	SECCHI Interface Coordination Memorandum	SICM 07-0007 Rev. 1.16	20 Nov 2008 Page 1 of 22

Title: SECCHI FITS Header Keyword Definition

Interface Category: Ground Software

Applicable Subsystems: SECCHI Ground Data Systems, SECCHI Flight Software, SECCHI I&T Team

Purpose: This document defines the data type, range of values, and description for each of the keywords that will be included in the SECCHI FITS image header. The SECCHI science team, flight software team, and I&T lead will review this to make sure that keywords required for instrument testing, instrument calibration, hardware-in-the-loop mission simulations, and science operations, are present. Note: The content of this document is the same as (and supercedes) the document titled "Definition of SECCHI Level 0.5 FITS Header" or the appendix of the SECCHI Data Management Plan.

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Revision History

Rev	Document Date	Author	Change Description
0 d1	11/9/01	Nathan Rich	Initial Release as SICM 06-0020.
0 d2	1/16/02	Nathan Rich	Released for comment
0 d3	9/30/02	Nathan Rich	Incorporate FITS definition with comments received into SICM. Renumbered/released as SICM 07-0007
0 d4	10/29/02	Nathan Rich	Make consistent with SECCHI Data Processing Plan appendix
0 d5	11/7/02	Nathan Rich	Modify filename; add CCD eval. Keywords; other changes
0 d6	12/19/03	Nathan Rich	Added or changed FILEORIG, DATE-OBS, GAINMODE, OFFSET, WGA_FILE, CLR_TBL, READ_TBL, LAMP, POLAR, EXPCMD, EXPCLRO, CLR_TIME, READTIME, JITRMAX, PCj_i
0 d7	7/30/04	Nathan Rich	Compare to FSW image header
0d8	2/3/05	Nathan Rich	Update keywords
0d9	10/7/05	Nathan Rich	Incorporate comments from Bill Thompson (4/28/05, 6/05) and Jeff Hall (7/7/05)
1.0	10/11/05	Nathan Rich	Add DATE_CLR, DATE_RO
1.1	10/25/05	Nathan Rich	Change location of hdractualspecs.htm
1.5	2/14/06	Nathan Rich	Use (next) cvs rev number; rename BIAS, LED, GAIN, DATE-MID
1.6	7/6/06	Nathan Rich	Add EUVI extended header keywords from J-P Wuelser; Incorporate changes from FITS Header meeting on 6/2/06
1.7	7/7/06	Nathan Rich	Add keywords for HI team requested in email from C.Eyles dated 6/18/06
1.8	8/8/06	Nathan Rich	Moved coordinate system info to References section; updated FILENAME, IPSUM, OBS_PROG, FITS extension table; added HI temps, SPWX, EPHEMFILE, ATT_FILE, CRLN_OPS, CRLT_ OBS; removed SPICEFIL
1.9	9/11/06	Nathan Rich	Update X(Y)CEN, RECTIFY, S1(2)COL, MASK, CROTA; remove JITTER, JITRMAX, OBJECTID
1.10	9/11/06	Robin Colaninno	Added column to indicate if keyword will be in the Level 1.0 and higher headers
1.11	1/24/07	Nathan Rich	FILENAME: A=2 (RT); corrected SUM keyword definitions; BLANK type; updated TBL, FILE keyword definitions; POLAR definitions for level-2 products; added TIMGCTR; VCHANNEL for Level-0; corrected BIASMEAN definition; renamed SOURCE to be DOWNLINK; added AZP TYPEs for HI; added PV2_1
1.12	3/27/07	Nathan Rich	Filename L=0, A=p,B,A,P; DIV2CORR; BLANK; RECTROTA, DSTART1(2), DSTOP1(2); PV2_1A; clarified EXPTIME, BIASMEAN, CRVAL, CTYPE1A, ATT_FILE, DSATVAL, MISSLIST
1.13	6/14/07	Nathan Rich	Added SC_YAW, SC_PITCH, SC_ROLL; FILENAME, MISSLIST defn change; CEB_T, CRPIXi, CRVALj CRVALjA, CTYPEiA description clarifications;
1.14	9/19/07	Nathan Rich	Added SC_YAWA, SC_PITA, SC_ROLLA, INS_X0, INS_Y0, INS_R0. Updated definitions of SUMMED, CCDSUM, EVCOUNT, EVROW(COL), OFFSETCR, SC_YAW, SC_PITCH, SC_ROLL, MISSLIST

Rev	Document Date	Author	Change Description
1.15	7/1/08	Nathan Rich	Clarified definition of CCDSUM, PiCOL, PiROW; increased EXPTIME precision in extended header definition and updated to reflect def_secchi_ext_hdr.pro,v 1.11; clarified ATT_FILE suffix
1.16	11/20/08	Nathan Rich	Corrected CROTA definition

DEFINITION OF SECCHI Level 0.5 FITS HEADER

OVERVIEW

MAIN HEADER

The items in the box are part of the pre-flight image header. Keywords are to be added as they become applicable. *Rows in ITALICS represent keywords that are not expected to be in use after launch.*

1. Minimum Header:
All images taken with SECCHI cameras should have this header information, from camera level testing onward.

2. Configuration Info:
Information identifying configuration; primarily for IandT, but can be for flight use.

3. Misc. Camera/CCD values:
Values specific to CCD and camera characteristics. Should be in all images from camera level testing onward.

4. Used from telescope level testing onward:
These keywords are applicable only if mechanisms apart from the camera are used in taking an exposure.

5. Housekeeping Parameters:
Ancillary information indirectly related to an image.

6. Software-Dependent Values:
These values are dependent on on-board image processing, nominally the SECCHI Flight Software.

7. FPS values from EUVI Extended Header

8. Computed from information external to the image, on the ground:
These values have ancillary information about spacecraft position, attitude, etc. This includes coordinate system definition. All attitude and orbit information is computed from DATE-END (end of exposure) for HI, and DATE-OBS (beginning of exposure) for SCIP telescopes.

9. Computed from image values, on the ground:
Values computed from the image but not in the FSW are included here.

10. HISTORY:
Examples of history field values.

11. Simulation Images
Values used for images generated from simulations.

SECCHI FITS EXTENSION

Information about individual exposures used to compute a single image from a sequence is contained in an ASCII table extension to the FITS header.

12. Extension Table Column (Field) Definitions
These are the values that will be recorded for each exposure.

13. Keywords for FITS Extension
Each column in a FITS extension has its own set of keywords to define the type of value.

TABLE DESCRIPTION

The following table has 6 columns: KEYWORD, TYPE, VALUES, DESCRIPTION, SOURCE, and L-1?:

KEYWORD gives the name of the FITS keyword and may be up to 8 characters.

