

Appendix A: Examples of GRS EDR Labels

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1. CHANNELIZED ENGINEERING DATA

1.1. CHAN_DATA_YYYYMMDD.LBL

PDS_VERSION_ID = PDS3

/* IDENTIFICATION DATA ELEMENTS for all referenced files */

DATA_SET_NAME = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_VERSION_ID = "1.0"
RELEASE_ID = "0005"

/* DESCRIPTIVE DATA ELEMENTS for all referenced files */

INSTRUMENT_HOST_NAME = "2001 MARS ODYSSEY"
INSTRUMENT_NAME = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID = ODY
TARGET_NAME = MARS
MISSION_PHASE_NAME = MAPPING
START_TIME = 2003-01-01T00:00:48.599
STOP_TIME = 2003-01-01T23:58:39.968
SPACECRAFT_CLOCK_START_COUNT = 185816716740
SPACECRAFT_CLOCK_STOP_COUNT = 185838802246
PRODUCT_CREATION_TIME = 2004-02-16T16:50:12.353

OBJECT = FILE

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 35
FILE_RECORDS = 51

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "GRS_AD_EN_ST.DAT"

/* IDENTIFICATION DATA ELEMENTS */

PRODUCT_ID = "CHAN_GRS_AD_EN_ST_20030101"
PRODUCT_TYPE = "CHAN_GRS_AD_EN_ST"

/* DESCRIPTIVE data elements */

DESCRIPTION = "

Status of the Anneal Door Enable state.

"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 51
ROW_BYTES = 35

```

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 3
^STRUCTURE = "CHAN_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 35
FILE_RECORDS = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES = "GRS_ANDR_ST.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID = "CHAN_GRS_ANDR_ST_20030101"
PRODUCT_TYPE = "CHAN_GRS_ANDR_ST"

/* DESCRIPTIVE data elements */
DESCRIPTION = "

GRS Anneal Door Status

"

/* DATA OBJECT DEFINITION */
OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 51
ROW_BYTES = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 3
^STRUCTURE = "CHAN_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

```

```

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE    = FIXED_LENGTH
RECORD_BYTES   = 35
FILE_RECORDS   = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES   = "GRS_ANNEAL.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID     = "CHAN_GRS_ANNEAL_20030101"
PRODUCT_TYPE   = "CHAN_GRS_ANNEAL"

/* DESCRIPTIVE data elements */
DESCRIPTION    = "

    Instructs the enabling or disabling of the GRS anneal process.

"

/* DATA OBJECT DEFINITION */
OBJECT        = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS          = 51
ROW_BYTES     = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS      = 3
^STRUCTURE    = "CHAN_DATA_COLS.FMT"

END_OBJECT    = TIME_SERIES

END_OBJECT    = FILE

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE    = FIXED_LENGTH
RECORD_BYTES   = 35
FILE_RECORDS   = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES   = "GRS_BOOT_ST.DAT"

/* IDENTIFICATION DATA ELEMENTS */

```

```
PRODUCT_ID          = "CHAN_GRS_BOOT_ST_20030101"  
PRODUCT_TYPE       = "CHAN_GRS_BOOT_ST"
```

```
/* DESCRIPTIVE data elements */  
DESCRIPTION        = "
```

Boot select discrete status.

"

```
/* DATA OBJECT DEFINITION */  
OBJECT             = TIME_SERIES
```

```
INTERCHANGE_FORMAT = BINARY  
ROWS               = 51  
ROW_BYTES          = 35
```

```
SAMPLING_PARAMETER_NAME = TIME  
SAMPLING_PARAMETER_UNIT = TICKS  
SAMPLING_PARAMETER_INTERVAL = "N/A"
```

```
/* The complete chan definitions are contained in an external file */  
/* found in the LABEL directory of the archive disk. */
```

```
COLUMNS           = 3  
^STRUCTURE         = "CHAN_DATA_COLS.FMT"
```

```
END_OBJECT         = TIME_SERIES
```

```
END_OBJECT         = FILE
```

```
OBJECT             = FILE
```

```
/* FILE CHARACTERISTICS */  
RECORD_TYPE        = FIXED_LENGTH  
RECORD_BYTES       = 35  
FILE_RECORDS       = 906
```

```
/* POINTERS TO DATA OBJECTS */  
^TIME_SERIES       = "GRS_CEB_TMP.DAT"
```

```
/* IDENTIFICATION DATA ELEMENTS */  
PRODUCT_ID         = "CHAN_GRS_CEB_TMP_20030101"  
PRODUCT_TYPE       = "CHAN_GRS_CEB_TMP"
```

```
/* DESCRIPTIVE data elements */  
DESCRIPTION        = "
```

Temperature of the GRS Central Electronics Box.

"

```
/* DATA OBJECT DEFINITION */  
OBJECT             = TIME_SERIES
```

```

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 906
ROW_BYTES             = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 3
^STRUCTURE            = "CHAN_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 35
FILE_RECORDS          = 906

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "GRS_GPA_TMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "CHAN_GRS_GPA_TMP_20030101"
PRODUCT_TYPE          = "CHAN_GRS_GPA_TMP"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "
    Temperature of the GRS Gamma Pulse Amplifier.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 906
ROW_BYTES             = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 3
^STRUCTURE            = "CHAN_DATA_COLS.FMT"

```

```

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 35
FILE_RECORDS        = 906

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "GRS_GSH_TMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "CHAN_GRS_GSH_TMP_20030101"
PRODUCT_TYPE        = "CHAN_GRS_GSH_TMP"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "

    Temperature of the GRS Gamma Sensor Head.

"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 906
ROW_BYTES           = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS            = 3
^STRUCTURE           = "CHAN_DATA_COLS.FMT"

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 35
FILE_RECORDS        = 51

```

```

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GRS_HB_CTR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CHAN_GRS_HB_CTR_20030101"
PRODUCT_TYPE      = "CHAN_GRS_HB_CTR"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "

    Number of total heartbeats received from the GRS.

"

/* DATA OBJECT DEFINITION */
OBJECT             = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS               = 51
ROW_BYTES          = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 3
^STRUCTURE        = "CHAN_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 35
FILE_RECORDS      = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GRS_HB_LT_C.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CHAN_GRS_HB_LT_C_20030101"
PRODUCT_TYPE      = "CHAN_GRS_HB_LT_C"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "

    Spacecraft time of last heartbeat (coarse reading in seconds).

"

```

```

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 51
ROW_BYTES        = 35

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 3
^STRUCTURE        = "CHAN_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 35
FILE_RECORDS      = 906

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GRS_HEND_TMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CHAN_GRS_HEND_TMP_20030101"
PRODUCT_TYPE      = "CHAN_GRS_HEND_TMP"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
    Temperature of the RKI High Energy Neutron Detector.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 906
ROW_BYTES        = 35

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */

```

```

/* found in the LABEL directory of the archive disk.      */

COLUMNS          = 3
^STRUCTURE        = "CHAN_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 35
FILE_RECORDS      = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GRS_HFTLP_EN.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CHAN_GRS_HFTLP_EN_20030101"
PRODUCT_TYPE      = "CHAN_GRS_HFTLP_EN"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "

Enable status for GRS_HFTLP_P_EXEC command to be processed.

"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS              = 51
ROW_BYTES         = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.      */

COLUMNS          = 3
^STRUCTURE        = "CHAN_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */

```

```

RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES        = 35
FILE_RECORDS        = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "GRS_HFTLP_EX.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "CHAN_GRS_HFTLP_EX_20030101"
PRODUCT_TYPE        = "CHAN_GRS_HFTLP_EX"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "

HFTL primary execute duration.

"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 51
ROW_BYTES           = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS            = 3
^STRUCTURE          = "CHAN_DATA_COLS.FMT"

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES        = 35
FILE_RECORDS        = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "GRS_HFTLS_EN.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "CHAN_GRS_HFTLS_EN_20030101"
PRODUCT_TYPE        = "CHAN_GRS_HFTLS_EN"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "

```

Enable status for GRS_HFTL_S_EXEC command to be processed.

"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY

ROWS = 51

ROW_BYTES = 35

SAMPLING_PARAMETER_NAME = TIME

SAMPLING_PARAMETER_UNIT = TICKS

SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */

/* found in the LABEL directory of the archive disk. */

COLUMNS = 3

^STRUCTURE = "CHAN_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH

RECORD_BYTES = 35

FILE_RECORDS = 51

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "GRS_HFTLS_EX.DAT"

/* IDENTIFICATION DATA ELEMENTS */

PRODUCT_ID = "CHAN_GRS_HFTLS_EX_20030101"

PRODUCT_TYPE = "CHAN_GRS_HFTLS_EX"

/* DESCRIPTIVE data elements */

DESCRIPTION = "

HFTL secondary execute duration.

"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY

ROWS = 51

ROW_BYTES = 35

SAMPLING_PARAMETER_NAME = TIME

```

SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 3
^STRUCTURE = "CHAN_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 35
FILE_RECORDS = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES = "GRS_HT_CRR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID = "CHAN_GRS_HT_CRR_20030101"
PRODUCT_TYPE = "CHAN_GRS_HT_CRR"

/* DESCRIPTIVE data elements */
DESCRIPTION = "

Number of heartbeats from last power-on or last boot
or last system init or last recovery.

"

/* DATA OBJECT DEFINITION */
OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 51
ROW_BYTES = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 3
^STRUCTURE = "CHAN_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

```

```

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 35
FILE_RECORDS         = 906

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "GRS_NS_TMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "CHAN_GRS_NS_TMP_20030101"
PRODUCT_TYPE         = "CHAN_GRS_NS_TMP"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "
    Temperature of the LANL Neutron Sensor.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT   = BINARY
ROWS                  = 906
ROW_BYTES             = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS              = 3
^STRUCTURE            = "CHAN_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 35
FILE_RECORDS         = 51

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "GRS_PWR_NCTR.DAT"

/* IDENTIFICATION DATA ELEMENTS */

```

```
PRODUCT_ID          = "CHAN_GRS_PWR_NCTR_20030101"  
PRODUCT_TYPE       = "CHAN_GRS_PWR_NCTR"
```

```
/* DESCRIPTIVE data elements */  
DESCRIPTION         = "
```

Number of times the GRS power notification command is sent.

"

```
/* DATA OBJECT DEFINITION */  
OBJECT              = TIME_SERIES
```

```
INTERCHANGE_FORMAT = BINARY  
ROWS                = 51  
ROW_BYTES           = 35
```

```
SAMPLING_PARAMETER_NAME = TIME  
SAMPLING_PARAMETER_UNIT = TICKS  
SAMPLING_PARAMETER_INTERVAL = "N/A"
```

```
/* The complete chan definitions are contained in an external file */  
/* found in the LABEL directory of the archive disk. */
```

```
COLUMNS            = 3  
^STRUCTURE          = "CHAN_DATA_COLS.FMT"
```

```
END_OBJECT          = TIME_SERIES
```

```
END_OBJECT          = FILE
```

```
OBJECT              = FILE
```

```
/* FILE CHARACTERISTICS */  
RECORD_TYPE         = FIXED_LENGTH  
RECORD_BYTES        = 35  
FILE_RECORDS        = 51
```

```
/* POINTERS TO DATA OBJECTS */  
^TIME_SERIES        = "GRS_RST_CTR.DAT"
```

```
/* IDENTIFICATION DATA ELEMENTS */  
PRODUCT_ID          = "CHAN_GRS_RST_CTR_20030101"  
PRODUCT_TYPE        = "CHAN_GRS_RST_CTR"
```

```
/* DESCRIPTIVE data elements */  
DESCRIPTION         = "
```

Number of times GRS has been reset.

"

```
/* DATA OBJECT DEFINITION */  
OBJECT              = TIME_SERIES
```

```

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 51
ROW_BYTES             = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 3
^STRUCTURE            = "CHAN_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 35
FILE_RECORDS          = 113

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "GRS_SYNC_T_C.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "CHAN_GRS_SYNC_T_C_20030101"
PRODUCT_TYPE          = "CHAN_GRS_SYNC_T_C"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "

GRS_SYNC_TIME_COARSE

"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 113
ROW_BYTES             = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 3
^STRUCTURE            = "CHAN_DATA_COLS.FMT"

```

```

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 35
FILE_RECORDS        = 113

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "GRS_SYN_CTR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "CHAN_GRS_SYN_CTR_20030101"
PRODUCT_TYPE        = "CHAN_GRS_SYN_CTR"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "

    Number of times GRS has been synched.

"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 113
ROW_BYTES           = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS            = 3
^STRUCTURE          = "CHAN_DATA_COLS.FMT"

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 35
FILE_RECORDS        = 51

```

```

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "HND_PWR_NCTR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CHAN_HND_PWR_NCTR_20030101"
PRODUCT_TYPE      = "CHAN_HND_PWR_NCTR"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "

    Number of times the Hend power notification command is sent.

"

/* DATA OBJECT DEFINITION */
OBJECT             = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS               = 51
ROW_BYTES         = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 3
^STRUCTURE        = "CHAN_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 35
FILE_RECORDS      = 917

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "RPC_1_CUR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CHAN_RPC_1_CUR_20030101"
PRODUCT_TYPE      = "CHAN_RPC_1_CUR"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "

    RPC_SWITCH_1_CURRENT

"

```

```

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS               = 917
ROW_BYTES         = 35

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 3
^STRUCTURE        = "CHAN_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 35
FILE_RECORDS      = 917

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "RPC_3_CUR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CHAN_RPC_3_CUR_20030101"
PRODUCT_TYPE      = "CHAN_RPC_3_CUR"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "

RPC_SWITCH_3_CURRENT

"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS               = 917
ROW_BYTES         = 35

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */

```

```

/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 3
^STRUCTURE            = "CHAN_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 35
FILE_RECORDS          = 917

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "RPC_8_CUR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "CHAN_RPC_8_CUR_20030101"
PRODUCT_TYPE          = "CHAN_RPC_8_CUR"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "

    RPC_SWITCH_8_CURRENT

"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 917
ROW_BYTES              = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 3
^STRUCTURE            = "CHAN_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */

```

```

RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 35
FILE_RECORDS         = 451

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "RPC_8_VLT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "CHAN_RPC_8_VLT_20030101"
PRODUCT_TYPE         = "CHAN_RPC_8_VLT"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "

    RPC_SWITCH_8_VOLTAGE

"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT   = BINARY
ROWS                 = 451
ROW_BYTES             = 35

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 3
^STRUCTURE             = "CHAN_DATA_COLS.FMT"

END_OBJECT             = TIME_SERIES

END_OBJECT             = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 35
FILE_RECORDS          = 917

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "RPC_9_CUR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "CHAN_RPC_9_CUR_20030101"
PRODUCT_TYPE          = "CHAN_RPC_9_CUR"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "

```

```

RPC_SWITCH_9_CURRENT
"
/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                 = 917
ROW_BYTES            = 35

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete chan definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 3
^STRUCTURE        = "CHAN_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

END

```

1.2. CHAN_DATA_COLS.FMT

```

OBJECT = COLUMN
COLUMN_NUMBER = 1
NAME = SC_RECV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 1
DESCRIPTION = "
The spacecraft time at which the channelized data was generated.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = UTC
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 9
DESCRIPTION = "
SC_RECV_TIME converted to UTC, stored as yyyy-mm-ddThh:mm:ss.sss.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 3

```

```

NAME = PROCESSED_VAL
DATA_TYPE = IEEE_REAL
BYTES = 4
START_BYTE = 32
DESCRIPTION = "
Processed engineering value of reading.
"
END_OBJECT = COLUMN

```

2. COMMAND LIST

2.1. COMMAND_LIST_YYYYMMDD.LBL

```
PDS_VERSION_ID = PDS3
```

```
/* FILE CHARACTERISTICS */
```

```

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 77
FILE_RECORDS = 35267

```

```
/* POINTERS TO DATA OBJECTS */
```

```
^TABLE = "COMMAND_LIST_20030101.DAT"
```

```
/* IDENTIFICATION DATA ELEMENTS */
```

```

DATA_SET_NAME = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_ID = "COMMAND_LIST_20030101"
PRODUCT_TYPE = "COMMAND_LIST"
PRODUCT_VERSION_ID = "1.0"
RELEASE_ID = "0005"

```

```
/* DESCRIPTIVE DATA ELEMENTS */
```

```

INSTRUMENT_HOST_NAME = "2001 MARS ODYSSEY"
INSTRUMENT_NAME = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID = ODY
TARGET_NAME = MARS
MISSION_PHASE_NAME = MAPPING
START_TIME = 2003-01-01T00:00:11.998
STOP_TIME = 2003-01-01T23:59:42.999
SPACECRAFT_CLOCK_START_COUNT = 185816707370
SPACECRAFT_CLOCK_STOP_COUNT = 185838818382
PRODUCT_CREATION_TIME = 2004-02-16T17:00:08.017

```

```
/* DATA OBJECT DEFINITION */
```

```
OBJECT = TABLE
```

```

INTERCHANGE_FORMAT = BINARY
ROWS = 35267
ROW_BYTES = 77

```

```
/* DESCRIPTIVE data elements */
```

```

DESCRIPTION = "
Commands that have been place on the FIS. Possible opcodes are as
follows:

```

1 SC_TIME_OPCODE spacecraft time command
 2 EQ_XING_ASC_OPCODE ascending equator crossing command
 3 ANNEAL_DOOR_OPCODE enable the anneal door to be moved
 4 HEND_POWER_OPCODE spacecraft hend power state command
 5 SHUTDOWN_OPCODE grs system is about to be shutdown
 6 IMED_SHUTDOWN_OPCODE grs system is going down immediately
 7 ANNEAL_ENABLE_OPCODE enable anneal to happen
 10 GAMMA_CMD_OPCODE gamma command
 11 GAMMA_RESET_OPCODE issue reset to gamma board
 12 CHG_GPA_HTR_OPCODE turn on or off the gpa heater
 13 RAMP_GAMMA_OPCODE ramp gamma high voltage
 14 STOP_GAMMA_RAMP_OPCODE stop ramping gamma high voltage
 20 LANL_CMD_OPCODE lanl command
 21 LANL_PRISM_OPCODE lanl prisms
 22 LANL_ALL_PRISM_OPCODE resets all prisms
 23 LANL_MODE_OPCODE lanl modes
 24 LANL_HVPS_OPCODE lanl hi voltage
 25 LANL_HVPS_CNTRL_OPCODE hi voltage control
 26 LANL_MUX_OPCODE set lanl mux
 27 LANL_SWAP_OPCODE lanl swap prompt/delay
 28 LANL_RUN_OPCODE lanl run command
 29 LANL_RESET_OPCODE issues a reset to lanl board
 35 HEND_CMD_OPCODE hend command
 36 CHG_HEND_STATUS_OPCODE changes the hend status lines
 45 CHG_MODE_OPCODE change grs operating mode
 46 CHG_ANALOG_OPCODE change and analog table entry
 47 CHG_PARAM_OPCODE change a parameters value
 48 RELOAD_TABLE_OPCODE reload a table from eeprom
 49 DOOR_PWR_CNTRL_OPCODE manually control door or latch powers
 50 ANNEAL_PWR_CNTRL_OPCODE manually control anneal heaters
 51 CAL_CURR_CNTRL_OPCODE change state of cal_curr bit in pcon reg
 52 OP_HTR_OPCODE change state of op_htr bit in pcon reg
 53 CEB_HTR_OPCODE change state of pwr_spare bit in pcon reg
 55 CHG_STATE_OPCODE change the power state
 56 CHG_SEQ_OPCODE change a command sequence
 57 EXEC_SEQ_OPCODE execute a command sequence
 58 CHG_INTERVAL_OPCODE change an instruments collection interval
 59 CHG_CLCT_OPCODE turn instrument data collect
 60 CHG_CEB_INT_OPCODE change a CEB timer interval
 61 CHG_TIMEOUT_OPCODE change the sc or hend rcv timeout
 62 DELETE_SEQ_OPCODE deletes a sequence
 65 DELETE_ALL_OPCODE delete all delayed commands
 66 DELETE_ONE_OPCODE delete one delayed command
 67 DOOR_OPCODE move the anneal door
 69 RESET_OPCODE reset the flight software
 70 ANNEAL_OPCODE starts or stops the anneal process
 71 EEPROM_EN_DIS_OPCODE enable the changing of eeprom write state
 75 MEM_LOAD_OPCODE upload new code or data
 76 DUMP_PARAMS_OPCODE download the parameter table
 77 DUMP_ANALOG_OPCODE download the analog table
 78 DUMP_FPGA_REGS_OPCODE download the FPGA registers
 79 DUMP_DMA_REGS_OPCODE download the DMA registers
 80 MEM_DUMP_OPCODE download a portion of memory
 81 DUMP_SEQ_OPCODE download a sequence
 82 DUMP_COUNTS_OPCODE download the sent data counts
 83 FILE_MEMLOAD_OPCODE upload file, data padded to 1000 bytes

```

85 SAVE_TO_EE_OPCODE save data to eeprom
86 CHG_TRACE_OPCODE change the fsw debug level
87 START_FSW_OPCODE start the fsw
98 PASS_THRU_OPCODE future GRS command
100 GET_VERSION_OPCODE returns the current version #
101 WRITE_REG_OPCODE write a value to a register location
102 SET_ORB_DURATION_OPCODE change the duration of the orbit
103 TRIGGER_BURST_OPCODE trigger a manual burst
104 NO_OP_OPCODE does nothing, generates message
105 ERROR_OPCODE generates an error message
106 GET_HEARTBEAT_CNT_OPCODE returns the number of heartbeats sent

```

"

```

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

```

```

COLUMNS          = 13
^STRUCTURE        = "COMMAND_LIST_COLS.FMT"

END_OBJECT        = TABLE

END

```

2.2. COMMAND_LIST_COLS.FMT

```

OBJECT = COLUMN
COLUMN_NUMBER = 1
NAME = CMD_ID
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 1
DESCRIPTION = "
ID of the command that was sent to the FIS.
"

```

END_OBJECT = COLUMN

```

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = OPCODE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 3
DESCRIPTION = "
Opcode of the command. See Label for values.
"

```

END_OBJECT = COLUMN

```

OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = FIS_CMD_TYPE
DATA_TYPE = MSB_INTEGER
BYTES = 1
START_BYTE = 5

```

```

INVALID_CONSTANT = -1
DESCRIPTION = "
Flags whether command is interactive (1) or not (0).
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = FIS_SEND_TIME
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 6
DESCRIPTION = "
UTC time when the command was sent to the FIS, stored as
yyyy-mm-ddThh:mm:ss.sss.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 5
NAME = SC_SENT_TIME
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 29
DESCRIPTION = "
Approximate time command was sent to the spacecraft, stored as
yyyy-mm-ddThh:mm:ss.sss.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 6
NAME = GRS_EXEC_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 52
DESCRIPTION = "
CEB time when command was executed.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 7
NAME = TIME_ORBIT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 60
DESCRIPTION = "
The time or orbit/pixel at which the command should be executed. If
TIME_ORBIT_FLAG is true, lowest two bytes contain the pixel, next two
bytes contain the orbit. If TIME_ORBIT is zero, the command is to be
executed immediately.
"
END_OBJECT = COLUMN

OBJECT = COLUMN

```

```

COLUMN_NUMBER = 8
NAME = TIME_ORBIT_FLAG
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 68
DESCRIPTION = "
True if the command to be executed by orbit/pixel, false if by time
value.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 9
NAME = DELAY_FLAG
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 69
DESCRIPTION = "
If non-zero, this a delayed command, to be executed at the time or
orbit value given in TIME_ORBIT.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 10
NAME = PARM1
DATA_TYPE = MSB_INTEGER
BYTES = 2
START_BYTE = 70
DESCRIPTION = "
First command argument.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 11
NAME = PARM2
DATA_TYPE = MSB_INTEGER
BYTES = 2
START_BYTE = 72
DESCRIPTION = "
Second command argument.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 12
NAME = PARM3
DATA_TYPE = MSB_INTEGER
BYTES = 2
START_BYTE = 74
DESCRIPTION = "
Third command argument.
"
END_OBJECT = COLUMN

```

```

OBJECT = COLUMN
  COLUMN_NUMBER = 13
  NAME = EXEC_CODE
  DATA_TYPE = MSB_INTEGER
  BYTES = 2
  START_BYTE = 76
  INVALID_CONSTANT = -1
  DESCRIPTION = "
  Completion code for command. If the command executed with no errors
  this value will be zero otherwise it will be the error message id (MSG_ID)
  of the last error that occurred.
  "
END_OBJECT = COLUMN

```

3. ENGINEERING DATA

3.1. ENG_DATA_YYYYMMDD.LBL

```

PDS_VERSION_ID          = PDS3

/* IDENTIFICATION DATA ELEMENTS for all referenced files */
DATA_SET_NAME           = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID             = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_VERSION_ID     = "1.0"
RELEASE_ID              = "0005"

/* DESCRIPTIVE DATA ELEMENTS for all referenced files */
INSTRUMENT_HOST_NAME   = "2001 MARS ODYSSEY"
INSTRUMENT_NAME        = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID          = ODY
TARGET_NAME            = MARS
MISSION_PHASE_NAME     = MAPPING
START_TIME             = 2003-01-01T00:00:11.279
STOP_TIME              = 2003-01-01T23:59:57.710
SPACECRAFT_CLOCK_START_COUNT = 185816707186
SPACECRAFT_CLOCK_STOP_COUNT = 185838822148
PRODUCT_CREATION_TIME  = 2004-02-16T16:57:52.380

OBJECT                  = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE            = FIXED_LENGTH
RECORD_BYTES          = 51
FILE_RECORDS          = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "PLUS_5V_ANLG.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "PLUS_5V_ANLG_20030101"
PRODUCT_TYPE          = "PLUS_5V_ANLG"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "

```

Neutron Spectrometer Plus 5 voltage, in Volts.

"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY

ROWS = 1945

ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME

SAMPLING_PARAMETER_UNIT = TICKS

SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */

/* found in the LABEL directory of the archive disk. */

COLUMNS = 6

^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH

RECORD_BYTES = 51

FILE_RECORDS = 1945

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "GAMMA_PLUS_5V_DIG_RAIL_CRNT.DAT"

/* IDENTIFICATION DATA ELEMENTS */

PRODUCT_ID = "GAMMA_PLUS_5V_DIG_RAIL_CRNT_20030101"

PRODUCT_TYPE = "GAMMA_PLUS_5V_DIG_RAIL_CRNT"

/* DESCRIPTIVE data elements */

DESCRIPTION = "

"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY

ROWS = 1945

ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME

SAMPLING_PARAMETER_UNIT = TICKS

SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */

```

/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 51
FILE_RECORDS          = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "GAMMA_ELEC_SLOW.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "GAMMA_ELEC_SLOW_20030101"
PRODUCT_TYPE          = "GAMMA_ELEC_SLOW"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "
Electrometer slow current, in nanoAmps.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 1945
ROW_BYTES              = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 51

```

```

FILE_RECORDS          = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "CEB_HTR_CNTRL_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "CEB_HTR_CNTRL_TEMP_20030101"
PRODUCT_TYPE          = "CEB_HTR_CNTRL_TEMP"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "
Heater Control temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 1945
ROW_BYTES              = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE             = "ENG_DATA_COLS.FMT"

END_OBJECT             = TIME_SERIES

END_OBJECT             = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE            = FIXED_LENGTH
RECORD_BYTES           = 51
FILE_RECORDS           = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "PLUS_5V_CRNT_DIG.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "PLUS_5V_CRNT_DIG_20030101"
PRODUCT_TYPE          = "PLUS_5V_CRNT_DIG"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "
Neutron Spectrometer Plus 5 volt digital current, in milliAmps.
"

/* DATA OBJECT DEFINITION */

```

```

OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS               = 1945
ROW_BYTES          = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.                */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "MINUS_5V_CRNT_ANLG.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "MINUS_5V_CRNT_ANLG_20030101"
PRODUCT_TYPE      = "MINUS_5V_CRNT_ANLG"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Neutron Spectrometer Minus 5 volt current, in milliAmps.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS               = 1945
ROW_BYTES          = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.                */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

```

```

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 51
FILE_RECORDS        = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "GAMMA_PLUS_12V_PULSE_AMP_CRNT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "GAMMA_PLUS_12V_PULSE_AMP_CRNT_20030101"
PRODUCT_TYPE        = "GAMMA_PLUS_12V_PULSE_AMP_CRNT"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 1945
ROW_BYTES           = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS            = 6
^STRUCTURE           = "ENG_DATA_COLS.FMT"

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 51
FILE_RECORDS        = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "GAMMA_HVBS_MNTR.DAT"

```

```

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "GAMMA_HVBS_MNTR_20030101"
PRODUCT_TYPE       = "GAMMA_HVBS_MNTR"

/* DESCRIPTIVE data elements */
DESCRIPTION         = "
High voltage bias supply readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS                = 1945
ROW_BYTES           = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS           = 6
^STRUCTURE         = "ENG_DATA_COLS.FMT"

END_OBJECT         = TIME_SERIES

END_OBJECT         = FILE

OBJECT             = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE        = FIXED_LENGTH
RECORD_BYTES       = 51
FILE_RECORDS       = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES       = "CEB_MAIN_ACTUATOR_CURR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "CEB_MAIN_ACTUATOR_CURR_20030101"
PRODUCT_TYPE       = "CEB_MAIN_ACTUATOR_CURR"

/* DESCRIPTIVE data elements */
DESCRIPTION         = "
Main actuator current, in Amps.
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS                = 3891

