ISO DATA PRODUCT DOCUMENT

ISO-SAI/94-1266/Dc

Issue 12

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Editor : R.D. Saxton ESA/SSD.

1 INTRODUCTION

1.1 Change Control Log

A pre-draft was distributed in August 1991.

Issue 1 (containing ERD layouts) was distributed in November 1991, and assigned the document number "ISO-SSD-9111A", although this number might vary in a future issue!

Issue 1.1 was distributed in January 1992; it contained in addition the Compact Status description for 3 of the instruments. CAM ERD was slightly corrected and column names were changed.

Issue 2 was distributed in September 1992. It was the first issue which described actually existing products (in their state at the end of the first ERD/SPD integration, although not all indicated FITS keywords were then yet implemented). There are no change bars in issue 2, but a list of changed/new things follows.

- GPSCAOTN deleted from general prefix (because no longer a need to identify AOTs within a TDT). CSGPAOTN, in the Compact Status prefix, remained, however!

- Raster point ID type changed to 2I*1 (in general prefix).

- CSTA layout revised (new fields added, and nominal/redundant flag deleted, and CONF mode deleted). Fields for pointing to dark and cal images were added but then deleted again.

- LSTA: 2 fields became "spare" (previously marked "TBC").

- Product description SSTA added.

- GEHK revised: subcommutated information is no longer duplicated in every record (but is present in just the same way as in TDF); ground station time was added to every record.

- editorial changes to CAM ERD, in response to an E-mail from Olivier Boulade (of 2/2/92).

- LWS ERD redefined, to use variable columns (LGER, LSER, and LLER), and some related keywords defined.

- LWHK frame type changed from I*1 to I*2.

- field SWEREXEC added to SWS ERD at request of Do Kester.

- section 3.4 added (common FITS headers for raw products).

- CAM SPD layout added.

- LWS SPD and LILL and LCAG added.

- PHT SPD layouts added, plus cal "G" file layouts, plus reference to cal "A" files.

- SWS SPD layout added, plus 4 types of cal "A" file. However, the cal "A" files were subsequently deleted again, as it was realised that they were anyway only a subset of SPD. A provisional description of cal "G" files was added instead (not yet in Word Perfect format).

- section 5.3 added (common FITS headers for SPD).

Issue 3 was distributed in July 1994. It contained descriptions of Automatic Analysis Results files in addition to an update of the other contents. This was the first version which was partly generated automatically from the Product description files. A list of changes follows.

- Various changes (RV, 09-Mar-94) :
  * LSTA: changed "LSTAMTYP" to "LSTALTYP"
  * CIER: changed BBVOLT, F2BB1VOL, F2BB2VOL to unsigned integers
  * PxER: added "suspected data corruption" flag
  * SWER: added comments for 16Kbps telemetry
  * ERD FITS keywords: added FILEVERS, FILEJOUR, OLPVERS, AOTVERS, TIME, NODENAME, USERNAME
  * ERD FITS keywords: changed EOHAAOTS to EOHAOSN and EOHAAOTC to EOHAPSN
  * CSGPAOTN renamed to CSGPOSN
  * CSGPFLID removed

- Many of the cal files have changed from version 2.

- Automatic Analysis Results have been added

- Some changes to SPD files

Issue 4 was distributed in January 1995, it has been renamed to DRAFT 4 to avoid certain internal difficulties. A rethink of attitude handling led to two new products, IRPH and IIPH, which give the observer a clearer view of the telescope pointing direction. The APPH will no longer be given to observers.

Other changes were:

* CAM cal files have been included
* The quaternion keywords have been removed from SPD products
* The INSTPANG keyword in SPD files has been renamed INSTROLL
* The products LXER and P1SR were added
* Orbit file renamed to ORBIT

Issue 5 was distributed in August 1995. Many Products (particularly from CAM) had their contents modified. The EOHA and EOHI files were included in the document and a list of all products was added as Appendix C.

Issue 6 was produced in November 1995. There have been a lot of changes since
issue 5.
RIDS fixed: 294,295,296,317,318,319,320,321,324,325,343,394,407,
408,414,415,416,422

New Products:
CDER
CCGLWSLP
CCGSWSLP
IFPG
LCLR_n, LCSR_n, where n=0 to 9
SC25_3E
LDDS

Modified Products:
CCIM CSTA APPH SWAA CWSP LILL LSPD LSAN IIPH IRPH CIER
SC* all SWS calibration files
PPAP PPAE PPAS PLAP PLAS PSAP PSAS PCAP PCAS PCAE CLWCVF1 CLWCVF2 CSWCVF

Deleted Products:
SC07, SC08, SC09, SC10, SC11, SC14, SC15, SC16D, SC19, SC20, SC22

Issue 7 was produced on St. Georges day 1996 (April 23).
Rids fixed: 404, 406, 423, 426, 432, 495, 504, 506
New Products: PCSV, PFLUXCONV, PSPECAL
Modified Products: CISP, IIPH, IRPH, LCAF, LCSI, LSAN, LSPD,
PSLS, PSSS, SWAA

Issue 8 was produced in August 1996 to coincide with the release of OLP version 5.0.
Rids addressed: 522, 529, 540, 556, 557, 558, 560,566 (Screws 227,233).
New Products: CIPH, CRPH, LCGB, LPAR, SC02A, SC02B, SC19, SWGH
Modified Products: CPSL, CSSP, IFPG, LSAN, LSPD

Issue 9 was produced in May 1997 to coincide with the release of OLP version 6.
The major change was the introduction of time dependent calibration files.
Rids addressed: 588,613,635,649,650,651,653,654,657,658,661
New Products: PTIMDEP, STIMEDEP, LCIR, LIPD, LSNR, LIAC, LSCA, LGIF, POMEGA, PC1D, PC2D, PPxD, PPxFCSAP
Modified Products: PSTA, LCLR_n, LCSR_n, LSPD, LSAN, IIPH, CCIM, CMOS,
CSSP, PC1ILLUM, PC2ILLUM, PSPECAL

Deleted Products: LCAF, LCSI, LILL

Issue 10 was produced in January 1999 to document the changes introduced by OLP version 7. Apart from the products listed below there have been in particular changes to PHT SPD header keywords.
Rids addressed: 714, 801
New Products: CCGLWDMOD, CCGLWSHIFT, EOHC, ISTR, LTIMEDEP, PC1CHOPCOR, PC2CHOPCOR, PPCHOPCOR, PC1DARK, PC2DARK, PPDARK, PSDARK,PC1FLAT, PC2FLAT, PC1OMEGA, PC2OMEGA, PPOMEGA, PC1RESETI, PC2RESETI, PP1RESETI, PP2RESETI, PP3RESETI, PC1RESP, PC2RESP, PPRESP, PCCBB, PCCMBBONE, PCCMBBTWO, PCCPOWER, PP2D, PP3D, PP3FCSAP
Modified Products: CCSH, CCGLWPOL, CIPH, CRPH, CIPS, CPSP, CSTA, IIPH, IRPH, LCGW, LGIF, LSPD, LSAN, LSCA, LSNR, LWGH, PC1A, PC1D, PC1S, PC2A, PC2D, PC2S, PP1A, PP1D, PP1S, PP2A, PP2D, PP2S, PP3A, PP3D, PP3S, PSLS, PSSS
Deleted Products: POMEGA, PDARKCURR, PRESPONSE, SC09, SC10, SC11

Issue 11 was produced in August 1999 to document the changes introduced by OLP version 8 and to include the Browse Products. The major change was the conversion of the document from wordperfect format to Microsoft Word.
Rids addressed:
New Products: CSP, LSP, PSP, SSP
Modified Products: CIPH, CRPH

Issue 12 was issued in June 2000 to document the changes introduced by OLP version 9 and the new LWS parallel products.
NewProducts: APHSTAR,CCGLWRESET,CCGLWSAT,CCGSWSAT,LCTP, LCDK,LCPB,LCPDK,LCPM,LCPR,LPAA,LPAD,LPSP,LSAA,LSSP,PC1CHOPSIG, PC2CHOPSIG,PP1CHOPSIG,PC1FOOTP,PC2FOOTP,PP2FOOTP,PP3FOOTP, PC1SLINR,PC2SLINR,PP1SLINR,PP2SLINR,PP3SLINR,PCFILTRAN,PPFILTRAN, PCPSF,PPFTOF,PPPSF,PSDYNAMIC,PSDYNWT,PSLD,PSSD,SC16ET,SC25_4A, SC25_4C,SC25_4D,SC41,HIPPARCHOS,TYCHO
Modified Products: CCGLWTRANS,CCGSWTRANS,LIPD,LSAN,PCAE,PCAP,PCAS, PPAE,PPAP,PPAS,PSLS,PSSS,PSPECAL,SC13

1.2 Glossary of Acronyms

AA	Auto analysis
ACT	Archive configuration table
ADD	Architectural design document
AOCS	Attitude and Orbit Control System
AOT	Astronomical Observation Template
BRD	Baseline requirements document
CD-R	Compact Disc (ROM) media
DDD	Detailed design document
ESA	European Space Agency
FCS	Fine Calibration Source
FITS	Flexible Image Transport System
FP	Fabry Perrot
GST	Ground station time
HK	Housekeeping
IA	Interactive analysis
ICD	Interface control document
ID	Identification
IDT	Instrument dedicated team
ION	ISO Observation Number
IS	Instrument station
ITK	Instrument Time Key
NAXIS	Number of axes (of a FITS primary array)
NAXISn	(Length of the) n-th most rapidly varying axis
NUM	a repetition factor (in tables)
OFF	byte offset within a row (in tables)
OLP	Off-Line Processing
OSN	Observation sequence number
QLA	Quick Look (scientific) Assessment
SOC	Science Operations Centre
SOT	Science Operations Team
SPAN	Space Physics Analysis Network
SPD	Standard Processed Data
TBC	To Be Confirmed
TBD	To Be Defined
TDF	Telemetry Distribution Format
TDT	Target-Dedicated Time
UTC	Universal Time (Coordinated)
UTK	Uniform Time Key
VILSPA	Villafrance (Spain)
VMS	Virtual Memory (operating) System

Many obvious acronyms appearing within the actual tables are not listed here.

1.3 References

ADDOLP ISO Architectural Design Document for Off-Line Software (SAI/94-1260/Dc) (now issue 1.2).

BRDOLP Baseline Requirements Document for Off-Line Scientific Data Processing (SAI/94-1269/Dc) (now issue 2.0).

ICD10 OAD/SOC Auxiliary Data ICD (ISO/OPS/ICD-10)

1.4 Scope and Purpose

The information contained in this document was defined by off-line software developers within ESA and within the ISO PI teams.

The document describes the contents and structure of the ISO data Products which will be distributed to observers. It gives details of the distribution process but does not contain all the information required to analyse the data Products.

In the short term, the document serves as a reference for software developers within the SOC and P.I. teams and as an interface document for the IDTs and the community in general.

The scope includes not only the 3 standard levels of products derived from instrument telemetry, but also (i) the layouts of those instrument calibration files which are externally distributed, and (ii) other outputs from the ground segment which have to be distributed in any special way. The scope also includes certain files which are not distributed, for internal reference by the SOC.

2 GENERAL FEATURES OF PRODUCTS

2.1 Relationship to Design of SOC Product Archive

In the document ADDOLP the design of the SOC product archive is explained. In particular a distinction is made between the internal and external formats of products. The IDPD describes the external format only, since this is the format received by external observers. Although sufficient information (data types etc) is given to enable the internal format to be worked out as well, this is not a primary purpose of the IDPD.

The document ADDOLP also explains four "shapes" of product, meaning four different time periods of validity. These generally fit into the IDPD in the following way:

products pertaining to a whole observation or part of an observation: covered in the main sections (2,3,6,7)

products pertaining to a whole revolution or to the whole mission: covered in sections 4 and 5.

Any products or other outputs from the ground segment described in the ADDOLP, which are not explicitly mentioned by name in the IDPD, are not intended to be distributed to external observers and are only internal to the ISO ground segment.

2.2 Usage of FITS Standard

The document BRDOLP contains requirements on the usage of the FITS standard for ISO.

The following varieties of FITS are used:

> Primary FITS header plus array (basic FITS standard, i.e. a simple array of N dimensions, avoiding any FITS extensions).
>
> Primary FITS header (as above but with no data array).
>
> Primary FITS header plus binary table extension (header plus table): used for all ERD, SPD and Compact Status. Note that only a restricted form of this standard is used, avoiding the optional varieties such as multi-dimensional arrays, variable record lengths, and avoiding the combination of more than one such extension into a particular file.

Calibration files exist for all three of the above varieties.

2.3 Additional Conventions for Product Layouts

Certain product types have record layouts beginning with a "general prefix", containing a time key plus other common information. This applies to all ERD and SPD products. For
the main science (instrument specific) ERD and SPD, the form of the prefix is slightly different from the other files; this is in order to limit its length to 8 bytes, thus reducing the resulting impact on total data volume. The prefix is specified in section 2.4.

A logical subdivision within each main science ERD file exists, although this is not evident from the FITS structure. It is defined by the records of the Compact Status, which must contain (i) the instrument time keys to define the subdivision, (ii) the relevant status information for each subdivision. Thus the main science ERD is intended to be read in conjunction with its associated Compact Status. By contrast it is hoped to make SPD self-describing and independent of the Compact Status, as far as an external user is concerned. (Within the SOC this may be different though).

There are no dummy records. The absence of record(s), caused e.g. by telemetry loss, is detectable only via an unexpected jump in the associated time key.

Products which are in the form of binary tables are assigned a "REC LENGTH" in bytes, which is always an exact multiple of 4. In the SOC analysis environment, this is also equal to the record length of the resulting data files on disc. It has nothing to do with the 2880-byte "record length" defined by the FITS authors. Products which are in the form of primary FITS arrays are instead described in terms of their array axes (FITS keywords NAXIS, NAXISn), with the choice of a suitable record length (for the resulting disc files) being left open.

Numbers are stored in IEEE format, e.g. bytes are stored in order of decreasing significance within two- or four-byte integers.

Binary integer or real fields of length N bytes are always aligned on a N-byte boundary.

For binary tables, all fields are described in tabular form, giving for each field:

- field name (up to 8 characters). This is the FITS column label, appearing in the TTYPEnnn extension keyword, which may be used to locate the column within access software. The first four characters of the name are often (by convention) equal to the product type.

- offset (OFF); the byte offset from the beginning of the row.

- repetition factor (NUM); the number of times the described data type is repeated, also encoded appropriately in the FITS extension header.

- data type (TYPE); either the type (in the FORTRAN sense - I*2, I*4, R*4 etc), or an indication of the total number of bytes occupied (if the field is not describable by a single FORTRAN type, or if the field description is expanded in a separate table).

- description in words; may contain subdivisions into bit fields, where applicable, in which case the bits are specified starting with the most significant, proceeding in order of decreasing significance. Bits are intentionally not given numbers; because of the strict order of bit significance (even for unused or spare bits), it is possible to dispense with bit numbers in the tables.

For primary arrays each axis is described in a table giving the number of elements in the axis and a description in words.

All types of Products may have HEADER KEYWORDS associated with them. In this document, important keywords are included after the description of any data component. The format for the keywords is:

- Keyword (upto 8 characters)

- Type (C,I,R,D,L for character, integer, real, double precision and logical)

- Description in words.

- Certain standard numbered keywords (e.g. TUNITn) may also be embedded as c comments within particular tables.

2.4 General Record Prefix

FIELD NAME : GPSC **:** General Prefix for Main Science ERD/SPD

FIELD	OFF	NUM	TYPE	DESCRIPTION	TOTAL LENGTH : 8
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID (x,y) (1,1) for a pointed observation	
GPSCFILL	6	1	I*2	Spare (reserved for future use for any common purpose)	

FIELD NAME : GEPR **:** General Prefix for Other ERD Files

FIELD	OFF	NUM	TYPE	DESCRIPTION	TOTAL LENGTH : 8
GEPRTKEY	0	1	I*4	Time key (UTK for spacecraft telemetry, or instrument time key for instrument-specific ERD)	
GEPRQUAL	4	1	I*4	Frame quality flags: - 0 = perfect or not applicable; - non-zero = imperfect quality of accompanying data. See note after table.	

Notes

The labelling of data with the raster point ID relies on the AOCS telemetry, which shall always contain this ID as part of the so-called user-selectable data.

Concerning the frame quality bits, the rules are:

- They are not present in the "GPSC" prefix, because they are perfect by definition - see BRDOLP - because imperfect data will have been excluded. (This has nothing to do with astronomical or engineering quality of the data).

- For general HK, all 32 quality bits from the format in question are copied into ERD, after masking out (setting to 0) the bits associated with the instrument-specific frames.

- For AOCS and LWS HK ERD, a similar approach is followed, i.e. all non-relevant quality bits

are masked out. So a bad LWS HK record can only have frames 1 or 17 shown as bad, because all other bits will have been masked to zero.

The frame quality bits are stored in order of decreasing significance with increasing frame number.

It can happen that a format containing some bad frames will nevertheless produce some perfect ERD records; this is because the bad quality is not recognised unless/until the "DERIVE_ERD" software actually attempts to access a bad or missing frame. Note also that if only a part of a CAM or PHT floating block is lost or bad, the entire block is disregarded.

3 RAW DATA PRODUCTS

3.1 General Introduction

The raw data products for any instrument consist of: (i) a Compact Status, (ii) Edited Raw Data. The latter is divided into common ERD (always present, i.e. general HK and AOCS), and instrument ERD, or main science ERD. The instrument ERD may vary in format according to the type of observation being performed, but there is only one type of instrument ERD generated at any one time. (Exception: product type LWHK is generated in parallel, and is not included under the definition of "main science ERD").

All these products are written according to the FITS binary table standard. Their FITS headers therefore contain the mandatory keywords required by that standard, plus the optional keywords TTYPEn to give labels and descriptions to the columns. Any extra keywords for particular product types are described together with the binary tables in question.

In addition some keywords of general relevance are stored in the primary FITS header and are described in section 3.4.

3.2 Compact Status

One record of the Compact Status defines the time limits of a contiguous period and the significant instrument status during that period.

There is one Compact Status product type for each of the instruments. Their records all contain the Compact Status General Prefix as defined below.

FIELD NAME : CSGP **:** Compact Status General Prefix

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**TOTAL LENGTH :** 48
CSGPUKST	0	1	I*4	UTK Start time	
CSGPUKEN	4	1	I*4	UTK End time	
CSGPIKST	8	1	I*4	ITK Start time	
CSGPIKEN	12	1	I*4	ITK End time	
CSGPUTST	16	2	I*4	Universal time for start of period seconds after 1989.0, followed by remaining fraction of a second)	
CSGPUTEN	24	2	I*4	Universal time for end of period (same layout)	
CSGPOSN	32	1	I*1	Observation Sequence number	
CSGPFILL	33	15	I*1	Spare	

3.2.1 CAM Compact Status

PRODUCT TYPE: CSTA : CAM Compact Status

FIELD	OFF	NUM	TYPE	DESCRIPTION REC LENGTH: 80
CSTACSGP	0	1	*48	General prefix
CSTADEID	48	1	I*1	detector ID (SW=0, LW=1)
CSTAMODE	49	1	I*1	current mode (1, 2, 3 or 4) 1 General Observing - imaging 2 Deleted - was microscanning 3 Beam switching 4 CVF - spectral observation
CSTAENTW	50	1	I*2	position of the entrance wheel
CSTAFLTW	52	1	I*2	position of the filter wheel
CSTALNSW	54	1	I*2	position of the lens wheel
CSTASELW	56	1	I*2	position of the selection wheel
CSTAREAD	58	1	I*2	no. of detector readouts per mode
CSTATINT	60	1	I*2	elementary integration time (CAMTU)
CSTAANOM	62	1	I*1	error code for mode termination
CSTACONF	63	1	I*1	configuration number within AOT
CSTAPRIM	64	1	I*1	CAM prime (0) or parallel (1)

CSTAFIL1	65	1	I*1	spare
CSTAFOBS	66	1	I*1	Observation type (1:norm,2:CUS,3:paral, 4:Activ,5:DeActiv)
CSTAFAOT	67	1	I*1	AOT identifier
CSTAVERS	68	1	I*1	Version number of CSTA
CSTAPROC	69	1	I*1	On board processing (derived from F2IMPROC)
CSTAGAIN	70	1	I*1	Electronics gain (derived from F2ADCGAI)
CSTAOFFS	71	1	I*1	Electronics offset (derived from F2ADCOFF)
CSTABFLG	72	1	I*1	Black-body status (derived from F2BBFLAG)
CSTAACIM	73	1	I*1	# of images accumulated (derived from F2ACCIMA)
CSTASAIM	74	1	I*1	# of images sampled (derived from F2SAMIMA)
CSTACVFI	75	1	I*1	CFV increment in motor steps (derived from CVFINCR)
CSTAFILL	76	4	I*1	spare

??

3.2.2 LWS Compact Status

PRODUCT TYPE: LSTA : LWS compact status history file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
LSTACSGP	0	1	*48	General prefix	
LSTASMP1	48	1	I*2	Sample list word 1	
LSTASMP2	50	1	I*2	Sample list word 2	
LSTASMP3	52	1	I*2	Sample list word 3	
LSTASMP4	54	1	I*2	Sample list word 4	
LSTASMP5	56	1	I*2	Sample list word 5	
LSTASMP6	58	1	I*2	Sample list word 6	
LSTASMP7	60	1	I*2	Sample list word 7	
LSTALTYP	62	1	I*2	Sample list type	
LSTASPA1	64	1	I*2	Spare	
LSTAGRSN	66	1	I*2	Grating scan number	
LSTAGRSD	68	1	I*2	Grating scan direction	
LSTASTAT	70	1	I*2	Instrument status	
LSTAFPSN	72	1	I*2	FP scan number	
LSTAFPSD	74	1	I*2	FP scan direction	
LSTAXTRA	76	1	I*4	Spare	

LSTALTYP is an Integer*2 variable consisting of a high byte which identifies the subsystem and a low byte that subdivides different types within the subsytem. The subsystem values are:

```
'0100'X  Illuminator subsystem
'0200'X  Grating subsystem
'0300'X  FPS subsystem
'0400'X  FPL subsystem
'0000'X  Other
```

The instrument status definition is:

LSTALTYP	LSTASTAT	Meaning
Grating	0	Grating sample list, grating not scanning
Grating	1	Grating sample list, grating scanning
FPS	0	FPS sample list,FP not scanning
FPS	1	FPS sample list,FP scanning
FPL	0	FPL sample list,FP not scanning
FPL	1	FPL sample list FP scanning
Illuminator	0	Illuminator sample list, illuminators off
Illuminator	1	Illuminator sample list, illuminators on
Other	n/a	Other sample list

Notes:

1. LSTALTYP is derived from the seven LWS sample words.
2. LSTAGRSD is derived from LSTAGRSN and the commanded grating scan mode.
3. LSTAFPSD is derived from LSTAFPSN and the commanded FP scan mode.
4. In the case of a grating scan measurement the LSTAFPSN and LSTAFPSD entries will contain zero; this situation is identified by the LSTALTYP entry.
5. In the case of an illuminator sequence measurement the LSTAGRSN, LSTAGRSD, LSTAFPSN and LSTAFPSD entries will contain zero; this situation is identified by the LSTALTYP entry.

3.2.3 PHT Compact Status

PRODUCT TYPE: PSTA : PHT Compact Status

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 128
PSTACSGP	0	1	*48	General prefix	
PSTAERR	48	1	I*4	ExHK error flags (bitmap)	
PSTASUBS	52	1	I*2	Subsystem	
PSTAOPFO	54	1	I*2	Chopper OPF Override	
PSTAF1TS	56	1	I*2	Sel. TRS(FCS1)	
PSTAF2TS	58	1	I*2	Sel. TRS(FCS2)	
PSTAF1PS	60	1	I*2	FCS1 power sel.	
PSTAF2PS	62	1	I*2	FCS2 power sel.	
PSTAC1PS	64	1	I*2	CHW1 position (select)	
PSTAC2PS	66	1	I*2	CHW2 position (select)	
PSTAC3PS	68	1	I*2	CHW3 position (select)	
PSTACMOD	70	1	I*2	Chopper mode	
PSTACAMP	72	1	I*2	Chopper amplitude	
PSTACSTE	74	1	I*2	Chopper step	
PSTACINC	76	1	I*2	Chopper increment	
PSTACRES	78	1	I*2	CRE switch	
PSTADETA	80	1	I*2	Detector assy	
PSTADRS	82	1	I*2	Data reduction size	
PSTAMUX1	84	1	I*2	MUX1 line	
PSTAMUX2	86	1	I*2	MUX2 line	
PSTAXSTA	88	1	I*2	Cross status	
PSTAD1OF	90	1	I*2	DIE1 offset	
PSTAD1GA	92	1	I*2	DIE1 gain	
PSTAD2OF	94	1	I*2	DIE2 offset	
PSTAD2GA	96	1	I*2	DIE2 gain	
PSTAFREQ	98	1	I*2	Frequencies	
PSTANNDR	100	1	I*2	No. NDRs	
PSTANDR	102	1	I*2	No. DRs	
PSTAINTT	104	1	I*2	Integration time	
PSTAMEAT	106	1	I*2	Measurement time	
PSTAMPC1	108	1	I*2	Measurement position CHW1	
PSTAMPC2	110	1	I*2	Measurement position CHW2	
PSTAMPC3	112	1	I*2	Measurement position CHW3	
PSTAMET	114	1	I*2	Measured EEU temperature	
PSTASER	116	1	I*2	PHT serendipity mode flag 1 = serendipity 0 = normal prime instrument	
PSTAFILL	118	10	I*1	Filler	

The field PSTAERR contains a bitmap reflecting inconsistencies between PHT ExHK floating blocks errors encountered during Compact Status generation by TDF-1ST-SCAN. When this field is 0, no errors were encountered. Otherwise, the contents should be interpreted as follows :

value	field	ExHKn (n=2,3,4)
1	FCS2Power	ExHK2

```
   2  FCS2Power       ExHK3
   4  FCS2Power       ExHK4

   8  Meas.time       ExHK2
  16  Meas.time       ExHK3
  32  Meas.time       ExHK4
  64  BiasVoltC200.1  ExHK2
 128  BiasVoltC200.1  ExHK3
 256  BiasVoltC200.1  ExHK4

 512  BiasVoltC200.4 ExHK2
1024  BiasVoltC200.4  ExHK3
2048  BiasVoltC200.4  ExHK4
```

For example, if PSTAERR has a value of 33 (1+32), this means that there was a difference between ExHK1 and ExHK2 w.r.t. the 'FCS2Power' field, and also between ExHK1 and ExHK4 w.r.t. the 'Meas.time' field.

PHT serendipity measurements will have an associated compact status file called PSTI. This will have the same format as PSTA but fields will be called PSTIxxxx rather than PSTAxxxx.

3.2.4 SWS Compact Status

PRODUCT TYPE: SSTA : SWS Compact Status

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 96
SSTACSGP	0	1	*48	General prefix	
SSTASHUT	48	1	I*2	shutter position (0=closed, or 1/2/3)	
SSTAGAIN	50	6	I*2	nominal gain in each of the bands Can be 1, 4 or 16	
SSTACALS	62	4	I*2	calibration source status (0=off, 1=low, 2=high) (1) Grating calibrator (2) Flusher (3) FP calibrator (4) Diffuse calibrator	
SSTARESP	70	2	I*2	reset pulse interval in frames (SW/LW)	
SSTAHKMD	74	1	I*2	house keeping mode	
SSTAFPS	76	1	I*2	FP selection (1=FP1, 2=FP2)	
SSTASPAR	78	9	I*2	spare	

3.3 Edited Raw Data

3.3.1 CAM Edited Raw Data

The first file description relates to CAM prime ERD, CIER, and CAM parallel ERD, CPER. The column names and format are identical in both cases.

The second description relates to the CAM Diagnostic ERD file, CDER. This file contains **all** the F1 blocks from the telemetry. Some of these blocks are stripped out of the CIER file during the DERIVE_ERD processing stage.

PRODUCTYPE: CIER : CAM Image Edited Raw Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 2716
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Spare	
MOTORSTS	8	48	I*2	Cryomotor currents & motion params (6 repetitions of 16 bytes).	
WSELECT	104	1	I*1	Last selected cryomotor	
WMOTION	105	1	I*1	Rotation sens of selected cryomotor	
CVFINCR	106	1	I*1	CVF increment per step	
CVFSTEP	107	1	I*1	Number of CVF steps	
CVFTIME	108	1	I*2	CVF dwell time [CAMTU] per step	
CVFINIT	110	1	I*2	CVF start position	
CVFCHNL	112	1	I*1	CVF selection (SW or LW)	
CVFSCAN	113	1	I*1	CVF scan running 1 if inside a scan, else 0	
CVFPOS	114	1	I*1	CVF running point number	
MOTRECOV	115	1	I*1	Control move position on/off	
LWTINT	116	1	I*2	LW elem. integration time [CAMTU]	
SWTINT	118	1	I*2	SW elem. integration time [CAMTU]	
SWTEMP	120	1	I*2	SW temperature	
SWCOMPOL	122	7	I*1	SW detector commanded polarizations	
FILLER1	129	1	I*1	Filler	
SWMESPOL	130	9	I*2	SW detector measured polarizations	
LWCOMPOL	148	7	I*2	LW detector commanded polarizations	
LWMESPOL	162	10	I*2	LW detector measured polarizations	
TEMPLW1	182	1	I*2	LW temperature 1 TEMPRT1	
TEMPLW2	184	1	I*2	LW temperature 2 TEMPRT2	
CAM1TEMP	186	4	I*2	FPU temperatures	
CAM2TEMP	194	2	I*1	CAM2B/A temperatures (B before A)	
TLWORDER	196	1	I*2	LW temperature setting	
BBCUR	198	1	I*2	Black body: selected current	
BBVOLT	200	1	I*2	Black body: voltage measure(16-bit) Unsigned Integer - TZERO=32768.0	
BBTIME	202	1	I*2	Black body: elapsed time	
BBSTAT	204	1	I*1	Black body: on/off	
BB12	205	1	I*1	Relay redundancy DCI 1/2	
BBPOWER	206	1	I*1	Black body: DCI1_2 on/off	
FILLER2	207	1	I*1	Filler	
BBMAXTIM	208	1	I*2	Black body: max time on (in CAMTU)	
TCSTS	210	2	I*2	Status of received TC	
MTOPZERO	214	1	I*1	Motor top zero	
OTFLAG	215	1	I*1	On-target flag	
PLL	216	1	I*1	PLL status	
LWPWR	217	1	I*1	Relay LW on/off	

MELE12	218	1	I*1	Relay redundancy mechanism 1/2
SWPWR	219	1	I*1	Relay SW on/off
CPU12	220	1	I*1	Relay redundancy CPU 1/2
LWTPROBE	221	1	I*1	LW temperature probe on/off
LWETA	222	1	I*1	ETA LW on/off
LWCAM3	223	1	I*1	CAM3 LW on/off
LWREAD	224	1	I*1	LW readout on/off
LWPOLAR	225	1	I*1	LW bias on/off
SWREAD	226	1	I*1	SW readout on/off
SWPHIL	227	1	I*1	Phi-L on/off
SWHEATER	228	1	I*1	SW heater on/off
PARALLEL	229	1	I*1	Parallel mode on/off
SWTPROBE	230	1	I*1	SW temperature probe mode
SWETAOD	231	1	I*1	ETA SW odd on/off
SWETAEV	232	1	I*1	ETA SW even on/off
TREG	233	1	I*1	LW temperature regulation mode
WOTFLAG	234	1	I*1	Wait target
ACQFLAG	235	1	I*1	Start/stop acquisition
ETASAVE	236	1	I*1	UNUSED
MAGPOWER	237	1	I*1	Magneto resistor on/off
SWCAM3	238	1	I*1	CAM3 SW on/off
SWPOLAR	239	1	I*1	SW bias on/off
IMORIG	240	1	I*1	Selected detector
LASTERR	241	1	I*1	Code of last s/w error
SOWSTAT	242	1	I*1	Software status
ERCOUNT	243	1	I*1	Error counter
BKGCOUNT	244	1	I*1	Background task counter
CAM3T	245	1	I*1	CAM3 temperature
TCSEQ	246	1	I*1	Running TC sequence
FILLER3	247	1	I*1	Filler
TBLOCK	248	20	I*1	Status of on-board tasks
ERROR	268	13	I*2	Error codes from on-board software
TCECHO	294	30	I*2	Echos of last TC
MEMADDR	354	1	I*2	Address of RAM/ROM
MEMWORD	356	1	I*2	Contents of RAM/ROM
MAGCOUNT	358	1	I*2	Magneto resistor counter
TIME	360	1	I*4	On-board processor time [CAMTU]
VGENALL	364	3	I*2	General voltages
LWVGEN	370	5	I*2	LW general voltages
SWVGEN	380	6	I*2	SW general voltages
VMOT	392	1	I*2	Motor drive voltage
ROTMODE	394	1	I*1	Rotation mode 0 if +ve, 1 if -ve, 2 unknown
SWTPTIME	395	1	I*1	SW temperature probe turn-on time
SWHETIME	396	1	I*1	SW heater turn-on time
ACCIMAG	397	1	I*1	Accumulated image number
FILLER4	398	1	I*2	Spare
TREGCONS	400	1	I*2	LW heater constant power
TREGFILT	402	1	I*1	Number of sample for filtering
TREGSAMP	403	1	I*1	LW temp. regul. sampling period
WRADIO	404	1	I*2	Writing address of I/O port
WRDAIO	406	1	I*2	Data written on I/O port
READIO	408	1	I*2	Reading address of I/O port
REDAIO	410	1	I*2	Data read on I/O port
ADCGAIN	412	1	I*1	Gain
ADCOFFS	413	1	I*1	Offset
IMPROC	414	1	I*1	Image processing
IMSREF	415	1	I*1	Selected reference level
QLA	416	1	I*1	QLA on/off
SAMIMAG	417	1	I*1	Sampled image number
INTMASK	418	1	I*1	Interruption mask
F2IMORIG	419	1	I*1	Data origin (SW or LW)
F2IMPROC	420	1	I*1	Type of on-board processing
FILLER5	421	3	I*1	Filler

F2IMCOUN	424	1	I*4	Elementary readout number
F2INTTIM	428	1	I*2	Elementary integration time [CAMTU]
F2ETASAV	430	1	I*1	UNUSED
F2IMSREF	431	1	I*1	Ref. image for on-board processing
F2ADCGAI	432	1	I*1	ADC electronics gain
F2ADCOFF	433	1	I*1	ADC electronics offset
F2QLA	434	1	I*1	Programmable QLA OK/not OK flag
F2PARALL	435	1	I*1	Programmable parallel mode on/off
F2DATADE	436	1	I*1	Programmable TM word
F2DATATY	437	1	I*1	Data type (REF, END_INT, DIFF)
F2MTOPZE	438	1	I*1	Motor top zero
F2OTFLAG	439	1	I*1	ISO's on target flag
F2PLL	440	1	I*1	PLL status
F2BB12	441	1	I*1	Main/redundant internal black body
F2LWPWR	442	1	I*1	LW detector on/off
F2MELE12	443	1	I*1	Main/redundant electronic subsystem
F2SWPWR	444	1	I*1	SW detector on/off
F2CPU12	445	1	I*1	Main/redundant CPU on
F2BBFLAG	446	1	I*1	Black body on/off
F2OTFSUM	447	1	I*1	logical AND of all F2OTFFLAGs
F2BB1VOL	448	1	I*2	Black body voltage V1 Unsigned Integer - TZERO=32768.0
F2BB2VOL	450	1	I*2	Black body voltage V2 Unsigned Integer - TZERO=32768.0
F2AOTOBS	452	1	I*1	AOT/CUS/other driven observation
F2AOTAOT	453	1	I*1	CAMs AOT number
F2AOTOPM	454	1	I*1	CAM's op-mode in configuration
F2AOTCNF	455	1	I*1	Configuration number within obs.
F2BMSWFL	456	1	I*2	Beam switch flag
FILLER6	458	2	I*1	Filler
F2BOOTTI	460	1	I*4	Elapsed time since last boot[CAMTU]
F2TIME	464	1	I*4	Elapsed time since last time reset
F2TEMPFS	468	1	I*2	SW detector temperature
F2ACCIMA	470	1	I*1	Number of images summed on board
F2SAMIMA	471	1	I*1	Sampling rate for sampl. image mode
F2IMAG	472	1122	I*2	Detector data

PRODUCT TYPE: CDER : CAM Diagnostic Edited Raw Data

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 420
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Spare	
MOTORSTS	8	48	I*2	Cryomotor currents & motion params (6 repetitions of 16 bytes).	
WSELECT	104	1	I*1	Last selected cryomotor	
WMOTION	105	1	I*1	Rotation sens of selected cryomotor	
CVFINCR	106	1	I*1	CVF increment per step	
CVFSTEP	107	1	I*1	Number of CVF steps	
CVFTIME	108	1	I*2	CVF dwell time [CAMTU] per step	
CVFINIT	110	1	I*2	CVF start position	
CVFCHNL	112	1	I*1	CVF selection (SW or LW)	
CVFSCAN	113	1	I*1	CVF scan running	
CVFPOS	114	1	I*1	CVF running point number	
MOTRECOV	115	1	I*1	Control move position on/off	
LWTINT	116	1	I*2	LW elem. integration time [CAMTU]	
SWTINT	118	1	I*2	SW elem. integration time [CAMTU]	
SWTEMP	120	1	I*2	SW temperature	
SWCOMPOL	122	7	I*1	SW detector commanded polarizations	
FILLER1	129	1	I*1	Filler	
SWMESPOL	130	9	I*2	SW detector measured polarizations	

LWCOMPOL	148	7	I*2	LW detector commanded polarizations
LWMESPOL	162	10	I*2	LW detector measured polarizations
TEMPLW1	182	1	I*2	LW temperature 1 TEMPRT1
TEMPLW2	184	1	I*2	LW temperature 2 TEMPRT2
CAM1TEMP	186	4	I*2	FPU temperatures
CAM2TEMP	194	2	I*1	CAM2B/A temperatures (B before A)
TLWORDER	196	1	I*2	LW temperature setting
BBCUR	198	1	I*2	Black body: selected current
BBVOLT	200	1	I*2	Black body: voltage measure(16-bit) Unsigned Integer - TZERO=32768.0
BBTIME	202	1	I*2	Black body: elapsed time
BBSTAT	204	1	I*1	Black body: on/off
BB12	205	1	I*1	Relay redundancy DCI 1/2
BBPOWER	206	1	I*1	Black body: DCI1_2 on/off
FILLER2	207	1	I*1	Filler
BBMAXTIM	208	1	I*2	Black body: max time on (in CAMTU)
TCSTS	210	2	I*2	Status of received TC
MTOPZERO	214	1	I*1	Motor top zero
OTFLAG	215	1	I*1	On-target flag
PLL	216	1	I*1	PLL status
LWPWR	217	1	I*1	Relay LW on/off
MELE12	218	1	I*1	Relay redundancy mechanism 1/2
SWPWR	219	1	I*1	Relay SW on/off
CPU12	220	1	I*1	Relay redundancy CPU 1/2
LWTPROBE	221	1	I*1	LW temperature probe on/off
LWETA	222	1	I*1	ETA LW on/off
LWCAM3	223	1	I*1	CAM3 LW on/off
LWREAD	224	1	I*1	LW readout on/off
LWPOLAR	225	1	I*1	LW bias on/off
SWREAD	226	1	I*1	SW readout on/off
SWPHIL	227	1	I*1	Phi-L on/off
SWHEATER	228	1	I*1	SW heater on/off
PARALLEL	229	1	I*1	Parallel mode on/off
SWTPROBE	230	1	I*1	SW temperature probe mode
SWETAOD	231	1	I*1	ETA SW odd on/off
SWETAEV	232	1	I*1	ETA SW even on/off
TREG	233	1	I*1	LW temperature regulation mode
WOTFLAG	234	1	I*1	Wait target
ACQFLAG	235	1	I*1	Start/stop acquisition
ETASAVE	236	1	I*1	UNUSED
MAGPOWER	237	1	I*1	Magneto resistor on/off
SWCAM3	238	1	I*1	CAM3 SW on/off
SWPOLAR	239	1	I*1	SW bias on/off
IMORIG	240	1	I*1	Selected detector
LASTERR	241	1	I*1	Code of last s/w error
SOWSTAT	242	1	I*1	Software status
ERCOUNT	243	1	I*1	Error counter
BKGCOUNT	244	1	I*1	Background task counter
CAM3T	245	1	I*1	CAM3 temperature
TCSEQ	246	1	I*1	Running TC sequence
FILLER3	247	1	I*1	Filler
TBLOCK	248	20	I*1	Status of on-board tasks
ERROR	268	13	I*2	Error codes from on-board software
TCECHO	294	30	I*2	Echos of last TC
MEMADDR	354	1	I*2	Address of RAM/ROM
MEMWORD	356	1	I*2	Contents of RAM/ROM
MAGCOUNT	358	1	I*2	Magneto resistor counter
TIME	360	1	I*4	On-board processor time [CAMTU]
VGENALL	364	3	I*2	General voltages
LWVGEN	370	5	I*2	LW general voltages
SWVGEN	380	6	I*2	SW general voltages
VMOT	392	1	I*2	Motor drive voltage
ROTMODE	394	1	I*1	Rotation mode
SWTPTIME	395	1	I*1	SW temperature probe turn-on time

SWHETIME	396	1	I*1	SW heater turn-on time
ACCIMAG	397	1	I*1	Accumulated image number
FILLER4	398	1	I*2	Spare
TREGCONS	400	1	I*2	LW heater constant power
TREGFILT	402	1	I*1	Number of sample for filtering
TREGSAMP	403	1	I*1	LW temp. regul. sampling period
WRADIO	404	1	I*2	Writing address of I/O port
WRDAIO	406	1	I*2	Data written on I/O port
READIO	408	1	I*2	Reading address of I/O port
REDAIO	410	1	I*2	Data read on I/O port
ADCGAIN	412	1	I*1	Gain
ADCOFFS	413	1	I*1	Offset
IMPROC	414	1	I*1	Image processing
IMSREF	415	1	I*1	Selected reference level
QLA	416	1	I*1	QLA on/off
SAMIMAG	417	1	I*1	Sampled image number
INTMASK	418	1	I*1	Interruption mask
FILLER5	419	1	I*1	Filler

The structured fields in CIER/CPER are detailed below. Note that the FITS headers will not specify these details.