TYPE refers to the data type of the header value:

S	String (max 68 chars)
I	Integer
R	Real
L	Logical (ASCII char, T or F)

The size of the data depends upon the data type. For example S*2 is a 2 character string, whereas I*2 is a 2 byte integer (16 bits).

VALUES shows the range of values that the KEYWORD can take.

DESCRIPTION gives a short description of the keyword. At the end of the description is a reference to a Flight Software (FSW) requirement, if any. (NOTE: FSW requirement numbers not up-to-date as of 9/10/02.)

SOURCE gives information about where the keyword value comes from.

L-1? Has an X if the keyword is included in the Level-1 header generated by secchi_prep.pro.

IMPLEMENTATION

This document is implemented in the SolarSoft procedures def_secchi_hdr.pro (v TBD) and make_scc_hdr.pro (v TBD). Translations of discrete values for various states can be found in def_scc_enums.pro.

References

1. "Coordinate Systems for Solar Image Data", http://orpheus.nascom.nasa.gov/~thompson/papers/coordinates.pdf

1.1. SECCHI Coordinate System Discussion

1.1.1. Images: Primary choice is Helioprojective Cartesian; RA-DEC also will be included. Ecliptic and Helioecliptic are possible if desired.

1.1.2. Position: Heliocentric Inertial (HCI): Z=Solar rotational axis, X=Solar ascending node on ecliptic of J2000. Header may also contain HEQ, HEE and GCI coordinate numbers, depending on interest.

1.1.3. Factors/requirements in selection of coordinate system:

1.1.3.1. Easily correct for B angle

1.1.3.2. Identify central meridian

1.1.3.3. Easily correct for differences in solar radius from distance

1.1.3.4. Ecliptic

1.1.3.5. Ascertain position relative to planets

1.2. Possibilities suggested so far:

1.2.1. EIT and LASCO (implicitly) use Helioprojective Cartesian with TAN projection

1.2.2. RA and DEC with TAN projection

2. "Definition of the Flexible Image Transport System (FITS)", http://archive.stsci.edu/fits/fits_standard/

3. "Definition of LASCO Level 1 FITS Header Keywords", http://lasco-www.nrl.navy.mil/level_1/level_1_keywords.html

4. "SSW Keyword/Tag Definitions", http://www.lmsal.com/solarsoft/ssw_standards.html

5. "A User's Guide for the Flexible Image Transport System (FITS)", http://fits.gsfc.nasa.gov/documents.html#Uguide

6. Detailed proposal for representing world coordinates in FITS (http://www.aoc.nrao.edu/~egreisen/inFITS.html):

6.1. *Representations of world coordinates in FITS* by Greisen and Calabretta, 31-December-2001.

6.2. *Representations of celestial coordinates in FITS* by Calabretta and Greisen, 12-December-2001.

6.3. *Representations of spectral coordinates in FITS* by Greisen and Valdes, 31-December-2001

7. SOHO object list http://Orpheus.nascom.nasa.gov/object.dat

8. M.Fraenz and D.Harper, *Heliospheric Coordinate Systems*, Plan.Space Sci., 50, 217-233 (Feb 2002) http://www.mps.mpg.de/homes/fraenz/systems/

9. D.Wang, SECCHI Science Operations Manual, http://stereo.nrl.navy.mil/cnsrtm/SECCHISciOpsManual.pdf

10. J.Chiralo, N.Rich, SECCHI Science Header Actuals Description, http://stereo.nrl.navy.mil/cnsrtm/docs/design/science/secchihdractualsspec.htm

MAIN HEADER

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
			Minimum Header		
SIMPLE	L	T	Conforms to FITS standard	FITS	X
BITPIX	I*2	16,32,-32, -64	Number of bits per pixel	FITS	X
NAXIS	I*2	0,2,3	Number of axes in the image (0 indicates header only)	FITS	X
NAXIS1	I*2	Positive	Length of the first axis (columns,x)	FITS	X
NAXIS2	I*2	Positive	Length of the second axis (rows,y)	FITS	X
DATE	S*23	Any	Date of file generation, in CCSDS standard format (UTC): "1996-05-21T17:28:48.208"	IDL	X
FILENAME	S*25	-->	Name of the FITS file: yyyymmdd_hhmmss_LATTS.fts Format as follows: S = Spacecraft (A,B,C)(c is for anything that is not associated with one or the other s/c); TT = a string representing telescope or camera: eu=EUVI, c1=COR1, c2=COR2, h1=HI1, h2=HI2, gt = GT, tk=Talktronics, ra=RAL development camera, …; L = a digit representing type of image: n = Normal Image m = Multiple SCIP Exposures Combined onboard d = Double Image k = Dark Image e = LED Image c = Continuous Image s = Sequence Image 1 = Photometrically calibrated (Level-1 Image units for EUVI=DN/s, COR=MSB, HI=MSB?) 0(zero) = Level-2 with photometric calibraton NOT applied v = Vignetting (cal); A = C(calib), 2(RT), 3(RT+SSR1), 4(SSR1), 5(SSR2), 7(SWX), p(percent polarized), B(total brightness from polarized), A(polarization angle), P(polarized brightness. The rest is year, month, day, hour, minute, second (equivalent to DATE_CMD)	SEB_hdr: derived from cmdExpTime, platformID, telescopID, imageType	X
FILEORIG	S*12	Any	YMDDaaaa.APT, where Y = LSD of year e.g. 2002 = '2'; M = Month (1 = Jan, 2 = Feb, … ,A=Oct, B= Nov, C = Dec); DD = Day of Month; aaaa = image counter & sequence number in base 36; AP = APID coding (actual hex ApID minus 0x400); T = telescope (for S/C A, 3=EUVI 2=COR1 1=COR2 5=HI1 4=HI2; for S/C B add 5)	SEB_hdr: filename	X

