CCLRC
Rutherford Appleton Laboratory

SMART-1 D-CIXS

To Planetary Science Archive Interface Control Document

S1-CIX-RAL-ICD-3010

Issue 3.2

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esa

Distribution List

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Change Log

Date	Sections Changed	Reasons for Change
27-Sept-2004	All	First formal release
14-Oct-2005	Section 2	Description of new type 6 packet added.
29-Jan-2008	All	Added Extended Mission Phase, added Time Standards, naming conventions, update of data products, added data products.
22-March-2010	All	Updated all PSA related things, i.e. version PDS standard, Data Set ID's, Data Directory naming convention, File naming convention, Data Types (instrument modes), modified description of dataset directories, updates Chapter 4 and added example label files for each data product.
15-June-2010	Section 3.4.3.6	Added geometry products.

TBD ITEMS

Section	Description

Table Of Contents

1 Introduction

1.1 Purpose and Scope

The purpose of this EAICD (Experimenter Archive Interface Control Document) is two fold.

1. It provides users of the D-CIXS instrument with detailed description of the data products, a description of how they were generated, including data sources and destinations. As part of this information sufficient description of the instrument is provided to help in the interpretation of the data and corresponding caveats.
2. It is the official interface between the D-CIXS team and the ESA Planetary Science Archive (PSA).

1.2 Archiving Authorities

The Planetary Data System Standard is used as archiving standard by

- NASA for U.S. planetary missions, implemented by PDS
- ESA for European planetary missions, implemented by the Research and Scientific Support Department (RSSD) of ESA

For the purpose of archiving SMART-1 data, version 3.8 of the PDS standard is applicable.

1.2.1 ESA's Planetary Science Archive (PSA)

ESA implements an online science archive, the PSA,

- To support and ease data ingestion
- To offer additional services to the scientific user community and science operations teams as e.g.
  - Search queries that allow searches across instruments, missions and scientific disciplines
  - Several data delivery options as
    - Direct download of data products, linked files and data sets
    - Ftp download of data products, linked files and data sets

The PSA aims for online ingestion of logical archive volumes and will offer the creation of physical archive volumes on request.

1.3 Contents

This document describes the data flow of the D-CIXS instrument on SMART-1 from the spacecraft through to insertion into the ESA PSA. It includes information on how data were processed, formatted, labelled and uniquely identified. The document discusses general naming schemes for data volumes, data sets, data and label files. Standards used to generate the product are explained. Software that may be used to access the product is explained further on.

The design of the data set structure and the data product is given.

1.4 Intended Readership

The intended readership for this EAICD is

- The staff of the archiving authority (Planetary Science Archive, ESA, RSSD, design team)
- Any potential user of the D-CIXS data.

1.5 Scientific Objectives

The detailed science objectives of the D-CIXS instrument are described in section 2.2.

The core science objective is to demonstrate the technology required to produce absolute elemental abundance of the lunar surface. In addition the instrument shall be used during the cruise phase to monitor variations in the solar X-ray spectrum and to undertake X-ray observations of celestial sources, the Earth and objects of opportunity such as comets.

1.6 Applicable Documents

AD1	Planetary Data System Preparation Workbook, February 1, 1995, Version 3.1, JPL, D-7669, Part1
AD2	Planetary Data System Standards Reference, February 27, 2009, Version 3.8, JPL, D-7669, Part 2
AD3	Smart1 Archive Generation, Validation and Transfer Plan, July 7, 2003, Version 1.5, S1-EST-PL-1004
AD4	Navigation and Ancillary Information Facility (NAIF), http://pds-naif.jpl.nasa.gov
AD5	Science Archive Review Procedure for EAICD/Cruise Phase, 12 October 2004, Version 3, S1-RSSD-PR-001
AD6	L1B Processor / Manager Software User Manual SOP-RSSD-UM-011 Draft b 23 May 2007
AD7	L1B Processor Software Configuration Language Definition SOP-RSSD-TN-034 Issue 1 b 23 May 2007
AD8	Quicklook Browse Tool for Level 1b Datasets, date, Version, SOP-RSSD-RP-032
DH	D-CIXS/XSM Data Handling Interface Control Document, February 24, 2006, Version 13, S1-CIX-ICD-3002
UM	D-CIXS DCIXS/XSM User Manual, October 16, 2002, Version 1.6, S1-CIX-MA-3002
XSM	SMART-1 XSM, October 1, 2004, Version 11, S1-CIX-HY-ICD-0001

1.7 Relationships to Other Interfaces

Changes in this document shall affect:

- D-CIXS data production pipeline
- D-CIXS archive volume production and delivery system

1.8 Acronyms and Abbreviations

ADC	Analogue to Digital Converter
D-CIXS	Demonstration Compact Imaging X-Ray Spectrometer
DDS	Data Distribution System
DPU	Data Processing Unit
EEPROM	Electrically Erasable Programmable Read-Only Memory
FPGA	Field Programmable Gate-Array
GDP	Generic Data Pipeline
HK	Housekeeping
OBDH	On Board Data Handling
OBT	On Board Time
PROM	Programmable Read-Only Memory

PSA	Planetary Science Archive
RAM	Random Access Memory
RICA	Rosetta Ion Counter ASIC
RSSD	Research and Scientific Support Department
SPICE	Spacecraft, Planet, Instrument, C-matrix, Events
TC	Tele-Commands
TM	Telemetry
XSM	X-ray Solar Monitor

1.9 Contact Names and Addresses

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2 Overview of Instrument Design, Data Handling Process and Product Generation

D-CIXS is a demonstration instrument aimed at proving the technology for a compact imaging spectrometer. As such there are many technical issues that must be taken into account when working with the data. In order to correctly utilise the data products for science analysis it is vital to have an understanding of the operation of the instrument and of the associated caveats provided with the data. This section provides a basic description of the instrument hardware and operation.

2.1 Hardware description

A block diagram of the system configuration is shown in Figure 2-1. The instrument consists of two units:

The *DCIXS* instrument comprises:

DCIXS unit – The electronics unit including the DCIXS detectors. The main ***DCIXS*** instrument detector head consists of a matrix of 24 X-ray sensitive Swept Charge Devices (SCDs), integrated microstructure collimators to define and limit the field of view (FOV), and filters to inhibit background UV and solar wind ions and electrons.

XSM – X-ray Solar Monitor on +X panel. The ***XSM Solar*** Monitor calibration unit is intended to provide direct observation of the Sun over a full range of phase angles and solar luminosities. The XSM has a wide spectral range (0.8 up to 20 keV) and good spectral resolution (about 200 eV at 6 keV obtainable).

Measurement of low fluxes requires a large sensitive area detector. The incident fluorescence X-rays are detected by means of an array of 24 X-ray sensitive Swept Charge Devices (SCDs). The X-rays create electron-hole pairs and charge packets within the substrate in exactly the same way as in an X-ray sensitive CCD. The SCD is a newly developed large area ($100mm^2$) single-pixel silicon X-ray detector. It has the same readout noise, and thus energy resolution characteristics of the very best customized X-ray CCD detectors.

These devices can meet the performance requirements at 'near room' temperatures, 0° to -20°C. But when operating in a proton radiation environment protective measures have to be taken. The trapped and solar protons can generate vacancies in the silicon detector which act as charge trapping sites which degrade the performance in particular the energy resolution. The low energy protons that actually stop in the silicon cause the most damage and therefore a sliding shield to absorb them is moved over the detectors each time the trapped proton belts are entered. The energy resolution can be restored to a certain extent by increasing the signal readout integration period. The increased integration time also increases the system noise that has been offset by reducing the nominal operating temperature to ≤-20°C.

The angular/spatial resolution is provided by a low profile (~3mm) collimator mounted directly above the SCDs.

The energy of individual X-rays is recorded and the event time-tagged. Depending on the telemetry capacity available the individual event data is transmitted to ground or a spectrum is accumulated on board and then transmitted.

The Solar X-ray monitor, which provides the measurement of the fluorescence excitation radiation, will measure the spectrum continuously with a 16s integration time. The data is time

tagged and transmitted, as it becomes ready. Further details of the XSM are covered in the separate XSM EAICD.

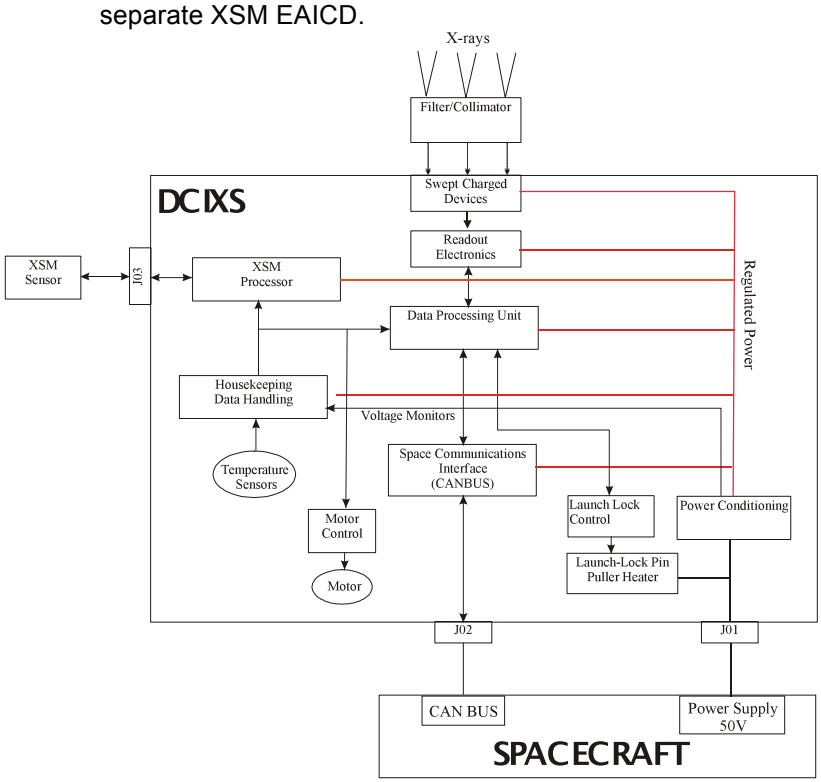

Figure 2-1 DCIXS/XSM System

2.1.1 Detector Assembly

A schematic of the detector assembly is shown in Figure 2-2.

The detectors are mounted in a housing which acts as a heatsink and provides attenuation using gold plated shielding for the X-ray background generated as secondary products in local structure from primary cosmic ray flux.

High-energy events depositing large amounts of charge within the detector are discriminated by threshold detection, so that although contributing to a detector dead time they do not produce background signal.

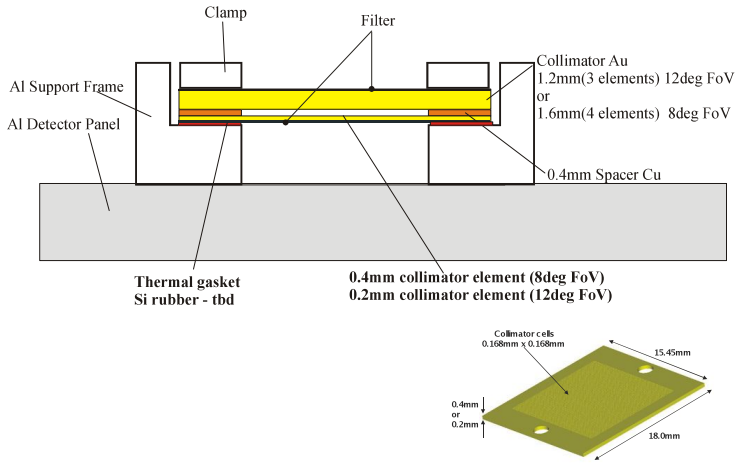

Figure 2-2 Detector Assembly

2.1.1.1 Detectors

Four SCDs are mounted on a ceramic substrate with the clocks and signal lines available on pins.
See *Figure 2-3*.

The detectors are mounted in small groups of four for ease of handling.

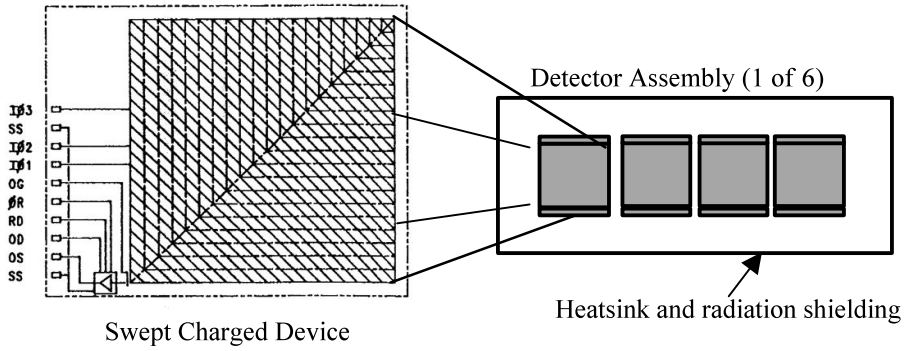

Figure 2-3 Detector Configuration

A summary of the SCD's characteristics is given in *Table 2-1*

SCD electrodes are arranged in a design that, upon clocking, will 'sweep' any charge towards a low capacitance sense amplifier located in one corner of the detector (the bottom left-hand corner as shown in *Figure 2-3*). The design of the sense amplifier is again based upon that used in CCD technology, consisting of a very low capacitance sense amplifier and reset transistor, and again operates in exactly the same way as in a CCD. Readout noise as low as 3 electrons rms. A 100KHz readout rate can be anticipated as this has already been demonstrated in EEV's latest CCD designs.

Table 2-1 Swept Charge Device Characteristics

Sensitive area:	10 x 10 mm
Max. Count rate:	30,000 counts/sec
Output noise:	3 (typ.) to 5 (max.) electrons rms. (with 100KHz Correlated Double Sampling)
Energy Resolution:	140eV
Detector Efficiency:	>30% at 280eV >30% at 10keV

Operating temperature:	-10°C to 0°C -20°C in proton radiation environment

2.1.1.2 Collimator Assembly

The assembly consists of the low profile collimator layers interleaved with aluminium thin film filters which act as a visible light blocking filter preventing reflected solar light from entering the detector and also functions to absorb the background solar electrons. These are present at the collimator entrance at a flux of ~100 s^{-1}

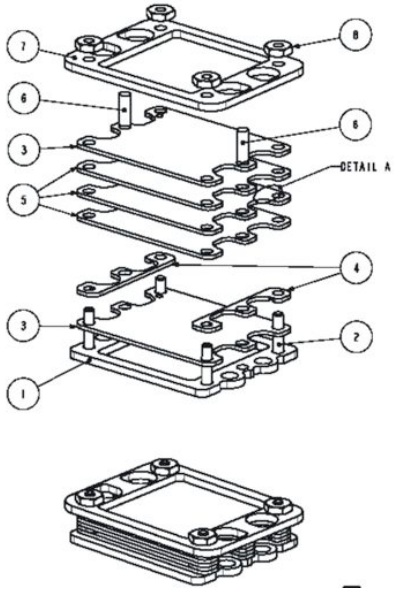

Figure 2-4 Collimator/Filter Configuration

A total of 4000Å of aluminium filter reduces the electron flux to essentially zero whilst allowing the transmission of 1-10keV fluorescence X-rays. For maximum electron suppression and immunity to pinholes, the filter is realised as two separate foils. Freestanding filters of this thickness would be far too fragile to survive launch thus a suitable mesh support is required. The collimators themselves make ideal filter support structures.

2.1.1.3 SCD Readout Electronics

A block diagram of the front-end readout electronics is given in Figure 2-5. The SCD detectors are all operated in parallel under the control of a master waveform generator ASIC. This ASIC provides all the timing signals for driving the SCD electrodes, output amplifiers, the external correlated double sampling (CDS) signal processing electronics and analogue-to-digital converter (ADC).

Digital control signals from the ASIC are level-shifted and buffered for driving the SCD's electrodes, again using circuitry already developed for CCD applications. The video signal from each SCD is taken to a CCD Signal Processor integrated circuit via a preamplifier. The signal processor performs the correlated double sampling and A/D conversion.

The digitised data is fed through an ACTEL FPGA which performs data thresholding in the digital domain, and thus provides the first stage of data reduction by only passing on those data that are above a predefined, but programmable threshold. From the ACTEL, the data are passed to the Data Processor Unit (DPU). See Figure 2-1.

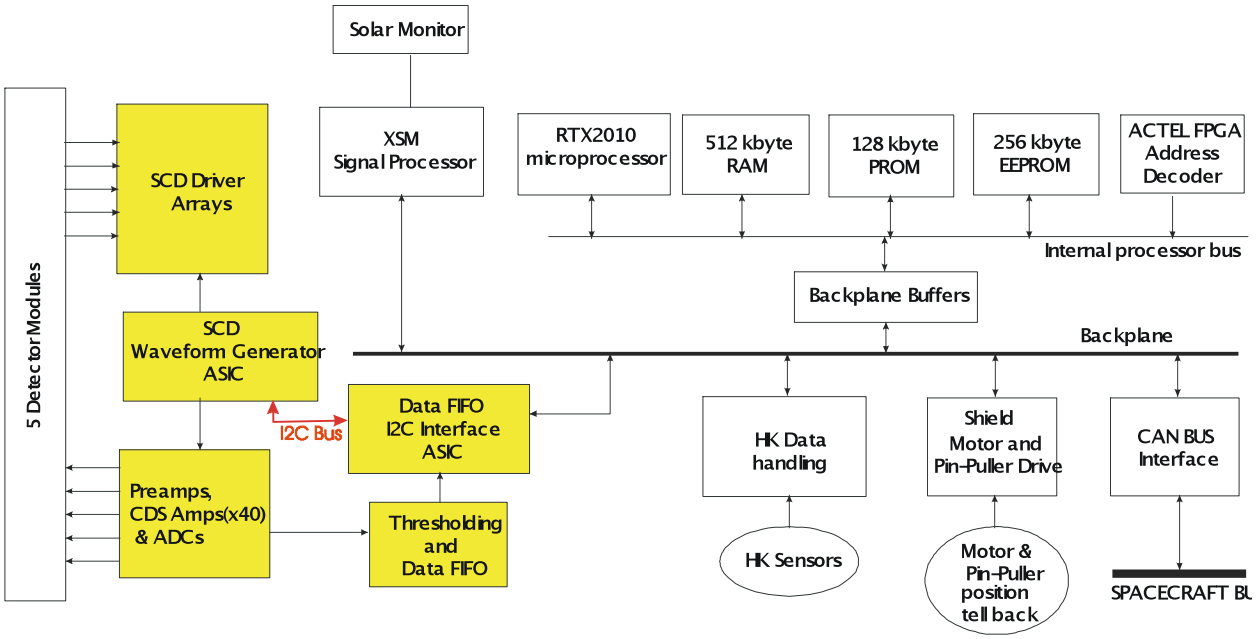

Figure 2-5 Swept Charged Device Readout System

2.1.2 Radiation Shield and Controller

The detectors are protected from the lower energy protons, which will cause the most damage to the silicon detector material, by moving a 3mm thick tungsten shield in front as the trapped radiation belts are approached. It is opened again on leaving the belts. See Figure 2-6

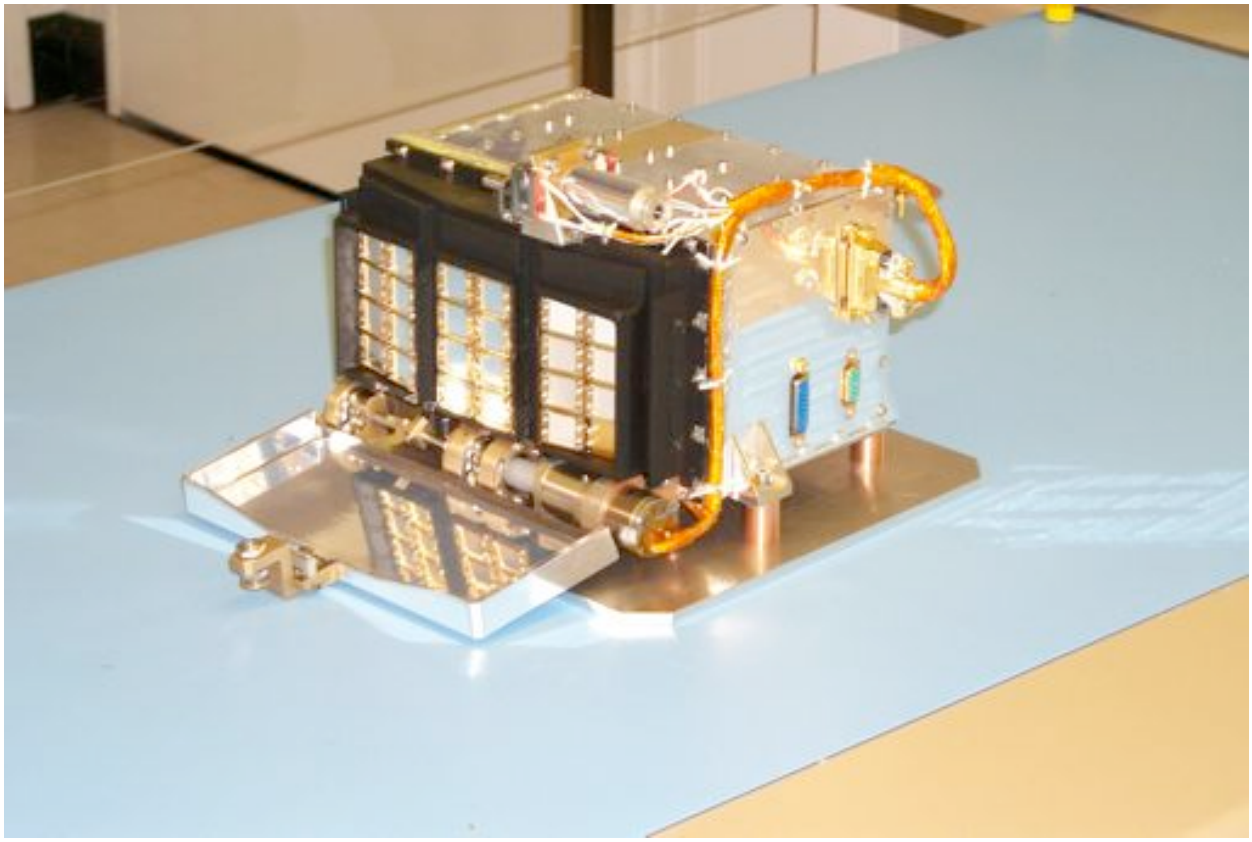

Figure 2-6 Radiation Shield

2.1.3 Solar Monitor

The sensor is an X-ray sensitive diode mounted on a Peltier cooler in a 13x9mm package behind a beryllium window. A front-end preamplifier is in the same detector package.

Table 2-2 Detector Characteristics

Sensor	Silicon diode
Area	0.28mm^2
Thickness	0.5mm
Energy Range	1keV to 20keV
Energy Resolution	250eV at 6keV
Window	Circular Be 25μm window
Field of View	52° half cone angle
Operating Temperature	Peltier Cooled to -10°C

The detector is mounted in a larger package which contains another preamplifier stage. This package is mounted on the spacecraft. See *Mechanical ICD S1-CIX-ICD-3004*

2.1.3.1 Solar Monitor Electronics

The system for processing the pulses from the detector and controlling the Peltier cooling of the sensor is contained on a single circuit board within the DCIXS unit. The system overview is given in Figure 2-7

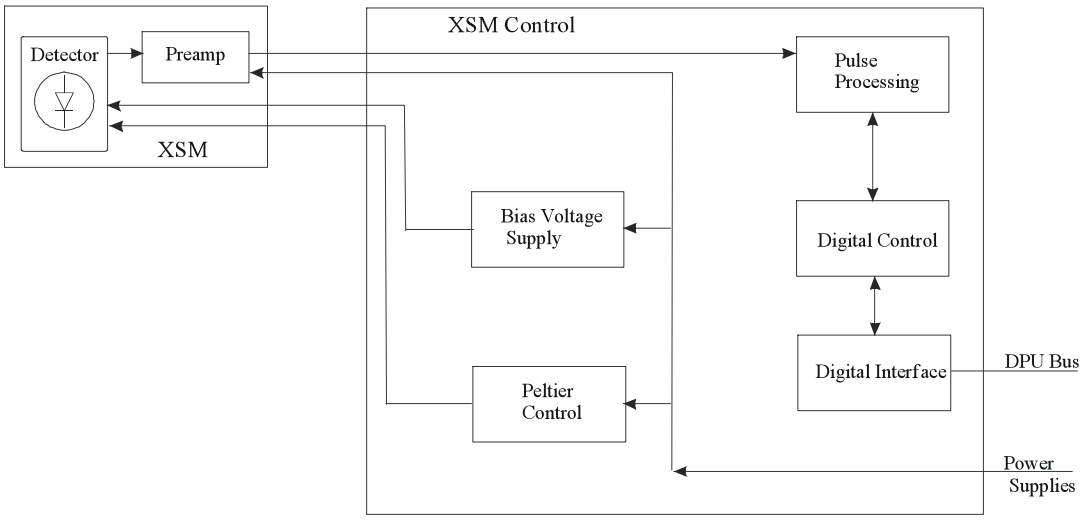

Figure 2-7 XSM System

2.1.4 Data Processing Unit

The Data Processor Unit (DPU) has design heritage from the ROSETTA MODULUS experiments. A block diagram of the DPU is given in Figure 2-8. It consists of an RTX2010 microprocessor with RAM, PROM, and EEPROM memory. The main functions of the unit are:

- To receive commands from the spacecraft OBDH,
- To provide control and timing synchronisation between the DCIXS detectors and the Solar Monitor,
- To receive data from both the DCIXS detector array and the Solar Monitor, and in software to provide a software histogram data compression and time tagging,
- To monitor the status and health of the instrument, and to provide housekeeping telemetry data,
- To pass data from the instrument to the main spacecraft OBDH.

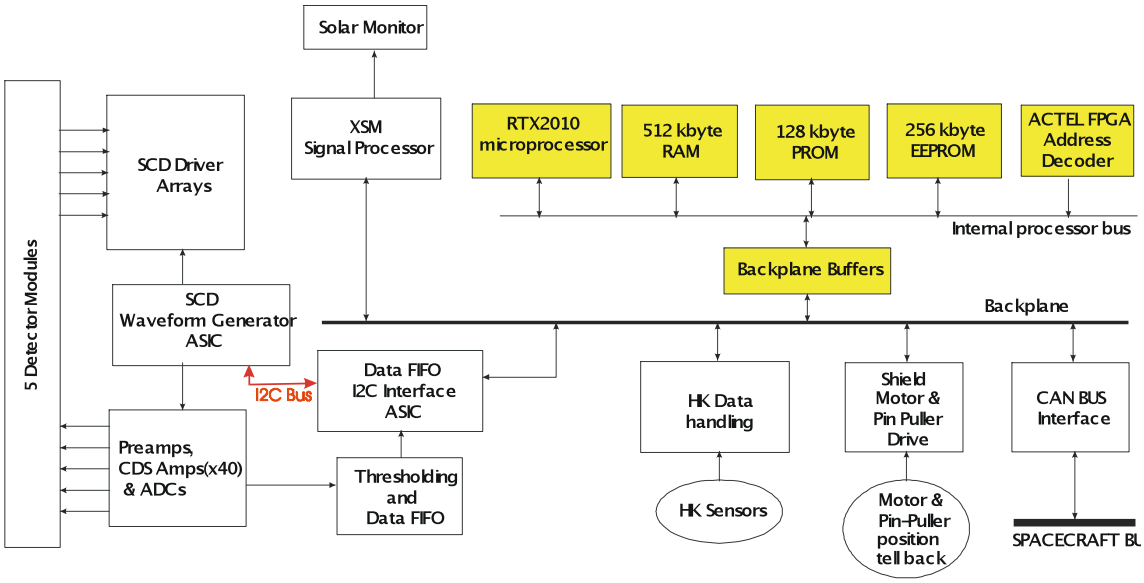

Figure 2-8 Data Processor System

2.1.4.1 Housekeeping Data Handling

Temperature sensors, voltage monitors, and Spacecraft Power Supply Current monitor is conditioned and digitised on demand from the DPU via the internal backplane bus. The housekeeping parameters are given in *S1-CIX-ICD-3002 Data Handling ICD* and are one of the standard products to be provided to the PSA.

2.1.4.2 On-Board Software Description

The on-board software is responsible for the control of the DCIXS & XSM experiments for periods of up to 4 days without Earth contact. It collects science and housekeeping data from the experiments and forwards these to the spacecraft. It receives, interprets and executes telecommands for the experiments and performs, autonomously, those actions that cannot be reasonably commanded during Earth contact or predicted sufficiently accurately to be handled by time-tagged telecommands.

The software is designed to allow the most effective collection and transmission of science data by DCIXS and XSM consistent with instrument survivability and with the external constraints on resources placed on the instrument. The overall benefits of the mission are,

first, proving of the technology of the DCIXS and XSM experiments and, second, collection of data on solar X-ray flux (XSM) and Lunar soft X-ray emissions (DCIXS). The Lunar soft X-ray events (photons) have to be time tagged with sufficient accuracy to allow location of the source on the Moon. The Solar X-ray flux is required contemporaneously with the Lunar soft X-ray data for calibration purposes.

During the (long) cruise to the Moon, certain astronomical sources will be observed by DCIXS for calibration and science purposes. One (the Crab Nebula) shall be at least two orders of magnitude brighter than the flux from the Moon. However, Solar X-ray flux and high accuracy time tagging of the soft X-ray photons is not required for the interpretation of these observations.

