENGTH: 12 words

CONTENT

+1	Label of the module (=9)
+2	Detector identifier
+3	Counter number
+4	Rϕ coordinate
+5	Z coordinate
+6	Time of flight
+7	Error on time of flight
+8	External TDC + 256×(external ADC)
+9	Internal TDC + 256×(internal ADC)
+10	Extrapolated Z coordinate
+11	TOF quality flag
+12	Multihit information (1024×T3 level)

PA MODULES
TEID MODULE (12)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the Inner Detector associated to the TK of the track.

+1	Label of the module (=12)
	+ 0.1×stage at which the TE is created (1 or 2)[1]
+2	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+3	Coordinate 1 : X or R)
+4	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5	Coordinate 3 : Z)
+6	θ angle
+7	ϕ angle
+8	1/P or 1/Pt momentum at TE reference point

[1] For the Inner Detector stage 1 means jet chamber TE, and stage 2 − trigger layer TE.

PA MODULES
TEID MODULE (12)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. m = n(n+1)/2 elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+8+1	Error matrix element 1
⋮	⋮
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

PA MODULES
TETP MODULE (13)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the TPC Detector associated to the TK of the track.

+1	Label of the module (=13)
	+ 0.1×stage at which the TE is created (1 or 2)
+2	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+3	Coordinate 1 : X or R)
+4	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5	Coordinate 3 : Z)
+6	θ angle
+7	ϕ angle
+8	1/P or 1/Pt momentum at TE reference point

PA MODULES
TETP MODULE (13)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. m = n(n+1)/2 elements. When t_1, t_2, θ, ϕ *and* p *are measured the order is (reading line by line) :*

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+8+1	Error matrix element 1
⋮	⋮
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

PA MODULES
TEOD MODULE (14)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the Outer Detector associated to the TK of the track.

+1 Label of the module (=14)
+ 0.1×stage at which the TE is created (1 or 2)
+2 TE data descriptor and measurement code :
bits 1 = 0 if coordinates are given as x, y, z
= 1 if coordinates are given as R, RΦ, z
2 = 0 if standard coordinates (as above)
= 1 if non-standard coordinates (u,v,z)
3 = 1 if coordinate 1 is measured
4 = 1 if coordinate 2 is measured
5 = 1 if coordinate 3 is measured
6 = 1 if t_1 (x or RΦ) is measured
7 = 1 if t_2 (y or z) is measured
8 = 1 if θ is measured
9 = 1 if ϕ is measured
10 = 1 if 1/P is measured
11 = 1 if 1/Pt is measured
12 = 1 if E is measured
13 = 1 if β is measured
14 = 1 if dE/dx is measured
15 = 1 if time is measured
+3 Coordinate 1 : X or R)
+4 Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5 Coordinate 3 : Z)
+6 θ angle
+7 ϕ angle
+8 1/P or 1/Pt momentum at TE reference point

PA MODULES
TEOD MODULE (14)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. m = n(n+1)/2 elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+8+1	Error matrix element 1
⋮	⋮
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

PA MODULES
TEFA MODULE (15)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the Forward Chamber A associated to the TK of the track.

+1	Label of the module (=15)
	+ 0.1×stage at which the TE is created (1 or 2)
+2	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+3	Coordinate 1 : X or R)
+4	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5	Coordinate 3 : Z)
+6	θ angle
+7	ϕ angle
+8	1/P or 1/Pt momentum at TE reference point

PA MODULES
TEFA MODULE (15)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. m = n(n+1)/2 elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+8+1	Error matrix element 1
⋮	⋮
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

PA MODULES
TEFB MODULE (16)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the Forward Chamber B associated to the TK of the track.

+1	Label of the module (=16)
	+ 0.1×stage at which the TE is created (1 or 2)
+2	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+3	Coordinate 1 : X or R)
+4	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5	Coordinate 3 : Z)
+6	θ angle
+7	ϕ angle
+8	1/P or 1/Pt momentum at TE reference point

PA MODULES
TEFB MODULE (16)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. $m = n(n+1)/2$ elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$$
\begin{array}{lllll}
D(t_1,\, t_1) & & & & \\
C(t_1,\, t_2) & D(t_2,\, t_2) & & & \\
C(t_1,\, \theta) & C(t_2,\, \theta) & D(\theta,\, \theta) & & \\
C(t_1,\, \phi) & C(t_2,\, \phi) & C(\theta,\, \phi) & D(\phi,\, \phi) & \\
C(t_1,\, p) & C(t_2,\, p) & C(\theta,\, p) & C(\phi,\, p) & D(p,\, p)
\end{array}
$$

+8+1	Error matrix element 1
⋮	⋮
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

PA MODULES
TDID MODULE (17)

LENGTH: 26 words

CONTENT

The module contains tracks for the Inner Detector calibaration with momentum above 2 GeV/c, TE in the TPC and ID jet part

+1	Label of the module (=17)
+2	ID jet sector number containing the track. Its sign is related to the drift direction : + for clockwise − for counter-clockwise
	For each wire[1]
+3	Raw drift time for wire 1
+4	Raw drift time for wire 2
+5	Raw drift time for wire 3
+6	Raw drift time for wire 4
+7	Raw drift time for wire 5
+8	Raw drift time for wire 6
+9	Raw drift time for wire 7
+10	Raw drift time for wire 8
+11	Raw drift time for wire 9
+12	Raw drift time for wire 10
+13	Raw drift time for wire 11
+14	Raw drift time for wire 12
+15	Raw drift time for wire 13
+16	Raw drift time for wire 14
+17	Raw drift time for wire 15
+18	Raw drift time for wire 16
+19	Raw drift time for wire 17
+20	Raw drift time for wire 18
+21	Raw drift time for wire 19
+22	Raw drift time for wire 20
+23	Raw drift time for wire 21
+24	Raw drift time for wire 22
+25	Raw drift time for wire 23
+26	Raw drift time for wire 24

[1] If for some wires the drift time is not available in the TD, a "scaled" drift time is given with a sign "−".

PA MODULES
STIC MODULE (19)

LENGTH: variable

CONTENT

+1	Label of the module (=19)
+2	Number of detected showers N_s
+3	STIC trigger (bitted word) :
	bits 1- 2 = 1 bhabha event
	3- 4 = 1 single arm forward
	5- 6 = 1 single arm backward
	7- 8 = 1 multiplicity bits forward
	9-10 = 1 multiplicity bits baclward
	11-32 = 0 free
	For each shower
+1	Length of the shower information
+2	Subdetector identifier :
	1 = calorimeter part for positive Z
	2 = calorimeter part for negative Z
	3 = first silicon layer for positive Z
	4 = second silicon layer for positive Z
	5 = first silicon layer for negative Z
	6 = second silicon layer for negative Z
	7 = veto detector for positive Z
	8 = veto detector for negative Z
+3	Shower identifier (from 1 to 999)
	+ 1000×Number of hits in the shower N_h
+4	Quality flag for the shower -
	0 = good (separated) shower
	1 = cluster
	2 = bad shower
	+ 1000×Number of showers N_{ass} from other sub-detectors associated with the current one
+5	Energy of the shower (GeV)
+6	R (cm)
+7	$R\phi$ (cm×radian)
+8	Z (cm)
+9	Mass identifier (from DELANA)

PA MODULES
STIC MODULE (19)

cont.

+10	Charged tag from the veto counters (bitted word):		
	bits	1- 3	Large veto -
			= 0 no information available
			= 1 tight photon
			= 2 soft photon
			= 3 electron
		4- 6	Combined (small+large) veto -
			= 0 no information available
			= 1 tight photon
			= 2 soft photon
			= 3 very soft photon
			= 4 electron
		7-12	Veto multiplicity side A
		13-18	Veto multiplicity side C
		19-24	not used

List of showers from other sub-detectors
assocaited with the current one.
The length of the list is n = (N_{ass} − 1)/2 words

+10+1 Shower 1 identifier + 1000×Shower 2 identifier

⋮ ⋮

+10+n Shower (n-1) identifier + 1000×Shower n identifier

For each calorimeter hit N_h of this shower

+1 Energy deposited by the hit (GeV)

+2 θ number + 100×ϕ number of the hit (tower units)

+1 Numbers of the three counters in the 1st Veto plane (central and two neighbours) associated with the shower $N_{left} + 100\times N_{center} + 10000\times N_{right}$

Veto counter signals after pedestal substraction and
3σ cut for three sectors in the 1st and 2nd plane

+2 Veto counter signals $1000\times S^1_{left} + S^1_{center}$

+3 Veto counter signals $1000\times S^1_{right} + S^2_{left}$

+4 Veto counter signals $1000\times S^2_{center} + S^2_{right}$

PA MODULES
STIC MODULE (19)

cont.

