|  |
| --- |
| Mars 2020 (M2020)  Software Interface Specification |
| Interface Title: **MEDA Environmental Experiment Data Record (EDR) Data Products**  Mission: M2020 Date: Sept. 10, 2020  Module ID: JPL D-99961  Module Type (REFerence Only or MISsion-specific info included): MIS |
| Reference Module ID: N/A Date: N/A |
| **Signatures**  ***GDS Generating Elements:***  Instrument Data System Lead  Stirling Algermissen \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Subsystem Lead Date  ***Science Receiving Elements:***  M2020 Deputy Project Scientist  Kenneth H Williford \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Deputy Project Scientist Date  ***GDS Receiving Elements:***  M2020 GDS Manager  Jim Kurien \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Manager Date  M2020 GDS System Engineer  Guy Pyrzak \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Subsystem Engineer Date  ***Concurrence:***  M2020 MEDA Principal Investigator  Jose Antonio Rodriguez-Manfredi \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Principal Investigator Date  M2020 MEDA Instrument Scientist  Manuel de la Torre Juarez \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Investigation Scientist Date  M2020 MEDA Instrument Engineer  Robin Leiter \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Instrument Engineer Date  PDS Program Manager  Tim McClanahan \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Manager Date  PDS Atmospheres Node Manager  Nancy Chanover \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Manager Date |

Mars 2020 Project

*Software Interface Specification (SIS)*

MEDA

Environmental

Experiment Data Record (EDR)

Data Products

Version 0.27 (DRAFT)

**Custodians:**

Rafael Alanis and Stirling Algermissen

**JPL D-99964**

September 10, 2020



Jet Propulsion Laboratory

California Institute of Technology

CHANGE LOG

| DATE | SECTIONS CHANGED | REASON FOR CHANGE | REVISION |
| --- | --- | --- | --- |
|  |  |  |  |

OPEN ISSUE ITEMS

| revision | Open Issue | CLOSED |
| --- | --- | --- |
|  |  |  |

TBD ITEMS

* ***“TBD” items are identified by PINK text.***
* ***Comments and questions are enclosed between “{<who>:“ and “}”***
* ***Text and comments in GREEN are intended for the PDS engineer.***
* ***Text and comments in ORANGE are specific to the REMS TEAM.***

|  |  |
| --- | --- |
| **SECTION** | **DESCRIPTION** |
| All | TBD items |
| Cover page | JPL D number |
| Cover Page | Document number |
| Signature page | Missing names |

CONTENTS

TBD ITEMS v

CONTENTS vi

ACRONYMS AND ABBREVIATIONS vii

1. INTRODUCTION 10

1.1 Purpose and Scope 10

1.2 Contents 10

1.3 Applicable Documents and Constraints 10

1.4 Relationships with Other Interfaces 11

2. Data Product Characteristics and Environment 11

2.1 Instrument Overview 11

2.2 Data Product Overview 15

2.3 EDR Product Specification 15

2.3.1 EDR Product Types 15

2.3.2 Science Data Product EDR 16

2.3.3 EventReport Data Product EDR 16

2.4 Data Product Generation 17

2.4.4 Data Processing Level 18

2.4.5 Data Flow 19

2.5 Standards Used in Generating Data Products 19

2.5.1 File Naming Standards 19

2.5.2 EDR Filename 20

2.5.3 Time Standards 28

2.5.4 Coordinate Systems 28

2.5.5 Data Storage Conventions 28

2.6 Data Validation 28

3. Data Product Specifications 29

3.1 Data Product Structure and Organization 29

3.2 Data Format Descriptions 29

3.3 Label Descriptions 30

3.3.1 Detached PDS4 Label (for Archive) 30

3.3.2 PDS4 Data 30

3.3.3 Detached ODL Label (for Operations) 31

4. Applicable Software 31

4.1 Utility Programs 31

4.2 Applicable PDS Software Tools 31

Appendix A - MEDA SCIENCE DATA PRODUCTS FIELDS 34

APPENDIX B – MEDA EVENT REPORT DATA PRODUCTS FIELDS 52

ACRONYMS AND ABBREVIATIONS

|  |  |
| --- | --- |
| ADC | Analog Digital Converter |
| APSW | Application Software |
| ASCII | American Standard Code for Information Interchange |
| ASIC | Application-Specific Integrated Circuit |
| ATS | Air Temperature Sensor |
| CAB | Centro de Astrobiología |
| CPU | Central Processing Unit |
| CODMAC | Committee on Data Management and Computation |
| DAC | Digital Analog Converter |
| EDAC | Error Detection and Correction |
| EDR | Experiment Data Record |
| ERDP | EventReport Data Product |
| DEF | Double Event Failure |
| FEI | File Exchange Interface |
| GDS | Ground Data System |
| HEPA | High Efficiency Particulate air |
| HK | Housekeeping |
| HPRT | Heating Platinum Resistance Thermometer |
| HS | Humidity Sensor |
| ICU | Instrument Control Unit |
| JPL | Jet Propulsion Laboratory |
| LMST | Local Mean Solar Time |
| LTST | Local True Solar Time |
| MIPL | Multi-mission image Processing Laboratory |
| MEDA | Mars Environmental Dynamics Analyzer |
| MPCS | Multi-mission Data Processing and Control System |
| NAIF | Navigation and Ancillary Information Facility |
| NASA | National Aeronautics and Space Administration |
| ODL | Object Description Language |
| ODS | Operations Data Store |
| OPGS | Operations Products Generation Sub-system |
| OT | Observation Table |
| PCB | Printed Circuit Board |
| PDS | Planetary Data System |
| PRT | Platinum Resistance Thermometer |
| PS | Pressure Sensor |
| PSU | Power Supply Unit |
| RDR | Reduced Data Record |
| RDS | Radiation and Dust Sensor |
| RFB | Rover Front Body |
| RSM | Remote Sensing Mast |
| MEDA | Mars Environmental Dynamics Analyzer |
| RAMP | Rover Avionics Mounting Panel |
| SDF | Science Data Frame |
| SDP | Science Data Product |
| SEF | Single Event Failure |
| SIS  SOL | Software Interface Specification  It represents 1 (one) solar day (from midnight to midnight) |
| SUSW | Start-up Software |
| TBD | To Be Determined |
| TIRS | Thermal Infrared Sensor |
| TM | Telemetry |
| UART | Universal Asynchronous Receiver/Transmitter |
| UVS | Ultraviolet Sensor |
| VICAR | Video image Communications and Retrieval system |
| WS | Wind Sensor |
|  |  |

|  |  |
| --- | --- |
|  |  |

# INTRODUCTION

## Purpose and Scope

The purpose of this data product Software Interface Specification (SIS) is to provide users of the Mars Environmental Dynamics Analyzer (MEDA) Experiment Data Record (EDR) with a detailed description of the product and a description of how it was generated, including data sources and destinations.

This SIS is intended to provide enough information to enable users to understand the MEDA EDR data product. The users for whom this SIS is intended are software developers of the programs used in generating the EDR products and scientists who will analyze the data, including those associated with the Mars 2020 (M2020) Project and those in the general planetary science community.

The MEDA EDR data products described in this document are the temporal series of environmental data. For MEDA SkyCam data products, refer to the Mars2020 Camera Instrument Experiment Data Record (EDR) and Reduced Data Record (RDR) Data Products SIS.

## Contents

This Data Product SIS describes how the MEDA data product is acquired by the instrument, and how it is processed, formatted, labeled, and uniquely identified on the ground. The document discusses standards used in generating the product and software that may be used to access the product. The data product structure and organization is described in sufficient detail to enable a user to read the product. Finally, an example of a product label is provided.

## Applicable Documents and Constraints

This Data Product SIS is responsive to the following Mars2020 documents:

1. Mars 2020 Project: Archive Generation, Validation, and Transfer Plan. JPL D-95520.
2. JPL D-95521, Rev A: Flight Ground Interface Control Document (FGICD) Volume 1: Downlink
3. Mars 2020 Flight-Ground Interface Control Document (FGICD), "Volume 1, Downlink, Rev A, Version 1.0", Biren Shah, JPL D-95521, October 3, 2017.

This SIS is also consistent with the following Planetary Data System documents:

1. The PDS4 Data Provider’s Handbook - Guide to Archiving Planetary Data Using the PDS4 Standard, Version 1.12.0, April 1, 2019.
2. Planetary Data System Standards Reference, Version 1.12.0, JPL D-7669, Part 2, April 1, 2019.
3. PDS4 Data Dictionary, Version 1.12.0.0, May 2, 2019.

Finally, this SIS is meant to be consistent with the contract negotiated between the M2020 Project and the Instrument Principal Investigator (PI) in which reduced data records and documentation are explicitly defined as deliverable products.

## Relationships with Other Interfaces

Changes to this MEDA SIS document will affect the following products, software, and/or documents.

**Table 1: Product and Software Interfaces to this SIS**

| Name | Type  P-product  S-software  D-document | Owner |
| --- | --- | --- |
| MEDA EDRs | P | IDS |
| M2020EdrGen (telemproc) | S | IDS |
| CS3 database schema | P | CS3 |
| Other MEDA Programs/Products/Documents | P/S/D | MEDA Science Team |

# Data Product Characteristics and Environment

## Instrument Overview

The MEDA instrument consists of a suite of sensors and a control unit, packaged in eleven enclosures:

* Wind Sensor, WS (two detectors, WS1 and WS2, placed on two booms)
* Air Temperature Sensor, ATS (five detectors: three of them placed on the RSM, and two more at the front of the rover body)
* Thermal Infra-Red Sensor, TIRS
* Relative Humidity Sensor, HS
* Radiation and Dust Sensor, RDS (it also includes the SkyCam imager, not covered in this SIS)
* Pressure Sensor, PS (inside the Instrument Control Unit, ICU)

The principal goal of this sensor suite is to provide continuous measurements that characterize the diurnal to seasonal cycles of the local environmental dust properties (opacity, size distribution, and phase function) and their temporal response to meteorology, and the local near-surface environment (pressure, air and surface temperature, relative humidity, wind, and solar radiative forcing in the UV-visible-IR parts of the spectrum).  Figure 2‑1 shows the MEDA sensors location onboard the rover.

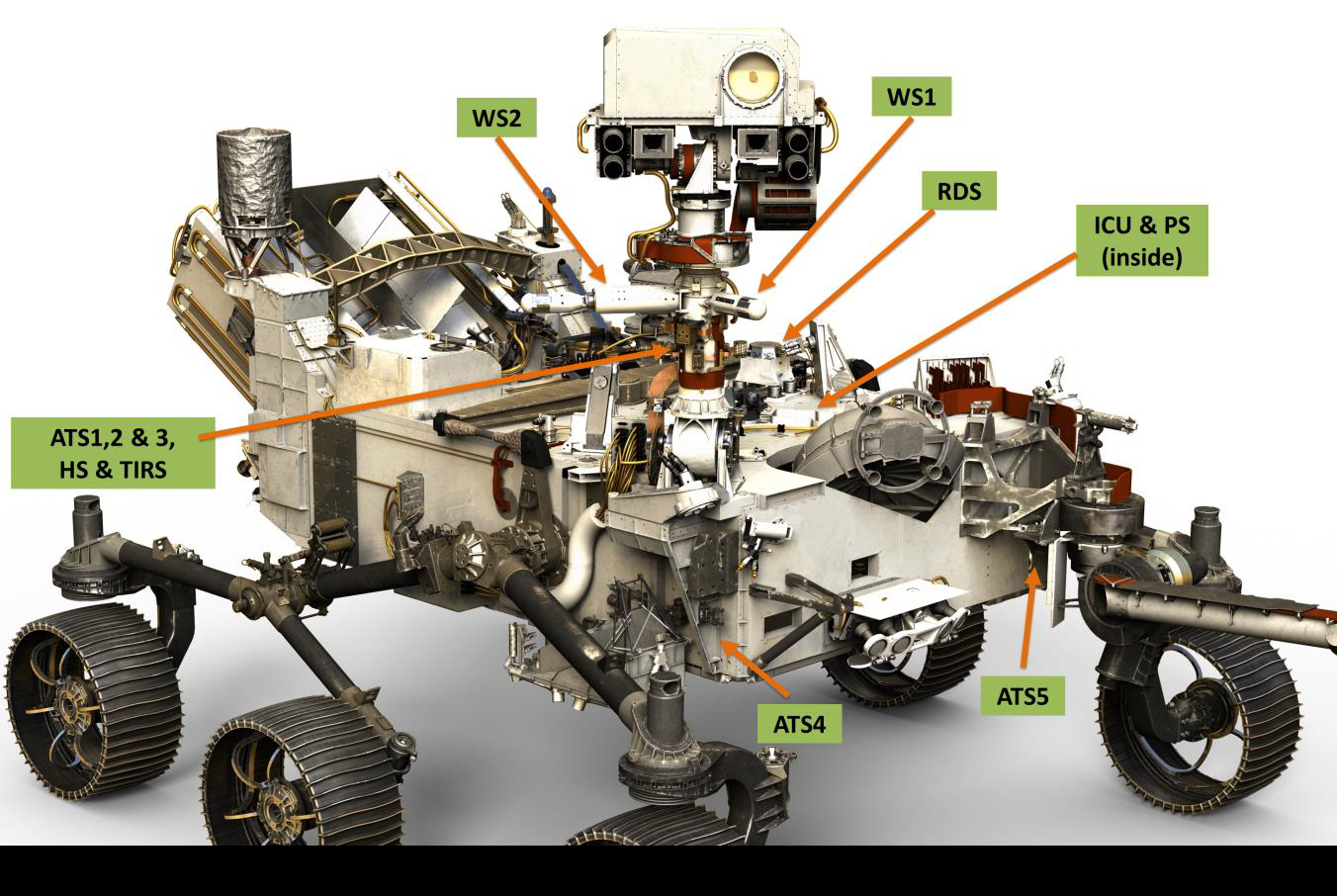


Figure 2‑1 Location of MEDA Sensors onboard the Mars2020 rover

The wind sensors are housed in two small Booms structures mounted orthogonal to the Remote Sensing Mast (RSM) of the Rover. Each Boom provides 6 wind sensor transducer boards on the head of the main boom cylinder. Booms include front-end mixed ASICs to condition and acquire the data from the wind sensors and to communicate serially with the Instrument Control Unit (ICU). This minimizes the number of cables required.

The Thermal-Infrared Radiation Sensor (TIRS) is also mounted on the RSM and it is composed of 5 thermopiles pointing upward and downward to measure different ground and atmosphere temperatures in different infrared bands and the solar radiation reflected on the ground (albedo).

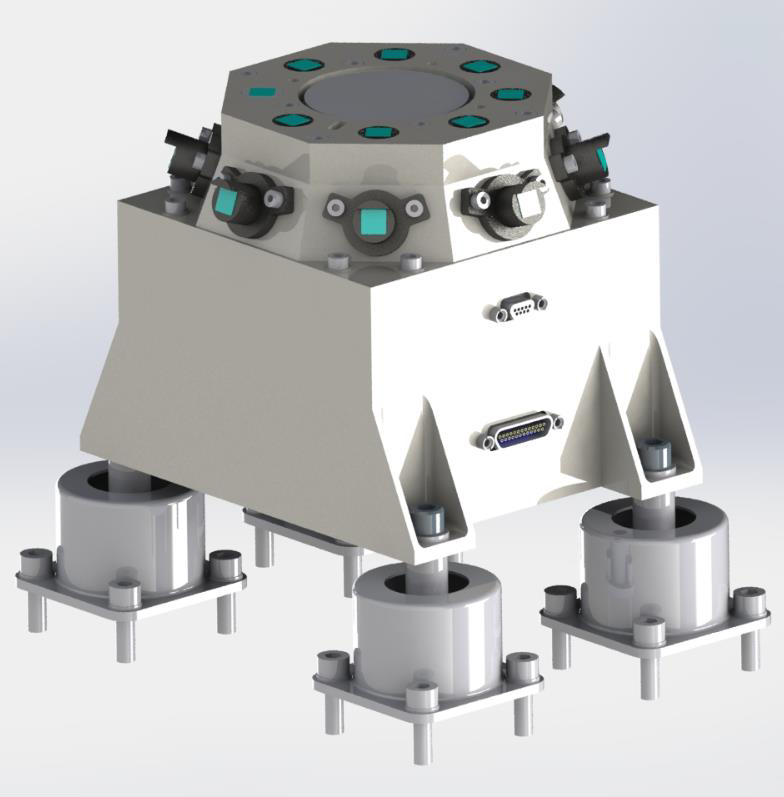
The Humidity Sensor (HS) is directly mounted to the RMS as well. It contains up to three capacitive sensor heads sensitive to the ambient relative humidity.