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
DATE-OBS	S*23	Any	Date and time of the start of the (first) opening of the shutter or CCD readout, whichever comes first (UTC): 2006-05-20T00:40:05.407 (accuracy level of time known from HISTORY or COMMENT)	SEB_hdr: actualExpTime	X
EXPTIME	R*4	Any	Time between open and close of shutter (seconds); if > 1 exposure, then the sum. For type DOUBLE, it is the average. For L=1+, use -1. (individual exptimes in header extension) (FSW 410, 423)	SEB_hdr: (actualExpDuration, actualExpDuration_2) * 4e-6	X
OBSRVTRY	S*8	STEREO_[AB]	Name of the satellite. (Replaces TELESCOP keyword, which is ambiguous.)	SEB_hdr: derived from platformID	X
DETECTOR	S*12	EUVI,COR1,COR2,HI1,HI2,…	Name of the telescope *or devel. camera* within SECCHI: Talktronics, RAL, EUVI, COR1, COR2, HI1, HI2, GT	SEB_hdr: derived from telescopeID	X
SUMMED	R*4	1.0-8.0	Combines summing from CCD and IP to get one number for number of rows and columns being summed on the CCD and SEB and ground. Applies to dimension only! dimension=original/(2^(SUMMED-1)),	SEB_hdr: depends on sumrow, sumcol, sebxsum, sebysum	X
SUMROW	I*1	1,2,3	Number of times +1 that rows (after rectification) are summed on CCD	SEB_hdr: sumrow, RECTIFY	X
SUMCOL	I*1	1,2,3	Number of times +1 that columns (after rectification) are summed on CCD	SEB_hdr: sumcol, RECTIFY	X
CCDSUM	R*4	Any	(sumrow + sumcol)/2.0 unsummedvalue=value/(2^(IPSUM-1))^2. Remember to account for DIV4 in IP list (always done in secchi_prep).	SEB_hdr: derived from sumrow(col)	X
IPSUM	R*4	1,2,3…	Number of times +1 that rows and columns are summed by onboard IP: (sebxsum + sebysum)/2.0 (sebxsum and sebysum are by definition always equal)	SEB_hdr: derived from sebx(y)sum	X
DIV2CORR	L	F(T)	True if there is a correction for IP Div2 applied to the image	secchi_reduce.pro	
P1COL P2COL	I*2	1..2176	CCD column number of start(end) of CCD readout corrected for any onboard IP trimming; 1–50 are underscan pixels, 2098-2176 are overscan pixels (FSW 212,431) (NOTE: First column is 1, not 0.)	SEB_hdr: p1(2)col	X
P1ROW P2ROW	I*2	1..2112	CCD row number of start(end) of CCD readout corrected for any onboard IP trimming; 1-2048 are the utilized imaging rows (FSW 212,431)	SEB_hdr: p1(2)row	X
INSTRUME	S*8	SECCHI	Name of the instrument	constant	X
VERSION	I*1	Any	Version number of SEB header	SEB hdr version	
ORIGIN	S*8	NRL GSFC UBHAM LMSAL APL ...	Institution where FITS file was created	proc or processing env	
BUNIT	S*20	DN DN/s UNITLESS MSB etc.	Physical unit of array values (after BZERO and BSCALE, if present, are applied)	definition	X
BLANK	I*2	0, for HI=xFFFF	Value of missing or masked data.	constant	X

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
OBS_PROG	S*20 ?	Any	Description of configuration or type of measurement (ie, 'Quantum E', 'Chrg Coll E', …) or name of proc or JOP ID ('JOP034', see http://soho.nascom.nasa.gov/soc/JOPs/) or …	STOL proc or user input or planning tool? TBD	X
COMMENT	S*71	Any	Comments. Can be repeated	varied	X
COMMENT	S*71	→	Describe method of deriving DATE-OBS	IDL pro	X
COMMENT	S*71	→	'FITS coordinate for center of 1024x1024 image is (512.5,512.5).'	constant	X
HISTORY	S*71	Any	History. Can be repeated.	IDL pros	X
END			Last keyword in the FITS header	na	X
			Configuration Info		
OBSERVER	S*20	List	Character string identifying operator who acquired the data associated with the header	user input or lookup table?	X
OBJECT	S*20	Any	Object observed: there are about 10 values used during I&T; how this is used for flight is TBD (suggestions welcome)	user input or lookup table?	X
SETUPTBL	S*40	filename	Camera setup table used (<directory rel to loads/ or $SCC_DATA >/filename, rev number appended if different than original build)	hk_events in database	
EXPOSTBL	S*40	filename	Exposure and mechanism position table used (<directory rel to loads/ or $SCC_DATA >/filename, rev number appended if different than original build).	hk_events in database	
MASK_TBL	S*40	filename	Mask table used by onboard IP (<directory rel to loads/ or $SCC_DATA>/filename, rev number appended if different than original build)	hk_events in database	X
IP_TBL	S*40	filename	Image processing table used (<directory rel to loads/ or $SCC_DATA >/filename, rev number appended if different than original build)	hk_events in database	
STGiPOS	R*4	any	position of stimtel stages during EUVI testing	GPIB stage controller via proc	
WGA_FILE	S*20	*.wga	Filename of list of waveforms and tables loaded (TDS only)	swire	
COMMENT	S*71	Any	Observer will have ability to input comments into FITS header	proc or user input	
			Camera/CCD values (if applicable)		
CCD_ID	S*?	Any	Identification number of CCD	user input	
CAMERA	S*?	List	Model of camera electronics used to acquire image (ie, 'Talktronics IDS-2100', 'RAL Prototype', 'RAL DM')	user input	
DIODSTEP	I*2	Any	Step of instrument used to control diode wavelength, from which the actual diode wavelength is derived	user input	
DIODWVLN	?	?	Wavelength of diode in Angstroms … or color?	user input	
DIODFILE	S*?	Any	Name of file which contains diode counts	user input	
CS	R*4	Any	Synchrotron current (units?)	user input	
SR	I*4	Any	Grating number of …?	user input	
DIODCOAT	I*2?	List?	Diode coating	user input	
DIODDESC	S*?	List	Description of diode used (ie, 'AXUV-100AL')	user input	