	Small Veto counter signals and second ADC's
+5	Small counter signals $1000\times S^1_{small} + S^2_{small}$
+6	2nd Veto ADC signals $1000\times S^1_{left} + S^1_{center}$
+7	2nd Veto ADC signals $1000\times S^1_{right} + S^2_{left}$
+8	2nd Veto ADC signals $1000\times S^2_{center} + S^2_{right}$
+9	2nd Veto ADC signals $1000\times S^1_{small} + S^2_{small}$
	Silicon strip data for two clusters associated with the calorimeter shower
+1	Total number of clusters in the 1st silicon plane associated with the current calorimeter shower + 100 $\times$ the same number in the 2nd silicon plane
	For the most energetic silicon cluster associated with the calorimeter shower (if any):
+2	θ angle reconstructed by the 1st silicon plane
+3	φ angle reconstructed by the 1st silicon plane
+4	Maximum signal in the 1st silicon plane cluster
+5	θ angle reconstructed by the 2nd silicon plane
+6	φ angle reconstructed by the 2nd silicon plane
+7	Maximum signal in the 2nd silicon plane cluster
	For the second energetic silicon cluster associated with the calorimeter shower (if any):
+8	θ angle reconstructed by the 1st silicon plane
+9	φ angle reconstructed by the 1st silicon plane
+10	Maximum signal in the 1st silicon plane cluster
+11	θ angle reconstructed by the 2nd silicon plane
+12	φ angle reconstructed by the 2nd silicon plane
+13	Maximum signal in the 2nd silicon plane cluster

PA MODULES
TERF MODULE (21)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the Forward RICH associated to the TK of the track.

+1	Label of the module (=21)
	+ 0.1×stage at which the TE is created (1 or 2)
+2	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+3	Coordinate 1 : X or R)
+4	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5	Coordinate 3 : Z)
+6	θ angle
+7	ϕ angle
+8	1/P or 1/Pt momentum at TE reference point

PA MODULES
TERF MODULE (21)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. $m = n(n+1)/2$ elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$$
\begin{array}{lllll}
D(t_1, t_1) & & & & \\
C(t_1, t_2) & D(t_2, t_2) & & & \\
C(t_1, \theta) & C(t_2, \theta) & D(\theta, \theta) & & \\
C(t_1, \phi) & C(t_2, \phi) & C(\theta, \phi) & D(\phi, \phi) & \\
C(t_1, p) & C(t_2, p) & C(\theta, p) & C(\phi, p) & D(p, p)
\end{array}
$$

+8+1	Error matrix element 1
⋮	⋮
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

PA MODULES
EMNC MODULE (22)

LENGTH: variable

CONTENT

+1	Label of the module (=22)
+2	Number of associated shower +
	100 $\times$ Detector identifier (9 = HPC, 26 = EMF)
	For each shower :
+1	Energy of the shower
+2	X)
+3	Y) > coordinate of the shower
+4	Z)
	HPC information
+5	Number of layer hit in this shower
+6	Layer pattern (bitted word) :
	bits 1 = 1 if hit in layer 1
	2 = 1 if hit in layer 2
	3 = 1 if hit in layer 3
	4 = 1 if hit in layer 4
	5 = 1 if hit in layer 5
	6 = 1 if hit in layer 6
	7 = 1 if hit in layer 7
	8 = 1 if hit in layer 8
	9 = 1 if hit in layer 9
	10 = 1 if hit in layer 10
	For each layer :
+1	Energy deposited in the layer
	EMF information
+5	Number of associated showers
	For each shower :
+6	Address of the central counter of the shower
+7	Number of hitted blocks

cont.

+6	Block pattern (bitted word) :
	bits 1 = 1 if hit in block 1
	2 = 1 if hit in block 2
	3 = 1 if hit in block 3
	4 = 1 if hit in block 4
	5 = 1 if hit in block 5
	6 = 1 if hit in block 6
	7 = 1 if hit in block 7
	8 = 1 if hit in block 8
	9 = 1 if hit in block 9
	10 = 0 free
	11 = 1 if hit in block 1 and 2 of external frame
	12 = 1 if hit in block 3 and 4 of external frame
	13 = 1 if hit in block 5 and 6 of external frame
	14 = 1 if hit in block 7 and 8 of external frame
	15 = 1 if hit in block 9 and 10 of external frame
	16 = 1 if hit in block 11 and 12 of external frame
	17 = 1 if hit in block 13 and 14 of external frame
	18 = 1 if hit in block 15 and 16 of external frame
	For each block
+1	Energy deposited in the block(s)
	or
	ERROR FLAG = -9999. if a non existing glass
	= -999. if a dead sting glass
	= -998. if a glass killed by EMFANA
	= 1000. + Energy if noisy glass
+1	EMF shower energy correction factor
	For each track
+1	Noisy EMF channels flag :
	= 0 if the channel is good
	= 1 if the channel is noisy

PA MODULES
HCNC MODULE (23)

Up to the version 1.06

LENGTH: variable

CONTENT

+1	Label of the module (=23)
+2	Number of associated shower
	For each shower :
+1	Energy of the shower
+2	X)
+3	Y) > coordinate of the shower
+4	Z)
+5	Number of layers hit in this shower
	For each layer :
+1	Energy deposited in the layer
+2	Number of active channels in the layer + 1000 $\times$ layer number

PA MODULES
MUID MODULE (24)

LENGTH: variable

CONTENT

+1	Label of the module (=24)		
+2	Global tag (bitted word) :		
	bits 1 = 1 if very loose refit		
	2 = 1 if loose and standard refit		
	3 = 1 if tight refit		
	4 = 1 if very loose tag		
	5 = 1 if loose tag		
	6 = 1 if standard tag		
	7 = 1 if tight tag		
	Very loose refit information (always present) :		
+1	Hit pattern (bit 9 set if MUB, bit 10 set if MUF, neither if SMC)		
+2	Global χ^2		
+3	Hit pattern with inefficiencies (different from 1. for Monte Carlo)		
+4	Hit pattern with ambiguities		
+5	R / x	)	
+6	Rϕ / y	)	Position and direction
+7	z	)	of the fitted track in MUB/MUF/SMC
+8	θ	)	at the inner MUC layer
+9	ϕ	)	
	Loose and standard refit information (if bit 2 set) :		
+1	Hit pattern (bit 9 set if MUB, bit 10 set if MUF, neither if SMC)		
+2	Global χ^2		
+3	Extrapolation χ^2		
+4	Global azimuthal χ^2		
+5	Extrapolation azimuthal χ^2		
+6	Extrapolation polar χ^2		
+7	R / x	)	
+8	Rϕ / y	)	Position and direction
+9	z	)	of the fitted track in MUB/MUF/SMC
+10	θ	)	at the inner MUC layer
+11	ϕ	)	

PA MODULES
MUID MODULE (24)

cont.

	Tight refit information (if bit 3 set) :		
+1	Hit pattern (bit 9 set if MUB, bit 10 set if MUF, neither if SMC)		
+2	Global χ^2		
+3	Extrapolation χ^2		
+4	R / x	)	
+5	Rϕ / y	)	Position and direction
+6	z	)	of the fitted track in MUB/MUF/SMC
+7	θ	)	at the inner MUC layer
+8	ϕ	)	
	Unassociated TE information		
+1	Unassociated TE word		

PA MODULES
ELID MODULE (25)

LENGTH: 40 words

CONTENT

+1	Label of the module (=25)
+2	Number of words + 1000.*Det.id. (9-HPC,26-EMF)
+3	1000*Vers.No. + 100.*ITAG + 10.*IVETO
+4	Electron probabilty from the HPC
+5	Gamma conversion radius from PXVETO
+6	Probability from the shower fit
+7	Fitted shower energy (not properly calibrated)
+8	HPC-crack flag (0=No,1=ϕ,2=θ,3=ϕ,θ)
+9	E_shower/P_track (fixed flat at 1 for electrons)
+10	Z (extrapolation) - Z (HPC)
+11	Phi(extrapolation) - Phi(HPC) (direction)
+12	Z position at HPC boarder from TRK-EXTRAP
+13	Probablity for radiated photon behind the TPC
+14	Probability that next shower found is from this track
+15	Probability that OD-TE found is from this track
+16	TANAGRA photon identifier (radiation behind TPC)
+17	Tanagra identifier of the next shower
+18	Probability from E/P
+19	Probability from Z(TPC) - Z(HPC)
+20	RICH tag
+21	Probablity for radiated photon in front of the TPC
+22	TANAGRA photon identifier (radiation in front of TPC)
+23	Phi(extrapolation) - Phi(HPC) (position)
+24	Normalized curvature change between ID/TPC
+25	Normalized curvature change between TPC/OD
+26	χ^2 of curvature change fit between ID/TPC
+27	χ^2 of curvature change between fit TPC/OD
+28	Fixed HPC_energy + nonlinearity corrections
+29	Best estimate for electron energy at vertex
+30	Electron Px fixed
+31	Electron Py fixed
+32	Electron Pz fixed

PA MODULES
ELID MODULE (25)

cont.