```

```

ROW_BYTES          = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GAMMA_REF_VOLT_166.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "GAMMA_REF_VOLT_166_20030101"
PRODUCT_TYPE      = "GAMMA_REF_VOLT_166"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
166 Reference voltage, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS              = 1945
ROW_BYTES         = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

```

```

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "CEB_SPARE_CURR_SENSE_3.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "CEB_SPARE_CURR_SENSE_3_20030101"
PRODUCT_TYPE    = "CEB_SPARE_CURR_SENSE_3"

/* DESCRIPTIVE data elements */
DESCRIPTION      = "
Spare current sensor, in Amps.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS           = 1945
ROW_BYTES      = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS       = 6
^STRUCTURE     = "ENG_DATA_COLS.FMT"

END_OBJECT     = TIME_SERIES

END_OBJECT     = FILE

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "CEB_SPARE_CURR_SENSE_2.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "CEB_SPARE_CURR_SENSE_2_20030101"
PRODUCT_TYPE    = "CEB_SPARE_CURR_SENSE_2"

```

```

/* DESCRIPTIVE data elements */
DESCRIPTION      = "
Spare current sensor, in Amps.
"

/* DATA OBJECT DEFINITION */
OBJECT           = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                 = 1945
ROW_BYTES            = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GAMMA_VREF_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "GAMMA_VREF_TEMP_20030101"
PRODUCT_TYPE      = "GAMMA_VREF_TEMP"

/* DESCRIPTIVE data elements */
DESCRIPTION      = "
V reference temperature readings, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT           = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                 = 3891
ROW_BYTES            = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS

```

```

SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "B_170K_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "B_170K_TEMP_20030101"
PRODUCT_TYPE      = "B_170K_TEMP"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
B_170K Card temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS              = 3891
ROW_BYTES         = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

```

```

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51
FILE_RECORDS         = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "CEB_IS_TEMP_B.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "CEB_IS_TEMP_B_20030101"
PRODUCT_TYPE         = "CEB_IS_TEMP_B"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "
Inner Stage B temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT   = BINARY
ROWS                  = 3891
ROW_BYTES             = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS              = 6
^STRUCTURE             = "ENG_DATA_COLS.FMT"

END_OBJECT             = TIME_SERIES

END_OBJECT             = FILE

OBJECT                 = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51
FILE_RECORDS         = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "GAMMA_HVBS_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "GAMMA_HVBS_TEMP_20030101"
PRODUCT_TYPE         = "GAMMA_HVBS_TEMP"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "
High voltage bias supply temperature readings, in Celsius.

```

```

"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 3891
ROW_BYTES        = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "CEB_IS_TEMP_A.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CEB_IS_TEMP_A_20030101"
PRODUCT_TYPE      = "CEB_IS_TEMP_A"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Inner Stage A temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 3891
ROW_BYTES        = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

```

```

    COLUMNS          = 6
    ^STRUCTURE        = "ENG_DATA_COLS.FMT"

    END_OBJECT        = TIME_SERIES

    END_OBJECT        = FILE

    OBJECT            = FILE

/* FILE CHARACTERISTICS */
    RECORD_TYPE       = FIXED_LENGTH
    RECORD_BYTES      = 51
    FILE_RECORDS      = 3891

/* POINTERS TO DATA OBJECTS */
    ^TIME_SERIES      = "CEB_PS2_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
    PRODUCT_ID        = "CEB_PS2_TEMP_20030101"
    PRODUCT_TYPE      = "CEB_PS2_TEMP"

/* DESCRIPTIVE data elements */
    DESCRIPTION       = "
    Power supply sensor 2 temperature, in Celsius.
    "

/* DATA OBJECT DEFINITION */
    OBJECT            = TIME_SERIES

    INTERCHANGE_FORMAT = BINARY
    ROWS              = 3891
    ROW_BYTES         = 51

    SAMPLING_PARAMETER_NAME = TIME
    SAMPLING_PARAMETER_UNIT = TICKS
    SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

    COLUMNS          = 6
    ^STRUCTURE        = "ENG_DATA_COLS.FMT"

    END_OBJECT        = TIME_SERIES

    END_OBJECT        = FILE

    OBJECT            = FILE

/* FILE CHARACTERISTICS */
    RECORD_TYPE       = FIXED_LENGTH
    RECORD_BYTES      = 51
    FILE_RECORDS      = 1945

```

```

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GAMMA_PLUS_12V_HVBS_RAIL_CRNT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "GAMMA_PLUS_12V_HVBS_RAIL_CRNT_20030101"
PRODUCT_TYPE      = "GAMMA_PLUS_12V_HVBS_RAIL_CRNT"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
"

/* DATA OBJECT DEFINITION */
OBJECT             = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS               = 1945
ROW_BYTES          = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "CEB_CPU_PLUS_5.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CEB_CPU_PLUS_5_20030101"
PRODUCT_TYPE      = "CEB_CPU_PLUS_5"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
CPU plus 5 voltage, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

```

```

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 1945
ROW_BYTES             = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 51
FILE_RECORDS          = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "CEB_ALT_ACT_CURR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "CEB_ALT_ACT_CURR_20030101"
PRODUCT_TYPE          = "CEB_ALT_ACT_CURR"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "
Alternate actuator current, in Amps.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 3891
ROW_BYTES             = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

```

```

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE        = FIXED_LENGTH
RECORD_BYTES       = 51
FILE_RECORDS       = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES       = "CEB_AD_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID         = "CEB_AD_TEMP_20030101"
PRODUCT_TYPE       = "CEB_AD_TEMP"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
A to D converter temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT             = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS               = 1945
ROW_BYTES          = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE        = FIXED_LENGTH
RECORD_BYTES       = 51
FILE_RECORDS       = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES       = "CEB_PLUS_12V_CEB_AN.DAT"

```

```
/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "CEB_PLUS_12V_CEB_AN_20030101"
PRODUCT_TYPE        = "CEB_PLUS_12V_CEB_AN"
```

```
/* DESCRIPTIVE data elements */
DESCRIPTION          = "
Plus 12 volt readings, in Volts.
"
```

```
/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES
```

```
INTERCHANGE_FORMAT = BINARY
ROWS                = 1945
ROW_BYTES           = 51
```

```
SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"
```

```
/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */
```

```
COLUMNS           = 6
^STRUCTURE          = "ENG_DATA_COLS.FMT"
```

```
END_OBJECT         = TIME_SERIES
```

```
END_OBJECT         = FILE
```

```
OBJECT             = FILE
```

```
/* FILE CHARACTERISTICS */
RECORD_TYPE        = FIXED_LENGTH
RECORD_BYTES       = 51
FILE_RECORDS       = 1945
```

```
/* POINTERS TO DATA OBJECTS */
^TIME_SERIES       = "PREAMP_TEMP.DAT"
```

```
/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "PREAMP_TEMP_20030101"
PRODUCT_TYPE        = "PREAMP_TEMP"
```

```
/* DESCRIPTIVE data elements */
DESCRIPTION          = "
Neutron Spectrometer Preamp temperature readings, in Celsius.
"
```

```
/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES
```

```
INTERCHANGE_FORMAT = BINARY
ROWS                = 1945
ROW_BYTES           = 51
```

```

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 6
^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 51
FILE_RECORDS = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES = "CEB_PC_CURR_REF.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID = "CEB_PC_CURR_REF_20030101"
PRODUCT_TYPE = "CEB_PC_CURR_REF"

/* DESCRIPTIVE data elements */
DESCRIPTION = "
PC current reference, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 1945
ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 6
^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

```

```

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "GAMMA_MINUS_12V_RAIL_VOLT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "GAMMA_MINUS_12V_RAIL_VOLT_20030101"
PRODUCT_TYPE    = "GAMMA_MINUS_12V_RAIL_VOLT"

/* DESCRIPTIVE data elements */
DESCRIPTION      = "
Minus 12 volt rail readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS           = 1945
ROW_BYTES      = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS       = 6
^STRUCTURE     = "ENG_DATA_COLS.FMT"

END_OBJECT     = TIME_SERIES

END_OBJECT     = FILE

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "MINUS_5V_ANLG.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "MINUS_5V_ANLG_20030101"
PRODUCT_TYPE    = "MINUS_5V_ANLG"

```

```

/* DESCRIPTIVE data elements */
DESCRIPTION      = "
Neutron Spectrometer Minus 5 voltage, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT           = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                 = 1945
ROW_BYTES            = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS           = 6
^STRUCTURE         = "ENG_DATA_COLS.FMT"

END_OBJECT         = TIME_SERIES

END_OBJECT         = FILE

OBJECT             = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE        = FIXED_LENGTH
RECORD_BYTES       = 51
FILE_RECORDS       = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES       = "CEB_AGND.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID         = "CEB_AGND_20030101"
PRODUCT_TYPE       = "CEB_AGND"

/* DESCRIPTIVE data elements */
DESCRIPTION      = "
AGND readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT           = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                 = 1945
ROW_BYTES            = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

```

```

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "CEB_MINUS_12V_CEB_AN.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CEB_MINUS_12V_CEB_AN_20030101"
PRODUCT_TYPE      = "CEB_MINUS_12V_CEB_AN"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Minus 12 volt analog readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS              = 1945
ROW_BYTES         = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */

```

```

RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51
FILE_RECORDS         = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "GAMMA_SPARE_2.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "GAMMA_SPARE_2_20030101"
PRODUCT_TYPE         = "GAMMA_SPARE_2"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "
Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT   = BINARY
ROWS                  = 1945
ROW_BYTES             = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS              = 6
^STRUCTURE             = "ENG_DATA_COLS.FMT"

END_OBJECT             = TIME_SERIES

END_OBJECT             = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51
FILE_RECORDS         = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "CEB_AGND_SPARE3.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "CEB_AGND_SPARE3_20030101"
PRODUCT_TYPE         = "CEB_AGND_SPARE3"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "
AGND spare3 voltage, in Volts.
"

```

```

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 1945
ROW_BYTES        = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GAMMA_SPARE_1.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "GAMMA_SPARE_1_20030101"
PRODUCT_TYPE      = "GAMMA_SPARE_1"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 1945
ROW_BYTES        = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

```

```

    COLUMNS          = 6
    ^STRUCTURE        = "ENG_DATA_COLS.FMT"

    END_OBJECT        = TIME_SERIES

    END_OBJECT        = FILE

    OBJECT            = FILE

    /* FILE CHARACTERISTICS */
    RECORD_TYPE       = FIXED_LENGTH
    RECORD_BYTES      = 51
    FILE_RECORDS      = 5413

    /* POINTERS TO DATA OBJECTS */
    ^TIME_SERIES      = "CEB_AGND_SPARE2.DAT"

    /* IDENTIFICATION DATA ELEMENTS */
    PRODUCT_ID        = "CEB_AGND_SPARE2_20030101"
    PRODUCT_TYPE      = "CEB_AGND_SPARE2"

    /* DESCRIPTIVE data elements */
    DESCRIPTION       = "
    AGND spare2 voltage, in Volts.
    "

    /* DATA OBJECT DEFINITION */
    OBJECT            = TIME_SERIES

    INTERCHANGE_FORMAT = BINARY
    ROWS              = 5413
    ROW_BYTES         = 51

    SAMPLING_PARAMETER_NAME = TIME
    SAMPLING_PARAMETER_UNIT = TICKS
    SAMPLING_PARAMETER_INTERVAL = "N/A"

    /* The complete column definitions are contained in an external file */
    /* found in the LABEL directory of the archive disk.          */

    COLUMNS          = 6
    ^STRUCTURE        = "ENG_DATA_COLS.FMT"

    END_OBJECT        = TIME_SERIES

    END_OBJECT        = FILE

    OBJECT            = FILE

    /* FILE CHARACTERISTICS */
    RECORD_TYPE       = FIXED_LENGTH
    RECORD_BYTES      = 51
    FILE_RECORDS      = 1945

```

```

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "CEB_AGND_SPARE1.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CEB_AGND_SPARE1_20030101"
PRODUCT_TYPE      = "CEB_AGND_SPARE1"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
AGND spare1 voltage, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT             = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS               = 1945
ROW_BYTES          = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GAMMA_GPA_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "GAMMA_GPA_TEMP_20030101"
PRODUCT_TYPE      = "GAMMA_GPA_TEMP"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Gamma Pulse Analyzer temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

```

```

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 3891
ROW_BYTES             = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 51
FILE_RECORDS          = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "GAMMA_MINUS_12V_PULSE_AMP_CRNT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "GAMMA_MINUS_12V_PULSE_AMP_CRNT_20030101"
PRODUCT_TYPE          = "GAMMA_MINUS_12V_PULSE_AMP_CRNT"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 1945
ROW_BYTES             = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

```

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 51
FILE_RECORDS = 1945

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "CEB_PLUS_5_CRYO.DAT"

/* IDENTIFICATION DATA ELEMENTS */

PRODUCT_ID = "CEB_PLUS_5_CRYO_20030101"
PRODUCT_TYPE = "CEB_PLUS_5_CRYO"

/* DESCRIPTIVE data elements */

DESCRIPTION = "
Plus 5 cryo voltage, in Volts.
"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 1945
ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 6
^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 51
FILE_RECORDS = 3891

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "CEB_MNT_RNG_TEMP_B.DAT"

/* IDENTIFICATION DATA ELEMENTS */

```

PRODUCT_ID          = "CEB_MNT_RNG_TEMP_B_20030101"
PRODUCT_TYPE       = "CEB_MNT_RNG_TEMP_B"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Mounting Ring B temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS             = 3891
ROW_BYTES       = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "CEB_MNT_RNG_TEMP_A.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CEB_MNT_RNG_TEMP_A_20030101"
PRODUCT_TYPE      = "CEB_MNT_RNG_TEMP_A"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Mounting Ring A temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS             = 3891
ROW_BYTES       = 51

```

```

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 6
^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 51
FILE_RECORDS = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES = "GAMMA_ELEC_FAST.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID = "GAMMA_ELEC_FAST_20030101"
PRODUCT_TYPE = "GAMMA_ELEC_FAST"

/* DESCRIPTIVE data elements */
DESCRIPTION = "
Electrometer fast current, in nanoAmps.
"

/* DATA OBJECT DEFINITION */
OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 1945
ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 6
^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

