

STIX Data Product Description Document



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1 Introduction

1.1 Purpose and scope

This Data Product Definition Document (DPDD) describes the format and content of the Spectrometer/Telescope for Imaging X-rays (STIX) Science data. It includes descriptions of the data products and associated metadata, including the data format, content, and generation pipeline. These products will be stored and distributed from the Solar Orbiter Science Archive (SOAR) [RD4] of the SOC.

The specifications described in this DPDD apply to all EPD Science Products submitted to ESA’s Solar Orbiter SOC for further archival and exploitation. This document only includes descriptions of Science products delivered by the Science pipelines run at the EPD Team premises. It does not address the Low Latency data (see [RD3]) since it will be described in [RD1] and [RD2].

1.2 Applicable and Reference Documents

Ref	Description	Doc. Number	Issue
[AD1]	SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science		
[AD2]	SOL-SGS-ICD-002 Data Producer to Archive ICD (DPAICD)		

Table 1: Applicable Documents

1.3 Reference Documents

Ref	Description	Doc. Number	Issue
[RD1]	Solar Orbiter Interface Control Document for Low Latency Data FITS Files	SOL-SGS-OTH-0003	
[RD2]	Solar Orbiter STIX Low Latency Data Product Description Document		
[RD3]	SOL-SGS-TN-0003 Solar Orbiter Low Latency Data: Concept and Implementation		
[RD4]	SOL-SGS-PL-0009 Solar Orbiter Archive Plan		
[RD5]	STIX Flight Software TM/TC Interface Control Document (ICD)	STIX-ICD-0812-ESC	I4R5

Table 2: Reference Documents

1.4 Acronyms and Abbreviations

SOAR	Solar Orbiter Archive
SOC	Science Operations Centre
STIX	Spectrometer/Telescope for Imaging X-rays

2 Instrument Description

STIX supports the Solar Orbiter mission with hard X-ray imaging spectroscopy measurements, providing diagnostics of the hottest (≈ 10 MK) thermal plasmas in the solar corona and information on nonthermal electrons that are accelerated above ~ 10 keV during solar flares. Hard X-ray spectroscopy in the 4 to 150 keV range at 1 keV resolution is achieved by using passively cooled Cadmium Telluride (CdTe) X-ray detectors. The instrument employs a Fourier-transform imaging technique, used by both the Hard X-ray Telescope on the Japanese Yohkoh mission and the Hard X-ray Imager on the upcoming Chinese ASO-S mission and related to that used for the Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) mission. The indirect imaging concept of STIX is well-suited to the limited mass, power, and telemetry resources available for the Solar Orbiter payload. For example, each STIX image can be transmitted with as little as 100 bytes.

2.1 Science objectives

The dominant emission mechanism in the STIX hard X-ray energy range is bremsstrahlung, which is produced when energetic electrons decelerate in the solar corona as they encounter ambient protons. In general only the highest energy electrons in the solar corona have enough energy to produce bremsstrahlung above the STIX lower energy range. STIX with its energy range from 4 to 150 keV therefore provides information on the tail of the electron distribution, which gives diagnostics of the most energetic electrons. Hence, hard X-ray emissions provide ideal diagnostics of the hottest plasmas in solar flares and of the nonthermal tails seen at energies above the hottest thermal population.

Typical hard X-ray flare spectra are shown in Figure 1 with the thermal distribution seen best at lower energies, while the high energies are produced by nonthermal electrons. For smaller flares which tend to be cooler, the energy above which nonthermal emission is seen is generally lower, and it can reach values below 10 keV. As the bremsstrahlung emission mechanism is well understood, the observed spectra provide quantitative diagnostics on the thermal plasma and the accelerated electrons.

In summary, solar flare hard X-ray observations give quantitative measurements of energy release processes in solar flares. The remote-sensing X-ray measurements made with STIX determine the intensity, spectrum, timing, and location of accelerated electrons near the Sun. Simultaneously, the size, density, temperature, and energy content of the flare-heated plasma are determined. Specifically, for well-observed flares, the spectral deconvolution of the X-ray imaging-spectroscopy observations enable both the temperature and emission measure of thermal plasmas and the number and energy spectrum of nonthermal electrons to be determined on both a spatially-integrated and feature-associated basis. By using this set of diagnostics, STIX plays an important role in enabling Solar Orbiter to achieve two of its major science goals:

1. understanding the acceleration of electrons at the Sun and their transport into interplanetary space and
2. determining the magnetic connection of the Solar Orbiter back to the Sun.

Therefore, STIX provides an important link between the remote and in-situ instruments of the Solar Orbiter mission.

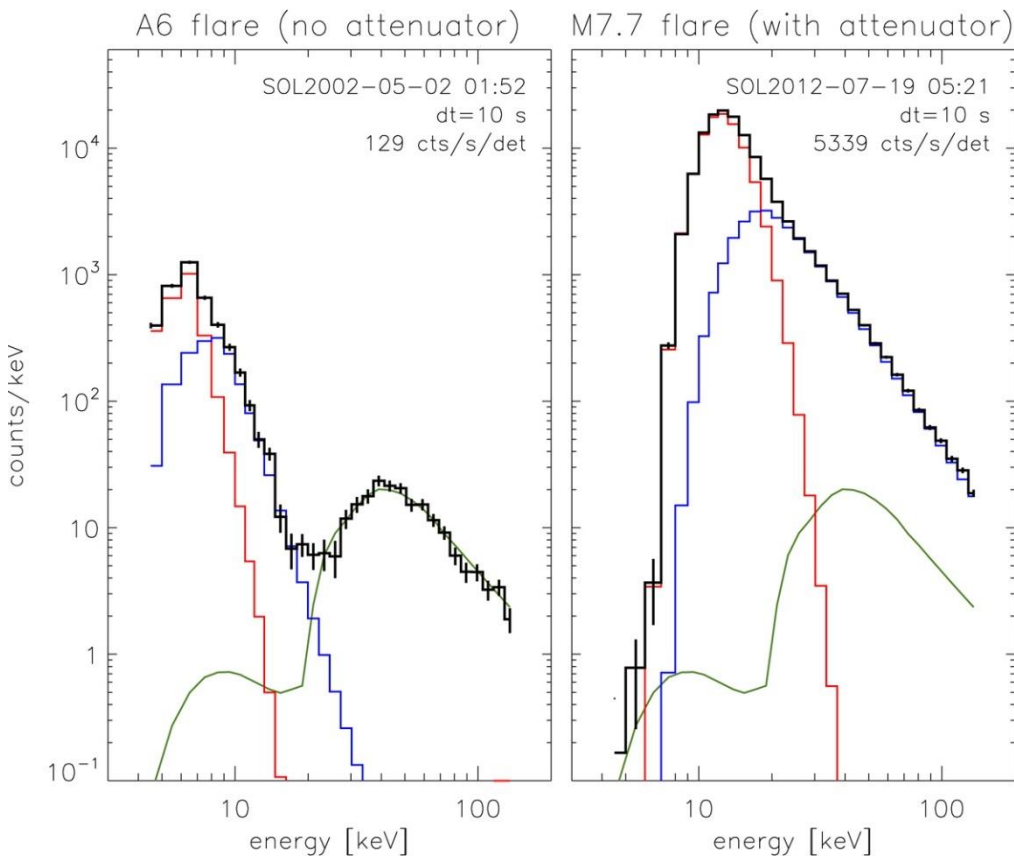


Figure 1: Expected STIX HXR count spectra for two real flares (GOES A6 and M7.7), shown as 10 s accumulations in default STIX science energy channels. In each plot, the black histogram with photon counting uncertainties is the detector-summed count spectrum made up of the thermal (red), nonthermal (blue), and background (green) components. Note that the contribution of the on-board calibration sources are not including in these simulations, and the background at low energies therefore appears artificially low.

2.2 Instrument overview

The STIX instrument provides imaging spectroscopy of solar flare X-ray emission. Instrument performance is summarized in Table 3.

Objective	specification
Energy range	4–150 keV
Energy resolution (FWHM)	1 keV at 6 keV
Effective area	6 cm ²
Finest angular resolution	7 arcsec
Field of view for imaging	2 × 2 degree
Image placement accuracy	4 arcsec
Time resolution	0.1 to 1 s
Nominal power	~8 W
Mass (excluding window)	6.58 kg
Telemetry	700 bits s ⁻¹

Table 3: STIX specification summary.

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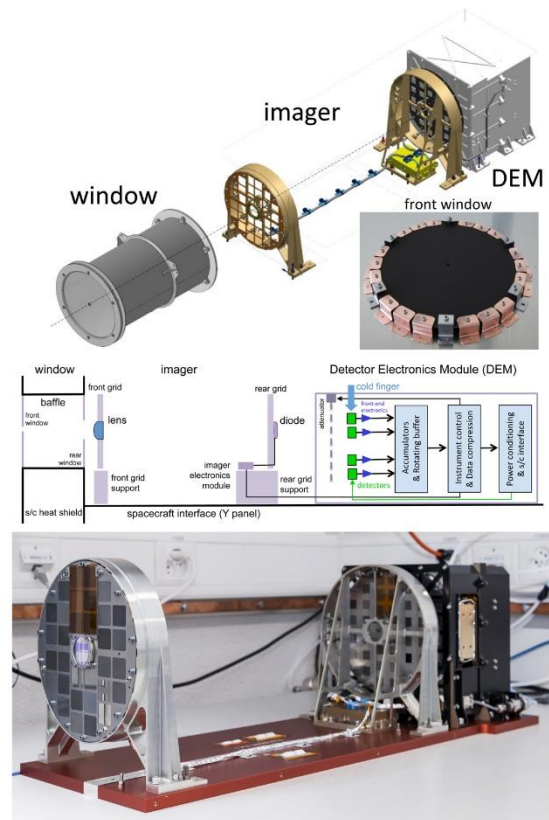


Table 3: STIX specification summary.

Figure 2: Drawing, functional, and photographic views of the STIX instrument, as described in the text. The inset (top) shows the front window, its six decoupling springs and copper thermal straps. Note that the photo of the instrument (bottom) has been

The hardware consists of three main subsystems:

1. A pair of X-ray transparent entrance windows, independently mounted in the heat shield of Solar Orbiter.
2. An imager with two widely separated grids, independently mounted on the spacecraft (s/c) Y panel, and containing key elements of the STIX aspect system.
3. A Detector/Electronics Module (DEM), mounted behind the imager, containing electronics and cadmium telluride (CdTe) detectors, and a movable X-ray attenuator.

2.2.1 Window

The STIX X-ray windows (Figure 2) play two roles. First, they are prime elements in the instrument thermal control system, reflecting or re-radiating most of the incident radiation so as to limit the optical and IR solar flux seen by the instrument itself and the s/c interior. Second, they serve to preferentially absorb the intense flux of low energy X-rays that would otherwise result in excessive count rates, pulse pileup, and dead time in the detectors during intense flares. Using low-Z materials (primarily optical grade beryllium), the thermally-effective window has X-ray absorption properties that permit observations down to 4 keV (Fig. 3). In terms of mounting, the 2 mm thick front window is attached via 6 decoupled springs to a feedthrough provided by Solar Orbiter. The 1 mm thick rear window is directly attached to the rear of the heatshield feedthrough (Fig. 2). To increase the margin on the thermal design, the front window is coated with Solar Black, the same coating used for the Solar Orbiter heatshield. The front and rear windows have 5 and 25 mm diameter open apertures, respectively, for use by the aspect system.

2.2.2 Imager

High-resolution solar hard X-ray imaging within the mass and volume constraints of Solar Orbiter currently precludes the use of focusing optics. Instead it requires non-focusing, grid or mask-based techniques. STIX uses Fourier-transform bigrid imaging to achieve the high angular resolution required for solar sources, an approach that is also well-suited to a limited-telemetry environment.

The imager hardware consists of two X-ray opaque grids separated by 55 cm that are independently mounted on the s/c Y panel (Figure 2). Each of these grids is divided into 32 subareas with a corresponding set of 32 coarsely-pixelized detectors located behind the rear grid. A pair of corresponding subareas and its detector is termed a “subcollimator”.

Within each subcollimator, the grids contain a large number of parallel, equispaced slits. The slits in the corresponding front and rear grids windows differ slightly in pitch and/or orientation. These differences are selected so that, for each window, the combined X-ray transmission of the grid pair forms a large-scale Moire pattern on the detector with a period equal to the detector width and oriented to be parallel to a detector edge. The amplitude and phase of this pattern are very sensitive to the angular distribution of the incident X-ray flux. Thus the high-angular resolution X-ray imaging information is encoded into a set of large-scale spatial distributions of counts in the detectors. The grid design provides the imaging information in the form of a set of angular Fourier components of the source distribution (visibilities) in analogy with the imaging information provided by antenna pairs in a radio interferometer. The set of measured visibilities is then used on the ground to reconstruct an image of the X-ray source.

2.2.3 Detector electronics module (DEM)

The DEM is in the form of a single module that contains almost all the active instrument electronics. Specifically, its content and purpose include:

- 32 coarsely pixelized CdTe detectors;
- A set of 128 weak ¹³³Ba radioactive sources that illuminate the detectors with X-ray. The two strongest lines of the ¹³³Ba spectrum at 31 and 81 keV are used for energy calibration;
- Front-end electronics that handle initial amplification, pulse shaping and processing of the detector output;
- An internal enclosure (Cold Unit) that thermally isolates the detectors and front-end electronics. This enables passive cooling to maintain them at temperatures well below -15°C ;
- A movable aluminum attenuator that can be inserted during high-rate periods to further limit the detectors’ exposure to high fluxes of low energy flare X-rays;

- Analog to digital converters for the X-ray detectors' output;
- An Instrument Data Processing Unit (IDPU) which performs all digital processing of the X-ray data;
- Low-voltage and high-voltage power supplies;
- Interfaces to spacecraft power and SpaceWire signals.

Power supplies and digital electronics are duplicated and cross-strapped to provide cold redundancy. The aspect system electronics are housed in a small "Instrument Electronics Module" (IEM) module attached to the rear grid mount.

2.2.4 Aspect

Aspect knowledge is required to compensate for potentially unstable pointing and to correctly place the reconstructed X-ray image on the Sun for comparison with other images.

STIX uses the spacecraft aspect solution for roll and relative pitch-yaw aspect. This ensures the integrity of the image morphology since changes in s/c pointing during an image integration time can be fully compensated post-facto by noise-free adjustments to the visibility phases.

However, the spacecraft aspect cannot support accurate determination of the absolute position of the X-ray source on the Sun. This is because on longer (multi-week) timescales, thermo-elastic deformation of the spacecraft and/or STIX mechanical structures can change the relative direction of the STIX optical axis and the s/c reference axis. These changes must be mitigated since they are expected to exceed the goal of 4 arcsec for the uncertainty in STIX absolute source positions.

To establish the relationship between the s/c reference axis and the STIX imaging axis, the STIX aspect system (see Figure 3) uses a 28 mm (effective) diameter plano-convex lens in the front grid assembly to focus a 550–700 nm optical image of the Sun onto the rear grid⁵. Measurement of the position of the solar optical limbs on the rear grid plane then locates the STIX imaging axis with respect to the direction to Sun center. The key design feature is that the position of the critical aspect system elements (lens and solar image detector) are fixed within the grids themselves. Thus, the locations of the lens center and solar image are accurately known relative to the X-ray slits. This enables the aspect calibration to be independent of the mechanical properties of the grid mounts and the s/c-dependent mechanical linkage between the front and rear grids.

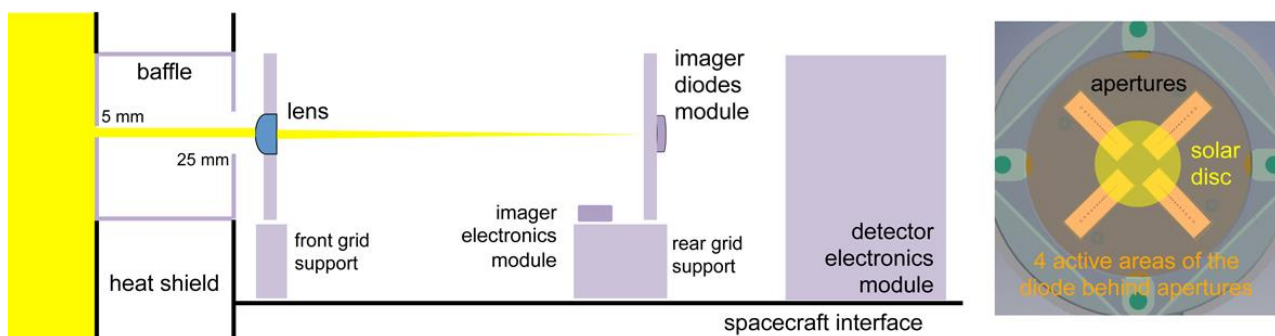


Figure 3: Schematic view of the STIX aspect system. Viewing the Sun through a 5 mm diameter opening in the front window, a lens in the front grid focuses an image of the solar disk onto four rows of small apertures in the rear grid. Four large photodiodes integrate the light passing through a corresponding row of apertures. When a solar limb passes over one of the apertures, the output of that diode changes by ~20%. Such transitions provide an occasional but accurate measurement of the location of the solar image relative to the rear grid slits.