The software provides separate modes (or sub-modes) of data acquisition/formatting to suit these different types of observation.

The following general functions are required of the software:

- Receive, validate, interpret and execute DCIXS telecommands.
- Set up the instrument and electronics into the required operating state (usually in response to a TC).
- Acquire and collate science data from the DCIXS and XSM detectors and format into PUS packets for transmission.
- Gather analogue housekeeping data from the XSM and DCIXS electronics once per second.
- Once per second, monitor analogue housekeeping data. Report results in housekeeping TM.
- Take appropriate action when anomalies are detected.
- Format housekeeping data into PUS packets for transmission every 64 seconds.
- Maintain an on-board time reference synchronised with the Spacecraft on-board time to allow time stamping of TM packets and of DCIXS photon events (for correlation with attitude history).
- Maintain a history of instrument operation (TCs, events, anomalies) for subsequent transmission.
- Perform routine system health checks.
- Perform such autonomous actions as are necessary for the continued collection of useful science data.
- Respond to an external watchdog timer in the event of a software anomaly.
- Provide an emergency operating mode in the event of a system failure to enable diagnostic data to be transmitted and recovery procedures to be effected.

The TCs must be acquired from the CAN-bus interface as CAN packets and assembled into PUS TC packets. Each of the TCs described in *Data Handling ICD S1-CIX-ICD-3002* must be supported.

On start-up or entry into standby or ROM-emergency mode, the on-board software must ensure that the XSM, DCIXS detector electronics and mechanisms are powered off.

On entry into self-test or operating mode, the on-board software must optionally (as specific in the mode change TC) power on any selected combination of the XSM and the two DCIXS processing chains.

The XSM must be set to its normal cooling mode. Also, at these transitions, the on-board software must load the correct waveform into the WGA, via the I2C interface on the RICA, and set up the FPGA and Analogue registers for each of the two DCIXS analogue processing chains.

XSM: The on-board software must regularly read the XSM event FIFO, collating the events to produce a 512 element XSM spectrum every second. The 1 second spectra shall be combined to produce 16s spectra for downlink.

DCIXS: The on-board software must regularly read the DCIXS event FIFO, depending on data formatting sub-mode and data rate, the events shall be reported either in a time-tagged event TM packets or in high or low rate spectra.

Analogue HK values shall be collected from the DCIXS electronics and from the XSM electronics each second. Simple health checks shall be performed. The Each HK packet shall include the latest collected values for selected signals.

If an analogue HK parameter exceeds a safety limit, the corresponding subsystem (XSM or DCIXS science electronics) should be switched off/disabled. No DCIXS analogue parameters have yet been identified for which a safety limit with corresponding action may be defined.

The XSM leakage current must be monitored against a threshold, its rate of increase should also be checked against a second threshold. In operating mode, the DCIXS detector total counts should be summed and checked against a threshold to detect excessive ambient ionising radiation. Individual detector total counts should be checked against a limit to detect damage.

If the XSM leakage current exceeds a threshold determined by two software parameters, which are monitored and updated during flight, the XSM must initiate an annealing sequence. After the sequence, XSM performs spectral calibration, updates the leakage current threshold, and returns to scheduled operation.
The total duration of XSM annealing sequence is about 6 hours.

If the total counts for 16 (software parameter) or more of the 24 DCIXS detector count totals exceeds a certain threshold (software parameter) the DCIXS detector door must be closed. The door shall be opened when the total count falls below a lower threshold (also a software parameter) for 8 (software parameter) or more detectors. If the total count for a particular detector should exceed a separate (software parameter) threshold, that detector shall be disabled and prevented from feeding data into the DCIXS RICA FIFO pending action/decision on the ground.

A watchdog timer shall restart the on-board software in ROM-Emergency mode in case of a software crash. The software shall reset the timer no less often than once per second when executing correctly.

The software must have an emergency operating mode that allows patching to RAM and dumping of memory locations. This mode shall be entered in case of a failed test at start-up or in case of a crash of the RAM-based software. The emergency mode should, if possible make no use of RAM or interrupts.

2.1.5 Summary of Instrument Operations

The operations envisaged for each phase of the mission are outlined in Table

Table 2-3: Operations during each phase of the mission

LEOP	Instrument Off
Escape Continuous Thrust	Instrument Off - radiation shields closed in radiation belts
Escape Coast Arcs	Radiation Shields closed in radiation belts DCIXS Calibration Astronomical observations XSM Solar Observations Auroral Observations DCIXS/XSM on-board calibrations
Lunar Observation and Extended Mission	Lunar Observation Astronomical observations DCIXS/XSM on-board calibrations

The experiment modes are defined below.

The DCIXS and XSM radiation shields should only be opened in OPERATING mode when prevailing radiation environment is acceptable. i.e. no large proton fluxes.

The experiment modes and the data handling states are used during the mission phases as shown in Table 2-4.

Table 2-4 Experiment Mode/Mission Phase Correlation

Experiment Mode	Mission Phase / Experiment Data State	Pre-Launch	LEOP	Escape Continuous Thrust	Escape Coast Arcs	Lunar Observation and Extended Mission
LAUNCH LOCK		X	X			
OFF		X		X	X	X
EMERGENCY		X			X	X
STANDBY		X			X	X
SELF-TEST		X			X	X
OPERATIONAL	DCIXS - Time tagged Event Format	X			X	X
	DCIXS - Low Count Spectrum Format	X			X	X
	DCIXS - High Count Spectrum Format	X			X	X
	DCIXS - Autoformat [Default]	X			X	X
	XSM	X			X	X
	Housekeeping	X			X	X

2.2 Scientific Objectives

A summary of the D-CIXS science objectives is given in Table 2-5 and described in the following sub-sections. The prime observations are those taken during the lunar observation phase. The x-rays from the sun are absorbed by the lunar surface which in turn is stimulated to emit fluorescence X-rays characteristic of the elements which comprise the surface. The D-CIXS instrument will simultaneously measure the solar X-ray flux and the emissions from the moon and will therefore able to produce a quantitative survey of the lunar surface materials as the spacecraft orbits the moon.

Table 2-5: Summary of Scientific Objectives

Observation	Physical parameter	Specific Performance Requirement	Special Requirements
Cruise Phase			
Earth's X-ray aurora: Argon line and N-S Conjugacy.	Auroral X-ray emissions	Resolution of Argon Line	Pointing of spacecraft required
Earth's Magnetotail.	Electron flux	Detection of high background levels of electrons by detectors	
Astronomical objects	X-ray spectral time dependence	Nominal D-CIXS performance	Pointing of spacecraft required
XSM Solar Monitoring	Flare temporal evolution and X-ray spectral variation	Nominal XSM performance	
Targets of Opportunity	X-ray spectra	Nominal D-CIXS performance	Pointing of spacecraft required
Lunar Observation Phase and Extended Mission			
Lunar geochemistry	Spatial distribution of the major lunar rock types	Nominal D-CIXS & XSM performance	
Lunar plasma interaction	X-ray emission from impact of solar wind electrons on night side of moon	Nominal D-CIXS performance	

2.2.1 Lunar Science (Moon observation phase)

The D-CIXS instrument will provide the first global map of the Moon in X-rays, with <50km spatial resolution at perilune (300km). It will map the absolute abundances of key elements across the Moon, such as Si, Mg, Al and Fe, and others in favourable (i.e. flare) conditions. It will provide far better energy resolution than that obtained with the Apollo 15/16 missions. Observations of these elements will help to constrain theories of lunar origin and evolution. Of fundamental importance is to determine the magnesium number [Mg/(Mg + Fe)] across the Moon which to date has not been achieved. We will also probe the geochemistry of the larger impact basins, one of which (the South Pole-Aitken basin) may contain exposed mantle material, and which exhibited unusual spectral signatures within the Clementine data. Vertical variations in crustal composition can be revealed by examination of impact crater ejecta and central peaks (as demonstrated by Clementine), which represent exhumed or exposed crustal material. We will be able to examine the deeper layers of the crust by studying the central peaks of the largest impact craters, and the central regions of the large impact basins. The time series of lava flows can reveal petrological evolution, and large scale observations of elemental variation across different lava flows in the maria will contribute to our understanding

of this evolution. These results will have direct relevance to lunar resource evaluation, as a precursor to future exploitation of the Moon as a base for space exploration.

2.2.2 *Lunar plasma interaction (Moon Observation Phase)*

Recent Japanese X-ray observations of the Moon suggest that X-ray production on the night side due to the impact of energetic particles, while measurements by GGS/Wind and Lunar Prospector show that the energetic electrons of the solar wind are not shielded by the shadow, and that 1keV energy electrons are on occasion accelerated towards the surface. D-CIXS with its large effective area will provide the high-quality spectroscopy necessary to identify the processes.

2.2.3 *The Earth's X-ray aurora: Argon line and N-S Conjugacy (Cruise Phase).*

Recent results from the X-ray emission of the aurora suggest that a significant portion of the X-ray flux it detects is due to the Argon line at 2.957 keV. This contaminates their efforts to deconvolute the incident electron spectrum and hence understand the global energetics. Spectra taken by DCIXS would clearly resolve this line, and hence remove the ambiguity. At distances up to about 18 Earth radii, DCIXS will be able to make measurements of the conjugacy of the northern and southern hemisphere X-ray aurora. These will be the first such measurements, and should again be of importance in understanding global auroral energy budgets.

2.2.4 *The Earth's Magnetotail (Cruise Phase).*

DCIXS is shielded against electrons of energy up to 6 keV. Electrons more energetic than this are extremely rare in the solar wind. They do however occur in the magnetotail. While the increased background may degrade the X-ray performance of the instrument on the occasions when it enters the tail, there is interesting science to be done in mapping the structure of the tail. As the orbit is slowly increased from geostationary to lunar radius, the instrument will perform a detailed map of the width of the tail.

2.2.5 *Astronomical Cruise Science with D-CIXS (Cruise Phase)*

There is scope for making important astronomical observations with D-CIXS. The one important area that D-CIXS can explore that is unlikely to be done by the current observatory-class X-ray missions (e.g. Chandra and XMM-Newton) is long duration monitoring campaigns. D-CIXS can monitor up to 15 or 20 sources for periods of up to 5 months (with daily observations) and can therefore alert the astronomical community to unusual or rare outburst phenomena on superluminal jet sources in AGN or other similar objects. D-CIXS can also monitor the much brighter galactic sources for spectral and time variability and again look for longer-term variability in these sources. This includes some of the brightest X-ray binary sources known which are now essentially beyond the limit of the very sensitive X-ray observatories (because they are too bright in X-rays). The proposed targets have been selected with the capabilities and limitations of the D-CIXS and SMART-1 in mind, and simulations have been made to be able to predict the observing times. Due to the large FOV without spatial resolution, the background contribution is estimated and the fields are checked for possible target confusion. All selected targets are significantly brighter than other targets in the 8x8 degree field.

2.2.6 XSM Solar Monitoring (Cruise Phase)

Important cruise science will also be undertaken by the X-ray Solar monitor. The XSM spectral range is very sensitive to solar flare activity. During a flare the measured total spectrum is largely dominated by the flux from the event, and the contribution from the solar network can be neglected, especially in the higher energies above about 3 keV. Thus we will be able to monitor the long-term evolution of flares, with the added dimension of good energy resolution (not possible with the current generation of GOES-type solar X-ray monitors). Such monitoring will complement the SOHO data very well. Long term monitoring of the X-ray spectral variability of the Sun excluding the flare events is also significant, especially in comparison with similar studies for other active stars.

See the separate XSM EAICD for full details of the XSM instrument and archiving activities.

2.2.7 Targets of Opportunity (Cruise Phase)

It is very likely that during the course of the SMART-1 cruise phase, a bright X-ray transient (sometimes referred to as X-ray Nova) will go off. Historically, such events occur about once per year. D-CIXS will then be able to provide the long-term monitor of such an event and provide detailed spectral evolution of the decline in X-rays. Again, these sources can be extremely bright close to maximum light and thus may be unobservable with other current X-ray instruments.

Another possible important but unpredictable type of X-ray source would be a bright or near-Earth comet (such as comet Hyakutake in 1996 or Hale-Bopp in 1997). We know already that such sources are extremely erratic and variable and respond very quickly in changes to the solar wind and/or internal gas/dust outbursts. In these events, the X-rays are boosted and D-CIXS will have the opportunity to make detailed spectral observations of the comet/outburst. The spectrum is certainly the vital "missing" ingredient that will allow the correct model for the X-ray production mechanism to be determined.

2.2.8 Technology Objectives

The capability of these X-ray detectors, based on Swept Charged Devices, to withstand the space environment whilst maintaining good sensitivity will be proven by this mission.

An in-flight calibration of the detectors is provided by the escape phase observations of well-.known astronomical X-ray sources. The measurements made of the low flux levels from the lunar surface against the background of the solar wind electrons will demonstrate the design possibilities of the micro-collimation techniques.

2.3 Data Handling Process

A description of the on-board data handling was provided under section 2.1.4. The data packets accumulated by the instrument are initially passed to the SMART-1 on-board data handling system where they are stored in a central solid state recorder in preparation for download to the ground. Contact with the ground station and down link of the science telemetry from occurs approximately twice a week. The instrument data packets together with spacecraft data and various auxiliary datasets (such as orbit, attitude, command logs and event files) are processed, catalogued and stored on the SMART-1 Data Distribution System (DDS) at ESOC. As part of this processing an additional binary header is pre-pended to each packet providing information on the ground receive station, packet time and quality.

Data from the DDS is returned to the D-CIXS EOF either via a web based request procedure or through an automated request that automatically delivers new data.

2.3.1 Data Levels

The D-CIXS raw data (level 0) consists of a set of fixed length telemetry packets. Each packet is preceded by a packet header that includes information on the downlink time and contents of each packet. There are 10 packet types defined as listed in the Table 2-6. The packet types are described in S1-CIX-ICD-3002.

Table 2-6 D-CIXS Level 0 Packet Types

Packet Type	Description
0	Housekeeping
1	D-CIXS Time Tagged Events
2	D-CIXS Low Count Spectrum
3	D-CIXS High Count Spectrum
4	XSM Spectrum
5	Memory Dump
6	D-CIXS Compressed Low Count Spectrum
7	D-CIXS SCD Test
8	Auxiliary Data
9	Auxiliary Data – Detector Means

The D-CIXS Level 1 data provided to the PSA shall consist of reformatted Level 0 data in PDS format. Where appropriate data shall be converted to engineering units using the standard conversion information specified in S1-CIX-ICD-3002 but will otherwise be uncalibrated.

During October 2005 the onboard software was updated to add a new packet type. The previously unassigned Type 6 packet was created and set-up to contain a compressed D-CIXS low count spectrum. The detailed description of the contents and implementation of this new data type are described in S1-CIX-RAL-ECR-54 and the updated version of S1-CIX-ICD-3002.

In the case of the Level 1 data the Type 6 packets will be decompressed prior to archival, the resulting output files resemble the existing Type 2 low count spectrum data, except for the binning of the data which is different. Therefore the decompressed Type 6 data will be archived as a product in its own right and not as a Type 2 product.

The Level 2 data shall consists of calibrated X-ray events (time tagged mode) and spectra (time tagged, low and high count rate modes).

The Level 3 data shall consist of lunar elemental abundance maps. This shall require deconvolution of the incident solar X-ray spectrum as measured by the XSM.

2.3.2 Software:

In the following sections the software used for data processing is detailed.

2.3.2.1 Calibration Software

No calibration software will be delivered with the exception of:

- Decompression software for decompressing the type 6 data, i.e. Compressed Low Count Spectra. This will be provided in the EXTRA's directory, see section 3.4.3.8.
- Data used for the conversion from raw values to engineering units. This will be stored in the CALIB directory, see section 3.4.3.2.

2.3.2.2 Pipeline Processing Software

ESA has made their Generic data Pipeline (GDP) available to process the telemetry data and is described hereunder see [AD6] for details.

The GDP software is designed for the processing of telemetry data from instruments on board of ESA planetary spacecrafts. Telemetry data can be processed (selection, conversion, calibration, etc.) and converted into PDS compatible output data. The GDP supports the automated or manual processing of payload telemetry data files. It is not designed to be used as a real time tool. The software provides the following functionalities:

GDP processor
This program allows extracting data from a single telemetry data file, process the extracted data, and export the result in the form of one or more PDS compatible data file(s). The contents (structure) of the telemetry file, as well as the data which shall be extracted, and the structure of the PDS product are described in user-defined configuration files, see [AD7] for details. The GDP is started via the IDL or UNIX command line. Diagnostic output is produced in the command window and/or the IDL status window. Status and error messages are also saved in a log file.

GDP manager
This program is provided for the automated GDP processing of multiple telemetry data files in a UNIX/Linux environment. Selection criteria and processing parameters for the telemetry files are defined in a dedicated main configuration file. For each telemetry data file that meets the selection criteria, a dedicated GDP process is created. This process generated the desired PDS products in a specified directory. After successful process execution the telemetry file is moved to the destination directory.

While the GDP processor can be used standalone for the manual processing of small numbers of data files, the combination of the GDP manager and processor allows for automatic processing of telemetry data in a SOC environment.

2.3.2.3 Scientific Analysis Software

No scientific analysis software is part of the delivery to PSA. The QBTool is available for taking a quick look at the data. See [AD8] for details.

2.4 Overview of Data Products

This section provides an overview of the D-CIXS products that are to be included in the submission to the PDS.

2.4.1 Pre-Flight Data Products

No deliveries of pre-flight data are planned.

2.4.2 Instrument Calibrations

Instrument calibration data is included as part of the standard datasets that are delivered to the PDS. There are several different types of calibration information that shall be provided.

- Results of the onboard energy calibration run every 256s
- Data from detector covered by radioactive calibration source

The onboard energy calibration information is returned in packets with specific data type ID that is only used to return this information. The data returned from the calibration source (spectral or time tagged) is included in the same data set as the other detectors that do not include the calibration source. However, each packet included the detector number allowing easy identification of the packets from the calibration detector.

2.4.3 In-Flight Data Products

The in-flight data products that shall be provided as the initial delivery to the PSA shall consist of PDS formatted level 2 data products. These are raw or engineering level data that have been unpacked from the telemetry packets, time tagged, converted to engineering units and output in an easily readable form together with the necessary labels and auxiliary information required for ingestion into the PSA system.

The science data has not been calibrated either for energy or for instrument efficiency factors so should not be directly used for science analysis without the application of the necessary calibration factors and algorithms.

The data provided includes observations made during the cruise, lunar and extended mission phases. Cruise phase observations are mainly of celestial objects used to help assess the operational performance of the novel new technologies used within the D-CIXS experiment. In addition the cruise phase data includes a small number of Earth scan observations and attempts to detect X-ray emission from comets. Lunar and Extended Mission observations shall mainly include nadir pointing observations of the lunar surface. In addition it shall include ongoing observations of celestial targets to allow routine assessment of instrument performance.

The level 2 data represents the full data set returned from the D-CIXS instrument.

Descriptions of the individual products that are included in the level 2 submission to the PSA are provided in section 4.4 of this document.

2.4.4 Software

The D-CIXS processing software is based on the Generic data Pipeline (GDP) as provided by ESA see section 2.3.2.2 for details. The GDP is written mainly in IDL.

The GDP will:

- Read the L1 telemetry files retrieved from the DDS
- Extract parameters from the telemetry packets and convert to L2 engineering units
- Re-package data and output L2 data in PDS format

No software shall be provided with the datasets supplied to the PSA; however the data files conform to the standard PDS ASCII conventions and so can be read by software such as PDSREAD, and NASAVIEW see section 5 for details.

2.4.5 Documentation

The following documentation shall be provided in the DOC directory.

- The EAICD
- Instrument papers
- Science papers
- The User Manual

Summary documentation shall be provided in simple ASCII.

Detailed documentation that includes complex formatting and diagrams shall only be provided as PDF.

2.4.6 Ancillary Data Usage

The D-CIXS processing software requires timing information (e.g. time correlation) for production of any archived products including L2.

The analysis of the D-CIXS data (both cruise and lunar operations) requires pointing information (orbit and attitude) as defined in the EID. This information is not required for the production of the L2 data products but is needed for any subsequent processing or analysis of these data (e.g. production of L3 data and lunar elemental abundance maps).

The production of lunar elemental abundance information is dependent on the incident X-ray solar spectrum as measured by the XSM.

3 Archive Format and Content

3.1 Format and Conventions

3.1.1 Deliveries and Archive Volume Format

The D-CIXS data shall be delivered to the PSA as complete data sets (i.e. not using the release and revision concept). Transfer to the PSA shall be via ftp to the D-CIXS allocated drop point on the PSA server.

The delivery schedule should be as agreed with the PSA (ref. PSA SMART-1 Archive Plan). The initial delivery shall consist of PDS Level 2 data.

Three archive volumes shall be produced for each processing level, one covering the cruise phase observations that will consist mainly of astronomical observations, and two others covering the lunar operations phase of the mission, i.e the lunar phase and extended mission phase.

3.1.2 Data Set ID Formation

Each PDS data set must have a unique identifier, DATA_SET_ID, formed from up to seven components and cannot exceed 40 characters in length. Each component of the DATA_SET_ID is an acronym, components are separated by hyphens. The components for each mission phase are listed in the table below.

Table 3-1 Data Set ID Formation

	Earth Escape Phase	Lunar Phase	Extended Mission
Instrument host	S1	S1	S1
Target	X	L	L
Instrument	DCIXS	DCIXS	DCIXS
Data processing level number	2	2	2
Data set type (optional)	EDR	EDR	EDR
Description (optional)	EEP	LP	EP
Version number	V1.0	V1.0	V1.0

This gives the following DATA_SET_IDs

- S1-X-DCIXS-2-EDR-EEP-V1.0
- S1-L-DCIXS-2-EDR-LP-V1.0
- S1-L-DCIXS-2-EDR-EP-V1.0

3.1.3 Data Directory Naming Convention

The planned data directory struture shall be the same for all archive volumes defined in Section3.4.2. The scheme to be used shall be:

For the Earth Escape Phase: EARTH_ESCAPE_yyyy_mm_TO_nn The subdirectory contains data from year yyyy month mm to month nn.

Example
EARTH_ESCAPE_2003_09_TO_12

Within the subdirectoriesthere is another subdirectory for each day of data.

For the Lunar Phase and Extended Mission Phase:
ORBIT_mmmmm_TO_nnnnn The subdirectory containing data from orbit mmmmm to orbit nnnnn in steps of 100 orbits. Each subdirectory in turn contains subdirectories for the individual orbits.

Example
ORBIT_00000_TO_00099
|---- ORBIT_00040
|---- ORBIT_00041
|---- ……
|---- ORBIT_00092
|---- ORBIT_00097

3.1.4 Filenaming Convention

For the Earth Escape Phase:

S1_DCIXS_<yyyy>_<mm>_<dd>_<type>.EEE

For the Lunar Phase and Extended Mission Phase:

S1_DCIXS_R<orbit no>_<type>.EEE

Where:

S1	= mission/spacecraft identifier
DCIXS	= instrument identifier
<yyyy>	= year (0000-9999)
<mm>	= month (01-12)
<dd>	= day of month (01-31)
<type>	= Txx where xx is the type number (see table below for details)
<orbit_no>	= nnnnn (00000-99999),
EEE	= extension, TAB for the data products, LBL for the detached label file.

<type> = Txx where xx is the type number (see table below for details)

Examples
S1_DCIXS_2003_09_29_T03.TAB
S1_DCIXS_R00099_T00.LBL

Table 3-2 Types used in data products

Packet Type	Type number	Description	Remarks
0	00	Housekeeping	
1	01	D-CIXS Time Tagged Events	
2	02	D-CIXS Low Count Spectrum	
3	03	D-CIXS High Count Spectrum	
4	n/a	XSM Spectrum	Although the XSM data products are archived as a separate dataset the RAW XSM data is also archived as part of the D-CIXS dataset.
5	n/a	Memory Dump	No product generated see section 4.4.5 for details.
6	06	D-CIXS Compressed Low Count Spectrum	
7	n/a	D-CIXS SCD Test	No product generated see section 4.4.5 for details.
8	8A	D-C1XS operating parameters	Type 8 packets are split into two data products.
8	8B	XSM operating parameters	
9	9A	Noise spectra	Type 9 packets are split into two data products.
9	9B	Detector means	

3.2 Standards Used in Data Product Generation

3.2.1 PDS Standards

PDS standard version 3.8 (February, 27, 2009) are used for the D-CIXS data archive production, see [AD1] and [AD2] for details.

3.2.2 Time Standards

All time information in the data follows the SPICE time standards. Please, see [AD4] for details.
Within the data products themselves, the time standard used is ET (Ephemeris Time), which is a double precision number of seconds. The starting point for this time is the J2000 epoch. This epoch is Greenwich noon on January 1, 2000 Barycentric Dynamical Time. This ephemeris time is calculated from the Spacecraft Onboard Time using the appropriate SPICE routines and the time correlation packages which are provided by ESA as a SPICE Clock Kernel. The main time values are provided in the data product labels, which provide a start and stop time for the measurement, and a corresponding clock count from the spacecraft. Below, the standards used to define these values are described.

3.2.2.1 START_TIME and STOP_TIME Formation

The PDS formation rule for dates and time in UTC is:

YYYY-MM-DDThh:mm:ss.fff

YYYY	year (0000-9999)
MM	month (01-12)
DD	day of month (01-31)
T	date/time separator
hh	hour (00-23)
mm	minute (00-59)
ss	second (00-59)
fff	fractions of second (000-999) (restricted to 3 digits)

This standard is followed for all START_TIME and STOP_TIME values in the products included in the D-CIXS data sets.

3.2.2.2 SPACECRAFT_CLOCK_START_COUNT and SPACECRAFT_CLOCK_STOP_COUNT

The SPACECRAFT_CLOCK_START_COUNT and SPACECRAFT_CLOCK_STOP_COUNT values represent the on-board time counters (OBT) of the spacecraft and instrument computers. This OBT counter is given in the headers of the experiment telemetry source packets. It contains the data acquisition start time as 32-bit of unit seconds followed by 16-bit of fractional seconds. The time resolution of the fractional part is 2^{-16} = 1.52×10^{-5} seconds. Thus, the OBT is represented as a decimal real number in floating-point notation with 5 digits after the decimal point.
A reset of the spacecraft clock is represented by an integer number
followed by a slash, e.g. "1/" or "2/".

Example:
SPACECRAFT_CLOCK_START_COUNT = "1/21983325.39258"

3.2.3 Reference Systems

The reference systems used for orbit, attitude, and target body follow the SPICE standards and are defined in the different SPICE kernels. Please, see [AD4] for details. All latitudes and longitudes are given in degrees, latitudes are planetocentric. All geographical information in labels and index files will be given as follows: Sinusoidal projection, R= 1737.4, center latitude = 0, center longitude will be determined automatically using an integer value

3.2.4 Other Applicable Standards

N/A

3.3 Data Validation

The level 2 products that are proposed for the initial delivery to the PSA are essentially re-formatted raw data, where appropriate conversion factors have been applied to supply the data in engineering units.

A basic set of checks have been applied to these data prior to conversion to the PDS standard to ensure that the data packets from which the parameters are derived are free from error (CRC check), complete and where necessary that all packets required in a multi-packet product have been received.

No scientific qualification of the data has taken place at this level.

The PVV tool provided by ESA will be used to validate the PDS archive.

The Science Archive Review Procedure describes all review steps to be taken to ensure fulfillment of the long-term preservation purposes of ESA, see [AD5] for details.

3.4 Content

This section provides a description of the initial data volumes to be provided to the PSA and their content. The initial PSA delivery consists of reformatted level 1 data.

3.4.1 Volume Set

The volume set constitutes three volumes as depicted below. For details on the naming conventions see the subsequent sections.

Figure 3-1 Volume Set

Three data volumes shall be provided for each level of data corresponding to the different phases of the mission.

The Cruise Science volumes shall include all observations taken during the Earth escape phase. These include celestial observations, observations of the Earth and other solar system objects (e.g. attempts to observe objects of opportunity such as comets). Included within these observations are engineering, calibration and field of view tests which were undertaken as part of the checkout of the instrument and to help assess the technical performance of the instrument sub-systems. It should be noted that observations by the XSM (solar X-ray monitor) part of D-CIXS are archived in a separate volume provided by the XSM PI, although the uncalibrated EDR data shall also be included in the D-CIXS level 2 product (type 4).

The Lunar Science volumes shall include all observations taken during the Lunar observation phase of the mission. This will include lunar nadir pointing data as well as celestial calibration observations made to assess the ongoing performance and aging of the instrument sub-systems. Depending on planning observations in the lunar wake during eclipse may be undertaken in which case these data shall also be included in this volume.

The Extended Mission volumes shall include all observations taken during the Extended Mission phase. This is basically a continuation of the Lunar Science phase.

Table 3-3 Volume ID's and Names

Volume Set ID	Volume Set Name	Volume Name	Volume ID	Data Set ID
UK_RAL_CLRC_S1DCIX_1000	SMART-1 D-CIXS SCIENCE DATA	VOLUME 1 SMART-1 D-CIXS CRUISE SCIENCE DATA	S1DCIX_1001	S1-X-DCIXS-2-EDR-EEP-V1.0
		VOLUME 2SMART-1 D-CIXS LUNAR	S1DCIX_1002	S1-L-DCIXS-2-

		SCIENCE DATA		EDR-LP-V1.0
		VOLUME 3 SMART-1 D-CIXS EXTENDED SCIENCE DATA	S1DCIX_1003	S1-L-DCIXS-2-EDR-EP-V1.0

3.4.2 Data Set

Each volume consists of a single data set. Note that the PDS LEVEL 2 data identifier is the same as Level 1b described elsewhere in this and other PSA SMART-1 archive plan. See section 6.2 for a description of the different processing levels.