```

```

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "GAMMA_VDD_DIRECT_MNTR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "GAMMA_VDD_DIRECT_MNTR_20030101"
PRODUCT_TYPE    = "GAMMA_VDD_DIRECT_MNTR"

/* DESCRIPTIVE data elements */
DESCRIPTION     = "
VDD direct monitor readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS           = 1945
ROW_BYTES      = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS       = 6
^STRUCTURE     = "ENG_DATA_COLS.FMT"

END_OBJECT     = TIME_SERIES

END_OBJECT     = FILE

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "GAMMA_REF_VOLT_500.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "GAMMA_REF_VOLT_500_20030101"
PRODUCT_TYPE    = "GAMMA_REF_VOLT_500"

/* DESCRIPTIVE data elements */

```

```

DESCRIPTION          = "
500 reference voltage, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT               = TIME_SERIES

INTERCHANGE_FORMAT   = BINARY
ROWS                 = 1945
ROW_BYTES            = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.                */

COLUMNS             = 6
^STRUCTURE           = "ENG_DATA_COLS.FMT"

END_OBJECT           = TIME_SERIES

END_OBJECT           = FILE

OBJECT               = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51
FILE_RECORDS         = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "GAMMA_MINUS_12V_RAIL_CRNT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "GAMMA_MINUS_12V_RAIL_CRNT_20030101"
PRODUCT_TYPE         = "GAMMA_MINUS_12V_RAIL_CRNT"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "
Minus 12 volt rail current readings, in milliAmps.
"

/* DATA OBJECT DEFINITION */
OBJECT               = TIME_SERIES

INTERCHANGE_FORMAT   = BINARY
ROWS                 = 1945
ROW_BYTES            = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

```

```

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GAMMA_PLUS_12V_RAIL_VOLT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "GAMMA_PLUS_12V_RAIL_VOLT_20030101"
PRODUCT_TYPE      = "GAMMA_PLUS_12V_RAIL_VOLT"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Plus 12 volt rail readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS              = 1945
ROW_BYTES         = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH

```

```

RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "CEB_PS1_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "CEB_PS1_TEMP_20030101"
PRODUCT_TYPE      = "CEB_PS1_TEMP"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
Power supply sensor 1 temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS              = 1945
ROW_BYTES         = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GAMMA_DAC_7.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "GAMMA_DAC_7_20030101"
PRODUCT_TYPE      = "GAMMA_DAC_7"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
DAC 7 readings, in Volts.
"

```

```

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 1945
ROW_BYTES        = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS        = 6
^STRUCTURE      = "ENG_DATA_COLS.FMT"

END_OBJECT      = TIME_SERIES

END_OBJECT      = FILE

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "GAMMA_DAC_6.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "GAMMA_DAC_6_20030101"
PRODUCT_TYPE    = "GAMMA_DAC_6"

/* DESCRIPTIVE data elements */
DESCRIPTION     = "
DAC 6 readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 1945
ROW_BYTES        = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS        = 6

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```

^STRUCTURE          = "ENG_DATA_COLS.FMT"

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 51
FILE_RECORDS        = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "GAMMA_DAC_5.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "GAMMA_DAC_5_20030101"
PRODUCT_TYPE        = "GAMMA_DAC_5"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "
DAC 5 readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 1945
ROW_BYTES           = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS            = 6
^STRUCTURE          = "ENG_DATA_COLS.FMT"

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 51
FILE_RECORDS        = 1945

/* POINTERS TO DATA OBJECTS */

```

```

^TIME_SERIES          = "CEB_CPU_PLUS_5_CURR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "CEB_CPU_PLUS_5_CURR_20030101"
PRODUCT_TYPE        = "CEB_CPU_PLUS_5_CURR"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "
CPU plus 5 current, in Amps.
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 1945
ROW_BYTES           = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS            = 6
^STRUCTURE          = "ENG_DATA_COLS.FMT"

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 51
FILE_RECORDS        = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "CEB_PS_CURR_REF.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "CEB_PS_CURR_REF_20030101"
PRODUCT_TYPE        = "CEB_PS_CURR_REF"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "
PS current reference, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY

```

```

ROWS          = 1945
ROW_BYTES     = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS      = 6
^STRUCTURE    = "ENG_DATA_COLS.FMT"

END_OBJECT    = TIME_SERIES

END_OBJECT    = FILE

OBJECT        = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE   = FIXED_LENGTH
RECORD_BYTES  = 51
FILE_RECORDS  = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES  = "GAMMA_DAC_4.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID    = "GAMMA_DAC_4_20030101"
PRODUCT_TYPE  = "GAMMA_DAC_4"

/* DESCRIPTIVE data elements */
DESCRIPTION    = "
DAC 4 readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT        = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS          = 1945
ROW_BYTES     = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS      = 6
^STRUCTURE    = "ENG_DATA_COLS.FMT"

END_OBJECT    = TIME_SERIES

```

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH

RECORD_BYTES = 51

FILE_RECORDS = 1945

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "GAMMA_PLUS_5V_DIG_RAIL_VOLT.DAT"

/* IDENTIFICATION DATA ELEMENTS */

PRODUCT_ID = "GAMMA_PLUS_5V_DIG_RAIL_VOLT_20030101"

PRODUCT_TYPE = "GAMMA_PLUS_5V_DIG_RAIL_VOLT"

/* DESCRIPTIVE data elements */

DESCRIPTION = "

"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY

ROWS = 1945

ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME

SAMPLING_PARAMETER_UNIT = TICKS

SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */

/* found in the LABEL directory of the archive disk. */

COLUMNS = 6

^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH

RECORD_BYTES = 51

FILE_RECORDS = 1945

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "GAMMA_MUX_OFFSET.DAT"

/* IDENTIFICATION DATA ELEMENTS */

PRODUCT_ID = "GAMMA_MUX_OFFSET_20030101"

```

PRODUCT_TYPE          = "GAMMA_MUX_OFFSET"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "
MUX offset readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 1945
ROW_BYTES             = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 51
FILE_RECORDS          = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "CEB_OS_TEMP_B.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "CEB_OS_TEMP_B_20030101"
PRODUCT_TYPE          = "CEB_OS_TEMP_B"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "
Outer Stage B temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 3891
ROW_BYTES             = 51

SAMPLING_PARAMETER_NAME = TIME

```

```

SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 6
^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 51
FILE_RECORDS = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES = "GAMMA_DAC_3.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID = "GAMMA_DAC_3_20030101"
PRODUCT_TYPE = "GAMMA_DAC_3"

/* DESCRIPTIVE data elements */
DESCRIPTION = "
DAC 3 readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 1945
ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 6
^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

```

```

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51
FILE_RECORDS         = 3891

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "CEB_OS_TEMP_A.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "CEB_OS_TEMP_A_20030101"
PRODUCT_TYPE         = "CEB_OS_TEMP_A"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "
Outer Stage A temperature, in Celsius.
"

/* DATA OBJECT DEFINITION */
OBJECT               = TIME_SERIES

INTERCHANGE_FORMAT   = BINARY
ROWS                 = 3891
ROW_BYTES            = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS             = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT           = TIME_SERIES

END_OBJECT           = FILE

OBJECT               = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51
FILE_RECORDS         = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "GAMMA_DAC_2.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "GAMMA_DAC_2_20030101"
PRODUCT_TYPE         = "GAMMA_DAC_2"

/* DESCRIPTIVE data elements */
DESCRIPTION           = "

```

DAC 2 readings, in Volts.

"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY

ROWS = 1945

ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME

SAMPLING_PARAMETER_UNIT = TICKS

SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */

/* found in the LABEL directory of the archive disk. */

COLUMNS = 6

^STRUCTURE = "ENG_DATA_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH

RECORD_BYTES = 51

FILE_RECORDS = 1945

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "CEB_CPU_TEMP.DAT"

/* IDENTIFICATION DATA ELEMENTS */

PRODUCT_ID = "CEB_CPU_TEMP_20030101"

PRODUCT_TYPE = "CEB_CPU_TEMP"

/* DESCRIPTIVE data elements */

DESCRIPTION = "

CEB CPU temperature, in Celsius.

"

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY

ROWS = 1945

ROW_BYTES = 51

SAMPLING_PARAMETER_NAME = TIME

SAMPLING_PARAMETER_UNIT = TICKS

SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */

```

/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51
FILE_RECORDS         = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES         = "GAMMA_DAC_1.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID           = "GAMMA_DAC_1_20030101"
PRODUCT_TYPE         = "GAMMA_DAC_1"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "
DAC 1 readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 1945
ROW_BYTES           = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE            = "ENG_DATA_COLS.FMT"

END_OBJECT            = TIME_SERIES

END_OBJECT            = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE          = FIXED_LENGTH
RECORD_BYTES         = 51

```

```

FILE_RECORDS          = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "GAMMA_DAC_0.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "GAMMA_DAC_0_20030101"
PRODUCT_TYPE          = "GAMMA_DAC_0"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "
DAC 0 readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT                = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                  = 1945
ROW_BYTES              = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS              = 6
^STRUCTURE             = "ENG_DATA_COLS.FMT"

END_OBJECT             = TIME_SERIES

END_OBJECT             = FILE

OBJECT                = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE            = FIXED_LENGTH
RECORD_BYTES           = 51
FILE_RECORDS          = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "GAMMA_HVBS_ENABLE_MNTR.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID            = "GAMMA_HVBS_ENABLE_MNTR_20030101"
PRODUCT_TYPE          = "GAMMA_HVBS_ENABLE_MNTR"

/* DESCRIPTIVE data elements */
DESCRIPTION            = "
High voltage bias supply enable monitor, in Volts.
"

/* DATA OBJECT DEFINITION */

```

```

OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 1945
ROW_BYTES        = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS        = 6
^STRUCTURE      = "ENG_DATA_COLS.FMT"

END_OBJECT      = TIME_SERIES

END_OBJECT      = FILE

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "PLUS_5V_CRNT_ANLG.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "PLUS_5V_CRNT_ANLG_20030101"
PRODUCT_TYPE    = "PLUS_5V_CRNT_ANLG"

/* DESCRIPTIVE data elements */
DESCRIPTION     = "
Neutron Spectrometer Plus 5 volt current, in milliAmps.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS              = 1945
ROW_BYTES        = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS        = 6
^STRUCTURE      = "ENG_DATA_COLS.FMT"

```

```

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 51
FILE_RECORDS        = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "GAMMA_MINUS_12V_HVBS_RAIL_CRNT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "GAMMA_MINUS_12V_HVBS_RAIL_CRNT_20030101"
PRODUCT_TYPE        = "GAMMA_MINUS_12V_HVBS_RAIL_CRNT"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "

"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 1945
ROW_BYTES           = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS           = 6
^STRUCTURE          = "ENG_DATA_COLS.FMT"

END_OBJECT          = TIME_SERIES

END_OBJECT          = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 51
FILE_RECORDS        = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "CEB_PLUS_28_CURR.DAT"

```

```

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "CEB_PLUS_28_CURR_20030101"
PRODUCT_TYPE        = "CEB_PLUS_28_CURR"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "
Plus 28 current, in Amps.
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 1945
ROW_BYTES           = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS            = 6
^STRUCTURE           = "ENG_DATA_COLS.FMT"

END_OBJECT           = TIME_SERIES

END_OBJECT           = FILE

OBJECT              = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 51
FILE_RECORDS        = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "HVPS_MNTR_2.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "HVPS_MNTR_2_20030101"
PRODUCT_TYPE        = "HVPS_MNTR_2"

/* DESCRIPTIVE data elements */
DESCRIPTION          = "
Neutron Spectrometer High voltage power supply 2 readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT              = TIME_SERIES

INTERCHANGE_FORMAT  = BINARY
ROWS                = 1945

```

```

ROW_BYTES          = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

OBJECT            = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE       = FIXED_LENGTH
RECORD_BYTES      = 51
FILE_RECORDS      = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES      = "GAMMA_REF_VOLT_333.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID        = "GAMMA_REF_VOLT_333_20030101"
PRODUCT_TYPE      = "GAMMA_REF_VOLT_333"

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
333 reference voltage, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT            = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS              = 1945
ROW_BYTES         = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

```

```

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "HVPS_MNTR_1.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "HVPS_MNTR_1_20030101"
PRODUCT_TYPE    = "HVPS_MNTR_1"

/* DESCRIPTIVE data elements */
DESCRIPTION     = "
Neutron Spectrometer High voltage power supply 1 readings, in Volts.
"

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS            = 1945
ROW_BYTES       = 51

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS        = 6
^STRUCTURE       = "ENG_DATA_COLS.FMT"

END_OBJECT      = TIME_SERIES

END_OBJECT      = FILE

OBJECT          = FILE

/* FILE CHARACTERISTICS */
RECORD_TYPE     = FIXED_LENGTH
RECORD_BYTES    = 51
FILE_RECORDS    = 1945

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES    = "GAMMA_PLUS_12V_RAIL_CRNT.DAT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID      = "GAMMA_PLUS_12V_RAIL_CRNT_20030101"
PRODUCT_TYPE    = "GAMMA_PLUS_12V_RAIL_CRNT"

```

```

/* DESCRIPTIVE data elements */
DESCRIPTION      = "
Plus 12 volt rail current readings, in milliAmps.
"

/* DATA OBJECT DEFINITION */
OBJECT           = TIME_SERIES

INTERCHANGE_FORMAT    = BINARY
ROWS                 = 1945
ROW_BYTES            = 51

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

COLUMNS          = 6
^STRUCTURE        = "ENG_DATA_COLS.FMT"

END_OBJECT        = TIME_SERIES

END_OBJECT        = FILE

END

```

3.2. *ENG_DATA_COLS.FMT*

```

OBJECT = COLUMN
COLUMN_NUMBER = 1
NAME = SC_EV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 1
DESCRIPTION = "
Spacecraft time when this engineering reading was taken, in ticks (256
per second).
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = SC_EV_TIME_FINE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 9
DESCRIPTION = "
Fine time portion of spacecraft time when this engineering reading was
taken, units of 65536ths of a second.
"

```

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = CEB_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 11
UNIT = MILLISECOND
DESCRIPTION = "
The CEB time when the reading was taken.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = UTC
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 19
DESCRIPTION = "
SC_EV_TIME converted to UTC, stored as yyyy-mm-ddThh:mm:ss.sss.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 5
NAME = RAW_VAL
DATA_TYPE = INTEGER
BYTES = 2
START_BYTE = 42
DESCRIPTION = "
The raw digital value of the reading as output from the
analog-to-digital converter in the CEB.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 6
NAME = ENG_VAL
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 44
DESCRIPTION = "
Raw value transformed to a physical unit.
"

END_OBJECT = COLUMN

4. EXPERIMENTER'S NOTEBOOK

4.1. E_KERNEL_YYYYMMDD.LBL

PDS_VERSION_ID = PDS3

```

/* IDENTIFICATION DATA ELEMENTS for all referenced files */
DATA_SET_NAME      = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID       = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_ID        = "E_KERNEL_20020412"
PRODUCT_TYPE      = "E_KERNEL"
PRODUCT_VERSION_ID = "0.0"
RELEASE_ID        = "0000"

