# Cassini
# Cosmic Dust Analyser (CDA)

# CDA Standard Products ARCHIVE VOLUME SOFTWARE INTERFACE SPECIFICATION

Version 1.0 Jul. 24, 2005

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## CDA ARCHIVE VOLUME
## SOFTWARE INTERFACE SPECIFICATION

**Version 1.0**
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Approved:

____________________________________ _____________
Ralf Srama Date
CDA Principal Investigator

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Diane Conner Date
Cassini Archive Data Engineer

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PDS Small Bodies Node PI

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## Document Change Log

| Change | Date | Affected Portions |
|---|---|---|
| | | |

The CDA PDS Data Product contents and formats are evolving as knowledge of instrument performance increases in response to target environments. Final products and their formats will be fixed very late in the mission.

# ACRONYMS AND ABREVIATIONS

| | |
|---|---|
| ASCII | American Standard Code for Information Interchange |
| CAT | Chemical Analyser Target |
| CDA | Cosmic Dust Analyser |
| CDU | Charge Detection Unit |
| DA | Dust Analyser |
| HRD | High Rate Detector |
| IDD | Initial Delivery Date |
| IID | Impact Ionization Target |
| JD | Julian Day |
| JPL | Jet Propulsion Laboratory |
| MPI-K | Max Planck Institut für Kernphysik |
| LSB | Least Significant Byte |
| MSB | Most Significant Byte |
| NASA | National Aeronautics and Space Administration |
| ODL | Object Description Language |
| PDS | Planetary Data System |
| S/C | Spacecraft |
| SBN | Small Bodies Node |
| SFDU | Standard Formatted Data Unit |
| SIS | Software Interface Specification |
| SCLK | Spacecraft Clock |
| SOI | Saturn Orbit Insertion |
| TBD | To Be Determined |
| TOF | Time of Flight |
| UTC | Universal Time Coordinated |

# 1. INTRODUCTION

## 1.1. Purpose and Scope

This document describes the format and the content of the CDA products as archived in the Small Bodies Node in the PDS. The data products stored in the PDS are a subset of the holdings of the CDA team database in Heidelberg.

This SIS is intended to provide enough information to enable users to read and understand the CDA data products as stored in the PDS. The users for whom this SIS is intended are software developers of the programs used in generating the CDA products and scientists who will analyze the data, including those associated with the Cassini-Huygens Project and those in the general planetary science community.

## 1.2. Contents

The Cosmic Dust Analyser (CDA) is an instrument on the Cassini orbiter that studies the physical properties of dust particles hitting the detector. This Data Product SIS describes how the CDA instrument acquires its data, and how the data are processed. This document specifically discusses the high level data subset, which is stored in the PDS.

## 1.3. Applicable Documents and Constraints

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

1 Cassini/Huygens Program Archive Plan for Science Data, PD 699-068.

The reader is referred to the following documents for additional information:

1 Planetary Data System Data Preparation Workbook, JPL D-7669, part 1.
2 Planetary Data System Data System Standards Reference, JPL D-7669, part 2.
3 The Cassini Cosmic Dust Analyser, Srama et al., SSR Volume 114, p. 465-518, December 2004.

# 2. DATA PRODUCT CHARACTERISTICS

## 2.1. Instrument Overview

The Cosmic Dust Analyser instrument (CDA) on the Cassini orbiter is the successor of the dust detectors flown on the Ulysses and the Galileo spacecrafts. The instrument accomplishes the detection of dust impacts by two different means: (1) a high rate detector (HRD), using two separate polyvinylidene fluoride (PVDF) sensors, and (2) a Dust Analyser (DA) based upon impact ionization. The DA measures the electric charges carried by the dust particle, the impact direction, the impact speed, mass, and the chemical composition, whereas the HRD is only

capable to determine the mass for particles with a known speed. Note that the data product for the HRD subsystem will not be described here, but in a separate SIS document.
The DA detector consists of three components: the charge detection unit, the impact ionization detector itself, and the time-of-flight (TOF) mass spectrometer.

### 2.1.1. Charge Detection Unit

The charge detection unit (CDU) consists of 4 entrance grids mounted in front of the ionization detector. The outermost and innermost grids are grounded, while the two innermost inclined grids are connected with a charge amplifier (QP charge signal). A charged particle flying through the entrance grid system induces its charge onto the innermost grids. The inclined grid mounting leads to asymmetric signal shapes which allows the determination of the particle direction as well as the particle speed within a plane.

### 2.1.2. Impact Ionization Detector

The impact ionization detector consists of a hemispherical impact target (small inner target made of Rhodium – chemical analyser target (CAT); large outer target made of Gold – impact ionization target (IID)), and the ion collector grid system. The plasma constituents generated by the dust impact onto the impact target are separated by the electric field between the target and the ion grid. The plasma electrons are collected at the CAT (QC charge signal) and the IID (QT charge signal), while most of the positive plasma ions are collected at the ion collector grid system (QI charge signal). Ions escaping the impact ionization detector are inducing their charges onto the charge detection grids (QP charge signal). The particle mass and the impact speed is deduced from the evolution of the impact plasma: the charge yield of the impact plasma is a function of the impactor's mass and velocity, while the plasma charge rise time is dependent on the impact speed only.

### 2.1.3. TOF mass spectrometer

The TOF mass spectrometer consists of the chemical analyser target (CAT), chemical analyser grid located 3 mm in front of the CAT, and the multiplier dynodes connected with the Dynode Logarithmic Amplifier (MP signal). Due to the strong electric field between the grid and the CAT, positive plasma ions are separated very quickly from the plasma and accelerated toward the multiplier, forming a time-of-flight mass spectrum.

## 2.2. Data Products

### 2.2.1. Overview

All CDA-DA products delivered to the PDS are in tabular format with space-delimited columns. These products are described in Table 2.1. Deliveries will be made to the PDS in accordance with the schedule defined in the Cassini/Huygens Program Archive Plan for Science Data, PD 699-068.

*Table 2.1. CDA Data Product Overview*

| **Product Name** | **Product ID** | **Description** | **Sub-system source** | **Est. Volume (#Files/Total bytes)** | **Comments** |
|---|---|---|---|---|---|
| CDA Area Table | CDAAREA | The sensitive area of the CDA impact detector (IID) and chemical analyser (CAT) is tabulated as a function of the incident angle with respect to the instrument axis. | Calib. | 1 / 10 KB | |
| CDA Status History | CDASTAT | Cassini mission and CDA configuration, tests and other events. Records are triggered by change in status affecting the sensitivity of the different CDA instruments and mission events that may affect the interpretation of the data. | DA | 1 / 300 MB | |
| Dust Analyser Event Table | CDAEVENTS | Spacecraft geometry information for any event which triggered the instrument. In case of a dust impact, detector responses and derived quantities. | DA | 1 / 10 GB | |
| CDA Spectra Table | CDASPECTRA | Time-of-flight mass spectra peaks for individual impact events. | MA | 1 / 1 GB | |
| [Individual Mass Spectra] | MS_XXXXXXXX | Time-of-flight mass spectra for individual impacts, identified by their unique identifier number xxxxxxxx. | MA | > $10^6$ / 10 KB per spectrum | xxxxxxxx indicates a unique numeric identifier for each impact event resulting in a mass spectrum |
| CDA QI Signal Table | QI_XXXXXXXX | Ion signals for individual impacts, identified by their unique identifier number xxxxxxxx. | IID | 0.3 GB/year | xxxxxxxx indicates a unique numeric identifier for each impact event resulting in an ion charge signal |
| CDA QT Signal Table | QT_XXXXXXXX | Electron signals for individual impacts on the IID target, identified by their unique identifier number xxxxxxxx. | IID | 0.3 GB/year | xxxxxxxx indicates a unique numeric identifier for each impact event resulting in an electron charge signal on the IID target |

| | | | | | |
|---|---|---|---|---|---|
| CDA QC Signal Table | QC_XXXXXXXX | Electron signals for individual impacts on the CAT target, identified by their unique identifier number xxxxxxxx.. | CAT | 0.15 GB/year | xxxxxxxx indicates a unique numeric identifier for each impact event resulting in an electron charge signal on the CAT target |
| CDA QP Signal Table | QP_XXXXXXXX | Induced charge signal for individual impacts, identified by their unique identifier number xxxxxxxx. | CDU | 1.2 GB/year | xxxxxxxx indicates a unique numeric identifier for each impact event resulting in an induced charge signal on the charge grid device |
| CDA Settings Table | CDASETTINGS | Table of voltages corresponding to voltage level codes and Coulomb threshold settings. | Calib. | 1 / 20 KB | |
| CDA Counter Table | CDACOUNTER | CDA impact counter time history file. | DA | 1 / 1 GB | |

### 2.2.2. Data Product Detailed Description and Format

See Appendix 1 for provisional PDS labels.
See Appendix 2 for condensed column descriptions (derived from the PDS labels).

### 2.2.3. Data Products Generation

All data products and associated documentation will be generated by the CDA team. The PDS SBN will assist in the definition and development of first delivery products and their associated PDS documentation, which will act as templates for subsequent updates. When new products are developed by the CDA team, PDS SBN will likewise assist in the definition and development of those products and their associated PDS documentation in preparation for their initial delivery.

## 2.3. Calibration Issues

### 2.3.1. Calibration of the Impact Ionization Detector

The calibration principle of the impact ionization detector is similar to the Galileo and Ulysses instrument. The calibration of the velocity-dependence of the signal rise times as well as the calibration of the mass-velocity-dependence of the plasma charge yields is based upon impact experiments in ground based laboratory accelerators. In such facilities, impacts of particles with known mass and velocity onto the flight spare unit can be studied. As the interference of the inner target (CAT) with the outer target (IID) is not entirely understood, future calibration work will be focused on this issue. Besides laboratory experiments, in-flight measurements in the well-understood environment at 1 AU as well as measurements of Jovian stream particles contributed to the instrument calibration. Data obtained after SOI will also contribute to a better understanding of the instrument response. Therefore, a definitive calibration will be available only late in the mission.

### 2.3.2. Calibration of the Mass Analyser

The calibration of the TOF mass spectrometer is still preliminary. In order to determine the mass resolution as well as the instrument characteristics, particles of known composition were shot in the Heidelberg dust accelerator onto the flight spare unit. The same remarks as for the IID subsystem do apply.

## 2.4. Data Processing

### 2.4.1. Data Processing Level

This documentation uses the "Committee on Data Management and Computation" (CODMAC) data level numbering system. The data files referred to in this document are considered "level 2" or "Edited Data" (equivalent to NASA level 0). The data files are generated from level 1 or "Raw Data" which is the telemetry packets within the project specific Standard Formatted Data Unit (SFDU) record. Refer to Table 1.

Table 1. 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 1-A | 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 1-B | Resampled - Level 4 | Irreversibly transformed (e.g., resampled, remapped, calibrated) values of the instrument measurements (e.g., radiances, magnetic field strength). |

| Table 1. Processing Levels for Science Data Sets | | |
|---|---|---|
| Level 1-C | Derived - Level 5 | Level 1A or 1B data that have been resampled and mapped onto uniform space-time grids. The data are calibrated (i.e., radiometrically corrected) and may have additional corrections applied (e.g., terrain correction). |
| 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. |

### 2.4.2. Data Product Generation

The CDA data products will be generated by the CDA team at the MPI-K in Heidelberg using the CDA data decoding and calibration software. The CDA event raw data (NASA level 0) will be reconstructed from the telemetry packets (SFDU) delivered by JPL and decoded according to the "CDA FSW users' guide" by the CDA decoding software. The CDA raw data together with meta-data extracted from the telemetry headers and SPICE data products will be deposited in the CDA data base in Heidelberg. Multiple event data will be removed from the stored data set. The higher data products will be exclusively derived from the uncalibrated raw data stored in the Heidelberg data base by means of the CDA calibration software.

# 3. ARCHIVE VOLUMES

## 3.1. Generation

The CDA Data Product Archive Collection and its updates are produced by the CDA Instrument Team in cooperation with the Small Bodies Node (SBN) of the PDS. It consists of a set of DVDs containing the CDA data set. The DVDs may be generated by SBN when the CDA team generates and transfers to SBN the DVDs images. The Archive Collection will include data acquired during the Cruise phase as well as during the Tour.

The SBN and the CDA will collaborate to design the PDS documentation (label, catalog, and index) files associated with the initial data delivery by the CDA team. SBN and the CDA team together will also identify how these files are to be updated in subsequent deliveries. This procedure will also be followed with new data products as they become available. The CDA team will include these documentation files (and subsequent updates) with their deliveries. All data formats are based on the Planetary Data System standards as documented in the PDS Standards Reference.

## 3.2. Data Transfer

The archive volumes are produced and transferred to PDS per schedule agreed upon between the CDA team and SBN and within the schedule defined in the Cassini-Huygens Archive Plan for Science Data. When sufficient data for a new archive volume are ready for validation, according to the mutually agreed upon schedule, the CDA team will deliver the data stored on DVDs to the SBN of the PDS. Delivery may also be electronic, in which case directory file structures of the DVDs will be reflected.

### 3.3. Review and Revision

The archive validation procedure described in this section applies to volumes generated during all phases of the mission. All data archived by the PDS are validated by use of the PDS peer review procedures.

The data and documentation will be subject to PDS internal review followed by an external peer review. The external review consists of at least two scientists having interest in the products being generated by the CDA who are associated with neither the CDA team nor the PDS. Reviewers are selected by the PDS with input from the CDA team.