Figure 2‑2 shows the relative positions of all of the sensors located on the RSM.



Figure 2‑2 *WS’s, ATS 1 to 3, TIRS and HS relative positions on the RSM*

The Radiation and Dust sensor (RDS) is mounted on the rover top deck and comprises of eight upward viewing UV photodetectors (8 photodiodes), 8 lateral viewing UV photodiodes (every photodiode looking 45º apart from the previous to cover the full 360º around the unit), a reference dark-current photodiode and an upward looking camera. The signals coming from these photodiodes and thermopiles will be routed to the ICU to be conditioned and digitized inside the ICU. The ICU will also control the camera through its power and data interfaces.



RDS-DP: Discrete Photodiodes

RDS-SkyCam sapphire protection and lens set

(JPL HazCam-inherited CCD inside)

*Figure 2‑3 RDS illustration*

The instrument control unit, the ICU, is mounted upside-down to the Rover Avionics Mounting Panel (RAMP), inside the rover chassis just under the top deck. It plans and controls the sensors’ data acquisition, communicating with Rover Computer Element (RCE) and temporarily storing science and housekeeping data.

The pressure sensor (PS) is located with the ICU analog module but additionally uses a small tube to reach the Martian environment outside the rover. This tube passes through the ICU base plate, the RAMP, and into a cavity in the rover top deck. The opening is protected from dust and for planetary protection reasons by a cover that attaches to the rover top deck

The instrument will regularly make measurements throughout the Martian day and night, over the lifetime of the Mars 2020 mission.  To achieve these measurements, MEDA is designed primarily to operate from an autonomous, low-power “sleep” mode, which can be powered even while the RCE is off.  An internal timer wakes MEDA to take observations according to a pre-determined schedule, saves the data internally, and goes back to sleep. Instrument housekeeping tasks can also be performed to a schedule.

## Data Product Overview

Each MEDA Science Data Product EDR will consist of two files. The first file is a XML formatted detached PDS4 label. The second file is the corresponding data as described in the label file, in ASCII format, comma separated values. The MEDA EDR data file contains science and engineering data downloaded from MEDA’s internal memory. MEDA data comes down in Science Data Frames (SDF) which contain a number of Science Data Products (SDP). Each SDP contains data from a specific instrument sensor channel for a period of time. SDPs have a fixed length of 512 bytes but the number of readings is variable. Each SDP contains the acquisition time of the first reading and the acquisition frequency, making it possible to calculate the acquisition time of each reading. SDFs have a maximum size of 65548 bytes.

Using the telemetry processing software called M2020EdrGen, IDS processes these SDFs, and converts them into EDRs. The data within the MEDA EDRs are represented as ASCII tables of 8 different types as described further down in Section ?? of this document. The IDS telemetry processor parses each SDF of MEDA Science and Engineering data, and based on its type and time stamp creates and/or updates the corresponding EDR for the corresponding SOL number derived from the record’s time stamp field. Therefore, for each SOL there will be only one EDR for each distinct MEDA science and engineering binary segment.

If an EDR of that type already exists for the specified SOL, then that EDR will be updated to include the new data, and its version number will be incremented. As part of EDR generation, older or partial EDRs are versioned and replaced with more complete ones. Newer versions will always contain the old data, plus any new data. The version number will be indicated in the filename.

## EDR Product Specification

### EDR Product Types

Descriptions for the various EDR product types are provided in this section. They are broken down into two groupings: a) Science Data Product EDRs, b) Event Report Data Product EDRs. Refer to Table 2.3.1 for a mapping between the EDR data product types generated on the ground and the MEDA data product types acquired onboard the spacecraft.

Table 2.3.1 – EDR Data Product Types

|  |  |  |
| --- | --- | --- |
| EDR Data Product  (Ground) | MEDA Data Product  (Onboard) | Description |
| “MEDA Science Data Product EDR” | Science Data Product (SDP) | Raw readings acquired by sensors |
|  |  |
|  |  |
|  |  |
|  |  |
| “MEDA Event Report Data Product EDR” | EventReport Data Product (ERDP) | Data generated for events or errors produced in the instrument, or after internal self-tests |
|  |  |  |

### Science Data Product EDR

Science Data Products contain the raw data readings acquired by the sensors. Each sensor is stored in a separate file, making each of them a data product subtype containing homogeneous data. The division is done attending to the following list:

* Analog data from MEDA ICU
* Pressure sensor
* Humidity Sensor
* Thermal Infrared Sensor
* Air Temperature Sensor
* Boom 1 Wind Sensor
* Boom 2 Wind Sensor
* Radiation and Dust Sensor

These Science Data Products are for environmental temporal series only. Science data products acquired by the SkyCam sensor located inside the RDS are not temporal series and thus not part of this SIS document. SkyCam data products are described in the Mars2020 Camera Instrument Experiment Data Record (EDR) and Reduced Data Record (RDR) Data Products SIS.

MEDA Science Data Product EDRs are CSV ASCII files, with each field of variable width. The first line contains columns names. Each data product contains one sol of data. Each data record is tagged with three temporal references: SCLK (as approximated by MEDA internal clock, without partition and including decimal thousandths of a second), LMST and LTST.

### Event Report Data Product EDR

Event Report data products are generated when an event or error is produced in MEDA, or contain the result of MEDA reset self-tests. Their purpose is to diagnose MEDA activity. Similar to Science Data Products, there is a separate subtype per event source, attending to the following list

* Reset
* OT Entry failure
* Rover UART Error
* Wind Sensor UART Error
* RDS UART Error
* SkyCam UART Error
* RDS Telemetry data
* EDAC SEF
* EDAC DEF
* Hardfault interrupt
* Frangibolt Firing data
* HS maintenance
* Flash Error
* TIRS Heaters current monitor
* WS ASIC failure

The same conventions used for Science Data Product EDRs apply to Event Report EDRs: files are stored as CSV ASCII files, with the first line containing column names. Each record is tagged with SCLK, LMST and LTST. In addition, data values may be stored as strings, integers or hexadecimal depending on the information that values provides.

## Data Product Generation

Ground data flow resulting in EDR generation begins with packetized instrument telemetry data that resides on JPL's Telemetry Delivery System (TDS) in the form of Standard Format Data Units (SFDUs). A software application developed by the Advanced Multi-mission Operations System (AMMOS), called AMMOS Mission Data Processing and Control Subsystem (AMPCS), is used to perform depacketization of the data. During this process, the SFDU wrapping is removed and the data is restructured to build a binary ".dat" data product (DP) comprised of one or more Data Product Objects (DPOs). An associated ".emd" Earth meta-data file is also generated for each DP. The DP and meta-data are written by AMPCS to the Operations Cloud Store (OCS), to be ingested by IDS’s EDR generator software “m20edrgen” and processed with a DPO Dictionary and APID Dictionary provided by M2020 Flight Software (FSW) and with SPICE kernels provided by NAIF. The EDR will be generated within 60 seconds after the JMS message describing the OCS location of the respective the binary data product and associated Earth meta-data file has been received by the IDS pipeline system. This data flow is illustrated in Figure 4.1, and is elaborated subsequently in this section:

Packetized

Data

(TDS)

AMPCS

Science Data Product EDR

Event Report Data Product EDR

“.dat” Binary Data Product

DPO & APID Dictionaries

M20edrgen

(IDS)

SPICE Kernels

“.emd” Meta-data

OR

Figure 2.4 - EDR Processing Flow

In all EDR cases, missing packets will be identified and reported for retransmission to the ground as “partial datasets”. Prior to retransmission, the missing EDR data will be filled with zeros. The EDR data will be reprocessed only after all “partial datasets” are retransmitted and received on the ground. In these cases, the EDR version will be incremented so as not to overwrite any previous EDR versions. The EDR data product will be available in DataDrive for distribution and to facilitate the archiving process.

### Data Processing Level

This documentation uses the “Planetary Data System Standard 4” (PDS4) data level numbering system. The MEDA instrument operations data products referred to in this document as EDRs are considered “Raw”. The EDRs are to be reconstructed from “Telemetry”, which are the telemetry packets within the project specific Standard Formatted Data Unit (SFDU) record. They are to be assembled into complete MEDA data products.

Refer to Table 2.4.4 for a breakdown of the PDS4 data processing levels.

Table 2.4.4 – PDS4 Processing Levels for Instrument Experiment Data Sets

| Processing Level for PDS4 Archive | Operations Data Product Name | Description |
| --- | --- | --- |
| Telemetry | n/a | An encoded byte stream used to transfer data from one or more instruments to temporary storage where the raw instrument data will be extracted. PDS does not archive telemetry data. |
| Raw | EDR  (Experiment Data Record) | Original data from an instrument. If compression, reformatting, packetization, or other translation has been applied to facilitate data transmission or storage, those processes will be reversed so that the archived data are in a PDS approved archive format. |
| Partially Processed | RDR  (Reduced Data Record) | Data that have been processed beyond the raw stage, but which have not yet reached calibrated status. These and more highly processed products. |
| Calibrated | RDR | Data converted to physical units, which makes values independent of the instrument. |
| Derived | RDR | Results that have been distilled from one or more calibrated data products (for example, maps, gravity or magnetic fields, or ring particle size distributions). Supplementary data, such as calibration tables or tables of viewing geometry, used to interpret observational data should also be classified as “derived” data if not easily matched to one of the other three categories. |

### Data Flow

The MEDA EDR data products generated by IDS during operations are created collectively from: a) AMPCS data products b) SPICE kernels, and c) a meta-data database. They are created on the OCS and then available into IDS’s DataDrive for electronic distribution to remote sites/users via a secure subscription protocol. After a data validation period, the MEDA EDR data products are collected with other science data and delivered to the Planetary Data System for archiving.

The size of the MEDA EDR data file varies depending on the type of data. The MEDA data will be reprocessed only if packets in the original downlink are not received. Partial files will be created. The MEDA EDR will be reprocessed after all data are retransmitted and received and the original version will be overwritten and placed into FEI for distribution. The remote sites/users will need to obtain and install the FEI client software and set up user access.

## Standards Used in Generating Data Products

### File Naming Standards

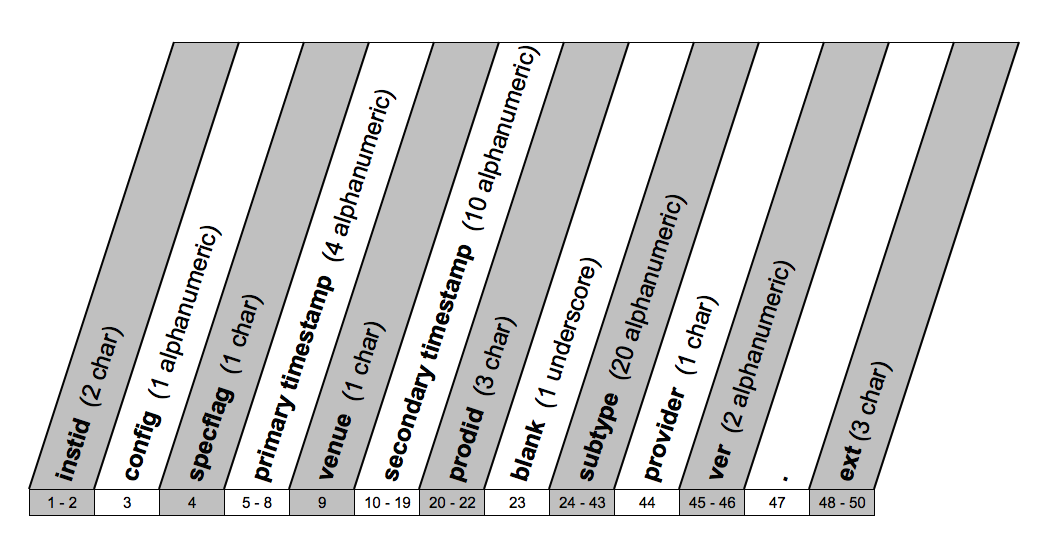
The primary attributes of the filename nomenclature are:

1. Uniqueness - It must be unique unto itself without the file system’s directory path. This protects against product overwrite as files are copied/moved within the file system and external to the file system, if managed correctly.
2. Metadata - It should be comprised of metadata fields that keep file bookkeeping and sorting intuitive to the human user. Even though autonomous file processing will be managed via databases, there will always be human-in-the-loop that puts a premium on filename intuition. Secondly, the metadata fields should be smartly selected based on their value to ground processing tools, as it is less CPU-intensive to extract information from the filename than from the label. NOTE: Metadata information in the filename also resides in the product label.

The metadata fields have been selected based on MER and PHX lessons learned. In general, the metadata fields are arranged to achieve readability. An effort is made to alternate Integer fields with ASCII character fields to Optimize differentiation of field boundaries for the human user.

### 2.5.2 EDR Filename

Each M2020 EDR data product can be uniquely identified by incorporating into the product filename at minimum the Instrument ID, SCLK (or UTC), Product Type identifier, and Version number. The convention is illustrated in Figure 5.1.1 below.