FIELD NAME : MOTORSTS : Cryomotor currents & motion params				
FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** | **TOTAL LENGTH** : 16
PHASE	0	1	I*2	Phase status
CUR	2	1	I*2	Current
SCUR	4	1	I*2	First step current
STEP	6	1	I*2	Stepping period
START	8	1	I*2	First step duration
COM	10	1	I*2	Wheel position setting
POS	12	1	I*2	Wheel position measure
OK	14	1	I*2	Wheel valid flag

An array of MOTORSTS is ordered as below for wheels 1 to 6:

```
motorsts(0) = F1_M1_PHASE          (Phase)
motorsts(1) = F1_M1_CUR            (Current)
motorsts(2) = F1_M1_SCUR           (Selected current)
motorsts(3) = F1_M1_STEP           (Step)

motorsts(4) = F1_M1_START          (Start position)
motorsts(5) = F1_W1_COM            (Commanded position)
motorsts(6) = F1_W1_POS            (Actual position)
motorsts(7) = F1_W1_OK             (ok)
motorsts(8) = F1_M2_PHASE          (Phase for wheel two)

    ...

motorsts(48) = F1_W6_OK
```

e.g. element 16 indicates the phase of wheel #3

FIELD NAME : SWCOMPOL : SW detector commanded polarizations				
FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** | **TOTAL LENGTH** : 7
SVDFETO	0	1	I*1	SW DAC 1 setting VDFET
SVSFETO	1	1	I*1	SW DAC 2 setting VSFET
SVECRANO	2	1	I*1	SW DAC 3 setting VECRAN
SVSUBO	3	1	I*1	SW DAC 4 setting VSUB
SVDLO	4	1	I*1	SW DAC 5 setting VDL
SVCBO	5	1	I*1	SW DAC 6 setting VCB
SVCHO	6	1	I*1	SW DAC 7 setting VCH

FIELD NAME : SWMESPOL **:** SW detector measured polarizations

FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 18

SVDFETM	0	1	I*2	SW bias 1 measure VDFET_1
SVSFETM	2	1	I*2	SW bias 2 measure VSFET
SVECRANM	4	1	I*2	SW bias 3 measure VECRAN
SVSUBM	6	1	I*2	SW bias 4 measure VSUB_1
SVDLM	8	1	I*2	SW bias 5 measure VDL
SVCBM	10	1	I*2	SW bias 6 measure VCB
SVCHM	12	1	I*2	SW bias 7 measure VCH
SWIDFET	14	1	I*2	SW bias 1 measure 2 VDFET_
SWISUB	16	1	I*2	SW bias 4 measure 2 ISUB_2

FIELD NAME : LWCOMPOL **:** LW detector commanded polarizations

FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 14

LVGGO	0	1	I*2	LW DAC 1 setting VGG
LVPCO	2	1	I*2	LW DAC 2 setting VPC
LVRO	4	1	I*2	LW DAC 3 setting VR
LVDDO	6	1	I*2	LW DAC 4 setting
LVCADRE	8	1	I*2	LW DAC 5 setting VCADRE
LALPHIRO	10	1	I*2	LW DAC 6 setting ALPHIR
LVREFO	12	1	I*2	LW DAC 7 setting VREF

FIELD NAME : LWMESPOL **:** LW detector measured polarizations

FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 20

LVGGM	0	1	I*2	LW bias 1 measure VGG
LVPCM	2	1	I*2	LW bias 2 measure VPC
LVRM	4	1	I*2	LW bias 3 measure VR
LVDD1M	6	1	I*2	LW bias 4 measure VDD_1
LVCADREM	8	1	I*2	LW bias 5 measure VCADRE
LALPHIRM	10	1	I*2	LW bias 6 measure ALPHIR
LVREFM	12	1	I*2	LW bias 7 measure VREF
LVAM	14	1	I*2	LW bias 8 measure VA
LVECRANM	16	1	I*2	LW bias 9 measure VECRAN
LWVDD2M	18	1	I*2	LW bias 4 measure 2 VDD_2

FIELD NAME : CAM1TEMP **:** FPU temperatures

FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 8

CAM1T1	0	1	I*2	CAM1 temperature 1: det SW
CAM1T2	2	1	I*2	CAM1 temperature 2: mot fil LW
CAM1T3	4	1	I*2	CAM1 temperature 3: det LW
CAM1T4	6	1	I*2	CAM1 temperature 4: mot fil SW

FIELD NAME : CAM2TEMP : CAM2A/B temperatures

FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 2

CAM2BT	0	1	I*1	CAM2 B temperature
CAM2AT	1	1	I*1	CAM2 A temperature

FIELD NAME : TCSTS : Status of received TC

FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 4

TCCHKS	0	1	I*2	Input TC checksum
TCCOUNT	2	1	I*2	Input TC counter

FIELD NAME : TBLOCK : Status of on-board tasks

FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 20

TM16	0	1	I*1	T_TM16
TM8	1	1	I*1	T_TM8
F2TEST	2	1	I*1	T_F2_TEST
MOTEUR	3	1	I*1	T_MOTEUR
EXECTC	4	1	I*1	T_EXEC_TC
SELECTTC	5	1	I*1	T_SELECT_TC
DMATC	6	1	I*1	T_DMA_TC
ACQHSK	7	1	I*1	T_ACQ_HSK
CALIB	8	1	I*1	T_CALIB
TEMPCALI	9	1	I*1	T_TEMP_CALIB
REGUL	10	1	I*1	T_REGUL
TEMPPFSW	11	1	I*1	T_TEMP_PFSW
SEQUENCE	12	1	I*1	T_SEQUENCE
CDESW	13	1	I*1	T_CDE_SW
CDELW	14	1	I*1	T_CDE_LW
TRAITEIM	15	1	I*1	T_TRAITE_IMA
HEATERSW	16	1	I*1	T_HEATER_SW
UPLINK	17	1	I*1	T_UPLINK
CVF	18	1	I*1	T_CVF
LECSWTEM	19	1	I*1	T_LEC_SW_TEM

FIELD NAME : VGENALL : General voltages

FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 6

VGEN15P	0	1	I*2	+15 V
VGEN15N	2	1	I*2	-15 V
VGEN5P	4	1	I*2	+5.2 V

FIELD NAME : LWVGEN **:** LW general voltages
FIELD OFF NUM TYPE DESCRIPTION | **TOTAL LENGTH :** 10

LW5P	0	1	I*2	+5.2 V (LW)
LW15P	2	1	I*2	+15 V (LW)
LW15N	4	1	I*2	-15 V (LW)
LWCAM3P	6	1	I*2	+V CAM3 (LW)
LWCAM3N	8	1	I*2	-V CAM3 (LW)

FIELD NAME : SWVGEN **:** SW general voltages
FIELD OFF NUM TYPE DESCRIPTION |**TOTAL LENGTH :** 12

SWVETAP	0	1	I*2	+V ETA (SW)
SWVETAN	2	1	I*2	-V ETA (SW)
SWCAM3N	4	1	I*2	-V CAM3 (SW)
SWCAM3P	6	1	I*2	+V CAM3 (SW)
SWVLOGP	8	1	I*2	SW readout logic +VLOG
SWVLOGN	10	1	I*2	SW readout logic -VLOG

3.3.2 LWS Edited Raw Data

The LWS ERD files have been currently defined in a way which can accommodate any arbitrary sample list of length 15. It is an assumption here that within any particular observation, the sample list for a single ERD type cannot change, i.e. LIER may be generated from several different sample lists, but for a given observation only one will be used.

To accommodate all the above possibilities, there are therefore six types of LWS ERD: LWHK with a fixed column layout, and LGER, LIER, LSER, LLER, LXER with variable column layouts. The last five can only be interpreted via the FITS keywords defining the columns, which makes them different from all other ERD types.

LXER contains the LWS ERD For calibration language observations.

PRODUCT TYPE: LIER : LWS Illuminator ERD file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 40
GPSCTKEY	0	1	I*4	General prefix	
GPSCRPID	4	2	I*1	General prefix	
GPSCFILL	6	1	I*2	General prefix	
LIERxxxx	8	15	I*2	15 sampled channels	
LIERFIL2	38	1	I*2	Spare	

PRODUCT TYPE: LGER : LWS grating scan ERD file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 40
GPSCTKEY	0	1	I*4	General prefix	
GPSCRPID	4	2	I*1	General prefix	
GPSCFILL	6	1	I*2	General prefix	
LGERxxxx	8	15	I*2	15 sampled channels	
LGERFIL2	38	1	I*2	Spare	

PRODUCT TYPE: LSER : LWS FPS scan ERD file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 40
GPSCTKEY	0	1	I*4	General prefix	
GPSCRPID	4	2	I*1	General prefix	
GPSCFILL	6	1	I*2	General prefix	
LSERxxxx	8	15	I*2	15 sampled channels	
LSERFIL2	38	1	I*2	Spare	

PRODUCT TYPE: LLER : LWS FPL scan ERD file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 40
GPSCTKEY	0	1	I*4	General prefix	
GPSCRPID	4	2	I*1	General prefix	
GPSCFILL	6	1	I*2	General prefix	
LLERxxxx	8	15	I*2	15 sampled channels	

LLERFIL2	38	1	I*2	Spare

PRODUCT TYPE: LXER : LWS CLO ERD file

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 40
GPSCTKEY	0	1	I*4	General prefix
GPSCRPID	4	2	I*1	General prefix
GPSCFILL	6	1	I*2	General prefix
LXERxxxx	8	15	I*2	15 sampled channels
LXERFIL2	38	1	I*2	Spare

PRODUCT TYPE: LWHK : LWS housekeeping ERD file

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 520
GEPRTKEY	0	1	I*4	General prefix: time key
GEPRQUAL	4	1	I*4	General prefix: frame quality
LWHKFR01	8	128	I*2	Frame 1
LWHKFR17	264	128	I*2	Frame 17

Note concerning variable contents of LGER, LIER, LSER, LLER and LXER.

The actual column contents are defined by the FITS keywords TTYPE1...TTYPE15. The value field for these keywords identifies the physical information sampled, for example 'LSERDSW1' would mean that the column contained SW detector 1 readouts (within a short-wavelength FP scan ERD). The defined values of xxxx above are:

DSW1....DSW5	for the 5 SW detectors
DLW1....DLW5	for the 5 LW detectors
GLVP	for grating LVDT position
GCUR	for grating current
LCP	for FPL commanded position
SCP	for FPS commanded position
LEC1....LEC3	for FPL error signals 1...3
SEC1....SEC3	for FPS error signals 1...3
GST	for Grating structure temperature
GET	for Grating electronics temperature
GCP	for Grating commanded position
DTA	for Detector temperature A
DTB	for Detector temperature B
LTMP	for FPL temperature
ICUR	for Illuminator current
ICS	for Illuminator commanded status

Software to read LGER/LIER/LSER/LLER/LXER files must use these TTYPEn keywords, in order to find out what information is in a file and at what offset within a record it is located.

3.3.3 PHT Edited Raw Data

PRODUCT TYPE: P1ER : PHT C100 Edited Raw Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 48
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
P1ERPIXF	8	1	I*2	Bit flags accompanying pixels	
P1ERPCS1	10	1	I*2	Power of calibration source 1	
P1ERPCS2	12	1	I*2	Power of calibration source 2	
P1ERCREV	14	1	I*2	Measured CRE checkout voltage	
P1ERTEMP	16	1	I*2	Measured temperature C100	
P1ERFILL	18	2	I*2	Spare	
P1ERCPOS	22	1	I*2	Measured chopper position	
P1ERMBV	24	1	I*2	Measured bias voltage C100	
P1ERPIXR	26	1	I*2	IR data (resistor)	
P1ERPIXO	28	1	I*2	IR data (open)	
P1ERPIX	30	9	I*2	IR data: 9 pixels	

PRODUCT TYPE: P2ER : PHT C200 Edited Raw Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 44
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
P2ERPIXF	8	1	I*2	Bit flags accompanying pixels	
P2ERPCS1	10	1	I*2	Power of calibration source 1	
P2ERPCS2	12	1	I*2	Power of calibration source 2	
P2ERCREV	14	1	I*2	Measured CRE checkout voltage	
P2ERTEMP	16	1	I*2	Measured temperature C200	
P2ERFILL	18	2	I*2	Spare	
P2ERCPOS	22	1	I*2	Measured chopper position	
P2ERMBV1	24	1	I*2	Measured bias voltage C200.1	
P2ERMBV2	26	1	I*2	Measured bias voltage C200.2	
P2ERMBV3	28	1	I*2	Measured bias voltage C200.3	
P2ERMBV4	30	1	I*2	Measured bias voltage C200.4	
P2ERPIX1	32	1	I*2	IR data (+y, -z, bias C200.3)	
P2ERPIX2	34	1	I*2	IR data (-y, -z, bias C200.4)	
P2ERPIX3	36	1	I*2	IR data (open, not used for FM)	
P2ERPIX4	38	1	I*2	IR data (-y, +z, bias C200.2)	
P2ERPIX5	40	1	I*2	IR data (+y, +z, bias C200.1)	
P2ERPIX6	42	1	I*2	IR data (resistor)	

PRODUCT TYPE: PPER : PHT-P Edited Raw Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 28
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PPERPIXF	8	1	I*2	Bit flags accompanying pixels	
PPERPCS1	10	1	I*2	Power of calibration source 1	
PPERPCS2	12	1	I*2	Power of calibration source 2	
PPERFIL1	14	1	I*2	Spare	
PPERTEMP	16	1	I*2	Measured temperature P1, P2, or P3	

PPERFIL2	18	2	I*2	Spare
PPERCPOS	22	1	I*2	Measured chopper position
PPERMBV	24	1	I*2	Measured bias voltage P1, P2, or P3
PPERPIX	26	1	I*2	IR data (1 pixel)

PRODUCT TYPE: PSER : PHT-S Edited Raw Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 292
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PSERPIXF	8	1	I*2	Bit flags accompanying pixels	
PSERPCS1	10	1	I*2	Power of calibration source 1	
PSERPCS2	12	1	I*2	Power of calibration source 2	
PSERCREV	14	1	I*2	Measured CRE checkout voltage	
PSERTEM1	16	1	I*2	Measured temperature S1	
PSERTEM2	18	1	I*2	Measured temperature S2	
PSERFILL	20	1	I*2	Spare	
PSERCPOS	22	1	I*2	Measured chopper position	
PSERMBV1	24	1	I*2	Measured bias voltage S1	
PSERMBV2	26	1	I*2	Measured bias voltage S2	
PSERPIX1	28	66	I*2	IR data for LW branch	
PSERPIX2	160	66	I*2	IR data for SW branch	

PRODUCT TYPE: P2ES : PHT C200 Serendipity ERD

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 44
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
P2ESPIXF	8	1	I*2	Bit flags accompanying pixels	
P2ESPCS1	10	1	I*2	Power of calibration source 1	
P2ESPCS2	12	1	I*2	Power of calibration source 2	
P2ESCREV	14	1	I*2	Measured CRE checkout voltage	
P2ESTEMP	16	1	I*2	Measured temperature C200	
P2ESFILL	18	2	I*2	Spare	
P2ESCPOS	22	1	I*2	Measured chopper position	
P2ESMBV1	24	1	I*2	Measured bias voltage C200.1	
P2ESMBV2	26	1	I*2	Measured bias voltage C200.2	
P2ESMBV3	28	1	I*2	Measured bias voltage C200.3	
P2ESMBV4	30	1	I*2	Measured bias voltage C200.4	
P2ESPIX1	32	1	I*2	IR data (+y, -z, bias C200.3)	
P2ESPIX2	34	1	I*2	IR data (-y, -z, bias C200.4)	
P2ESPIX3	36	1	I*2	IR data (open, not used for FM)	
P2ESPIX4	38	1	I*2	IR data (-y, +z, bias C200.2)	
P2ESPIX5	40	1	I*2	IR data (+y, +z, bias C200.1)	
P2ESPIX6	42	1	I*2	IR data (resistor)	

The column PxERPIXF (or P2ESPIXF) in each PHT ERD file contains a set of flags which pertain to all the pixels in that row.

```
   1 bit  - chopper on-position (most significant bit)
   1 bit  - chopper sign
   1 bit  - readout status
   1 bit  - on-target flag
   1 bit  - automatic data reduction flag
  10 bits - spare
```

1 bit - suspected data corruption flag (least significant bit)

3.3.4 SWS Edited Raw Data

The following table applies primarily to the 32 Kbps telemetry bit rate, but it would also be used for ERD generated from 16 Kbps telemetry. It is explicitly mentioned where this requires a different interpretation of column descriptions.

PRODUCT TYPE: SWER : SWS Edited Raw Data

FIELD	OFF	NUM	TYPE	DESCRIPTION REC LENGTH: 144
GPSCTKEY	0	1	I*4	Instrument time key
GPSCRPID	4	2	I*1	Raster point ID
GPSCFILL	6	1	I*2	Filler
SWERDR5	8	12	I*2	5-micron array readouts
SWERDR10	32	12	I*2	10-micron array readouts
SWERDR20	56	12	I*2	20-micron array readouts
SWERDR35	80	12	I*2	35-micron array readouts
SWERDRFP	104	4	I*2	FP detector readouts
				The selection of which of the next 10 fields contain valid information is mode-dependent. The "mode" can be 0, 1, 2 or 3, with a normal default value of 0. A change in mode implies the start of a new measurement period, and the value of the mode is contained in the corresponding Compact Status field called SSTAHKMD.
SWERHK1	112	1	I*2	SW scanner - actual position (if mode = 0,1)
SWERHK2	114	1	I*2	SW scanner - LVDT output (if mode = 0,1)
SWERHK3	116	1	I*2	SW scanner motor current (if mode=1)
SWERHK4	118	1	I*2	SW scanner DAC output (if mode=1)
SWERHK5	120	1	I*2	LW scanner - actual position (if mode = 0,2,3)
SWERHK6	122	1	I*2	LW scanner - LVDT output (if mode = 0,2,3)
SWERHK7	124	1	I*2	LW scanner motor current (if mode=2)
SWERHK8	126	1	I*2	LW scanner DAC output (if mode=2)
SWERHK9	128	1	I*2	last received internal command (if mode=3)
SWERHK10	130	1	I*2	temp. sensor FP cal. source (if mode=3)
SWERHK11	132	1	I*2	Fabry-Perot main current
SWERHK12	134	1	I*2	Fabry-Perot correction current #1
SWERHK13	136	1	I*2	Fabry-Perot correction current #2
SWERSLHK	138	1	I*2	Slowly commutated HK: whereas all other fields repeat at the rate of 24 Hz (16Kbps: 12 Hz), SWERSLHK repeats at 0.5 Hz (16Kbps: 0.25 Hz) and the meaning of any individual readout depends on the accompanying

				value of SWERIRC see below)
SWERIRC	140	1	I*2	Internal readout counter begins at 1 (for the first readout cycle of a new format), then increments up to 48 (16 kbps: 96). It is derived from the "SWS internal frame counter" and indicates the sequence of information in SWERSLHK.
SWEREXEC	142	1	I*2	"Execute" flags Extracted from the more significant byte of the SWS internal frame counter. Because the flags are telemetered at a rate of 12 Hz (16Kbps: 6 Hz), they appear only in ERD records for which SWERIRC is a multiple of 2 (16Kbps: multiple of 4); the flags are set to zero for the intervening records. The more significant byte of SWEREXEC is always set to zero, i.e. the sign bit for the flags is not extended.

HEADER KEYWORDS

TNULLd	I	Null values for the columns SWERHK1 to SWERHK10 (d=1,10). Used because not all of the columns contain valid information

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For 16 Kbps ERD, not all detector values are present, causing some of the SWERDRnn columns to contain a NULL value defined by a corresponding TNULL FITS keyword (-32768). Note however, that there are currently no plans to use the 16kbps telemetry rate during operations.

3.3.5 General HK Edited Raw Data

PRODUCT TYPE: GEHK : General HK

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 1296
GEPRTKEY	0	1	I*4	UTK time key	
GEPRQUAL	4	1	I*4	Frame quality	
GEHKGST	8	2	I*4	GST in original TDF record	
GEHKFR0	16	256	I*1	Frame 0	
GEHKFR8	272	256	I*1	Frame 8 (science HK)	
GEHKFR16	528	256	I*1	Frame 16	
GEHKRPID	784	3	I*1	Raster point ID and validity	
GEHKDERP	787	509	I*1	(ESOC's) derived parameters	

The file GSHH is a sampled version of the above containing every fifteenth record. The fields are called GSHHxxxx rather than GEHKxxxx.

3.3.6 AOCS Edited Raw Data

PRODUCT TYPE: AOCS : Raw AOCS frames

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 264
GEPRTKEY	0	1	I*4	UTK time key	
GEPRQUAL	4	1	I*4	Frame quality	
AOCSFRAM	8	256	I*1	Frame 4, 12, 20 or 28	

3.3.7 LWS parallel data

PRODUCT TYPE: LPAR : LWS Parallel Mode data

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 512
GEPRTKEY	0	1	I*4	General prefix: time key (UTK)	
GEPRQUAL	4	1	I*4	General prefix: frame quality	
SCTIME	8	1	I*2	fr00[076-077] S/C Time	
E200	10	1	I*2	fr00[124-125] E200: Prime Inst	
FR8_1	12	1	I*2	fr08[084-085] FORMAT / FORMAT	
FR8_2	14	1	I*2	fr08[086-087] OBS Flags / OBS Flags	
FR8_3	16	1	I*2	fr08[088-089] CMD_RECV_CNT / SW1 half diff	
FR8_4	18	1	I*2	fr08[090-091] CMD_EXEC_CNT / SW2 half diff	
FR8_5	20	1	I*2	fr08[092-093] IA_PWR_A / SW1 full diff	
FR8_6	22	1	I*2	fr08[094-095] IA_PWR_B / SW2 full diff	
FR8_7	24	1	I*2	fr08[096-097] WH_SENS_PWR / SW3 half	

				diff
FR8_8	26	1	I*2	fr08[098-099] WH Status / SW3 full diff
FR8_9	28	1	I*2	fr08[100-101] FP Status / SW4 full diff
FR8_10	30	1	I*2	fr08[102-103] GR Status / SW5 full diff
FR8_11	32	1	I*2	fr08[104-105] HTR Status / LW1 full diff
FR8_12	34	1	I*2	fr08[106-107] ILL_PWR / LW2 full diff
FR8_13	36	1	I*2	fr08[108-109] GR_CURR / GR_CURR
FR8_14	38	1	I*2	fr08[110-111] ILL_CURR / ILL_CURR
FR8_15	40	1	I*2	fr08[112-113] HTR_CURR / HTR_CURR
FR8_16	42	1	I*2	fr08[114-115] CONV_CURR / CONV_CURR
FR8_17	44	1	I*2	fr08[116-117] DPU_5VOLT / DPU_5VOLT
FR8_18	46	1	I*2	fr08[118-119] FPS_VOLTS / FPS_VOLTS
FR8_19	48	1	I*2	fr08[120-121] FPL_VOLTS / FPL_VOLTS
FR8_20	50	1	I*2	fr08[122-123] Bias part1 / LW3 full diff
FR8_21	52	1	I*2	fr08[124-125] Bias part2 / LW4 full diff
FR8_22	54	1	I*2	fr08[126-127] THERMS_CMD / LW5 full diff
FR8_23	56	1	I*2	fr08[128-129] DET_TEMP_A / DET_TEMP_A
FR8_24	58	1	I*2	fr08[130-131] DET_TEMP_B / SW4 half diff
FR8_25	60	1	I*2	fr08[132-133] STR_TEMP / SW5 half diff
FR8_26	62	1	I*2	fr08[134-135] GR_TEMP / GR_TEMP
FR8_27	64	1	I*2	fr08[136-137] FPL_TEMP / LW1 half diff
FR8_28	66	1	I*2	fr08[138-139] DPU_TEMP / DPU_TEMP
FR8_29	68	1	I*2	fr08[140-141] FPL_EL_TEMP / LW2 half diff
FR8_30	70	1	I*2	fr08[142-143] FPS_EL_TEMP / LW3 half diff
FR8_31	72	1	I*2	fr08[144-145] GR_EL_TEMP / LW4 half diff
FR8_32	74	1	I*2	fr08[146-147] ADC_TEMP / ADC_TEMP
FR8_33	76	1	I*2	fr08[148-149] WH_OUTPUT / LW5 half diff
FR1_1	78	1	I*2	fr01[010-011] FORMAT
FR1_2	80	1	I*2	fr01[012-013] OBS Flags
FR1_3	82	1	I*2	fr01[014-015] SW1 half diff (when slewing)
FR1_4	84	1	I*2	fr01[016-017] SW2 half diff (when slewing)
FR1_5	86	1	I*2	fr01[018-019] SW1 full diff (when slewing)
FR1_6	88	1	I*2	fr01[020-021] SW2 full diff (when slewing)
FR1_7	90	1	I*2	fr01[022-023] SW3 half diff (when slewing)
FR1_8	92	1	I*2	fr01[024-025] SW3 full diff (when slewing)
FR1_9	94	1	I*2	fr01[026-027] SW4 full diff (when slewing)
FR1_10	96	1	I*2	fr01[028-029] SW5 full diff (when slewing)
FR1_11	98	1	I*2	fr01[030-031] LW1 full diff (when slewing)
FR1_12	100	1	I*2	fr01[032-033] LW2 full diff (when slewing)
FR1_13	102	1	I*2	fr01[034-035] GR_CURR

FR1_14	104	1	I*2	fr01[036-037]	ILL_CURR
FR1_15	106	1	I*2	fr01[038-039]	HTR_CURR
FR1_16	108	1	I*2	fr01[040-041]	CONV_CURR
FR1_17	110	1	I*2	fr01[042-043]	DPU_5VOLT
FR1_18	112	1	I*2	fr01[044-045]	FPS_VOLTS
FR1_19	114	1	I*2	fr01[046-047]	FPL_VOLTS
FR1_20	116	1	I*2	fr01[048-049]	LW3 full diff (when slewing)
FR1_21	118	1	I*2	fr01[050-051]	LW4 full diff (when slewing)
FR1_22	120	1	I*2	fr01[052-053]	LW5 full diff (when slewing)
FR1_23	122	1	I*2	fr01[054-055]	DET_TEMP_A
FR1_24	124	1	I*2	fr01[056-057]	SW4 half diff (when slewing)
FR1_25	126	1	I*2	fr01[058-059]	SW5 half diff (when slewing)
FR1_26	128	1	I*2	fr01[060-061]	GR_TEMP
FR1_27	130	1	I*2	fr01[062-063]	LW1 half diff (when slewing)
FR1_28	132	1	I*2	fr01[064-065]	DPU_TEMP
FR1_29	134	1	I*2	fr01[066-067]	LW2 half diff (when slewing)
FR1_30	136	1	I*2	fr01[068-069]	LW3 half diff (when slewing)
FR1_31	138	1	I*2	fr01[070-071]	LW4 half diff (when slewing)
FR1_32	140	1	I*2	fr01[072-073]	ADC_TEMP
FR1_33	142	1	I*2	fr01[074-075]	LW5 half diff (when slewing)
COMP1	144	1	I*2	fr17[018-019]	Comp part1
COMP2	146	1	I*2	fr17[020-021]	Comp part2
COMP3	148	1	I*2	fr17[022-023]	Comp part3
COMP4	150	1	I*2	fr17[024-025]	Comp part4
COMP5	152	1	I*2	fr17[026-027]	Comp part5
ILLSTAT	154	1	I*2	fr17[028-029]	Ill. Status
DETHTEMP	156	1	I*2	fr17[038-039]	DET_HI_TEMP
GRPOSN	158	1	I*2	fr17[044-045]	GR_POSN
GRSTART	160	1	I*2	fr17[046-047]	GR_START
GRSTEP	162	1	I*2	fr17[048-049]	GR_STEP
GRSTEPS	164	1	I*2	fr17[050-051]	GR_STEPS
GRSCANNO	166	1	I*2	fr17[056-057]	GR_SCAN_NO
GRSCANMD	168	1	I*2	fr17[058-059]	GR_SCAN_MODE
GRLVDT	170	1	I*2	fr17[062-063]	GR_LVDT
GRMODE	172	1	I*2	fr17[064-065]	GR_MODE
GRCOIL1	174	1	I*2	fr17[066-067]	GR_COIL1
GRCOIL2	176	1	I*2	fr17[068-069]	GR_COIL2
GROUTPUT	178	1	I*2	fr17[070-071]	GR_OUTPUT
FPSELECT	180	1	I*2	fr17[072-073]	FP_SELECT
FPPOSN	182	1	I*2	fr17[074-075]	FP_POSN
FPSTART	184	1	I*2	fr17[076-077]	FP_START
FPSTEP	186	1	I*2	fr17[078-079]	FP_STEP
FPSTEPS	188	1	I*2	fr17[080-081]	FP_STEPS
FPSCANNO	190	1	I*2	fr17[086-087]	FP_SCAN_NO
FPSCANMD	192	1	I*2	fr17[088-089]	FP_SCAN_MODE
FPSPWR	194	1	I*2	fr17[090-091]	FPS_PWR
FPSERR1	196	1	I*2	fr17[096-097]	FPS_ERR1
FPSERR2	198	1	I*2	fr17[098-099]	FPS_ERR2
FPSERR3	200	1	I*2	fr17[100-101]	FPS_ERR3
FPSCURR1	202	1	I*2	fr17[102-103]	FPS_CURR1
FPSCURR2	204	1	I*2	fr17[104-105]	FPS_CURR2
FPSCURR3	206	1	I*2	fr17[106-107]	FPS_CURR3
FPLPWR	208	1	I*2	fr17[108-109]	FPL_PWR
FPLERR1	210	1	I*2	fr17[114-115]	FPL_ERR1

FPLERR2	212	1	I*2	fr17[116-117] FPL_ERR2
FPLERR3	214	1	I*2	fr17[118-119] FPL_ERR3
FPLCURR1	216	1	I*2	fr17[120-121] FPL_CURR1
FPLCURR2	218	1	I*2	fr17[122-123] FPL_CURR2
FPLCURR3	220	1	I*2	fr17[124-125] FPL_CURR3
WHSLOWNO	222	1	I*2	fr17[136-137] WH_SLOW_NO
WHPOS	224	1	I*2	fr17[148-149] WH_POSITION
WHNCOIL	226	1	I*2	fr17[150-151] WH_NCOIL
WHRCOIL	228	1	I*2	fr17[152-153] WH_RCOIL
ADCVOLTR	230	1	I*2	fr17[156-157] ADC_VOLT_REF
ADCZEROR	232	1	I*2	fr17[158-159] ADC_ZERO_REF
NSAMPLES	234	1	I*2	fr17[168-169] NSAMPLES
NRESETS	236	1	I*2	fr17[170-171] NRESETS
AOCSTIME	238	4	I*4	fr04,12,20,28[010-013] 4 AOCS TIMEs
AOCSLAYO	254	4	I*2	fr04,12,20,28[014-015] 4 AOCS LAYOUT words
AOCSQUAT	262	16	I*4	fr04,12,20,28[016-031] 4*4 AOCS I*4 quaternions
AOCSFSSY	326	4	I*2	fr04,12,20,28[034-035] 4 AOCS FSSY measurements
AOCSSTAT	334	4	I*2	fr04,12,20,28[072-073] 4 AOCS STATUS words
AOCSUSD	342	160	I*1	fr04,12,20,28[116-155] 4 AOCS 20-word USD
FILLER	502	10	I*1	Filler

3.4 General FITS Keywords for Raw Data

This section applies to Edited Raw Data files derived from ISO telemetry and to the corresponding Compact Status files.

Raw data products do not contain any keywords which involve "unsafe" processing of either instrument or AOCS telemetry (they would be introduced at the SPD stage instead, such as the "actual" attitude quaternions).

Keywords which are mandatory for (primary or binary table) FITS headers are not mentioned here and are always present. In addition, the keywords TTYPEn recommended by the binary table standard are always present, even though not mandatory.

This section therefore describes only those keywords which are (i) common to all instruments and (ii) not mandatory. Some are reserved (pre-defined) by FITS, others are special for ISO. They are all added to the primary FITS header.

The keywords beginning with "EOHA" are present only in the main science ERD files and are copied from that part of the Executed Observation History which contains general
information about an observation. Their values are all expressed in characters, even if some values are called "numbers" below.

The keywords beginning with "TREF" have the purpose of defining the relationships between the time scales used within the data (UTK/ITK) and the UTC (Earth-received time). The keywords describing Instrument Time Key are present only in main science ERD files (see ADDOLP appendix A for a full description of ISO time conventions). The LWS and PHT continuous compact status files, have an extra keyword (LWSREFUT or PHTREFUT) which gives the UTK of the first LWS or PHT format in the revolution.

The keywords beginning with "ATT" are present only in the main science ERD files and contain the "raw" information extracted from the Aperture Pointing History (APH). "ATTTYPE" is present in every such file, but the other keywords giving raster details (beginning with "ATTR") are present only if ATTTYPE = 'R'. No information about the intended timing of a raster is copied from the APH to the FITS header, because the main science ERD itself anyway has each record tagged with the raster point ID, from which the actual timing is evident. For ATTTYPE = 'T', there are no details of the raster pattern in the FITS header, and analysis software will instead have to read the APH together with the ERD.

The ISO Observation Number, which is a significant piece of information for Observers, does not have a separate keyword. However it is simply a concatenation of the values for OBSERVER, EOHAPLID, EOHAOSN, and EOHAPSN, making 20 bytes altogether. Similarly, the TDT number does not have a separate keyword; it is contained in the "value" field of FILENAME.

Because strings in a FITS header "value" appear with a length of at least 8 characters, any shorter strings are defined to be left-justified in their corresponding value fields.

The format for the descriptions is "keyword type description", where "type" is I for an integer-valued keyword, C for character, L for logical, R for real and D for double precision.

Pre-defined FITS keywords used for ISO Raw Data

DATE	C	date of creation of file (dd/mm/yy)
TIME	C	time of creation of file (hh:mm:ss)
ORIGIN	C	organisation creating file
TELESCOP	C	'ISO '
INSTRUME	C	identifier of instrument (e.g. 'CAM ')
OBSERVER	C	proposer identification (8 characters only, the key used in the ISO Mission Data Base)
OBJECT	C	target identification (as given by proposer)
EQUINOX	R	Equinox to which all attitude-related keywords as well as the AOCS data records refer. (This replaces the "deprecated" keyword EPOCH).

Added FITS Keywords used for ISO Raw Data

FILENAME	C	Product filename used at the Science Operations Centre (does not include a VMS file extension or directory specification). Format of name for ERD or Compact Status files is: - product type (4 characters) - TDT number (6 characters, of which the first three are the orbit (revolution) number - a two-character sequence number, which has the same value as EOHAOSN below. Therefore the length is 12 bytes. (FILENAME is present in the headers for all other ISO data products too, and in general can have any length between 4 and 12 bytes).
FILEVERS	C	OLP version id for this product (4 characters)
OLPVERS	C	OLP pipeline software version which generated this product
AOTVERS	C	AOT-to-OCT logic version used for this product
TMRATE	C	Data rate of telemetry from which this product was generated (16 for 16Kbps, 32 for 32Kbps).
EOHAUTCS	C	Approximate UTC of start of observation, expressed as 'yy dddhhmmss' (11 characters). File may contain data slightly earlier than this time.
EOHAUTCE	C	Approximate UTC of end of observation, expressed as 'yydddhhmmss' (11 characters). File may contain data slightly later than this time.

EOHAAOTN	C	AOT name: 4 characters containing a string which identifies the AOT used by the proposer to generate this observation. For calibration language observations the value is 'x99'.
EOHAPLID	C	Proposal ID (up to 8 characters assigned by proposer).
EOHAOSN	C	Observation Sequence Number within a proposal (which generated multiple observations); 2 characters.
EOHAPSN	C	Pointing Sequence Number (currently not used).
EOHAPCAT	C	Proposal Category (1 character)
EOHACIND	C	Calibration Indicator (1 character)
EOHASCAT	C	Target type (3 characters)
TREFUTK	I	The time of an arbitrary telemetry format during the observation, expressed in terms of the "uniform time key" of ISO data analysis; will be divisible by 48 because it refers to the start of that format.
TREFUTC1	I	The universal time (UTC) corresponding with TREFUTK, truncated to a whole number of sec onds after the beginning of the year 1989. (Leap seconds are not counted, i.e. the value is exactly divisible by 86400 at midnight UTC).
TREFUTC2	I	The remaining fraction of a second that had been truncated from the preceding UTC value, in units of 10**-7 seconds.
TREFITK	I	The Instrument Time Key value corresponding to TREFUTK and TREFUTC1/2.
TREFITKU	D	The duration, in seconds, of one unit of the Instrument Time Key. (Units of ITK depend on INSTRUME and should not vary during the mission).
ATTUTCSL	C	UTC of start of slew to intended target, in the format "yydddhhmmss".
ATTUTCS	C	UTC of arrival at intended target (on-target flag set) in the format "yydddhhmmss". (Should be close in value to EOHAUTCS). If the observation contains micro-slews (e.g. SWS slit changes), only the first arrival at the target is recorded here.
ATTOTFTH	R	On-target flag threshold (arc secs).
ATTRA	D	Intended Right Ascension of instrument viewing direction in degrees. For SWS it refers to whichever of the three entrance slits is in use. If ATTTYPE = 'R' or 'T', it refers to the centre of the raster pattern.
ATTDEC	D	Intended declination in degrees corresponding to ATTRA.
ATTTYPE	C	Type of attitude operation:

		- 'P' for fine pointing - 'R' for a raster pointing - 'T' for solar system tracking.
ATTRNPTS	I	Number of points per line of the raster.
ATTRNLNS	I	Number of lines in whole raster pointing.
ATTRDPTS	I	Distance (in arc secs) between adjacent points.
ATTRDLNS	I	Distance (in arc secs) between adjacent lines.
ATTRORIE	I	Orientation flag (0 or 1).
ATTRROTA	R	Rotation of raster pattern (in degrees).
ATTGUIDE	I	Guide star reference number (referring to the Guide Star Catalogue used at the Science Operations Centre).
ATTSAANG	R	Solar aspect angle (degrees).
ATTERROR	I	Contingency flag; normally set to 0, but a value 1 means that the target was not successfully acquired.
ATTHIGHP	L	High precision pointing mode ?

3.5 Edited Observation Histories

PRODUCT TYPE: EOHA : Attributes of instantiated Obs.

FIELD	OFF	NUM	TYPE	DESCRIPTION (REC LENGTH: 160)
EOHATDTN	0	1	C*6	TDT number
EOHAUTCS	6	1	C*11	UTC start of observation (yydddhhmmss)
EOHAUTCE	17	1	C*11	UTC end of observation (yydddhhmmss)
EOHAINST	28	1	C*1	Prime instrument ID
EOHANCPU	29	1	C*1	# CAM peak-ups (obsolete) Field is always 0
EOHARES	30	1	C*14	Reserved
EOHAAOTN	44	1	C*4	AOT name
EOHAPRID	48	1	C*8	Proposer ID
EOHAPLID	56	1	C*8	Proposal ID
EOHAOSN	64	1	C*2	Observation Sequence Number (OSN)
EOHAPSN	66	1	C*2	Pointing Sequence Number (PSN) (obsolete) Field is always 0
EOHAPCAT	68	1	C*1	Proposal category
EOHACIND	69	1	C*1	Calibration indicator
EOHATNAM	70	1	C*16	Target name
EOHASCAT	86	1	C*3	Scientific category
EOHALIND	89	1	C*2	Link indicator
EOHASPAR	91	1	C*5	Spare area within observ. description
EOHAAOTV	96	1	C*64	AOT/COT variable info (instr.specific)

PRODUCT TYPE: EOHI : Information unconnected to a whole AOT

FIELD	OFF	NUM	TYPE	DESCRIPTION (REC LENGTH: 88)
EOHITDTN	0	1	C*6	TDT number
EOHIOSN	6	1	C*2	Observation Sequence Number (OSN)
EOHIUTC	8	1	C*11	UTC of sending associated ICS (yydddhhmmss)
EOHIINST	19	1	C*2	Prime instrument ID, followed by instrument aperture
EOHITDTC	21	1	C*3	TDT Component part
EOHIMSG1	24	1	C*64	AOT specific information on ICS level

PRODUCT TYPE: EOHC : Continuous Executed Observation History

FIELD	OFF	NUM	TYPE	DESCRIPTION (REC LENGTH: 160)
EOHCTDTN	0	1	C*6	TDT number
EOHCUTCS	6	1	C*11	UTC start of observation (yydddhhmmss)
EOHCUTCE	17	1	C*11	UTC end of observation (yydddhhmmss)
EOHCINST	28	1	C*1	Prime instrument ID
EOHCNCPU	29	1	C*1	Obsolete column carried over from EOHA

EOHCRES	30	1	C*14	Reserved
EOHCAOTN	44	1	C*4	AOT name
EOHCPRID	48	1	C*8	Proposer ID
EOHCPLID	56	1	C*8	Proposal ID
EOHCOSN	64	1	C*2	Observation Sequence Number (OSN)
EOHCPSN	66	1	C*2	Obsolete column carried over from EOHA
EOHCPCAT	68	1	C*1	Proposal category
EOHCCIND	69	1	C*1	Calibration indicator
EOHCTNAM	70	1	C*16	Target name
EOHCSCAT	86	1	C*3	Scientific category
EOHCLIND	89	1	C*2	Link indicator
EOHCSPAR	91	1	C*5	Spare area within observ. description
EOHCAOTV	96	1	C*64	AOT/COT variable info (instr.specific)

3.6 Instrument Station Reports

Each instrument has an instrument station report with the name xISR where x=C,L,P or S. The files consist of a set of header records which contain details from the processing of the instrument stations.

4 AUXILLIARY FILES

4.1 General Introduction

These files describe the operations of the spacecraft itself rather then the performance of the instruments.

4.2 Attitude files

There are two types of attitude information available to ISO users :

1. the intended pointing direction(s); and
2. the subsequent history of the instantaneous attitude against time

A set of keywords inserted at the ERD level and SPD level gives a single intended reference pointing direction for each observation. In practice, due to the execution of a raster or some other maneouvre, an observation may entail several different reference pointings. While these may be derived from entries in the Aperture Pointing History available in the APPH file, some detailed work is required. This is also the case for the series of instantaneous measurements of the attitude coded in the AOCS telemetry. Therefore, two attitude products are derived at the SPD level, namely the

* IRPH or Instrument Reference Pointing History

* IIPH or Instrument Instantaneous Pointing History

Both cover the same period of time as the SPD. The IRPH contains all the reference pointing positions that apply to the observation along with a raster-point ID, that is set to (1,1) for pointed observations. These are the positions on the sky at which the instrument was pointed without taking into account any drifts with time. The IIPH gives the pointing direction of the instrument as a function of time. The APPH and AOCS used to generate the IRPH and IIPH files are not distributed to observers.

Both the IRPH and IIPH contain the quaternions used to calculate the pointing position to enable the observer to verify the attitude should the need arise. Appendix A shows how to reconstruct the attitude. The STR/QSS misalignment, and its corresponding quaternion, is subject to change due to thermal effects and thus is planned to be recalibrated at the beginning of each revolution. It may also be subject to change during a revolution, causing an instrument's pointing direction to drift. Although it will not be possible to estimate the magnitude of any such drift in routine operations, detailed future analysis of high-resolution CAM data may allow the overall drift to be estimated. The IIPH columns RA, DEC and ROLL contain, wherever possible, the corresponding quantities used by the AOCS control law. This is an estimate of the current pointing direction based on a recent star-tracker, gyro and other measurements that is expected to be the most accurate available. It is signalled by FILTER=1.

Two files called CRPH and CIPH are produced for CAM parallel observations. They have a similar format to the IRPH and IIPH files but give the attitude for the CAM instrument when it is operating in a parallel role.

The IFPG file describes the focal plane geometry giving the disposition of each instrument aperture.