In the event that the contents of a volume are found to contain errors, the reviewers can recommend one of two courses of action: fix the files or publish as is with a note in the ERRATA.TXT file. If the errors are minor, typically minor errors in the documentation, the volume can be published if the appropriate notes added to the volume's errata file and the error(s) are corrected on subsequent volumes. If the errors are major, typically involving errors in the data themselves, the corrections constitute liens against the data set that must be resolved before the data set can be ingested by the PDS. In that event, the volume must be corrected, re-generated by the CDA team, and sent back out for review.

After peer review and lien resolution, 6 DVD copies of each finalized volume are produced by PDS SBN. Two copies are sent back to the CDA team (Heidelberg and Chicago). Of the remaining four copies, two remain at SBN for online access and backup, one is delivered to PDS CN, and the other is delivered to NSSDC for deep archiving. For accounting purposes, this will be considered a mission cost assumed by the PDS SBN.

### 3.4. Data Volume Architecture

The volume name is COCDA_NNNN, where NNNN is the volume number.
Data will be delivered to SBN on DVD or DVD-image with the following directory architecture:

```
COCDA_NNNN ----------AAREADME.TXT , VOLDESC.CAT, ERRATA.TXT
              |
              |--/DATA        [this directory contains all data products and their labels.]
```

```
|
|--/CATALOG [this directory contains the data set, instrument,
|                    and mission catalog files.]
|
|--/INDEX [this directory contains the index files for the volume.]
|
|--/DOCUMENT [this directory contains the document you are reading.]
```

There will be a separate document volume containing appropriate documents on instrument operation and calibration when they are available.
The CDA data production rate depends upon the dust impact rate and on the spacecraft telemetry rate. Assuming an average number impact rate of about 2000 events per week (during cruise phase) leads to a predicted data production rate of 8 MB per week[1]. So one DVD-worth of data is produced for every year from the beginning of the Cruise measurements in 1999. The time required to process the data and validate the products is approximately one (1) year. Data volumes are expected to be much higher while in Saturn orbit.

### 3.5 Interface Media Characteristics

All volumes in the CDA PDS Product Archive Collection will be CD-ROMs. If the archive media changes from CD-ROM to DVD, there will be no changes to the file naming or other conventions.

### 3.6 Backup and Duplicates

SBN keeps two copies of each CD-R volume. One volume is placed in the jukebox at SBN in order to make the data web accessible. The second copy is a backup that can be used if the CD-R sent to the vendor becomes lost or damaged. One copy is sent to PDS CN. The two CD-R volumes sent to the CDA Team and the volume sent to NSSDC do not need to be returned to the SBN.

### 3.7 Labeling and Identification

Each CDA PDS CD-ROM bears a volume ID using the last two components of the volume set ID [PDS Standards Reference, 1995].

[1] However, it must be stressed that this estimate is uncertain by at least a factor of 10.

# 4. SUPPORT STAFF AND COGNIZANT PERSONS

*Table 4.1 – CDA PDS Archive Collection Support Staff*

| | | | |
|---|---|---|---|
| **CDA Team** | | | |
| **Dr. Sascha Kempf** | MPI für Kernphysik<br>Saupfercheckweg 1<br>69117 Heidelberg, Germany | +49 6221 516247 | Sascha.Kempf@mpi-hd.mpg.de |
| **Dr. Ralf Srama** | MPI für Kernphysik<br>Saupfercheckweg 1<br>69117 Heidelberg, Germany | +49 6221 516423 | Ralf.Srama@mpi-hd.mpg.de |
| **Dr. Nicolas Altobelli** | NASA/JPL<br>4800 Oak Grove Drive<br>CA-91109 Pasadena, USA | +1 818 393 0837 | Nicolas.altobelli@jpl.nasa.gov |
| **Mr. Georg Moragas-Klostermeyer** | MPI für Kernphysik<br>Saupfercheckweg 1<br>69117 Heidelberg, Germany | +49 6221 516423 | Georg.Moragas@mpi-hd.mpg.de |
| **Asteroid/Dust Subnode of the SBN, Planetary Science Institute** | | | |
| **Dr. Carol Neese** | Planetary Science Institute<br>1700 East Ft. Lowell, Suite 106<br>Tucson, AZ 85719-2395 | 520/622-6300 | neese@psi.edu |
| **PDS Engineering Node** | | | |
| **Steven Adams, PDS Cassini Data Engineer** | Jet Propulsion Laboratory, MS<br>Pasadena, CA | +1 818 354 2624 | Steven.L.Adams@jpl.nasa.gov |

# APPENDIX 1 – PROVISIONAL CDA PRODUCT LABELS

The following labels describe the CDA data products to be delivered. New keywords may be added when mutually agreed by the CDA team and PDS Data Engineer for Cassini.

## Cassini CDA  Area Table

```
PDS_VERSION_ID                  = PDS3

RECORD_TYPE                     = FIXED_LENGTH
RECORD_BYTES                    = TBD
FILE_RECORDS                    = TBD

^TABLE                          = "CDAAREA.TAB"

DATA_SET_NAME                   = "CASSINI CDA DATA V1.0"
DATA_SET_ID                     = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                      = "CDA-CAL-AREA"
PRODUCT_NAME                    = "CASSINI CDA AREA TABLE"
SPACECRAFT_NAME                 = "CASSINI ORBITER"
INSTRUMENT_NAME                 = "COSMIC DUST ANALYSER"
TARGET_NAME                     = "DUST"
START_TIME                      = "TBD"
STOP_TIME                       = "TBD"
PRODUCT_CREATION_TIME           = "2005-173T14:20:22"
RECORD_FORMAT                   =
"(I2,3(1X,F6.4))"

OBJECT                          = TABLE
 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = TBD
 COLUMNS                        = 4
 ROW_BYTES                      = TBD
 DESCRIPTION                    =
"The sensitive area of the CDA impact detector (IID - total area 0.0825
meter**2) and chemical analyser (CAT - total area 0.0073 meter**2) is
tabulated as a function of the incident angle with respect to the
instrument axis.  Area values are in meter**2, not normalized. They are
a numerical simulation of a stream of particles striking the detector at
different angles, taking shadowing into account. There are slight
variations with azimuthal angle that are not reflected in the table.
These are less than 10 percent variations, see SRAMAETAL2004B."

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "SENSOR_AXIS_ANGLE"
  UNIT                          = "DEGREES"
  DESCRIPTION                   =
"This is the angle to the sensor axis where zero is along the axis"
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 1
  BYTES                         = 2
  FORMAT                        = "I2"
 END_OBJECT                     = COLUMN
```

```
 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "IMPACT_IONIZATION_DETECTOR_AREA"
  UNIT                          = "METER**2"
  DESCRIPTION                   =
"The exposed sensitive area of the outer CDA target (impact ionization
detector IID) corresponding to the projected area of the hemispherical
detector visible to an incoming particle traveling along a path at the
sensor axis angle."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 4
  BYTES                         = 6
  FORMAT                        = "F6.4"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 3
  NAME                          = "CHEMICAL_ANALYSER_AREA"
  UNIT                          = "METER**2"
  DESCRIPTION                   =
"The exposed sensitive area of the inner CDA Rhodium target (chemical
analyser target CAT) corresponding to the projected area of the
hemispherical detector visible to an incoming particle traveling along a
path at the sensor axis angle."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 11
  BYTES                         = 6
  FORMAT                        = "F6.4"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 4
  NAME                          = "TOTAL_AREA"
  UNIT                          = "METER**2"
  DESCRIPTION                   =
"The total exposed sensitive area of the CDA corresponding to the
projected area of the hemispherical detector visible to an incoming
particle traveling along a path at the sensor axis angle."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 18
  BYTES                         = 6
  FORMAT                        = "F6.4"
 END_OBJECT                     = COLUMN

END_OBJECT                      = TABLE
END
```

## Cassini CDA Status History

```
PDS_VERSION_ID                  = PDS3

RECORD_TYPE                     = FIXED_LENGTH
RECORD_BYTES                    = TBD
FILE_RECORDS                    = TBD
```

```
^TABLE                          = "CDASTAT.TAB"

DATA_SET_NAME                   = "CASSINI CDA DATA V1.0"
DATA_SET_ID                     = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                      = "CDA_STAT"
PRODUCT_NAME                    = "CASSINI CDA STATUS HISTORY FILE"
SPACECRAFT_NAME                 = "CASSINI ORBITER"
INSTRUMENT_NAME                 = "COSMIC DUST ANALYSER"
TARGET_NAME                     = "DUST"
START_TIME                      = "TBD"
STOP_TIME                       = "TBD"
PRODUCT_CREATION_TIME           = "2005-173T14:20:22"
RECORD_FORMAT                   =
"(A17,1X,A5,5(1X,I2),3(1X,I3),7(1X,I1),1X,I3)"

OBJECT                          = TABLE
 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = TBD
 COLUMNS                        = 18
 ROW_BYTES                      = TBD
 DESCRIPTION                    =
"CDA configuration state as function of time. Records are triggered by
any change in the CDA status, taking into account the sensitivity
thresholds of the different CDA subsystems, the compression level of the
data, the articulation angle of the turntable, and if the instrument was
on or off."

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "EVENT_TIME"
  DESCRIPTION                   =
"The UTC time given in year, day of year, hours, minutes, and seconds in
the general form: yyyy-dddThh:mm:ss."
  DATA_TYPE                     = "TIME"
  START_BYTE                    = 1
  BYTES                         = 17
  MISSING_CONSTANT              = "9999-999T99:99:99"
  FORMAT                        = "A17"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "EVENT_DEFINITION"
  DESCRIPTION                   =
"A five digit integer which indicates which detectors can trigger a
particle detection, coded as follows 1   | QT, 2   | QC, 3   | QA, 4   |
QI, 5   | QMA, where the digit value is 0 if the detector is switched
off, and 1 if the detector is switched on."
  DATA_TYPE                     = "CHARACTER"
  START_BYTE                    = 19
  BYTES                         = 5
  MISSING_CONSTANT              = "99999"
  FORMAT                        = "A5"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 3
  NAME                          = "QC_THRESHOLD_SETTING"
```

```
  DESCRIPTION                    =
"Code corresponding to the threshold setting at the time of impact for
the amplifier connected to the chemical analyser target. Values are
between 0 and 15. Conversion to Coulombs is dependent upon rise time and
is found in CDASETTINGS.TAB."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 25
  BYTES                          = 2
  MISSING_CONSTANT               = 99
  FORMAT                         = "I2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 4
  NAME                           = "QA_THRESHOLD_SETTING"
  DESCRIPTION                    =
"Code corresponding to the threshold setting at the time of impact for
the amplifier connected to the chemical analyser grid. Values are
between 0 and 15. Conversion to Coulombs is dependent upon rise time and
is found in CDASETTINGS.TAB."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 28
  BYTES                          = 2
  MISSING_CONSTANT               = 99
  FORMAT                         = "I2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 5
  NAME                           = "QT_THRESHOLD_SETTING"
  DESCRIPTION                    =
"Code corresponding to the threshold setting at the time of impact for
the amplifier connected to the impact ionisation grid. Values are
between 0 and 15. Conversion to Coulombs is dependent upon rise time and
is found in CDASETTINGS.TAB."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 31
  BYTES                          = 2
  MISSING_CONSTANT               = 99
  FORMAT                         = "I2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 6
  NAME                           = "QI_THRESHOLD_SETTING"
  DESCRIPTION                    =
"Code corresponding to the threshold setting at the time of impact for
the amplifier connected to the ion grid. Values are between 0 and 15.
Conversion to Coulombs is dependent upon rise time and is found in
CDASETTINGS.TAB."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 34
  BYTES                          = 2
  MISSING_CONSTANT               = 99
  FORMAT                         = "I2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
```

```
  COLUMN_NUMBER                 = 7
  NAME                          = "QMA_THRESHOLD_SETTING"
  DESCRIPTION                   =
"Code corresponding to the threshold setting at the time of impact for
the amplifier connected to the multiplier anode. Values are between 0
and 15. Conversion to Coulombs is dependent upon rise time and is found
in CDASETTINGS.TAB."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 37
  BYTES                         = 2
  MISSING_CONSTANT              = 99
  FORMAT                        = "I2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 8
  NAME                          = "MULTIPLIER_VOLTAGE_LEVEL"
  DESCRIPTION                   =
"The multiplier high voltage level setting, in steps between 0 and 255.
Corresponding voltages are found in CDASETTINGS.TAB."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 40
  BYTES                         = 3
  MISSING_CONSTANT              = 999
  FORMAT                        = "I3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 9
  NAME                          = "ION_GRID_VOLTAGE_LEVEL"
  DESCRIPTION                   =
"The ion grid high voltage level setting, in steps between 0 and 255.
Corresponding voltages are found in CDASETTINGS.TAB."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 44
  BYTES                         = 3
  MISSING_CONSTANT              = 999
  FORMAT                        = "I3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 10
  NAME                          = "CHEMICAL_ANALYSER_VOLTAGE_LEVEL"
  DESCRIPTION                   =
"The chemical analyser high voltage level setting, in steps between 0 and
255. Corresponding voltages are found in CDASETTINGS.TAB."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 48
  BYTES                         = 3
  MISSING_CONSTANT              = 999
  FORMAT                        = "I3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 11
  NAME                          = "CDA_LISTEN_FLAG"
  DESCRIPTION                   =
"A flag indicating that CDA was in a measurement mode (1) or not (0)."
```

```
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 52
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 12
  NAME                           = "CDA_HARD_STATUS"
  DESCRIPTION                    =
"Code indicating whether CDA was on (1) or off (0)."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 54
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 13
  NAME                           = "QI_SHRINKING"
  DESCRIPTION                    =
"A description of the degree of lossy data compression applied to the
transmitted time-resolved ion grid signal (QI), where there is no
compression (1) or compression by factors of 2 (2) or 4 (4). The
compression degree strongly affects the accuracy of the data reduction
on Earth."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 56
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 14
  NAME                           = "QC_SHRINKING"
  DESCRIPTION                    =
"A description of the degree of lossy data compression applied to the
transmitted the time-resolved electron charge signal at the chemical
target (QC), where there is no compression (1) or compression by factors
of 2 (2) or 4 (4). The compression degree strongly affects the accuracy
of the data reduction on Earth."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 58
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 15
  NAME                           = "QT_SHRINKING"
  DESCRIPTION                    =
"A description of the degree of lossy data compression applied to the
transmitted the time-resolved electron charge signal at the impact
target (QT), where there is no compression (1) or compression by factors
```

```
of 2 (2) or 4 (4). The compression degree strongly affects the accuracy
of the data reduction on Earth."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 60
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 16
  NAME                           = "QP_SHRINKING"
  DESCRIPTION                    =
"A description of the degree of lossy data compression applied to the
transmitted the time-resolved ion grid signal (QP), where there is no
compression (1) or compression by factors of 2 (2) or 4 (4). The
compression degree strongly affects the accuracy of the data reduction
on Earth."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 62
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 17
  NAME                           = "MP_SHRINKING"
  DESCRIPTION                    =
"A description of the degree of lossy data compression applied to the
transmitted the time-resolved ion grid signal (MP), where there is no
compression (1) or compression by factors of 2 (2) or 4 (4). The
compression degree strongly affects the accuracy of the data reduction
on Earth."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 64
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 18
  NAME                           = "ARTICULATION_POSITION"
  DESCRIPTION                    =
"CDA articulation position on the turntable given in degrees. The CDA
instrument boresight within the
S/C coordinate systems depends upon the position a as: x = 1/8 ( -1 -
SQRT(3) + (-1 + SQRT(3)) COS(a) - 2 SQRT(6) SIN(a) ) y = 1/8 (  3 +
SQRT(3) + (-3 + SQRT(3)) COS(a) - 2 SQRT(2) SIN(a) ) z = 1/4 ( -1 +
SQRT(3) + ( 1 + SQRT(3)) COS(a) )"
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 66
  BYTES                          = 3
  MISSING_CONSTANT               = 999
  FORMAT                         = "I3"
 END_OBJECT                      = COLUMN
```

```
END_OBJECT                      = TABLE
END
```