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
CONTAMIN	*L*	*T(F)*	*CCD is considered contaminated*	*user input*	
DCS	*R*4*	*Any*	*Synchrotron current at diode measurement*	*user input*	
VOLTAGE	*R*4*	*Any*	*??*	*???*	
CCD_COAT	*S*20*	*List*	*Description of coating on CCD (ie, 'None', 'AR', ..)*	*user input*	
OFFSET	I*2	0-1023	Offset setting of camera	SEB hdr: offset	
GAINCMD	I*2	0-255	Video gain setting of camera (FSW 431?)	SEB hdr: gain	
READPORT	S*1	L,R	CCD readout port: R=Right(A), L=Left(B) (FSW 411,431) Currently all are R except EUVI-A.	lookup table	
GAINMODE	S*4	HIGH,LOW	CCD camera FPGA gain mode (0 high, 1 low) (FSW 434)?	SEB hdr: gainMode	
CEB_T	R*2	any	CEB internal temperature (1 hour median)	ICSCIP/HIHKTEMP	
TEMP_CCD	R*4	Any	Temperature of the CCD (degrees C)	HKP tlm	
WAVEFILE	S*24	wave*.img	Name of waveform table used by FSW. (<directory rel to loads/ or $SCC_DATA>/filename, rev number appended if different than original build).	hk_events in database	
READFILE	S*24	ro*.img	Name of readout table file used by FSW. (<directory rel to loads/ or $SCC_DATA>/filename, rev number appended if different than original build).	hk_events in database	
CLR_TBL	I*1	0-7	Table used for clear (key in WGA file or READFILE) Table filename and version number in field comment.	SEB hdr: clrTableID, comment from READFILE	
READ_TBL	I*1	0-7	Table used for readout (key in WGA file or READFILE) Table filename and version number in field comment.	SEB hdr: readoutTableID, comment from READFILE	
			Used from telescope level testing onward		
FILTER	S*4	OPEN, S1, S2, DBL	Position of the EUVI filter (FSW 410,411,442)	SEB hdr: derived from cmdFilterPosition	X
ENCODERF	I*2	0..255	Encoder reading from filter wheel; nominal range is 0-179, but FW is nominally disabled which results in 255	SEB hdr: actualFilterPosition	X
POLAR	R*4	0..357.5, 1001-1004	Position of the polarizer, degrees from vertical WRT to CCD "North,"; if the image is computed from a sequence, then this is the sum of the positions during the sequence (FSW 410,411,442) (Polarizer steps in increments of 2.5 °, or 144 positions.) For TotalB or %P images: 1001 – Total Brightness 1002 – Polarized Brightness 1003 – Percent Polarized 1004 – Polarization Angle	SEB hdr: derived from cmdPolarPosition (actual is not accurate)	X
ENCODERP	I*1	0..143	Encoder reading from polarizer (0..143)	SEB hdr: actualPolarPosition	X

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
ENCODERQ	I*1	0..23	Encoder reading from quadrant selector (0..23)	SEB hdr: actualPolarPosition	X
WAVELNTH	I*2	171 195 284 304	Sector (wavelength in Angstroms) of EUVI exposure (FSW 411,424?,442)	SEB extended hdr: derived from actualpolarposition	X
SHUTTDIR	S*3	CW CCW	Direction of motion of the shutter from the CCD's POV (FSW 424?,442?)	SEB hdr: derived from actualshutterdirection and ground table	
LEDCOLOR	S*1	NONE, RED, PURPLE, BLUE	Description of LED used (FSW 411,424?)	SEB hdr: derived from cmdledmode + ehkpledcolor	
LEDPULSE	I*4	any	Number of LED pulses commanded	SEB hdr: cmdLEDPulses	
SCSTATUS	I*2	any	Spacecraft status message before exposure	SEB hdr: preExpSCStatus	
DOORSTAT	I*1	0-255	Telescope door state (2=OPEN, 0=CLOSED) (FSW 411?,424?,442) String equivalent in keyword comment	SEB hdr: derived from actualDoorPosition	
EXPCMD	R*4	Any	Sum of commanded time [between open and close of shutter (seconds) or between estimated end of clear and begin of readout] for each of N_IMAGES exposures.	SEB hdr: (cmdExpDuration + cmdExpDuration_2) * 1.024e-3, or 2.0e-3 for dark/HI	
EXPCLRO	*R*4*	*Any*	*Length of time between start of CCD clear operation and readout (seconds) (FSW ???)*	*???*	
READTIME	R*4	Any	Actual duration of CCD read-out operation	seb hdr	
IP_TIME	I*2	Any	Duration of IP operations onboard (seconds)	seb hdr: Diff .hdr and .tlr ipprocessingtime	
EXPOUT	*R*4*	*Any*	*Length of time, shutter close to camera readout (seconds) (FSW ???)*	*???*	
			Housekeeping parameters		
TEMP_CEB	R*4	Any	HB[SCIP,HI]CEBENCLT	HKP Tlm YSI therm	
TEMPAFT1	R*4	Any	Temperature, Degrees C for HIBACKSTR, COR1ZONE2, EUVIAFTSHTR, or COR2OPHTR3	HKP Tlm	
TEMPAFT2	R*4	Any	Temperature, Degrees C for HIFIN, COR1DOUB2, EUVIPRIMIR, or COR2RLYLNS	HKP Tlm	
TEMPMID1	R*4	Any	Temperature, Degrees C for HIZONE1, COR1POLDOUB1, EUVIAFTMNT, or COR2FLDLNS	HKP Tlm	
TEMPTHRM	R*4	Any	Temperature, Degrees C for COR1THERM, EUVITHERM, or COR2THERM	S/C HKP Tlm	
TEMPMID2	R*4	Any	Temperature, Degrees C for HIZONE2, EUVISECMIR or COR2HRMRR	HKP Tlm	
TEMPFWD1	R*4	Any	Temperature, Degrees C for HIFRNTSTR, COR1TUBEOCC, EUVIENTR, or COR2ZONE2	HKP Tlm	
TEMPFWD2	R*4	Any	Temperature, Degrees C for HIBASESTR, COR1ZONE1, EUVIFWDMNT, or COR2ZONE1	HKP Tlm	

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
			Software-dependent values: Use with FSW		
EXTEND	L	T(F)	Indicates that there is (not) an extension.	pipeline	X
DATE-CMD	S*23	Any	uploaded target time (UTC) of (first) exposure	SEB hdr: cmdExpTime	
DATE-CLR	S*23	Any	Time of start of clear operation	SEB hdr: actualCCDclearStartTime	
DATE-RO	S*23	Any	Time of start of readout	SEB hdr: actualImageRetrieveStartTime	
COMPRSSN	I*1	5-17	Code indicating the algorithm used in compressing the data (FSW 215,410)	SEB hdr: from ipCmdLog + comment from cnvrt_ip.dat	X
COMPFACT	R*4	Any	Actual compression factor without packet overhead	derived from decompression program output or file sizes	X
DATE-AVG	S*23	Any	Date/time of midpoint of the exposure(s) (UTC standard)	midpoint between DATE-OBS and DATE-END	X
DATE-END	2*23	Any	Date/time of end of (last) exposure	SEB hdr: derived from actualExpTim and actualExpDuration of (last) image	X
OBT_TIME	R*4	Any	Value of the STEREO S/C On-Board Time (seconds) (FSW 043)	???	X
APID	I*2	List	Application ID for the telemetry from which this image is generated.	SEB hdr: derived from filename	
OBS_ID	I*2	0..32767	Observing Sequence ID (number): A number that specifies an instrument setup/configuration or sequence of exposures (such as polarizer sequence); can be used to search the database for the same types of images. Corresponds with Observation ID in Planning Tool. (FSW 050)	SEB hdr: osNumber	X
OBSSETID	I*2	0..9999	Observing Set ID from Planning Tool	SEB hdr: campaignSet	
SEB_PROG	S*8	NORMAL, DARK, DOUBLE, LED, CONTIN, SEQ	Description of the type of image (observing program ID). (Equivalent to LEB_PROG on LASCO) (FSW 217,410,411,416)	SEB hdr: derived from imageType	X
SPWX	L	T(F)	This image was (not) also sent down the SPWX channel.	SEB hdr: ipCmdLog	
IP_PROGn, n=0-9	I*2		Description of the first 10 onboard Image Processing routine(s) which produced the image, possibly from several exposures.	SEB hdr: from ipCmdLog + comment from cnvrt_ip.dat; see also ipcodes.h	
IP_00_19	S*60	numeral chars	string representation of up to 20 values in ipcmdlog. Key in ops/tables/default/ipcodes.h (cnvrt_ip.dat).	SEB hdr: ipCmdLog	