3 Data Generation and Analysis Process

The STIX science products are produced by the STIX Instrument Team. The data generation and analysis process are described in this section.

Science data received by the SOC from the STIX team are made available to end users through the Solar Orbiter archive following the policies described in the Archiving Plan [RD4].

The procedure for delivery of the Science data from the EPD Instrument Team to the SOC must be fully compliant with the IT-SOC Science Data Delivery ICD [AD2].

3.1 Onboard data handling

The design driver for the IDPU's X-ray data processing is the need to reconcile an input stream of up to 800 000 photons per second (~ 20 Mbits s^{-1}) to a telemetry budget of 700 bits per second. This is done by combining rapid FPGA sorting and accumulation of individual events with slower application software that processes the accumulator contents.

The goal of the FPGA's prompt processing is to sort and sum the input photon stream into accumulators on the basis of their detector ID, pixel ID and detected energy in keV. Application software running on a LEON3 processor then proceeds along three parallel paths:

- a primary path that handles the X-ray imaging and spectroscopy data;
- a quick-look (QL) path that supports the generation of light curves and other products used to monitor the performance of the instrument and to provide a continuous overview of solar activity;
- a calibration path that acquires data needed to establish the energy calibration of each detector/pixel.

3.1.1 Primary data path

In the primary data path, each photon word increments one of 12288 double-buffered accumulators (32 energies $\times 32$ detectors $\times 12$ pixels). Accumulation continues for an integral number of 0.1 s periods until one of two conditions is met: (1) a preset minimum integration time has been exceeded AND a preset count threshold (within a specified energy range) has also been exceeded; OR 2) a preset maximum integration time is reached. The use of programmable, adaptive integration times enables subsequent data handling to be efficient during solar quiet periods while still supporting high time-resolution during flares. With suitable parameter selection, the option of fixed integration times is also available.

As each integration is completed, the FPGA transfers the contents of the accumulators into a time-tagged rotating buffer. The contents of the rotating buffer are subsequently compacted (partly by eliminating accumulators with zero counts) and stored into 16 GBytes of flash memory. This "archive buffer" can be retained on board for several weeks and provides the input for all subsequent primary analyses. It is important to note that despite the foregoing energy and time binning, the archived data can be generally considered scientifically lossless in the sense that higher time- or energy-resolution could not be exploited for statistically significant solar analysis.

In parallel with the photon word handling, one of 16 trigger accumulators is incremented each time a trigger is generated by a "not-busy" detector. Trigger counters accumulate for the same time intervals as the event counters and their output is carried along with event counts in subsequent data handling and analysis steps. Photons that are detected in more than one pixel in a detector pair generate a single trigger but are otherwise excluded from subsequent analysis and do not generate a photon event word. The dead time is digitally the same for all triggers (nominally 12.5 microsec). Therefore the trigger rate alone is sufficient to

directly measure the live time for the corresponding detector pair. An important corollary is that all pixels in a single detector share a common live time. This greatly eases the interpretation of intra-detector count rate comparisons which form the basis for imaging.

3.1.2 Quick-look data path

As with the primary data path, the QL data path also begins by feeding the photon words into a (separate) set of 12288 double-buffered accumulators. In this case, the accumulation intervals are fixed (4 s nominal). In most cases the calculation of QL products requires only summing various combinations of the QL accumulator contents. In five cases detailed in subsequent subsections, more extensive calculations are required. Except as noted, the calculation of QL products must be completed within the 4 s QL-integration time.

3.1.2.1 Flare detection

The goal here is to detect flares in real time and to provide a rough measure of their intensity. The detection algorithm uses two time sequences of detector-summed counts, corresponding to different energy bands (to support detection of thermal and nonthermal X-rays). For each band, two different averaging times (multi-second and multi-minute) are used to provide sensitivity to both impulsive and gradual events. A flare is deemed detected when current counts in any of the four cases exceeds a preset minimum count rate while representing a significant fractional increase relative to a longer term average. The flare is deemed to have ended when all the triggering count rate(s) fall below a preset fraction of its maximum. The flare status is included in real-time data transmitted to other instruments with an overall 4 to 8 s latency.

3.1.2.2 Coarse flare location

The CFL subcollimator illuminates its detector with a distinctive shadow pattern whose position depends on the flare centroid location relative to the STIX imaging axis. Combining the eight CFL pixel count rates with averages from other detectors, the centroid location is estimated on board in successive 8 s (nominal) intervals by maximizing the correlation of the various count rates with expectations calculated for an array of 65×65 potential flare locations. The result is a location digitized to 2 arcmin and included in the data distributed to other instruments in real time.

To ensure adequate statistics while avoiding potential nonlinear effects at very high count rates, the real-time flare location is calculated only when flare count rates are at intermediate levels. This should not be an issue since once underway, flare centroid locations are typically stable on a 2 arcmin scale.

3.1.2.3 Detector monitoring

The purpose of this task is to identify malfunctioning detectors that exhibit abnormally high count rates. Although such detectors can increase the volume of T/M and data within the archive buffer, their most serious impacts are that they may provide erroneous input to the QL accumulators and to some onboard decision-making algorithms. Restricted to non-flaring times, the detector monitoring task identifies any detector with count rates that persist at significantly higher levels than those of its peers in either of two preset energy ranges. The offending detector is then flagged in appropriate masks to exclude it from any decision-making role and from QL light curves calculations. More detailed diagnostics, mitigation and restoration are handled after the fact by the ground segment.

3.1.2.4 Rate control regimes

This task uses detector-summed trigger rates to identify and initiate the most appropriate attenuator and pixel states to maintain viable event rates without unnecessarily sacrificing sensitivity.

3.1.2.5 Variance calculation

To monitor for “bursty” detectors and for significant subsecond time variations in the solar flare flux, a variance measure is calculated and included in the QL data. This is done by accumulating detector-summed counts in a preset energy range into a set of 40 successive 0.1 s time bins. After 4 s have elapsed, a variance measure among the contents of these 40 accumulators is calculated and transmitted as part of the QL T/M. The conversion to actual variance and evaluation of its statistical significance (if any) is done on the ground.

3.1.3 Calibration data path

The purpose of the calibration data path is to obtain high-resolution spectral data from the weak onboard ^{133}Ba X-ray sources (see Sect. 6.3.2). These data provide the input to ground-based spectral fits that determine the gain and offset for each detector and pixel. The onboard spectral accumulation is based on a 10 bit representation of the 12-bit (temperature-compensated) ADC output in the event word. Events are summed into 393 216 accumulators ($1024 \text{ energies} \times 32 \text{ detectors} \times 12 \text{ pixels}$) over a commandable multi-hour timescale. To ensure that the ^{133}Ba spectra are not overwhelmed by solar photons, accumulation is restricted to periods when the Sun is quiet. This determination is made automatically by requiring that no event be accumulated unless a minimum specified time interval (\sim milliseconds) has elapsed since a previous photon detection. Such a criterion automatically suppresses accumulation during periods of enhanced count rates. To establish the normalization of the resulting spectra, live time is measured using a 1 kHz oscillator whose output is gated and summed over the same times as when an incoming event could be accumulated.

After the X-ray accumulation is completed, the resulting spectra can be flexibly truncated and/or averaged and the results included in the QL telemetry.

3.1.4 Aspect data path

Aspect data are included in the telemetry in two forms: first, regular aspect is included in the housekeeping telemetry on a quasi-continuous basis at low (64 s) time resolution, a cadence that is suitable for periods of stable pointing; second, burst mode aspect is included in bulk science telemetry only upon post-facto request by the ground segment which specifies the time interval and cadence (16 ms to 32 s). This option is intended to provide high rate aspect data for periods when the pointing is varying. The aspect data to support post-facto burst mode aspect selections are stored within the archive buffer with a multi-week longevity similar to its X-ray counterpart.

To generate aspect data, the analog output of each active area of the photodiode is digitized at 1000 Hz by a pair of multiplexed 12-bit A/D converters. For each active area, 16 successive outputs are summed into a 16-bit word at a 62.5 Hz rate which is stored in the archive buffer to provide the input for the optional post-facto burst-mode aspect telemetry.

In parallel, the 62.5 Hz stream of aspect values are sampled every 4 s. For each active area, 16 such samples are averaged every 64 s and the averages included in the housekeeping telemetry. This regular aspect data requires about 1 bit s⁻¹ of telemetry.

3.1.5 Integer compression

In addition to the aforementioned processing, all individual values for X-ray count and trigger sums in the QL and bulk science T/M are compressed to 8 bits from their multi-byte internal representations. This integer compression uses a quasi-floating-point format (with parametrization appropriate for each data type) whose range can accommodate maximum realistic expectations. Low values are represented exactly; compression errors for larger values correspond to a fixed fraction ($\sim 1.5\text{--}3\%$ rms) of the uncompressed value. Ground decompression is based on lookup tables. Except for X-ray and trigger telemetry values, integer compression

is not invoked for any other onboard data handling. In some cases, the use of compression should be considered in evaluating the statistical significance of results.

Level 0 data always provides the uncompressed count or trigger values with the associated compression uncertainty.

4 Data Product Description

4.1 L0

4.1.1 Calibration

4.1.1.1 EnergyCalibration

- **Description:** Quick Look energy calibration data product. In level 0 format.
- **Descriptor:** stix-cal-energy
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/41/solo_L0_stix-cal-energy_0683856000_V01.fits

4.1.1.1.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-cal-energy_0683856000_V01.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.03.756.qHnD@2021.247.06.00.01.553.1.xml
PARENT	Source file current data	solo_LB_stix-21-6-41_0683942400_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T13:50:41.382
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	41
OBT_BEG	Start acquisition time in OBT	683902496.0
OBT_END	End acquisition time in OBT	683911136.0
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0683902496:00000
DATE-BEG	Start time of observation	0683902496:00000
DATE-AVG	Average time of observation	0683906816:00000
DATE-END	End time of observation	0683911136:00000

DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	8959
BUNIT	Units of physical value, after application of B	counts
CHECKSUM	HDU checksum updated 2023-03-30T13:50:41	jCNamCNajCNajCNa
DATASUM	data unit checksum updated 2023-03-30T13:50:41	0
HISTORY	Processed by STIXCore L0	

4.1.1.1.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(32,12,1024)	pixel counts for the time period
counts_comp_err	float	ct	Nx(32,12,1024)	estimated error due to compression alone for the pixel count values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin

4.1.1.1.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
average_temperature	uint	-	Nx(1)	average temperature
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
detector_mask	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
index	int	-	Nx(1)	index column
integration_time	uint	-	Nx(1)	duration of the (aggregated) time bin
live_time	uint	-	Nx(1)	live time
num_channels	int	-	Nx(1)	number of channels
num_samples	uint	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
quiet_time	uint	-	Nx(1)	quiet time
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	uint	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)
subspec_lowest_channel	uint	-	Nx(8)	lowest channel of the subspectra
subspec_num_points	uint	-	Nx(8)	number of spectral points
subspec_num_summed_channel	uint	-	Nx(8)	number of summed channel in spectral point
subspectrum_mask	uint	-	Nx(8)	SbSpect Mask

4.1.1.1.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.1.1.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
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channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.1.2 EnergyCalibration

- **Description:** Quick Look energy calibration data product. In level 0 format.
- **Descriptor:** stix-cal-energy
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/41/solo_L0_stix-cal-energy_0640137600_V01.fits

4.1.1.2.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-cal-energy_0640137600_V01.fits
RAW_FILE	Raw filename(s)	NECP1.DAY1.BatchRequest.PktTmRaw.SOL.0.2020.106.10.40.19.352.iZMy@2020.106.10.40.20.415.1.xml
PARENT	Source file current data product	solo_LB_stix-21-6-41_0640137600_V01.fits; solo_LB_stix-21-6-41_0640224000_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T13:50:18.980
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	41
OBT_BEG	Start acquisition time in OBT	640177840.0
OBT_END	End acquisition time in OBT	640203417.0
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0640177840:00000
DATE-BEG	Start time of observation	0640177840:00000
DATE-AVG	Average time of observation	0640190628:32768
DATE-END	End time of observation	0640203417:00000
DATAMIN	Minimum valid physical value	0.0

DATAMAX	Maximum valid physical value	6527.0
BUNIT	Units of physical value, after application of B	counts
CHECKSUM	HDU checksum updated 2023-03-30T13:50:19	jE11mCl1jCl1jCl1
DATASUM	data unit checksum updated 2023-03-30T13:50:19	0
HISTORY		Processed by STIXCore L0

4.1.1.2.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	float	ct	Nx(32,12,1024)	pixel counts for the time period
counts_comp_err	float	ct	Nx(32,12,1024)	estimated error due to compression alone for the pixel count values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin

4.1.1.2.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
average_temperature	uint	-	Nx(1)	average temperature
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
detector_mask	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
index	int	-	Nx(1)	index column
integration_time	uint	-	Nx(1)	duration of the (aggregated) time bin
live_time	uint	-	Nx(1)	live time
num_channels	int	-	Nx(1)	number of channels
num_samples	uint	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
quiet_time	uint	-	Nx(1)	quiet time
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	uint	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)
subspec_lowest_channel	uint	-	Nx(8)	lowest channel of the subspectra
subspec_num_points	uint	-	Nx(8)	number of spectral points
subspec_num_summed_channel	uint	-	Nx(8)	number of summed channel in spectral point
subspectrum_mask	uint	-	Nx(8)	SbSpect Mask

4.1.1.2.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.1.2.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band

e_low	float	keV	Nx(1)	beginning of the energy band
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4.1.2 Housekeeping Data

4.1.2.1 MaxiReport

- **Description:** Maxi house keeping reported in all modes while the flight software is running. In level 0 format.
- **Descriptor:** stix-hk-maxi
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/3/25/2/solo_L0_stix-hk-maxi_0647913600_V01.fits

4.1.2.1.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-hk-maxi_0647913600_V01.fits
RAW_FILE	Raw filename(s)	cruise_phase_dailyBatchRequest.PktTmRaw.SOL.0.2020.195.19.50.22.408.mmpD@2020.197.05.00.40.859.1.xml; cruise_phase_dailyBatchRequest.PktTmRaw.SOL.0.2020.196.08.33.08.601.mVhO@2020.196.08.33.09.557.1.xml
PARENT	Source file current data p	solo_LB_stix-3-25-2_0647913600_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T14:23:28.378
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	3
SSTYPE	Sub-service Type	25
SSID	Science Structure ID	2
OBT_BEG	Start acquisition time in OBT	647953703.543267
OBT_END	End acquisition time in OBT	647999974.631693
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0647953703:35603
DATE-BEG	Start time of observation	0647953703:35603
DATE-AVG	Average time of observation	0647976839:05732
DATE-END	End time of observation	0647999974:41398

DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
CHECKSUM	HDU checksum updated 2023-03-30T14:23:28	Yj0Gcj0FZj0Faj0F
DATASUM	data unit checksum updated 2023-03-30T14:23:28	0
HISTORY	Processed by STIXCore L0	