Table 3-4 data Set ID's and Names

Data Set ID	Data Set Name
S1-X-DCIXS-2-EDR-EEP-V1.0	SMART-1 D-CIXS LEVEL 2 CRUISE DATA V1.0
S1-L-DCIXS-2-EDR-LP-V1.0	SMART-1 D-CIXS LEVEL 2 LUNAR DATA V1.0
S1-L-DCIXS-2-EDR-EP-V1.0	SMART-1 D-CIXS LEVEL 2 EXTENDED DATA V1.0

3.4.3 Directories

This section describes the organisation and structure of the data volume to be delivered to the PDS. The structure shall be identical for the three differrent datasets.

3.4.3.1 Root Directory

The contents of the ROOT directory shall follow the PDS specification. In addition to the standard directories (DOCUMENT, CATALOG, CALIB, GEOMETRY, INDEX and DATA) described in the following sections, the ROOT directory shall contain the files AAREADME.TXT, VOLDESC.CAT and ERRATA.TXT.

3.4.3.2 Calibration Directory

No calibration data will be archived.

3.4.3.3 Catalog Directory

The catalogue template objects providing high-level information about the data set shall be stored in the CATALOG directory.

The catalogue directory shall include the following required files. These are based on the templates provided by the PSA

CATINFO.TXT	Identifies and describes the function of each file in the CALIB subdirectory.
INST.CAT	Brief description of instrument, one file for each instrument providing data to this delivery.
DATASET.CAT	Description of the data set currently being submitted, one file for each data product.
INSTHOST.CAT	Brief description of spacecraft and instrument's mounting relationship to spacecraft.

MISSION.CAT	Description of mission and a summary of significant events during the mission.
REF.CAT	Bibliography. Other catalogues provide reference to these using keywords. PSA will produce central list for whole mission based on this information.
PERSON.CAT	Contains information about those persons responsible for the D-CIXS instrument and dataset.
SOFTWARE.CAT	A description of the software required to read/process this dataset.

3.4.3.4 Index Directory

All the standard INDEX entries in this directory can be created by the PSA PVV tool.

3.4.3.4.1 Dataset Index File, INDEX.LBL and INDEX.TAB

The dataset index files shall provide a full list of all files within the given data set.

INDXINFO.TXT	list of files in the INDEX directory

3.4.3.4.2 Geometric Index File, GEOINDEX.LBL and GEOINDEX.TAB

Not included in the datasets.

3.4.3.4.3 Other Index Files

No other index files are envisaged.

3.4.3.5 Browse Directory and Browse Files

No browse products will be provide; no BROWSE directory will be included.

3.4.3.6 Geometry Directory

The GEOMETRY directory contains the ancillary data products that are needed to reconstruct the DC1XS pointing information. This information was derived from inputs provided by ESA, e.g. SPICE files. There is one geometry table for each data product containing various geometry parameters for every 30 seconds.

The SPICE kernels will be archived separately in the PSA.

3.4.3.7 Document Directory

The DOCUMENT directory contains detailed documentation describing the instrument, datasets and software related to the volume. The documentation will be in PDF format and ASCII versions of the documentation shall also be provided.

3.4.3.8 EXTRA Directory

In this directory “Value added” elements included by the data preparer, but outside the scope of the PDS archive requirements. This directory contains:

- Explanation of the decompression of Type 6 data.
- A detailed target list.
- Explanation of the conversion to engineering units for HK data
- Elaboration of the S/C clock.

3.4.3.9 Data Directory

See section 3.1.3 for information on the proposed directory-naming scheme.

This directory should contain the data files corresponding to the products specified in section 4. Files shall be split into sub-directories based on year and month of observation

4 Detailed Interface Specifications

This section describes the detailed specification of each of the level 2 products to be supplied to the PSA. As described in the previous section the products contained within the different observation datasets are essentially identical so no distinction has been made in this section between the different datasets.

4.1 Structure and Organization Overview

A schematic overview of a dataset is given in Figure 4-1 below. For a description of the individual components see section 3.4.

Figure 4-1Data Set

4.2 Data Sets, Definition and Content

As described in sub-sections under section 4.4 for the three datasets.

4.3 Data Product Design – Common Information Elements

This section provides the description of the PDS product labels that are used to describe each of the PDS datasets that will be supplied to the PSA.

In the following sub-sections we describe the different label elements that are common to all the supplied PDS labels that will be supplied by the D-CIXS EOF. These include the PDS version label, the file characteristic elements, data object pointers, identification information, instrument and detector descriptive information and positional data. The data object descriptions which are

the part of the label that are unique to each product within a dataset are described in section 4.4.

Most of the labels have been given example values. See section 6.3 for examples for all data products. For some of the labels explanation comments where added. These comments are prefixed by a pound/number sign (“#”), and not part of the data definition.

```
PDS_VERSION_ID               = PDS3
```

4.3.1 File Characteristics Data Elements

```
/***      FILE CHARACTERISTICS                                          ***/
FILE_NAME                    = "S1_DCIXS_2005_01_19_T02.TAB"
RECORD_TYPE                  = FIXED_LENGTH
# All records in the data product file have the same length.
RECORD_BYTES                 = 1060
FILE_RECORDS                 = 179
INTERCHANGE_FORMAT           = ASCII
# This label represents the manner in which data items are stored, for D-CIXS data
products always ASCII.
```

4.3.2 Data Object Pointers

```
/***      POINTERS TO DATA OBJECTS                                      ***/
^TABLE                       = ("S1_DCIXS_2005_01_19_T02.TAB",1)
This indicates that the TABLE object (see for example section 4.4.1) points to the
file S1_DCIXS_2005_01_19_T02.TAB. Pointers to data objects are always required to be
located in the same directory as the label file, so the file in this example can be
found the same directory as the detached label file.
```

4.3.3 Identification Data Elements

```
/***      IDENTIFICATION DATA ELEMENTS                                  ***/
DATA_SET_ID                  = S1-X-DCIXS-2-EEP-V1.0
DATA_SET_NAME                = "SMART-1 OTHER DCIXS 2 EDR LUNAR  V1.0"
PRODUCT_ID                   = S1_DCIXS_2005_01_19_T00
PRODUCT_CREATION_TIME        = 2007-12-13T10:19:41
PRODUCER_INSTITUTION_NAME    = "RUTHERFORD APPLETON LABORATORY"
MISSION_ID                   = SMART1
MISSION_NAME                 = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                               TECHNOLOGY"
INSTRUMENT_HOST_ID           = S1
INSTRUMENT_HOST_NAME         = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                               TECHNOLOGY"
TARGET_NAME                  = MOON
# This element identifies a target. Note that these can only take specific values
specified in the PDS dictionary
TARGET_TYPE                  = SATELLITE
# The target type may be a planet, satellite, ring, region, feature, asteroid or
comet.
MISSION_PHASE_NAME           = "LUNAR PHASE"
# Possible values are: ("EARTH ESCAPE PHASE", "LUNAR PHASE", "EXTENDED MISSION")
PRODUCT_TYPE                 = EDR
START_TIME                   = 2005-01-18T13:18:49
STOP_TIME                    = 2005-01-18T13:31:01
SPACECRAFT_CLOCK_START_COUNT = 8/28339048.64
SPACECRAFT_CLOCK_STOP_COUNT  = 8/28339780.4480
ORBIT_NUMBER                 = 94
# The orbit number is "N/A" for Earth escape phase, for Lunar phase and Extended
mission it is calculated,
START_ORBIT_NUMBER           = 94
# This provides the lowest revolution orbit number that contributed data to a given
data product.
STOP_ORBIT_NUMBER            = 94
```

```
# This provides the highest revolution orbit number that contributed data to a given
data product.
PRODUCER_ID                    = DCIXS_TEAM
PRODUCER_FULL_NAME             = " ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID            = 2
# For processing levels see section 6.2.
PROCESSING_LEVEL_DESC          = "EDITED DATA CORRECTED FOR TELEMETRY
                                  ERRORS AND DELIVERED AS HOUSE-KEEPING
                                  DATA"
```

4.3.4 Instrument and Detector Descriptive Data Elements

```
/***      INSTRUMENT RELATED PARAMETERS                                    ***/
INSTRUMENT_TYPE                = "SPECTROMETER"
INSTRUMENT_ID                  = DCIXS
INSTRUMENT_NAME                = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                                  SPECTROMETER"
INSTRUMENT_MODE_ID             = OPERATING
INSTRUMENT_MODE_DESC           = "OPERATING"
```

4.3.5 Positional information elements

```
/***      POSITIONAL INFORMATION                                           ***/


RIGHT_ASCENSION              = 106.544
DECLINATION                  = -70.448

WESTERNMOST_LONGITUDE        = -117.672
EASTERNMOST_LONGITUDE        = 139.625
MINIMUM_LATITUDE             = -83.489
MAXIMUM_LATITUDE             = 74.935

INCIDENCE_ANGLE              = -1.000
PHASE_ANGLE                  = 84.351
EMISSION_ANGLE               = 13.636
LOCAL_HOUR_ANGLE             = 323.046

SUB_SPACECRAFT_LONGITUDE     = 51.511
SUB_SPACECRAFT_LATITUDE      = -85.560
SPACECRAFT_ALTITUDE          = 627.015
```

4.4 Data Product Design – Header Data Element Descriptions

Values in the tables shall be separated by a "," the START_BYTE and BYTES value should not include this within the column definition.

4.4.1 Product Design – D-CIXS HK Time Series

The D-CIXS HKD product consists of a time series of over one hundred housekeeping parameters that describe the state of the instrument operation. The information contained in the PDS data file shall contain each of the parameters extracted from the D-CIXS HK telemetry packet, and where appropriate converted to engineering units using the conversion tables defined in the D-CIXS data handling ICD (S1_CIX_RAL_ICD_3002). Only a sub-set of the parameters are currently listed in the example object description provided below.

```
OBJECT               = TABLE
  INTERCHANGE_FORMAT = ASCII
```

```
  ROWS                = 293
# The rows element represents the number of rows in a data object, in PDS, the term
'rows' is synonymous with 'records'.
  ROW_BYTES           = 831
# The row_bytes element represents the maximum number of bytes in each data object
row.
  COLUMNS             = 113
# The columns element represents the number of columns in each row of a data object,
in the PDS, the term 'columns' is synonymous with 'fields'.
  NAME                = "D-CIXS HK"
  DESCRIPTION         = "D-CIXS HOUSEKEEPING DATA IN ENGINEERING UNITS"

  OBJECT              = COLUMN
    BYTES             = 23
# The bytes element indicates the number of bytes allocated for a particular data
representation.
    DATA_TYPE         = "TIME"
# The data_type element supplies the internal representation and/or mathematical
properties of a value being stored.
    NAME              = "TIME"
    START_BYTE        = 1
    UNIT              = "UT"
# The unit element provides the full name or standard abbreviation of a unit of
measurement in which a value is expressed.
    DESCRIPTION       = "TIME OF OBSERVATION"
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = <see Table 4-1>
    DATA_TYPE         = <see Table 4-1>
    START_BYTE        =
    BYTES             =
    DESCRIPTION       = <see Table 4-1>
    FORMAT            = <see Table 4-1>
    UNIT              = <see Table 4-1>
    # units need to be in SI if applicable.
  END_OBJECT          = COLUMN

END_OBJECT            = TABLE

END
```

Table 4-1 D-CIXS HK Parameter List

NAME	DESCRIPTION	UNITS	FORMAT
TC_FLAGS	TC error flags	N/A	Z4.4
SW_VER	Software Version (divide by 10 to get version e.g. 43 = version 4.3)	#	F3.1
TC_OK	TCs Accepted Count	#	I4
TC_REJ	TCs rejected Count	#	I4
TC_ECODE	TC Error Code	#	Z4.4
sw_flags-7	XSM processing 1= enabled	#	I1
sw_flags-6	DCIXS processing 1 = enabled	#	I1
sw_flags-5	Door radiation status 1=Shut	#	I1
sw_flags-4	Door radiation movement 1= Moving	#	I1
sw_flags-3	XSM shutter status 1= closed	#	I1
sw_flags-2	XSM entering annealing 1= annealing	#	I1
sw_flags-1	XSM on for >1s 1= true	#	I1
sw_flags-0	XSM switched on 1 = true	#	I1
CRC_BAD_R	Received CRC from last TC packet with bad CRC	#	Z4.4
CRC_BAD_C	Calculated CRC from last TC packet with bad CRC	#	Z4.4
DOOR_STATE	Door State	#	I
MODE	Mode	#	I
SUBMODE	Submode	#	I
MAX_CAN	Max CAN packets in Output queue this HK period	#	I
	The following two parameters (TIME_ADJ1 and		

	TIME_ADJ2) are combined into one.		
TIME_ADJ1	Last calculated time adjustment (high word)	#	I
TIME_ADJ2	Last calculated time adjustment (low word)	#	I
TIME_ADJF	Last calculated time adjustment (fraction)	#	I
TIME_WBG	Worst background elapsed time this HK period	#	I
TIME_WIDL	Worst idle loop count this HK period	#	I
CAN_NOT_READY	Count of times CAN TX not ready	#	I
LOST_PUS	Count of lost TM PUS packets	#	I
RET_STACK	Return Stack pointer	#	Z4.4
PAR_STACK	Parameter stack pointer	#	Z4.4
EEW_RETRY	EEPROM write retries	#	I
EEW_FAIL	EEPROM write failures	#	I
DOOR_CLS_DT	Seconds remaining of minimum door closed interval	S	I
LASTTC_TYPE	Last TC Type	#	Z2.2
LASTTC_QUAL	Last TC qualifier	#	Z2.2
LASTTC_ADDR	Last TC Address/ function	#	Z4.4
LASTTC_DATA	Last TC first data word	#	Z4.4
	All four LASTTC parameters are combined into one and printed as hex.		Z12
LASTTC1_TYPE	Last but 1 TC Type	#	Z2.2
LASTTC1_QUAL	Last but 1 TC qualifier	#	Z2.2
LASTTC1_ADDR	Last but 1 TC Address/ function	#	Z4.4
LASTTC1_DATA	Last but 1 TC first data word	#	Z4.4
	All four LASTTC1 (last but one) parameters are combined and printed as hex.		Z12
SEN16_OFF	Sensor 16 inhibit	#	I1
SEN17_OFF	Sensor 17 inhibit	#	I1
SEN18_OFF	Sensor 18 inhibit	#	I1
SEN19_OFF	Sensor 19 inhibit	#	I1
SEN20_OFF	Sensor 20 inhibit	#	I1
SEN21_OFF	Sensor 21 inhibit	#	I1
SEN22_OFF	Sensor 22 inhibit	#	I1
SEN23_OFF	Sensor 23 inhibit	#	I1
SEN08_OFF	Sensor 8 inhibit	#	I1
SEN09_OFF	Sensor 9 inhibit	#	I1
SEN10_OFF	Sensor 10 inhibit	#	I1
SEN11_OFF	Sensor 11 inhibit	#	I1
SEN12_OFF	Sensor 12 inhibit	#	I1
SEN13_OFF	Sensor 13 inhibit	#	I1
SEN14_OFF	Sensor 14 inhibit	#	I1
SEN15_OFF	Sensor 15 inhibit	#	I1
SEN00_OFF	Sensor 0	#	I1
SEN01_OFF	Sensor 1 inhibit	#	I1
SEN02_OFF	Sensor 2 inhibit	#	I1
SEN03_OFF	Sensor 3 inhibit	#	I1
SEN04_OFF	Sensor 4 inhibit	#	I1
SEN05_OFF	Sensor 5 inhibit	#	I1
SEN06_OFF	Sensor 6 inhibit	#	I1
SEN07_OFF	Sensor 7 inhibit	#	I1
POWER_MON	Power monitor	#	I
BANK1A_CNT	BANK 1 Channel A Event Count	#	I
BANK1B_CNT	BANK 1 Channel B Event Count	#	I
BANK1C_CNT	BANK 1 Channel C Event Count	#	I
BANK1D_CNT	BANK 1 Channel D Event Count	#	I
BANK1E_CNT	BANK 1 Channel E Event Count	#	I
BANK1F_CNT	BANK 1 Channel F Event Count	#	I

BANK1G_CNT	BANK 1 Channel G Event Count	#	I
BANK1H_CNT	BANK 1 Channel H Event Count	#	I
BANK1I_CNT	BANK 1 Channel I Event Count	#	I
BANK1J_CNT	BANK 1 Channel J Event Count	#	I
BANK1K_CNT	BANK 1 Channel K Event Count	#	I
BANK1L_CNT	BANK 1 Channel L Event Count	#	I
BANK2A_CNT	BANK 2 Channel A Event Count	#	I
BANK2B_CNT	BANK 2 Channel B Event Count	#	I
BANK2C_CNT	BANK 2 Channel C Event Count	#	I
BANK2D_CNT	BANK 2 Channel D Event Count	#	I
BANK2E_CNT	BANK 2 Channel E Event Count	#	I
BANK2F_CNT	BANK 2 Channel F Event Count	#	I
BANK2G_CNT	BANK 2 Channel G Event Count	#	I
BANK2H_CNT	BANK 2 Channel H Event Count	#	I
BANK2I_CNT	BANK 2 Channel I Event Count	#	I
BANK2J_CNT	BANK 2 Channel J Event Count	#	I
BANK2K_CNT	BANK 2 Channel K Event Count	#	I
BANK2L_CNT	BANK 2 Channel L Event Count	#	I
XSM_V_5	XSM +5V monitor	V	F5.2
XSM_V_12	XSM +12V monitor	V	F5.2
XSM_V_M12	XSM -12V monitor	V	F5.2
XSM_T_PIN	XSM PIN detector temperature	C	F6.2
XSM_T_BOX	XSM Detector Box temperature	C	F6.2
XSM_HV	XSM HV Bias Voltage	V	F5.1
XSM_LEAK	XSM Leakage Current	pA	F5.2
T_PSU	DC Converter Temperature	C	F5.1
T_CANPCB	CAN/ HK PCB Temperature	C	F5.1
T_BOX	-Y plate Temperature	C	F5.1
T_VIDPCB	Video Digital PCB temperature	C	F5.1
T_3DP1	VIDEO1 3D+ temperature	C	F5.1
T_3DP2	VIDEO2 3D+ temperature	C	F5.1
T_SCDB	SCD column B temperature	C	F5.1
T_SCDE	SCD column E temperature	C	F5.1
V_12	12V regulated supply	V	F6.2
V_5	5V regulated supply	V	F5.2
V_3_3	3. 3V regulated supply	V	F5.2
XSM_V_PELT	XSM Peltier supply voltage	V	F5.2
V_M12	-12V regulated supply	V	F6.2
V_M5	-5V regulated supply	V	F6.2
V_MOTOR_P1	Motor Phase 1 voltage	V	F5.1
V_MOTOR_P2	Motor Phase 2 voltage	V	F5.1
V_SCD_SS	SCD Substrate Voltage Monitor	V	F5.2
V_SCD_OG	SCD Output Gate Voltage Monitor	V	F5.2
V_SCD_RD	SCD Reset Drain Voltage Monitor	V	F5.2
V_SCD_OD	SCD Output Drain Voltage Monitor	V	F5.2
V_39	39V supply voltage [39V_ VMON]	V	F5.2
V_0	0V	V	F5.1
DOOR_LLL	bit 1 Launch Lock Latch Enabled '1' = enabled	#	A
DOOR_LLB	bit 2 Launch Lock Bypass Enabled '1' = enabled	#	A
DOOR_LLO	bit 3 Launch Lock Latch Open = 1 [SW1] '1' = true	#	A
DOOR_LLC	bit 4 Launch Lock Latch Closed = 1 [SW2] '1' = true	#	A
DOOR_MOTOR	bit 5 Door Motor Running '1' = true	#	A
DOOR_OPEN	bit 6 Door Open '1' = true	#	A
DOOR_CLOSED	bit 7 Door Closed '1' = true	#	A
DOOR_STEP	Door Motor Step Count	#	I
XSM_CMD_PELT	bit 3 Peltier Control 1 = On or Heat 0 = Off & Cold	#	A

XSM_CMD_SHUT	bit 4 Shutter 1 = Open 0 = Closed	#	A
XSM_CMD_BIAS	bit 5 HV Bias on/ off : 1= on 0 = off	#	A
XSM_CMD_HVOVER	bit 6 HV Override Enable: '1' = enabled '0' = Disabled	#	A
XSM_CMD_FIFO	bit 7 LSB FIFO write Enable: '1' = enabled '0' = Disabled	#	A
XSM_OPEN	bit 3 Shutter Open '1' = Open, 0 = -	#	A
XSM_CLOSED	bit 4 Shutter Closed '1' = Closed, 0 = -	#	A
XSM_OVERT	bit 5 Detector Overtemp HV should be switched down	#	I
XSM_OVERV	bit 6 HV bias overvoltage HV should be switched down	#	I
XSM_ADC	bit 7 LSB ADC Conversion complete	#	I
XSM_DAC0	XSM DAC 0 (last value written to DAC)	#	Z
XSM_DAC1	XSM DAC 1 (last value written to DAC)	#	Z
XSM_STATE	XSM State	#	I
XSM_COUNT	XSM second counter	#	I
SW+PATCH	Software Patch ID (added, in .xls not in table)	#	I
BOOT_PG	Boot Page Number (added, in .xls not in table)	#	I
SS_DAC_AV	SS DAC Monitor Average	#	I
OG_DAC_AV	OG DAC Monitor Average	#	I
RD_DAC_AV	RD DAC Monitor Average	#	I
OD_DAC_AV	OD DAC Monitor Average	#	I
SS_DAC_REQ	SS DAC demand	#	I
OF_DAC_REQ	OG DAC demand	#	I
RD_DAC_REQ	RD DAC demand	#	I
OD_DAC_REQ	OD DAC demand	#	I
MS_LOST	Milliseconds lost to 3D+ offset adjustment	#	I
EVENTS_SEC	Most events per second this period	#	I
CK_SUMS	Memory checksums	#	I
Var_parameter	Contents of address in Table 6 param 55	#	Z
ITL_ID	ITL identity	#	1
WGA_Status	WGA status register contents	#	Z
SCD_FIFO_2	SCD RICA FIFO port 2 register contents	#	Z
SCD_FIFO_3	SCD RICA FIFO port 3 register contents	#	Z
SCD_RICA	SCD RICA software control register contents	#	Z
XSM_Spectra	XSM Spectra Count	#	I
XSM_FIFO_2	XSM RICA FIFO port 2 register contents	#	Z
XSM_FIFO_3	XSM RICA FIFO port 3 register contents	#	Z
XSM_RICA	XSM RICA software control register contents	#	Z

4.4.2 *Product Design – D-CIXS Time Tagged X-Ray Data*

The D-CIXS time tagged science mode returns information on individual events detected by the sensors. For the PDS product, the events shall be unpacked and the spacecraft and time offset information used to calculate an absolute time for each event. The detector number, event signal (ADC bin number) and error flag information shall also be included.

```
OBJECT                = TABLE
  INTERCHANGE_FORMAT  = ASCII
  ROWS                = 25439
  ROW_BYTES           = 35
  COLUMNS             = "4"
  NAME                = "D-CIXS TIME TAGGED EVENTS"
  DESCRIPTION         = "D-CIXS TIME TAGGED EVENTS"

  OBJECT              = COLUMN
    BYTES             = 23
    DATA_TYPE         = "TIME"
    NAME              = "TIME"
    START_BYTE        = 1
    UNIT              = "UT"
    DESCRIPTION       = "TIME OF OBSERVATION"
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    BYTES             = 2
    DATA_TYPE         = "ASCII_INTEGER"
    NAME              = "DETECTOR"
    START_BYTE        = 25
    UNIT              = "N/A"
    DESCRIPTION       = "DETECTOR NUMBER"
    VALID_MAXIMUM     = "23"
    VALID_MINIMUM     = "00"
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    BYTES             = 4
    DATA_TYPE         = "ASCII_INTEGER"
    NAME              = "X_RAY_SIGNAL"
    START_BYTE        = 30
    UNIT              = "N/A"
    VALID_MAXIMUM     = 4096
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

END_OBJECT            = TABLE

END
```

4.4.3 *Product Design – D-CIXS X-Ray Spectra Time Series*

The D-CIXS energy spectrum object shall be used for data retrieved in both high, low count and compress low count spectra modes. The spectra consist of 256 energy levels (0 to 255) containing the number of events detected in the corresponding energy range within each integration period. The count information contained in the PDS data shall be decompressed from the internal compression scheme used within the telemetry format.

Each spectrum shall have an associated start time and integration interval (normally fixed for low count spectra mode).

```
/***      DATA CALIBRATION RELATED PARAMETERS                              ***/

/***      OBJECT DESCRIPTION                                               ***/
OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = ASCII
   ROWS                         = 179
   ROW_BYTES                    = 1060
   COLUMNS                      = 4
   NAME                         = "DCIXS SPECTRA"
   DESCRIPTION                  = "DCIXS SPECTRA"

   OBJECT                       = COLUMN
      NAME                      = "START TIME"
      BYTES                     = 23
      DATA_TYPE                 = TIME
      START_BYTE                = 1
      UNIT                      = UT
      DESCRIPTION               = "START TIME OF OBSERVATION"
   END_OBJECT                   = COLUMN

   OBJECT                       = COLUMN
      NAME                      = "INTEGRATION TIME"
      BYTES                     = 5
      DATA_TYPE                 = ASCII_INTEGER
      START_BYTE                = 25
      UNIT                      = "SECONDS"
      DESCRIPTION               = "INTEGRATION TIME"
      VALID_MAXIMUM             = 9999
      VALID_MINIMUM             = 0008
   END_OBJECT                   = COLUMN

   OBJECT                       = COLUMN
      NAME                      = "DETECTOR"
      BYTES                     = 3
      DATA_TYPE                 = ASCII_INTEGER
      START_BYTE                = 31
      UNIT                      = "N/A"
      DESCRIPTION               = "DETECTOR NUMBER"
      VALID_MAXIMUM             = "23"
      VALID_MINIMUM             = "00"
   END_OBJECT                   = COLUMN

   OBJECT                       = COLUMN
      DESCRIPTION               = "NUMBER OF X-RAY EVENTS in EACH OF THE 256 X-RAY
                                   SPECTRUM ELEMENTS"
      NAME                      = "EVENTS IN EACH X-RAY SPECTRUM ELEMENT"
       START_BYTE                = 35
      UNIT                      = "N/A"
      ITEMS                     = 255
      ITEM_BYTES                = 3
      # 3 for LCS/DLCS, 9 for HCS
      DATA_TYPE                 = ASCII_INTEGER
      ITEM_OFFSET               = 4
      VALID_MAXIMUM             = 255, 255 for LCS/DLCS, 134184960 for HCS (4095*2^15)
      VALID_MINIMUM             = 0
   END_OBJECT                   = COLUMN
```

```
END_OBJECT                    = TABLE

END
```

4.4.4 *Product Design – Auxiliary Data*

The detector readout electronics configuration and noise parameters are transmitted in D-CIXS telemetry packet types 8 and 9. They are transmitted whenever an offset adjustment is performed which for the default configuration is every 256s. The type 8 and type 9 packet data shall be combined and used to generate the following data products.

1. Offset calculation data
2. Noise Spectra
3. DCIXS operating parameters
4. XSM operating parameters

This information is required to allow energy offset and energy calibration of the data to be calculated which is required to correctly use the spectral or time tagged data.