Figure 6.1.1 – EDR Filename Convention

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| where, | | | | | | | | | | | | | | | | | | | | | |
| ***instid*** | = | (2 character) Instrument ID, denoting the source M2020 science or engineering payload instrument that acquired the data. 1st character is primary Instrument identifier. 2nd character is Instrument state, or simply secondary Instrument identifer if no state.  Valid values for Instrument IDs are: | | | | | | | | | | | | | | | | | | | |
|  | | “**WE**” | | | | - | | MEDA Environmental | | | | | | | |  | | |  |  | |
|  | | Valid values for Instrument IDs not described in this SIS: | | | | | | | | | | | | | | | | | | | |
|  | | “**FL**”  “**FR**”  “**RL**”  “**RR**”  “**ZL**”  “**ZR**”  “**NL**”  “**NR**”  “**ML**”  “**MR**”  “**XM**”  “**XS**”  “**OX**”  “**PC**”  “**PS**”  “**SC**”  “**SS**”  “**SI**” | | | | -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  - | | Front Hazcam Left (String A)  Front Hazcam Right (String A)  Rear Hazcam Left (String A)  Rear Hazcam Right (String A)  Front Hazcam Left (String B)  Front Hazcam Right (String B)  Navcam Left  Navcam Right  Mastcam-Z Left  Mastcam-Z Right  RIMFAX Mobile  RIMFAX Stationary  MOXIE  PIXL Context Cam (MCC)  PIXL Spectrometer  SHERLOC Context Cam (ACI)  SHERLOC Spectrometer  SHERLOC Imaging | | | | | | “**SL**”  “**SP**”  “**SR**”  “**SD**”  “**SM**”  “**SA**”  “**EA**”  “**EB**”  “**EC**”  “**ED**”  “**EU**”  “**EL**”  “**ES**”  “**CC**”  “**HN**”  “**HS**”  “**WS**” | | -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  - | SuperCam Laser  SuperCam Passive  SuperCam RMI (camera)  SuperCam Diagnostic  SuperCam Scan Mode  SuperCam Microphone (Audio)  EDLcam Parachute Uplook Cam A  EDLcam Parachute Uplook Cam B  EDLcam Parachute Uplook Cam C  EDLcam Rover Downlook Cam  EDLcam Rover Uplook Cam  EDLcam Lander Vision System (LVS)  EDLcam Descent Stage Downlook Cam  Sample Cache Cam  MEDA SkyCam | | | | |
| ***config*** | = | (1 alphanumeric) Instrument Configuration, an operational attribute of the Instrument that assists in characterizing the data.  Valid values for MEDA configurations: | | | | | | | | | | | | | | | | | | | |
|  | |  | **Instrument State** | | | | | | | | | **Configuration** | | | | | | | | | |
|  | |  | **Value** | | | **Description** | | | | | | | |
|  | |  | MEDA Environmental | | | | | | | | | **“\_”** | | | Config is always an underscore. | | | | | | | |
|  | |  | | | | | | | | | | | | | | | | | | | |
| ***specflag*** | = | (1 character) Special Processing flag is always “\_" for MEDA EDRs. | | | | | | | | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | | | | | |
| ***primary time-stamp*** | = | (4 alphanumeric) Primary Timestamp that is of coarser granularity than the Secondary timestamp (documented later). Value type is based on either of four scenarios:  Flight Cruise  Year-DOY (4 alphanumeric) - This field stores two metadata items in the order:   1. One alpha character in range “A-Z” to designate Earth Year portion of the UTC-like time value, representing Years 2017 to 2042 2. Three integers in range “001-366” representing Day-of-Year (DOY)   Flight Surface  Sol (4 integer) - This field stores the 4-integer Sol (Mars solar day) of the first (i.e., lowest Clock time) acquired instrument data.  Ground Test in which SCLK in NOT reset  When SCLK continuously increments and does NOT repeat, there are two variants:   1. Year-DOY (4 alphanumeric) - This field stores two metadata items in the order:    1. One alpha character in range “A-Z” to designate Earth Year portion of the UTC-like time value, representing Years 2017 to 2042    2. Three integers in range “001-366” representing Day-of-Year (DOY)   – OR –   1. Sol (4 integer) - This field stores the 4-integer Sol (Mars solar day) of the first (i.e.,   lowest Clock time) acquired instrument data.  Ground Test in which SCLK is reset  When SCLK is reset and repeats, we lose time “uniqueness”. So, we have to change  from SCLK to using “wall clock” derived from ERT and represent with a UTC-like format:  DOY-Year (4 alphanumeric) - This field stores two metadata items in reverse order  compared to the previous “Year-DOY” cases, indicating that the Secondary Time field  (described later) contains ERT   1. Three integers in range “001-366” representing Day-of-Year (DOY) 2. One alpha character in range “A-Z” to designate Earth Year portion of the UTC-like time value, representing Years 2017 to 2042 | | | | | | | | | | | | | | | | | | | |
|  | | The valid values, in their progression, are as follows (non-Hex):   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Scenario** | **Time Type** | **Value Format** | **Valid Values** | **Time Range** | | Flight Cruise | Year-DOY | [A-Z]<ddd> | “**A001**”,“**A002**”, **…** “**A365**”, “**B001**”,“**B002**”, **…** “**B365**”,  **•**  **•**  **•**  “**Z001**”,“**Z002**”, **…** “**Z365**” | 2017 - Days 1 to 366,  2018 - Days 1 to 366,  **•**  **•**  **•**  2042 - Days 1 to 366 | | <aaaa> | “**\_ \_ \_ \_**” (4 underscores) | Value is out of range | | Flight Surface | Sol | <nnnn> | “**0000**”,“**0001**”, **…** “**9999**” | 0 thru 9999 | | <aaaa> | “**\_ \_ \_ \_**” (4 underscores) | Value is out of range | | Ground Test  where SCLK  is NOT reset | Year-DOY | (same as Flight Cruise) | (same as Flight Cruise) | (same as Flight Cruise) | | Sol | <nnnn> | “**0000**”,“**0001**”, **…** “**9999**” | 0 thru 9999 | | <aaaa> | “**\_ \_ \_ \_**” (4 underscores) | Value is out of range | | Ground Test  where SCLK  is reset | DOY-Year | <ddd>[A-Z] | “**001A**”,“**002A**”, **…** “**365A**”, “**001B**”,“**002B**”, **…** “**365B**”,  **•**  **•**  **•**  “**001Z**”,“**002Z**”, **…** “**365Z**” | Days 1 to 366 - 2017,  Days 1 to 366 - 2018,  **•**  **•**  **•**  Days 1 to 366 - 2042 | | <aaaa> | “**\_ \_ \_ \_**” (4 underscores) | Value is out of range | | | | | | | | | | | | | | | | | | | | |
| ***venue*** | = | (1 character) Venue type denoting the data processing context or activity. Valid types are Flight (Cruise, Surface), Test / VSTB, Testbed, ATLO, Thread Test, Design Sim, ORT.  Venue also denotes the Instrument Model type (Flight vs Engineering).  NOTE: Characters “I” and “O” are NOT used to avoid confusion in readability with Numeric  Values “1” and “0” in adjacent Filename fields. | | | | | | | | | | | | | | | | | | | |
|  | | See the following table of valid values: | | | | | | | | | | | | | | | | | | | |
|  | |  | **Venue** | | | | | | | | | | | **Value** | | | | **Instrument Model** | | |  |
|  | |  | Flight (see Sol field) | | | | | | | | | | | “**\_**” | | | | Flight | | |  |
|  | |  | Test / VSTB | | | | | | | | | | | “**A**” | | | | Flight | | |  |
|  | |  | “**B**” | | | | Engineering | | |  |
|  | |  | Testbed | | | | | | | | | | | “**C**” | | | | Flight | | |  |
|  | |  | “**D**” | | | | Engineering | | |  |
|  | |  | ATLO | | | | | | | | | | | “**E**” | | | | Flight | | |  |
|  | |  | “**F**” | | | | Engineering | | |  |
|  | |  | Thread Test (TT) | | | | | | | | | | | “**G**” | | | | Flight | | |  |
|  | |  | “**H**” | | | | Engineering | | |  |
|  | |  | Design Sim | | | | | | | | | | | “**J**” | | | | Flight | | |  |
|  | |  | “**K**” | | | | Engineering | | |  |
|  | |  | Ops Readiness Test (ORT) | | | | | | | | | | | “**L**” | | | | Flight | | |  |
|  | |  | “**M**” | | | | Engineering | | |  |
|  | |  | | | | | | | | | | | | | | | | | | | |
| ***second-ary time-stamp*** | = | (10 integer) Secondary Timestamp that is of finer granularity than the Primary timestamp. Value type is based on either of four scenarios:  Flight Cruise  SCLK – This field stores the 10-integer SCLK (seconds). Which specific SCLK count  (Start or End) is used depends on the instrument, but nominally it is the starting  count of the first (i.e., lowest Clock time) acquired instrument data.  Flight Surface  SCLK – Same as for “Flight Cruise”  Ground Test in which SCLK in NOT reset  SCLK – Same as for “Flight Cruise”  Ground Test in which SCLK is reset  ERT - This field stores the ERT time portions Month, Day-of-month, Hour and Seconds  as 10 integers in a UTC-like format | | | | | | | | | | | | | | | | | | | |
|  | | The valid value formats are as follows:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Scenario** | **Time Type** | **Value Format** | **Valid Values** | **Time Range** | | Flight Cruise | SCLK | <aaaaaaaaaa>  (Alphabetic) | “**\_ \_ \_ \_ \_ \_ \_ \_ \_ \_**”  (10 underscores) | Value is out of range | | Flight Surface | SCLK | <aaaaaaaaaa>  (Alphabetic) | “**\_ \_ \_ \_ \_ \_ \_ \_ \_ \_**”  (10 underscores) | Value is out of range | | Ground Test  where SCLK  is NOT reset | SCLK | <aaaaaaaaaa>  (Alphabetic) | “**\_ \_ \_ \_ \_ \_ \_ \_ \_ \_**”  (10 underscores) | Value is out of range | | Ground Test  where SCLK  is reset | ERT | MMDDHHmmss  (Month, Day-of-month, Hour, Minute, Second) | “**0101010000**”,  “**0101010001**”,  **•**  **•**  **•**  “**1231235959**” | January 1, 01:00:00  thru  December 31, 23:59:59 | | <aaaaaaaaaa>  (Alphabetic) | “**\_ \_ \_ \_ \_ \_ \_ \_ \_ \_**”  (10 underscores) | Value is out of range | | | | | | | | | | | | | | | | | | | | |
| ***prodid*** | | = (3 character) Product Type identifier.  This field has the following rule-of-thumb:  Beginning “**E**” - Type of EDR, which is the first-order product with no processing  applied, with the exception of decompression in the case that Instrument applied  onboard compression.  If no beginning “E”, then product is an RDR.  Valid values for Prodid are: | | | | | | | | | | | | | | | | | | | |  | | |
|  |  | “**ESD**” | | | | | - | | | Science Data Product | | | | | | | | | | | |
|  |  | “**EER**” | | | | | - | | | Event Report Data Product | | | | | | | | | | | |
| ***subtype*** | = | (20 character) Product Subtype identifier.  There is a product subtype attending to the list defined in sections 2.3.2 and 2.3.3 | | | | | | | | | | | | | | | | | | | |
|  | | Valid values for Product Subtype identifiers are listed below: | | | | | | | | | | | | | | | | | | | |
|  | | When **Prodid** = “**ESD**” | | | | | | | | | | | | | | | | | | | |
|  | |  | **Values** | | | | | | | | | **Subtype** | | | | | | | | | |
|  | |  | “**ENG\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | | ICU analog engineering data | | | | | | | | | |
|  | |  | “**PS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | | Pressure Sensor data | | | | | | | | | |
|  | |  | “**RHS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | | Relative Humidity Sensor data | | | | | | | | | |
|  | |  | **“TIRS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”** | | | | | | | | | Thermal and Infrared Sensor data | | | | | | | | | |
|  | |  | **“ATS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”** | | | | | | | | | Air Temperature Sensor data | | | | | | | | | |
|  | |  | **“WS1\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”** | | | | | | | | | Boom 1 Wind Sensor data | | | | | | | | | |
|  | |  | **“WS2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”** | | | | | | | | | Boom 2 Wind Sensor data | | | | | | | | | |
|  | |  | **“RDS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”** | | | | | | | | | Radiation and Dust Sensor data | | | | | | | | | |
|  | |  | **“UNK\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”** | | | | | | | | | Unknown | | | | | | | | | |
|  | | When **Prodid** = “**EER**” | | | | | | | | | | | | | | | | | | | |
|  | |  | | **Values** | | | | | | | | **Subtype** | | | | | | | | | |
|  | |  | | “**RESET\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | Reset | | | | | | | | | |
|  | |  | | “**OT\_ENTRY\_FAIL\_\_\_\_\_\_\_**” | | | | | | | | OT Entry failure | | | | | | | | | |
|  | |  | | “**ROVER\_UART\_ERR\_\_\_\_\_\_**” | | | | | | | | Rover UART Error | | | | | | | | | |
|  | |  | | “**WS\_UART\_ERR\_\_\_\_\_\_\_\_\_**” | | | | | | | | Wind Sensor UART Error | | | | | | | | | |
|  | |  | | “**RDS\_UART\_ERR\_\_\_\_\_\_\_\_**” | | | | | | | | RDS UART Error | | | | | | | | | |
|  | |  | | “**SKYCAM\_UART\_ERR\_\_\_\_\_**” | | | | | | | | SkyCam UART Error | | | | | | | | | |
|  | |  | | “**RDS\_TM\_\_\_\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | RDS Telemetry data | | | | | | | | | |
|  | |  | | “**EDAC\_SEF\_\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | EDAC SEF | | | | | | | | | |
|  | |  | | “**EDAC\_DEF\_\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | EDAC DEF | | | | | | | | | |
|  | |  | | “**HARD\_FAULT\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | Hardfault interrupt | | | | | | | | | |
|  | |  | | “**FRANGIBOLT\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | Frangibolt Firing data | | | | | | | | | |
|  | |  | | “**HS\_MAINT\_\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | HS maintenance | | | | | | | | | |
|  | |  | | “**FLASH\_ERR\_\_\_\_\_\_\_\_\_\_\_**” | | | | | | | | Flash Error | | | | | | | | | |
|  | |  | | “**TIRS\_HEATER\_\_\_\_\_\_\_\_\_**” | | | | | | | | TIRS Heaters current monitor | | | | | | | | | |
|  | |  | | “**WS\_ASIC\_FAIL\_\_\_\_\_\_\_\_**” | | | | | | | | WS ASIC failure | | | | | | | | | |
|  | |  | | **“UNK\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”** | | | | | | | | Unknown | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | | | | | |
| ***provider*** | = | (1 character) Product Provider ID, identifying the institution that generated the EDR or RDR product. | | | | | | | | | | | | | | | | | | | |
|  | | See the following table of valid values: | | | | | | | | | | | | | | | | | | | |
|  | |  | | | **Values** | | | | | | **Description** | | | | | | | | | | |
|  | |  | | | “**J**” | | | | | | IDS at JPL | | | | | | | | | | |
|  | |  | | | “**P**” | | | | | | Principal Investigator of Instrument … | | | | | | | | | | |
|  | |  | | | Instrument | | | | | Principal Investigator | | | | | |
|  | |  | | | MEDA | | | | | CAB CSIC-INTA (Spain) | | | | | |
|  | |  | | | “**A**” - “**I**”,  “**K**” - “**O**”,  “**Q**” - “**Z**”, | | | | | | Co-Investigators (to be identified per Instrument at discretion of P.I.) | | | | | | | | | | |
|  | |  | | | Value | | | | | Co-Investigator | | | | | |
|  | |  | | |  | | | | |  | | | | | |
|  | | See the following table of Instruments not covered by this SIS: | | | | | | | | | | | | | | | | | | | |
|  | |  | | | **Values** | | | | | | **Description** | | | | | | | | | | |
|  | |  | | | “**P**” | | | | | | Principal Investigator of Instrument … | | | | | | | | | | |
|  | |  | | |  | | | | | | Instrument | | | | | Principal Investigator | | | | | |
|  | |  | | |  | | | | | | EECAM | | | | | JPL | | | | | |
|  | |  | | |  | | | | | | Mastcam-Z | | | | | ASU (Tempe, AZ) | | | | | |
|  | |  | | |  | | | | | | SuperCam spectroscopy | | | | | LANL (Los Alamos, NM) | | | | | |
|  | |  | | |  | | | | | | SuperCam imaging | | | | | IRAP (France) | | | | | |
|  | |  | | |  | | | | | | PIXL spectroscopy | | | | | JPL | | | | | |
|  | |  | | |  | | | | | | PIXL imaging | | | | | TBD | | | | | |
|  | |  | | |  | | | | | | SHERLOC spectroscopy | | | | | JPL | | | | | |
|  | |  | | |  | | | | | | SHERLOC imaging | | | | | JPL | | | | | |
|  | |  | | |  | | | | | | MOXIE | | | | | MIT (Cambridge, MA) | | | | | |
|  | |  | | |  | | | | | | EDLcam | | | | | JPL | | | | | |
|  | |  | | |  | | | | | | Helicopter camera | | | | | JPL | | | | | |
|  | |  | | | “**A**” - “**I**”,  “**K**” - “**O**”,  “**Q**” - “**Z**”, | | | | | | Co-Investigators (to be identified per Instrument at discretion of P.I.) | | | | | | | | | | |
|  | |  | | |  | | | | | | | | | | |
|  | |  | | |  | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | | | | | |
| ***ver*** | = | (2 alphanumeric) Version identifier. The Version number increments by one whenever an otherwise-identical filename would be produced. | | | | | | | | | | | | | | | | | | | |
|  | | The valid values, in their progression that excludes “**0**” altogether, are as follows (non-Hex): | | | | | | | | | | | | | | | | | | | |
|  | | Range 1 thru 99 | | | | | | | | | | - | “**01**”,“**02**”, **…** “**99”** | | | | | | | | | | |
|  | | Range 100 thru 109 | | | | | | | | | | - | “**A0**”,“**A1**”, **…** “**A9”** | | | | | | | | | | |
|  | | Range 110 thru 135 | | | | | | | | | | - | “**AA**”,“**AB**”, **…** “**AZ”** | | | | | | | | | | |
|  | | Range 136 thru 145 | | | | | | | | | | - | “**B0**”,“**B1**”, **…** “**B9”** | | | | | | | | | | |
|  | | Range 146 thru 171 | | | | | | | | | | - | “**BA**”,“**BB**”, **…** “**BZ”** | | | | | | | | | | |
|  | | Range 172 thru 181 | | | | | | | | | | - | “**C0**”,“**C1**”, **…** “**C9”** | | | | | | | | | | |
|  | | Range 182 thru 207 | | | | | | | | | | - | “**CA**”,“**CB**”, **…** “**CZ”** | | | | | | | | | | |
|  | | Note that not every version need exist, e.g. versions 1, 2 and 4 may exist but not 3. In general, the highest-numbered Version represents the “best” version of that product.  NOTE: To be clear, this field increments independently of all fields, including the Special  Processing field. | | | | | | | | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | | | | | | | |
| ***ext*** | = | (2 to 3 characters) Product type extension.  The valid values for MEDA EDR products are: | | | | | | | | | | | | | | | | | | | |
|  | | “**CSV**” | | | | | | - | Comma Separated Value data | | | | | | | | | | | | |
|  | | Valid values for some other data products not covered by this SIS are: | | | | | | | | | | | | | | | | | | | |
|  | | “**IMG**”  “**VIC**”  “**iv**”  “**ht**”  “**rgb**”  “**LBL**”  “**JPG**”  “**TIF**”  “**PNG**”  “**TXT**”  “**tar**”  “**QUB**” | | | | | | -  -  -  -  -  -  -  -  -  -  -  - | Binary image data product, may include embedded IDS-generated VICAR label  Temp binary image EDR/RDR product from IDS’s VICAR image processing SW  Per-XYZ (Wedge) Terrain Mesh in Inventor format  Per-XYZ (Wedge) Height Map in VICAR (IDS image processing SW) format  Per-XYZ (Wedge) “texture” (Terrain Mesh skin) product in RGB format  Detached Ops product label file in ODL (ASCII) format  JPEG-compressed formatted binary product (no label)  TIFF formatted binary product (no label)  PNG formatted binary product (no label)  Text file for Specially-processed file (see Filename field “Special Processing”)  Tar file  Multi-layer spectral cube data | | | | | | | | | | | | |
|  | | Of the above, only “IMG”, “LBL”, “JPG”, “TXT”, “QUB”, “CSV”, “DAT” and “TAB” are currently supported by PDS4. | | | | | | | | | | | | | | | | | | | |