### Cassini CDA Dust Analyser Events Table

```
PDS_VERSION_ID                  = PDS3

RECORD_TYPE                     = FIXED_LENGTH
RECORD_BYTES                    = TBD
FILE_RECORDS                    = TBD

^TABLE                          = "CDAEVENTS.TAB"

DATA_SET_NAME                   = "CASSINI CDA DATA V1.0"
DATA_SET_ID                     = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                      = "CDA_DA_IMPACTS"
PRODUCT_NAME                    = "CASSINI CDA DUST ANALYSER EVENTS TABLE"
SPACECRAFT_NAME                 = "CASSINI ORBITER"
INSTRUMENT_NAME                 = "COSMIC DUST ANALYSER"
TARGET_NAME                     = "DUST"
START_TIME                      = "1999-084T00:00:00"
STOP_TIME                       = "2000-100T00:00:00"
PRODUCT_CREATION_TIME           = "2005-202T18:44:32"
RECORD_FORMAT                   =
"(I10,1X,A17,1X,F14.6,1X,E8.1,1X,I1,1X,E8.1,1X,I1,1X,E8.1,1X,I1,1X,E8.1,
1X,I1,3(1X,E8.1),1X,I1,2(1X,F7.2),1X,F6.4,2(1X,F7.2),
1X,F8.2,3(1X,F6.2),2(1X,F7.2),1X,I2,1X,I3,1X,F5.1,1X,F4.1,1X,E8.1,
1X,F4.1,2(1X,E8.1),1X,I1)"

OBJECT                          = TABLE
 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = TBD
 COLUMNS                        = 35
 ROW_BYTES                      = TBD
 DESCRIPTION                    =
"Detector responses and derived quantities from the Cassini dust detector
as well as spacecraft geometry information for each event wich triggered
the instrument. An event class flag is provided to distinguish between 4
differents types of signals: test pulses, noise, weak and strong
impacts. However, this flag value may be poorly reliable. Only a
carefully analysis of the individual charge signals combined with the
CDA documentation (see SRAMAETAL2004B) can confirm the event class. For
each event, and for each of the QP, QT, QI, QC channels, a flag is set
to 1 if a charge signal was  transmitted to Earth. The charge signal can
then be found in the appropriate directory."

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "EVENT_ID"
  DESCRIPTION                   =
"An identifier number associated with an event."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 1
  BYTES                         = 10
  MISSING_CONSTANT              = -999999999
  FORMAT                        = "I10"
 END_OBJECT                     = COLUMN
```

```
 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "EVENT_TIME"
  DESCRIPTION                   =
"The UTC time of an event given in year, day of year, hours, minutes, and
seconds in the general form:yyyy-dddThh:mm:ss. Uncertainty is smaller
than 1 second."
  DATA_TYPE                     = "TIME"
  START_BYTE                    = 12
  BYTES                         = 17
  MISSING_CONSTANT              = "9999-999T99:99:99"
  FORMAT                        = "A17"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 3
  NAME                          = "EVENT_JULIAN_DATE"
  UNIT                          = "DAY"
  DESCRIPTION                   =
"The full Julian date of an  event. Uncertainty is smaller than 1 second."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 30
  BYTES                         = 14
  MISSING_CONSTANT              = -999999.999999
  FORMAT                        = "F14.6"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 4
  NAME                          = "QP_AMPLITUDE"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Amplitude of the entrance grid channel signal. In case of a dust impact
event, particle charge as measured by the signal maximum."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 45
  BYTES                         = 8
  MISSING_CONSTANT              = -9.9E-99
  FORMAT                        = "E8.1"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 5
  NAME                          = "QP_SIGNAL_FLAG"
  DESCRIPTION                   =
"This flag is set to 1 if a charge signal is provided for this event in
the QP_SIGNAL directory."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 54
  BYTES                         = 1
  MISSING_CONSTANT              = 9
  FORMAT                        = "I1"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 6
  NAME                          = "QI_AMPLITUDE"
  UNIT                          = "COULOMBS"
```

```
  DESCRIPTION                     =
"Amplitude of the signal monitored by the integrating amplifier connected
to the ion grid. In case of a dust impact event, fraction of the plasma
ion charge yield generated by the impact."
  DATA_TYPE                       = "ASCII_REAL"
  START_BYTE                      = 56
  BYTES                           = 8
  MISSING_CONSTANT                = -9.9E-99
  FORMAT                          = "E8.1"
 END_OBJECT                       = COLUMN

 OBJECT                           = COLUMN
  COLUMN_NUMBER                   = 7
  NAME                            = "QI_SIGNAL_FLAG"
  DESCRIPTION                     =
"This flag is set to 1 if a charge signal is provided for this event in
the QI_SIGNAL directory."
  DATA_TYPE                       = "ASCII_INTEGER"
  START_BYTE                      = 65
  BYTES                           = 1
  MISSING_CONSTANT                = 9
  FORMAT                          = "I1"
 END_OBJECT                       = COLUMN

 OBJECT                           = COLUMN
  COLUMN_NUMBER                   = 8
  NAME                            = "QT_AMPLITUDE"
  UNIT                            = "COULOMBS"
  DESCRIPTION                     =
"Amplitude of the signal monitored by the integrating amplifier connected
to the impact ionization target (IID). In case of a dust impact event,
fraction of the plasma electron charge yield generated by the particle
impact."
  DATA_TYPE                       = "ASCII_REAL"
  START_BYTE                      = 67
  BYTES                           = 8
  MISSING_CONSTANT                = -9.9E-99
  FORMAT                          = "E8.1"
 END_OBJECT                       = COLUMN

 OBJECT                           = COLUMN
  COLUMN_NUMBER                   = 9
  NAME                            = "QT_SIGNAL_FLAG"
  DESCRIPTION                     =
"This flag is set to 1 if a charge signal is provided for this event in
the QT_SIGNAL directory."
  DATA_TYPE                       = "ASCII_INTEGER"
  START_BYTE                      = 76
  BYTES                           = 1
  MISSING_CONSTANT                = 9
  FORMAT                          = "I1"
 END_OBJECT                       = COLUMN

 OBJECT                           = COLUMN
  COLUMN_NUMBER                   = 10
  NAME                            = "QC_AMPLITUDE"
  UNIT                            = "COULOMBS"
  DESCRIPTION                     =
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```
"Amplitude of the signal monitored by the integrating amplifier connected
to the chemical analyser target (CAT). In case of a dust impact event,
fraction of the plasma electron charge yield generated by the particle
impact."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 78
  BYTES                          = 8
  MISSING_CONSTANT               = -9.9E-99
  FORMAT                         = "E8.1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 11
  NAME                           = "QCSIGNAL_FLAG"
  DESCRIPTION                    =
"This flag is set to 1 if a charge signal is provided for this event in
the QC_SIGNAL directory."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 87
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 12
  NAME                           = "QI_RISE_TIME"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"The signal from the ion grid is reconstructed and converted to Coulomb.
The rise time is that time elapsed between 10% and 90% of the signal
maximum. The error on the rise time is set by the channel sampling rate
and is of 166.6E-9 s. In case of a noise event, or if the signal
amplitude is zero, the rise time is set to its missing value."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 89
  BYTES                          = 8
  MISSING_CONSTANT               = -9.9E-99
  FORMAT                         = "E8.1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 13
  NAME                           = "QT_RISE_TIME"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"The signal from the impact ionization detector is reconstructed and
converted to Coulomb. The rise time is that time elapsed between 10% and
90% of the signal maximum. The error on the rise time is set by the
channel sampling rateand is of 333.3E-9 s. In case of a noise event, or
if the signal amplitude is zero, the rise time is set to its missing
value."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 98
  BYTES                          = 8
  MISSING_CONSTANT               = -9.9E-99
  FORMAT                         = "E8.1"
 END_OBJECT                      = COLUMN
```

```
 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 14
  NAME                           = "QC_RISE_TIME"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"The signal from the chemical analyser target is reconstructed and
converted to Coulomb. The rise time is that time elapsed between 10% and
90% of the signal maximum. The error on the rise time is set by the
channel sampling rate and is of 166.6E-9 s. In case of a noise event, or
if the signal amplitude is zero, the rise time is set to its missing
value."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 107
  BYTES                          = 8
  MISSING_CONSTANT               = -9.9E-99
  FORMAT                         = "E8.1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 15
  NAME                           = "TARGET_FLAG"
  DESCRIPTION                    =
"In case of an impact event, the target flag (TF) indicates that portion
of the target impacted. TF|Portion: 0|Unknown, 1|Chemical Analyser
Target, (inner target), 2|Impact Ionization Detector, (outer target),
3|QP-Grid, 4|CAT-Grid, 5|Wall impacts. Will be supplied in later
delivery, when a reliable determination method will be available."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 116
  BYTES                          = 1
  MISSING_CONSTANT               = 9
  FORMAT                         = "I1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 16
  NAME                           = "SPACECRAFT_RIGHT_ASCENSION"
  UNIT                           = "DEGREES"
  DESCRIPTION                    =
"The heliocentric right ascension (J2000) of the spacecraft."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 118
  BYTES                          = 7
  MISSING_CONSTANT               = -999.99
  FORMAT                         = "F7.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 17
  NAME                           = "SPACECRAFT_DECLINATION"
  UNIT                           = "DEGREES"
  DESCRIPTION                    =
"The heliocentric declination (J2000) of the spacecraft."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 126
  BYTES                          = 7
  MISSING_CONSTANT               = -999.99
```

```
  FORMAT                         = "F7.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 18
  NAME                           = "SPACECRAFT_SUN_DISTANCE"
  UNIT                           = "AU"
  DESCRIPTION                    =
"The distance from the spacecraft to the Sun."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 134
  BYTES                          = 6
  MISSING_CONSTANT               = 9.9999
  FORMAT                         = "F6.4"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 19
  NAME                           = "SPACECRAFT_SATURN_SYSTEM_III_LONGITUDE"
  UNIT                           = "DEGREES"
  DESCRIPTION                    =
"The sub-Saturn longitude of the spacecraft in the System III
coordinates: +z is the pole axis of Saturn, xy the ring plane. +x is the
projection of the J2000 vernal equinox direction onto the ring plane"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 141
  BYTES                          = 7
  MISSING_CONSTANT               = -999.99
  FORMAT                         = "F7.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 20
  NAME                           = "SPACECRAFT_SATURN_SYSTEM_III_LATITUDE"
  UNIT                           = "DEGREES"
  DESCRIPTION                    =
"The sub-Saturn latitude of the spacecraft in the System III coordinates:
+z is the pole axis of Saturn, xy the ring plane. +x is the projection
of the J2000 vernal equinox direction onto the ring plane"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 149
  BYTES                          = 7
  MISSING_CONSTANT               = -999.99
  FORMAT                         = "F7.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 21
  NAME                           = "SPACECRAFT_SATURN_DISTANCE"
  UNIT                           = "SAT_RA"
  DESCRIPTION                    =
"The distance from the spacecraft to Saturn in Saturnian radii."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 157
  BYTES                          = 8
  MISSING_CONSTANT               = -9999.99
  FORMAT                         = "F8.2"
 END_OBJECT                      = COLUMN
```

```
 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 22
  NAME                          = "SPACECRAFT_X_VELOCITY"
  UNIT                          = "KM/S"
  DESCRIPTION                   =
"The J2000 heliocentric equatorial X component of the Cassini velocity
vector."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 166
  BYTES                         = 6
  MISSING_CONSTANT              = -99.99
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 23
  NAME                          = "SPACECRAFT_Y_VELOCITY"
  UNIT                          = "KM/S"
  DESCRIPTION                   =
"The J2000 heliocentric equatorial Y component of the Cassini velocity
vector."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 173
  BYTES                         = 6
  MISSING_CONSTANT              = -99.99
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 24
  NAME                          = "SPACECRAFT_Z_VELOCITY"
  UNIT                          = "KM/S"
  DESCRIPTION                   =
"The J2000 heliocentric equatorial Z component of the Cassini velocity
vector."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 180
  BYTES                         = 6
  MISSING_CONSTANT              = -99.99
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 25
  NAME                          = "DETECTOR_RIGHT_ASCENSION"
  UNIT                          = "DEGREES"
  DESCRIPTION                   =
"The spacecraft-centered right ascension (J2000) of the sensor axis."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 187
  BYTES                         = 7
  MISSING_CONSTANT              = -999.99
  FORMAT                        = "F7.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 26
```

```
  NAME                           = "DETECTOR_DECLINATION"
  UNIT                           = "DEGREES"
  DESCRIPTION                    =
"The spacecraft-centered declination (J2000) of the sensor axis."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 195
  BYTES                          = 7
  MISSING_CONSTANT               = -999.99
  FORMAT                         = "F7.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 27
  NAME                           = "COUNTER_NUMBER"
  DESCRIPTION                    =
"Event counter assigned by the on-board event evaluation algorithm with a
value between 0 and 19. The event counter value is a rough measure for
the properties of the registered event."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 203
  BYTES                          = 2
  MISSING_CONSTANT               = -9
  FORMAT                         = "I2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 28
  NAME                           = "EVENT_QUALITY"
  DESCRIPTION                    =
"Event quality assigned by the on-board evaluation algorithm. The event
class takes values between 0 and 4 and is a rough measure for the
quality of the event 0 - noise 1 - test pulse, 2 - small impact, 3 -
strong impact, 4 - impacts with TOF mass spectrum). Will be supplied in
later delivery, when a reliable determination method will be available."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 206
  BYTES                          = 3
  MISSING_CONSTANT               = -9
  FORMAT                         = "I3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 29
  NAME                           = "PARTICLE_SPEED"
  UNIT                           = "KILOMETER PER SECOND"
  DESCRIPTION                    =
"The impact speed of the particle relative to the spacecraft. When no
speed can be determined, or in case of a noise event, the value is set
to its missing value. Will be supplied in later delivery, when a
reliable determination method will be available."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 210
  BYTES                          = 5
  MISSING_CONSTANT               = -99.9
  FORMAT                         = "F5.1"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
```

```
  COLUMN_NUMBER                 = 30
  NAME                          = "PARTICLE_SPEED_FACTOR"
  DESCRIPTION                   =
"An upper and lower estimate of impactor speed relative to the spacecraft
is obtained by multiplying and dividing, respectively, the particle
speed by this factor. When no speed (hence error factor) can be
determined, the value of this factor is set to its missing value. Will
be supplied in later delivery, when a reliable determination method will
be available."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 216
  BYTES                         = 4
  MISSING_CONSTANT              = -9.9
  FORMAT                        = "F4.1"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 31
  NAME                          = "PARTICLE_MASS"
  UNIT                          = "KG"
  DESCRIPTION                   =
"The particle mass. When the particle speed is not determined, the mass
is not determined and is set to its missing value. Will be supplied in
later delivery, when a reliable determination method will be available."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 221
  BYTES                         = 8
  MISSING_CONSTANT              = -9.9E-99
  FORMAT                        = "E8.1"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 32
  NAME                          = "PARTICLE_MASS_FACTOR"
  DESCRIPTION                   =
"An upper and lower estimate of the impactor mass is obtained by
multiplying and dividing, respectively, the particle mass by this
factor. When the speed is not determined, neither is the mass, and this
factor is set to its missing value. Will be supplied in later delivery,
when a reliable determination method will be available."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 230
  BYTES                         = 4
  MISSING_CONSTANT              = -9.9
  FORMAT                        = "F4.1"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 33
  NAME                          = "PARTICLE_CHARGE"
  UNIT                          = "COULOMB"
  DESCRIPTION                   =
"The charge of a particle derived from the entrance grid signal. When no
charge can be determined, the value is set to its missing value. Will be
supplied in later delivery, when a reliable determination method will be
available."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 235
```

```
  BYTES                         = 8
  MISSING_CONSTANT              = -9.9E-99
  FORMAT                        = "E8.1"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 34
  NAME                          = "PARTICLE_CHARGE_ERROR"
  DESCRIPTION                   =
"The error factor associated with the particle charge. An upper and lower
particle charge by this factor. Will be supplied in later delivery, when
a reliable determination method will be available."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 244
  BYTES                         = 8
  MISSING_CONSTANT              = -9.9E-99
  FORMAT                        = "E8.1"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 35
  NAME                          = "SPECTRUM_FLAG"
  DESCRIPTION                   =
"A flag indicating if there exists a corresponding mass spectrum for the
particle (1) or not (0)."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 253
  BYTES                         = 1
  MISSING_CONSTANT              = 9
  FORMAT                        = "I1"
 END_OBJECT                     = COLUMN

END_OBJECT                      = TABLE
END
```