4.4.4.1 Offset Calculation Data

As part of the processing activity the data values shall be re-ordered to put them in detector number order.

```
OBJECT               = TABLE
  INTERCHANGE_FORMAT = ASCII
  ROWS               =
  ROW_BYTES          = fixed number
  COLUMNS            = fixed number
  NAME               = "D-CIXS OFFSET DATA"
  DESCRIPTION        = "D-CIXS ZERO OFFSET CALCULATION PARAMETERS"

  OBJECT             = COLUMN
    BYTES            = 23
    DATA_TYPE        = "TIME"
    NAME             = "TIME"
    START_BYTE       = 1
    UNIT             = "UT"
    DESCRIPTION      = "TIME OF OBSERVATION"
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = <see Table 4-2>
    DATA_TYPE        = <see Table 4-2>
    START_BYTE       =
    BYTES            =
    DESCRIPTION      = <see Table 4-2>
    FORMAT           = <see Table 4-2>
    UNIT             = <see Table 4-2>
  END_OBJECT         = COLUMN

END_OBJECT           = TABLE

END
```

Table 4-2 D-CIXS Offset Parameter List

TM PKT-Byte	NAME	DESCRIPTION	UNITS	FORMAT
8-16	SCD0_OFFSET	SCD 0 zero position offset value	#	I
8-30	SCD1_OFFSET	SCD 1 zero position offset value	#	I
8-44	SCD2_OFFSET	SCD 2 zero position offset value	#	I
8-58	SCD3_OFFSET	SCD 3 zero position offset value	#	I
8-18	SCD4_OFFSET	SCD 4 zero position offset value	#	I
8-32	SCD5_OFFSET	SCD 5 zero position offset value	#	I
8-46	SCD6_OFFSET	SCD 6 zero position offset value	#	I

8-60	SCD7_OFFSET	SCD 7 zero position offset value	#	I
8-20	SCD8_OFFSET	SCD 8 zero position offset value	#	I
8-34	SCD9_OFFSET	SCD 9 zero position offset value	#	I
8-48	SCD10_OFFSET	SCD 10 zero position offset value	#	I
8-62	SCD11_OFFSET	SCD 11 zero position offset value	#	I
8-72	SCD12_OFFSET	SCD 12 zero position offset value	#	I
8-86	SCD13_OFFSET	SCD 13 zero position offset value	#	I
8-100	SCD14_OFFSET	SCD 14 zero position offset value	#	I
8-114	SCD15_OFFSET	SCD 15 zero position offset value	#	I
8-74	SCD16_OFFSET	SCD 16 zero position offset value	#	I
8-88	SCD17_OFFSET	SCD 17 zero position offset value	#	I
8-102	SCD18_OFFSET	SCD 18 zero position offset value	#	I
8-116	SCD19_OFFSET	SCD 19 zero position offset value	#	I
8-76	SCD20_OFFSET	SCD 20 zero position offset value	#	I
8-90	SCD21_OFFSET	SCD 21 zero position offset value	#	I
8-104	SCD22_OFFSET	SCD 22 zero position offset value	#	I
8-118	SCD23_OFFSET	SCD 23 zero position offset value	#	I
8-126	SCD0_THRESHOLD	SCD 0 detection threshold value	#	I
8-132	SCD1_THRESHOLD	SCD 1 detection threshold value	#	I
8-138	SCD2_THRESHOLD	SCD 2 detection threshold value	#	I
8-144	SCD3_THRESHOLD	SCD 3 detection threshold value	#	I
8-128	SCD4_THRESHOLD	SCD 4 detection threshold value	#	I
8-134	SCD5_THRESHOLD	SCD 5 detection threshold value	#	I
8-140	SCD6_THRESHOLD	SCD 6 detection threshold value	#	I
8-146	SCD7_THRESHOLD	SCD 7 detection threshold value	#	I
8-130	SCD8_THRESHOLD	SCD 8 detection threshold value	#	I
8-136	SCD9_THRESHOLD	SCD 9 detection threshold value	#	I
8-142	SCD10_THRESHOLD	SCD 10 detection threshold value	#	I
8-148	SCD11_THRESHOLD	SCD 11 detection threshold value	#	I
8-166	SCD12_THRESHOLD	SCD 12 detection threshold value	#	I
8-172	SCD13_THRESHOLD	SCD 13 detection threshold value	#	I
8-178	SCD14_THRESHOLD	SCD 14 detection threshold value	#	I
8-184	SCD15_THRESHOLD	SCD 15 detection threshold value	#	I
8-168	SCD16_THRESHOLD	SCD 16 detection threshold value	#	I
8-174	SCD17_THRESHOLD	SCD 17 detection threshold value	#	I
8-180	SCD18_THRESHOLD	SCD 18 detection threshold value	#	I
8-186	SCD19_THRESHOLD	SCD 19 detection threshold value	#	I
8-170	SCD20_THRESHOLD	SCD 20 detection threshold value	#	I
8-176	SCD21_THRESHOLD	SCD 21 detection threshold value	#	I
8-182	SCD22_THRESHOLD	SCD 22 detection threshold value	#	I
8-188	SCD23_THRESHOLD	SCD 23 detection threshold value	#	I
8-222	SCD0_SD	SCD 0 noise peak standard deviation value	#	I
8-224	SCD1_SD	SCD 1 noise peak standard deviation value	#	I
8-226	SCD2_SD	SCD 2 noise peak standard deviation value	#	I
8-228	SCD3_SD	SCD 3 noise peak standard deviation value	#	I
8-230	SCD4_SD	SCD 4 noise peak standard deviation value	#	I
8-232	SCD5_SD	SCD 5 noise peak standard deviation value	#	I
8-234	SCD6_SD	SCD 6 noise peak standard deviation value	#	I
8-236	SCD7_SD	SCD 7 noise peak standard	#	I

		deviation value		
8-238	SCD8_SD	SCD 8 noise peak standard deviation value	#	I
8-240	SCD9_SD	SCD 9 noise peak standard deviation value	#	I
8-242	SCD10_SD	SCD 10 noise peak standard deviation value	#	I
8-244	SCD11_SD	SCD 11 noise peak standard deviation value	#	I
8-246	SCD12_SD	SCD 12 noise peak standard deviation value	#	I
8-248	SCD13_SD	SCD 13 noise peak standard deviation value	#	I
8-250	SCD14_SD	SCD 14 noise peak standard deviation value	#	I
8-252	SCD15_SD	SCD 15 noise peak standard deviation value	#	I
8-254	SCD16_SD	SCD 16 noise peak standard deviation value	#	I
8-256	SCD17_SD	SCD 17 noise peak standard deviation value	#	I
8-258	SCD18_SD	SCD 18 noise peak standard deviation value	#	I
8-260	SCD19_SD	SCD 19 noise peak standard deviation value	#	I
8-262	SCD20_SD	SCD 20 noise peak standard deviation value	#	I
8-264	SCD21_SD	SCD 21 noise peak standard deviation value	#	I
8-266	SCD22_SD	SCD 22 noise peak standard deviation value	#	I
8-268	SCD23_SD	SCD 23 noise peak standard deviation value	#	I
9-14	SCD0_MEAN	SCD 0 noise peak mean value	#	I
9-16	SCD1_MEAN	SCD 1 noise peak mean value	#	I
9-18	SCD2_MEAN	SCD 2 noise peak mean value	#	I
9-20	SCD3_MEAN	SCD 3 noise peak mean value	#	I
9-22	SCD4_MEAN	SCD 4 noise peak mean value	#	I
9-24	SCD5_MEAN	SCD 5 noise peak mean value	#	I
9-26	SCD6_MEAN	SCD 6 noise peak mean value	#	I
9-28	SCD7_MEAN	SCD 7 noise peak mean value	#	I
9-30	SCD8_MEAN	SCD 8 noise peak mean value	#	I
9-32	SCD9_MEAN	SCD 9 noise peak mean value	#	I
9-34	SCD10_MEAN	SCD 10 noise peak mean value	#	I
9-36	SCD11_MEAN	SCD 11 noise peak mean value	#	I
9-38	SCD12_MEAN	SCD 12 noise peak mean value	#	I
9-40	SCD13_MEAN	SCD 13 noise peak mean value	#	I
9-42	SCD14_MEAN	SCD 14 noise peak mean value	#	I
9-44	SCD15_MEAN	SCD 15 noise peak mean value	#	I
9-46	SCD16_MEAN	SCD 16 noise peak mean value	#	I
9-48	SCD17_MEAN	SCD 17 noise peak mean value	#	I
9-50	SCD18_MEAN	SCD 18 noise peak mean value	#	I
9-52	SCD19_MEAN	SCD 19 noise peak mean value	#	I
9-54	SCD20_MEAN	SCD 20 noise peak mean value	#	I
9-56	SCD21_MEAN	SCD 21 noise peak mean value	#	I
9-58	SCD22_MEAN	SCD 22 noise peak mean value	#	I

9-60	SCD23_MEAN	SCD 23 noise peak mean value	#	I

4.4.4.2 Noise Spectra

```
/***      OBJECT DESCRIPTION                                                ***/
OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = "ASCII"
   ROWS                         =
   ROW_BYTES                    =
   COLUMNS                      =
   NAME                         = "NOISE PEAK SPECTRA"
   DESCRIPTION                  = "NOISE PEAK SPECTRA"

   OBJECT                       = COLUMN
      BYTES                     = 23
      DATA_TYPE                 = "TIME"
      NAME                      = "TIME"
      START_BYTE                =
      UNIT                      = "UT"
      DESCRIPTION               = "TIME SPECTRUM CREATED"
   END_OBJECT                   = COLUMN

   OBJECT                       = COLUMN
      BYTES                     = "3"
      DATA_TYPE                 = "ASCII_INTEGER"
      NAME                      = "DETECTOR"
      START_BYTE                =
      UNIT                      = "N/A"
      DESCRIPTION               = "DETECTOR NUMBER"
      VALID_MAXIMUM             = "23"
      VALID_MINIMUM             = "00"
   END_OBJECT                   = COLUMN

   OBJECT                       = COLUMN
      DESCRIPTION               = "NUMBER OF NOISE EVENTS IN SPECTRUM"
      NAME                      = "NOISE SPECTRUM"
      START_BYTE                =
      UNIT                      = "N/A"
      ITEMS                     = 108
      ITEM_BYTES                = "3"
      DATA_TYPE                 = "MSB_INTEGER"
      ITEM_OFFSET               = 4
      VALID_MAXIMUM             = "255"
      VALID_MINIMUM             = "0"
   END_OBJECT                   = COLUMN

END_OBJECT                  = TABLE

END
```

4.4.4.3 DCIXS Operating Parameters

```
OBJECT               = TABLE
  INTERCHANGE_FORMAT = ASCII
  ROWS               =
  ROW_BYTES          =
  COLUMNS            =
  NAME               = "D-CIXS OPERATING PARAMETERS"
  DESCRIPTION        = "D-CIXS OPERATING PARAMETERS"

  OBJECT             = COLUMN
    BYTES            = 23
    DATA_TYPE        = "TIME"
    NAME             = "TIME"
    START_BYTE       = 1
    UNIT             = "UT"
```

```
    DESCRIPTION      = "TIME OF OBSERVATION"
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = <see Table 4-3>
    DATA_TYPE        = <see Table 4-3>
    START_BYTE       =
    BYTES            =
    DESCRIPTION      = <see Table 4-3>
    FORMAT           = <see Table 4-3>
    UNIT             = <see Table 4-3>
  END_OBJECT         = COLUMN

END_OBJECT           = TABLE

END
```

Table 4-3 DCIXS Operating Parameters

TM PKT-Byte	NAME	DESCRIPTION	UNITS	FORMAT
8-14	VIDEO_CONFIG1	SCD 0, 4 & 8 configuration	#	I
8-28	VIDEO_CONFIG2	SCD 1, 5 & 9 configuration	#	I
8-42	VIDEO_CONFIG3	SCD 2, 6 & 10 configuration	#	I
8-56	VIDEO_CONFIG4	SCD 3, 7 & 11 configuration	#	I
8-70	VIDEO_CONFIG5	SCD 12, 16 & 20 configuration	#	I
8-84	VIDEO_CONFIG6	SCD 13, 17 & 21 configuration	#	I
8-98	VIDEO_CONFIG7	SCD 14, 18 & 22 configuration	#	I
8-112	VIDEO_CONFIG8	SCD 15, 19 & 23 configuration	#	I
8-22	SCD0_GAIN	SCD 0 video system gain	#	I
8-36	SCD1_GAIN	SCD 1 video system gain	#	I
8-50	SCD2_GAIN	SCD 2 video system gain	#	I
8-64	SCD3_GAIN	SCD 3 video system gain	#	I
8-24	SCD4_GAIN	SCD 4 video system gain	#	I
8-38	SCD5_GAIN	SCD 5 video system gain	#	I
8-52	SCD6_GAIN	SCD 6 video system gain	#	I
8-66	SCD7_GAIN	SCD 7 video system gain	#	I
8-26	SCD8_GAIN	SCD 8 video system gain	#	I
8-40	SCD9_GAIN	SCD 9 video system gain	#	I
8-54	SCD10_GAIN	SCD 10 video system gain	#	I
8-68	SCD11_GAIN	SCD 11 video system gain	#	I
8-78	SCD12_GAIN	SCD 12 video system gain	#	I
8-92	SCD13_GAIN	SCD 13 video system gain	#	I
8-106	SCD14_GAIN	SCD 14 video system gain	#	I
8-120	SCD15_GAIN	SCD 15 video system gain	#	I
8-80	SCD16_GAIN	SCD 16 video system gain	#	I
8-94	SCD17_GAIN	SCD 17 video system gain	#	I
8-108	SCD18_GAIN	SCD 18 video system gain	#	I
8-122	SCD19_GAIN	SCD 19 video system gain	#	I
8-82	SCD20_GAIN	SCD 20 video system gain	#	I
8-96	SCD21_GAIN	SCD 21 video system gain	#	I
8-110	SCD22_GAIN	SCD 22 video system gain	#	I
8-124	SCD23_GAIN	SCD 23 video system gain	#	I
8-150	BANK1_REJECT	SCD 0 to 11 event reject level	#	I
8-152	BANK1_THRESHOLD	SCD 0 to 11 threshold mask	#	I
8-156	BANK1_COUNTERS	SCD 0 to 11 counters control	#	I
8-160	SCD_VOD_DAC	SCD OD voltage DAC	#	I
8-162	SCD_VRD_DAC	SCD RD voltage DAC	#	I
8-164	BANK1_PWR	Bank1 power control	#	I
8-190	BANK2_REJECT	SCD 12 to 23 event reject level	#	I

8-192	BANK2_THRESHOLD	SCD 12 to 23 threshold mask	#	I
8-196	BANK2_COUNTERS	SCD 12 to 23 counters control	#	I
8-200	SCD_VOG_DAC	SCD OG voltage DAC	#	I
8-202	SCD_VSS_DAC	SCD SS voltage DAC	#	I
8-204	BANK2_PWR	Bank2 power control	#	I
8-270	OFFSET_CALTIME	Time to last Offset calibration (1/1024s units)	s	F8.4

4.4.4.4 XSM Operating Parameters

```
OBJECT               = TABLE
  INTERCHANGE_FORMAT = ASCII
  ROWS               =
  ROW_BYTES          =
  COLUMNS            =
  NAME               = "XSM OPERATING PARAMETERS"
  DESCRIPTION        = "XSM OPERATING PARAMETERS IN ENGINEERING UNITS"

  OBJECT             = COLUMN
    BYTES            = 23
    DATA_TYPE        = "TIME"
    NAME             = "TIME"
    START_BYTE       = 1
    UNIT             = "UT"
    DESCRIPTION      = "TIME OF OBSERVATION"
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = <see Table 4-4>
    DATA_TYPE        = <see Table 4-4>
    START_BYTE       =
    BYTES            =
    DESCRIPTION      = <see Table 4-4>
    FORMAT           = <see Table 4-4>
    UNIT             = <see Table 4-4>
  END_OBJECT         = COLUMN

END_OBJECT           = TABLE

END
```

Table 4-4 XSM Operating Parameters

TM PKT-Byte	NAME	DESCRIPTION	UNITS	FORMAT
8-206	XSM_PELTIER_DAC	XSM default Peltier Target Tempr DAC o/p	#	I
8-207	XSM_DATA_THRSHLD	XSM default Discriminator Threshold	#	I
8-208	XSM_HVBIAS_OFFTEMP	XSM max. detector temperature to keep HV bias on (Temp C = - Count*0.21875)	degC	F4.1
8-209	XSM_PKTGEN_THRSHLD	XSM total count threshold for spectrum transmission	#	I
8-210	XSM_DELTA_I	XSM delta leakage current threshold to shut shutter (pA = Count * 0.78125)	pA	F6.3
8-211	XSM_I	XSM max expected leakage current at end of calibration (pA = Count * 0.78125)	pA	F6.3
8-212	XSM_I_SETTLE	XSM leakage current settling time in seconds	s	I
8-213	XSM_SHTR_PULSES	XSM number shutter pulses for	#	I

		autonomous activation		
8-214	XSM_HVBIAS_ONTEMP	XSM max safe PIN temperature for bias switch-on (Temp C = - Count*0.21875)	degC	F4.1
8-215	XSM_CALTIME	XSM calibration integration time in seconds	s	I
8-216	XSM_SHTR_TRIES	XSM number of times to try shutter open/close	#	I
8-217	XSM_CAL_DELTA_I	XSM margin for excess leakage current in calibration (pA = Count * 0.78125)	pA	F6.3
8-218	XSM_ANNEAL_TIME	XSM annealing period in seconds	s	I
8-219	XSM_ANNEAL_I_SETTLE	XSM leakage current settling time before anealing	s	I

4.4.5 Product Design – Other Products

XSM Sensor Data – Provision of the XSM data to the PSA is to be undertaken by the XSM team and is covered by a separate EAICD. However for level 2 data the XSM (Type 4) data shall also be supplied as part of the D-CIXS submission to the PSA.

The PDS specification for this product can be found in [XSM]. The same data products as delivered by the XSM team will be delivered by the D-CIXS team as well.

Memory Dump – This D-CIXS telemetry product provides dumps of the onboard DPU memory (Type 5). This is only useful for instrument engineering operations and shall not be delivered to the PSA.

D-CIXS SCD Test – This is the output from the special D-CIXS TEST MODE (Type 7), which performs a long integration, fast readout of the swept charge devices to help assess their performance particularly with respect to radiation damage. This is primarily an engineering product and it will not be provided as part of the D-CIXS PSA products.

5 Appendix: Available Software to read PDS files

NASAView
NASAView is a PDS archive product display program that runs on multiple platforms in a GUI environment.

PDSRead
PDSRead was created at the Small Bodies Node (SBN) of the Planetary Data System (PDS) to read PDS image and data files.

6 Appendix

6.1 Appendix A Example of Directory Listing of Data Set X

This is an example for a data set; depending on the final outcome of what will be included in the PSA, updates may be necessary.

```
ROOT DIRECTORY
 |
 |- VOLDESC.CAT
 |- AAREADME.TXT
 |- ERRATA.TXT
 |
 |- CATALOG
 |     |- CATINFO.TXT
 |     |- INST.CAT
 |     |- DATASET.CAT
 |     |- INSTHOST.CAT
 |     |- MISSION.CAT
 |     |- SOFTWARE.CAT
 |     |- REF.CAT
 |     |- PERSON.CAT
 |
 |- DATA
 |     |- SUBDIRECTORIES_AS_REQUIRED [contains your data products]
 |
 |- INDEX
 |    |-INDXINFO.TXT
 |    |- INDEX.LBL [created by ESA's PVV tool]
 |    |- INDEX.TAB [created by ESA's PVV tool]
 |
 |- DOCUMENT [contains supplementary and ancillary documents to help understand
 |                    the data products on the volume]
 |     |- DOCINFO.TXT
 |     |- DOCUMENTS_AS_REQUIRED
 |
 |- EXTRAS [contains additional items beyond the scope of the PDS requirements]
 |     |- EXTRINFO.TXT
 |
```

6.2 Appendix B Processing Levels

The table below lists the different PDS processing levels.

Table 6-1 PDS Data Processing Levels

Level	Type	Processing Level Description
1	Raw Data	Telemetry data with data embedded.
2	Edited Data	Corrected for telemetry errors and split or decommutated into a data set for a given instrument. Sometimes called Experimental Data Record. Data are also tagged with time and location of acquisition. Corresponds to NASA Level 0 data.
3	Calibrated Data	Edited data that are still in units produced by instrument, but that have been corrected so that values are expressed in or are proportional to some physical unit such as radiance. No resampling, so edited data can be reconstructed. NASA Level 1A.
4	Resampled Data	Data that have been resampled in the time or space domains in such a way that the original edited data cannot be reconstructed. Could be calibrated in addition to being resampled. NASA Level lB.

5	Derived Data	Derived results, as maps, reports, graphics, etc. NASA Levels 2 through 5.
6	Ancillary Data	Nonscience data needed to generate calibrated or resampled data sets. Consists of instrument gains, offsets, pointing information for scan platforms, etc.
7	Correlative Data	Other science data needed to interpret space-based data sets. May include ground based data observations such as soil type or ocean buoy measurements of wind drift.
8	User Description	Description of why the data were required, any peculiarities associated with the data sets, and enough documentation to allow secondary user to extract information from the data.
N	N	Not Applicable

6.3 Appendix C Example Data Products Descriptions

The product labels for all products are listed in the following sub-sections.

