III.3. The "ready to use" CoRoT data

S.Chaintreuil[(1)], A.Deru[(1)], F.Baudin[(2)], A.Ferrigno[(1)], E.Grolleau[(1)], R.Romagnan[(1)].

[(1)] LESIA, Observatoire de Paris, PSL Research University, CNRS, Sorbonne Universités, UPMC Univ. Paris 06, Univ. Paris Diderot, Sorbonne Paris Cité, 5 place Jules Janssen, 92195 Meudon, France
[(2)] Institut d'Astrophysique Spatiale, UMR8617, CNRS, Université Paris XI, Bâtiment 121, 91405, Orsay Cedex, France

1 INTRODUCTION

1.1 Overview of the document

This document presents the « Ready to use » data of the CoRoT Mission, which can be used by a scientist without a priori knowledge of the instrument.
It describes

- the LEGACY data (version 4), the last one to be delivered at the end of the project
- the previous versions (version 1 to 3) which have been delivered along the mission to the scientific community ; they were the only data available during the mission and just after but should not be used any more.

The differences of the data processing according to the data versions is displayed in § 4.

Only the legacy data (V4) should be used from now on.

Important changes have been introduced in the final version: they concern the time stamping of the exposures, the introduction of complementary and more refined corrections, and different levels of corrections given in the different EXTENDS.

These data are public, available in 2015:

- at the mission archive **: http://idoc-corot.ias.u-psud.fr/**
- and at CDS in the Vizier environment : **http://vizier.u-strasbg.fr/viz-bin/VizieR-2**

1.2 Overview of the data

From the point of view of the processing, these data are N2 data. They derive from N1 data that are available on request at CNES and at IAS.
As described in Baglin&Fridlund (2006), the CoRoT mission was built to record light curves, which are relative variations of the brightness of a target as a function of time.
The instrument had two different observing channels [see Baglin&Fridlund (2006)], so, there are two different types of Light Curves (LC):

- **AN2_STAR files** created from the bright star channel (previously called asteroseismology channel) where stars with magnitude between 5 and 9 are observed
- **EN2_STAR files** coming from the faint star channel (previously called exo channel) observing stars from the magnitude between 9.5 and 17. Three types of files exist for faint stars :
  - **EN2_STAR_CHR** corresponding to targets observed on board with "pseudo-colors" leading to three light-curves on board added on ground to obtain a fourth lightcurve
  - **EN2_STAR_MON** corresponding to targets where all the pixels of the target are added, leading to a single light-curve
  - **EN2_STAR_IMAG** containing a single light-curve where all the pixels of on board imagettes are processed and added on ground.

Though CoRoT N2 data are in principle « Ready to Use », some auxiliary information might be of interest: observation timing, sky background, environmental parameters, applied corrections, astrophysical characteristics of the target, etc.
This information is included either :

- in the header of the LC files
  - a few parameters describing the observation and indexes of characterisation of the signal
  - astrophysical characteristics of the target (coordinates, spectral type etc…)

from the CoRoTSKY and EXODAT data bases.
- information on data treatment (version number)

- in additional files
  - **AN2_POINTING files** provide, every second, the precise position of the line of sight of the telescope
  - **AN2_WINDESCRIPTOR** and **EN2_WINDESCRIPTOR files** provide information on the surrounding of the target and on CCD windows and masks
  - **AN1_FULLIMAGE** et **EN1_FULLIMAGE** give the global field of view seen by each CDD. It is observed at the beginning of each run.
- or included in the binary data of star files (sky background).

All files are FITS files, with one or several extensions.
For STAR files, the extensions are used to provide three different levels of correction: the first extend provides less corrected data whereas the last extend includes all the corrections.
Table 1 shows the corrections according to the extension.

Bright stars		**Faint stars**	
RAW	Correction from aliasing, offsets, backgrounds and of the jitter of the satellite. Time scale is Terrestrial Time scale.	BAR	Correction from aliasing, offsets, backgrounds and of the jitter of the satellite. Correction of the change of the temperature set point and of the loss of long term efficiency.
BAR	RAW + correction of the differences in the flux due to the change of the mask, the change of the temperature set point and the loss of long term efficiency. Spurious points are replaced by interpolation.	BARFILL	BAR + correction of the jumps + replacement of the invalid and missing data using the Inpainting method
BARREG	BAR + replacement of the invalid and missing data using the Inpainting method [Pires&al (2015)]	SYSTEMATIC	BARFILL + correction of residual systematics skews in the whole set of light-curves of the run.

Table 1 : summary of the corrections according to the extends for both bright and faint stars.

In all extends, the values of the flux come together with STATUS codes indicate spurious points in the time series and give information on the processing applied to these points . Depending on the version and the level of processing, the points can be used or not. The meaning of the STATUS codes is fully described in next sections.

Together with the data, some routines are provided to open and handle these files easily; the routines are available in the same location than the archives.

1.3 Complementary information

1.3.1 Time scales and time stamps

During the mission, the time scale used was Universal Time (UT) delivered by the GPS constellation ; it remains used in TM, N0, N1 and old N2, versions 1 to 3.

The dating changed completely between N2 version 4 and N2 versions 1 to 3.
In version 4 ,

- the time stamp of the measurements is the weighted average of the integration time,
- time scale is the Barycentric Dynamical Time scale (except for bright stars RAW data that are in Terrestrial Time)
- Dates are expressed in usual Julian day numbers after the first leading digits are removed (JD – 2 400 000) as commonly done in the astronomical literature. Therefore, dates are expressed either in Julian $Day_{(Terrestrial\ Time)}$ for bright stars RAW data or in Julian $Day_{(Barycentric\ Dynamical\ Time)}$ for other star extensions.

In versions 1 to 3,

- time was stamped at the end of the exposure
- time scale is Heliocentric time scale and UT time for RAW Bright star data.
- Dates are expressed in 'CoRoT' Julian day numbers beginning January 1st 2000 at noon (20000101T120000)

Warning :

- one leap second has been added to UTC twice during the mission : December 31st 2008 and June 30th 2012.

1.3.2 Naming of the runs

Each run is described by a name with the format <type>R<d><nn>

- <type> is a char and refers to the type of run ('S': short, 'L': long, 'I': initial),
- 'R' refers to 'RUN',
- <d> refers to the direction of the observation with respect to the centre of the Galaxy ('a': anticentre direction, 'c': centre direction)
- <nn> are two digits corresponding to the run number.

Examples: "IRa01", "SRc01", "LRa01", "LRc02", etc...

1.3.3 Naming of the files

The names of the files are normalized; they contain the type of the file, the number of the target in the CoRoT databases and the date of the beginning and of the end of the observation:

AN2_STAR_<*COROTID*>_<*START_DATE*>_<*END_DATE* >.fits

A means that it was observed in the bright stars field (E means observed in the faint stars filed), N2 means data level 2.

The COROTID is a number always coded on 10 digits.

The format of the dates is : YYYYMMDDTHHMMSS, compliant with ISO-8601.
For instance: AN2_STAR_0000012345_20070411T150824_20070508T213552.fits

When needed, the code of the run or the name of the CCD are inserted in the name of the file.

1.3.4 Standard data types

The standard data types used throughout this entire document are the following:

Type	Format	Size
Float	Floating point, simple precision	32 bits
Double	Floating point, double precision	64 bits
Int	(Short) signed Integer	16 bits
Long	Long signed integer	32 bits
Long64	Long 64bits signed integer	64 bits
Byte	Byte	8 bits
String	String	Up to 80 characters of the restricted ASCII set, used in the headers of the FITS files

1.3.5 Acronyms

BS : Bright Star channel
FS : Faint Star channel
AN2 : files containing data from the bright star channel (previously called asteroseismology channel)
EN2 : files containing data from the faint star channel (previously called exo-planet channel)

LR : Long Run longer than 60 days
SR : Short Run shorter than 60 days
IR : Initial Run

CCD : Charge-Coupled Device
CDC: Corot Data Center
EMI: Electro-Magnetic Interferences or diaphony
LC : Light Curve
LOS: Line Of Sight
SAA : South Atlantic Anomaly

2 N2 LEGACY FILES (VERSION 4)

The description of the complete processing for the Legacy can be found in chapter 3.1

2.1 AN2 Products from the bright star channel

The main products are the AN2_STAR that give the evolution over the run of the flux of the observed targets. Each AN2_STAR comes with

- its AN2_WINDESCRIPTOR companion that provides the mask applied to the target and its environment.
- one auxiliary file named AN2_POINTING giving precise information on the pointing of the satellite, is also presented in this section because this information is acquired from the "bright star" channel ; this information is provided to help users to identify spurious frequencies due to the pointing (see chap.3.1).

In addition, the sky observed in each CCD at the beginning of each run is provided in the AN2_FULLIMAGE files.

2.1.1 The AN2_WINDESCRIPTOR product

This product gathers the information on the observation setup, for a given target. It is produced once per observed star. It is stored in the file:
AN2_WINDESCRIPTOR_<*CoRoT_ID*>_<*START_DATE*>_<*END_DATE* >.fits

2.1.1.1 The AN2_WINDESCRIPTOR main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	8
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Means that the creation of extend is possible	boolean	T (==True)
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Date of the creation of the file (UT)	string	yyyy-mm-dd Thh:mm:ss
FILENAME	Name of the file	string	
PIPE_VER	Version of the process that created the file	string	
N2_VER	Version of the N2 data	string	
COROTID	CoRoT identifier of the target	int	
RUN_CODE	Run during which the target has been observed	string	
HLFCCDID	Half CCD on which the target was observed	string	
START_DATE	Date of the first measurement of the run In UT	string (23 char)	yyyy-mm-dd Thh:mm:ss
END_DATE	Date of the last measurement of the run in UT	string (23 char)	yyyy-mm-dd Thh:mm:ss

2.1.1.2 The AN2_WINDESCRIPTOR binary table extension (BINTABLE)

The header of the BINTABLE of the AN2_WINDESCRIPTOR product is displayed in

Annex 2 (6.1.1)

Binary table BINTABLE of the AN2_WINDESCRIPTOR product

NAME	DESCRIPTION	TYPE	UNIT/EX…
T_START_WIN	Time of the beginning of the observation of the target	string	Calendar (UT)
T_END_WIN	Time of the end of the observation of the target	string	Calendar (UT)
WIN_ID	ID of the on-board window used to observe the star	long	0->436 for bright stars
SIZEX	Window size in the X direction	int	pixel
SIZEY	Window size in the Y direction	int	pixel
ORIGINX	X origin of the target window on the CCD	int	pixels
ORIGINY	Y origin of the target window on the CCD	int	pixel
MASK_ID	ID of the photometric mask applied to the target.	int	0-255
MASK_SIZE	Total number of pixels within the photometric mask	int	pixel
CCD_WINREF	Sub-image of size (NXIMGREF, NYIMGREF) extracted from AN2_FULLIMAGE (see §2.1.4)	int	e-/pix/s
NXIMGREF	Size of the subimage CCD_WINREF in X	int	pixel
NYIMGREF	Size of the subimage CCD_WINREF in Y	int	pixel
POSXIMGREF	X position of the bottom left corner of the sub-image CCD_WINREF in the FULLIMAGE	int	pixel
POSYIMGREF	Y position of the bottom left corner of the sub-image CCD_WINREF in the FULLIMAGE	int	pixel
MASK	Mask applied to the target on-board in the window of size (SIZEX, SIZEY). 1 indicates that the flux on the pixel is added, 0 indicates that the pixel is outside the photometric mask.	Int	

2.1.2 The AN2_STAR product

It is stored in the file:
AN2_STAR_<*COROTID*>_<*START_DATE*>_<*END_DATE* >.fits
It contains a main header and three extensions, RAW, BAR and BARREG :

- the RAW extension contains slightly corrected data ; they are N1 data accumulated over 32 seconds. At N1 level, data are corrected for aliasing, from residual offsets, from residuals of the background and from the jitter of the satellite.

  The outliers are detected and marked and orbital events such as SAA, inbound and outbound crossing of the Earth shadow are marked.

  At N2 level, data are accumulated on a 32s scale. The time stamp of each exposure is the mean time of the 32 exposures of the accumulation ; it is expressed in Terrestrial Time.

  In this extend, are also given the values of the background used to corrected the flux : they have been measured on board in a "black" window positioned on the CCD as near as possible to the star window.

- the BAR extension contains data also accumulates every 32s. They also derive from N1 data, so they have received the same corrections as RAW data. But, before the accumulation, the following corrections are applied :
    - the difference of the flux is normalized taking into account the optimisation of the photometric mask after a few days of observation
    - the changes of the temperature set point are corrected
    - the curves are detrended from the loss of long term efficiency
    - and finally, the data are accumulated over 32 exposures. Only valid exposures are taken into account and the time stamp of the exposure is the barycentre of the timestamps of the valid exposures (unless more than 16 exposures are invalid, in which case all data are accumulated and status is invalid). It is then converted to the Barycentric Dynamical Time scale.

  These data are the best-corrected data from the known, measured or modelled, instrumental and environmental effects.
- Data in the BARREG extension are first corrected as previously and invalid and/or missing data are interpolated as described in Pires&al (2015). The charges are distributed to a strictly regular Barycentric Dynamical Time scale.

  These data are provided to allow easy use of the FFT algorithm.

All dates are given in “reduced” Julian date, ie JD -2 400 000.

2.1.2.1 Status code for RAWSTATUS, STATUSBAR, STATUSBARREG

STATUS is a bit mask. This means that all the values can be combined.
For instance STATUS=5 is the combination of (1) and (4), which means that the measurement is considered as out of range and that it has been acquired during an SAA crossing.
The meaning of the values depend on the extension.
Values with STATUS=0 are always fully valid data.
The routines provided in the archives to open and handle the N2 files give the choice of the data to be returned according to their STATUS. All combinations can be chosen but a choice has been made for the default return. The values considered “valid” or “invalid” by default are indicated in the following tables.

RAWSTATUS

code	Meaning	Default behaviour
0	Flux measurement is valid	valid
1	Data considered as outlier (e.g . energetic particles or glitch)	excluded
2	Data marked invalid from on-board (spare value or EXPORANK value)	excluded
4	SAA crossing	excluded
8		
16		
32	Discontinuity due to change in mask (sequence change)	excluded
64		
128		
256	Satellite entering the earth penumbra*	included
512	Satellite leaving the penumbra*	included

1024	Jitter excursion out of range : flux is replaced by a calculated value	included

* Information derived from the orbital information. It might happen that to find asymmetric information (entering the penumbra without leaving or vice versa ; this comes from the accumulation from 1 to 32s and is not worrying.