4.1.2.1.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
active_spw_link	int	-	Nx(1)	Active SPW link
archive_memory_usage	int	-	Nx(1)	Archive Memory usage
aspect_a-power_status	int	-	Nx(1)	ASPECT A - power status
aspect_b-power_status	int	-	Nx(1)	ASPECT B - power status
att_ab_flag-open	int	-	Nx(1)	ATT AB flag - OPEN
att_bc_flag-closed	int	-	Nx(1)	ATT BC flag - CLOSED
att_m1-moving	int	-	Nx(1)	ATT M1 - moving
att_m2-moving	int	-	Nx(1)	ATT M2 - moving
attenuator_currents	int	-	Nx(1)	Attenuator currents
attenuator_motions	int	-	Nx(1)	Attenuator motions
autonomous_asw_boot_stat	int	-	Nx(1)	Autonomous ASW boot stat
control_index	int	-	Nx(1)	join index to the control table
cpu_load	int	-	Nx(1)	cpu load
det_q1_t	int	-	Nx(1)	Detector Temperature Quarter 1
det_q2_t	int	-	Nx(1)	Detector Temperature Quarter 2
det_q3_t	int	-	Nx(1)	Detector Temperature Quarter 3
det_q4_t	int	-	Nx(1)	Detector Temperature Quarter 4
en/dis_detector_status	int	-	Nx(1)	En/Dis Detector Status
fdir_function_status	int	-	Nx(1)	FDIR function status
hk_asp_phot0a0_v	int	-	Nx(1)	Aspect system Photodiode A0 voltage, accumulated over time from last report (reference is time bin end)
hk_asp_phot0a1_v	int	-	Nx(1)	Aspect system Photodiode A1 voltage, accumulated over time from last report (reference is time bin end)
hk_asp_phot0b0_v	int	-	Nx(1)	Aspect system Photodiode B0 voltage, accumulated over time from last report (reference is time bin end)
hk_asp_phot0b1_v	int	-	Nx(1)	Aspect system Photodiode B1 voltage, accumulated over time from last report (reference is time bin end)
hk_asp_ref_2v5a_v	int	-	Nx(1)	Aspect System A 2.5V reference
hk_asp_ref_2v5b_v	int	-	Nx(1)	Aspect System B 2.5V reference
hk_asp_tim01_t	int	-	Nx(1)	Aspect System Temperature TIM01
hk_asp_tim02_t	int	-	Nx(1)	Aspect System Temperature TIM02
hk_asp_tim03_t	int	-	Nx(1)	Aspect System Temperature TIM03
hk_asp_tim04_t	int	-	Nx(1)	Aspect System Temperature TIM04
hk_asp_tim05_t	int	-	Nx(1)	Aspect System Temperature TIM05
hk_asp_tim06_t	int	-	Nx(1)	Aspect System Temperature TIM06
hk_asp_tim07_t	int	-	Nx(1)	Aspect System Temperature TIM07
hk_asp_tim08_t	int	-	Nx(1)	Aspect System Temperature TIM08
hk_asp_vsensa_v	int	-	Nx(1)	Aspect System A supply voltage

hk_asp_vsensb_v	int	-	Nx(1)	Aspect System B supply voltage
hk_att_c	int	-	Nx(1)	Attenuator current
hk_att_t	int	-	Nx(1)	Attenuator temperature
hk_att_v	int	-	Nx(1)	Attenuator voltage
hk_det_c	int	-	Nx(1)	Detector current
hk_dpu_1v5_c	int	-	Nx(1)	IDPU FPGA 1.5V Current
hk_dpu_1v5_v	int	-	Nx(1)	IDPU FPGA 1.5V
hk_dpu_2v5_c	int	-	Nx(1)	IDPU FPGA 2.5V Current
hk_dpu_2v9_v	int	-	Nx(1)	IDPU 2.9V
hk_dpu_3v3_c	int	-	Nx(1)	IDPU 3.3V Current
hk_dpu_fpga_t	int	-	Nx(1)	IDPU FPGA Temperature
hk_dpu_pcb_t	int	-	Nx(1)	IDPU PCB Temperature
hk_dpu_spw0_v	int	-	Nx(1)	SpaceWire Main Supply Voltage
hk_dpu_spw1_v	int	-	Nx(1)	SpaceWire Redundant Supply Voltage
hk_dpu_spw_c	int	-	Nx(1)	IDPU SpaceWire Current
hk_hv_01_16_v	int	-	Nx(1)	High Voltage supply for Detectors 1-16
hk_hv_17_32_v	int	-	Nx(1)	High Voltage supply for Detectors 17-32
hk_psu_temp_t	int	-	Nx(1)	PSU Temperature
hk_ref_2v5_v	int	-	Nx(1)	IDPU 2.5V Analog Reference
hv01-16-enabled_status	int	-	Nx(1)	HV01-16 - enabled status
hv17-32-enabled_status	int	-	Nx(1)	HV17-32 - enabled status
hv1_depolar_in_progress	int	-	Nx(1)	HV1 depolar in progress
hv2_depolar_in_progress	int	-	Nx(1)	HV2 depolar in progress
hv_regulators_mask	int	-	Nx(1)	HV regulators mask
idpu_identifier	int	-	Nx(1)	IDPU identifier
instrument_mode	int	-	Nx(1)	Instrument mode
instrument_number	int	-	Nx(1)	Instrument number
lv-enabled_status	int	-	Nx(1)	LV - enabled status
max_value_of_trig_acc	int	-	Nx(1)	Max value of trig acc
med_value_of_trig_acc	int	-	Nx(1)	Med value of trig acc
memory_load_ena_flag	int	-	Nx(1)	Memory load ena flag
overruns_for_tasks	int	-	Nx(1)	Overruns for tasks
q1-power_status	int	-	Nx(1)	Q1 - power status
q2-power_status	int	-	Nx(1)	Q2 - power status
q3-power_status	int	-	Nx(1)	Q3 - power status
q4-power_status	int	-	Nx(1)	Q4 - power status
received_spw_packets	int	-	Nx(1)	Received SpW packets
rejected_spw_packets	int	-	Nx(1)	Rejected SpW packets
spw0-power_status	int	-	Nx(1)	SPW0 - power status
spw1-power_status	int	-	Nx(1)	SPW1 - power status
sw_running	int	-	Nx(1)	SW running
sw_version_number	int	-	Nx(1)	SW Version Number
tc(20,128)_seq_cnt	int	-	Nx(1)	TC(20,128) seq cnt
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
watchdog_state	int	-	Nx(1)	Watchdog state

4.1.2.1.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
index	int	-	Nx(1)	index column
integration_time	int	-	Nx(1)	duration of the (aggregated) time bin
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry

scet_coarse	int	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.1.2.1.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.2.2 MiniReport

- **Description:** Mini house keeping reported during start up of the flight software. In level 0 format.
- **Descriptor:** stix-hk-mini
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/3/25/1/solo_L0_stix-hk-mini_0643507200_V01.fits

4.1.2.2.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-hk-mini_0643507200_V01.fits
RAW_FILE	Raw filename(s)	IX6BatchRequest.PktTmRaw.SOL.0.2020.142.08.30.22.245.YKOz@2020.144.09.50.01.869.1.xml
PARENT	Source file current data p	solo_LB_stix-3-25-1_0643507200_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T13:50:21.345
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	3
SSTYPE	Sub-service Type	25
SSID	Science Structure ID	1
OBT_BEG	Start acquisition time in OBT	643525898.2957656
OBT_END	End acquisition time in OBT	643535679.404944
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0643525898:19383
DATE-BEG	Start time of observation	0643525898:19383

DATE-AVG	Average time of observation	0643530788:55728
DATE-END	End time of observation	0643535679:26538
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
CHECKSUM	HDU checksum updated 2023-03-30T13:50:21	6mGB6kEA6kEA6kEA
DATASUM	data unit checksum updated 2023-03-30T13:50:21	0
HISTORY	Processed by STIXCore L0	

4.1.2.2.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
active_spw_link	int	-	Nx(1)	Active SPW link
archive_memory_usage	int	-	Nx(1)	Archive Memory usage
autonomous_asw_boot_stat	int	-	Nx(1)	Autonomous ASW boot stat
control_index	int	-	Nx(1)	join index to the control table
cpu_load	int	-	Nx(1)	cpu load
fdir_function_status	int	-	Nx(1)	FDIR function status
fdir_stat_msk_hk_curr_ch	int	-	Nx(1)	FDIR stat msk HK curr ch
fdir_stat_msk_hk_temp_ch	int	-	Nx(1)	FDIR stat msk HK temp ch
fdir_stat_msk_hk_volt_ch	int	-	Nx(1)	FDIR stat msk HK volt ch
hk_dpu_1v5_c	int	-	Nx(1)	IDPU FPGA 1.5V Current
hk_dpu_1v5_v	int	-	Nx(1)	IDPU FPGA 1.5V
hk_dpu_2v5_c	int	-	Nx(1)	IDPU FPGA 2.5V Current
hk_dpu_2v9_v	int	-	Nx(1)	IDPU 2.9V
hk_dpu_3v3_c	int	-	Nx(1)	IDPU 3.3V Current
hk_dpu_fpga_t	int	-	Nx(1)	IDPU FPGA Temperature
hk_dpu_pcb_t	int	-	Nx(1)	IDPU PCB Temperature
hk_dpu_spw0_v	int	-	Nx(1)	SpaceWire Main Supply Voltage
hk_dpu_spw1_v	int	-	Nx(1)	SpaceWire Redundant Supply Voltage
hk_dpu_spw_c	int	-	Nx(1)	IDPU SpaceWire Current
hk_psu_temp_t	int	-	Nx(1)	PSU Temperature
hk_ref_2v5_v	int	-	Nx(1)	IDPU 2.5V Analog Reference
hkselftest_is_exec_stat	int	-	Nx(1)	HKSelftest is exec stat
idpu_identifier	int	-	Nx(1)	IDPU identifier
instrument_mode	int	-	Nx(1)	Instrument mode
instrument_number	int	-	Nx(1)	Instrument number
memory_load_ena_flag	int	-	Nx(1)	Memory load ena flag
memory_ser_exec_stat fla	int	-	Nx(1)	Memory ser exec stat fla
number_of_executed_tc_pa	int	-	Nx(1)	Number of executed TC pa
number_of_failed_tm_gene	int	-	Nx(1)	Number of failed TM gene
number_of_sent_tm_packet	int	-	Nx(1)	Number of sent TM packet
overruns_for_tasks	int	-	Nx(1)	Overruns for tasks
received_spw_packets	int	-	Nx(1)	Received SpW packets
rejected_spw_packets	int	-	Nx(1)	Rejected SpW packets
sw_running	int	-	Nx(1)	SW running
sw_version_number	int	-	Nx(1)	SW Version Number
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
watchdog_state	int	-	Nx(1)	Watchdog state

4.1.2.2.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
index	int	-	Nx(1)	index column
integration_time	int	-	Nx(1)	duration of the (aggregated) time bin
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	int	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.1.2.2.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.3 Quicklook Data

4.1.3.1 Background

- **Description:** Quick Look Background Light Curve data product. In level 0 format.
- **Descriptor:** stix-ql-background
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/31/solo_L0_stix-ql-background_0668822400_V01.fits

4.1.3.1.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-ql-background_0668822400_V01.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL. 0.2021.027.09.34.09.564.PVCJ@2021.072.06.00.01.084.1.xml; LTP03_morning_req_BatchRequest.PktTmRaw.SOL. 0.2021.027.09.49.01.069.hlSk@2021.075.06.00.00.519.1.xml; LTP03_noon_req_BatchRequest.PktTmRaw.SOL. 0.2021.027.09.49.07.189.ThcJ@2021.071.13.00.01.899.1.xml
PARENT	Source file current data product	solo_LB_stix-21-6-31_0668822400_V01.fits; solo_LB_stix-21-6-31_0668908800_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T13:45:05.114
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01

OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	31
OBT_BEG	Start acquisition time in OBT	668822399.0001678
OBT_END	End acquisition time in OBT	668908803.6001679
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0668822399:00011
DATE-BEG	Start time of observation	0668822399:00011
DATE-AVG	Average time of observation	0668865601:19671
DATE-END	End time of observation	0668908803:39332
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	83.0
BUNIT	Units of physical value, after application of B	counts
CHECKSUM	HDU checksum updated 2023-03-30T13:45:05	eXAdhX0deX7deX7d
DATASUM	data unit checksum updated 2023-03-30T13:45:05	0
HISTORY		Processed by STIXCore L0

4.1.3.1.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	float	ct	Nx(5)	pixel counts for the time period
counts_comp_err	float	ct	Nx(5)	estimated error due to compression alone for the pixel count values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(1)	trigger counts for the time period
triggers_comp_err	float	-	Nx(1)	estimated error due to compression alone for the trigger values

4.1.3.1.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_energies	int	-	Nx(1)	number of energy bins
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry

raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.1.3.1.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.3.1.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.3.2 FlareFlag

- **Description:** Quick Look Flare Flag and Location data product. In level 0 format.
- **Descriptor:** stix-ql-flareflag
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/34/solo_L0_stix-ql-flareflag_0684547200_V01.fits

4.1.3.2.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-ql-flareflag_0684547200_V01.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.03.765.jOSR@2021.254.06.00.01.102.1.xml; LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.03.767.dqvB@2021.255.06.00.00.938.1.xml; LTP03_noon_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.21.668.dUAv@2021.253.13.00.01.407.1.xml
PARENT	Source file current data product	solo_LB_stix-21-6-34_0684547200_V01.fits; solo_LB_stix-21-6-34_0684633600_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T13:50:21.606
BLANK	Value marking undefined pixels (before the appl)	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX

INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	34
OBT_BEG	Start acquisition time in OBT	684547198.9001144
OBT_END	End acquisition time in OBT	684633598.6001374
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0684547198:58989
DATE-BEG	Start time of observation	0684547198:58989
DATE-AVG	Average time of observation	0684590398:49159
DATE-END	End time of observation	0684633598:39330
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
CHECKSUM	HDU checksum updated 2023-03-30T13:50:21	EHe2EGZ2EGb2EGZ2
DATASUM	data unit checksum updated 2023-03-30T13:50:21	0
HISTORY		Processed by STIXCore L0

4.1.3.2.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
flare_progress	int	-	Nx(1)	Flare in progress
loc_y	int	-	Nx(1)	Flare Location Y
loc_z	int	-	Nx(1)	Flare Location Z
location_status	int	-	Nx(1)	Flare location status
non_thermal_index	int	-	Nx(1)	Non-thermal flare index
thermal_index	int	-	Nx(1)	Thermal flare index
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin

4.1.3.2.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.1.3.2.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT

obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.3.2.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.3.3 LightCurve

- **Description:** Quick Look Light Curve data product. In level 0 format.
- **Descriptor:** stix-ql-lightcurve
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/30/solo_L0_stix-ql-lightcurve_0684892800_V01.fits

4.1.3.3.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-ql-lightcurve_0684892800_V01.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.03.770.ovLu@2021.258.06.00.00.645.1.xml; LTP03_noon_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.21.675.aqqd@2021.258.13.20.25.678.1.xml
PARENT	Source file current data product	solo_LB_stix-21-6-30_0684892800_V01.fits; solo_LB_stix-21-6-30_0684979200_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T13:52:53.420
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	30
OBT_BEG	Start acquisition time in OBT	684892798.2001374
OBT_END	End acquisition time in OBT	684979198.2001221
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0684892798:13116

DATE-BEG	Start time of observation	0684892798:13116
DATE-AVG	Average time of observation	0684935998:13115
DATE-END	End time of observation	0684979198:13115
DATAMIN	Minimum valid physical value	24.0
DATAMAX	Maximum valid physical value	17407.0
BUNIT	Units of physical value, after application of B	counts
CHECKSUM	HDU checksum updated 2023-03-30T13:52:53	9VAADV579VAACV55
DATASUM	data unit checksum updated 2023-03-30T13:52:53	0
HISTORY		Processed by STIXCore L0

4.1.3.3.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	float	ct	Nx(5)	pixel counts for the time period
counts_comp_err	float	ct	Nx(5)	estimated error due to compression alone for the pixel count values
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(1)	trigger counts for the time period
triggers_comp_err	float	-	Nx(1)	estimated error due to compression alone for the trigger values

4.1.3.3.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
detector_mask	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_energies	int	-	Nx(1)	number of energy bins
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.1.3.3.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT

obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.3.3.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.3.4 Variance

- **Description:** Quick Look Variance data product. In level 0 format.
- **Descriptor:** stix-ql-variance
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/33/solo_L0_stix-ql-variance_0687484800_V01.fits