6.3.1 HK Time Series (S1_DCIXS_R00953_T00.LBL)

```
 PDS_VERSION_ID               = PDS3


/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                     = "S1_DCIXS_R00953_T00.TAB"
RECORD_TYPE                   = FIXED_LENGTH
RECORD_BYTES                  = 682
FILE_RECORDS                  = 146
INTERCHANGE_FORMAT            = ASCII


/* DATA OBJECT POINTERS */

^TABLE                        = ("S1_DCIXS_R00953_T00.TAB",1)


/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                   = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME                 = "SMART-1 DCIXS LEVEL 2 EDR
                                 LUNAR DATA V1.0"

PRODUCT_ID                    = "S1_DCIXS_R00953_T00"
PRODUCT_CREATION_TIME         = 2010-01-28T18:27:02
PRODUCT_TYPE                  = EDR

PRODUCER_ID                   = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME     = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME            = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID           = 2
PROCESSING_LEVEL_DESC         = "EDITED DATA CORRECTED FOR TELEMETRY
                                 ERRORS AND DELIVERED AS HOUSEKEEPING
                                 DATA"

DATA_QUALITY_ID               = 1
DATA_QUALITY_DESC             = "1=NORMAL 2=POOR"

MISSION_ID                    = SMART1
MISSION_NAME                  = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                 TECHNOLOGY"
MISSION_PHASE_NAME            = "LUNAR PHASE"
INSTRUMENT_HOST_ID            = S1
INSTRUMENT_HOST_NAME          = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                 TECHNOLOGY"

INSTRUMENT_ID                 = DCIXS
INSTRUMENT_NAME               = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
```

```
                              SPECTROMETER"
INSTRUMENT_TYPE             = "SPECTROMETER"
INSTRUMENT_MODE_ID          = OPERATING
INSTRUMENT_MODE_DESC        = "OPERATING"

TARGET_NAME                 = "DARK SKY"
TARGET_TYPE                 = "N/A"

START_TIME                  = 2005-07-26T22:23:13
STOP_TIME                   = 2005-07-27T00:58:57
SPACECRAFT_CLOCK_START_COUNT = "8/44701312.1088"
SPACECRAFT_CLOCK_STOP_COUNT  = "8/44701568.1088"
ORBIT_NUMBER                = 953


/* POSITIONAL INFORMATION */

RIGHT_ASCENSION             = 319.713
DECLINATION                 = 64.813

WESTERNMOST_LONGITUDE       = -177.443
EASTERNMOST_LONGITUDE       = 171.709
MINIMUM_LATITUDE            = -88.330
MAXIMUM_LATITUDE            = 84.680

INCIDENCE_ANGLE             = -1.000
PHASE_ANGLE                 = 91.943
EMISSION_ANGLE              = 47.459
LOCAL_HOUR_ANGLE            = 254.379

SUB_SPACECRAFT_LONGITUDE    = 43.942
SUB_SPACECRAFT_LATITUDE     = 76.721
SPACECRAFT_ALTITUDE         = 2825.427


NOTE                        = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                              GDP SOFTWARE.

                              CONFIGURATION FILES USED:
                               SM1_DCIXS_1007_T00_HK.tcf
                               SM1_DCIXS_1007_T00_HK.dcf
                               SM1_DCIXS_1007_T00_HK.pcf

                              SPICE KERNELS USED:
                               NAIF0009.TLS
                               PCK00008.TPC
                               MOON_PA_DE418_1950-2050.BPC
                               MOON_071218.TF
                               MOON_ASSOC_ME.TF
                               EARTH_TOPO_050714.TF
                               RSSD0002.TF
                               DE418.BSP
                               SMART1_070227_STEP.TSC
                               ATNS_P030929010023_00188.BC
                               ATNS_P050930150947_00220.BC
                               ATNS_P060301004212_00233.BC
                               EARTHSTNS_FX_050714.BSP
```

```
                                  EARTHSTNS_ITRF93_050714.BSP
                                  ORES_____________00125.BSP
                                  ORMS_____________00233.BSP
                                  ORMS__041111020517_00206.BSP
                                  SMART1_STRUCT_V01.BSP
                                  SMART1_V11.TF
                                  SMART1_DCIXS_V03.TI
                                "


/*  DATA OBJECTS DEFINITION */

OBJECT                          = TABLE
  INTERCHANGE_FORMAT            = ASCII
  ROWS                          = 146
  ROW_BYTES                     = 682
  COLUMNS                       = 107

  NAME                          = "D-CIXS HK"
  DESCRIPTION                   = "D-CIXS Housekeeping Data in engineering units"

  OBJECT                        = COLUMN
    NAME                        = "UTC_TIME"
    COLUMN_NUMBER               = 1
    BYTES                       = 23
    DATA_TYPE                   = TIME
    START_BYTE                  = 1
    DESCRIPTION                 = "START TIME OF MEASUREMENT (UTC)"
    FORMAT                      = "A23"
    UNIT                        = "UT"
    VALID_MAXIMUM               = "N/A"
    VALID_MINIMUM               = "N/A"
  END_OBJECT                    = COLUMN

  OBJECT                        = COLUMN
    NAME                        = "TC_FLAGS"
    COLUMN_NUMBER               = 2
    BYTES                       = 3
    DATA_TYPE                   = ASCII_INTEGER
    START_BYTE                  = 25
    DESCRIPTION                 = "TC ERROR FLAGS"
    FORMAT                      = "I3"
    UNIT                        = "N/A"
    VALID_MAXIMUM               = "N/A"
    VALID_MINIMUM               = "N/A"
  END_OBJECT                    = COLUMN

  OBJECT                        = COLUMN
    NAME                        = "SW_VER"
    COLUMN_NUMBER               = 3
    BYTES                       = 3
    DATA_TYPE                   = ASCII_REAL
    START_BYTE                  = 29
    DESCRIPTION                 = "SOFTWARE VERSION"
    FORMAT                      = "F3.1"
    UNIT                        = "N/A"
    VALID_MAXIMUM               = 6
```

```
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "TC_OK"
  COLUMN_NUMBER            = 4
  BYTES                    = 3
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 33
  DESCRIPTION              = "TC ACCEPTED COUNTER"
  FORMAT                   = "I3"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 255
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "TC_REJ"
  COLUMN_NUMBER            = 5
  BYTES                    = 3
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 37
  DESCRIPTION              = "TC REJECTED COUNTER"
  FORMAT                   = "I3"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 20
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "TC_ECODE"
  COLUMN_NUMBER            = 6
  BYTES                    = 3
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 41
  DESCRIPTION              = "TC ERROR CODE"
  FORMAT                   = "I3"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 255
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SW_FLAGS_LB"
  COLUMN_NUMBER            = 7
  BYTES                    = 8
  DATA_TYPE                = CHARACTER
  START_BYTE               = 45
  DESCRIPTION              = "THE SOFTWARE FLAGS LOW BYTE PARAMETER IS
                             DEFINED WITH A CHARACTER STRING FORMED
                             FROM EIGHT COMPONENTS (CHARACTERS):
                             A0 A1 A2 A3 A4 A5 A6 A7

                             VALID ASSIGNMENTS FOR EACH COMPONENT ARE:
                             A0: XSM PROCESSING (0=DISABLED,1=ENABLED)
                             A1: DCIXS PROCESSING (0=DISABLED,1=ENABLED)
                             A2: DOOR RADIATION STATUS (0=OPEN,1=SHUT)
```

```
                              A3: DOOR RADIATION MOVEMENT(0=-,1=CLOSING)
                              A4: XSM SHUTTER STATUS (0=OPEN,1=CLOSED)
                              A5: XSM ENTERING ANNEALING(0=FALSE,1=TRUE)
                              A6: XSM ON FOR >1s (0=FALSE,1=TRUE)
                              A7: XSM SWITCHED ON (0=FALSE,1=TRUE)."
  FORMAT                    = "A8"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = "N/A"
  VALID_MINIMUM             = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "CRC_BAD_R"
  COLUMN_NUMBER             = 8
  BYTES                     = 5
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 54
  DESCRIPTION               = "RECEIVED CRC FROM LAST TC PACKET WITH BAD
                               CRC"
  FORMAT                    = "I5"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 65535
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "CRC_BAD_C"
  COLUMN_NUMBER             = 9
  BYTES                     = 5
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 60
  DESCRIPTION               = "CALCULATED CRC FROM LAST TC PACKET WITH
                               BAD CRC"
  FORMAT                    = "I5"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 65535
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "DOOR_STATE"
  COLUMN_NUMBER             = 10
  BYTES                     = 2
  DATA_TYPE                 = CHARACTER
  START_BYTE                = 66
  DESCRIPTION               = "THE DOOR STATE PARAMETER IS DEFINED WITH
                               A CHARACTER STRING FORMED FROM TWO
                               COMPONENTS: S E

                               VALID ASSIGNMENTS FOR EACH COMPONENT ARE:

                                S (DOOR SW STATE):
                                0 = OPEN
                                1 = CLOSING
                                2 = OPENING
                                3 = CLOSED
                                4 = SWITCH_FAIL
```

```
                              E (DOOR E2 STATE):
                              0 = OPEN
                              1 = CLOSING
                              2 = OPENING
                              3 = CLOSED"
  FORMAT                  = "A2"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = "N/A"
  VALID_MINIMUM           = "N/A"
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "MODE"
  COLUMN_NUMBER           = 11
  BYTES                   = 2
  DATA_TYPE               = CHARACTER
  START_BYTE              = 69
  DESCRIPTION             = "THE MODE PARAMETER IS DEFINED WITH A
                             CHARACTER STRING FORMED FROM TWO
                             COMPONENTS: M S

                             VALID ASSIGNMENTS FOR EACH COMPONENT ARE:

                              M (SW MODE):
                              0 = STANDBY
                              1 = OPERATING
                              2 = TEST
                              3 = CALIBRATE
                              4 = RESTING

                              S (SW SUBMODE):
                              0 = TIME_TAGGED
                              1 = LC_SPECTRUM
                              2 = HC_SPECTRUM
                              3 = LUNAR
                              4 = COMPRESSED_LC
                              5 = TT_3PIX
                              6 = TT
                              7 = HRLCS
                              8 = AUTO2"
  FORMAT                  = "A2"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = "N/A"
  VALID_MINIMUM           = "N/A"
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "MAX_CAN"
  COLUMN_NUMBER           = 12
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 72
  DESCRIPTION             = "MAX CAN PACKETS IN OUTPUT QUEUE THIS HK
                             PERIOD"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
```

```
  VALID_MAXIMUM            = 50
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "TIME_ADJ"
  COLUMN_NUMBER            = 13
  BYTES                    = 10
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 78
  DESCRIPTION              = "LAST CALCULATED TIME ADJUSTMENT"
  FORMAT                   = "I10"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 134217727
  VALID_MINIMUM            = -134217728
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "TIME_ADJF"
  COLUMN_NUMBER            = 14
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 89
  DESCRIPTION              = "LAST CALCULATED TIME ADJUSTMENT (FRACTION)
                              65535THS OF A SECOND"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "TIME_WBG"
  COLUMN_NUMBER            = 15
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 95
  DESCRIPTION              = "WORST BACKGROUND ELAPSED TIME THIS HK
                              PERIOD"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "TIME_WIDL"
  COLUMN_NUMBER            = 16
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 101
  DESCRIPTION              = "WORST IDLE LOOP COUNT THIS HK PERIOD"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = "CAN_NOT_READY"
  COLUMN_NUMBER         = 17
  BYTES                 = 5
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 107
  DESCRIPTION           = "COUNT OF TIMES CAN TX NOT READY"
  FORMAT                = "I5"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 65535
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "LOST_PUS"
  COLUMN_NUMBER         = 18
  BYTES                 = 5
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 113
  DESCRIPTION           = "COUNT OF LOST TM PUS PACKETS"
  FORMAT                = "I5"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 65535
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "RET_STACK"
  COLUMN_NUMBER         = 19
  BYTES                 = 3
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 119
  DESCRIPTION           = "RETURN STACK POINTER"
  FORMAT                = "I3"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 255
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "PAR_STACK"
  COLUMN_NUMBER         = 20
  BYTES                 = 3
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 123
  DESCRIPTION           = "PARAMETER STACK POINTER"
  FORMAT                = "I3"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 255
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "EEW_RETRY"
  COLUMN_NUMBER         = 21
  BYTES                 = 5
```

```
    DATA_TYPE               = ASCII_INTEGER
    START_BYTE              = 127
    DESCRIPTION             = "EEPROM WRITE RETRIES"
    FORMAT                  = "I5"
    UNIT                    = "N/A"
    VALID_MAXIMUM           = 65535
    VALID_MINIMUM           = 0
  END_OBJECT                = COLUMN

  OBJECT                    = COLUMN
    NAME                    = "EEW_FAIL"
    COLUMN_NUMBER           = 22
    BYTES                   = 5
    DATA_TYPE               = ASCII_INTEGER
    START_BYTE              = 133
    DESCRIPTION             = "EEPROM WRITE FAILURES"
    FORMAT                  = "I5"
    UNIT                    = "N/A"
    VALID_MAXIMUM           = 65535
    VALID_MINIMUM           = 0
  END_OBJECT                = COLUMN

  OBJECT                    = COLUMN
    NAME                    = "DOOR_CLS_DT"
    COLUMN_NUMBER           = 23
    BYTES                   = 10
    DATA_TYPE               = ASCII_INTEGER
    START_BYTE              = 139
    DESCRIPTION             = "SECONDS REMAINING OF MINIMUM DOOR CLOSED
                               INTERVAL"
    FORMAT                  = "I10"
    UNIT                    = "s"
    VALID_MAXIMUM           = 65535
    VALID_MINIMUM           = 0
  END_OBJECT                = COLUMN

  OBJECT                    = COLUMN
    NAME                    = "SW_FLAGS_HB"
    COLUMN_NUMBER           = 24
    BYTES                   = 4
    DATA_TYPE               = CHARACTER
    START_BYTE              = 150
    DESCRIPTION             = "THE SOFTWARE FLAGS HIGHBYTEPARAMETERISDEFINED"
    FORMAT                  = "A4"
    UNIT                    = "N/A"
    VALID_MAXIMUM           = "N/A"
    VALID_MINIMUM           = "N/A"
  END_OBJECT                = COLUMN

  OBJECT                    = COLUMN
    NAME                    = "DOOR_INT_CNT"
    COLUMN_NUMBER           = 25
    BYTES                   = 3
    DATA_TYPE               = ASCII_INTEGER
    START_BYTE              = 155
    DESCRIPTION             = "DOOR CLOSE INTEGRATOR COUNT"
    FORMAT                  = "I3"
```

```
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "TIME_SINCE_CAL"
  COLUMN_NUMBER           = 26
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 159
  DESCRIPTION             = "SECONDS SINCE LAST CALIBRATION"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "LAST_TC"
  COLUMN_NUMBER           = 27
  BYTES                   = 7
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 165
  DESCRIPTION             = "LAST TC"
  FORMAT                  = "I7"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 4294967295
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "LAST_TC1"
  COLUMN_NUMBER           = 28
  BYTES                   = 7
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 173
  DESCRIPTION             = "LAST BUT 1 TC TYPE"
  FORMAT                  = "I7"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 4294967295
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD1623_OFF"
  COLUMN_NUMBER           = 29
  BYTES                   = 8
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 181
  DESCRIPTION             = "THE SENSOR 16-23 INHIBIT PARAMETER IS
                             DEFINED WITH A"
  FORMAT                  = "A8"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 255
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = "SCD0815_OFF"
  COLUMN_NUMBER         = 30
  BYTES                 = 8
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 190
  DESCRIPTION           = "THE SENSOR 8-15 INHIBIT PARAMETER IS
                           DEFINED WITH A"
  FORMAT                = "A8"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 255
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "SCD0007_OFF"
  COLUMN_NUMBER         = 31
  BYTES                 = 8
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 199
  DESCRIPTION           = "THE SENSOR 0-7 INHIBIT PARAMETER IS
                           DEFINED WITH A"
  FORMAT                = "A8"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 255
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "VIDEO_PWR_STATUS"
  COLUMN_NUMBER         = 32
  BYTES                 = 3
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 208
  DESCRIPTION           = "POWER MONITOR"
  FORMAT                = "I3"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 255
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "SCD0_EVENTS"
  COLUMN_NUMBER         = 33
  BYTES                 = 5
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 212
  DESCRIPTION           = "BANK1 CHANNEL A EVENT COUNT"
  FORMAT                = "I5"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 65535
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "SCD1_EVENTS"
```

```
  COLUMN_NUMBER            = 34
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 218
  DESCRIPTION              = "BANK1 CHANNEL B EVENT COUNT"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SCD2_EVENTS"
  COLUMN_NUMBER            = 35
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 224
  DESCRIPTION              = "BANK1 CHANNEL C EVENT COUNT"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SCD3_EVENTS"
  COLUMN_NUMBER            = 36
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 230
  DESCRIPTION              = "BANK1 CHANNEL D EVENT COUNT"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SCD4_EVENTS"
  COLUMN_NUMBER            = 37
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 236
  DESCRIPTION              = "BANK1 CHANNEL E EVENT COUNT"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SCD5_EVENTS"
  COLUMN_NUMBER            = 38
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 242
  DESCRIPTION              = "BANK1 CHANNEL F EVENT COUNT"
```

```
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD6_EVENTS"
  COLUMN_NUMBER           = 39
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 248
  DESCRIPTION             = "BANK1 CHANNEL G EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD7_EVENTS"
  COLUMN_NUMBER           = 40
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 254
  DESCRIPTION             = "BANK1 CHANNEL H EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD8_EVENTS"
  COLUMN_NUMBER           = 41
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 260
  DESCRIPTION             = "BANK1 CHANNEL I EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD9_EVENTS"
  COLUMN_NUMBER           = 42
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 266
  DESCRIPTION             = "BANK1 CHANNEL J EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = "SCD10_EVENTS"
  COLUMN_NUMBER         = 43
  BYTES                 = 5
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 272
  DESCRIPTION           = "BANK1 CHANNEL K EVENT COUNT"
  FORMAT                = "I5"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 65535
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "SCD11_EVENTS"
  COLUMN_NUMBER         = 44
  BYTES                 = 5
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 278
  DESCRIPTION           = "BANK1 CHANNEL L EVENT COUNT"
  FORMAT                = "I5"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 65535
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "SCD12_EVENTS"
  COLUMN_NUMBER         = 45
  BYTES                 = 5
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 284
  DESCRIPTION           = "BANK2 CHANNEL A EVENT COUNT"
  FORMAT                = "I5"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 65535
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "SCD13_EVENTS"
  COLUMN_NUMBER         = 46
  BYTES                 = 5
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 290
  DESCRIPTION           = "BANK2 CHANNEL B EVENT COUNT"
  FORMAT                = "I5"
  UNIT                  = "N/A"
  VALID_MAXIMUM         = 65535
  VALID_MINIMUM         = 0
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "SCD14_EVENTS"
  COLUMN_NUMBER         = 47
  BYTES                 = 5
```

```
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 296
  DESCRIPTION             = "BANK2 CHANNEL C EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD15_EVENTS"
  COLUMN_NUMBER           = 48
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 302
  DESCRIPTION             = "BANK2 CHANNEL D EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD16_EVENTS"
  COLUMN_NUMBER           = 49
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 308
  DESCRIPTION             = "BANK2 CHANNEL E EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD17_EVENTS"
  COLUMN_NUMBER           = 50
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 314
  DESCRIPTION             = "BANK2 CHANNEL F EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "SCD18_EVENTS"
  COLUMN_NUMBER           = 51
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 320
  DESCRIPTION             = "BANK2 CHANNEL G EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
```

```
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SCD19_EVENTS"
  COLUMN_NUMBER            = 52
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 326
  DESCRIPTION              = "BANK2 CHANNEL H EVENT COUNT"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SCD20_EVENTS"
  COLUMN_NUMBER            = 53
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 332
  DESCRIPTION              = "BANK2 CHANNEL I EVENT COUNT"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SCD21_EVENTS"
  COLUMN_NUMBER            = 54
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 338
  DESCRIPTION              = "BANK2 CHANNEL J EVENT COUNT"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SCD22_EVENTS"
  COLUMN_NUMBER            = 55
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 344
  DESCRIPTION              = "BANK2 CHANNEL K EVENT COUNT"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
```

```
  NAME                    = "SCD23_EVENTS"
  COLUMN_NUMBER           = 56
  BYTES                   = 5
  DATA_TYPE               = ASCII_INTEGER
  START_BYTE              = 350
  DESCRIPTION             = "BANK2 CHANNEL L EVENT COUNT"
  FORMAT                  = "I5"
  UNIT                    = "N/A"
  VALID_MAXIMUM           = 65535
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "XSM_V_5"
  COLUMN_NUMBER           = 57
  BYTES                   = 10
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 356
  DESCRIPTION             = "XSM +5V MONITOR"
  FORMAT                  = "F10.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 0.5
  VALID_MINIMUM           = -2400
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "XSM_V_12"
  COLUMN_NUMBER           = 58
  BYTES                   = 10
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 367
  DESCRIPTION             = "XSM +12V MONITOR"
  FORMAT                  = "F10.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 0.5
  VALID_MINIMUM           = 0
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "XSM_V_M12"
  COLUMN_NUMBER           = 59
  BYTES                   = 10
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 378
  DESCRIPTION             = "XSM -12V MONITOR"
  FORMAT                  = "F10.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 0.5
  VALID_MINIMUM           = -0.5
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "XSM_T_PIN"
  COLUMN_NUMBER           = 60
  BYTES                   = 10
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 389
```

```
  DESCRIPTION              = "XSM PIN DETECTOR TEMPERATURE"
  FORMAT                   = "F10.1"
  UNIT                     = "C"
  VALID_MAXIMUM            = 60
  VALID_MINIMUM            = -25
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "XSM_T_BOX"
  COLUMN_NUMBER            = 61
  BYTES                    = 10
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 400
  DESCRIPTION              = "XSM DETECTOR BOX TEMPERATURE"
  FORMAT                   = "F10.1"
  UNIT                     = "C"
  VALID_MAXIMUM            = -270
  VALID_MINIMUM            = -280
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "XSM_HV"
  COLUMN_NUMBER            = 62
  BYTES                    = 10
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 411
  DESCRIPTION              = "XSM HV BIAS VOLTAGE"
  FORMAT                   = "F10.1"
  UNIT                     = "V"
  VALID_MAXIMUM            = 0
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "XSM_LEAK"
  COLUMN_NUMBER            = 63
  BYTES                    = 10
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 422
  DESCRIPTION              = "XSM LEAKAGE CURRENT"
  FORMAT                   = "F10.1"
  UNIT                     = "pA"
  VALID_MAXIMUM            = 0.5
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "T_PSU"
  COLUMN_NUMBER            = 64
  BYTES                    = 5
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 433
  DESCRIPTION              = "DC CONVERTER TEMPERATURE"
  FORMAT                   = "F5.1"
  UNIT                     = "C"
  VALID_MAXIMUM            = 50
  VALID_MINIMUM            = -40
```

```
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "T_CANPCB"
  COLUMN_NUMBER             = 65
  BYTES                     = 5
  DATA_TYPE                 = ASCII_REAL
  START_BYTE                = 439
  DESCRIPTION               = "CAN/HK PCB TEMPERATURE"
  FORMAT                    = "F5.1"
  UNIT                      = "C"
  VALID_MAXIMUM             = 50
  VALID_MINIMUM             = -40
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "T_BOX"
  COLUMN_NUMBER             = 66
  BYTES                     = 5
  DATA_TYPE                 = ASCII_REAL
  START_BYTE                = 445
  DESCRIPTION               = "MY PLATE TEMPERATURE"
  FORMAT                    = "F5.1"
  UNIT                      = "C"
  VALID_MAXIMUM             = 50
  VALID_MINIMUM             = -40
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "T_VIDPCB"
  COLUMN_NUMBER             = 67
  BYTES                     = 5
  DATA_TYPE                 = ASCII_REAL
  START_BYTE                = 451
  DESCRIPTION               = "VIDEO DIGITAL PCB TEMPERATURE"
  FORMAT                    = "F5.1"
  UNIT                      = "C"
  VALID_MAXIMUM             = 50
  VALID_MINIMUM             = -40
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "T_3DP1"
  COLUMN_NUMBER             = 68
  BYTES                     = 5
  DATA_TYPE                 = ASCII_REAL
  START_BYTE                = 457
  DESCRIPTION               = "VIDEO1 3D+ TEMPERATURE"
  FORMAT                    = "F5.1"
  UNIT                      = "C"
  VALID_MAXIMUM             = 50
  VALID_MINIMUM             = -40
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "T_3DP2"
  COLUMN_NUMBER             = 69
```

```
  BYTES                    = 5
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 463
  DESCRIPTION              = "VIDEO2 3D+ TEMPERATURE"
  FORMAT                   = "F5.1"
  UNIT                     = "C"
  VALID_MAXIMUM            = 50
  VALID_MINIMUM            = -40
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "T_SCDB"
  COLUMN_NUMBER            = 70
  BYTES                    = 5
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 469
  DESCRIPTION              = "SCD COLUMN B TEMPERATURE"
  FORMAT                   = "F5.1"
  UNIT                     = "C"
  VALID_MAXIMUM            = 20
  VALID_MINIMUM            = -40
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "T_SCDE"
  COLUMN_NUMBER            = 71
  BYTES                    = 5
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 475
  DESCRIPTION              = "SCD COLUMN E TEMPERATURE"
  FORMAT                   = "F5.1"
  UNIT                     = "C"
  VALID_MAXIMUM            = 20
  VALID_MINIMUM            = -40
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "V_12"
  COLUMN_NUMBER            = 72
  BYTES                    = 5
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 481
  DESCRIPTION              = "12V REGULATED SUPPLY"
  FORMAT                   = "F5.1"
  UNIT                     = "V"
  VALID_MAXIMUM            = 12.5
  VALID_MINIMUM            = 11.5
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "V_5"
  COLUMN_NUMBER            = 73
  BYTES                    = 5
  DATA_TYPE                = ASCII_REAL
  START_BYTE               = 487
  DESCRIPTION              = "5V REGULATED SUPPLY"
  FORMAT                   = "F5.1"
```

```
  UNIT                    = "V"
  VALID_MAXIMUM           = 5.5
  VALID_MINIMUM           = 4.6
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "V_3_3"
  COLUMN_NUMBER           = 74
  BYTES                   = 5
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 493
  DESCRIPTION             = "3.3V REGULATED SUPPLY"
  FORMAT                  = "F5.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 3.5
  VALID_MINIMUM           = 3
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "XSM_V_PELT"
  COLUMN_NUMBER           = 75
  BYTES                   = 5
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 499
  DESCRIPTION             = "XSM PELTIER SUPPLY VOLTAGE"
  FORMAT                  = "F5.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 1.8
  VALID_MINIMUM           = 1.4
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "V_M12"
  COLUMN_NUMBER           = 76
  BYTES                   = 5
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 505
  DESCRIPTION             = "M12V REGULATED SUPPLY"
  FORMAT                  = "F5.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = -11.5
  VALID_MINIMUM           = -12.5
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "V_M5"
  COLUMN_NUMBER           = 77
  BYTES                   = 5
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 511
  DESCRIPTION             = "M5V REGULATED SUPPLY"
  FORMAT                  = "F5.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = -4.6
  VALID_MINIMUM           = -5.5
END_OBJECT                = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = "V_MOTOR_P1"
  COLUMN_NUMBER         = 78
  BYTES                 = 5
  DATA_TYPE             = ASCII_REAL
  START_BYTE            = 517
  DESCRIPTION           = "MOTOR PHASE 1 VOLTAGE"
  FORMAT                = "F5.1"
  UNIT                  = "V"
  VALID_MAXIMUM         = 5
  VALID_MINIMUM         = -5
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "V_MOTOR_P2"
  COLUMN_NUMBER         = 79
  BYTES                 = 5
  DATA_TYPE             = ASCII_REAL
  START_BYTE            = 523
  DESCRIPTION           = "MOTOR PHASE 2 VOLTAGE"
  FORMAT                = "F5.1"
  UNIT                  = "V"
  VALID_MAXIMUM         = 5
  VALID_MINIMUM         = -5
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "V_SCD_SS"
  COLUMN_NUMBER         = 80
  BYTES                 = 5
  DATA_TYPE             = ASCII_REAL
  START_BYTE            = 529
  DESCRIPTION           = "SCD SUBSTRATE VOLTAGE MONITOR"
  FORMAT                = "F5.1"
  UNIT                  = "V"
  VALID_MAXIMUM         = 0.5
  VALID_MINIMUM         = -0.5
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "V_SCD_OG"
  COLUMN_NUMBER         = 81
  BYTES                 = 5
  DATA_TYPE             = ASCII_REAL
  START_BYTE            = 535
  DESCRIPTION           = "SCD OUTPUT GATE VOLTAGE MONITOR"
  FORMAT                = "F5.1"
  UNIT                  = "V"
  VALID_MAXIMUM         = 0.5
  VALID_MINIMUM         = -0.5
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                  = "V_SCD_RD"
  COLUMN_NUMBER         = 82
  BYTES                 = 5
  DATA_TYPE             = ASCII_REAL
```

```
  START_BYTE              = 541
  DESCRIPTION             = "SCD RESET DRAIN VOLTAGE MONITOR"
  FORMAT                  = "F5.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 0.5
  VALID_MINIMUM           = -0.5
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "V_SCD_OD"
  COLUMN_NUMBER           = 83
  BYTES                   = 6
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 547
  DESCRIPTION             = "SCD OUTPUT DRAIN VOLTAGE MONITOR"
  FORMAT                  = "F6.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 0.5
  VALID_MINIMUM           = -0.5
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "V_32"
  COLUMN_NUMBER           = 84
  BYTES                   = 5
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 554
  DESCRIPTION             = "32V SUPPLY VOLTAGE"
  FORMAT                  = "F5.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 0.5
  VALID_MINIMUM           = -1
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "V_0"
  COLUMN_NUMBER           = 85
  BYTES                   = 5
  DATA_TYPE               = ASCII_REAL
  START_BYTE              = 560
  DESCRIPTION             = "0V"
  FORMAT                  = "F5.1"
  UNIT                    = "V"
  VALID_MAXIMUM           = 0.5
  VALID_MINIMUM           = -0.5
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
  NAME                    = "DOOR_MECH_STATUS"
  COLUMN_NUMBER           = 86
  BYTES                   = 5
  DATA_TYPE               = CHARACTER
  START_BYTE              = 566
  DESCRIPTION             = "THE DOOR MECHANISM STATUS PARAMETER IS
                             DEFINED WITH A CHARACTER STRING FORMED
                             FROM FIVE COMPONENTS: B0 B1 B2 B3 B4
```

```
                                VALID ASSIGNMENTS FOR EACH COMPONENT ARE:
                                 B0: LAUNCH-LOCK LATCH ENABLED
                                     (0=DISABLED,1=ENABLED)
                                 B1: LAUNCH-LOCK BYPASS ENABLED
                                     (0=DISABLED,1=ENABLED)
                                 B2: LAUNCH-LOCK LATCH OPEN
                                     (0=FALSE,1=TRUE)
                                 B3: LAUNCH-LOCK LATCH CLOSED
                                     (0=FALSE,1=TRUE)
                                 B4: DOOR MOTOR RUNNING (0=FALSE,1=TRUE)"
  FORMAT                      = "A5"
  UNIT                        = "N/A"
  VALID_MAXIMUM               = "N/A"
  VALID_MINIMUM               = "N/A"
END_OBJECT                    = COLUMN

OBJECT                        = COLUMN
  NAME                        = "DOOR_STEP"
  COLUMN_NUMBER               = 87
  BYTES                       = 5
  DATA_TYPE                   = ASCII_INTEGER
  START_BYTE                  = 572
  DESCRIPTION                 = "DOOR MOTOR STEP COUNT"
  FORMAT                      = "I5"
  UNIT                        = "N/A"
  VALID_MAXIMUM               = 65535
  VALID_MINIMUM               = 0
END_OBJECT                    = COLUMN

OBJECT                        = COLUMN
  NAME                        = "XSM_CONTROL"
  COLUMN_NUMBER               = 88
  BYTES                       = 5
  DATA_TYPE                   = CHARACTER
  START_BYTE                  = 578
  DESCRIPTION                 = "THE XSM CONTROL STATUS PARAMETER IS
                                 DEFINED WITH A CHARACTER STRING FORMED
                                 FROM FIVE COMPONENTS (CHARACTERS):
                                 B0 B1 B2 B3 B4

                                VALID ASSIGNMENTS FOR EACH COMPONENT ARE:
                                 B0: PELTIER SUPPLY (0=OFF,1=ON)
                                 B1: PELTIER MODE (0=COOL,1=HEAT)
                                 B2: HV BIAS (0=OFF,1=ON)
                                 B3: HV OVERRIDE (0=DISABLED,1=ENABLED)
                                 B4: XSM FIFO WRITE (0=DISABLED,1=ENABLED)"
  FORMAT                      = "A5"
  UNIT                        = "N/A"
  VALID_MAXIMUM               = "N/A"
  VALID_MINIMUM               = "N/A"
END_OBJECT                    = COLUMN

OBJECT                        = COLUMN
  NAME                        = "XSM_STATUS"
  COLUMN_NUMBER               = 89
  BYTES                       = 2
  DATA_TYPE                   = CHARACTER
```

```
  START_BYTE                = 584
  DESCRIPTION               = "THE XSM STATUS PARAMETER IS DEFINED WITH
                               A CHARACTER STRING FORMED FROM TWO
                               COMPONENTS (CHARACTERS): B0 B1

                               VALID ASSIGNMENTS FOR EACH COMPONENT ARE:
                                B0: XSM DETECTOR OVER-TEMP
                                    (0=FALSE,1=TRUE)
                                B1: XSM HV OVER-VOLTAGE (0=FALSE,1=TRUE)"
  FORMAT                    = "A2"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = "N/A"
  VALID_MINIMUM             = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "XSM_DAC0"
  COLUMN_NUMBER             = 90
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 587
  DESCRIPTION               = "XSM DAC 0 (LAST VALUE WRITTEN TO DAC)"
  FORMAT                    = "I3"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 255
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "XSM_DAC1"
  COLUMN_NUMBER             = 91
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 591
  DESCRIPTION               = "XSM DAC 1 (LAST VALUE WRITTEN TO DAC)"
  FORMAT                    = "I3"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 255
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "XSM_STATE"
  COLUMN_NUMBER             = 92
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 595
  DESCRIPTION               = "VALID ASSIGNMENTS FOR THE XSM STATE
                               PARAMETER ARE:
                                 0 = OFF
                                 1 = STARTING
                                 2 = COOLING
                                 3 = COOL
                                 4 = CALIBRATE
                                 5 = OPENING
                                 6 = OPERATING
                                 7 = CLOSING
```

```
                                8 = HIGH-LEAKAGE
                                9 = PRE-ANNEAL
                               10 = ANNEAL
                               11 = CLOSING"
  FORMAT                    = "I3"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 15
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "XSM_SECONDS"
  COLUMN_NUMBER             = 93
  BYTES                     = 5
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 599
  DESCRIPTION               = "THE TIME XSM HAS BEEN IN ITS CURRENT
                               STATE (SECONDS)"
  FORMAT                    = "I5"
  UNIT                      = "s"
  VALID_MAXIMUM             = 65535
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "SW_PATCH_ID"
  COLUMN_NUMBER             = 94
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 605
  DESCRIPTION               = "SOFTWARE PATCH ID"
  FORMAT                    = "I3"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 65535
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "BOOT_PG"
  COLUMN_NUMBER             = 95
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 609
  DESCRIPTION               = "THE PAGE NUMBER THAT THE SOFTWARE BOOTED
                               FROM"
  FORMAT                    = "I3"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 65535
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "SS_DAC_AV"
  COLUMN_NUMBER             = 96
  BYTES                     = 5
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 613
```

```
  DESCRIPTION              = "SS DAC MONITOR AVERAGE"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "OG_DAC_AV"
  COLUMN_NUMBER            = 97
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 619
  DESCRIPTION              = "OG DAC MONITOR AVERAGE"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "RD_DAC_AV"
  COLUMN_NUMBER            = 98
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 625
  DESCRIPTION              = "RD DAC MONITOR AVERAGE"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "OD_DAC_AV"
  COLUMN_NUMBER            = 99
  BYTES                    = 5
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 631
  DESCRIPTION              = "OD DAC MONITOR AVERAGE"
  FORMAT                   = "I5"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 65535
  VALID_MINIMUM            = 0
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
  NAME                     = "SS_DAC_REQ"
  COLUMN_NUMBER            = 100
  BYTES                    = 3
  DATA_TYPE                = ASCII_INTEGER
  START_BYTE               = 637
  DESCRIPTION              = "SS DAC DEMAND"
  FORMAT                   = "I3"
  UNIT                     = "N/A"
  VALID_MAXIMUM            = 255
  VALID_MINIMUM            = 0
```

```
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "OG_DAC_REQ"
  COLUMN_NUMBER             = 101
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 641
  DESCRIPTION               = "OG DAC DEMAND"
  FORMAT                    = "I3"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 255
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "RD_DAC_REQ"
  COLUMN_NUMBER             = 102
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 645
  DESCRIPTION               = "RD DAC DEMAND"
  FORMAT                    = "I3"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 255
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "OD_DAC_REQ"
  COLUMN_NUMBER             = 103
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 649
  DESCRIPTION               = "OD DAC DEMAND"
  FORMAT                    = "I3"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 255
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "EVENTS_SEC"
  COLUMN_NUMBER             = 104
  BYTES                     = 5
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 653
  DESCRIPTION               = "MOST EVENTS/SEC THIS PERIOD"
  FORMAT                    = "I5"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = 65535
  VALID_MINIMUM             = 0
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
  NAME                      = "CK_SUMS"
  COLUMN_NUMBER             = 105
```

```
    BYTES                    = 10
    DATA_TYPE                = ASCII_INTEGER
    START_BYTE               = 659
    DESCRIPTION              = "MEMORY CHECKSUMS"
    FORMAT                   = "I10"
    UNIT                     = "N/A"
    VALID_MAXIMUM            = 0
    VALID_MINIMUM            = 0
  END_OBJECT                 = COLUMN

  OBJECT                     = COLUMN
    NAME                     = "T6PAR55"
    COLUMN_NUMBER            = 106
    BYTES                    = 5
    DATA_TYPE                = ASCII_INTEGER
    START_BYTE               = 670
    DESCRIPTION              = "DATA IN ADDRESS POINTED TO BY TABLE 6
                               PARAM. 55"
    FORMAT                   = "I5"
    UNIT                     = "N/A"
    VALID_MAXIMUM            = 65535
    VALID_MINIMUM            = 0
  END_OBJECT                 = COLUMN

  OBJECT                     = COLUMN
    NAME                     = "ITL_ID"
    COLUMN_NUMBER            = 107
    BYTES                    = 5
    DATA_TYPE                = ASCII_INTEGER
    START_BYTE               = 676
    DESCRIPTION              = "ITL ID TABLE 6 PARAMETER 56"
    FORMAT                   = "I5"
    UNIT                     = "N/A"
    VALID_MAXIMUM            = 65535
    VALID_MINIMUM            = 0
  END_OBJECT                 = COLUMN

END_OBJECT                   = TABLE

END
```

