

Mars Reconnaissance Orbiter

Mars Climate Sounder Experiment Data Record Software Interface Specification

Version 1.3

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ACRONYMS AND ABBREVIATIONS

ASCII	American Standard Code for Information Interchange
CODMAC	Committee on Data Management and Computation
EDR	Experiment Data Record
ICD	Interface Control Document
ISO	International Standards Organization
JPL	Jet Propulsion Laboratory
Kbyte	Kilobytes
LSB	Least Significant Byte
MB	Mega Bytes
MIPL	Multimission Image Processing Laboratory
MRO	Mars Reconnaissance Orbiter
MSB	Most Significant Byte
NASA	National Aeronautics and Space Administration
ODL	Object Description Language
PMIRR	Pressure Modulator Infrared Radiometer
PDS	Planetary Data System
RAM	Random Access Memory
RDR	Reduced Data Record
SFDU	Standard Formatted Data Unit
SIS	Software Interface Specification
TBD	To Be Determined
TDS	Telemetry Delivery Subsystem
URL	Universal Resource Locator

GLOSSARY

TERM	DEFINITION
Meta-Data	Selected or summary information about data. PDS catalog objects and data product labels are forms of meta-data for summarizing important aspects of data sets and data products.
Profile	The vertical distribution, as a function of atmospheric altitude, of some physical property, such as temperature or water vapor amount

1. INTRODUCTION

1.1 Purpose and Scope

The purpose of this data product Software Interface Specification (SIS) is to provide users of the Mars Climate Sounder (MCS) Experiment Data Record (EDR) with a detailed description of the product and a description of how it was generated, including data sources and destinations. The document is intended to provide enough information to enable users to understand the MCS EDR data product. The users for whom this document 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 Reconnaissance Orbiter (MRO) Project and those in the general planetary science community.

1.2 Contents

This data product SIS describes how the MRO MCS instrument acquires its data, and how the data are processed, formatted, labeled, and uniquely identified. This 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.

1.3 Applicable Documents and Constraints

This data product SIS is responsive to the following MRO documents:

1. Mars Exploration Program Data Management Plan, R. E. Avidson, S. Slavney and S. Nelson, Rev. 3, March 20, 2002.
2. Mars Reconnaissance Orbiter Project Data Archive Generation, Validation and Transfer Plan, R. E. Avidson, S. Noland and S. Slavney, JPL D-22246, July 27, 2005.
3. Mars Climate Sounder Telemetry Dictionary, A. S. Mazer, JPL D-28436.

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

4. Planetary Data System Archive Preparation Guide, Version .050503, JPL D-31224, May 3, 2005.
5. Planetary Data System Data Standards Reference, Version 3.6, JPL D-7669, Part 2, August 1, 2003.
6. Planetary Science Data Dictionary Document, JPL D-7116, August

28, 2002.

7. Mars Reconnaissance Orbiter Mars Climate Sounder (MCS) Science Team and PDS Atmospheres Node Interface Control Document (ICD), J. Murphy, April 30, 2004.

1.4 Relationships with Other Interfaces

The Experiment Data Record products described in this SIS are used in the production of other archived products of the Mars Reconnaissance Orbiter (MRO) mission, so that changes to their content and format may result in an interface impact. In particular, the MCS Reduced Data Record (RDR) products take EDR products as their input data sets.

2. DATA PRODUCT CHARACTERISTICS AND ENVIRONMENT

2.1 Instrument Overview

The Mars Climate Sounder is a follow-on experiment to PMIRR, the Pressure Modulator Infrared Radiometer lost with the Mars Observer spacecraft, and to PMIRR2, lost with the Mars Climate Orbiter. MCS observes radiation with 21 detectors in each of nine spectral bands; eight thermal infrared channels are used to characterize atmospheric temperature, pressure, water vapor, and condensates, while the remaining spectral channel (operating in the visible and near infrared, 0.3-3.0 microns) is used primarily to understand the effects of solar radiation on the Martian energy budget

MCS looks near the horizon of Mars at the atmospheric limb to observe the atmosphere in 21 vertical samples simultaneously, with measurements centered approximately 5 kilometers (3 miles) through the atmosphere at the limb. From these observations vertical distributions ("profiles") of temperature, pressure, water vapor, dust, and condensates are determined. . These profiles are combined into daily, three-dimensional global maps for both daytime and nighttime. . Analyzing these profiles and maps should lead to a better understanding of Martian weather and, eventually, of Martian climate.

2.2.1 Hardware Overview

The Mars Climate Sounder is a nine channel infrared radiometer employing filter radiometry. These channels are distributed between two identical, boresighted telescopes, and an articulated elevation/azimuth mount allows the

telescopes to view the surface of Mars, the limb of Mars, space, and calibration targets. The instantaneous field-of-view (FOV) response of each channel is defined by a linear, 21-element, thermopile detector array at the telescope focal plane, and its spectral response is defined by a focal plane bandpass filter.

The MCS structure consists of an instrument optics bench assembly (OBA), an elevation/azimuth yoke, and an instrument mount. The OBA contains all of the instrument optical subassemblies, and is suspended from the yoke (Figure 3-1). Elevation and azimuth motors mounted on the yoke drive instrument articulation. The OBA is temperature controlled, and internal temperature gradients are minimized by design. Radiometric calibration is provided by views of blackbody and solar targets mounted on the yoke. The electronics subassemblies control signal processing, instrument operation and articulation, command processing, and data processing and are distributed between the OBA and the yoke. Figure 1 shows a schematic of the mechanical configuration of the instrument with the major components indicated. Figure 2 gives a schematic representation of the optical layout.

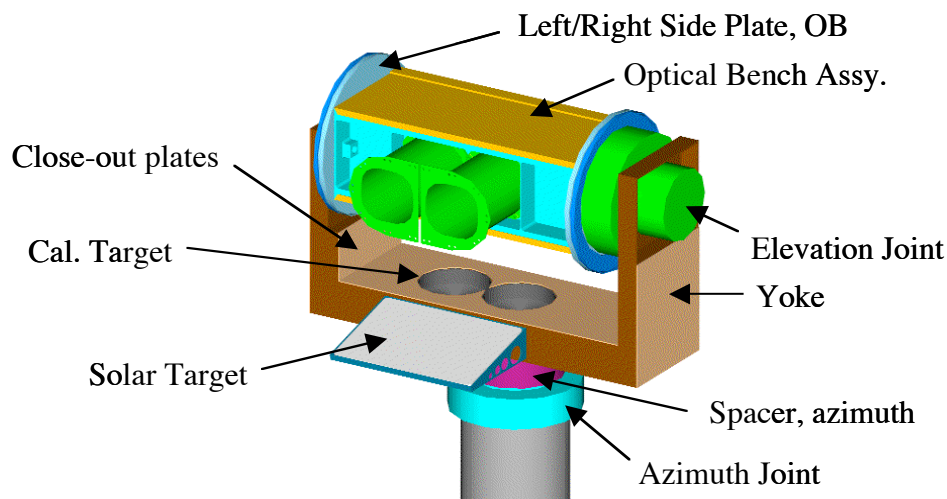
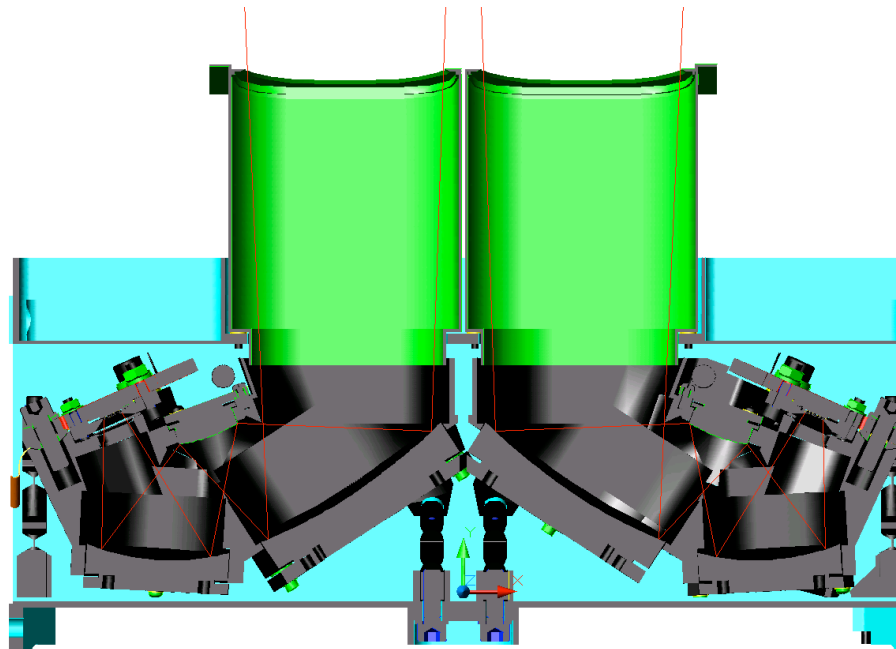


Figure 1 Instrument Configuration



Telescope/ Channel #	Bandpass cm ⁻¹	Band Center - μm	Measurement Function (Reference Only)
A1	595 - 615	16.5	Temperature 20-40 km
A2	615 - 645	15.9	Temperature 40-80 km, Pressure
A3	635 - 665	15.4	Temperature 40-80 km, Pressure
A4	820 - 870	11.8	Dust & Condensate (D&C) extinction 0-80 km
A5	400 - 500	22.2	Temperature 0-20km, D&C extinction 0-80 km
A6	3300 - 33000	1.65	Polar Radiative Balance
B1	290 - 340	31.7	Temperature 0-20km, D&C extinction 0-80 km
B2	220 - 260	41.7	Water Vapor 0-40 km, D&C extinction 0-80 km
B3	230 - 245	42.1	Water Vapor 0-40 km, D&C extinction 0-80 km

Figure 3 MCS channel spectral characteristics

The detector arrays for channels A1 through A6 are located in the focal plane of

telescope A. The detector arrays for channels B1 through B3 shall be located in the focal plane of telescope B.

Each MCS spectral channel has 21 FOVs defined by the individual detectors of the corresponding linear array. Individual detector FOV dimensions, linear array length and linear array spacing in both focal planes is specified in Figure 4.

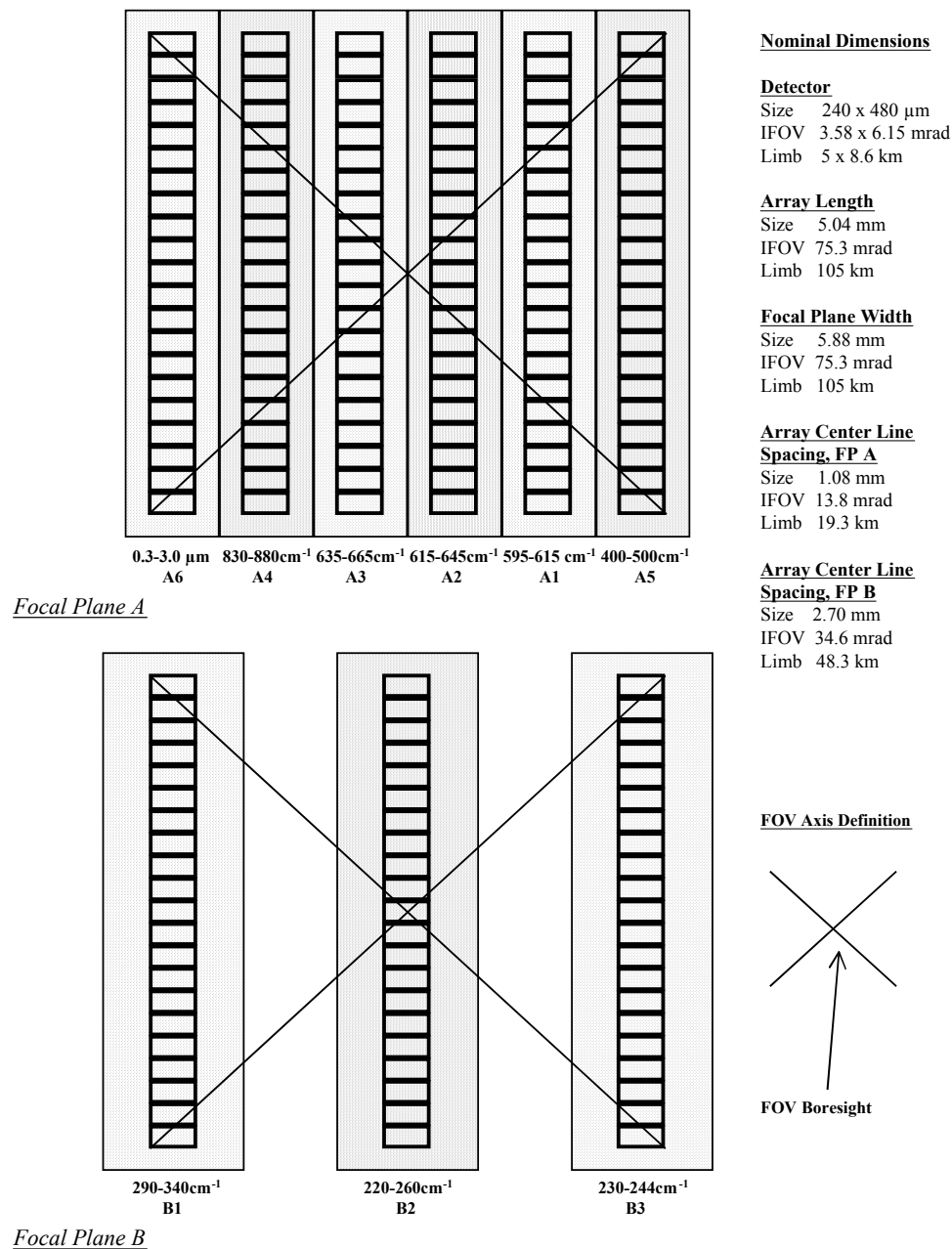


Figure 3-4. Detector and Filter Layout and Channel Assignments, Focal Planes A & B