## Cassini CDA Spectra Peaks Table

```
PDS_VERSION_ID                  = PDS3

RECORD_TYPE                     = FIXED_LENGTH
RECORD_BYTES                    = TBD
FILE_RECORDS                    = TBD

^TABLE                          = "CDASPECTRA.TAB"

DATA_SET_NAME                   = "CASSINI CDA DATA V1.0"
DATA_SET_ID                     = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                      = "CDA-SPECTRA"
PRODUCT_NAME                    = "CASSINI CDA SPECTRA PEAKS TABLE"
SPACECRAFT_NAME                 = "CASSINI ORBITER"
INSTRUMENT_NAME                 = "COSMIC DUST ANALYSER"
TARGET_NAME                     = "DUST"
START_TIME                      = "TBD"
STOP_TIME                       = "TBD"
PRODUCT_CREATION_TIME           = "2005-173T14:20:22"
```

```
RECORD_FORMAT                   =
"(I10,2(1X,I2),6(1X,E10.3),1X,F6.2,4(1X,E10.3),1X,F6.2,4(1X,E10.3),
1X,F6.2,4(1X,E10.3),1X,F6.2,4(1X,E10.3),1X,F6.2,4(1X,E10.3),
1X,F6.2,4(1X,E10.3),1X,F6.2,4(1X,E10.3),1X,F6.2,4(1X,E10.3),
1X,F6.2,4(1X,E10.3),1X,F6.2,4(1X,E10.3),1X,F6.2)"

OBJECT                          = TABLE
 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = TBD
 COLUMNS                        = 60
 ROW_BYTES                      = TBD
 DESCRIPTION                    =
"Time-of-flight mass spectra evaluation of individual impact events. The
Cassini CDA Mass Analyser has a capability of reliably distinguishing
eleven or fewer peaks in the mass spectrum. Peaks are given in time
order."

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "IMPACT_EVENT_ID"
  DESCRIPTION                   =
"An identifier number associated with a dust impact with a
TOF mass spectrum."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 1
  BYTES                         = 10
  MISSING_CONSTANT              = -999999999
  FORMAT                        = "I10"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "NUMBER_PEAKS"
  DESCRIPTION                   =
"The number of distinguishable peaks in the mass spectrum of an impacting
particle."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 12
  BYTES                         = 2
  MISSING_CONSTANT              = -9
  FORMAT                        = "I2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 3
  NAME                          = "SCALE_ID"
  DESCRIPTION                   =
"Identifier flag showing how the mass scale was calculated. 0: from
impact time only, 1: from impact time and first peak, 2: from two
reference peaks."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 15
  BYTES                         = 2
  MISSING_CONSTANT              = -9
  FORMAT                        = "I2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
```

```
  COLUMN_NUMBER                = 4
  NAME                         = "SCALE_POS1"
  UNIT                         = "SECOND"
  DESCRIPTION                  =
"Reference position (time) of first peak for mass scale calculation, in
second from trigger time."
  DATA_TYPE                    = "ASCII_REAL"
  START_BYTE                   = 18
  BYTES                        = 10
  MISSING_CONSTANT             = -9.999E-99
  FORMAT                       = "E10.3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 5
  NAME                         = "SCALE_POS2"
  UNIT                         = "SECOND"
  DESCRIPTION                  =
"Reference position (time) of second peak for mass scale calculation, in
second from trigger time."
  DATA_TYPE                    = "ASCII_REAL"
  START_BYTE                   = 29
  BYTES                        = 10
  MISSING_CONSTANT             = -9.999E-99
  FORMAT                       = "E10.3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 6
  NAME                         = "PEAK_1_FLIGHT_TIME"
  UNIT                         = "SECONDS"
  DESCRIPTION                  =
"Time elapsed between Mass Analyser triggering and first spectral peak."
  DATA_TYPE                    = "ASCII_REAL"
  START_BYTE                   = 40
  BYTES                        = 10
  MISSING_CONSTANT             = -9.999E-99
  FORMAT                       = "E10.3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 7
  NAME                         = "PEAK_1_FLIGHT_TIME_UNCERTAINTY"
  UNIT                         = "SECONDS"
  DESCRIPTION                  =
"The uncertainty in the time elapsed between Mass Analyser triggering and
first spectral peak"
  DATA_TYPE                    = "ASCII_REAL"
  START_BYTE                   = 51
  BYTES                        = 10
  MISSING_CONSTANT             = -9.999E-99
  FORMAT                       = "E10.3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 8
  NAME                         = "PEAK_1_AMPLITUDE"
  UNIT                         = "VOLT"
```

```
  DESCRIPTION                    =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 62
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 9
  NAME                           = "PEAK_1_INTEGRAL"
  UNIT                           = "VOLT SECOND"
  DESCRIPTION                    =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 73
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 10
  NAME                           = "PEAK_1_MASS"
  UNIT                           = "AMU"
  DESCRIPTION                    =
"Atomic weight corresponding to 1st mass peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 84
  BYTES                          = 6
  MISSING_CONSTANT               = -9.99
  FORMAT                         = "F6.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 11
  NAME                           = "PEAK_2_FLIGHT_TIME"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"Time elapsed between Mass Analyser triggering and 2th spectral peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 91
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 12
  NAME                           = "PEAK_2_FLIGHT_TIME_UNCERTAINTY"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"The uncertainty in the time elapsed between Mass Analyser triggering and
2th spectral peak"
  DATA_TYPE                      = "ASCII_REAL"
```

```
  START_BYTE                    = 102
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 13
  NAME                          = "PEAK_2_AMPLITUDE"
  UNIT                          = "VOLT"
  DESCRIPTION                   =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 113
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 14
  NAME                          = "PEAK_2_INTEGRAL"
  UNIT                          = "VOLT SECOND"
  DESCRIPTION                   =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 124
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 15
  NAME                          = "PEAK_2_MASS"
  UNIT                          = "AMU"
  DESCRIPTION                   =
"Atomic weight corresponding to 2th mass peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 135
  BYTES                         = 6
  MISSING_CONSTANT              = -9.99
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 16
  NAME                          = "PEAK_3_FLIGHT_TIME"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"Time elapsed between Mass Analyser triggering and 3th spectral peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 142
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
```

```
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 17
  NAME                          = "PEAK_3_FLIGHT_TIME_UNCERTAINTY"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"The uncertainty in the time elapsed between Mass Analyser triggering and
3th spectral peak"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 153
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 18
  NAME                          = "PEAK_3_AMPLITUDE"
  UNIT                          = "VOLT"
  DESCRIPTION                   =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 164
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 19
  NAME                          = "PEAK_3_INTEGRAL"
  UNIT                          = "VOLT SECOND"
  DESCRIPTION                   =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 175
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 20
  NAME                          = "PEAK_3_MASS"
  UNIT                          = "AMU"
  DESCRIPTION                   =
"Atomic weight corresponding to 3th mass peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 186
  BYTES                         = 6
  MISSING_CONSTANT              = -9.99
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
```

```
  COLUMN_NUMBER                = 21
  NAME                         = "PEAK_4_FLIGHT_TIME"
  UNIT                         = "SECONDS"
  DESCRIPTION                  =
"Time elapsed between Mass Analyser triggering and 4th spectral peak."
  DATA_TYPE                    = "ASCII_REAL"
  START_BYTE                   = 193
  BYTES                        = 10
  MISSING_CONSTANT             = -9.999E-99
  FORMAT                       = "E10.3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 22
  NAME                         = "PEAK_4_FLIGHT_TIME_UNCERTAINTY"
  UNIT                         = "SECONDS"
  DESCRIPTION                  =
"The uncertainty in the time elapsed between Mass Analyser triggering and
4th spectral peak"
  DATA_TYPE                    = "ASCII_REAL"
  START_BYTE                   = 204
  BYTES                        = 10
  MISSING_CONSTANT             = -9.999E-99
  FORMAT                       = "E10.3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 23
  NAME                         = "PEAK_4_AMPLITUDE"
  UNIT                         = "VOLT"
  DESCRIPTION                  =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                    = "ASCII_REAL"
  START_BYTE                   = 215
  BYTES                        = 10
  MISSING_CONSTANT             = -9.999E-99
  FORMAT                       = "E10.3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 24
  NAME                         = "PEAK_4_INTEGRAL"
  UNIT                         = "VOLT SECOND"
  DESCRIPTION                  =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                    = "ASCII_REAL"
  START_BYTE                   = 226
  BYTES                        = 10
  MISSING_CONSTANT             = -9.999E-99
  FORMAT                       = "E10.3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 25
  NAME                         = "PEAK_4_MASS"
  UNIT                         = "AMU"
```

```
  DESCRIPTION                    =
"Atomic weight corresponding to 4th mass peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 237
  BYTES                          = 6
  MISSING_CONSTANT               = -9.99
  FORMAT                         = "F6.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 26
  NAME                           = "PEAK_5_FLIGHT_TIME"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"Time elapsed between Mass Analyser triggering and 5th spectral peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 244
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 27
  NAME                           = "PEAK_5_FLIGHT_TIME_UNCERTAINTY"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"The uncertainty in the time elapsed between Mass Analyser triggering and
5th spectral peak"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 255
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 28
  NAME                           = "PEAK_5_AMPLITUDE"
  UNIT                           = "VOLT"
  DESCRIPTION                    =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 266
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 29
  NAME                           = "PEAK_5_INTEGRAL"
  UNIT                           = "VOLT SECOND"
  DESCRIPTION                    =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                      = "ASCII_REAL"
```

```
  START_BYTE                    = 277
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 30
  NAME                          = "PEAK_5_MASS"
  UNIT                          = "AMU"
  DESCRIPTION                   =
"Atomic weight corresponding to 5th mass peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 288
  BYTES                         = 6
  MISSING_CONSTANT              = -9.99
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 31
  NAME                          = "PEAK_6_FLIGHT_TIME"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"Time elapsed between Mass Analyser triggering and 6th spectral peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 295
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 32
  NAME                          = "PEAK_6_FLIGHT_TIME_UNCERTAINTY"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"The uncertainty in the time elapsed between Mass Analyser triggering and
6th spectral peak"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 306
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 33
  NAME                          = "PEAK_6_AMPLITUDE"
  UNIT                          = "VOLT"
  DESCRIPTION                   =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 317
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
```

```
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 34
  NAME                           = "PEAK_6_INTEGRAL"
  UNIT                           = "VOLT SECOND"
  DESCRIPTION                    =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 328
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 35
  NAME                           = "PEAK_6_MASS"
  UNIT                           = "AMU"
  DESCRIPTION                    =
"Atomic weight corresponding to 6th mass peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 339
  BYTES                          = 6
  MISSING_CONSTANT               = -9.99
  FORMAT                         = "F6.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 36
  NAME                           = "PEAK_7_FLIGHT_TIME"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"Time elapsed between Mass Analyser triggering and 7th spectral peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 346
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 37
  NAME                           = "PEAK_7_FLIGHT_TIME_UNCERTAINTY"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"The uncertainty in the time elapsed between Mass Analyser triggering and
7th spectral peak"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 357
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 38
```

```
  NAME                          = "PEAK_7_AMPLITUDE"
  UNIT                          = "VOLT"
  DESCRIPTION                   =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 368
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 39
  NAME                          = "PEAK_7_INTEGRAL"
  UNIT                          = "VOLT SECOND"
  DESCRIPTION                   =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 379
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 40
  NAME                          = "PEAK_7_MASS"
  UNIT                          = "AMU"
  DESCRIPTION                   =
"Atomic weight corresponding to 7th mass peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 390
  BYTES                         = 6
  MISSING_CONSTANT              = -9.99
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 41
  NAME                          = "PEAK_8_FLIGHT_TIME"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"Time elapsed between Mass Analyser triggering and 8th spectral peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 397
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 42
  NAME                          = "PEAK_8_FLIGHT_TIME_UNCERTAINTY"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"The uncertainty in the time elapsed between Mass Analyser triggering and
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8th spectral peak"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 408
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 43
  NAME                           = "PEAK_8_AMPLITUDE"
  UNIT                           = "VOLT"
  DESCRIPTION                    =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 419
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 44
  NAME                           = "PEAK_8_INTEGRAL"
  UNIT                           = "VOLT SECOND"
  DESCRIPTION                    =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 430
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 45
  NAME                           = "PEAK_8_MASS"
  UNIT                           = "AMU"
  DESCRIPTION                    =
"Atomic weight corresponding to 8th mass peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 441
  BYTES                          = 6
  MISSING_CONSTANT               = -9.99
  FORMAT                         = "F6.2"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 46
  NAME                           = "PEAK_9_FLIGHT_TIME"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"Time elapsed between Mass Analyser triggering and 9th spectral peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 448
  BYTES                          = 10
```