4.1.3.4.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-ql-variance_0687484800_V01.fits
RAW_FILE	Raw filename(s)	LTP05_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.272.09.33.09.559.nKrz@2021.288.06.00.01.438.1.xml; LTP05_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.272.09.33.09.569.fvCb@2021.290.06.00.01.630.1.xml
PARENT	Source file current data product	solo_LB_stix-21-6-33_0687484800_V01.fits; solo_LB_stix-21-6-33_0687571200_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T13:46:46.636
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	33
OBT_BEG	Start acquisition time in OBT	687484800.0001221
OBT_END	End acquisition time in OBT	687571199.9001449
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0687484800:00008

DATE-BEG	Start time of observation	0687484800:00008
DATE-AVG	Average time of observation	0687527999:62267
DATE-END	End time of observation	0687571199:58991
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
CHECKSUM	HDU checksum updated 2023-03-30T13:46:46	ehS9ggS9egS9egS9
DATASUM	data unit checksum updated 2023-03-30T13:46:46	0
HISTORY		Processed by STIXCore L0

4.1.3.4.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
variance	uint	-	Nx(1)	Compressed Variance
variance_comp_err	float	-	Nx(1)	estimated error due to compression alone for the variance values

4.1.3.4.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_variance_skm	uint	-	Nx(3)	SKM compression schema parameter used for variance values
detector_mask	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
energy_bin_mask	bool	-	Nx(32)	mask for all 32 energy bands used for the combined data
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_energies	int	-	Nx(1)	number of energy bins
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
samples_per_variance	uint	-	Nx(1)	Samp per variance val
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.1.3.4.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.3.4.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
------	------	------	-------	-------------

channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.3.5 Spectra

- **Description:** Quick Look Spectra data product. In level 0 format.
- **Descriptor:** stix-ql-spectra
- **Free field:** None
- **Level:** L0
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/32/solo_L0_stix-ql-spectra_0680400000_V01.fits

4.1.3.5.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-ql-spectra_0680400000_V01.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.03.570.HrfT@2021.206.06.00.01.855.1.xml; LTP03_noon_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.21.557.WDNH@2021.205.13.00.00.958.1.xml; LTP03_noon_req_BatchRequest.PktTmRaw.SOL.0.2021.202.17.09.21.562.QRyT@2021.206.13.00.00.947.1.xml
PARENT	Source file current data product	solo_LB_stix-21-6-32_0680400000_V01.fits; solo_LB_stix-21-6-32_0680486400_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T13:50:50.162
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	32
OBT_BEG	Start acquisition time in OBT	680400753.9001297
OBT_END	End acquisition time in OBT	680485777.9004349
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0680400753:58990
DATE-BEG	Start time of observation	0680400753:58990

DATE-AVG	Average time of observation	0680443265:59000
DATE-END	End time of observation	0680485777:59010
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
CHECKSUM	HDU checksum updated 2023-03-30T13:50:50	oea8rZY8oda8oZW8
DATASUM	data unit checksum updated 2023-03-30T13:50:50	0
HISTORY		Processed by STIXCore L0

4.1.3.5.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
detector_index	uint	-	Nx(32)	Detector number
num_integrations	uint	-	Nx(1)	Num of integr aft 1 samp
spectra	float	ct	Nx(32,32)	spectra count values
spectra_comp_err	float	-	Nx(32,32)	estimated error due to compression alone for the spectra values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(32)	trigger counts for the time period
triggers_comp_err	float	-	Nx(32)	estimated error due to compression alone for the trigger values

4.1.3.5.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_spectra_skm	uint	-	Nx(3)	SKM compression schema parameter used for spectra values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_energies	int	-	Nx(1)	number of energy bins
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.1.3.5.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.3.5.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.4 Science Data

4.1.4.1 RawPixelData

- **Description:** Raw X-ray pixel counts: compression level 0. No aggregation. In level 0 format.
- **Descriptor:** stix-sci-xray-rpd
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/20/solo_L0_stix-sci-xray-rpd_0678187309-0678187429_V01_2106280011-54760.fits

4.1.4.1.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-sci-xray-rpd_0678187309-0678187429_V01_2106280011-54760.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.140.08.45.27.379.vFwY@2021.196.06.00.01.219.1.xml
PARENT		solo_LB_stix-21-6-20_0000000000-9999999999_V01_2106280011-54760.fits
DATE	FITS file creation date in UTC	2023-03-30T14:18:02.278
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	20
OBT_BEG	Start acquisition time in OBT	678187309.0
OBT_END	End acquisition time in OBT	678187429.0
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0678187309:00000
DATE-BEG	Start time of observation	0678187309:00000

DATE-AVG	Average time of observation	0678187369:00000
DATE-END	End time of observation	0678187429:00000
DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	18
BUNIT	Units of physical value, after application of B	counts
CHECKSUM	HDU checksum updated 2023-03-30T14:18:02	2gaK5eXH2eaH2eWH
DATASUM	data unit checksum updated 2023-03-30T14:18:02	0
HISTORY	Processed by STIXCore L0	

4.1.4.1.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(32,12,21)	pixel counts for the time period
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
pixel_masks	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(16)	trigger counts for the time period

4.1.4.1.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(24)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.1.4.1.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.4.1.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.4.1.6 Supplements

- **Description:** For RawPixelData data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.
- **Descriptors:** stix-sci-xray-rpd-sup1 stix-sci-xray-rpd-sup2
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [RawPixelData](#)

4.1.4.2 CompressedPixelData

- **Description:** Aggregated (over time and/or energies) X-ray pixel counts: compression level 1. In level 0 format.
- **Descriptor:** stix-sci-xray-cpd
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/21/solo_L0_stix-sci-xray-cpd_0688454771-0688455372_V01_2110250007-65280.fits

4.1.4.2.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-sci-xray-cpd_0688454771-0688455372_V01_2110250007-65280.fits
RAW_FILE	Raw filename(s)	LTP05_T10PM_req_BatchRequest.PktTmRaw.SOL.0.2021.306.11.19.12.616.riyx@2021.312.22.00.01.543.1.xml
PARENT		solo_LB_stix-21-6-21_0000000000-9999999999_V01_2110250007-65280.fits
DATE	FITS file creation date in UTC	2023-03-30T14:57:43.251
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0

VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	21
OBT_BEG	Start acquisition time in OBT	688454771.5000076
OBT_END	End acquisition time in OBT	688455372.1999848
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0688454771:32768
DATE-BEG	Start time of observation	0688454771:32768
DATE-AVG	Average time of observation	0688455071:55705
DATE-END	End time of observation	0688455372:13106
DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	117
BUNIT	Units of physical value, after application of B	counts
CHECKSUM	HDU checksum updated 2023-03-30T14:57:43	FA7CF66BFA6BF56B
DATASUM	data unit checksum updated 2023-03-30T14:57:43	0
HISTORY		Processed by STIXCore L0

4.1.4.2.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(32,12,13)	pixel counts for the time period
counts_comp_err	float	ct	Nx(32,12,13)	estimated error due to compression alone for the pixel count values
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
num_energy_groups	uint	-	Nx(1)	number of energy bands
num_pixel_sets	uint	-	Nx(1)	number of pixelsets in the count structure
pixel_masks	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(16)	trigger counts for the time period
triggers_comp_err	float	-	Nx(16)	estimated error due to compression alone for the trigger values

4.1.4.2.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values

energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(2)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.1.4.2.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.4.2.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.4.2.6 Supplements

- **Description:** For CompressedPixelData data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.
- **Descriptors:** stix-sci-xray-cpd-sup1 stix-sci-xray-cpd-sup2
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [CompressedPixelData](#)

4.1.4.3 SummedPixelData

- **Description:** Aggregated (over time and/or energies and pixelsets) X-ray pixel counts: compression level 2. In level 0 format.
- **Descriptor:** stix-sci-xray-scpd
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request

- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/22/solo_L0_stix-sci-xray-scpd_0642038387-0642038407_V01_0087031810-50884.fits

4.1.4.3.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-sci-xray-scpd_0642038387-0642038407_V01_0087031810-50884.fits
RAW_FILE	Raw filename(s)	IX3.INTER.BatchRequest.PktTmRaw.SOL.0.2020.129.09.39.41.768.bVyc@2020.129.09.39.42.621.1.xml
PARENT		solo_LB_stix-21-6-22_0000000000-9999999999_V01_0087031810-50884.fits
DATE	FITS file creation date in UTC	2023-03-30T13:53:18.374
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	22
OBT_BEG	Start acquisition time in OBT	642038387.1000077
OBT_END	End acquisition time in OBT	642038407.1000077
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0642038387:06554
DATE-BEG	Start time of observation	0642038387:06554
DATE-AVG	Average time of observation	0642038397:06554
DATE-END	End time of observation	0642038407:06554
DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	275
BUNIT	Units of physical value, after application of B	counts
CHECKSUM	HDU checksum updated 2023-03-30T13:53:18	3MaJ6JYI3JaI3JYI
DATASUM	data unit checksum updated 2023-03-30T13:53:18	0
HISTORY		Processed by STIXCore L0

4.1.4.3.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(32,4,32)	pixel counts for the time period
counts_comp_err	float	ct	Nx(32,4,32)	estimated error due to compression alone for the pixel count values
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
num_energy_groups	uint	-	Nx(1)	number of energy bands
num_pixel_sets	uint	-	Nx(1)	number of pixelsets in the count structure
pixel_masks	uint	-	Nx(4,12)	mask for all 12 detector pixels used for the combined data
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(16)	trigger counts for the time period
triggers_comp_err	float	-	Nx(16)	estimated error due to compression alone for the trigger values

4.1.4.3.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(6)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.1.4.3.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.4.3.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.4.3.6 Supplements

- **Description:** For SummedPixelData data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the

various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.

- **Descriptors:** stix-sci-xray-scpd-sup1 stix-sci-xray-scpd-sup2
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [SummedPixelData](#)

4.1.4.4 Visibility

- **Description:** X-ray Visibilities or compression Level 3 data. In level 0 format.
- **Descriptor:** stix-sci-xray-vis
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/23/solo_L0_stix-sci-xray-vis_0678187308-0678187429_V01_2106280004-54716.fits

4.1.4.4.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-sci-xray-vis_0678187308-0678187429_V01_2106280004-54716.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.140.08.45.27.377.WnZT@2021.195.06.00.00.825.1.xml
PARENT		solo_LB_stix-21-6-23_0000000000-9999999999_V01_2106280004-54716.fits
DATE	FITS file creation date in UTC	2023-03-30T13:58:38.147
BLANK	Value marking undefined pixels (before the appl)	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	23

OBT_BEG	Start acquisition time in OBT	678187309.0
OBT_END	End acquisition time in OBT	678187429.9000076
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0678187308:65535
DATE-BEG	Start time of observation	0678187308:65535
DATE-AVG	Average time of observation	0678187369:29490
DATE-END	End time of observation	0678187429:58982
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
CHECKSUM	HDU checksum updated 2023-03-30T13:58:38	9JUSHHTP9HTPGHTP
DATASUM	data unit checksum updated 2023-03-30T13:58:38	0
HISTORY		Processed by STIXCore L0

4.1.4.4.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	int	-	Nx(1)	join index to the control table
delta_time	float	s	Nx(1)	delta time
detector_id	int	-	Nx(21,32)	ID of the detector
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
flux	uint	-	Nx(21)	Flux
imaginary	int	-	Nx(32,21)	Imaginary visibility com
imaginary_comp_err	float	-	Nx(32,21)	estimated error due to compression alone for the imaginary part values
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
pixel_mask1	uint	-	Nx(12)	Pixel mask 1
pixel_mask2	uint	-	Nx(12)	Pixel mask 2
pixel_mask3	uint	-	Nx(12)	Pixel mask 3
pixel_mask4	uint	-	Nx(12)	Pixel mask 4
pixel_mask5	uint	-	Nx(12)	Pixel mask 5
rcr	int	-	Nx(1)	current rate control regime of the instrument
real	int	-	Nx(32,21)	Real visibility com
real_comp_err	float	-	Nx(32,21)	estimated error due to compression alone for the real part values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(16)	trigger counts for the time period
triggers_comp_err	float	-	Nx(16)	estimated error due to compression alone for the trigger values

4.1.4.4.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values

compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(4)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.1.4.4.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.4.4.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.4.4.6 Supplements

- **Description:** For Visibility data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.
- **Descriptors:** stix-sci-xray-vis-sup1 stix-sci-xray-vis-sup2
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [Visibility](#)

4.1.4.5 Aspect

- **Description:** Bulk Aspect data. In level 0 format.
- **Descriptor:** stix-sci-aspect-burst
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request

- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/42/solo_L0_stix-sci-aspect-burst_0687412111-0687419343_V01_2110130059.fits

4.1.4.5.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-sci-aspect-burst_0687412111-0687419343_V01_2110130059.fits
RAW_FILE	Raw filename(s)	LTP05_T06PM_req_BatchRequest.PktTmRaw.SOL.0.2021.306.11.18.31.636.tcwn@2022.016.18.00.00.811.1.xml
PARENT		solo_LB_stix-21-6-42_0000000000-9999999999_V01_2110130059-00000.fits
DATE	FITS file creation date in UTC	2023-03-30T14:49:06.026
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	42
OBT_BEG	Start acquisition time in OBT	687412111.8080109
OBT_END	End acquisition time in OBT	687419343.2329748
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0687412111:52953
DATE-BEG	Start time of observation	0687412111:52953
DATE-AVG	Average time of observation	0687415727:34110
DATE-END	End time of observation	0687419343:15268
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
CHECKSUM	HDU checksum updated 2023-03-30T14:49:06	ka9UnX9Uka9UkU9U
DATASUM	data unit checksum updated 2023-03-30T14:49:06	0
HISTORY		Processed by STIXCore L0

4.1.4.5.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
cha_diode0	uint	-	Nx(1)	Photodiode A counts
cha_diode1	uint	-	Nx(1)	Photodiode B counts
chb_diode0	uint	-	Nx(1)	Photodiode C counts
chb_diode1	uint	-	Nx(1)	Photodiode D counts
control_index	int	-	Nx(1)	join index to the control table
time	float	s	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	float	s	Nx(1)	duration of the time bin

4.1.4.5.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
averaging_value	uint	-	Nx(1)	Averaging value Asp TC
index	uint	-	Nx(1)	index column
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
samples	uint	-	Nx(1)	Number of samples
summing_value	uint	-	Nx(1)	Summing value Asp FPGA

4.1.4.5.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.4.5.5 Supplements

- **Description:** For Aspect data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.
- **Descriptors:** stix-sci-aspect-burst-sup1 stix-sci-aspect-burst-sup2
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [Aspect](#)

4.1.4.6 Spectrogram

- **Description:** X-ray Spectrogram or compression Level 2 data In level 0 format.
- **Descriptor:** stix-sci-xray-spec
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request

- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L0/21/6/24/solo_L0_stix-sci-xray-spec_0689786926-0689801914_V01_2111090002-50819.fits

4.1.4.6.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L0_stix-sci-xray-spec_0689786926-0689801914_V01_2111090002-50819.fits
RAW_FILE	Raw filename(s)	LTP05_T06PM_req_BatchRequest.PktTmRaw.SOL.0.2021.306.11.18.31.488.QfHg@2021.332.18.00.00.655.1.xml
PARENT		solo_LB_stix-21-6-24_0000000000-9999999999_V01_2111090002-50819.fits
DATE	FITS file creation date in UTC	2023-03-30T14:30:21.716
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L0
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	24
OBT_BEG	Start acquisition time in OBT	689786926.2
OBT_END	End acquisition time in OBT	689801914.2999923
TIMESYS	System used for time keywords	OBT
DATE-OBS	Deprecated, same as DATE-BEG	0689786926:13107
DATE-BEG	Start time of observation	0689786926:13107
DATE-AVG	Average time of observation	0689794420:16383
DATE-END	End time of observation	0689801914:19660
DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	2943
BUNIT	Units of physical value, after application of B	counts
CHECKSUM	HDU checksum updated 2023-03-30T14:30:21	5H2e5E1d5E1d5E1d
DATASUM	data unit checksum updated 2023-03-30T14:30:21	0
HISTORY		Processed by STIXCore L0

4.1.4.6.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(17)	pixel counts for the time period
counts_comp_err	float	ct	Nx(17)	estimated error due to compression alone for the pixel count values
pixel_masks	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(1)	trigger counts for the time period
triggers_comp_err	float	-	Nx(1)	estimated error due to compression alone for the trigger values

4.1.4.6.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(53)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.1.4.6.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.1.4.6.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.1.4.6.6 Supplements

- Description:** For Spectrogram data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already

existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.