The IIPH and IRPH files contain the following header keywords, specified in **AUX.INC**

INSTRUME	C	Instrument identifier
ATTRA	D	Intended Instrument J2000 Right Ascension (deg)
ATTDEC	D	Intended Instrument J2000 Declination (deg)
ATTTYPE	C	Type of attitude operation
ATTOTFTH	R	On-target threshold (arcsec)
ATTRNPTS	I	Number of points per raster line
ATTRNLNS	I	Number of raster lines
ATTRDPTS	I	Distance between adjacent points (arcsec)
ATTRDLNS	I	Distance between adjacent lines (arcsec)
ATTRORIE	I	Raster orientation flag (0 or 1)
ATTRROTA	R	Rotation of raster pattern (deg)
ATTGUIDE	I	Guide star reference number
ATTSAANG	R	Solar aspect angle (deg)
ATTERROR	I	(0=OK, 1=target not acquired, 2=No STR/QSS misalignment)
ATTMISQ1	D	STR/QSS misalignment quaternion Q(1)
ATTMISQ2	D	STR/QSS misalignment quaternion Q(2)
ATTMISQ3	D	STR/QSS misalignment quaternion Q(3)
ATTMISQ4	D	STR/QSS misalignment quaternion Q(4)
ATTINSQ1	D	QSS/Instrument alignment quaternion Q(1)
ATTINSQ2	D	QSS/Instrument alignment quaternion Q(2)
ATTINSQ3	D	QSS/Instrument alignment quaternion Q(3)
ATTINSQ4	D	QSS/Instrument alignment quaternion Q(4)
INSTRA	D	Reference instrument J2000 right ascension (deg)
INSTDEC	D	Reference instrument J2000 declination (deg)
INSTROLL	D	Reference instrument J2000 roll angle (deg)
CINSTRA	D	Corrected reference instrument J2000 right ascension (deg)
CINSTDEC	D	Corrected reference instrument J2000 Declination (deg)
CINSTROL	D	Corrected reference instrument J2000 roll angle (deg)

PRODUCT TYPE: IRPH : Instrument Reference Pointing History

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 216

RA0	0	1	R*8	Raster centre reference right ascension TUNIT=deg
DEC0	8	1	R*8	Raster centre reference declination TUNIT=deg
ROLL0	16	1	R*8	Raster centre reference roll angle TUNIT=deg
SPARE	24	1	I*1	Spare space
TYPE	25	1	C*1	Type of pointing operation
RPID	26	2	I*1	Raster-pointer ID
UTC	28	1	I*4	Expected UTC of start of pointing TUNIT=s Since 1989.0
STRQ	32	4	R*8	Star-tracker quaternion
INSQ	64	4	R*8	QSS/aperture alignment quaternion
RPQ	96	4	R*8	Raster-point quaternion
RA	128	1	R*8	Uncorrected raster-point reference right ascension TUNIT=deg
DEC	136	1	R*8	Uncorrected raster-point reference declination TUNIT=deg
ROLL	144	1	R*8	Uncorrected raster-point reference roll angle TUNIT=deg
CORQ	152	4	R*8	Raster-point correction quaternion
CRA	184	1	R*8	Corrected raster-point reference right ascension TUNIT=deg
CDEC	192	1	R*8	Corrected raster-point reference declination TUNIT=deg
CROLL	200	1	R*8	Corrected raster-point reference roll angle TUNIT=deg
OTFT	208	1	R*4	On-target flag threshold TUNIT=arcsec
APERTURE	212	1	C*2	Instrument/aperture combination (e.g. 'S3')
FILLER	214	2	I*1	For alignment

HEADER KEYWORDS

Includes AUX.INC

PRODUCT TYPE: IIPH : Instrument Instantaneous Pointing History

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 200
UTK	0	1	I*4	UTK time key
UTC	4	2	I*4	UTC time key
RPID	12	2	I*1	Raster-pointer ID
APERTURE	14	1	C*2	Aperture in use
OTF	16	1	I*1	On-target flag 0=Off target 1=On target
FILTER	17	1	I*1	Attitude filter applied 0=None 1=AOCS 2=Slew gyro correction

				3=Search submode gyro correction
SPIKE	18	1	I*1	Attitude spike flag 0=OK 1=warning 2=not defined
SPARE	19	13	I*1	Spare space
ATTQ	32	4	R*8	Instantaneous attitude quaternion
RA	64	1	R*8	Right ascension TUNIT=deg
DEC	72	1	R*8	Declination TUNIT=deg
ROLL	80	1	R*8	Roll angle TUNIT=deg
CORQ	88	4	R*8	Correction quaternion
CRA	120	1	R*8	Corrected right ascension TUNIT=deg
CDEC	128	1	R*8	Corrected declination TUNIT=deg
CROLL	136	1	R*8	Corrected roll angle TUNIT=deg
STRQ	144	4	R*8	Instantaneous star-tracker quaternion
XRA	176	1	R*8	Instantaneous right ascension TUNIT=deg
XDEC	184	1	R*8	Instantaneous declination TUNIT=deg
XROLL	192	1	R*8	Instantaneous roll angle TUNIT=deg

HEADER KEYWORDS

Includes AUX.INC

PRODUCT TYPE: CRPH : CAM Reference Pointing History

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 216
RA0	0	1	R*8	Raster centre reference right ascension TUNIT=deg
DEC0	8	1	R*8	Raster centre reference declination TUNIT=deg
ROLL0	16	1	R*8	Raster centre reference roll angle TUNIT=deg
SPARE	24	1	I*1	Spare space
TYPE	25	1	C*1	Type of pointing operation
RPID	26	2	I*1	Raster-pointer ID
UTC	28	1	I*4	Expected UTC of start of pointing TUNIT=s Since 1989.0
STRQ	32	4	R*8	Star-tracker quaternion
INSQ	64	4	R*8	QSS/aperture alignment quaternion
RPQ	96	4	R*8	Raster-point quaternion
RA	128	1	R*8	Uncorrected raster-point reference right ascension TUNIT=deg
DEC	136	1	R*8	Uncorrected raster-point reference declination TUNIT=deg
ROLL	144	1	R*8	Uncorrected raster-point reference roll angle TUNIT=deg
CORQ	152	4	R*8	Raster-point correction quaternion

CRA	184	1	R*8	Corrected raster-point reference right ascension TUNIT=deg
CDEC	192	1	R*8	Corrected raster-point reference declination TUNIT=deg
CROLL	200	1	R*8	Corrected raster-point reference roll angle TUNIT=deg
OTFT	208	1	R*4	On-target flag threshold TUNIT=arcsec
APERTURE	212	1	C*2	ISOCAM focal-plane aperture (e.g. 'C1')
PRIME	214	1	C*2	Prime instrument focal-plane aperture (e.g. 'S3')

HEADER KEYWORDS

Includes AUX.INC

PRODUCT TYPE: CIPH : CAM Instantaneous Pointing History

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 200
UTK	0	1	I*4	UTK time key	
UTC	4	2	I*4	UTC time key	
RPID	12	2	I*1	Raster-pointer ID	
APERTURE	14	1	C*2	ISOCAM focal-plane aperture	
PRIME	16	1	C*2	Prime instrument focal-plane aperture (e.g. 'S3')	
OTF	18	1	I*1	On-target flag 0=Off target 1=On target	
FILTER	19	1	I*1	Attitude filter applied 0=None 1=AOCS 2=Slew gyro correction 3=Search submode gyro correction	
SPIKE	20	1	I*1	Attitude spike flag 0=OK 1=warning 2=not defined	
SPARE	21	11	I*1	Spare space	
ATTQ	32	4	R*8	Instantaneous attitude quaternion	
RA	64	1	R*8	Right ascension TUNIT=deg	
DEC	72	1	R*8	Declination TUNIT=deg	
ROLL	80	1	R*8	Roll angle TUNIT=deg	
CORQ	88	4	R*8	Correction quaternion	
CRA	120	1	R*8	Corrected right ascension TUNIT=deg	
CDEC	128	1	R*8	Corrected declination TUNIT=deg	
CROLL	136	1	R*8	Corrected roll angle TUNIT=deg	
STRQ	144	4	R*8	Instantaneous star-tracker quaternion	
XRA	176	1	R*8	Instantaneous right ascension TUNIT=deg	
XDEC	184	1	R*8	Instantaneous declination	

				TUNIT=deg
XROLL	192	1	R*8	Instantaneous roll angle TUNIT=deg

HEADER KEYWORDS

Includes AUX.INC

PRODUCT TYPE: IFPG : ISO Focal Plane Geometry

FIELD	OFF	NUM	TYPE	DESCRIPTION REC LENGTH: 32
SPARE	0	17	I*1	Spare
INSTID	17	1	C*1	Instrument ID (C,L,P,S)
APERTID	18	1	I*2	Aperture ID (1/2/3)
DY	20	1	R*4	Aperture Y-offset with respect to QSS TUNIT=arcmin
DZ	24	1	R*4	Aperture Z-offset with respect to QSS TUNIT=arcmin
REV	28	1	I*4	Revolution during which the offsets were measured -1 = EE1 tests -2 = EE2 tests

PRODUCT TYPE: APPH : Aperture Pointing History

FIELD	OFF	NUM	TYPE	DESCRIPTION REC LENGTH: 168
SLEWSTA	0	2	I*4	Start time of slew to target (Seconds since 1989.0 (UTC) followed by remaining fraction of se cond)
SLEWEND	8	2	I*4	End time of slew to target Seconds since 1989.0 (UTC)
RA	16	1	R*8	R.A. of intended view direction TUNIT=degrees
DEC	24	1	R*8	DEC of intended view direction TUNIT=degrees
OTFTHRES	32	1	R*4	On-target flag threshold TUNIT=arcsecs TDISP=F5.1
INSTID	36	1	C*1	Instrument ID (C,L,P,S)
REQTYPE	37	1	C*1	Type of request 'P'ointing, 'R'aster or 'T'racking
APERTID	38	1	I*2	Aperture ID { 0 | 1 | 2 | 3 | 4 }
NGRID	40	1	I*2	Number of grid points on a scan From 1 to 32, TDISP=I2
NRASTER	42	1	I*2	Number of lines in the raster From 1 to 32, TDISP=I2
TSLEW1	44	1	I*2	Time to slew and dwell on 1st point TUNIT=seconds Unsigned Integer - TZERO=32768.0
TSLEW2	46	1	I*2	Ditto for a point on the current line TUNIT=seconds Unsigned Integer - TZERO=32768.0
TSLEW3	48	1	I*2	Ditto for 1st point on next line TUNIT=seconds Unsigned Integer - TZERO=32768.0
SCANDIST	50	1	I*2	Dist. between points on a scan line (units are usually arcseconds but if

				REQTYPE='T' then scandist is defined in units of 0.01 arcseconds)
LINEDIST	52	1	I*2	Dist. between scan lines TUNIT=arcsecs
ORIENT	54	1	I*1	Orientation raster flag 0=Raster at an angle ROTATE to North 1=Raster starts parallel to the S/C Y-axis
SPARE	55	5	I*1	Spare
ROTATE	60	1	R*4	Rotation of raster pattern 0<ROTATE<360 TUNIT=degrees TDISP=F5.1
QSSQUAT	64	4	R*8	QSS quaternion for the intended viewing direction. Refers to raster centre if REQTYPE i s R or T TDISP=E14.7
MISQUAT	96	4	R*8	QSS/star tracker misalignment quaternion TDISP=E14.7
STARVEC	128	3	R*8	Guide star unit vector TDISP=E14.7
REFSTAR	152	1	I*4	Guide star ref no in catalogue TDISP=I6
SOLASPCT	156	1	R*4	Solar aspect angle TUNIT=degrees TDISP=F5.1
RPEAMP	160	1	R*4	RPE amplitude TUNIT=arcsecs TDISP=F5.1
ATTCONT	164	1	I*1	Attitude continuation flag 1=different aperture but same instru ment and target as previous record 0=otherwise TDISP=I1
CONTINGE	165	1	I*1	Contingency flag 0=no contingency 1=target attitude not acquired 2=no QSS/STR misalignment available TDISP=I1
SPARE2	166	2	I*1	Spare

HEADER KEYWORDS

TSTART	C	Start time of interval covered by file Expressed as YYDDDHHMMSS
TSTOP	C	End time of interval covered by file Expressed as YYDDDHHMMSS
GENTIM	C	Time of generation of this file Expressed as YYDDDHHMMSS
REVNUM	I	Revolution number
APHVERS	I	APH version number

PRODUCT TYPE: ISTR : ISO star-tracker calibration data

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 80
F	0	1	R*8	Focal length TUNIT=m
DFY	8	1	R*8	Focal length fractional error

				Y-component
DFZ	16	1	R*8	Focal length fractional error Z-component
X10	24	1	R*8	FSS-Z misalignment parameter
DX10	32	1	R*8	FSS-Z misalignment parameter error equivalent angle TUNIT=arcsec
STRX	40	1	R*8	STR-X misalignment TUNIT=deg
DSTRX	48	1	R*8	STR-X misalignment error TUNIT=arcsec
REV	56	1	I*4	Revolution after which the measurements apply
UTC	60	1	I*4	UTC after which the measurements apply TUNIT=s Since 1989.0
SPARE	64	16	I*1	Spare space

PRODUCT TYPE: APHSTAR : ISO operational guide-star list

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 32
REFNUM	0	1	I*4	ISO guide-star catalogue reference number	
TYC	4	2	I*2	Tycho Catalogue identifier (TYC(3)=1)	
HIP	8	1	I*4	Hipparchos Catalogue identifier TNULL=0	
VMAG	12	1	R*4	V magnitude TUNIT=mag	
PMOTION	16	2	I*4	Proper motion TUNIT=arcsec/yr TSCAL=1d-5 TZERO=0 TNULL=-987654321	
PARALLAX	24	1	I*4	Trigonometric parallax TUNIT=arcsec TSCAL=1d-5 TZERO=0 TNULL=-987654321	
SPARE	28	4	I*1	Spare space	

PRODUCT TYPE: HIPPARCHOS : ISO guide-star Hipparchos catalogue data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 360
H1	0	1	I*4	Identifier (HIP number)	
H3	4	1	C*12	Identifier RA(J1991.25) TUNIT="h m s"	
H4	16	1	C*12	Identifier Dec(J1991.25) TUNIT="d m s"	
H5	28	1	R*4	Johnson V magnitude TUNIT=mag	
H8	32	1	R*8	alpha(J1991.25) TUNIT=degrees	
H9	40	1	R*8	delta(J1991.25) TUNIT=degrees	
H11	48	1	R*8	Trigonometric parallax TUNIT=mas	

H12	56	1	R*8	mu_alpha* TUNIT=mas/yr
H13	64	1	R*8	mu_delta TUNIT=mas/yr
H14	72	1	R*8	Standard error in alpha(J1991.25) TUNIT=mas
H15	80	1	R*8	Standard error in delta(J1991.25) TUNIT=mas
H16	88	1	R*8	Standard error in pi TUNIT=mas
H17	96	1	R*8	Standard error in mu_alpha* TUNIT=mas/yr
H18	104	1	R*8	Standard error in mu_delta TUNIT=mas/yr
H19	112	1	R*4	Correlation: alpha*/delta
H20	116	1	R*4	Correlation: alpha*/pi
H21	120	1	R*4	Correlation: delta/pi
H22	124	1	R*4	Correlation: alpha*/mu_alpha*
H23	128	1	R*4	Correlation: delta/mu_alpha*
H24	132	1	R*4	Correlation: pi/mu_alpha*
H25	136	1	R*4	Correlation: alpha*/mu_delta
H26	140	1	R*4	Correlation: delta/mu_delta
H27	144	1	R*4	Correlation: pi/mu_delta
H28	148	1	R*4	Correlation: mu_alpha*/mu_delta
H29	152	1	I*4	Data points rejected TUNIT=per cent
H30	156	1	R*4	F2(goodness-of-fit)
H31	160	1	I*4	HIP number
H32	164	1	R*4	BT TUNIT=mag
H33	168	1	R*4	sigma(BT) TUNIT=mag
H34	172	1	R*4	VT TUNIT=mag
H35	176	1	R*4	sigma(VT) TUNIT=mag
H37	180	1	R*4	B-V TUNIT=mag
H38	184	1	R*4	sigma(B-V) TUNIT=mag
H40	188	1	R*4	V-I TUNIT=mag
H41	192	1	R*4	sigma(V-I) TUNIT=mag
H44	196	1	R*4	median(Hp) TUNIT=mag
H45	200	1	R*4	sigma(Hp) TUNIT=mag
H46	204	1	R*4	Scatter TUNIT=mag
H47	208	1	I*4	Number of accepted transits
H49	212	1	R*4	Magnitude at maximum Hp (5th percentile) TUNIT=mag
H50	216	1	R*4	Magnitude at minimum Hp (95th percentile) TUNIT=mag
H51	220	1	R*4	Period TUNIT=days
H63	224	1	I*4	Position angle TUNIT=degrees
H64	228	1	R*4	Angular separation TUNIT=arcsec
H65	232	1	R*4	sigma(separation)

				TUNIT=arcsec
H66	236	1	R*4	delta(Hp)
				TUNIT=mag
H67	240	1	R*4	sigma(delta(Hp))
				TUNIT=mag
H75	244	1	R*4	V-I used for reductions
				TUNIT=mag
H0	248	1	C*1	Catalogue (H = Hipparcos)
H2	249	1	C*1	Proximity flag
H6	250	1	C*1	Coarse variability flag
H7	251	1	C*1	Source of magnitude identifier
H10	252	1	C*1	Reference flag for astrometry
H36	253	1	C*1	Reference flag for BT and VT
H39	254	1	C*1	Source of B-V
H42	255	1	C*1	Source of V-I
H43	256	1	C*1	Reference flag for colour indices
H48	257	1	C*1	Reference flag for photometry
H52	258	1	C*1	Flag (variability type)
H53	259	1	C*1	Flag (variability tables)
H54	260	1	C*1	Flag (light curves)
H55	261	1	C*10	CCDM Identifier
H56	271	1	C*1	Historical status flag
H57	272	1	I*1	Number of catalogue entries
H58	273	1	I*1	Number of components
H59	274	1	C*1	Double/Multiple Systems Annex flag
H60	275	1	C*1	Astrometric source flag
H61	276	1	C*1	Solution quality
H62	277	1	C*2	Component identifiers
H68	279	1	C*1	Survey flag
H69	280	1	C*1	Chart flag
H70	281	1	C*1	Notes flag
H71	282	1	C*6	HD identifier
H72	288	1	C*10	DM (BD) identifier
H73	298	1	C*10	DM (CoD) identifier
H74	308	1	C*10	DM (CPD) identifier
H76	318	1	C*12	Spectral type
H77	330	1	C*1	Source of spectral type
SPARE	331	29	C*1	Spare space

HEADER KEYWORDS

CREATOR	C	Task which created the file (e.g. 'OLP_CREATE v1.0')
CALIBRAT	C	Calibration Data release = 'CAL-G v5.6'
DATE	C	Date of file creation (yyyy-mm-dd)
TIME	C	Time of file creation (hh:mm:ss)
XTENSION	C	Extension type = 'BINTABLE'
EXTNAME	C	Extension name = 'Hiiparchos Catalogue data for ISO Guide Star
RADECSYS	C	Coordinate reference frame = 'ICRS'
EQUINOX	R	Coordinate epoch = 1991.25

PRODUCT TYPE: TYCHO : ISO guide-star Tycho catalogue data

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 300
T1	0	3	I*2	TYC identifier
T0	6	1	C*1	Catalogue (T = Tycho)
T2	7	1	C*1	Proximity flag
T3	8	1	C*12	Identifier RA(J1991.25)
				TUNIT="h m s"

```
T4          20    1 C*12 Identifier Dec(J1991.25)
                         TUNIT="d m s"
T5          32    1 R*4  Johnson V magnitude
                         TUNIT=mag
T6          36    1 C*4  Blank
T8          40    1 R*8  alpha(J1991.25)
                         TUNIT=degrees
T9          48    1 R*8  delta(J1991.25)
                         TUNIT=degrees
T11         56    1 R*8  Trigonometric parallax
                         TUNIT=mas
T12         64    1 R*8  mu_alpha*
                         TUNIT=mas/yr
T13         72    1 R*8  mu_delta
                         TUNIT=mas/yr
T14         80    1 R*8  Standard error in alpha(J1991.25)
                         TUNIT=mas
T15         88    1 R*8  Standard error in delta(J1991.25)
                         TUNIT=mas
T16         96    1 R*8  Standard error in pi
                         TUNIT=mas
T17        104    1 R*8  Standard error in mu_alpha*
                         TUNIT=mas/yr
T18        112    1 R*8  Standard error in mu_delta
                         TUNIT=mas/yr
T19        120    1 R*4  Correlation: alpha*/delta
T20        124    1 R*4  Correlation: alpha*/pi
T21        128    1 R*4  Correlation: delta/pi
T22        132    1 R*4  Correlation: alpha*/mu_alpha*
T23        136    1 R*4  Correlation: delta/mu_alpha*
T24        140    1 R*4  Correlation: pi/mu_alpha*
T25        144    1 R*4  Correlation: alpha*/mu_delta
T26        148    1 R*4  Correlation: delta/mu_delta
T27        152    1 R*4  Correlation: pi/mu_delta
T28        156    1 R*4  Correlation: mu_alpha*/mu_delta
T29        160    1 I*4  Data points rejected
                         TUNIT=per cent
T30        164    1 R*4  F2(goodness-of-fit)
T31        168    1 I*4  HIP number
                         TNULL=0
T32        172    1 R*4  BT
                         TUNIT=mag
T33        176    1 R*4  sigma(BT)
                         TUNIT=mag
T34        180    1 R*4  VT
                         TUNIT=mag
T35        184    1 R*4  sigma(VT)
                         TUNIT=mag
T37        188    1 R*4  B-V
                         TUNIT=mag
T38        192    1 R*4  sigma(B-V)
                         TUNIT=mag
T41        196    1 R*4  S/N ratio
                         TUNIT=mag
T44        200    1 R*4  V(T) scatter
                         TUNIT=mag
T45        204    1 R*4  Magnitude at maximum VT (5th
                         percentile)
                         TUNIT=mag
T46        208    1 R*4  Magnitude at minimum VT (95th
                         percentile)
                         TUNIT=mag
T7         212    1 C*1  Source of magnitude identifier
T10        213    1 C*1  Reference flag for astrometry
```

```
T36         214    1 C*1  Reference flag for BT and VT
T40         215    1 I*1  Astrometric quality flag
T42         216    1 C*1  Source of astrometric data
T43         217    1 I*1  N(photom)
T47         218    1 C*1  Variability (from GCVS/NSV)
T48         219    1 C*1  Variability (from Tycho)
T49         220    1 C*1  Duplicity (from Tycho)
T50         221    1 C*1  Flag (epoch data)
T51         222    1 C*2  CCDM component Identifier
T52         224    1 I*4  PPM identifier
T53         228    1 I*4  HD identifier
T54         232    1 C*10 DM (BD) identifier
T55         242    1 C*10 DM (CoD) identifier
T56         252    1 C*10 DM (CPD) identifier
T57         262    1 C*1  Notes flag
T39         263    1 C*1  Blank
SPARE       264   36 I*1  Spare space
```

HEADER KEYWORDS

```
CREATOR  C  Task which created the file (e.g. 'OLP_CREATE
            v1.0')
CALIBRAT C  Calibration Data release = 'CAL-G v5.6'
DATE     C  Date of file creation (dd/mm/yy)
TIME     C  Time of file creation (hh:mm:ss)
XTENSION C  Extension type = 'BINTABLE'
EXTNAME  C  Extension name = 'Tycho Catalogue data for ISO
            Guide Stars'
RADECSYS C  Coordinate reference frame = 'ICRS'
EQUINOX  R  Coordinate epoch = 1991.25
```

In the IRPH file a fine pointing is considered as a 1 by 1 raster as far as the structure of the file is concerned. The UTC column is mainly present in order to distinguish N possible pointings within one observation (e.g. for 3 SWS slits).

4.3 The Orbit History

PRODUCT TYPE: ORBIT : Compressed orbit file					
FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 80
ORBITDAT	0	1	C*80	Orbit parameters (composite structure)	

The orbit history file is written in a manner which does not translate readily into FITS. The FITS representation here contains all the necessary information to reconstitute the orbital parameters of the satellite, but to do so the subroutine ORBIT must be obtained from flight dynamics at ESOC. A description of the original contents and format of the file may be found in ICD10.

4.4 OLP Reports

Each observation is checked before distribution to determine whether the observation has been performed successfully and to check that the data has been processed correctly by the ISO OLP pipeline. Any anomolies will be described in a file called an OLP report. There is a separate OLP report for each instrument, the files are called, COLR, LOLR, POLR and SOLR. These files just contain header records.

5 CALIBRATION FILES

5.1 General Introduction

This section describes instrument calibration files which are relevant to the whole mission. These are commonly known as CAL_G files. Calibration files are also generated per observation during the DERIVE_SPD and AUTO_ANALYSIS phases of the pipeline processing. These files are known as CAL_A and CAL_B respectively and are included in the DERIVE_SPD and AUTO_ANALYSIS sections of this document.

Some of the aspects of the instrumental calibration have changed during the course of the mission. In these cases, two or more files, with different validity periods, are used to describe the instrument response. These files are marked with an asterix in Appendix C.
The periods of validity of these files are defined in further files called xTIMEDEP. Currently only PHT and SWS use time dependent files and hence only PTIMEDEP and STIMEDEP exist.

5.2 CAM Calibration files

Many CAM calibration files include the following keywords specified in CCAL_HEAD.INC.

```
CREATOR         C  Task which created the file (e.g. CFDP 1.0)
CALIBRAT        C  Calibration data release (e.g. 'CCD v0.3')
DATE            C  Date of file creation (dd/mm/yy)
TIME            C  Time of file creation (hh:mm:ss)
TELESCOP        C  'ISO'
INSTRUME        C  'CAM'
CHANNEL         C  ('LW' or 'SW')
```

PRODUCT TYPE: CSCGCROSS : CAM SW noise/cross talk decorrelation matrices

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8704
COR33	0	1088	R*4	Decorrelation coefficients, column 33	
COR34	4352	1088	R*4	Decorrelation coefficients, column 34	

HEADER KEYWORDS

```
CREATOR  C  Task which created the file (e.g. 'CFDP 1.0')
CALIBRAT C  Calibration data release (e.g. 'CCD v0.3')
EXTNAME  C  Extension name = 'CSCGCROSS'
```

PRODUCT TYPE: CCGSWDARK : CAM SW Dark Current Exposure Library

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8600
SPARE	0	36	I*1	Spare space	
TINT	36	1	I*2	Integration time TUNIT=CAMTU	
EWHL	38	1	I*2	Entrance wheel step number	
SWHL	40	1	I*2	Selection wheel step number	
GAIN	42	1	I*1	Electronics gain	
OFFSET	43	1	I*1	Electronics offset	
TEMPERAT	44	10	R*4	mean temperature TUNIT=K	
TRMS	84	10	R*4	RMS temperature TUNIT=K	
TMIN	124	10	R*4	minimum temperature TUNIT=K	
TMAX	164	10	R*4	maximum temperature TUNIT=K	
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV	
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV	
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV	
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV	
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32	
NAXIS	368	1	I*4	No of image axes in ARRAY = 3	
NAXIS1	372	1	I*4	No of axis 1 pixels = 32	
NAXIS2	376	1	I*4	No of axis 2 pixels = 32	
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }	
BSCALE	384	1	R*4	ARRAY scaling factor	
BZERO	388	1	R*4	ARRAY zero value	
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined	
BUNIT	396	1	C*12	Units of data in ARRAY	
ARRAY	408	2048	I*4	SW detector dark current rate and error coded values	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWDFLT : CAM SW Detector Flat Field Library

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8600
SPARE	0	32	I*1	Spare space	
FCVF	32	1	I*2	Filter wheel step number	
PFOV	34	1	I*2	Lens wheel step number	
TINT	36	1	I*2	Integration time TUNIT=CAMTU	
EWHL	38	1	I*2	Entrance wheel step number	
SWHL	40	1	I*2	Selection wheel step number	
GAIN	42	1	I*1	Electronics gain	
OFFSET	43	1	I*1	Electronics offset	
TEMPERAT	44	10	R*4	mean temperature	

				TUNIT=K
TRMS	84	10	R*4	RMS temperature TUNIT=K
TMIN	124	10	R*4	minimum temperature TUNIT=K
TMAX	164	10	R*4	maximum temperature TUNIT=K
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	368	1	I*4	No of image axes in ARRAY = 3
NAXIS1	372	1	I*4	No of axis 1 pixels = 32
NAXIS2	376	1	I*4	No of axis 2 pixels = 32
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }
BSCALE	384	1	R*4	ARRAY scaling factor
BZERO	388	1	R*4	ARRAY zero value
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	396	1	C*12	Units of data in ARRAY
ARRAY	408	2048	I*4	SW detector flat field rate & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWOFLT : CAM SW Optical Flat Field Library

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 8600
SPARE	0	32	I*1	Spare space
FCVF	32	1	I*2	Filter wheel step number
PFOV	34	1	I*2	Lens wheel step number
TINT	36	1	I*2	Integration time TUNIT=CAMTU
EWHL	38	1	I*2	Entrance wheel step number
SWHL	40	1	I*2	Selection wheel step number
GAIN	42	1	I*1	Electronics gain
OFFSET	43	1	I*1	Electronics offset
TEMPERAT	44	10	R*4	mean temperature TUNIT=K
TRMS	84	10	R*4	RMS temperature TUNIT=K
TMIN	124	10	R*4	minimum temperature TUNIT=K
TMAX	164	10	R*4	maximum temperature TUNIT=K
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV
VMAX	324	10	R*4	maximum bias voltage

				TUNIT=mV
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	368	1	I*4	No of image axes in ARRAY = 3
NAXIS1	372	1	I*4	No of axis 1 pixels = 32
NAXIS2	376	1	I*4	No of axis 2 pixels = 32
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }
BSCALE	384	1	R*4	ARRAY scaling factor
BZERO	388	1	R*4	ARRAY zero value
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	396	1	C*12	Units of data in ARRAY
ARRAY	408	2048	I*4	SW optical flat field rate & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWDEAD : CAM SW Dead Pixel Map

NAXIS : 2 **TYPE :** I*1 **UNITS :** NONE (0=LIVE,1=DEAD)

AXIS No.	LENGTH	DESCRIPTION
1	32	SW detector axis 1 (by convention Y)
2	32	SW detector axis 2 (by convention Z)

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWGLITCH : CAM SW Glitch Model

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 40
SPARE	0	40	I*1	Spare space	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWPSF : CAM SW Point-Spread-Function Library

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8600
SPARE	0	24	I*1	Spare space	
CRPIX1	24	1	R*4	Reference pixel on axis 1 = Source position	
CRPIX2	28	1	R*4	Reference pixel on axis 2 = Source position	
FCVF	32	1	I*2	Filter wheel step number	
PFOV	34	1	I*2	Lens wheel step number	
TINT	36	1	I*2	Integration time TUNIT=CAMTU	
EWHL	38	1	I*2	Entrance wheel step number	

SWHL	40	1	I*2	Selection wheel step number
GAIN	42	1	I*1	Electronics gain
OFFSET	43	1	I*1	Electronics offset
TEMPERAT	44	10	R*4	mean temperature TUNIT=K
TRMS	84	10	R*4	RMS temperature TUNIT=K
TMIN	124	10	R*4	minimum temperature TUNIT=K
TMAX	164	10	R*4	maximum temperature TUNIT=K
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	368	1	I*4	No of image axes in ARRAY = 3
NAXIS1	372	1	I*4	No of axis 1 pixels = 32
NAXIS2	376	1	I*4	No of axis 2 pixels = 32
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }
BSCALE	384	1	R*4	ARRAY scaling factor
BZERO	388	1	R*4	ARRAY zero value
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	396	1	C*12	Units of data in ARRAY
ARRAY	408	2048	I*4	SW detector PSF & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWSTRAY **:** CAM SW Non-dark local light model

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 8600
SPARE	0	32	I*1	Spare space
FCVF	32	1	I*2	Filter wheel step number
PFOV	34	1	I*2	Lens wheel step number
TINT	36	1	I*2	Integration time TUNIT=CAMTU
EWHL	38	1	I*2	Entrance wheel step number
SWHL	40	1	I*2	Selection wheel step number
GAIN	42	1	I*1	Electronics gain
OFFSET	43	1	I*1	Electronics offset
TEMPERAT	44	10	R*4	mean temperature TUNIT=K
TRMS	84	10	R*4	RMS temperature TUNIT=K
TMIN	124	10	R*4	minimum temperature TUNIT=K
TMAX	164	10	R*4	maximum temperature TUNIT=K
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV

VMIN	284	10	R*4	minimum bias voltage TUNIT=mV
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	368	1	I*4	No of image axes in ARRAY = 3
NAXIS1	372	1	I*4	No of axis 1 pixels = 32
NAXIS2	376	1	I*4	No of axis 2 pixels = 32
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }
BSCALE	384	1	R*4	ARRAY scaling factor
BZERO	388	1	R*4	ARRAY zero value
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	396	1	C*12	Units of data in ARRAY
ARRAY	408	2048	I*4	SW stray light rate & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWFRAME : CAM SW detector astrometric calibration

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 12344
SPARE	0	32	I*1	Spare space
FCVF	32	1	I*2	Filter wheel step number
PFOV	34	1	I*2	Lens wheel step number { 432=1.5" | 208=3" | 120=6" | 300=12" }
BITPIX	36	1	I*4	No of bits that represent an ARRAY value = -32
NAXIS	40	1	I*4	No of image axes in ARRAY = 3
NAXIS1	44	1	I*4	No of axis 1 pixels = 32
NAXIS2	48	1	I*4	No of axis 2 pixels = 32

NAXIS3	52	1	I*4	No of axis 3 pixels = 3 {
				(1)=PHI in radians | -PI < PHI < +PI
				(2)=THETA in radians | 0 < THETA < +PI
				(3)=OMEGA in steradians
				}

ARRAY	56	3072	R*4	SW detector flat field rate & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PIXEL1_5	R	Actual pixel size in arcsec corresponding to PFOV=432
PIXEL3	R	Actual pixel size in arcsec corresponding to PFOV=208
PIXEL6	R	Actual pixel size in arcsec corresponding to PFOV=120
PIXEL12	R	Actual pixel size in arcsec corresponding to PFOV=300

PRODUCT TYPE: CCGLWDARK : CAM LW Dark Current Exposure Library

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8600
SPARE	0	36	I*1	Spare space	
TINT	36	1	I*2	Integration time TUNIT=CAMTU	
EWHL	38	1	I*2	Entrance wheel step number	
SWHL	40	1	I*2	Selection wheel step number	
GAIN	42	1	I*1	Electronics gain	
OFFSET	43	1	I*1	Electronics offset	
TEMPERAT	44	10	R*4	mean temperature TUNIT=K	
TRMS	84	10	R*4	RMS temperature TUNIT=K	
TMIN	124	10	R*4	minimum temperature TUNIT=K	
TMAX	164	10	R*4	maximum temperature TUNIT=K	
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV	
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV	
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV	
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV	
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32	
NAXIS	368	1	I*4	No of image axes in ARRAY = 3	
NAXIS1	372	1	I*4	No of axis 1 pixels = 32	
NAXIS2	376	1	I*4	No of axis 2 pixels = 32	
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }	
BSCALE	384	1	R*4	ARRAY scaling factor	
BZERO	388	1	R*4	ARRAY zero value	
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined	
BUNIT	396	1	C*12	Units of data in ARRAY	
ARRAY	408	2048	I*4	LW detector dark current rate & error coded values	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWDFLT : CAM LW Detector Flat Field Library

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8600
SPARE	0	32	I*1	Spare space	
FCVF	32	1	I*2	Filter wheel step number	
PFOV	34	1	I*2	Lens wheel step number	
TINT	36	1	I*2	Integration time TUNIT=CAMTU	
EWHL	38	1	I*2	Entrance wheel step number	
SWHL	40	1	I*2	Selection wheel step number	
GAIN	42	1	I*1	Electronics gain	
OFFSET	43	1	I*1	Electronics offset	
TEMPERAT	44	10	R*4	mean temperature	

				TUNIT=K
TRMS	84	10	R*4	RMS temperature TUNIT=K
TMIN	124	10	R*4	minimum temperature TUNIT=K
TMAX	164	10	R*4	maximum temperature TUNIT=K
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	368	1	I*4	No of image axes in ARRAY = 3
NAXIS1	372	1	I*4	No of axis 1 pixels = 32
NAXIS2	376	1	I*4	No of axis 2 pixels = 32
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }
BSCALE	384	1	R*4	ARRAY scaling factor
BZERO	388	1	R*4	ARRAY zero value
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	396	1	C*12	Units of data in ARRAY
ARRAY	408	2048	I*4	LW detector flat field rate & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWOFLT : CAM LW Optical Flat Field Library

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 8600
SPARE	0	32	I*1	Spare space
FCVF	32	1	I*2	Filter wheel step number
PFOV	34	1	I*2	Lens wheel step number
TINT	36	1	I*2	Integration time TUNIT=CAMTU
EWHL	38	1	I*2	Entrance wheel step number
SWHL	40	1	I*2	Selection wheel step number
GAIN	42	1	I*1	Electronics gain
OFFSET	43	1	I*1	Electronics offset
TEMPERAT	44	10	R*4	mean temperature TUNIT=K
TRMS	84	10	R*4	RMS temperature TUNIT=K
TMIN	124	10	R*4	minimum temperature TUNIT=K
TMAX	164	10	R*4	maximum temperature TUNIT=K
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV
VMAX	324	10	R*4	maximum bias voltage

				TUNIT=mV
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	368	1	I*4	No of image axes in ARRAY = 3
NAXIS1	372	1	I*4	No of axis 1 pixels = 32
NAXIS2	376	1	I*4	No of axis 2 pixels = 32
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }
BSCALE	384	1	R*4	ARRAY scaling factor
BZERO	388	1	R*4	ARRAY zero value
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	396	1	C*12	Units of data in ARRAY
ARRAY	408	2048	I*4	LW optical flat field rate & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWDEAD : CAM LW Dead Pixel Map

NAXIS : 2 **TYPE :** I*1 **UNITS :** NONE 0=LIVE,1=DEAD

AXIS No.	LENGTH	DESCRIPTION
1	32	LW detector axis 1 (by convention Y)
2	32	LW detector axis 2 (by convention Z)

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWTRANS : CAM LW Model transients for memory calibration

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 40
SPARE	0	40	I*1	Spare space	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWGLITCH : CAM LW Glitch Model

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 40
SPARE	0	40	I*1	Spare space	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWPSF : CAM LW Point-Spread-Function Library

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8600
SPARE	0	24	I*1	Spare space	
CRPIX1	24	1	R*4	Reference pixel on axis 1 = Source position	
CRPIX2	28	1	R*4	Reference pixel on axis 2 = Source position	
FCVF	32	1	I*2	Filter wheel step number	
PFOV	34	1	I*2	Lens wheel step number	
TINT	36	1	I*2	Integration time TUNIT=CAMTU	
EWHL	38	1	I*2	Entrance wheel step number	
SWHL	40	1	I*2	Selection wheel step number	
GAIN	42	1	I*1	Electronics gain	
OFFSET	43	1	I*1	Electronics offset	
TEMPERAT	44	10	R*4	mean temperature TUNIT=K	
TRMS	84	10	R*4	RMS temperature TUNIT=K	
TMIN	124	10	R*4	minimum temperature TUNIT=K	
TMAX	164	10	R*4	maximum temperature TUNIT=K	
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV	
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV	
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV	
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV	
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32	
NAXIS	368	1	I*4	No of image axes in ARRAY = 3	
NAXIS1	372	1	I*4	No of axis 1 pixels = 32	
NAXIS2	376	1	I*4	No of axis 2 pixels = 32	
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }	
BSCALE	384	1	R*4	ARRAY scaling factor	
BZERO	388	1	R*4	ARRAY zero value	
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined	
BUNIT	396	1	C*12	Units of data in ARRAY	
ARRAY	408	2048	I*4	LW detector PSF & error coded values	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWSTRAY : CAM LW Non-dark local light model

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8600
SPARE	0	32	I*1	Spare space	
FCVF	32	1	I*2	Filter wheel step number	
PFOV	34	1	I*2	Lens wheel step number	
TINT	36	1	I*2	Integration time TUNIT=CAMTU	
EWHL	38	1	I*2	Entrance wheel step number	
SWHL	40	1	I*2	Selection wheel step number	
GAIN	42	1	I*1	Electronics gain	

OFFSET	43	1	I*1	Electronics offset
TEMPERAT	44	10	R*4	mean temperature TUNIT=K
TRMS	84	10	R*4	RMS temperature TUNIT=K
TMIN	124	10	R*4	minimum temperature TUNIT=K
TMAX	164	10	R*4	maximum temperature TUNIT=K
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	368	1	I*4	No of image axes in ARRAY = 3
NAXIS1	372	1	I*4	No of axis 1 pixels = 32
NAXIS2	376	1	I*4	No of axis 2 pixels = 32
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }
BSCALE	384	1	R*4	ARRAY scaling factor
BZERO	388	1	R*4	ARRAY zero value
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	396	1	C*12	Units of data in ARRAY
ARRAY	408	2048	I*4	LW stray light rate & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWFRAME : CAM LW detector astrometric calibration

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 12344
SPARE	0	32	I*1	Spare space
FCVF	32	1	I*2	Filter wheel step number
PFOV	34	1	I*2	Lens wheel step number { 192=1.5" | 448=3" | 360=6" | 60=12 " }
BITPIX	36	1	I*4	No of bits that represent an ARRAY value = -32
NAXIS	40	1	I*4	No of image axes in ARRAY = 3
NAXIS1	44	1	I*4	No of axis 1 pixels = 32
NAXIS2	48	1	I*4	No of axis 2 pixels = 32
NAXIS3	52	1	I*4	No of axis 3 pixels = 3 (1)=PHI in radians | -PI < PHI < +PI (2)=THETA in radians | 0 < THETA < +PI (3)=OMEGA in steradians
ARRAY	56	3072	R*4	LW detector flat field rate & error coded values

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PIXEL1_5 R Actual pixel size in arcsec corresponding to PFOV=192

PIXEL3 R Actual pixel size in arcsec corresponding to PFOV=448

PIXEL6 R Actual pixel size in arcsec corresponding to PFOV=360

PIXEL12 R Actual pixel size in arcsec corresponding to PFOV=60

PRODUCT TYPE: CCGLWLINEAR : CAM LW Linearity Correction Library

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 8600
SPARE	0	36	I*1	Spare space
SIGNAL	36	1	R*4	Illumination level TUNIT=ADU per pixel
TINT	40	1	I*2	Integration time TUNIT=CAMTU
GAIN	42	1	I*1	Electronics gain
OFFSET	43	1	I*1	Electronics offset
TEMPERAT	44	10	R*4	mean temperature TUNIT=K
TRMS	84	10	R*4	RMS temperature TUNIT=K
TMIN	124	10	R*4	minimum temperature TUNIT=K
TMAX	164	10	R*4	maximum temperature TUNIT=K
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	368	1	I*4	No of image axes in ARRAY = 3
NAXIS1	372	1	I*4	No of axis 1 pixels = 32
NAXIS2	376	1	I*4	No of axis 2 pixels = 32
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }
BSCALE	384	1	R*4	ARRAY scaling factor
BZERO	388	1	R*4	ARRAY zero value
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	396	1	C*12	Units of data in ARRAY
ARRAY	408	2048	I*4	LW linearity correction factors & error coded values

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HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWLINEAR : CAM SW Linearity Correction Library

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FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8600
SPARE	0	36	I*1	Spare space	
SIGNAL	36	1	R*4	Illumination level TUNIT=ADU per pixel	
TINT	40	1	I*2	Integration time TUNIT=CAMTU	
GAIN	42	1	I*1	Electronics gain	
OFFSET	43	1	I*1	Electronics offset	
TEMPERAT	44	10	R*4	mean temperature TUNIT=K	
TRMS	84	10	R*4	RMS temperature TUNIT=K	
TMIN	124	10	R*4	minimum temperature TUNIT=K	
TMAX	164	10	R*4	maximum temperature TUNIT=K	
VOLTAGE	204	10	R*4	mean bias voltage TUNIT=mV	
VRMS	244	10	R*4	RMS bias voltage TUNIT=mV	
VMIN	284	10	R*4	minimum bias voltage TUNIT=mV	
VMAX	324	10	R*4	maximum bias voltage TUNIT=mV	
BITPIX	364	1	I*4	No of bits that represent an ARRAY value = 32	
NAXIS	368	1	I*4	No of image axes in ARRAY = 3	
NAXIS1	372	1	I*4	No of axis 1 pixels = 32	
NAXIS2	376	1	I*4	No of axis 2 pixels = 32	
NAXIS3	380	1	I*4	No of axis 3 pixels = 2 { (1)=DATA | (2)=ERROR }	
BSCALE	384	1	R*4	ARRAY scaling factor	
BZERO	388	1	R*4	ARRAY zero value	
BLANK	392	1	I*4	Integer specifying ARRAY values that are undefined	
BUNIT	396	1	C*12	Units of data in ARRAY	
ARRAY	408	2048	I*4	SW linearity correction factors & error coded values	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWPOL : CAM LW Polariser angle calibration

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 32
SPARE	0	16	I*1	Spare space	
EWHL	16	1	I*2	Entrance wheel step number	
SWHL	18	1	I*2	Selection wheel step number	
FCVF	20	1	I*2	Filter wheel step number	
PFOV	22	1	I*2	Lens wheel step number	
ANGLE	24	1	R*4	Polariser angle	
ERROR	28	1	R*4	Error of the polariser angle	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWPOL : CAM SW Polariser calibration as the inverse 4*4 Mueller matrices

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 168
SPARE	0	16	I*1	Spare space	
EWHL	16	1	I*2	Entrance wheel step number	
SWHL	18	1	I*2	Selection wheel step number	
FCVF	20	1	I*2	Filter wheel step number	
PFOV	22	1	I*2	Lens wheel step number	
BITPIX	24	1	I*4	No of bits that represent an ARRAY value = -32	
NAXIS	28	1	I*4	No of image axes in ARRAY = 2	
NAXIS1	32	1	I*4	No of axis 1 pixels = 4	
NAXIS2	36	1	I*4	No of axis 2 pixels = 4	
ARRAY	40	16	R*8	Inverse Mueller matrix	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWSPEC : CAM LW filter & CVF spectral characteristics

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 868
SPARE	0	8	I*1	Spare space	
EWHL	8	1	I*2	Entrance wheel step number	
SWHL	10	1	I*2	Selection wheel step number	
PFOV	12	1	I*2	Lens wheel step number	
FCVF	14	1	I*2	Filter wheel step number	
WAVELENG	16	1	R*4	Central wavelength TUNIT=micron	
BANDWIDT	20	1	R*4	Equivalent width TUNIT=micron	
TRANSMIS	24	1	R*4	Mean transmission	
NORMALIS	28	1	R*4	Normalisation factor of nominal value unity	
SENSITIV	32	1	R*4	Sensitivity TUNIT=(ADU/sec) per Jy	
CRPIX1	36	1	R*4	Reference pixel on axis 1	
CRVAL1	40	1	R*4	Wavelength at the reference axis-1 pixel TUNIT=micron	
CDELT1	44	1	R*4	Wavelength Increment per axis-1 pixel TUNIT=micron	
BITPIX	48	1	I*4	No of bits that represent an ARRAY value = -32	
NAXIS	52	1	I*4	No of image axes in ARRAY = 1	
NAXIS1	56	1	I*4	No of axis 1 points = N	
ARRAY	60	202	R*4	Transmission data	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWSPEC : CAM SW filter & CVF spectral characteristics