+33	Probability from ϕ-direction mismatch
+34	Combined dE/dX and HPC probability
+35	Probability from dE/dX for electron
+36	Probability from dE/dX for pion
+37	Rotation angle from shower analysis
+38	Significance of 2-peak shower substructure
+39	Momentum from track refit + addition of radiation
+40	Phi position at HPC boarder from TRK-EXTRAP

PA MODULES
HAID MODULE (26)

LENGTH: variable

CONTENT

+1	Label of the module (=26)		
+2	Number of ionization	data	+
	10 × number of RICH(gas)	data	+
	100 × number of RICH(liquid)	data	+
	1000 × number of VD (dE/dx)	data	+
	10000 × number of RINGSCAN	data	+
	100000 × number of RICH status	data	
	1000000 × number of TPC (dE/dx)	data	

Ionization information

+1	dE/dx measured value normalized to 1 for MIP's
+2	Width of dE/dx Landau distribution (NOT dE/dx error)
+3	Number of wires used for the dE/dx measurement
+4	Mean distance between the wires for the track (gap)

+1 Tagging word (bitted) :

Kaon signature with dE/dx

bits 1- 3 = 0 no measurement available
= 1 compatible with a π
= 2 loose K
= 3 standard K
= 4 tight K

Proton signature with dE/dx

bits 4- 6 = 0 no measurement available
= 1 compatible with a π
= 2 loose proton
= 3 standard proton
= 4 tight proton

Used for combined tag

bits 7-10 = 1 dE/dx only
= 2 RICH gas
= 3 RICH liquid

Pion signature with RICH

bits 11-13 = 0 no measurement available
= 1 not a π
= 3 a π

+2 Combined kaon tag + 100 × combined proton tag

PA MODULES
HAID MODULE (26)

cont.

	RICH gas information
+1	Measured Cherenkov angle
+2	σ of the Cherenkov angle per photon
+3	Number of photoelectrons in ring +
	500 $\times$ (expected number of phototelectrons $\times$ 10)
+4	Quality flag (bitted word) :

RING (>1 photons)	VETO ($\leq$ 1 photon)
bits 1= extrapolation to RICH	bits 1= idem
2= acceptance theta	2= idem
3= run selection, no trip	3= idem
4= good ring cuts	4= $\leq$ 3 photons in bands
5= tight ring cuts	5= as 4 and no trip
6= hits on track(s)	6= idem

	RICH liquid information
+1	Measured Cherenkov angle
+2	σ of the Cherenkov angle per photon
+3	Number of photoelectrons in ring +
	500 $\times$ (expected number of phototelectrons $\times$ 10)
+4	Quality flag (bitted word) :

RING (BRICH >3 photons) (FRICH >2 photons)	VETO (BRICH $\leq$3 photons) (FRICH $\leq$2 photons)
bits 1= extrapolation to RICH	bits 1= idem
2= acceptance theta	2= idem
3= run selection, no trip	3= idem
4= good ring cuts	4= as 2 and hits
5= tight ring cuts	5= as 4 and $\chi^2 > 9$
6= hits on track(s)	6= idem

	VD ionization information
+1	dE/dx value measured with VD only
+2	Number of VD hits in the measurement

PA MODULES
HAID MODULE (26)

cont.

RINGSCAN information

+1	Tagging word (bitted) :			
	bits	1- 2	= 1	loose e
			= 2	standard e
			= 3	tight e
		3	= 1	local maximum for probability
		4	= 1	8 (3) and more photoelectrons around this hypothesis for $p<2.5$ ($p>2.5$)
		5- 6	= 1	loose μ
			= 2	standard μ
			= 3	tight μ
		7	= 1	local maximum for probability
		8	= 1	8 (3) and more photoelectrons around this hypothesis for $p<2.5$ ($p>2.5$)
		9-10	= 1	loose π
			= 2	standard π
			= 3	tight π
		11	= 1	local maximum for probability
		12	= 1	8 (3) and more photoelectrons around this hypothesis for $p<2.5$ ($p>2.5$)
		13-14	= 1	loose K
			= 2	standard K
			= 3	tight K
		15	= 1	local maximum for probability
		16	= 1	8 (3) and more photoelectrons around this hypothesis for $p<2.5$ ($p>2.5$)
		17-18	= 1	loose p
			= 2	standard p
			= 3	tight p
		19	= 1	local maximum for probability
		20	= 1	8 (3) and more photoelectrons around this hypothesis for $p<2.5$ ($p>2.5$)
+2	bits	1-13		mean θ angle in liquid
		14-24		logarithm of the maximum probablity
+3	bits	1-13		mean θ angle in gas
		14-24		logarithm of the maximum probablity

PA MODULES
HAID MODULE (26)

cont.

+1 **RICH status** (bitted word) :

bits 1 = 1 no liquid in the barrel for this period
2 = 1 no liquid in the forward for this period
3 = 1 do not use the gas for this track
4 = 1 do not use the liquid for this track
5 = 1 absorption length between 2 and 5 m. (doubt for gas)
6 = 1 no hit in the tube (doubt for veto)
7 = 1 no ionization around this track (doubt for veto)
8 = 1 no hit in this tube and 2 neighbours (doubt for liquid)
9 = 1 track close to midwall (important for liquid)
10 = 1 liquid affected by HV trip
11 = 1 LTD overflow or DAS problem for gas
12 = 1 LTD overflow or DAS problem for liquid
13 = 1 the gas info was killed by RICFIX
14 = 1 the liquid info was killed by RICFIX

dE/dx error information

+1 Momentum of the track in TPC
+2 Error of the track momentum in TPC

PA MODULES
MUFI MODULE (27)

LENGTH: variable

CONTENT Muon Chambers information after refitting

+1	Label of the module (=27)
+2	Detector identifier (14=MUB, 17=MUS, 30=MUF)
+3	Number of associated layers
+4	Number of degrees of freedom
+5	Global χ^2
+6	X coordinate in the first layer
+7	Y coordinate in the first layer
+8	Expected number of missing layers
+9	χ^2 for the MU chambers alone
+10	X (extrapolated − fitted)
+11	Y (extrapolated − fitted)
+12	θ (extrapolated − fitted)
+13	ϕ (extrapolated − fitted)
+14	Error on X (extrapolated − fitted)
+15	Error on Y (extrapolated − fitted)
+16	Error on θ (extrapolated − fitted)
+17	Error on ϕ (extrapolated − fitted)
+18	Layer hit pattern (bitted word) − each bit set indicates a layer hit
	Layer information for MUB and MUS :
+1	Submodule identifier TER(2)
+2	χ^2 of the layer
+3	R measured
+4	Rϕ(fitted) − Rϕ(measured)
+5	Z (fitted) − Z (measured)
+6	Error on Rϕ
+7	Error on Z
+8	Rϕ measured
+9	Z measured
+10	Status of the TER bank after EMMASS : 0. − deactive, 1. − active

PA MODULES
MUFI MODULE (27)

cont.

	Layer information for MUF :
+1	Submodule identifier 100×TER(2) + TER(36)
+2	χ^2 of the layer
+3	X (fitted) − X (measured)
+4	Y (fitted) − Y (measured)
+5	Z measured
+6	Error on X
+7	Error on Y
+8	X measured
+9	Y measured
+10	Status of the TER bank after EMMASS : 0. − deactive, 1. − active

	Information for refit : *(T1/T2 stands for Rϕ/Z (MUB) or X/Y (MUF))*	
+1	T3 fit)	
+2	dT1 − dT1)	
+3	dT1 − dT2)	
+4	dT2 − dT2)	Covariance matrix of TKX
+5	dT1 − dθ) >	at the closest reference surface
+6	dT2 − dθ)	to the interaction point
+7	dθ − dθ)	
+8	dT1 − dφ)	
+9	dT2 − dφ)	
+10	dθ − dφ)	
+11	dφ − dφ)	

PA MODULES
ELTR MODULE (28)

LENGTH: 21 words

CONTENT Extra-module TRAC(8) refitted for the electron tracks

+1	Label of the module (=8)	
+2	ε impact parameter	
+3	z impact parameter	
+4	θ angle	
+5	ϕ angle	
+6	1./R (R - radius of the curvature)	
+7	Weight matrix for these parameters :	$\varepsilon - \varepsilon$
+8		$z - \varepsilon$
+9		$z - z$
+10		$\varepsilon - \theta$
+11		$z - \theta$
+12		$\theta - \theta$
+13		$\varepsilon - \phi$
+14		$z - \phi$
+15		$\theta - \phi$
+16		$\phi - \phi$
+17		$\varepsilon - 1/R$
+18		$z - 1/R$
+19		$\theta - 1/R$
+20		$\phi - 1/R$
+21		$1/R - 1/R$