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
IMGCTR	I*2	Any	Sequential counter corresponding to filename (FSW 240?)	SEB hdr: imgctr	
TIMGCTR	I*2	Any	Sequential counter of images per telescope since IC(?) restarted.	SEB hdr: telescopeImgCnt	
IMGSEQ	I*2	0..32767	Number of the image in the current sequence, starting at 0 (FSW 240?)	SEB hdr: imgseq	
RECTIFY	L	T(F)	Status of rectification to put ecliptic north to the top of the image		X
RECTROTA	I*1	0..7	Argument for IDL rotate.pro that was used, or would be used, indicating rotation and transposing	secchi_rectify.pro	
R1(2)COL	I*2	1..2176	The rectified begin(end) X-coordinate, as though rectification had been unnecessary. If RECTIFY is F, then this is equal to P1(2)COL.		X
R1(2)ROW	I*2	1..2176	Rectified P1(2)ROW	“” and P1(2)ROW	X
DSTART1(2)	I*2	1..51	Indicates the first column (row) of image area on the data array.	R1COL(ROW)	
DSTOP1(2)	I*2	64..2098	Last column (row) of image area.	R2COL(ROW)	
SYNC	L	T(F)	The image is (not) commanded to be synchronous with the other spacecraft.	SEB hdr: derived from sync	X
JITRSDEV	R*4	Any	Standard deviation of JITTER, computed onboard. EUVI ONLY	SEB extended hdr: derived from GT/FPS image header values ???	X
FPS_ON	L	T(F)	EUVI fine pointing system (FPS) is (not) activated during exposure(s) (FSW 320,424?) EUVI ONLY	SEB extended hdr: derived from actualFPSmode	X
FPS_CMD	L	T(F)	FPS was (not) commanded on. EUVI ONLY	SEB extended hdr: useFPS	X
SCFP_ON	L	T(F)	Fine pointing bit from spacecraft is (not) activated. (FSW 322) EUVI ONLY	SEB extended hdr: derived from actualSCFinePointMode	X
SCANT_ON	L	T(F)	The “move antenna” bit from the spacecraft is (not) set during the (series of) image(s).	SEB hdr: derived from preExpSCStatus and postEXPSCStatus	X
CADENCE	R*4	Any	Number of seconds between exposures/sequences for the current observing program/OBS_ID (not individual exposures in a sequence). Is zero if no previous instance is found. (FSW 410?)	Computed in pipeline	X
EVENT	L	T(F)	A (flare) event has (not) been triggered by the flare detection algorithm prior to or during this observation sequence. (FSW 413,424?)	derived from critEvent	X
EVCOUNT	S*5	Big, Small	Magnitude of event detection; >100 blocks triggered is Big (FSW 413,424?)	SEB hdr: critEvent	X
EVROW(COL)	I*2	Any	Y(X)- block coordinate of event detection in UNRECTIFIED image. (FSW ???)	SEB hdr: critEvent	X
					X
S1(2)COL	I*2	Any	Start (end) X-coordinates of sub-field obtained via mask, equivalent to P1(2)COL (FSW 416) *IMPLEMENTATION TBD!*	SEB hdr: function of mask used and P1(2)COL	X
S1(2)ROW	I*2	Any	Start (end) Y-coordinates (FSW 416)	“” and P1(2)ROW	X

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
COSMICS	I*4	Any	Number of pixels removed from image by cosmic ray removal algorithm in FSW (if image is from a sequence, then the mean) (FSW 217,411,416)	HI image, if requested	X
N_IMAGES	I*2	1..1000+	Number of CCD readouts used to compute the image (Number of extension header rows = N_IMAGES>1)	derived from ipCmdCnt ???	X
VCHANNEL	I*2	6 7	Virtual channel of telemetry downlink (7=Realtime or beacon, 6=Playback, 13=6+7=Level-0) (FSW 410)	pipeline environment	
MASK	S*?	F(T)	A mask was not (was) applied to image.	SEB hdr: derived from ipCmdLog	X
BIASMEAN	R*4	Any	As of BLD501 (12/06), The bias is the average of 1 column depending upon the amount of CCD summing: Col 1x1 25 2x2 12 4x4 6 8x8 3 (NOTE: This is invalid for readouts that have P1COL > 1.)	SEB hdr: meanbias	X
BIASSDEV	R*4	Any	Standard deviation of column used to compute BIASMEAN	SEB hdr: stddevbias	X
CEB_STAT	I*1	0-20	CEB-Link-status (enum CAMERA_INTERFACE_STATUS) (0=SUCCESSFUL_RESPONSE)	SEB hdr: cebintfstatus	
CAM_STAT	I*1	0-3	enum CAMERA_PROGRAM_STATE (1=CAMERA_READY)	SEB hdr: ccdintfstatus	
			From FSW—EUVI only		
FPSNUMS	I*4		Number of FPS samples	SEB extended hdr	X
FPSOFFY	I*4		Y offset	SEB extended hdr	X
FPSOFFZ	I*4		Z offset	SEB extended hdr	X
FPSGTSY	I*4		FPS Y sum	SEB extended hdr	X
FPSGTSZ	I*4		FPS Z sum	SEB extended hdr	X
FPSGTQY	I*4		FPS Y square	SEB extended hdr	X
FPSGTQZ	I*4		FPS Z square	SEB extended hdr	X
FPSERS1	I*4		PZT Error sum [0]	SEB extended hdr	X
FPSERS2	I*4		PZT Error sum [1]	SEB extended hdr	X
FPSERS3	I*4		PZT Error sum [2]	SEB extended hdr	X
FPSERQ1	I*4		PZT Error square [0]	SEB extended hdr	X
FPSERQ2	I*4		PZT Error square [1]	SEB extended hdr	X
FPSERQ3	I*4		PZT Error square [2]	SEB extended hdr	X
FPSDAS1	I*4		PZT DAC sum [0]	SEB extended hdr	X
FPSDAS2	I*4		PZT DAC sum [1]	SEB extended hdr	X
FPSDAS3	I*4		PZT DAC sum [2]	SEB extended hdr	X
FPSDAQ1	I*4		PZT DAC square [0]	SEB extended hdr	X
FPSDAQ2	I*4		PZT DAC square [1]	SEB extended hdr	X
FPSDAQ3	I*4		PZT DAC square [2]	SEB extended hdr	X
			Computed from information external to the image, on the ground		
OFFSETCR	R*4	Any	Offset bias subtracted from image, either on ground or in SEB.	Usually from BIASMEAN	
DOWNLINK	S*4	RT, SSR1, SSR2, SWX	How the image came down	derived from filename/APID and ground table	