Figure 4 Detector and Filter Layout

2.2 Data Product Overview

The MCS software collects 192 sixteen-bit science measurements from the focal plane interface electronics every 2.048 seconds, along with associated instrument engineering and housekeeping measurements. The science and housekeeping data are organized into data packets that are transmitted to the spacecraft at the same 2.048-second spacing. The data packets are downlinked to the MRO Ground Data System (GDS) and placed into the Raw Science Data Server (RSDS). MCS software queries the data from the RSDS and assembles them into EDR data tables, each covering a 4 hour time period.

Each MCS EDR data product will consist of three files. The first file is an ASCII formatted detached PDS label. The second file is the detached PDS format file. The third file is the ASCII data table file. These are described in Appendix A. Each MCS EDR data table will be approximately 14MB; volume of the EDR data product will be approximately 84MB per day.

2.3 Data Processing

2.3.1 Data Processing Level

This document uses the Committee on Data Management and Computation (CODMAC) data level numbering system to describe the processing level of the EDR data product. MCS EDR data products are considered CODMAC “Level 2”, equivalent to NASA level 0. The EDR data files are generated from CODMAC Level 1 or “Raw Data”, which are the telemetry packets within the project specific Standard Formatted Data Unit (SFDU) record. Refer to Table 2 for a definition of the CODMAC and NASA data processing levels.

Table 2: Processing Levels for Science Data Sets

NASA	CODMAC	Description
Packet data	Raw – Level 1	Telemetry data stream as received at the ground station, with science and engineering data embedded.
Level-0	Edited – Level 2	Instrument science data (e.g., raw voltages, counts) at full resolution, time ordered, with duplicates and transmission errors removed.
Level 1A	Calibrated - Level 3	Level 0 data that have been located in space and may have been transformed (e.g., calibrated, rearranged) in a reversible manner and packaged with needed ancillary and auxiliary data (e.g., radiances with the calibration equations applied).
Level 1B	Resampled - Level 4	Irreversibly transformed (e.g., resampled, remapped, calibrated) values of the instrument measurements (e.g., radiances, magnetic field strength).

Level 2	Derived - Level 5	Geophysical parameters, generally derived from Level 1 data, and located in space and time commensurate with instrument location, pointing, and sampling.
Level 3	Derived - Level 5	Geophysical parameters mapped onto uniform space-time grids.

2.3.2 Data Product Generation

The MCS EDR data products will be generated by the MCS Instrument Team at JPL. The EDR data products will be reconstructed from telemetry data products and formatted according to this EDR SIS. Meta-data acquired from the telemetry data headers will be used to populate the PDS label.

2.3.3 Data Flow

MCS science and engineering telemetry are transferred to the MRO Project RSDS. Once transferred, the MCS software automatically processes the telemetry into Level 0 EDR data products. The MCS EDR data products are then archived locally at the MCS operation center.

After an initial data validation period, the MCS team will assemble the data products and ancillary files into archive volumes and will transfer the assembled volume to the Atmospheres Node. The MCS EDR archive will be made available via data releases scheduled at three month intervals as specified in the Mars Reconnaissance Orbiter Project Data Archive Generation, Validation and Transfer Plan (see Applicable document #2).

2.3.4 Labeling and Identification

The data set ID provided by the PDS for the MCS EDR data product is: MRO-M-MCS-2-EDR-V1.0. The version number is incremented should the entire EDR data set be revised. [Clarify major/minor versioning conventions.] The data set name is "MRO MARS CLIMATE SOUNDER LEVEL 2 EDR V1.0".

The file naming convention for the MCS data products will be in the form of an 8 digit date in the format YYYYMMDD, plus a two-digit hour, e.g. "2007070820_EDR.TAB"

Each MCS EDR data product has a detached PDS label in a separate file of the same name, extension .LBL: e.g. "2007070820_EDR.LBL". The PDS format file for each EDR data product will be MCS_EDR.FMT.

2.4 Standards Used in Generating Data Products

2.4.1 PDS Standards

The MCS EDR complies with Planetary Data System standards for file formats and directory names, PDS labels, as specified in the PDS Standards Reference [5] and the Planetary Science Data Dictionary Document [6].

2.4.2 Time Standards

The PDS label for an MCS EDR uses keywords denoting time values, such as start time, stop time, start spacecraft clock count, and stop spacecraft clock count. Each time value standard is defined according to the PDS keyword definition. See Appendix C.

In the data product label, Start Time and Stop Time values are stored in PDS compliant UTC date format, in the pattern YYYY-MM-DDTHH:MM:SS.SSS (four digit year, two digits for month, day, hour, minute and second, and three digits for decimal fractional second). Spacecraft clock start and stop count time values are stored in decimal seconds from the epoch 1980.

2.4.3 Coordinate Systems

The MCS EDR is a low-level data product, and as such contains no geometry/"geo"location information. For this reason, no spatial coordinate systems are used, nor are any coordinate system conventions required.

2.4.4 Data Storage Conventions

The MCS EDR data files are stored as fixed-length ASCII tables. The detached PDS labels for MCS EDR's are stored as ASCII text. Each record is terminated with a carriage return followed by a line feed.

2.5 Data Validation

MCS EDR products will be validated before being released to the PDS. Validation is accomplished in two parts: validation for scientific integrity and validation for compliance with PDS standards. MCS Team members are expected to conduct validation for scientific integrity in the course of their analysis of the products. Science validation is meant to ensure that data products contain the expected measurements and that they are otherwise suitable for analysis. The details of the science validation process are the responsibility of the MCS Team.

Validation for PDS compliance will be performed by the PDS Atmospheres Node and is meant to ensure that data products conform to PDS standards and to the specifications in this SIS.

A data set must also pass a peer review before it is accepted by PDS. The MCS

Team and the PDS Atmospheres Node will convene a peer review committee made up of scientists and data engineers. The committee will examine the data set to make sure it is complete and meets the product specifications as defined in the SIS. The committee will include a PDS representative to ensure that the data set is in compliance with PDS standards.

3. DETAILED DATA PRODUCT SPECIFICATIONS

3.1 Data Product Structure and Organization

The EDR data products will be located in the DATA directory of the EDR volume. The files will be grouped into directories with one directory per day. Each directory name will be in the format YYYYMMDD. Within each directory there will be 6 data product files and their labels. The labels will point to the corresponding data files, and contain pointers to format labels detailing the column layout of the data files. The data product file names will be in the format YYYYMMDDHH_EDR.TAB for the data tables, and YYYYMMDDHH_EDR.LBL for the labels.

3.2 Data Format Descriptions

The MCS EDR data product file is a fixed record-length ASCII table. Descriptions of the data contained within the table columns are provided below:

Table 1: MRO MCS Measurement Data Components

Column #	Name	Data Type	Length	Description
1	1	ASCII_INTEGER	1	A quality indicator: 0 means this record contains valid data
2	DATE	CHARACTER	14	Date of observation (UTC)
3	UTC	CHARACTER	15	Time of observation (UTC)
4	SCLK	ASCII_REAL	15	Decimal spacecraft clock at time of observation
5	PKT_COUNT	ASCII_INTEGER	10	The packet count, including the current one, sent since bootup. Rolls over to 0 at 65536
6	SAFING	ASCII_INTEGER	7	A 1-bit value indicating Safing; '1' indicates that the instrument had started moving to the stow position but hasn't yet finished. See column 7 for additional information
7	SAFED	ASCII_INTEGER	6	A 1-bit value indicating Safed; '1' indicates that the instrument was stowed during this observation. The stowed position is sun-safe and views the internal blackbody. Flight software will not move the actuators until a resume command has been received
8	FREEZING	ASCII_INTEGER	9	A 1-bit value indicating Freezing; '1' indicates that the instrument was moving to the frozen position during this observation. See the column 9 for additional information

9	FROZEN	ASCII_INTEGER	7	A 1-bit value indicating Frozen; '1' indicates that the instrument was frozen during this observation; flight software will not move the actuators (except to safe) until a free command has been received. While frozen, the instrument generally points at the limb for the duration of a high stability image
10	ROLLING	ASCII_INTEGER	8	A 1-bit value indicating Rolling; '1' indicates that the flight software is performing special scanning for sun safety during a large roll by the spacecraft for a targeted observation. It is enabled by a command and ends with a second command
11	DUMPING	ASCII_INTEGER	8	A 1-bit value indicating Dumping memory; '1' indicates that the packet contains dump data instead of science data. Enabled by command
12	MOVING	ASCII_INTEGER	7	A 1-bit value indicating Actuator motion; '1' indicates that an actuator moved during acquisition of the packet's science data
13	TEMP_FAULT	ASCII_INTEGER	11	A 1-bit value indicating stepper temperature fault; '1' indicates that an over-temperature condition was detected in the actuator-controlling chip
14	MODE	CHARACTER	7	An 8-bit value indicating various conditions: Bit 0: RAM CRC calc disabled; Bit 1: Logging I/O transactions; Bit 2: Logging movements; Bit 3: Watchdog disabled; Bit 4: Debug telem mode; The science channels contain debug data, not science observations. Bit 5: Safing disabled; Bit 6: Sensor data synthesized; Temperature data in this packet is not real. Bit 7: Science data synthesized; Science observations in this packet are not real
15	PKT_TIME	ASCII_INTEGER	11	The MCS FSW-internal value of sc_time, at the time of packet assembly.
16	TICKS_PKT_START	ASCII_INTEGER	16	The number of 31.25 Hz MCS fine-time pulses received since bootup, at the time of packet assembly
17	TICKS_AT_SC_TIME	ASCII_INTEGER	17	The number of 31.25 Hz MCS fine-time pulses received since bootup, as of the last time a time message from the spacecraft was processed
18	RAM_CRC	CHARACTER	10	The most recently calculated cyclic redundancy check (CRC). Normally this will be calculated over RAM (the jumptable, the scan tables, and any uploaded patches)
19	FSW_VERSION	CHARACTER	12	The version of flight software currently running. Interpreted as a hex number, the first digit is the major release, and the second digit is the minor release. The flight build is 30 hex, that is, major release 3 and minor release 0
20	RESET_COUNT	ASCII_INTEGER	12	The number of times the processor has rebooted since power was applied. Includes watchdog resets and hardware resets, as well as commanded reboots.
21	MISSING_TIMES	ASCII_INTEGER	14	The number of times since boot that no time command was received from the spacecraft during the expected window
22	OST_INDEX	ASCII_INTEGER	10	The current index into the Orbit Schedule Table. This is -1 at bootup, and then increments by one with each equator crossing, as announced by the spacecraft through the MCS_EQX command. After index 11, it wraps around to 0.
23	EST_INDEX	ASCII_INTEGER	10	The index of the current Event Schedule Table. EST indices come from the Orbit Schedule Table. The Event Schedule Table selected determines which