PA MODULES
ODHI MODULE (29)

LENGTH: 3 words

CONTENT Outer Detector hits information

+1	Label of the module (=29)
+2	Number of OD hits with azimuthal angle $\phi < 5^0$ from the TK angle extrapolated at the OD surface
+3	Spread of these hits around the center of gravity

PA MODULES
PHOT MODULE (30)

LENGTH: 6 or 33 words

CONTENT Photon and π^0 identification in HPC

+1	Label of the module (=30)
+2	Length of photon part + 100 $\times$ length of π^0 part
	Photon information
+3	Energy weighted depth
+4	1000 $\times$ number of clusters + 100 $\times$ first layer number + 10 $\times$ number of layers + maximum number of consecutive layers
+5	Transverse shower fluctuation measure
+6	Longitudinal shower fit (reserved for)
	π^0 information
+7	Mass of HPCANA tensor fit
+8	Rotation angle of HPCANA tensor fit
+9	1-st eigenvalue of HPCANA tensor
+10	2-nd eigenvalue of HPCANA tensor
+11	Number of connected maxima in HPCANA
+12	Number of accepted maxima in HPCANA
+13	Realtive energy of the first Gaussian
+14	Position of the first Gaussian
+15	Width of the first Gaussian
+16	Position of the second Gaussian
+17	Width of the second Gaussian
+18	Fitted mass
+19	1-st eigenvalue
+20	2-nd eigenvalue
+21	Rotation angle
+22	θ of the shower center
+23	ϕ of the shower center
+24	θ of the shower
+25	ϕ of the shower
+26	Number of OD links + 100 $\times$ number of stray showers

PA MODULES
PHOT MODULE (30)

cont.

	π^0/photon information
+27	Number of weighted HPC hits in the main peak after the π^0 mass constrained fit
+28	Number of weighted HPC hits in the second peak after the π^0 mass constrained fit
+29	χ^2 of the π^0 mass constrained fit
+30	Number of fitted bins (degrees of freedom) of the π^0 mass constrained fit
+31	χ^2 of the photon constrained fit
+32	Gaussian width of the photon shower shape in ϕ
+33	Gaussian width of the photon shower shape in θ

PA MODULES
NMUS MODULE (32)

LENGTH: variable

CONTENT Surounding Muon Chamber information

+1	Label of the module (=32)
+2	Detector identifier (=17)
+3	Number of associated layers
+4	Number of degrees of freedom
+5	Global χ^2
+6	X coordinate in the first layer
+7	Y coordinate in the first layer
+8	Expected number of missing layers
+9	χ^2 for the MU chambers alone
+10	X (extrapolated − fitted)
+11	Y (extrapolated − fitted)
+12	θ (extrapolated − fitted)
+13	ϕ (extrapolated − fitted)
+14	Error on X (extrapolated − fitted)
+15	Error on Y (extrapolated − fitted)
+16	Error on θ (extrapolated − fitted)
+17	Error on ϕ (extrapolated − fitted)
+18	Layer hit pattern (bitted word) − each bit set indicates a layer hit
	For each layer
+1	Submodule identifier
+2	χ^2 of the layer
+3	R measured
+4	Rϕ(fitted) − Rϕ(measured)
+5	Z (fitted) − Z (measured)
+6	Error on Rϕ
+7	Error on Z
+8	Rϕ measured
+9	Z measured
+10	Status of the TER bank after EMMASS : 0. − deactive, 1. − active

PA MODULES
NMUS MODULE (32)

cont.

	Information for refit	
+1	T3 fit)	
+2	$dR\phi - dR\phi$)	
+3	$dR\phi - dZ$)	
+4	$dZ - dZ$)	Covariance matrix of TKX
+5	$dR\phi - d\theta$) >	at the closest reference surface
+6	$dZ - d\theta$)	to the interaction point
+7	$d\theta - d\theta$)	
+8	$dR\phi - d\varphi$)	
+9	$dZ - d\varphi$)	
+10	$d\theta - d\varphi$)	
+11	$d\varphi - d\varphi$)	

PA MODULES
SSTC MODULE (33)

LENGTH: variable

CONTENT Shortened STIC information

+1	Label of the module (=33)		
+1	Length of the shower information		
+2	Energy of the shower (GeV)		
+3	R (cm)		
+4	R $\times$ ϕ (cm $\times$ radian)		
+5	Number of towers (hits) in the shower		
+6	Charged tag from the veto counters (bitted word):		
	bits	1- 3	Large veto -
			= 0 no information available
			= 1 tight photon
			= 2 soft photon
			= 3 electron
		4- 6	Combined (small+large) veto -
			= 0 no information available
			= 1 tight photon
			= 2 soft photon
			= 3 very soft photon
			= 4 electron
		7-12	Veto multiplicity side A
		13-18	Veto multiplicity side C
		19-24	not used
+7	Silicon strip vertex position		
+8	Silicon strip reconstruction flag:		
	-2 =	no silicon information available	
	-1 =	shower inside the silicon region, but no reconstruction is possible	
	0 =	shower outside the silicon region	
	1 =	shower located within $\pm$ 0.1 m from IP	
	2 =	shower located within $\pm$ 0.3 m from IP	
	3 =	shower located within $\pm$ 0.5 m from IP	
	4 =	shower located within $\pm$ 1.0 m from IP	
	5 =	shower located within $\pm$ 1.5 m from IP	
	6 =	shower located beyond $\pm$ 1.5 m from IP	

PA MODULES
HCRO MODULE (34)

LENGTH: 8 or 13 words

CONTENT HCAL cathode read-out information

+1	Label of the module (=34)
+2	Number of words + 1000 $\times$number of assigned hits
+3	Mean distance (with sign) between the hits and the track
+4	RMS of the mean distance
+5	Number of hits in planes 1 - 5
+6	Number of hits in planes 6 - 10
+7	Number of hits in planes 11 - 15
+8	Number of hits in planes 16 - 20
	If the track is identified as muon :
+9	Muon identification flags : 1 = loose μ 2 = standard μ 3 = tight μ
+10	ϕ angle of the matching TE
+11	χ^2 of the matching
+12	Dispersion of the number of near-by hits
+13	Number of points used in the fit + Maximum layer number of hits in the fit $\times$ 100 + Minimum layer number of hits in the fit $\times$ 10000 + Number of degrees of freedom in the fit $\times$ 1000000

PA MODULES
HCMU MODULE (35)

LENGTH: 4 words

CONTENT HCAL muon identification

+1	Label of the module (=35)
+2	Number of words + 1000 $\times$Muon identification flag :
	1 = loose μ
	2 = standard μ
	3 = tight μ
+3	Mean distance (with sign) between the track extrapolation and tubes
+4	RMS of the mean distance

PA MODULES
TEST MODULE (41)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the Straw Tubes associated to the TK of the track.

+1	Label of the module (=41)
	+ 0.1×stage at which the TE is created (1 or 2)
+2	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+3	Coordinate 1 : X or R)
+4	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5	Coordinate 3 : Z)
+6	θ angle
+7	ϕ angle
+8	1/P or 1/Pt momentum at TE reference point

PA MODULES
TEST MODULE (41)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. m = n(n+1)/2 elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+8+1	Error matrix element 1
⋮	⋮
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

PA MODULES
TEVF MODULE (42)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the Very Forward Tracker associated to the TK of the track.

+1	Label of the module (=42)
	+ 0.1×stage at which the TE is created (1 or 2)
+2	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+3	Coordinate 1 : X or R)
+4	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5	Coordinate 3 : Z)
+6	θ angle
+7	ϕ angle
+8	1/P or 1/Pt momentum at TE reference point

PA MODULES
TEVF MODULE (42)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. $m = n(n+1)/2$ *elements. When* t_1, t_2, θ, ϕ *and* p *are measured the order is (reading line by line) :*

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+8+1	Error matrix element 1
$\vdots$	$\vdots$
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

PA MODULES
TERB MODULE (43)

LENGTH: variable

CONTENT

The module contains extra information from the TER's in the Barrel RICH associated to the TK of the track.

+1	Label of the module (=43)
	+ 0.1×stage at which the TE is created (1 or 2)
+2	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+3	Coordinate 1 : X or R)
+4	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+5	Coordinate 3 : Z)
+6	θ angle
+7	ϕ angle
+8	1/P or 1/Pt momentum at TE reference point

PA MODULES
TERB MODULE (43)

cont.