```

```

/* DESCRIPTIVE DATA ELEMENTS for all referenced files */
INSTRUMENT_HOST_NAME = "2001 MARS ODYSSEY"
INSTRUMENT_NAME      = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID        = ODY
TARGET_NAME          = MARS
MISSION_PHASE_NAME   = MAPPING
START_TIME           = 2002-04-12T17:12:17.999
STOP_TIME            = 2002-04-12T19:16:43.998
SPACECRAFT_CLOCK_START_COUNT = 179993292816
SPACECRAFT_CLOCK_STOP_COUNT  = 179995204115
PRODUCT_CREATION_TIME   = 2004-02-10T17:49:33.791

```

```

OBJECT              = FILE
/* FILE CHARACTERISTICS */
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 425
FILE_RECORDS        = 5

```

```

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES        = "E_KERNEL_PEF_20020412.DAT"

```

```

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID          = "E_KERNEL_PEF_20020412"
PRODUCT_TYPE        = "E_KERNEL_PEF"

```

```

/* DESCRIPTIVE data elements */
DESCRIPTION          = "

```

Possible command opcodes are as follows:

- 1 SC_TIME_OPCODE spacecraft time command
- 2 EQ_XING_ASC_OPCODE ascending equator crossing command
- 3 ANNEAL_DOOR_OPCODE enable the anneal door to be moved
- 4 HEND_POWER_OPCODE spacecraft hend power state command
- 5 SHUTDOWN_OPCODE grs system is about to be shutdown
- 6 IMED_SHUTDOWN_OPCODE grs system is going down immediately
- 7 ANNEAL_ENABLE_OPCODE enable anneal to happen
- 10 GAMMA_CMD_OPCODE gamma command
- 11 GAMMA_RESET_OPCODE issue reset to gamma board
- 12 CHG_GPA_HTR_OPCODE turn on or off the gpa heater
- 13 RAMP_GAMMA_OPCODE ramp gamma high voltage
- 14 STOP_GAMMA_RAMP_OPCODE stop ramping gamma high voltage
- 20 LANL_CMD_OPCODE lanl command
- 21 LANL_PRISM_OPCODE lanl prisms
- 22 LANL_ALL_PRISM_OPCODE resets all prisms
- 23 LANL_MODE_OPCODE lanl modes
- 24 LANL_HVPS_OPCODE lanl hi voltage
- 25 LANL_HVPS_CNTL_OPCODE hi voltage control
- 26 LANL_MUX_OPCODE set lanl mux
- 27 LANL_SWAP_OPCODE lanl swap prompt/delay

28 LANL_RUN_OPCODE lanl run command
 29 LANL_RESET_OPCODE issues a reset to lanl board
 35 HEND_CMD_OPCODE hend command
 36 CHG_HEND_STATUS_OPCODE changes the hend status lines
 45 CHG_MODE_OPCODE change grs operating mode
 46 CHG_ANALOG_OPCODE change and analog table entry
 47 CHG_PARAM_OPCODE change a parameters value
 48 RELOAD_TABLE_OPCODE reload a table from eeprom
 49 DOOR_PWR_CNTRL_OPCODE manually control door or latch powers
 50 ANNEAL_PWR_CNTRL_OPCODE manually control anneal heaters
 51 CAL_CURR_CNTRL_OPCODE change state of cal_curr bit in pcon reg
 52 OP_HTR_OPCODE change state of op_htr bit in pcon reg
 53 CEB_HTR_OPCODE change state of pwr_spare bit in pcon reg
 55 CHG_STATE_OPCODE change the power state
 56 CHG_SEQ_OPCODE change a command sequence
 57 EXEC_SEQ_OPCODE execute a command sequence
 58 CHG_INTERVAL_OPCODE change an instruments collection interval
 59 CHG_CLCT_OPCODE turn instrument data collect
 60 CHG_CEB_INT_OPCODE change a CEB timer interval
 61 CHG_TIMEOUT_OPCODE change the sc or hend recv timeout
 62 DELETE_SEQ_OPCODE deletes a sequence
 65 DELETE_ALL_OPCODE delete all delayed commands
 66 DELETE_ONE_OPCODE delete one delayed command
 67 DOOR_OPCODE move the anneal door
 69 RESET_OPCODE reset the flight software
 70 ANNEAL_OPCODE starts or stops the anneal process
 71 EEPROM_EN_DIS_OPCODE enable the changing of eeprom write state
 75 MEM_LOAD_OPCODE upload new code or data
 76 DUMP_PARAMS_OPCODE download the parameter table
 77 DUMP_ANALOG_OPCODE download the analog table
 78 DUMP_FPGA_REGS_OPCODE download the FPGA registers
 79 DUMP_DMA_REGS_OPCODE download the DMA registers
 80 MEM_DUMP_OPCODE download a portion of memory
 81 DUMP_SEQ_OPCODE download a sequence
 82 DUMP_COUNTS_OPCODE download the sent data counts
 83 FILE_MEMLOAD_OPCODE upload file, data padded to 1000 bytes
 85 SAVE_TO_EE_OPCODE save data to eeprom
 86 CHG_TRACE_OPCODE change the fsw debug level
 87 START_FSW_OPCODE start the fsw
 98 PASS_THRU_OPCODE future GRS command
 100 GET_VERSION_OPCODE returns the current version #
 101 WRITE_REG_OPCODE write a value to a register location
 102 SET_ORB_DURATION_OPCODE change the duration of the orbit
 103 TRIGGER_BURST_OPCODE trigger a manual burst
 104 NO_OP_OPCODE does nothing, generates message
 105 ERROR_OPCODE generates an error message
 106 GET_HEARTBEAT_CNT_OPCODE returns the number of heartbeats sent

"

/* DATA OBJECT DEFINITION */
 OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
 ROWS = 5
 ROW_BYTES = 425

```

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 4
^STRUCTURE = "E_KERNEL_PEF_COLS.FMT"

END_OBJECT = TIME_SERIES

END_OBJECT = FILE

OBJECT = FILE
/* FILE CHARACTERISTICS */
RECORD_TYPE = STREAM
FILE_RECORDS = 5

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES = "E_KERNEL_NOTES_20020412.TXT"

/* IDENTIFICATION DATA ELEMENTS */
PRODUCT_ID = "E_KERNEL_NOTES_20020412"
PRODUCT_TYPE = "E KERNEL NOTES"

/* DESCRIPTIVE data elements */
DESCRIPTION = "Experimenter's Notebook."

END_OBJECT = FILE

END

```

4.2. E_KERNEL_PEF_COLS.FMT

```

OBJECT = COLUMN
COLUMN_NUMBER = 1
NAME = FIS_SEND_TIME
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 1
DESCRIPTION = "
UTC Time the commands were uploaded to the FIS, stored as
yyyy-mm-ddThh:mm:ss.sss.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = COMMAND_COUNT

```

```

DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 24
DESCRIPTION = "
Number of commands in array.
"
END_OBJECT = COLUMN

OBJECT = CONTAINER
NAME = COMMANDS
BYTES = 4
START_BYTE = 26
REPETITIONS = 100
DESCRIPTION = "
Array of commands, padded out to 400 bytes. Each item contains a
two-byte OPCODE followed by a two-byte command ID.
"

OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = OPCODE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 1
INVALID_CONSTANT = 0
DESCRIPTION = "
Opcode of the command. See Label for values.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = CMD_ID
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 3
INVALID_CONSTANT = 0
DESCRIPTION = "
ID of the command that was sent to the FIS.
"
END_OBJECT = COLUMN

END_OBJECT = CONTAINER

```

5. GAMMA SPECTRA

5.1. GAMMA_SPECTRA_YYYYMMDD.LBL

```

PDS_VERSION_ID          = PDS3

/* FILE CHARACTERISTICS */
RECORD_TYPE              = FIXED_LENGTH
RECORD_BYTES             = 33075

```

```

FILE_RECORDS          = 3941

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES          = "GAMMA_SPECTRA_20030101.DAT"

/* IDENTIFICATION DATA ELEMENTS */
DATA_SET_NAME         = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID           = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_ID            = "GAMMA_SPECTRA_20030101"
PRODUCT_TYPE          = "GAMMA_SPECTRA"
PRODUCT_VERSION_ID    = "1.0"
RELEASE_ID            = "0005"

/* DESCRIPTIVE DATA ELEMENTS */
INSTRUMENT_HOST_NAME = "2001 MARS ODYSSEY"
INSTRUMENT_NAME       = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID         = ODY
TARGET_NAME           = MARS
MISSION_PHASE_NAME    = MAPPING
START_TIME             = 2003-01-01T00:00:16.849
STOP_TIME              = 2003-01-02T00:00:07.905
SPACECRAFT_CLOCK_START_COUNT = 185816708612
SPACECRAFT_CLOCK_STOP_COUNT  = 185838824758
PRODUCT_CREATION_TIME  = 2004-02-16T16:35:12.065

/* DATA OBJECT DEFINITION */
OBJECT                 = TIME_SERIES

INTERCHANGE_FORMAT     = BINARY
ROWS                   = 3941
ROW_BYTES              = 33075

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.                */

COLUMNS               = 36
^STRUCTURE              = "GAMMA_SPECTRA_COLS.FMT"

/* DESCRIPTIVE data elements */
DESCRIPTION             = "
This the raw uncalibrated gamma ray spectra and associated data."

END_OBJECT              = TIME_SERIES

END

```

5.2. GAMMA_SPECTRA_COLS.FMT

```

OBJECT = COLUMN
COLUMN_NUMBER = 1

```

```

NAME = SC_RECV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 1
DESCRIPTION = "
The time this packet was received by the spacecraft, in ticks (256 per
second).
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = SC_EV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 9
DESCRIPTION = "
Spacecraft time at the middle of the pixel, in ticks.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = CEB_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 17
UNIT = MILLISECOND
DESCRIPTION = "
Clock count from the GRS Common Electronics Box at the beginning of the
pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = UTC
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 25
DESCRIPTION = "
SC_EV_TIME converted to UTC, stored as yyyy-mm-ddThh:mm:ss.sss.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 5
NAME = GRS_PIXEL_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 48
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of accumulation intervals, starts with one as grs
orbit begins. Special case on reboot when the CEB is in orbit 0,
pixel 0.

```

```

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 6
NAME = GRS_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 52
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of orbits from GRS CEB boot.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 7
NAME = ODY_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 56
INVALID_CONSTANT = 0
DESCRIPTION = "
Orbit number common to all instruments aboard Odyssey. This orbit
number is incremented by one as the spacecraft passes through the
orbital descending node.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 8
NAME = LATITUDE
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 60
DESCRIPTION = "
Sub spacecraft latitude in Mars fixed coordinates at the middle of the
pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 9
NAME = LONGITUDE
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 68
DESCRIPTION = "
Sub spacecraft longitude in Mars fixed coordinates at the middle of the
pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 10
NAME = SCPOS_INERT

```

```

DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 76
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "
The geometric position (x,y,z) of the spacecraft with respect to Mars
in the 'MARSIAU' inertial frame at the input epoch 'et' at the middle
of the pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 11
NAME = SCVEL_INERT
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 100
UNIT = "KILOMETER/SECOND"
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "
The geometric velocity (x,y,z) of the spacecraft with respect to Mars
in the 'MARSIAU' inertial frame at the input epoch 'et' at the middle
of the pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 12
NAME = MARSPOS_INSTR
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 124
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "
The (x,y,z) position of the sub-spacecraft point as seen from the
spacecraft in the instrument frame at the middle of the pixel. If no
spacecraft orientation data was available from the loaded CK files for
the request time, then all elements are set to zero.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 13
NAME = MARSVEL_INSTR
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 148
UNIT = "KILOMETER/SECOND"
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

```

Contains the inertial spacecraft velocity direction (x,y,z) rotated to the instrument frame at the middle of the pixel. If no spacecraft orientation data was available for the request time, then all elements are set to zero.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 14
NAME = SCPOS_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 172
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "
Spacecraft position (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 15
NAME = INSTR_BORESIGHT_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 196
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "
Sub instrument boresight (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 16
NAME = SUB_SCPOS_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 220
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "
Sub spacecraft vector (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 17
NAME = SCALT
DATA_TYPE = IEEE_REAL

```

BYTES = 8
START_BYTE = 244
UNIT = KILOMETER
DESCRIPTION = "
Areocentric altitude of the sub-spacecraft point in Mars-fixed rotating
frame at the middle of the pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 18
NAME = DELTA_ANGLE
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 252
UNIT = DEGREE
DESCRIPTION = "
Difference between instrument +y direction and true north at the middle
of the pixel. Currently not computed for NEUTRON_SPECTRA and
HEND_SPECTRA.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 19
NAME = MARS_SOL
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 260
DESCRIPTION = "
Longitude of the Sun at 0 hours UT on the date of the record. Taken
from the Association of Lunar and Planetary Observers 'Ephemeris for
Physical Observation of Mars'.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 20
NAME = DAY_INDEX
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 268
DESCRIPTION = "
Day of Martian year.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 21
NAME = LOCAL_HOUR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 270
DESCRIPTION = "
Local Sun hour at the sub-spacecraft point.
"

```

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 22
NAME = LOCAL_MINUTE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 271
DESCRIPTION = "
Local Sun minute at the sub-spacecraft point.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 23
NAME = POINTING
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 272
DESCRIPTION = "
True if pointing data was available.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 24
NAME = INTERSECTING
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 273
DESCRIPTION = "
True if the pointing vector intersects Mars.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 25
NAME = BAD_CODE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 274
DESCRIPTION = "
If non-zero, the data has been flagged bad. Definitions in
bad_code.txt.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 26
NAME = COUNTER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 278
DESCRIPTION = "
A spectra can come down in up to 8 packets. Each packet has its own
counter. This counter is the combination of all eight possible

```

counters, four bits for each.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 27
NAME = FIRST_CHAN
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 282
DESCRIPTION = "
First valid channel in the spectrum.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 28
NAME = LAST_CHAN
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 284
DESCRIPTION = "
Last valid channel in the spectrum.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 29
NAME = LLD_CNTR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 286
DESCRIPTION = "
Lower level discriminator count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 30
NAME = ULD_CNTR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 288
DESCRIPTION = "
Upper level discriminator count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 31
NAME = L1_CNTR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 290
DESCRIPTION = "
Total number of gamma events within the L1 energy range.