				Scan Sequence Tables execute.
24	ROT_INDEX	ASCII_INTEGER	10	The current index into the Radio-Occultation Table. The Radio-Occultation Table references Scan Sequence Tables to execute based on spacecraft time rather than orbit.
25	EOCT_INDEX	ASCII_INTEGER	11	The current index into the Eccentricity- Oblateness Correction Table. The EOCT contains elevation corrections to pointings, based on times since the last equator crossing.
26	SST_INDEX	ASCII_INTEGER	10	The current index into the current Scan Sequence Table, which determines the current pointing.
27	LAST_AZ_CMD	ASCII_INTEGER	12	The last azimuth commanded, in steps, which if the actuator isn't moving, is the same as the current azimuth.
28	LAST_EL_CMD	ASCII_INTEGER	12	The last elevation commanded, in steps, which, if the actuator isn't moving, is the same as the current elevation.
29	FPA_TEMP	ASCII_INTEGER	9	The temperature readout of the focal plane A temperature sensor, in data numbers
30	FPB_TEMP	ASCII_INTEGER	9	The temperature readout of the focal plane B temperature sensor, in data numbers
31	BAFFLE_A_TEMP	ASCII_INTEGER	14	The temperature readout of the baffle A temperature sensor, in data numbers
32	BAFFLE_B_TEMP	ASCII_INTEGER	14	The temperature readout of the baffle B temperature sensor, in data numbers
33	BB_1_TEMP	ASCII_INTEGER	10	The temperature readout of the blackbody temperature sensor 1, in data numbers
34	OBA_1_TEMP	ASCII_INTEGER	11	The temperature readout of the optical bench assembly temperature sensor 1, in data numbers
35	ROTATING_VALUE_1	ASCII_INTEGER	17	The temperature or voltage readout in DN of the sensor referenced by 'Rotating temp/voltage index #1'. The value is assigned to the appropriate sensor in columns 54 through 76.
36	ROTATING_VALUE_2	ASCII_INTEGER	17	The temperature or voltage readout in DN of the sensor referenced by 'Rotating temp/voltage index #2'. The value is assigned to the appropriate sensor in columns 54 through 76.
37	ROTATING_INDEX_1	ASCII_INTEGER	17	The index of the first rotating sensor value contained in this telemetry packet. This is used to assign column 35 to the appropriate sensor
38	ROTATING_INDEX_2	ASCII_INTEGER	17	The index of the second rotating sensor value contained in this telemetry packet. This is used to assign column 35 to the appropriate sensor
39	ERROR_TIME	ASCII_INTEGER	11	The MCS FSW-internal value of sc_time, at the time of the most recent error
40	ERROR_ID	ASCII_INTEGER	9	The error ID associated with the most recent error.
41	ERROR_DETAIL	CHARACTER	15	Three bytes containing up to three additional bytes of information describing the most recent error condition
42	ERROR_COUNT	ASCII_INTEGER	12	The number of errors that have occurred since last reboot
43	COMMANDS_RECEIVED	ASCII_INTEGER	18	The number of commands received since bootup. Spacecraft time commands are only counted if rejected.
44	COMMANDS_EXECUTED	ASCII_INTEGER	18	The number of commands successfully executed since bootup. This plus the number of commands rejected should equal the number of commands received, unless one of the commands received is still executing.

45	COMMANDS_REJECTED	ASCII_INTEGER	18	The number of commands received but not successfully executed, since bootup. This plus the number of commands executed should equal the number of commands received, unless one of the commands received is still executing.
46	LAST_COMMAND_REC	CHARACTER	21	The last command received, as an 8-byte descriptor. Commands are saved regardless of their validity
47	CMD	ASCII_INTEGER	4	The first byte of LAST_COMMAND_REC, indicating which of the seven types of MCS command was last received
48	REQ_ID	CHARACTER	9	The second byte of LAST_COMMAND_REC. For command type 3, MCS_REQUEST, this is the request ID
49	LAST_TIME_COMMAND	ASCII_INTEGER	18	The spacecraft time when the last command was received, regardless of whether or not the command was valid.
50	LAST_EQX_PREDICTION	ASCII_INTEGER	20	The last equator crossing prediction received from the spacecraft. This time may not be the same as the time of the last equator crossing, if the spacecraft missed sending one or more.
51	CHIP_1_REF	ASCII_INTEGER	11	The signal, in counts, from the thermally- shorted dummy detector on the first focal plane processing chip. This corresponds to the first 10 or 11 detectors of each A channel.
52	CHIP_2_REF	ASCII_INTEGER	11	The signal, in counts, from the thermally- shorted dummy detector on the second focal plane processing chip. This corresponds to the last 10 or 11 detectors of each A channel.
53	CHIP_3_REF	ASCII_INTEGER	11	The signal, in counts, from the thermally- shorted dummy detector on the third focal plane processing chip. This corresponds to all detectors on each B channel.
54	VREF_C2	ASCII_INTEGER	8	The calibration counts corresponding to +4.9997 volts
55	VREF_C1	ASCII_INTEGER	8	The calibration counts corresponding to 0.0000 volts
56	PRT_NARROW_C2	ASCII_INTEGER	14	The calibration counts corresponding to the 620.318 ohm Vishay resistor, as processed through the narrow range PRT circuitry.
57	PRT_NARROW_C1	ASCII_INTEGER	14	The calibration counts corresponding to the 480.393 ohm Vishay resistor, as processed through the narrow range PRT circuitry.
58	PRT_WIDE_C2	ASCII_INTEGER	12	The calibration counts corresponding to the 620.318 ohm Vishay resistor, as processed through the wide range PRT circuitry.
59	PRT_WIDE_C1	ASCII_INTEGER	12	The calibration counts corresponding to the 480.393 ohm Vishay resistor, as processed through the wide range PRT circuitry.
60	HYBRID_TEMP	ASCII_INTEGER	12	The temperature readout of the hybrid electronics temperature sensor, in data numbers. This value converted to volts is temperature in kelvins divided by 100.
61	FPA_TEMP_CYC	ASCII_INTEGER	13	The temperature readout of the cycling focal plane A temperature sensor, in data numbers. This sensor uses narrow range Vishay calibration counts. This is the same sensor as column 29, measured at a slightly different time.
62	FPB_TEMP_CYC	ASCII_INTEGER	13	The temperature readout of the cycling focal plane B temperature sensor, in data numbers. This sensor uses narrow range Vishay calibration counts. This is the same sensor as column 30, measured at a slightly different time.

63	BAFFLE_A_TEMP_CYC	ASCII_INTEGER	18	The temperature readout of the cycling baffle A temperature sensor, in data numbers. This sensor uses narrow range Vishay calibration counts. This is the same sensor as column 31, measured at a slightly different time.
64	BAFFLE_B_TEMP_CYC	ASCII_INTEGER	18	The temperature readout of the cycling baffle B temperature sensor, in data numbers. This sensor uses narrow range Vishay calibration counts. This is the same sensor as column 32, measured at a slightly different time.
65	OBA_1_TEMP_CYC	ASCII_INTEGER	15	The temperature readout of the cycling optical bench assembly temperature sensor 1, in data numbers. This sensor uses narrow range Vishay calibration counts. This is the same sensor as column 33, measured at a slightly different time.
66	OBA_2_TEMP	ASCII_INTEGER	11	The temperature readout of the cycling optical bench assembly temperature sensor 2, in data numbers. This sensor uses narrow range Vishay calibration counts.
67	BB_1_TEMP_CYC	ASCII_INTEGER	14	The temperature readout of the cycling black body temperature sensor 1, in data numbers. This sensor uses narrow range Vishay calibration counts. This is the same sensor as column 34, measured at a slightly different time.
68	BB_2_TEMP	ASCII_INTEGER	10	The temperature readout of the black body temperature sensor 2, in data numbers. This sensor uses narrow range Vishay calibration counts.
69	SOLAR_TARGET_TEMP	ASCII_INTEGER	18	The temperature readout of the solar target temperature sensor, in data numbers. This sensor uses wide range Vishay calibration counts.
70	YOKE_TEMP	ASCII_INTEGER	10	The temperature readout of the yoke temperature sensor, in data numbers. This sensor uses wide range Vishay calibration counts.
71	EL_ACTUATOR_TEMP	ASCII_INTEGER	17	The temperature readout of the elevation actuator temperature sensor, in data numbers. This sensor uses wide range Vishay calibration counts.
72	AZ_ACTUATOR_TEMP	ASCII_INTEGER	17	The temperature readout of the azimuth actuator temperature sensor, in data numbers. This sensor uses wide range Vishay calibration counts.
73	-15V	ASCII_INTEGER	9	The voltage readout of the minus fifteen volt supply, in data numbers
74	+15V	ASCII_INTEGER	8	The voltage readout of the plus fifteen volt supply, in data numbers
75	SOLAR_BASE_TEMP	ASCII_INTEGER	16	The temperature readout of the solar target base temperature sensor, in data numbers. This sensor uses wide range Vishay calibration counts.
76	+5V	ASCII_INTEGER	7	The voltage readout of the plus five volt supply, in data numbers
77	A1_01	ASCII_INTEGER	6	The signal, in counts, from detector A1-01
78	A1_02	ASCII_INTEGER	6	The signal, in counts, from detector A1-02
79	A1_03	ASCII_INTEGER	6	The signal, in counts, from detector A1-03
80	A1_04	ASCII_INTEGER	6	The signal, in counts, from detector A1-04
81	A1_05	ASCII_INTEGER	6	The signal, in counts, from detector A1-05
82	A1_06	ASCII_INTEGER	6	The signal, in counts, from detector A1-06
83	A1_07	ASCII_INTEGER	6	The signal, in counts, from detector A1-07
84	A1_08	ASCII_INTEGER	6	The signal, in counts, from detector A1-08
85	A1_09	ASCII_INTEGER	6	The signal, in counts, from detector A1-09
86	A1_10	ASCII_INTEGER	6	The signal, in counts, from detector A1-10