### Time Standards

The MEDA PDS4 label uses attributes containing time values. Each time value standard is defined according to the attribute description within the standard PDS data dictionaries.

### Coordinate Systems

The primary coordinate system defined for surface operations, the Rover Frame, is the one used for surface navigation and mobility. By definition, the frame is attached to the rover, and moves with it when the rover moves while on the surface. Its Y origin is centered on the rover and its X origin is aligned with the middle wheels’ rotation axis for the deployed rover and suspension system on a flat plane. The Z origin is defined to be at the nominal surface, which is a fixed position with respect to the rover body. The actual surface will likely not be at exactly Z = 0 due to the effects of suspension sag, rover tilt, rocker bogie angles, etc. The +X axis points to the front of the rover, +Y to the right side, and +Z down (perpendicular to the chassis deck).

### Data Storage Conventions

The MEDA EDR data files contain comma separated value data. The detached PDS4 labels for MEDA EDRs are stored as ASCII text. The EDR products are described/defined as PDS table objects.

All MEDA EDR data files will contain variable length records, as blank fields will not be padded with zero nor space values. Label attributes will provide necessary information to determine the size and organization of the records.

## Data Validation

The MEDA EDRs, as with all other Mars 2020 EDRs, are subject to PDS peer review.

Validation of MEDA EDR products during production will be performed according to specifications in the M2020 Archive Plan and the MEDA science team. The MEDA Team will validate the science content of the data products, and the PDS Atmospheres Node will validate the products for compliance with PDS standards and for conformance with the design specified in this SIS.

Validation of the Mars 2020 EDRs will fall into two primary categories: automated and manual. Automated validation will be performed on every EDR product produced for the mission. Manual validation will only be performed on a subset.

Automated validation will be performed as a part of the archiving process, and will be done simultaneously with the archive volume validation. Validations performed will include such things as verification that the checksum in the label matches a calculated checksum for the data product (i.e., that the data product included in the archive is identical to that produced by the real-time process), a validation of the PDS syntax of the label, a check of the label values against the database and against the index tables included on the archive volume, and checks for internal consistency of the label items. The latter include such things as verifying that the product creation date is later than the earth received time. As problems are discovered and/or new possibilities identified for automated verification, they will be added to the validation procedure.

Manual validation of the data will be performed both as spot-checking of data throughout the life of the mission, and comprehensive validation of a subset of the data (for example, a couple of days' worth of data). A human will view these products. The MEDA Team will validate the science content of the data products, and the corresponding PDS Atmospheres node will validate the products for compliance with PDS standards and for conformance with the design specified in this SIS.

# Data Product Specifications

## Data Product Structure and Organization

The structure of the MEDA EDR consists of an ASCII formatted MEDA Science or Fault Data Product EDR and a detached ASCII PDS4 label.

MEDA Data File (ASCII)

Detached PDS4 Label (ASCII)

*Figure 3‑1 The MEDA EDR consists of two files*

## Data Format Descriptions

MEDA EDR data files are ASCII formatted. A detached ASCII PDS4 label will accompany each EDR data file.

The MEDA ASCII-formatted EDR data files will have a “.csv” extension, while the accompanying detached ASCII PDS4 label will carry a “.xml” extension.

## The MEDA ASCII formatted data files can be one of two types, listed in Table 2.4.5. Both consist of comma separated value (csv) table file whereupon each row, or record, denotes a single data product and each column, or field, denotes a single attribute.

## Label Descriptions

### Detached PDS4 Label (for Archive)

MEDA EDR data products have detached PDS4 labels stored as ASCII. A PDS4 label is object- oriented and describes the objects in the data file. The PDS4 label contains attributes for product identification and for table object definitions. The label also contains descriptive information needed to interpret or process the data objects in the file.

PDS4 labels are written in eXtensible Markup Language (xml). PDS4 label statements have the form of "<attribute>value</attribute>".

### PDS4 Data

The fundamental structure of a MEDA data table (.csv) file is the Parsable\_Byte\_Stream class (a stream of bytes that can be parsed using standardized rules). A simple ASCII text file - the MEDA CSV table - consists of a stream of character data; one or more records delimited by a standard set of characters (the carriage-return line-feed pair). This is called the Delimiter Separated Value Format,

aaa,bbb,ccc<CR><LF>

zzz,yyy,xxx<CR><LF>

More specifically, a MEDA .csv file is characterized by the Table\_Delimited class, which inherits attributes from the Parsable\_Byte\_Stream class, and it adds several more.

Each Table\_Delimited class requires one Record\_Delimited class, which describes the structure of all records in the delimited table.

Although the individual fields may vary in size from one record to the next, the number of fields, their names, and their data types must remain the same from line to line. There must be one Field\_Delimited class present in the label to describe each field in the table record, except when Group\_Field\_Delimited can be used. Field definitions within the label must be in the same order as the physical appearance of the fields in the record.

The attribute <field\_delimiter> must be defined in the Table\_Delimited class. Attribute <maximum\_field\_length> gives the maximum number of bytes in a field. Field delimiters and bracketing double quotes around character strings (if any) are not included in the count.

Repeating sets of fields may be ‘grouped’ within a record, simplifying their definition, using the Group\_Field\_Delimited class.

### Detached ODL Label (for Operations)

MEDA instrument EDRs will be generated by JPL’s instrument Data System (IDS). All products will be comprised of two files: the table data file (.csv) and a detached VICAR label (.lbl) in ODL format.

The table file is in CSV format and contains the actual MEDA measurements. Each table file has one corresponding label: the detached VICAR label (used during operations). A detached PDS4 label, which is used for archiving the data at the PDS is generated from the VICAR label during production to ensure consistency between them. Although the two labels’ formats differ significantly, both labels contain the same semantic content and can be used interchangeably.

The VICAR label is used internally by the MEDA project’s GDS and also the IDS software. The PDS4 label is added after each imaging product is generated so that it can be archived at the PDS.

# Applicable Software

## Utility Programs

The MEDA science team, per request, will provide software and other utility programs.

## Applicable PDS Software Tools

PDS-labeled data can be viewed with PDS4 Viewer, developed by the PDS Small Bodies Node and available for a variety of computer platforms from the PDS web site http://pds.nasa.gov/tools/tool-registry/. There is no charge for PDS4 Viewer.

# 

This page intentionally left blank

# 

# 

This page intentionally left blank

# APPENDIX A - MEDA SCIENCE DATA PRODUCTS FIELDS

**ICU analog engineering data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | ICU\_Analog\_TH\_HK\_TM | ASCII\_Integer | ICU PSU PCB hot spot temperature |  |
| 5 | ICU\_Analog\_H\_PRT\_TEMP\_1 | ASCII\_Integer | HS HPRT regeneration temperature measurement |  |
| 6 | ICU\_Analog\_TIRS\_ACQ\_TEMP\_TM | ASCII\_Integer | ICU TIRS conditioning amplifier temperature TM |  |
| 7 | ICU\_Analog\_5V\_CURRENT\_TM | ASCII\_Integer | 5 volts rail current TM. Used for power supply to WS1, WS2 and ICU CPU |  |
| 8 | ICU\_Analog\_8V\_CURRENT\_TM | ASCII\_Integer | +8 volts rail current TM. Used for power supply to RDS SkyCam, to RDS and to the HS Heater |  |
| 9 | ICU\_Analog\_11VN\_CURRENT\_TM | ASCII\_Integer | -11 volts rail current TM. Used for power supply to RDS SkyCam |  |
| 10 | ICU\_Analog\_3V3\_HK\_MUX | ASCII\_Integer | 3V3 voltage HK TM. Voltage TM de 3V3 ICU CPU supply secondary line |  |
| 11 | ICU\_Analog\_POWER\_H\_SENSE | ASCII\_Integer | Not implemented |  |
| 12 | ICU\_Analog\_POWER\_P1 | ASCII\_Integer | PS oscillator 1 power supply voltage TM |  |
| 13 | ICU\_Analog\_R1\_CAL\_PRT | ASCII\_Integer | Calibration 1 reference for PRT acquisition. 1Kohm resistor measurement used for ICU ADC calibrations |  |
| 14 | ICU\_Analog\_POWER\_P2 | ASCII\_Integer | PS oscillator 2 power supply voltage TM |  |
| 15 | ICU\_Analog\_R2\_CAL\_PRT | ASCII\_Integer | Calibration 2 reference for PRT acquisition. 499 ohms resistor measurement used for ICU ADC calibrations |  |
| 16 | ICU\_Analog\_8V\_FRANGI\_TM | ASCII\_Integer | Frangibolt driving voltage TM. Measurement of ICU voltage provided for frangibolt actuation. Measurement performed between the Arming switch and the Firing switches |  |
| 17 | ICU\_Analog\_MEDA\_RDS\_TEMP | ASCII\_Integer | RDS photodetectors electronics internal temperature TM |  |
| 18 | ICU\_Analog\_B1\_SEC\_PWR\_TLM | ASCII\_Integer | Wind Sensor 1 Power Supply voltage TM |  |
| 19 | ICU\_Analog\_CAM\_PCB\_PRT | ASCII\_Integer | Skycam electronics PCB temperature |  |
| 20 | ICU\_Analog\_B2\_SEC\_PWR\_TLM | ASCII\_Integer | Wind Sensor 2 Power Supply voltage TM |  |
| 21 | ICU\_Analog\_CAM\_CCD\_PRT | ASCII\_Integer | Skycam CCD temperature |  |
| 22 | ICU\_Analog\_8V\_H\_PRT\_TM | ASCII\_Integer | HS PRT heater Voltage |  |
| 23 | ICU\_Analog\_H\_PRT\_TEMP\_2 | ASCII\_Integer | HS humicap reference temperature (4 wire measurement) |  |
| 24 | ICU\_Analog\_12V\_HTR\_CURRENT\_TM | ASCII\_Integer | TIRS Heaters Current TM |  |
| 25 | ICU\_Analog\_WS1\_PRT | ASCII\_Integer | WS1 platinum thermistor measurement. Measurement of the temperature of the WS1 ASIC reference resistor in WS Acquisition board 2 |  |
| 26 | ICU\_Analog\_WS2\_PRT | ASCII\_Integer | WS2 frangibolt built-in platinum resistor measurement |  |

**Pressure Sensor data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | PS\_P\_CHANNEL\_CH1 | ASCII\_Integer | NGM type Barocap® (transducer 1) / RSP2M type Barocap® (transducer 2) |  |
| 5 | PS\_P\_CHANNEL\_CH2 | ASCII\_Integer | Reference capacitor |  |
| 6 | PS\_P\_CHANNEL\_CH3 | ASCII\_Integer | Reference capacitor |  |
| 7 | PS\_P\_CHANNEL\_CH4 | ASCII\_Integer | Thermocap® temperature sensor |  |
| 8 | PS\_P\_CHANNEL\_CH5 | ASCII\_Integer | Thermocap® temperature sensor |  |
| 9 | PS\_P\_CHANNEL\_CH6 | ASCII\_Integer | RSP2M type Barocap® |  |
| 10 | PS\_P\_CHANNEL\_CH7 | ASCII\_Integer | Reference capacitor |  |
| 11 | PS\_P\_CHANNEL\_CH8 | ASCII\_Integer | NGM type Barocap® (transducer 1) / Reference capacitor (transducer 2) |  |
| 12 | PS\_PCONF\_1 | ASCII\_Integer | Pressure Sensor Channel Enable Selector |  |
| 13 | PS\_PCONF\_2 | ASCII\_Integer | Pressure Sensor Configuration |  |

**Relative Humidity Sensor data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | HS\_H\_CHANNEL\_CH1 | ASCII\_Integer | Humicap® humidity sensor A with in-built PT1000 temperature sensor |  |
| 5 | HS\_H\_CHANNEL\_CH2 | ASCII\_Integer | Reference capacitor |  |
| 6 | HS\_H\_CHANNEL\_CH3 | ASCII\_Integer | Reference capacitor |  |
| 7 | HS\_H\_CHANNEL\_CH4 | ASCII\_Integer | Humicap® humidity sensor B with in-built PT1000 temperature sensor |  |
| 8 | HS\_H\_CHANNEL\_CH5 | ASCII\_Integer | Reference capacitor |  |
| 9 | HS\_H\_CHANNEL\_CH6 | ASCII\_Integer | Reference capacitor |  |
| 10 | HS\_H\_CHANNEL\_CH7 | ASCII\_Integer | Thermocap® housekeeping temperature sensor |  |
| 11 | HS\_H\_CHANNEL\_CH8 | ASCII\_Integer | Thermocap® housekeeping temperature sensor |  |
| 12 | HS\_H\_H\_CONF1 | ASCII\_Integer | Humidity Sensor Channel Enable Selector |  |
| 13 | HS\_H\_H\_CONF2 | ASCII\_Integer | Humidity Sensor Configuration |  |