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 868
SPARE	0	8	I*1	Spare space	
EWHL	8	1	I*2	Entrance wheel step number	
SWHL	10	1	I*2	Selection wheel step number	
PFOV	12	1	I*2	Lens wheel step number	
FCVF	14	1	I*2	Filter wheel step number	
WAVELENG	16	1	R*4	Central wavelength TUNIT=micron	
BANDWIDT	20	1	R*4	Equivalent width TUNIT=micron	
TRANSMIS	24	1	R*4	Mean transmission	
NORMALIS	28	1	R*4	Normalisation factor of nominal value unity	
SENSITIV	32	1	R*4	Sensitivity TUNIT=(ADU/sec) per Jy	
CRPIX1	36	1	R*4	Reference pixel on axis 1	
CRVAL1	40	1	R*4	Wavelength at the reference axis-1 pixel TUNIT=micron	
CDELT1	44	1	R*4	Wavelength Increment per axis-1 pixel TUNIT=micron	
BITPIX	48	1	I*4	No of bits that represent an ARRAY value = -32	
NAXIS	52	1	I*4	No of image axes in ARRAY = 1	
NAXIS1	56	1	I*4	No of axis 1 points = N	
ARRAY	60	202	R*4	Transmission data	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWSLP : CAM LW CVF spectral line profile

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 1432
SPARE	0	8	I*1	Spare space	
NAME	8	1	C*24	Source name (e.g. 'ISOC201843.3+434143') TDISP1=A20	
RA	32	1	R*8	Source right ascension TUNIT=deg TDISP=F8.4	
DEC	40	1	R*8	Source declination TUNIT=deg TDISP=F8.4	
LINE	48	1	C*12	Line name	
LINEWVLN	60	1	R*4	Wavelength of the line TUNIT=micron TDISP=F6.3	
MJD	64	1	R*8	Epoch of start of exposure(s) TUNIT=day TDISP=F11.5	
EWHL	72	1	I*2	Entrance wheel step number	
SWHL	74	1	I*2	Selection wheel step number	
PFOV	76	1	I*2	Lens wheel step number	
FCVFREF	78	1	I*2	Filter wheel step number nearest line wvl	
SPARE	80	1	I*2	Spare space for alignment purposes	
NORMALIS	82	1	R*4	Normalisation factor	
NUMBER	86	1	I*2	Number of measured cvf positions	
FCVF	88	96	I*2	Filter wheel step number	

NORMFLX	280	96	R*4	Measured flux / peak response height TDISP=1P,E9.3,0P
DNORMFLX	664	96	R*4	normflux 1-sigma error TDISP=1P,E9.3,0P
WAVELENG	1048	96	R*4	Wavelength TUNIT=micron TDISP=F6.3

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWSLP : CAM SW CVF spectral line profile

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 1824
SPARE	0	8	I*1	Spare space
NAME	8	1	C*24	Source name (e.g. 'ISOC201843.3+434143') TDISP1=A20
RA	32	1	R*8	Source right ascension TUNIT=deg TDISP=F8.4
DEC	40	1	R*8	Source declination TUNIT=deg TDISP=F8.4
LINE	48	1	C*12	Line name
LINEWVLN	60	1	R*4	Wavelength of the line TUNIT=micron TDISP=F6.3
MJD	64	1	R*8	Epoch of start of exposure(s) TUNIT=day TDISP=F11.5
EWHL	72	1	I*2	Entrance wheel step number
SWHL	74	1	I*2	Selection wheel step number
PFOV	76	1	I*2	Lens wheel step number
FCVFREF	78	1	I*2	Filter wheel step number nearest line wvl
SPARE	80	1	I*2	Spare space for alignment purposes
NORMALIS	82	1	R*4	Normalisation factor
NUMBER	86	1	I*2	Number of measured cvf positions
FCVF	88	124	I*2	Filter wheel step number
NORMFLX	336	124	R*4	Measured flux / peak response height TDISP=1P,E9.3,0P
DNORMFLX	832	124	R*4	normflux 1-sigma error TDISP=1P,E9.3,0P
WAVELENG	1328	124	R*4	Wavelength TUNIT=micron TDISP=F6.3

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWDMOD : CAM LW Dark Current Model Library

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 42000
TINT	0	1	I*2	Integration time TUNIT=CAMTU

GAIN	2	1	I*1	Electronics gain (always 0)
SPARE	3	13	I*1	Spare space
MASK	16	1024	I*1	Defined pixels mask (0=OK)
IR	1040	1024	R*4	Constant of revolution component
IR_ERR	5136	1024	R*4	Error of constant of revolution component
SR	9232	1024	R*4	Slope of revolution component
SR_ERR	13328	1024	R*4	Error of slope of revolution component
IO	17424	1024	R*4	Constant of orbit component
IO_ERR	21520	1024	R*4	Error of constant of orbit component
SO	25616	1024	R*4	Slope of orbit component
SO_ERR	29712	1024	R*4	Error of slope of orbit component
PO	33808	1024	R*4	2nd order orbit component
PO_ERR	37904	1024	R*4	Error of 2nd order orbit component

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWSHIFT : CAM LW astrometric shift correction

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 40
SPARE	0	16	I*1	Spare space	
EWHL	16	1	I*2	Entrance wheel step number	
SWHL	18	1	I*2	Selection wheel step number	
FCVF	20	1	I*2	Filter wheel step number	
PFOV	22	1	I*2	Lens wheel step number	
Y_SHIFT	24	1	R*4	Induced AXIS1 shift TUNIT=arcsec	
Y_ERROR	28	1	R*4	Error in induced AXIS1 shift TUNIT=arcsec	
Z_SHIFT	32	1	R*4	Induced AXIS2 shift TUNIT=arcsec	
Z_ERROR	36	1	R*4	Error in induced AXIS2 shift TUNIT=arcsec	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWRESET : CAM LW detector RESET value statistics

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 32
SPARE	0	16	I*1	Spare space	
REV	16	1	I*4	Revolution number	
MEAN	20	1	R*4	Mean RESET value	
MEDIAN	24	1	R*4	Median RESET value	
RMS	28	1	R*4	RMS of RESET value	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWSAT : CAM LW saturation thresholds

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 32
SPARE	0	18	I*1	Spare space	
GAIN	18	1	I*1	Electronics gain	
PROC	19	1	I*1	On-board data handling mode	
THRESHLD	20	1	I*4	ADU upper limit above which saturation occurs	
CAUSE	24	1	C*8	Cause of saturation problems {'Detector'|'ADC'}	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWSAT : CAM SW saturation thresholds

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 32
SPARE	0	18	I*1	Spare space	
GAIN	18	1	I*1	Electronics gain	
PROC	19	1	I*1	On-board data handling mode	
THRESHLD	20	1	I*4	ADU upper limit above which saturation occurs	
CAUSE	24	1	C*8	Cause of saturation problems {'Detector'|'ADC'}	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGLWTRANS : LW Fouks-Schubert coefficients

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8224
BITPIX	0	1	I*4	Nb bits to code an ARRAY value	
NAXIS	4	1	I*4	Nb axes in ARRAY	
NAXIS1	8	1	I*4	Nb pixels; axis 1	
NAXIS2	12	1	I*4	Nb pixels; axis 2	
NAXIS3	16	1	I*4	Nb pixels; axis 3 (1)	
BSCALE	20	1	R*4	ARRAY scaling factor	
BZERO	24	1	R*4	ARRAY zero value	
BLANK	28	1	I*4	Undefined ARRAY value	
LAMBDA	32	1024	R*4	Lambda Values 32x32 pixels	
BETA	4128	1024	R*4	Beta Values 32x32 pixels	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CCGSWTRANS : CAM SW Model transients for memory calibration : Currently empty

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 40
SPARE	0	40	I*1	Spare space	

HEADER KEYWORDS

Includes CCAL_HEAD.INC

PRODUCT TYPE: CHCGCONV : CAM House Keeping interpolation values

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 812
SUBNAME	0	1	C*8	Name of subsystem for which interpolation is given	
NPNTS	8	1	I*2	Number of points in interpolation table	
FILLER	10	1	I*2	Two byte filler	
ADU	12	100	I*4	Analog Digital Units, interpolation input	
OUT	412	100	R*4	Physical units (degrees, volts, etc.); interpolation out	

PRODUCT TYPE: CLWCVF1 : CAM LW CVF segment 1 description table

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
MOTOSTEP	0	1	I*2	Motor step number for this CVF	
FILLER	2	1	I*2	Two byte filler	
CVFWAVE	4	1	R*4	Wavelength at this MOTOSTEP, microns	
CVFWDTH	8	1	R*4	Width at this MOTOSTEP, microns	
SENSITIV	12	1	R*4	Sensitivity TUNIT=(ADU/sec) per Jy	

PRODUCT TYPE: CLWCVF2 : CAM LW CVF segment 2 description table

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
MOTOSTEP	0	1	I*2	Motor step number for this CVF	
FILLER	2	1	I*2	Two byte filler	
CVFWAVE	4	1	R*4	Wavelength at this MOTOSTEP, microns	
CVFWDTH	8	1	R*4	Width at this MOTOSTEP, microns	
SENSITIV	12	1	R*4	Sensitivity TUNIT=(ADU/sec) per Jy	

PRODUCT TYPE: CSWCVF : CAM SW CVF description table

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
MOTOSTEP	0	1	I*2	Motor step number for this CVF	
FILLER	2	1	I*2	Two byte filler	
CVFWAVE	4	1	R*4	Wavelength at this MOTOSTEP, microns	
CVFWDTH	8	1	R*4	Width at this MOTOSTEP, microns	
SENSITIV	12	1	R*4	Sensitivity TUNIT=(ADU/sec) per Jy	

PRODUCT TYPE: CWHEELS : CAM Wheel Information Table

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
WHLNB	0	1	I*2	Wheel number (Ent:1, Sel:2, Llw:3,Flw:4,Lsw:5,Fsw:6)	
MOTOSTEP	2	1	I*2	Motor step number for wheel WHLNB	
OPTINAME	4	1	C*4	Optical name in path, ex. HOLE, LW10, etc.)	
FILTWAVE	8	1	R*4	Filter central wavelength, meaningful for wheels 4 and 6	
FILTRESO	12	1	R*4	Filter resolution, meaningful for wheels 4 and 6	

5.3 LWS Calibration files

Many LWS calibration files include the following keywords specified in LWS_CAL_VALIDITY.INC.

LDATE	C	Date of current version
LVER	I	LWS version number
LMODEL	C	Instrument model ('FM' or 'FS')
LVLSTART	I	UTK of start of validity (0 = no start time)
LVLEND	I	UTK of end of validity (0 = no end time)
LVLBIA0	I	SW1 bias level this file is valid for. If set to -1 then file does not depend upon bias level and remaining bias level keywords may be omitted
LVLBIA1	I	SW2 bias level this file is valid for
LVLBIA2	I	SW3 bias level this file is valid for
LVLBIA3	I	SW4 bias level this file is valid for
LVLBIA4	I	SW5 bias level this file is valid for
LVLBIA5	I	LW1 bias level this file is valid for
LVLBIA6	I	LW2 bias level this file is valid for
LVLBIA7	I	LW3 bias level this file is valid for
LVLBIA8	I	LW4 bias level this file is valid for
LVLBIA9	I	LW5 bias level this file is valid for

PRODUCT TYPE: LCGW : AAL cal file: Grating position to wavelength conversion parameters

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 68
LCGWSREV	0	1	I*4	Revolution number of start of valdity for this record	
LCGWEREV	4	1	I*4	Revolution number of end of validity for this record	
LCGWCOEF	8	5	R*4	Conversion coefficients	
LCGWADET	28	10	R*4	Angle for each detector TUNIT=degrees	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC
LCGWOdet I (det='SW1'...'LW5') Grating order number for each detector
LCGWLINE R Number of lines per um on grating

PRODUCT TYPE: LCFW : AAL calibration file: FP wavelength calibration parameters

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC
LCFWFLC0 D FPL zeroth coefficient
LCFWFLC1 D FPL first coefficient
LCFWFLC2 D FPL second coefficient
LCFWFLC3 D FPL third coefficient
LCFWFSC0 D FPS zeroth coefficient
LCFWFSC1 D FPS first coefficient
LCFWFSC2 D FPS second coefficient
LCFWFSC3 D FPS third coefficient

PRODUCT TYPE: LCAG : AAL calibration file: General parameters (provisional)

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCDP : AAL cal file: Dark current cal params (provisional)

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCST : AAL cal file: Spectral structure of Straylight (provisional)

NAXIS : 3 **TYPE :** R*4 **UNITS :** Amps

AXIS No.	LENGTH	DESCRIPTION
1	2	Photocurrent, followed by uncertainty in photocurrent
2	10	Detector number (1=SW1 etc.)
3	4096	Grating LVDT position

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCGR : AAL cal file: Grating relative wavelength responsivity file

---

NAXIS : 3 **TYPE :** R*4 **UNITS :** ?

AXIS No.	LENGTH	DESCRIPTION
1	4	Wavelength, uncertainty in wavelength, responsivity, uncertainty in resp.
2	10	Detector number (1=SW1 etc.)
3	4096	Grating position

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC
LSTARPOS I First valid grating position

LENDPOS I Last valid gration position

PRODUCT TYPE: LCLRZ : LWS cal: Zero FP positions for data held in LCLR file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 24
GPOS	0	1	I*2	Grating LVDT position	
FPZERO	2	10	I*2	FP zero position for each detector	
FILL	22	1	I*2	Needed to make record size multiple of 4 bytes	

PRODUCT TYPE: LCSRZ : LWS cal: Zero FP positions for data held in LCSR file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 24
GPOS	0	1	I*2	Grating LVDT position	
FPZERO	2	10	I*2	FP zero position for each detector	
FILL	22	1	I*2	Needed to make record size multiple of 4 bytes	

PRODUCT TYPE: LCDT : SPL calibration file: Discard times

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

LCDTTRTd	R	Time period to ignore after a reset (msecs) d=0,9
LCDTTGR	R	Time period to ignore after a grating movement (msecs)
LCDTTFP	R	Time period to ignore after a Fabry-Perot movement (msecs)

PRODUCT TYPE: LCAL : SPL cal file: Valid readout limits for analogue electronics

HEADER KEYWORDS

LCALDMId	R	The minimum readout value below which the analog amplification chain does not respond, d=0,9 for SW1..SW5, LW1..LW5
LCALDMXd	R	The maximum readout value below which the analog amplification chain does not respond, d=0,9 for SW1..SW5, LW1..LW5

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCVC : SPL calibration file: Detector voltage conversion parameters

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

LCVCVFAC R Conversion factor, Volts per raw value.
LCVCVOFF I Offset to be subtracted from raw value.
            These are used in the conversion of raw detector
            readouts into voltages. Using:

            V = (raw detector value - LCVCVOFF) * LCVCVFAC

PRODUCT TYPE: LCLR_0 : LWS FPL relative wavelength responsivity file. Detector SW1.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_1 : LWS FPL relative wavelength responsivity file. Detector SW2.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_2 : LWS FPL relative wavelength responsivity file. Detector SW3.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	

RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_3 : LWS FPL relative wavelength responsivity file. Detector SW4.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for
NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_4 : LWS FPL relative wavelength responsivity file. Detector SW5.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for
NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_5 : LWS FPL relative wavelength responsivity file. Detector LW1.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for

NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_6 : LWS FPL relative wavelength responsivity file. Detector LW2.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for
NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_7 : LWS FPL relative wavelength responsivity file. Detector LW3.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for
NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_8 : LWS FPL relative wavelength responsivity file. Detector LW4.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for

ENDGP	2	1	I*2	Last grating LVDT value this record is valid for
NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCLR_9 : LWS FPL relative wavelength responsivity file. Detector LW5.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_0 : LWS FPS relative wavelength responsivity file. Detector SW1.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_1 : LWS FPS relative wavelength responsivity file. Detector SW2.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 10008

STARTGP	0	1	I*2	First grating LVDT value this record is valid for
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for
NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_2 : LWS FPS relative wavelength responsivity file. Detector SW3.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for
NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_3 : LWS FPS relative wavelength responsivity file. Detector SW4.

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for
NRES	4	1	I*4	Number of valid responsivity values in RES
RELFP	8	1000	I*2	Relative FP positions
RES	2008	1000	R*4	Responsivities for given detector
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_4 : LWS FPS relative wavelength responsivity file. Detector SW5.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_5 : LWS FPS relative wavelength responsivity file. Detector LW1.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_6 : LWS FPS relative wavelength responsivity file. Detector LW2.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_7 : LWS FPS relative wavelength

responsivity file. Detector LW3.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_8 : LWS FPS relative wavelength responsivity file. Detector LW4.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCSR_9 : LWS FPS relative wavelength responsivity file. Detector LW5.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 10008
STARTGP	0	1	I*2	First grating LVDT value this record is valid for	
ENDGP	2	1	I*2	Last grating LVDT value this record is valid for	
NRES	4	1	I*4	Number of valid responsivity values in RES	
RELFP	8	1000	I*2	Relative FP positions	
RES	2008	1000	R*4	Responsivities for given detector	
RESU	6008	1000	R*4	Uncertainties in responsivities for given detector	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LTIMEDEP : LWS Calibration Time Dependency

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
CALGROOT	0	1	C*12	Root name (referred to when file is opened)	
CALGFILE	12	1	C*12	Corresponding filename	
CALGTIME	24	1	C*11	Time from which this file applies (yydddhhmmss)	
CALGCOMM	35	1	C*45	Optional comment relating to this file	

PRODUCT TYPE: LCGA : SPL calibration file: Analogue amplification gains

HEADER KEYWORDS

```
Includes LWS_CAL_VALIDITY.INC
LCGADGdv R  The analogue amplification gain for each
            gain setting of each detector. d=0,9
            v=0,7 (the gain setting)
```

PRODUCT TYPE: LCD1 : SPL calibration file: First level deglitching parameters

HEADER KEYWORDS

```
LCD1SDIN R  The fraction of points which are assumed
            to be within one SD of the median value.
LCD1SDRJ R  The number of standard deviations from the
            mean value for a point to be considered
            an outlier.
LCD1nnVd R  Glitch height, in volts
            d=0,9 for SW1..SW5 and LW1..LW5,
            nn=element number, currently 00, 01
LCD1nnTd R  Discard time, in milliseconds
            (d=0,9, nn=00,01)
Includes LWS_CAL_VALIDITY.INC
```

PRODUCT TYPE: LCD2 : SPL calibration file: Second level deglitching parameters

HEADER KEYWORDS

```
Includes LWS_CAL_VALIDITY.INC
LCD2D2Rd R  Rejection level
            d=1,9 for SW1..SW5, LW1..LW5
```

PRODUCT TYPE: LCD3 : SPL calibration file: Third level deglitching parameters

HEADER KEYWORDS

```
Includes LWS_CAL_VALIDITY.INC
LCD3D3Rd R  Rejection level, d=0,9, SW1..SW5, LW1..LW5
```

These values specify the maximum RMS deviation of any photocurrent from the set of photocurrents at each mechanism position. Any slope with a photocurrent which deviates by more than this amount is rejected.

PRODUCT TYPE: LCGH : SPL calibration file: Glitch history file parameters

---

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC
LCGHGHMR I Maximum number of records which may be written to the LWS Glitch History file.
LCGHGHV0 R These two keywords are used to convert
LCGHGHVS R glitch height in volts to a 12 bit integer

PRODUCT TYPE: LCFP : SPL calibration file: Parameters for electronic filters

---

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC
LCFPHFTd R Time constant for the high pass filter (secs)
d=0,9

PRODUCT TYPE: LCDB : SPL cal file: Debiasing params and max. acceptable voltages

---

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC
LCDBnDBd R Debiasing parameter (1/Volts)
n=0,5 (the bias level)
d=0,9 (the detector)
LCDBVMd R Maximum allowable voltage readout
d=0,9 SW1..SW5, LW1..LW5

PRODUCT TYPE: LCJF : SPL calibration file: JF4 amplifier parameters

---

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC
LCJFJGd R Fixed gain of each JF4 amplifier
d=0,9 for SW1..SW5, LW1..LW5
LCJFJCd R The capicatance of each JF4 amplifier (farads)
d=0,9

PRODUCT TYPE: LCIL : SPL cal file: Second level deglitching parameters

---

HEADER KEYWORDS

LCILDMIN	I	Min. number of points required for illuminator deglitching
LCILDSDM	I	Min. number of points required for calculating the standard deviation by the standard method
LCILDRJd	R	Standard deviations to be used by illuminator second level deglitching. (d=0,9)

PRODUCT TYPE: LCGB : AAL cal file: grating spectral bandwidth correction factors

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 12
LCGBDET	0	1	C*3	Detector ('SW1'...'LW5')	
LCGBSPAR	3	1	I*1	Spare - record must be multiple of 4 bytes	
LCGBSB	4	1	R*4	Grating spectral bandwidth correction factor	
LCGBSBU	8	1	R*4	Uncertainty in grating spectral bandwidth correction factor	

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCIR : LWS Illuminator reference data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 92
LCIRTYPE	0	1	I*4	Number identifying type of illuminator flash	
LCIRPHC	4	10	R*4	Reference photo-current, with background subtracted	
LCIRPHCU	44	10	R*4	Uncertainty in reference photo-current	
LCIRSTAT	84	1	I*4	Status word. 1=use this value, 0=ignore this value	
LCIRICS	88	1	I*4	Illuminator commanded status	

HEADER KEYWORDS

LCIRNSDB	R	Number of Standard deviations to use for median clipping of background
LCIRNSDF	R	Number of Standard deviations to use for median clipping of flash data

PRODUCT TYPE: LCDK : AAL cal file: Standard dark current/straylight values

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 88
LCDKSREV	0	1	I*4	Revolution number of start of validity for this record	
LCDKEREV	4	1	I*4	Revolution number of end of validity for this record	
LCDKDRK	8	10	R*4	Dark current/straylight photocurrent for each detector TUNIT=amps	

LCDKDRKU	48	10	R*4	Uncertainty in dark current/straylight photocurrent for each detector TUNIT=amps

HEADER KEYWORDS

Includes LWS_CAL_VALIDITY.INC

PRODUCT TYPE: LCTP : LWS FP throughput correction coefficients

Header only. Not yet defined.

PRODUCT TYPE: LCPB : Parallel cal file: LWS beam sizes

NAXIS :1 **TYPE :** R*4 **UNITS :** ?

AXIS No.	LENGTH	DESCRIPTION
1	10	LWS beam sizes

PRODUCT TYPE: LCPDK : Parallel cal file: LWS parallel dark currents

NAXIS :1 **TYPE :** R*4 **UNITS :** ?

AXIS No.	LENGTH	DESCRIPTION
1	10	LWS parallel dark currents

PRODUCT TYPE: LCPDR : Parallel cal file: LWS drift coefficients

NAXIS :3 **TYPE :** R*8 **UNITS :** ?

AXIS No.	LENGTH	DESCRIPTION
1	7	rev,darks and coefficients of fit before and after handover
2	10	Detector number (1=SW1 etc.)
3	900	Revolution number

PRODUCT TYPE: LCPM : Parallel cal file: LWS memory effects parameters

NAXIS :1 **TYPE :** R*4 **UNITS :** ?

AXIS No.	LENGTH	DESCRIPTION
1	10	LWS memory effect parameters

PRODUCT TYPE: LCPR : Parallel cal file: LWS parallel ramp correction factors

NAXIS : 2 **TYPE :** R*4 **UNITS :** ?

AXIS No.	LENGTH	DESCRIPTION
1	3	First three order coefficients
2	10	Detector number (1=SW1 etc.)

5.4 PHT calibration files

PRODUCT TYPE: PC1CRELIN : PHT C100 linearisations

NAXIS :4 **TYPE :** R*4 **UNITS :** VOLTS

AXIS No.	LENGTH	DESCRIPTION
1	121	CRE output voltages Each element corresponds to a CRE output voltage from -1.2V to 1.2V in steps of 0.02V.
2	9	Pixels, in same order as SPD. i.e. [Y,Z] = [1,1], [1,2], [1,3] etc.
3	3	Readout frequency 1,4,8 KHz
4	2	Voltage correction and uncertainty

PRODUCT TYPE: PC2CRELIN : PHT C200 linearisations

NAXIS :4 **TYPE :** R*4 **UNITS :** VOLTS

AXIS No.	LENGTH	DESCRIPTION
1	121	CRE output voltages Each element corresponds to a CRE output voltage from -1.2V to 1.2V in steps of 0.02V.
2	4	Pixels, in same order as SPD. i.e. [Y,Z] = [1,1], [1,2],...
3	3	Readout frequency 1,4,8 KHz
4	2	Voltage correction and uncertainty

PRODUCT TYPE: PPCRELIN : PHT P linearisations

NAXIS :4 **TYPE :** R*4 **UNITS :** VOLTS

AXIS No.	LENGTH	DESCRIPTION
1	121	CRE output voltages Each element corresponds to a CRE output voltage from -1.2V to 1.2V in steps of 0.02V.
2	3	PHT-P detectors, P1,P2,P3
3	3	Readout frequency 1,4,8 KHz
4	2	Voltage correction and uncertainty

PRODUCT TYPE: PDIE1TRANS : PHT DIE 1 Transfer Function

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
PDIE1FIX	0	1	R*4	Fixed offset	
PDIE1UOF	4	1	R*4	Offset dependent on signal gain TUNIT=VOLTS	

PDIE1GN1	8	1	R*4	Signal gain
PDIE1GN2	12	1	R*4	Offset gain

PRODUCT TYPE: PDIE2TRANS : PHT DIE 2 Transfer Function

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
PDIE2FIX	0	1	R*4	Fixed offset	
PDIE2UOF	4	1	R*4	Offset dependent on signal gain TUNIT=VOLTS	
PDIE2GN1	8	1	R*4	Signal gain	
PDIE2GN2	12	1	R*4	Offset gain	

PRODUCT TYPE: PC1ILLUM : PHT C100 FCS non-uniform illumination corrs.

NAXIS : 4 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	9	Pixels, in same order as SPD. (Dimension 1) i.e. [Y,Z] = [1,1], [1,2], [1,3] etc.
2	7	Filters (in ch.wheel order)
3	2	Each FCS
4	2	Illum. matrix value and uncertainty

PRODUCT TYPE: PC2ILLUM : PHT C200 FCS non-uniform illumination corrs.

NAXIS : 4 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	4	Pixels, in same order as SPD. (Dimension 1) i.e. [Y,Z] = [1,1], [1,2],...
2	5	Filters (in ch.wheel order)
3	2	Each FCS
4	2	Illum. matrix value and uncertainty

PRODUCT TYPE: PSELNDR : PHT NDR selection

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 32
PP1SNDR	0	1	I*4	NDRs to discard (PHT_P1)	
PP2SNDR	4	1	I*4	NDRs to discard (PHT_P2)	
PP3SNDR	8	1	I*4	NDRs to discard (PHT_P3)	
PFILSNDR	12	1	I*4	Filler	
PSSSNDR	16	1	I*4	NDRs to discard (PHT_SS)	
PSLSNDR	20	1	I*4	NDRs to discard (PHT_SL)	
PC1SNDR	24	1	I*4	NDRs to discard (PHT_C100)	
PC2SNDR	28	1	I*4	NDRs to discard (PHT_C200)	

PRODUCT TYPE: PC1FCSPOW : PHT C100 FCS power tables

NAXIS : 4 **TYPE :** R*4 **UNITS :** mW

AXIS No.	LENGTH	DESCRIPTION
1	45	In-band optical power on detector (W/pixel - log scale)
2	7	Filters
3	2	Each TRS
4	2	Each FCS

HEADER KEYWORDS

Includes PFCS_HDR.INC

PRODUCT TYPE: PC2FCSPOW : PHT C200 FCS power tables

NAXIS : 4 **TYPE :** R*4 **UNITS :** mW

AXIS No.	LENGTH	DESCRIPTION
1	45	In-band optical power on detector (W/pixel - log scale)
2	5	Filters
3	2	Each TRS
4	2	Each FCS

HEADER KEYWORDS

Includes PFCS_HDR.INC

PRODUCT TYPE: PP1FCSPOW : PHT P1 FCS power tables

NAXIS : 4 **TYPE :** R*4 **UNITS :** mW

AXIS No.	LENGTH	DESCRIPTION
1	45	In-band optical power on detector (W/pixel - log scale)
2	10	Filters
3	2	Each TRS
4	2	Each FCS

HEADER KEYWORDS

Includes PFCS_HDR.INC

PRODUCT TYPE: PP2FCSPOW : PHT P2 FCS power tables

NAXIS : 4 **TYPE :** R*4 **UNITS :** mW

AXIS No.	LENGTH	DESCRIPTION
1	45	In-band optical power on detector (W/pixel - log scale)
2	2	Filters
3	2	Each TRS
4	2	Each FCS

HEADER KEYWORDS

Includes PFCS_HDR.INC

PRODUCT TYPE: PP3FCSPOW : PHT P3 FCS power tables

NAXIS :4 **TYPE :** R*4 **UNITS :** mW

AXIS No.	LENGTH	DESCRIPTION
1	45	In-band optical power on detector (W/pixel - log scale)
2	2	Filters
3	2	Each TRS
4	2	Each FCS

HEADER KEYWORDS

Includes PFCS_HDR.INC

PRODUCT TYPE: PC1VIGN : PHT C100 vignetting corrections

NAXIS :3 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	9	Pixels
2	25	FP chopper Position in 15 arcsec units
3	7	Filters

PRODUCT TYPE: PC2VIGN : PHT C200 vignetting corrections

NAXIS :3 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	4	Pixels
2	25	FP chopper position in 15 arcsec units
3	5	Filters

PRODUCT TYPE: PP1VIGN : PHT P1 vignetting corrections

NAXIS :3 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	14	Apertures
2	25	FP chopper position in 15 arcsec units
3	10	Filters

PRODUCT TYPE: PP2VIGN : PHT P2 vignetting corrections

NAXIS :3 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	14	Apertures
2	25	FP chopper Position in 15 arcsec units
3	2	Filters

PRODUCT TYPE: PP3VIGN : PHT P3 vignetting corrections

NAXIS :3 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	14	Apertures
2	25	FP chopper Position in 15 arcsec units
3	2	Filters

PRODUCT TYPE: PPSF : PHT Point Spread Function Corrections

NAXIS :2 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	15	Corrections, 14 * P-apers; PHT-C
2	14	Filter wheel positions

PRODUCT TYPE: PSPECAL : PHT-S Calibration Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 56
PSPELAMB	0	1	R*4	Wavelength in metres (increasing)	
PSPELUNC	4	1	R*4	Uncertainty in wavelength (metres)	
PSPESRFP	8	1	R*4	Point source spectral response fn ((V/sec)/Jy)	
PSPESRUP	12	1	R*4	Uncertainty in point source srf ((V/sec)/Jy)	
PSPESRFE	16	1	R*4	Extended source spectral response fn ((V/sec)/(MJy/ster))	
PSPESRUE	20	1	R*4	Uncertainty in extended source srf ((V/sec)/(MJy/ster))	
PSPECRFP	24	1	R*4	Averaged chopped point source srf ((V/sec)/Jy)	
PSPECRUP	28	1	R*4	Uncertainty in chopped point source srf ((V/sec)/Jy)	
PSPECRFE	32	1	R*4	Averaged chopped extended source srf ((V/sec)/Jy)	
PSPECRUE	36	1	R*4	Uncertainty in chopped extended source srf ((V/sec)/Jy)	
PSPECCC0	40	1	R*4	Constant term for chopped srf first order correction(Jy)	
PSPECUC0	44	1	R*4	Uncertainty in constant term for srf (Jy)	
PSPECCC1	48	1	R*4	Multiplicative term for chopped srf first order correction	
PSPECUC1	52	1	R*4	Uncertainty in multiplicative term for srf correction	

PRODUCT TYPE: PFLUXCONV : PHT Flux Conversions

HEADER KEYWORDS

FCP3P29	R	Flux conversion for PHT-P1 3.29micron filter Units of m^2.Hz.
FCP3P6	R	Flux conversion for PHT-P1 3.6micron filter
FCP4P85	R	Flux conversion for PHT-P1 4.85micron filter
FCP7P3	R	Flux conversion for PHT-P1 7.3micron filter
FCP7P7	R	Flux conversion for PHT-P1 7.7micron filter
FCP10	R	Flux conversion for PHT-P1 10micron filter
FCP11P3	R	Flux conversion for PHT-P1 11.3micron filter
FCP11P5	R	Flux conversion for PHT-P1 11.5micron filter
FCP12P8	R	Flux conversion for PHT-P1 12.8micron filter
FCP16	R	Flux conversion for PHT-P1 16micron filter
FCP20	R	Flux conversion for PHT-P2 20micron filter
FCP25	R	Flux conversion for PHT-P2 25micron filter
FCP60	R	Flux conversion for PHT-P3 60micron filter
FCP100	R	Flux conversion for PHT-P3 100micron filter
FCC50	R	Flux conversion for C100 50micron filter
FCC60	R	Flux conversion for C100 60micron filter
FCC70	R	Flux conversion for C100 70micron filter
FCC90	R	Flux conversion for C100 90micron filter
FCC100	R	Flux conversion for C100 100micron filter
FCC105	R	Flux conversion for C100 105micron filter
FCC120	R	Flux conversion for C200 120micron filter
FCC135	R	Flux conversion for C200 135micron filter
FCC160	R	Flux conversion for C200 160micron filter
FCC180	R	Flux conversion for C200 180micron filter
FCC200	R	Flux conversion for C200 200micron filter
FCC105	R	Flux conversion for C200 105micron filter

PRODUCT TYPE: PTIMEDEP : PHT Calibration Time Dependency

FIELD	OFF	NUM	TYPE	DESCRIPTION REC LENGTH: 80
CALGROOT	0	1	C*12	Root name (referred to when file is opened)
CALGFILE	12	1	C*12	Corresponding filename
CALGTIME	24	1	C*11	Time from which this file applies (yydddhhmmss)
CALGCOMM	35	1	C*45	Optional comment relating to this file

PRODUCT TYPE: PP1FCSAP : PHT P1 FCS aperture correction tables

NAXIS :4 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	14	Apertures (Dimension 1)
2	10	Filters (Dimension 2)
3	2	Each FCS (Dimension 3)
4	2	Correction and uncertainty (Dimension 4)

PRODUCT TYPE: PP2FCSAP : PHT P2 FCS aperture correction tables

NAXIS : 4 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	14	Apertures (Dimension 1)
2	2	Filters (Dimension 2)
3	2	Each FCS (Dimension 3)
4	2	Correction and uncertainty (Dimension 4)

PRODUCT TYPE: PP3FCSAP : PHT P3 FCS aperture correction tables

NAXIS : 4 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	14	Apertures (Dimension 1)
2	2	Filters (Dimension 2)
3	2	Each FCS (Dimension 3)
4	2	Correction and uncertainty (Dimension 4)

PRODUCT TYPE: PC1CHOPCOR : PHT C100 chopper correction factors

NAXIS : 3 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	9	Pixels, in same order as SPD. (Dimension 1) i.e. [Y,Z] = [1,1], [1,2], [1,3] etc.
2	8	Chopper plateaux time (i.e. frequency), t=2**(n-1)secs, n=1,8
3	2	Correction and uncertainty

PRODUCT TYPE: PC2CHOPCOR : PHT C200 chopper correction factors

NAXIS : 3 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	4	Pixels, in same order as SPD. (Dimension 1) i.e. [Y,Z] = [1,1], [1,2], etc.
2	8	Chopper plateaux time (i.e. frequency), t=2**(n-1)secs, n=1,8
3	2	Correction and uncertainty

PRODUCT TYPE: PPCHOPCOR : PHT P chopper correction factors

NAXIS : 3 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION

1	3	PHT-P1,P2,P3
2	8	Chopper plateau time (i.e. frequency), t=2**(n-1)secs, n=1,8
3	2	Correction and uncertainty

PRODUCT TYPE: PC1DARK : PHT C100 dark current file

NAXIS :3 **TYPE :** R*4 **UNITS :** V/s

AXIS No.	LENGTH	DESCRIPTION
1	100	Orbital position (units 0.24hours) Each element corresponds to a time from 0.01 to 1.0 in steps of 0.01.
2	9	Pixels, in same order as SPD. i.e. [Y,Z] = [1,1], [1,2], [1,3] etc.
3	2	Dark current and uncertainty

PRODUCT TYPE: PC2DARK : PHT C200 dark current file

NAXIS :3 **TYPE :** R*4 **UNITS :** V/s

AXIS No.	LENGTH	DESCRIPTION
1	100	Orbital position (units 0.24hours) Each element corresponds to a time from 0.01 to 1.0 in steps of 0.01.
2	4	Pixels, in same order as SPD. i.e. [Y,Z] = [1,1], [1,2], ...etc.
3	2	Dark current and uncertainty

PRODUCT TYPE: PPDARK : PHT P dark current file

NAXIS :3 **TYPE :** R*4 **UNITS :** V/s

AXIS No.	LENGTH	DESCRIPTION
1	100	Orbital position (units 0.24hours) Each element corresponds to a time from 0.01 to 1.0 in steps of 0.01.
2	3	PHT-P detectors, P1,P2,P3
3	2	Dark current and uncertainty

PRODUCT TYPE: PSDARK : PHT S dark current file

NAXIS :3 **TYPE :** R*4 **UNITS :** V/s

AXIS No.	LENGTH	DESCRIPTION
1	100	Orbital position (units 0.24hours) Each element corresponds to a time from 0.01 to 1.0 in steps of 0.01.
2	128	Pixels - PHT-SS (1-64) and PHT-SL (65-128)
3	2	Dark current and uncertainty

PRODUCT TYPE: PC1FLAT : PHT C100 filter-to-filter flatfield correction

NAXIS : 3 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	9	Pixels, in same order as SPD. (Dimension 1) i.e. [Y,Z] = [1,1], [1,2], [1,3] etc.
2	7	Filters (Dimension 2)
3	2	Correction and uncertainty (Dimension 3)

PRODUCT TYPE: PC2FLAT : PHT C200 filter-to-filter flatfield correction

NAXIS : 3 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	4	Pixels, in same order as SPD. (Dimension 1) i.e. [Y,Z] = [1,1], [1,2], etc.
2	5	Filters (Dimension 2)
3	2	Correction and uncertainty (Dimension 3)

PRODUCT TYPE: PC1OMEGA : PHT C100 aperture dimensions and solid angles

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 48
PC1OMFIL	0	1	I*4	Filter (CHW position)	
PC1OMPIX	4	1	I*4	Pixel in SPD order	
PC1OMOFY	8	1	R*4	Offset(") in y relative to centre of array	
PC1OMOYU	12	1	R*4	Uncertainty in offset (") in y	
PC1OMOFZ	16	1	R*4	Offset(") in z relative to centre of array	
PC1OMOZU	20	1	R*4	Uncertainty in offset (") in z	
PC1OMDAY	24	1	R*4	Aperture dimension y (")	
PC1OMDYU	28	1	R*4	Uncertainty in aperture dimension y(")	
PC1OMDAZ	32	1	R*4	Aperture dimension z (")	
PC1OMDZU	36	1	R*4	Uncertainty in aperture dimension z (")	
PC1OMOME	40	1	R*4	Omega (sr*10E-7)	
PC1OMOMU	44	1	R*4	Uncertainty in omega (sr*10E-7)	

PRODUCT TYPE: PC2OMEGA : PHT C200 aperture dimensions and solid angles

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 48
PC2OMFIL	0	1	I*4	Filter (CHW position)	
PC2OMPIX	4	1	I*4	Pixel in SPD order	
PC2OMOFY	8	1	R*4	Offset(") in y relative to centre of	

				array
PC2OMOYU	12	1	R*4	Uncertainty in offset (") in y
PC2OMOFZ	16	1	R*4	Offset(") in z relative to centre of array
PC2OMOZU	20	1	R*4	Uncertainty in offset (") in z
PC2OMDAY	24	1	R*4	Aperture dimension y (")
PC2OMDYU	28	1	R*4	Uncertainty in aperture dimension y(")
PC2OMDAZ	32	1	R*4	Aperture dimension z (")
PC2OMDZU	36	1	R*4	Uncertainty in aperture dimension z (")
PC2OMOME	40	1	R*4	Omega (sr*10E-7)
PC2OMOMU	44	1	R*4	Uncertainty in omega (sr*10E-7)

PRODUCT TYPE: PPOMEGA : PHT P aperture dimensions and solid angles

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 32
PPOMFILT	0	1	I*4	Filter (CHW position)	
PPOMAPER	4	1	I*4	Aperture (CHW position)	
PPOMDASY	8	1	R*4	Aperture diameter (") in Y	
PPOMDAYU	12	1	R*4	Uncertainty in aperture diameter (") in Y	
PPOMDASZ	16	1	R*4	Aperture diameter (") in Z	
PPOMDAZU	20	1	R*4	Uncertainty in aperture diameter (") in Z	
PPOMOMEG	24	1	R*4	Omega (sr*10E-7)	
PPOMOMUN	28	1	R*4	Uncertainty in omega (sr*10E-7)	

PRODUCT TYPE: PC1RESETI : PHT-C100 parameters for conversion to 1/4s reset interval

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 24
PC1RESRI	0	1	I*4	Reset interval, n, where reset interval,Tint[s]=2**(7-n)	
PC1RESDR	4	1	I*4	Data reduction factor	
PC1RESA0	8	1	R*4	Offset correction, A0 (V/s)	
PC1RESA1	12	1	R*4	Slope correction, A1	
PC1RESE0	16	1	R*4	Error(standard deviation) in A0 (V/s)	
PC1RESE1	20	1	R*4	Error(standard deviation) in A1	

PRODUCT TYPE: PC2RESETI : PHT-C200 parameters for conversion to 1/4s reset interval

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 24
PC2RESRI	0	1	I*4	Reset interval, n, where reset interval, Tint[s]=2**(7-n)	
PC2RESDR	4	1	I*4	Data reduction factor	
PC2RESA0	8	1	R*4	Offset correction, A0 (V/s)	
PC2RESA1	12	1	R*4	Slope correction, A1	
PC2RESE0	16	1	R*4	Error(standard deviation) in A0 (V/s)	
PC2RESE1	20	1	R*4	Error(standard deviation) in A1	

PHT-P1, PHT-P2 and PHT-P3 have the same RESET file

formats. In the descriptions below 'x' stands for 1,2 or 3.