87	A1_11	ASCII_INTEGER	6	The signal, in counts, from detector A1-11
88	A1_12	ASCII_INTEGER	6	The signal, in counts, from detector A1-12
89	A1_13	ASCII_INTEGER	6	The signal, in counts, from detector A1-13
90	A1_14	ASCII_INTEGER	6	The signal, in counts, from detector A1-14
91	A1_15	ASCII_INTEGER	6	The signal, in counts, from detector A1-15
92	A1_16	ASCII_INTEGER	6	The signal, in counts, from detector A1-16
93	A1_17	ASCII_INTEGER	6	The signal, in counts, from detector A1-17
94	A1_18	ASCII_INTEGER	6	The signal, in counts, from detector A1-18
95	A1_19	ASCII_INTEGER	6	The signal, in counts, from detector A1-19
96	A1_20	ASCII_INTEGER	6	The signal, in counts, from detector A1-20
97	A1_21	ASCII_INTEGER	6	The signal, in counts, from detector A1-21
98	A2_01	ASCII_INTEGER	6	The signal, in counts, from detector A2-01
99	A2_02	ASCII_INTEGER	6	The signal, in counts, from detector A2-02
100	A2_03	ASCII_INTEGER	6	The signal, in counts, from detector A2-03
101	A2_04	ASCII_INTEGER	6	The signal, in counts, from detector A2-04
102	A2_05	ASCII_INTEGER	6	The signal, in counts, from detector A2-05
103	A2_06	ASCII_INTEGER	6	The signal, in counts, from detector A2-06
104	A2_07	ASCII_INTEGER	6	The signal, in counts, from detector A2-07
105	A2_08	ASCII_INTEGER	6	The signal, in counts, from detector A2-08
106	A2_09	ASCII_INTEGER	6	The signal, in counts, from detector A2-09
107	A2_10	ASCII_INTEGER	6	The signal, in counts, from detector A2-10
108	A2_11	ASCII_INTEGER	6	The signal, in counts, from detector A2-11
109	A2_12	ASCII_INTEGER	6	The signal, in counts, from detector A2-12
110	A2_13	ASCII_INTEGER	6	The signal, in counts, from detector A2-13
111	A2_14	ASCII_INTEGER	6	The signal, in counts, from detector A2-14
112	A2_15	ASCII_INTEGER	6	The signal, in counts, from detector A2-15
113	A2_16	ASCII_INTEGER	6	The signal, in counts, from detector A2-16
114	A2_17	ASCII_INTEGER	6	The signal, in counts, from detector A2-17
115	A2_18	ASCII_INTEGER	6	The signal, in counts, from detector A2-18
116	A2_19	ASCII_INTEGER	6	The signal, in counts, from detector A2-19
117	A2_20	ASCII_INTEGER	6	The signal, in counts, from detector A2-20
118	A2_21	ASCII_INTEGER	6	The signal, in counts, from detector A2-21
119	A3_01	ASCII_INTEGER	6	The signal, in counts, from detector A3-01
120	A3_02	ASCII_INTEGER	6	The signal, in counts, from detector A3-02
121	A3_03	ASCII_INTEGER	6	The signal, in counts, from detector A3-03
122	A3_04	ASCII_INTEGER	6	The signal, in counts, from detector A3-04
123	A3_05	ASCII_INTEGER	6	The signal, in counts, from detector A3-05
124	A3_06	ASCII_INTEGER	6	The signal, in counts, from detector A3-06
125	A3_07	ASCII_INTEGER	6	The signal, in counts, from detector A3-07
126	A3_08	ASCII_INTEGER	6	The signal, in counts, from detector A3-08
127	A3_09	ASCII_INTEGER	6	The signal, in counts, from detector A3-09
128	A3_10	ASCII_INTEGER	6	The signal, in counts, from detector A3-10
129	A3_11	ASCII_INTEGER	6	The signal, in counts, from detector A3-11
130	A3_12	ASCII_INTEGER	6	The signal, in counts, from detector A3-12
131	A3_13	ASCII_INTEGER	6	The signal, in counts, from detector A3-13
132	A3_14	ASCII_INTEGER	6	The signal, in counts, from detector A3-14
133	A3_15	ASCII_INTEGER	6	The signal, in counts, from detector A3-15

134	A3_16	ASCII_INTEGER	6	The signal, in counts, from detector A3-16
135	A3_17	ASCII_INTEGER	6	The signal, in counts, from detector A3-17
136	A3_18	ASCII_INTEGER	6	The signal, in counts, from detector A3-18
137	A3_19	ASCII_INTEGER	6	The signal, in counts, from detector A3-19
138	A3_20	ASCII_INTEGER	6	The signal, in counts, from detector A3-20
139	A3_21	ASCII_INTEGER	6	The signal, in counts, from detector A3-21
140	A4_01	ASCII_INTEGER	6	The signal, in counts, from detector A4-01
141	A4_02	ASCII_INTEGER	6	The signal, in counts, from detector A4-02
142	A4_03	ASCII_INTEGER	6	The signal, in counts, from detector A4-03
143	A4_04	ASCII_INTEGER	6	The signal, in counts, from detector A4-04
144	A4_05	ASCII_INTEGER	6	The signal, in counts, from detector A4-05
145	A4_06	ASCII_INTEGER	6	The signal, in counts, from detector A4-06
146	A4_07	ASCII_INTEGER	6	The signal, in counts, from detector A4-07
147	A4_08	ASCII_INTEGER	6	The signal, in counts, from detector A4-08
148	A4_09	ASCII_INTEGER	6	The signal, in counts, from detector A4-09
149	A4_10	ASCII_INTEGER	6	The signal, in counts, from detector A4-10
150	A4_11	ASCII_INTEGER	6	The signal, in counts, from detector A4-11
151	A4_12	ASCII_INTEGER	6	The signal, in counts, from detector A4-12
152	A4_13	ASCII_INTEGER	6	The signal, in counts, from detector A4-13
153	A4_14	ASCII_INTEGER	6	The signal, in counts, from detector A4-14
154	A4_15	ASCII_INTEGER	6	The signal, in counts, from detector A4-15
155	A4_16	ASCII_INTEGER	6	The signal, in counts, from detector A4-16
156	A4_17	ASCII_INTEGER	6	The signal, in counts, from detector A4-17
157	A4_18	ASCII_INTEGER	6	The signal, in counts, from detector A4-18
158	A4_19	ASCII_INTEGER	6	The signal, in counts, from detector A4-19
159	A4_20	ASCII_INTEGER	6	The signal, in counts, from detector A4-20
160	A4_21	ASCII_INTEGER	6	The signal, in counts, from detector A4-21
161	A5_01	ASCII_INTEGER	6	The signal, in counts, from detector A5-01
162	A5_02	ASCII_INTEGER	6	The signal, in counts, from detector A5-02
163	A5_03	ASCII_INTEGER	6	The signal, in counts, from detector A5-03
164	A5_04	ASCII_INTEGER	6	The signal, in counts, from detector A5-04
165	A5_05	ASCII_INTEGER	6	The signal, in counts, from detector A5-05
166	A5_06	ASCII_INTEGER	6	The signal, in counts, from detector A5-06
167	A5_07	ASCII_INTEGER	6	The signal, in counts, from detector A5-07
168	A5_08	ASCII_INTEGER	6	The signal, in counts, from detector A5-08
169	A5_09	ASCII_INTEGER	6	The signal, in counts, from detector A5-09
170	A5_10	ASCII_INTEGER	6	The signal, in counts, from detector A5-10
171	A5_11	ASCII_INTEGER	6	The signal, in counts, from detector A5-11
172	A5_12	ASCII_INTEGER	6	The signal, in counts, from detector A5-12
173	A5_13	ASCII_INTEGER	6	The signal, in counts, from detector A5-13
174	A5_14	ASCII_INTEGER	6	The signal, in counts, from detector A5-14
175	A5_15	ASCII_INTEGER	6	The signal, in counts, from detector A5-15
176	A5_16	ASCII_INTEGER	6	The signal, in counts, from detector A5-16
177	A5_17	ASCII_INTEGER	6	The signal, in counts, from detector A5-17
178	A5_18	ASCII_INTEGER	6	The signal, in counts, from detector A5-18
179	A5_19	ASCII_INTEGER	6	The signal, in counts, from detector A5-19
180	A5_20	ASCII_INTEGER	6	The signal, in counts, from detector A5-20

181	A5_21	ASCII_INTEGER	6	The signal, in counts, from detector A5-21
182	A6_01	ASCII_INTEGER	6	The signal, in counts, from detector A6-01
183	A6_02	ASCII_INTEGER	6	The signal, in counts, from detector A6-02
184	A6_03	ASCII_INTEGER	6	The signal, in counts, from detector A6-03
185	A6_04	ASCII_INTEGER	6	The signal, in counts, from detector A6-04
186	A6_05	ASCII_INTEGER	6	The signal, in counts, from detector A6-05
187	A6_06	ASCII_INTEGER	6	The signal, in counts, from detector A6-06
188	A6_07	ASCII_INTEGER	6	The signal, in counts, from detector A6-07
189	A6_08	ASCII_INTEGER	6	The signal, in counts, from detector A6-08
190	A6_09	ASCII_INTEGER	6	The signal, in counts, from detector A6-09
191	A6_10	ASCII_INTEGER	6	The signal, in counts, from detector A6-10
192	A6_11	ASCII_INTEGER	6	The signal, in counts, from detector A6-11
193	A6_12	ASCII_INTEGER	6	The signal, in counts, from detector A6-12
194	A6_13	ASCII_INTEGER	6	The signal, in counts, from detector A6-13
195	A6_14	ASCII_INTEGER	6	The signal, in counts, from detector A6-14
196	A6_15	ASCII_INTEGER	6	The signal, in counts, from detector A6-15
197	A6_16	ASCII_INTEGER	6	The signal, in counts, from detector A6-16
198	A6_17	ASCII_INTEGER	6	The signal, in counts, from detector A6-17
199	A6_18	ASCII_INTEGER	6	The signal, in counts, from detector A6-18
200	A6_19	ASCII_INTEGER	6	The signal, in counts, from detector A6-19
201	A6_20	ASCII_INTEGER	6	The signal, in counts, from detector A6-20
202	A6_21	ASCII_INTEGER	6	The signal, in counts, from detector A6-21
203	B1_01	ASCII_INTEGER	6	The signal, in counts, from detector B1-01
204	B1_02	ASCII_INTEGER	6	The signal, in counts, from detector B1-02
205	B1_03	ASCII_INTEGER	6	The signal, in counts, from detector B1-03
206	B1_04	ASCII_INTEGER	6	The signal, in counts, from detector B1-04
207	B1_05	ASCII_INTEGER	6	The signal, in counts, from detector B1-05
208	B1_06	ASCII_INTEGER	6	The signal, in counts, from detector B1-06
209	B1_07	ASCII_INTEGER	6	The signal, in counts, from detector B1-07
210	B1_08	ASCII_INTEGER	6	The signal, in counts, from detector B1-08
211	B1_09	ASCII_INTEGER	6	The signal, in counts, from detector B1-09
212	B1_10	ASCII_INTEGER	6	The signal, in counts, from detector B1-10
213	B1_11	ASCII_INTEGER	6	The signal, in counts, from detector B1-11
214	B1_12	ASCII_INTEGER	6	The signal, in counts, from detector B1-12
215	B1_13	ASCII_INTEGER	6	The signal, in counts, from detector B1-13
216	B1_14	ASCII_INTEGER	6	The signal, in counts, from detector B1-14
217	B1_15	ASCII_INTEGER	6	The signal, in counts, from detector B1-15
218	B1_16	ASCII_INTEGER	6	The signal, in counts, from detector B1-16
219	B1_17	ASCII_INTEGER	6	The signal, in counts, from detector B1-17
220	B1_18	ASCII_INTEGER	6	The signal, in counts, from detector B1-18
221	B1_19	ASCII_INTEGER	6	The signal, in counts, from detector B1-19
222	B1_20	ASCII_INTEGER	6	The signal, in counts, from detector B1-20
223	B1_21	ASCII_INTEGER	6	The signal, in counts, from detector B1-21
224	B2_01	ASCII_INTEGER	6	The signal, in counts, from detector B2-01
225	B2_02	ASCII_INTEGER	6	The signal, in counts, from detector B2-02
226	B2_03	ASCII_INTEGER	6	The signal, in counts, from detector B2-03
227	B2_04	ASCII_INTEGER	6	The signal, in counts, from detector B2-04

228	B2_05	ASCII_INTEGER	6	The signal, in counts, from detector B2-05
229	B2_06	ASCII_INTEGER	6	The signal, in counts, from detector B2-06
230	B2_07	ASCII_INTEGER	6	The signal, in counts, from detector B2-07
231	B2_08	ASCII_INTEGER	6	The signal, in counts, from detector B2-08
232	B2_09	ASCII_INTEGER	6	The signal, in counts, from detector B2-09
233	B2_10	ASCII_INTEGER	6	The signal, in counts, from detector B2-10
234	B2_11	ASCII_INTEGER	6	The signal, in counts, from detector B2-11
235	B2_12	ASCII_INTEGER	6	The signal, in counts, from detector B2-12
236	B2_13	ASCII_INTEGER	6	The signal, in counts, from detector B2-13
237	B2_14	ASCII_INTEGER	6	The signal, in counts, from detector B2-14
238	B2_15	ASCII_INTEGER	6	The signal, in counts, from detector B2-15
239	B2_16	ASCII_INTEGER	6	The signal, in counts, from detector B2-16
240	B2_17	ASCII_INTEGER	6	The signal, in counts, from detector B2-17
241	B2_18	ASCII_INTEGER	6	The signal, in counts, from detector B2-18
242	B2_19	ASCII_INTEGER	6	The signal, in counts, from detector B2-19
243	B2_20	ASCII_INTEGER	6	The signal, in counts, from detector B2-20
244	B2_21	ASCII_INTEGER	6	The signal, in counts, from detector B2-21
245	B3_01	ASCII_INTEGER	6	The signal, in counts, from detector B3-01
246	B3_02	ASCII_INTEGER	6	The signal, in counts, from detector B3-02
247	B3_03	ASCII_INTEGER	6	The signal, in counts, from detector B3-03
248	B3_04	ASCII_INTEGER	6	The signal, in counts, from detector B3-04
249	B3_05	ASCII_INTEGER	6	The signal, in counts, from detector B3-05
250	B3_06	ASCII_INTEGER	6	The signal, in counts, from detector B3-06
251	B3_07	ASCII_INTEGER	6	The signal, in counts, from detector B3-07
252	B3_08	ASCII_INTEGER	6	The signal, in counts, from detector B3-08
253	B3_09	ASCII_INTEGER	6	The signal, in counts, from detector B3-09
254	B3_10	ASCII_INTEGER	6	The signal, in counts, from detector B3-10
255	B3_11	ASCII_INTEGER	6	The signal, in counts, from detector B3-11
256	B3_12	ASCII_INTEGER	6	The signal, in counts, from detector B3-12
257	B3_13	ASCII_INTEGER	6	The signal, in counts, from detector B3-13
258	B3_14	ASCII_INTEGER	6	The signal, in counts, from detector B3-14
259	B3_15	ASCII_INTEGER	6	The signal, in counts, from detector B3-15
260	B3_16	ASCII_INTEGER	6	The signal, in counts, from detector B3-16
261	B3_17	ASCII_INTEGER	6	The signal, in counts, from detector B3-17
262	B3_18	ASCII_INTEGER	6	The signal, in counts, from detector B3-18
263	B3_19	ASCII_INTEGER	6	The signal, in counts, from detector B3-19
264	B3_20	ASCII_INTEGER	6	The signal, in counts, from detector B3-20
265	B3_21	ASCII_INTEGER	6	The signal, in counts, from detector B3-21

3.3 Label and Header Descriptions

Each MCS EDR data product is described by a detached PDS label in a separate file with the same name, extension “.LBL”. A label file is stored in the same directory as the data file it describes.