**Thermal and Infrared Sensor data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | TIRS\_TIRS1\_avg | ASCII\_Integer | TIRS downward LW channel reading (6.5-30 μm band) |  |
| 5 | TIRS\_TIRS2\_avg | ASCII\_Integer | TIRS Air Temperature channel reading (14.5-15.5 μm band) |  |
| 6 | TIRS\_TIRS3\_avg | ASCII\_Integer | TIRS Upward SW channel reading (0.3-3 μm band) |  |
| 7 | TIRS\_TIRS4\_avg | ASCII\_Integer | TIRS Upward LW channel reading (6.5-30 μm band) |  |
| 8 | TIRS\_TIRS5\_avg | ASCII\_Integer | TIRS Ground Temperature channel reading (8-14 μm band) |  |
| 9 | TIRS\_SUP\_1\_PLATE\_PRT\_avg | ASCII\_Integer | TIRS support plate temperature (rear side) |  |
| 10 | TIRS\_SUP\_2\_PLATE\_PRT\_avg | ASCII\_Integer | TIRS support plate temperature (front side) |  |
| 11 | TIRS\_CAL\_PLATE\_PRT\_avg | ASCII\_Integer | TIRS calibration plate temperature |  |
| 12 | TIRS\_HEATER\_PWM | ASCII\_Integer | TIRS support plate heater driver pulse wide modulation value |  |

**Air Temperature Sensor data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | ATS\_ATS1 | ASCII\_Integer | Thermocouple counts of the unit mounted on the RSM at 50º |  |
| 5 | ATS\_ATS2 | ASCII\_Integer | Thermocouple counts of the unit mounted on the RSM at 155º |  |
| 6 | ATS\_ATS3 | ASCII\_Integer | Thermocouple counts of the unit mounted on the RSM at 290º |  |
| 7 | ATS\_ATS4 | ASCII\_Integer | Thermocouple counts of the unit mounted on the RFB at Port side/Pilot |  |
| 8 | ATS\_ATS5 | ASCII\_Integer | Thermocouple counts of the unit mounted on the RFB at Starboard/Co-pilot |  |
| 9 | ATS\_ATS1\_PRT | ASCII\_Integer | PT1000 counts of the unit mounted on the RSM at 50º |  |
| 10 | ATS\_ATS2\_PRT | ASCII\_Integer | PT1000 counts of the unit mounted on the RSM at 155º |  |
| 11 | ATS\_ATS3\_PRT | ASCII\_Integer | PT1000 counts of the unit mounted on the RSM at 290º |  |
| 12 | ATS\_ATS4\_PRT | ASCII\_Integer | PT1000 counts of the unit mounted on RFB at Port side/Pilot |  |
| 13 | ATS\_ATS5\_PRT | ASCII\_Integer | PT1000 counts of the unit mounted on RFB at Starboard/Co-pilot |  |

Boom 1 Wind Sensor data

**Boom 1 Wind Sensor data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_1 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 1 |  |
| 5 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_2 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 2 |  |
| 6 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_3 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 3 |  |
| 7 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_4 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 4 |  |
| 8 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_5 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 5 |  |
| 9 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_6 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 6 |  |
| 10 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_7 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 7 |  |
| 11 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_8 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 8 |  |
| 12 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_9 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 9 |  |
| 13 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_10 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 10 |  |
| 14 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_11 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 11 |  |
| 15 | WS\_BOOM1\_ASIC1\_Sigma\_Delta\_12 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC1 Die 12 |  |
| 16 | WS\_BOOM1\_ASIC1\_ExternalChannel\_1 | ASCII\_Integer | PT1000 1 Raw Reading of Boom 1 ASIC 1 |  |
| 17 | WS\_BOOM1\_ASIC1\_ExternalChannel\_2 | ASCII\_Integer | PT1000 2 Raw Reading of Boom 1 ASIC 1 |  |
| 18 | WS\_BOOM1\_ASIC1\_ExternalChannel\_3 | ASCII\_Integer | PT1000 3 Raw Reading of Boom 1 ASIC 1 |  |
| 19 | WS\_BOOM1\_ASIC1\_ExternalChannel\_4 | ASCII\_Integer | Short-circuited ASIC channel 1 of Boom 1 ASIC 1 |  |
| 20 | WS\_BOOM1\_ASIC1\_ExternalChannel\_5 | ASCII\_Integer | Short-circuited ASIC channel 2 of Boom 1 ASIC 1 |  |
| 21 | WS\_BOOM1\_ASIC1\_ExternalChannel\_6 | ASCII\_Integer | Short-circuited ASIC channel 3 of Boom 1 ASIC 1 |  |
| 22 | WS\_BOOM1\_ASIC1\_ExternalChannel\_7 | ASCII\_Integer | Cold Die 1 Temperature of Boom 1 ASIC 1 |  |
| 23 | WS\_BOOM1\_ASIC1\_ExternalChannel\_8 | ASCII\_Integer | Cold Die 2 Temperature of Boom 1 ASIC 1 |  |
| 24 | WS\_BOOM1\_ASIC1\_ExternalChannel\_9 | ASCII\_Integer | Cold Die 3 Temperature of Boom 1 ASIC 1 |  |
| 25 | WS\_BOOM1\_ASIC1\_LowGainCal\_10 | ASCII\_Integer | 10% calibration parameter of the low gain settings of the ADC at Boom 1, ASIC 1 |  |
| 26 | WS\_BOOM1\_ASIC1\_LowGainCal\_50 | ASCII\_Integer | 50% calibration parameter of the low gain setting of the ADC at Boom 1, ASIC 1 |  |
| 27 | WS\_BOOM1\_ASIC1\_LowGainCal\_90 | ASCII\_Integer | 90% calibration parameter of the low gain setting of the ADC at Boom 1, ASIC1 |  |
| 28 | WS\_BOOM1\_ASIC1\_HighGainCal\_10 | ASCII\_Integer | Not used |  |
| 29 | WS\_BOOM1\_ASIC1\_HighGainCal\_50 | ASCII\_Integer | Not used |  |
| 30 | WS\_BOOM1\_ASIC1\_HighGainCal\_90 | ASCII\_Integer | Not used |  |
| 31 | WS\_BOOM1\_ASIC1\_DAC1 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 1-4, Boom 1, ASIC1 |  |
| 32 | WS\_BOOM1\_ASIC1\_DAC2 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 5-8, Boom 1, ASIC1 |  |
| 33 | WS\_BOOM1\_ASIC1\_DAC3 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 9-12, Boom 1, ASIC1 |  |
| 34 | WS\_BOOM1\_ASIC1\_AVDD | ASCII\_Integer | Boom 1 ASIC 1 Internal Voltage |  |
| 35 | WS\_BOOM1\_ASIC1\_IntTemp | ASCII\_Integer | Boom 1 ASIC 1 Internal Temperature |  |
| 36 | WS\_BOOM1\_ASIC1\_ExternalChannel\_1\_status | ASCII\_Integer | Status of PT1000 1 channel of Boom 1 ASIC 1 |  |
| 37 | WS\_BOOM1\_ASIC1\_ExternalChannel\_2\_status | ASCII\_Integer | Status of PT1000 2 channel of Boom 1 ASIC 1 |  |
| 38 | WS\_BOOM1\_ASIC1\_ExternalChannel\_3\_status | ASCII\_Integer | Status of PT1000 3 of Boom 1 ASIC 1 |  |
| 39 | WS\_BOOM1\_ASIC1\_ExternalChannel\_4\_status | ASCII\_Integer | Status of short-circuit 1 of Boom 1 ASIC 1 |  |
| 40 | WS\_BOOM1\_ASIC1\_ExternalChannel\_5\_status | ASCII\_Integer | Status of short-circuit 2 of Boom 1 ASIC 1 |  |
| 41 | WS\_BOOM1\_ASIC1\_ExternalChannel\_6\_status | ASCII\_Integer | Status of short-circuit 3 of Boom 1 ASIC 1 |  |
| 42 | WS\_BOOM1\_ASIC1\_ExternalChannel\_7\_status | ASCII\_Integer | Cold Die 1 Status of Boom 1 ASIC 1 |  |
| 43 | WS\_BOOM1\_ASIC1\_ExternalChannel\_8\_status | ASCII\_Integer | Cold Die 2 Status of Boom 1 ASIC 1 |  |
| 44 | WS\_BOOM1\_ASIC1\_ExternalChannel\_9\_status | ASCII\_Integer | Cold Die 3 Status of Boom 1 ASIC 1 |  |
| 45 | WS\_BOOM1\_ASIC1\_LowGainCal\_10\_status | ASCII\_Integer | Status of the 10% calibration parameter channel of the low gain settings of the ADC at Boom 1, ASIC 1 |  |
| 46 | WS\_BOOM1\_ASIC1\_LowGainCal\_50\_status | ASCII\_Integer | Status of the 50% calibration parameter channel of the low gain settings of the ADC at Boom 1, ASIC 1 |  |
| 47 | WS\_BOOM1\_ASIC1\_LowGainCal\_90\_status | ASCII\_Integer | Status of the 90% calibration parameter channel of the low gain settings of the ADC at Boom 1, ASIC 1 |  |
| 48 | WS\_BOOM1\_ASIC1\_HighGainCal\_10\_status | ASCII\_Integer | Not used |  |
| 49 | WS\_BOOM1\_ASIC1\_HighGainCal\_50\_status | ASCII\_Integer | Not used |  |
| 50 | WS\_BOOM1\_ASIC1\_HighGainCal\_90\_status | ASCII\_Integer | Not used |  |
| 51 | WS\_BOOM1\_ASIC1\_DAC1\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 1-4, ASIC 1, Boom 1 |  |
| 52 | WS\_BOOM1\_ASIC1\_DAC2\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 5-8, ASIC 1, Boom 1 |  |
| 53 | WS\_BOOM1\_ASIC1\_DAC3\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 9-12, ASIC 1, Boom 1 |  |
| 54 | WS\_BOOM1\_ASIC1\_AVDD\_status | ASCII\_Integer | Boom 1 ASIC 1 Internal Voltage Channel Status |  |
| 55 | WS\_BOOM1\_ASIC1\_IntTemp\_status | ASCII\_Integer | Boom 1 ASIC 1 Internal Temperature Channel Status |  |
| 56 | WS\_BOOM1\_ASIC1\_WIND\_DAC1 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 1-4, ASIC 1, Boom 1 |  |
| 57 | WS\_BOOM1\_ASIC1\_WIND\_DAC2 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 5-8, ASIC 1, Boom 1 |  |
| 58 | WS\_BOOM1\_ASIC1\_WIND\_DAC3 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 9-12, ASIC 1, Boom 1 |  |
| 59 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_1 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 1 |  |
| 60 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_2 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 2 |  |
| 61 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_3 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 3 |  |
| 62 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_4 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 4 |  |
| 63 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_5 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 5 |  |
| 64 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_6 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 6 |  |
| 65 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_7 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 7 |  |
| 66 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_8 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 8 |  |
| 67 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_9 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 9 |  |
| 68 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_10 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 10 |  |
| 69 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_11 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 11 |  |
| 70 | WS\_BOOM1\_ASIC2\_Sigma\_Delta\_12 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 1 ASIC2 Die 12 |  |
| 71 | WS\_BOOM1\_ASIC2\_ExternalChannel\_1 | ASCII\_Integer | PT1000 1 Raw Reading of Boom 1 ASIC 2 |  |
| 72 | WS\_BOOM1\_ASIC2\_ExternalChannel\_2 | ASCII\_Integer | PT1000 2 Raw Reading of Boom 1 ASIC 2 |  |
| 73 | WS\_BOOM1\_ASIC2\_ExternalChannel\_3 | ASCII\_Integer | PT1000 3 Raw Reading of Boom 1 ASIC 2 |  |
| 74 | WS\_BOOM1\_ASIC2\_ExternalChannel\_4 | ASCII\_Integer | Short-circuited ASIC channel 1 of Boom 1 ASIC 2 |  |
| 75 | WS\_BOOM1\_ASIC2\_ExternalChannel\_5 | ASCII\_Integer | Short-circuited ASIC channel 2 of Boom 1 ASIC 2 |  |
| 76 | WS\_BOOM1\_ASIC2\_ExternalChannel\_6 | ASCII\_Integer | Short-circuited ASIC channel 3 of Boom 1 ASIC 2 |  |
| 77 | WS\_BOOM1\_ASIC2\_ExternalChannel\_7 | ASCII\_Integer | Cold Die 1 Temperature of Boom 1 ASIC 2 |  |
| 78 | WS\_BOOM1\_ASIC2\_ExternalChannel\_8 | ASCII\_Integer | Cold Die 2 Temperature of Boom 1 ASIC 2 |  |
| 79 | WS\_BOOM1\_ASIC2\_ExternalChannel\_9 | ASCII\_Integer | Cold Die 3 Temperature of Boom 1 ASIC 2 |  |
| 80 | WS\_BOOM1\_ASIC2\_LowGainCal\_10 | ASCII\_Integer | 10% calibration parameter of the low gain settings of the ADC at Boom 1, ASIC 2 |  |
| 81 | WS\_BOOM1\_ASIC2\_LowGainCal\_50 | ASCII\_Integer | 50% calibration parameter of the low gain settings of the ADC at Boom 1, ASIC 2 |  |
| 82 | WS\_BOOM1\_ASIC2\_LowGainCal\_90 | ASCII\_Integer | 90% calibration parameter of the low gain settings of the ADC at Boom 1, ASIC 2 |  |
| 83 | WS\_BOOM1\_ASIC2\_HighGainCal\_10 | ASCII\_Integer | Not used |  |
| 84 | WS\_BOOM1\_ASIC2\_HighGainCal\_50 | ASCII\_Integer | Not used |  |
| 85 | WS\_BOOM1\_ASIC2\_HighGainCal\_90 | ASCII\_Integer | Not used |  |
| 86 | WS\_BOOM1\_ASIC2\_DAC1 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 1-4 of Boom 1 ASIC2 |  |
| 87 | WS\_BOOM1\_ASIC2\_DAC2 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 5-8 of Boom 1 ASIC2 |  |
| 88 | WS\_BOOM1\_ASIC2\_DAC3 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 9-12 of Boom 1 ASIC2 |  |
| 89 | WS\_BOOM1\_ASIC2\_AVDD | ASCII\_Integer | Boom 1 ASIC 2 Internal Voltage |  |
| 90 | WS\_BOOM1\_ASIC2\_IntTemp | ASCII\_Integer | Boom 1 ASIC 2 Internal Temperature |  |
| 91 | WS\_BOOM1\_ASIC2\_ExternalChannel\_1\_status | ASCII\_Integer | Status of PT1000 1 channel of Boom 1 ASIC 2 |  |
| 92 | WS\_BOOM1\_ASIC2\_ExternalChannel\_2\_status | ASCII\_Integer | Status of PT1000 2 channel of Boom 1 ASIC 2 |  |
| 93 | WS\_BOOM1\_ASIC2\_ExternalChannel\_3\_status | ASCII\_Integer | Status of PT1000 3 of Boom 1 ASIC 2 |  |
| 94 | WS\_BOOM1\_ASIC2\_ExternalChannel\_4\_status | ASCII\_Integer | Status of short-circuit 1 of Boom 1 ASIC 2 |  |
| 95 | WS\_BOOM1\_ASIC2\_ExternalChannel\_5\_status | ASCII\_Integer | Status of short-circuit 2 of Boom 1 ASIC 2 |  |
| 96 | WS\_BOOM1\_ASIC2\_ExternalChannel\_6\_status | ASCII\_Integer | Status of short-circuit 3 of Boom 1 ASIC 2 |  |
| 97 | WS\_BOOM1\_ASIC2\_ExternalChannel\_7\_status | ASCII\_Integer | Cold Die 1 Status of Boom 1 ASIC 2 |  |
| 98 | WS\_BOOM1\_ASIC2\_ExternalChannel\_8\_status | ASCII\_Integer | Cold Die 2 Status of Boom 1 ASIC 2 |  |
| 99 | WS\_BOOM1\_ASIC2\_ExternalChannel\_9\_status | ASCII\_Integer | Cold Die 3 Status of Boom 1 ASIC 2 |  |
| 100 | WS\_BOOM1\_ASIC2\_LowGainCal\_10\_status | ASCII\_Integer | Status of the 10% calibration parameter channel of the low gain settings of the ADC at Boom 1, ASIC 2 |  |
| 101 | WS\_BOOM1\_ASIC2\_LowGainCal\_50\_status | ASCII\_Integer | Status of the 50% calibration parameter channel of the low gain settings of the ADC at Boom 1, ASIC 2 |  |
| 102 | WS\_BOOM1\_ASIC2\_LowGainCal\_90\_status | ASCII\_Integer | Status of the 90% calibration parameter channel of the low gain settings of the ADC at Boom 1, ASIC 2 |  |
| 103 | WS\_BOOM1\_ASIC2\_HighGainCal\_10\_status | ASCII\_Integer | Not used |  |
| 104 | WS\_BOOM1\_ASIC2\_HighGainCal\_50\_status | ASCII\_Integer | Not used |  |
| 105 | WS\_BOOM1\_ASIC2\_HighGainCal\_90\_status | ASCII\_Integer | Not used |  |
| 106 | WS\_BOOM1\_ASIC2\_DAC1\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 1-4, ASIC 2, Boom 1 |  |
| 107 | WS\_BOOM1\_ASIC2\_DAC2\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 5-8, ASIC 2, Boom 1 |  |
| 108 | WS\_BOOM1\_ASIC2\_DAC3\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 9-12, ASIC 2, Boom 1 |  |
| 109 | WS\_BOOM1\_ASIC2\_AVDD\_status | ASCII\_Integer | Boom 1 ASIC 2 Internal Voltage Channel Status |  |
| 110 | WS\_BOOM1\_ASIC2\_IntTemp\_status | ASCII\_Integer | Boom 1 ASIC 2 Internal Temperature Channel Status |  |
| 111 | WS\_BOOM1\_ASIC2\_WIND\_DAC1 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 1-4, ASIC 2, Boom 1 |  |
| 112 | WS\_BOOM1\_ASIC2\_WIND\_DAC2 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 5-8, ASIC 2, Boom 1 |  |
| 113 | WS\_BOOM1\_ASIC2\_WIND\_DAC3 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 9-12, ASIC 2, Boom 1 |  |
| 114 | WS\_BOOM1\_ASIC1\_TR1\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 1 of Boom 1 ASIC 1 |  |
| 115 | WS\_BOOM1\_ASIC1\_TR2\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 2 of Boom 1 ASIC 1 |  |
| 116 | WS\_BOOM1\_ASIC1\_TR3\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 3 of Boom 1 ASIC 1 |  |
| 117 | WS\_BOOM1\_ASIC2\_TR1\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 1 of Boom 1 ASIC 2 |  |
| 118 | WS\_BOOM1\_ASIC2\_TR2\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 2 of Boom 1 ASIC 2 |  |
| 119 | WS\_BOOM1\_ASIC2\_TR3\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 3 of Boom 1 ASIC 2 |  |