STATUSBAR

Value	Meaning	Default behaviour
0	Flux measurement is valid	valid
1	Outliers are detected and the flux is interpolated	included
2	Data marked invalid from on-board (spare value or EXPORANK value)	excluded
4	SAA crossing	excluded
8		
16		
32	Discontinuity due to change in mask	excluded
64		
128	Outlier detected (2^{nd} detection) ; flux is interpolated**	included
256	Satellite entering the Earth penumbra*	included
512	Satellite leaving the penumbra*	included
1024	Jitter excursion out of range : flux is replaced by a calculated value	included

* This information is derived from the orbital information. It might happen that to find asymmetric information (entering the penumbra without leaving or vice versa ; this comes from the processing and is not worrying).
** In the BAR extension of the AN2_STAR, this value of the status should be used with caution because it might happen that it marks stellar activity as well as outliers. Data should thus be verified before excluding the value.

BARREG

code	information	Default behaviour
0	Flux measurement is valid	valid
1	Outlier detected (1^{st} detection) ; flux is interpolated	included
2		
4		
8	Gap filling using Inpainting method (<2 hours)	Included
16	Gap filling using Inpainting method (>2 hours)	included
32		
64		
128		
256	Satellite entering the Earth penumbra*	included
512	Satellite leaving the penumbra*	included
1024	Jitter excursion out of range : flux is replaced by a calculated value	included

* See BAR extension

Note : all the data with STATUS 2, 4, 32, 128 (and any combination of these) in the

previous extensions are replaced using the inpainting method : those data get a STATUS 8 in the BARREG extension.

2.1.2.2 The AN2_STAR main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	8
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Means that several extends exist	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
PIPE_VER	Version of the N1_N2 pipeline (not useful for the N2 users)	string	
N2_VER	Version of the N2 data	string	
STARTDAT	Date of the first measurement **In UT**	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement **In UT**	string	yyyy-mm-dd:hh:mm:ss
COROTID	Identification of the target	long	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See Annex 2 § 7
ALPHA	Right ascension of the target (equinox 2000)	double	Degrees (decimal)
DELTA	Declination of the target (equinox 2000)	double	Degrees (decimal)
STARNAME	Usual name of the target*	string	Ex : HD 49933
MAGNIT_V	Visual magnitude of the target*	float	
ABSM_V	Absolute visual magnitude*	float	
COL_B_V	Color index *	float	
SPECTYPE	Spectral type *	string (5)	O,B…..
SUBCLASS	Subclass of the spectral type*	string (5)	1,2
LUMCLASS	Luminosity class*	string (5)	I, IV
TEFF	Effective temperature *	float	d°Kelvin
GRAVITY	$\log_{10}$ of the surface gravity* in m/s^2	float	m/s^2
METAL	Star metallicity*	float	$\log_{10}(Fe/H)/\log_{10}(Fe/H)_{Sun}$
LC_MEAN	Mean value of the flux in the BARREG extend; meaningful as all data are valid in extend BARREG	float	e^-/sec
LC_RMS	RMS of of the flux in the BARREG extend	float	e^-/sec
NBPHOTPIX	Number of hot pixels detected	int	

COR_SLOP	Estimated slope of the efficiency loss	double	e^-/sec^2
COR_DELT	Range delta of the estimated COR_SLOP	double	e^-/sec^2
NB_CONSI	Number of temperature jumps of the run	int	Between 0 and 6
DATE_TPE1..6	Date of the 1st…6th temperature jump in UT	float	
COR_TPE1…6	Flag of the temperature correction 0=OK, -1 not executed, +1 done with warning**	int	0, -1, +1
MASK_COR	Code of the correction of known discontinuities, mainly mask discontinuities in BS channel 0=no correction, +1=standard correction, +2=empirical correction (see chap 3.1, §4.2.6)	int	0, +1, +2

* From the COROTSKY data base
** For the meaning of the warning, see chap3.1, § 4.2.13

2.1.2.3 RAW extension of the file AN2_STAR

The header of the RAW extension of AN2_STAR is displayed in Annex 2 (6.1.2).

Binary table of the RAW extension of AN2_STAR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATETT	Date of measurement	double	Terrestrial Time
RAWFLUX	N1 flux light curve *	double	e^-/sec
RAWFLUXDEV	Standard deviation of the 1s measurement in the 32s interval	double	e^-/sec
RAWSTATUS	Flag for the status	ulong (unsigned)	See 2.1.2.1
BG	Background flux already subtracted	float	e^-/sec

* Sampled at 32s, as a sum of 1s measurements, divided by valid exposures

2.1.2.4 BAR extension of the file AN2_STAR

The header of the BAR extension of AN2_STAR is displayed in Annex 2 (6.1.3).

Binary table of the BAR extension of AN2_STAR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATEBARTT	Date of measurement in the solar barycentric reference frame	double	Solar Barycentric Terrestrial Time**
FLUXBAR	flux light curve *	double	e^-/sec
FLUXDEVBAR	Standard deviation of the 1s measurement	double	e^-/sec
STATUSBAR	Flag for the status	long	See 2.1.2.1

* Irregular sampling, 32s. in average
** Time stamp at the barycentre of the valid exposures.

2.1.2.5 BARREG extension of the file AN2_STAR

The header of the BARREG extension of the AN2_STAR is displayed in Annex 2 (6.1.4).

Binary table of the BARREG extension of AN2_STAR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATEBARREGTT	date of the measurements in the solar barycentric reference frame, with a strict regular sampling	double	Solar Barycentric Terrestrial time**
FLUXBARREG	flux light curve *	double	e^-/sec
FLUXDEVBARREG	Standard deviation of the 1s measurement	double	e^-/sec
STATUSBARREG	Flag for the status	long	See 2.1.2.1

* Regular sampling, 32s.
** Time stamp at the middle of the 32 exposures.

2.1.3 The AN2_POINTING product

An auxiliary file giving precise information about the pointing of the satellite, sampled at 1 second.
It is stored in the file:
AN2_POINTING_<RUN_ID>_<NUM_CCD>_<START_DATE >_<END_DATE>.fits
Sampling rate is 1 second.

2.1.3.1 The AN2_POINTING main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	Boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Means that several extend exist	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Date of the final processing	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
N2_VER	Version of the N2 data	string	
PIPE_VER	Version of the process (not to be used	string	
START_DAT	Date of the first measurement In UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement In UT	string	yyyy-mm-dd:hh:mm:ss
NB_STARS	Number of targets observed in the run *	integer	10 or 5
RUN_CODE	Name of the run	string	
NUMCCD	ID of CCD	string	
CID_0/…/4	COROTIDs of the targets observed in	String	

	the run, for the given NUMCCD		

* 10 for the first runs (to LRa02 included) and 5 for the later ones.

2.1.3.2 The AN2_POINTING binary table extension

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATE	Time stamp in UT in calendar format	String (23 char)	yyyy-mm-ddThh:mm:ss.sss
DATETT	Time stamp in TT (sampling at 1s)	double	Standart Julian day
DELTA_PHI	Yaw variation of the LOS (bore sight frame)	double	arcsec
DELTA_THETA	Pitch variation of the LOS (bore sight frame)	double	arcsec
DELTA_PSI	Roll variation of the LOS (bore sight frame)	double	arcsec
F_EST	Estimated focal length	double	meter
BARY_X0/…/ BARY_X4	X coordinate of the star barycenter*	float	pixels
BARY_Y0/…/ BARY_Y4	Y coordinate of the star barycenter*	float	pixels

* X,Y coordinates in the 50x50 pixels window

Index 0 to 4 refers to the index of the CID in the main header. Ex : BARY_X2, BARY_Y2 are the coordinates of the barycenter of the COROT_ID given in CID_2.

CAUTION: To synchronise the data with the LOS information, some NaN were added in the barycenter coordinates : it is especially true at the beginning of the runs, when only the two stars used for pointing are recorded. The NaN must be looked for and removed before using the data.

2.1.4 The AN2_FULLIMAGE product

It is stored in the file:
AN2_FULLIMAGE_<NUM_CCD>_<START_DATE >_<END_DATE>.fits

2.1.4.1 The AN2_FULLIMAGE main header

NAME	DESCRIPTION	TYPE	UNIT/EX…
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
DATE	Date of the first measurement of the image	string	yyyy-mm-dd:hh:mm:ss
EXTNAME	Name of the extend	string	
FILENAME	Name of the file	string	
N2_VER	Version of the N2 data	string	
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd :hh :mm :ss
CSMEAR	Flag of the smearing correction	int	1 if smearing corrected
CBK	Flag of background correction	int	1 if

			background subtracted
CGAIN	Flag of the gain correction	int	1 if gain corrected
COFST	Flag of the offset correction	int	1 if offset subtracted
EMI_CORR	Flag of the EMI correction	int	1 if EMI corrected
CHAINID	ID ofof the photometric channel used	int	1 or 2
NUMCCD	ID of the CCD	string	
OFFSET_R	The value of the offset used to correct the right half of the CCD	float	ADU
OFFSET_L	The value of the offset used to correct the left half of the CCD	float	ADU
RON_R	Readout noise of the right half of the CCD	float	e-/PIX
RON_L	Readout noise of the left half of the CCD	float	e-/PIX
GAIN_L	Gain applied to correct the left half CCD	float	e-/ADU
GAIN_R	Gain applied to correct the right half CCD	float	e-/ADU
RUN_CODE	Run during which the target has been observed	string	See § 1.6

2.1.4.2 The AN2_FULLIMAGE extension

The aim of this product is to give the environment of the stars.

The file contains two extensions, one for the AN2_Fullimage and one for the background image, both in e-/pixel, both of the same size (2048, 2048) pixels.

The background image comes from the process of detection and identification of the stars.

2.2 EN2 Products form the faint star channel

There are five different products,

- the windescriptor which describes the windows and the masks defined to observe the targets
- 3 STAR products: the EN2_STAR_CHR product, which correspond to the windows treated in the chromatic mode, the EN2_STAR_MON product for the monochromatic windows, and the EN2_STAR_IMAG product associated to the targets observed as imagettes
- the image of the full CDD recorded at the beginning of the run during 3 orbits with no SAA crossing.

The star products contain data sampled at 32s, 512s or both samplings. The sampling rate can be found in the side file EN2_WINDESCRIPTOR (EXPTIME, see 2.2.2).

The files contain a main Header and 3 extensions : BAR, BARFIL and SYSTEMATIC :

In the BAR extension, the corrections applied to the data are :

- elimination of the aliasing,
- subtraction of the offsets recorded on board
- subtraction of the background acquired on board ; the method used for this processing has evolved along the mission according to the ageing of the instrument
- correction of the jitter of the satellite
- detection of the outliers : the points are marked but not corrected
- orbital events such as SAA, inbound and outbound crossing of the Earth shadow are marked
- the changes of the temperature set point are corrected
- the curves are detrended from the loss of long term efficiency.

These data are corrected from known instrumental and environmental effects, using from measurements or modelled data.

In the BARFIL extension, the "jumps" are corrected (on on-board LC, not on LC from imagettes, see chap.3.1, §4.2.13) and the gaps are filled. The sampling is unchanged, 512s, 32s or a mixture of these.

In the SYSTEMATIC extension, all data are resampled to 512s and then, an overall trend is modelled and suppressed (see chap.3.2).

2.2.1 STATUS CODE for the "faint stars" products

STATUS (BAR extension)

Value	**Information**	Default behaviour
0	Flux measurement valid	valid
1	Cosmic event detected by the N0-N1 pipeline	excluded
2	Spare value detected by the N0-N1 pipeline	excluded
4	SAA crossing (N0-N1)	excluded
8	Flux perturbed by an Earth eclipse (inbound)	included
16	Flux perturbed by an Earth eclipse (outbound)	included
32	SAA crossing (N1-N2)	excluded
64	Interpolated data due to a high jitter	included
128	Local high jitter value (EN2_STAR_IMAG only)	included

STATUSFIL and STATUSSYS

Value	**Information**	**Default behaviour**
0	Flux measurement valid	included
1	(*)	
2	(*)	
4	(*)	
8	Flux perturbed by an Earth eclipse (inbound)	included
16	Flux perturbed by an Earth eclipse (outbound)	included
32	(*)	
64	Interpolated data due to a high jitter	included

128	Local high jitter value (EN2_STAR_IMAG only)	included
256	Gap filling using Inpainting method (<2 hours)	included
512	Gap filling using Inpainting method (>2 hours)	included
1024	Jump correction (see chap.3.1, §4.2.13)	included

(*) : all excluded data in the BAR extension are not taken into account, which creates "holes" filled using the Inpainting method. So data with previous values 1, 2 4 or 32 (or any combination) have a STATUSFIL or STATUSSYS = 256.

2.2.2 The EN2_WINDESCRIPTOR product

This product gathers the information on the observation setup, for a given target. It is produced just once per observed star. It is stocked in the file:
EN2_WINDESCRIPTOR_<*CoRoT_ID*>_<*START_DATE*>_<*END_DATE* >.fits

2.2.2.1 The EN2_WINDESCRIPTOR main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Means that the creation of extend is possible	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd :hh :mm :ss
FILENAME	Name of the file	string	
PIPE_VER	Version of the process	string	
N2_VER	Version of the N2 data	string	
COMMENT	Commentary (2 lines)	string	
COROTID	CoRot identifier of the target	int	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See §5.1
START_DATE	Date of the first measurement of the run in UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement of the run in UT	string	yyyy-mm-dd:hh:mm:ss

2.2.2.2 The EN2_WINDESCRIPTOR binary table extension

The header of the BINTABLE of EN2_WINDESCRIPTOR is displayed in Annex 2 (6.1.5).