A PDS label is object-oriented and describes the objects in the data file. The PDS label contains keywords for product identification and for data object definitions. The label also contains descriptive information needed to interpret or process the data objects in the file.

PDS labels are written in Object Description Language (ODL) [7]. PDS label statements have the form of "keyword = value". Each label statement is terminated with a carriage return character (ASCII 13) and a line feed character (ASCII 10) sequence to allow the label to be read by many operating systems. Pointer statements with the following format are used to indicate the location of data objects in the file:

^TABLE = filename,location

where the caret character (^, also called a pointer) is followed by the name of the specific data object. The ‘location’ is the starting record number (counting from one) for the data within the file, e.g.

^TABLE = ("2005091216_EDR.TAB", 5)

The data files themselves will usually contain some rows of embedded headers, marked by the ‘#’ symbols, which are used for file comments.

The PDS label will also include a pointer to another file that contains the table column definitions, in order to avoid repeating the lengthy definitions in every label. The column definition file has the extension “.FMT” and is stored in the LABEL directory of the EDR archive.

An example of MCS EDR label is in Appendix A; an example format file is in Appendix B

4. APPLICABLE SOFTWARE

4.1 Utility Programs

Because the MCS EDR products are formatted as columnar ASCII data, they can be read and manipulated by standard, public-domain software. For this reason, no special utilities are provided.

4.2 Applicable PDS Software Tools

PDS-labeled tables can be viewed with the program NASAView, developed by the PDS and available for a variety of computer platforms from the PDS web site

http://pds.nasa.gov/tools/software_download.cfm. There is no charge for NASAView.

4.3 Software Distribution and Update Procedures

None at this time.

APPENDIX A - EXAMPLE OF AN MCS EDR LABEL

```
PDS_VERSION_ID          = PDS3

RECORD_TYPE              = STREAM
RECORD_BYTES             = 2327
FILE_RECORDS             = 7031
DESCRIPTION              = "This table contains Level 0 data records from
                           the Mars Climate Sounder collected during the
                           orbital operations phase of the Mars
                           Reconnaissance Orbiter mission."
^TABLE                   = ("2006093000_EDR.TAB", 2500<BYTES>)
DATA_SET_ID              = "MRO-M-MCS-2-EDR-V1.0"
MISSION_NAME             = "MARS RECONNAISSANCE ORBITER"
INSTRUMENT_HOST_NAME     = "MARS RECONNAISSANCE ORBITER"
INSTRUMENT_NAME          = "MARS CLIMATE SOUNDER"
PRODUCT_NAME             = "MCS EDR"
PRODUCT_ID               = "2006093000_EDR.TAB"
TARGET_NAME              = "MARS"
START_TIME               = 2006-09-30T00:00:01.087
STOP_TIME                = 2006-09-30T03:59:58.449
SPACECRAFT_CLOCK_START_COUNT = 844041619.230
SPACECRAFT_CLOCK_STOP_COUNT = 844056017.066
PRODUCT_CREATION_TIME    = 2006-12-14T19:39:47
START_ORBIT_NUMBER       = 828
STOP_ORBIT_NUMBER        = 830
SOLAR_LONGITUDE          = 113.71

OBJECT                   = TABLE
  INTERCHANGE_FORMAT     = ASCII
  ROW_BYTES              = 2327
  ROWS                   = 7027
  COLUMNS               = 265
  ^STRUCTURE             = "MCS_EDR.FMT"
END_OBJECT               = TABLE

END
```

APPENDIX B - EXAMPLE OF AN MCS EDR FORMAT FILE

```
OBJECT                = COLUMN
  COLUMN_NUMBER       = 1
  NAME                 = 1
  DATA_TYPE           = ASCII_INTEGER
  START_BYTE           = 1
  BYTES                 = 1
  DESCRIPTION           = "A quality indicator: 0 means this record
                           contains valid data"
END_OBJECT             = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 2
  NAME                 = DATE
  DATA_TYPE           = CHARACTER
  START_BYTE           = 3
  BYTES                 = 14
  DESCRIPTION           = "Date of observation (UTC)"
END_OBJECT             = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 3
  NAME                 = UTC
  DATA_TYPE           = CHARACTER
  START_BYTE           = 18
  BYTES                 = 15
  DESCRIPTION           = "Time of observation (UTC)"
END_OBJECT             = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 4
  NAME                 = SCLK
  DATA_TYPE           = ASCII_REAL
  START_BYTE           = 34
  BYTES                 = 15
  DESCRIPTION           = "Decimal spacecraft clock at time of
                           observation"
END_OBJECT             = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 5
  NAME                 = PKT_COUNT
  DATA_TYPE           = ASCII_INTEGER
  START_BYTE           = 50
  BYTES                 = 10
  DESCRIPTION           = "The packet count, including the current
                           one, sent since bootup. Rolls over to 0 at 65536"
END_OBJECT             = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 6
  NAME                 = SAFING
  DATA_TYPE           = ASCII_INTEGER
  START_BYTE           = 61
  BYTES                 = 7
  DESCRIPTION           = "A 1-bit value indicating Safing; '1'
                           indicates that the instrument had started moving to the stow
                           position but hasn't yet finished. See column 7 for additional
                           information"
END_OBJECT             = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 7
  NAME                 = SAFED
  DATA_TYPE           = ASCII_INTEGER
  START_BYTE           = 69
  BYTES                 = 6
  DESCRIPTION           = "A 1-bit value indicating Safed; '1'
```