**Boom 2 Wind Sensor data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_1 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 1 |  |
| 5 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_2 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 2 |  |
| 6 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_3 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 3 |  |
| 7 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_4 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 4 |  |
| 8 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_5 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 5 |  |
| 9 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_6 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 6 |  |
| 10 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_7 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 7 |  |
| 11 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_8 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 8 |  |
| 12 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_9 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 9 |  |
| 13 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_10 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 10 |  |
| 14 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_11 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 11 |  |
| 15 | WS\_BOOM2\_ASIC1\_Sigma\_Delta\_12 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC1 Die 12 |  |
| 16 | WS\_BOOM2\_ASIC1\_ExternalChannel\_1 | ASCII\_Integer | PT1000 1 Raw Reading of Boom 2 ASIC 1 |  |
| 17 | WS\_BOOM2\_ASIC1\_ExternalChannel\_2 | ASCII\_Integer | PT1000 2 Raw Reading of Boom 2 ASIC 1 |  |
| 18 | WS\_BOOM2\_ASIC1\_ExternalChannel\_3 | ASCII\_Integer | PT1000 3 Raw Reading of Boom 2 ASIC 1 |  |
| 19 | WS\_BOOM2\_ASIC1\_ExternalChannel\_4 | ASCII\_Integer | Short-circuited ASIC channel 1 of Boom 2 ASIC 1 |  |
| 20 | WS\_BOOM2\_ASIC1\_ExternalChannel\_5 | ASCII\_Integer | Short-circuited ASIC channel 2 of Boom 2 ASIC 1 |  |
| 21 | WS\_BOOM2\_ASIC1\_ExternalChannel\_6 | ASCII\_Integer | Short-circuited ASIC channel 3 of Boom 2 ASIC 1 |  |
| 22 | WS\_BOOM2\_ASIC1\_ExternalChannel\_7 | ASCII\_Integer | Cold Die 1 Temperature of Boom 2 ASIC 1 |  |
| 23 | WS\_BOOM2\_ASIC1\_ExternalChannel\_8 | ASCII\_Integer | Cold Die 2 Temperature of Boom 2 ASIC 1 |  |
| 24 | WS\_BOOM2\_ASIC1\_ExternalChannel\_9 | ASCII\_Integer | Cold Die 3 Temperature of Boom 2 ASIC 1 |  |
| 25 | WS\_BOOM2\_ASIC1\_LowGainCal\_10 | ASCII\_Integer | 10% calibration parameter of the low gain settings of the ADC at Boom 2, ASIC 1 |  |
| 26 | WS\_BOOM2\_ASIC1\_LowGainCal\_50 | ASCII\_Integer | 50% calibration parameter of the low gain settings of the ADC at Boom 2, ASIC 1 |  |
| 27 | WS\_BOOM2\_ASIC1\_LowGainCal\_90 | ASCII\_Integer | 90% calibration parameter of the low gain settings of the ADC at Boom 2, ASIC 1 |  |
| 28 | WS\_BOOM2\_ASIC1\_HighGainCal\_10 | ASCII\_Integer | Not used |  |
| 29 | WS\_BOOM2\_ASIC1\_HighGainCal\_50 | ASCII\_Integer | Not used |  |
| 30 | WS\_BOOM2\_ASIC1\_HighGainCal\_90 | ASCII\_Integer | Not used |  |
| 31 | WS\_BOOM2\_ASIC1\_DAC1 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 1-4, Boom 2, ASIC1 |  |
| 32 | WS\_BOOM2\_ASIC1\_DAC2 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 5-8 of Boom 2, ASIC1 |  |
| 33 | WS\_BOOM2\_ASIC1\_DAC3 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 9-12 of Boom 2, ASIC1 |  |
| 34 | WS\_BOOM2\_ASIC1\_AVDD | ASCII\_Integer | Boom 2 ASIC 1 Internal Voltage |  |
| 35 | WS\_BOOM2\_ASIC1\_IntTemp | ASCII\_Integer | Boom 2 ASIC 1 Internal Temperature |  |
| 36 | WS\_BOOM2\_ASIC1\_ExternalChannel\_1\_status | ASCII\_Integer | Status of PT1000 1 channel of Boom 2 ASIC 1 |  |
| 37 | WS\_BOOM2\_ASIC1\_ExternalChannel\_2\_status | ASCII\_Integer | Status of PT1000 2 channel of Boom 2 ASIC 1 |  |
| 38 | WS\_BOOM2\_ASIC1\_ExternalChannel\_3\_status | ASCII\_Integer | Status of PT1000 3 of Boom 2 ASIC 1 |  |
| 39 | WS\_BOOM2\_ASIC1\_ExternalChannel\_4\_status | ASCII\_Integer | Status of short-circuit 1 of Boom 2 ASIC 1 |  |
| 40 | WS\_BOOM2\_ASIC1\_ExternalChannel\_5\_status | ASCII\_Integer | Status of short-circuit 2 of Boom 2 ASIC 1 |  |
| 41 | WS\_BOOM2\_ASIC1\_ExternalChannel\_6\_status | ASCII\_Integer | Status of short-circuit 3 of Boom 2 ASIC 1 |  |
| 42 | WS\_BOOM2\_ASIC1\_ExternalChannel\_7\_status | ASCII\_Integer | Cold Die 1 Status of Boom 2 ASIC 1 |  |
| 43 | WS\_BOOM2\_ASIC1\_ExternalChannel\_8\_status | ASCII\_Integer | Cold Die 2 Status of Boom 2 ASIC 1 |  |
| 44 | WS\_BOOM2\_ASIC1\_ExternalChannel\_9\_status | ASCII\_Integer | Cold Die 3 Status of Boom 2 ASIC 1 |  |
| 45 | WS\_BOOM2\_ASIC1\_LowGainCal\_10\_status | ASCII\_Integer | Status of the 10% calibration parameter channel of the low gain settings of the ADC at Boom 2, ASIC 1 |  |
| 46 | WS\_BOOM2\_ASIC1\_LowGainCal\_50\_status | ASCII\_Integer | Status of the 50% calibration parameter channel of the low gain settings of the ADC at Boom 2, ASIC 1 |  |
| 47 | WS\_BOOM2\_ASIC1\_LowGainCal\_90\_status | ASCII\_Integer | Status of the 90% calibration parameter channel of the low gain settings of the ADC at Boom 2, ASIC 1 |  |
| 48 | WS\_BOOM2\_ASIC1\_HighGainCal\_10\_status | ASCII\_Integer | Not used |  |
| 49 | WS\_BOOM2\_ASIC1\_HighGainCal\_50\_status | ASCII\_Integer | Not used |  |
| 50 | WS\_BOOM2\_ASIC1\_HighGainCal\_90\_status | ASCII\_Integer | Not used |  |
| 51 | WS\_BOOM2\_ASIC1\_DAC1\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 1-4, ASIC 1 of Boom 2 |  |
| 52 | WS\_BOOM2\_ASIC1\_DAC2\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 5-8, ASIC 1 of Boom 2 |  |
| 53 | WS\_BOOM2\_ASIC1\_DAC3\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 9-12, ASIC 1 of Boom 2 |  |
| 54 | WS\_BOOM2\_ASIC1\_AVDD\_status | ASCII\_Integer | Boom 2 ASIC 1 Internal Voltage Channel Status |  |
| 55 | WS\_BOOM2\_ASIC1\_IntTemp\_status | ASCII\_Integer | Boom 2 ASIC 1 Internal Temperature Channel Status |  |
| 56 | WS\_BOOM2\_ASIC1\_WIND\_DAC1 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 1-4, ASIC 1 of Boom 2 |  |
| 57 | WS\_BOOM2\_ASIC1\_WIND\_DAC2 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 5-8, ASIC 1 of Boom 2 |  |
| 58 | WS\_BOOM2\_ASIC1\_WIND\_DAC3 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 9-12, ASIC 1 of Boom 2 |  |
| 59 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_1 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 1 |  |
| 60 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_2 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 2 |  |
| 61 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_3 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 3 |  |
| 62 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_4 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 4 |  |
| 63 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_5 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 5 |  |
| 64 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_6 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 6 |  |
| 65 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_7 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 7 |  |
| 66 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_8 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 8 |  |
| 67 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_9 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 9 |  |
| 68 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_10 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 10 |  |
| 69 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_11 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 11 |  |
| 70 | WS\_BOOM2\_ASIC2\_Sigma\_Delta\_12 | ASCII\_Integer | Wind Raw Sigma Delta reading of Boom 2 ASIC2 Die 12 |  |
| 71 | WS\_BOOM2\_ASIC2\_ExternalChannel\_1 | ASCII\_Integer | PT1000 1 Raw Reading of Boom 2 ASIC 2 |  |
| 72 | WS\_BOOM2\_ASIC2\_ExternalChannel\_2 | ASCII\_Integer | PT1000 2 Raw Reading of Boom 2 ASIC 2 |  |
| 73 | WS\_BOOM2\_ASIC2\_ExternalChannel\_3 | ASCII\_Integer | PT1000 3 Raw Reading of Boom 2 ASIC 2 |  |
| 74 | WS\_BOOM2\_ASIC2\_ExternalChannel\_4 | ASCII\_Integer | Short-circuited ASIC channel 1 of Boom 2 ASIC 2 |  |
| 75 | WS\_BOOM2\_ASIC2\_ExternalChannel\_5 | ASCII\_Integer | Short-circuited ASIC channel 2 of Boom 2 ASIC 2 |  |
| 76 | WS\_BOOM2\_ASIC2\_ExternalChannel\_6 | ASCII\_Integer | Short-circuited ASIC channel 3 of Boom 2 ASIC 2 |  |
| 77 | WS\_BOOM2\_ASIC2\_ExternalChannel\_7 | ASCII\_Integer | Cold Die 1 Temperature of Boom 2 ASIC 2 |  |
| 78 | WS\_BOOM2\_ASIC2\_ExternalChannel\_8 | ASCII\_Integer | Cold Die 2 Temperature of Boom 2 ASIC 2 |  |
| 79 | WS\_BOOM2\_ASIC2\_ExternalChannel\_9 | ASCII\_Integer | Cold Die 3 Temperature of Boom 2 ASIC 2 |  |
| 80 | WS\_BOOM2\_ASIC2\_LowGainCal\_10 | ASCII\_Integer | 10% calibration parameter of the low gain settings of the ADC at Boom 2, ASIC 2 |  |
| 81 | WS\_BOOM2\_ASIC2\_LowGainCal\_50 | ASCII\_Integer | 50% calibration parameter of the low gain settings of the ADC at Boom 2, ASIC 2 |  |
| 82 | WS\_BOOM2\_ASIC2\_LowGainCal\_90 | ASCII\_Integer | 90% calibration parameter of the low gain settings of the ADC at Boom 2, ASIC 2 |  |
| 83 | WS\_BOOM2\_ASIC2\_HighGainCal\_10 | ASCII\_Integer | Not used |  |
| 84 | WS\_BOOM2\_ASIC2\_HighGainCal\_50 | ASCII\_Integer | Not used |  |
| 85 | WS\_BOOM2\_ASIC2\_HighGainCal\_90 | ASCII\_Integer | Not used |  |
| 86 | WS\_BOOM2\_ASIC2\_DAC1 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 1-4 of Boom 2 ASIC2 |  |
| 87 | WS\_BOOM2\_ASIC2\_DAC2 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 5-8 of Boom 2 ASIC2 |  |
| 88 | WS\_BOOM2\_ASIC2\_DAC3 | ASCII\_Integer | DAC Voltage raw data for the Sigma Delta Control Loop of Dice 9-12 of Boom 2 ASIC2 |  |
| 89 | WS\_BOOM2\_ASIC2\_AVDD | ASCII\_Integer | Boom 2 ASIC 2 Internal Voltage |  |
| 90 | WS\_BOOM2\_ASIC2\_IntTemp | ASCII\_Integer | Boom 2 ASIC 2 Internal Temperature |  |
| 91 | WS\_BOOM2\_ASIC2\_ExternalChannel\_1\_status | ASCII\_Integer | Status of PT1000 1 channel of Boom 2 ASIC 2 |  |
| 92 | WS\_BOOM2\_ASIC2\_ExternalChannel\_2\_status | ASCII\_Integer | Status of PT1000 2 channel of Boom 2 ASIC 2 |  |
| 93 | WS\_BOOM2\_ASIC2\_ExternalChannel\_3\_status | ASCII\_Integer | Status of PT1000 3 of Boom 2 ASIC 2 |  |
| 94 | WS\_BOOM2\_ASIC2\_ExternalChannel\_4\_status | ASCII\_Integer | Status of short-circuit 1 of Boom 2 ASIC 2 |  |
| 95 | WS\_BOOM2\_ASIC2\_ExternalChannel\_5\_status | ASCII\_Integer | Status of short-circuit 2 of Boom 2 ASIC 2 |  |
| 96 | WS\_BOOM2\_ASIC2\_ExternalChannel\_6\_status | ASCII\_Integer | Status of short-circuit 3 of Boom 2 ASIC 2 |  |
| 97 | WS\_BOOM2\_ASIC2\_ExternalChannel\_7\_status | ASCII\_Integer | Cold Die 1 Status of Boom 2 ASIC 2 |  |
| 98 | WS\_BOOM2\_ASIC2\_ExternalChannel\_8\_status | ASCII\_Integer | Cold Die 2 Status of Boom 2 ASIC 2 |  |
| 99 | WS\_BOOM2\_ASIC2\_ExternalChannel\_9\_status | ASCII\_Integer | Cold Die 3 Status of Boom 2 ASIC 2 |  |
| 100 | WS\_BOOM2\_ASIC2\_LowGainCal\_10\_status | ASCII\_Integer | Status of the 10% calibration parameter channel of the low gain settings of the ADC at Boom 2, ASIC 2 |  |
| 101 | WS\_BOOM2\_ASIC2\_LowGainCal\_50\_status | ASCII\_Integer | Status of the 50% calibration parameter channel of the low gain settings of the ADC at Boom 2, ASIC 2 |  |
| 102 | WS\_BOOM2\_ASIC2\_LowGainCal\_90\_status | ASCII\_Integer | Status of the 90% calibration parameter channel of the low gain settings of the ADC at Boom 2, ASIC 2 |  |
| 103 | WS\_BOOM2\_ASIC2\_HighGainCal\_10\_status | ASCII\_Integer | Not used |  |
| 104 | WS\_BOOM2\_ASIC2\_HighGainCal\_50\_status | ASCII\_Integer | Not used |  |
| 105 | WS\_BOOM2\_ASIC2\_HighGainCal\_90\_status | ASCII\_Integer | Not used |  |
| 106 | WS\_BOOM2\_ASIC2\_DAC1\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 1-4, ASIC 2, Boom 2 |  |
| 107 | WS\_BOOM2\_ASIC2\_DAC2\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta Channels 5-8, ASIC 2, Boom 2 |  |
| 108 | WS\_BOOM2\_ASIC2\_DAC3\_status | ASCII\_Integer | Status of the DAC Reference Voltage of Sigma Delta channels 9-12, ASIC 2 of Boom 2 |  |
| 109 | WS\_BOOM2\_ASIC2\_AVDD\_status | ASCII\_Integer | Boom 2 ASIC 2 Internal Voltage Channel Status |  |
| 110 | WS\_BOOM2\_ASIC2\_IntTemp\_status | ASCII\_Integer | Boom 2 ASIC 2 Internal Temperature Channel Status |  |
| 111 | WS\_BOOM2\_ASIC2\_WIND\_DAC1 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 1-4, ASIC 2 of Boom 2 |  |
| 112 | WS\_BOOM2\_ASIC2\_WIND\_DAC2 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 5-8, ASIC 2 of Boom 2 |  |
| 113 | WS\_BOOM2\_ASIC2\_WIND\_DAC3 | ASCII\_Integer | DAC programmed code of the Sigma Delta channels 9-12, ASIC 2 of Boom 2 |  |
| 114 | WS\_BOOM2\_ASIC1\_TR1\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 1 of Boom 2 ASIC 1 |  |
| 115 | WS\_BOOM2\_ASIC1\_TR2\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 2 of Boom 2 ASIC 1 |  |
| 116 | WS\_BOOM2\_ASIC1\_TR3\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 3 of Boom 2 ASIC 1 |  |
| 117 | WS\_BOOM2\_ASIC2\_TR1\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 1 of Boom 2 ASIC 2 |  |
| 118 | WS\_BOOM2\_ASIC2\_TR2\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 2 of Boom 2 ASIC 2 |  |
| 119 | WS\_BOOM2\_ASIC2\_TR3\_Control\_Alg\_State | ASCII\_Integer | Wind Configuration Control Algorithm State for Transducer 3 of Boom 2 ASIC 2 |  |