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  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 47
  NAME                           = "PEAK_9_FLIGHT_TIME_UNCERTAINTY"
  UNIT                           = "SECONDS"
  DESCRIPTION                    =
"The uncertainty in the time elapsed between Mass Analyser triggering and
9th spectral peak"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 459
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 48
  NAME                           = "PEAK_9_AMPLITUDE"
  UNIT                           = "VOLT"
  DESCRIPTION                    =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 470
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 49
  NAME                           = "PEAK_9_INTEGRAL"
  UNIT                           = "VOLT SECOND"
  DESCRIPTION                    =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 481
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 50
  NAME                           = "PEAK_9_MASS"
  UNIT                           = "AMU"
  DESCRIPTION                    =
"Atomic weight corresponding to 9th mass peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 492
  BYTES                          = 6
  MISSING_CONSTANT               = -9.99
  FORMAT                         = "F6.2"
 END_OBJECT                      = COLUMN
```

```
 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 51
  NAME                          = "PEAK_10_FLIGHT_TIME"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"Time elapsed between Mass Analyser triggering and 10th spectral peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 499
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 52
  NAME                          = "PEAK_10_FLIGHT_TIME_UNCERTAINTY"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"The uncertainty in the time elapsed between Mass Analyser triggering and
10th spectral peak"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 510
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 53
  NAME                          = "PEAK_10_AMPLITUDE"
  UNIT                          = "VOLT"
  DESCRIPTION                   =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 521
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 54
  NAME                          = "PEAK_10_INTEGRAL"
  UNIT                          = "VOLT SECOND"
  DESCRIPTION                   =
"The peak integral is the area below the amplitude curve. The integral is
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 532
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 55
```

```
  NAME                          = "PEAK_10_MASS"
  UNIT                          = "AMU"
  DESCRIPTION                   =
"Atomic weight corresponding to 10th mass peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 543
  BYTES                         = 6
  MISSING_CONSTANT              = -9.99
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 56
  NAME                          = "PEAK_11_FLIGHT_TIME"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"Time elapsed between Mass Analyser triggering and 11th spectral peak."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 550
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 57
  NAME                          = "PEAK_11_FLIGHT_TIME_UNCERTAINTY"
  UNIT                          = "SECONDS"
  DESCRIPTION                   =
"The uncertainty in the time elapsed between Mass Analyser triggering and
11th spectral peak"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 561
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 58
  NAME                          = "PEAK_11_AMPLITUDE"
  UNIT                          = "VOLT"
  DESCRIPTION                   =
"This is the peak amplitude in volts at the multiplier. The peak
amplitude is determined in the processed data"
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 572
  BYTES                         = 10
  MISSING_CONSTANT              = -9.999E-99
  FORMAT                        = "E10.3"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 59
  NAME                          = "PEAK_11_INTEGRAL"
  UNIT                          = "VOLT SECOND"
  DESCRIPTION                   =
"The peak integral is the area below the amplitude curve. The integral is
```

```
calculated on the processed data (x=time scale, y=volt-scale)"
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 583
  BYTES                          = 10
  MISSING_CONSTANT               = -9.999E-99
  FORMAT                         = "E10.3"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 60
  NAME                           = "PEAK_11_MASS"
  UNIT                           = "AMU"
  DESCRIPTION                    =
"Atomic weight corresponding to 11th mass peak."
  DATA_TYPE                      = "ASCII_REAL"
  START_BYTE                     = 594
  BYTES                          = 6
  MISSING_CONSTANT               = -9.99
  FORMAT                         = "F6.2"
 END_OBJECT                      = COLUMN

END_OBJECT                       = TABLE
END
```

### Individual  Mass Spectra (Cassini CDA Mass Spectrum XXXXXXXX)

```
PDS_VERSION_ID                   = PDS3

RECORD_TYPE                      = FIXED_LENGTH
RECORD_BYTES                     = TBD
FILE_RECORDS                     = TBD

^TABLE                           = "_MP_XXXXXXXX.TAB"

DATA_SET_NAME                    = "CASSINI CDA DATA V1.0"
DATA_SET_ID                      = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                       = "MP_XXXXXXXX"
PRODUCT_NAME                     = "CDA MP SIGNAL TABLE"
SPACECRAFT_NAME                  = "CASSINI ORBITER"
INSTRUMENT_NAME                  = "COSMIC DUST ANALYSER"
TARGET_NAME                      = "DUST"
START_TIME                       = "TBD"
STOP_TIME                        = "TBD"
PRODUCT_CREATION_TIME            = "2005-173T14:20:22"
RECORD_FORMAT                    =
"(F6.2,1X,F5.2)"

OBJECT                           = TABLE
 INTERCHANGE_FORMAT              = ASCII
 ROWS                            = TBD
 COLUMNS                         = 2
 ROW_BYTES                       = TBD
 DESCRIPTION                     =
"Signal value at the ion multiplier"

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 1
```

```
  NAME                            = "OFFSET_TIME"
  UNIT                            = "MICROSECONDS"
  DESCRIPTION                     =
"Flight time measured from estimated time of impact."
  DATA_TYPE                       = "ASCII_REAL"
  START_BYTE                      = 1
  BYTES                           = 6
  MISSING_CONSTANT                = 999
  FORMAT                          = "F6.2"
 END_OBJECT                       = COLUMN

 OBJECT                           = COLUMN
  COLUMN_NUMBER                   = 2
  NAME                            = "AMPLITUDE"
  UNIT                            = "MICROVOLTS"
  DESCRIPTION                     =
"Signal value provided by the multiplier channel."
  DATA_TYPE                       = "ASCII_REAL"
  START_BYTE                      = 8
  BYTES                           = 5
  MISSING_CONSTANT                = -9.99
  FORMAT                          = "F5.2"
 END_OBJECT                       = COLUMN

END_OBJECT                        = TABLE
END
```

### Cassini CDA Signals Table (Cassini CDA Individual Signals XXXXXXXX)

### QI Signal Table (XXXXXXXX)

```
PDS_VERSION_ID                    = PDS3

RECORD_TYPE                       = FIXED_LENGTH
RECORD_BYTES                      = TBD
FILE_RECORDS                      = TBD

^TABLE                            = "_QI_XXXXXXXX.TAB"

DATA_SET_NAME                     = "CASSINI CDA DATA V1.0"
DATA_SET_ID                       = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                        = "QI_XXXXXXXX"
PRODUCT_NAME                      = "CDA QI SIGNAL TABLE"
SPACECRAFT_NAME                   = "CASSINI ORBITER"
INSTRUMENT_NAME                   = "COSMIC DUST ANALYSER"
TARGET_NAME                       = "DUST"
START_TIME                        = "TBD"
STOP_TIME                         = "TBD"
PRODUCT_CREATION_TIME             = "2005-173T14:20:22"
RECORD_FORMAT                     =
"(F6.2,1X,E8.1)"

OBJECT                            = TABLE
 INTERCHANGE_FORMAT               = ASCII
```

```
 ROWS                           = TBD
 COLUMNS                        = 2
 ROW_BYTES                      = TBD
 DESCRIPTION                    =
"Ion charge signal generated by an impact."

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "OFFSET_TIME"
  UNIT                          = "MICROSECONDS"
  DESCRIPTION                   =
"Time after triggering event."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 1
  BYTES                         = 6
  MISSING_CONSTANT              = 999
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "RECONSTRUCTED_QI_CHARGE"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Calibrated QI charge at time elapsed after triggering event."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 8
  BYTES                         = 8
  MISSING_CONSTANT              = -9.E99
  FORMAT                        = "E8.1"
 END_OBJECT                     = COLUMN

END_OBJECT                      = TABLE
END
```

### QT Signal Table (XXXXXXXX)

```
PDS_VERSION_ID                  = PDS3

RECORD_TYPE                     = FIXED_LENGTH
RECORD_BYTES                    = TBD
FILE_RECORDS                    = TBD

^TABLE                          = "_QT_XXXXXXXX.TAB"

DATA_SET_NAME                   = "CASSINI CDA DATA V1.0"
DATA_SET_ID                     = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                      = "QT_XXXXXXXX"
PRODUCT_NAME                    = "CASSINI CDA DUST ANALYSER QT SIGNAL TABLE"
SPACECRAFT_NAME                 = "CASSINI ORBITER"
INSTRUMENT_NAME                 = "COSMIC DUST ANALYSER"
TARGET_NAME                     = "DUST"
START_TIME                      = "TBD"
STOP_TIME                       = "TBD"
PRODUCT_CREATION_TIME           = "2005-173T14:20:22"
RECORD_FORMAT                   =
"(F6.2,1X,E8.1)"
```

```
OBJECT                          = TABLE
 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = TBD
 COLUMNS                        = 2
 ROW_BYTES                      = TBD
 DESCRIPTION                    =
"Electron charge signal monitored at the IID target generated by an
impact."