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. $m = n(n+1)/2$ elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+8+1	Error matrix element 1
⋮	⋮
+8+m	Error matrix element m
+9+m	Number of degrees of freedom
+10+m	χ^2
+11+m	Length of the Track Element

SH BANK

0	Structural links
4	Reference links
14	Data (format −F)

Link LSH = LQ(LDTOP-3)

LINKS

0	Next SH bank
-1	SH bank of daughter particle
-2	SH bank of mother particle
-3	SH bank of sister particle
-4	ST bank (simulated track)

STATUS BITS not used

DATA	CONTENT
	Simulation history bank from the generation
+1	Particle mass code (DELPHI convention)
+2	Particle mass value
+3	Px)
+4	Py)
+5	Pz) $\Rightarrow$ in laboratory system
+6	E)
+7	P)
+8	Charge from LUND
+9	Index in LUND common
+10	K(I,1) = 10000×KS + KH (LUND convention)
+11	KF (LUND convention)
+12	z of fragmentation
+13	Type of continuum event generated with matrix element option (MSTJ(120) in LUND)
+14	Decay mode in LUND

INITIAL e^+e^- BANK

0	Structural links
0	Reference links
9	Data (format −F)

Link LPIEE = LQ(LDTOP-4)

DATA	CONTENT
	Simulated initial state of the e^+e^- system from the beam definition
+1	Px)
+2	Py) > of the system
+3	Pz)
+4	E
+5	P
+6	$\cos(\vartheta)$
+7	φ
+8	Code of particle 1 (DELPHI convention)
+9	Code of particle 2 (DELPHI convention)

$\boxed{\textbf{FINAL } e^+e^- \textbf{ BANK}}$

0	Structural links
0	Reference links
9	Data (format −F)

Link LPFEE = LQ(LDTOP-5)

DATA	CONTENT
	Simulated final state of the e^+e^- system after emitting a bremsstrahlung photon
+1	Px)
+2	Py) > of the system
+3	Pz)
+4	E
+5	P
+6	$\cos(\vartheta)$
+7	φ
+8	Code of particle 1 (DELPHI convention)
+9	Code of particle 2 (DELPHI convention)

INITIAL $l\bar{l}$ / $q\bar{q}$ BANK

0	Structural links
0	Reference links
9	Data (format −F)

Link LPIQL = LQ(LDTOP-6)

DATA	CONTENT
	Simulated initial state of the $l\bar{l}$ or $q\bar{q}$ system before gluon radiation
+1	Px)
+2	Py) > of the system
+3	Pz)
+4	E
+5	P
+6	$\cos(\vartheta)$
+7	φ
+8	Code of particle 1 (DELPHI convention)
+9	Code of particle 2 (DELPHI convention)

Unassociated TE BANK

15	Structural links
0	Reference links
0	Data

Link LPTEM = LQ(LDTOP-10)

LINKS[1]

-1	ID	unassociated TE banks[2]
-2	TPC	unassociated TE banks
-3	RIB	unassociated TE banks
-4	OD	unassociated TE banks
-5	TOF	unassociated TE banks[3]
-6	MUB	unassociated TE banks
-7	FCA	unassociated TE banks
-8	RIF	unassociated TE banks
-9	FCB	unassociated TE banks
-10	MUF	unassociated TE banks
-11	HOF	unassociated TE banks[3]
-12	MUS	unassociated TE banks
-13	STRAW	unassociated TE banks
-14	VFT	unassociated TE banks[3]
-15	not used	

[1] At each link there is a linear chain of banks for one detector. Each bank contains information from an active TER not associated with a TK. For the MU chambers only the deactive TER's are kept as well.

[2] The format of the TE banks is identical for most of the detectors. The description of the ID unassociated TE bank is given as an example. For the module identifiers of the other detectors concerned see page 30.

[3] The formats of TOF, HOF and VFT are different and therefore described individually.

ID unassociated TE BANK

0	Structural links
0	Reference links
13+m	Data (format 4I −F)

Link LPT = LQ(LPTEM-1)

LINKS

0	Next ID unassociated TE bank

DATA CONTENT

The bank contains extra information from the TER's in the Inner Detector unassociated to the TK of the track.

+1 Module identifier (= 4)
+2 Submodule identifier
+3 Stage at which the TE was created (1 or 2)[1]
+4 TE data descriptor and measurement code :
bits 1 = 0 if coordinates are given as x, y, z
= 1 if coordinates are given as R, RΦ, z
2 = 0 if standard coordinates (as above)
= 1 if non-standard coordinates (u,v,z)
3 = 1 if coordinate 1 is measured
4 = 1 if coordinate 2 is measured
5 = 1 if coordinate 3 is measured
6 = 1 if t_1 (x or RΦ) is measured
7 = 1 if t_2 (y or z) is measured
8 = 1 if θ is measured
9 = 1 if ϕ is measured
10 = 1 if 1/P is measured
11 = 1 if 1/Pt is measured
12 = 1 if E is measured
13 = 1 if β is measured
14 = 1 if dE/dx is measured
15 = 1 if time is measured
+5 Coordinate 1 : X or R)
+6 Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+7 Coordinate 3 : Z)

[1]For the Inner Detector only the TER's from the jet chamber are considered, and only if they are validated by the trigger part.

ID unassociated TE BANK

cont.

+8	θ angle
+9	ϕ angle
+10	1/P or 1/Pt momentum at TE reference point

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. m = n(n+1)/2 elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+10+1	Error matrix element 1
$\vdots$	$\vdots$
+10+m	Error matrix element m
+11+m	Number of degrees of freedom
+12+m	χ^2
+13+m	Length of the Track Element

TOF unassociated TE BANK

0	Structural links
0	Reference links
14	Data (format 4I −F)

Link LPT = LQ(LPTEM-5)

LINKS

0	Next TOF unassociated TE bank

DATA CONTENT

The bank contains extra information from the TER's in the TOF Detector unassociated to the TK of the track.

+1	Module identifier (= 11)
+2	Submodule identifier
+3	Stage at which the TE was created (1 or 2)
+4	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+5	Coordinate 1 : X or R)
+6	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+7	Coordinate 3 : Z)

TOF unassociated TE BANK

cont.

+8	θ angle
+9	ϕ angle
+10	Time of flight measurement
+11	bits 1- 8 : External TDC
	9-16 : External ADC
	17-24 : not used
+12	bits 1- 8 : Internal TDC
	9-16 : Internal ADC
	17-24 : not used
+13	TOF quality flag
+14	Multi hit information (1024×T3 level)

HOF unassociated TE BANK

0	Structural links
0	Reference links
14	Data (format 4I −F)

Link LPT = LQ(LPTEM-11)

LINKS

0	Next HOF unassociated TE bank

DATA CONTENT

The bank contains extra information from the TER's in the HOF Detector unassociated to the TK of the track.

+1 Module identifier (= 29)
+2 Submodule identifier
+3 Stage at which the TE was created (1 or 2)
+4 TE data descriptor and measurement code :
bits 1 = 0 if coordinates are given as x, y, z
= 1 if coordinates are given as R, RΦ, z
2 = 0 if standard coordinates (as above)
= 1 if non-standard coordinates (u,v,z)
3 = 1 if coordinate 1 is measured
4 = 1 if coordinate 2 is measured
5 = 1 if coordinate 3 is measured
6 = 1 if t_1 (x or RΦ) is measured
7 = 1 if t_2 (y or z) is measured
8 = 1 if θ is measured
9 = 1 if ϕ is measured
10 = 1 if 1/P is measured
11 = 1 if 1/Pt is measured
12 = 1 if E is measured
13 = 1 if β is measured
14 = 1 if dE/dx is measured
15 = 1 if time is measured
+5 Coordinate 1 : X or R)
+6 Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+7 Coordinate 3 : Z)

HOF unassociated TE BANK

cont.

+8	θ angle
+9	ϕ angle
+10	Time of flight measurement
+11	Error on X
+12	not used
+13	Error on Y
+14	Error on time (1.0)

VFT unassociated TE BANK

0	Structural links
0	Reference links
N	Data (format 4I –F)

Link LPT = LQ(LPTEM-14)

LINKS

0	Next VFT unassociated TE bank

DATA CONTENT

The bank contains extra information from the TER's in the VFT Detector unassociated to the TK of the track.