- **Descriptors:** stix-sci-xray-spec-sup1 stix-sci-xray-spec-sup2
- **Free field:** Request ID
- **Level:** L0
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [Spectrogram](#)

4.2 L1

4.2.1 Calibration

4.2.1.1 EnergyCalibration

- **Description:** Quick Look energy calibration data product. In level 1 format.
- **Descriptor:** stix-cal-energy
- **Free field:** None
- **Level:** L1
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2021/11/16/CAL/solo_L1_stix-cal-energy_20211116_V01.fits

4.2.1.1.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-cal-energy_20211116_V01.fits
RAW_FILE	Raw filename(s)	LTP05_T05AM_req_BatchRequest.PktTmRaw.SOL.0.2021.306.11.13.36.322.RdSC@2021.321.05.00.03.148.1.xml
PARENT	Source file current da	solo_L0_stix-cal-energy_0690336000_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T16:16:51.754
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	41

DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	8959
BUNIT	Units of physical value, after application of B	counts
XPOSURE	[s] shortest exposure time	8639.0
TARGET	Type of target from planning	none
SOOPTYPE	Campaign ID(s) that the data belong to	LF5
SOOPNAME	Name of the SOOP Campaign that t	L_FULL_LRES_MCAD_Coronal-Synoptic
OBS_ID	Unique ID of the individual observation	SSTX_050A_LF5_11C_5Md2_11Q
OBS_TYPE	Encoded version of OBS_MODE	5Md2
OBS_MODE	Observation mode	STIX_BASIC
OBT_BEG	Start of acquisition time in OBT	690340773.0
OBT_END	End of acquisition time in OBT	690349412.0
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2021-11-16T01:21:05.947
DATE-BEG	Start of acquisition time in UTC	2021-11-16T01:21:05.947
DATE-AVG	Center of acquisition time in UTC	2021-11-16T02:33:05.455
DATE-END	End of acquisition time in UTC	2021-11-16T03:45:04.962
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1039.530017112673
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	1.699425167068364
HGLN_OBS	[deg] s/c heliographic longitude	0.4770870198404922
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	1.699425167068364
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	0.4770870198404922
DSUN_OBS	[m] s/c distance from Sun	138042221781.4156
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	138015489397.7763
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	1429220388.482265
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-2310196901.347935
HCIX_OBS	[m] s/c Heliocentric Inertial X	128401635606.6021
HCIY_OBS	[m] s/c Heliocentric Inertial Y	-50516489271.13102
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	4093809914.811864

HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	20292.22315212431
HCIY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	22815.64482478963
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	-512.2357794151018
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	80646920751.3874
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	112010567714.9373
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	80646920751.3874
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	137976721555.6888
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	1148922745.381577
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	4093809914.811864
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	9930440753.476114
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	-1429279981.597032
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	-2310196534.61146
OBS_VR	[m/s] Radial velocity of spacecraft relative to	10569.20739205621
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	33.03524354013058
SUN_TIME	[s] Time(Sun to s/c)	460.4592880766055
DATE_EAR	Start time of observation, corrected to Ea	2021-11-16T01:21:38.983
DATE_SUN	Start time of observation, corrected to Su	2021-11-16T01:13:25.488
CHECKSUM	HDU checksum updated 2023-03-30T16:16:51	Wb4aaZ3TZb3ZaZ3Z
DATASUM	data unit checksum updated 2023-03-30T16:16:51	0
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.1.1.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(32,12,1024)	pixel counts for the time period
counts_comp_err	float	ct	Nx(32,12,1024)	estimated error due to compression alone for the pixel count values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin

4.2.1.1.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
average_temperature	float	K	Nx(1)	average temperature
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
detector_mask	uint	-	Nx(32)	mask for all 32 detectors used for the combined data

index	int	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
live_time	float	ms	Nx(1)	live time
num_channels	int	-	Nx(1)	number of channels
num_samples	uint	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
quiet_time	float	s	Nx(1)	quiet time
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	uint	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)
subspec_lowest_channel	uint	-	Nx(8)	lowest channel of the subspectra
subspec_num_points	uint	-	Nx(8)	number of spectral points
subspec_num_summed_channel	uint	-	Nx(8)	number of summed channel in spectral point
subspectrum_mask	uint	-	Nx(8)	SbSpect Mask

4.2.1.1.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.1.1.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.2 Housekeeping Data

4.2.2.1 MaxiReport

- **Description:** Maxi house keeping reported in all modes while the flight software is running. In level 1 format.
- **Descriptor:** stix-hk-maxi
- **Free field:** None
- **Level:** L1
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2020/06/16/HK/solo_L1_stix-hk-maxi_20200616_V01.fits

4.2.2.1.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-hk-maxi_20200616_V01.fits
RAW_FILE	Raw filename(s)	IX6BatchRequest.PktTmRaw.SOL. 0.2020.170.20.32.35.319.OvFD@2020.170.20.32.36.296.1.xml
PARENT	Source file current data	solo_L0_stix-hk-maxi_0645580800_V01.fits

DATE	FITS file creation date in UTC	2023-03-30T16:52:48.309
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	3
SSTYPE	Sub-service Type	25
SSID	Science Structure ID	2
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
XPOSURE	[s] shortest exposure time	0.0
TARGET	Type of target from planning	none
SOOPTYPE	Campaign ID(s) that the data belong to	CC1; IDF
SOOPNAME	Name of the SOOP Campaign that the dat	COORD_CALIBRATION; I_DEFAULT
OBS_MODE	Observation mode	none
OBS_TYPE	Encoded version of OBS_MODE	none
OBS_ID	Unique ID of the individual observation	none
OBT_BEG	Start of acquisition time in OBT	645580841.7715572
OBT_END	End of acquisition time in OBT	645667176.8915541
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2020-06-16T00:01:00.072
DATE-BEG	Start of acquisition time in UTC	2020-06-16T00:01:00.072
DATE-AVG	Center of acquisition time in UTC	2020-06-16T12:00:27.705
DATE-END	End of acquisition time in UTC	2020-06-16T23:59:55.338
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1858.639097729813
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	6.679553262682062
HGLN_OBS	[deg] s/c heliographic longitude	64.41438305777118
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	6.679553262682062

CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	64.41438305777118
DSUN_OBS	[m] s/c distance from Sun	77207225350.82275
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	33301196765.06176
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	69655038976.3022
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-401852705.8364097
HCIX_OBS	[m] s/c Heliocentric Inertial X	-21020579442.78635
HCIY_OBS	[m] s/c Heliocentric Inertial Y	-73745794732.9967
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	8980459089.654135
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	45509.49201261518
HCIY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-13690.87299100329
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	247.4455238921323
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	66840072364.16185
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	-38641948641.0267
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	66840072364.16185
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	33116339299.60024
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	69163683189.26869
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	8980459089.654135
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	118683011437.3668
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	-69655039202.37285
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Z	-402092428.9424419
OBS_VR	[m/s] Radial velocity of spacecraft relative to	32845.33485487599
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	249.4291694163135
SUN_TIME	[s] Time(Sun to s/c)	257.5355826690702
DATE_EAR	Start time of observation, corrected to Ea	2020-06-16T00:05:09.501
DATE_SUN	Start time of observation, corrected to Su	2020-06-15T23:56:42.536
CHECKSUM	HDU checksum updated 2023-03-30T16:52:48	cQXPfOUMcOUMcOUM
DATASUM	data unit checksum updated 2023-03-30T16:52:48	0
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.2.1.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
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active_spw_link	str	-	Nx(1)	Active SPW link
archive_memory_usage	int	-	Nx(1)	Archive Memory usage
aspect_a-power_status	str	-	Nx(1)	ASPECT A - power status
aspect_b-power_status	str	-	Nx(1)	ASPECT B - power status
att_ab_flag-open	bool	-	Nx(1)	ATT AB flag - OPEN
att_bc_flag-closed	bool	-	Nx(1)	ATT BC flag - CLOSED
att_m1-moving	str	-	Nx(1)	ATT M1 - moving
att_m2-moving	str	-	Nx(1)	ATT M2 - moving
attenuator_currents	int	-	Nx(1)	Attenuator currents
attenuator_motions	int	-	Nx(1)	Attenuator motions
autonomous_asw_boot_stat	bool	-	Nx(1)	Autonomous ASW boot stat
control_index	int	-	Nx(1)	join index to the control table
cpu_load	float	0.01	Nx(1)	cpu load
det_q1_t	float	K	Nx(1)	Detector Temperature Quarter 1
det_q2_t	float	K	Nx(1)	Detector Temperature Quarter 2
det_q3_t	float	K	Nx(1)	Detector Temperature Quarter 3
det_q4_t	float	K	Nx(1)	Detector Temperature Quarter 4
en/dis_detector_status	int	-	Nx(1)	En/Dis Detector Status
fdir_function_status	int	-	Nx(1)	FDIR function status
hk_asp_photod0_v	float	V	Nx(1)	Aspect system Photodiode A0 voltage, accumulated over time from last report (reference is time bin end)
hk_asp_photod1_v	float	V	Nx(1)	Aspect system Photodiode A1 voltage, accumulated over time from last report (reference is time bin end)
hk_asp_photob0_v	float	V	Nx(1)	Aspect system Photodiode B0 voltage, accumulated over time from last report (reference is time bin end)
hk_asp_photob1_v	float	V	Nx(1)	Aspect system Photodiode B1 voltage, accumulated over time from last report (reference is time bin end)
hk_asp_ref_2v5a_v	float	V	Nx(1)	Aspect System A 2.5V reference
hk_asp_ref_2v5b_v	float	V	Nx(1)	Aspect System B 2.5V reference
hk_asp_tim01_t	float	K	Nx(1)	Aspect System Temperature TIM01
hk_asp_tim02_t	float	K	Nx(1)	Aspect System Temperature TIM02
hk_asp_tim03_t	float	K	Nx(1)	Aspect System Temperature TIM03
hk_asp_tim04_t	float	K	Nx(1)	Aspect System Temperature TIM04
hk_asp_tim05_t	float	K	Nx(1)	Aspect System Temperature TIM05
hk_asp_tim06_t	float	K	Nx(1)	Aspect System Temperature TIM06
hk_asp_tim07_t	float	K	Nx(1)	Aspect System Temperature TIM07
hk_asp_tim08_t	float	K	Nx(1)	Aspect System Temperature TIM08
hk_asp_vsensa_v	float	V	Nx(1)	Aspect System A supply voltage
hk_asp_vsensb_v	float	V	Nx(1)	Aspect System B supply voltage
hk_att_c	float	mA	Nx(1)	Attenuator current
hk_att_t	float	K	Nx(1)	Attenuator temperature
hk_att_v	float	V	Nx(1)	Attenuator voltage
hk_det_c	float	mA	Nx(1)	Detector current
hk_dpu_1v5_c	float	mA	Nx(1)	IDPU FPGA 1.5V Current
hk_dpu_1v5_v	float	V	Nx(1)	IDPU FPGA 1.5V
hk_dpu_2v5_c	float	mA	Nx(1)	IDPU FPGA 2.5V Current
hk_dpu_2v9_v	float	V	Nx(1)	IDPU 2.9V
hk_dpu_3v3_c	float	mA	Nx(1)	IDPU 3.3V Current
hk_dpu_fpga_t	float	K	Nx(1)	IDPU FPGA Temperature
hk_dpu_pcb_t	float	K	Nx(1)	IDPU PCB Temperature
hk_dpu_spw0_v	float	V	Nx(1)	SpaceWire Main Supply Voltage
hk_dpu_spw1_v	float	V	Nx(1)	SpaceWire Redundant Supply Voltage
hk_dpu_spw_c	float	mA	Nx(1)	IDPU SpaceWire Current

hk_hv_01_16_v	float	V	Nx(1)	High Voltage supply for Detectors 1-16
hk_hv_17_32_v	float	V	Nx(1)	High Voltage supply for Detectors 17-32
hk_psu_temp_t	float	K	Nx(1)	PSU Temperature
hk_ref_2v5_v	float	V	Nx(1)	IDPU 2.5V Analog Reference
hv01-16-enabled_status	str	-	Nx(1)	HV01-16 - enabled status
hv17-32-enabled_status	str	-	Nx(1)	HV17-32 - enabled status
hv1_depolar_in_progress	bool	-	Nx(1)	HV1 depolar in progress
hv2_depolar_in_progress	bool	-	Nx(1)	HV2 depolar in progress
hv_regulators_mask	str	-	Nx(1)	HV regulators mask
idpu_identifier	str	-	Nx(1)	IDPU identifier
instrument_mode	str	-	Nx(1)	Instrument mode
instrument_number	str	-	Nx(1)	Instrument number
lv-enabled_status	str	-	Nx(1)	LV - enabled status
max_value_of_trig_acc	int	-	Nx(1)	Max value of trig acc
med_value_of_trig_acc	int	-	Nx(1)	Med value of trig acc
memory_load_ena_flag	bool	-	Nx(1)	Memory load ena flag
overruns_for_tasks	str	-	Nx(1)	Overruns for tasks
q1-power_status	str	-	Nx(1)	Q1 - power status
q2-power_status	str	-	Nx(1)	Q2 - power status
q3-power_status	str	-	Nx(1)	Q3 - power status
q4-power_status	str	-	Nx(1)	Q4 - power status
received_spw_packets	int	-	Nx(1)	Received SpW packets
rejected_spw_packets	int	-	Nx(1)	Rejected SpW packets
spw0-power_status	str	-	Nx(1)	SPW0 - power status
spw1-power_status	str	-	Nx(1)	SPW1 - power status
sw_running	str	-	Nx(1)	SW running
sw_version_number	int	-	Nx(1)	SW Version Number
tc(20,128)_seq_cnt	int	-	Nx(1)	TC(20,128) seq cnt
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
watchdog_state	str	-	Nx(1)	Watchdog state

4.2.2.1.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
index	int	-	Nx(1)	index column
integration_time	int	-	Nx(1)	duration of the (aggregated) time bin
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	int	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.2.2.1.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.2.2 MiniReport

- **Description:** Mini house keeping reported during start up of the flight software. In level 1 format.
- **Descriptor:** stix-hk-mini
- **Free field:** None
- **Level:** L1

- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2021/09/20/HK/solo_L1_stix-hk-mini_20210920_V01.fits

4.2.2.2.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-hk-mini_20210920_V01.fits
RAW_FILE	Raw filename(s)	LTP04_manualBatchRequest.PktTmRaw.SOL.0.2021.264.07.23.54.970.MHhA@2021.264.07.23.55.946.1.xml
PARENT	Source file current data	solo_L0_stix-hk-mini_0685411200_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T16:34:53.953
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	3
SSTYPE	Sub-service Type	25
SSID	Science Structure ID	1
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
XPOSURE	[s] shortest exposure time	0.0
TARGET	Type of target from planning	none
SOOCTYPE	Campaign ID(s) that the data belong to	LF5; LS2
SOOPNAME	Name of the SOOP Campaign that the data belong to	L_FULL_LRES_MCAD_Coronal-Synoptic; L_SMALL_HRES_HCAD_Slow-Wind-Connection
OBS_ID	Unique ID of the individual observation	SSTX_040A_000_000_5Md2_114
OBS_TYPE	Encoded version of OBS_MODE	5Md2
OBS_MODE	Observation mode	STIX_BASIC
OBT_BEG	Start of acquisition time in OBT	685476204.1471733
OBT_END	End of acquisition time in OBT	685476349.0471656
TIMESYS	System used for time keywords	UTC

DATE-OBS	Start of acquisition time in UTC	2021-09-20T18:04:48.836
DATE-BEG	Start of acquisition time in UTC	2021-09-20T18:04:48.836
DATE-AVG	Center of acquisition time in UTC	2021-09-20T18:06:01.286
DATE-END	End of acquisition time in UTC	2021-09-20T18:07:13.736
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1607.028693343803
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	1.536192532696061
HGLN_OBS	[deg] s/c heliographic longitude	-37.20325197567462
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	1.536192532696061
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	-37.20325197567462
DSUN_OBS	[m] s/c distance from Sun	89295155751.88745
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	70848988380.08778
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	-53785241041.45285
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-7822629505.789034
HCIX_OBS	[m] s/c Heliocentric Inertial X	-37971322369.14751
HCIY_OBS	[m] s/c Heliocentric Inertial Y	-80784113221.92041
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	2393860739.488244
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	38334.95059511881
HCIY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-22591.45389639495
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	1504.874827199197
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	68633898021.33007
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	-56584628761.65393
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	68633898021.33007
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	71097636374.63983
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	-53972403813.92389
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	2393860739.488244
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	79365029976.2084
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	53784854342.87038
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Z	-7825546599.548429