indicates that the instrument was stowed during this observation.
The stowed position is sun-safe and views the internal blackbody.
Flight software will not move the actuators until a resume
command has been received"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 8
NAME = FREEZING
DATA_TYPE = ASCII_INTEGER
START_BYTE = 76
BYTES = 9
DESCRIPTION = "A 1-bit value indicating Freezing; '1'
indicates that the instrument was moving to the frozen position
during this observation. See the column 9 for additional "
information"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 9
NAME = FROZEN
DATA_TYPE = ASCII_INTEGER
START_BYTE = 86
BYTES = 7
DESCRIPTION = "A 1-bit value indicating Frozen; '1'
indicates that the instrument was frozen during this observation;
flight software will not move the actuators (except to safe) until
a free command has been received. While frozen, the instrument
generally points at the limb for the duration of a high stability
image"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 10
NAME = ROLLING
DATA_TYPE = ASCII_INTEGER
START_BYTE = 94
BYTES = 8
DESCRIPTION = "A 1-bit value indicating Rolling; '1'
indicates that the flight software is performing special
scanning for sun safety during a large roll by the spacecraft
for a targeted observation. It is enabled by a command and ends
with a second command"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 11
NAME = DUMPING
DATA_TYPE = ASCII_INTEGER
START_BYTE = 103
BYTES = 8
DESCRIPTION = "A 1-bit value indicating Dumping memory; '1'
indicates that the packet contains dump data instead of science
data. Enabled by command"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 12
NAME = MOVING
DATA_TYPE = ASCII_INTEGER
START_BYTE = 112
BYTES = 7
DESCRIPTION = "A 1-bit value indicating Actuator motion; '1'
indicates that an actuator moved during acquisition of the
packet's science data"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 13
NAME = TEMP_FAULT
DATA_TYPE = ASCII_INTEGER

```

START_BYTE      = 120
BYTES           = 11
DESCRIPTION     = "A 1-bit value indicating stepper temperature
                  fault; '1' indicates that an over-temperature condition was
                  detected in the actuator-controlling chip"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 14
NAME            = MODE
DATA_TYPE       = CHARACTER
START_BYTE      = 132
BYTES           = 7
DESCRIPTION     = "An 8-bit value indicating various conditions:
                  Bit 0: RAM CRC calc disabled;
                  Bit 1: Logging I/O transactions;
                  Bit 2: Logging movements;
                  Bit 3: Watchdog disabled;
                  Bit 4: Debug telem mode;
                  The science channels contain debug
                  data, not science observations.
                  Bit 5: Safing disabled;
                  Bit 6: Sensor data synthesized;
                  Temperature data in this packet is
                  not real.
                  Bit 7: Science data synthesized;
                  Science observations in this packet
                  are not real"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 15
NAME            = PKT_TIME
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 140
BYTES           = 11
DESCRIPTION     = "The MCS FSW-internal value of sc_time, at the
                  time of packet assembly."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 16
NAME            = TICKS_PKT_START
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 152
BYTES           = 16
DESCRIPTION     = "The number of 31.25 Hz MCS fine-time pulses
                  received since bootup, at the time of packet assembly"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 17
NAME            = TICKS_AT_SC_TIME
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 169
BYTES           = 17
DESCRIPTION     = "The number of 31.25 Hz MCS fine-time pulses
                  received since bootup, as of the last time a time message from
                  the spacecraft was processed"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 18
NAME            = RAM_CRC
DATA_TYPE       = CHARACTER
START_BYTE      = 187
BYTES           = 10
DESCRIPTION     = "The most recently calculated cyclic
                  redundancy check (CRC). Normally this will be calculated over
                  RAM (the jumtable, the scan tables, and any uploaded patches)."
END_OBJECT      = COLUMN

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OBJECT                = COLUMN
  COLUMN_NUMBER       = 19
  NAME                 = FSW_VERSION
  DATA_TYPE          = CHARACTER
  START_BYTE          = 198
  BYTES               = 12
  DESCRIPTION          = "The version of flight software currently
                        running. Interpreted as a hex number, the first digit is the
                        major release, and the second digit is the minor release. The
                        flight build is 30 hex, that is, major release 3 and minor
                        release 0"
END_OBJECT            = COLUMN

OBJECT                = COLUMN

  COLUMN_NUMBER       = 20
  NAME                 = RESET_COUNT
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 211
  BYTES               = 12
  DESCRIPTION          = "The number of times the processor has
                        rebooted since power was applied. Includes watchdog resets and
                        hardware resets, as well as commanded reboots."
END_OBJECT            = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 21
  NAME                 = MISSING_TIMES
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 224
  BYTES               = 14
  DESCRIPTION          = "The number of times since boot that no time
                        command was received from the spacecraft during the expected
                        window"
END_OBJECT            = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 22
  NAME                 = OST_INDEX
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 239
  BYTES               = 10
  DESCRIPTION          = "The current index into the Orbit Schedule
                        Table. This is -1 at bootup, and then increments by one with each
                        equator crossing, as announced by the spacecraft through the
                        MCS_EQX command. After index 11, it wraps around to 0."
END_OBJECT            = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 23
  NAME                 = EST_INDEX
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 250
  BYTES               = 10
  DESCRIPTION          = "The index of the current Event Schedule
                        Table. EST indices come from the Orbit Schedule Table. The Event
                        Schedule Table selected determines which Scan Sequence Tables
                        execute."
END_OBJECT            = COLUMN

OBJECT                = COLUMN
  COLUMN_NUMBER       = 24
  NAME                 = ROT_INDEX
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 261
  BYTES               = 10
  DESCRIPTION          = "The current index into the Radio-Occultation
                        Table. The Radio-Occultation Table references Scan Sequence
                        Tables to execute based on spacecraft time rather than orbit."
END_OBJECT            = COLUMN

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OBJECT          = COLUMN
  COLUMN_NUMBER = 25
  NAME          = EOCT_INDEX
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 272
  BYTES         = 11
  DESCRIPTION    = "The current index into the Eccentricity-
    Oblateness Correction Table. The EOCT contains elevation
    corrections to pointings, based on times since the last equator
    crossing."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 26
  NAME          = SST_INDEX
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 284
  BYTES         = 10
  DESCRIPTION    = "The current index into the current Scan
    Sequence Table, which determines the current pointing."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 27
  NAME          = LAST_AZ_CMD
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 295
  BYTES         = 12
  DESCRIPTION    = "The last azimuth commanded, in steps, which
    if the actuator isn't moving, is the same as the current azimuth."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 28
  NAME          = LAST_EL_CMD
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 308
  BYTES         = 12
  DESCRIPTION    = "The last elevation commanded, in steps,
    which, if the actuator isn't moving, is the same as the current
    elevation."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 29
  NAME          = FPA_TEMP
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 321
  BYTES         = 9
  DESCRIPTION    = "The temperature readout of the focal plane A
    temperature sensor, in data numbers"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 30
  NAME          = FPB_TEMP
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 331
  BYTES         = 9
  DESCRIPTION    = "The temperature readout of the focal plane B
    temperature sensor, in data numbers"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 31
  NAME          = BAFFLE_A_TEMP
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 341
  BYTES         = 14
  DESCRIPTION    = "The temperature readout of the baffle A

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        temperature sensor, in data numbers"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 32
NAME            = BAFFLE_B_TEMP
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 356
BYTES           = 14
DESCRIPTION     = "The temperature readout of the baffle B
        temperature sensor, in data numbers"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 33
NAME            = BB_1_TEMP
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 371
BYTES           = 10
DESCRIPTION     = "The temperature readout of the blackbody
        temperature sensor 1, in data numbers"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 34
NAME            = OBA_1_TEMP
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 382
BYTES           = 11
DESCRIPTION     = "The temperature readout of the optical bench
        assembly temperature sensor 1, in data numbers"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 35
NAME            = ROTATING_VALUE_1
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 394
BYTES           = 17
DESCRIPTION     = "The temperature or voltage readout in DN of
        the sensor referenced by 'Rotating temp/voltage index #1'. The
        value is assigned to the appropriate sensor in columns 54
        through 76."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 36
NAME            = ROTATING_VALUE_2
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 412
BYTES           = 17
DESCRIPTION     = "The temperature or voltage readout in DN of
        the sensor referenced by 'Rotating temp/voltage index #2'. The
        value is assigned to the appropriate sensor in columns 54
        through 76."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 37
NAME            = ROTATING_INDEX_1
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 430
BYTES           = 17
DESCRIPTION     = "The index of the first rotating sensor value
        contained in this telemetry packet. This is used to assign column
        35 to the appropriate sensor"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 38
NAME            = ROTATING_INDEX_2

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DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 448
BYTES              = 17
DESCRIPTION         = "The index of the second rotating sensor
value contained in this telemetry packet. This is used to assign column
35 to the appropriate sensor"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 39
NAME                = ERROR_TIME
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 466
BYTES               = 11
DESCRIPTION          = "The MCS FSW-internal value of sc_time, at the
time of the most recent error"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 40
NAME                = ERROR_ID
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 478
BYTES               = 9
DESCRIPTION          = "The error ID associated with the most recent
error."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 41
NAME                = ERROR_DETAIL
DATA_TYPE           = CHARACTER
START_BYTE          = 488
BYTES               = 15
DESCRIPTION          = "Three bytes containing up to three additional
bytes of information describing the most recent error condition"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 42
NAME                = ERROR_COUNT
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 504
BYTES               = 12
DESCRIPTION          = "The number of errors that have occurred since
last reboot"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 43
NAME                = COMMANDS_RECEIVED
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 517
BYTES               = 18
DESCRIPTION          = "The number of commands received since bootup.
Spacecraft time commands are only counted if rejected."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 44
NAME                = COMMANDS_EXECUTED
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 536
BYTES               = 18
DESCRIPTION          = "The number of commands successfully executed
since bootup. This plus the number of commands rejected should
equal the number of commands received, unless one of the commands
received is still executing."
END_OBJECT          = COLUMN

OBJECT              = COLUMN

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COLUMN_NUMBER      = 45
NAME               = COMMANDS_REJECTED
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 555
BYTES              = 18
DESCRIPTION        = "The number of commands received but not
                      successfully executed, since bootup. This plus the number of
                      commands executed should equal the number of commands received,
                      unless one of the commands received is still executing."
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 46
NAME               = LAST_COMMAND_REC
DATA_TYPE          = CHARACTER
START_BYTE         = 574
BYTES              = 21
DESCRIPTION        = "The last command received, as an 8-byte
                      descriptor. Commands are saved regardless of their validity."
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 47
NAME               = CMD
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 596
BYTES              = 4
DESCRIPTION        = "The first byte of LAST_COMMAND_REC,
                      indicating which of the seven types of MCS command was last
                      received."
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 48
NAME               = REQ_ID
DATA_TYPE          = CHARACTER
START_BYTE         = 601
BYTES              = 9
DESCRIPTION        = "The second byte of LAST_COMMAND_REC. For
                      command type 3, MCS_REQUEST, this is the request ID."
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 49
NAME               = LAST_TIME_COMMAND
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 611
BYTES              = 18
DESCRIPTION        = "The spacecraft time when the last command was
                      received, regardless of whether or not the command was valid."
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 50
NAME               = LAST_EQX_PREDICTION
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 630
BYTES              = 20
DESCRIPTION        = "The last equator crossing prediction received
                      from the spacecraft. This time may not be the same as the time
                      of the last equator crossing, if the spacecraft missed sending
                      one or more."
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 51
NAME               = CHIP_1_REF
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 651
BYTES              = 11
DESCRIPTION        = "The signal, in counts, from the thermally-

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        shorted dummy detector on the first focal plane processing chip.
        This corresponds to the first 10 or 11 detectors of each A
        channel."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER   = 52
    NAME             = CHIP_2_REF
    DATA_TYPE       = ASCII_INTEGER
    START_BYTE       = 663
    BYTES             = 11
    DESCRIPTION       = "The signal, in counts, from the thermally-
        shorted dummy detector on the second focal plane processing
        chip. This corresponds to the last 10 or 11 detectors of each A
        channel."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER   = 53
    NAME             = CHIP_3_REF
    DATA_TYPE       = ASCII_INTEGER
    START_BYTE       = 675
    BYTES             = 11
    DESCRIPTION       = "The signal, in counts, from the thermally-
        shorted dummy detector on the third focal plane processing chip.
        This corresponds to all detectors on each B channel."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER   = 54
    NAME             = VREF_C2
    DATA_TYPE       = ASCII_INTEGER
    START_BYTE       = 687
    BYTES             = 8
    DESCRIPTION       = "The calibration counts corresponding to
        +4.9997 volts"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER   = 55
    NAME             = VREF_C1
    DATA_TYPE       = ASCII_INTEGER
    START_BYTE       = 696
    BYTES             = 8
    DESCRIPTION       = "The calibration counts corresponding to
        0.0000 volts"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER   = 56
    NAME             = PRT_NARROW_C2
    DATA_TYPE       = ASCII_INTEGER
    START_BYTE       = 705
    BYTES             = 14
    DESCRIPTION       = "The calibration counts corresponding to the
        620.318 ohm Vishay resistor, as processed through the narrow
        range PRT circuitry."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER   = 57
    NAME             = PRT_NARROW_C1
    DATA_TYPE       = ASCII_INTEGER
    START_BYTE       = 720
    BYTES             = 14
    DESCRIPTION       = "The calibration counts corresponding to the
        480.393 ohm Vishay resistor, as processed through the narrow
        range PRT circuitry."
END_OBJECT          = COLUMN

OBJECT              = COLUMN

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COLUMN_NUMBER      = 58
NAME                = PRT_WIDE_C2
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 735
BYTES               = 12
DESCRIPTION          = "The calibration counts corresponding to the
    620.318 ohm Vishay resistor, as processed through the wide range
    PRT circuitry."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 59
NAME                = PRT_WIDE_C1
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 748
BYTES               = 12
DESCRIPTION          = "The calibration counts corresponding to the
    480.393 ohm Vishay resistor, as processed through the wide range
    PRT circuitry."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 60
NAME                = HYBRID_TEMP
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 761
BYTES               = 12
DESCRIPTION          = "The temperature readout of the hybrid
    electronics temperature sensor, in data numbers. This value
    converted to volts is temperature in kelvins divided by 100."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 61
NAME                = FPA_TEMP_CYC
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 774
BYTES               = 13
DESCRIPTION          = "The temperature readout of the cycling focal
    plane A temperature sensor, in data numbers. This sensor uses
    narrow range Vishay calibration counts. This is the same sensor
    as column 29, measured at a slightly different time."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 62
NAME                = FPB_TEMP_CYC
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 788
BYTES               = 13
DESCRIPTION          = "The temperature readout of the cycling focal
    plane B temperature sensor, in data numbers. This sensor uses
    narrow range Vishay calibration counts. This is the same sensor
    as column 30, measured at a slightly different time."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 63
NAME                = BAFFLE_A_TEMP_CYC
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 802
BYTES               = 18
DESCRIPTION          = "The temperature readout of the cycling
    baffle A temperature sensor, in data numbers. This sensor uses
    narrow range Vishay calibration counts. This is the same sensor
    as column 31, measured at a slightly different time."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 64
NAME                = BAFFLE_B_TEMP_CYC

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DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 821
BYTES              = 18
DESCRIPTION         = "The temperature readout of the cycling
    baffle B temperature sensor, in data numbers. This sensor uses
    narrow range Vishay calibration counts. This is the same sensor
    as column 32, measured at a slightly different time."
END_OBJECT         = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 65
NAME                = OBA_1_TEMP_CYC
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 840
BYTES               = 15
DESCRIPTION         = "The temperature readout of the cycling
    optical bench assembly temperature sensor 1, in data numbers.
    This sensor uses narrow range Vishay calibration counts. This
    is the same sensor as column 33, measured at a slightly
    different time."
END_OBJECT         = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 66
NAME                = OBA_2_TEMP
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 856
BYTES               = 11
DESCRIPTION         = "The temperature readout of the cycling
    optical bench assembly temperature sensor 2, in data numbers.
    This sensor uses narrow range Vishay calibration counts."
END_OBJECT         = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 67
NAME                = BB_1_TEMP_CYC
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 868
BYTES               = 14
DESCRIPTION         = "The temperature readout of the cycling black
    body temperature sensor 1, in data numbers. This sensor uses
    narrow range Vishay calibration counts. This is the same sensor
    as column 34, measured at a slightly different time."
END_OBJECT         = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 68
NAME                = BB_2_TEMP
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 883
BYTES               = 10
DESCRIPTION         = "The temperature readout of the black body
    temperature sensor 2, in data numbers. This sensor uses
    narrow range Vishay calibration counts."
END_OBJECT         = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 69
NAME                = SOLAR_TARGET_TEMP
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 894
BYTES               = 18
DESCRIPTION         = "The temperature readout of the solar target
    temperature sensor, in data numbers. This sensor uses wide range
    Vishay calibration counts."
END_OBJECT         = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 70
NAME                = YOKE_TEMP
DATA_TYPE           = ASCII_INTEGER

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START_BYTE      = 913
BYTES           = 10
DESCRIPTION      = "The temperature readout of the yoke
                    temperature sensor, in data numbers. This sensor uses wide
                    range Vishay calibration counts."
END_OBJECT      = COLUMN

OBJECT           = COLUMN
COLUMN_NUMBER    = 71
NAME             = EL_ACTUATOR_TEMP
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 924
BYTES            = 17
DESCRIPTION       = "The temperature readout of the elevation
                    actuator temperature sensor, in data numbers. This sensor uses
                    wide range Vishay calibration counts."
END_OBJECT      = COLUMN

OBJECT           = COLUMN
COLUMN_NUMBER    = 72
NAME             = AZ_ACTUATOR_TEMP
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 942
BYTES            = 17
DESCRIPTION       = "The temperature readout of the azimuth
                    actuator temperature sensor, in data numbers. This sensor uses
                    wide range Vishay calibration counts."
END_OBJECT      = COLUMN

OBJECT           = COLUMN
COLUMN_NUMBER    = 73
NAME             = "-15V"
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 960
BYTES            = 9
DESCRIPTION       = "The voltage readout of the minus fifteen volt
                    supply, in data numbers"
END_OBJECT      = COLUMN

OBJECT           = COLUMN
COLUMN_NUMBER    = 74
NAME             = "+15V"
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 970
BYTES            = 8
DESCRIPTION       = "The voltage readout of the plus fifteen volt
                    supply, in data numbers"
END_OBJECT      = COLUMN

OBJECT           = COLUMN
COLUMN_NUMBER    = 75
NAME             = SOLAR_BASE_TEMP
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 979
BYTES            = 16
DESCRIPTION       = "The temperature readout of the solar target base
                    temperature sensor, in data numbers. This sensor uses wide range
                    Vishay calibration counts."
END_OBJECT      = COLUMN

OBJECT           = COLUMN
COLUMN_NUMBER    = 76
NAME             = "+5V"
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 996
BYTES            = 7
DESCRIPTION       = "The voltage readout of the plus five volt
                    supply, in data numbers"
END_OBJECT      = COLUMN

OBJECT           = COLUMN

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COLUMN_NUMBER      = 77
NAME               = A1_01
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1004
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A1-01"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 78
NAME               = A1_02
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1011
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A1-02"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 79
NAME               = A1_03
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1018
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A1-03"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 80
NAME               = A1_04
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1025
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A1-04"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 81
NAME               = A1_05
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1032
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A1-05"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 82
NAME               = A1_06
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1039
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A1-06"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 83
NAME               = A1_07
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1046
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A1-07"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 84
NAME               = A1_08
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1053
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A1-08"
END_OBJECT         = COLUMN

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OBJECT          = COLUMN
  COLUMN_NUMBER = 85
  NAME          = A1_09
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1060
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A1-09"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 86
  NAME          = A1_10
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1067
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A1-10"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 87
  NAME          = A1_11
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1074
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A1-11"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 88
  NAME          = A1_12
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1081
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A1-12"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 89
  NAME          = A1_13
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1088
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A1-13"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 90
  NAME          = A1_14
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1095
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A1-14"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 91
  NAME          = A1_15
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1102
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A1-15"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 92
  NAME          = A1_16
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1109
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A1-16"
END_OBJECT      = COLUMN

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OBJECT                = COLUMN
  COLUMN_NUMBER       = 93
  NAME                = A1_17
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1116
  BYTES               = 6
  DESCRIPTION         = "The signal, in counts, from detector A1-17"
END_OBJECT            = COLUMN

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OBJECT                = COLUMN
  COLUMN_NUMBER       = 94
  NAME                = A1_18
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1123
  BYTES               = 6
  DESCRIPTION         = "The signal, in counts, from detector A1-18"
END_OBJECT            = COLUMN