+1	Module identifier (= 4)
+2	Submodule identifier
+3	Stage at which the TE was created (1 or 2)
+4	TE data descriptor and measurement code :
	bits 1 = 0 if coordinates are given as x, y, z
	= 1 if coordinates are given as R, RΦ, z
	2 = 0 if standard coordinates (as above)
	= 1 if non-standard coordinates (u,v,z)
	3 = 1 if coordinate 1 is measured
	4 = 1 if coordinate 2 is measured
	5 = 1 if coordinate 3 is measured
	6 = 1 if t_1 (x or RΦ) is measured
	7 = 1 if t_2 (y or z) is measured
	8 = 1 if θ is measured
	9 = 1 if ϕ is measured
	10 = 1 if 1/P is measured
	11 = 1 if 1/Pt is measured
	12 = 1 if E is measured
	13 = 1 if β is measured
	14 = 1 if dE/dx is measured
	15 = 1 if time is measured
+5	Coordinate 1 : X or R)
+6	Coordinate 2 : Y or RΦ) ⇒ of TE reference point
+7	Coordinate 3 : Z)

VFT unassociated TE BANK

cont.

+8	θ angle
+9	ϕ angle
+10	1/P or 1/Pt momentum at TE reference point

The error matrix contains only the elements corresponding to the (n) measured quantities declared in the measurement code, i.e. m = n(n+1)/2 elements. When t_1, t_2, θ, ϕ and p are measured the order is (reading line by line) :

$D(t_1, t_1)$				
$C(t_1, t_2)$	$D(t_2, t_2)$			
$C(t_1, \theta)$	$C(t_2, \theta)$	$D(\theta, \theta)$		
$C(t_1, \phi)$	$C(t_2, \phi)$	$C(\theta, \phi)$	$D(\phi, \phi)$	
$C(t_1, p)$	$C(t_2, p)$	$C(\theta, p)$	$C(\phi, p)$	$D(p, p)$

+10+1	Error matrix element 1
⋮	⋮
+10+m	Error matrix element m
+11+m	Number of degrees of freedom
+12+m	χ^2
+13+m	Length of the Track Element
+1	Number of TD forming the TE
	For each TD
+1	Tanagra identifier

HPC trigger BANK

0	Structural links
0	Reference links
$2N_m+2$	Data (format −I)

Link LHPT1 = LQ(LDTOP-14)

DATA	CONTENT[1]
+1	Global word count
+2	Number of modules with data N_m
	For each module with data :
+1	Module number[2]
+2	A.D.C content of that module[3]

[1]The bank is not written out for events in which none of the scintillators is above the threshold.

[2]The module numbers range from 1 to 144 for the HPC scintillators, from 145 to 168 for the 90^0 counters, and from -11 to 0 for the spare channels. Each 90^0 counter module covers 15^0 in ϕ starting at 262.5^0.

[3]The ADC content is pedestal-substracted.

HCAL cathode readout BANK

0	Structural links
0	Reference links
N	Data (format 1I –B)

Link LKTUB = LQ(LDTOP-18)

DATA CONTENT

Packed information of HCAL tube cathode readout

+1	Number of tube hits N_h in the event
	For each tube hit :
+1	Tube identifier –
	bits 1- 7 : Module number
	8-12 : Plane number
	13-16 : Tube number
	17-20 : Cluster number
+2	Coordinates of tube center (in Delphi frame) –
	bits 1-16 : R(cm)×100 in the barrel
	: D(cm)×100 in the end caps (D is the distance with sign from the module axis)
	17-32 : $\phi\times10000$

Packed information of HCAL anode read-out

Up to the version 1.06

$2N_h$+2	Number of words N_a with anode read-out information
	For each two modules :
$2N_h$+3	Anode read-out timing –
	bits 1- 8 : Module number
	9-16 : Time in ADC units
	17-24 : Module number
	25-32 : Time in ADC units
$2N_h+N_a+3$	Length of the next information module (if any) or 0

HCAL cathode readout BANK
cont.

Since the version 1.07

$2N_h+2$	Number of anode read-out signals N_a
	For each signal :
$2N_h+3$	Anode read-out timing −
	bits 1- 8 : Module number
	9-16 : Layer number
	17-24 : Time in ADC units
$2N_h+N_a+3$	Length of the next information module (if any) or 0

STIC trigger BANK

0	Structural links
0	Reference links
14	Data (format 5I −B)

Link LSTT1 = LQ(LDTOP-20)

DATA	CONTENT[1]
	STIC calorimeter and Veto counter trigger information
+1	General trigger description : 0 = no problem detected 1 = no Calorimeter LTS_DB trigger blocklet 2 = no Veto counter VDB trigger blocklet 3 = both trigger blocklets are absent
+2	Side C low threshold hit patterns for the Calorimeter
+3	Side C high threshold hit patterns for the Calorimeter
+4	Side A low threshold hit patterns for the Calorimeter
+5	Side A high threshold hit patterns for the Calorimeter
+6	Side A 1st Veto counter plane : bits 1-16 : 1st wagon 17-32 : 2nd wagon
+7	Side A 1st Veto counter plane : bits 1-16 : 3rd wagon 17-32 : 4th wagon
+8	Side A 2nd Veto counter plane : bits 1-16 : 1st wagon 17-32 : 2nd wagon
+9	Side A 2nd Veto counter plane : bits 1-16 : 3rd wagon 17-32 : 4th wagon
+10	Side C 1st Veto counter plane : bits 1-16 : 1st wagon 17-32 : 2nd wagon
+11	Side C 1st Veto counter plane : bits 1-16 : 3rd wagon 17-32 : 4th wagon

STIC trigger BANK

cont.

+12	Side C 2nd Veto counter plane :	
	bits 1-16 :	1st wagon
	17-32 :	2nd wagon
+13	Side C 2nd Veto counter plane :	
	bits 1-16 :	3rd wagon
	17-32 :	4th wagon
+14	bits 1-16 :	Neutral trigger from arm A
	17-32 :	Neutral trigger from arm C
+15	bits 1- 8 :	Small veto counter trigger bits
	9-32 :	not used
+16	bits 1- 4 :	Small veto hit bits from ADB 1st wagon
	5- 8 :	Small veto hit bits from ADB 2nd wagon
	9-12 :	Small veto hit bits from ADB 3rd wagon
	13-16 :	Small veto hit bits from ADB 4th wagon
	17 :	Ratio cut decision side A
	18 :	Ratio cut decision side C
	19 :	Ratio cut enabled side A
	20 :	Ratio cut enabled side C
	21 :	Small veto enabled side A
	22 :	Small veto enabled side C
	23-32 :	not used
+17	Small veto counter 1A amplitude :	
	bits 1-12 :	1st wagon
	bits 13-24 :	2nd wagon
+18	Small veto counter 2A amplitude :	
	bits 1-12 :	1st wagon
	bits 13-24 :	2nd wagon
+19	Small veto counter 1C amplitude :	
	bits 1-12 :	1st wagon
	bits 13-24 :	2nd wagon
+20	Small veto counter 2C amplitude :	
	bits 1-12 :	1st wagon
	bits 13-24 :	2nd wagon

[1]The last several words of this bank are added at a different time for various reprocessings. To read its content correctly the exact number of the data words should be found in the ZEBRA structure at IQ(LSST1-1).

μVD Hits BANK

0	Structural links
N_a	Reference links
N	Data (format 1I−F)

Link LMVDH = LQ(LDTOP-21)

LINKS

0	Next μVD Hits bank
$-N_a$	PA bank associated to the hit N_a[1]

DATA	CONTENT
+1	Number of hits N_h + 1000×number of words per hit
	Then for each hit N_h [2] *:*
+1	Module number with the sign of Z
+2	Local X or Z (since 94) coordinate − In case of multiplexed area local Z of the hits if associated, otherwise local Z corresponding to the smallest |Z| in DELPHI frame
+3	R coordinate (from TE if associated) − the sign "+" indicates Rϕ − the sign "−" indicates RZ
+4	Rϕ or Z (since 94) coordinate − the sign of Z from TE if associated, or estimated if not associated
+5	Signal to noise ratio of the hit

[1] The number of the reference links is equal to the number of the associated VD hits only.

[2] The VD hits in the bank are ordered - all associated hits are coming first followed by the unassociated ones.