OBS_VR	[m/s] Radial velocity of spacecraft relative to	26920.03783057234
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	203.203537960182
SUN_TIME	[s] Time(Sun to s/c)	297.856578339564
DATE_EAR	Start time of observation, corrected to Ea	2021-09-20T18:08:12.039
DATE_SUN	Start time of observation, corrected to Su	2021-09-20T17:59:50.979
CHECKSUM	HDU checksum updated 2023-03-30T16:34:54	177b455a155a155a
DATASUM	data unit checksum updated 2023-03-30T16:34:54	0
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.2.2.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
active_spw_link	str	-	Nx(1)	Active SPW link
archive_memory_usage	int	-	Nx(1)	Archive Memory usage
autonomous_asw_boot_stat	bool	-	Nx(1)	Autonomous ASW boot stat
control_index	int	-	Nx(1)	join index to the control table
cpu_load	float	0.01	Nx(1)	cpu load
fdir_function_status	int	-	Nx(1)	FDIR function status
fdir_stat_msk_hk_curr_ch	int	-	Nx(1)	FDIR stat msk HK curr ch
fdir_stat_msk_hk_temp_ch	int	-	Nx(1)	FDIR stat msk HK temp ch
fdir_stat_msk_hk_volt_ch	int	-	Nx(1)	FDIR stat msk HK volt ch
hk_dpu_1v5_c	float	mA	Nx(1)	IDPU FPGA 1.5V Current
hk_dpu_1v5_v	float	V	Nx(1)	IDPU FPGA 1.5V
hk_dpu_2v5_c	float	mA	Nx(1)	IDPU FPGA 2.5V Current
hk_dpu_2v9_v	float	V	Nx(1)	IDPU 2.9V
hk_dpu_3v3_c	float	mA	Nx(1)	IDPU 3.3V Current
hk_dpu_fpga_t	float	K	Nx(1)	IDPU FPGA Temperature
hk_dpu_pcb_t	float	K	Nx(1)	IDPU PCB Temperature
hk_dpu_spw0_v	float	V	Nx(1)	SpaceWire Main Supply Voltage
hk_dpu_spw1_v	float	V	Nx(1)	SpaceWire Redundant Supply Voltage
hk_dpu_spw_c	float	mA	Nx(1)	IDPU SpaceWire Current
hk_psu_temp_t	float	K	Nx(1)	PSU Temperature
hk_ref_2v5_v	float	V	Nx(1)	IDPU 2.5V Analog Reference
hkselftest_is_exec_stat	bool	-	Nx(1)	HKSelftest is exec stat
idpu_identifier	str	-	Nx(1)	IDPU identifier
instrument_mode	str	-	Nx(1)	Instrument mode
instrument_number	str	-	Nx(1)	Instrument number
memory_load_ena_flag	bool	-	Nx(1)	Memory load ena flag
memory_ser_exec_stat fla	bool	-	Nx(1)	Memory ser exec stat fla
number_of_executed_tc_pa	int	-	Nx(1)	Number of executed TC pa
number_of_failed_tm_gene	int	-	Nx(1)	Number of failed TM gene
number_of_sent_tm_packet	int	-	Nx(1)	Number of sent TM packet
overruns_for_tasks	str	-	Nx(1)	Overruns for tasks
received_spw_packets	int	-	Nx(1)	Received SpW packets
rejected_spw_packets	int	-	Nx(1)	Rejected SpW packets
sw_running	str	-	Nx(1)	SW running
sw_version_number	int	-	Nx(1)	SW Version Number
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin

watchdog_state	str	-	Nx(1)	Watchdog state
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4.2.2.2.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
index	int	-	Nx(1)	index column
integration_time	int	-	Nx(1)	duration of the (aggregated) time bin
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	int	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.2.2.2.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.3 Quicklook Data

4.2.3.1 Background

- **Description:** Quick Look Background Light Curve data product. In level 1 format.
- **Descriptor:** stix-ql-background
- **Free field:** None
- **Level:** L1
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2020/06/16/QL/solo_L1_stix-ql-background_20200616_V01.fits

4.2.3.1.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-ql-background_20200616_V01.fits
RAW_FILE	Raw filename(s)	IX6BatchRequest.PktTmRaw.SOL.0.2020.170.20.32.35.319.OvFD@2020.170.20.32.36.296.1.xml
PARENT	Source file current data product	solo_L0_stix-ql-background_0645494400_V01.fits; solo_L0_stix-ql-background_0645580800_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T16:27:42.379
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX

STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	31
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	83.0
BUNIT	Units of physical value, after application of B	counts
XPOSURE	[s] shortest exposure time	8.0
TARGET	Type of target from planning	none
SOOPTYPE	Campaign ID(s) that the data belong to	CC1; IDF
SOOPNAME	Name of the SOOP Campaign that the dat	COORD_CALIBRATION; I_DEFAULT
OBS_ID	Unique ID of the individual observation	SSTX_012A_000_000_UCvg_111
OBS_TYPE	Encoded version of OBS_MODE	UCvg
OBS_MODE	Observation mode	STIX_DOWNLOAD
OBT_BEG	Start of acquisition time in OBT	645580782.8017243
OBT_END	End of acquisition time in OBT	645667182.7001297
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2020-06-16T00:00:01.102
DATE-BEG	Start of acquisition time in UTC	2020-06-16T00:00:01.102
DATE-AVG	Center of acquisition time in UTC	2020-06-16T12:00:01.124
DATE-END	End of acquisition time in UTC	2020-06-17T00:00:01.147
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1858.639555434855
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	6.679549999905189
HGLN_OBS	[deg] s/c heliographic longitude	64.41373089011144
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	6.679549999905189
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	64.41373089011144
DSUN_OBS	[m] s/c distance from Sun	77207206338.43288
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	33301970487.04095
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	69654648217.54253
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-401813334.7735032
HCIX_OBS	[m] s/c Heliocentric Inertial X	-21021789128.45621
HCIY_OBS	[m] s/c Heliocentric Inertial Y	-73745430808.38802

HCIZ_OBS	[m] s/c Heliocentric Inertial Z	8980452511.389784
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	45509.33088882754
HCY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-13691.43824354864
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	247.5143586409825
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	66839424184.81868
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	-38643032215.68317
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	66839424184.81868
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	33117118616.92654
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	69163289668.64171
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	8980452511.389784
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	118682233520.8467
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	-69654648443.495
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	-402053084.2210054
OBS_VR	[m/s] Radial velocity of spacecraft relative to	32845.34609365153
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	249.4292188431568
SUN_TIME	[s] Time(Sun to s/c)	257.5355192505639
DATE_EAR	Start time of observation, corrected to Ea	2020-06-16T00:04:10.531
DATE_SUN	Start time of observation, corrected to Su	2020-06-15T23:55:43.566
CHECKSUM	HDU checksum updated 2023-03-30T16:27:42	LF28OC07LC07LC07
DATASUM	data unit checksum updated 2023-03-30T16:27:42	0
HISTORY	Processed by STIXCore L1	

4.2.3.1.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	float	ct	Nx(5)	pixel counts for the time period
counts_comp_err	float	ct	Nx(5)	estimated error due to compression alone for the pixel count values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(1)	trigger counts for the time period
triggers_comp_err	float	-	Nx(1)	estimated error due to compression alone for the trigger values

4.2.3.1.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
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compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_energies	int	-	Nx(1)	number of energy bins
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.2.3.1.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.3.1.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.3.2 FlareFlag

- **Description:** Quick Look Flare Flag and Location data product. In level 1 format.
- **Descriptor:** stix-ql-flareflag
- **Free field:** None
- **Level:** L1
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2020/06/16/QL/solo_L1_stix-ql-flareflag_20200616_V01.fits

4.2.3.2.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-ql-flareflag_20200616_V01.fits
RAW_FILE	Raw filename(s)	IX6BatchRequest.PktTmRaw.SOL.0.2020.170.20.32.35.319.OvFD@2020.170.20.32.36.296.1.xml
PARENT	Source file current data product	solo_L0_stix-ql-flareflag_0645494400_V01.fits; solo_L0_stix-ql-flareflag_0645580800_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T16:35:51.644
BLANK	Value marking undefined pixels (before the appl	4294967295

LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	34
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
XPOSURE	[s] shortest exposure time	0.0
TARGET	Type of target from planning	none
SOOPTYPE	Campaign ID(s) that the data belong to	CC1; IDF
SOOPNAME	Name of the SOOP Campaign that the data	COORD_CALIBRATION; I_DEFAULT
OBS_ID	Unique ID of the individual observation	SSTX_012A_000_000_UCvg_111
OBS_TYPE	Encoded version of OBS_MODE	UCvg
OBS_MODE	Observation mode	STIX_DOWNLOAD
OBT_BEG	Start of acquisition time in OBT	645580782.8001678
OBT_END	End of acquisition time in OBT	645667182.7001755
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2020-06-16T00:00:01.100
DATE-BEG	Start of acquisition time in UTC	2020-06-16T00:00:01.100
DATE-AVG	Center of acquisition time in UTC	2020-06-16T12:00:01.123
DATE-END	End of acquisition time in UTC	2020-06-17T00:00:01.147
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1858.639555452071
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	6.679549999782418
HGLN_OBS	[deg] s/c heliographic longitude	64.4137308655781
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	6.679549999782418
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	64.4137308655781
DSUN_OBS	[m] s/c distance from Sun	77207206337.71774

HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	33301970516.14688
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	69654648202.84285
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-401813333.2924396
HCIX_OBS	[m] s/c Heliocentric Inertial X	-21021789173.96224
HCYI_OBS	[m] s/c Heliocentric Inertial Y	-73745430794.69757
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	8980452511.142288
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	45509.33088275816
HCYI_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-13691.43826480138
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	247.5143612335522
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	66839424160.43514
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	-38643032256.44508
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	66839424160.43514
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	33117118646.24295
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	69163289653.8381
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	8980452511.142288
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	118682233491.5831
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	-69654648428.79529
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	-402053082.7409402
OBS_VR	[m/s] Radial velocity of spacecraft relative to	32845.3460940634
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	249.429218845016
SUN_TIME	[s] Time(Sun to s/c)	257.5355192481785
DATE_EAR	Start time of observation, corrected to Ea	2020-06-16T00:04:10.530
DATE_SUN	Start time of observation, corrected to Su	2020-06-15T23:55:43.565
CHECKSUM	HDU checksum updated 2023-03-30T16:35:51	KDCLLA9LKAALKA9L
DATASUM	data unit checksum updated 2023-03- 30T16:35:51	0
HISTORY		Processed by STIXCore L1

4.2.3.2.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
flare_progress	int	-	Nx(1)	Flare in progress
loc_y	int	-	Nx(1)	Flare Location Y
loc_z	int	-	Nx(1)	Flare Location Z

location_status	int	-	Nx(1)	Flare location status
non_thermal_index	int	-	Nx(1)	Non-thermal flare index
thermal_index	int	-	Nx(1)	Thermal flare index
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin

4.2.3.2.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.2.3.2.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.3.2.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.3.3 LightCurve

- **Description:** Quick Look Light Curve data product. In level 1 format.
- **Descriptor:** stix-ql-lightcurve
- **Free field:** None
- **Level:** L1
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2020/06/16/QL/solo_L1_stix-ql-lightcurve_20200616_V01.fits

4.2.3.3.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-ql-lightcurve_20200616_V01.fits
RAW_FILE	Raw filename(s)	IX6BatchRequest.PktTmRaw.SOL.0.2020.170.20.32.35.319.OvFD@2020.170.20.32.36.296.1.xml
PARENT	Source file current data product	solo_L0_stix-ql-lightcurve_0645494400_V01.fits; solo_L0_stix-ql-lightcurve_0645580800_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T16:40:35.544

BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	30
DATAMIN	Minimum valid physical value	26.0
DATAMAX	Maximum valid physical value	991.0
BUNIT	Units of physical value, after application of B	counts
XPOSURE	[s] shortest exposure time	4.0
TARGET	Type of target from planning	none
SOOCTYPE	Campaign ID(s) that the data belong to	CC1; IDF
SOOPNAME	Name of the SOOP Campaign that the dat	COORD_CALIBRATION; I_DEFAULT
OBS_ID	Unique ID of the individual observation	SSTX_012A_000_000_UCvg_111
OBS_TYPE	Encoded version of OBS_MODE	UCvg
OBS_MODE	Observation mode	STIX_DOWNLOAD
OBT_BEG	Start of acquisition time in OBT	645580782.8001525
OBT_END	End of acquisition time in OBT	645667182.7001297
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2020-06-16T00:00:01.100
DATE-BEG	Start of acquisition time in UTC	2020-06-16T00:00:01.100
DATE-AVG	Center of acquisition time in UTC	2020-06-16T12:00:01.123
DATE-END	End of acquisition time in UTC	2020-06-17T00:00:01.147
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1858.639555452071
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	6.679549999782418
HGLN_OBS	[deg] s/c heliographic longitude	64.4137308655781
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	6.679549999782418
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	64.4137308655781

DSUN_OBS	[m] s/c distance from Sun	77207206337.71774
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	33301970516.14688
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	69654648202.84285
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-401813333.2924396
HCIX_OBS	[m] s/c Heliocentric Inertial X	-21021789173.96224
HCY_OBS	[m] s/c Heliocentric Inertial Y	-73745430794.69757
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	8980452511.142288
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	45509.33088275816
HCY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-13691.43826480138
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	247.5143612335522
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	66839424160.43514
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	-38643032256.44508
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	66839424160.43514
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	33117118646.24295
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	69163289653.8381
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	8980452511.142288
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	118682233491.5831
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	-69654648428.79529
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	-402053082.7409402
OBS_VR	[m/s] Radial velocity of spacecraft relative to	32845.3460940634
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	249.429218845016
SUN_TIME	[s] Time(Sun to s/c)	257.5355192481785
DATE_EAR	Start time of observation, corrected to Ea	2020-06-16T00:04:10.530
DATE_SUN	Start time of observation, corrected to Su	2020-06-15T23:55:43.565
CHECKSUM	HDU checksum updated 2023-03-30T16:40:35	AI77AF67AF67AF67
DATASUM	data unit checksum updated 2023-03- 30T16:40:35	0
HISTORY		Processed by STIXCore L1

4.2.3.3.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	float	ct	Nx(5)	pixel counts for the time period

counts_comp_err	float	ct	Nx(5)	estimated error due to compression alone for the pixel count values
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(1)	trigger counts for the time period
triggers_comp_err	float	-	Nx(1)	estimated error due to compression alone for the trigger values

4.2.3.3.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
detector_mask	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_energies	int	-	Nx(1)	number of energy bins
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.2.3.3.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.3.3.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.3.4 Variance

- **Description:** Quick Look Variance data product. In level 1 format.
- **Descriptor:** stix-ql-variance
- **Free field:** None
- **Level:** L1
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2020/06/16/QL/solo_L1_stix-ql-variance_20200616_V01.fits

4.2.3.4.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-ql-variance_20200616_V01.fits
RAW_FILE	Raw filename(s)	IX6BatchRequest.PktTmRaw.SOL.0.2020.170.20.32.35.319.OvFD@2020.170.20.32.36.296.1.xml
PARENT	Source file current data product	solo_L0_stix-ql-variance_0645494400_V01.fits; solo_L0_stix-ql-variance_0645580800_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T16:57:33.923
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	33
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
XPOSURE	[s] shortest exposure time	0.0
TARGET	Type of target from planning	none
SOOPTYPE	Campaign ID(s) that the data belong to	CC1; IDF
SOOPNAME	Name of the SOOP Campaign that the dat	COORD_CALIBRATION; I_DEFAULT
OBS_ID	Unique ID of the individual observation	SSTX_012A_000_000_UCvg_111
OBS_TYPE	Encoded version of OBS_MODE	UCvg
OBS_MODE	Observation mode	STIX_DOWNLOAD
OBT_BEG	Start of acquisition time in OBT	645580782.9001907
OBT_END	End of acquisition time in OBT	645667182.7005265
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2020-06-16T00:00:01.200
DATE-BEG	Start of acquisition time in UTC	2020-06-16T00:00:01.200

DATE-AVG	Center of acquisition time in UTC	2020-06-16T12:00:01.174
DATE-END	End of acquisition time in UTC	2020-06-17T00:00:01.147
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1858.639554574002
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	6.679550006044314
HGLN_OBS	[deg] s/c heliographic longitude	64.41373211686893
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	6.679550006044314
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	64.41373211686893
DSUN_OBS	[m] s/c distance from Sun	77207206374.19144
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	33301969031.63647
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	69654648952.58173
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-401813408.8323396
HCIX_OBS	[m] s/c Heliocentric Inertial X	-21021786852.98641
HCYI_OBS	[m] s/c Heliocentric Inertial Y	-73745431492.96089
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	8980452523.765524
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	45509.33119191709
HCYI_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-13691.43718029305
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	247.5142291621815
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	66839425404.08633
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	-38643030177.4373
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	66839425404.08633
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	33117117150.99693
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	69163290408.87604
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	8980452523.765524
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	118682234984.1414
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	-69654649178.5344
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Z	-402053158.2302898
OBS_VR	[m/s] Radial velocity of spacecraft relative to	32845.34607251555
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	249.4292187501981
SUN_TIME	[s] Time(Sun to s/c)	257.5355193698417

DATE_EAR	Start time of observation, corrected to Ea	2020-06-16T00:04:10.630
DATE_SUN	Start time of observation, corrected to Su	2020-06-15T23:55:43.665
CHECKSUM	HDU checksum updated 2023-03-30T16:57:34	OXg3QXZ1OXf1OXZ1
DATASUM	data unit checksum updated 2023-03-30T16:57:34	0
HISTORY	Processed by STIXCore L1	

4.2.3.4.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
variance	uint	-	Nx(1)	Compressed Variance
variance_comp_err	float	-	Nx(1)	estimated error due to compression alone for the variance values

4.2.3.4.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_variance_skm	uint	-	Nx(3)	SKM compression schema parameter used for variance values
detector_mask	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
energy_bin_mask	bool	-	Nx(32)	mask for all 32 energy bands used for the combined data
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_energies	int	-	Nx(1)	number of energy bins
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
samples_per_variance	uint	-	Nx(1)	Samp per variance val
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.2.3.4.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.3.4.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.3.5 Spectra

- **Description:** Quick Look Spectra data product. In level 1 format.