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
RSUN	R*4	Any	Radius of sun (Arcseconds)	SPICE/ephemeris	X
CROTA	R*4	Any	Rotation angle of solar north of image about axis perpendicular to the plane of the rectified image. Specified in degrees ~~C~~CW relative to the Y direction. (Superceded by PCj_i) (Sign is opposite that of input to rot.pro ~~correction~~.)	SPICE. Source file in comment.	X
CTYPE1	S*8	HPLN-TAN or HPLN-AZP (HI)	A string value representing the type of each coordinate axis: Helioprojective Cartesian with Gnomonic (TAN) Projection. CTYPE1 is for x (westward angle) axis (θ_x). For HI projection is Perspective Zenithal (AZP)	definition	X
CTYPE2	S*8	HPLT-TAN or HPLT-AZP (HI)	Helioprojective Cartesian with Gnomonic (Perspective Zenithal) Projection for y (northward angle) axis (θ_y).	definition	X
CRPIXi	R*4	Any	The pixel coordinates of sun center (EUVI), occulter center (COR), or CCD center (HI). (Reminder: in FITS, 1st pixel is 1, not 0.)	Pre-flight and on-orbit Calibration	X
PCj_i	R*4	Any	A coordinate transformation matrix; rotation (of solar north) information is included in these keywords (replaces CROTAi)	SPICE. Source file in comment.	X
CRVALj	R*4	Any	The reference frame data coordinates of CRPIX1(2). If the pixel coordinates specify the origin of the coordinate system (sun center), then set CRVAL1 and CRVAL2 to zero. (arcsec)	SPICE	X
PV2_1	R*4	Any	For HI only: a parameter which encodes information about the optical properties of the telescope, and is derived experimentally.	Optical calibration	
CUNITj	S*8	arcsec, deg for HI	The units of the coordinates along axis j.	constant	X
CDELTj	R*8	Any	The width and height of a pixel in data units, where units are specified by CUNITj (Same as PLATESCL)	ground table	X
CTYPE1A	S*8	RA---TAN or RA---AZP (HI)	A string value representing the type of each coordinate axis (RA=Right Angle= Geocentric Equatorial Inertial). Projection CTYPE1 is for x (westward angle) axis (θ_x). For HI, projection is Perspective Zenithal (AZP)	constant	X
CTYPE2A	S*8	DEC--TAN or DEC--AZP (HI)	Projection for y (northward angle) axis (θ_y) (DEC=Declination= Geocentric Equatorial Inertial).	constant	X
CUNITjA	S*8	deg	The units of the coordinates along axis j.	constant	X
CRPIXiA	R*4	Any	Same as CRPIXi	Pre-flight Calibration	X
CRVALjA	R*4	Any	R.A.(Dec.) coordinates of CRPIXiA on celestial sphere	SPICE	X
CDELTjA	R*4	Any	Same as CDELTj except degrees	ground table	X
PCj_iA	R*4	Any	Same as PCj_i but for RA/DEC coordinate system	SPICE	X
PV2_1A	R*4	Any	= PV2_1		X

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
XCEN, YCEN	R*4	Any	East-West (North-South) FOV center of CCD relative to sun center in CDELT1(2) units, positive West (North). X(Y)CEN is related to the above FITS keywords by: i = (NAXIS1+1)/2 – CRPIX1 j = (NAXIS2+1)/2 – CRPIX2 X(Y)CEN = CRVAL1(2) + CDELT1(2)*[PC1(2)_1*i + PC1(2)_2*j] (units = arcseconds, deg for HI)	derived	X
EPHEMFIL	S*36	Any	kernel file from which ephemeris coordinates are derived	get_stereo_spice_kernel.pro	X
ATT_FILE	S*36	Any	Source of pointing info (such as kernel file from which S/C attitude information is derived). There is a suffix “+eGT” where +GT indicates GT data used for pointing, and e= 0 if no error, otherwise nonzero error code: 7 : invalid observatory 3 : error reading GT calibration file. 2 : no roll update: spice/icy not available 1 : outdated GT calibration data	get_stereo_spice_kernel.pro, scc_[gt2]sunvec.pro	X
SC_YAW SC_PITCH SC_ROLL	R*4	Any	Uncorrected spacecraft yaw (arcsec), pitch (arcsec), roll (degrees) from SPICE attitude history, using DATE-AVG. HPC system. All units degrees for HI.	get_stereo_hpc_point.pro (SPICE)	
SC_YAWA SC_PITA SC_ROLLA	R*4	Any	Uncorrected spacecraft yaw, pitch, roll from SPICE attitude history, using DATE-AVG. RA-DEC system (all units degrees).	get_stereo_hpc_point.pro (SPICE)	
INS_X0 INS_Y0 INS_R0	R*4	Any	Instrument offset (yaw, pitch, roll) from GT axis used to compute CRVAL.	calibration parameter	
HCIX_OBS	I*4	Any	Heliocentric Inertial Position of spacecraft in x direction (meters).	SPICE	X
HCIY_OBS	I*4	Any	“ in y direction “	SPICE	X
HCIZ_OBS	I*4	Any	“ in z direction “	SPICE	X
HAEX_OBS	I*4	Any	Heliocentric Ares Ecliptic Position of spacecraft in x direction (meters).	SPICE	X
HAEY_OBS	I*4	Any	“ in y direction “	SPICE	X
HAEZ_OBS	I*4	Any	“ in z direction “	SPICE	X
HEEX_OBS	I*4	Any	Heliocentric Earth Ecliptic Position of spacecraft in x direction (meters).	SPICE	X
HEEY_OBS	I*4	Any	“ in y direction “	SPICE	X
HEEZ_OBS	I*4	Any	“ in z direction “	SPICE	X
HEQX_OBS	I*4	Any	Heliocentric Earth Equatorial Position of spacecraft in x direction (meters).	SPICE	X
HEQY_OBS	I*4	Any	“ in y direction “	SPICE	X
HEQZ_OBS	I*4	Any	“ in z direction “	SPICE	X
LONPOLE	I*1	180	Degrees (default for helioprojective coordinates)	constant	X
UFOCOUNT	I*2	any	Number of flying saucers detected	The Enquirer	