```

```

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 32
NAME = L2_CNTR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 292
DESCRIPTION = "
Total number of gamma events within the L2 energy range.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 33
NAME = L3_CNTR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 294
DESCRIPTION = "
Total number of gamma events within the L3 energy range.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 34
NAME = PHA_CNTR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 296
DESCRIPTION = "
Pulse Height Analyzer counter.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 35
NAME = PHA_TIMER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 300
DESCRIPTION = "
Pulse Height Analyzer timer.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 36
NAME = RAW_SPECTRUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32768
START_BYTE = 308
ITEMS = 16384
ITEM_BYTES = 2
DESCRIPTION = "

```

Raw uncompressed gamma spectrum.
"
END_OBJECT = COLUMN

6. HEND SPECTRA

6.1. HEND_SPECTRA_YYYYMMDD.LBL

PDS_VERSION_ID = PDS3

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 852
FILE_RECORDS = 3940

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "HEND_SPECTRA_20030101.DAT"

/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_NAME = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_ID = "HEND_SPECTRA_20030101"
PRODUCT_TYPE = "HEND_SPECTRA"
PRODUCT_VERSION_ID = "1.0"
RELEASE_ID = "0005"

/* DESCRIPTIVE DATA ELEMENTS */

INSTRUMENT_HOST_NAME = "2001 MARS ODYSSEY"
INSTRUMENT_NAME = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID = ODY
TARGET_NAME = MARS
MISSION_PHASE_NAME = MAPPING
START_TIME = 2003-01-01T00:00:22.650
STOP_TIME = 2003-01-02T00:00:13.507
SPACECRAFT_CLOCK_START_COUNT = 185816710097
SPACECRAFT_CLOCK_STOP_COUNT = 185838826192
PRODUCT_CREATION_TIME = 2004-02-16T17:01:54.052

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 3940
ROW_BYTES = 852

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk. */

COLUMNS = 69
^STRUCTURE = "HEND_SPECTRA_COLS.FMT"

```

/* DESCRIPTIVE data elements */
DESCRIPTION      = "
This the raw uncalibrated hend spectra and associated data.

```

HEND records or frames, can be of three types: spectra (nominal), profile (burst), or status.

The nominal frame consist of six spectra, with 16 channels, two bytes per channel.

The profile frame consists of the six spectra plus two time profiles.

```

END_OBJECT      = TIME_SERIES

```

```

END

```

6.2. HEND_SPECTRA_COLS.FMT

```

OBJECT = COLUMN
COLUMN_NUMBER = 1
NAME = SC_RECV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 1
DESCRIPTION = "
The time this packet was received by the spacecraft, in ticks (256 per
second).
"

```

```

END_OBJECT = COLUMN

```

```

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = SC_EV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 9
DESCRIPTION = "
Spacecraft time at the middle of the pixel, in ticks.
"

```

```

END_OBJECT = COLUMN

```

```

OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = CEB_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 17
UNIT = MILLISECOND
DESCRIPTION = "
Clock count from the GRS Common Electronics Box at the beginning of the
pixel.
"

```

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = UTC
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 25
DESCRIPTION = "
SC_EV_TIME converted to UTC, stored as yyyy-mm-ddThh:mm:ss.sss.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 5
NAME = GRS_PIXEL_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 48
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of accumulation intervals, starts with one as grs
orbit begins. Special case on reboot when the CEB is in orbit 0,
pixel 0.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 6
NAME = GRS_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 52
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of orbits from GRS CEB boot.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 7
NAME = ODY_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 56
INVALID_CONSTANT = 0
DESCRIPTION = "
Orbit number common to all instruments aboard Odyssey. This orbit
number is incremented by one as the spacecraft passes through the
orbital descending node.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 8
NAME = LATITUDE

```

DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 60
DESCRIPTION = "
Sub spacecraft latitude in Mars fixed coordinates at the middle of the
pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 9
NAME = LONGITUDE
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 68
DESCRIPTION = "
Sub spacecraft longitude in Mars fixed coordinates at the middle of the
pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 10
NAME = SCPOS_INERT
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 76
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "
The geometric position (x,y,z) of the spacecraft with respect to Mars
in the 'MARSIAU' inertial frame at the input epoch 'et' at the middle
of the pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 11
NAME = SCVEL_INERT
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 100
UNIT = "KILOMETER/SECOND"
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "
The geometric velocity (x,y,z) of the spacecraft with respect to Mars
in the 'MARSIAU' inertial frame at the input epoch 'et' at the middle
of the pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 12
NAME = MARSPOS_INSTR

```

DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 124
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

The (x,y,z) position of the sub-spacecraft point as seen from the spacecraft in the instrument frame at the middle of the pixel. If no spacecraft orientation data was available from the loaded CK files for the request time, then all elements are set to zero.

"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 13
NAME = MARSVEL_INSTR
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 148
UNIT = "KILOMETER/SECOND"
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

Contains the inertial spacecraft velocity direction (x,y,z) rotated to the instrument frame at the middle of the pixel. If no spacecraft orientation data was available for the request time, then all elements are set to zero.

"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 14
NAME = SCPOS_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 172
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

Spacecraft position (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 15
NAME = INSTR_BORESIGHT_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 196
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

Sub instrument boresight (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 16
NAME = SUB_SCPOS_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 220
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

Sub spacecraft vector (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 17
NAME = SCALT
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 244
UNIT = KILOMETER
DESCRIPTION = "

Areocentric altitude of the sub-spacecraft point in Mars-fixed rotating frame at the middle of the pixel.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 18
NAME = DELTA_ANGLE
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 252
UNIT = DEGREE
DESCRIPTION = "

Difference between instrument +y direction and true north at the middle of the pixel. Currently not computed for NEUTRON_SPECTRA and HEND_SPECTRA.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 19
NAME = MARS_SOL
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 260
DESCRIPTION = "

Longitude of the Sun at 0 hours UT on the date of the record. Taken from the Association of Lunar and Planetary Observers 'Ephemeris for

```

Physical Observation of Mars'.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 20
NAME = DAY_INDEX
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 268
DESCRIPTION = "
Day of Martian year.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 21
NAME = LOCAL_HOUR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 270
DESCRIPTION = "
Local Sun hour at the sub-spacecraft point.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 22
NAME = LOCAL_MINUTE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 271
DESCRIPTION = "
Local Sun minute at the sub-spacecraft point.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 23
NAME = POINTING
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 272
DESCRIPTION = "
True if pointing data was available.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 24
NAME = INTERSECTING
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 273
DESCRIPTION = "
True if the pointing vector intersects Mars.

```

```

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 25
NAME = BAD_CODE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 274
DESCRIPTION = "
If non-zero, the data has been flagged bad. Definitions in
bad_code.txt.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 26
NAME = COUNTER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 278
DESCRIPTION = "
The packet counter from the hend packet, values from 0 to 15.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 27
NAME = CHECKSUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 279
DESCRIPTION = "
An XOR checksum of the packet from title through temps, put on the data
by the HEND instrument.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 28
NAME = ANTICOINCIDENCE_CODE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 281
DESCRIPTION = "
Bit 1 represents the anticoincidence veto setting (on or off) for the
signal from the outer scintillator versus neutrons from the inner
scintillator. Bit 2 represents the anticoincidence veto setting (on or
off) for the signal from the outer scintillator versus the background
from the inner scintillator. Bit 3 represents the anticoincidence veto
setting (on or off) for the signal from the inner scintillator versus
the background from the outer scintillator.
"
END_OBJECT = COLUMN

OBJECT = COLUMN

```

```

COLUMN_NUMBER = 29
NAME = FRAME_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 282
DESCRIPTION = "
HEND data frame number, aka packet counter.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 30
NAME = FRAME_TYPE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 284
DESCRIPTION = "
Type of frame, (status=0, spectra=2, profile=3).
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 31
NAME = IN_CONTROL
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 285
DESCRIPTION = "
The state of the In control discrettes between the CEB and HEND.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 32
NAME = OUT_STATUS
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 287
DESCRIPTION = "
The state of the Out status discrettes between the CEB and the HEND.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 33
NAME = T1_T4_TEMP
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 289
DESCRIPTION = "
Reading of temperature sensor 1 if even frame, temperature sensor 4 if
odd.
"
END_OBJECT = COLUMN

OBJECT = COLUMN

```

```
COLUMN_NUMBER = 34
NAME = T2_T5_TEMP
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 291
DESCRIPTION = "
Reading of temperature sensor 2 if even frame, temperature sensor 5 if
odd.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 35
NAME = T3_T6_TEMP
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 293
DESCRIPTION = "
Reading of temperature sensor 3 if even frame, temperature sensor 6 if
odd.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 36
NAME = HV1_LVL
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 295
DESCRIPTION = "
High Voltage #1 (LD) level. 0 = off, 1 = minimal level, 2 = optimal
level, 3 = maximal level.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 37
NAME = HV2_LVL
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 296
DESCRIPTION = "
High Voltage #2 (LD) level. 0 = off, 1 = minimal level, 2 = optimal
level, 3 = maximal level.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 38
NAME = HV3_LVL
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 297
DESCRIPTION = "
High Voltage #3 (SD) level. 0 = off, 1 = minimal level, 2 = optimal
level, 3 = maximal level.
```

```

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 39
NAME = HV4_LVL
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 298
DESCRIPTION = "
High Voltage #4 (Inner) level. 0 = off, 1 = minimal level, 2 = optimal
level, 3 = maximal level.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 40
NAME = HV5_LVL
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 299
DESCRIPTION = "
High Voltage #5 (Outer) level. 0 = off, 1 = minimal level, 2 = optimal
level, 3 = maximal level.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 41
NAME = TRIG_LOGIC
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 300
DESCRIPTION = "
Triggering logic, (0=AND, 1=OR).
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 42
NAME = TRIGGER_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 301
DESCRIPTION = "
Count of triggers seen.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 43
NAME = TRIGGER_LVL_C1
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 303
DESCRIPTION = "

```

Criteria code for profile 1 (inner scintillator). Trigger level in units of counts is 8 for C1 = 0, 16 for C1 = 2, ... 64 for C1=7.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 44
NAME = TRIGGER_LVL_C2
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 304
DESCRIPTION = "

Criteria code for profile 2 (outer scintillator). Trigger level in units of counts is 32 for C2 = 0, 64 for C2 = 2, ... 256 for C2=7.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 45
NAME = TRIGGER_PERM_C1
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 305
DESCRIPTION = "
Trigger permission on/off for profile1.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 46
NAME = TRIGGER_PERM_C2
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 306
DESCRIPTION = "
Trigger permission on/off for profile2.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 47
NAME = T1
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 307
DESCRIPTION = "
Time of previous SYNC signal/start of accumulation.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 48
NAME = T2
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 311

```

DESCRIPTION = "
Time of last trigger as a 16 bit value.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 49
NAME = K1
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 315
DESCRIPTION = "
Bitmask for total number of permitted triggering, 0=arbitrary, N=N
successive triggers are permitted.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 50
NAME = TITLE
DATA_TYPE = MSB_INTEGER
BYTES = 4
START_BYTE = 316
DESCRIPTION = "
from the title field in the HEND packet.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 51
NAME = LD_DISCRIMINATOR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 320
DESCRIPTION = "
Large detector discriminator level. 0 = off, 1 = minimal level, 2 =
optimal level, 3 = maximal level.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 52
NAME = MD_DISCRIMINATOR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 321
DESCRIPTION = "
Medium detector discriminator level. 0 = off, 1 = minimal level, 2 =
optimal level, 3 = maximal level.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 53
NAME = SD_DISCRIMINATOR
DATA_TYPE = MSB_UNSIGNED_INTEGER

```

BYTES = 1
START_BYTE = 322
DESCRIPTION = "
Small detector discriminator level. 0 = off, 1 = minimal level, 2 =
optimal level, 3 = maximal level.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 54
NAME = IN_DISCRIMINATOR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 323
DESCRIPTION = "
Inner discriminator level. 0 = off, 1 = minimal level, 2 = optimal
level, 3 = maximal level.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 55
NAME = OUT_DISCRIMINATOR
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 324
DESCRIPTION = "
Outer discriminator level. 0 = off, 1 = minimal level, 2 = optimal
level, 3 = maximal level.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 56
NAME = LD_SPECTRUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 325
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Large detector spectrum.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 57
NAME = MD_SPECTRUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 357
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Medium detector spectrum.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 58
NAME = SD_SPECTRUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 389
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Small detector spectrum.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 59
NAME = IN_SPECTRUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 421
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Inner scintillator background spectrum.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 60
NAME = OUT_SPECTRUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 453
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Outer scintillator background spectrum.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 61
NAME = NEUTRON_SPECTRUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 485
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Neutron spectrum from the inner scintillator.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 62

```

NAME = IN_PROFILE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 60
START_BYTE = 517
ITEMS = 30
ITEM_BYTES = 2
DESCRIPTION = "
Inner scintillator profile data. Time resolution is 1 second.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 63
NAME = OUT_PROFILE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 240
START_BYTE = 577
ITEMS = 120
ITEM_BYTES = 2
DESCRIPTION = "
Outer scintillator profile data. Time resolution is 0.25 seconds.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 64
NAME = CMD1
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 6
START_BYTE = 817
ITEMS = 6
ITEM_BYTES = 1
DESCRIPTION = "
Data for the most recent command received. First byte is the code,
second byte is the parameter, 3rd byte is the checksum, final three
bytes are the receiving time.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 65
NAME = CMD2
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 6
START_BYTE = 823
ITEMS = 6
ITEM_BYTES = 1
DESCRIPTION = "
Data for the 2nd most recent command received. First byte is the code,
second byte is the parameter, 3rd byte is the checksum, final three
bytes are the receiving time.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 66

```

```

NAME = CMD3
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 6
START_BYTE = 829
ITEMS = 6
ITEM_BYTES = 1
DESCRIPTION = "
Data for the 3rd recent command received. First byte is the code,
second byte is the parameter, 3rd byte is the checksum, final three
bytes are the receiving time.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 67
NAME = CMD4
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 6
START_BYTE = 835
ITEMS = 6
ITEM_BYTES = 1
DESCRIPTION = "
Data for the 4th recent command received. First byte is the code,
second byte is the parameter, 3rd byte is the checksum, final three
bytes are the receiving time.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 68
NAME = CMD5
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 6
START_BYTE = 841
ITEMS = 6
ITEM_BYTES = 1
DESCRIPTION = "
Data for the 5th recent command received. First byte is the code,
second byte is the parameter, 3rd byte is the checksum, final three
bytes are the receiving time.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 69
NAME = CMD6
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 6
START_BYTE = 847
ITEMS = 6
ITEM_BYTES = 1
DESCRIPTION = "
Data for the 6th recent command received. First byte is the code,
second byte is the parameter, 3rd byte is the checksum, final three
bytes are the receiving time.
"

```

END_OBJECT = COLUMN

7. MESSAGE LOG

7.1. MESSAGE_LOG_YYMMDD.LBL

PDS_VERSION_ID = PDS3

/* FILE CHARACTERISTICS */

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 175
FILE_RECORDS = 55446

/* POINTERS TO DATA OBJECTS */

^TIME_SERIES = "MESSAGE_LOG_20030101.DAT"