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "OFFSET_TIME"
  UNIT                          = "MICROSECONDS"
  DESCRIPTION                   =
"Time after triggering event."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 1
  BYTES                         = 6
  MISSING_CONSTANT              = 999
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "RECONSTRUCTED_QT_CHARGE"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Calibrated QT charge at time elapsed after triggering event."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 8
  BYTES                         = 8
  MISSING_CONSTANT              = -9.E99
  FORMAT                        = "E8.1"
 END_OBJECT                     = COLUMN

END_OBJECT                      = TABLE
END
```

### QC Signal Table (XXXXXXXX)

```
PDS_VERSION_ID                  = PDS3

RECORD_TYPE                     = FIXED_LENGTH
RECORD_BYTES                    = TBD
FILE_RECORDS                    = TBD

^TABLE                          = "_QC_XXXXXXXX.TAB"

DATA_SET_NAME                   = "CASSINI CDA DATA V1.0"
DATA_SET_ID                     = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                      = "QC_XXXXXXXX"
PRODUCT_NAME                    = "CASSINI CDA DUST ANALYSER QC SIGNAL TABLE"
SPACECRAFT_NAME                 = "CASSINI ORBITER"
INSTRUMENT_NAME                 = "COSMIC DUST ANALYSER"
TARGET_NAME                     = "DUST"
START_TIME                      = "TBD"
STOP_TIME                       = "TBD"
PRODUCT_CREATION_TIME           = "2005-173T14:20:22"
RECORD_FORMAT                   =
```

```
"(F6.2,1X,E8.1)"

OBJECT                          = TABLE
 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = TBD
 COLUMNS                        = 2
 ROW_BYTES                      = TBD
 DESCRIPTION                    =
"Electron charge signal monitored at the CAT target generated by an
impact."

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "OFFSET_TIME"
  UNIT                          = "MICROSECONDS"
  DESCRIPTION                   =
"Time after triggering event."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 1
  BYTES                         = 6
  MISSING_CONSTANT              = 999
  FORMAT                        = "F6.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "RECONSTRUCTED_QC_CHARGE"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Calibrated QC charge at time elapsed after triggering event."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 8
  BYTES                         = 8
  MISSING_CONSTANT              = -9.E99
  FORMAT                        = "E8.1"
 END_OBJECT                     = COLUMN

END_OBJECT                      = TABLE
END
```

### QP Signal Table (XXXXXXXX)

```
PDS_VERSION_ID                  = PDS3

RECORD_TYPE                     = FIXED_LENGTH
RECORD_BYTES                    = TBD
FILE_RECORDS                    = TBD

^TABLE                          = "_QP_XXXXXXXX.TAB"

DATA_SET_NAME                   = "CASSINI CDA DATA V1.0"
DATA_SET_ID                     = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                      = "QP_XXXXXXXX"
PRODUCT_NAME                    = "CDA QP SIGNAL TABLE"
SPACECRAFT_NAME                 = "CASSINI ORBITER"
INSTRUMENT_NAME                 = "COSMIC DUST ANALYSER"
TARGET_NAME                     = "DUST"
START_TIME                      = "TBD"
STOP_TIME                       = "TBD"
```

```
PRODUCT_CREATION_TIME           = "2005-173T14:20:22"
RECORD_FORMAT                   =
"(F8.2,1X,E8.1)"

OBJECT                          = TABLE
 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = TBD
 COLUMNS                        = 2
 ROW_BYTES                      = TBD
 DESCRIPTION                    =
"Charge induced by the particle on the charge grid device"

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "OFFSET_TIME"
  UNIT                          = "MICROSECONDS"
  DESCRIPTION                   =
"Time after triggering event."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 1
  BYTES                         = 8
  MISSING_CONSTANT              = -999.99
  FORMAT                        = "F8.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "RECONSTRUCTED_QP_CHARGE"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Calibrated QP charge at time elapsed after triggering event."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 10
  BYTES                         = 8
  MISSING_CONSTANT              = -9.E99
  FORMAT                        = "E8.1"
 END_OBJECT                     = COLUMN

END_OBJECT                      = TABLE
END
```

## Cassini CDA Settings Table

```
PDS_VERSION_ID                  = PDS3

RECORD_TYPE                     = FIXED_LENGTH
RECORD_BYTES                    = 84
FILE_RECORDS                    = 256

^TABLE                          = "CDASETTINGS.TAB"

DATA_SET_NAME                   = "CASSINI CDA DATA V1.0"
DATA_SET_ID                     = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                      = "CDA_SETTINGS"
PRODUCT_NAME                    = "CASSINI CDA SETTINGS TABLE"
SPACECRAFT_NAME                 = "CASSINI ORBITER"
INSTRUMENT_NAME                 = "COSMIC DUST ANALYSER"
TARGET_NAME                     = "DUST"
```

```
START_TIME                      = "N/A"
STOP_TIME                       = "N/A"
PRODUCT_CREATION_TIME           = "2005-06-27T15:21:50"
RECORD_FORMAT                   =
"(I2,1X,E8.2,1X,I2,1X,E8.2,1X,I2,1X,E8.2,1X,I2,1X,E8.2,1X,I2,2(1X,I3),1X,I5,
1X,I1,1X,I4,1X,I3,1X,I4)"

OBJECT                          = TABLE
 INTERCHANGE_FORMAT             = ASCII
 ROWS                           = 256
 COLUMNS                        = 16
 ROW_BYTES                      = 84
 DESCRIPTION                    =
"Table of voltages corresponding to voltage level codes and coulomb
threshold settings. Refer to SRAMAETAL2004B for a detailed description
of the CDA settings."

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 1
  NAME                          = "QC_THRESHOLD_SETTING"
  DESCRIPTION                   =
"Code corresponding to the threshold setting for the amplifier connected
to the chemical analyser target. Values are between 0 and 15."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 1
  BYTES                         = 2
  MISSING_CONSTANT              = 99
  FORMAT                        = "I2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 2
  NAME                          = "QC_THRESHOLD_SETTING_COULOMB"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Value in Coulomb corresponding to the code value."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 4
  BYTES                         = 8
  MISSING_CONSTANT              = 9.99E-99
  FORMAT                        = "E8.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 3
  NAME                          = "QA_THRESHOLD_SETTING"
  DESCRIPTION                   =
"Code corresponding to the threshold setting for the amplifier connected
to the chemical analyser grid. Values are between 0 and 15."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 13
  BYTES                         = 2
  MISSING_CONSTANT              = 99
  FORMAT                        = "I2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 4
```

```
  NAME                          = "QA_THRESHOLD_SETTING_COULOMB"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Value in Coulomb corresponding to the code value."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 16
  BYTES                         = 8
  MISSING_CONSTANT              = 9.99E-99
  FORMAT                        = "E8.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 5
  NAME                          = "QT_THRESHOLD_SETTING"
  DESCRIPTION                   =
"Code corresponding to the threshold setting for the amplifier connected
to the impact ionisation target. Values are between 0 and 15."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 25
  BYTES                         = 2
  MISSING_CONSTANT              = 99
  FORMAT                        = "I2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 6
  NAME                          = "QT_THRESHOLD_SETTING_COULOMB"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Value in Coulomb corresponding to the code value."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 28
  BYTES                         = 8
  MISSING_CONSTANT              = 9.99E-99
  FORMAT                        = "E8.2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 7
  NAME                          = "QI_THRESHOLD_SETTING"
  DESCRIPTION                   =
"Code corresponding to the threshold setting for the amplifier connected
to the ion grid. Values are between 0 and 15."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 37
  BYTES                         = 2
  MISSING_CONSTANT              = 99
  FORMAT                        = "I2"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 8
  NAME                          = "QI_THRESHOLD_SETTING_COULOMB"
  UNIT                          = "COULOMBS"
  DESCRIPTION                   =
"Value in Coulomb corresponding to the code value."
  DATA_TYPE                     = "ASCII_REAL"
  START_BYTE                    = 40
```

```
  BYTES                        = 8
  MISSING_CONSTANT             = 9.99E-99
  FORMAT                       = "E8.2"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 9
  NAME                         = "QMA_THRESHOLD_SETTING"
  DESCRIPTION                  =
"Code corresponding to the threshold setting for the amplifier connected
to the multiplier anode. Values are between 0 and 15."
  DATA_TYPE                    = "ASCII_INTEGER"
  START_BYTE                   = 49
  BYTES                        = 2
  MISSING_CONSTANT             = 99
  FORMAT                       = "I2"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 10
  NAME                         = "QMA_THRESHOLD_VOLTAGE"
  UNIT                         = "MILLIVOLT"
  DESCRIPTION                  =
"Value in Millivolt corresponding to the code value."
  DATA_TYPE                    = "ASCII_INTEGER"
  START_BYTE                   = 52
  BYTES                        = 3
  MISSING_CONSTANT             = -99
  FORMAT                       = "I3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 11
  NAME                         = "MULTIPLIER_VOLTAGE_LEVEL"
  DESCRIPTION                  =
"The multiplier high voltage setting, in steps between 0 and 255."
  DATA_TYPE                    = "ASCII_INTEGER"
  START_BYTE                   = 56
  BYTES                        = 3
  MISSING_CONSTANT             = 999
  FORMAT                       = "I3"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 12
  NAME                         = "MULTIPLIER_VOLTAGE"
  UNIT                         = "VOLT"
  DESCRIPTION                  =
"Multiplier high voltage setting values."
  DATA_TYPE                    = "ASCII_INTEGER"
  START_BYTE                   = 60
  BYTES                        = 5
  MISSING_CONSTANT             = -9999
  FORMAT                       = "I5"
 END_OBJECT                    = COLUMN

 OBJECT                        = COLUMN
  COLUMN_NUMBER                = 13
```

```
  NAME                            = "ION_GRID_VOLTAGE_LEVEL"
  DESCRIPTION                     =
"The ion grid high voltage setting in steps between 0 and 3."
  DATA_TYPE                       = "ASCII_INTEGER"
  START_BYTE                      = 66
  BYTES                           = 1
  MISSING_CONSTANT                = 9
  FORMAT                          = "I1"
 END_OBJECT                       = COLUMN

 OBJECT                           = COLUMN
  COLUMN_NUMBER                   = 14
  NAME                            = "ION_GRID_VOLTAGE"
  UNIT                            = "VOLT"
  DESCRIPTION                     =
"Ion grid voltage setting value."
  DATA_TYPE                       = "ASCII_INTEGER"
  START_BYTE                      = 68
  BYTES                           = 4
  MISSING_CONSTANT                = -999
  FORMAT                          = "I4"
 END_OBJECT                       = COLUMN

 OBJECT                           = COLUMN
  COLUMN_NUMBER                   = 15
  NAME                            = "CHEMICAL_ANALYSER_VOLTAGE_LEVEL"
  DESCRIPTION                     =
"The chemical analyser high voltage setting in steps between 0 and 255."
  DATA_TYPE                       = "ASCII_INTEGER"
  START_BYTE                      = 73
  BYTES                           = 3
  MISSING_CONSTANT                = 999
  FORMAT                          = "I3"
 END_OBJECT                       = COLUMN

 OBJECT                           = COLUMN
  COLUMN_NUMBER                   = 16
  NAME                            = "CHEMICAL_ANALYSER_VOLTAGE"
  UNIT                            = "VOLT"
  DESCRIPTION                     =
"Chemical analyser voltage setting value."
  DATA_TYPE                       = "ASCII_INTEGER"
  START_BYTE                      = 77
  BYTES                           = 4
  MISSING_CONSTANT                = -999
  FORMAT                          = "I4"
 END_OBJECT                       = COLUMN

END_OBJECT                        = TABLE
END
```

### Cassini CDA Counter Table

```
PDS_VERSION_ID                    = PDS3
```

```
RECORD_TYPE                      = FIXED_LENGTH
RECORD_BYTES                     = TBD
FILE_RECORDS                     = TBD

^TABLE                           = "CDACOUNTER.TAB"

DATA_SET_NAME                    = "CASSINI CDA DATA V1.0"
DATA_SET_ID                      = "CO-D-CDA-3/4/5-DUST-V1.0"
PRODUCT_ID                       = "CDA-COUNTER"
PRODUCT_NAME                     = "CDA COUNTER STATE TABLE"
SPACECRAFT_NAME                  = "CASSINI ORBITER"
INSTRUMENT_NAME                  = "COSMIC DUST ANALYSER"
TARGET_NAME                      = "DUST"
START_TIME                       = "TBD"
STOP_TIME                        = "TBD"
PRODUCT_CREATION_TIME            = "2005-173T14:20:22"
RECORD_FORMAT                    =
"(A17,20(1X,I8))"

OBJECT                           = TABLE
 INTERCHANGE_FORMAT              = ASCII
 ROWS                            = TBD
 COLUMNS                         = 21
 ROW_BYTES                       = TBD
 DESCRIPTION                     =
"Table of counter values."