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
DSUN_OBS	I*4	any	Distance of observer from sun center (meters)	SPICE	X
HGLN_OBS	R*4	0-360	Stonyhurst Heliographic longitude of observer relative to Earth (degrees)	SPICE	X

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
HGLT_OBS	R*4	???	Stonyhurst Heliographic latitude (B0) of observer (degrees)	SPICE	X
CRLN_OBS	R*4	0-360	Carrington Heliographic longitude of observer (degrees)	SPICE	X
CRLT_OBS	R*4	???	Carrington Heliographic latitude of observer (degrees)	SPICE	X
EAR_TIME	R*4	Any	Time(Sun to Earth) - Time(Sun to S/C) (Seconds)	SPICE/ephemeris	X
SUN_TIME	R*4	Negative	Time(Light-travel time from Sun to S/C.) (Seconds)	SPICE/ephemeris	X
CMDOFFSE	R*4	Any	Commanded offset from schedule (Seconds) (Exact definition TBD)	SEB hdr: lightTravelOffsetTime	
ANTENNA	S*12	Any	Antenna which received (most) of the packets for this image	from FrontEnd ID used in playback	
RO_DELAY	R*4	Any	Time (sec) between DATE_RO and start of readout operation	lookup table	
LINE_CLR	R*4	Any	Time (sec) for one line during clear operation	lookup table	
LINE_RO	R*4	Any	Time (sec) for one line during readout operation	lookup table	
CLEARTIM	R*4	Any	Duration (sec) of clear operation	lookup table	
			Computed from image values, on the ground		
DATAMIN	R*4	Any	Minimum value of the image, including the bias	derived	X
DATAMAX	R*4	Any	Maximum value of the image	derived	X
DATAZER	I*4	Any	Number of zero pixels in the image	derived	X
DATASAT	I*4	Any	Number of saturated values in the image	derived	X
DSATVAL	R*4	Any	Value above which data is not valid (too nonlinear): HI is 14,000*N_IMAGES*[2^(SUMMED-1)]^2, COR1 is 15,000, TBD by COR2, EUVI.	constant	X
DATAAVG	R*4	Any	Average value of the image	derived	X
DATASIG	R*4	Any	Standard deviation in computing the average	derived	X
DATAP01	R*4	Any	Intensity of 1st percentile of image	derived	X
DATAP10	R*4	Any	Intensity of 10th percentile image	derived	X
DATAP25	R*4	Any	Intensity of 25th percentile of image	derived	X
DATAP75	R*4	Any	Intensity of 75th percentile of image	derived	X
DATAP90	R*4	Any	Intensity of 90th percentile of image	derived	X
DATAP95	R*4	Any	Intensity of 95th percentile of image	derived	X
DATAP98	R*4	Any	Intensity of 98th percentile of image	derived	X
DATAP99	R*4	Any	Intensity of 99th percentile of image	derived	X

KEYWORD	TYPE	VALUES	DESCRIPTION	SOURCE	L-1?
MISSLIST	S*80	Any	Charlist (base34, format='(a2)') of missing blocks. The numbers are the 1D subscripts of a 34x34 array representing superpixels of the array. For ICER, list of missing or "incorrect" segments.	derived	X
NMISSING	I*4	Any	Number of missing blocks (not including on-board masked regions) For ICER images, number of bad segments.	derived	X
BSCALE	R*8	Any	For FITS use only. If missing, then assumed to be 1: output data = FITS data * BSCALE + BZERO	derived	X
BZERO	R*8	Any	For FITS use only. If missing, then assumed to be zero	derived	X
			HISTORY: (Examples from LASCO, just to give an idea....)		
HISTORY			'Vxx dd mmm yyyy reduce_level_1,'d2nnnnnn.fts','d5nnnnnn.fts''	IDL pros	X
HISTORY			'Vxx dd mmm yyyy get_exp_factor, old_exp_time, bias'	IDL pros	X
HISTORY			'Vxx dd mmm yyyy vigfilename.fts'	IDL pros	X
			SIMULATION Images		
RANDHEAT	L	T(F)	Each loop's heating function is (not) chosen randomly	user input	
CONSHEAT	L	T(F)	All loops do (not) have same base heating rate	user input	
SIMNOISE	L	T(F)	Photon noise is (not) included	user input	
SIMBCKD	L	T(F)	Simulated background is (not) included	user input	

SECCHI FITS EXTENSION

Information about individual exposures used to compute a single image from a sequence is contained in an ASCII table extension to the FITS header. With the exception of DELTTIME, the values in the columns (fields) have the same meaning as the corresponding keywords in the main header, if the main header is for a single image. If an image consists of a single exposure, this table is optional and would have a single row. There is one row for each exposure, including the first one in the sequence.

Extension Table Column (Field) Definitions

FIELD	HEADING	VALUES	DESCRIPTION
1	DELTTIME	Any	Time (seconds) from the beginning of the first exposure. (i.e., Difference between actualExpTime of current exposure and the first exposure.) First row is always zero.
2	EXPTIME	Any	Duration of the exposure (seconds)
3	CCDSUM	Any	(sumrow + sumcol)/2.0
4	IPSUM	Any	(sebxsum + sebysum)/2.0
5	POLAR	0..357.5	Commanded Position of the polarizer, degrees from vertical WRT to detector
6	SHUTTR	T(F)	Shutter was (not) commanded open during the exposure
7	ENCODER	0..143	Encoder reading from polarizer (mech.actualPolarPosition2)
8	LEDCOLOR	N,R,B,P	Color of LED commanded on (FSW 411)
9	DOORSTAT	0-3	Telescope door state
10	IMGCTR	Any	Sequential counter since the last SEB reboot
11	IMGSEQ	Any	Number of the image in the current sequence, starting at 0
12	EVENT	T(F)	An event has (not) been triggered by the event detection algorithm prior to this exposure (FSW 413)
13	EVCOUNT	Any	Count level used by the event detection algorithm to detect event (FSW 413)
14	EVROW	Any	X-coordinate of event centroid (FSW ???)
15	EVCOL	Any	Y-coordinate of event centroid(FSW ???)
16	DATE_CLR	Any	Time of start of clear operation
17	DATE_RO	Any	Time of start of readout
18	COSMICS	Any	Number of pixels removed from exposure by cosmic ray removal algorithm (FSW 217,411)