PRODUCT TYPE: PPxRESETI : PHT-Px parameters for conversion to 1/4s reset interval

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 24
PPxRESRI	0	1	I*4	Reset interval, n, where reset interval, Tint[s]=2**(7-n)	
PPxRESDR	4	1	I*4	Data reduction factor	
PPxRESA0	8	1	R*4	Offset correction, A0 (V/s)	
PPxRESA1	12	1	R*4	Slope correction, A1	
PPxRESE0	16	1	R*4	Error(standard deviation) in A0 (V/s)	
PPxRESE1	20	1	R*4	Error(standard deviation) in A1	

PRODUCT TYPE: PC1RESP : PHT C100 default responsivity file

NAXIS :3 **TYPE :** R*4 **UNITS :** A/W

AXIS No.	LENGTH	DESCRIPTION
1	100	Orbital phase (each element corresponds to a phase in the range from 0.01 to 1.0 in steps of 0.01)
2	9	Pixels, in same order as SPD. i.e. [Y,Z] = [1,1], [1,2], [1,3] etc.
3	2	Default responsivity and uncertainty

PRODUCT TYPE: PC2RESP : PHT C200 default responsivity file

NAXIS :3 **TYPE :** R*4 **UNITS :** A/W

AXIS No.	LENGTH	DESCRIPTION
1	100	Orbital phase (each element corresponds to a phase in the range from 0.01 to 1.0 in steps of 0.01)
2	4	Pixels, in same order as SPD. i.e. [Y,Z] = [1,1], [1,2], ...etc.
3	2	Default responsivity and uncertainty

PRODUCT TYPE: PPRESP : PHT P default responsivity file

NAXIS :3 **TYPE :** R*4 **UNITS :** A/W

AXIS No.	LENGTH	DESCRIPTION
1	100	Orbital phase (each element corresponds to a phase in the range from 0.01 to 1.0 in steps of 0.01)
2	3	PHT-P detectors, P1,P2,P3
3	2	Default responsivity and uncertainty

PRODUCT TYPE: PCCBB : PHT Black body Colour correction

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 104
TEMP	0	1	R*4	Temperature in K	
P1_3.29	4	1	R*4	P1_3.29 correction	
P1_3.60	8	1	R*4	P1_3.60 correction	
P1_4.85	12	1	R*4	P1_4.85 correction	
P1_7.30	16	1	R*4	P1_7.30 correction	
P1_7.70	20	1	R*4	P1_7.70 correction	
P1_10.0	24	1	R*4	P1_10.0 correction	
P1_11.3	28	1	R*4	P1_11.3 correction	
P1_11.5	32	1	R*4	P1_11.5 correction	
P1_12.8	36	1	R*4	P1_12.8 correction	
P1_16.0	40	1	R*4	P1_16.0 correction	
P2_20	44	1	R*4	P2_20 correction	
P2_25	48	1	R*4	P2_25 correction	
P3_60	52	1	R*4	P3_60 correction	
P3_100	56	1	R*4	P3_100 correction	
C1_50	60	1	R*4	C1_50 correction	
C1_60	64	1	R*4	C1_60 correction	
C1_70	68	1	R*4	C1_70 correction	
C1_90	72	1	R*4	C1_90 correction	
C1_100	76	1	R*4	C1_100 correction	
C1_105	80	1	R*4	C1_105 correction	
C2_120	84	1	R*4	C2_120 correction	
C2_135	88	1	R*4	C2_135 correction	
C2_160	92	1	R*4	C2_160 correction	
C2_180	96	1	R*4	C2_180 correction	
C2_200	100	1	R*4	C2_200 correction	

PRODUCT TYPE: PCCMBBONE : PHT Modified Black body Nu1 Colour correction

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 104
TEMP	0	1	R*4	Temperature in K	
P1_3.29	4	1	R*4	P1_3.29 correction	
P1_3.60	8	1	R*4	P1_3.60 correction	
P1_4.85	12	1	R*4	P1_4.85 correction	
P1_7.30	16	1	R*4	P1_7.30 correction	
P1_7.70	20	1	R*4	P1_7.70 correction	
P1_10.0	24	1	R*4	P1_10.0 correction	
P1_11.3	28	1	R*4	P1_11.3 correction	
P1_11.5	32	1	R*4	P1_11.5 correction	
P1_12.8	36	1	R*4	P1_12.8 correction	
P1_16.0	40	1	R*4	P1_16.0 correction	
P2_20	44	1	R*4	P2_20 correction	
P2_25	48	1	R*4	P2_25 correction	
P3_60	52	1	R*4	P3_60 correction	
P3_100	56	1	R*4	P3_100 correction	
C1_50	60	1	R*4	C1_50 correction	
C1_60	64	1	R*4	C1_60 correction	
C1_70	68	1	R*4	C1_70 correction	
C1_90	72	1	R*4	C1_90 correction	
C1_100	76	1	R*4	C1_100 correction	
C1_105	80	1	R*4	C1_105 correction	
C2_120	84	1	R*4	C2_120 correction	
C2_135	88	1	R*4	C2_135 correction	
C2_160	92	1	R*4	C2_160 correction	
C2_180	96	1	R*4	C2_180 correction	
C2_200	100	1	R*4	C2_200 correction	

PRODUCT TYPE: PCCMBBTWO : PHT Modified Black body Nu2 Colour correction

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 104
TEMP	0	1	R*4	Temperature in K	
P1_3.29	4	1	R*4	P1_3.29 correction	
P1_3.60	8	1	R*4	P1_3.60 correction	
P1_4.85	12	1	R*4	P1_4.85 correction	
P1_7.30	16	1	R*4	P1_7.30 correction	
P1_7.70	20	1	R*4	P1_7.70 correction	
P1_10.0	24	1	R*4	P1_10.0 correction	
P1_11.3	28	1	R*4	P1_11.3 correction	
P1_11.5	32	1	R*4	P1_11.5 correction	
P1_12.8	36	1	R*4	P1_12.8 correction	
P1_16.0	40	1	R*4	P1_16.0 correction	
P2_20	44	1	R*4	P2_20 correction	
P2_25	48	1	R*4	P2_25 correction	
P3_60	52	1	R*4	P3_60 correction	
P3_100	56	1	R*4	P3_100 correction	
C1_50	60	1	R*4	C1_50 correction	
C1_60	64	1	R*4	C1_60 correction	
C1_70	68	1	R*4	C1_70 correction	
C1_90	72	1	R*4	C1_90 correction	
C1_100	76	1	R*4	C1_100 correction	
C1_105	80	1	R*4	C1_105 correction	
C2_120	84	1	R*4	C2_120 correction	
C2_135	88	1	R*4	C2_135 correction	
C2_160	92	1	R*4	C2_160 correction	
C2_180	96	1	R*4	C2_180 correction	
C2_200	100	1	R*4	C2_200 correction	

PRODUCT TYPE: PCCPOWER : PHT Power law Colour correction

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 104
POWER	0	1	R*4	Power	
P1_3.29	4	1	R*4	P1_3.29 correction	
P1_3.60	8	1	R*4	P1_3.60 correction	
P1_4.85	12	1	R*4	P1_4.85 correction	
P1_7.30	16	1	R*4	P1_7.30 correction	
P1_7.70	20	1	R*4	P1_7.70 correction	
P1_10.0	24	1	R*4	P1_10.0 correction	
P1_11.3	28	1	R*4	P1_11.3 correction	
P1_11.5	32	1	R*4	P1_11.5 correction	
P1_12.8	36	1	R*4	P1_12.8 correction	
P1_16.0	40	1	R*4	P1_16.0 correction	
P2_20	44	1	R*4	P2_20 correction	
P2_25	48	1	R*4	P2_25 correction	
P3_60	52	1	R*4	P3_60 correction	
P3_100	56	1	R*4	P3_100 correction	
C1_50	60	1	R*4	C1_50 correction	
C1_60	64	1	R*4	C1_60 correction	
C1_70	68	1	R*4	C1_70 correction	
C1_90	72	1	R*4	C1_90 correction	
C1_100	76	1	R*4	C1_100 correction	
C1_105	80	1	R*4	C1_105 correction	
C2_120	84	1	R*4	C2_120 correction	
C2_135	88	1	R*4	C2_135 correction	

C2_160	92	1	R*4	C2_160 correction
C2_180	96	1	R*4	C2_180 correction
C2_200	100	1	R*4	C2_200 correction

PRODUCT TYPE: PC1CHOPSIG : PHT-C100 chopped signal correction

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
PC1CSPIX	0	1	I*4	Pixel	
PC1CSCPT	4	1	I*4	Chopper plateau time, n. where time = 2^(n-1)secs, n=1,8	
PC1CSOOU	8	1	R*4	Uncorrected on-off source signal (V/s)	
PC1CSOOC	12	1	R*4	Corrected on-off source signal (V/s)	
PC1CSUNC	16	1	R*4	Uncertainty of the corrected on-off signal (V/s)	

PRODUCT TYPE: PC2CHOPSIG : PHT-C200 chopped signal correction

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
PC2CSPIX	0	1	I*4	Pixel	
PC2CSCPT	4	1	I*4	Chopper plateau time, n. where time = 2^(n-1)secs, n=1,8	
PC2CSOOU	8	1	R*4	Uncorrected on-off source signal (V/s)	
PC2CSOOC	12	1	R*4	Corrected on-off source signal (V/s)	
PC2CSUNC	16	1	R*4	Uncertainty of the corrected on-off signal (V/s)	

PRODUCT TYPE: PPnCHOPSIG : PHT-Pn chopped signal correction

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
PPnCSCPT	0	1	I*4	Chopper plateau time, n. where time = 2^(n-1)secs, n=1,8	
PPnCSOOU	4	1	R*4	Uncorrected on-off source signal (V/s)	
PPnCSOOC	8	1	R*4	Corrected on-off source signal (V/s)	
PPnCSUNC	12	1	R*4	Uncertainty of the corrected on-off signal (V/s)	

n = detector number = 1,2 or 3

PRODUCT TYPE: PC1FOOTP : PHT C100 footprint matrix

NAXIS : 3 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	7	Filters (C100, in wheel position order)
2	35	Y-SC direction - 7.5" steps
3	35	Z-SC direction - 7.5" steps

PRODUCT TYPE: PC2FOOTP : PHT C200 footprint matrix

NAXIS : 3 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	5	Filters (C200, in wheel position order)
2	35	Y-SC direction - 15" steps
3	35	Z-SC direction - 15" steps

PRODUCT TYPE: PP2FOOTP : PHT P2 footprint matrix

NAXIS : 4 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	2	Filters (20mu - 25mu)
2	14	Apertures (Change Wheel position)
3	87	Y-SC direction - 3" steps (2" for AP<18")
4	87	Z-SC direction - 3" steps (2" for AP<18")

PRODUCT TYPE: PP3FOOTP : PHT P3 footprint matrix

NAXIS : 4 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	LENGTH	DESCRIPTION
1	2	Filters (60mu - 100mu)
2	14	Apertures (Change Wheel position)
3	41	Y-SC direction - 10" steps (2" for AP<52")
4	41	Z-SC direction - 10" steps (2" for AP<52")

PRODUCT TYPE: PC1SLINR : PHT C100 signal linearisation file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
PC1SLFIL	0	1	I*4	Filter (CHW position)	
PC1SLPIX	4	1	I*4	Pixel no.	
PC1SLSIG	8	1	R*4	Signal averaged over plateau(V/s)	
PC1SLSCR	12	1	R*4	Corrected signal(V/s)	
PC1SLSCU	16	1	R*4	Uncertainty in corrected signal(V/s)	

HEADER KEYWORDS

FILTCWd	I	CHW2 filter position
LOSIGLd	R	Lower limit of calibrated signal range(V/s)
HISIGLd	R	Upper limit of calibrated signal range(V/s)

PRODUCT TYPE: PC2SLINR : PHT C200 signal linearisation file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
PC2SLFIL	0	1	I*4	Filter (CHW position)	
PC2SLPIX	4	1	I*4	Pixel no.	

PC2SLSIG	8	1	R*4	Signal averaged over plateau(V/s)
PC2SLSCR	12	1	R*4	Corrected signal(V/s)
PC2SLSCU	16	1	R*4	Uncertainty in corrected signal(V/s)

HEADER KEYWORDS

FILTCWd	I	CHW2 filter position
LOSIGLd	R	Lower limit of calibrated signal range(V/s)
HISIGLd	R	Upper limit of calibrated signal range(V/s)

PRODUCT TYPE: PPnSLINR **:** PHT P1 signal linearisation file

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 16
PPnSLFIL	0	1	I*4	Filter (CHW position)
PPnSLSIG	4	1	R*4	Signal averaged over plateau(V/s)
PPnSLSCR	8	1	R*4	Corrected signal(V/s)
PPnSLSCU	12	1	R*4	Uncertainty in corrected signal(V/s)

HEADER KEYWORDS

FILTCWd	I	CHW3 filter position
LOSIGLd	R	Lower limit of calibrated signal range(V/s)
HISIGLd	R	Upper limit of calibrated signal range(V/s)

n = detector number = 1,2 or 3

PRODUCT TYPE: PCFILTRAN **:** PHT-C Filter Spectral Response

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 88
LC50	0	1	R*4	Wavelength in micron for C100 65 micron filter
SRC50	4	1	R*4	Spectral response for C100 65 micron filter
LC60	8	1	R*4	Wavelength in micron for C100 60 micron filter
SRC60	12	1	R*4	Spectral response for C100 60 micron filter
LC70	16	1	R*4	Wavelength in micron for C100 80 micron filter
SRC70	20	1	R*4	Spectral response for C100 80 micron filter
LC90	24	1	R*4	Wavelength in micron for C100 90 micron filter
SRC90	28	1	R*4	Spectral response for C100 90 micron filter
LC100	32	1	R*4	Wavelength in micron for C100 100 micron filter
SRC100	36	1	R*4	Spectral response for C100 100 micron filter
LC105	40	1	R*4	Wavelength in micron for C100 105 micron filter
SRC105	44	1	R*4	Spectral response for C100 105 micron filter
LC120	48	1	R*4	Wavelength in micron for C200 120 micron filter
SRC120	52	1	R*4	Spectral response for C200 120 micron filter
LC135	56	1	R*4	Wavelength in micron for C200 150 micron filter

SRC135	60	1	R*4	Spectral response for C200 150 micron filter
LC160	64	1	R*4	Wavelength in micron for C200 170 micron filter
SRC160	68	1	R*4	Spectral response for C200 170 micron filter
LC180	72	1	R*4	Wavelength in micron for C200 180 micron filter
SRC180	76	1	R*4	Spectral response for C200 180 micron filter
LC200	80	1	R*4	Wavelength in micron for C200 200 micron filter
SRC200	84	1	R*4	Spectral response for C200 200 micron filter

PRODUCT TYPE: PPFILTRAN : PHT-P Filter Spectral Response

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 112
LP3P29	0	1	R*4	Wavelength in micron for PHT-P1 3.3 micron filter
SRP3P29	4	1	R*4	Spectral response for PHT-P1 3.3 micron filter
LP3P6	8	1	R*4	Wavelength in micron for PHT-P1 3.6 micron filter
SRP3P6	12	1	R*4	Spectral response for PHT-P1 3.6 micron filter
LP4P85	16	1	R*4	Wavelength in micron for PHT-P1 4.8 micron filter
SRP4P85	20	1	R*4	Spectral response for PHT-P1 4.8 micron filter
LP7P3	24	1	R*4	Wavelength in micron for PHT-P1 7.3 micron filter
SRP7P3	28	1	R*4	Spectral response for PHT-P1 7.3 micron filter
LP7P7	32	1	R*4	Wavelength in micron for PHT-P1 7.7 micron filter
SRP7P7	36	1	R*4	Spectral response for PHT-P1 7.7 micron filter
LP10	40	1	R*4	Wavelength in micron for PHT-P1 10 micron filter
SRP10	44	1	R*4	Spectral response for PHT-P1 10 micron filter
LP11P3	48	1	R*4	Wavelength in micron for PHT-P1 11.3 micron filter
SRP11P3	52	1	R*4	Spectral response for PHT-P1 11.3 micron filter
LP11P5	56	1	R*4	Wavelength in micron for PHT-P1 12 micron filter
SRP11P5	60	1	R*4	Spectral response for PHT-P1 12 micron filter
LP12P8	64	1	R*4	Wavelength in micron for PHT-P1 12.8 micron filter
SRP12P8	68	1	R*4	Spectral response for PHT-P1 12.8 micron filter
LP16	72	1	R*4	Wavelength in micron for PHT-P1 15 micron filter
SRP16	76	1	R*4	Spectral response for PHT-P1 15 micron filter
LP20	80	1	R*4	Wavelength in micron for PHT-P2 20 micron filter
SRP20	84	1	R*4	Spectral response for PHT-P2 20

				micron filter
LP25	88	1	R*4	Wavelength in micron for PHT-P2 25 micron filter
SRP25	92	1	R*4	Spectral response for PHT-P2 25 micron filter
LP60	96	1	R*4	Wavelength in micron for PHT-P3 60 micron filter
SRP60	100	1	R*4	Spectral response for PHT-P3 60 micron filter
LP100	104	1	R*4	Wavelength in micron for PHT-P3 100 micron filter
SRP100	108	1	R*4	Spectral response for PHT-P3 100 micron filter

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PRODUCT TYPE: PCPSF : PHT-C Point Spread Function Corrections

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 12
PCPSFFIL	0	1	I*4	Filter (CHW position)
PCPSFPIX	4	1	R*4	Psf correction per pixel
PCPSFARR	8	1	R*4	Psf correction for array

PRODUCT TYPE: PPFTOF : PHT-P filter-to-filter flatfield correction

NAXIS : 2 **TYPE :** R*4 **UNITS :** None

AXIS No.	**LENGTH**	**DESCRIPTION**
1	14	Filters (Dimension 1)
2	2	Correction and uncertainty (Dimension 2)

PRODUCT TYPE: PPPSF : PHT Point Spread Function Corrections

NAXIS : 2 **TYPE :** R*4 **UNITS :** NONE

AXIS No.	**LENGTH**	**DESCRIPTION**
1	14	Corrections, 14 * P-apertures
2	14	Filter wheel positions

PRODUCT TYPE: PSDYNAMIC : PHT-S Dynamic Calibration - corrected flux

NAXIS : 3 **TYPE :** R*4 **UNITS :** Jy

AXIS No.	**LENGTH**	**DESCRIPTION**
1	130	Signal - log(V/s)
2	13	Time at log_2(t) = 0,1,2,3,4,5,6,7,8,9,10,11,12
3	128	Pixels

PRODUCT TYPE: PSDYNWT : PHT-S Dynamic Calibration - weighting function

NAXIS : 3 **TYPE :** R*4 **UNITS :** None

AXIS No.	LENGTH	DESCRIPTION
1	130	Signal - log(V/s)
2	13	Time at log_2(t) = 0,1,2,3,4,5,6,7,8,9,10,11,12
3	128	Pixels

5.5 *SWS Calibration files*

PRODUCT TYPE: SC01 **:** SWS Electrical Xtalk Matrices

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 208
B1_DET1	0	1	R*4	Crosstalk between det 1 and others in band 1	
B1_DET2	4	1	R*4	Crosstalk between det 2 and others in band 1	
B1_DET3	8	1	R*4	Crosstalk between det 3 and others in band 1	
B1_DET4	12	1	R*4	Crosstalk between det 4 and others in band 1	
B1_DET5	16	1	R*4	Crosstalk between det 5 and others in band 1	
B1_DET6	20	1	R*4	Crosstalk between det 6 and others in band 1	
B1_DET7	24	1	R*4	Crosstalk between det 7 and others in band 1	
B1_DET8	28	1	R*4	Crosstalk between det 8 and others in band 1	
B1_DET9	32	1	R*4	Crosstalk between det 9 and others in band 1	
B1_DET10	36	1	R*4	Crosstalk between det 10 and others in band 1	
B1_DET11	40	1	R*4	Crosstalk between det 11 and others in band 1	
B1_DET12	44	1	R*4	Crosstalk between det 12 and others in band 1	
B2_DET1	48	1	R*4	Crosstalk between det 1 and others in band 2	
B2_DET2	52	1	R*4	Crosstalk between det 2 and others in band 2	
B2_DET3	56	1	R*4	Crosstalk between det 3 and others in band 2	
B2_DET4	60	1	R*4	Crosstalk between det 4 and others in band 2	
B2_DET5	64	1	R*4	Crosstalk between det 5 and others in band 2	
B2_DET6	68	1	R*4	Crosstalk between det 6 and others in band 2	
B2_DET7	72	1	R*4	Crosstalk between det 7 and others in band 2	
B2_DET8	76	1	R*4	Crosstalk between det 8 and others in band 2	
B2_DET9	80	1	R*4	Crosstalk between det 9 and others in band 2	
B2_DET10	84	1	R*4	Crosstalk between det 10 and others in band 2	
B2_DET11	88	1	R*4	Crosstalk between det 11 and others in band 2	
B2_DET12	92	1	R*4	Crosstalk between det 12 and others in band 2	
B3_DET1	96	1	R*4	Crosstalk between det 1 and others in band 3	
B3_DET2	100	1	R*4	Crosstalk between det 2 and others	

				in band 3
B3_DET3	104	1	R*4	Crosstalk between det 3 and others in band 3
B3_DET4	108	1	R*4	Crosstalk between det 4 and others in band 3
B3_DET5	112	1	R*4	Crosstalk between det 5 and others in band 3
B3_DET6	116	1	R*4	Crosstalk between det 6 and others in band 3
B3_DET7	120	1	R*4	Crosstalk between det 7 and others in band 3
B3_DET8	124	1	R*4	Crosstalk between det 8 and others in band 3
B3_DET9	128	1	R*4	Crosstalk between det 9 and others in band 3
B3_DET10	132	1	R*4	Crosstalk between det 10 and others in band 3
B3_DET11	136	1	R*4	Crosstalk between det 11 and others in band 3
B3_DET12	140	1	R*4	Crosstalk between det 12 and others in band 3
B4_DET1	144	1	R*4	Crosstalk between det 1 and others in band 4
B4_DET2	148	1	R*4	Crosstalk between det 2 and others in band 4
B4_DET3	152	1	R*4	Crosstalk between det 3 and others in band 4
B4_DET4	156	1	R*4	Crosstalk between det 4 and others in band 4
B4_DET5	160	1	R*4	Crosstalk between det 5 and others in band 4
B4_DET6	164	1	R*4	Crosstalk between det 6 and others in band 4
B4_DET7	168	1	R*4	Crosstalk between det 7 and others in band 4
B4_DET8	172	1	R*4	Crosstalk between det 8 and others in band 4
B4_DET9	176	1	R*4	Crosstalk between det 9 and others in band 4
B4_DET10	180	1	R*4	Crosstalk between det 10 and others in band 4
B4_DET11	184	1	R*4	Crosstalk between det 11 and others in band 4
B4_DET12	188	1	R*4	Crosstalk between det 12 and others in band 4
B5_DET1	192	1	R*4	Crosstalk between det 1 and others in band 5
B5_DET2	196	1	R*4	Crosstalk between det 2 and others in band 5
B6_DET1	200	1	R*4	Crosstalk between det 1 and others in band 6
B6_DET2	204	1	R*4	Crosstalk between det 2 and others in band 6

PRODUCT TYPE: SC02 **:** SWS RC correction timescales

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 4
TAU	0	1	R*4	RC time per detector TUNIT=s

PRODUCT TYPE: SC02A : SWS MIDBIT shift

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 4
MIDBIT	0	1	R*4	Telemetry MIDBIT Data	

PRODUCT TYPE: SC02B : SWS Reset Pulse Correction Factor

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 208
SHAPE01	0	1	R*4	Reset Shape Factor	
SHAPE02	4	1	R*4	Reset Shape Factor	
.					
.					
.					
SHAPE51	200	1	R*4	Reset Shape Factor	
SHAPE52	204	1	R*4	Reset Shape Factor	

NB: The 52 columns in SC02B correspond to detectors 1 to 52 where column 1 is for detector 1, column 2 for detector 2 etc.

PRODUCT TYPE: SC03 : SWS reset cutout length

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 4
AFTE	0	1	I*4	Reset length	

PRODUCT TYPE: SC04 : SWS Amplifier limits

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 24
MIN_V_01	0	1	R*4	Min saturation voltage with gain 1 TUNIT=chan	
MAX_V_01	4	1	R*4	Max saturation voltage with gain 1 TUNIT=chan	
MIN_V_04	8	1	R*4	Min saturation voltage with gain 4 TUNIT=chan	
MAX_V_04	12	1	R*4	Max saturation voltage with gain 4 TUNIT=chan	
MIN_V_16	16	1	R*4	Min saturation voltage with gain 16 TUNIT=chan	
MAX_V_16	20	1	R*4	Max saturation voltage with gain 16 TUNIT=chan	

PRODUCT TYPE: SC05 : SWS switchable gains

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 12
GAIN_1	0	1	R*4	Gain 1	
GAIN_4	4	1	R*4	Gain 4	
GAIN_16	8	1	R*4	Gain 16	

PRODUCT TYPE: SC06 : SWS glitch reject levels

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
ALPHA	0	1	R*4	Glitch discrimination level	
NP_BEFOR	4	1	I*4	Number of points to be skipped before a glitch	
NP_AFTER	8	1	I*4	Number of points to be skipped after a glitch	
MINWIDTH	12	1	I*4	Min width for glitch rejection	

PRODUCT TYPE: SC12 : SWS gap-position relation

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 36
FPPS	0	1	R*4	FP position	
C11	4	1	R*4	FP1 maincurrent TUNIT=chan	
C12	8	1	R*4	FP1 Correction current 1 TUNIT=chan	
C13	12	1	R*4	FP1 Correction current 2 TUNIT=chan	
GAP1	16	1	R*4	FP1 Gap TUNIT=um	
C21	20	1	R*4	FP2 maincurrent TUNIT=chan	
C22	24	1	R*4	FP2 Correction current 1 TUNIT=chan	
C23	28	1	R*4	FP2 Correction current 2 TUNIT=chan	
GAP2	32	1	R*4	FP2 Gap TUNIT=um	

PRODUCT TYPE: SC13 : SWS Cal file 13

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 604
AOT_BAND	0	1	C*4	name of AOT band	
KEYWAVEL	4	1	R*4	Key wavelength TUNITS=um	
DETNON_L	8	1	R*4	detector non linearity TUNITS=um	
PASSBAND	12	1	R*4	passband width used to determine cal. flux TUNITS=um	
S_F1	16	1	R*4	conv. factor at key wavel., det. 1 TUNITS=uV/sec/Jy	
S_F2	20	1	R*4	conv. factor at key wavel., det. 2 TUNITS=uV/sec/Jy	
S_F3	24	1	R*4	conv. factor at key wavel., det. 3 TUNITS=uV/sec/Jy	
S_F4	28	1	R*4	conv. factor at key wavel., det. 4 TUNITS=uV/sec/Jy	
S_F5	32	1	R*4	conv. factor at key wavel., det. 5 TUNITS=uV/sec/Jy	
S_F6	36	1	R*4	conv. factor at key wavel., det. 6 TUNITS=uV/sec/Jy	
S_F7	40	1	R*4	conv. factor at key wavel., det. 7 TUNITS=uV/sec/Jy	
S_F8	44	1	R*4	conv. factor at key wavel., det. 8 TUNITS=uV/sec/Jy	

S_F9	48	1	R*4	conv. factor at key wavel., det. 9 TUNITS=uV/sec/Jy
S_F10	52	1	R*4	conv. factor at key wavel., det.10 TUNITS=uV/sec/Jy
S_F11	56	1	R*4	conv. factor at key wavel., det.11 TUNITS=uV/sec/Jy
S_F12	60	1	R*4	conv. factor at key wavel., det.12 TUNITS=uV/sec/Jy
S0D1	64	1	R*4	intern. cal. signal for S_F1, det. 1 TUNITS=uV/sec
S0D2	68	1	R*4	intern. cal. signal for S_F1, det. 2 TUNITS=uV/sec
S0D3	72	1	R*4	intern. cal. signal for S_F1, det. 3 TUNITS=uV/sec
S0D4	76	1	R*4	intern. cal. signal for S_F1, det. 4 TUNITS=uV/sec
S0D5	80	1	R*4	intern. cal. signal for S_F1, det. 5 TUNITS=uV/sec
S0D6	84	1	R*4	intern. cal. signal for S_F1, det. 6 TUNITS=uV/sec
S0D7	88	1	R*4	intern. cal. signal for S_F1, det. 7 TUNITS=uV/sec
S0D8	92	1	R*4	intern. cal. signal for S_F1, det. 8 TUNITS=uV/sec
S0D9	96	1	R*4	intern. cal. signal for S_F1, det. 9 TUNITS=uV/sec
S0D10	100	1	R*4	intern. cal. signal for S_F1, det.10 TUNITS=uV/sec
S0D11	104	1	R*4	intern. cal. signal for S_F1, det.11 TUNITS=uV/sec
S0D12	108	1	R*4	intern. cal. signal for S_F1, det.12 TUNITS=uV/sec
RELFLX1	112	1	R*4	Relative flux calibration (S0D1/S_F1) TUNITS=Jy
RELFLX2	116	1	R*4	Relative flux calibration (S0D2/S_F2) TUNITS=Jy
RELFLX3	120	1	R*4	Relative flux calibration (S0D3/S_F3) TUNITS=Jy
RELFLX4	124	1	R*4	Relative flux calibration (S0D4/S_F4) TUNITS=Jy
RELFLX5	128	1	R*4	Relative flux calibration (S0D5/S_F5) TUNITS=Jy
RELFLX6	132	1	R*4	Relative flux calibration (S0D6/S_F6) TUNITS=Jy
RELFLX7	136	1	R*4	Relative flux calibration (S0D7/S_F7) TUNITS=Jy
RELFLX8	140	1	R*4	Relative flux calibration (S0D8/S_F8) TUNITS=Jy
RELFLX9	144	1	R*4	Relative flux calibration (S0D9/S_F9) TUNITS=Jy
RELFLX10	148	1	R*4	Relative flux calibration (S0D10/S_F10) TUNITS=Jy
RELFLX11	152	1	R*4	Relative flux calibration (S0D11/S_F11) TUNITS=Jy
RELFLX12	156	1	R*4	Relative flux calibration (S0D12/S_F12) TUNITS=Jy
SF_LER1	160	1	R*4	Error in S_F1 TUNITS=uV/sec/Jy
SF_LER2	164	1	R*4	Error in S_F2 TUNITS=uV/sec/Jy
SF_LER3	168	1	R*4	Error in S_F3

				TUNITS=uV/sec/Jy
SF_LER4	172	1	R*4	Error in S_F4
				TUNITS=uV/sec/Jy
SF_LER5	176	1	R*4	Error in S_F5
				TUNITS=uV/sec/Jy
SF_LER6	180	1	R*4	Error in S_F6
				TUNITS=uV/sec/Jy
SF_LER7	184	1	R*4	Error in S_F7
				TUNITS=uV/sec/Jy
SF_LER8	188	1	R*4	Error in S_F8
				TUNITS=uV/sec/Jy
SF_LER9	192	1	R*4	Error in S_F9
				TUNITS=uV/sec/Jy
SF_LER10	196	1	R*4	Error in S_F10
				TUNITS=uV/sec/Jy
SF_LER11	200	1	R*4	Error in S_F11
				TUNITS=uV/sec/Jy
SF_LER12	204	1	R*4	Error in S_F12
				TUNITS=uV/sec/Jy
SF_MER1	208	1	R*4	Error in S_F1
				TUNITS=uV/sec/Jy
SF_MER2	212	1	R*4	Error in S_F2
				TUNITS=uV/sec/Jy
SF_MER3	216	1	R*4	Error in S_F3
				TUNITS=uV/sec/Jy
SF_MER4	220	1	R*4	Error in S_F4
				TUNITS=uV/sec/Jy
SF_MER5	224	1	R*4	Error in S_F5
				TUNITS=uV/sec/Jy
SF_MER6	228	1	R*4	Error in S_F6
				TUNITS=uV/sec/Jy
SF_MER7	232	1	R*4	Error in S_F7
				TUNITS=uV/sec/Jy
SF_MER8	236	1	R*4	Error in S_F8
				TUNITS=uV/sec/Jy
SF_MER9	240	1	R*4	Error in S_F9
				TUNITS=uV/sec/Jy
SF_MER10	244	1	R*4	Error in S_F10
				TUNITS=uV/sec/Jy
SF_MER11	248	1	R*4	Error in S_F11
				TUNITS=uV/sec/Jy
SF_MER12	252	1	R*4	Error in S_F12
				TUNITS=uV/sec/Jy
SF_HER1	256	1	R*4	Error in S_F1
				TUNITS=uV/sec/Jy
SF_HER2	260	1	R*4	Error in S_F2
				TUNITS=uV/sec/Jy
SF_HER3	264	1	R*4	Error in S_F3
				TUNITS=uV/sec/Jy
SF_HER4	268	1	R*4	Error in S_F4
				TUNITS=uV/sec/Jy
SF_HER5	272	1	R*4	Error in S_F5
				TUNITS=uV/sec/Jy
SF_HER6	276	1	R*4	Error in S_F6
				TUNITS=uV/sec/Jy
SF_HER7	280	1	R*4	Error in S_F7
				TUNITS=uV/sec/Jy
SF_HER8	284	1	R*4	Error in S_F8
				TUNITS=uV/sec/Jy
SF_HER9	288	1	R*4	Error in S_F9
				TUNITS=uV/sec/Jy
SF_HER10	292	1	R*4	Error in S_F10
				TUNITS=uV/sec/Jy
SF_HER11	296	1	R*4	Error in S_F11

				TUNITS=uV/sec/Jy
SF_HER12	300	1	R*4	Error in S_F12
				TUNITS=uV/sec/Jy
S0DLER1	304	1	R*4	Error in S0D1
				TUNITS=uV/sec
S0DLER2	308	1	R*4	Error in S0D2
				TUNITS=uV/sec
S0DLER3	312	1	R*4	Error in S0D3
				TUNITS=uV/sec
S0DLER4	316	1	R*4	Error in S0D4
				TUNITS=uV/sec
S0DLER5	320	1	R*4	Error in S0D5
				TUNITS=uV/sec
S0DLER6	324	1	R*4	Error in S0D6
				TUNITS=uV/sec
S0DLER7	328	1	R*4	Error in S0D7
				TUNITS=uV/sec
S0DLER8	332	1	R*4	Error in S0D8
				TUNITS=uV/sec
S0DLER9	336	1	R*4	Error in S0D9
				TUNITS=uV/sec
S0DLER10	340	1	R*4	Error in S0D10
				TUNITS=uV/sec
S0DLER11	344	1	R*4	Error in S0D11
				TUNITS=uV/sec
S0DLER12	348	1	R*4	Error in S0D12
				TUNITS=uV/sec
S0DMER1	352	1	R*4	Error in S0D1
				TUNITS=uV/sec
S0DMER2	356	1	R*4	Error in S0D2
				TUNITS=uV/sec
S0DMER3	360	1	R*4	Error in S0D3
				TUNITS=uV/sec
S0DMER4	364	1	R*4	Error in S0D4
				TUNITS=uV/sec
S0DMER5	368	1	R*4	Error in S0D5
				TUNITS=uV/sec
S0DMER6	372	1	R*4	Error in S0D6
				TUNITS=uV/sec
S0DMER7	376	1	R*4	Error in S0D7
				TUNITS=uV/sec
S0DMER8	380	1	R*4	Error in S0D8
				TUNITS=uV/sec
S0DMER9	384	1	R*4	Error in S0D9
				TUNITS=uV/sec
S0DMER10	388	1	R*4	Error in S0D10
				TUNITS=uV/sec
S0DMER11	392	1	R*4	Error in S0D11
				TUNITS=uV/sec
S0DMER12	396	1	R*4	Error in S0D12
				TUNITS=uV/sec
S0DHEHR1	400	1	R*4	Error in S0D1
				TUNITS=uV/sec
S0DHER2	404	1	R*4	Error in S0D2
				TUNITS=uV/sec
S0DHER3	408	1	R*4	Error in S0D3
				TUNITS=uV/sec
S0DHER4	412	1	R*4	Error in S0D4
				TUNITS=uV/sec
S0DHER5	416	1	R*4	Error in S0D5
				TUNITS=uV/sec
S0DHER6	420	1	R*4	Error in S0D6
				TUNITS=uV/sec
S0DHER7	424	1	R*4	Error in S0D7

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                                TUNITS=uV/sec
S0DHER8     428     1 R*4   Error in S0D8
                            TUNITS=uV/sec
S0DHER9     432     1 R*4   Error in S0D9
                            TUNITS=uV/sec
S0DHER10    436     1 R*4   Error in S0D10
                            TUNITS=uV/sec
S0DHER11    440     1 R*4   Error in S0D11
                            TUNITS=uV/sec
S0DHER12    444     1 R*4   Error in S0D12
                            TUNITS=uV/sec
RLFXLE1     448     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE2     452     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE3     456     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE4     460     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE5     464     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE6     468     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE7     472     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE8     476     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE9     480     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE10    484     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE11    488     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXLE12    492     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME1     496     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME2     500     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME3     504     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME4     508     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME5     512     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME6     516     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME7     520     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME8     524     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME9     528     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME10    532     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME11    536     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXME12    540     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXHE1     544     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXHE2     548     1 R*4   Error on relative flux
                            TUNITS=Jy
RLFXHE3     552     1 R*4   Error on relative flux
```

				TUNITS=Jy
RLFXHE4	556	1	R*4	Error on relative flux TUNITS=Jy
RLFXHE5	560	1	R*4	Error on relative flux TUNITS=Jy
RLFXHE6	564	1	R*4	Error on relative flux TUNITS=Jy
RLFXHE7	568	1	R*4	Error on relative flux TUNITS=Jy
RLFXHE8	572	1	R*4	Error on relative flux TUNITS=Jy
RLFXHE9	576	1	R*4	Error on relative flux TUNITS=Jy
RLFXHE10	580	1	R*4	Error on relative flux TUNITS=Jy
RLFXHE11	584	1	R*4	Error on relative flux TUNITS=Jy
RLFXHE12	588	1	R*4	Error on relative flux TUNITS=Jy
START_P	592	1	R*4	grating start position of photometric check
END_P	596	1	R*4	grating end position of photometric check
IGNSTART	600	1	I*4	samples ignored at begin of cal. data

PRODUCT TYPE: SC16A : SWS aperture offsets

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 28
BETA_SW	0	1	R*4	Angle to optical axis (SW) TUNIT=deg	
BETA_LW	4	1	R*4	Angle to optical axis (LW) TUNIT=deg	
COMMENT	8	1	C*20	Comment string	

PRODUCT TYPE: SC16B : SWS element offsets

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 4
DELTA	0	1	R*4	Angles to detectors TUNIT=deg	

PRODUCT TYPE: SC16C : SWS grating constants

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 4
GR_CONST	0	1	R*4	Grating constants TUNIT=um	

PRODUCT TYPE: SC16E : SWS scanner curve coefficients

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 16
SW	0	1	R*8	SW scanner curve coeffs	
LW	8	1	R*8	LW scanner curve coeffs	

PRODUCT TYPE: SC16ET : SWS Cal file 16ET

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 56
ITK	0	1	I*4	Instrument Time Key	
SW_LW	4	1	C*4	Key wavelength TUNITS=um	
P0	8	1	R*8	wavelength interpolation coefficient	
P1	16	1	R*8	wavelength interpolation coefficient	
P2	24	1	R*8	wavelength interpolation coefficient	
P3	32	1	R*8	wavelength interpolation coefficient	
P4	40	1	R*8	wavelength interpolation coefficient	
P5	48	1	R*8	wavelength interpolation coefficient	

PRODUCT TYPE: SC18 : SWS effective gap corr.

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 12
WAVE	0	1	R*4	Wavelength TUNIT=um	
D_GAP_1	4	1	R*4	Delta gap 1 TUNIT=um	
D_GAP_2	8	1	R*4	Delta gap 2 TUNIT=um	

PRODUCT TYPE: SC19 : SWS FWHM Responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
AOT_NAME	0	1	C*4	AOT name	
AOTSPEED	4	1	I*4	AOT speed (1,2,3 or 4 for S01, 0 for rest)	
AOT_BAND	8	1	C*4	AOT band (1A, 1B, ...6)	
WAVE	12	1	R*4	Wavelength TUNIT=um	
FWHM	16	1	R*4	FWHM at wavelength TUNIT=um	

PRODUCT TYPE: SC21_1 : SWS Detector dark current/noise (reset=1sec)

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
DETECTOR	0	1	I*4	Detector number	
DARK_CUR	4	1	R*4	Average measured dark current TUNIT=uV/s	
DARK_NOI	8	1	R*4	The dark current noise TUNIT=uV/s	
LOW_LIMI	12	1	R*4	Lower limit for valid dark current TUNIT=uV/s	
HIGH_LIM	16	1	R*4	Upper limit for valid dark current TUNIT=uV/s	

PRODUCT TYPE: SC21_2 : SWS Cal file 21_2

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
DETECTOR	0	1	I*4	Detector number	
DARK_CUR	4	1	R*4	Average measured dark current TUNIT=uV/s	
DARK_NOI	8	1	R*4	The dark current noise TUNIT=uV/s	
LOW_LIMI	12	1	R*4	Lower limit for valid dark current TUNIT=uV/s	
HIGH_LIM	16	1	R*4	Upper limit for valid dark current TUNIT=uV/s	

PRODUCT TYPE: SC21_4 : SWS Cal file 21_4

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
DETECTOR	0	1	I*4	Detector number	
DARK_CUR	4	1	R*4	Average measured dark current TUNIT=uV/s	
DARK_NOI	8	1	R*4	The dark current noise TUNIT=uV/s	
LOW_LIMI	12	1	R*4	Lower limit for valid dark current TUNIT=uV/s	
HIGH_LIM	16	1	R*4	Upper limit for valid dark current TUNIT=uV/s	

PRODUCT TYPE: SC21_8 : SWS Cal file 21_8

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
DETECTOR	0	1	I*4	Detector number	
DARK_CUR	4	1	R*4	Average measured dark current TUNIT=uV/s	
DARK_NOI	8	1	R*4	The dark current noise TUNIT=uV/s	
LOW_LIMI	12	1	R*4	Lower limit for valid dark current TUNIT=uV/s	
HIGH_LIM	16	1	R*4	Upper limit for valid dark current TUNIT=uV/s	

PRODUCT TYPE: SC23 : SWS wave limits - bands

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 8
LODET	0	1	R*4	Low wavelength limits of the bands TUNIT=um	
HIDET	4	1	R*4	High wavelength limits of the bands TUNIT=um	

PRODUCT TYPE: SC24 : SWS wavelen limits - apertures

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
LOWAVE_1	0	1	R*4	Low wavelength limit of SW apertures	

				TUNIT=um
HIWAVE_1	4	1	R*4	High wavelength limit of SW apertures TUNIT=um
LOWAVE_2	8	1	R*4	Low wavelength limit of LW apertures TUNIT=um
HIWAVE_2	12	1	R*4	High wavelength limit of LW apertures TUNIT=um

PRODUCT TYPE: SC25_1A : SWS Cal file 25_1A: spectral responsivity

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 144
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA02	12	1	R*4	Wavelength TUNIT=um	
RESPON02	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA02	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					
LAMBDA12	132	1	R*4	Wavelength TUNIT=um	
RESPON12	136	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA12	140	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_1B : SWS Cal file 25_1B: spectral responsivity

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 144
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA02	12	1	R*4	Wavelength TUNIT=um	
RESPON02	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA02	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					
LAMBDA12	132	1	R*4	Wavelength TUNIT=um	
RESPON12	136	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA12	140	1	R*4	Sigma	

TUNIT=uV/s/Jy

PRODUCT TYPE: SC25_1D : SWS Cal file 25_1D: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 144
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA02	12	1	R*4	Wavelength TUNIT=um	
RESPON02	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA02	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					
LAMBDA12	132	1	R*4	Wavelength TUNIT=um	
RESPON12	136	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA12	140	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_1E : SWS Cal file 25_1E: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 144
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA02	12	1	R*4	Wavelength TUNIT=um	
RESPON02	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA02	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					
LAMBDA12	132	1	R*4	Wavelength TUNIT=um	
RESPON12	136	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA12	140	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_2A : SWS Cal G file 25_2A: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 144
LAMBDA13	0	1	R*4	Wavelength TUNIT=um	
RESPON13	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA13	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA14	12	1	R*4	Wavelength TUNIT=um	
RESPON14	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA14	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					
LAMBDA24	132	1	R*4	Wavelength TUNIT=um	
RESPON24	136	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA24	140	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_2B : SWS Cal G file 25_2B: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 144
LAMBDA13	0	1	R*4	Wavelength TUNIT=um	
RESPON13	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA13	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA14	12	1	R*4	Wavelength TUNIT=um	
RESPON14	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA14	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					
LAMBDA24	132	1	R*4	Wavelength TUNIT=um	
RESPON24	136	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA24	140	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_2C : SWS Cal G file 25_2C: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 144
LAMBDA13	0	1	R*4	Wavelength TUNIT=um	
RESPON13	4	1	R*4	Responsivity	

				TUNIT=uV/s/Jy
SIGMA13	8	1	R*4	Sigma TUNIT=uV/s/Jy
LAMBDA14	12	1	R*4	Wavelength TUNIT=um
RESPON14	16	1	R*4	Responsivity TUNIT=uV/s/Jy
SIGMA14	20	1	R*4	Sigma TUNIT=uV/s/Jy
.				
.				
.				
LAMBDA24	132	1	R*4	Wavelength TUNIT=um
RESPON24	136	1	R*4	Responsivity TUNIT=uV/s/Jy
SIGMA24	140	1	R*4	Sigma TUNIT=uV/s/Jy

PRODUCT TYPE: SC25_3A : SWS Cal G file 25_3A: spectral responsivity

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 144
LAMBDA25	0	1	R*4	Wavelength TUNIT=um	
RESPON25	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA25	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA26	12	1	R*4	Wavelength TUNIT=um	
RESPON26	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA26	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					
LAMBDA36	132	1	R*4	Wavelength TUNIT=um	
RESPON36	136	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA36	140	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_3C : SWS Cal G file 25_3C: spectral responsivity

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 144
LAMBDA25	0	1	R*4	Wavelength TUNIT=um	
RESPON25	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA25	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA26	12	1	R*4	Wavelength TUNIT=um	
RESPON26	16	1	R*4	Responsivity	

				TUNIT=uV/s/Jy
SIGMA26	20	1	R*4	Sigma TUNIT=uV/s/Jy
.				
.				
.				
LAMBDA36	132	1	R*4	Wavelength TUNIT=um
RESPON36	136	1	R*4	Responsivity TUNIT=uV/s/Jy
SIGMA36	140	1	R*4	Sigma TUNIT=uV/s/Jy

PRODUCT TYPE: SC25_3D : SWS Cal G file 25_3D: spectral responsivity

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 144
LAMBDA25	0	1	R*4	Wavelength TUNIT=um	
RESPON25	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA25	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA26	12	1	R*4	Wavelength TUNIT=um	
RESPON26	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA26	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					
LAMBDA36	132	1	R*4	Wavelength TUNIT=um	
RESPON36	136	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA36	140	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_3E : SWS Cal G file 25_3E: spectral responsivity

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 144
LAMBDA25	0	1	R*4	Wavelength TUNIT=um	
RESPON25	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA25	8	1	R*4	Sigma TUNIT=uV/s/Jy	
LAMBDA26	12	1	R*4	Wavelength TUNIT=um	
RESPON26	16	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA26	20	1	R*4	Sigma TUNIT=uV/s/Jy	
.					
.					
.					

LAMBDA36	132	1	R*4	Wavelength TUNIT=um
RESPON36	136	1	R*4	Responsivity TUNIT=uV/s/Jy
SIGMA36	140	1	R*4	Sigma TUNIT=uV/s/Jy

PRODUCT TYPE: SC25_4 : SWS Cal G file 25_4: spectral responsivity

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** (**REC LENGTH:** 144)
LAMBDA37	0	1	R*4	Wavelength TUNIT=um
RESPON37	4	1	R*4	Responsivity TUNIT=uV/s/Jy
SIGMA37	8	1	R*4	Sigma TUNIT=uV/s/Jy
LAMBDA38	12	1	R*4	Wavelength TUNIT=um
RESPON38	16	1	R*4	Responsivity TUNIT=uV/s/Jy
SIGMA38	20	1	R*4	Sigma TUNIT=uV/s/Jy
.				
.				
.				
LAMBDA48	132	1	R*4	Wavelength TUNIT=um
RESPON48	136	1	R*4	Responsivity TUNIT=uV/s/Jy
SIGMA48	140	1	R*4	Sigma TUNIT=uV/s/Jy

PRODUCT TYPE: SC25_4A : SWS Cal G file 25_4A: spectral responsivity

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** (**REC LENGTH:** 144)
LAMBDA37	0	1	R*4	Wavelength TUNITS=microns
RESPON37	4	1	R*4	Responsivity TUNITS=uV/sec/Jy
SIGMA37	8	1	R*4	Sigma TUNITS=uV/sec/Jy
LAMBDA38	12	1	R*4	Wavelength TUNITS=microns
RESPON38	16	1	R*4	Responsivity TUNITS=uV/sec/Jy
SIGMA38	20	1	R*4	Sigma TUNITS=uV/sec/Jy
.				
.				
.				
LAMBDA48	132	1	R*4	Wavelength TUNITS=microns
RESPON48	136	1	R*4	Responsivity TUNITS=uV/sec/Jy
SIGMA48	140	1	R*4	Sigma TUNITS=uV/sec/Jy

PRODUCT TYPE: SC25_4C : SWS Cal G file 25_4C: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 144
LAMBDA37	0	1	R*4	Wavelength TUNITS=microns	
RESPON37	4	1	R*4	Responsivity TUNITS=uV/sec/Jy	
SIGMA37	8	1	R*4	Sigma TUNITS=uV/sec/Jy	
LAMBDA38	12	1	R*4	Wavelength TUNITS=microns	
RESPON38	16	1	R*4	Responsivity TUNITS=uV/sec/Jy	
SIGMA38	20	1	R*4	Sigma TUNITS=uV/sec/Jy	
.					
.					
.					
LAMBDA48	132	1	R*4	Wavelength TUNITS=microns	
RESPON48	136	1	R*4	Responsivity TUNITS=uV/sec/Jy	
SIGMA48	140	1	R*4	Sigma TUNITS=uV/sec/Jy	

PRODUCT TYPE: SC25_4D : SWS Cal G file 25_4D: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 144
LAMBDA37	0	1	R*4	Wavelength TUNITS=microns	
RESPON37	4	1	R*4	Responsivity TUNITS=uV/sec/Jy	
SIGMA37	8	1	R*4	Sigma TUNITS=uV/sec/Jy	
LAMBDA38	12	1	R*4	Wavelength TUNITS=microns	
RESPON38	16	1	R*4	Responsivity TUNITS=uV/sec/Jy	
SIGMA38	20	1	R*4	Sigma TUNITS=uV/sec/Jy	
.					
.					
.					
LAMBDA48	132	1	R*4	Wavelength TUNITS=microns	
RESPON48	136	1	R*4	Responsivity TUNITS=uV/sec/Jy	
SIGMA48	140	1	R*4	Sigma TUNITS=uV/sec/Jy	

PRODUCT TYPE: SC25_5A : SWS Cal G file 25_5A: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 12
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_5B : SWS Cal G file 25_5B: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 12
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_5C : SWS Cal G file 25_5C: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 12
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_5D : SWS Cal G file 25_5D: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 12
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma TUNIT=uV/s/Jy	

PRODUCT TYPE: SC25_6 : SWS Cal G file 25_6: spectral responsivity

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 12
LAMBDA01	0	1	R*4	Wavelength TUNIT=um	
RESPON01	4	1	R*4	Responsivity TUNIT=uV/s/Jy	
SIGMA01	8	1	R*4	Sigma	

TUNIT=uV/s/Jy

PRODUCT TYPE: SC41 : SWS Cal file 41

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 272
DET	0	1	I*4	Detector number	
N_OBS	4	1	I*4	Number of obserbvations used	
GRPOS	8	22	I*4	grating positions	
SIGNAL	96	22	R*4	wavelength interpolation coefficient	
STDEV	184	22	R*4	wavelength interpolation coefficient	

PRODUCT TYPE: STIMEDEP : SWS Calibration Time Dependency

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
CALGROOT	0	1	C*12	Root name (referred to when file is opened)	
CALGFILE	12	1	C*12	Corresponding filename	
CALGTIME	24	1	C*11	Time from which this file applies (yydddhhmmss)	
CALGCOMM	35	1	C*45	Optional comment relating to this file	

For the sake of brevity some of the above files have been condensed by removing repetitive field names and replacing them with three lines containing a single dot. e.g. SC25_1A contains keywords LAMBDAnn, RESPONnn and SIGMAnn, where nn=01 to 12 inclusive.

SC25 has been split into many parts. Only one example of each of the following types has been given in the preceeding descriptions.

SC25_1A, SC25_1B, SC25_1D, SC25_1E have an identical structure and represent the responsivity of grating number one over different wavelength ranges.

SC25_2A, SC25_2B, SC25_2C have an identical structure and represent the responsivity of grating number two over different wavelength ranges.

Similarly SC25_3A, SC25_3C, SC25_3D give the responsivity for grating 3 while SC25_4, SC25_4A,C,D describe grating 4.

SC25_5A, SC25_5B, SC25_5C, SC25_5D contain the responsivity of the first Fabry-Perot over four different wavelength ranges.

SC25_6 describes the second Fabry-Perot.

6 STANDARD PROCESSED DATA

6.1 General Introduction

This section describes the files generated during the DERIVE_SPD processing. These include calibration files relevant to a particular observation (CAL_A).

6.2 SPD Detailed Specification

6.2.1 CAM SPD

PRODUCT TYPE: CISP : CAM Standard Processed Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 4600
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Spare	
CISPFILL	8	9	I*4	Spare	
CISPBOOT	44	1	I*4	Time since processor's boot [CAMTU]	
CISPDEID	48	1	I*1	Detector ID (SW:0, LW:1)	
CISPCNFG	49	1	I*1	Configuration number within AOT	
CISPQFLG	50	1	I*1	CAM's QLA flag: F2_QLA + 2*OTFLAG + 4*OTFSUM 0 = bad, 3 = good (normal processing mode) 7 = good (accumulated or sampled processing mode)	
CISPPROC	51	1	I*1	PROCessing mode 0:Normal, 1:Accumulated, 2:Sampled	
CISPDISC	52	1	I*2	CSH/ERD "Discrepancy Flags" 0 = good, >0 = bad	
CISPPFOV	54	1	I*2	Lens wheel step number	
CISPITIM	56	1	I*2	Elementary integration time (CAMTU)	
CISPFCVF	58	1	I*2	Filter wheel step number	
CISPWAVE	60	1	R*4	Filter or CVF central wavelength	
CISPEWHL	64	1	I*2	Entrance wheel step number	
CISPSWHL	66	1	I*2	Selection wheel step number	
CISPWDTH	68	1	I*2	Filter/CVF width in millimicrons	
CISPOBST	70	1	I*1	Current op-mode 1:OBS, 2:DRK, 3:CAL, 4:CLN,0:IDLE	
CISPCVFS	71	1	I*1	CVF scan on/off (1/0)	
CISPTEMP	72	10	R*4	CAM Temperatures [K] Cam1temp (4) Templw1 (1) Templw2 (1) Swtemp (1) Cam2temp (2) Cam3t (1)	
CISPBLKB	112	2	R*4	Black body current & voltage	
CISPGAIN	120	1	I*1	Electronics gain (0,1,2)	