Binary table BINTABLE of product EN2_WINDESCRIPTOR

NAME	DESCRIPTION	TYPE	UNIT/EX…
T_START_WIN	List of start time for the use of a given	float	Calendar (UT)

	window for the target		
T_END_WIN	List of end time for the use of a given window for the target	float	Calendar (UT)
WIN_ID	ID of the target window	long	0-8191
SIZEX	Window size in the X direction	int	pixel
SIZEY	Window size in the Y direction	int	pixel
ORIGINX	X origin of the target window on the CCD	int	pixels
ORIGINY	Y origin of the targeted window on the CCD	int	pixel
TPL_ID	ID of the template associated to the target	int	0-255
TPL_SIZE	Number of pixels in the template applied on board	int	pixel
NRPIX	Number of "red" pixels	int	pixel
NGPIX	Number of "green" pixels	int	pixel
NBPIX	Number of "blue" pixels	int	pixel
NB	Position of the right edge of the blue part for CHR windows (-1 for MON files) **	int	pixel
NR	Position of the left edge of the red part of the CHR windows (-1 for MON files) **	int	pixel
NBFRAC	Position of the right edge of the blue part extracted form imagettes, -1 otherwise **	float	pixel
NRFRAC	Position of the left edge of the red part extracted form imagettes, -1 otherwise **	float	pixel
CCD_WINREF	Preprocessed sub-image showing the neighbourhood of the target	float	e-/pix/s
TEMPLATE	Image of the template used to sum pixels on-board	byte	***
NXIMGREF	Size of the subimage CCD_WINREF in X	int	pixel
NYIMGREF	Size of the subimage CCD_WINREF in Y	int	pixel
POSXIMGREF	X position on the CCD of the bottom left corner of CCD_WINREF	int	pixel
POSYIMGREF	Y position on the CCD of the bottom left corner of CCD_WINREF	int	pixel
EXPTIME	Exposure time*	int	second

* Indicates of the measures are oversampled (32s) or not (512s). If a change occurs during a run (from 512 to 32 or the converse) EXPTIME = -1

** Blue part from 1 to NB, green part from NB+1 to NR-1, the red part from NR to 15

*** Pixels with value 1 are inside the mask

2.2.3 The EN2_STAR_CHR product

Contains the information about the chromatic stars of a run. It is stocked in the file:
EN2_STAR_CHR_<*COROTID*>_<*START_DATE*>_<*END_DATE* >.fits
For all extends, the time stamp of the measurements is at the mean time of the exposure.

2.2.3.1 The EN2_STAR_CHR main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary	int	0

	extensions		
EXTEND	Mandatory for the creation of several extend	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
N2_VER	Version of the N2 data	string	
PIPE_VER	Version of the process used to produce the data	string	
STARTDAT	Date of the first measurement in UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement in UT	string	yyyy-mm-dd:hh:mm:ss
COROTID	CoRoT identifier of the target	Long	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See §5.1
WIN_ID	ID of the window associated to the target when unique (-1 otherwise)	int	
MAGNITUD	Visual R magnitude of the target*	float	
ALPHA	Right ascension of the target* (equinox 2000)	double	Degrees (decimal)
DELTA	Declination of the target* (equinox 2000)	double	Degrees (decimal)
CONTFACT	Contamination factor*	float	[0,1]
EXPTIME	Exposure time	int	32/512/-1
MAGNIT_B/V/R/I	Star magnitude B/V/R/I *	float	
COLTEMP	Star color temperature *	float	
SPECTYPE	Spectral type* (If none available 'K5III' or 'unknown')	string	O, B…..
LUMCLASS	Luminosity class*	string	I, IV
NBPHOTPIX	Number of hot pixels detected in the template	int	
LC_MEANR/G/B/W	Mean of the flux in R/G/B/W channels ***	float	e^- per 32s
LC_RMS_R/G/B/W	Standard deviation of the flux in R/G/B/W channels ***	float	e^- per 32s
COR_SLOP	Estimated slope of the efficiency loss	double	e^-/sec^2
COR_DELT	Range delta of the estimated COR_SLOP	double	e^-/sec^2
NB_CONSI	Number of temperature jumps in the run. (Valid only for version 3.1 and later)	int	
DAT_TPE1…6	Julian date of the 1st/../6th temperature jump in TU	float	CoRoT Julian date
1…6	Flag of the 1^{st}….6^{th} temperature jump correction : 0=OK, -1 not executed, +1	int	0,-1, +1

	done with warning **		

* From the EXODAT data base.
** For the meaning of the warning, see chap3.1, § 4.2.13
*** Calculated in the BAR extension on values with STATUS=0

2.2.3.2 BAR extension of the files EN2_STAR_CHR

The header of the BAR extension of the EN2_STAR_CHR is displayed in Annex 2 (6.1.6).

Binary table of the BAR extension of EN2_STAR_CHR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATE	Calendar date	string	yyyy-mm-ddThh:mm:ss
DATETT	Date of the measurement in Terrestrial Time	double	Terrestrial Time, Julian day
DATEBARTT	Date of the measurement in the solar barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian day
STATUS	Flag of the status	int	see $3.2
REDFLUX	Integrated red flux *	float	e^- per 32s
REDFLUXDEV	Standard deviation of the 16 exposures of 32s in the red channel added for the 512 sampling	float	e^- per 32s
GREENFLUX	Integrated green flux *	float	e^- per 32s
GREENFLUXDEV	Standard deviation of the 16 exposures of 32s in the green channel added for the 512 sampling	float	e^- per 32s
BLUEFLUX	Integrated blue flux *	float	e^- per 32s
BLUEFLUXDEV	Standard deviation of the 16 exposures of 32s in the red channel added for the 512 sampling	float	e^- per 32s
WHITEFLUX	White flux calculated from Red, Green, Blue*	float	e^- per 32s
BG	Background flux already subtracted	float	e^- per pix per 32s

* 32 or 512s sampling.

2.2.3.3 BARFILL extension of the files EN2_STAR_CHR

The header of the BARFILL extension of the EN2_STAR_CHR is displayed in Annex 2 (6.1.7).

Binary table of the BARFILL extension of EN2_STAR_CHR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATETT	Date of the measurement in Terrestrial Time	double	Terrestrial Time, Julian day

DATEBARTT	Date of the measurement in the solar barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian day
WHITEFLUXFIL	White flux, after the gap filling correction	float	e^- per 32s
STATUSFIL	Flag of the status	int	see $3.2
T_EXP	exposure time	int	32s or 512s

2.2.3.4 SYSTEMATIC extension of the files EN2_STAR_CHR

The header of the SYSTEMATIC extension of the EN2_STAR_CHR is displayed in Annex 2 (6.1.8).

Binary table of the SYSTEMATIC extension of the EN2_STAR_CHR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATEBARTT	Date of the measurement in the solar barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian day
WHITEFLUXSYS	White flux, after the correction of the systemantics	float	e^- per 322
STATUSSYS	Flag of the status	int	see $3.2

2.2.4 The EN2_STAR_MON product

Contains the information about the monochromatic stars of a run. It is stocked in the file: EN2_STAR_MON_<*COROTID*>_<*START_DATE* >_<*END_DATE*>.fits
For all extends, the time stamp of the measurements is at the mean time of the exposure.

2.2.4.1 The EN2_STAR_MON main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Mandatory for the creation of several extend	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
N2_VER	Version of the N2 data	string	
PIPE_VER	Version of the process used	string	

	to produce the data		
STARTDAT	Date of the first measurement in UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement in UT	string	yyyy-mm-dd:hh:mm:ss
COROTID	CoRoT identifier of the target	Long	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See §5.1
WIN_ID	ID of the window associated to the target when unique (-1 otherwise)	int	
MAGNITUD	Visual R magnitude of the target*	float	
ALPHA	Right ascension of the target* (equinox 2000)	double	Degrees (decimal)
DELTA	Declination of the target* (equinox 2000)	double	Degrees (decimal)
CONTFACT	Contamination factor*	float	[0,1]
EXPTIME	Exposure time	int	32/512/-1
MAGNIT_B/V/R/I	Star magnitude B/V/R/I *	float	
COLTEMP	Star color temperature *	float	
SPECTYPE	Spectral type* (If none available 'K5III' or 'unknown')	string	O, B…..
LUMCLASS	Luminosity class*	string	I, IV
NBPHOTPIX	Number of hot pixels detected in the template	int	
LC_MEAN	Mean of the flux ***	float	e^- per 32s
LC_RMS	Standard deviation of the flux***	float	e^- per 32s
COR_SLOP	Estimated slope of the efficiency loss	double	e^-/sec^2
COR_DELT	Range delta of the estimated COR_SLOP	double	e^-/sec^2
NB_CONSI	Number of temperature jumps in the run. (Valid only for version 3.1 and later)	int	
DAT_TPE1…6	Julian date of the 1st/../6th temperature jump in TU	float	CoRoT Julian date
COR_TPE1…6	Flag of the 1^{st}….6^{th} temperature jump correction : 0=OK, -1 not executed, +1 done with warning**	int	0,-1, +1

* From the EXODAT data base

** For the meaning of the warning, see chap3.1, § 4.2.13

*** Calculated in the BAR extension on values with STATUS=0

2.2.4.2 BAR extension of the files EN2_STAR_MON

The header of the BAR extension of EN2_STAR_MON is displayed in Annex 2 (6.1.9).

Binary table of the BAR extension of EN2_STAR_MON

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATE	Calendar date	string	yyyy-mm-ddThh:mm:ss
DATETT	Date of the measurement in Terrestrial Time	double	Terrestrial Time, Julian day
DATEBARTT	Date of the measurement in the solar barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian day
STATUS	Flag of the status	int	see $3.2
WHITEFLUX	White flux of the star	float	e^- per 32s
WHITEFLUXDEV	Standard deviation of the 16 exposures of 32s, added for the 512 sampling	float	e^- per 32s
BG	Background flux already subtracted	float	e^- per pix per 32s

2.2.4.3 BARFILL extension of the EN2_STAR_MON table

The header of the BARFILL extension of EN2_STAR_MON is displayed in Annex 2 (6.1.10).

Binary table of the BARFILL extension of EN2_STAR_MON

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATETT	Date of the measurement in Terrestrial Time	double	Terrestrial Time, Julian day
DATEBARTT	Date of the measurement in the solar barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian day
WHITEFLUXFIL	White flux, after the gap filling correction	float	e^- per 32s
STATUSFIL	Flag of the status	int	see $3.2
T_EXP	exposure time	int	32s or 512s

2.2.4.4 SYSTEMATIC extension of the files EN2_STAR_MON

The header of the SYSTEMATIC extension of EN2_STAR_MON is displayed in Annex 2 (6.1.11).

Binary table of the SYSTEMATIC extension of EN2_STAR_MON

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATEBARTT	Date of the measurement in the solar barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian day
WHITEFLUXSYS	White flux, after the correction of the systemantics	float	e^- per 32s
STATUSSYS	Flag of the status	int	see $3.2

2.2.5 The EN2_STAR_IMAG product

Contains the fluxes of the stars observed as imagettes. The light curve sums the pixels of the imagettes over the PSF. Four light curves are generated, three "colours" and the white flux that contains all the pixels of the mask.
It is stocked in the file:
EN2_STAR_IMAG_<*COROTID*>_<*START_DATE* >_<*END_DATE*>.fits
For all extends, the time stamp of the measurements is at the mean time of the exposure.
The time sampling of EN2_STAR_IMAG is 32s.

2.2.5.1 The EN2_STAR_IMAG main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Mandatory for the creation of several extend	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
N2_VER	Version of the N2 data	string	
PIPE_VER	Version of the process used to produce the data	string	
STARTDAT	Date of the first measurement In UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement In UT	string	yyyy-mm-dd:hh:mm:ss
COROTID	CoRoT identifier of the target	Long	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See §5.1
WIN_ID	ID of the window associated to the target when unique (-1 otherwise)	int	
MAGNITUD	Visual R magnitude of the target*	float	
ALPHA	Right ascension of the target* (equinox 2000)	double	Degrees (decimal)
DELTA	Declination of the target* (equinox 2000)	double	Degrees (decimal)
CONTFACT	Contamination factor*	float	[0,1]
EXPTIME	Exposure time	int	32/512/-1

MAGNIT_B/V/R/I	Star magnitude B/V/R/I *	float	
COLTEMP	Star color temperature *	float	
SPECTYPE	Spectral type* (If none available 'K5III' or 'unknown')	string	O, B…..
LUMCLASS	Luminosity class*	string	I, IV
NBPHOTPIX	Number of hot pixels detected in the template	int	
LC_MEANR/G/B/W	Mean of the flux in R/G/B/W channels ***	float	e^- per 32s
LC_RMS_R/G/B/W	Standard deviation of the flux in R/G/B/W channels ***	float	e^- per 32s
COR_SLOP	Estimated slope of the efficiency loss	double	e^-/sec^2
COR_DELT	Range delta of the estimated COR_SLOP	double	e^-/sec^2
NB_CONSI	Number of temperature jumps in the run. (Valid only for version 3.1 and later)	int	
DAT_TPE1…6	Julian date of the 1st/../6th temperature jump in TU	float	CoRoT Julian date
COR_TPE1…6	Flag of the 1^{st}….6^{th} temperature jump correction : 0=OK, -1 not executed, +1 done with warning**	int	0,-1, +1

* From the EXODAT data base
** For the meaning of the warning, see chap3.1, § 4.2.13
*** Calculated in the BAR extension on values with STATUS=0

2.2.5.2 BAR extension of the files EN2_STAR_IMAG

The header of the BAR extension of EN2_STAR_IMAG is displayed in Annex 2 (6.1.12).

Binary Table of the BAR extension of EN2_STAR_IMAG

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATE	Calendar date	string	yyyy-mm-ddThh:mm:ss
DATETT	Date of the measurement in Terrestrial Time	double	Terrestrial Time, Julian day
DATEBARTT	Date of the measurement in the solar barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian day
STATUS	Flag of the status	int	see $3.2
REDFLUX	Integrated red flux extracted from the imagettes (32 s. sampling)	double	e^- per 32s
GREENFLUX	Integrated green flux extracted from the imagettes (32 s. sampling)	double	e^- per 32s
BLUEFLUX	Integrated blue flux extracted from the imagettes (32 s. sampling)	double	e^- per 32s

WHITEFLUX	White flux calculated from Red, Green, Blue	double	e^- per 32s
BG	Background flux already subtracted	float	e^- per pix per 32s
CENX	X position of the star centroid	float	pixels
CENY	Y position of the star centroid	float	pixels

* Origin: 1 Jan 2000, 12:00:00 TU

2.2.5.3 BARFILL extension of the files EN2_STAR_IMAG

The header of the BARFILL extension of EN2_STAR_IMAG is displayed in Annex 2 (6.1.13).

Binary table of the BARFILL extension of EN2_STAR_IMAG

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATETT	Date of the measurement in Terrestrial Time	double	Terrestrial Time, Julian day
DATEBARTT	Date of the measurement in the solar Barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian Day
WHITEFLUXFIL	White flux, after the gap filling correction	double	e^- per 32s
STATUSFIL	Flag of the status	int	see $3.2

2.2.5.4 SYSTEMATIC extension of the EN2_STAR_IMAG table

The header of the SYSTEMATIC extension of EN2_STAR_IMAG is displayed in Annex 2 (6.1.14).