- **Descriptor:** stix-ql-spectra
- **Free field:** None
- **Level:** L1
- **File cadence:** Daily file
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2021/11/16/QL/solo_L1_stix-ql-spectra_20211116_V01.fits

4.2.3.5.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-ql-spectra_20211116_V01.fits
RAW_FILE	Raw filename(s)	LTP05_T05AM_req_BatchRequest.PktTmRaw.SOL.0.2021.306.11.13.36.322.RdSC@2021.321.05.00.03.148.1.xml
PARENT	Source file current da	solo_L0_stix-ql-spectra_0690336000_V01.fits
DATE	FITS file creation date in UTC	2023-03-30T16:17:24.330
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	32
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
XPOSURE	[s] shortest exposure time	0.0
TARGET	Type of target from planning	none
SOOPTYPE	Campaign ID(s) that the data belong to	LF5
SOOPNAME	Name of the SOOP Campaign that t	L_FULL_LRES_MCAD_Coronal-Synoptic
OBS_ID	Unique ID of	SSTX_050A_LF5_11C_5Md2_11Q; SSTX_050A_LF5_11C_vFLg_15q
OBS_TYPE	Encoded version of OBS_MODE	5Md2; vFLg
OBS_MODE	Observation mode	STIX_ANALYSIS; STIX_BASIC
OBT_BEG	Start of acquisition time in OBT	690421255.1001297
OBT_END	End of acquisition time in OBT	690422311.1001297

TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2021-11-16T23:42:28.184
DATE-BEG	Start of acquisition time in UTC	2021-11-16T23:42:28.184
DATE-AVG	Center of acquisition time in UTC	2021-11-16T23:51:16.185
DATE-END	End of acquisition time in UTC	2021-11-17T00:00:04.186
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1033.517339273549
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	1.673127982638656
HGLN_OBS	[deg] s/c heliographic longitude	0.4955020466706636
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	1.673127982638656
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	0.4955020466706636
DSUN_OBS	[m] s/c distance from Sun	138845301100.299
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	138821307415.5182
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	1461042995.192407
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-2127815416.11667
HCIX_OBS	[m] s/c Heliocentric Inertial X	129938855174.4062
HCIY_OBS	[m] s/c Heliocentric Inertial Y	-48759380885.14774
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	4053927638.038054
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	19797.03605698137
HCIY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	23005.90306167011
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	-527.7715707736199
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	79330481528.41496
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	113930422611.0004
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	79330481528.41496
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	138780916423.8586
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	1200227016.945018
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	4053927638.038054
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	9095425167.774853
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	-1461096466.772712

GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	-2127808219.458365
OBS_VR	[m/s] Radial velocity of spacecraft relative to	10473.88381655969
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	30.25906138353838
SUN_TIME	[s] Time(Sun to s/c)	463.1380723403622
DATE_EAR	Start time of observation, corrected to Ea	2021-11-16T23:42:58.443
DATE_SUN	Start time of observation, corrected to Su	2021-11-16T23:34:45.046
CHECKSUM	HDU checksum updated 2023-03-30T16:17:24	Ilf1Lle1lle1lle1
DATASUM	data unit checksum updated 2023-03-30T16:17:24	0
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.3.5.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
detector_index	uint	-	Nx(32)	Detector number
num_integrations	uint	-	Nx(1)	Num of integr aft 1 samp
spectra	uint	ct	Nx(32,32)	spectra count values
spectra_comp_err	float	-	Nx(32,32)	estimated error due to compression alone for the spectra values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(32)	trigger counts for the time period
triggers_comp_err	float	-	Nx(32)	estimated error due to compression alone for the trigger values

4.2.3.5.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_spectra_skm	uint	-	Nx(3)	SKM compression schema parameter used for spectra values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
index	uint	-	Nx(1)	index column
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
num_energies	int	-	Nx(1)	number of energy bins
num_samples	int	-	Nx(1)	number of data samples
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
pixel_mask	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
scet_coarse	uint	-	Nx(1)	coarse part (s) of the spacecraft elapsed time (OBT)
scet_fine	int	-	Nx(1)	fine part (bin s) of the spacecraft elapsed time (OBT)

4.2.3.5.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT

version	str	-	Nx(1)	valid IDB version for the time period
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4.2.3.5.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.4 Science Data

4.2.4.1 RawPixelData

- **Description:** Raw X-ray pixel counts: compression level 0. No aggregation. In level 1 format.
- **Descriptor:** stix-sci-xray-rpd
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2021/06/28/SCI/solo_L1_stix-sci-xray-rpd_20210628T092301-20210628T092501_V01_2106280010-54759.fits

4.2.4.1.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-sci-xray-rpd_20210628T092301-20210628T092501_V01_2106280010-54759.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.140.08.45.27.379.vFwY@2021.196.06.00.01.219.1.xml
PARENT	Source file current data product	solo_L0_stix-sci-xray-rpd_0678187309-0678187429_V01_2106280010-54759.fits
DATE	FITS file creation date in UTC	2023-03-30T16:14:51.387
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	20
DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	18
BUNIT	Units of physical value, after application of B	counts
XPOSURE	[s] shortest exposure time	5.0

OBS_ID	Unique ID of the individual observation	SSTX_040A_000_000_5Md2_111
OBS_TYPE	Encoded version of OBS_MODE	5Md2
OBS_MODE	Observation mode	STIX_BASIC
SOOPNAME	Name of the SOOP Campaign that the data belong	none
SOOPTYPE	Campaign ID(s) that the data belong to	none
TARGET	Type of target from planning	none
OBT_BEG	Start of acquisition time in OBT	678187309.0
OBT_END	End of acquisition time in OBT	678187429.0
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2021-06-28T09:23:01.298
DATE-BEG	Start of acquisition time in UTC	2021-06-28T09:23:01.298
DATE-AVG	Center of acquisition time in UTC	2021-06-28T09:24:01.298
DATE-END	End of acquisition time in UTC	2021-06-28T09:25:01.298
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1044.60000093465
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	-1.649003624911553
HGLN_OBS	[deg] s/c heliographic longitude	-100.2033616198231
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	-1.649003624911553
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	-100.2033616198231
DSUN_OBS	[m] s/c distance from Sun	137372237202.9653
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	-24477573915.5998
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	-134535383880.2863
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	13122896537.66084
HCIX_OBS	[m] s/c Heliocentric Inertial X	-25012918460.8119
HCIY_OBS	[m] s/c Heliocentric Inertial Y	135017993063.4075
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	-3953101737.902811
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	-24891.37729957298
HCIY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-9272.013106234526
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	-389.2461454166653

HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	-136459945427.6935
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	8811139775.846457
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	-136459945427.6935
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	-24324381682.74983
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	-135143734581.1839
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	-3953101737.902811
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	176556292773.8407
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	134535515188.0477
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	13121286368.01581
OBS_VR	[m/s] Radial velocity of spacecraft relative to	4600.82021907967
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	49.05547703854523
SUN_TIME	[s] Time(Sun to s/c)	458.2244600795306
DATE_EAR	Start time of observation, corrected to Ea	2021-06-28T09:23:50.353
DATE_SUN	Start time of observation, corrected to Su	2021-06-28T09:15:23.073
CHECKSUM	HDU checksum updated 2023-03-30T16:14:51	EFnGFDnEEDnEEDnE
DATASUM	data unit checksum updated 2023-03- 30T16:14:51	0
COMMENT		Time and count arrays offset not fixed as possibly summed on board
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.4.1.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(32,12,21)	pixel counts for the time period
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
pixel_masks	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(16)	trigger counts for the time period

4.2.4.1.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(24)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry

raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.2.4.1.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.4.1.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.4.1.6 Supplements

- **Description:** For RawPixelData data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.
- **Descriptors:** stix-sci-xray-rpd-sup1 stix-sci-xray-rpd-sup2
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [RawPixelData](#)

4.2.4.2 CompressedPixelData

- **Description:** Aggregated (over time and/or energies) X-ray pixel counts: compression level 1. In level 1 format.
- **Descriptor:** stix-sci-xray-cpd
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2021/06/28/SCI/solo_L1_stix-sci-xray-cpd_20210628T190505-20210628T191459_V01_2106280009-54755.fits

4.2.4.2.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True

BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-sci-xray-cpd_20210628T190505-20210628T191459_V01_2106280009-54755.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.140.08.45.27.377.WnZT@2021.195.06.00.00.825.1.xml
PARENT	Source file current data product	solo_L0_stix-sci-xray-cpd_0678222233-0678222827_V01_2106280009-54755.fits
DATE	FITS file creation date in UTC	2023-03-30T16:20:09.607
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	21
DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	311
BUNIT	Units of physical value, after application of B	counts
XPOSURE	[s] shortest exposure time	15.50000762951095
OBS_ID	Unique ID of the individual observation	SSTX_040A_000_000_5Md2_111
OBS_TYPE	Encoded version of OBS_MODE	5Md2
OBS_MODE	Observation mode	STIX_BASIC
SOOPNAME	Name of the SOOP Campaign that the data belong	none
SOOPTYPE	Campaign ID(s) that the data belong to	none
TARGET	Type of target from planning	none
OBT_BEG	Start of acquisition time in OBT	678222233.1000077
OBT_END	End of acquisition time in OBT	678222827.6
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2021-06-28T19:05:05.456
DATE-BEG	Start of acquisition time in UTC	2021-06-28T19:05:05.456
DATE-AVG	Center of acquisition time in UTC	2021-06-28T19:10:02.706

DATE-END	End of acquisition time in UTC	2021-06-28T19:14:59.957
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1045.832889116611
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	-1.656615521167277
HGLN_OBS	[deg] s/c heliographic longitude	-100.2046828023968
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	-1.656615521167277
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	-100.2046828023968
DSUN_OBS	[m] s/c distance from Sun	137210296265.0387
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	-24454838238.60558
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	-134379537780.8201
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	13067750903.52122
HCIX_OBS	[m] s/c Heliocentric Inertial X	-25887332519.483
HCIY_OBS	[m] s/c Heliocentric Inertial Y	134687701748.8557
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	-3966662800.984317
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	-24845.4798148918
HCIY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-9515.180568460808
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	-382.1062092157437
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	-136359020417.6911
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	7883427867.686002
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	-136359020417.6911
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	-24298726391.78683
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	-134983342983.8662
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	-3966662800.984317
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	176535721456.1364
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	134379672780.9854
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Z	13066084229.79797
OBS_VR	[m/s] Radial velocity of spacecraft relative to	4670.659848337666
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	49.60287009728313
SUN_TIME	[s] Time(Sun to s/c)	457.6842832551803
DATE_EAR	Start time of observation, corrected to Ea	2021-06-28T19:05:55.059

DATE_SUN	Start time of observation, corrected to Su	2021-06-28T18:57:27.771
CHECKSUM	HDU checksum updated 2023-03-30T16:20:09	3A8Y468Y3A8Y358Y
DATASUM	data unit checksum updated 2023-03-30T16:20:09	0
COMMENT		Time and count arrays offset not fixed as possibly summed on board
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.4.2.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(32,12,21)	pixel counts for the time period
counts_comp_err	float	ct	Nx(32,12,21)	estimated error due to compression alone for the pixel count values
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
num_energy_groups	uint	-	Nx(1)	number of energy bands
num_pixel_sets	uint	-	Nx(1)	number of pixelsets in the count structure
pixel_masks	uint	-	Nx(12)	mask for all 12 detector pixels used for the combined data
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(16)	trigger counts for the time period
triggers_comp_err	float	-	Nx(16)	estimated error due to compression alone for the trigger values

4.2.4.2.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(57)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.2.4.2.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.4.2.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.4.2.6 Supplements

- **Description:** For CompressedPixelData data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.
- **Descriptors:** stix-sci-xray-cpd-sup1 stix-sci-xray-cpd-sup2
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [CompressedPixelData](#)

4.2.4.3 SummedPixelData

- **Description:** Aggregated (over time and/or energies and pixelsets) X-ray pixel counts: compression level 2. In level 1 format.
- **Descriptor:** stix-sci-xray-scpd
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2021/06/28/SCI/solo_L1_stix-sci-xray-scpd_20210628T092301-20210628T092502_V01_2106280006-54720.fits

4.2.4.3.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-sci-xray-scpd_20210628T092301-20210628T092502_V01_2106280006-54720.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.140.08.45.27.377.WnZT@2021.195.06.00.00.825.1.xml
PARENT	Source file current data product	solo_L0_stix-sci-xray-scpd_0678187309-0678187429_V01_2106280006-54720.fits
DATE	FITS file creation date in UTC	2023-03-30T16:30:24.540
BLANK	Value marking undefined pixels (before the appl	4294967295

LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	22
DATAMIN	Minimum valid physical value	0
DATAMAX	Maximum valid physical value	171
BUNIT	Units of physical value, after application of B	counts
XPOSURE	[s] shortest exposure time	10.50000762951095
OBS_ID	Unique ID of the individual observation	SSTX_040A_000_000_5Md2_111
OBS_TYPE	Encoded version of OBS_MODE	5Md2
OBS_MODE	Observation mode	STIX_BASIC
SOOPNAME	Name of the SOOP Campaign that the data belong	none
SOOPTYPE	Campaign ID(s) that the data belong to	none
TARGET	Type of target from planning	none
OBT_BEG	Start of acquisition time in OBT	678187309.0
OBT_END	End of acquisition time in OBT	678187429.9000076
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2021-06-28T09:23:01.298
DATE-BEG	Start of acquisition time in UTC	2021-06-28T09:23:01.298
DATE-AVG	Center of acquisition time in UTC	2021-06-28T09:24:01.748
DATE-END	End of acquisition time in UTC	2021-06-28T09:25:02.198
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1044.600016571557
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	-1.649003722689598
HGLN_OBS	[deg] s/c heliographic longitude	-100.2033616423468
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	-1.649003722689598
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	-100.2033616423468
DSUN_OBS	[m] s/c distance from Sun	137372235146.6198

HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	-24477573640.82483
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	-134535381898.8957
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	13122895837.21842
HCIX_OBS	[m] s/c Heliocentric Inertial X	-25012929661.93275
HCYI_OBS	[m] s/c Heliocentric Inertial Y	135017988891.0005
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	-3953101913.063582
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	-24891.37672329031
HCYI_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-9272.016216612748
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	-389.2460543587611
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	-136459944191.3608
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	8811127906.320852
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	-136459944191.3608
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	-24324381370.56611
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	-135143732541.9954
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	-3953101913.063582
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	176556292527.3764
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	134535513206.7046
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	13121285666.82114
OBS_VR	[m/s] Radial velocity of spacecraft relative to	4600.821107836035
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	49.05548399216065
SUN_TIME	[s] Time(Sun to s/c)	458.2244532203002
DATE_EAR	Start time of observation, corrected to Ea	2021-06-28T09:23:50.353
DATE_SUN	Start time of observation, corrected to Su	2021-06-28T09:15:23.073
CHECKSUM	HDU checksum updated 2023-03-30T16:30:24	kAb5k5b2kAb2k5b2
DATASUM	data unit checksum updated 2023-03- 30T16:30:24	0
COMMENT		Time and count arrays offset not fixed as possibly summed on board
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.4.3.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	uint	-	Nx(1)	join index to the control table
counts	uint	ct	Nx(32,4,21)	pixel counts for the time period

counts_comp_err	float	ct	Nx(32,4,21)	estimated error due to compression alone for the pixel count values
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
num_energy_groups	uint	-	Nx(1)	number of energy bands
num_pixel_sets	uint	-	Nx(1)	number of pixelsets in the count structure
pixel_masks	uint	-	Nx(4,12)	mask for all 12 detector pixels used for the combined data
rcr	uint	-	Nx(1)	current rate control regime of the instrument
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(16)	trigger counts for the time period
triggers_comp_err	float	-	Nx(16)	estimated error due to compression alone for the trigger values

4.2.4.3.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(5)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.2.4.3.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.4.3.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.4.3.6 Supplements

- Description:** For SummedPixelData data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM

configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.