**Radiation and Dust Sensor data**



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | RDS\_CUMULATE\_NUMBER | ASCII\_Integer | Number of times that each channel was acquired and accumulated, attending to the following equivalence:  1 => 1 accumulated sample  2 => 64 accumulated samples  4 => 128 accumulated samples  8 => 256 accumulated samples  16 => 512 accumulated samples  32 => 1024 accumulated samples  64 => 2048 accumulated samples  128 => 4096 accumulated samples |  |
| 5 | RDS\_LAT\_SE\_1\_PSTD | ASCII\_Integer | Pseudo Standard deviation of the Lateral Mount Photodiode 1 in nominal mode |  |
| 6 | RDS\_LAT\_SE\_1\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 1 in nominal mode |  |
| 7 | RDS\_LAT\_SE\_2\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 2 in nominal mode |  |
| 8 | RDS\_LAT\_SE\_2\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 2 in nominal mode |  |
| 9 | RDS\_LAT\_SE\_3\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 3 in nominal mode |  |
| 10 | RDS\_LAT\_SE\_3\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 3 in nominal mode |  |
| 11 | RDS\_LAT\_SE\_4\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 4 in nominal mode |  |
| 12 | RDS\_LAT\_SE\_4\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 4 in nominal mode |  |
| 13 | RDS\_LAT\_SE\_5\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 5 in nominal mode |  |
| 14 | RDS\_LAT\_SE\_5\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 5 in nominal mode |  |
| 15 | RDS\_LAT\_SE\_6\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 6 in nominal mode |  |
| 16 | RDS\_LAT\_SE\_6\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 6 in nominal mode |  |
| 17 | RDS\_LAT\_SE\_7\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 7 in nominal mode |  |
| 18 | RDS\_LAT\_SE\_7\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 7 in nominal mode |  |
| 19 | RDS\_LAT\_SE\_8\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 8 in nominal mode |  |
| 20 | RDS\_LAT\_SE\_8\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 8 in nominal mode |  |
| 21 | RDS\_TOP\_SE\_1\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 1 in nominal mode |  |
| 22 | RDS\_TOP\_SE\_1\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 1 in nominal mode |  |
| 23 | RDS\_TOP\_SE\_2\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 2 in nominal mode |  |
| 24 | RDS\_TOP\_SE\_2\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 2 in nominal mode |  |
| 25 | RDS\_TOP\_SE\_3\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 3 in nominal mode |  |
| 26 | RDS\_TOP\_SE\_3\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 3 in nominal mode |  |
| 27 | RDS\_TOP\_SE\_4\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 4 in nominal mode |  |
| 28 | RDS\_TOP\_SE\_4\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 4 in nominal mode |  |
| 29 | RDS\_TOP\_SE\_5\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 5 in nominal mode |  |
| 30 | RDS\_TOP\_SE\_5\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 5 in nominal mode |  |
| 31 | RDS\_TOP\_SE\_6\_PSTD | ASCII\_Integer | Pseudo standard of the deviation Top Mount Photodiode 6 in nominal mode |  |
| 32 | RDS\_TOP\_SE\_6\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 6 in nominal mode |  |
| 33 | RDS\_TOP\_SE\_7\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 7 in nominal mode |  |
| 34 | RDS\_TOP\_SE\_7\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 7 in nominal mode |  |
| 35 | RDS\_TOP\_SE\_8\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 8 in nominal mode |  |
| 36 | RDS\_TOP\_SE\_8\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 8 in nominal mode |  |
| 37 | RDS\_LAT\_SE\_1\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 1 in High Gain mode |  |
| 38 | RDS\_LAT\_SE\_1\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 1 in High Gain mode |  |
| 39 | RDS\_LAT\_SE\_2\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 2 in High Gain mode |  |
| 40 | RDS\_LAT\_SE\_2\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 2 in High Gain mode |  |
| 41 | RDS\_LAT\_SE\_3\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 3 in High Gain mode |  |
| 42 | RDS\_LAT\_SE\_3\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 3 in High Gain mode |  |
| 43 | RDS\_LAT\_SE\_4\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 4 in High Gain mode |  |
| 44 | RDS\_LAT\_SE\_4\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 4 in High Gain mode |  |
| 45 | RDS\_LAT\_SE\_5\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation Lateral Mount Photodiode 5 in High Gain mode |  |
| 46 | RDS\_LAT\_SE\_5\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 5 in High Gain mode |  |
| 47 | RDS\_LAT\_SE\_6\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 6 in High Gain mode |  |
| 48 | RDS\_LAT\_SE\_6\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 6 in High Gain mode |  |
| 49 | RDS\_LAT\_SE\_7\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 7 in High Gain mode |  |
| 50 | RDS\_LAT\_SE\_7\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 7 in High Gain mode |  |
| 51 | RDS\_LAT\_SE\_8\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 8 in High Gain mode |  |
| 52 | RDS\_LAT\_SE\_8\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 8 in High Gain mode |  |
| 53 | RDS\_TOP\_SE\_1\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 1 in High Gain mode |  |
| 54 | RDS\_TOP\_SE\_1\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 1 in High Gain mode |  |
| 55 | RDS\_TOP\_SE\_2\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 2 in High Gain mode |  |
| 56 | RDS\_TOP\_SE\_2\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 2 in High Gain mode |  |
| 57 | RDS\_TOP\_SE\_3\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 3 in High Gain mode |  |
| 58 | RDS\_TOP\_SE\_3\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 3 in High Gain mode |  |
| 59 | RDS\_TOP\_SE\_4\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 4 in High Gain mode |  |
| 60 | RDS\_TOP\_SE\_4\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 4 in High Gain mode |  |
| 61 | RDS\_TOP\_SE\_5\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 5 in High Gain mode |  |
| 62 | RDS\_TOP\_SE\_5\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 5 in High Gain mode |  |
| 63 | RDS\_TOP\_SE\_6\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 6 in High Gain mode |  |
| 64 | RDS\_TOP\_SE\_6\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 6 in High Gain mode |  |
| 65 | RDS\_TOP\_SE\_7\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 7 in High Gain mode |  |
| 66 | RDS\_TOP\_SE\_7\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 7 in High Gain mode |  |
| 67 | RDS\_TOP\_SE\_8\_HG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 8 in High Gain mode |  |
| 68 | RDS\_TOP\_SE\_8\_HG\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 8 in High Gain mode |  |
| 69 | RDS\_LAT\_TMP\_2\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 2 Temperature |  |
| 70 | RDS\_LAT\_TMP\_2\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 2 Temperature |  |
| 71 | RDS\_LAT\_TMP\_4\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 4 Temperature |  |
| 72 | RDS\_LAT\_TMP\_4\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 4 Temperature |  |
| 73 | RDS\_LAT\_TMP\_6\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 6 Temperature |  |
| 74 | RDS\_LAT\_TMP\_6\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 6 Temperature |  |
| 75 | RDS\_LAT\_TMP\_8\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Lateral Mount Photodiode 8 Temperature |  |
| 76 | RDS\_LAT\_TMP\_8\_ACCUM | ASCII\_Integer | Accumulated value of the Lateral Mount Photodiode 8 Temperature |  |
| 77 | RDS\_TOP\_TMP\_1\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 1 Temperature |  |
| 78 | RDS\_TOP\_TMP\_1\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 1 Temperature |  |
| 79 | RDS\_TOP\_TMP\_3\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 3 Temperature |  |
| 80 | RDS\_TOP\_TMP\_3\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 3 Temperature |  |
| 81 | RDS\_TOP\_TMP\_5\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 5 Temperature |  |
| 82 | RDS\_TOP\_TMP\_5\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 5 Temperature |  |
| 83 | RDS\_TOP\_TMP\_7\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Top Mount Photodiode 7 Temperature |  |
| 84 | RDS\_TOP\_TMP\_7\_ACCUM | ASCII\_Integer | Accumulated value of the Top Mount Photodiode 7 Temperature |  |
| 85 | RDS\_INT\_SENSE\_5V\_IN\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Sensed Input 5V Voltage from ICU |  |
| 86 | RDS\_INT\_SENSE\_5V\_IN\_ACCUM | ASCII\_Integer | Accumulated value of the Sensed Input 5V Voltage from ICU |  |
| 87 | RDS\_INT\_SENSE\_5V\_DIG\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Sensed Internal Digital 5V Voltage |  |
| 88 | RDS\_INT\_SENSE\_5V\_DIG\_ACCUM | ASCII\_Integer | Accumulated value Sensed of the Internal Digital 5V Voltage |  |
| 89 | RDS\_INT\_TMP\_DD\_PSTD | ASCII\_Integer | Pseudo standard deviation of the processing electronics Displacement Damage Temperature Sensor |  |
| 90 | RDS\_INT\_TMP\_DD\_ACCUM | ASCII\_Integer | Accumulated value of the processing electronics Displacement Damage Temperature Sensor |  |
| 91 | RDS\_INT\_SE\_DD\_PSTD | ASCII\_Integer | Pseudo standard deviation of the processing electronics Displacement Damage Sensor |  |
| 92 | RDS\_INT\_SE\_DD\_ACCUM | ASCII\_Integer | Accumulated value of the processing electronics Displacement Damage Sensor |  |
| 93 | RDS\_INT\_REF\_DD\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Voltage Reference of the processing electronics Displacement Damage Sensor |  |
| 94 | RDS\_INT\_REF\_DD\_ACCUM | ASCII\_Integer | Accumulated value of the Voltage Reference of the processing electronics Displacement Damage Sensor |  |
| 95 | RDS\_INT\_REF\_TIA\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Voltage Reference for Trans-Impedance Amplifier |  |
| 96 | RDS\_INT\_REF\_TIA\_ACCUM | ASCII\_Integer | Accumulated value of the Voltage Reference for Trans-Impedance Amplifier |  |
| 97 | RDS\_INT\_TMP\_PE\_PSTD | ASCII\_Integer | Pseudo standard deviation of the Processing Electronics Temperature |  |
| 98 | RDS\_INT\_TMP\_PE\_ACCUM | ASCII\_Integer | Accumulated value of the Processing Electronics Temperature |  |