Binary table of the SYSTEMATIC extension of EN2_STAR_IMAG

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATEBARTT	Date of the measurement in the solar barycentric reference frame	double	Solar barycentric Terrestrial Time, Julian day
WHITEFLUXSYS	White flux, after the gap filling correction	double	e^- per 32s
STATUSSYS	Flag of the status	int	see $3.2

2.2.6 Full images of the faint stars channel: EN2_FULLIMAGE

The files contain one extension composed of one header, one image and the table containing the flux in (electrons/pixel) of each pixel of the image. It is stored in the file:
EN2_FULLIMAGE_<NUM_CCD>_<START_DATE >_<END_DATE>.fits
The time stamp of the image is at the end of the first exposure of the accumulation, ie, the beginning of accumulation plus 32s.

2.2.6.1 Header of EN2_FULLIMAGE primary extension

NAME	DESCRIPTION	TYPE	UNIT/EX…

SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Means that the creation of extend is possible	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd :hh :mm :ss
EXTNAME	Name of the extend	string	
FILENAME	Name of the file	string	
N2_VER	Version of the N2 data	string	
DATE	Date of the first measurement of the image	string	yyyy-mm-dd:hh:mm:ss
CHAINID	ID of the photometric channel used	int	1 or 2
GAIN_R	Gain applied to correct the right half CCD	float	e-/ADU
GAIN_L	Gain applied to correct the left half CCD	float	e-/ADU
SIZEX	Size of the image upon X axis	int	=2048
SIZEY	Size of the image upon Y axis	int	=2048
EMI_CORR	Flag of the EMI correction	int	1 if EMI corrected
OFFSET_R	The value of the offset used to correct the right half of the CCD	float	ADU
OFFSET_L	The value of the offset used to correct the left half of the CCD	float	ADU
BRIGHTPI	Bright pixels processed	int	
THRESHOL	Threshold parameter for bright pixel	int	
NBPIX	nbpix parameter for bright pixel	int	
RUN_CODE	Run during which the target has been observed	string	See § 1.6

2.2.6.2 Image of EN2_FULLIMAGE

The primary image corresponds to the square corrected image; a SizeX × SizeY array, used to describe the environment of the stars on the CCD.

Type: double

Unit: electrons/pixel

3 PREVIOUS VERSIONS OF N2 FILES

As written before these versions are older versions : they should not be used anymore.

3.1 AN2 Products from the « bright star » channel

There is one single format for the light curves from the bright star channel. Files contain 3 extensions.

3.1.1 Status code for RAWSTATUS, STATUSHEL, STATUSHELREG

STATUS is a bit mask. This means that all the values can be combined.
For instance STATUS=13 is the combination of (1), (4) and (8) which means that the measurement is considered as out of range, the data have been acquired during an SAA crossing and that the data have been calculated by interpolation.

Bit number	type	code	information
bit 0	false	(0)	Flux measurement valid
bit 0	true	(1)	Data considered as out of range (e.g . energetic particles or glitch)*
bit 1	true	(2)	Data invalid (original value is a default value, or no data accumulated (EXPORANK=0)**
bit 2	true	(4)	SAA crossing
bit 3	true	(8)	Interpolated data
bit 4	true	(16)	Discontinuity detected in the LC
bit 5	true	(32)	Discontinuity due to the change of mask (once at the beginning of each run)
bit 6	true	(64)	Flux extracted from imagette
bit 7	true	(128)	New hot pixel detected
bit 8	true	(256)	Satellite entering the earth penumbra***
bit 9	true	(512)	Satellite leaving the penumbra****
bit 10	true	(1024)	Jitter excursion out of range. Original value replaced by a calculated value*****

* Corresponds to OVER=1 in N1 products
** Corresponds to OVER=2 in N1 products
*** Orbital event 3, OVER=8 in N1 products
**** Orbital event 6, OVER=16 in N1 products
***** OVER=32 in N1 products

3.1.2 The AN2_STAR product

It is stocked in the file:
AN2_STAR_<*COROTID*>_<*START_DATE*>_<*END_DATE* >.fits
It contains a main Header and 3 extensions: RAW, HEL and HELREG:

- As from its name, the RAW extension contains raw data; it means that these data are as N1 data, simply accumulated over 32 seconds. This extension contains the values of the background measured in a background window positioned on the CCD as near as possible to the star window.
- The HEL extension contains data also accumulates on 32s. Before accumulation, the data at 1 second sampling have been corrected :
    - the difference of the flux is normalized before and after the change of the mask

- the changes of the temperature set point are corrected
- the curves are detrended from the loss of long term efficiency
- the points acquired when the satellite crosses the South Atlantic Anomaly are interpolated
- finally, the date of the exposure is converted to heliocentric scale ; this leads to a slightly non regular time scale

• Data in the HELREG extension are corrected exactly as previously at the 1s level but, the fluxes are distributed so that the sampling in heliocentric scale is strictly regular at 32s.

The time stamp of the data of the RAW and HEL extension is positioned at the end of the 32 of the exposures. .

DATEJD

Description: dates of the end of the measurements in the satellite reference frame, in CoRoT Julian day.

Type: double float

Unit: CoRoT Julian day (origin 1 January 2000 12:00.00)

DATEJDHEL

Description: dates of the end of the measurements in the heliocentric reference frame (giving an irregular sampling), in CoRoT Julian day.

Type: double float

Unit: CoRoT Julian day (origin 1 January 2000 12:00.00)

DATEJDHELREG

Description: dates of the measurements in the heliocentric reference frame, in CoRoT Julian day, with a strict regular 32s sampling

Type: double

Unit: CoRoT Julian day (origin 1 January 2000 12:00.00)

3.1.2.1 The AN2_STAR main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	8
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Means that several extend exist	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
PIPE_VER	Version of the N1_N2 pipeline / Version of the N2 data	string	ex: 2.8 / 3.4 pipeline version 2.8 data version 3.4

START_DAT	Date of the first measurement **In UT**	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement **In UT**	string	yyyy-mm-dd:hh:mm:ss
COROTID	Identification of the target	long	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See Annex §5.1
ALPHA	Right ascension of the target (equinox 2000)	double	Degrees (decimal)
DELTA	Declination of the target (equinox 2000)	double	Degrees (decimal)
STARNAME	Usual name of the target*	string	Ex : HD 49933
MAGNIT_V	Visual magnitude of the target*	float	
ABSM_V	Absolute visual magnitude*	float	
COL_B_V	Color index *	float	
SPECTYPE	Spectral type *	string (5)	O,B…..
SUBCLASS	Subclass of the spectral type*	string (5)	1,2
LUMCLASS	Luminosity class*	string (5)	I, IV
TEFF	Effective temperature *	float	d°Kelvin
GRAVITY	$\log_{10}$ of the surface gravity* in m/s^2	float	m/s^2
METAL	Star metallicity*	float	$\log_{10}(Fe/H)/\log_{10}(Fe/H)_{Sun}$
LC_MEAN	Mean value of the HELREG flux	float	e^-/sec
LC_RMS	RMS of the HELREG flux	float	e^-/sec
NBPHOTPIX	Number of hot pixels detected (not implemented)	int	Value is always - 1
COR_SLOP	Estimated slope of the efficiency loss	double	e^-/sec^2
COR_DELT	Range delta of the estimated COR_SLOP	double	e^-/sec^2
NB_CONSI	Number of temperature jumps of the run (implemented from V3.1)	int	
DATE_TPE1..6	Date of the 1st…6th temperature jump in TU (implemented from V3.1)	float	
COR_TPE1…6	Flag of the temperature correction (implemented from V3.1) ; 0=OK, -1 not executed, +1 done with warning **	int	0, -1, +1
MASK_COR	Code of the mask discontinuity correction 0=no corr, +1=measured corr, +2=empirical corr	int	0, +1, +2

* From the COROTSKY data base

** For the meaning of the warning, see chap3.1, § 4.2.13

3.1.2.2 RAW extension of the files AN2_STAR

The header of the RAW extension of the AN2_STAR table is given in Annex 2 (6.2.1).

Binary table of the RAW extension of AN2_STAR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATEJD	Date of measurement	double	CoRoT Julian Day**
RAWFLUX	N1 flux light curve *	double	e^-/sec
RAWFLUXDEV	Standard deviation of the 1s measurement in the 32s interval	double	e^-/sec
RAWSTATUS	Flag for the status	long	See § ? 32bits
BG	Background flux already subtracted	float	e^-/pix/sec

* Sampled at 32s, as a sum of 1s measurements, divided by the number of valid exposures
** Origin: 1 Jan 2000, 12:00:00 TU

3.1.2.3 HEL extension of the files AN2_STAR

The header of the HEL extension of the AN2_STAR table is given in Annex 2 (6.2.2).

HEL extension of the AN2_STAR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATEJDHEL	Date of measurement in the heliocentric reference frame	double	CoRoT Julian Day**
FLUXHEL	flux light curve *	double	e^-/sec
FLUXDEVHEL	Standard deviation of the 1s measurement	double	e^-/sec
STATUSHEL	Flag for the status	long	32 bits

* Irregular sapling, 32s. in average
** Origin: 1 Jan 2000, 12:00:00 TU

3.1.2.4 HELREG extension of the AN2_STAR table

The header of the HELREG extension of the AN2_STAR table is given in Annex 2 (6.2.3).

3.1.2.4.1 Binary table of the HELREG extension of the AN2_STAR table

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATEJDHELREG	date of the measurements in the heliocentric reference frame, with a strict regular sampling	double	CoRoT Julian Day**
FLUXHELREG	flux light curve*	double	e^-/sec
FLUXDEVHELREG	Standard deviation of the 1s measurement	double	e^-/sec
STATUSHELREG	Flag for the status	long	See § 32bits

* Regular sampling, 32s.
** Origin: 1 Jan 2000, 12:00:00 TU

3.2 EN2 Products from the « faint star » channel

There are four different products, the windescriptor which describes the selected windows, the EN2_STAR_CHR product, which correspond to the windows treated in the chromatic mode, the EN2_STAR_MON product for the monochromatic windows, and the EN2_STAR_IMAG product associated to the targets observed as imagettes.

It is stored in files :

EN2_STAR_<TYPE>_<*COROTID*>_<*START_DATE*>_<*END_DATE* >.fits

where TYPE = CHR, MON or IMAG according to the type of the on-board acquisition.

The file can contain data sampled at 32s, 512s or both samplings. The sampling rate can be found in the side file EN2_WINDESCRIPTOR (EXPTIME)

The file contains a main header and one extension called BINTABLE.

The corrections applied to the data are presented in chap3.1 :

- elimination of the aliasing,
- subtraction of the offsets recorded on board
- subtraction of the background acquired on board ; the method used for this processing has evolved along the mission according to the ageing of the instrument
- correction of the jitter of the satellite
- detection of the outliers : the points are marked but not corrected
- orbital events such as SAA, inbound and outbound crossing of the Earth shadow are marked
- the changes of the temperature set point are corrected
- the curves are detrended from the loss of long term efficiency

The corrections applied to the data can differ from one version to another (see §5 for a complete description of the corrections according to the version of the data).

The time stamp of the exposure is

- the time of the end of the exposure for 32s data
- the time of the end of the first exposure for 512s data.

It is expressed in Universal Time in the satellite reference frame and in Heliocentric Time, in "CoRoT" Julian time (reference January 1st 2000. at 12:00:00).

3.2.1 The EN2_WINDESCRIPTOR product

This product gathers the information on the observation setup, for a given target. It is produced once per target and per run. It is stocked in the file:
EN2_WINDESCRIPTOR_<*CoRoT_ID*>_<*START_DATE*>_<*END_DATE* >.fits

3.2.1.1 The EN2_WINDESCRIPTOR main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel	int	16

	(for images)		
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Means that the creation of extend is possible	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd :hh :mm :ss
FILENAME	Name of the file	string	
PIPE_VER	Version of the process	float	
N2_VER	Version of the N2 data	string	
COMMENT	Commentary (2 lines)	string	
COROTID	CoRot identifier of the target	int	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See §5.1
START_DATE	Date of the first measurement of the run in UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement of the run in UT	string	yyyy-mm-dd:hh:mm:ss

3.2.1.2 The EN2_WINDESCRIPTOR binary table extension (BINTABLE)

The header of the BINTABLE extension of EN2_WINDESCRIPTOR is given in Annex 2 (6.2.4).

Binary table BINTABLE of the EN2_WINDESCRIPTOR product

NAME	DESCRIPTION	TYPE	UNIT/EX…
T_START_WIN	List of start time for the use of a given window for the target	float	CoRoT Julian Day
T_END_WIN	List of end time for the use of a given window for the target	float	CoRoT Julian Day
WIN_ID	ID of the target window	long	0-8191
SIZEX	Window size in the X direction	int	pixel
SIZEY	Window size in the Y direction	int	pixel
ORIGINX	X origin of the target window on the CCD	int	pixels
ORIGINY	Y origin of the targeted window on the CCD	int	pixel
TPL_ID	ID of the template associated to the target	int	0-255
TPL_SIZE	Number of pixels in the template	int	pixel
NRPIX	Number of red pixels ***	int	pixel
NGPIX	Number of green pixels ***	int	pixel
NBPIX	Number of blue pixels ***	int	pixel
NB	Position of the right edge of the blue part ***, ****	int	pixel
NR	Position of the left edge of the red part ***, ****	int	pixel
NBFRAC	Position of the right edge of the blue	float	pixel

	part extracted form imagettes, -1 otherwise ****		
NRFRAC	Position of the left edge of the red part extracted form imagettes, -1 otherwise ****	float	pixel
CCD_WINREF	Preprocessed sub-image of the neighbourhood of the target	float	e-/pix/s
TEMPLATE	Image of the template used **	byte	
NXIMGREF	Size of the sub-image CCD_WINREF in X	int	pixel
NYIMGREF	Size of the sub-image CCD_WINREF in Y	int	pixel
POSXIMGREF	X position on the CCD of the bottom left corner of CCD_WINREF	int	pixel
POSYIMGREF	Y position on the CCD of the bottom left corner of CCD_WINREF	int	pixel
EXPTIME	Exposure time*	int	second

* Indicates of the measures are oversampled or not. If during a run a change occurs in the sampling (from 512 to 32 or the converse) EXPTIME = -1
** Pixels with value 1 are inside the mask
*** -1 for Monochromatic windows, or if the flux is extracted from imagettes data
**** Blue part from 1 to NB, green part from NB+1 to NR-1, the red part from NR to 15