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 1
  NAME                           = "TIME"
  DESCRIPTION                    =
"Time when the counter state snapshot was taken, given in UTC (years, day
of year, hours, minutes, and seconds) in the general
form:yyyy-dddThh:mm:ss. Uncertainty is about 1 second."
  DATA_TYPE                      = "CHARACTER"
  START_BYTE                     = 1
  BYTES                          = 17
  FORMAT                         = "A17"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 2
  NAME                           = "COUNTER_0"
  DESCRIPTION                    =
"State of counter 0 at the time of the snapshot."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 19
  BYTES                          = 8
  MISSING_CONSTANT               = -99
  FORMAT                         = "I8"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 3
  NAME                           = "COUNTER_1"
  DESCRIPTION                    =
"State of counter 1 at the time of the snapshot."
  DATA_TYPE                      = "ASCII_INTEGER"
```

```
  START_BYTE                    = 28
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 4
  NAME                          = "COUNTER_2"
  DESCRIPTION                   =
"State of counter 2 at the time of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 37
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 5
  NAME                          = "COUNTER_3"
  DESCRIPTION                   =
"State of counter 3 at the time of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 46
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 6
  NAME                          = "COUNTER_4"
  DESCRIPTION                   =
"State of counter 4 at the time of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 55
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 7
  NAME                          = "COUNTER_5"
  DESCRIPTION                   =
"State of counter 5 at the time  of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 64
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 8
  NAME                          = "COUNTER_6"
  DESCRIPTION                   =
```

```
"State of counter 6 at the time of the snapshot."
  DATA_TYPE                        = "ASCII_INTEGER"
  START_BYTE                       = 73
  BYTES                            = 8
  MISSING_CONSTANT                 = -99
  FORMAT                           = "I8"
 END_OBJECT                        = COLUMN

 OBJECT                            = COLUMN
  COLUMN_NUMBER                    = 9
  NAME                             = "COUNTER_7"
  DESCRIPTION                      =
"State of counter 7 at the time  of the snapshot."
  DATA_TYPE                        = "ASCII_INTEGER"
  START_BYTE                       = 82
  BYTES                            = 8
  MISSING_CONSTANT                 = -99
  FORMAT                           = "I8"
 END_OBJECT                        = COLUMN

 OBJECT                            = COLUMN
  COLUMN_NUMBER                    = 10
  NAME                             = "COUNTER_8"
  DESCRIPTION                      =
"State of counter 8 at the time  of the snapshot."
  DATA_TYPE                        = "ASCII_INTEGER"
  START_BYTE                       = 91
  BYTES                            = 8
  MISSING_CONSTANT                 = -99
  FORMAT                           = "I8"
 END_OBJECT                        = COLUMN

 OBJECT                            = COLUMN
  COLUMN_NUMBER                    = 11
  NAME                             = "COUNTER_9"
  DESCRIPTION                      =
"State of counter 9 at the time of the snapshot."
  DATA_TYPE                        = "ASCII_INTEGER"
  START_BYTE                       = 100
  BYTES                            = 8
  MISSING_CONSTANT                 = -99
  FORMAT                           = "I8"
 END_OBJECT                        = COLUMN

 OBJECT                            = COLUMN
  COLUMN_NUMBER                    = 12
  NAME                             = "COUNTER_10"
  DESCRIPTION                      =
"State of counter 10 at the time of the snapshot."
  DATA_TYPE                        = "ASCII_INTEGER"
  START_BYTE                       = 109
  BYTES                            = 8
  MISSING_CONSTANT                 = -99
  FORMAT                           = "I8"
 END_OBJECT                        = COLUMN

 OBJECT                            = COLUMN
  COLUMN_NUMBER                    = 13
```

```
  NAME                          = "COUNTER_11"
  DESCRIPTION                   =
"State of counter 11 at the time of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 118
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 14
  NAME                          = "COUNTER_12"
  DESCRIPTION                   =
"State of counter 12 at the time of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 127
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 15
  NAME                          = "COUNTER_13"
  DESCRIPTION                   =
"State of counter 13 at the time of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 136
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 16
  NAME                          = "COUNTER_14"
  DESCRIPTION                   =
"State of counter 14 at the time of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 145
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN

 OBJECT                         = COLUMN
  COLUMN_NUMBER                 = 17
  NAME                          = "COUNTER_15"
  DESCRIPTION                   =
"State of counter 15 at the time of the snapshot."
  DATA_TYPE                     = "ASCII_INTEGER"
  START_BYTE                    = 154
  BYTES                         = 8
  MISSING_CONSTANT              = -99
  FORMAT                        = "I8"
 END_OBJECT                     = COLUMN
```

```
 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 18
  NAME                           = "COUNTER_16"
  DESCRIPTION                    =
"State of counter 16 at the time of the snapshot."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 163
  BYTES                          = 8
  MISSING_CONSTANT               = -99
  FORMAT                         = "I8"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 19
  NAME                           = "COUNTER_17"
  DESCRIPTION                    =
"State of counter 17 at the time of the snapshot."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 172
  BYTES                          = 8
  MISSING_CONSTANT               = -99
  FORMAT                         = "I8"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 20
  NAME                           = "COUNTER_18"
  DESCRIPTION                    =
"State of counter 18 at the time of the snapshot."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 181
  BYTES                          = 8
  MISSING_CONSTANT               = -99
  FORMAT                         = "I8"
 END_OBJECT                      = COLUMN

 OBJECT                          = COLUMN
  COLUMN_NUMBER                  = 21
  NAME                           = "COUNTER_19"
  DESCRIPTION                    =
"State of counter 19 at the time of the snapshot."
  DATA_TYPE                      = "ASCII_INTEGER"
  START_BYTE                     = 190
  BYTES                          = 8
  MISSING_CONSTANT               = -99
  FORMAT                         = "I8"
 END_OBJECT                      = COLUMN