/* IDENTIFICATION DATA ELEMENTS */

DATA_SET_NAME = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_ID = "MESSAGE_LOG_20030101"
PRODUCT_TYPE = "MESSAGE_LOG"
PRODUCT_VERSION_ID = "1.0"
RELEASE_ID = "0005"

/* DESCRIPTIVE DATA ELEMENTS */

INSTRUMENT_HOST_NAME = "2001 MARS ODYSSEY"
INSTRUMENT_NAME = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID = ODY
TARGET_NAME = MARS
MISSION_PHASE_NAME = MAPPING
START_TIME = 2003-01-01T00:00:21.381
STOP_TIME = 2003-01-02T00:00:12.233
SPACECRAFT_CLOCK_START_COUNT = 185816709772
SPACECRAFT_CLOCK_STOP_COUNT = 185838825866
PRODUCT_CREATION_TIME = 2004-02-16T16:53:32.108

/* DATA OBJECT DEFINITION */

OBJECT = TIME_SERIES

INTERCHANGE_FORMAT = BINARY
ROWS = 55446
ROW_BYTES = 175

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

COLUMNS = 10
^STRUCTURE = "MESSAGE_LOG_COLS.FMT"

/* DESCRIPTIVE data elements */

DESCRIPTION = "
Messages returned by Common Electronics Box (CEB).
Possible message id's are as follows:
0 MSG_ERROR_START start of error messages

1 MSG_START_ERR error during startup
 2 MSG_DMA_ERR error in DMA
 3 MSG_SC_DATA_NOT_READ error, data from SC not read
 4 MSG_DATA_NOT_SENT error, data packet not sent
 5 MSG_TABLE_UNKNOWN error, unknown analog table parameter
 6 MSG_TABLE_SETTING error, unknown analog setting
 7 MSG_TABLE_VALUE error, analog value is out of range
 8 MSG_2_MANY_CMDS error, too many commands in delayed list
 10 MSG_BAD_CHECKSUM error, bad checksum
 11 MSG_NOT_READ_SCBUF error, incorrect data in sc buffer
 12 MSG_OLD_COMMAND error, command is old
 13 MSG_HI_ENG_FULL error, engineering buffer full
 14 MSG_GAMMA_Q_FULL error, too many commands to gamma
 15 MSG_LANL_Q_FULL error, too many commands to lanl
 16 MSG_BAD_TRACE_LEVEL error, unknown debug level
 17 MSG_DUMP_TOO_LONG error, requested memory dump is too long
 18 MSG_DUMP_ADDRESS error, address is out of memory range
 19 MSG_UNDEF_CODE_INTER error, undefined code interrupt
 20 MSG_DIV_ZERO_INTER error, divide by zero interrupt
 21 MSG_INVALID_CMD error, command not in list
 22 MSG_EQ_CROSS_TOO_LATE error, equator crossing command came late
 23 MSG_EEPROM_WRITE_FAIL error, write to eeprom did not work
 24 MSG_CHG_SEQ_FAILED error, updating cmd sequence failed
 25 MSG_PWR_NOT_OK error, power on failed
 26 MSG_NO_DATA error, no data available
 27 MSG_BAD_SIZE error, size of data not what is expected
 28 MSG_BAD_LANL_REG error, LANL register not what is expected
 30 MSG_INVALID_CEB error, invalid ceb timer number
 31 MSG_NO_CMD_IN_SEQ error, no commands in a sequence
 32 MSG_DOOR_NOT_ENABLED error, door not enabled
 33 MSG_DOOR_STATE error, door already open or closed
 34 MSG_ANNEAL error, already anneal or not
 35 MSG_NOT_POWERED error, the instrument not yet on
 36 MSG_DOOR_TIME error, time to move door expired
 37 MSG_LATCH_TIME error, time to move door expired
 38 MSG_DOOR_ALREADY_MOVING error, the door is already in motion
 39 MSG_NO_DOOR_DITHER error, no door dither detected in close op
 40 MSG_ERR_BUF_FULL error, no room left in error buffer
 41 MSG_MSG_BUF_FULL error, no room left in message buffer
 42 MSG_COM_ERR error, communication problem
 43 MSG_NOT_ADD_UTIL error, task not added to util timers
 44 MSG_INVALID_INDEX error, invalid parameter index
 46 MSG_OVERRIDE error, override not enabled
 47 MSG_GAMMA_VOLTAGE warn, hi volt not turn on, temp not in range
 48 MSG_FUNC_CHECKSUM error, function checksum calc failed
 49 MSG_RAMP_ABORT error, gamma high voltage ramp aborted
 50 MSG_ADDR_CHECKSUM error, function address and size
 51 MSG_ANNEAL_NOT_ENABLED error, anneal not enabled
 52 MSG_CANT_SET_PARAM error, can't set DOOR and ANNEAL enable
 53 MSG_EEPROM_NOT_ENABLED error, attempt chng eeprom state w/o enable
 54 MSG_BAD_SEQ_NUM error, invalid sequence number
 70 MSG_RAM_CHECK_FAIL error, RAM check failed
 71 MSG_FSW_EEPROM_CHECK_FAIL error, FSW EEPROM checksum check failed
 72 MSG_MINI_MEM_CHECK_FAIL error, found error in mini memory check
 73 MSG_NOT_LOADER_CMD error, valid cmd but not handled by loader
 74 MSG_INVALID_MEM_ADDRESS error, invalid memory

75 MSG_BAD_SIDE_PATTERN error, bad side pattern
 76 MSG_UART_INTER_IN_LOADER error, UART interrupt is received by loader
 80 MAX_ERR_MSG end of error messages
 81 MSG_ORBIT_PERIOD length of an orbit
 82 MSG_PIXEL_PERIODS length of a pixel for the instruments
 83 MSG_TABLE_CHANGE analog table has been changed
 84 MSG_SC_TIME1 spacecraft time was sent
 85 MSG_SC_TIME2 spacecraft time was sent
 86 MSG_EQ_CROSS_ASC ascending equator crossing command received
 87 MSG_CMD_DONE command has been executed
 88 MSG_TRACE_LEVEL debug level has been changed
 89 MSG_INTER_CNT number of times and interrupt has been run
 90 MSG_VERSION current fsw version
 91 MSG_ENTER function was entered
 92 MSG_EXIT function was exited
 93 MSG_DATA data was presented
 94 MSG_ADDED_DELAYED cmd added to delayed list
 95 MSG_TIMING amount of process time between heartbeats
 96 MSG_INTER_TIME time spent in interrupts
 97 MSG_SHUTDOWN shutdown command received from S/C
 98 MSG_HEND_POWER hend power change
 99 MSG_ANNEAL_CMD received anneal door enable from S/C
 100 MSG_HEARTBEAT the number of heartbeat sent so far
 101 MSG_ACTION_COMPLETE a delayed action has been completed
 102 MSG_SC_TIME_DELTA delta between SC and CEB time
 103 MSG_POWER_CHANGE gamma, lanl or heater power changed
 104 MSG_CHANGE_ANNEAL_STATE went to a different annealing state
 105 MSG_SEQ_EXEC a sequence is being executed
 106 MSG_GAMMA_RAMP gamma has been ramped
 107 MSG_PARAM_CHANGE parameter has been changed
 108 MSG_ANNEAL_ENABLE_CMD received anneal enable from S/C
 130 MSG_FSW_EEPROM_PASSED ldr passed FSW EEPROM checksum checking
 131 MSG_LDR_MEM_PASSED ldr passed memory checking
 132 MSG_LDR_INIT_DONE ldr finished initialization
 "

END_OBJECT = TIME_SERIES

END

7.2. MESSAGE_LOG_COLS.FMT

OBJECT = COLUMN
 COLUMN_NUMBER = 1
 NAME = SC_EV_TIME
 DATA_TYPE = MSB_UNSIGNED_INTEGER
 BYTES = 8
 START_BYTE = 1
 DESCRIPTION = "
 The spacecraft time this message was generated, in ticks (256 per
 second).
 "
 END_OBJECT = COLUMN

```
OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = UTC
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 9
DESCRIPTION = "
SC_EV_TIME converted to UTC, stored as yyyy-mm-ddThh:mm:ss.sss.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = MSG_ID
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 32
DESCRIPTION = "
Identifies type of message. See Label for details.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = GRS_PIXEL_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 34
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of accumulation intervals, starts with one as grs
orbit begins. Special case on reboot when the CEB is in orbit 0,
pixel 0.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 5
NAME = GRS_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 38
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of orbits from GRS CEB boot.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 6
NAME = ODY_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 42
INVALID_CONSTANT = 0
DESCRIPTION = "
```

Orbit number common to all instruments aboard Odyssey. This orbit number is incremented by one as the spacecraft passes through the orbital descending node.

```
"  
END_OBJECT = COLUMN  
  
OBJECT = COLUMN  
COLUMN_NUMBER = 7  
NAME = COUNTER  
DATA_TYPE = MSB_UNSIGNED_INTEGER  
BYTES = 1  
START_BYTE = 46  
DESCRIPTION = "  
The packet counter from the message packet, values from 0 to 15.  
"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
COLUMN_NUMBER = 8  
NAME = ORIGIN  
DATA_TYPE = MSB_UNSIGNED_INTEGER  
BYTES = 1  
START_BYTE = 47  
DESCRIPTION = "  
Origin of execution (loader or flight software).  
"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
COLUMN_NUMBER = 9  
NAME = MESSAGE_TEXT  
DATA_TYPE = CHARACTER  
BYTES = 128  
START_BYTE = 48  
DESCRIPTION = "  
More verbose description of message.  
"  
END_OBJECT = COLUMN
```

8. NEUTRON SPECTRA

8.1. NEUTRON_SPECTRA_YYYYMMDD.LBL

```
PDS_VERSION_ID          = PDS3  
  
/* FILE CHARACTERISTICS */  
RECORD_TYPE              = FIXED_LENGTH  
RECORD_BYTES             = 2024  
FILE_RECORDS             = 3941  
  
/* POINTERS TO DATA OBJECTS */  
^TIME_SERIES             = "NEUTRON_SPECTRA_20030101.DAT"
```

```

/* IDENTIFICATION DATA ELEMENTS */
DATA_SET_NAME      = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID        = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_ID         = "NEUTRON_SPECTRA_20030101"
PRODUCT_TYPE       = "NEUTRON_SPECTRA"
PRODUCT_VERSION_ID = "1.0"
RELEASE_ID         = "0005"

```

```

/* DESCRIPTIVE DATA ELEMENTS */
INSTRUMENT_HOST_NAME = "2001 MARS ODYSSEY"
INSTRUMENT_NAME      = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID        = ODY
TARGET_NAME          = MARS
MISSION_PHASE_NAME   = MAPPING
START_TIME           = 2003-01-01T00:00:25.041
STOP_TIME            = 2003-01-02T00:00:15.835
SPACECRAFT_CLOCK_START_COUNT = 185816710709
SPACECRAFT_CLOCK_STOP_COUNT  = 185838826788
PRODUCT_CREATION_TIME      = 2004-02-16T16:37:50.521

```

```

/* DATA OBJECT DEFINITION */
OBJECT          = TIME_SERIES

```

```

INTERCHANGE_FORMAT = BINARY
ROWS               = 3941
ROW_BYTES          = 2024

```

```

SAMPLING_PARAMETER_NAME = TIME
SAMPLING_PARAMETER_UNIT = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

```

```

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.          */

```

```

COLUMNS          = 59
^STRUCTURE        = "NEUTRON_SPECTRA_COLS.FMT"

```

```

/* DESCRIPTIVE data elements */
DESCRIPTION        = "
This the raw uncalibrated neutron detector counts and associated data."

```

```

END_OBJECT        = TIME_SERIES

```

```

END

```

8.2. NEUTRON_SPECTRA_COLS.FMT

```

OBJECT = COLUMN
COLUMN_NUMBER = 1
NAME = SC_RECV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 1
DESCRIPTION = "

```

The time this packet was received by the spacecraft, in ticks (256 per second).

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = SC_EV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 9
DESCRIPTION = "
Spacecraft time at the middle of the pixel, in ticks.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = CEB_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 17
UNIT = MILLISECOND
DESCRIPTION = "
Clock count from the GRS Common Electronics Box at the beginning of the pixel.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = UTC
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 25
DESCRIPTION = "
SC_EV_TIME converted to UTC, stored as yyyy-mm-ddThh:mm:ss.sss.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 5
NAME = GRS_PIXEL_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 48
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of accumulation intervals, starts with one as grs orbit begins. Special case on reboot when the CEB is in orbit 0, pixel 0.

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 6

```

NAME = GRS_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 52
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of orbits from GRS CEB boot.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 7
NAME = ODY_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 56
INVALID_CONSTANT = 0
DESCRIPTION = "
Orbit number common to all instruments aboard Odyssey. This orbit
number is incremented by one as the spacecraft passes through the
orbital descending node.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 8
NAME = LATITUDE
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 60
DESCRIPTION = "
Sub spacecraft latitude in Mars fixed coordinates at the middle of the
pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 9
NAME = LONGITUDE
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 68
DESCRIPTION = "
Sub spacecraft longitude in Mars fixed coordinates at the middle of the
pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 10
NAME = SCPOS_INERT
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 76
UNIT = KILOMETER
ITEMS = 3

```

ITEM_BYTES = 8
DESCRIPTION = "
The geometric position (x,y,z) of the spacecraft with respect to Mars
in the 'MARSIAU' inertial frame at the input epoch 'et' at the middle
of the pixel.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 11
NAME = SCVEL_INERT
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 100
UNIT = "KILOMETER/SECOND"
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

The geometric velocity (x,y,z) of the spacecraft with respect to Mars
in the 'MARSIAU' inertial frame at the input epoch 'et' at the middle
of the pixel.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 12
NAME = MARSPOS_INSTR
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 124
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

The (x,y,z) position of the sub-spacecraft point as seen from the
spacecraft in the instrument frame at the middle of the pixel. If no
spacecraft orientation data was available from the loaded CK files for
the request time, then all elements are set to zero.
"

END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 13
NAME = MARSVEL_INSTR
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 148
UNIT = "KILOMETER/SECOND"
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

Contains the inertial spacecraft velocity direction (x,y,z) rotated to
the instrument frame at the middle of the pixel. If no spacecraft
orientation data was available for the request time, then all elements
are set to zero.
"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 14
NAME = SCPOS_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 172
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

Spacecraft position (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 15
NAME = INSTR_BORESIGHT_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 196
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

Sub instrument boresight (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 16
NAME = SUB_SCPOS_MARS
DATA_TYPE = IEEE_REAL
BYTES = 24
START_BYTE = 220
UNIT = KILOMETER
ITEMS = 3
ITEM_BYTES = 8
DESCRIPTION = "

Sub spacecraft vector (x,y,z) in Mars fixed coordinates at the middle of the pixel.