3.2.2 STATUS CODE for the EN2_STAR_CHR, EN2_STAR_MON, EN2_STAR_IMAG tables

Bit number	Type	code	Information
bit 0	false	(0)	Flux measurement valid
bit 0	true	(1)	Cosmic event detected by the N0-N1 pipeline
bit 1	true	(2)	Spare value detected by the N0-N1 pipeline
bit 2	true	(4)	SAA crossing (added in N0->N1 pipe-line)
bit 3	true	(8)	Flux perturbed by an Earth eclipse (inbound)
bit 4	true	(16)	Flux perturbed by an Earth eclipse (outbound)
bit 5	true	(32)	SAA crossing (added in N1->N2 pipe-line)
bit 6	true	(64)	Interpolated data due to a large jitter
bit 7	true	(128)	New hot pixel detected
bit 8			*not used*
bit 9			*not used*
bit 10	true	(1024)	Flux flagged as « incorrect » by the flight s/w (VALIDFLUX=1
bit 11	true	(2048)	Flux flagged as « incorrect » by the flight s/w (VALIDFLUX=2)

3.2.3 The EN2_STAR_CHR product

Contains the information about the chromatic star of a run. It is stocked in the file:

EN2_STAR_CHR_<*COROTID*>_<*START_DATE*>_<*END_DATE* >.fits

3.2.3.1 The EN2_STAR_CHR main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Mandatory for the creation of several extend	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
PIPE_VER	Version of the process	float	
N2_VER	Version of the N2 data	string	
STARTDAT	Date of the first measurement In UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement In UT	string	yyyy-mm-dd:hh:mm:ss
COROTID	CoRoT identifier of the target	Long	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See §5.1
WIN_ID	ID of the window associated to the target when unique (-1 otherwise)	int	
MAGNITUD	Visual R magnitude of the target*	float	
ALPHA	Right ascension of the target* (equinox 2000)	double	Degrees (decimal)
DELTA	Declination of the target* (equinox 2000)	double	Degrees (decimal)
CONTFACT	Contamination factor*	float	[0,1]
EXPTIME	Exposure time	int	32/512/-1
CHRDEG	D° of chromaticity (not completed)	float	0.0
ACTILEV	Level of activity (not completed)	float	0.0
VARCLASS 1/2/3	Class of variability**	string	
PRBCLASS 1/2/3	Probability associated to the class of variability**	float	
MAGNIT_B/V/R/I	Star magnitude B/V/R/I *	float	
COLTEMP	Star color temperature *	float	
SPECTYPE	Spectral type *	string	O, B…..
LUMCLASS	Luminosity class*	string	I, IV
NBPHOTPIX	Number of hot pixels detected in the template	int	

LC_MEANR/G/B/W	Mean of the flux in R/G/B/W channels ****	float	e^-/sec
LC_RMS_R/G/B/W	Standard deviation of the flux in R/G/B/W channels ****	float	e^-/sec
COR_SLOP	Estimated slope of the efficiency loss	double	e^-/sec²
COR_DELT	Range delta of the estimated COR_SLOP	double	e^-/sec²
NB_CONSI	Number of temperature jumps in the run ; valid only for version 3.1 and later	int	
DAT_TPE1…6	Julian date of the 1st/../6th temperature jump in TU ; valid only for version 3.1 and later	float	CoRoT Julian date
COR_TPE1…6	Flag of the temperature correction ; valid only for version 3.1 and later 0=OK, -1 not executed, +1 done with warning***	int	0,-1, +1

* From the EXODAT data base
** Defined in Debosscher et al. A&A 506, 519, 2009.
*** For the meaning of the warning, see chap3.1, § 4.2.13

3.2.3.2 The BINTABLE extension of the files EN2_STAR_CHR

The header of the BINTABLE extension of EN2_STAR_CHR is given in Annex 2 (6.2.5).

BINTABLE extension of EN2_STAR_CHR

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATE	Calendar date	string	yyyy-mm-ddThh:mm:ss
DATEJD	Date of the measurement in UT	double	CoRoT Julian Day*
DATEHEL	Date of the measurement in the heliocentric reference frame	double	CoRoT Julian Day*
STATUS	Flag of the status	int	see $3.2
REDFLUX	Integrated red flux **	double	e^-/sec
REDFLUXDEV	Standard deviation of the 16 exposures of 32s in the red channel added for the 512 sampling	double	e^-/sec
GREENFLUX	Integrated green flux **	double	e^-/sec
GREENFLUXDEV	Standard deviation of the 16 exposures of 32s in the green channel added for the 512 sampling	double	e^-/sec
BLUEFLUX	Integrated blue flux **	double	e^-/sec
BLUEFLUXDEV	Standard deviation of the 16 exposures of 32s in the red channel added for the 512 sampling	double	e^-/sec

WHITEFLUX	White flux calculated from Red, Green, Blue	double	e^-/sec
JCFW	Jitter correction for the white flux	float	e^-/sec
BG	Background flux already subtracted	float	e^-/sec
CORREC_RED	Difference with N1 of the red flux	float	e^-/sec
CORREC_GREEN	Difference with N1 of the green flux	float	e^-/sec
CORREC_BLUE	Difference with N1 of the blue flux	float	e^-/sec

* Origin: 1 Jan 2000, 12:00:00 TU

3.2.4 The EN2_STAR_MON product

Contains the information about the monochromatic star of a run. It is stocked in the file: EN2_STAR_MON_<*COROTID*>_<*START_DATE* >_<*END_DATE*>.fits

3.2.4.1 The EN2_STAR_MON main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Mandatory for the creation of several extend	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
PIPE_VER	Version of the process	float	
N2_VER	Version of the N2 data	string	
STARTDAT	Date of the first measurement in UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement in UT	string	yyyy-mm-dd:hh:mm:ss
COROTID	CoRoT identifier of the target	Long	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See §5.1
WIN_ID	ID of the window associated to the target when unique (-1 otherwise)	int	
MAGNITUD	Visual R magnitude of the target*	float	
ALPHA	Right ascension of the target*	double	Degrees

	(equinox 2000)		(decimal)
DELTA	Declination of the target* (equinox 2000)	double	Degrees (decimal)
CONTFACT	Contamination factor*	float	[0,1]
EXPTIME	Exposure time	int	32/512/-1
CHRDEG	D° of chromaticity (not available)	float	0.0
ACTILEV	Level of activity (not available)	float	0.0
VARCLASS 1/2/3	Class of variability	string	
PRBCLASS 1/2/3	Probability associated to the class of variability**	float	
MAGNIT_B/V/R/I	Star magnitude B/V/R/I *	float	
COLTEMP	Star color temperature *	float	
SPECTYPE	Spectral type *	string	O, B…..
LUMCLASS	Luminosity class*	string	I, IV
NBPHOTPIX	Number of hot pixels detected in the template	int	
LC_MEAN	Mean of the flux ****	float	e^-/sec
LC_RMS	Standard deviation of the flux****	float	e^-/sec
COR_SLOP	Estimated slope of the efficiency loss	double	e^-/sec²
COR_DELT	Range delta of the estimated COR_SLOP	double	e^-/sec²
NB_CONSI	Number of temperature jumps in the run ; valid only for version 3.1 and later	int	
DAT_TPE1…6	Julian date of the 1st/../6th temperature jump in TU ; valid only for version 3.1 and later	float	CoRoT Julian date
COR_TPE1…6	Flag of the temperature correction ; valid only for version 3.1 and later 0=OK, -1 not executed, +1 done with warning***	int	0,-1, +1

* From the EXODAT data base
** Defined in Debosscher et al. A&A 506, 519, 2009.
*** For the meaning of the warning, see chap3.1, § 4.2.13
**** Computed on valid values, ie with STATUS=0

3.2.4.2 The BINTABLE extension of the files EN2_STAR_MON

The header of the BINTABLE extension of EN2_STAR_MON is given in Annex 2 (6.2.6)

BINTABLE extension of the EN2_STAR_MON table

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATE	Calendar date	string	yyyy-mm-ddThh:mm:ss
DATEJD	Date of the measurement in UT	double	CoRoT Julian Day*
DATEHEL	Date of the measurement in the heliocentric reference frame	double	CoRoT Julian Day*
STATUS	Flag of the status	int	see $3.2

WHITEFLUX	White flux of the star	float	e^-/sec
WHITEFLUX_DEV	Standard deviation of the 16 exposures of 32s, added for the 512 sampling	float	e^-/sec
BG	Background flux already subtracted	float	e^-/sec
CORREC	Difference with N1 of the flux	float	e^-/sec

3.2.5 The EN2_STAR_IMAG product

Contains the information about the imagettes of a star. This product proposes to build a light curve which is in principle of better quality than the classical method which sums on board the flux over the PSF. As it is very TM consuming, it is performed only on very few selected targets. It is stocked in the file:
EN2_STAR_IMAG_<*COROTID*>_<*START_DATE* >_<*END_DATE*>.fits

3.2.5.1 The EN2_STAR_IMAG main Header

NAME	DESCRIPTION	TYPE	UNIT/EX…
SIMPLE	Mandatory : means that the file is fully compliant to FITS format	boolean	True
BITPIX	Mandatory : Nb of bits by pixel (for images)	int	16
NAXIS	Mandatory; 0 means binary extensions	int	0
EXTEND	Mandatory for the creation of several extend	boolean	True
TELESCOP	Telescope name	string	COROT
ORIGIN	Processing site	string	CDC
CREA_DAT	Creation date of the file in UT	string	yyyy-mm-dd:hh:mm:ss
FILENAME	Name of the file	string	
PIPE_VER	Version of the process	string	
N2_VER	Version of the N2 data	string	
STARTDAT	Date of the first measurement In UT	string	yyyy-mm-dd:hh:mm:ss
END_DATE	Date of the last measurement In UT	string	yyyy-mm-dd:hh:mm:ss
COROTID	CoRoT identifier of the target	Long	
RUN_CODE	Run during which the target has been observed	string	See § 1.6
HLFCCDID	Half CCD from which the product originates	string	See §5.1
WIN_ID	ID of the window associated to the target when unique (-1 otherwise)	int	
MAGNITUD	Visual R magnitude of the target*	float	
ALPHA	Right ascension of the target*	double	Degrees

	(equinox 2000)		(decimal)
DELTA	Declination of the target* (equinox 2000)	double	Degrees (decimal)
CONTFACT	Contamination factor*	float	[0,1]
EXPTIME	Exposure time	int	32/512/-1
CHRDEG	D° of chromaticity (not available)	float	0.0
ACTILEV	Level of activity (not available)	float	0.0
VARCLASS 1/2/3	Class of variability**	string	
PRBCLASS 1/2/3	Probability associated to the class of variability**	float	
MAGNIT_B/V/R/I	Star magnitude B/V/R/I *	float	
COLTEMP	Star color temperature *	float	
SPECTYPE	Spectral type*	string	O, B…..
LUMCLASS	Luminosity class*	string	I, IV
NBPHOTPIX	Number of hot pixels detected in the template	int	
LC_MEANR/G/B/W	Mean of the flux in R/G/B/W channels	float	e^-/sec
LC_RMS_R/G/B/W	Standard deviation of the flux in R/G/B/W channels	float	e^-/sec
COR_SLOP	Estimated slope of the efficiency loss	double	e^-/sec²
COR_DELT	Range delta of the estimated COR_SLOP	double	e^-/sec²
NB_CONSI	Number of temperature jumps in the run. Valid only for version 3.1 and later	int	
DAT_TPE1…6	Julian date of the 1st/../6th temperature jump in TU	float	CoRoT Julian date
COR_TPE1…6	Flag of the temperature correction ; valid only for version 3.1 and later 0=OK, -1 not executed, +1 done with warning***	int	0,-1, +1

* From the EXODAT data base
** Defined in Debosscher et al. A&A 506, 519, 2009.
*** For the meaning of the warning, see chap3.1, § 4.2.13

3.2.5.2 The BINTABLE extension of the EN2_STAR_IMAG table

The header of the BINTABLE extension of EN2_STAR_IMAG is given in Annex 2 (6.2.7).

BINTABLE extension of the EN2_STAR_IMAG table

NAME	DESCRIPTION	TYPE	UNIT/EX…
DATE	Calendar date	string	yyyy-mm-ddThh:mm:ss
DATEJD	Date of the measurement in UT	double	CoRoT Julian Day*
DATEHEL	Date of the measurement in the heliocentric reference frame	double	CoRoT Julian Day*
STATUS	Flag of the status	int	see $3.2

REDFLUX_IMAG	Integrated red flux extracted from the imagettes (32 s. sampling)	double	e^-/sec
GREENFLUX_IMAG	Integrated green flux extracted from the imagettes (32 s. sampling)	double	e^-/sec
BLUEFLUX_IMAG	Integrated blue flux extracted from the imagettes (32 s. sampling)	double	e^-/sec
WHITEFLUX_IMAG	White flux calculated from Red, Green, Blue	double	e^-/sec
BG_IMAG	Background flux already subtracted	float	e^-/sec
CENX	X position of the star centroid	float	Pixels in the window frame
CENY	Y position of the star centroid	float	pixels in the window frame

* Origin: 1 Jan 2000, 12:00:00 TU

4 DESCRIPTION OF THE PROCESSING ACCORDING TO THE VERSION OF THE DATA

The purpose of this section is to present roughly the processing applied to the CoRoT data according to the version of the data.
The version of the data is given by the keyword N2_VER in the primary header of the fits files [1].
The final version of the data (V4) have a different structure and above all, a different time stamping: TU and heliocentric from version 1 to 3, TT and barycentric for version 4.

In this section, we give a short description of the general processing and then, we present the different versions of each type of data.
The whole processing can be found in [2] and [3].
In the faint stars channel, each STAR file comes with a EN2_WINDESCRIPTOR file; the version of the windescriptor file is the same as the version of the lightcurve.

4.1 Short description of the successive steps of the processing

- **The aim of the pipe-lines (N0->N1 and N1->N2) is to correct the raw data from instrumental and environmental perturbations, well known and modelled so far.**

4.1.1 Version 4

The description of the complete processing for the Legacy can be found in chapter 3.1.

4.1.2 Versions 1 to 3

- **N0 -> N1 processing :**
  - The corrections are applied in the following order :
    - **Elimination of the aliasing** appearing on a CCD when reading another CDD : this is done by using patterns measured in the calibration phase
    - on the **seismology** field, elimination of the residuals of **offset and background**
    - on the **exo** field, subtraction of the **offset** and of the **background** obtained as the **median** of the observed **backgrounds** in order to eliminate the hot pixels in the background light curves
    - on the exo chromatic light curves, **computation of the white light**
    - correction of the duration of the exposure and absolute dating
    - **jitter corrections** using high resolution PSF on the seismo field and medium resolution PSF on the exo field
    - Correction of relativistic aberration via the modification of the focal equivalent to the dilatation (resp contraction) of the field of the of view
    - Detection of energetic particle impacts : a point is considered as an impact when the difference between the signal and the median calculated on a sliding window is higher then 5 σ. Data are not modified at that step, a warning is included in the data (see STATUS word below)

[1] The keyword PIPE_VER indicates the version of the pipe-line used to produce the data, not the version of the data. It has been used for processing purpose and is of no use for the final user.