END_OBJECT                       = TABLE
END
```

# APPENDIX 2 – PROVISIONAL CDA PRODUCT COLUMN DESCRIPTIONS

## Cassini CDA Area Table

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | 1. SENSOR AXIS ANGLE | 1 | I2 | Degrees | This is the angle to the sensor axis where zero is along the axis. |
| 2 | IMPACT DETECTOR AREA | 4 | F6.4 | Meter**2 | The exposed sensitive area of the CDA impact detector corresponding to the projected area of the hemispherical detector visible to an incoming particle traveling along a path at the SENSOR AXIS ANGLE. |
| 3 | CHEMICAL ANALYSER AREA | 11 | F6.4 | Meter**2 | The exposed sensitive area of the CDA chemical analyser corresponding to the projected area of the hemispherical detector visible to an incoming particle traveling along a path at the SENSOR AXIS ANGLE. |
| 4 | TOTAL AREA | 18 | F6.4 | Meter**2 | The total exposed sensitive area of the CDA corresponding to the projected area of the hemispherical detector visible to an incoming particle traveling along a path at the SENSOR AXIS ANGLE. |

## Cassini CDA Status History

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | EVENT TIME | 1 | A17 | | The UTC time given in year, day of year, hours, minutes, and seconds in the general form: yyyy-dddThh:mm:ss. |
| 2 | EVENT DEFINITION | 19 | A5 | | A five digit integer which indicates which detectors can trigger a particle detection, coded as follows:<br><br>Column Detector<br>1 QT<br>2 QC<br>3 QA<br>4 QI<br>5 QMA<br><br>where the column value is 0 if the detector is switched off, and 1 if the detector is switched on. |
| 4 | QC THRESHOLD SETTING | 25 | I2 | | Code corresponding to the threshold setting at the time of impact for the amplifier connected to the chemical analyser target. Values are between 0 and 15. Conversion to Coulombs is dependent upon rise time and is found in CDASETTINGS.TAB. |

| | | | | | |
|---|---|---|---|---|---|
| 5 | QA THRESHOLD SETTING | 28 | I2 | | Code corresponding to the threshold setting at the time of impact for the amplifier connected to the chemical analyser grid. Values are between 0 and 15. Conversion to Coulombs is dependent upon rise time and is found in CDASETTINGS.TAB. |
| 6 | QT THRESHOLD SETTING | 31 | I2 | | Code corresponding to the threshold setting at the time of impact for the amplifier connected to the impact ionization grid. Values are between 0 and 15. Conversion to Coulombs is dependent upon rise time and is found in CDASETTINGS.TAB. |
| 7 | QI THRESHOLD SETTING | 34 | I2 | | Code corresponding to the threshold setting at the time of impact for the amplifier connected to the ion grid. Values are between 0 and 15. Conversion to Coulombs is dependent upon rise time and is found in CDASETTINGS.TAB. |
| 8 | QMA THRESHOLD SETTING | 37 | I2 | | Code corresponding to the threshold setting at the time of impact for the amplifier connected to the multiplier anode. Values are between 0 and 15. Conversion to Volts is found in CDASETTINGS.TAB. |
| 9 | MULTIPLIER VOLTAGE LEVEL | 40 | I3 | | The multiplier high voltage level setting, in steps between 0 and 255. Corresponding voltages are found in CDASETTINGS.TAB. |
| 10 | ION GRID VOLTAGE LEVEL | 44 | I3 | | The ion grid high voltage level setting, in steps between 0 and 255. Corresponding voltages are found in CDASETTINGS.TAB. |
| 11 | CHEMICAL ANALYSER VOLTAGE LEVEL | 48 | I3 | | The chemical analyser high voltage level setting, in steps between 0 and 255. Corresponding voltages are found in CDASETTINGS.TAB. |
| 12 | LISTEN FLAG | 52 | I1 | | A flag indicating that CDA was in a measurement mode (1) or not (0). |
| 13 | HARD STATUS | 54 | I1 | | Code indicating whether CDA was on (1) or off (0). |
| 14 | QI SHRINKING | 56 | I1 | | A description of the degree of lossy data compression applied to the transmitted the time-resolved ion grid signal (QI), where there is no compression (1) or compression by factors of 2 (2) or 4 (4). |
| 15 | QC SHRINKING | 58 | I1 | | A description of the degree of lossy data compression applied to the transmitted time-resolved chemical analyzer target signal (QC), where there is no compression (1) or compression by factors of 2 (2) or 4 (4). |

| | | | | | |
|---|---|---|---|---|---|
| 16 | QT SHRINKING | 60 | I1 | | A description of the degree of lossy data compression applied to the transmitted time-resolved impact ionization target signal (QT), where there is no compression (1) or compression by factors of 2 (2) or 4 (4). |
| 17 | QP SHRINKING | 62 | I1 | | A description of the degree of lossy data compression applied to the transmitted time-resolved signal at the charge sensitive entrance grids (QP), where there is no compression (1) or compression by factors of 2 (2) or 4 (4). |
| 18 | MP SHRINKING | 64 | I1 | | A description of the degree of lossy data compression applied to the transmitted time-resolved time of flight mass spectrum (MP), where there is no compression (1) or compression by factors of 2 (2) or 4 (4). |
| 20 | ARTICULATION POSITION | 66 | I3 | | CDA articulation position on the turntable given in degrees. The CDA instrument boresight within the S/C coordinate systems depends upon the position a as:<br>x = 1/8 ( -1 - SQRT(3) + (-1 + SQRT(3)) COS(a) - 2 SQRT(6) SIN(a) )<br>y = 1/8 ( 3 + SQRT(3) + (-3 + SQRT(3)) COS(a) - 2 SQRT(2) SIN(a) )<br>z = 1/4 ( -1 + SQRT(3) + ( 1 + SQRT(3)) COS(a) ) |

## Cassini CDA Dust Analyser Event Table

| # | Name | Start Byte | Format | Units | Definition |
|---|---|---|---|---|---|
| 1 | EVENT ID | 1 | I10 | | An identifier number associated with an event. |
| 2 | EVENT TIME | 12 | A17 | | The UTC time of an event given in year, day of year, hours, minutes, and seconds in the general form:<br>yyyy-dddThh:mm:ss.<br>Uncertainty is smaller than 1 second. |
| 3 | EVENT JULIAN DATE | 30 | F14.6 | Days | The full Julian date of an event. Uncertainty is smaller than 1 second. |
| 4 | QP AMPLITUDE | 45 | E8.1 | Coulombs | Amplitude of the entrance grid channel signal.<br>In case od a dust impact event, particle charge as measured by the signal maximum. |
| 5 | QP SIGNAL FLAG | 54 | I1 | | This flag is set to 1 if a charge signal is provided for this event. |

| | | | | | |
|---|---|---|---|---|---|
| 6 | QI AMPLITUDE | 56 | E8.1 | Coulombs | Amplitude of the signal monitored by the integrating amplifier connected to the ion grid. In case of a dust impact event, fraction of the plasma ion charge yield generated by the particle impact. |
| 7 | QI SIGNAL FLAG | 65 | I1 | | This flag is set to 1 if a charge signal is provided for this event. |
| 8 | QT AMPLITUDE | 67 | E8.1 | Coulombs | Amplitude of the signal monitored by the integrating amplifier connected to the impact ionization target (IID). In case of a dust impact event, fraction of the plasma electron charge yield generated by the particle impact. |
| 9 | QT SIGNAL FLAG | 76 | I1 | | This flag is set to 1 if a charge signal is provided for this event |
| 10 | QC AMPLITUDE | 78 | E8.1 | Coulombs | Amplitude of the signal monitored by the integrating amplifier connected to the chemical analyser target (CAT). In case of a dust impact event, fraction of the plasma electron charge yield generated by the particle impact. |
| 11 | QC SIGNAL FLAG | 87 | I1 | | This flag is set to 1 if a charge signal is provided for this event |
| 12 | QI RISE TIME | 89 | E8.1 | Seconds | The signal from the ion grid is reconstructed and converted to Coulomb. The rise time is that time elapsed between 10% and 90% of the signal maximum. The error on the rise time is set by the channel sampling rate and is of 166.6E-9 s. In case of a noise event, or if the signal amplitude is zero, the rise time is set to its missing value. |
| 13 | QT RISE TIME | 98 | E8.1 | Seconds | The signal from the impact ionization detector is reconstructed and converted to Coulomb. The rise time is that time elapsed between 10% and 90% of the signal maximum. The error on the rise time is set by the channel sampling rate and is of 333.3E-9 s. In case of a noise event, or if the signal amplitude is zero, the rise time is set to its missing value. |
| 14 | QC RISE TIME | 107 | E8.1 | Seconds | The signal from the chemical analyzer target is reconstructed and converted to Coulomb. The rise time is that time elapsed between 10% and 90% of the signal maximum. The error on the rise time is set by the channel sampling rate and is of 166.6E-9 s. In case of a noise event, or if the signal amplitude is zero, the rise time is set to its missing value. |

| | | | | | |
|---|---|---|---|---|---|
| 15 | TARGET FLAG | 116 | I1 | | The target flag (TF) indicates that portion of the target impacted.<br><br>TF Portion<br>0 Unknown<br>1 Chemical Analyser<br>2 IID<br>3 QP grid<br>4 CAT grid<br>5 wall impact |
| 16 | SPACECRAFT RIGHT ASCENSION | 118 | F7.2 | Degrees | The heliocentric right ascension (J2000) of the spacecraft. |
| 17 | SPACECRAFT DECLINATION | 126 | F7.2 | Degrees | The heliocentric declination (J2000) of the spacecraft. |
| 18 | SPACECRAFT-SUN DISTANCE | 134 | F6.4 | AU | The distance from the spacecraft to the sun. |
| 19 | SPACECRAFT SATURN SYSTEM III LONGITUDE | 141 | F7.2 | Degrees | The sub-Saturn longitude of the spacecraft in the System III coordinates: +z is the pole axis of Saturn, xy the ring plane. +x is the projection of the J2000 vernal equinox direction onto the ring plane. |
| 20 | SPACECRAFT SATURN SYSTEM III LATITUDE | 149 | F7.2 | Degrees | The sub-Saturn latitude of the spacecraft in the System III coordinates.+x is the projection of the J2000 vernal equinox direction onto the ring plane. |
| 21 | SPACECRAFT-SATURN DISTANCE | 157 | F8.2 | RS | The distance from the spacecraft to Saturn in Saturnian radii. |
| 22 | SPACECRAFT X VELOCITY | 166 | F6.2 | Km/sec | The J2000 heliocentric equatorial X component of the Cassini velocity vector. |
| 23 | SPACECRAFT Y VELOCITY | 173 | F6.2 | Km/sec | The J2000 heliocentric equatorial Y component of the Cassini velocity vector. |
| 24 | SPACECRAFT Z VELOCITY | 180 | F6.2 | Km/sec | The J2000 heliocentric equatorial Z component of the Cassini velocity vector. |
| 25 | DETECTOR RIGHT ASCENSION | 187 | F7.2 | Degrees | The spacecraft-centered right ascension (J2000) of the sensor axis. |
| 26 | DETECTOR DECLINATION | 195 | F7.2 | Degrees | The spacecraft-centered declination (J2000) of the sensor axis. |
| 27 | COUNTER NUMBER | 203 | I2 | | Event counter assigned by the on-board event evaluation algorithm with a value between 0 and 19. The event counter value is a rough measure for the properties of the registered event. |
| 28 | EVENT QUALITY | 206 | I3 | | Event qua;ity assigned by the on-board event evaluation algorithm. The evnt class takes values between0 and 4 and is a rough measure for the quality of the event 0 – noise, 1- test pulse, 2- small impatc, 3- strong impact, 4- impacts with TOF mass spectrum. |

| | | | | | |
|---|---|---|---|---|---|
| 29 | PARTICLE SPEED | 210 | F5.1 | Km/sec | The impact speed of the particle relative to the spacecraft. When no speed can be determined, or in case of a noise event, the value is set to its missing value. |
| 30 | PARTICLE SPEED ERROR FACTOR | 216 | F4.1 | | An upper and lower estimate of impactor speed relative to the spacecraft is obtained by multiplying and dividing, respectively, the particle speed by this factor. When no speed (hence error factor) can be determined, the value of this factor is set to its missing value. |
| 31 | PARTICLE MASS | 221 | E8.1 | Kilogram | The particle mass. When the particle speed is not determined, the mass is not determined and is set to its missing value. |
| 32 | PARTICLE MASS ERROR FACTOR | 230 | F4.1 | | An upper and lower estimate of impactor mass is obtained by multiplying and dividing, respectively, the particle mass by this factor. When the speed is not determined, neither is the mass, and this factor is set to its missing value, |
| 33 | PARTICLE CHARGE | 235 | E8.1 | Coulomb | The charge of particle derived from the entrance grid signal. When no charge can be determined, the value is set to its missing value. |
| 34 | PARTICLE CHARGE ERROR | 244 | E8.1 | Coulomb | The error associated with the particle charge. |
| 35 | SPECTRUM FLAG | 253 | I1 | | A flag indicating if there exists a corresponding mass spectrum for the particle (1) or not (0). |

## Cassini CDA Spectra Peaks Table

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | IMPACT EVENT ID | 1 | I10 | | An identifier number associated with a dust impact with a TOF mass spectrum. |
| 2 | NUMBER PEAKS | 12 | I2 | | The number of distinguishable peaks in the mass spectrum of an impacting particle. |
| 3 | SCALE ID | 15 | I2 | | Identifier flag showing how the mass scale was calculated. 0: from impact time only, 1: from impact time and first peak, 2: from two reference peaks. |
| 4 | SCALE POS 1 | 18 | E10.3 | Seconds | Reference position (time) of the first peak for mass scale calculation, in second from trigger time. |
| 5 | SCALE POS 2 | 29 | E10.3 | Seconds | Reference position (time) of the second peak for mass scale calculation, in second from trigger time. |
| 6 | PEAK 1 FLIGHT TIME | 40 | E10.3 | Seconds | Time elapsed between Mass Analyser triggering and first spectral peak. |

| | | | | | |
|---|---|---|---|---|---|
| 7 | PEAK 1 FLIGHT TIME UNCERTAINTY | 51 | E10.3 | Seconds | The uncertainty in the time elapsed between Mass Analyser triggering and first spectral peak. |
| 9 | PEAK 1 AMPLITUDE | 62 | E10.3 | Volts | This is the peak amplitude in volts at the multiplier. The peak amplitude is determined in the processed data. |
| 9 | PEAK 1 INTEGRAL | 73 | E10.3 | Volt Seconds | The peak integral is area below the amplitude curve. The integral is calculated on the processed data (x = time scale, y = volt-scale). |
| 10 | PEAK 1 MASS | 84 | F6.2 | AMU | Atomic weight corresponding to 1$^{st}$ mass peak. |
| … | | | | | |
| 55 | PEAK 11 FLIGHT TIME | 550 | E10.4 | Seconds | Time elapsed between Mass Analyser triggering and 11th spectral peak. |
| 56 | PEAK 11 FLIGHT TIME UNCERTAINTY | 561 | E10.4 | Seconds | The uncertainty in the time elapsed between Mass Analyser triggering and twelfth spectral peak. |
| 57 | PEAK 11 AMPLITUDE | 572 | E10.4 | Volts | This is the peak amplitude in volts at the multiplier. The peak amplitude is determined in the processed data. |
| 58 | PEAK 11 INTEGRAL | 583 | E10.4 | Volt Seconds | The peak integral is area below the amplitude curve. The integral is calculated on the processed data (x = timescale, y = volt-scale). |
| 59 | PEAK 11 MASS | 594 | F5.2 | AMU | Atomic weight corresponding to 11th mass peak. |

## MP Signal Table

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | OFFSET TIME | 1 | F6.2 | Microseconds | Flight time measured from estimated time of impact. |
| 2 | AMPLITUDE | 8 | F5.2 | Microvolts | Signal value provided by the multiplier channel |

## QI Signal Table

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | OFFSET TIME | 1 | F6.2 | Microseconds | Time elapsed after event triggering |
| 2 | RECONSTRUCTED QI CHARGE | 8 | E8.1 | Coulombs | Calibrated QI charge at time elapsed after event triggering. |

## QT Signal Table

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | OFFSET TIME | 1 | F6.2 | Microseconds | Time elapsed after event triggering |

| | | | | | |
|---|---|---|---|---|---|
| 2 | RECONSTRUCTED QT CHARGE | 8 | E8.1 | Coulombs | Calibrated QT charge at time elapsed after event triggering. |

## QC Signal Table

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | OFFSET TIME | 1 | F6.2 | Microseconds | Time elapsed after event triggering |
| 2 | RECONSTRUCTED QT CHARGE | 8 | E8.1 | Coulombs | Calibrated QC charge at time elapsed after event triggering. |

## Cassini CDA QP Signal Table (Cassini CDA Charge Grid signal XXXXXXX)

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | OFFSET TIME | 1 | F8.2 | Microseconds | Time measured from estimated impact time Negative time values correspond to time values before the impact time, positive values after the impact time. |
| 2 | RECONSTRUCTED QP CHARGE | 10 | E8.1 | Coulombs | Charge induced by the dust particle at the charge grid device. |

## Cassini CDA Settings Table

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | QC THRESHOLD SETTING | 1 | I2 | | Code corresponding to the threshold setting for the amplifier connected to the chemical analyzer target. Values are between 0 and 15 |
| 2 | QC THRESHOLD SETTING COULOMB | 4 | E8.2 | Coulombs | Value in Coulombs corresponding to the code value |
| 3 | QA THRESHOLD SETTING | 13 | I2 | | Code corresponding to the threshold setting for the amplifier connected to the chemical analyser grid. Values are between 0 and 15 |
| 4 | QA THRESHOLD SETTING COULOMB | 16 | E8.2 | Coulombs | Value in Coulombs corresponding to the code value |
| 5 | QT THRESHOLD SETTING | 25 | I2 | | Code corresponding to the threshold setting for the amplifier connected impact ionization target. Values are between 0 and 15 |
| 6 | QT THRESHOLD SETTING COULOMB | 28 | E8.2 | Coulombs | Value in Coulombs corresponding to the code value |
| 7 | QI THRESHOLD SETTING | 37 | I2 | | Code corresponding to the threshold setting for the amplifier connected to the ion grid. Values are between 0 and 15 |

| | | | | | |
|---|---|---|---|---|---|
| 8 | QI THRESHOLD SETTING COULOMB | 40 | E8.2 | Coulombs | Value in Coulombs corresponding to the code value |
| 9 | QMA THRESHOLD SETTING | 49 | I2 | | Code corresponding to the threshold setting at the time of impact for the amplifier connected to the multiplier anode. Values are between 0 and 15. |
| 10 | QMA THRESHOLD SETTING VOLTAGE | 52 | I3 | Volt | Value in Volts corresponding to the code value |
| 11 | MULTIPLIER VOLTAGE LEVEL | 56 | I3 | | The multiplier high voltage level setting, in steps between 0 and 255. |
| 12 | MULTIPLIER VOLTAGE | 60 | I5 | Volt | Multiplier high voltage setting values |
| 13 | ION GRID VOLTAGE LEVEL | 66 | I1 | | The ion grid high voltage level setting, in steps between 0 and 3. |
| 14 | ION GRID VOLTAGE | 68 | I4 | Volt | Ion grid high voltage setting values. |
| 15 | CHEMICAL ANALYSER VOLTAGE LEVEL | 73 | I3 | | The chemical analyser high voltage level setting, in steps between 0 and 255. |
| 16 | CHEMICAL ANALYSER VOLTAGE | 77 | I4 | Volt | Chemical analyzer high voltage setting values |

## Cassini CDA Counter Table

| # | Name | Start Byte | Format | Units | Description |
|---|---|---|---|---|---|
| 1 | TIME | 1 | A17 | | Time when the counter state snapshot was taken, given in UTC (years, hours, minutes, and seconds in the general form: yyyy-dddThh:mm:ss.) Uncertainty is about 1 second. |
| 2 | COUNTER 0 | 19 | I8 | | State of counter 0 at the time of the snapshot |
| 3 | COUNTER 1 | 28 | I8 | | State of counter 1 at the time of the snapshot |
| 4 | COUNTER 2 | 37 | I8 | | State of counter 2 at the time of the snapshot |
| 5 | COUNTER 3 | 46 | I8 | | State of counter 3 at the time of the snapshot |
| 6 | COUNTER 4 | 55 | I8 | | State of counter 4 at the time of the snapshot |
| 7 | COUNTER 5 | 64 | I8 | | State of counter 5 at the time of the snapshot |
| 8 | COUNTER 6 | 73 | I8 | | State of counter 6 at the time of the snapshot |
| 9 | COUNTER 7 | 82 | I8 | | State of counter 7 at the time of the snapshot |
| 10 | COUNTER 8 | 91 | I8 | | State of counter 8 at the time of the snapshot |
| 11 | COUNTER 9 | 100 | I8 | | State of counter 9 at the time of the snapshot |
| 12 | COUNTER 10 | 109 | I8 | | State of counter 10 at the time of the snapshot |
| 13 | COUNTER 11 | 118 | I3 | | State of counter 11 at the time of the snapshot |
| 14 | COUNTER 12 | 127 | I8 | | State of counter 12 at the time of the snapshot |

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| 15 | COUNTER 13 | 136 | I8 | | State of counter 13 at the time of the snapshot |
| 16 | COUNTER 14 | 145 | I8 | | State of counter 14 at the time of the snapshot |
| 17 | COUNTER 15 | 154 | I8 | | State of counter 15 at the time of the snapshot |
| 18 | COUNTER 16 | 163 | I8 | | State of counter 16 at the time of the snapshot |
| 19 | COUNTER 17 | 172 | I8 | | State of counter 17 at the time of the snapshot |
| 20 | COUNTER 18 | 181 | I8 | | State of counter 18 at the time of the snapshot |
| 21 | COUNTER 19 | 190 | I8 | | State of counter 19 at the time of the snapshot |