6.3.2 Time Tagged Events (S1_DCIXS_R00953_T01.LBL)

```
PDS_VERSION_ID               = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                    = "S1_DCIXS_R00953_T01.TAB"
RECORD_TYPE                  = FIXED_LENGTH
RECORD_BYTES                 = 33
FILE_RECORDS                 = 79716
INTERCHANGE_FORMAT           = ASCII

/* DATA OBJECT POINTERS */

^TABLE                       = ("S1_DCIXS_R00953_T01.TAB",1)
```

```
/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                    = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME                  = "SMART-1 DCIXS LEVEL 2 EDR
                                  LUNAR DATA V1.0"

PRODUCT_ID                     = "S1_DCIXS_R00953_T01"
PRODUCT_CREATION_TIME          = 2010-01-31T14:13:00
PRODUCT_TYPE                   = EDR

PRODUCER_ID                    = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME      = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME             = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID            = 2
PROCESSING_LEVEL_DESC          = "EDITED DATA CORRECTED FOR TELEMETRY
                                  ERRORS"

DATA_QUALITY_ID                = 1
DATA_QUALITY_DESC              = "1=NORMAL 2=POOR"

MISSION_ID                     = SMART1
MISSION_NAME                   = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                  TECHNOLOGY"
MISSION_PHASE_NAME             = "LUNAR PHASE"
INSTRUMENT_HOST_ID             = S1
INSTRUMENT_HOST_NAME           = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                  TECHNOLOGY"

INSTRUMENT_ID                  = DCIXS
INSTRUMENT_NAME                = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                                  SPECTROMETER"
INSTRUMENT_TYPE                = "SPECTROMETER"
INSTRUMENT_MODE_ID             = OPERATING
INSTRUMENT_MODE_DESC           = "OPERATING"

TARGET_NAME                    = "DARK SKY"
TARGET_TYPE                    = "N/A"

START_TIME                     = 2005-07-26T22:05:46
STOP_TIME                      = 2005-07-27T00:26:10
SPACECRAFT_CLOCK_START_COUNT   = "8/44634623.0"
SPACECRAFT_CLOCK_STOP_COUNT    = "8/44637327.0"
ORBIT_NUMBER                   = 953


/* POSITIONAL INFORMATION */

RIGHT_ASCENSION                = 0.000
DECLINATION                    = 0.000

WESTERNMOST_LONGITUDE          = -179.971
EASTERNMOST_LONGITUDE          = 174.516
MINIMUM_LATITUDE               = -38.631
MAXIMUM_LATITUDE               = 84.544
```

```
INCIDENCE_ANGLE              = -1.000
PHASE_ANGLE                  = 97.383
EMISSION_ANGLE               = 0.000
LOCAL_HOUR_ANGLE             = 0.006

SUB_SPACECRAFT_LONGITUDE     = 44.455
SUB_SPACECRAFT_LATITUDE      = 65.874
SPACECRAFT_ALTITUDE          = 2875.716

NOTE                         = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                                GDP SOFTWARE.

                                CONFIGURATION FILES USED:
                                 SM1_DCIXS_1006_T01_TT.tcf
                                 SM1_DCIXS_1006_T01_TT.dcf
                                 SM1_DCIXS_1006_T01_TT.pcf

                                SPICE KERNELS USED:
                                 NAIF0009.TLS
                                 PCK00008.TPC
                                 MOON_PA_DE418_1950-2050.BPC
                                 MOON_071218.TF
                                 MOON_ASSOC_ME.TF
                                 EARTH_TOPO_050714.TF
                                 RSSD0002.TF
                                 DE418.BSP
                                 SMART1_070227_STEP.TSC
                                 ATNS_P030929010023_00188.BC
                                 ATNS_P050930150947_00220.BC
                                 ATNS_P060301004212_00233.BC
                                 EARTHSTNS_FX_050714.BSP
                                 EARTHSTNS_ITRF93_050714.BSP
                                 ORES_____________00125.BSP
                                 ORMS_____________00233.BSP
                                 ORMS__041111020517_00206.BSP
                                 SMART1_STRUCT_V01.BSP
                                 SMART1_V11.TF
                                 SMART1_DCIXS_V03.TI
                               "

/*  DATA OBJECTS DEFINITION */

OBJECT                       = TABLE
   INTERCHANGE_FORMAT        = ASCII
   ROWS                      = 79716
   ROW_BYTES                 = 33
   COLUMNS                   = 3
   NAME                      = "DCIXS TYPE 1 TIME TAGGED EVENTS"
   DESCRIPTION               = "DCIXS SINGLE PIXEL TIME TAGGED EVENTS"

   OBJECT                    = COLUMN
      NAME                   = "TIME"
      BYTES                  = 23
      DATA_TYPE              = TIME
      START_BYTE             = 1
      UNIT                   = UT
      DESCRIPTION            = "TIME OF OBSERVATION"
```

```
   END_OBJECT                = COLUMN

   OBJECT                    = COLUMN
      NAME                   = "DETECTOR"
      BYTES                  = 2
      DATA_TYPE              = ASCII_INTEGER
      START_BYTE             = 25
      UNIT                   = "N/A"
      DESCRIPTION            = "DETECTOR NUMBER"
      VALID_MAXIMUM          = 23
      VALID_MINIMUM          = 0
   END_OBJECT                = COLUMN

   OBJECT                    = COLUMN
      NAME                   = "X_RAY_SIGNAL"
      BYTES                  = 4
      DATA_TYPE              = ASCII_INTEGER
      START_BYTE             = 28
      UNIT                   = "N/A"
      VALID_MAXIMUM          = 4095
      VALID_MINIMUM          = 0
   END_OBJECT                = COLUMN

END_OBJECT                   = TABLE

END
```

6.3.3 Time Tagged X-Ray Data LCS (S1_DCIXS_R00953_T02.LBL)

```
PDS_VERSION_ID               = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                    = "S1_DCIXS_R00953_T02.TAB"
RECORD_TYPE                  = FIXED_LENGTH
RECORD_BYTES                 = 1315
FILE_RECORDS                 = 1870
INTERCHANGE_FORMAT           = ASCII

/* DATA OBJECT POINTERS */

^TABLE                       = ("S1_DCIXS_R00953_T02.TAB",1)

/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                  = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME                = "SMART-1 DCIXS LEVEL 2 EDR
                                LUNAR DATA V1.0"

PRODUCT_ID                   = "S1_DCIXS_R00953_T02"
PRODUCT_CREATION_TIME        = 2010-02-06T11:42:07
PRODUCT_TYPE                 = EDR

PRODUCER_ID                  = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME    = "RUTHERFORD APPLETON LABORATORY"
```

```
PRODUCER_FULL_NAME           = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID          = 2
PROCESSING_LEVEL_DESC        = "EDITED DATA CORRECTED FOR TELEMETRY
                                ERRORS"

DATA_QUALITY_ID              = 1
DATA_QUALITY_DESC            = "1=NORMAL 2=POOR"

MISSION_ID                   = SMART1
MISSION_NAME                 = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                TECHNOLOGY"
MISSION_PHASE_NAME           = "LUNAR PHASE"
INSTRUMENT_HOST_ID           = S1
INSTRUMENT_HOST_NAME         = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                TECHNOLOGY"

INSTRUMENT_ID                = DCIXS
INSTRUMENT_NAME              = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                                SPECTROMETER"
INSTRUMENT_TYPE              = "SPECTROMETER"
INSTRUMENT_MODE_ID           = OPERATING
INSTRUMENT_MODE_DESC         = "OPERATING"

TARGET_NAME                  = "MOON"
TARGET_TYPE                  = "SATELLITE"

START_TIME                   = 2005-07-26T22:30:34
STOP_TIME                    = 2005-07-27T00:55:50
SPACECRAFT_CLOCK_START_COUNT = "8/44701753.0"
SPACECRAFT_CLOCK_STOP_COUNT  = "8/44796224.0"
ORBIT_NUMBER                 = 953

/* POSITIONAL INFORMATION */

RIGHT_ASCENSION              = 252.696
DECLINATION                  = 56.096

WESTERNMOST_LONGITUDE        = -139.895
EASTERNMOST_LONGITUDE        = 46.916
MINIMUM_LATITUDE             = -69.867
MAXIMUM_LATITUDE             = 75.965

INCIDENCE_ANGLE              = -1.000
PHASE_ANGLE                  = 91.272
EMISSION_ANGLE               = 9.005
LOCAL_HOUR_ANGLE             = 99.742

SUB_SPACECRAFT_LONGITUDE     = 43.456
SUB_SPACECRAFT_LATITUDE      = 81.400
SPACECRAFT_ALTITUDE          = 2777.313

NOTE                         = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                                GDP SOFTWARE.

                                CONFIGURATION FILES USED:
                                 SM1_DCIXS_1006_T02_LCS.tcf
                                 SM1_DCIXS_1006_T02_LCS.dcf
```

```
                                SM1_DCIXS_1006_T02_LCS.pcf

                               SPICE KERNELS USED:
                                NAIF0009.TLS
                                PCK00008.TPC
                                MOON_PA_DE418_1950-2050.BPC
                                MOON_071218.TF
                                MOON_ASSOC_ME.TF
                                EARTH_TOPO_050714.TF
                                RSSD0002.TF
                                DE418.BSP
                                SMART1_070227_STEP.TSC
                                ATNS_P030929010023_00188.BC
                                ATNS_P050930150947_00220.BC
                                ATNS_P060301004212_00233.BC
                                EARTHSTNS_FX_050714.BSP
                                EARTHSTNS_ITRF93_050714.BSP
                                ORES_____________00125.BSP
                                ORMS_____________00233.BSP
                                ORMS__041111020517_00206.BSP
                                SMART1_STRUCT_V01.BSP
                                SMART1_V11.TF
                                SMART1_DCIXS_V03.TI
                              "


/*  DATA OBJECTS DEFINITION */

OBJECT                        = TABLE
  INTERCHANGE_FORMAT          = ASCII
  ROWS                        = 1870
  ROW_BYTES                   = 1315
  COLUMNS                     = 4
  NAME                        = "DCIXS SPECTRA"
  DESCRIPTION                 = "DCIXS SPECTRA"

  OBJECT                      = COLUMN
    NAME                      = "START TIME"
    BYTES                     = 23
    DATA_TYPE                 = TIME
    START_BYTE                = 1
    UNIT                      = UT
    DESCRIPTION               = "START TIME OF OBSERVATION"
  END_OBJECT                  = COLUMN

  OBJECT                      = COLUMN
    NAME                      = "INTEGRATION TIME"
    BYTES                     = 5
    DATA_TYPE                 = ASCII_INTEGER
    START_BYTE                = 25
    UNIT                      = "SECONDS"
    DESCRIPTION               = "INTEGRATION TIME"
    VALID_MAXIMUM             = 9999
    VALID_MINIMUM             = 8
  END_OBJECT                  = COLUMN

  OBJECT                      = COLUMN
```

```
    NAME                        = "DETECTOR"
    BYTES                       = 3
    DATA_TYPE                   = ASCII_INTEGER
    START_BYTE                  = 31
    UNIT                        = "N/A"
    DESCRIPTION                 = "DETECTOR NUMBER"
    VALID_MAXIMUM               = 23
    VALID_MINIMUM               = 0
  END_OBJECT                    = COLUMN


  OBJECT                        = COLUMN
      DESCRIPTION               = "NUMBER OF X-RAY EVENTS IN EACH OF THE
                                256X-RAY SPECTRUM ELEMENTS"
      NAME                      = "EVENTS IN EACH X-RAY SPECTRUM ELEMENT"
      START_BYTE                = 35
      UNIT                      = "N/A"
      ITEMS                     = 256
      ITEM_BYTES                = 4
      BYTES                     = 1279
      DATA_TYPE                 = ASCII_INTEGER
      ITEM_OFFSET               = 5
      VALID_MAXIMUM             = 255
      VALID_MINIMUM             = 0
    END_OBJECT                  = COLUMN

END_OBJECT                  = TABLE

END
```

6.3.4 Time Tagged X-Ray Data HCS (S1_DCIXS_R00619_T03.LBL)

```
PDS_VERSION_ID              = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                   = "S1_DCIXS_R00619_T03.TAB"
RECORD_TYPE                 = FIXED_LENGTH
RECORD_BYTES                = 2595
FILE_RECORDS                = 52
INTERCHANGE_FORMAT          = ASCII

/* DATA OBJECT POINTERS */

^TABLE                      = ("S1_DCIXS_R00619_T03.TAB",1)


/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                 = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME               = "SMART-1 DCIXS LEVEL 2 EDR
                               LUNAR DATA V1.0"

PRODUCT_ID                  = "S1_DCIXS_R00619_T03"
```

```
PRODUCT_CREATION_TIME        = 2009-08-10T07:35:30
PRODUCT_TYPE                 = EDR

PRODUCER_ID                  = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME    = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME           = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID          = 2
PROCESSING_LEVEL_DESC        = "EDITED DATA CORRECTED FOR TELEMETRY
                                ERRORS"

DATA_QUALITY_ID              = 1
DATA_QUALITY_DESC            = "1=NORMAL 2=POOR"

MISSION_ID                   = SMART1
MISSION_NAME                 = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                TECHNOLOGY"
MISSION_PHASE_NAME           = "LUNAR PHASE"

INSTRUMENT_HOST_ID           = S1
INSTRUMENT_HOST_NAME         = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                TECHNOLOGY"

INSTRUMENT_ID                = DCIXS
INSTRUMENT_NAME              = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                                SPECTROMETER"
INSTRUMENT_TYPE              = "SPECTROMETER"
INSTRUMENT_MODE_ID           = OPERATING
INSTRUMENT_MODE_DESC         = "OPERATING"

TARGET_NAME                  = "MOON"
TARGET_TYPE                  = "SATELLITE"

START_TIME                   = 2005-05-19T01:50:06
STOP_TIME                    = 2005-05-19T01:57:06
SPACECRAFT_CLOCK_START_COUNT = "8/38752124.0"
SPACECRAFT_CLOCK_STOP_COUNT  = "8/38752544.0"
ORBIT_NUMBER                 = 619

/* POSITIONAL INFORMATION */

RIGHT_ASCENSION              = 213.859
DECLINATION                  = 78.024

WESTERNMOST_LONGITUDE        = 105.193
EASTERNMOST_LONGITUDE        = 117.788
MINIMUM_LATITUDE             = 70.081
MAXIMUM_LATITUDE             = 72.185

INCIDENCE_ANGLE              = -1.000
PHASE_ANGLE                  = 81.322
EMISSION_ANGLE               = 26.431
LOCAL_HOUR_ANGLE             = 63.553

SUB_SPACECRAFT_LONGITUDE     = 50.379
SUB_SPACECRAFT_LATITUDE      = 82.043
SPACECRAFT_ALTITUDE          = 2716.748
```

```
NOTE                          = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                                 GDP SOFTWARE.

                                 CONFIGURATION FILES USED:
                                  SM1_DCIXS_1006_T03_HCS.tcf
                                  SM1_DCIXS_1006_T03_HCS.dcf
                                  SM1_DCIXS_1006_T03_HCS.pcf

                                SPICE KERNELS USED:
                                  NAIF0009.TLS
                                  PCK00008.TPC
                                  MOON_PA_DE418_1950-2050.BPC
                                  MOON_071218.TF
                                  MOON_ASSOC_ME.TF
                                  EARTH_TOPO_050714.TF
                                  RSSD0002.TF
                                  DE418.BSP
                                  SMART1_070227_STEP.TSC
                                  ATNS_P030929010023_00188.BC
                                  ATNS_P050930150947_00220.BC
                                  ATNS_P060301004212_00233.BC
                                  EARTHSTNS_FX_050714.BSP
                                  EARTHSTNS_ITRF93_050714.BSP
                                  ORES_____________00125.BSP
                                  ORMS_____________00233.BSP
                                  ORMS__041111020517_00206.BSP
                                  SMART1_STRUCT_V01.BSP
                                  SMART1_V11.TF
                                  SMART1_DCIXS_V03.TI
                                "


/*  DATA OBJECTS DEFINITION */

OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = ASCII
   ROWS                         = 52
   ROW_BYTES                    = 2595
   COLUMNS                      = 4
   NAME                         = "DCIXS HIGH COUNT SPECTRA"
   DESCRIPTION                  = "DCIXS HIGH COUNT SPECTRA"

  OBJECT                       = COLUMN
      NAME                      = "START TIME"
      BYTES                     = 23
      DATA_TYPE                 = TIME
      START_BYTE                = 1
      UNIT                      = UT
      DESCRIPTION               = "START TIME OF OBSERVATION"
  END_OBJECT                   = COLUMN

  OBJECT                       = COLUMN
      NAME                      = "INTEGRATION TIME"
      BYTES                     = 5
      DATA_TYPE                 = ASCII_INTEGER
      START_BYTE                = 25
      UNIT                      = "SECONDS"
```

```
      DESCRIPTION              = "INTEGRATION TIME"
      VALID_MAXIMUM            = 9999
      VALID_MINIMUM            = 0008
    END_OBJECT                 = COLUMN

  OBJECT                       = COLUMN
      NAME                     = "DETECTOR"
      BYTES                    = 3
      DATA_TYPE                = ASCII_INTEGER
      START_BYTE               = 31
      UNIT                     = "N/A"
      DESCRIPTION              = "DETECTOR NUMBER"
      VALID_MAXIMUM            = 23
      VALID_MINIMUM            = 0
    END_OBJECT                 = COLUMN

  OBJECT                       = COLUMN
      DESCRIPTION              = "NUMBER OF X-RAY EVENTS IN EACH OF
                                  THE 256 X-RAY SPECTRUM ELEMENTS"
      NAME                     = "X-RAY SPECTRUM ELEMENT"
      START_BYTE               = 35
      UNIT                     = "N/A"
      ITEMS                    = 256
      ITEM_BYTES               = 9
      BYTES                    = 2559
      DATA_TYPE                = ASCII_INTEGER
      ITEM_OFFSET              = 10
      VALID_MAXIMUM            = 134184960
      VALID_MINIMUM            = 0
    END_OBJECT                 = COLUMN

END_OBJECT                     = TABLE

END
```

6.3.5 *Time Tagged X-Ray Data, Decompressed LCS (S1_DCIXS_R01403_T06.LBL)*

```
PDS_VERSION_ID               = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                    = "S1_DCIXS_R01403_T06.TAB"
RECORD_TYPE                  = FIXED_LENGTH
RECORD_BYTES                 = 1315
FILE_RECORDS                 = 1937
INTERCHANGE_FORMAT           = ASCII

/* DATA OBJECT POINTERS */

^TABLE                       = ("S1_DCIXS_R01403_T06.TAB",1)

/* IDENTIFICATION DATA ELEMENTS */
```

```
DATA_SET_ID                    = "S1-L-DCIXS-2-EDR-EP-V1.0"
DATA_SET_NAME                  = "SMART-1 DCIXS LEVEL 2 EDR
                                  EXTENDED DATA V1.0"

PRODUCT_ID                     = "S1_DCIXS_R01403_T06"
PRODUCT_CREATION_TIME          = 2009-08-13T17:17:52
PRODUCT_TYPE                   = EDR

PRODUCER_ID                    = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME      = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME             = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID            = 2
PROCESSING_LEVEL_DESC          = "EDITED DATA CORRECTED FOR TELEMETRY
                                  ERRORS"

DATA_QUALITY_ID                = 1
DATA_QUALITY_DESC              = "1=NORMAL 2=POOR"

MISSION_ID                     = SMART1
MISSION_NAME                   = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                  TECHNOLOGY"
MISSION_PHASE_NAME             = "EXTENDED MISSION"
INSTRUMENT_HOST_ID             = S1
INSTRUMENT_HOST_NAME           = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                  TECHNOLOGY"

INSTRUMENT_ID                  = DCIXS
INSTRUMENT_NAME                = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                                  SPECTROMETER"
INSTRUMENT_TYPE                = "SPECTROMETER"
INSTRUMENT_MODE_ID             = OPERATING
INSTRUMENT_MODE_DESC           = "OPERATING"

TARGET_NAME                    = "MOON"
TARGET_TYPE                    = "SATELLITE"

START_TIME                     = 2005-10-28T05:47:06
STOP_TIME                      = 2005-10-28T08:21:22
SPACECRAFT_CLOCK_START_COUNT   = "8/52745993.0"
SPACECRAFT_CLOCK_STOP_COUNT    = "8/52763901.0"
ORBIT_NUMBER                   = 1403

/* POSITIONAL INFORMATION */

RIGHT_ASCENSION                = 81.022
DECLINATION                    = -47.195

WESTERNMOST_LONGITUDE          = -179.661
EASTERNMOST_LONGITUDE          = 145.135
MINIMUM_LATITUDE               = -86.787
MAXIMUM_LATITUDE               = 71.819

INCIDENCE_ANGLE                = -1.000
```

```
PHASE_ANGLE                    = 101.757
EMISSION_ANGLE                 = 24.851
LOCAL_HOUR_ANGLE               = 217.253

SUB_SPACECRAFT_LONGITUDE       = 76.263
SUB_SPACECRAFT_LATITUDE        = -73.178
SPACECRAFT_ALTITUDE            = 645.212


NOTE                           = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                                   GDP SOFTWARE.

                 CONFIGURATION FILES USED:
                  SM1_DCIXS_1006_T06_CLCS.tcf
                  SM1_DCIXS_1006_T06_CLCS.dcf
                  SM1_DCIXS_1006_T06_CLCS.pcf

                 SPICE KERNELS USED:
                  NAIF0009.TLS
                  PCK00008.TPC
                  MOON_PA_DE418_1950-2050.BPC
                  MOON_071218.TF
                  MOON_ASSOC_ME.TF
                  EARTH_TOPO_050714.TF
                  RSSD0002.TF
                  DE418.BSP
                  SMART1_070227_STEP.TSC
                  ATNS_P030929010023_00188.BC
                  ATNS_P050930150947_00220.BC
                  ATNS_P060301004212_00233.BC
                  EARTHSTNS_FX_050714.BSP
                  EARTHSTNS_ITRF93_050714.BSP
                  ORES_____________00125.BSP
                  ORMS_____________00233.BSP
                  ORMS__041111020517_00206.BSP
                  SMART1_STRUCT_V01.BSP
                  SMART1_V11.TF
                  SMART1_DCIXS_V03.TI
                 "

/*  DATA OBJECTS DEFINITION */

OBJECT                          = TABLE

 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = 19
 ROW_BYTES                      = 1315
 COLUMNS                        = 4
 NAME                           = "DCIXS SPECTRA"
 DESCRIPTION                    = "DCIXS SPECTRA"

 OBJECT                         = COLUMN
  NAME                          = "START TIME"
  BYTES                         = 23
  DATA_TYPE                     = TIME
```

```
  START_BYTE                = 1
  UNIT                      = UT
  DESCRIPTION               = "START TIME OF OBSERVATION"
 END_OBJECT                  = COLUMN

 OBJECT                      = COLUMN
  NAME                      = "INTEGRATION TIME"
  BYTES                     = 5
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 25
  UNIT                      = "SECONDS"
  DESCRIPTION               = "INTEGRATION TIME"
  VALID_MAXIMUM             = 9999
  VALID_MINIMUM             = 0008
 END_OBJECT                  = COLUMN

 OBJECT                      = COLUMN
  NAME                      = "DETECTOR"
  BYTES                     = 3
  DATA_TYPE                 = ASCII_INTEGER
  START_BYTE                = 31
  UNIT                      = "N/A"
  DESCRIPTION               = "DETECTOR NUMBER"
  VALID_MAXIMUM             = 23
  VALID_MINIMUM             = 0
 END_OBJECT                  = COLUMN

 OBJECT                      = COLUMN
   DESCRIPTION              = "NUMBER OF X-RAY EVENTS IN EACH OF THE 256X-RAY
                               SPECTRUM ELEMENTS"
   NAME                     = "EVENTS IN EACH X-RAY SPECTRUM ELEMENT"
   START_BYTE               = 35
   UNIT                     = "N/A"
   ITEMS                    = 256
   ITEM_BYTES               = 4
   BYTES                    = 1279
   DATA_TYPE                = ASCII_INTEGER
   ITEM_OFFSET              = 5
   VALID_MAXIMUM            = 255
   VALID_MINIMUM            = 0
  END_OBJECT                 = COLUMN

END_OBJECT                  = TABLE

END
```

6.3.6 X-Ray XSM Spectra *(S1_DCIXS_R00953_T04.LBL)*

```
PDS_VERSION_ID               = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                    = "S1_DCIXS_R00953_T04.TAB"
```

```
RECORD_TYPE                  = FIXED_LENGTH
RECORD_BYTES                 = 5157
FILE_RECORDS                 = 2
INTERCHANGE_FORMAT           = ASCII

/* DATA OBJECT POINTERS */

^TABLE                       = ("S1_DCIXS_R00953_T04.TAB",1)

/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                  = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME                = "SMART-1 DCIXS LEVEL 2 EDR
                               LUNAR DATA V1.0"

PRODUCT_ID                   = "S1_DCIXS_R00953_T04"
PRODUCT_CREATION_TIME        = 2010-02-11T19:17:49
PRODUCT_TYPE                 = EDR

PRODUCER_ID                  = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME    = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME           = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID          = 2
PROCESSING_LEVEL_DESC        = "EDITED DATA CORRECTED FOR TELEMETRY
                               ERRORS"

DATA_QUALITY_ID              = 1
DATA_QUALITY_DESC            = "1=NORMAL 2=POOR"

MISSION_ID                   = SMART1
MISSION_NAME                 = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                               TECHNOLOGY"
MISSION_PHASE_NAME           = "LUNAR PHASE"
INSTRUMENT_HOST_ID           = S1
INSTRUMENT_HOST_NAME         = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                               TECHNOLOGY"

INSTRUMENT_ID                = DCIXS
INSTRUMENT_NAME              = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                               SPECTROMETER"
INSTRUMENT_TYPE              = "SPECTROMETER"
INSTRUMENT_MODE_ID           = OPERATING
INSTRUMENT_MODE_DESC         = "OPERATING"

TARGET_NAME                  = "MOON"
TARGET_TYPE                  = "SATELLITE"

START_TIME                   = 2005-07-26T22:30:11
STOP_TIME                    = 2005-07-26T22:30:25
SPACECRAFT_CLOCK_START_COUNT = "8/44701730.0"

SPACECRAFT_CLOCK_STOP_COUNT  = "8/44808598.0"

ORBIT_NUMBER                 = 953

/* POSITIONAL INFORMATION */
```

```
RIGHT_ASCENSION              = 254.068
DECLINATION                  = 56.722

WESTERNMOST_LONGITUDE        = 38.176
EASTERNMOST_LONGITUDE        = 39.304
MINIMUM_LATITUDE             = 76.308
MAXIMUM_LATITUDE             = 76.854

INCIDENCE_ANGLE              = -1.000
PHASE_ANGLE                  = 91.324
EMISSION_ANGLE               = 7.091
LOCAL_HOUR_ANGLE             = 101.262

SUB_SPACECRAFT_LONGITUDE     = 43.493
SUB_SPACECRAFT_LATITUDE      = 81.153
SPACECRAFT_ALTITUDE          = 2780.218

NOTE                         = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                                GDP SOFTWARE.

                                CONFIGURATION FILES USED:
                                 SM1_DCIXS_1006_T04_XSM.tcf

                                 SM1_DCIXS_1006_T04_XSM.dcf
                                 SM1_DCIXS_1006_T04_XSM.pcf

                                SPICE KERNELS USED:
                                 NAIF0009.TLS
                                 PCK00008.TPC
                                 MOON_PA_DE418_1950-2050.BPC
                                 MOON_071218.TF
                                 MOON_ASSOC_ME.TF
                                 EARTH_TOPO_050714.TF
                                 RSSD0002.TF
                                 DE418.BSP
                                 SMART1_070227_STEP.TSC
                                 ATNS_P030929010023_00188.BC
                                 ATNS_P050930150947_00220.BC
                                 ATNS_P060301004212_00233.BC
                                 EARTHSTNS_FX_050714.BSP
                                 EARTHSTNS_ITRF93_050714.BSP
                                 ORES_____________00125.BSP
                                 ORMS_____________00233.BSP
                                 ORMS__041111020517_00206.BSP
                                 SMART1_STRUCT_V01.BSP
                                 SMART1_V11.TF
                                 SMART1_DCIXS_V03.TI
                                "

/*  DATA OBJECTS DEFINITION */

OBJECT                       = TABLE
   INTERCHANGE_FORMAT        = ASCII
   ROWS
   ROW_BYTES                 = 5157
   COLUMNS                   = 6
   NAME                      = "XSM SCIENCE DATA"
```

```
  DESCRIPTION                 = "XSM SCIENCE AND DIAGNOSTIC DATA"

OBJECT                       = COLUMN
     NAME                      = "START TIME"
     BYTES                     = 23
     DATA_TYPE                 = TIME
     START_BYTE                = 1
     UNIT                      = UT
     DESCRIPTION               = "START TIME OF OBSERVATION"
  END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
     NAME                      = "INTEGRATION TIME"
     BYTES                     = 5
     DATA_TYPE                 = ASCII_INTEGER
     START_BYTE                = 25
     UNIT                      = "SECONDS"
     DESCRIPTION               = "INTEGRATION TIME"
     VALID_MAXIMUM             = 9999
     VALID_MINIMUM             = 0008
  END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
     NAME                      = "OVERTEMP HV"
     BYTES                     = 1
     DATA_TYPE                 = ASCII_INTEGER
     START_BYTE                = 31
     UNIT                      = "N/A"
     DESCRIPTION               = "OVERTEMP HV"
  END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
     NAME                      = "OVERVOLTAGE HV"
     BYTES                     = 1
     DATA_TYPE                 = ASCII_INTEGER
     START_BYTE                = 33
     UNIT                      = "N/A"
     DESCRIPTION               = "OVERVOLTAGE HV"
  END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
    NAME                       = "ADC CONVERSION"
     BYTES                     = 1
     DATA_TYPE                 = ASCII_INTEGER
     START_BYTE                = 35
     UNIT                      = "N/A"
     DESCRIPTION               = "ADC CONVERSION"
  END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
     NAME                      = "XSM SPECTRUM"
     START_BYTE                = 37
     UNIT                      = "N/A"
     ITEMS                     = 512
     ITEM_BYTES                = 9
     BYTES                     = 5129
     DATA_TYPE                 = ASCII_INTEGER
```

```
      ITEM_OFFSET              = 10
      VALID_MAXIMUM            = 134184960
      VALID_MINIMUM            = 0
      DESCRIPTION              = "XSM SPECTRUM"
   END_OBJECT                  = COLUMN

END_OBJECT                     = TABLE

END
```