- Orbital events are indicated taking into account the absolute date of the data : SAA, inbound and outbound Earth eclipses (see STATUS word below)

- **N1 -> N2 processing** :
  - For both seismo and exo data :
    - Translation from UTC to heliocentric time basis
    - the diminution of the quantum efficiency will be compensated
    - the effect of the changing of the CCD temperature will be corrected
  - For seismo data,
    - resampling from a 1s basis to a 32s
    - Resampling to regular heliocentric time basis
    - Elimination of the discontinuity due the changing of the on-board mask
  - For exo data,
    - Merging of 512s and 32s files
    - Hot pixels are detected and flagged
    - Creation of a 'windescriptor' file containing an extraction of the on-board full image, the size of the on-board mask and some useful information about the observed target.

4.1.2.1 Bright star channel

version	Corrections
1.0	• Cross-talk corrections using ground-measured patterns • Correction of the offsets and of the backgrounds are improved from on-board measurements • First and rough jitter correction where the line of sight is continuous only by segments
1.1 ; 1.2	• Optimisation of the computation of the PSF
1.3 ; 1.4	• Correction of a bug in the reading of the gain: the correct value for each half-CCD is now used • Better jitter correction: the excursion is computed relatively to the same mean value along the whole run
1.8	• Correction of the discontinuity caused by the breakdown of DPU1 • Warning on the data where the jitter excursion can't be corrected ; in this case, the value is interpolated • Correction of minor bugs on the STATUS word (valid/invalid data)
1.9 ; 2.1	• Incorporation of the flag for ingress and egress of the earth eclipses
3.0	• Better dating of the SAA and earth eclipses : the flags are coherent between N1 and N2 pipe-lines • Only positive impacts are marked (instead of positive and negative) • **The effect of the decrease of the quantum efficiency is corrected**
3.1 ; 3.2 3.3	• **New jitter correction: the relativistic aberration is taken into account through the variation of the focal of the telescope** • **The changes of the temperatures of the CCDs are corrected**

3.4	• New version of the correction of the loss of efficiency according to the flux : the coefficients of the correction have be recomputed using the data of all the runs • The flux of the two sequences are normalized using small images (imagettes) ; new words added in the primary header (COR_SLOP, COR_DELT, MSK_COR) characterise the correction.

4.1.2.2 Faint Stars channel

Faint stars are observed using different methods:

- a few stars, up to 40, are acquired as a small portion (10*15 pixels) of the image called imagette observed during 32 seconds
- the other stars, up to 11400, are observed as lightcurves. The lightcurves are either "chromatic" or monochromatic (see [2] for a further description); some of them, up to 2000, are acquired at 32s rate while most of them are accumulated over 16 exposures leading to a 512s sampling.

The exact number of each set of stars depends upon the run [4].

4.1.2.2.1 Data from onboard lightcurves

These files are named :
EN2_STAR_<type>_<CorotID>_<data_start_date>_<data_end_date>.fits ; <type> is either MON or CHR.
Example : EN2_STAR_MON_0123456789_20070411T150824_20070508T213552.fits

version	Corrections
1.1	• Cross-talk corrections, offset subtraction, backgrounds subtraction. • Very rough jitter correction on chromatic light-curves • No jitter corrections on mono-chromatic light-curves
1.2 ; 1.3	• Correction of a bug in the reading of the gain: the correct value for each half-CCD is now used • Addition of lacking information in the headers of the files
1.4	• Incorporation of the flag for ingress and egress of the earth eclipses • Correction of the discontinuity caused by the breakdown of DPU1
2.0	• **Computation of a "white flux" on chromatic lightcurves by addition of the 3 "colors"** • New calculation of the line of sight based on the computation of the PSF
2.1 2.1b	• Better dating of the SAA and earth eclipses: the flags are coherent between N1 and N2 pipe-lines • Change in the indication of impacts: only positive outliers are marked (instead of positive and negative)
2.2	• Better PSF determination due to hot pixel elimination before calculation • Adjustment of the filtering of the outliers on the duration of the orbit

3.0	• **New jitter correction: the relativistic aberration is taken into account through the variation of the focal of the telescope** • **Correction of the loss of efficiency** • **Correction of the changes of the temperature of the CCDs** • Pipe-line version 2.3 : the star information in the EN2_WINDESCRIPTOR is updated from EXODAT via a web service
3.1	• Change in the order of the correction: the effect of the jumps of the CCD temperature are applied after the correction of the loss of global efficiency (this is not correct and is fixed in version 3.4)
3.2	• the increase of the dark current with the position of the star on the CCD is taken into account (with a small bug fixed in version 3.4)
3.3	• New version of the correction of the loss of efficiency according to the flux : the coefficients of the correction have be recomputed using the data of all the runs
3.4, 3.5	• Correction of the previous bugs
3.6	• Improvement in the correction of background: both 32s and 512s median values are upgraded to the overall median value.

NB : versions in grey include bugs.

4.1.2.2.2 Lightcurves from onboard small images (« imagettes »)

These files are named : EN2_STAR_IMAG _<CorotID>_<data_start_date>_<data_end_date>.fits ;
example : EN2_STAR_IMAG_0123456789_20070516T060050_20071015T063522.fits

co-ls version	**Corrections**
1.0 1.0b 1.1	• Calculation of light curves from on board imagettes. • Correction of the cross-talk, subtraction of the offset and of the background. • The algorithm is based on the determination of a significant mask • The reconstruction is performed using the LOS.
1.2	• Improvements of the STATUS word and of the position of the orbital events • Information in WINDESCRIPTORs are read directly from Exodat via a web service
2.0	• **Major change : the centroid of the spread image is calculated and its coordinates are given in two new columns** • Improved corrections of the jitter • Correction of the jumps of the CCD temperature: their date and the "quality" of the correction are given in the primary header. • Correction of the global loss loss of efficiency • The number of pixels of the reconstructed colours are integers (previous bug fixed)
2.1	• Improvement in the correction of background including better correction of the dark current
2.2	• Subtraction of the loss of efficiency according to the mean flux of the lightcurve.
2.3	• New improvement in the correction of background: both 32s and 512s median

	value are upgraded to the overall median value.

5 ANNEX 1 : HEADERS OF THE EXTENSIONS

5.1 Headers of the extensions in version 4 data

5.1.1 Header of the BINTABLE of the WINDESCRIPTOR product

NAME	DESCRIPTION	TYPE	VALUE
XTENSION	Mandatory (indicates the type of the extend)	string	BINTABLE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	15
EXTNAME	Name of the extension	string	BINTABLE'
TFORM1	Format of column 1	string	23A
TTYPE1	Label of column 1	string	T_START_WIN
TUNIT1	Unit of column 1	string	Calendar date (UT)
TFORM2	Format of column 2	string	19A
TTYPE2	Label of column 2	string	T_END_WIN
TUNIT2	Unit of column 2	string	Calendar date (UT)
TFORM3	Format of column 3	string	J (long integer)
TTYPE3	Label of column 3	string	WIN_ID
TUNIT3	Unit of column 3	string	
TFORM4	Format of column 4	string	I (integer)
TTYPE4	Label of column 4	string	SIZEX
TUNIT4	Unit of column 4	string	
TFORM5	Format of column 5	string	I (integer)
TTYPE5	Label of column 5	string	SIZEY
TUNIT5	Unit of column 5	string	
TFORM6	Format of column 6	string	I (integer)
TTYPE6	Label of column 6	string	ORIGINX
TUNIT6	Unit of column 6	string	
TFORM7	Format of column 7	string	I (integer)
TTYPE7	Label of column 7	string	ORIGINY
TUNIT7	Unit of column 7	string	
TFORM8	Format of column 8	string	I (integer)
TTYPE8	Label of column 8	string	MASK_ID
TUNIT8	Unit of column 8	string	
TFORM9	Format of column 9	string	I (integer)
TTYPE9	Label of column 9	string	MASK_SIZE
TUNIT9	Unit of column 9	string	pixel
TFORM10	Format of column 10	string	2500D
TTYPE10	Label of column 10	string	CCD_WINREF
TDIM10	Array dimensions for column 10	string	(50,50)
TUNIT10	Unit of column 10	string	Electron/px/s
TFORM11	Format of column 11	string	I (int)
TTYPE11	Label of column 11	string	NXIMGREF

TUNIT11	Unit of column 11	string	
TFORM12	Format of column 12	string	I
TTYPE12	Label of column 12	string	NYIMGREF
TUNIT12	Unit of column 12	string	
TFORM13	Format of column 13	string	I
TTYPE13	Label of column 13	string	POSXIMGREF
TUNIT13	Unit of column 13	string	
TFORM14	Format of column 14	string	I
TTYPE14	Label of column 14	string	POSYIMGREF
TUNIT14	Unit of column 14	string	
TFORM15	Format of column 15	string	2500D
TTYPE15	Label of column 15	string	MASK
TDIM15	Array dimensions for column 15	string	(50,50)
TUNIT15	Unit of column 15	string	
COMMENT	Lines of comments, describing the contents of the BINTABLE specially the small images.	string	80 characters max.
…			
COMMENT			

5.1.2 Header of the RAW extension of the AN2_STAR table

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory : (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Not used		
GCOUNT	Not used		
TFIELDS	Number of columns	int	5
EXTNAME	Name of the extension	string	RAW
TFORM1	Format of column 1	string	D (double)
TTYPE1	Label of column 1	string	DATETT
TUNIT1	Unit of column 1	string	Terrestrial Time
TFORM2	Format of column 2	string	D (double)
TTYPE2	Label of column 2	string	RAWFLUX
TUNIT2	Unit of column 2	string	electron/s
TFORM3	Format of column 3	string	D (double)
TTYPE3	Label of column 3	string	RAWFLUXDEV
TUNIT3	Unit of column 3	string	electron/s
TFORM4	Format of column 4	string	J (long)
TTYPE4	Label of column 4	string	RAWSTATUS
TUNIT4	Unit of column 4		
TFORM5	Format of column 5	string	E (float)
TTYPE5	Label of column 5	string	BG
TUNIT5	Unit of column 5	string	electron/px/s
COMMENTS		string	

5.1.3 Header of the BAR extension of the AN2_STAR table

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory : (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2

NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Not used		
GCOUNT	Not used		
TFIELDS	Number of columns	int	4
EXTNAME	Name of the extension	string	BAR
TFORM1	Format of column 1	string	D (double)
TTYPE1	Label of column 1	string	DATEBARTT
TUNIT1	Unit of column 1	string	Barycentric time (irreg)
TFORM2	Format of column 2	string	D (double)
TTYPE2	Label of column 2	string	FLUXBAR
TUNIT2	Unit of column 2	string	electron/s
TFORM3	Format of column 3	string	D (double)
TTYPE3	Label of column 3	string	FLUXDEVBAR
TUNIT3	Unit of column 3	string	electron/s
TFORM4	Format of column 4	string	J (long)
TTYPE4	Label of column 4	string	STATUSBAR
TUNIT4	Unit of column 4		
COMMENTS		string	

5.1.4 Header of the BARREG extension of the AN2_STAR table

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory : (for images)	Int	8
NAXIS	Mandatory word ; 2D table	Int	2
NAXIS1	Number of bytes per row	Int	
NAXIS2	Number of rows	Int	
PCOUNT	Not used		
GCOUNT	Not used		
TFIELDS	Number of columns	int	4
EXTNAME	Name of the extension	string	BARREG
TFORM1	Format of column 1	string	D (double)
TTYPE1	Label for column 1	string	DATEBARREGTT
TUNIT1	Unit of column 1	string	Barycentric time (reg)
TFORM2	Format of column 2	string	D (double)
TTYPE2	Label for column 2	string	FLUXBARREG
TUNIT2	µUnit of column 2	string	electron/s
TFORM3	Format of column 3	string	D (double)
TTYPE3	Label for column 3	string	FLUXDEVBARREG
TUNIT3	Unit of column 3	string	electron/s
TFORM4	Format of column 4	string	J (long)
TTYPE4	Label of column 4	string	STATUSBARREG
TUNIT4	Unit of column 4	string	
COMMENTS		string	

5.1.5 Header of the BINTABLE of the product EN2_WINDESCRIPTOR

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2

NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	23
TTYPE1	Label of column 1	string	T_START_WIN
TFORM1	Format of column 1	string	23A
TUNIT1	Unit of column 1	string	Calendar (UT)
TTYPE2	Label of column 2	string	T_END_WIN
TFORM2	Format of column 2	string	19A
TUNIT2	Unit of column 2	string	Calendar (UT)
TTYPE3	Label of column 3	string	WIN_ID
TFORM3	Format of column 3	string	J (long)
TUNIT3	Unit of column 3	string	
TTYPE4	Label of column 4	string	SIZEX
TFORM4	Format of column 4	string	I (int)
TUNIT4	Unit of column 4	string	pixels
TTYPE5	Label of column 5	string	SIZEY
TFORM5	Format of column 5	string	I (int)
TUNIT5	Unit of column 5	string	pixels
TTYPE6	Label of column 6	string	ORIGINX
TFORM6	Format of column 6	string	I (int)
TUNIT6	Unit of column 6	string	pixels
TTYPE7	Label of column 7	string	ORIGINY
TFORM7	Format of column 7	string	I (int)
TUNIT7	Unit of column 7	string	pixels
TTYPE8	Label of column 8	string	TPL_ID
TFORM8	Format of column 8	string	I (int)
TUNIT8	Unit of column 8	string	
TTYPE9	Label of column 9	string	TPL_SIZE
TFORM9	Format of column 9	string	I (int)
TUNIT9	Unit of column 9	string	pixels
TTYPE10	Label of column 10	string	NRPIX
TFORM10	Format of column 10	string	I (int)
TUNIT10	Unit of column 10	string	pixels
TTYPE11	Label of column 11	string	NGPIX
TFORM11	Format of column 11	string	I (int)
TUNIT11	Unit of column 11	string	pixels
TTYPE12	Label of column 12	string	NBPIX
TFORM12	Format of column 12	string	I (int)
TUNIT12	Unit of column 12	string	pixels
TTYPE13	Label of column 13	string	NB
TFORM13	Format of column 13	string	I (int)
TUNIT13	Unit of column 13	string	
TTYPE14	Label of column 14	string	NR
TFORM14	Format of column 14	string	I (int)
TUNIT14	Unit of column 14	string	
TTYPE15	Label of column 15	string	NB_FRAC
TFORM15	Format of column 15	string	E (float)
TUNIT15	Unit of column 15	string	
TTYPE16	Label of column 16	string	NR_FRAC
TFORM16	Format of column 16	string	E (float)
TUNIT16	Unit of column 16	string	