```

```

OBJECT                = COLUMN
  COLUMN_NUMBER       = 95
  NAME                = A1_19
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1130
  BYTES               = 6
  DESCRIPTION         = "The signal, in counts, from detector A1-19"
END_OBJECT            = COLUMN

```

```

OBJECT                = COLUMN
  COLUMN_NUMBER       = 96
  NAME                = A1_20
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1137
  BYTES               = 6
  DESCRIPTION         = "The signal, in counts, from detector A1-20"
END_OBJECT            = COLUMN

```

```

OBJECT                = COLUMN
  COLUMN_NUMBER       = 97
  NAME                = A1_21
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1144
  BYTES               = 6
  DESCRIPTION         = "The signal, in counts, from detector A1-21"
END_OBJECT            = COLUMN

```

```

OBJECT                = COLUMN
  COLUMN_NUMBER       = 98
  NAME                = A2_01
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1151
  BYTES               = 6
  DESCRIPTION         = "The signal, in counts, from detector A2-01"
END_OBJECT            = COLUMN

```

```

OBJECT                = COLUMN
  COLUMN_NUMBER       = 99
  NAME                = A2_02
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1158
  BYTES               = 6
  DESCRIPTION         = "The signal, in counts, from detector A2-02"
END_OBJECT            = COLUMN

```

```

OBJECT                = COLUMN
  COLUMN_NUMBER       = 100
  NAME                = A2_03
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 1165
  BYTES               = 6

```



```

    DESCRIPTION      = "The signal, in counts, from detector A2-03"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER    = 101
    NAME              = A2_04
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE        = 1172
    BYTES              = 6
    DESCRIPTION        = "The signal, in counts, from detector A2-04"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER    = 102
    NAME              = A2_05
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE        = 1179
    BYTES              = 6
    DESCRIPTION        = "The signal, in counts, from detector A2-05"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER    = 103
    NAME              = A2_06
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE        = 1186
    BYTES              = 6
    DESCRIPTION        = "The signal, in counts, from detector A2-06"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER    = 104
    NAME              = A2_07
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE        = 1193
    BYTES              = 6
    DESCRIPTION        = "The signal, in counts, from detector A2-07"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER    = 105
    NAME              = A2_08
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE        = 1200
    BYTES              = 6
    DESCRIPTION        = "The signal, in counts, from detector A2-08"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER    = 106
    NAME              = A2_09
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE        = 1207
    BYTES              = 6
    DESCRIPTION        = "The signal, in counts, from detector A2-09"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER    = 107
    NAME              = A2_10
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE        = 1214
    BYTES              = 6
    DESCRIPTION        = "The signal, in counts, from detector A2-10"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
    COLUMN_NUMBER    = 108
    NAME              = A2_11
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE        = 1221

```

```

        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A2-11"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 109
        NAME = A2_12
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1228
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A2-12"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 110
        NAME = A2_13
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1235
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A2-13"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 111
        NAME = A2_14
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1242
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A2-14"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 112
        NAME = A2_15
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1249
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A2-15"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 113
        NAME = A2_16
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1256
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A2-16"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 114
        NAME = A2_17
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1263
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A2-17"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 115
        NAME = A2_18
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1270
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A2-18"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 116
        NAME = A2_19
        DATA_TYPE = ASCII_INTEGER

```

```

START_BYTE      = 1277
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector A2-19"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 117
NAME            = A2_20
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1284
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector A2-20"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 118
NAME            = A2_21
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1291
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector A2-21"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 119
NAME            = A3_01
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1298
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector A3-01"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 120
NAME            = A3_02
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1305
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector A3-02"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 121
NAME            = A3_03
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1312
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector A3-03"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 122
NAME            = A3_04
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1319
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector A3-04"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 123
NAME            = A3_05
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1326
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector A3-05"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 124
NAME            = A3_06

```

```

DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1333
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A3-06"
END_OBJECT           = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER        = 125
NAME                 = A3_07
DATA_TYPE            = ASCII_INTEGER
START_BYTE           = 1340
BYTES                = 6
DESCRIPTION           = "The signal, in counts, from detector A3-07"
END_OBJECT            = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER        = 126
NAME                 = A3_08
DATA_TYPE            = ASCII_INTEGER
START_BYTE           = 1347
BYTES                = 6
DESCRIPTION           = "The signal, in counts, from detector A3-08"
END_OBJECT            = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER        = 127
NAME                 = A3_09
DATA_TYPE            = ASCII_INTEGER
START_BYTE           = 1354
BYTES                = 6
DESCRIPTION           = "The signal, in counts, from detector A3-09"
END_OBJECT            = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER        = 128
NAME                 = A3_10
DATA_TYPE            = ASCII_INTEGER
START_BYTE           = 1361
BYTES                = 6
DESCRIPTION           = "The signal, in counts, from detector A3-10"
END_OBJECT            = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER        = 129
NAME                 = A3_11
DATA_TYPE            = ASCII_INTEGER
START_BYTE           = 1368
BYTES                = 6
DESCRIPTION           = "The signal, in counts, from detector A3-11"
END_OBJECT            = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER        = 130
NAME                 = A3_12
DATA_TYPE            = ASCII_INTEGER
START_BYTE           = 1375
BYTES                = 6
DESCRIPTION           = "The signal, in counts, from detector A3-12"
END_OBJECT            = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER        = 131
NAME                 = A3_13
DATA_TYPE            = ASCII_INTEGER
START_BYTE           = 1382
BYTES                = 6
DESCRIPTION           = "The signal, in counts, from detector A3-13"
END_OBJECT            = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER        = 132

```

```

NAME = A3_14
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1389
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A3-14"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 133
NAME = A3_15
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1396
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A3-15"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 134
NAME = A3_16
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1403
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A3-16"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 135
NAME = A3_17
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1410
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A3-17"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 136
NAME = A3_18
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1417
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A3-18"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 137
NAME = A3_19
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1424
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A3-19"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 138
NAME = A3_20
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1431
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A3-20"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 139
NAME = A3_21
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1438
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A3-21"
END_OBJECT = COLUMN

OBJECT = COLUMN

```

```

COLUMN_NUMBER      = 140
NAME               = A4_01
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1445
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A4-01"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 141
NAME               = A4_02
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1452
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A4-02"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 142
NAME               = A4_03
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1459
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A4-03"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 143
NAME               = A4_04
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1466
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A4-04"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 144
NAME               = A4_05
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1473
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A4-05"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 145
NAME               = A4_06
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1480
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A4-06"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 146
NAME               = A4_07
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1487
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A4-07"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 147
NAME               = A4_08
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1494
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector A4-08"
END_OBJECT         = COLUMN

```

```

OBJECT          = COLUMN
  COLUMN_NUMBER = 148
  NAME          = A4_09
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1501
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-09"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 149
  NAME          = A4_10
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1508
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-10"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 150
  NAME          = A4_11
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1515
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-11"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 151
  NAME          = A4_12
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1522
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-12"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 152
  NAME          = A4_13
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1529
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-13"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 153
  NAME          = A4_14
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1536
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-14"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 154
  NAME          = A4_15
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1543
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-15"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 155
  NAME          = A4_16
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1550
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-16"
END_OBJECT      = COLUMN

```

```

OBJECT          = COLUMN
  COLUMN_NUMBER = 156
  NAME          = A4_17
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1557
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-17"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 157
  NAME          = A4_18
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1564
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-18"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 158
  NAME          = A4_19
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1571
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-19"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 159
  NAME          = A4_20
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1578
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-20"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 160
  NAME          = A4_21
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1585
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A4-21"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 161
  NAME          = A5_01
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1592
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A5-01"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 162
  NAME          = A5_02
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1599
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A5-02"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 163
  NAME          = A5_03
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1606
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector A5-03"

```



```

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 164
  NAME              = A5_04
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1613
  BYTES              = 6
  DESCRIPTION        = "The signal, in counts, from detector A5-04"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 165
  NAME              = A5_05
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1620
  BYTES              = 6
  DESCRIPTION        = "The signal, in counts, from detector A5-05"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 166
  NAME              = A5_06
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1627
  BYTES              = 6
  DESCRIPTION        = "The signal, in counts, from detector A5-06"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 167
  NAME              = A5_07
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1634
  BYTES              = 6
  DESCRIPTION        = "The signal, in counts, from detector A5-07"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 168
  NAME              = A5_08
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1641
  BYTES              = 6
  DESCRIPTION        = "The signal, in counts, from detector A5-08"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 169
  NAME              = A5_09

  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1648
  BYTES              = 6
  DESCRIPTION        = "The signal, in counts, from detector A5-09"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 170
  NAME              = A5_10
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1655
  BYTES              = 6
  DESCRIPTION        = "The signal, in counts, from detector A5-10"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 171
  NAME              = A5_11
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1662