# APPENDIX B - MEDA EVENT REPORT DATA PRODUCTS FIELDS

**Reset**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | Data\_Source | ASCII\_String | Source of reset entry: ERDP or Do\_BIST |  |
| 5 | Reset\_Source | ASCII\_String | The source event for this reset entry: WATCHDOG, RESET\_TC, POWERON, LOCKUP, OT\_WAKEUP |  |
| 6 | SUSW\_Test\_Performed | ASCII\_Numeric\_Base16 | bit0 (LSB) -> Processor RAM test  bit1 -> PROM checksum test  bit2 -> MMP checksum test  bit3 -> APSW Image 1 checksum test  bit4 -> APSW Image 2 checksum test  bit5-> MMP Address voting unanimity  bit6-> Default APSW voting unanimity  Bit = 0 means Test Performed; = 1 means not performed |  |
| 7 | SUSW\_Test\_Result | ASCII\_Numeric\_Base16 | Same format as field SUSW\_Test\_Performed  Bit = 0 means Test OK; = 1 means Test Fail Result is not relevant when Test has not been performed |  |
| 8 | APSW\_Test\_Performed | ASCII\_Numeric\_Base16 | bit0 (LSB) -> System Parameters checksum test  bit1 -> Spare  bit2-> Persistent data checksum test  bit3-> Spare  bit4-> Observation Table 1 checksum Test  bit5-> Observation Table 2 checksum Test  bit6-> Observation Table 3 checksum Test  bit7-> Observation Table 4 checksum Test  bit8-> Observation Table 5 checksum Test  bit9-> Observation Table 6 checksum Test  bit10-> Observation Table 7 checksum Test  bit11-> Observation Table 8 checksum Test  bit12-> Observation Table 9 checksum Test  bit13-> Observation Table 10 checksum Test  bit14-> Observation Table 11 checksum Test  bit15-> Observation Table 12 checksum Test  bit16-> Observation Table 13 checksum Test  bit17-> Observation Table 14 checksum Test  bit18-> Observation Table 15 checksum Test  bit19-> Observation Table 16 checksum Test  Bit = 0 means Test Performed; = 1 means not performed |  |
| 9 | APSW\_Test\_Result | ASCII\_Numeric\_Base16 | Same format as field APSW\_Test\_Performed  Bit = 0 means Test OK; = 1 means Test Fail Result is not relevant when Test has not been performed |  |
| 10 | Proc\_RAM\_test\_first\_fail\_address | ASCII\_Numeric\_Base16 | Processor RAM test, first failure address |  |
| 11 | Proc\_RAM\_test\_first\_fail\_expected\_value | ASCII\_Numeric\_Base16 | Processor RAM test, first failure expected value |  |
| 12 | Proc\_RAM\_test\_first\_fail\_value\_read | ASCII\_Numeric\_Base16 | Processor RAM test, first failure value read |  |
| 13 | PROM\_expected\_checksum | ASCII\_Numeric\_Base16 | PROM expected checksum |  |
| 14 | PROM\_calculated\_checksum | ASCII\_Numeric\_Base16 | PROM calculated checksum |  |
| 15 | MMP\_expected\_checksum | ASCII\_Numeric\_Base16 | MMP expected checksum |  |
| 16 | MMP\_calculated\_checksum | ASCII\_Numeric\_Base16 | MMP calculated checksum |  |
| 17 | MMP\_Voted\_Address | ASCII\_Numeric\_Base16 | MMP Voted Address |  |
| 18 | APSW\_Image1\_expected\_checksum | ASCII\_Numeric\_Base16 | APSW Image 1 expected checksum |  |
| 19 | APSW\_Image1\_calculated\_checksum | ASCII\_Numeric\_Base16 | APSW Image 1 calculated checksum |  |
| 20 | APSW\_Image1\_Version | ASCII\_Numeric\_Base16 | APSW\_Image1 Version |  |
| 21 | APSW\_Image2\_expected\_checksum | ASCII\_Numeric\_Base16 | APSW Image 2 expected checksum |  |
| 22 | APSW\_Image2\_calculated\_checksum | ASCII\_Numeric\_Base16 | APSW Image 2 calculated checksum |  |
| 23 | APSW\_Image2\_Version | ASCII\_Numeric\_Base16 | APSW\_Image2 Version |  |
| 24 | Default\_APSW\_image | ASCII\_Integer | Default APSW image  1 = APSW Image 1  2 = APSW Image 2 |  |
| 25 | APSW\_RAM\_Checksum\_Test\_Performed | ASCII\_String | APSW RAM Checksum Test Performed |  |
| 26 | APSW\_RAM\_Checksum\_Test\_Result | ASCII\_String | APSW RAM Checksum Test Result |  |
| 27 | Executable\_APSW\_image | ASCII\_Integer | Executable APSW image  0 = No APSW image is available for execution  1 = APSW Image 1 executed  2 = APSW Image 2 executed |  |
| 28 | SP\_expected\_checksum | ASCII\_Numeric\_Base16 | SP expected checksum |  |
| 29 | SP\_calculated\_checksum | ASCII\_Numeric\_Base16 | SP calculated checksum |  |
| 30 | Persistent\_Data\_expected\_checksum | ASCII\_Numeric\_Base16 | Persistent Data expected checksum |  |
| 31 | Persistent\_Data\_calculated\_checksum | ASCII\_Numeric\_Base16 | Persistent Data calculated checksum |  |
| 32 | OT0\_expected\_checksum | ASCII\_Numeric\_Base16 | OT0 expected checksum |  |
| 33 | OT0\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT0 calculated checksum |  |
| 34 | OT1\_expected\_checksum | ASCII\_Numeric\_Base16 | OT1 expected checksum |  |
| 35 | OT1\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT1 calculated checksum |  |
| 36 | OT2\_expected\_checksum | ASCII\_Numeric\_Base16 | OT2 expected checksum |  |
| 37 | OT2\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT2 calculated checksum |  |
| 38 | OT3\_expected\_checksum | ASCII\_Numeric\_Base16 | OT3 expected checksum |  |
| 39 | OT3\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT3 calculated checksum |  |
| 40 | OT4\_expected\_checksum | ASCII\_Numeric\_Base16 | OT4 expected checksum |  |
| 41 | OT4\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT4 calculated checksum |  |
| 42 | OT5\_expected\_checksum | ASCII\_Numeric\_Base16 | OT5 expected checksum |  |
| 43 | OT5\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT5 calculated checksum |  |
| 44 | OT6\_expected\_checksum | ASCII\_Numeric\_Base16 | OT6 expected checksum |  |
| 45 | OT6\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT6 calculated checksum |  |
| 46 | OT7\_expected\_checksum | ASCII\_Numeric\_Base16 | OT7 expected checksum |  |
| 47 | OT7\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT7 calculated checksum |  |
| 48 | OT8\_expected\_checksum | ASCII\_Numeric\_Base16 | OT8 expected checksum |  |
| 49 | OT8\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT8 calculated checksum |  |
| 50 | OT9\_expected\_checksum | ASCII\_Numeric\_Base16 | OT9 expected checksum |  |
| 51 | OT9\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT9 calculated checksum |  |
| 52 | OT10\_expected\_checksum | ASCII\_Numeric\_Base16 | OT10 expected checksum |  |
| 53 | OT10\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT10 calculated checksum |  |
| 54 | OT11\_expected\_checksum | ASCII\_Numeric\_Base16 | OT11 expected checksum |  |
| 55 | OT11\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT11 calculated checksum |  |
| 56 | OT12\_expected\_checksum | ASCII\_Numeric\_Base16 | OT12 expected checksum |  |
| 57 | OT12\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT12 calculated checksum |  |
| 58 | OT13\_expected\_checksum | ASCII\_Numeric\_Base16 | OT13 expected checksum |  |
| 59 | OT13\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT13 calculated checksum |  |
| 60 | OT14\_expected\_checksum | ASCII\_Numeric\_Base16 | OT14 expected checksum |  |
| 61 | OT14\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT14 calculated checksum |  |
| 62 | OT15\_expected\_checksum | ASCII\_Numeric\_Base16 | OT15 expected checksum |  |
| 63 | OT15\_calculated\_checksum | ASCII\_Numeric\_Base16 | OT15 calculated checksum |  |
| 64 | SUSW\_EDAC\_SEF\_Counter | ASCII\_Integer | Number of EDAC SEFs detected (and corrected) by SUSW |  |
| 65 | SUSW\_Last\_SEF\_Address | ASCII\_Numeric\_Base16 | Address of Last SEF detected by SUSW |  |
| 66 | SUSW\_EDAC\_DEF\_Counter | ASCII\_Integer | Number of EDAC DEFs detected by SUSW |  |
| 67 | SUSW\_Last\_DEF\_Address | ASCII\_Numeric\_Base16 | Address of Last DEF detected by SUSW |  |
| 68 | SUSW\_Hardfault\_Interrupt\_Counter | ASCII\_Integer | Number of Hardfault Interrupts detected by SUSW |  |
| 69 | SUSW\_Last\_Hardfault\_Error\_Address | ASCII\_Numeric\_Base16 | Error Address of Last Hardfault Interrupt detected by SUSW |  |
| 70 | SUSW\_Hardfault\_ID | ASCII\_Integer | Identificator of the Hardfault Interrupt detected by SUSW |  |
| 71 | SUSWMaxCycle | ASCII\_Integer | Time consumed by the longest SUSW schedule cycle since reset, in ms |  |
| 72 | SUSWMaxLoad | ASCII\_Integer | Max SUSW CPU Load in one second (10 schedule cycles) since reset, in ms |  |
| 73 | APSWMaxCycle0 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 0 since reset, in ms |  |
| 74 | APSWMaxCycle1 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 1 since reset, in ms |  |
| 75 | APSWMaxCycle2 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 2 since reset, in ms |  |
| 76 | APSWMaxCycle3 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 3 since reset, in ms |  |
| 77 | APSWMaxCycle4 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 4 since reset, in ms |  |
| 78 | APSWMaxCycle5 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 5 since reset, in ms |  |
| 79 | APSWMaxCycle6 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 6 since reset, in ms |  |
| 80 | APSWMaxCycle7 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 7 since reset, in ms |  |
| 81 | APSWMaxCycle8 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 8 since reset, in ms |  |
| 82 | APSWMaxCycle9 | ASCII\_Integer | Time consumed by the longest APSW schedule cycle 9 since reset, in ms |  |
| 83 | APSWMaxLoad | ASCII\_Integer | Max APSW CPU Load in one second (10 schedule cycles) since reset, in ms |  |

**OT Entry failure**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | Failure\_ID | ASCII\_String | Failure reason ID |  |
| 5 | OT\_Entry | ASCII\_Integer | Failed OT entry |  |
| 6 | Failure\_Cause | ASCII\_String | Failure reason description |  |

**Rover UART Error**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | Rover\_UART\_Rx\_Status\_ORed | ASCII\_Numeric\_Base16 | ORed value (over all transactions since APSW start) of UART\_RX\_STATUS register |  |
| 5 | Rover\_UART\_Tx\_Status\_ORed | ASCII\_Numeric\_Base16 | ORed value (over all transactions since APSW start) of UART\_TX\_STATUS register |  |

**Wind Sensor UART Error**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | WS\_ASIC\_ID | ASCII\_Integer | Identifier of the ASIC that is causing the error: 1 -> BOOM1, ASIC1 2 -> BOOM1, ASIC2 3 -> BOOM2, ASIC1 4 -> BOOM2, ASIC2 |  |
| 5 | WS\_UART\_Status | ASCII\_Numeric\_Base16 | Content of ASICx\_BOOMx\_UART\_STS |  |
| 6 | BOOM\_SwitchedOFF\_flag | ASCII\_Integer | Will be 1 if the BOOM is Switched OFF as consequence of this error, otherwise 0 |  |

**RDS UART Error**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | RDS\_UART\_Status | ASCII\_Numeric\_Base16 | RDS UART Status Register |  |
| 5 | RDS\_SwitchedOFF\_flag | ASCII\_Integer | Will be 1 if the RDS is Switched OFF as consequence of this error, otherwise 0. |  |
| 6 | RDS\_TCResponse | ASCII\_Numeric\_Base16 | Complete TC response from RDS (Header, Utile Data & Tail) |  |
| 7 | RDS\_Timeout | ASCII\_Integer | Will be 1 if the TCR + TM for a TC is not received within a maximum reception time |  |

**SkyCam UART Error**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | SkyCam\_UART\_Status | ASCII\_Numeric\_Base16 | SkyCam UART Status Register |  |

**RDS Telemetry data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | RDS\_Telecommand | ASCII\_Numeric\_Base16 | Copy of the parameter "RDS\_Telecommand" of the last Send\_RDS\_TC OT entry executed. |  |
| 5 | RDS\_TM | ASCII\_Numeric\_Base16 | Complete Telemetry received from RDS (Header, Utile Data & Tail) |  |

**EDAC SEF**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | SEF\_Address | ASCII\_Numeric\_Base16 | Failing address |  |

**EDAC DEF**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | DEF\_Address | ASCII\_Numeric\_Base16 | Failing address |  |

**Hardfault interrupt**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | Error\_Address | ASCII\_Numeric\_Base16 | Error memory address |  |

**Frangibolt Firing data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | Firing\_Time | ASCII\_Integer | Duration of FIRING phase, in seconds |  |
| 5 | Frangibolt\_Temperature | ASCII\_Integer | Temperature at the end of FIRING phase, in raw value of WS2\_PRT |  |

**HS maintenance**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | HS\_Initial\_TempRange\_Min | ASCII\_Integer | HS\_Maintenance OT entry Parameter, Minimum maintenance temperature range |  |
| 5 | HS\_Initial\_TempRange\_Max | ASCII\_Integer | HS\_Maintenance OT entry Parameter, Maximum maintenance temperature range |  |
| 6 | HS\_PRT\_Heater\_Timeout | ASCII\_Integer | HS\_Maintenance OT entry Parameter, HS Heater timeout to switch off heater |  |
| 7 | HS\_Max\_Temp | ASCII\_Integer | HS\_Maintenance OT entry Parameter, Max Temperature |  |
| 8 | Max\_Value\_H\_PRT\_TEMP\_1 | ASCII\_Integer | Max value of H\_PRT\_TEMP\_1 reached during maintenance operation |  |
| 9 | Time\_Start\_Maintenance | ASCII\_Integer | Time at the start of Maintenance operation |  |
| 10 | Time\_End\_Maintenance | ASCII\_Integer | Time at the end of Maintenance operation |  |
| 11 | Maintenance\_End\_Status | ASCII\_String | Status at the end of Maintenance Operation |  |

**Flash Error**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | Flash\_Error\_Type | ASCII\_String | Error Type |  |
| 5 | Logical\_block | ASCII\_Numeric\_Base16 | Failing Block (Logical) |  |
| 6 | Physical\_block | ASCII\_Numeric\_Base16 | Failing Block (Physical) |  |
| 7 | Chip | ASCII\_Numeric\_Base16 | Raw HW info for decoding Flash Address |  |
| 8 | Block\_ID | ASCII\_Numeric\_Base16 | Raw HW info for decoding Flash Address |  |
| 9 | Physical\_Page | ASCII\_Numeric\_Base16 | Failing Physical Page |  |

**TIRS Heaters current monitor**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | Reading\_12V\_HTR\_CURRENT\_TM | ASCII\_Integer | Raw value of ICU Analog 12V\_HTR\_CURRENT\_TM that didnt pass the threshold check and caused the disabling of TIRS Heaters |  |

**WS ASIC failure**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Column** | **Data Type** | **Description** |  |
| 1 | SCLK | ASCII\_Real | Spacecraft Clock |  |
| 2 | LMST | ASCII\_String | Local Mean Solar Time |  |
| 3 | LTST | ASCII\_String | Local True Solar Time |  |
| 4 | WS\_ASIC\_ID | ASCII\_Integer | Identifier of the ASIC that is causing the error: 1 -> BOOM1, ASIC1 2 -> BOOM1, ASIC2 3 -> BOOM2, ASIC1 4 -> BOOM2, ASIC2 |  |
| 5 | WS\_Response\_Status | ASCII\_Numeric\_Base16 | Content of Response Status Byte (in LSByte) |  |