TTYPE17	Label of column 17	string	CCD_WINREF
TFORM17	Format of column 17	string	E (float)
TUNIT17	Unit of column 17	string	e^-/pix/s
TTYPE18	Label of column 18	string	TEMPLATE
TFORM18	Format of column 18	string	B (byte)
TUNIT18	Unit of column 18	string	
TTYPE19	Label of column 19	string	NXIMGREF
TFORM19	Format of column 1	string	I (int)
TUNIT19	Unit of column 19	string	
TTYPE20	Label of column 20	string	NYIMGREF
TFORM20	Format of column 20	string	I (int)
TUNIT20	Unit of column 20	string	
TTYPE21	Label of column 21	string	POSXIMGREF
TFORM21	Format of column 21	string	I (int)
TUNIT21	Unit of column 21	string	
TTYPE22	Label of column 22	string	POSYIMGREF
TFORM22	Format of column 22	string	I (int)
TUNIT22	Unit of column 22	string	
TTYPE23	Label of column 23	string	EXPTIME
TFORM23	Format of column 23	string	I (int)
TUNIT23	Unit of column 23	string	SECOND
TDIM17		string	(40,26)
TDIM18		string	(40,26)
EXTNAME	name of the extension	string	BINTABLE

5.1.6 Header of the BAR extension of the EN2_STAR_CHR

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	16
TTYPE1	Label of column 1	string	DATE
TFORM1	Format of column 1	string	23A
TUNIT1	Unit of column 1	string	yyyy-mm-ddThh:mm:ss
TTYPE2	Label of column 2	string	DATETT
TFORM2	Format of column 2	string	D (double)
TUNIT2	Unit of column 2	string	JULIAN DAY
TTYPE3	Label of column 3	string	DATEBARTT
TFORM3	Format of column 3	string	D (double)
TUNIT3	Unit of column 3	string	JULIAN DAY
TTYPE4	Label of column 4	string	STATUS
TFORM4	Format of column 4	string	J (long)
TUNIT4	Unit of column 4	string	
TTYPE5	Label of column 5	string	REDFLUX
TFORM5	Format of column 5	string	E (float)
TUNIT5	Unit of column 5	string	ELECTRONS PER 32s
TTYPE6	Label of column 6	string	REDFLUXDEV

TFORM6	Format of column 6	string	E (float)
TUNIT6	Unit of column 6	string	ELECTRONS PER 32s
TTYPE7	Label of column 7	string	GREENFLUX
TFORM7	Format of column 7	string	E (float)
TUNIT7	Unit of column 7	string	ELECTRONS PER 32s
TTYPE8	Label of column 8	string	GREENFLUXDEV
TFORM8	Format of column 8	string	E (float)
TUNIT8	Unit of column 8	string	ELECTRONS PER 32s
TTYPE9	Label of column 9	string	BLUEFLUX
TFORM9	Format of column 9	string	E (float)
TUNIT9	Unit of column 9	string	ELECTRONS PER 32s
TTYPE10	Label of column 10	string	BLUEFLUXDEV
TFORM10	Format of column 10	string	E (float)
TUNIT10	Unit of column 10	string	ELECTRONS PER 32s
TTYPE11	Label of column 11	string	WHITEFLUX
TFORM11	Format of column 11	string	E (float)
TUNIT11	Unit of column 11	string	ELECTRONS PER 32s
TTYPE12	Label of column 12	string	BG
TFORM12	Format of column 12	string	E (float)
TUNIT12	Unit of column 12	string	ELECTRONS PER PIXEL PER 32s
EXTNAME	Name of the extension	string	BAR

5.1.7 Header of the BARFILL extension of the EN2_STAR_CHR

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	4
TTYPE1	Label of column 1	string	DATEBARTT
TFORM1	Format of column 1	string	D (double)
TUNIT1	Unit of column 1	string	JULIAN DAY
TTYPE2	Label of column 2	string	WHITEFLUXFIL
TFORM2	Format of column 2	string	E (float)
TUNIT2	Unit of column 2	string	ELECTRONS PER 32s
TTYPE3	Label of column 3	string	STATUSFIL
TFORM3	Format of column 3	string	J (long)
TUNIT3	Unit of column 3	string	
TTYPE4	Label of column 4	string	T_EXP
TFORM4	Format of column 4	string	I (int)
TUNIT4	Unit of column 4	string	
EXTNAME	name of the extension	string	BARFILL

5.1.8 Header of the SYSTEMATIC extension of the EN2_STAR_CHR

NAME	DESCRIPTION	TYPE	VALUE

BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	3
EXTNAME	name of the extension	string	SYSTEMATIC
TTYPE1	Label of column 1	string	DATEBARTT
TFORM1	Format of column 1	string	D (double)
TUNIT1	Unit of column 1	string	JULIAN DAY
TTYPE2	Label of column 2	string	WHITEFLUXSYS
TFORM2	Format of column 2	string	E (float)
TUNIT2	Unit of column 2	string	ELECTRONS PER 32s
TTYPE3	Label of column 3	string	STATUSSYS
TFORM3	Format of column 3	string	J (long)
TUNIT3	Unit of column 3	string	

5.1.9 Header of the BAR extension of the EN2_STAR_MON

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	16
TTYPE1	Label of column 1	string	DATE
TFORM1	Format of column 1	string	23A
TUNIT1	Unit of column 1	string	yyyy-mm-ddThh:mm:ss
TTYPE2	Label of column 2	string	DATETT
TFORM2	Format of column 2	string	D (double)
TUNIT2	Unit of column 2	string	JULIAN DAY
TTYPE3	Label of column 3	string	DATEBARTT
TFORM3	Format of column 3	string	D (double)
TUNIT3	Unit of column 3	string	JULIAN DAY
TTYPE4	Label of column 4	string	STATUS
TFORM4	Format of column 4	string	J (long)
TUNIT4	Unit of column 4	string	
TTYPE5	Label of column 5	string	WHITEFLUX
TFORM5	Format of column 5	string	E (float)
TUNIT5	Unit of column 5	string	ELECTRONS PER 32s
TTYPE6	Label of column 6	string	WHITEFLUXDEV
TFORM6	Format of column 6	string	E (float)
TUNIT6	Unit of column 6	string	ELECTRONS PER 32s
TTYPE7	Label of column 7	string	BG
TFORM7	Format of column 7	string	E (float)
TUNIT7	Unit of column 7	string	ELECTRONS PER PIXEL PER 32s
EXTNAME	name of the extension	string	BAR

5.1.10 Header of the BARFILL extension of the EN2_STAR_MON

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	4
TTYPE1	Label of column 1	string	DATEBARTT
TFORM1	Format of column 1	string	D (double)
TUNIT1	Unit of column 1	string	JULIAN DAY
TTYPE2	Label of column 2	string	WHITEFLUXFIL
TFORM2	Format of column 2	string	E (float)
TUNIT2	Unit of column 2	string	ELECTRONS PER 32s
TTYPE3	Label of column 3	string	STATUSFIL
TFORM3	Format of column 3	string	J (long)
TUNIT3	Unit of column 3	string	
TTYPE4	Label of column 4	string	T_EXP
TFORM4	Format of column 4	string	I (int)
TUNIT4	Unit of column 4	string	
EXTNAME	name of the extension	string	BARFILL

5.1.11 Header of the SYSTEMATIC extension of the EN2_STAR_MON

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	3
EXTNAME	name of the extension	string	SYSTEMATIC
TTYPE1	Label of column 1	string	DATEBARTT
TFORM1	Format of column 1	string	D (double)
TUNIT1	Unit of column 1	string	JULIAN DAY
TTYPE2	Label of column 2	string	WHITEFLUXSYS
TFORM2	Format of column 2	string	E (float)
TUNIT2	Unit of column 2	string	ELECTRON PER 32s
TTYPE3	Label of column 3	string	STATUSSYS
TFORM3	Format of column 3	string	J (long)
TUNIT3	Unit of column 3	string	

5.1.12 Header of the BAR extension of the EN2_STAR_IMAG

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	11
TTYPE1	Label of column 1	string	DATE
TFORM1	Format of column 1	string	23A
TUNIT1	Unit of column 1	string	yyyy-mm-ddThh:mm:ss
TTYPE2	Label of column 2	string	DATETT
TFORM2	Format of column 2	string	D (double)
TUNIT2	Unit of column 2	string	JULIAN DAY
TTYPE3	Label of column 3	string	DATEBARTT
TFORM3	Format of column 3	string	D (double)
TUNIT3	Unit of column 3	string	JULIAN DAY
TTYPE4	Label of column 4	string	STATUS
TFORM4	Format of column 4	string	J (long)
TUNIT4	Unit of column 4	string	
TTYPE5	Label of column 5	string	REDFLUX
TFORM5	Format of column 5	string	D (double)
TUNIT5	Unit of column 5	string	ELECTRONS PER 32s
TTYPE6	Label of column 6	string	GREENFLUX
TFORM6	Format of column 6	string	D (double)
TUNIT6	Unit of column 6	string	ELECTRONS PER 32s
TTYPE7	Label of column 7	string	BLUEFLUX
TFORM7	Format of column 7	string	D (double)
TUNIT7	Unit of column 7	string	ELECTRONS PER 32s
TTYPE8	Label of column 8	string	WHITEFLUX
TFORM8	Format of column 8	string	D (double)
TUNIT8	Unit of column 8	string	ELECTRONS PER 32s
TTYPE9	Label of column 9	string	BG
TFORM9	Format of column 9	string	E (float)
TUNIT9	Unit of column 9	string	ELECTRONS PER PIXEL PER 32s
TTYPE10	Label of column 10	string	CENX
TFORM10	Format of column 10	string	E (float)
TUNIT10	Unit of column 10	string	
TTYPE11	Label of column 11	string	CENY
TFORM11	Format of column 11	string	E (float)
TUNIT11	Unit of column 11	string	
EXTNAME	name of the extension	string	BAR

5.1.13 Header of the BARFILL extension of the EN2_STAR_IMAG

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	3
TTYPE1	Label of column 1	string	DATEBARTT
TFORM1	Format of column 1	string	D (double)
TUNIT1	Unit of column 1	string	JULIAN DAY
TTYPE2	Label of column 2	string	WHITEFLUXFIL
TFORM2	Format of column 2	string	E (float)
TUNIT2	Unit of column 2	string	ELECTRONS PER 32s
TTYPE3	Label of column 3	string	STATUSFIL
TFORM3	Format of column 3	string	J (long)
TUNIT3	Unit of column 3	string	
EXTNAME	name of the extension	string	BARFILL

5.1.14 Header of the SYSTEMATIC extension of the EN2_STAR_IMAG

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	3
TTYPE1	Label of column 1	string	DATEBARTT
TFORM1	Format of column 1	string	D (double)
TUNIT1	Unit of column 1	string	JULIAN DAY
TTYPE2	Label of column 2	string	WHITEFLUXSYS
TFORM2	Format of column 2	string	E (float)
TUNIT2	Unit of column 2	string	ELECTRONS PER 32s
TTYPE3	Label of column 3	string	STATUSSYS
TFORM3	Format of column 3	string	J (long)
TUNIT3	Unit of column 3	string	
EXTNAME	name of the extension	string	SYSTEMATIC

5.2 Headers of the extension of the files in versions 1 to 3

5.2.1 Header of the RAW extension of the AN2_STAR table

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory : (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2

NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Not used		
GCOUNT	Not used		
TFIELDS	Number of columns	int	5
EXTNAME	Name of the extension	string	RAW
TFORM1	Format of column 1	string	D (double)
TTYPE1	Label of column 1	string	DATEJD
TUNIT1	Unit of column 1	string	CoRoT Julian Day
TFORM2	Format of column 2	string	D (double)
TTYPE2	Label of column 2	string	RAWFLUX
TUNIT2	Unit of column 2	string	electron/s
TFORM3	Format of column 3	string	D (double)
TTYPE3	Label of column 3	string	RAWFLUXDEV
TUNIT3	Unit of column 3	string	electron/s
TFORM4	Format of column 4	string	J (long)
TTYPE4	Label of column 4	string	RAWSTATUS
TUNIT4	Unit of column 4		
TFORM5	Format of column 5	string	E (float)
TTYPE5	Label of column 5	string	BG
TUNIT5	Unit of column 5	string	electron/px/s
COMMENTS		string	

5.2.2 Header of the HEL extension of the AN2_STAR table

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory : (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Not used		
GCOUNT	Not used		
TFIELDS	Number of columns	int	4
EXTNAME	Name of the extension	string	HEL
TFORM1	Format of column 1	string	D (double)
TTYPE1	Label of column 1	string	DATEJDHEL
TUNIT1	Unit of column 1	string	CoRoT Julian Day
TFORM2	Format of column 2	string	D (double)
TTYPE2	Label of column 2	string	FLUXHEL
TUNIT2	Unit of column 2	string	electron/s
TFORM3	Format of column 3	string	D (double)
TTYPE3	Label of column 3	string	FLUXDEVHEL
TUNIT3	Unit of column 3	string	electron/s
TFORM4	Format of column 4	string	J (long)
TTYPE4	Label of column 4	string	STATUSHEL
TUNIT4	Unit of column 4		
COMMENTS		string	

5.2.3 Header of the HELREG extension of the AN2_STAR table

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory : (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Not used		
GCOUNT	Not used		
TFIELDS	Number of columns	int	4
EXTNAME	Name of the extension	string	HELREG
TFORM1	Format of column 1	string	D (double)
TTYPE1	Label for column 1	string	DATEJDHELREG
TUNIT1	Unit of column 1	string	CoRoT Julian Day
TFORM2	Format of column 2	string	D (double)
TTYPE2	Label for column 2	string	FLUXHELREG
TUNIT2	µUnit of column 2	string	electron/s
TFORM3	Format of column 3	string	D (double)
TTYPE3	Label for column 3	string	FLUXDEVHELREG
TUNIT3	Unit of column 3	string	electron/s
TFORM4	Format of column 4	string	J (long)
TTYPE4	Label of column 4	string	STATUSHELREG
TUNIT4	Unit of column 4	string	
COMMENTS		string	