The following illustrates the layout of each row in the extension table:

```
0000000001111111111222222222233333333334444444444555555555566666666667777777777
1234567890123456789012345678901234567890123456789012345678901234567890123456789

rrrr.rrr rrr.rrrrrr ii ii rrr.r l sss s i iiiii iiii l iiiiii iiii iiii YYYY-MM

000000000000000000001111111111111111111111111111111
888888888899999999990000000000111111111122222222223
012345678901234567890123456789012345678901234567890

-DDThh:mm:ss.sss YYYY-MM-DDThh:mm:ss.sss iiiiii
```

Keywords for FITS Extension

KEYWORD	TYPE	VALUES	DESCRIPTION
XTENSION	S*8	TABLE	Required
BITPIX	I*2	8	Indicates printable ASCII characters
NAXIS	I*2	2	Axes are the rows and columns of the table
NAXIS1	I*2	126	Number of characters in a table row
NAXIS2	I*2	Any	Number of exposures in the sequence (=N_IMAGES)
PCOUNT	I*2	0	Required
GCOUNT	I*2	1	Required
TFIELDS	I*2	18	Number of fields in each table row
TBCOL1	I*2	1	Column number of first character in first field
TFORM1	S*4	F8.3	FORTRAN format of field 1: single precision floating point
TTYPE1	S*8	DELTTIME	Heading for field 1.
TUNIT1	S*7	Seconds	Units of field 1.
TBCOL2	I*2	10	Column number of first character in field 2
TFORM2	S*4	F10.6	FORTRAN format of field 2: single precision floating point
TTYPE2	S*7	EXPTIME	Heading for field 2.
TUNIT2	S*7	Seconds	Units of field 2.
TBCOL3	I*2	21	Column number of first character in field 3
TFORM3	S*2	I2	FORTRAN format of field 3: integer
TTYPE3	S*6	CCDSUM	Heading for field 3.
TUNIT3	S*2	NA	Units of field 3.
TBCOL4	I*2	24	Column number of first character in field 4
TFORM4	S*2	I2	FORTRAN format of field 4: integer
TTYPE4	S*5	IPSUM	Heading for field 4.
TUNIT4	S*2	NA	Units of field 4.
TBCOL5	I*2	27	Column number of first character in field 5
TFORM5	S*2	F6.1	FORTRAN format of field 5: float
TTYPE5	S*5	POLAR	Heading for field 5.
TUNIT5	S*7	Degrees	Units of field 5.
TBCOL6	I*2	34	Column number of first character in field 6
TFORM6	S*2	A1	FORTRAN format of field 6: character
TTYPE6	S*6	SHUTTR	Heading for field 6.
TUNIT6	S*7	Logical	Units of field 6.
TBCOL7	I*2	36	Column number of first character in field 7
TFORM7	S*2	I3	FORTRAN format of field 7: character
TTYPE7	S*8	ENCODER	Heading for field 7.
TUNIT7	S*8	NA	Units of field 7.
TBCOL8	I*2	40	Column number of first character in field
TFORM8	S*2	A1	FORTRAN format of field: character
TTYPE8	S*4	LEDCOLOR	Heading for field.
TUNIT8	S*2	NA	Units of field.
TBCOL9	I*2	42	Column number of first character in field
TFORM9	S*2	I1	FORTRAN format of field: small int

KEYWORD	TYPE	VALUES	DESCRIPTION
TTYPE9	S*4	DOORSTAT	Heading for field.
TUNIT9	S*2	NA	Units of field.
TBCOL10	I*2	44	Column number of first character in field
TFORM10	S*2	I5	FORTRAN format of field: integer
TTYPE10	S*6	IMGCTR	Heading for field.
TUNIT10	S*4	None	Units of field.
TBCOL11	I*2	50	Column number of first character in field
TFORM11	S*2	I4	FORTRAN format of field: integer
TTYPE11	S*6	IMGSEQ	Heading for field.
TUNIT11	S*4	None	Units of field.
TBCOL12	I*2	55	Column number of first character in field
TFORM12	S*2	A1	FORTRAN format of field: character
TTYPE12	S*5	EVENT	Heading for field.
TUNIT12	S*7	Logical	Units of field.
TBCOL13	I*2	57	Column number of first character in field
TFORM13	S*2	I6	FORTRAN format of field: integer
TTYPE13	S*7	EVCOUNT	Heading for field.
TUNIT13	S*6	Counts	Units of field.
TBCOL14	I*2	64	Column number of first character in field
TFORM14	S*2	I4	FORTRAN format of field: integer
TTYPE14	S*5	EVROW	Heading for field.
TUNIT14	S*3	Row	Units of field.
TBCOL15	I*2	69	Column number of first character in field
TFORM15	S*2	I4	FORTRAN format of field: integer
TTYPE15	S*5	EVCOL	Heading for field.
TUNIT15	S*6	Column	Units of field.
TBCOL16	I*2	74	Column number of first character in field
TFORM16	S*3	A23	FORTRAN format of field: date string
TTYPE16	S*8	DATE_CLR	Heading for field.
TUNIT16	S*2	NA	Units of field.
TBCOL17	I*3	98	Column number of first character in field
TFORM17	S*3	A23	FORTRAN format of field: date string
TTYPE17	S*7	DATE_RO	Heading for field.
TUNIT17	S*2	NA	Units of field.
TBCOL18		122	Column number of first character in field
TFORM18		F9.6	FORTRAN format of field: float
TTYPE18		PC1_1	Heading for field.
TUNIT18		NA	
TBCOL19		132	Column number of first character in field
TFORM19		F9.6	FORTRAN format of field: float
TTYPE19		PC1_2	Heading for field.
TUNIT19		NA	
TBCOL20		142	Column number of first character in field
TFORM20		F9.6	FORTRAN format of field: float
TTYPE20		PC2_1	Heading for field.
TUNIT20		NA	

KEYWORD	**TYPE**	**VALUES**	**DESCRIPTION**
TBCOL21		152	Column number of first character in field
TFORM21		F9.6	FORTRAN format of field: float
TTYPE21		PC2_2	Heading for field.
TUNIT21		NA	
TBCOL22		162	Column number of first character in field
TFORM22		F9.5	FORTRAN format of field: float
TTYPE22		CRVAL1	Heading for field.
TUNIT22		deg	for HI; arcsec for SCIP
TBCOL23		172	Column number of first character in field
TFORM23		F9.5	FORTRAN format of field: float
TTYPE23		CRVAL2	Heading for field.
TUNIT23		deg	for HI; arcsec for SCIP
TBCOL24	I*2	182	Column number of first character in field
TFORM24	S*2	I7	FORTRAN format of field: long integer
TTYPE24	S*7	COSMIC	Heading for field.
TUNIT24	S*6	Pixels	Units of field.