6.3.7 Auxiliary Data

6.3.7.1 Offset Calculation Data (S1_DCIXS_R00953_T9B.LBL)

```
PDS_VERSION_ID               = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                    = "S1_DCIXS_R00953_T9B.TAB"
RECORD_TYPE                  = FIXED_LENGTH
RECORD_BYTES                 = 169
FILE_RECORDS                 = 35
INTERCHANGE_FORMAT           = ASCII


/* DATA OBJECT POINTERS */

^TABLE                       = ("S1_DCIXS_R00953_T9B.TAB",1)

/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                  = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME                = "SMART-1 DCIXS LEVEL 2 EDR
                                LUNAR DATA V1.0"

PRODUCT_ID                   = "S1_DCIXS_R00953_T9B"
PRODUCT_CREATION_TIME        = 2010-02-05T03:20:48
PRODUCT_TYPE                 = EDR

PRODUCER_ID                  = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME    = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME           = "ANDREW MCDERMOTT"

PROCESSING_LEVEL_ID          = 2

PROCESSING_LEVEL_DESC        = "EDITED DATA CORRECTED FOR TELEMETRY
                                ERRORS"

DATA_QUALITY_ID              = 1
DATA_QUALITY_DESC            = "1=NORMAL 2=POOR"

MISSION_ID                   = SMART1
MISSION_NAME                 = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                TECHNOLOGY"
```

```
MISSION_PHASE_NAME           = "LUNAR PHASE"
INSTRUMENT_HOST_ID           = S1
INSTRUMENT_HOST_NAME         = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                TECHNOLOGY"

INSTRUMENT_ID                = DCIXS
INSTRUMENT_NAME              = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                                SPECTROMETER"

INSTRUMENT_TYPE              = "SPECTROMETER"
INSTRUMENT_MODE_ID           = OPERATING
INSTRUMENT_MODE_DESC         = "OPERATING"

TARGET_NAME                  = "MOON"
TARGET_TYPE                  = "SATELLITE"

START_TIME                   = 2005-07-26T22:30:28
STOP_TIME                    = 2005-07-27T00:55:52
SPACECRAFT_CLOCK_START_COUNT = "8/44701746.33856"
SPACECRAFT_CLOCK_STOP_COUNT  = "8/44813087.32832"
ORBIT_NUMBER                 = 953

/* POSITIONAL INFORMATION */

RIGHT_ASCENSION              = 253.072
DECLINATION                  = 56.270

WESTERNMOST_LONGITUDE        = -140.047
EASTERNMOST_LONGITUDE        = 46.952
MINIMUM_LATITUDE             = -70.653
MAXIMUM_LATITUDE             = 76.212

INCIDENCE_ANGLE              = -1.000
PHASE_ANGLE                  = 91.287
EMISSION_ANGLE               = 8.473
LOCAL_HOUR_ANGLE             = 100.143

SUB_SPACECRAFT_LONGITUDE     = 43.467
SUB_SPACECRAFT_LATITUDE      = 81.330
SPACECRAFT_ALTITUDE          = 2778.136

NOTE                         = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                                GDP SOFTWARE.

               CONFIGURATION FILES USED:
                SM1_DCIXS_1006_T09_AUX.tcf
                SM1_DCIXS_1006_T9B_AUX.dcf
                SM1_DCIXS_1006_T9B_AUX.pcf

               SPICE KERNELS USED:
                NAIF0009.TLS
                PCK00008.TPC
                MOON_PA_DE418_1950-2050.BPC
                MOON_071218.TF
                MOON_ASSOC_ME.TF
                EARTH_TOPO_050714.TF
                RSSD0002.TF
```

```
                DE418.BSP
                SMART1_070227_STEP.TSC
                ATNS_P030929010023_00188.BC
                ATNS_P050930150947_00220.BC
                ATNS_P060301004212_00233.BC
                EARTHSTNS_FX_050714.BSP
                EARTHSTNS_ITRF93_050714.BSP
                ORES_____________00125.BSP
                ORMS_____________00233.BSP
                ORMS__041111020517_00206.BSP
                SMART1_STRUCT_V01.BSP
                SMART1_V11.TF
                SMART1_DCIXS_V03.TI
               "

/*  DATA OBJECTS DEFINITION */

OBJECT                        = TABLE

 INTERCHANGE_FORMAT           = ASCII
 ROWS                         =
 ROW_BYTES                    = 169
 COLUMNS                      = 25
 NAME                         = "NOISE PEAK SPECTRA"

 OBJECT                       = COLUMN
  NAME                       = "UTC_TIME"
  COLUMN_NUMBER              = 1
  BYTES                      = 23
  DATA_TYPE                  = TIME
  START_BYTE                 = 1
  DESCRIPTION                = "START TIME OF MEASUREMENT (UTC)"
  FORMAT                     = "A23"
  UNIT                       = "UT"
  VALID_MAXIMUM              = "N/A"
  VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

 OBJECT                       = COLUMN
  NAME                       = "SCD0_MEAN"
  COLUMN_NUMBER              = 2
  BYTES                      = 5
  DATA_TYPE                  = ASCII_INTEGER
  START_BYTE                 = 25
  DESCRIPTION                = "SCD0 NOISE PEAK MEAN VALUE"
  FORMAT                     = "A5"
  UNIT                       = "N/A"
  VALID_MAXIMUM              = "N/A"
  VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

 OBJECT                       = COLUMN
  NAME                       = "SCD1_MEAN"
  COLUMN_NUMBER              = 3
  BYTES                      = 5
  DATA_TYPE                  = ASCII_INTEGER
  START_BYTE                 = 31
```

```
 DESCRIPTION              = "SCD1 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
 NAME                     = "SCD2_MEAN"
 COLUMN_NUMBER            = 4
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 37
 DESCRIPTION              = "SCD2 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
 NAME                     = "SCD3_MEAN"
 COLUMN_NUMBER            = 5
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 43
 DESCRIPTION              = "SCD3 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
 NAME                     = "SCD4_MEAN"
 COLUMN_NUMBER            = 6
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 49
 DESCRIPTION              = "SCD4 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
 NAME                     = "SCD5_MEAN"
 COLUMN_NUMBER            = 7
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 55
 DESCRIPTION              = "SCD5 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
```

```
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                      = "SCD6_MEAN"
 COLUMN_NUMBER             = 8
 BYTES                     = 5
 DATA_TYPE                 = ASCII_INTEGER
 START_BYTE                = 61
 DESCRIPTION               = "SCD6 NOISE PEAK MEAN VALUE"
 FORMAT                    = "A5"
 UNIT                      = "N/A"
 VALID_MAXIMUM             = "N/A"
 VALID_MINIMUM             = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                      = "SCD7_MEAN"
 COLUMN_NUMBER             = 9
 BYTES                     = 5
 DATA_TYPE                 = ASCII_INTEGER
 START_BYTE                = 67
 DESCRIPTION               = "SCD7 NOISE PEAK MEAN VALUE"
 FORMAT                    = "A5"
 UNIT                      = "N/A"
 VALID_MAXIMUM             = "N/A"
 VALID_MINIMUM             = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                      = "SCD8_MEAN"
 COLUMN_NUMBER             = 10
 BYTES                     = 5
 DATA_TYPE                 = ASCII_INTEGER
 START_BYTE                = 73
 DESCRIPTION               = "SCD8 NOISE PEAK MEAN VALUE"
 FORMAT                    = "A5"
 UNIT                      = "N/A"
 VALID_MAXIMUM             = "N/A"
 VALID_MINIMUM             = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                      = "SCD9_MEAN"
 COLUMN_NUMBER             = 11
 BYTES                     = 5
 DATA_TYPE                 = ASCII_INTEGER
 START_BYTE                = 79
 DESCRIPTION               = "SCD9 NOISE PEAK MEAN VALUE"
 FORMAT                    = "A5"
 UNIT                      = "N/A"
 VALID_MAXIMUM             = "N/A"
 VALID_MINIMUM             = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                      = "SCD10_MEAN"
 COLUMN_NUMBER             = 12
```

```
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 85
 DESCRIPTION              = "SCD10 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
 NAME                     = "SCD11_MEAN"
 COLUMN_NUMBER            = 13
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 91
 DESCRIPTION              = "SCD11 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
 NAME                     = "SCD12_MEAN"
 COLUMN_NUMBER            = 14
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 97
 DESCRIPTION              = "SCD12 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
 NAME                     = "SCD13_MEAN"
 COLUMN_NUMBER            = 15
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 103
 DESCRIPTION              = "SCD13 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
 UNIT                     = "N/A"
 VALID_MAXIMUM            = "N/A"
 VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
 NAME                     = "SCD14_MEAN"
 COLUMN_NUMBER            = 16
 BYTES                    = 5
 DATA_TYPE                = ASCII_INTEGER
 START_BYTE               = 109
 DESCRIPTION              = "SCD14 NOISE PEAK MEAN VALUE"
 FORMAT                   = "A5"
```

```
 UNIT                    = "N/A"
 VALID_MAXIMUM           = "N/A"
 VALID_MINIMUM           = "N/A"
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
 NAME                    = "SCD15_MEAN"
 COLUMN_NUMBER           = 17
 BYTES                   = 5
 DATA_TYPE               = ASCII_INTEGER
 START_BYTE              = 115
 DESCRIPTION             = "SCD15 NOISE PEAK MEAN VALUE"
 FORMAT                  = "A5"
 UNIT                    = "N/A"
 VALID_MAXIMUM           = "N/A"
 VALID_MINIMUM           = "N/A"
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
 NAME                    = "SCD16_MEAN"
 COLUMN_NUMBER           = 18
 BYTES                   = 5
 DATA_TYPE               = ASCII_INTEGER
 START_BYTE              = 121
 DESCRIPTION             = "SCD16 NOISE PEAK MEAN VALUE"
 FORMAT                  = "A5"
 UNIT                    = "N/A"
 VALID_MAXIMUM           = "N/A"
 VALID_MINIMUM           = "N/A"
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
 NAME                    = "SCD17_MEAN"
 COLUMN_NUMBER           = 19
 BYTES                   = 5
 DATA_TYPE               = ASCII_INTEGER
 START_BYTE              = 127
 DESCRIPTION             = "SCD17 NOISE PEAK MEAN VALUE"
 FORMAT                  = "A5"
 UNIT                    = "N/A"
 VALID_MAXIMUM           = "N/A"
 VALID_MINIMUM           = "N/A"
END_OBJECT                = COLUMN

OBJECT                    = COLUMN
 NAME                    = "SCD18_MEAN"
 COLUMN_NUMBER           = 20
 BYTES                   = 5
 DATA_TYPE               = ASCII_INTEGER
 START_BYTE              = 133
 DESCRIPTION             = "SCD18 NOISE PEAK MEAN VALUE"
 FORMAT                  = "A5"
 UNIT                    = "N/A"
 VALID_MAXIMUM           = "N/A"
 VALID_MINIMUM           = "N/A"
END_OBJECT                = COLUMN
```

```
OBJECT                      = COLUMN
 NAME                       = "SCD19_MEAN"
 COLUMN_NUMBER              = 21
 BYTES                      = 5
 DATA_TYPE                  = ASCII_INTEGER
 START_BYTE                 = 139
 DESCRIPTION                = "SCD19 NOISE PEAK MEAN VALUE"
 FORMAT                     = "A5"
 UNIT                       = "N/A"
 VALID_MAXIMUM              = "N/A"
 VALID_MINIMUM              = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                       = "SCD20_MEAN"
 COLUMN_NUMBER              = 22
 BYTES                      = 5
 DATA_TYPE                  = ASCII_INTEGER
 START_BYTE                 = 145
 DESCRIPTION                = "SCD20 NOISE PEAK MEAN VALUE"
 FORMAT                     = "A5"
 UNIT                       = "N/A"
 VALID_MAXIMUM              = "N/A"
 VALID_MINIMUM              = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                       = "SCD21_MEAN"
 COLUMN_NUMBER              = 23
 BYTES                      = 5
 DATA_TYPE                  = ASCII_INTEGER
 START_BYTE                 = 151
 DESCRIPTION                = "SCD21 NOISE PEAK MEAN VALUE"
 FORMAT                     = "A5"
 UNIT                       = "N/A"
 VALID_MAXIMUM              = "N/A"
 VALID_MINIMUM              = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                       = "SCD22_MEAN"
 COLUMN_NUMBER              = 24
 BYTES                      = 5
 DATA_TYPE                  = ASCII_INTEGER
 START_BYTE                 = 157
 DESCRIPTION                = "SCD22 NOISE PEAK MEAN VALUE"
 FORMAT                     = "A5"
 UNIT                       = "N/A"
 VALID_MAXIMUM              = "N/A"
 VALID_MINIMUM              = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
 NAME                       = "SCD23_MEAN"
 COLUMN_NUMBER              = 25
 BYTES                      = 5
 DATA_TYPE                  = ASCII_INTEGER
```

```
  START_BYTE                = 163
  DESCRIPTION               = "SCD23 NOISE PEAK MEAN VALUE"
  FORMAT                    = "A5"
  UNIT                      = "N/A"
  VALID_MAXIMUM             = "N/A"
  VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

END_OBJECT                    = TABLE

END
```

6.3.7.2 Noise Spectra (S1_DCIXS_R00953_T9A.LBL)

```
PDS_VERSION_ID                = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                     = "S1_DCIXS_R00953_T9A.TAB"
RECORD_TYPE                   = FIXED_LENGTH

RECORD_BYTES                  = 569
FILE_RECORDS                  = 35
INTERCHANGE_FORMAT            = ASCII

/* DATA OBJECT POINTERS */

^TABLE                        = ("S1_DCIXS_R00953_T9A.TAB",1)

/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                   = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME                 = "SMART-1 DCIXS LEVEL 2 EDR
                                 LUNAR DATA V1.0"

PRODUCT_ID                    = "S1_DCIXS_R00953_T9A"
PRODUCT_CREATION_TIME         = 2010-02-04T17:01:46
PRODUCT_TYPE                  = EDR
PRODUCER_ID                   = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME     = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME            = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID           = 2
PROCESSING_LEVEL_DESC         = "EDITED DATA CORRECTED FOR TELEMETRY
                                 ERRORS"
DATA_QUALITY_ID               = 1
DATA_QUALITY_DESC             = "1=NORMAL 2=POOR"
MISSION_ID                    = SMART1
MISSION_NAME                  = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                 TECHNOLOGY"
MISSION_PHASE_NAME            = "LUNAR PHASE"
INSTRUMENT_HOST_ID            = S1
INSTRUMENT_HOST_NAME          = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                 TECHNOLOGY"
INSTRUMENT_ID                 = DCIXS
INSTRUMENT_NAME               = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
```

```
                              SPECTROMETER"
INSTRUMENT_TYPE              = "SPECTROMETER"
INSTRUMENT_MODE_ID           = OPERATING
INSTRUMENT_MODE_DESC         = "OPERATING"
TARGET_NAME                  = "MOON"
TARGET_TYPE                  = "SATELLITE"
START_TIME                   = 2005-07-26T22:30:28
STOP_TIME                    = 2005-07-27T00:55:52
SPACECRAFT_CLOCK_START_COUNT = "8/44701746.33856"
SPACECRAFT_CLOCK_STOP_COUNT  = "8/44813087.32832"
ORBIT_NUMBER                 = 953

/* POSITIONAL INFORMATION */
RIGHT_ASCENSION              = 253.072
DECLINATION                  = 56.270

WESTERNMOST_LONGITUDE        = -140.047
EASTERNMOST_LONGITUDE        = 46.952
MINIMUM_LATITUDE             = -70.653
MAXIMUM_LATITUDE             = 76.212

INCIDENCE_ANGLE              = -1.000
PHASE_ANGLE                  = 91.287
EMISSION_ANGLE               = 8.473
LOCAL_HOUR_ANGLE             = 100.143

SUB_SPACECRAFT_LONGITUDE     = 43.467
SUB_SPACECRAFT_LATITUDE      = 81.330
SPACECRAFT_ALTITUDE          = 2778.136

NOTE                         = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                               GDP SOFTWARE.

                               CONFIGURATION FILES USED:
                                SM1_DCIXS_1006_T09_AUX.tcf
                                SM1_DCIXS_1006_T9A_AUX.dcf
                                SM1_DCIXS_1006_T9A_AUX.pcf

                               SPICE KERNELS USED:
                                NAIF0009.TLS
                                PCK00008.TPC
                                MOON_PA_DE418_1950-2050.BPC
                                MOON_071218.TF
                                MOON_ASSOC_ME.TF
                                EARTH_TOPO_050714.TF
                                RSSD0002.TF
                                DE418.BSP
                                SMART1_070227_STEP.TSC
                                ATNS_P030929010023_00188.BC
                                ATNS_P050930150947_00220.BC
                                ATNS_P060301004212_00233.BC
                                EARTHSTNS_FX_050714.BSP
                                EARTHSTNS_ITRF93_050714.BSP
                                ORES_____________00125.BSP
                                ORMS_____________00233.BSP
                                ORMS__041111020517_00206.BSP
```

```
                                  SMART1_STRUCT_V01.BSP
                                  SMART1_V11.TF
                                  SMART1_DCIXS_V03.TI
                                "

/*  DATA OBJECTS DEFINITION */

OBJECT                          = TABLE
  INTERCHANGE_FORMAT            = ASCII
  ROWS                          = 35
  ROW_BYTES                     = 569
  COLUMNS                       = 3
  NAME                          = "NOISE PEAK SPECTRA"

 OBJECT                         = COLUMN
    NAME                        = "UTC_TIME"
    COLUMN_NUMBER               = 1
    BYTES                       = 23
    DATA_TYPE                   = TIME
    START_BYTE                  = 1
    DESCRIPTION                 = "START TIME OF MEASUREMENT (UTC)"
    FORMAT                      = "A23"
    UNIT                        = "UT"
    VALID_MAXIMUM               = "N/A"
    VALID_MINIMUM               = "N/A"

  END_OBJECT                    = COLUMN

 OBJECT                         = COLUMN
    NAME                        = "DETECTOR"
    COLUMN_NUMBER               = 2
    BYTES                       = 3
    DATA_TYPE                   = ASCII_INTEGER
    START_BYTE                  = 25
    DESCRIPTION                 = "DETECTOR NUMBER"
    UNIT                        = "N/A"
    VALID_MAXIMUM               = "N/A"
    VALID_MINIMUM               = "N/A"
  END_OBJECT                    = COLUMN

 OBJECT                         = COLUMN
    NAME                        = "NOISE_SPECTRUM"
    COLUMN_NUMBER               = 3
    BYTES                       = 539
    DATA_TYPE                   = ASCII_INTEGER
    START_BYTE                  = 29
    ITEMS                       = 108
    ITEM_BYTES                  = 4
    DESCRIPTION                 = "108 SAMPLES FROM THE DETECTOR IDENTIFIED
                                   IN PREVIOUS COLUMN"
    UNIT                        = "N/A"
    VALID_MAXIMUM               = "N/A"
    VALID_MINIMUM               = "N/A"
    ITEM_OFFSET                 = 5
  END_OBJECT                    = COLUMN

END_OBJECT                      = TABLE
```

```
END
```