5.2.4 Header of the BINTABLE of the EN2_WINDESCRIPTOR product

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	23
TTYPE1	Label of column 1	string	T_START_WIN
TFORM1	Format of column 1	string	23A
TUNIT1	Unit of column 1	string	CoRoT Julian day
TTYPE2	Label of column 2	string	T_END_WIN
TFORM2	Format of column 2	string	19A
TUNIT2	Unit of column 2	string	CoRoT Julian day
TTYPE3	Label of column 3	string	WIN_ID
TFORM3	Format of column 3	string	J (long)
TUNIT3	Unit of column 3	string	
TTYPE4	Label of column 4	string	SIZEX
TFORM4	Format of column 4	string	I (int)
TUNIT4	Unit of column 4	string	pixels
TTYPE5	Label of column 5	string	SIZEY
TFORM5	Format of column 5	string	I (int)
TUNIT5	Unit of column 5	string	pixels
TTYPE6	Label of column 6	string	ORIGINX
TFORM6	Format of column 6	string	I (int)

TUNIT6	Unit of column 6	string	pixels
TTYPE7	Label of column 7	string	ORIGINY
TFORM7	Format of column 7	string	I (int)
TUNIT7	Unit of column 7	string	pixels
TTYPE8	Label of column 8	string	TPL_ID
TFORM8	Format of column 8	string	I (int)
TUNIT8	Unit of column 8	string	
TTYPE9	Label of column 9	string	TPL_SIZE
TFORM9	Format of column 9	string	I (int)
TUNIT9	Unit of column 9	string	pixels
TTYPE10	Label of column 10	string	NRPIX
TFORM10	Format of column 10	string	I (int)
TUNIT10	Unit of column 10	string	pixels
TTYPE11	Label of column 11	string	NGPIX
TFORM11	Format of column 11	string	I (int)
TUNIT11	Unit of column 11	string	pixels
TTYPE12	Label of column 12	string	NBPIX
TFORM12	Format of column 12	string	I (int)
TUNIT12	Unit of column 12	string	pixels
TTYPE13	Label of column 13	string	NB
TFORM13	Format of column 13	string	I (int)
TUNIT13	Unit of column 13	string	
TTYPE14	Label of column 14	string	NR
TFORM14	Format of column 14	string	I (int)
TUNIT14	Unit of column 14	string	
TTYPE15	Label of column 15	string	NB_FRAC
TFORM15	Format of column 15	string	E (float)
TUNIT15	Unit of column 15	string	
TTYPE16	Label of column 16	string	NR_FRAC
TFORM16	Format of column 16	string	E (float)
TUNIT16	Unit of column 16	string	
TTYPE17	Label of column 17	string	CCD_WINREF
TFORM17	Format of column 17	string	E (float)
TUNIT17	Unit of column 17	string	
TTYPE18	Label of column 18	string	TEMPLATE
TFORM18	Format of column 18	string	B (byte)
TUNIT18	Unit of column 18	string	
TTYPE19	Label of column 19	string	NXIMGREF
TFORM19	Format of column 1	string	I (int)
TUNIT19	Unit of column 19	string	
TTYPE20	Label of column 20	string	NYIMGREF
TFORM20	Format of column 20	string	I (int)
TUNIT20	Unit of column 20	string	
TTYPE21	Label of column 21	string	POSXIMGREF
TFORM21	Format of column 21	string	I (int)
TUNIT21	Unit of column 21	string	
TTYPE22	Label of column 22	string	POSYIMGREF
TFORM22	Format of column 22	string	I (int)
TUNIT22	Unit of column 22	string	
TTYPE23	Label of column 23	string	EXPTIME
TFORM23	Format of column 23	string	I (int)
TUNIT23	Unit of column 23	string	SECOND
TDIM17	Dimension of the image	string	(40,26)

	CCD_WINREF		
TDIM18	Dimension of the image TEMPLATE	string	(40,26)
EXTNAME	name of the extension	string	BINTABLE

5.2.5 Header of the BINTABLE extension of the EN2_STAR_CHR table

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	16
TTYPE1	Label of column 1	string	DATE
TFORM1	Format of column 1	string	23A
TUNIT1	Unit of column 1	string	yyyy-mm-ddThh:mm:ss
TTYPE2	Label of column 2	string	DATEJD
TFORM2	Format of column 2	string	D (double)
TUNIT2	Unit of column 2	string	CoRoT Julian Day
TTYPE3	Label of column 3	string	DATEHEL
TFORM3	Format of column 3	string	D (double)
TUNIT3	Unit of column 3	string	CoRoT Julian Day
TTYPE4	Label of column 4	string	STATUS
TFORM4	Format of column 4	string	J (long)
TUNIT4	Unit of column 4	string	
TTYPE5	Label of column 5	string	REDFLUX
TFORM5	Format of column 5	string	E (float)
TUNIT5	Unit of column 5	string	electrons/s
TTYPE6	Label of column 6	string	REDFLUXDEV
TFORM6	Format of column 6	string	E (float)
TUNIT6	Unit of column 6	string	electrons/s
TTYPE7	Label of column 7	string	GREENFLUX
TFORM7	Format of column 7	string	E (float)
TUNIT7	Unit of column 7	string	electrons/s
TTYPE8	Label of column 8	string	GREENFLUXDEV
TFORM8	Format of column 8	string	E (float)
TUNIT8	Unit of column 8	string	electrons/s
TTYPE9	Label of column 9	string	BLUEFLUX
TFORM9	Format of column 9	string	E (float)
TUNIT9	Unit of column 9	string	electrons/s
TTYPE10	Label of column 10	string	GREENFLUXDEV
TFORM10	Format of column 10	string	E (float)
TUNIT10	Unit of column 10	string	electrons/s
TTYPE11	Label of column 11	string	WHITEFLUX
TFORM11	Format of column 11	string	E (float)
TUNIT11	Unit of column 11	string	electrons/s
TTYPE12	Label of column 12	string	JCWF
TFORM12	Format of column 12	string	E (float)
TUNIT12	Unit of column 12	string	electrons/s

TTYPE13	Label of column 13	string	BG
TFORM13	Format of column 13	string	E (float)
TUNIT13	Unit of column 13	string	electrons/s
TTYPE14	Label of column 14	string	CORREC_RED
TFORM14	Format of column 14	string	E (float)
TUNIT14	Unit of column 14	string	electrons/s
EXTNAME	name of the extension	string	BINTABLE
TFORM15	Format of column 15	string	E (float)
TFORM16	Format of column 16	string	E (float)
TTYPE15	Label of column 15	string	CORREC_GREEN
TTYPE16	Label of column 16	string	CORREC_BLUE

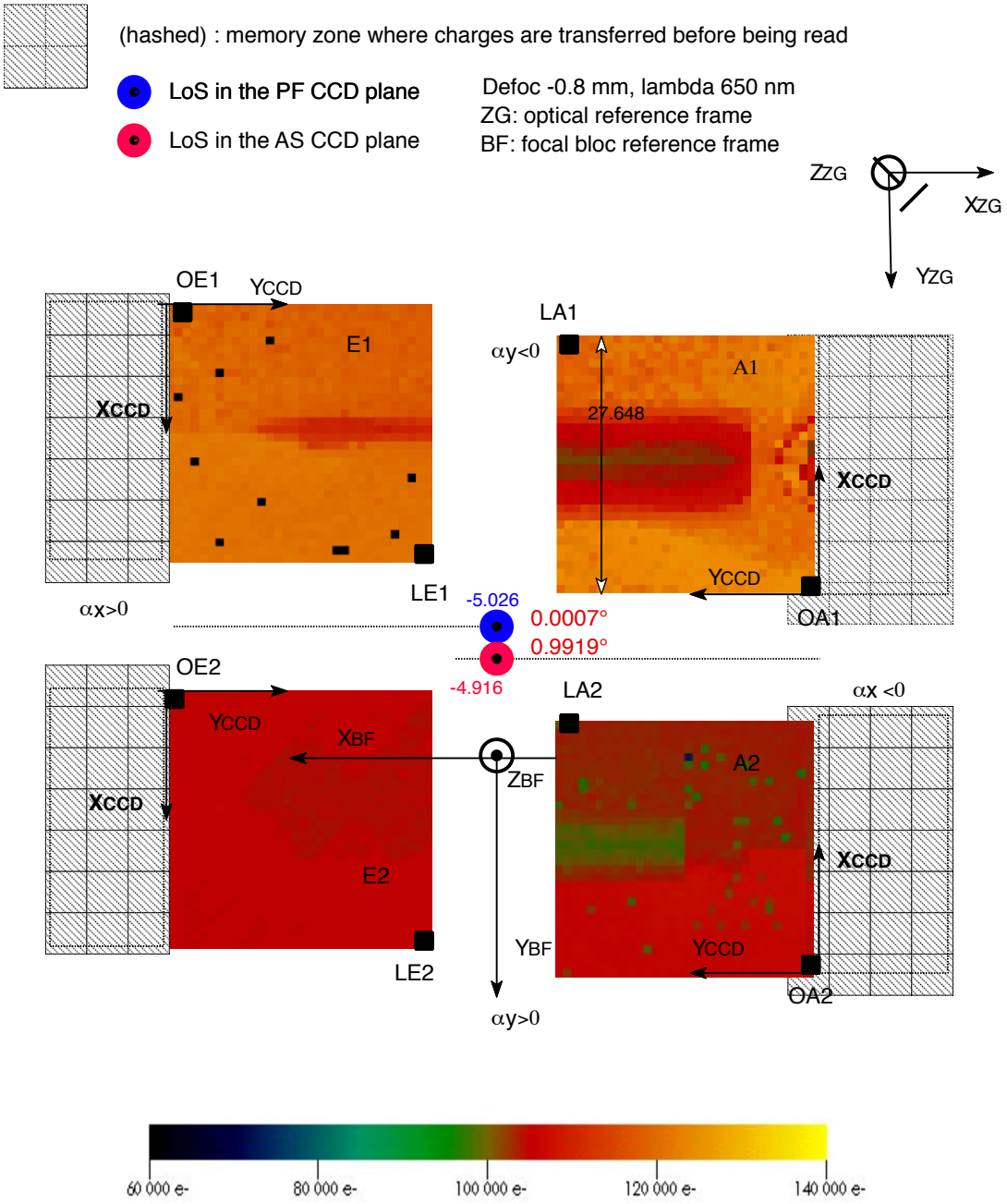
5.2.6 Header of the BINTABLE extension of EN2_STAR_MON

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	16
TTYPE1	Label of column 1	string	DATE
TFORM1	Format of column 1	string	23A
TUNIT1	Unit of column 1	string	yyyy-mm-ddThh:mm:ss
TTYPE2	Label of column 2	string	DATEJD
TFORM2	Format of column 2	string	D (double)
TUNIT2	Unit of column 2	string	CoRoT Julian Day
TTYPE3	Label of column 3	string	DATEHEL
TFORM3	Format of column 3	string	D (double)
TUNIT3	Unit of column 3	string	CoRoT Julian Day
TTYPE4	Label of column 4	string	STATUS
TFORM4	Format of column 4	string	J (long)
TUNIT4	Unit of column 4	string	
TTYPE5	Label of column 5	string	WHITEFLUX
TFORM5	Format of column 5	string	E (float)
TUNIT5	Unit of column 5	string	electrons/s
TTYPE6	Label of column 6	string	WHITEFLUXDEV
TFORM6	Format of column 6	string	E (float)
TUNIT6	Unit of column 6	string	electrons/s
TTYPE7	Label of column 7	string	BG
TFORM7	Format of column 7	string	E (float)
TUNIT7	Unit of column 7	string	electrons/s
TTYPE8	Label of column 8	string	CORREC
TFORM8	Format of column 8	string	E (float)
TUNIT8	Unit of column 8	string	electrons/s
EXTNAME	name of the extension	string	BINTABLE

5.2.7 Header of the BINTABLE extension of EN2_STAR_IMAG

NAME	DESCRIPTION	TYPE	VALUE
BITPIX	Mandatory (for images)	int	8
NAXIS	Mandatory word ; 2D table	int	2
NAXIS1	Number of bytes per row	int	
NAXIS2	Number of rows	int	
PCOUNT	Mandatory but not used		
GCOUNT	Mandatory but not used		
TFIELDS	Number of columns	int	16
TTYPE1	Label of column 1	string	DATE
TFORM1	Format of column 1	string	23A
TUNIT1	Unit of column 1	string	yyyy-mm-ddThh:mm:ss
TTYPE2	Label of column 2	string	DATEJD
TFORM2	Format of column 2	string	D (double)
TUNIT2	Unit of column 2	string	CoRoT Julian Day
TTYPE3	Label of column 3	string	DATEHEL
TFORM3	Format of column 3	string	D (double)
TUNIT3	Unit of column 3	string	CoRoT Julian Day
TTYPE4	Label of column 4	string	STATUS
TFORM4	Format of column 4	string	J (long)
TUNIT4	Unit of column 4	string	
TTYPE5	Label of column 5	string	REDFLUX_IMAG
TFORM5	Format of column 5	string	D (double)
TUNIT5	Unit of column 5	string	electrons/s
TTYPE6	Label of column 6	string	GREENFLUX_IMAG
TFORM6	Format of column 6	string	D (double)
TUNIT6	Unit of column 6	string	electrons/s
TTYPE7	Label of column 7	string	BLUEFLUX_IMAG
TFORM7	Format of column 7	string	D (double)
TUNIT7	Unit of column 7	string	electrons/s
TTYPE8	Label of column 8	string	WHITEFLUX_IMAG
TFORM8	Format of column 8	string	D (double)
TUNIT8	Unit of column 8	string	electrons/s
TTYPE9	Label of column 9	string	BG_IMAG
TFORM9	Format of column 9	string	E (float)
TUNIT9	Unit of column 9	string	electrons/pixel/s
EXTNAME	name of the extension	string	BINTABLE
TFORM10	Format of column 10	string	E (float)
TFORM11	Format of column 11	string	E (float)
TTYPE10	Label of column 10	string	CENX
TTYPE11	Label of column 11	string	CENY

6 ANNEX 2 : COORDINATES IN THE CCD FRAME.



For each CCD, O_{CCD} is the origin of the CCD; L_{CCD} is located opposite to the origin.

A given pixel is identified by its coordinates (*x,y*) where *x* is the subscript for the raw number and *y* is the line number.

The numbering of lines follows the direction of the frame: The first line is the first to be transferred into the buffer, and the first to be next transferred into the reader storage.

For each CCD, pixels are numbered aboard from 1 to 2048 : $1 \leq x \leq 2048$;$1 \leq y \leq 2048$.

CAUTION : when reading the FITS files, pixels in the images might be numbered from 0 to 2047.