- **Descriptors:** stix-sci-xray-scpd-sup1 stix-sci-xray-scpd-sup2
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [SummedPixelData](#)

4.2.4.4 Visibility

- **Description:** X-ray Visibilities or compression Level 3 data In level 1 format.
- **Descriptor:** stix-sci-xray-vis
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2021/06/28/SCI/solo_L1_stix-sci-xray-vis_20210628T092301-20210628T092502_V01_2106280004-54716.fits

4.2.4.4.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-sci-xray-vis_20210628T092301-20210628T092502_V01_2106280004-54716.fits
RAW_FILE	Raw filename(s)	LTP03_morning_req_BatchRequest.PktTmRaw.SOL.0.2021.140.08.45.27.377.WnZT@2021.195.06.00.00.825.1.xml
PARENT	Source file current data product	solo_L0_stix-sci-xray-vis_0678187308-0678187429_V01_2106280004-54716.fits
DATE	FITS file creation date in UTC	2023-03-30T16:30:25.406
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	23
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0

BUNIT	Units of physical value, after application of B	
XPOSURE	[s] shortest exposure time	0.0
OBS_ID	Unique ID of the individual observation	SSTX_040A_000_000_5Md2_111
OBS_TYPE	Encoded version of OBS_MODE	5Md2
OBS_MODE	Observation mode	STIX_BASIC
SOOPNAME	Name of the SOOP Campaign that the data belong	none
SOOPTYPE	Campaign ID(s) that the data belong to	none
TARGET	Type of target from planning	none
OBT_BEG	Start of acquisition time in OBT	678187309.0
OBT_END	End of acquisition time in OBT	678187429.9000076
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2021-06-28T09:23:01.298
DATE-BEG	Start of acquisition time in UTC	2021-06-28T09:23:01.298
DATE-AVG	Center of acquisition time in UTC	2021-06-28T09:24:01.748
DATE-END	End of acquisition time in UTC	2021-06-28T09:25:02.198
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1044.600016571557
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	-1.649003722689598
HGLN_OBS	[deg] s/c heliographic longitude	-100.2033616423468
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	-1.649003722689598
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	-100.2033616423468
DSUN_OBS	[m] s/c distance from Sun	137372235146.6198
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	-24477573640.82483
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	-134535381898.8957
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	13122895837.21842
HCIX_OBS	[m] s/c Heliocentric Inertial X	-25012929661.93275
HCIY_OBS	[m] s/c Heliocentric Inertial Y	135017988891.0005
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	-3953101913.063582
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	-24891.37672329031
HCIY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	-9272.016216612748

HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	-389.2460543587611
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	-136459944191.3608
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	8811127906.320852
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	-136459944191.3608
HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	-24324381370.56611
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	-135143732541.9954
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	-3953101913.063582
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	176556292527.3764
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	134535513206.7046
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	13121285666.82114
OBS_VR	[m/s] Radial velocity of spacecraft relative to	4600.821107836035
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	49.05548399216065
SUN_TIME	[s] Time(Sun to s/c)	458.2244532203002
DATE_EAR	Start time of observation, corrected to Ea	2021-06-28T09:23:50.353
DATE_SUN	Start time of observation, corrected to Su	2021-06-28T09:15:23.073
CHECKSUM	HDU checksum updated 2023-03-30T16:30:25	f0eSf0bSf0bSf0bS
DATASUM	data unit checksum updated 2023-03-30T16:30:25	0
COMMENT		Time and count arrays offset not fixed as possibly summed on board
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.4.4.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
control_index	int	-	Nx(1)	join index to the control table
delta_time	float	s	Nx(1)	delta time
detector_id	int	-	Nx(21,32)	ID of the detector
detector_masks	uint	-	Nx(32)	mask for all 32 detectors used for the combined data
flux	uint	-	Nx(21)	Flux
imaginary	int	-	Nx(32,21)	Imaginary visibility com
imaginary_comp_err	float	-	Nx(32,21)	estimated error due to compression alone for the imaginary part values
integration_time	float	s	Nx(1)	duration of the (aggregated) time bin
pixel_mask1	uint	-	Nx(12)	Pixel mask 1
pixel_mask2	uint	-	Nx(12)	Pixel mask 2
pixel_mask3	uint	-	Nx(12)	Pixel mask 3
pixel_mask4	uint	-	Nx(12)	Pixel mask 4
pixel_mask5	uint	-	Nx(12)	Pixel mask 5
rcr	int	-	Nx(1)	current rate control regime of the instrument
real	int	-	Nx(32,21)	Real visibility com

real_comp_err	float	-	Nx(32,21)	estimated error due to compression alone for the real part values
time	uint	cs	Nx(1)	unique time index: center of bin relative to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin
triggers	uint	-	Nx(16)	trigger counts for the time period
triggers_comp_err	float	-	Nx(16)	estimated error due to compression alone for the trigger values

4.2.4.4.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
compression_scheme_counts_skm	uint	-	Nx(3)	SKM compression schema parameter used for count values
compression_scheme_triggers_skm	uint	-	Nx(3)	SKM compression schema parameter used for trigger values
energy_bin_edge_mask	uint	-	Nx(33)	mask of 33 bits - setting start and closing points of energy ranges
index	uint	-	Nx(1)	index column
num_substructures	uint	-	Nx(4)	number of science sub packets
packet	uint	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
tc_packet_id_ref	uint	-	Nx(1)	reference to the TC type that triggered this TM
tc_packet_seq_control	uint	-	Nx(1)	reference to the TC (counter) that triggered this TM
time_stamp	float	s	Nx(1)	OBT time stamp

4.2.4.4.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.4.4.5 Extension: 'ENERGIES'

Name	Type	Unit	Dims.	Description
channel	uint	-	Nx(1)	Energy Band Index
e_high	float	keV	Nx(1)	end of the energy band
e_low	float	keV	Nx(1)	beginning of the energy band

4.2.4.4.6 Supplements

- **Description:** For Visibility data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.
- **Descriptors:** stix-sci-xray-vis-sup1 stix-sci-xray-vis-sup2
- **Free field:** Request ID

- **Level:** L1
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [Visibility](#)

4.2.4.5 Aspect

- **Description:** Bulk Aspect data. In level 1 format.
- **Descriptor:** stix-sci-aspect-burst
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Download example:** http://pub099.cs.technik.fhnw.ch/data/fits/L1/2021/10/13/SCI/solo_L1_stix-sci-aspect-burst_20211013T034959-20211013T055031_V01_2110130059.fits

4.2.4.5.1 PRIMARY Header

Name	Description	Value example
SIMPLE	conforms to FITS standard	True
BITPIX	array data type	8
NAXIS	number of array dimensions	0
EXTEND		True
FILENAME	FITS filename	solo_L1_stix-sci-aspect-burst_20211013T034959-20211013T055031_V01_2110130059.fits
RAW_FILE	Raw filename(s)	LTP05_T06PM_req_BatchRequest.PktTmRaw.SOL.0.2021.306.11.18.31.636.tcwn@2022.016.18.00.00.811.1.xml
PARENT	Source file current data product	solo_L0_stix-sci-aspect-burst_0687412111-0687419343_V01_2110130059.fits
DATE	FITS file creation date in UTC	2023-03-30T16:34:37.352
BLANK	Value marking undefined pixels (before the appl	4294967295
LEVEL	Processing level of the data	L1
ORIGIN	FHNW	STIX Team, FHNW
CREATOR	FITS creation software	stixcore
VERS_SW	Version of SW that provided FITS file	1.0.0
VERSION	Version of data product	01
OBSRVTRY	Satellite name	Solar Orbiter
TELESCOP	Telescope/Sensor name	SOLO/STIX
INSTRUME	Instrument name	STIX
STYPE	Service Type	21
SSTYPE	Sub-service Type	6
SSID	Science Structure ID	42
DATAMIN	Minimum valid physical value	0.0
DATAMAX	Maximum valid physical value	0.0
BUNIT	Units of physical value, after application of B	
XPOSURE	[s] shortest exposure time	0.0
TARGET	Type of target from planning	none
SOOCTYPE	Campaign ID(s) that the data belong to	LF5

SOOPNAME	Name of the SOOP Campaign that t	L_FULL_LRES_MCAD_Coronal-Synoptic
OBS_ID	Unique ID of the individual observation	SSTX_050A_LF5_118_5Md2_11K
OBS_TYPE	Encoded version of OBS_MODE	5Md2
OBS_MODE	Observation mode	STIX_BASIC
OBT_BEG	Start of acquisition time in OBT	687412111.8080109
OBT_END	End of acquisition time in OBT	687419343.2330663
TIMESYS	System used for time keywords	UTC
DATE-OBS	Start of acquisition time in UTC	2021-10-13T03:49:59.786
DATE-BEG	Start of acquisition time in UTC	2021-10-13T03:49:59.786
DATE-AVG	Center of acquisition time in UTC	2021-10-13T04:50:15.504
DATE-END	End of acquisition time in UTC	2021-10-13T05:50:31.223
SPICE_MK	SPICE meta kernel file	solo_ANC_soc-flown-mk_V110_20230329_002.tm
RSUN_ARC	[arcsec] Apparent photospheric solar radius	1365.419623968852
HGLT_OBS	[deg] s/c heliographic latitude (B0 angle)	2.3663959696753
HGLN_OBS	[deg] s/c heliographic longitude	-11.44656345038951
CRLT_OBS	[deg] s/c Carrington latitude (B0 angle)	2.3663959696753
CRLN_OBS	[deg] s/c Carrington longitude (L0 angle)	-11.44656345038951
DSUN_OBS	[m] s/c distance from Sun	105095511469.5479
HEEX_OBS	[m] s/c Heliocentric Earth Ecliptic X	102806593469.3185
HEEY_OBS	[m] s/c Heliocentric Earth Ecliptic Y	-20328202268.31946
HEEZ_OBS	[m] s/c Heliocentric Earth Ecliptic Z	-7914231663.177074
HCIX_OBS	[m] s/c Heliocentric Inertial X	40660932519.33529
HCIY_OBS	[m] s/c Heliocentric Inertial Y	-96813868171.66388
HCIZ_OBS	[m] s/c Heliocentric Inertial Z	4339357941.402956
HCIX_VOB	[m/s] s/c Heliocentric Inertial X Velocity	38906.31680317773
HCIY_VOB	[m/s] s/c Heliocentric Inertial Y Velocity	4623.681271828634
HCIZ_VOB	[m/s] s/c Heliocentric Inertial Z Velocity	489.8668162276074
HAEX_OBS	[m] s/c Heliocentric Aries Ecliptic X	103619821225.673
HAEY_OBS	[m] s/c Heliocentric Aries Ecliptic Y	15663180551.49941
HAEZ_OBS	[m] s/c Heliocentric Aries Ecliptic Z	103619821225.673

HEQX_OBS	[m] s/c Heliocentric Earth Equatorial X	102917343692.8227
HEQY_OBS	[m] s/c Heliocentric Earth Equatorial Y	-20838830843.29959
HEQZ_OBS	[m] s/c Heliocentric Earth Equatorial Z	4339357941.402956
GSEX_OBS	[m] s/c Geocentric Solar Ecliptic X	46457200439.38368
GSEY_OBS	[m] s/c Geocentric Solar Ecliptic Y	20327846159.96507
GSEZ_OBS	[m] s/c Geocentric Solar Ecliptic Y	-7915294324.322224
OBS_VR	[m/s] Radial velocity of spacecraft relative to	19812.60066588
EAR_TDEL	[s] Time(Sun to Earth) - Time(Sun to S/C)	147.3296158134058
SUN_TIME	[s] Time(Sun to s/c)	350.5608919272674
DATE_EAR	Start time of observation, corrected to Ea	2021-10-13T03:52:27.115
DATE_SUN	Start time of observation, corrected to Su	2021-10-13T03:44:09.225
CHECKSUM	HDU checksum updated 2023-03-30T16:34:37	ZJ6CeG3AZG3AbG3A
DATASUM	data unit checksum updated 2023-03-30T16:34:37	0
HISTORY		Processed by STIXCore L0
HISTORY		Processed by STIXCore L1

4.2.4.5.2 Extension: 'DATA'

Name	Type	Unit	Dims.	Description
cha_diode0	uint	-	Nx(1)	Photodiode A voltage
cha_diode1	uint	-	Nx(1)	Photodiode B voltage
chb_diode0	uint	-	Nx(1)	Photodiode C voltage
chb_diode1	uint	-	Nx(1)	Photodiode D voltage
control_index	int	-	Nx(1)	join index to the control table
time	uint	cs	Nx(1)	unique time index: center of bin relativeB to DATE_BEG
timedel	uint	cs	Nx(1)	duration of the time bin

4.2.4.5.3 Extension: 'CONTROL'

Name	Type	Unit	Dims.	Description
averaging_value	uint	-	Nx(1)	Averaging value Asp TC
index	uint	-	Nx(1)	index column
packet	int	-	Nx(P)	packet ID from XML TM file
parent	str	-	Nx(1)	the parent fits file(s) of this data entry
raw_file	str	-	Nx(1)	the RAW TM file from SOC of this data entry
request_id	uint	-	Nx(1)	unique request ID for the BSD processing
samples	uint	-	Nx(1)	Number of samples
summing_value	uint	-	Nx(1)	Summing value Asp FPGA

4.2.4.5.4 Extension: 'IDB_VERSIONS'

Name	Type	Unit	Dims.	Description
obt_end	float	s	Nx(1)	Start of the IDB period in OBT
obt_start	float	s	Nx(1)	End of the IDB period in OBT
version	str	-	Nx(1)	valid IDB version for the time period

4.2.4.5.5 Supplements

- **Description:** For Aspect data products, supplementary data of this type may be available for the same time period. These data originate from the same raw measurements recorded onboard but were downlinked with another configuration by an operator request. Most commonly, the various configuration uses cases are different pixel/detector masks or time/energy binning. Such supplements can contain additional but also (partly) overlapping data compared to the already existing data product of the same time and type (base product). In the FITS "COMMENT" header keyword, you will find a reference to the base product and a brief description of the TM configuration for this product. If supplement data products are available for the same time period, merging this data into the base product for the best scientific approach could be worthwhile. But this merging has to be done manually by the user. Please contact the STIX team if you have any questions.
- **Descriptors:** stix-sci-aspect-burst-sup1 stix-sci-aspect-burst-sup2
- **Free field:** Request ID
- **Level:** L1
- **File cadence:** One file per request
- **Keyword and Extension definition see:** [Aspect](#)