V0ID BANK

0	Structural links
$2N_{V^0}$	Reference links
N	Data (format 1I-F)

Link LV0ID = LQ(LDTOP-22)

LINKS

	PA banks of the i-th V^0 decay products
−L1	LQ(LV0ID − 2∗I + 1)
−L2	LQ(LV0ID − 2∗I)

DATA	CONTENT
+1	Number of reconstructed V^0's N_{V^0}
	For each reconstructed V^0 :
+1	bits 1-10 : Number of words
	11-14 : Number of hypothesis
	15-20 : Tagging flag : 0 – loose V^0
	1 – tight V^0
	– very tight V^0 :
	2 – K^0 background
	3 – Λ background
	22 – K^0
	33 – Λ
+2	V^0 momentum (GeV/c)
+3	Probability of χ^2 (from PXFVTX fit)
+4	X)
+5	Y) > coordinates of V0 vertex (cm)
+6	Z)
+7	Flight distance in XY (XYZ since 94) normalized to its error
+8	Angle (in radians) in XY with respect to the line joining to the primary vertex
+9	|p+| coordinate x after the fit (GeV/c)
+10	|p+| coordinate y after the fit (GeV/c)
+11	|p+| coordinate z after the fit (GeV/c)
+12	|p−| coordinate x after the fit (GeV/c)
+13	|p−| coordinate y after the fit (GeV/c)
+14	|p−| coordinate z after the fit (GeV/c)
+15	V^0 suggested mass (GeV/c^2), negative if antiparticle

B tagging BANK

0	Structural links
0	Reference links
30	Data (format −F)

Link LBTAG = LQ(LDTOP-25)

DATA	CONTENT
+1	X)
+2	Y) > coordinates of the Beam position
+3	Z)
+4	X)
+5	Y) > sizes of the the Beam spot (σ)
+6	Z)
+7	bits 1- 8 : Reconstructed primary vertex multiplicity
	9-16 : Number of degrees of freedom of the vertex fit
+8	X)
+9	Y) > coordinates of the reconstructed primary vertex fit
+10	Z)
+11	χ^2 of the priamry vertex fit
+12	xx)
+13	xy)
+14	yy) > primary vertex covariance matrix
+15	xz)
+16	yz)
+17	zz)
+18	B tag probability for tracks with neg. imp. parameter
+19	B tag probability for tracks with pos. imp. parameter
+20	B tag probability for all tracks
+21	B tag hemisphere 1 probability for neg. imp. parameters
+22	B tag hemisphere 2 probability for neg. imp. parameters
+23	B tag hemisphere 1 probability for pos. imp. parameters
+24	B tag hemisphere 2 probability for pos. imp. parameters
+25	B tag hemisphere 1 probability for all tracks
+26	B tag hemisphere 2 probability for all tracks
+27	X)
+28	Y) > components of thrust axis vector
+29	Z)
+30	Thrust value

B tagging BANK

cont.

Since the version 1.08

+31	Combined b-tag for the event clustered in 2 jets (given below), but using only the probability, the mass of the secondary vertex and the track rapidity scaled to Sprime. For 2f physics at LEP2.
	2-jet configuration[1]
+32	Minimum Y value for which there are 2 jets
+33	Momentum P(x) for the 1st jet
+34	Momentum P(y) for the 1st jet
+35	Momentum P(z) for the 1st jet
+36	Energy for the 1st jet
+37	Momentum P(x) for the 2nd jet
+38	Momentum P(y) for the 2nd jet
+39	Momentum P(z) for the 2nd jet
+40	Energy for the 2nd jet
+41	Combined btag for the event computed as a sum on charm-like and uds-like (for Z0)
+42	Combined btag for the event computed on the 2 most b-tagged jets (for SM Higgs events)
+43	Combined btag for the event computed on all b-tagged jets (for MSSM hA events)
+44	Combined b-tag for jet 1
+45	Code identifying the variable used to b-tag jet 1
+46	Combined b-tag for jet 2
+47	Code identifying the variable used to b-tag jet 2
	3-jet configuration
+48	Minimum Y value for which there are 3 jets
+49	Momentum P(x) for the 1st jet
+50	Momentum P(y) for the 1st jet
+51	Momentum P(z) for the 1st jet
+52	Energy for the 1st jet
+53	Momentum P(x) for the 2nd jet
+54	Momentum P(y) for the 2nd jet
+55	Momentum P(z) for the 2nd jet
+56	Energy for the 2nd jet
+57	Momentum P(x) for the 3rd jet
+58	Momentum P(y) for the 3rd jet
+59	Momentum P(z) for the 3rd jet

[1] The DURHAM jet finding algorithm scheme is applied for all jet configurations.

B tagging BANK

cont.

+60	Energy for the 3rd jet
+61	Combined btag for the event computed as a sum on charm-like and uds-like (for Z0)
+61	Combined btag for the event computed on the 2 most b-tagged jets (for SM Higgs events)
+62	Combined btag for the event computed on all b-tagged jets (for MSSM hA events)
+63	Combined b-tag for jet 1
+64	Code identifying the variable used to b-tag jet 1
+65	Combined b-tag for jet 2
+66	Code identifying the variable used to b-tag jet 2
+67	Combined b-tag for jet 3
+68	Code identifying the variable used to b-tag jet 3
	4-jet configuration
+69	Minimum Y value for which there are 4 jets
+70	Momentum P(x) for the 1st jet
+71	Momentum P(y) for the 1st jet
+72	Momentum P(z) for the 1st jet
+73	Energy for the 1st jet
+74	Momentum P(x) for the 2nd jet
+75	Momentum P(y) for the 2nd jet
+76	Momentum P(z) for the 2nd jet
+77	Energy for the 2nd jet
+78	Momentum P(x) for the 3rd jet
+79	Momentum P(y) for the 3rd jet
+80	Momentum P(z) for the 3rd jet
+81	Energy for the 3rd jet
+82	Momentum P(x) for the 4th jet
+83	Momentum P(y) for the 4th jet
+84	Momentum P(z) for the 4th jet
+85	Energy for the 4th jet
+86	Combined btag for the event computed as a sum on charm-like and uds-like (for Z0)
+87	Combined btag for the event computed on the 2 most b-tagged jets (for SM Higgs events)
+88	Combined btag for the event computed on all b-tagged jets (for MSSM hA events)

B tagging BANK

cont.

+89	Combined b-tag for jet 1
+90	Code identifying the variable used to b-tag jet 1
+91	Combined b-tag for jet 2
+92	Code identifying the variable used to b-tag jet 2
+93	Combined b-tag for jet 3
+94	Code identifying the variable used to b-tag jet 3
+95	Combined b-tag for jet 4
+96	Code identifying the variable used to b-tag jet 4
	5-jet configuration
+97	Minimum Y value for which there are 4 jets
+98	Momentum P(x) for the 1st jet
+99	Momentum P(y) for the 1st jet
+100	Momentum P(z) for the 1st jet
+101	Energy for the 1st jet
+102	Momentum P(x) for the 2nd jet
+103	Momentum P(y) for the 2nd jet
+104	Momentum P(z) for the 2nd jet
+105	Energy for the 2nd jet
+106	Momentum P(x) for the 3rd jet
+107	Momentum P(y) for the 3rd jet
+108	Momentum P(z) for the 3rd jet
+109	Energy for the 3rd jet
+110	Momentum P(x) for the 4th jet
+111	Momentum P(y) for the 4th jet
+112	Momentum P(z) for the 4th jet
+113	Energy for the 4th jet
+114	Momentum P(x) for the 5th jet
+115	Momentum P(y) for the 5th jet
+116	Momentum P(z) for the 5th jet
+117	Energy for the 5th jet
+118	Combined btag for the event computed as a sum on charm-like and uds-like (for Z0)
+119	Combined btag for the event computed on the 2 most b-tagged jets (for SM Higgs events)
+120	Combined btag for the event computed on all b-tagged jets (for MSSM hA events)

B tagging BANK

cont.

+121	Combined b-tag for jet 1
+122	Code identifying the variable used to b-tag jet 1
+123	Combined b-tag for jet 2
+124	Code identifying the variable used to b-tag jet 2
+125	Combined b-tag for jet 3
+126	Code identifying the variable used to b-tag jet 3
+127	Combined b-tag for jet 4
+128	Code identifying the variable used to b-tag jet 4
+129	Combined b-tag for jet 5
+130	Code identifying the variable used to b-tag jet 5
	For the 2-jet configuration
+1	Number of secondary verteces in the configuration
	For each secondary vertex (if any) :
+1	Index of the jet in which the vertex is found
+2	Number of tracks fitted to the secondary vertex
+3	Mass of the secondary vertex
	For the 3-jet configuration
+1	Number of secondary verteces in the configuration
	For each secondary vertex (if any) :
+1	Index of the jet in which the vertex is found
+2	Number of tracks fitted to the secondary vertex
+3	Mass of the secondary vertex
	For the 4-jet configuration
+1	Number of secondary verteces in the configuration
	For each secondary vertex (if any) :
+1	Index of the jet in which the vertex is found
+2	Number of tracks fitted to the secondary vertex
+3	Mass of the secondary vertex
	For the 5-jet configuration
+1	Number of secondary verteces in the configuration
	For each secondary vertex (if any) :
+1	Index of the jet in which the vertex is found
+2	Number of tracks fitted to the secondary vertex
+3	Mass of the secondary vertex