```
CISPOFFS   121    1 I*1  Electronics offset (0...3)
CISPBSFG   122    1 I*2  BeamS flag: 256*C+R; C:cycle, R:ref#,
                         Add 16 on Ref
CISPMEAN   124    1 R*4  Frame mean of CISPDATA (this - last)
CISPMEDI   128    1 R*4  Frame median of CISPDATA (this)
CISPSRMS   132    1 R*4  Frame RMS of CISPDATA (this - last)
CISPICNT   136    1 I*2  Current internal image counter
CISPACSA   138    1 I*1  ACcumulated/SAmpled image register
CISPAOBS   139    1 I*1  F2_AOT_AOT + 16*F2_AOT_OBS
CISPBIAS   140   10 R*4  Bias voltages
                         =LWMESPOL or SWMESPOL (LW/SW active)
CISPDATA   180 1024 I*2  Detector data (EOI - RESET)
CISPRESE  2228 1122 I*2  Reset level for NORMAL processing
CISP3334  4472   64 I*2  Columns 33 & 34 of SW readout
```

HEADER KEYWORDS

```
CDARKn    C  DARK   to use w/config
             n: configuration number
CDETEon   C  Detector ID
             o:Dark,Observation,Calibration,Flood
             n: configuration number
CDFLATn   C  D-FLAT to use w/config
             n: configuration number
CEGANon   I  Electronic gain
             o:Dark,Observation,Calibration,Flood
             n: configuration number
CEOFSon   I  Electronic offset
             o:Dark,Observation,Calibration,Flood
             n: configuration number
COFLATn   C  O-FLAT to use w/config
             n: configuration number
CTINTop   I  Tint
             o:Dark,Observation,Calibration,Flood
             n: configuration number
CWENTop   C  Entrance wheel
             o:Dark,Observation,Calibration,Flood
             n: configuration number
CWFLTon   C  Filter wheel
             o:Dark,Observation,Calibration,Flood
             n: configuration number
CWLNSop   C  Lens wheel
             o:Dark,Observation,Calibration,Flood
             n: configuration number
CWSELop   C  Selection wheel
             o:Dark,Observation,Calibration,Flood
             n: configuration number
```

Cam parallel SPD files, CPSP, have the same contents as CAM prime files, CISP.

6.2.2 LWS SPD

PRODUCT TYPE: LSPD : LWS Standard Processed Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 216
GPSCTKEY	0	1	I*4	General prefix: ITK	
GPSCRPID	4	2	I*1	General prefix: Raster Point ID	
GPSCFILL	6	1	I*2	General prefix: Spare	
LSPDTYPE	8	1	I*4	Record type	
LSPDADET	12	1	I*4	Active detector flags. Bit 0 = SW1, bit 1 = SW2... (bit 0=LSB)	
LSPDLINE	16	1	I*4	Line number	
LSPDSCNT	20	1	I*4	Scan count	
LSPDSDIR	24	1	I*4	Scan direction (0=forward, 1=reverse,-999=error) Sometimes changes at end of scan. Va lue at start is correct.	
LSPDGCP	28	1	I*4	Grating commanded position	
LSPDGLVP	32	1	R*4	Grating LVDT position (average over mechanism position)	
LSPDGLVU	36	1	R*4	Uncertainty in grating LVDT position	
LSPDFPOS	40	1	I*4	FP position	
LSPDPHC	44	10	R*4	Detector photo-currents in amps TUNIT=amps	
LSPDPHCU	84	10	R*4	RMS of detector ramp fit TUNIT=amps	
LSPDPUD	124	10	R*4	Detector photo-currents with no deglitching TUNIT=amps	
LSPDUUD	164	10	R*4	RMS of undeglitched detector ramp fit TUNIT=amps	
LSPDSTAT	204	10	I*1	Detector Status bytes	
LSPDMAUX	214	1	I*2	Auxilliary data for this mechanism position	

HEADER KEYWORDS

LBIASxx	I	Bias level for each detector (xx='S1','S2',...'L5')
LCD1*	V	values from LCD1 calibration file
LCF*	C	of configuration options selected
LSR*	V	statistics accumulated during processing, eg no. of glitches
LSVERSnn	C	LWS version numbers of each calibration file used by SPL
LPHOTOM	L	Indicates if observation is photometric observation

The following keywords are obtained from the LWS specific TDATA in the EOH

LEOHFPS	L	Indicates if FPS was used (FP observations only)
LEOHFPL	L	Indicates if FPL was used (FP observations only)
LEOHSPCT	I	Number of spectra to be obtained
LEOHSDET	I	Detector used for start wavelength (L01 only)
LEOHEDET	I	Detector used for end wavelength (L01 only)
LEOHSZNE	I	Start zone (L03 only)

LEOHEZNE I End zone (L03 only)
LEOHBZNE I Break zone (L03 and L04 only)
LEOHSWAV R Start wavelength of requested range (L01 and L03 only)
LEOHEWAV R End wavelength of requested range (L01 and L03 only)

Information from the EOHI file

LEIWAVnn R For line AOTs give the expected wavelength for line nn. For wavelength range AOTs gives the wavelength of the which determined the integration time for part nn

---

PRODUCT TYPE: LPSP : LWS parallel SPD data

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 104
GPSCTKEY	0	1	I*4	Instrument time key
GPSCRPID	4	2	I*1	Raster point ID
GPSCFILL	6	1	I*2	Filler
UTK	8	1	I*4	UTK time
LWINTKEY	12	1	I*4	LWS window time Key TUNIT=second
FLUX	16	10	R*4	Detector photo-current TUNIT=amps
PROCFLGS	56	10	I*2	Processing flags
OTF	76	1	I*2	On Target Flag (Star Tracker flag)
STABLE	78	1	I*2	Stability flag (computed)
RA	80	1	R*8	Ra coordinate TUNIT=degree
DEC	88	1	R*8	OCFLGS coordinate TUNIT=degree
ROLL	96	1	R*8	roll angle TUNIT=degree

HEADER KEYWORDS

PRODUCT TYPE: LSSP : LWS serendipity SPD data

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 104
GPSCTKEY	0	1	I*4	Instrument time key
GPSCRPID	4	2	I*1	Raster point ID
GPSCFILL	6	1	I*2	Filler
UTK	8	1	I*4	UTK time
LWINTKEY	12	1	I*4	LWS window time Key TUNIT=second
FLUX	16	10	R*4	Detector photo-current TUNIT=amps
PROCFLGS	56	10	I*2	Processing flags
OTF	76	1	I*2	On Target Flag (Star Tracker flag)
STABLE	78	1	I*2	Stability flag (computed)
RA	80	1	R*8	Ra coordinate TUNIT=degree
DEC	88	1	R*8	OCFLGS coordinate TUNIT=degree
ROLL	96	1	R*8	roll angle TUNIT=degree

HEADER KEYWORDS

The LWS processing produces one calibration A file.

PRODUCT TYPE: LIPD : LWS Illuminator Processed Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 132
GPSCTKEY	0	1	I*4	ITK time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	General prefix: Spare	
LIPDFLSH	8	1	I*4	Flash number (0 = first flash)	
LIPDWHAP	12	1	I*4	Wheel absolute position	
LIPDPHC	16	10	R*4	Detector photo-currents, in amps TUNIT=amps	
LIPDPHCU	56	10	R*4	Detector photo-current uncertainties, in amps TUNIT=amps	
LIPDSTAT	96	10	I*1	Detector status bytes	
LIPDFILL	106	1	I*2	Filler (record length must be multiple of 4 bytes)	
LIPDGST	108	1	R*4	Average grating structure temperature over ramp	
LIPDDTA	112	1	R*4	Average detector temperature A over ramp	
LIPDLTMP	116	1	R*4	Average FPL temperature over ramp	
LIPDICUR	120	1	R*4	Average illuminator current over ramp	
LIPDICUE	124	1	R*4	Standard error in average illuminator current	
LIPDICS	128	1	I*4	Illuminator commanded status	

HEADER KEYWORDS

Identical keywords to those described in LSPD.

PRODUCT TYPE: LWGH : LWS glitch history file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 16
LWGHITK	0	1	I*4	ITK time of start of glitch	
LWGHRITK	4	1	I*4	ITK time of start of glitched ramp	
LWGHDET	8	1	I*2	Detector number (0-9)	
LWGHRAT	10	1	I*2	Estimated glitch height to ramp height ratio TUNIT=1/100	
LWGHHI	12	1	R*4	Estimated height of glitch TUNIT=volts	

HEADER KEYWORDS

LWGHMORE	I	No. of glitches found after file was full
TREFITK	I	ITK of arbitrary format
TREFUTC1	I	UTC(1) of arbitrary format
TREFUTC2	I	UTC(2) of arbitrary format

TREFUTK I UTK of arbitrary format

6.2.3 PHT SPD

PHT SPD and CAL_A files include some or all of the following standard keywords.

PHT_MAIN_HDR.INC

```
_____________________________________________________
DETECTOR  C   Detector subsystem
CALSEQU   I   Calibration sequence
FPCMODE   C   Focal plane chopper mode
FPCAMP    I   Chopper amplitude(arcsec)
FPCNSTEP  I   Number of chopper steps (if FPCMODE='SW'/'TR')
FPCINCR   I   Inc. between chopper steps (FPCMODE='SW'/'TR')
MINDEG    I   Min points for deglitcher
MAXERR    R   Max error if points < MINDEG
NITERATE  I   No. of iterations of deglitcher
NLOCAL    I   No. of local points used by deglitcher
NSTEP     I   Deglitcher step size
NSIGMA    R   Deglitcher: rms from local median
NBAD      I   Deglitcher: badness count limit
SATLIMi   R   Saturation limit (i=1,number of pix)
              (SATLIM if PHT-P,S)
FITDRi    L   Drift fit flag (i=1, number of pix)
              (FITDR if PHT-P,S)
DRIFTPCT  R   To fit drift
                DRIFTPCT/100*median > interquartile
CALFCS    I   FCS used for cal calculations
RDITER    I   Ramp deglitcher: no. of iterations
RDFSIG    R   Ramp deglitcher: no. of sigma for detection
RDMINP    I   Ramp deglitcher: min. no. of readouts in ramp
DRALPHA   R   Drift removal: significance level
DRMINPTS  I   Drift removal: min. no. of points for Mann-test
USEDRS    L   Use destructive readouts?
DISCNDRS  I   Discard first NDRs of ramps
READAUTO  I   Readouts with automatic data reduction
READSUSP  I   Readouts flagged as suspicious
READOFFT  I   Readouts off-target
READCOP   I   Readouts with chopper off position
RAMPSAT   I   Ramps saturated
RAMPDEGL  I   Ramps deglitched
RAMPPCT   R   %ramps accepted
RAMPUSET  R   %time achieved (accepted ramps)
RAMPINVD  I   Bad cycles
RAMPFROP  I   First ramps ignored
RAMPZSG   I   Zero signals on plateau
PLATNORP  I   Plateaux with no good ramps
PLATDROP  I   Plateaux dropouts due to gaps
_____________________________________________________
```

PHT_SPD_HDR.INC

```
_____________________________________________________
PTOREXT   C  Point(P) or Extended(E)
NMEAS     I  Number of measurements
FILTERn   C  Filter (n = 1, N, N= no. of filters)
EXFLUXn   R  Expected source flux (log base 10 Jy)
UNCFLXn   R  Uncertainty in flux (log base 10 Jy)

MXBACKn   R  Maximum background (log base 10 MJy/ster)
RESPDEF   L  TRUE if default responsivity is used
```

The following keywords are only present in absolute photometry observations

SELTRS1	I	Selected TRS for FCS1
SELTRS2	I	Selected TRS for FCS2
SELPOW1	R	Selected power for FCS1 (mW)
SELPOW2	R	Selected power for FCS2 (mW)
MEASPW1	R	Measured power for FCS1 (mW)
MEASPW2	R	Measured power for FCS2 (mW)
POWFCS1	R	Optical power from FCS1 (Watts)
POWFCS2	R	Optical power from FCS2 (Watts)
RESPR	R	Actual / Default Responsivity
CAL	R	FCS measurement
CALUNC	R	FCS uncertainty
COLD	R	Cold FCS measurement
COLDUNC	R	Cold FCS uncertainty

The following keywords are only present in NON-absolute photometry observations

CALPiFn	C	Cal used in SPD calculations
CALDATE	C	Date of spectral response fn
TRS1Sn	I	Selected TRS for FCS1 (cal obs.)
TRS2Sn	I	Selected TRS for FCS2 (cal obs.)
POW1Sn	R	Selected power for FCS1 (mW) (cal obs)
POW2Sn	R	Selected power for FCS2 (mW) (cal obs)
POW1Mn	R	Measured power for FCS1 (mW) (cal obs)
POW2Mn	R	Measured power for FCS2 (mW) (cal obs)
CALPOWn	R	In-band power on detector for cal (Watts)
CALAPn	I	Aperture used for cal (CHW position)
CALPOLn	I	Polarizer setting used (CHW position)
CALTYPn	I	Type of processing for cal observation
RESPRi	R	Actual / Default Responsivity
RS1PiFn	R	Responsivity (A/W) for first cal measurement
RU1PiFn	R	Uncertainty in responsivity for first cal
RS2PiFn	R	Responsivity (A/W) for second cal measurement
RU2PiFn	R	Uncertainty in responsivity for second cal
A0RIn	R	Reset correction interval, A0 (V/s)
A0RIUn	R	Unc. in reset correction interval, A0 (V/s)
A1RIn	R	Reset correction interval, A1 (V/s)
A1RIUn	R	Unc. in reset correction interval, A1 (V/s)

The following keywords are only present in chopped observations

CHCnPi	R	Chopper corrections
CHUnPi	R	Chopper correction uncertainty

In the above i=pixel number, n=filter

PHT_CALA_HDR.INC

NMEASn	I	Number of measurements for cal with PxxAKYID = n
CALTYPn	I	Type of cal measurement
TRS1Sn	I	Selected TRS for FCS1
TRS2Sn	I	Selected TRS for FCS2
POW1Sn	R	Selected power for FCS1 (mW)
POW2Sn	R	Selected power for FCS2 (mW)
CALFILn	I	Filter used for cal (CHW position)
CALAPn	I	Aperture used for cal (CHW position)
CALPOLn	I	Polarizer setting used fo cal (CHW position)
NDRSn	I	Number of DRs on a chopper plateau

```
NNDRSn   I  Number of NDRs per integration cycle
DREDn    I  Commanded data reduction factor
INTIMEn  I  Integration time (2^-7secs)
DWELLTn  I  Time spent on each plateau (2^-7secs)
MTIMEn   I  Measurement time(secs)
ICFREQn  I  Internal clock frequency (kHz)
POW1On   R  Optical power on detector for FCS1 (W)
POW2On   R  Optical power on detector for FCS2 (W)
CALPOWn  R  In-band power on detector for cal (W)

Where n= cal filter number
```

PHT_DARK_HDR.INC

```
NDRS       I  Number of DRs on a chopper plateau
NNDRS      I  Number of NDRs per integration cycle
DREDUCT    I  Commanded data reduction factor
INTIME     I  Integration time(2**-7secs)
MEASTIME   I  Measurement time (secs)
SATLIM     R  Saturation limit
FITDR      L  Drift fit flag
MINDEG     I  Min points for deglitcher
MAXERR     R  Max error if points < MINDEG
NITERATE   I  No. of iterations of deglitcher
NLOCAL     I  No. of local points used by deglitcher
NSTEP      I  Deglitcher step size
NSIGMA     R  Deglitcher: rms from local median
NBAD       I  Deglitcher: badness count limit
CALFCS     I  FCS used for cal calculations
RDITER     I  Ramp deglitcher: no. of iterations
RDFSIG     R  Ramp deglitcher: no. of sigma for detection
RDMINP     I  Ramp deglitcher: min. no. of readouts in ramp
DRALPHA    R  Drift removal: significance level
DRMINPTS   I  Drift removal: min. no. of points for Mann-test
READAUTO   I  Readouts with automatic data reduction
READSUSP   I  Readouts flagged as suspicious
READOFFT   I  Readouts off-target
READCOP    I  Readouts with chopper off position
RAMPSAT    I  Ramps saturated
RAMPDEGL   I  Ramps deglitched
RAMPPCT    R  %ramps accepted
RAMPUSET   R  %time achieved (accepted ramps)
RAMPINVD   I  Bad cycles
RAMPFROP   I  First ramps ignored
RAMPZSG    I  Zero signals on plateau
PLATNORP   I  Plateaux with no good ramps
PLATDROP   I  Plateaux dropouts due to gaps
USEDRS     L  Use destructive readouts?
DISCNDRS   I  Discard 1st NDRs of ramps
```

PRODUCT TYPE: PC1S : PHT-C100 Standard Processed Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 300
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PC1SKYID	8	1	I*2	Keyword identifier	
PC1SMNUM	10	1	I*2	Measurement number	
PC1SSPAR	12	1	I*2	Spare	
PC1SFILT	14	1	I*2	Filter ID (CHW3 position)	
PC1SAPER	16	1	I*2	Aperture ID (CHW2 position)	
PC1SPOLZ	18	1	I*2	Polarizer identifier	
PC1SNDRS	20	1	I*2	Number of destructive readouts	
PC1SCSTP	22	1	I*2	Chopper step number	
PC1SDWEL	24	1	I*4	Chopper dwell time (2**-7 secs)	
PC1SMEAS	28	1	I*4	Measurement time (secs)	
PC1SCPOS	32	1	I*4	Chopper position (arc secs)	
PC1SMNPW	36	9	R*4	Mean or fitted power	
PC1SMNPU	72	9	R*4	Uncertainty in mean power	
PC1SMDPW	108	9	R*4	Median power	
PC1SQ1PW	144	9	R*4	1st quartile of power	
PC1SQ3PW	180	9	R*4	3rd quartile of power	
PC1SPLEN	216	9	I*4	Plateau length (2**-7 secs)	
PC1SNSIG	252	9	I*4	No. of valid signals on the plateau	
PC1SFLAG	288	9	I*1	Status flag	
PC1SFILL	297	3	I*1	Filler	

HEADER KEYWORDS

```
Includes PHT_MAIN_HDR.INC
Includes PHT_SPD_HDR.INC
STATPIX  I  Pixel used in statistics
DARKPn   R  Dark current
DARKUPn  R  Dark current uncertainty
RESPDEF  L  True if default responsivity has been used.
```

PRODUCT TYPE: PC2S : PHT-C200 Standard Processed Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 152
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PC2SKYID	8	1	I*2	Keyword identifier	
PC2SMNUM	10	1	I*2	Measurement number	
PC2SSPAR	12	1	I*2	Spare	
PC2SFILT	14	1	I*2	Filter ID (CHW3 position)	
PC2SAPER	16	1	I*2	Aperture ID (CHW2 position)	
PC2SPOLZ	18	1	I*2	Polarizer identifier	
PC2SNDRS	20	1	I*2	Number of destructive readouts	
PC2SCSTP	22	1	I*2	Chopper step number	
PC2SDWEL	24	1	I*4	Chopper dwell time (2**-7 secs)	
PC2SMEAS	28	1	I*4	Measurement time (secs)	
PC2SCPOS	32	1	I*4	Chopper position (arc secs)	
PC2SMNPW	36	4	R*4	Mean or fitted power	
PC2SMNPU	52	4	R*4	Uncertainty in mean power	
PC2SMDPW	68	4	R*4	Median power	

PC2SQ1PW	84	4	R*4	1st quartile of power
PC2SQ3PW	100	4	R*4	3rd quartile of power
PC2SPLEN	116	4	I*4	Plateau length (2**-7 secs)
PC2SNSIG	132	4	I*4	No. of valid signals on the plateau
PC2SFLAG	148	4	I*1	Status flags

HEADER KEYWORDS

Includes	PHT_MAIN_HDR.INC	
Includes	PHT_SPD_HDR.INC	
STATPIX	I	Pixel used in statistics
DARKPn	R	Dark current
DARKUPn	R	Dark current uncertainty
RESPDEF	L	True if default responsivity has been used.

PHT-P1, PHT-P2 and PHT-P3 have the same SPD file format. In the description below 'x' stands for 1,2 or 3.

PRODUCT TYPE: PPxS : PHT-Px Standard Processed Data

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 68
GPSCTKEY	0	1	I*4	Instrument time key
GPSCRPID	4	2	I*1	Raster point ID
GPSCFILL	6	1	I*2	Filler
PPxSKYID	8	1	I*2	Keyword identifier
PPxSMNUM	10	1	I*2	Measurement number
PPxSSPAR	12	1	I*2	Spare
PPxSFILT	14	1	I*2	Filter ID (CHW3 position)
PPxSAPER	16	1	I*2	Aperture ID (CHW2 position)
PPxSPOLZ	18	1	I*2	Polarizer identifier
PPxSNDRS	20	1	I*2	Number of destructive readouts
PPxSCSTP	22	1	I*2	Chopper step number
PPxSDWEL	24	1	I*4	Chopper dwell time (2**-7 secs)
PPxSMEAS	28	1	I*4	Measurement time (secs)
PPxSCPOS	32	1	I*4	Chopper position (arc secs)
PPxSMNPW	36	1	R*4	Mean or fitted power
PPxSMNPU	40	1	R*4	Uncertainty in mean power
PPxSMDPW	44	1	R*4	Median power
PPxSQ1PW	48	1	R*4	1st quartile of power
PPxSQ3PW	52	1	R*4	3rd quartile of power
PPxSPLEN	56	1	I*4	Plateau length (2**-7 secs)
PPxSNSIG	60	1	I*4	No. of valid signals on the plateau
PPxSFLAG	64	1	I*1	Status flag
PPxSFILL	65	3	I*1	Filler

HEADER KEYWORDS

Includes	PHT_MAIN_HDR.INC	
Includes	PHT_SPD_HDR.INC	
CALAPER	I	Aperture used for cal (CHW position)
CHC1Pn	R	Chopped corrections
CHU1Pn	R	Chopped corrections uncertainty
RESPDEF	L	True if default responsivity has been used.
RESPR1	R	Actual/default responsivity
DARK	R	Dark current
DARKUNC	R	Uncertainty in dark current

PRODUCT TYPE: PSLS : PHT-SL Standard Processed Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 1560
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PSLSPOLZ	8	1	I*2	Polarizer identifier	
PSLSNDRS	10	1	I*2	Number of destructive readouts	
PSLSDWEL	12	1	I*4	Chopper dwell time (2**-7 secs)	
PSLSMEAS	16	1	I*4	Measurement time (secs)	
PSLSCPOS	20	1	I*4	Chopper position (arc secs)	
PSLSSPB	24	64	R*4	Source + Background TUNIT=Jy	
PSLSSPBU	280	64	R*4	Uncertainty in Source + Background TUNIT=Jy	
PSLSBCK	536	64	R*4	Background TUNIT=Jy	
PSLSBCKU	792	64	R*4	Uncertainty in Background TUNIT=Jy	
PSLSSRCE	1048	64	R*4	Source TUNIT=Jy	
PSLSSRCU	1304	64	R*4	Uncertainty in Source TUNIT=Jy	

HEADER KEYWORDS

Includes	PHT_MAIN_HDR.INC	
CALDATE	C	Date cal defaults generated
PTOREXT	C	Point(P) or Extended(E)
LAMBDAd	R	Central wavelength of pixel (m), d=1,64
RESPPd	R	Default responsivity (A/W), d=1,64
RPUNCd	R	Uncertainty in responsivity (A/W), d=1,64
STATPIX	I	Pixel used in statistics
DARKPn	R	Dark current
DARKUPn	R	Dark current uncertainty

PRODUCT TYPE: PSSS : PHT-SS Standard Processed Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 1560
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PSSSPOLZ	8	1	I*2	Polarizer identifier	
PSSSNDRS	10	1	I*2	Number of destructive readouts	
PSSSDWEL	12	1	I*4	Chopper dwell time (2**-7 secs)	
PSSSMEAS	16	1	I*4	Measurement time (secs)	
PSSSCPOS	20	1	I*4	Chopper position (arc secs)	
PSSSSPB	24	64	R*4	Source + Background TUNIT=Jy	
PSSSSPBU	280	64	R*4	Uncertainty in Source + Background TUNIT=Jy	
PSSSBCK	536	64	R*4	Background TUNIT=Jy	
PSSSBCKU	792	64	R*4	Uncertainty in Background TUNIT=Jy	
PSSSSRCE	1048	64	R*4	Source TUNIT=Jy	
PSSSSRCU	1304	64	R*4	Uncertainty in Source TUNIT=Jy	

HEADER KEYWORDS

```
Includes PHT_MAIN_HDR.INC
CALDATE   C  Date cal defaults generated
PTOREXT   C  Point(P) or Extended(E)
LAMBDAd   R  Central wavelength of pixel (m), d=1,64
RESPPd    R  Default responsivity (A/W), d=1,64
RPUNCd    R  Uncertainty in responsivity (A/W), d=1,64
STATPIX   I  Pixel used in statistics
DARKPn    R  Dark current
DARKUPn   R  Dark current uncertainty
```

There is one type of calibration "A" data corresponding to each type of PHT-C or PHT-P SPD. Their record structures are similar, though not identical, to those of the SPD. Their product types are PC1A, PC2A, PP1A, PP2A, PP3A.

PRODUCT TYPE: PC1A : PHT C100 cal A file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 316
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PC1AQFLG	8	1	I*2	Quality flag	
PC1AKYID	10	1	I*2	Keyword identifier	
PC1AMNUM	12	1	I*2	Measurement number	
PC1ASPAR	14	1	I*2	Spare	
PC1AFILT	16	1	I*2	Filter ID (CHW3 position)	
PC1AAPER	18	1	I*2	Aperture ID (CHW2 position)	
PC1APOLZ	20	1	I*2	Polarizer identifier	
PC1ASTAT	22	1	I*2	FPC state (0 = COFOV, 1 = FCS1, 2 = FCS2)	
PC1ADWEL	24	1	I*4	Chopper dwell time (2**-7 secs)	
PC1ACPOS	28	1	R*4	Chopper position (arc secs).	
PC1AFCS1	32	1	R*4	Measured FCS1 power	
PC1AFCS2	36	1	R*4	Measured FCS2 power	
PC1ATEMP	40	1	R*4	Detector temperature	
PC1AFILL	44	1	R*4	Filler	
PC1ABIAS	48	1	R*4	Measured bias voltage	
PC1AMNSG	52	9	R*4	Mean or fitted signal	
PC1AMNSU	88	9	R*4	Uncertainty in signal	
PC1AMDSG	124	9	R*4	Median signal	
PC1AQ1SG	160	9	R*4	1st quartile of signal	
PC1AQ3SG	196	9	R*4	3rd quartile of signal	
PC1APLEN	232	9	I*4	Plateau length (2**-7 secs)	
PC1ANSIG	268	9	I*4	No. of valid signals on the plateau	
PC1AFLAG	304	9	I*1	Status flags	
PC1AFILL	313	3	I*1	Filler	

HEADER KEYWORDS

```
Includes PHT_MAIN_HDR.INC
Includes PHT_CALA_HDR.INC
STATPIX   I  Pixel used in statistics
```

PRODUCT TYPE: PC2A : PHT C200 cal A file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 180
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PC2AQFLG	8	1	I*2	Quality flag	
PC2AKYID	10	1	I*2	Keyword identifier	
PC2AMNUM	12	1	I*2	Measurement number	
PC2ASPAR	14	1	I*2	Spare	
PC2AFILT	16	1	I*2	Filter ID (CHW3 position)	
PC2AAPER	18	1	I*2	Aperture ID (CHW2 position)	
PC2APOLZ	20	1	I*2	Polarizer identifier	
PC2ASTAT	22	1	I*2	FPC state (0 = COFOV, 1 = FCS1, 2 = FCS2)	
PC2ADWEL	24	1	I*4	Chopper dwell time (2**-7 secs)	
PC2ACPOS	28	1	R*4	Chopper position (arc secs).	
PC2AFCS1	32	1	R*4	Measured FCS1 power	
PC2AFCS2	36	1	R*4	Measured FCS2 power	
PC2ATEMP	40	1	R*4	Detector temperature	
PC2AFILL	44	1	R*4	Filler	
PC2ABIAS	48	4	R*4	Measured bias voltages (C200.1, C200.2, etc)	
PC2AMNSG	64	4	R*4	Mean or fitted signal	
PC2AMNSU	80	4	R*4	Uncertainty in signal	
PC2AMDSG	96	4	R*4	Median signal	
PC2AQ1SG	112	4	R*4	1st quartile of signal	
PC2AQ3SG	128	4	R*4	3rd quartile of signal	
PC2APLEN	144	4	I*4	Plateau length (2**-7 secs)	
PC2ANSIG	160	4	I*4	No. of valid signals on the plateau	
PC2AFLAG	176	4	I*1	Status flags	

HEADER KEYWORDS

```
Includes PHT_MAIN_HDR.INC
Includes PHT_CALA_HDR.INC
STATPIX  I  Pixel used in statistics
```

PHT-P1, PHT-P2 and PHT-P3 have the same CAL-A file formats. In the descriptions below 'x' stands for 1,2 or 3.

PRODUCT TYPE: PPxA : PHT-Px Cal A file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 84
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PPxAQFLG	8	1	I*2	Quality flag	
PPxAKYID	10	1	I*2	Keyword identifier	
PPxAMNUM	12	1	I*2	Measurement number	
PPxASPAR	14	1	I*2	Spare	
PPxAFILT	16	1	I*2	Filter ID (CHW3 position)	
PPxAAPER	18	1	I*2	Aperture ID (CHW2 position)	
PPxAPOLZ	20	1	I*2	Polarizer identifier	
PPxASTAT	22	1	I*2	FPC state (0 = COFOV, 1 = FCS1, 2 = FCS2)	
PPxADWEL	24	1	I*4	Chopper dwell time (2**-7 secs)	
PPxACPOS	28	1	R*4	Chopper position (arc secs)	
PPxAFCS1	32	1	R*4	Measured FCS1 power	
PPxAFCS2	36	1	R*4	Measured FCS2 power	
PPxATEMP	40	1	R*4	Detector temperature	
PPxAFILR	44	1	R*4	Filler	

PPxABIAS	48	1	R*4	Measured bias voltage
PPxAMNSG	52	1	R*4	Mean or fitted signal
PPxAMNSU	56	1	R*4	Uncertainty in signal
PPxAMDSG	60	1	R*4	Median signal
PPxAQ1SG	64	1	R*4	1st quartile of signal
PPxAQ3SG	68	1	R*4	3rd quartile of signal
PPxAPLEN	72	1	I*4	Plateau length (2**-7 secs)
PPxANSIG	76	1	I*4	No. of valid signals on the plateau
PPxAFLAG	80	1	I*1	Status flag
PPxAFILI	81	3	I*1	Filler

HEADER KEYWORDS

Includes PHT_MAIN_HDR.INC
Includes PHT_CALA_HDR.INC

PRODUCT TYPE: PC1D : PHT-C100 dark current file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 128
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PC1DDARK	8	9	R*4	Dark current (V/s)	
PC1DDUNC	44	9	R*4	Uncertainty in dark current (V/s)	
PC1DNSIG	80	9	I*4	No. of valid signals on the plateau	
PC1DFLAG	116	9	I*1	Status flag	
PC1DFILI	125	3	I*1	Filler	

HEADER KEYWORDS

Includes PHT_DARK_HDR.INC

PRODUCT TYPE: PC2D : PHT-C200 dark current file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 60
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
PC2DDARK	8	4	R*4	Dark current (V/s)	
PC2DDUNC	24	4	R*4	Uncertainty in dark current (V/s)	
PC2DNSIG	40	4	I*4	No. of valid signals on the plateau	
PC2DFLAG	56	4	I*1	Status flag	

HEADER KEYWORDS

Includes PHT_DARK_HDR.INC

PHT-P1, PHT-P2 and PHT-P3 have the same dark current file formats. In the descriptions below 'x' stands for 1,2 or 3.

PRODUCT TYPE: PPxD : PHT-Px dark current file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 24
GPSCTKEY	0	1	I*4	Instrument time key	

GPSCRPID	4	2	I*1	Raster point ID
GPSCFILL	6	1	I*2	Filler
PPxDDARK	8	1	R*4	Dark current (V/s)
PPxDDUNC	12	1	R*4	Uncertainty in dark current (V/s)
PPxDNSIG	16	1	I*4	No. of valid signals on the plateau
PPxDFLAG	20	1	I*1	Status flag
PPxDFILI	21	3	I*1	Filler

HEADER KEYWORDS

Includes PHT_DARK_HDR.INC

PRODUCT TYPE: PSLD : PHT-SL dark signal file

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 840
GPSCTKEY	0	1	I*4	Instrument time key
GPSCRPID	4	2	I*1	Raster point ID
GPSCFILL	6	1	I*2	Filler
PSLDDARK	8	64	R*4	Dark signal (V/s)
PSLDDUNC	264	64	R*4	Uncertainty in dark signal (V/s)
PSLDNSIG	520	64	I*4	No. of valid signals on the plateau
PSLDFLAG	776	64	I*1	Status flag

PRODUCT TYPE: PSSD : PHT-SS dark signal file

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION** **REC LENGTH:** 840
GPSCTKEY	0	1	I*4	Instrument time key
GPSCRPID	4	2	I*1	Raster point ID
GPSCFILL	6	1	I*2	Filler
PSSDDARK	8	64	R*4	Dark signal (V/s)
PSSDDUNC	264	64	R*4	Uncertainty in dark signal (V/s)
PSSDNSIG	520	64	I*4	No. of valid signals on the plateau
PSSDFLAG	776	64	I*1	Status flag

6.2.4 SWS SPD

PRODUCT TYPE: SWSP : SWS Standard Processed Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 1092
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
SWSPSTAT	8	1	I*4	Status of this record	
SWSPGPOS	12	2	R*4	Average positions for gratings 1/2	
SWSPGANG	20	2	R*4	Angles for gratings 1/2 TUNIT=deg	
SWSPFPOS	28	1	I*4	Position of FP	
SWSPFCUR	32	3	R*4	Average main current for FP coils TUNIT=chan	
SWSPFGAP	44	2	R*4	Gaps for FP TUNIT=um	
SWSPWAVE	52	52	R*4	Detector wavelength TUNIT=um	
SWSPFLUX	260	52	R*4	Detector flux TUNIT=uV/s	
SWSPOFFS	468	52	R*4	Offsets of slopes TUNIT=uV	
SWSPSTDV	676	52	R*4	Standard deviation TUNIT=uV/s	
SWSPFLAG	884	52	I*4	Flags per detector	

PRODUCT TYPE: SWGH : SWS Glitch History Data

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 940
GPSCTKEY	0	1	I*4	Instrument time key	
SWGHS_S1	4	52	I*2	Start sample of first glitch	
SWGHS_E1	108	52	I*2	End sample of first glitch	
SWGHHGT1	212	52	R*4	Glitch height of first glitch TUNIT=uV	
SWGHS_S2	420	52	I*2	Start sample of second glitch	
SWGHS_E2	524	52	I*2	End sample of second glitch	
SWGHHGT2	628	52	R*4	Glitch height of second glitch TUNIT=uV	
SWGHN_GL	836	52	I*2	Number of glitches	

6.3 General FITS Keywords for SPD

All kinds of SPD follow the FITS binary table standard, and therefore all mandatory keywords of the (primary or binary table) headers are present and are not mentioned below. In addition the keywords TTYPEn recommended by the binary table standard are present, even though not mandatory.

The common keywords present in the primary headers of raw data files (described in section 3.4) are all copied forward to SPD with keywords and their values unchanged. Therefore they are all accessible in the corresponding SPD too. Exceptions are the FILENAME and FILEVERS keywords, which are automatically set to the values for the SPD.

The following common keywords are not present in raw data products but are introduced into the primary FITS headers at the SPD stage. (The format is the same as used in section 3.4).

ISRRSEV	I	"RTA maximum severity level", as indicated in the IS report.
ISRQSEV	I	"QLA maximum severity level", as indicated in the QLA report.
ISRRWARN	C	"RA warning" as indicated in the QLA report (length: 2 characters): - "OK" is a non-negative statement, that the RA saw no problem with the data, - " " means that the RA did not assign a value at all, - "xx" (any other value) means a warning of some unspecified kind; values may be defined later and included in a future issue of this document.
ISRNOOSL	I	Number of out-of-soft-limit warnings.
ISRNOOHL	I	Number of out-of-hard-limit warnings.
ISRNMW	I	Number of monitor warnings.
ISRNCVW	I	Number of command verification warnings.
ISRNBTW	I	Number of bad telemetry warnings.
ISRNMVW	I	Number of memory verification warnings.
ISRNSQLA	I	Number of severe QLA errors
INSTRA	R	Right Ascension of intended instrument viewing direction, in degrees.
INSTDEC	R	Declination of intended instrument viewing direction, in degrees.
INSTROLL	R	Intended roll angle about the instrument viewing direction, in degrees.
TREFCORn	I	The UTC (in seconds since the beginning of 1989) of three reference times, n=1,2,3, for which TREFHELI and TREFDOPP have been calculated; usually the start, middle and end of the observation.
TREFHELn	R	The interval to be added to all UTC values to convert Earth-received time to the solar system (helio)centre (Units: seconds). n=1,2,3
TREFDOPn	R	The velocity component in the line of sight towards the target, due to the combined motions of the spacecraft and of the Earth. (Units: km/sec). n=1,2,3

The three keywords INSTRA, INSTDEC and INSTROLL give the intended instrument reference attitude. More detailed attitude is available in the files IRPH and IIPH. Observers should be prepared

for the possibility that the actual attitude may be recalculated and improved, even after their SPD products have been distributed; they should have a capability to accept and process the improved attitude without the need to request a new version of all their SPD files. Details of attitude calculations are given in Appendix A.

For an observation containing more than one commanded pointing, INSTRA, INSTDEC and INSTROLL refer to the first pointing.

Information from the IS report is contained in keywords beginning with "ISR". It is hoped that general Observers will not normally need to access these QLA report details, but they are copied into the SPD header as a precautionary measure.

7 AUTOMATIC ANALYSIS RESULTS

7.1 Introduction

7.2 AAR Detailed Specification

7.2.1 CAM Auto Analysis Results

The following keywords, specified in CHEAD.INC, are included in all CAM auto-analysis files.