6.3.7.3 D-CIXS Operating Parameters (S1_DCIXS_R00953_T8A.LBL)

```
PDS_VERSION_ID               = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                    = "S1_DCIXS_R00953_T8A.TAB"
RECORD_TYPE                  = FIXED_LENGTH
RECORD_BYTES                 = 727
FILE_RECORDS                 = 35
INTERCHANGE_FORMAT           = ASCII

/* DATA OBJECT POINTERS */

^TABLE                       = ("S1_DCIXS_R00953_T8A.TAB",1)

/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                  = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME                = "SMART-1 DCIXS LEVEL 2 EDR
                                LUNAR DATA V1.0"
PRODUCT_ID                   = "S1_DCIXS_R00953_T8A"
PRODUCT_CREATION_TIME        = 2009-08-17T09:52:01
PRODUCT_TYPE                 = EDR
PRODUCER_ID                  = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME    = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME           = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID          = 2
PROCESSING_LEVEL_DESC        = "EDITED DATA CORRECTED FOR TELEMETRY
                                ERRORS"
DATA_QUALITY_ID              = 1
DATA_QUALITY_DESC            = "1=NORMAL 2=POOR"
MISSION_ID                   = SMART1
MISSION_NAME                 = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                TECHNOLOGY"
MISSION_PHASE_NAME           = "LUNAR PHASE"
INSTRUMENT_HOST_ID           = S1
INSTRUMENT_HOST_NAME         = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                TECHNOLOGY"
INSTRUMENT_ID                = DCIXS
INSTRUMENT_NAME              = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                                SPECTROMETER"
INSTRUMENT_TYPE              = "SPECTROMETER"
INSTRUMENT_MODE_ID           = OPERATING
INSTRUMENT_MODE_DESC         = "OPERATING"

TARGET_NAME                  = "MOON"
TARGET_TYPE                  = "SATELLITE"

START_TIME                   = 2005-07-26T22:30:28
STOP_TIME                    = 2005-07-27T00:55:52
SPACECRAFT_CLOCK_START_COUNT = "8/44701746.33728"
SPACECRAFT_CLOCK_STOP_COUNT  = "8/44709026.32320"
```

```
ORBIT_NUMBER                = 953

/* POSITIONAL INFORMATION */

RIGHT_ASCENSION             = 253.072
DECLINATION                 = 56.271

WESTERNMOST_LONGITUDE       = -140.047
EASTERNMOST_LONGITUDE       = 46.952
MINIMUM_LATITUDE            = -70.653
MAXIMUM_LATITUDE            = 76.212

INCIDENCE_ANGLE             = -1.000
PHASE_ANGLE                 = 91.287
EMISSION_ANGLE              = 8.473
LOCAL_HOUR_ANGLE            = 100.143

SUB_SPACECRAFT_LONGITUDE    = 43.467
SUB_SPACECRAFT_LATITUDE     = 81.330
SPACECRAFT_ALTITUDE         = 2778.137

NOTE                        = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                               GDP SOFTWARE.

                              CONFIGURATION FILES USED:
                               SM1_DCIXS_1006_T08_AUX.tcf
                               SM1_DCIXS_1006_T8A_AUX.dcf
                               SM1_DCIXS_1006_T8A_AUX.pcf

                             SPICE KERNELS USED:
                               NAIF0009.TLS
                               PCK00008.TPC
                               MOON_PA_DE418_1950-2050.BPC
                               MOON_071218.TF
                               MOON_ASSOC_ME.TF
                               EARTH_TOPO_050714.TF
                               RSSD0002.TF
                               DE418.BSP
                               SMART1_070227_STEP.TSC
                               ATNS_P030929010023_00188.BC
                               ATNS_P050930150947_00220.BC
                               ATNS_P060301004212_00233.BC
                               EARTHSTNS_FX_050714.BSP
                               EARTHSTNS_ITRF93_050714.BSP
                               ORES_____________00125.BSP
                               ORMS_____________00233.BSP
                               ORMS__041111020517_00206.BSP
                               SMART1_STRUCT_V01.BSP
                               SMART1_V11.TF
                               SMART1_DCIXS_V03.TI
                             "


/*  DATA OBJECTS DEFINITION */

OBJECT                      = TABLE
```

```
 INTERCHANGE_FORMAT          = ASCII
 ROWS                        = 35
 ROW_BYTES                   = 727
 COLUMNS                     = 118
 NAME                        = "C1XS OPERATIONAL PARAMETERS"
 DESCRIPTION                 = "C1XS OPERATIONAL PARAMETERS"

OBJECT                      = COLUMN
   NAME                      = "UTC_TIME"
   COLUMN_NUMBER             = 1
   BYTES                     = 23
   DATA_TYPE                 = TIME
   START_BYTE                = 1
   DESCRIPTION               = "START TIME OF MEASUREMENT (UTC)"
   FORMAT                    = "A23"
   UNIT                      = "UT"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "VIDEO_CONFIG1"
   COLUMN_NUMBER             = 2
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 25
   DESCRIPTION               = "SCD 0 4 AND 8 CONFIGURATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "VIDEO_CONFIG2"
   COLUMN_NUMBER             = 3
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 31
   DESCRIPTION               = "SCD 1 5 AND 9 CONFIGURATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "VIDEO_CONFIG3"
   COLUMN_NUMBER             = 4
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 37
   DESCRIPTION               = "SCD 2 6 AND 10 CONFIGURATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
```

```
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "VIDEO_CONFIG4"
   COLUMN_NUMBER             = 5
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 43
   DESCRIPTION               = "SCD 3 7 AND 11 CONFIGURATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "VIDEO_CONFIG5"
   COLUMN_NUMBER             = 6
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 49
   DESCRIPTION               = "SCD 12 16 AND 20 CONFIGURATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "VIDEO_CONFIG6"
   COLUMN_NUMBER             = 7
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 55
   DESCRIPTION               = "SCD 13 17 AND 21 CONFIGURATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "VIDEO_CONFIG7"
   COLUMN_NUMBER             = 8
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 61
   DESCRIPTION               = "SCD 14 18 AND 22 CONFIGURATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "VIDEO_CONFIG8"
   COLUMN_NUMBER             = 9
```

```
    BYTES                    = 5
    DATA_TYPE                = ASCII_INTEGER
    START_BYTE               = 67
    DESCRIPTION              = "SCD 15 19 AND 23 CONFIGURATION"
    FORMAT                   = "A5"
    UNIT                     = "N/A"
    VALID_MAXIMUM            = "N/A"
    VALID_MINIMUM            = "N/A"
  END_OBJECT                 = COLUMN

 OBJECT                     = COLUMN
    NAME                     = "SCD0_GAIN"
    COLUMN_NUMBER            = 10
    BYTES                    = 5
    DATA_TYPE                = ASCII_INTEGER
    START_BYTE               = 73
    DESCRIPTION              = "SCD0 GAIN"
    FORMAT                   = "A5"
    UNIT                     = "N/A"
    VALID_MAXIMUM            = "N/A"
    VALID_MINIMUM            = "N/A"
  END_OBJECT                 = COLUMN

 OBJECT                     = COLUMN
    NAME                     = "SCD1_GAIN"
    COLUMN_NUMBER            = 11
    BYTES                    = 5
    DATA_TYPE                = ASCII_INTEGER
    START_BYTE               = 79
    DESCRIPTION              = "SCD1 GAIN"
    FORMAT                   = "A5"
    UNIT                     = "N/A"
    VALID_MAXIMUM            = "N/A"
    VALID_MINIMUM            = "N/A"
  END_OBJECT                 = COLUMN

 OBJECT                     = COLUMN
    NAME                     = "SCD2_GAIN"
    COLUMN_NUMBER            = 12
    BYTES                    = 5
    DATA_TYPE                = ASCII_INTEGER
    START_BYTE               = 85
    DESCRIPTION              = "SCD2 GAIN"
    FORMAT                   = "A5"
    UNIT                     = "N/A"
    VALID_MAXIMUM            = "N/A"
    VALID_MINIMUM            = "N/A"
  END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
    NAME                     = "SCD3_GAIN"
    COLUMN_NUMBER            = 13
    BYTES                    = 5
    DATA_TYPE                = ASCII_INTEGER
    START_BYTE               = 91
    DESCRIPTION              = "SCD3 GAIN"
    FORMAT                   = "A5"
```

```
    UNIT                    = "N/A"
    VALID_MAXIMUM           = "N/A"
    VALID_MINIMUM           = "N/A"
  END_OBJECT                = COLUMN

 OBJECT                     = COLUMN
    NAME                    = "SCD4_GAIN"
    COLUMN_NUMBER           = 14
    BYTES                   = 5
    DATA_TYPE               = ASCII_INTEGER
    START_BYTE              = 97
    DESCRIPTION             = "SCD4 GAIN"
    FORMAT                  = "A5"
    UNIT                    = "N/A"
    VALID_MAXIMUM           = "N/A"
    VALID_MINIMUM           = "N/A"
  END_OBJECT                = COLUMN

OBJECT                      = COLUMN
    NAME                    = "SCD5_GAIN"
    COLUMN_NUMBER           = 15
    BYTES                   = 5
    DATA_TYPE               = ASCII_INTEGER
    START_BYTE              = 103
    DESCRIPTION             = "SCD5 GAIN"
    FORMAT                  = "A5"
    UNIT                    = "N/A"
    VALID_MAXIMUM           = "N/A"
    VALID_MINIMUM           = "N/A"
  END_OBJECT                = COLUMN

 OBJECT                     = COLUMN
    NAME                    = "SCD6_GAIN"
    COLUMN_NUMBER           = 16
    BYTES                   = 5
    DATA_TYPE               = ASCII_INTEGER
    START_BYTE              = 109
    DESCRIPTION             = "SCD6 GAIN"
    FORMAT                  = "A5"
    UNIT                    = "N/A"
    VALID_MAXIMUM           = "N/A"
    VALID_MINIMUM           = "N/A"
  END_OBJECT                = COLUMN

 OBJECT                     = COLUMN
    NAME                    = "SCD7_GAIN"
    COLUMN_NUMBER           = 17
    BYTES                   = 5
    DATA_TYPE               = ASCII_INTEGER
    START_BYTE              = 115
    DESCRIPTION             = "SCD7 GAIN"
    FORMAT                  = "A5"
    UNIT                    = "N/A"
    VALID_MAXIMUM           = "N/A"
    VALID_MINIMUM           = "N/A"
  END_OBJECT                = COLUMN
```

```
OBJECT                       = COLUMN
   NAME                       = "SCD8_GAIN"
   COLUMN_NUMBER              = 18
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 121
   DESCRIPTION                = "SCD8 GAIN"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD9_GAIN"
   COLUMN_NUMBER              = 19
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 127
   DESCRIPTION                = "SCD9 GAIN"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD10_GAIN"
   COLUMN_NUMBER              = 20
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 133
   DESCRIPTION                = "SCD10 GAIN"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD11_GAIN"
   COLUMN_NUMBER              = 21
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 139
   DESCRIPTION                = "SCD11 GAIN"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD12_GAIN"
   COLUMN_NUMBER              = 22
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
```

```
   START_BYTE                = 145
   DESCRIPTION               = "SCD12 GAIN"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                       = COLUMN
   NAME                      = "SCD13_GAIN"
   COLUMN_NUMBER             = 23
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 151
   DESCRIPTION               = "SCD13 GAIN"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                       = COLUMN
   NAME                      = "SCD14_GAIN"
   COLUMN_NUMBER             = 24
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 157
   DESCRIPTION               = "SCD14 GAIN"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                       = COLUMN
   NAME                      = "SCD15_GAIN"
   COLUMN_NUMBER             = 25
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 163
   DESCRIPTION               = "SCD15 GAIN"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                       = COLUMN
   NAME                      = "SCD16_GAIN"
   COLUMN_NUMBER             = 26
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 169
   DESCRIPTION               = "SCD16 GAIN"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
```

```
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD17_GAIN"
   COLUMN_NUMBER            = 27
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 175
   DESCRIPTION              = "SCD17 GAIN"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD18_GAIN"
   COLUMN_NUMBER            = 28
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 181
   DESCRIPTION              = "SCD18 GAIN"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD19_GAIN"
   COLUMN_NUMBER            = 29
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 187
   DESCRIPTION              = "SCD19 GAIN"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD20_GAIN"
   COLUMN_NUMBER            = 30
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 193
   DESCRIPTION              = "SCD20 GAIN"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD21_GAIN"
```

```
   COLUMN_NUMBER            = 31
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 199
   DESCRIPTION              = "SCD21 GAIN"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD22_GAIN"
   COLUMN_NUMBER            = 32
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 205
   DESCRIPTION              = "SCD22 GAIN"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD23_GAIN"
   COLUMN_NUMBER            = 33
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 211
   DESCRIPTION              = "SCD23 GAIN"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD0_OFFSET"
   COLUMN_NUMBER            = 34
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 217
   DESCRIPTION              = "SCD0 OFFSET"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD1_OFFSET"
   COLUMN_NUMBER            = 35
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 223
   DESCRIPTION              = "SCD1 OFFSET"
```

```
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD2_OFFSET"
   COLUMN_NUMBER           = 36
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 229
   DESCRIPTION             = "SCD2 OFFSET"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD3_OFFSET"
   COLUMN_NUMBER           = 37
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 235
   DESCRIPTION             = "SCD3 OFFSET"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD4_OFFSET"
   COLUMN_NUMBER           = 38
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 241
   DESCRIPTION             = "SCD4 OFFSET"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD5_OFFSET"
   COLUMN_NUMBER           = 39
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 247
   DESCRIPTION             = "SCD5 OFFSET"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN
```

```
OBJECT                      = COLUMN
   NAME                      = "SCD6_OFFSET"
   COLUMN_NUMBER             = 40
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 253
   DESCRIPTION               = "SCD6 OFFSET"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD7_OFFSET"
   COLUMN_NUMBER             = 41
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 259
   DESCRIPTION               = "SCD7 OFFSET"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD8_OFFSET"
   COLUMN_NUMBER             = 42
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 265
   DESCRIPTION               = "SCD8 OFFSET"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD9_OFFSET"
   COLUMN_NUMBER             = 43
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 271
   DESCRIPTION               = "SCD9 OFFSET"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD10_OFFSET"
   COLUMN_NUMBER             = 44
   BYTES                     = 5
```

```
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 277
   DESCRIPTION              = "SCD10 OFFSET"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD11_OFFSET"
   COLUMN_NUMBER            = 45
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 283
   DESCRIPTION              = "SCD11 OFFSET"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD12_OFFSET"
   COLUMN_NUMBER            = 46
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 289
   DESCRIPTION              = "SCD12 OFFSET"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD13_OFFSET"
   COLUMN_NUMBER            = 47
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 295
   DESCRIPTION              = "SCD13 OFFSET"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD14_OFFSET"
   COLUMN_NUMBER            = 48
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 301
   DESCRIPTION              = "SCD14 OFFSET"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
```

```
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD15_OFFSET"
   COLUMN_NUMBER             = 49
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 307
   DESCRIPTION               = "SCD15 OFFSET"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD16_OFFSET"
   COLUMN_NUMBER             = 50
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 313
   DESCRIPTION               = "SCD16 OFFSET"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD17_OFFSET"
   COLUMN_NUMBER             = 51
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 319
   DESCRIPTION               = "SCD17 OFFSET"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD18_OFFSET"
   COLUMN_NUMBER             = 52
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 325
   DESCRIPTION               = "SCD18 OFFSET"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
```

```
   NAME                    = "SCD19_OFFSET"
   COLUMN_NUMBER           = 53
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 331
   DESCRIPTION             = "SCD19 OFFSET"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD20_OFFSET"
   COLUMN_NUMBER           = 54
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 337
   DESCRIPTION             = "SCD20 OFFSET"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD21_OFFSET"
   COLUMN_NUMBER           = 55
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 343
   DESCRIPTION             = "SCD21 OFFSET"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD22_OFFSET"
   COLUMN_NUMBER           = 56
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 349
   DESCRIPTION             = "SCD22 OFFSET"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD23_OFFSET"
   COLUMN_NUMBER           = 57
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 355
```

```
   DESCRIPTION              = "SCD23 OFFSET"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD0_THRESHOLD"
   COLUMN_NUMBER            = 58
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 361
   DESCRIPTION              = "SCD0 DETECTION THRESHOLD"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD1_THRESHOLD"
   COLUMN_NUMBER            = 59
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 367
   DESCRIPTION              = "SCD1 DETECTION THRESHOLD"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD2_THRESHOLD"
   COLUMN_NUMBER            = 60
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 373
   DESCRIPTION              = "SCD2 DETECTION THRESHOLD"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD3_THRESHOLD"
   COLUMN_NUMBER            = 61
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 379
   DESCRIPTION              = "SCD3 DETECTION THRESHOLD"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
```

```
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD4_THRESHOLD"
   COLUMN_NUMBER             = 62
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 385
   DESCRIPTION               = "SCD4 DETECTION THRESHOLD"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD5_THRESHOLD"
   COLUMN_NUMBER             = 63
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 391
   DESCRIPTION               = "SCD5 DETECTION THRESHOLD"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD6_THRESHOLD"
   COLUMN_NUMBER             = 64
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 397
   DESCRIPTION               = "SCD6 DETECTION THRESHOLD"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD7_THRESHOLD"
   COLUMN_NUMBER             = 65
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 403
   DESCRIPTION               = "SCD7 DETECTION THRESHOLD"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD8_THRESHOLD"
   COLUMN_NUMBER             = 66
```

```
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 409
   DESCRIPTION              = "SCD8 DETECTION THRESHOLD"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD9_THRESHOLD"
   COLUMN_NUMBER            = 67
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 415
   DESCRIPTION              = "SCD9 DETECTION THRESHOLD"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD10_THRESHOLD"
   COLUMN_NUMBER            = 68
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 421
   DESCRIPTION              = "SCD10 DETECTION THRESHOLD"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD11_THRESHOLD"
   COLUMN_NUMBER            = 69
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 427
   DESCRIPTION              = "SCD11 DETECTION THRESHOLD"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD12_THRESHOLD"
   COLUMN_NUMBER            = 70
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 433
   DESCRIPTION              = "SCD12 DETECTION THRESHOLD"
   FORMAT                   = "A5"
```

```
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD13_THRESHOLD"
   COLUMN_NUMBER           = 71
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 439
   DESCRIPTION             = "SCD13 DETECTION THRESHOLD"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD14_THRESHOLD"
   COLUMN_NUMBER           = 72
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 445
   DESCRIPTION             = "SCD14 DETECTION THRESHOLD"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD15_THRESHOLD"
   COLUMN_NUMBER           = 73
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 451
   DESCRIPTION             = "SCD15 DETECTION THRESHOLD"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "SCD16_THRESHOLD"
   COLUMN_NUMBER           = 74
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 457
   DESCRIPTION             = "SCD16 DETECTION THRESHOLD"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN
```

```
OBJECT                       = COLUMN
   NAME                       = "SCD17_THRESHOLD"
   COLUMN_NUMBER              = 75
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 463
   DESCRIPTION                = "SCD17 DETECTION THRESHOLD"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD18_THRESHOLD"
   COLUMN_NUMBER              = 76
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 469
   DESCRIPTION                = "SCD18 DETECTION THRESHOLD"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD19_THRESHOLD"
   COLUMN_NUMBER              = 77
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 475
   DESCRIPTION                = "SCD19 DETECTION THRESHOLD"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD20_THRESHOLD"
   COLUMN_NUMBER              = 78
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 481
   DESCRIPTION                = "SCD20 DETECTION THRESHOLD"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD21_THRESHOLD"
   COLUMN_NUMBER              = 79
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
```

```
   START_BYTE                = 487
   DESCRIPTION               = "SCD21 DETECTION THRESHOLD"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD22_THRESHOLD"
   COLUMN_NUMBER             = 80
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 493
   DESCRIPTION               = "SCD22 DETECTION THRESHOLD"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD23_THRESHOLD"
   COLUMN_NUMBER             = 81
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 499
   DESCRIPTION               = "SCD23 DETECTION THRESHOLD"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD0_SD"
   COLUMN_NUMBER             = 82
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 505
   DESCRIPTION               = "SCD0 NOISE PEAK STANDARD DEVIATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
   VALID_MINIMUM             = "N/A"
 END_OBJECT                  = COLUMN

OBJECT                      = COLUMN
   NAME                      = "SCD1_SD"
   COLUMN_NUMBER             = 83
   BYTES                     = 5
   DATA_TYPE                 = ASCII_INTEGER
   START_BYTE                = 511
   DESCRIPTION               = "SCD1 NOISE PEAK STANDARD DEVIATION"
   FORMAT                    = "A5"
   UNIT                      = "N/A"
   VALID_MAXIMUM             = "N/A"
```

```
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD2_SD"
   COLUMN_NUMBER            = 84
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 517
   DESCRIPTION              = "SCD2 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD3_SD"
   COLUMN_NUMBER            = 85
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 523
   DESCRIPTION              = "SCD3 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD4_SD"
   COLUMN_NUMBER            = 86
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 529
   DESCRIPTION              = "SCD4 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD5_SD"
   COLUMN_NUMBER            = 87
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 535
   DESCRIPTION              = "SCD5 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

 OBJECT                     = COLUMN
   NAME                     = "SCD6_SD"
```

```
   COLUMN_NUMBER            = 88
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 541
   DESCRIPTION              = "SCD6 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD7_SD"
   COLUMN_NUMBER            = 89
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 547
   DESCRIPTION              = "SCD7 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD8_SD"
   COLUMN_NUMBER            = 90
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 553
   DESCRIPTION              = "SCD8 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD9_SD"
   COLUMN_NUMBER            = 91
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 559
   DESCRIPTION              = "SCD9 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD10_SD"
   COLUMN_NUMBER            = 92
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 565
   DESCRIPTION              = "SCD10 NOISE PEAK STANDARD DEVIATION"
```

```
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                    = COLUMN
   NAME                    = "SCD11_SD"
   COLUMN_NUMBER           = 93
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 571
   DESCRIPTION             = "SCD11 NOISE PEAK STANDARD DEVIATION"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                    = COLUMN
   NAME                    = "SCD12_SD"
   COLUMN_NUMBER           = 94
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 577
   DESCRIPTION             = "SCD12 NOISE PEAK STANDARD DEVIATION"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                    = COLUMN
   NAME                    = "SCD13_SD"
   COLUMN_NUMBER           = 95
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 583
   DESCRIPTION             = "SCD13 NOISE PEAK STANDARD DEVIATION"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                    = COLUMN
   NAME                    = "SCD14_SD"
   COLUMN_NUMBER           = 96
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 589
   DESCRIPTION             = "SCD14 NOISE PEAK STANDARD DEVIATION"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN
```

```
OBJECT                       = COLUMN
   NAME                       = "SCD15_SD"
   COLUMN_NUMBER              = 97
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 595
   DESCRIPTION                = "SCD15 NOISE PEAK STANDARD DEVIATION"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD16_SD"
   COLUMN_NUMBER              = 98
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 601
   DESCRIPTION                = "SCD16 NOISE PEAK STANDARD DEVIATION"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD17_SD"
   COLUMN_NUMBER              = 99
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 607
   DESCRIPTION                = "SCD17 NOISE PEAK STANDARD DEVIATION"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD18_SD"
   COLUMN_NUMBER              = 100
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 613
   DESCRIPTION                = "SCD18 NOISE PEAK STANDARD DEVIATION"
   FORMAT                     = "A5"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "SCD19_SD"
   COLUMN_NUMBER              = 101
   BYTES                      = 5
```

```
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 619
   DESCRIPTION              = "SCD19 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD20_SD"
   COLUMN_NUMBER            = 102
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 625
   DESCRIPTION              = "SCD20 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD21_SD"
   COLUMN_NUMBER            = 103
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 631
   DESCRIPTION              = "SCD21 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD22_SD"
   COLUMN_NUMBER            = 104
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 637
   DESCRIPTION              = "SCD22 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD23_SD"
   COLUMN_NUMBER            = 105
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 643
   DESCRIPTION              = "SCD23 NOISE PEAK STANDARD DEVIATION"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
```

```
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "BANK1_REJECT"
   COLUMN_NUMBER            = 106
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 649
   DESCRIPTION              = "BANK 1 EVENT REJECT LEVEL"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "BANK1_THRESHOLD"
   COLUMN_NUMBER            = 107
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 655
   DESCRIPTION              = "SCD 0 TO 11 THRESHOLD MASK"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "BANK1_COUNTERS"
   COLUMN_NUMBER            = 108
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 661
   DESCRIPTION              = "SCD 0 TO 11 COUNTERS CONTROL"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD_VOD_DAC"
   COLUMN_NUMBER            = 109
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 667
   DESCRIPTION              = "SCD OUTPUT DRAIN VOLTAGE DAC VALUE"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
```

```
   NAME                    = "SCD_VRD_DAC"
   COLUMN_NUMBER           = 110
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 673
   DESCRIPTION             = "SCD RESET DRAIN VOLTAGE DAC VALUE"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "BANK1_PWR"
   COLUMN_NUMBER           = 111
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 679
   DESCRIPTION             = "BANK 1 POWER CONTROL BITS"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "BANK2_REJECT"
   COLUMN_NUMBER           = 112
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 685
   DESCRIPTION             = "BANK 2 EVENT REJECT LEVEL"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "BANK2_THRESHOLD"
   COLUMN_NUMBER           = 113
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 691
   DESCRIPTION             = "SCD 12 TO 23 THRESHOLD MASK"
   FORMAT                  = "A5"
   UNIT                    = "N/A"
   VALID_MAXIMUM           = "N/A"
   VALID_MINIMUM           = "N/A"
 END_OBJECT                = COLUMN

OBJECT                     = COLUMN
   NAME                    = "BANK2_COUNTERS"
   COLUMN_NUMBER           = 114
   BYTES                   = 5
   DATA_TYPE               = ASCII_INTEGER
   START_BYTE              = 697
```

```
   DESCRIPTION              = "SCD 12 TO 23 COUNTERS CONTROL"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD_VOG_DAC"
   COLUMN_NUMBER            = 115
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 703
   DESCRIPTION              = "SCD OUTPUT GATE VOLTAGE DAC VALUE"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "SCD_VSS_DAC"
   COLUMN_NUMBER            = 116
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 709
   DESCRIPTION              = "SCD SUBSTRATE VOLTAGE DAC VALUE"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "BANK2_PWR"
   COLUMN_NUMBER            = 117
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 715
   DESCRIPTION              = "BANK 2 POWER CONTROL BITS"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "OFFSET_CALTIME"
   COLUMN_NUMBER            = 118
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 721
   DESCRIPTION              = "TIME TO LAST OFFSET CALIBRATION
                               (1/1024 SECONDS UNITS)"
   FORMAT                   = "A5"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
```

```
    VALID_MINIMUM             = "N/A"
  END_OBJECT                  = COLUMN

END_OBJECT                    = TABLE

END
```

6.3.7.4 XSM Operating Parameters (S1_DCIXS_R00953_T8B.LBL)

```
PDS_VERSION_ID                = PDS3

/* FILE CHARACTERISTICS AND DATA ELEMENTS */

FILE_NAME                     = "S1_DCIXS_R00953_T8B.TAB"
RECORD_TYPE                   = FIXED_LENGTH
RECORD_BYTES                  = 121
FILE_RECORDS                  = 35
INTERCHANGE_FORMAT            = ASCII

/* DATA OBJECT POINTERS */

^TABLE                        = ("S1_DCIXS_R00953_T8B.TAB",1)

/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_ID                   = "S1-L-DCIXS-2-EDR-LP-V1.0"
DATA_SET_NAME                 = "SMART-1 DCIXS LEVEL 2 EDR
                                 LUNAR DATA V1.0"

PRODUCT_ID                    = "S1_DCIXS_R00953_T8B"
PRODUCT_CREATION_TIME         = 2009-08-18T15:15:19
PRODUCT_TYPE                  = EDR

PRODUCER_ID                   = DCIXS_TEAM
PRODUCER_INSTITUTION_NAME     = "RUTHERFORD APPLETON LABORATORY"
PRODUCER_FULL_NAME            = "ANDREW MCDERMOTT"
PROCESSING_LEVEL_ID           = 2
PROCESSING_LEVEL_DESC         = "EDITED DATA CORRECTED FOR TELEMETRY
                                 ERRORS"

DATA_QUALITY_ID               = 1
DATA_QUALITY_DESC             = "1=NORMAL 2=POOR"

MISSION_ID                    = SMART1
MISSION_NAME                  = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                 TECHNOLOGY"
MISSION_PHASE_NAME            = "LUNAR PHASE"
INSTRUMENT_HOST_ID            = S1
INSTRUMENT_HOST_NAME          = "SMALL MISSIONS FOR ADVANCED RESEARCH AND
                                 TECHNOLOGY"

INSTRUMENT_ID                 = DCIXS
INSTRUMENT_NAME               = "DEMONSTRATION OF A COMPACT IMAGING X-RAY
                                 SPECTROMETER"
INSTRUMENT_TYPE               = "SPECTROMETER"
```

```
INSTRUMENT_MODE_ID           = OPERATING
INSTRUMENT_MODE_DESC         = "OPERATING"

TARGET_NAME                  = "MOON"
TARGET_TYPE                  = "SATELLITE"

START_TIME                   = 2005-07-26T22:30:28
STOP_TIME                    = 2005-07-27T00:55:52
SPACECRAFT_CLOCK_START_COUNT = "8/44701746.33728"
SPACECRAFT_CLOCK_STOP_COUNT  = "8/44709026.32320"
ORBIT_NUMBER                 = 953


/* POSITIONAL INFORMATION */

RIGHT_ASCENSION              = 253.072
DECLINATION                  = 56.271

WESTERNMOST_LONGITUDE        = -140.047
EASTERNMOST_LONGITUDE        = 46.952
MINIMUM_LATITUDE             = -70.653
MAXIMUM_LATITUDE             = 76.212

INCIDENCE_ANGLE              = -1.000
PHASE_ANGLE                  = 91.287
EMISSION_ANGLE               = 8.473
LOCAL_HOUR_ANGLE             = 100.143

SUB_SPACECRAFT_LONGITUDE     = 43.467
SUB_SPACECRAFT_LATITUDE      = 81.330
SPACECRAFT_ALTITUDE          = 2778.137

NOTE                         = "THIS DATA PRODUCT HAS BEEN GENERATED BY THE
                                GDP SOFTWARE.

                                CONFIGURATION FILES USED:
                                 SM1_DCIXS_1006_T08_AUX.tcf
                                 SM1_DCIXS_1006_T8B_AUX.dcf
                                 SM1_DCIXS_1006_T8B_AUX.pcf

                                SPICE KERNELS USED:
                                 NAIF0009.TLS
                                 PCK00008.TPC
                                 MOON_PA_DE418_1950-2050.BPC
                                 MOON_071218.TF
                                 MOON_ASSOC_ME.TF
                                 EARTH_TOPO_050714.TF
                                 RSSD0002.TF
                                 DE418.BSP
                                 SMART1_070227_STEP.TSC
                                 ATNS_P030929010023_00188.BC
                                 ATNS_P050930150947_00220.BC
                                 ATNS_P060301004212_00233.BC
                                 EARTHSTNS_FX_050714.BSP
                                 EARTHSTNS_ITRF93_050714.BSP
                                 ORES_____________00125.BSP
                                 ORMS_____________00233.BSP
```

```
                                ORMS__041111020517_00206.BSP
                                SMART1_STRUCT_V01.BSP
                                SMART1_V11.TF
                                SMART1_DCIXS_V03.TI
                              "


/*  DATA OBJECTS DEFINITION */

OBJECT                         = TABLE
  INTERCHANGE_FORMAT           = ASCII
  ROWS                         = 35
  ROW_BYTES                    = 121
  COLUMNS                      = 16
  NAME                         = "XSM OPERATING PARAMETERS"
  DESCRIPTION                  = "XSM OPERATING PARAMETERS IN ENGINEERING
                                  UNITS"

 OBJECT                       = COLUMN
    NAME                       = "UTC_TIME"
    COLUMN_NUMBER              = 1
    BYTES                      = 23
    DATA_TYPE                  = TIME
    START_BYTE                 = 1
    DESCRIPTION                = "START TIME OF MEASUREMENT (UTC)"
    FORMAT                     = "A23"
    UNIT                       = "UT"
    VALID_MAXIMUM              = "N/A"
    VALID_MINIMUM              = "N/A"
  END_OBJECT                   = COLUMN

 OBJECT                       = COLUMN
    NAME                       = "XSM_PELTIER_DAC"
    COLUMN_NUMBER              = 2
    BYTES                      = 5
    DATA_TYPE                  = ASCII_INTEGER
    START_BYTE                 = 25
    DESCRIPTION                = "XSM DEFAULT PELTIER TARGET TEMPR DAC O/P"
    UNIT                       = "N/A"
    VALID_MAXIMUM              = "N/A"
    VALID_MINIMUM              = "N/A"
  END_OBJECT                   = COLUMN

 OBJECT                       = COLUMN
    NAME                       = "XSM_DATA_THRSHLD"
    COLUMN_NUMBER              = 3
    BYTES                      = 5
    DATA_TYPE                  = ASCII_INTEGER
    START_BYTE                 = 31
    DESCRIPTION                = "XSM DEFAULT DISCRIMINATOR THRESHOLD"
    UNIT                       = "N/A"
    VALID_MAXIMUM              = "N/A"
    VALID_MINIMUM              = "N/A"
  END_OBJECT                   = COLUMN

 OBJECT                       = COLUMN
    NAME                       = "XSM_HVBIAS_OFFTEMP"
```

```
   COLUMN_NUMBER              = 4
   BYTES                      = 5
   DATA_TYPE                  = ASCII_REAL
   START_BYTE                 = 37
   DESCRIPTION                = "XSM MAX. DETECTOR TEMPERATURE TO KEEP HV
                                BIAS ON"
   FORMAT                     = "F5.1"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN


OBJECT                       = COLUMN
   NAME                       = "XSM_PKTGEN_THRSHLD"
   COLUMN_NUMBER              = 5
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 43
   DESCRIPTION                = "XSM TOTAL COUNT THRESHOLD FOR SPECTRUM
                                TRANSMISSION"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "XSM_DELTA_I"
   COLUMN_NUMBER              = 6
   BYTES                      = 7
   DATA_TYPE                  = ASCII_REAL
   START_BYTE                 = 49
   DESCRIPTION                = "XSM DELTA LEAKAGE CURRENT THRESHOLD TO
                                SHUT SHUTTER (pA = COUNT * 0.78125)"
   FORMAT                     = "F7.3"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "XSM_I"
   COLUMN_NUMBER              = 7
   BYTES                      = 5
   DATA_TYPE                  = ASCII_INTEGER
   START_BYTE                 = 57
   DESCRIPTION                = "XSM MAX EXPECTED LEAKAGE CURRENT AT END OF
                                CALIBRATION (pA = COUNT * 0.78125)"
   UNIT                       = "N/A"
   VALID_MAXIMUM              = "N/A"
   VALID_MINIMUM              = "N/A"
 END_OBJECT                   = COLUMN

OBJECT                       = COLUMN
   NAME                       = "XSM_I_SETTLE"
   COLUMN_NUMBER              = 8
```

```
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 63
   DESCRIPTION              = "XSM LEAKAGE CURRENT SETTLING TIME IN
                               SECONDS"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "XSM_SHTR_PULSES"
   COLUMN_NUMBER            = 9
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 69
   DESCRIPTION              = "XSM NUMBER SHUTTER PULSES FOR AUTONOMOUS
                               ACTIVATION"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "XSM_HVBIAS_ONTEMP"
   COLUMN_NUMBER            = 10
   BYTES                    = 5
   DATA_TYPE                = ASCII_REAL
   START_BYTE               = 75
   DESCRIPTION              = "XSM MAX SAFE PIN TEMPERATURE FOR BIAS
                               SWITCH-ON"
   FORMAT                   = "F5.1"
   UNIT                     = "degC"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "XSM_CALTIME"
   COLUMN_NUMBER            = 11
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 81
   DESCRIPTION              = "XSM CALIBRATION INTEGRATION TIME IN
                               SECONDS"
   UNIT                     = "N/A"
   VALID_MAXIMUM            = "N/A"
   VALID_MINIMUM            = "N/A"
 END_OBJECT                 = COLUMN

OBJECT                     = COLUMN
   NAME                     = "XSM_SHTR_TRIES"
   COLUMN_NUMBER            = 12
   BYTES                    = 5
   DATA_TYPE                = ASCII_INTEGER
   START_BYTE               = 87
   DESCRIPTION              = "XSM NUMBER OF TIMES TO TRY SHUTTER
```

```
                                OPEN/CLOSE"
   UNIT                        = "N/A"
   VALID_MAXIMUM               = "N/A"
   VALID_MINIMUM               = "N/A"
 END_OBJECT                    = COLUMN

OBJECT                        = COLUMN
   NAME                        = "XSM_NOANNEAL_I"
   COLUMN_NUMBER               = 13
   BYTES                       = 7
   DATA_TYPE                   = ASCII_REAL
   START_BYTE                  = 93
   DESCRIPTION                 = "DELTA LEAKAGE CURRENT IN NO ANNEALING CASE
                                  (pA = COUNT * 0.78125)"
   FORMAT                      = "F7.3"
   UNIT                        = "pA"
   VALID_MAXIMUM               = "N/A"
   VALID_MINIMUM               = "N/A"
 END_OBJECT                    = COLUMN

OBJECT                        = COLUMN
   NAME                        = "XSM_CAL_DELTA_I"
   COLUMN_NUMBER               = 14
   BYTES                       = 7
   DATA_TYPE                   = ASCII_REAL
   START_BYTE                  = 101
   DESCRIPTION                 = "XSM MARGIN FOR EXCESS LEAKAGE CURRENT
                                  IN CALIBRATION (pA = COUNT * 0.78125)"
   FORMAT                      = "F7.3"
   UNIT                        = "pA"
   VALID_MAXIMUM               = "N/A"
   VALID_MINIMUM               = "N/A"
 END_OBJECT                    = COLUMN

OBJECT                        = COLUMN
   NAME                        = "XSM_ANNEAL_TIME"
   COLUMN_NUMBER               = 15
   BYTES                       = 5
   DATA_TYPE                   = ASCII_INTEGER
   START_BYTE                  = 109
   DESCRIPTION                 = "XSM ANNEALING PERIOD IN SECONDS"
   UNIT                        = "N/A"
   VALID_MAXIMUM               = "N/A"
   VALID_MINIMUM               = "N/A"
 END_OBJECT                    = COLUMN

OBJECT                        = COLUMN
   NAME                        = "XSM_ANNEAL_I_SETTLE"
   COLUMN_NUMBER               = 16
   BYTES                       = 5
   DATA_TYPE                   = ASCII_INTEGER
   START_BYTE                  = 115
   DESCRIPTION                 = "XSM LEAKAGE CURRENT SETTLING TIME
                                  BEFORE ANNEALING"
   UNIT                        = "N/A"
   VALID_MAXIMUM               = "N/A"
   VALID_MINIMUM               = "N/A"
```

```
  END_OBJECT                    = COLUMN

END_OBJECT                      = TABLE

END
```