V0TK BANK

0	Structural links
0	Reference links
N	Data (format 1I −F)

Link LV0TK = LQ(LDTOP-27)

DATA	CONTENT	
+1	Number of reconstructed V^0's	
+2	Number of words per V^0 neutral track	
	For each reconstructed V^0:	
+1	ε impact parameter	
+2	z impact parameter	
+3	θ angle	
+4	ϕ angle	
+5	Weight matrix for these parameters :	$\varepsilon - \varepsilon$
+6		$z - \varepsilon$
+7		$z - z$
+8		$\varepsilon - \theta$
+9		$z - \theta$
+10		$\theta - \theta$
+11		$\varepsilon - \phi$
+12		$z - \phi$
+13		$\theta - \phi$
+14		$\phi - \phi$

EFLO BANK

0	Structural links
0	Reference links
N	Data (format −F)

Link LEFLO = LQ(LDTOP-30)

DATA	CONTENT
	Energy flow information
	Global variables for the event
+1	Number of global event words
+2	Normally computed total energy
+3	Total energy where jet energies are forced to E_{beam}
+4	Total energy at less than 40° to the beam pipe
+5	Missing energy
+6	Angle wrt the beam of thrust (in degrees)
+7	Total unassociated elm. energy in the event
+8	Total unassociated had. energy in the event
+9	Had. energy excess in charged showers
+10	Elm. energy excess in charged showers
+11	Total energy excess in charged showers
+12	Estimate of energy in FCA/FCB
+13	Total charged energy
+14	$M^2_{missing}$ restricted to select "good" events
+15	Thrust
	Jet analysis
+1	Number of jets found + 100 × number of words per jet
	For each jet
+1	Multiplicity (including neutrals)
+2	Momentum in x direction, in GeV/c
+3	Momentum in y direction, in GeV/c
+4	Momentum in z direction, in GeV/c
+5	Energy, in GeV
+6	Invariant mass, in GeV/c^2
+7	Elm. shower energy, in GeV
+8	Had. shower energy, in GeV

EFLO BANK

cont.

JETSET-like track information

+1	Number of charged tracks	+
	$1000 \times$ number of showers	+
	$1000000 \times$ number of Elephant neutral tracks	+
+2	Number of words per track	

For each track

+1	Px, momentum in the x direction, in GeV/c
+2	Py, momentum in the y direction, in GeV/c
+3	Pz, momentum in the z direction, in GeV/c
+4	E, energy, in GeV
+5	m, mass, in GeV/c^2
+6	Electromagnetic energy of the track
+7	Hadronic energy of the track
+8	charge (Delphi convention)

DSTR BANK

0	Structural links
$5N_{D^*}$	Reference links
N	Data (format 1I−F)

Link LDSTR = LQ(LDTOP-31)

LINKS	
	PA banks of the i-th D^* decay products
−L1	LQ(LDSTR − 5∗I + 4) to slow π
−L2	LQ(LDSTR − 5∗I + 3) to K from D^0
−L3	LQ(LDSTR − 5∗I + 2) to π from D^0
−L4	LQ(LDSTR − 5∗I + 1) to π from D^0 (if any)
−L5	LQ(LDSTR − 5∗I) to π from D^0 (if any)

DATA	CONTENT
	Reconstructed D^* candidates
+1	Number of reconstructed D^* + 100×number of words per D^*
	For each D^* candidate
+1	D^* candidate type : 1 D^* normal 11 D^0 mass side band 21 (D^*−D^0) mass side band
+2	D^* momentum
+3	Probability of the D^0 vertex fit
+4	X)
+5	Y) ⇒ coordinates of the D^0 vertex
+6	Z)
+7	XY flight distance of the D^0 vertex
+8	cos(θ) of K in the D^0 rest frame
+9	D^0 mass (negative for antiparticle)
+10	(D^*−D^0) mass
+11	Px)
+12	Py) ⇒ refitted momentum of the slow π
+13	Pz)
+14	Px)
+15	Py) ⇒ refitted momentum of the K from D^0
+16	Pz)

DSTR BANK

cont.

+17	Px)	
+18	Py)	$\Rightarrow$ refitted momentum of the π from D^0
+19	Pz)	
+20	Px)	
+21	Py)	$\Rightarrow$ refitted momentum of the π from D^0 (if any)
+22	Pz)	
+23	Px)	
+24	Py)	$\Rightarrow$ refitted momentum of the π from D^0 (if any)
+25	Pz)	

VSAT BANK

0	Structural links
0	Reference links
N	Data (format 1I−F)

Link LVSAT = LQ(LDTOP-32)

DATA	CONTENT
	Selected VSAT track elements TE [1]
+1	Number of non empty VSAT modules + 100×number of words per module
	For each non empty module :
+1	Energy deposited in the fads of the module
+2	X1 coordinate reconstructed from the first strip plane
+3	X2 coordinate reconstructed from the second strip plane
+4	Y coordinate reconstructed from the second strip plane
+5	Z coordinate distance along the beam from the interaction point

[1] The TE selection criteria applied are :
- Energy $\geq 0.2\times$Ebeam
- $5. \leq X1 \leq 20.$
- $5. \leq X2 \leq 20.$
- $Y \leq 5.$

EMCL BANK

0	Structural links
N_{PA}	Reference links
N	Data (format 1I−F)

Link LEMCL = LQ(LDTOP-33)

LINKS

PA banks associated to the elm. clusters

$-L_n^i$ n-th PA bank of i-th cluster[1]

DATA CONTENT

Reconstructed electromagnetic clusters

+1 Number of reconstructed elm. clusters + 100 × number of words per cluster

For each electromagnetic cluster

+1	Best elm. energy estimate of the cluster		
+2	θ angle of the cluster		
+3	ϕ angle of the cluster		
+4	Error on the cluster energy		
+5	Hadronic energy associated to the cluster		
+6	bits 1- 6 :	Identification flag :	0 – not identified
			1 – electron
			2 – photon
			11 – loose electron
			22 – loose photon
	7-18 :	not used	
	19-24 :	Number of PA's associated to the cluster	
+7	Type of the associated PA's (bitted word)[2]:		
	bit n = 1	if the n-th PA has an electromagnetic deposit	
	n = 0	if the n-th PA has not an electromagnetic deposit	

[1]The reference links contain consecutively the addresses of the PA banks associated to each electromagnetic cluster. The order of the clusters is the same as in the data part of the bank. The number of associated PA banks is different for each cluster.

[2]The order of the PA's associated to the cluster corresponds to the order of the PA reference links for this cluster.

PXTD BANK

0	Structural links
0	Reference links
N	Data (format −I)

Link LPXTD = LQ(LDTOP-42)

DATA	CONTENT
	VFT Pixel cluster data
+1	Number of clusters (hits) in the event
	For each cluster
+1	Module number (crown number + 1000 $\times$ raquette)
+2	X)
+3	Y) $\Rightarrow$ cluster coordinates $\times$ 10000 (Delphi frame)
+4	Z)
+5	X) $\Rightarrow$ cluster coordinates $\times$ 10000 (local frame)
+6	Z)
+7	Error of cluster local X coordinate $\times$ 10000
+8	Error of cluster local Z coordinate $\times$ 10000
+9	Tanagra identifier of the TK or TE
+10	Number of pixels in the cluster + 100 $\times$ truth label
+11	TANAGRA identifier of the TDR
	For each pixel in the cluster
+1	Address of the pixel : bits 1- 8 : column 9-16 : row

STTD BANK

0	Structural links
0	Reference links
N	Data (format −I)

Link LSTTD = LQ(LDTOP-43)

DATA	CONTENT
	VFT Ministrip cluster data
+1	Number of clusters (hits) in the event
	For each cluster
+1	Module number
+2	Cluster local coordinate × 10000
+3	Error of cluster local coordinate × 10000
+4	TANAGRA identifier of the TK or TE
+5	Number of strips in the cluster + 100 × truth label
+6	TANAGRA identifier of the TDR
+7	Number of the first strip in the cluster
	For each strip in the cluster
+1	bits 1-10 : noise in the strip 11-20 : signal in the strip

References

[1] "ZEBRA User Guide", CERN Program Library, J.Zoll

[2] "PHDST Package Description, Version 3.00", N.Smirnov and V.Perevozchikov, **DELPHI 92-118 PROG 189 Rev 3**, 5 September 1994

[3] "DELPHI Pilot Record Description", Y.Sacquin, **DELPHI 91-90 PROG 177**, 23 September 1991
"DELPHI DST Content, Version 3.36", Y.Sacquin, **DELPHI 94-161 PROG 210 Rev 1**, 20 December 1996

[4] "DELANA – Delphi Analysis Package", User's Guide Version 3.4, **DELPHI 89-67 PROG 142**, 10 July 1989