```
CREATOR         C  Task which created the file
                   (e.g. 'AAC v1.1')
CALIBRAT        C  Calibration data release (e.g. 'CCD v0.3')
DATE            C  Date of file creation (dd/mm/yy)
TIME            C  Time of file creation (hh:mm:ss)
TELESCOP        C  'ISO'
INSTRUME        C  { 'CAM SW' | 'CAM LW' }
OBSERVER        C  Name of the Principal Investigator
OBJECT          C  Name of target
OBS_ID          C  Observation identification
DATE-OBS        C  Date of start of observation
TIME-OBS        C  Time of start of observation
MJD_OBS         D  Approximate epoch of start of observation
DATE-END        C  Date of end of observation
TIME-END        C  Time of end of observation
MJD_END         D  Approximate epoch of end of observation
```

PRODUCT TYPE: CMAP : ISOCAM maps of IR flux vs celestial position

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: N
CHANNEL	0	1	C*4	{ 'SW' | 'LW' } TDISP=A2	
INDEX	4	1	I*4	Index of the component within CMAP TDISP=I4	
TYPE	8	1	C*8	Type of data in the ARRAY column TDISP=A8 { 'FLUX' | 'FLUX_ERR' | 'EXPOSURE' | 'Q' | 'Q_ERROR' | 'U' | 'U_ERROR' }	
BITPIX	16	1	I*4	No of bits that represent an ARRAY value = 32	
NAXIS	20	1	I*4	No of image axes in ARRAY = 2	
NAXIS1	24	1	I*4	No of axis 1 pixels	
NAXIS2	28	1	I*4	No of axis 2 pixels	
BSCALE	32	1	R*4	Image scaling factor	

BZERO	36	1	R*4	Image origin
BLANK	40	1	I*4	Integer defining null image datum before scaling
BUNIT	44	1	C*12	Units of image data
CTYPE1	56	1	C*8	Type of projection used = 'RA--TAN'
CUNIT1	64	1	C*8	Units of axis1 = 'deg'
CRVAL1	72	1	R*8	RA at the reference pixel
CRPIX1	80	1	R*4	Reference pixel on axis 1
CDELT1	84	1	R*4	Increment per pixel
CTYPE2	88	1	C*8	Type of projection used = 'DEC--TAN'
CUNIT2	96	1	C*8	Units of axis2 = 'deg'
CRVAL2	104	1	R*8	DEC at the reference pixel
CRPIX2	112	1	R*4	Reference pixel on axis 2
CDELT2	116	1	R*4	Increment per pixel
CROTA2	120	1	R*8	Image rotation in degrees
CD001001	128	1	R*8	Rotation matrix element (1,1)
CD002002	136	1	R*8	Rotation matrix element (2,2)
CD001002	144	1	R*8	Rotation matrix element (1,2)
CD002001	152	1	R*8	Rotation matrix element (2,1)
DATE-OBS	160	1	C*8	Date of start of component observation
TIME-OBS	168	1	C*8	Time of start of component observation
MJD-OBS	176	1	R*8	Epoch of start of observation
DATE-END	184	1	C*8	Date of end of component observation
TIME-END	192	1	C*8	Time of end of component observation
MJD-END	200	1	R*8	Epoch of end of observation
WAVELENG	208	1	R*4	Wavelength TUNIT=micron TDISP=F5.2
BANDWIDT	212	1	R*4	Bandwidth TUNIT=micron TDISP=F5.2
POLARISE	216	1	C*4	Polariser in use TDISP=A4 { 'NONE' | 'P0' | 'P60' | 'P120' }
OBSINDEX	220	1	I*4	Index of the associated OBS exposure within CCIM TDISP=I4
DRKINDEX	224	1	I*4	Index of the associated DARK exposure within CCIM TDISP=I4
FLTINDEX	228	1	I*4	Index of the associated FLAT exposure within CCIM TDISP=I4
ARRAY	232	N	I*4	Data TDISP=1P,E9.3,0P

HEADER KEYWORDS

Includes CHEAD.INC

RADECSYS	C	Coordinate reference frame = 'FK5'
EQUINOX	R	Coordinate epoch = 2000.0

PRODUCT TYPE: CPSL : CAM Point-Source List

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 128
NSRC	0	1	I*4	Source number in the current list TDISP=I5	
NAME	4	1	C*20	Source name (e.g. 'ISOC201843.3+434143')	

				TDISP=A20
Y	24	1	R*4	Source detector Y-coordinate TDISP=F5.2
DY	28	1	R*4	Source detector Y-coordinate 1-sigma error TDISP=F5.2
Z	32	1	R*4	Source detector Z-coordinate TDISP=F5.2
DZ	36	1	R*4	Source detector Z-coordinate 1-sigma error TDISP=F5.2
RA	40	1	R*8	Source right ascension (J2000) TUNIT=deg TDISP=A10
DEC	48	1	R*8	Source declination (J2000) TUNIT=deg TDISP=A9
STAT	56	1	R*4	Detection statistic TDISP=F8.2
COUNTRAT	60	1	R*4	Detected count rate TUNIT=per second TDISP=1P,E9.3,0P
DCOUNTRA	64	1	R*4	Detected count rate 1-sigma error TUNIT=per second TDISP=1P,E9.3,0P
FLUX	68	1	R*4	Source flux TUNIT=Jy TDISP=1P,E9.3,0P
DFLUX	72	1	R*4	Source flux 1-sigma error TUNIT=Jy TDISP=1P,E9.3,0P
WAVELENG	76	1	R*4	Wavelength TUNIT=micron TDISP=F5.2
BANDWIDT	80	1	R*4	Bandwidth TUNIT=micron TDISP=F5.2
POLARISE	84	1	C*4	Polariser in use { 'NONE' | 'P0' | 'P60' | 'P120' } TDISP=A4
PIXELSIZ	88	1	R*4	Pixel size TUNIT=arcsec TDISP=F3.1
MAPINDEX	92	1	I*4	Index of the associated image within CMAP TDISP=I4
MJD	96	1	R*8	Epoch of start of exposure TUNIT=day TDISP=F11.5
EXPOSURE	104	1	R*4	Exposure time TUNIT=second TDISP=F8.2
SPARE	108	20	I*1	Spare space

HEADER KEYWORDS

Includes CHEAD.INC
RADECSYS C Coordinate reference frame = 'FK5'
EQUINOX R Coordinate epoch = 2000.0

PRODUCT TYPE: CSSP : CAM Source Spectrum

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: N
NSPEC	0	1	I*4	Spectrum number in the current list TDISP=I5	
NAME	4	1	C*20	Source name (e.g. 'ISOC201843.3+434143') TDISP1=A20	
RA	24	1	R*8	Source right ascension TUNIT=deg TDISP=A10	
DEC	32	1	R*8	Source declination TUNIT=deg TDISP=A10	
POLARISE	40	1	C*4	Polariser in use { 'NONE' | 'P0' | 'P60' | 'P120' } TDISP=A4	
SIZE	44	1	I*4	Number of points in the spectrum	
WAVELENG	48	N	R*4	Wavelength TUNIT=micron TDISP=F5.2	
BANDWIDT	48	N	R*4	Bandwidth TUNIT=micron TDISP=F5.2	
FLUX	48	N	R*4	Source flux TUNIT=Jy TDISP=1P,E9.3,0P	
DFLUX	48	N	R*4	Source flux 1-sigma error TUNIT=Jy TDISP=1P,E9.3,0P	
MJD1	48	N	R*8	Epoch of start of exposure(s) TUNIT=day TDISP=F11.5	
MJD2	48	N	R*8	Epoch of end of exposure(s) TUNIT=day TDISP=F11.5	
EXPOSURE	48	N	R*4	Exposure time TUNIT=second TDISP=F8.2	
STAT	48	N	R*4	Detection statistic TDISP=F8.2	
NPSL	48	N	I*4	Number of point-source measurements	
PSLINDEX	48	N	I*4	Indexes of the corresponding CPSL records [1:MAX(SIZE),1:MAX(NPSL)]	

HEADER KEYWORDS

Includes CHEAD.INC		
RADECSYS	C	Coordinate reference frame = 'FK5'
EQUINOX	R	Coordinate epoch = 2000.0

PRODUCT TYPE: CCIM : CAM calibration images in detector coordinates

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 4296
INDEX	0	1	I*4	Index of the component image within CCIM TDISP=I4	
CHANNEL	4	1	C*1	Short or Long wavelength channel TDISP=A1 {'S'|'L'}	

MODE	5	1	C*3	Operational mode TDISP=A3 {'OBS'|'FLT'|'DRK'|'CLN'}
TYPE	8	1	C*8	Type of data in the ARRAY column TDISP=A8 {'RATE'|'RATE_ERR'|'EXPOSURE'}
BITPIX	16	1	I*4	No of bits that represent an ARRAY value = 32
NAXIS	20	1	I*4	No of image axes in ARRAY = 2
NAXIS1	24	1	I*4	No of axis 1 pixels = 32
NAXIS2	28	1	I*4	No of axis 2 pixels = 32
BSCALE	32	1	R*4	ARRAY scaling factor
BZERO	36	1	R*4	ARRAY zero value
BLANK	40	1	I*4	Integer specifying ARRAY values that are undefined
BUNIT	44	1	C*12	Units of data in ARRAY
DATE-OBS	56	1	C*8	Date of start
TIME-OBS	64	1	C*8	Time of start
MJD-OBS	72	1	R*8	Epoch of start
DATE-END	80	1	C*8	Date of end
TIME-END	88	1	C*8	Time of end
MJD-END	96	1	R*8	Epoch of end
Y0	104	1	R*4	'OBS'-mode reference pixel or null
Z0	108	1	R*4	'OBS'-mode reference pixel or null
RA	112	1	R*8	'OBS'-mode J2000 RA at the reference pixel or null
DEC	120	1	R*8	'OBS'-mode J2000 DEC at the reference pixel or null
ROLL	128	1	R*8	'OBS'-mode roll angle
WAVELENG	136	1	R*4	Wavelength TUNIT=micron TDISP=F5.2
BANDWIDT	140	1	R*4	Bandwidth TUNIT=micron TDISP=F5.2
POLARISE	144	1	C*4	Polariser in use TDISP=A4 {'NONE'|'P0'|'P60'|'P120'}
PIXELSIZ	148	1	R*4	Pixel size TUNIT=arcsec TDISP=F3.1
DATAREF	152	1	C*32	Unique data identifier TDISP=A32
DEID	184	1	I*1	Detector ID
GAIN	185	1	I*1	Electronics gain
OFFS	186	1	I*1	Electronics offset
OBST	187	1	I*1	Obs mode
PROC	188	1	I*1	Processing mode
ACSA	189	1	I*1	Accumulated/Sampled image register
EWHL	190	1	I*2	Entrance wheel step number
SWHL	192	1	I*2	Selection wheel step number
PFOV	194	1	I*2	Lens wheel step number
FCVF	196	1	I*2	Filter wheel step number
TINT	198	1	I*2	Elementary integration time
ARRAY	200	1024	I*4	Data TDISP=1P,E9.3,0P

HEADER KEYWORDS

Includes CHEAD.INC

PRODUCT TYPE: CGLL **:** CAM Glitch List

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 84
INDEX	0	1	I*4	Index of the component image within CCIM TDISP=I4	
Y	4	1	I*4	Glitch Y coordinate TDISP=I2	
Z	8	1	I*4	Glitch Z coordinate TDISP=I2	
UTK	12	1	I*4	Glitch T coordinate TDISP=I9	
RA	16	1	R*8	Right ascension corresponding to (Y,Z) TUNIT=deg TDISP=F10.6	
DEC	24	1	R*8	Declination corresponding to (Y,Z) TUNIT=deg TDISP=F10.6	
MJD	32	1	R*8	Epoch corresponding to UTK TDISP=F11.5	
COUNT	40	1	I*4	Glitch pixel count TDISP=I7	
GLITCHID	44	1	I*4	Glitch identifier TDISP=I5	
STAT	48	1	R*4	Glitch detection statistic TDISP=F7.1	
COUNTG	52	1	R*4	Best-fit total glitch count TDISP=F7.1	
YG	56	1	R*4	Best-fit glitch Y coordinate TDISP=F5.1	
ZG	60	1	R*4	Best-fit glitch Z coordinate TDISP=F5.1	
UTKG	64	1	R*4	Best-fit glitch T-coordinate TDISP=F7.1	
SPARE	68	16	I*1	Spare space	

HEADER KEYWORDS

Includes CHEAD.INC
METHOD C Name of the deglitching algorithm
MODEL C Name of glitch model

PRODUCT TYPE: CJAM : CAM Jitter, Memory and Stabilisation information

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 32
INDEX	0	1	I*4	Index of the component image within CCIM TDISP=I5	
UTK	4	1	I*4	Universal time key TDISP=I5	
DY	8	1	R*4	Y-coordinate jitter shift TDISP=F8.2	
DZ	12	1	R*4	Z-coordinate jitter shift TDISP=F8.2	
MEMORY	16	1	I*2	{ 0=good | 1=bad } TDISP=I1	
UNSTABLE	18	1	I*2	{ 0=good | 1=bad } TDISP=I1	
GLITCHED	20	1	I*2	{ 0=good | 1=bad }	

```
                              TDISP=I1
SPARE          22    10 I*1   Spare space
```

HEADER KEYWORDS

```
Includes CHEAD.INC
JMETHOD   C  Name of the jitter algorithm
JMODEL    C  Name of jitter model
MMETHOD   C  Name of the memory algorithm
MMODEL    C  Name of memory model
HISTORY   C  History of analysis procedures applied
```

PRODUCT TYPE: CUFF : CAM User-Friendly log File

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
MESSAGE	0	1	C*80	Line of ASCII output TDISP1=A80	

HEADER KEYWORDS

```
Includes CHEAD.INC
```

PRODUCT TYPE: CMOS : ISOCAM celestial IR mosaic

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: N
CHANNEL	0	1	C*4	{ 'SW' | 'LW' } TDISP=A2	
INDEX	4	1	I*4	Index of the component within CMOS TDISP=I4	
TYPE	8	1	C*8	Type of data in the ARRAY column TDISP=A8 { 'FLUX' | 'FLUX_ERR' | 'EXPOSURE' | 'Q' | 'Q_ERROR' | 'U' | 'U_ERROR' }	
BITPIX	16	1	I*4	No of bits that represent an ARRAY value = 32	
NAXIS	20	1	I*4	No of image axes in ARRAY = 2	
NAXIS1	24	1	I*4	No of axis 1 pixels	
NAXIS2	28	1	I*4	No of axis 2 pixels	
BSCALE	32	1	R*4	Image scaling factor	
BZERO	36	1	R*4	Image origin	
BLANK	40	1	I*4	Integer defining null image datum before scaling	
BUNIT	44	1	C*12	Units of image data	
CTYPE1	56	1	C*8	Type of projection used = 'RA---TAN'	
CUNIT1	64	1	C*8	Units of axis1 = 'deg'	
CRVAL1	72	1	R*8	RA at the reference pixel	
CRPIX1	80	1	R*4	Reference pixel on axis 1	
CDELT1	84	1	R*4	Increment per pixel	
CTYPE2	88	1	C*8	Type of projection used = 'DEC--TAN'	
CUNIT2	96	1	C*8	Units of axis2 = 'deg'	
CRVAL2	104	1	R*8	DEC at the reference pixel	
CRPIX2	112	1	R*4	Reference pixel on axis 2	
CDELT2	116	1	R*4	Increment per pixel	
CROTA2	120	1	R*8	Image rotation in degrees	
CD001001	128	1	R*8	Rotation matrix element (1,1)	
CD002002	136	1	R*8	Rotation matrix element (2,2)	
CD001002	144	1	R*8	Rotation matrix element (1,2)	

```
CD002001   152    1 R*8  Rotation matrix element (2,1)
DATE-OBS   160    1 C*8  Date of start of component
                         observation
TIME-OBS   168    1 C*8  Time of start of component
                         observation
MJD-OBS    176    1 R*8  Epoch of start of observation
DATE-END   184    1 C*8  Date of end of component observation
TIME-END   192    1 C*8  Time of end of component observation
MJD-END    200    1 R*8  Epoch of end of observation
WAVELENG   208    1 R*4  Wavelength
                         TUNIT=micron
                         TDISP=F5.2
BANDWIDT   212    1 R*4  Bandwidth
                         TUNIT=micron
                         TDISP=F5.2
POLARISE   216    1 C*4  Polariser in use
                         TDISP=A4
                         { 'NONE' | 'P0' | 'P60' | 'P120' }
NMAP       220    1 I*4  Number of component CMAPs
MAPINDEX   224    N I*4  Indexes of the component CMAPs
ARRAY      224    N I*4  Data
                         TDISP=1P,E9.3,0P
```

HEADER KEYWORDS