```

```

        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A5-11"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 172
        NAME = A5_12
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1669
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A5-12"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 173
        NAME = A5_13
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1676
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A5-13"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 174
        NAME = A5_14
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1683
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A5-14"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 175
        NAME = A5_15
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1690
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A5-15"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 176
        NAME = A5_16
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1697
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A5-16"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 177
        NAME = A5_17
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1704
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A5-17"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 178
        NAME = A5_18
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 1711
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector A5-18"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 179
        NAME = A5_19
        DATA_TYPE = ASCII_INTEGER

```

```

START_BYTE      = 1718
BYTES           = 6
DESCRIPTION      = "The signal, in counts, from detector A5-19"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER    = 180
NAME             = A5_20
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 1725
BYTES            = 6
DESCRIPTION      = "The signal, in counts, from detector A5-20"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER    = 181
NAME             = A5_21
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 1732
BYTES            = 6
DESCRIPTION      = "The signal, in counts, from detector A5-21"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER    = 182
NAME             = A6_01
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 1739
BYTES            = 6
DESCRIPTION      = "The signal, in counts, from detector A6-01"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER    = 183
NAME             = A6_02
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 1746
BYTES            = 6
DESCRIPTION      = "The signal, in counts, from detector A6-02"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER    = 184
NAME             = A6_03
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 1753
BYTES            = 6
DESCRIPTION      = "The signal, in counts, from detector A6-03"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER    = 185
NAME             = A6_04
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 1760
BYTES            = 6
DESCRIPTION      = "The signal, in counts, from detector A6-04"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER    = 186
NAME             = A6_05
DATA_TYPE        = ASCII_INTEGER
START_BYTE       = 1767
BYTES            = 6
DESCRIPTION      = "The signal, in counts, from detector A6-05"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER    = 187
NAME             = A6_06

```

```

DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1774
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A6-06"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 188
NAME                = A6_07
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1781
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A6-07"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 189
NAME                = A6_08
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1788
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A6-08"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 190
NAME                = A6_09
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1795
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A6-09"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 191
NAME                = A6_10
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1802
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A6-10"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 192
NAME                = A6_11
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1809
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A6-11"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 193
NAME                = A6_12
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1816
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A6-12"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 194
NAME                = A6_13
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1823
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector A6-13"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 195

```

```

NAME = A6_14
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1830
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A6-14"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 196
NAME = A6_15
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1837
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A6-15"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 197
NAME = A6_16
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1844
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A6-16"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 198
NAME = A6_17
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1851
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A6-17"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 199
NAME = A6_18
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1858
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A6-18"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 200
NAME = A6_19
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1865
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A6-19"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 201
NAME = A6_20
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1872
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A6-20"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 202
NAME = A6_21
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1879
BYTES = 6
DESCRIPTION = "The signal, in counts, from detector A6-21"
END_OBJECT = COLUMN

OBJECT = COLUMN

```

```

COLUMN_NUMBER      = 203
NAME               = B1_01
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1886
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector B1-01"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 204
NAME               = B1_02
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1893
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector B1-02"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 205
NAME               = B1_03
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1900
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector B1-03"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 206
NAME               = B1_04
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1907
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector B1-04"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 207
NAME               = B1_05
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1914
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector B1-05"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 208
NAME               = B1_06
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1921
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector B1-06"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 209
NAME               = B1_07
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1928
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector B1-07"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
COLUMN_NUMBER      = 210
NAME               = B1_08
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1935
BYTES              = 6
DESCRIPTION        = "The signal, in counts, from detector B1-08"
END_OBJECT         = COLUMN

```

```

OBJECT          = COLUMN
  COLUMN_NUMBER = 211
  NAME          = B1_09
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1942
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-09"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 212
  NAME          = B1_10
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1949
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-10"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 213
  NAME          = B1_11
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1956
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-11"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 214
  NAME          = B1_12
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1963
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-12"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 215
  NAME          = B1_13
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1970
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-13"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 216
  NAME          = B1_14
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1977
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-14"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 217
  NAME          = B1_15
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1984
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-15"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 218
  NAME          = B1_16
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1991
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-16"
END_OBJECT      = COLUMN

```

```

OBJECT          = COLUMN
  COLUMN_NUMBER = 219
  NAME          = B1_17
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1998
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-17"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 220
  NAME          = B1_18
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 2005
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-18"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 221
  NAME          = B1_19
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 2012
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-19"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 222
  NAME          = B1_20
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 2019
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-20"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 223
  NAME          = B1_21
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 2026
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B1-21"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 224
  NAME          = B2_01
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 2033
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B2-01"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 225
  NAME          = B2_02
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 2040
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B2-02"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  COLUMN_NUMBER = 226
  NAME          = B2_03
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 2047
  BYTES         = 6
  DESCRIPTION   = "The signal, in counts, from detector B2-03"

```



```

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 227
  NAME              = B2_04
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 2054
  BYTES             = 6
  DESCRIPTION       = "The signal, in counts, from detector B2-04"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 228
  NAME              = B2_05
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 2061
  BYTES             = 6
  DESCRIPTION       = "The signal, in counts, from detector B2-05"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 229
  NAME              = B2_06
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 2068
  BYTES             = 6
  DESCRIPTION       = "The signal, in counts, from detector B2-06"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 230
  NAME              = B2_07
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 2075
  BYTES             = 6
  DESCRIPTION       = "The signal, in counts, from detector B2-07"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 231
  NAME              = B2_08
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 2082
  BYTES             = 6
  DESCRIPTION       = "The signal, in counts, from detector B2-08"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 232
  NAME              = B2_09
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 2089
  BYTES             = 6
  DESCRIPTION       = "The signal, in counts, from detector B2-09"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 233
  NAME              = B2_10
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 2096
  BYTES             = 6
  DESCRIPTION       = "The signal, in counts, from detector B2-10"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  COLUMN_NUMBER     = 234
  NAME              = B2_11
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 2103
  BYTES             = 6

```

```

        DESCRIPTION      = "The signal, in counts, from detector B2-11"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    COLUMN_NUMBER       = 235
    NAME                 = B2_12
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE           = 2110
    BYTES                = 6
    DESCRIPTION          = "The signal, in counts, from detector B2-12"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    COLUMN_NUMBER       = 236
    NAME                 = B2_13
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE           = 2117
    BYTES                = 6
    DESCRIPTION          = "The signal, in counts, from detector B2-13"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    COLUMN_NUMBER       = 237
    NAME                 = B2_14
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE           = 2124
    BYTES                = 6
    DESCRIPTION          = "The signal, in counts, from detector B2-14"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    COLUMN_NUMBER       = 238
    NAME                 = B2_15
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE           = 2131
    BYTES                = 6
    DESCRIPTION          = "The signal, in counts, from detector B2-15"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    COLUMN_NUMBER       = 239
    NAME                 = B2_16
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE           = 2138
    BYTES                = 6
    DESCRIPTION          = "The signal, in counts, from detector B2-16"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    COLUMN_NUMBER       = 240
    NAME                 = B2_17
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE           = 2145
    BYTES                = 6
    DESCRIPTION          = "The signal, in counts, from detector B2-17"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    COLUMN_NUMBER       = 241
    NAME                 = B2_18
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE           = 2152
    BYTES                = 6
    DESCRIPTION          = "The signal, in counts, from detector B2-18"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    COLUMN_NUMBER       = 242
    NAME                 = B2_19
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE           = 2159

```

```

        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector B2-19"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 243
        NAME = B2_20
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 2166
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector B2-20"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 244
        NAME = B2_21
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 2173
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector B2-21"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 245
        NAME = B3_01
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 2180
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector B3-01"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 246
        NAME = B3_02
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 2187
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector B3-02"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 247
        NAME = B3_03
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 2194
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector B3-03"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 248
        NAME = B3_04
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 2201
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector B3-04"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 249
        NAME = B3_05
        DATA_TYPE = ASCII_INTEGER
        START_BYTE = 2208
        BYTES = 6
        DESCRIPTION = "The signal, in counts, from detector B3-05"
    END_OBJECT = COLUMN

    OBJECT = COLUMN
        COLUMN_NUMBER = 250
        NAME = B3_06
        DATA_TYPE = ASCII_INTEGER

```

```

START_BYTE      = 2215
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector B3-06"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 251
NAME            = B3_07
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 2222
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector B3-07"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 252
NAME            = B3_08
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 2229
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector B3-08"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 253
NAME            = B3_09
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 2236
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector B3-09"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 254
NAME            = B3_10
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 2243
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector B3-10"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 255
NAME            = B3_11
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 2250
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector B3-11"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 256
NAME            = B3_12
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 2257
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector B3-12"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 257
NAME            = B3_13
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 2264
BYTES           = 6
DESCRIPTION     = "The signal, in counts, from detector B3-13"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
COLUMN_NUMBER   = 258
NAME            = B3_14

```

```

DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 2271
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector B3-14"
END_OBJECT           = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 259
NAME                = B3_15
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 2278
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector B3-15"
END_OBJECT           = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 260
NAME                = B3_16
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 2285
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector B3-16"
END_OBJECT           = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 261
NAME                = B3_17
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 2292
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector B3-17"
END_OBJECT           = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 262
NAME                = B3_18
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 2299
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector B3-18"
END_OBJECT           = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 263
NAME                = B3_19
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 2306
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector B3-19"
END_OBJECT           = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 264
NAME                = B3_20
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 2313
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector B3-20"
END_OBJECT           = COLUMN

OBJECT              = COLUMN
COLUMN_NUMBER       = 265
NAME                = B3_21
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 2320
BYTES               = 6
DESCRIPTION          = "The signal, in counts, from detector B3-21"
END_OBJECT           = COLUMN

```

APPENDIX C – MCS LABEL KEYWORD DEFINITIONS

Keyword	Description
RECORD_TYPE	The record_type element indicates the record format of a file.
RECORD_BYTES	The record_bytes element indicates the number of bytes in a physical file record, including record terminators and separators.
FILE_RECORDS	The file_records element indicates the number of physical file records, including both label records and data records.
DESCRIPTION	The description element provides a free-form, unlimited-length character string that represents or gives an account of something.
^TABLE	Pointer to the EDR data product file.
DATA_SET_ID	The data_set_id element is a unique alphanumeric identifier for a data set or a data product.
MISSION_NAME	The mission_name element identifies a major planetary mission or project.
INSTRUMENT_HOST_NAME	The instrument_host_name element provides the full name of the host on which an instrument is based.
INSTRUMENT_NAME	The instrument_name element provides the full name of an instrument.
PRODUCT_NAME	The PRODUCT_NAME element provides the full name of a product. It is related to product_id and provides a brief, descriptive title for a particular data product (i.e., a single file).
PRODUCT_ID	The product_id data element represents a permanent, unique identifier assigned to a data product by its producer.
TARGET_NAME	The target_name element identifies a target.
START_TIME	The start_time element provides the date and time of the beginning of an event or observation (whether it be a spacecraft, ground-based, or system event) in UTC system format. Formation rule: YYYY-MM-DDThh:mm:ss[.fff]
STOP_TIME	The stop_time element provides the date and time of the end of an observation or event (whether it be a spacecraft, ground-based, or system event) in UTC system format. Formation rule: YYYY-MM-DDThh:mm:ss[.fff]
SPACECRAFT_CLOCK_START_COUNT	The spacecraft_clock_start_count element provides the value of the spacecraft clock at the beginning of a time period of interest.
SPACECRAFT_CLOCK_STOP_COUNT	The spacecraft_clock_stop_count element provides the value of the spacecraft clock at the end of a time period of interest.
PRODUCT_CREATION_TIME	The product_creation_time element defines the UTC system format time when a product was created. Formation rule: YYYY-MM-DDThh:mm:ss[.fff]

INTERCHANGE_FORMAT	The interchange_format element represents the manner in which data items are stored. Example values: BINARY, ASCII.
ROW_BYTES	The row_bytes element represents the maximum number of bytes in each data object row.
ROWS	The rows element represents the number of rows in a data object.
COLUMNS	The columns element represents the number of columns in each row of a data object.