```
Includes CHEAD.INC
RADECSYS C  Coordinate reference frame = 'FK5'
EQUINOX  R  Coordinate epoch = 2000.0
```

7.2.2 LWS Auto Analysis Results

PRODUCT TYPE: LSAN : LWS Automatic Analysis Results

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 48
LSANUTK	0	1	I*4	UTK time	
LSANRPID	4	2	I*1	Raster Point ID	
LSANFILL	6	1	I*2	Filler	
LSANLINE	8	1	I*4	Line number	
LSANDET	12	1	I*4	Detector ID	
LSANSDIR	16	1	I*4	Scan direction	
LSANSCNT	20	1	I*4	Scan count	
LSANWAV	24	1	R*4	Wavelength in microns TUNIT=microns	
LSANWAVU	28	1	R*4	Uncertainty in wavelength in microns TUNIT=microns	
LSANFLX	32	1	R*4	Flux on detector watts/cm^2/micron (GR only) FP scans will be in watts/cm^2 until spectral bandwidth correction is per formed TUNIT=watts/cm^2/micron_(watts/cm^2_for_FP_scans)	
LSANFLXU	36	1	R*4	Fractional systematic flux error due to calib. TUNIT=none	
LSANSTAT	40	1	I*4	Status word	
LSANITK	44	1	I*4	ITK time	

HEADER KEYWORDS

LVERSn	C	LWS version information for each calibration file n=1,2,3...
LCGBdet	R	Grating spectral bandwidth correction factor for detector (det='SW1'...'LW5') from LCGB file
LCGBUdet	R	Uncertainty in grating spectral bandwidth correction factor for (det='SW1'...'LW5') from LCGB file
LCFWFLCn	R	4 double precision numbers (n=0,1,2,3) giving the FPL wavelength conversion coefficients. Present in FP observations only
LCFWFSCn	R	4 double precision numbers (n=0,1,2,3) giving the FPS wavelength conversion coefficients. Present in FP observations only
LVCOEFn	R	Coefficients of 2nd order fit for velocity correction n=0,1,2
LOSKPDRK	L	Indicates if dark current subtraction stage was omitted
LOSKPFPR	L	Indicates if FP spectral responsivity stage was omitted
LOSKPVEL	L	Indicates if velocity correction stage was omitted
LOABSOPT	I	Abs responsivity option. 0=off,1=on,2=select
LORELOPT	I	Rel responsivity option. 0=off,1=on,2=select
LOABSDN	L	Absolute responsivity correction done for this obs ?
LORELDN	L	Relative responsivity correction done for this obs ?

LPHOTOM	L	Indicates if observation is photometric observation
LEOH*	A	of the keywords with the prefix LEOH are copied from the LSPD header into the LSAN header. See LSP description for details of these keywords
LCDKdet	R	If fixed dark current/straylight used then these Keywords give the values used for each detector (det='SW1'…'LW5').
LCDKUdet	R	Uncertainty associated with each LCDKdet value
LCGWCOn	R	(n=0,1,2,3,4) Coefficients used during conversion of grating LVDT to wavelength
LCGWLINE	R	Number of lines per um on grating. Used during conversion of grating LVDT to wavelength
LCGWAdet	R	(Det='SW1'...'LW5') Angle for each detector used during conversion of grating LVDT to wavelength
LSTRNOMn	R	(n=0-9) Start of wavelength range for which GR RSRF is valid for each detector
LENDNOMn	R	(n=0-9) End of wavelength range for which GR RSRF is valid for each detector

---

PRODUCT TYPE: LSNR : LWS AAR data, no responsivity correction

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 48
LSNRUTK	0	1	I*4	UTK time	
LSNRRPID	4	2	I*1	Raster Point ID	
LSNRFILL	6	1	I*2	Filler	
LSNRLINE	8	1	I*4	Line number	
LSNRDET	12	1	I*4	Detector ID	
LSNRSDIR	16	1	I*4	Scan direction	
LSNRSCNT	20	1	I*4	Scan count	
LSNRWAV	24	1	R*4	Wavelength in microns TUNIT=microns	
LSNRWAVU	28	1	R*4	Uncertainty in wavelength in microns TUNIT=microns	
LSNRFLX	32	1	R*4	Flux on detector in watts per cm^2 per micron (GR only) FP scans will be in watts per cm^2 u ntil spectral bandwidth correction is performed (SCREW 149) TUNIT=watts/cm^2/micron_(watts/cm^2_ for_FP_scans)	
LSNRFLXU	36	1	R*4	Fractional systematic flux error due to calib. TUNIT=none	
LSNRSTAT	40	1	I*4	Status word	
LSNRITK	44	1	I*4	ITK time	

HEADER KEYWORDS

See	L	description file for description of keywords

PRODUCT TYPE: LIAC : LWS illuminator results summary

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 264
LIACIKS	0	1	I*4	ITK of start of flash	
LIACIKE	4	1	I*4	ITK of end of flash	
LIACUKS	8	1	I*4	UTK of start of flash	

LIACUKE	12	1	I*4	UTK of end of flash
LIACTYPE	16	1	I*4	Illuminator flash type identifier (0,1...)
LIACWHAP	20	1	I*4	Wheel absolute position 0=FPS, 1=GR, 2=FPL, 3=BLANK
LIACRES	24	10	R*4	Absolute responsivity correction factor for each detector
LIACRESU	64	10	R*4	Uncertainty in absolute responsivity correction factors
LIACBK	104	10	R*4	Background photocurrent for each detector
LIACBKU	144	10	R*4	Uncertainty in background photocurrent for each detector
LIACNR	184	10	I*4	No. of points used in calculation of correction factor per det.
LIACNB	224	10	I*4	No. of points used in calculation of background per det.

HEADER KEYWORDS

LCIRNSDB R	Number of standard deviations used for rejecting outliers in illuminator background using median clipping
LCIRNSDF R	Number of standard deviations used for rejecting outliers in illuminator flash data using median clipping

PRODUCT TYPE: LSCA : LWS scan summary file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 240
LSCARPID	0	2	I*1	Raster point ID	
LSCAADET	2	3	I*1	Active detector as string Detector name for AOTs L02 and L04, PHT=L02 photometric observation, ALL=L01, ???=L03	
LSCAFILL	5	3	I*1	Filler (Record must be multiple of 4 bytes)	
LSCAITKS	8	1	I*4	ITK of start of scan	
LSCAITKE	12	1	I*4	ITK time of end of scan	
LSCAITKR	16	1	I*4	ITK time of reference point in scan scan	
LSCAFLX	20	10	R*4	Average detector flux for scan for each detector	
LSCANRMT	60	1	I*4	Total number of ramps in scan	
LSCANRMF	64	10	I*4	Number of ramps used in calculation of average flux, for each detector	
LSCALINE	104	1	I*4	line number (L02 and L04 only)	
LSCAGPOS	108	1	I*4	Grating measured position at start of scan (L03 and L04 only) Set to -1 for L01 and L02	
LSCASCNT	112	1	I*4	scan count (0,1...)	
LSCASDIR	116	1	I*4	scan direction (0=forward, 1=reverse,-999=error)	
LSCAORD	120	10	R*4	Order numbers (L03, L04)	
LSCABK	160	10	R*4	Background/straylight subtracted from scan for each detector	
LSCABKU	200	10	R*4	Uncertainties in background/straylight for each detector	

HEADER KEYWORDS

LPHOTOM	L	Indicates if observation is photometric observation

PRODUCT TYPE: LGIF : LWS scan group information file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 236
LGIFITKS	0	1	I*4	ITK of start of group	
LGIFITKE	4	1	I*4	ITK of end of group	
LGIFITKR	8	1	I*4	Reference ITK at which correction is calculated	
LGIFABS	12	10	R*4	Absolute responsivity correction factor for each detector	
LGIFABSU	52	10	R*4	Uncertainties in absolute responsivity correction factors The following fields will only have valid data if the relative responsivity information could be ge nerated for the observation. Flag LGIFREL in the header will indi cate if these fields contain valid data.	
LGIFRSTA	92	10	I*4	Relative responsivity status flag for each detector 0 = No valid relative responsivity i nformation stored for this detector 1 = Relative responsivity informatio n stored for this detector	
LGIFREL1	132	10	R*4	1st coeff. of relative responsivity correction for each detector (Flux at reference ITK)	
LGIFREL2	172	10	R*4	2nd coeff. of relative responsivity correction for each detector (Flux per ITK unit)	
LGIFNSCD	212	1	I*4	Number of scans used for calculation of drift correction	
LGIFNSCG	216	1	I*4	Total number of scans in group	
LGIFLINE	220	1	I*4	Line number for group (only valid for L02 and L04)	
LGIFGPOS	224	1	I*4	Grating measured position for group (only valid for L03 and L04)	
LGIFADET	228	3	I*1	Active detector, as string (only valid for L02 and L04)	
LGIFFILL	231	3	I*1	Filler (Record must be multiple of 4 bytes)	
LGIFRPID	234	2	I*1	Raster point ID for group	

HEADER KEYWORDS

LGIFREL	L	If set then relative responsivity information was generated for this file.
LPHOTOM	L	Indicates if observation is photometric observation

PRODUCT TYPE: LPAA : LWS parallel auto-analysis file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 104
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
UTK	8	1	I*4	UTK time	
LWINTKEY	12	1	I*4	LWS window time Key TUNIT=second	
FLUX	16	10	R*4	Detector photo-current TUNIT=Watt/cm^2/um	
PROCFLGS	56	10	I*2	Processing flags	
OTF	76	1	I*2	On Target Flag (Star Tracker flag)	
STABLE	78	1	I*2	Stability flag (computed)	
RA	80	1	R*8	Ra coordinate TUNIT=degree	
DEC	88	1	R*8	OCFLGS coordinate TUNIT=degree	
ROLL	96	1	R*8	roll angle TUNIT=degree	

HEADER KEYWORDS

PRODUCT TYPE: LSAA : LWS serendipity AAR file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 112
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
UTK	8	1	I*4	UTK time	
LWINTKEY	12	1	I*4	LWS window time Key TUNIT=second	
FLUX	16	10	R*4	Detector photo-current TUNIT=MJy/sr	
PROCFLGS	56	10	I*2	Processing flags	
OTF	76	1	I*2	On Target Flag (Star Tracker flag)	
STABLE	78	1	I*2	Stability flag (computed)	
RA	80	1	R*8	Ra coordinate TUNIT=degree	
DEC	88	1	R*8	OCFLGS coordinate TUNIT=degree	
ROLL	96	1	R*8	roll angle TUNIT=degree	
SPEED	104	1	R*8	ISO speed TUNIT=degree/s	

HEADER KEYWORDS

PRODUCT TYPE: LPAD : LWS parallel derived file

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 184
GPSCTKEY	0	1	I*4	Instrument time key	
GPSCRPID	4	2	I*1	Raster point ID	
GPSCFILL	6	1	I*2	Filler	
UTK	8	1	I*4	UTK time	
LWINTKEY	12	1	I*4	LWS window time Key TUNIT=second	

FLUX	16	10	R*4	Detector photo-current TUNIT=Watt/cm^2/um
STDEV	56	10	R*4	Standard deviation on Flux TUNIT=Watt/cm^2/um
WEIGHT	96	10	I*4	Number of samples effectively used
PROCFLGS	136	10	I*2	Processing flags
OTF	156	1	I*2	On Target Flag (Star Tracker flag)
STABLE	158	1	I*2	Stability flag (computed)
RA	160	1	R*4	Ra coordinate TUNIT=degree
RAERR	164	1	R*4	Error on Ra coordinate TUNIT=degree
DEC	168	1	R*4	Average Dec coordinate TUNIT=degree
DECERR	172	1	R*4	Error on Dec coordinate TUNIT=degree
ROLL	176	1	R*4	Average roll angle TUNIT=degree
ROLLERR	180	1	R*4	Error on roll angle TUNIT=degree

HEADER KEYWORDS

7.2.3 PHT Auto Analysis Results

PRODUCT TYPE: PPAP : PHT-P point source photometry

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
PPAPFILT	0	1	I*4	Filter ID (CHW3 position)	
PPAPAPER	4	1	I*4	Aperture ID (CHW2 position)	
PPAPNBCK	8	1	I*4	Number of background reference positions	
PPAPSRCE	12	1	R*4	Source flux TUNIT=Jy	
PPAPSRCU	16	1	R*4	Uncertainty in source flux TUNIT=Jy	
PPAPSRCB	20	1	R*4	Source surface brightness TUNIT=MJy/sr	
PPAPSCBU	24	1	R*4	Uncertainty in source surface brightness TUNIT=MJy/sr	
PPAPBACK	28	1	R*4	Background for given aperture TUNIT=Jy	
PPAPBCKU	32	1	R*4	Uncertainty in background TUNIT=Jy	
PPAPSPB	36	1	R*4	Source plus background TUNIT=Jy	
PPAPSPBU	40	1	R*4	Uncertainty in source plus background TUNIT=Jy	
PPAPSBB	44	1	R*4	Source plus background (brightness) TUNIT=MJy/sr	
PPAPSBBU	48	1	R*4	Uncertainty in source plus background (brightness) TUNIT=MJy/sr	
PPAPBCK1	52	1	R*4	Background at reference position 1 TUNIT=Jy	
PPAPBK1U	56	1	R*4	Uncertainty in background 1 TUNIT=Jy	
PPAPBCK2	60	1	R*4	Background at reference position 2 TUNIT=Jy	
PPAPBK2U	64	1	R*4	Uncertainty in background 2 TUNIT=Jy	
PPAPBINT	68	1	R*4	Mean background intensity TUNIT=MJy/ster	
PPAPBINU	72	1	R*4	Uncertainty in background intensity TUNIT=MJy/ster	
PPAPNCYC	76	1	I*4	Number of accepted chopper cycles	

HEADER KEYWORDS

FILTERd	C	Filter, d=1 to no. of filters used
APERd	C	Aperture
EXFLUXd	R	Expected source flux
UNCFLXd	R	Uncertainty in expected flux
MXBACKd	R	Max expected background (MJy/ster)
FLUXd	R	Flux density (source + background)
FLUXUNd	R	Uncertainty in flux (source + background)
BACKd	R	Measured background (MJy/ster)

PRODUCT TYPE: PPAE : PHT-P extended source photometry

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 72
PPAEFILT	0	1	I*4	Filter ID (CHW3 position)	
PPAEAPER	4	1	I*4	Aperture ID (CHW2 position)	
PPAENBCK	8	1	I*4	Number of background reference positions	
PPAESRCE	12	1	R*4	Source brightness TUNIT=MJy/ster	
PPAESRCU	16	1	R*4	Uncertainty in source brightness TUNIT=MJy/ster	
PPAEFLUX	20	1	R*4	Source flux density TUNIT=Jy	
PPAEFLXU	24	1	R*4	Uncertainty in flux density TUNIT=Jy	
PPAEBACK	28	1	R*4	Background for given aperture TUNIT=MJy/ster	
PPAEBCKU	32	1	R*4	Uncertainty in background TUNIT=MJy/ster	
PPAESPB	36	1	R*4	Source plus background TUNIT=MJy/ster	
PPAESPBU	40	1	R*4	Uncertainty in source plus background TUNIT=MJy/ster	
PPAESBFX	44	1	R*4	Source plus background flux density TUNIT=Jy	
PPAESBFU	48	1	R*4	Uncertainty in source plus background flux density TUNIT=Jy	
PPAEBCK1	52	1	R*4	Background at reference position 1 TUNIT=MJy/ster	
PPAEBK1U	56	1	R*4	Uncertainty in background 1 TUNIT=MJy/ster	
PPAEBCK2	60	1	R*4	Background at reference position 2 TUNIT=MJy/ster	
PPAEBK2U	64	1	R*4	Uncertainty in background 2 TUNIT=MJy/ster	
PPAENCYC	68	1	I*4	Number of accepted chopper cycles	

HEADER KEYWORDS

FILTERd	C	Filter, d=1 to no. of filters used
APERd	C	Aperture
EXBRGTd	R	Expected source brightness
UNCFLXd	R	Uncertainty in expected brightness
MXBACKd	R	Max expected background (MJy/ster)
BRGTd	R	Brightness (source + background)
BRGTUNd	R	Uncertainty in brightness (source + background)
BACKd	R	Measured background (MJy/ster)

PRODUCT TYPE: PPAS : PHT-P scan & slew photometry

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 48
PPASFILT	0	1	I*4	Filter ID (CHW3 position)	
PPASRA	4	1	R*4	Right Ascension	
PPASRAU	8	1	R*4	Uncertainty	
PPASDEC	12	1	R*4	Declination	
PPASDECU	16	1	R*4	Uncertainty	
PPASROLL	20	1	R*4	Roll angle	
PPASROLU	24	1	R*4	Uncertainty	
PPASBRGT	28	1	R*4	Surface brightness	

				TUNIT=MJy/ster
PPASBRGU	32	1	R*4	Uncertainty in surface brightness TUNIT=MJy/ster
PPASFLUX	36	1	R*4	Flux density per pixel TUNIT=Jy
PPASFLXU	40	1	R*4	Uncertainty in flux density TUNIT=Jy
PPASSTAT	44	1	I*1	Status flag
PPASFILL	45	3	I*1	Filler

HEADER KEYWORDS

FPCMODE	C	Chopper mode
APERTURE	C	Aperture
FILTERd	C	Filter name, d=1 to no. of filters
EXBRGTd	R	Expected source brightness
UNCFLXd	R	Unc. in expected brightness
MXBRGTd	R	Maximum measured brightness
UNBRGTd	R	Uncertainty in measured brightness

PRODUCT TYPE: PLAP : PHT-SL point source spectroscopy

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 2568
PLAPDFLG	0	1	I*4	Dark background flag (1 if dark meas, 0 otherwise)	
PLAPNBCK	4	1	I*4	Number of background reference positions	
PLAPSRCE	8	64	R*4	Source TUNIT=W/m^2/um	
PLAPSRCU	264	64	R*4	Uncertainty in Source TUNIT=W/m^2/um	
PLAPBCK	520	64	R*4	Mean Background TUNIT=W/m^2/um	
PLAPBCKU	776	64	R*4	Uncertainty in Mean Background TUNIT=W/m^2/um	
PLAPSPB	1032	64	R*4	Source + Background TUNIT=W/m^2/um	
PLAPSPBU	1288	64	R*4	Uncertainty in Source + Background TUNIT=W/m^2/um	
PLAPBCK1	1544	64	R*4	Background at reference position 1 TUNIT=W/m^2/um	
PLAPBK1U	1800	64	R*4	Uncertainty in Background 1 TUNIT=W/m^2/um	
PLAPBCK2	2056	64	R*4	Background at reference position 2 TUNIT=W/m^2/um	
PLAPBK2U	2312	64	R*4	Uncertainty in Background 2 TUNIT=W/m^2/um	

HEADER KEYWORDS

CALSEQ	I	Calibration Sequence
CALDATE	C	Date Calibration defaults generated
FPCMODE	C	Focal plane chopper mode (ST, RE, SW or TR)
LAMBDAd	R	Central Wavelength of pixel (m), d=1,64

PRODUCT TYPE: PLAE : PHT-SL extended source spectroscopy

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 2568
PLAEDFLG	0	1	I*4	Dark background flag (1 if dark meas, 0 otherwise)	
PLAENBCK	4	1	I*4	Number of background reference positions	
PLAESRCE	8	64	R*4	Source TUNIT=W/m^2/um/ster	
PLAESRCU	264	64	R*4	Uncertainty in Source TUNIT=W/m^2/um/ster	
PLAEBCK	520	64	R*4	Mean Background TUNIT=W/m^2/um/ster	
PLAEBCKU	776	64	R*4	Uncertainty in Mean Background TUNIT=W/m^2/um/ster	
PLAESPB	1032	64	R*4	Source + Background TUNIT=W/m^2/um/ster	
PLAESPBU	1288	64	R*4	Uncertainty in Source + Background TUNIT=W/m^2/um/ster	
PLAEBCK1	1544	64	R*4	Background at reference position 1 TUNIT=W/m^2/um/ster	
PLAEBK1U	1800	64	R*4	Uncertainty in Background 1 TUNIT=W/m^2/um/ster	
PLAEBCK2	2056	64	R*4	Background at reference position 2 TUNIT=W/m^2/um/ster	
PLAEBK2U	2312	64	R*4	Uncertainty in Background 2 TUNIT=W/m^2/um/ster	

HEADER KEYWORDS

CALSEQ	I	Calibration Sequence
CALDATE	C	Date Calibration defaults generated
FPCMODE	C	Focal plane chopper mode (ST, RE, SW or TR)
LAMBDAd	R	Central Wavelength of pixel (m), d=1,64

PRODUCT TYPE: PLAS : PHT-SL Raster mode spectroscopy

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 604
PLASDFLG	0	1	I*4	Dark background flag (1 if dark meas, 0 otherwise)	
PLASRA	4	1	R*4	Right Ascension of raster point	
PLASRAU	8	1	R*4	Uncertainty in Right Ascension	
PLASDEC	12	1	R*4	Declination of raster point	
PLASDECU	16	1	R*4	Uncertainty in Declination	
PLASROLL	20	1	R*4	Roll angle	
PLASROLU	24	1	R*4	Uncertainty in roll angle	
PLASSPB	28	64	R*4	Source plus background TUNIT=W/m^2/um/ster	
PLASSPBU	284	64	R*4	Uncertainty in Source plus background TUNIT=W/m^2/um/ster	
PLASSTAT	540	64	I*1	Status flags	

HEADER KEYWORDS

CALSEQ	I	Calibration Sequence
CALDATE	C	Date Calibration defaults generated
LAMBDAd	R	Central Wavelength of pixel (m), d=1,64

PRODUCT TYPE: PSAP : PHT-SS point source spectroscopy

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 2568
PSAPDFLG	0	1	I*4	Dark background flag (1 if dark meas, 0 otherwise)	
PSAPNBCK	4	1	I*4	Number of background reference positions	
PSAPSRCE	8	64	R*4	Source TUNIT=W/m^2/um	
PSAPSRCU	264	64	R*4	Uncertainty in Source TUNIT=W/m^2/um	
PSAPBCK	520	64	R*4	Mean Background TUNIT=W/m^2/um	
PSAPBCKU	776	64	R*4	Uncertainty in Mean Background TUNIT=W/m^2/um	
PSAPSPB	1032	64	R*4	Source + Background TUNIT=W/m^2/um	
PSAPSPBU	1288	64	R*4	Uncertainty in Source + Background TUNIT=W/m^2/um	
PSAPBCK1	1544	64	R*4	Background at reference position 1 TUNIT=W/m^2/um	
PSAPBK1U	1800	64	R*4	Uncertainty in Background 1 TUNIT=W/m^2/um	
PSAPBCK2	2056	64	R*4	Background at reference position 2 TUNIT=W/m^2/um	
PSAPBK2U	2312	64	R*4	Uncertainty in Background 2 TUNIT=W/m^2/um	

HEADER KEYWORDS

CALSEQ	I	Calibration Sequence
CALDATE	C	Date Calibration defaults generated
FPCMODE	C	Focal plane chopper mode (ST, RE, SW or TR)
LAMBDAd	R	Central Wavelength of pixel (m), d=1,64

PRODUCT TYPE: PSAE : PHT-SS extended source spectroscopy

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 2568
PSAEDFLG	0	1	I*4	Dark background flag (1 if dark meas, 0 otherwise)	
PSAENBCK	4	1	I*4	Number of background reference positions	
PSAESRCE	8	64	R*4	Source TUNIT=W/m^2/um/ster	
PSAESRCU	264	64	R*4	Uncertainty in Source TUNIT=W/m^2/um/ster	
PSAEBCK	520	64	R*4	Mean Background TUNIT=W/m^2/um/ster	
PSAEBCKU	776	64	R*4	Uncertainty in Mean Background TUNIT=W/m^2/um/ster	
PSAESPB	1032	64	R*4	Source + Background TUNIT=W/m^2/um/ster	
PSAESPBU	1288	64	R*4	Uncertainty in Source + Background TUNIT=W/m^2/um/ster	
PSAEBCK1	1544	64	R*4	Background at reference position 1 TUNIT=W/m^2/um/ster	
PSAEBK1U	1800	64	R*4	Uncertainty in Background 1 TUNIT=W/m^2/um/ster	
PSAEBCK2	2056	64	R*4	Background at reference position 2	

				TUNIT=W/m^2/um/ster
PSAEBK2U	2312	64	R*4	Uncertainty in Background 2 TUNIT=W/m^2/um/ster

HEADER KEYWORDS

CALSEQ	I	Calibration Sequence
CALDATE	C	Date Calibration defaults generated
FPCMODE	C	Focal plane chopper mode (ST, RE, SW or TR)
LAMBDAd	R	Central Wavelength of pixel (m), d=1,64

PRODUCT TYPE: PSAS : PHT-SS Raster mode spectroscopy

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 604
PSASDFLG	0	1	I*4	Dark background flag (1 if dark meas, 0 otherwise)	
PSASRA	4	1	R*4	Right Ascension of raster point	
PSASRAU	8	1	R*4	Uncertainty in Right Ascension	
PSASDEC	12	1	R*4	Declination of raster point	
PSASDECU	16	1	R*4	Uncertainty in Declination	
PSASROLL	20	1	R*4	Roll angle	
PSASROLU	24	1	R*4	Uncertainty in roll angle	
PSASSPB	28	64	R*4	Source plus background TUNIT=W/m^2/um/ster	
PSASSPBU	284	64	R*4	Uncertainty in Source plus background TUNIT=W/m^2/um/ster	
PSASSTAT	540	64	I*1	Status flags	

HEADER KEYWORDS

CALSEQ	I	Calibration Sequence
CALDATE	C	Date Calibration defaults generated
LAMBDAd	R	Central Wavelength of pixel (m), d=1,64

PRODUCT TYPE: PCAP : PHT-C point source photometry

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 560
PCAPFILT	0	1	I*4	Filter ID (CHW2 position)	
PCAPNBCK	4	1	I*4	Number of background reference positions	
PCAPNPIX	8	1	I*4	Number of pixels defined	
PCAPSRCE	12	9	R*4	Source flux TUNIT=Jy	
PCAPSRCU	48	9	R*4	Uncertainty in source flux TUNIT=Jy	
PCAPSRCB	84	9	R*4	Source surface brightness TUNIT=MJy/sr	
PCAPSCBU	120	9	R*4	Uncertainty in source surface brightness TUNIT=MJy/sr	
PCAPSPB	156	9	R*4	Source plus background TUNIT=Jy	
PCAPSPBU	192	9	R*4	Uncertainty in source plus background TUNIT=Jy	
PCAPSBB	228	9	R*4	Source plus background (brightness) TUNIT=MJy/sr	
PCAPSBBU	264	9	R*4	Uncertainty in source plus background (brightness)	

				TUNIT=MJy/sr
PCAPB1	300	9	R*4	Background at reference position 1 TUNIT=MJy/ster
PCAPB1U	336	9	R*4	Uncertainty in background 1 TUNIT=MJy/ster
PCAPB2	372	9	R*4	Background at reference position 2 TUNIT=MJy/ster
PCAPB2U	408	9	R*4	Uncertainty in background 2 TUNIT=MJy/ster
PCAPPEAK	444	1	R*4	Fitted source peak TUNIT=Jy
PCAPPKU	448	1	R*4	Uncertainty in source peak TUNIT=Jy
PCAPBCKS	452	1	R*4	Background at source position TUNIT=Jy
PCAPBKSU	456	1	R*4	Uncertainty in background at source TUNIT=Jy
PCAPBCK1	460	1	R*4	Avg. Background at off-source position 1 TUNIT=Jy
PCAPBK1U	464	1	R*4	Uncertainty in background off-source 1 TUNIT=Jy
PCAPBCK2	468	1	R*4	Avg. Background at off-source position 2 TUNIT=Jy
PCAPBK2U	472	1	R*4	Uncertainty in background off-source 2 TUNIT=Jy
PCAPBINS	476	1	R*4	On-source background intensity TUNIT=MJy/ster
PCAPBISU	480	1	R*4	Uncertainty in background intensity on-source TUNIT=MJy/ster
PCAPBIN1	484	1	R*4	Off-source background intensity 1 TUNIT=MJy/ster
PCAPBI1U	488	1	R*4	Uncertainty in background intensity off-source 1 TUNIT=MJy/ster
PCAPBIN2	492	1	R*4	Off-source background intensity 2 TUNIT=MJy/ster
PCAPBI2U	496	1	R*4	Uncertainty in background intensity off-source 2 TUNIT=MJy/ster
PCAPOFF	500	2	R*4	(x,y) offset of source peak TUNIT=arcsec
PCAPOFFU	508	2	R*4	(x,y) uncertainty in offset TUNIT=arcsec
PCAPFITU	516	1	R*4	Uncertainty of Gaussian fit TUNIT=Jy
PCAPSTAT	520	1	I*4	Fit status
PCAPNCYC	524	9	I*4	Number of accepted chopper cycles

HEADER KEYWORDS

FILTERd	C	Filter, d=1 to no. of filters used
EXFLUXd	R	Expected source flux
UNCFLXd	R	Uncertainty in expected flux
MXBACKd	R	Max expected background (MJy/ster)
FLUXd	R	Flux density (source + background)
FLUXUNd	R	Uncertainty in flux (source + background)
BACKd	R	Measured background (MJy/ster)

PRODUCT TYPE: PCAE : PHT-C extended source photometry

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 504
PCAEFILT	0	1	I*4	Filter ID (CHW2 position)	
PCAENBCK	4	1	I*4	Number of background reference positions	
PCAENPIX	8	1	I*4	Number of pixels defined	
PCAESRCE	12	9	R*4	Source brightness TUNIT=MJy/ster	
PCAESRCU	48	9	R*4	Uncertainty in source brightness TUNIT=MJy/ster	
PCAEFLUX	84	9	R*4	Source flux density TUNIT=Jy	
PCAEFLXU	120	9	R*4	Uncertainty in flux density TUNIT=Jy	
PCAESPB	156	9	R*4	Source plus background TUNIT=MJy/ster	
PCAESPBU	192	9	R*4	Uncertainty in source plus background TUNIT=MJy/ster	
PCAESBFX	228	9	R*4	Source plus background flux density TUNIT=Jy	
PCAESBFU	264	9	R*4	Uncertainty in source plus background flux density TUNIT=Jy	
PCAEB1	300	9	R*4	Background at reference position 1 TUNIT=MJy/ster	
PCAEB1U	336	9	R*4	Uncertainty in background 1 TUNIT=MJy/ster	
PCAEB2	372	9	R*4	Background at reference position 2 TUNIT=MJy/ster	
PCAEB2U	408	9	R*4	Uncertainty in background 2 TUNIT=MJy/ster	
PCAEBACK	444	1	R*4	Average background TUNIT=MJy/ster	
PCAEBCKU	448	1	R*4	Uncertainty in background TUNIT=MJy/ster	
PCAEBCK1	452	1	R*4	Avg. background at off-source position 1 TUNIT=MJy/ster	
PCAEBK1U	456	1	R*4	Uncertainty in background off-source 1 TUNIT=MJy/ster	
PCAEBCK2	460	1	R*4	Avg. background at off-source position 2 TUNIT=MJy/ster	
PCAEBK2U	464	1	R*4	Uncertainty in background off-source 2 TUNIT=MJy/ster	
PCAENCYC	468	9	I*4	Number of accepted chopper cycles	

HEADER KEYWORDS

FILTERd	C	Filter, d=1 to no. of filters used
EXBRGTd	R	Expected source brightness
UNCFLXd	R	Uncertainty in expected brightness
MXBACKd	R	Max expected background (MJy/ster)
BRGTd	R	Brightness (source + background)
BRGTUNd	R	Uncertainty in brightness (source + background)
BACKd	R	Measured background (MJy/ster)

PRODUCT TYPE: PCAS : PHT-C scan & slew photometry

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 192
PCASFILT	0	1	I*4	Filter ID (CHW2 position)	
PCASRA	4	1	R*4	Right Ascension	
PCASRAU	8	1	R*4	Uncertainty	
PCASDEC	12	1	R*4	Declination	
PCASDECU	16	1	R*4	Uncertainty	
PCASROLL	20	1	R*4	Roll angle	
PCASROLU	24	1	R*4	Uncertainty	
PCASAVGB	28	1	R*4	Average brightness over array TUNIT=MJy/ster	
PCASNPIX	32	1	I*4	Number of pixels defined	
PCASBRGT	36	9	R*4	Surface brightness TUNIT=MJy/ster	
PCASBRGU	72	9	R*4	Uncertainty in surface brightness TUNIT=MJy/ster	
PCASFLUX	108	9	R*4	Flux density per pixel TUNIT=Jy	
PCASFLXU	144	9	R*4	Uncertainty in flux density TUNIT=Jy	
PCASSTAT	180	9	I*1	Status flags	
PCASFILL	189	3	I*1	Filler	

HEADER KEYWORDS

FPCMODE	C	Chopper mode
FILTERd	C	Filter name, d=1 to no. of filters
EXBRGTd	R	Expected source brightness
UNCFLXd	R	Unc. in expected brightness
MXBRGTd	R	Maximum measured brightness
UNBRGTd	R	Uncertainty in measured brightness

PRODUCT TYPE: PGAI : PHT Photometric Image

NAXIS : 3 **TYPE :** R*4 **UNITS :** MJY/SR

AXIS No.	LENGTH	DESCRIPTION
1	N	Points per raster line (upto 32)
2	N	Number of lines (upto 32)
3	14	Filters

HEADER KEYWORDS

CRPIX1	R	Origin of RA-axis, image centre (pixels)
CRPIX2	R	Origin of DEC-axis, image centre (pixels)
CRVAL1	R	R.A.
CRVAL2	R	Declination
CRVAL3	R	Wavelength (metres)
CDELT1	R	Pixel size
CDELT2	R	Pixel size
CROTA3	R	Roll angle
FILTERn	C	Filter (n is the value of NAXIS3)
LAMBDAn	R	Central Wavelength of filter (m)
EXBRGTn	R	Expected brightness
DATAMIN	R	Minimum brightness
DATAMAX	R	Maximum brightness
APERTURE	C	Aperture (if PHT-P)

PRODUCT TYPE: PGAU : PHT Uncertainty Image

NAXIS : 3 **TYPE :** R*4 **UNITS :** MJY/SR

AXIS No.	LENGTH	DESCRIPTION
1	N	Points per raster line (upto 32)
2	N	Number of lines (upto 32)
3	14	Filters

HEADER KEYWORDS

CRPIX1	R	Origin of RA-axis, image centre (pixels)
CRPIX2	R	Origin of DEC-axis, image centre (pixels)
CRVAL1	R	R.A.
CRVAL2	R	Declination
CRVAL3	R	Wavelength (metres)
CDELT1	R	Pixel size
CDELT2	R	Pixel size
CROTA3	R	Roll angle
DATAMIN	R	Minimum uncertainty
DATAMAX	R	Maximum uncertainty
FILTERn	C	Filter (n is the value of NAXIS3)
APERTURE	C	Aperture (if PHT-P)
LAMBDAn	R	Central Wavelength of filter (m)
EXPUNCn	R	Expected uncertainty

PRODUCT TYPE: PGAT : PHT Exposure Image

NAXIS : 3 **TYPE :** R*4 **UNITS :** Seconds

AXIS No.	LENGTH	DESCRIPTION
1	N	Points per raster line (upto 32)
2	N	Number of lines (upto 32)
3	14	Filters

HEADER KEYWORDS

CRPIX1	R	Origin of RA-axis, image centre (pixels)
CRPIX2	R	Origin of DEC-axis, image centre (pixels)
CRVAL1	R	R.A.
CRVAL2	R	Declination
CRVAL3	R	Wavelength (metres)
CDELT1	R	Pixel size
CDELT2	R	Pixel size
CROTA3	R	Roll angle
APERTURE	C	Aperture (if PHT-P)
FILTERn	C	Filter (n is the value of NAXIS3)
LAMBDAn	R	Central Wavelength of filter (m)
DATAMIN	R	Minimum exposure
DATAMAX	R	Maximum exposure
DATAAVG	R	Average exposure

7.2.4 SWS Auto Analysis Results

PRODUCT TYPE: SWAA : SWS Auto Analysis Results

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 52
SWAAWAVE	0	1	R*4	wavelength of data point TUNIT=um	
SWAAFLUX	4	1	R*4	flux TUNIT=Jy	
SWAASTDV	8	1	R*4	standard deviation TUNIT=Jy	
SWAATINT	12	1	I*4	total integration time (total time taken into account to calculate this data point) TUNIT=s	
SWAADETN	16	1	I*4	detector number	
SWAAITK	20	1	I*4	SWS instrument time key	
SWAAUTK	24	1	I*4	ISO uniform time key	
SWAARPID	28	2	I*1	filler (formerly raster point ID)	
SWAASPAR	30	2	I*1	spare	
SWAALINE	32	1	I*4	line number	
SWAASDIR	36	1	I*4	scan direction	
SWAASCNT	40	1	I*4	scan number	
SWAASTAT	44	1	I*4	status word	
SWAAFLAG	48	1	I*4	flag word	

8 BROWSE PRODUCTS

8.1 Introduction

These products are intended to provide a quick-look at the final scientifically reduced data from an observation. They are produced from auto-analysis products by software which runs outside of the ISO OLP system. Each set of products consists of a POSTCARD in GIF format for easy display and a survey product in FITS format. Survey products are stored in either standard FITS image format, displayable by most astronomical image software, or in ASCII table format. There is one survey product per observation, for each instrument apart from CAM, where a separate image product is produced for each filter.

8.2 Survey Products

PRODUCT TYPE: CSP : CAM survey product

NAXIS : 2 **TYPE :** R*4 **UNITS :** Jy/pixel

AXIS No.	LENGTH	DESCRIPTION
1	N	X (pixels)
2	N	Y (pixels)

PRODUCT TYPE: LSP : LWS survey product

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
WAVE	0	1	F8.4	Wavelength (um)	
FLUX	8	1	E11.3	Flux (Units=w/cm^2/um)	
STDEV	19	1	E11.3	Standard deviation of flux Units=w/cm^2/um	
DET	30	1	I2	Detector number	
LINE	32	1	I2	Line number	
MECH	34	1	I2	Mechanism (0,1, or 2)	
ACTIVE	36	1	I2	Active detector flag (1 if active)	
PAD	38	1	C*42	Spare	

The survey product for PHT may be either an image, a spectrum or a curve-of-growth.

PRODUCT TYPE: PSP : PHT survey product (image)

NAXIS : 3 **TYPE :** R*4 **UNITS :** MJy/Sr

AXIS No.	LENGTH	DESCRIPTION

1	N	X axis (pixel)
2	N	Y axis (pixel)
3	N	Filter

PRODUCT TYPE: PSP: PHT survey product (spectrum)
P17/P18/P19 - sparse map with P detectors
P25 - absolute photometry with C detectors
P37/P38/P39 - sparse map with C detectors

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
LAMBDA	0	1	F6.2	Filter Reference Wavelength UNITS=micron	
FLUX_SPB	7	1	E10.2	Flux SRC+BCK UNITS=Jy for Point Source MJy/ster for Extended source	
UFLX_SPB	18	1	E10.2	Uncertainty in Flux SRC+BCK UNITS=Jy for Point Source MJy/ster for Extended source	
PAD	29	1	C*50	Spare	

PRODUCT TYPE: PSP : PHT survey product (curve-of-growth)
P04 - multi aperture photometry

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
APERSIZY	0	1	F5.1	Aperture Size in Y UNITS=arcsec	
APERSIZZ	7	1	F5.1	Aperture Size in Z UNITS=arcsec	
APERAREA	14	1	F7.1	Aperture area UNITS=arcsec^2	
FLUX_SPB	23	1	E10.2	Flux SRC+BCK UNITS=Jy for Point Source MJy/ster for Extended source	
UFLX_SPB	35	1	E10.2	Uncertainty in Flux SRC+BCK UNITS=Jy for Point Source MJy/ster for Extended source	
PAD	47	1	C*32	Spare	

PRODUCT TYPE: PSP : PHT survey product (spectrum)
P05 absolute photometry with P detectors

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 80
APERSIZY	0	1	F5.1	Aperture Size in Y UNITS=arcsec	
APERSIZZ	6	1	F5.1	Aperture Size in Z UNITS=arcsec	
APERAREA	12	1	F7.1	Aperture area UNITS=arcsec^2	
LAMBDA	20	1	F6.2	Wavelength (Microns)	
FLUX_SPB	27	1	E10.2	Flux SRC+BCK UNITS=Jy for Point Source MJy/ster for Extended source	
UFLX_SPB	38	1	E10.2	Uncertainty in Flux SRC+BCK UNITS=Jy for Point Source	

				MJy/ster for Extended source
PAD	49	1	C*30	Spare

PRODUCT TYPE: PSP : PHT survey product - (spectrum)
P03/P22 single pointing (stare/chopping)

FIELD	OFF	NUM	TYPE	DESCRIPTION — REC LENGTH: 160
LAMBDA	0	1	F6.2	Filter Reference Wavelength UNITS=micron
FLUX_SPB	7	1	E10.2	Flux SRC+BCK UNITS=Jy for Point Source MJy/ster for Extended source
UFLX_SPB	18	1	E10.2	Uncertainty in Flux SRC+BCK UNITS=Jy for Point Source MJy/ster for Extended source
FLUX_SRC	29	1	E10.2	Flux Source UNITS=Jy for Point Source MJy/ster for Extended source
UFLX_SRC	40	1	E10.2	Uncertainty in Flux SRC UNITS=Jy for Point Source MJy/ster for Extended source
BACK	51	1	E10.2	Background at Source Position UNITS=Jy for Point Source MJy/ster for Extended source
UBCK	62	1	E10.2	Uncertainty in BACK UNITS=Jy for Point Source MJy/ster for Extended source
BACK_AVE	78	1	E10.2	On-Source Background (MJy/ster)
UBCK_AVE	89	1	E10.2	Uncertainty in BACK_AVE (MJy/ster)
BACK_1	100	1	E10.2	Avg. Background at off-source pos 1 UNITS=Jy for Point Source MJy/ster for Extended source
UBCK_1	111	1	E10.2	Uncertainty in BACK_1 UNITS=Jy for Point Source MJy/ster for Extended source
BACK_2	122	1	E10.2	Avg. Background at off-source pos 2 UNITS=Jy for Point Source MJy/ster for Extended source
UBCK_2	133	1	E10.2	Uncertainty in BACK_2 UNITS=Jy for Point Source MJy/ster for Extended source
PAD	144	1	C*15	Spare

PRODUCT TYPE: PSP : PHT survey product - (spectrum)
P40 - spectrophotometry

FIELD	OFF	NUM	TYPE	DESCRIPTION — REC LENGTH: 160
LAMBDA	0	1	F8.4	Filter Reference Wavelength UNITS=micron
FLUX_SPB	9	1	E10.2	Flux SRC+BCK UNITS=W/m^2/um
UFLX_SPB	20	1	E10.2	Uncertainty in Flux SRC+BCK UNITS=W/m^2/um
FLUX_SRC	31	1	E10.2	Flux Source UNITS=W/m^2/um
UFLX_SRC	42	1	E10.2	Uncertainty in Flux SRC UNITS=W/m^2/um
BACK_AVE	53	1	E10.2	On-Source Background

				UNITS=W/m^2/um
UBCK_AVE	64	1	E10.2	Uncertainty in BACK_AVE UNITS=W/m^2/um
BACK_1	80	1	E10.2	Avg. Background at off-source position 1 UNITS=W/m^2/um
UBCK_1	91	1	E10.2	Uncertainty in BACK_1 UNITS=W/m^2/um
BACK_2	102	1	E10.2	Avg. Background at off-source position 2 UNITS=W/m^2/um
UBCK_2	113	1	E10.2	Uncertainty in BACK_2 UNITS=W/m^2/um
PAD	124	1	C*35	Spare

PRODUCT TYPE: SSP : SWS survey product

FIELD	**OFF**	**NUM**	**TYPE**	**DESCRIPTION**	**REC LENGTH:** 80
LINE	0	1	C*4	Line	
WAVE	5	1	F10.6	Wavelength (um)	
FLUX	17	1	E20.8	Flux (Jy)	
STDEV	39	1	E20.8	Standard deviation (Jy)	
PAD	60	1	C*20	Spare	

9 INTERNAL FILES

The following files are used by the ISO project and will not be distributed to observers.

PRODUCT TYPE: LDDS : AAL diagnostic detector scan file (Used for debugging)

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 88
LDDSUTK	0	1	I*4	UTK time	
LDDSGCP	4	1	I*4	Grating commanded position	
LDDSGLVP	8	1	R*4	Grating LVDT position	
LDDSGLVU	12	1	R*4	Grating LVDT position uncertainty	
LDDSFPOS	16	1	I*4	FP position	
LDDSSPPC	20	1	R*4	Detector photocurrent	
LDDSSPPU	24	1	R*4	Detector photocurrent uncertainty	
LDDSSPST	28	1	I*4	SPD status word	
LDDSDSPC	32	1	R*4	Photocurrent after dark current/straylight removal	
LDDSDSPU	36	1	R*4	Photocurrent uncertainty after dark current/straylight removal	
LDDSDSST	40	1	I*4	Status word from dark current/straylight removal	
LDDSFX	44	1	R*4	Flux	
LDDSFXU	48	1	R*4	Flux uncertainty	
LDDSFXST	52	1	I*4	Status word from flux conversion	
LDDSWV	56	1	R*4	Wavelength	
LDDSWVU	60	1	R*4	Wavelength uncertainty	
LDDSWVST	64	1	I*4	Status word from wavelength conversion	
LDDSSRFX	68	1	R*4	Flux after spectral responsivity calibration	
LDDSSRFU	72	1	R*4	Flux uncertainty after spectral responsivity calibration	
LDDSSRST	76	1	I*4	Status word after spectral responsivity calibration	
LDDSAAST	80	1	I*4	AAD status word	
LDDSITK	84	1	I*4	ITK time	

PRODUCT TYPE: PCSV : PHT CHW Sensor Voltages

FIELD	OFF	NUM	TYPE	DESCRIPTION	REC LENGTH: 20
PCSVUTC	0	2	I*4	UTC of originating TDF record	
PCSVC1PS	8	1	I*2	CHW1 position	
PCSVC2PS	10	1	I*2	CHW2 position	
PCSVC3PS	12	1	I*2	CHW3 position	
PCSVMPC1	14	1	I*2	CHW1 sensor voltage	
PCSVMPC2	16	1	I*2	CHW2 sensor voltage	
PCSVMPC3	18	1	I*2	CHW3 sensor voltage	

10 DATA DISTRIBUTION

10.1 Standard Observer Products

OLP Version 7 products have been distributed to observers on DAT tape or by FTP. The datasets included ERD, SPD, AAR and housekeeping and attitude files. The latest version of calibration files used to process each observation were also distributed.

10.2 Calibration and Auxiliary Files

Calibration files will continue to be updated as a better understanding of the instrumentation becomes available. More recent versions of the calibration files will become available for download from the ISO web server.

A ATTITUDE RECONSTRUCTION

The IRPH and IIPH data products described in section 4 are intended to provide a simple and complete ISO aspect solution for use in the data analysis of all four instruments. The following discussion of the basis on which the attitude products are derived is intended to give users the ability to understand and verify the contents of those products.

Astronomers, and the FITS standard and other related recommendations, express the attitude in terms of the 3 angles

{RA, DEC, ROLL}

that specify the orientation of the instrument in the inertial J2000 frame. The ROLL angle is measured anticlockwise from North through East to the spacecraft Z axis. Operationally, on the other hand, attitudes are specified in terms of 4-component quaternions

Q = {Q(1), Q(2), Q(3), Q(4)}

that provide the most concise representation of the series of rotations that are required to specify the attitude. For a rotation of D degrees about an axis specified by the direction cosines {l,m,n} the quaternion components are given by

Q(1) = l * sin(D/2)
Q(2) = m * sin(D/2)
Q(3) = n * sin(D/2)
Q(4) = cos(D/2)

The resultant quaternion, Qab, of successive rotations Qa and Qb is the product of a 4*4 matrix, each of whose elements is one of the elements of Qb, and the 4*1 matrix representation of Qa, written Qab = Qa*Qb =

| Qb(4) Qb(3) -Qb(2) Qb(1)| |Qa(1)|
|-Qb(3) Qb(4) Qb(1) Qb(2)| |Qa(2)|
| Qb(2) -Qb(1) Qb(4) Qb(3)| |Qa(3)|
|-Qb(1) -Qb(2) -Qb(3) Qb(4)| |Qa(4)|

In addition to the attitude estimator used by the AOCS in its control law and given in the IIPH columns RA, DEC and ROLL recommended for normal use, the AOCS also delivers instantaneous estimates of the Star-Tracker quaternion

* STRQ

that defines the STR J2000 pointing. It should be emphasised that these data that appear in the telemetry do not refer either to the telescope boresight or to the field-of-view of any of the instruments.

The telescope boresight is defined with respect to the Quadrant Star Sensor, or QSS, that also provides the frame of reference for the geometry of the individual instrument apertures. There is a different quaternion to describe each component of an instrument's pointing direction. The STRQ is combined with

* any raster-point quaternion - RPQ -

which depends, among other things, on the raster orientation, and

* the STR/QSS misalignment quaternion - STRQSSQ -

which is recalibrated every orbit and may suffer drift through an orbit

* any of the QSS/Instrument alignment quaternions (one per aperture)
  - QSSCAMQ -
  - QSSLWSQ -
  - QSSPHTQ -
  - QSSSWSQ -

to give a resultant quaternion, Q, that defines the orientation of an instrument in the inertial frame. Please note that the STRQSSQ quaternion to be used in this calculation is the inverse of the APPH(MISQUAT) quaternion which is reproduced in the header of the IRPH file, where the inverse is defined as Q'={-Q(1),-Q(2),-Q(3),Q(4)}.
Thus, for example,

(CAM) Q = STRQ*[RPQ*]STRQSSQ*QSSCAMQ

defines the orientation of the (CAM) X-, Y- and Z- instrument axes. If
<i>, <j> and <k> are the axis unit vectors of the J2000 inertial frame, then :

<x> = (Instrument) Pointing direction == {RA,DEC}
<y> = (Instrument) Y-axis
<z> = (Instrument) Z-axis

<x> = cos(DEC)*cos(RA)*<i> + cos(DEC)*sin(RA)*<j> + sin(DEC)*<k>

sin(DEC) = 2*(Q(1)*Q(3)-Q(2)*Q(4))

cos(RA)*cos(DEC) = Q(1)*Q(1)-Q(2)*Q(2)-Q(3)*Q(3)+Q(4)*Q(4)
sin(RA)*cos(DEC) = 2*(Q(1)*Q(2)+Q(3)*Q(4))

cos(ROLL)*cos(DEC) = -Q(1)*Q(1)-Q(2)*Q(2)+Q(3)*Q(3)+Q(4)*Q(4)
sin(ROLL)*cos(DEC) = -2*(Q(1)*Q(4)+Q(2)*Q(3))

These instantaneous attitude estimates are given in the IIPH columns XRA, XDEC and XROLL.

B The Relationship between UTK and UTC

The UTC-UTK relationship is not 100% stable or constant, because of the following reasons :

1. The UTC, which is basically the TDF format arrival time, will not be exactly 2 seconds from the preceding format, as there may be some "jitter". Hopefully this will usually be minimal or not at all the case during operations, but it is certainly possible (as in fact seen during EE-tests).

2. There is a slow change in the UTC due to orbital motion, related to the changing distance between the earth and the spacecraft.

3. The UTC is 'real-world' time. In the real world, there exist so-called 'leap seconds'. Like leap years, these can be added to the last second of a day at the end of June 30, or December 31. For everyday use, this is irrelevant, but for scientific analysi, this would be a major disruption.

4. Lastly, it is always possible that TDF formats drop out, causing "gaps" in the telemetry.

Therefore, the following should be borne in mind :

* the TREFxxxx keywords in main science ERD product FITS headers refer only to one particular point in time in the observation, and cannot be extrapolated to other points in the observation with high precision.

* the UTC is not supposed to be used for any analysis purposes within the ISO mission; the UTK/ITK should be used instead.

* the UTC can only be used to roughly correlate events outside ISO, like data from other sources for example.

* the UTC cannot be derived from the UTK with high precision (max. 2 seconds deviation should be expected).

NB. For clarity, the abbreviations "UTC" (Universal Time Coordinated), "GST" (Ground Station Time) and "ERT" (Earth Reception Time) are often used as synonyms.

C LIST of PRODUCTS

Compact status files

CSTA : CAM Compact Status
LSTA : LWS Compact Status
PSTA : PHT Compact Status
PSTI : PHT serendipity mode Compact Status
SSTA : SWS Compact Status

ERD files

CDER : CAM Diagnostic Edited Raw Data
CIER : CAM Image Edited Raw Data
CPER : CAM parallel Edited Raw Data
LIER : LWS Illuminator ERD file
LGER : LWS grating scan ERD file
LSER : LWS FPS scan ERD file
LLER : LWS FPL scan ERD file
LXER : LWS CLO ERD file
LWHK : LWS housekeeping ERD file
P1ER : PHT C100 Edited Raw Data
P2ER : PHT C200 Edited Raw Data
PPER : PHT-P Edited Raw Data
PSER : PHT-S Edited Raw Data
P2ES : PHT C200 Serendipity ERD
SWER : SWS Edited Raw Data
GEHK : General HK
GSHH : General HK (sampled)
AOCS : Raw AOCS frames

CAM CAL_G files

CSCGCROSS : CAM SW noise/cross talk decorrelation matrices
CCGSWDARK : CAM SW Dark Current Exposure Library
CCGSWDFLT : CAM SW Detector Flat Field Library
CCGSWOFLT : CAM SW Optical Flat Field Library
CCGSWDEAD : CAM SW Dead Pixel Map
CCGSWTRANS : CAM SW Model transients for memory calibration
CCGSWGLITCH : CAM SW Glitch Model
CCGSWPSF : CAM SW Point-Spread-Function Library
CCGSWSTRAY : CAM SW Non-dark local light model
CCGSWFRAME : CAM SW detector astrometric calibration
CCGLWDARK : CAM LW Dark Current Exposure Library
CCGLWDFLT : CAM LW Detector Flat Field Library
CCGLWOFLT : CAM LW Optical Flat Field Library
CCGLWDEAD : CAM LW Dead Pixel Map
CCGLWTRANS : CAM LW Model transients for memory calibration
CCGLWGLITCH : CAM LW Glitch Model
CCGLWPSF : CAM LW Point-Spread-Function Library
CCGLWSTRAY : CAM LW Non-dark local light model
CCGLWFRAME : CAM LW detector astrometric calibration
CCGLWLINEAR : CAM LW Linearity Correction Library
CCGSWLINEAR : CAM SW Linearity Correction Library
CCGLWPOL : CAM LW Polariser calibration as the inverse

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                4*4 Mueller matrices
CCGSWPOL      : CAM SW Polariser calibration as the inverse
                4*4 Mueller matrices
CCGLWSPEC     : CAM LW filter & CVF spectral characteristics
CCGSWSPEC     : CAM SW filter & CVF spectral characteristics
CCGLWSLP      : CAM LW CVF spectral line profile
CCGSWSLP      : CAM SW CVF spectral line profile
CCGLWDMOD     : CAM LW Dark Current Model Library
CCGLWSHIFT    : CAM LW astrometric shift correction
CHCGCONV      : CAM House Keeping interpolation values
CLWCVF1       : CAM LW CVF segment 1 description table
CLWCVF2       : CAM LW CVF segment 2 description table
CSWCVF        : CAM SW CVF description table
CWHEELS       : CAM Wheel Information Table
CCGLWRESET    : CAM LW reset value statistics
CCGLWSAT      : CAM LW saturation thresholds
CCGSWSAT      : CAM SW saturation thresholds
```

LWS CAL_G files

```
LCAF          : Absolute flux calibration data
LCGW          : Grating pos. to wavelength conversion table
LCFW          : FP wavelength calibration parameters
LCAG          : General parameters (provisional)
LCDP          : Dark current cal params (provisional)
LCST          : Spectral structure of Straylight (provisional)
LCGB          : Grating spectral bandwidth correction factors
LCGR          : Grating relative wavelength responsivity file
LCSI          : Standard illuminator flux file
LCDT          : Discard times
LCAL          : Valid readout limits for analogue electronics
LCVC          : Detector voltage conversion parameters
LCLRZ         : Zero FP positions for data held in LCLR file
LCSRZ         : Zero FP positions for data held in LCSR file
LCLR_0        : FPL relative wavelength responsivity (SW1)
LCLR_1        : FPL relative wavelength responsivity (SW2)
LCLR_2        : FPL relative wavelength responsivity (SW3)
LCLR_3        : FPL relative wavelength responsivity (SW4)
LCLR_4        : FPL relative wavelength responsivity (SW5)
LCLR_5        : FPL relative wavelength responsivity (LW1)
LCLR_6        : FPL relative wavelength responsivity (LW2)
LCLR_7        : FPL relative wavelength responsivity (LW3)
LCLR_8        : FPL relative wavelength responsivity (LW4)
LCLR_9        : FPL relative wavelength responsivity (LW5)
LCSR_0        : FPS relative wavelength responsivity (SW1)
LCSR_1        : FPS relative wavelength responsivity (SW2)
LCSR_2        : FPS relative wavelength responsivity (SW3)
LCSR_3        : FPS relative wavelength responsivity (SW4)
LCSR_4        : FPS relative wavelength responsivity (SW5)
LCSR_5        : FPS relative wavelength responsivity (LW1)
LCSR_6        : FPS relative wavelength responsivity (LW2)
LCSR_7        : FPS relative wavelength responsivity (LW3)
LCSR_8        : FPS relative wavelength responsivity (LW4)
LCSR_9        : FPS relative wavelength responsivity (LW5)
LTIMEDEP      : LWS Calibration Time Dependency
LCGA          : Analogue amplification gains
LCD1          : First level deglitching parameters
LCD2          : Second level deglitching parameters
LCD3          : Third level deglitching parameters
LCGH          : Glitch history file parameters
LCFP          : Parameters for electronic filters
LCDB          : Debiasing params and max. acceptable voltages
LCJF          : JF4 amplifier parameters
```

```
LCIL         : Second level deglitching parameters
LCIR         : LWS Illuminator reference data
LCTP         : LWS FP throughput correction coefficients
LCDK         : AAL cal file: Standard dark current/straylight values
LCPB         : Parallel cal file: LWS beam sizes
LCPDK        : Parallel cal file: LWS parallel dark currents
LCPDR        : Parallel cal file: LWS drift coefficients
LCPM         : Parallel cal file: LWS memory effects parameters
LCPR         : Parallel cal file: LWS parallel ramp correction factors
```

PHT CAL_G files

```
PC1CRELIN    : PHT C100 linearisations
PC2CRELIN    : PHT C200 linearisations
PPCRELIN     : PHT P linearisations
PDIE1TRANS   : PHT DIE 1 Transfer Function
PDIE2TRANS   : PHT DIE 2 Transfer Function
PC1ILLUM*    : PHT C100 FCS non-uniform illumination corrs.
PC2ILLUM*    : PHT C200 FCS non-uniform illumination corrs.
PSELNDR      : PHT NDR selection
PC1FCSPOW*   : PHT C100 FCS power tables
PC2FCSPOW*   : PHT C200 FCS power tables
PP1FCSPOW*   : PHT P1 FCS power tables
PP2FCSPOW*   : PHT P2 FCS power tables
PP3FCSPOW*   : PHT P3 FCS power tables
PC1VIGN      : PHT C100 vignetting corrections
PC2VIGN      : PHT C200 vignetting corrections
PP1VIGN      : PHT P1 vignetting corrections
PP2VIGN      : PHT P2 vignetting corrections
PP3VIGN      : PHT P3 vignetting corrections
PPSF         : PHT Point Spread Function Corrections
PSPECAL      : PHT-S Calibration Data
PFLUXCONV    : PHT Flux Conversions
PTIMEDEP     : PHT Calibration Time Dependency
PP1FCSAP     : PHT P1 FCS aperture correction tables
PP2FCSAP     : PHT P2 FCS aperture correction tables
PP3FCSAP     : PHT P3 FCS aperture correction tables
PC1CHOPCOR   : PHT C100 chopper correction factors
PC2CHOPCOR   : PHT C200 chopper correction factors
PPCHOPCOR    : PHT P chopper correction factors
PC1DARK      : PHT C100 dark current file
PC2DARK      : PHT C200 dark current file
PPDARK       : PHT P dark current file
PSDARK       : PHT S dark current file
PC1FLAT      : PHT C100 filter-to-filter flatfield correction
PC2FLAT      : PHT C200 filter-to-filter flatfield correction
PC1OMEGA     : PHT C100 aperture dimensions and solid angles
PC2OMEGA     : PHT C200 aperture dimensions and solid angles
PPOMEGA      : PHT P aperture dimensions and solid angles
PC1RESETI    : PHT-C100 parameters for conversion to 1/4s reset interval
PC2RESETI    : PHT-C200 parameters for conversion to 1/4s reset interval
PP1RESETI    : PHT-P1 parameters for conversion to 1/4s reset interval
PP2RESETI    : PHT-P2 parameters for conversion to 1/4s reset interval
PP3RESETI    : PHT-P3 parameters for conversion to 1/4s reset interval
PC1RESP*     : PHT C100 default responsivity file
PC2RESP*     : PHT C200 default responsivity file
PPRESP*      : PHT P default responsivity file
PCCBB        : PHT Black body Colour correction
PCCMBBONE    : PHT Modified Black body Nu1 Colour correction
PCCMBBTWO    : PHT Modified Black body Nu2 Colour correction
PCCPOWER     : PHT Power law Colour correction
PC1CHOPSIG   : PHT-C100 chopped signal correction
```

PC2CHOPSIG : PHT-C200 chopped signal correction
PP1CHOPSIG : PHT-P1 chopped signal correction
PP2CHOPSIG : PHT-P2 chopped signal correction
PP3CHOPSIG : PHT-P3 chopped signal correction
PC1FOOTP : PHT C100 footprint matrix
PC2FOOTP : PHT C200 footprint matrix
PP2FOOTP : PHT P2 footprint matrix
PP3FOOTP : PHT P3 footprint matrix
PC1SLINR : PHT C100 signal linearisation file
PC2SLINR : PHT C200 signal linearisation file
PP1SLINR : PHT P1 signal linearisation file
PP2SLINR : PHT P2 signal linearisation file
PP3SLINR : PHT P3 signal linearisation file
PCFILTRAN : PHT-C Filter Spectral Response
PPFILTRAN : PHT-P Filter Spectral Response
PCPSF : PHT-C Point Spread Function Corrections
PPFTOF : PHT-P filter-to-filter flatfield correction
PPPSF : PHT Point Spread Function Corrections
PSDYNAMIC : PHT-S Dynamic Calibration - corrected flux
PSDYNWT : PHT-S Dynamic Calibration - weighting function

SWS CAL_G files

SC01* : SWS Electrical Xtalk Matrices
SC02* : SWS RC correction timescales
SC02A* : SWS MIDBIT shift
SC02B* : SWS Reset Pulse Correction Factor
SC03* : SWS reset cutout length
SC04* : SWS Amplifier limits
SC05* : SWS switchable gains
SC06* : SWS glitch reject levels
SC12* : SWS gap-position relation
SC13* : SWS Cal file 13
SC16A* : SWS aperture offsets
SC16B* : SWS element offsets
SC16C* : SWS grating constants
SC16E* : SWS scanner curve coefficients
SC16ET* : SWS Cal file 16ET
SC18* : SWS effective gap corr.
SC19* : SWS FWHM Responsivity
SC21_1* : SWS Cal file 21_1
SC21_2* : SWS Cal file 21_2
SC21_4* : SWS Cal file 21_4
SC21_8* : SWS Cal file 21_8
SC23* : SWS wave limits - bands
SC24* : SWS wavelength limits - apertures
SC25_1A* : SWS Cal file 25_1A: spectral responsivity
SC25_1B* : SWS Cal file 25_1B: spectral responsivity
SC25_1D* : SWS Cal file 25_1D: spectral responsivity
SC25_1E* : SWS Cal file 25_1E: spectral responsivity
SC25_2A* : SWS Cal G file 25_2A: spectral responsivity
SC25_2B* : SWS Cal G file 25_2B: spectral responsivity
SC25_2C* : SWS Cal G file 25_2C: spectral responsivity
SC25_3A* : SWS Cal G file 25_3A: spectral responsivity
SC25_3C* : SWS Cal G file 25_3C: spectral responsivity
SC25_3D* : SWS Cal G file 25_3D: spectral responsivity
SC25_3E* : SWS Cal G file 25_3E: spectral responsivity
SC25_4* : SWS Cal G file 25_4: spectral responsivity
SC25_4A* : SWS Cal G file 25_4A: spectral responsivity
SC25_4C* : SWS Cal G file 25_4C: spectral responsivity
SC25_4D* : SWS Cal G file 25_4D: spectral responsivity
SC25_5A* : SWS Cal G file 25_5A: spectral responsivity

```
SC25_5B*     : SWS Cal G file 25_5B: spectral responsivity
SC25_5C*     : SWS Cal G file 25_5C: spectral responsivity
SC25_5D*     : SWS Cal G file 25_5D: spectral responsivity
SC25_6*      : SWS Cal G file 25_6: spectral responsivity
SC41*        : SWS Cal file 41
STIMEDEP     : SWS time dependencies index file
```

SPD files

```
CISP         : CAM Standard Processed Data
CPSP         : CAM parallel Standard Processed Data
LSPD         : LWS SPD
LIPD         : LWS Illuminator Processed Data
LWGH         : LWS glitch history file
PC1S         : PHT-C100 Standard Processed Data
PC2S         : PHT-C200 Standard Processed Data
PP1S         : PHT-P1 Standard Processed Data
PP2S         : PHT-P2 Standard Processed Data
PP3S         : PHT-P3 Standard Processed Data
PSLS         : PHT-SL Standard Processed Data
PSSS         : PHT-SS Standard Processed Data
PC1A         : PHT C100 cal A file
PC2A         : PHT C200 cal A file
PP1A         : PHT-P1 Cal A file
PP2A         : PHT-P2 Cal A file
PP3A         : PHT-P3 Cal A file
PC1D         : PHT C100 dark currents
PC2D         : PHT C200 dark currents
PP1D         : PHT-P1 dark currents
PP2D         : PHT-P2 dark currents
PP3D         : PHT-P3 dark currents
  PSLD         : PHT-SL dark signal file
  PSSD         : PHT-SS dark signal file
SWSP         : SWS Standard Processed Data
SWGH         : SWS Glitch History Data
```

CAM Auto_Analysis files

```
CMAP         : ISOCAM maps of IR flux vs celestial position
CPSL         : CAM Point-Source List
CSSP         : CAM Source Spectrum
CCIM         : CAM calibration images in detector coordinates
CGLL         : CAM Glitch List
CJAM         : CAM Jitter, Memory and Stabilisation info.
CUFF         : CAM User-Friendly log File
CMOS         : ISOCAM celestial IR mosaic
```

LWS Auto_Analysis files

```
LSAN         : LWS Automatic Analysis Results
LSNR         : LWS AAR data, no responsivity correction
LIAC         : LWS illuminator results summary
LSCA         : LWS scan summary file
LGIF         : LWS scan group information file
```

PHT Auto_Analysis files

```
PPAP         : PHT-P point source photometry
PPAE         : PHT-P extended source photometry
PPAS         : PHT-P scan & slew photometry
```

```
PLAP          : PHT-SL point source spectroscopy
PLAE          : PHT-SL extended source spectroscopy
PLAS          : PHT-SL Raster mode spectroscopy
PSAP          : PHT-SS point source spectroscopy
PSAE          : PHT-SS extended source spectroscopy
PSAS          : PHT-SS Raster mode spectroscopy
PCAP          : PHT-C point source photometry
PCAE          : PHT-C extended source photometry
PCAS          : PHT-C scan & slew photometry
PGAI          : PHT Photometric Image
PGAU          : PHT Uncertainty Image
PGAT          : PHT Exposure Image
```

SWS Auto_Analysis files

```
SWAA          : SWS Auto Analysis Results
```

Browse product files

```
CSP           : CAM survey product
LSP           : LWS survey product
PSP           : PHT survey product
SSP           : SWS survey product
```

Auxiliary files

```
IRPH          : Instrument Reference Pointing History
IIPH          : Instrument Instantaneous Pointing History
CRPH          : CAM Reference Pointing History
CIPH          : CAM Instantaneous Pointing History
IFPG          : ISO Focal Plane Geometry
APPH          : Aperture Pointing History
ISTR          : ISO star-tracker calibration data
APHSTAR       : ISO operational guide-star list
HIPPARCHOS    : ISO guide-star Hipparchos catalogue data
TYCHO         : ISO guide-star Tycho catalogue data
ORBIT         : Compressed orbit file
```

Other files

```
EOHA          : Attributes of instantiated Obs.
EOHC          : Continuous Executed Observaiton History
EOHI          : Information unconnected to a whole AOT
LPAR          : LWS Parallel Mode data
LDDS          : AAL diagnostic detector scan file
PCSV          : PHT CHW Sensor Voltages
CISR          : CAM Instrument station report
LISR          : LWS Instrument station report
PISR          : PHT Instrument station report
SISR          : SWS Instrument station report
COLR          : CAM OLP report
LOLR          : LWS OLP report
POLR          : PHT OLP report
SOLR          : SWS OLP report
```

Key: * means a time dependent calibration file (see section 5)