"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 17
NAME = SCALT
DATA_TYPE = IEEE_REAL
BYTES = 8
START_BYTE = 244
UNIT = KILOMETER
DESCRIPTION = "

Areocentric altitude of the sub-spacecraft point in Mars-fixed rotating

frame at the middle of the pixel.

"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 18

NAME = DELTA_ANGLE

DATA_TYPE = IEEE_REAL

BYTES = 8

START_BYTE = 252

UNIT = DEGREE

DESCRIPTION = "

Difference between instrument +y direction and true north at the middle of the pixel. Currently not computed for NEUTRON_SPECTRA and HEND_SPECTRA.

"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 19

NAME = MARS_SOL

DATA_TYPE = IEEE_REAL

BYTES = 8

START_BYTE = 260

DESCRIPTION = "

Longitude of the Sun at 0 hours UT on the date of the record. Taken from the Association of Lunar and Planetary Observers 'Ephemeris for Physical Observation of Mars'.

"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 20

NAME = DAY_INDEX

DATA_TYPE = MSB_UNSIGNED_INTEGER

BYTES = 2

START_BYTE = 268

DESCRIPTION = "

Day of Martian year.

"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 21

NAME = LOCAL_HOUR

DATA_TYPE = MSB_UNSIGNED_INTEGER

BYTES = 1

START_BYTE = 270

DESCRIPTION = "

Local Sun hour at the sub-spacecraft point.

"

END_OBJECT = COLUMN

OBJECT = COLUMN

COLUMN_NUMBER = 22

NAME = LOCAL_MINUTE

```

DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 271
DESCRIPTION = "
Local Sun minute at the sub-spacecraft point.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 23
NAME = POINTING
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 272
DESCRIPTION = "
True if pointing data was available.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 24
NAME = INTERSECTING
DATA_TYPE = BOOLEAN
BYTES = 1
START_BYTE = 273
DESCRIPTION = "
True if the pointing vector intersects Mars.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 25
NAME = BAD_CODE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 274
DESCRIPTION = "
If non-zero, the data has been flagged bad. Definitions in
bad_code.txt.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 26
NAME = COUNTER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 278
DESCRIPTION = "
The packet counter from the lanl pkt, values from 0 to 15.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 27
NAME = NS_COMPRESSED

```

```

DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 279
DESCRIPTION = "
indicates if LANL compression algorithm was used on this data.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 28
NAME = GRS_COMPRESSED
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 280
DESCRIPTION = "
indicates if GAMMA compression algorithm was used on this data.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 29
NAME = NS_INSTRUMENT_MEMORY_SIDE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 281
DESCRIPTION = "
Memory side data is coming from.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 30
NAME = EARLY_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 283
DESCRIPTION = "
Early time register.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 31
NAME = LATE_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 285
DESCRIPTION = "
Late time register.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 32
NAME = DEAD_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER

```

```

BYTES = 8
START_BYTE = 287
DESCRIPTION = "
Dead count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 33
NAME = GCR_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 295
DESCRIPTION = "
Galactic cosmic ray count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 34
NAME = EARLY_2ND_PULSE_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 297
DESCRIPTION = "
Early time to second pulse count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 35
NAME = CAT1_3SEG_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 299
DESCRIPTION = "
Category 1, 3 prism event count
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 36
NAME = CAT1_4SEG_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 301
DESCRIPTION = "
Category 1, 4 prism event count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 37
NAME = CAT2_3SEG_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2

```

```

START_BYTE = 303
DESCRIPTION = "
Category 2, 3 prism event count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 38
NAME = CAT2_4SEG_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 305
DESCRIPTION = "
Category 2, 4 prism event count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 39
NAME = CAT2_CNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 307
DESCRIPTION = "
Category 2 event count.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 40
NAME = CAT1_1_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 128
START_BYTE = 309
ITEMS = 64
ITEM_BYTES = 2
DESCRIPTION = "
Category 1 histogram 1.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 41
NAME = CAT1_2_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 128
START_BYTE = 437
ITEMS = 64
ITEM_BYTES = 2
DESCRIPTION = "
Category 1 histogram 2.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 42

```

```
NAME = CAT1_3_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 128
START_BYTE = 565
ITEMS = 64
ITEM_BYTES = 2
DESCRIPTION = "
Category 1 histogram 3.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 43
NAME = CAT1_4_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 128
START_BYTE = 693
ITEMS = 64
ITEM_BYTES = 2
DESCRIPTION = "
Category 1 histogram 4.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 44
NAME = CAT1_SUM_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 128
START_BYTE = 821
ITEMS = 64
ITEM_BYTES = 2
DESCRIPTION = "
Category 1 summation histogram.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 45
NAME = CAT2_EARLY_1_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 949
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 early time histogram 1.
"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 46
NAME = CAT2_EARLY_2_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 981
```

```

ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 early time histogram 2.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 47
NAME = CAT2_EARLY_3_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 1013
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 early time histogram 3.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 48
NAME = CAT2_EARLY_4_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 1045
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 early time histogram 4.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 49
NAME = CAT2_EARLY_SUM_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 1077
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 early time summation histogram.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 50
NAME = CAT2_LATE_1_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 1109
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 late time histogram 1.

```

```

"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 51
NAME = CAT2_LATE_2_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 1141
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 late time histogram 2.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 52
NAME = CAT2_LATE_3_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 1173
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 late time histogram 3.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 53
NAME = CAT2_LATE_4_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 1205
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 late time histogram 4.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 54
NAME = CAT2_LATE_SUM_HIST
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 32
START_BYTE = 1237
ITEMS = 16
ITEM_BYTES = 2
DESCRIPTION = "
Category 2 late time summation histogram.
"
END_OBJECT = COLUMN

```

```

OBJECT = CONTAINER
NAME = EVENTS_ARRAY
BYTES = 9
START_BYTE = 1269
REPETITIONS = 84
DESCRIPTION = "
Events mode data is the first 84 prism events in each accumulation
period.
"
OBJECT = COLUMN
COLUMN_NUMBER = 55
NAME = TTSP
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 1
DESCRIPTION = "
Time to second pulse.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 56
NAME = DELAY_HITS
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 3
DESCRIPTION = "
Delayed segment id, 0 if a single-prism event, 1 for multiple-prism
event.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 57
NAME = PRISM_ID
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 4
DESCRIPTION = "
1 = prism segment 1 only, 2 = prism segment 2 only, 3 = prism segment 3
only, 4 = prism segment 4 only, 5 = multiple prism event.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 58
NAME = DELAY
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 5
DESCRIPTION = "
Delayed interaction pulse height.
"
END_OBJECT = COLUMN

OBJECT = COLUMN

```

```

COLUMN_NUMBER = 59
NAME = PROMPT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 6
DESCRIPTION = "
Prompt interaction pulse height.
"
END_OBJECT = COLUMN

```

```

END_OBJECT = CONTAINER

```

9. PROFILE DATA

9.1. PROFILE_DATA_YYYYMMDD.LBL

```

PDS_VERSION_ID      = PDS3

```

```

/* FILE CHARACTERISTICS */

```

```

RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 32839
FILE_RECORDS        = 4

```

```

/* POINTERS TO DATA OBJECTS */

```

```

^TIME_SERIES        = "PROFILE_DATA_20020412.DAT"

```

```

/* IDENTIFICATION DATA ELEMENTS */

```

```

DATA_SET_NAME       = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID         = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_ID          = "PROFILE_DATA_20020412"
PRODUCT_TYPE        = "PROFILE_DATA"
PRODUCT_VERSION_ID  = "0.0"
RELEASE_ID          = "0000"

```

```

/* DESCRIPTIVE DATA ELEMENTS */

```

```

INSTRUMENT_HOST_NAME = "2001 MARS ODYSSEY"
INSTRUMENT_NAME      = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID        = ODY
TARGET_NAME          = MARS
MISSION_PHASE_NAME   = MAPPING
START_TIME           = 2002-04-12T07:01:25.508
STOP_TIME            = 2002-04-12T16:54:46.048
SPACECRAFT_CLOCK_START_COUNT = 179983909762
SPACECRAFT_CLOCK_STOP_COUNT  = 179993023516
PRODUCT_CREATION_TIME = 2004-02-10T17:43:20.074

```

```

/* DATA OBJECT DEFINITION */

```

```

OBJECT              = TIME_SERIES

```

```

INTERCHANGE_FORMAT  = BINARY
ROW_BYTES           = 32839
ROWS                = 4

```

```

SAMPLING_PARAMETER_NAME    = TIME
SAMPLING_PARAMETER_UNIT    = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* DESCRIPTIVE data elements */
DESCRIPTION                  = "Profile spectra and associated data."

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.                */

COLUMNS                    = 15
^STRUCTURE                  = "PROFILE_DATA_COLS.FMT"

END_OBJECT                  = TIME_SERIES

END

```

9.2. PROFILE_DATA_COLS.FMT

```

OBJECT = COLUMN
COLUMN_NUMBER = 1
NAME = SC_RECV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 1
DESCRIPTION = "
The time this packet was received by the spacecraft, in ticks (256 per
second).
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = SC_EV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 9
DESCRIPTION = "
Spacecraft time at the beginning of the pixel, in ticks (256 per
second).
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = SC_EV_TIME_FINE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 17
DESCRIPTION = "
Fine time portion of spacecraft time at the beginning of the pixel,
units of 65536ths of a second.
"
END_OBJECT = COLUMN

```

```
OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = CEB_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 19
UNIT = MILLISECOND
DESCRIPTION = "
Clock count from the GRS Common Electronics Box at the beginning of the
pixel.
"
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 5
NAME = UTC
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 27
DESCRIPTION = "
SC_EV_TIME converted to UTC, stored as yyyy-mm-ddThh:mm:ss.sss.
"
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 6
NAME = GRS_PIXEL_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 50
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of accumulation intervals, starts with one as GRS
orbit begins. Special case on reboot when the CEB is in orbit 0, pixel
0.
"
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 7
NAME = GRS_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 54
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of orbits from GRS CEB boot.
"
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 8
NAME = ODY_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
```

```

START_BYTE = 58
INVALID_CONSTANT = 0
DESCRIPTION = "
Orbit number common to all instruments aboard Odyssey. This orbit
number is incremented by one as the spacecraft passes through the
orbital descending node.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 9
NAME = BAD_CODE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 62
DESCRIPTION = "
If non-zero, the data has been flagged as bad. Definitions in
bad_code.txt.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 10
NAME = COUNTER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 66
DESCRIPTION = "
A profile can come down in up to 4 packets. Each packet has its own
counter. This counter is the combination of all eight possible
counters, four bits for each.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 11
NAME = PROFILE_COUNT
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 70
DESCRIPTION = "
Number of 4-scalar element sets that are in the profile array.
"
END_OBJECT = COLUMN

OBJECT = CONTAINER
NAME = PROFILE_SERIES
BYTES = 16
START_BYTE = 72
REPETITIONS = 2048
DESCRIPTION = "
Series of summed counts of gamma events in four energy ranges. The
nominal summing period is 32 milliseconds.
"
OBJECT = COLUMN

```

```

COLUMN_NUMBER = 12
NAME = LLD
DATA_TYPE = MSB_INTEGER
BYTES = 4
START_BYTE = 1
INVALID_CONSTANT = -1
DESCRIPTION = "
All counts above the LLD energy.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 13
NAME = LLD_L1
DATA_TYPE = MSB_INTEGER
BYTES = 4
START_BYTE = 5
INVALID_CONSTANT = -1
DESCRIPTION = "
Counts in the LLD to L1 energy range.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 14
NAME = L1_L2
DATA_TYPE = MSB_INTEGER
BYTES = 4
START_BYTE = 9
INVALID_CONSTANT = -1
DESCRIPTION = "
Counts in the L1 to L2 energy range.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 15
NAME = L2_L3
DATA_TYPE = MSB_INTEGER
BYTES = 4
START_BYTE = 13
INVALID_CONSTANT = -1
DESCRIPTION = "
Counts in the L2 to L3 energy range.
"
END_OBJECT = COLUMN

END_OBJECT = CONTAINER

```

10. PULSER SPECTRA

10.1. PULSER_SPECTRA_YYYYMMDD.LBL

```

PDS_VERSION_ID          = PDS3

/* FILE CHARACTERISTICS */
RECORD_TYPE              = FIXED_LENGTH
RECORD_BYTES             = 1568
FILE_RECORDS             = 3941

/* POINTERS TO DATA OBJECTS */
^TIME_SERIES             = "PULSER_SPECTRA_20030101.DAT"

/* IDENTIFICATION DATA ELEMENTS */
DATA_SET_NAME            = "ODY MARS GAMMA RAY SPECTROMETER 2 EDR V1.0"
DATA_SET_ID              = "ODY-M-GRS-2-EDR-V1.0"
PRODUCT_ID               = "PULSER_SPECTRA_20030101"
PRODUCT_TYPE             = "PULSER_SPECTRA"
PRODUCT_VERSION_ID      = "1.0"
RELEASE_ID               = "0005"

/* DESCRIPTIVE DATA ELEMENTS */
INSTRUMENT_HOST_NAME    = "2001 MARS ODYSSEY"
INSTRUMENT_NAME         = "GAMMA RAY SPECTROMETER"
SPACECRAFT_ID           = ODY
TARGET_NAME              = MARS
MISSION_PHASE_NAME      = MAPPING
START_TIME               = 2003-01-01T00:00:17.955
STOP_TIME                = 2003-01-02T00:00:09.003
SPACECRAFT_CLOCK_START_COUNT = 185816708895
SPACECRAFT_CLOCK_STOP_COUNT = 185838825039
PRODUCT_CREATION_TIME    = 2004-02-16T16:55:52.483

/* DATA OBJECT DEFINITION */
OBJECT                   = TIME_SERIES

INTERCHANGE_FORMAT       = BINARY
ROW_BYTES                = 1568
ROWS                     = 3941

SAMPLING_PARAMETER_NAME  = TIME
SAMPLING_PARAMETER_UNIT  = TICKS
SAMPLING_PARAMETER_INTERVAL = "N/A"

/* DESCRIPTIVE data elements */
DESCRIPTION              = "Pulser spectrum and associated data."

/* The complete column definitions are contained in an external file */
/* found in the LABEL directory of the archive disk.                */

COLUMNS                 = 13
^STRUCTURE                = "PULSER_SPECTRA_COLS.FMT"

END_OBJECT               = TIME_SERIES

END

```

10.2. PULSER_SPECTRA_COLS.FMT

```
OBJECT = COLUMN
COLUMN_NUMBER = 1
NAME = SC_RECV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 1
DESCRIPTION = "
The time this packet was received by the spacecraft, in ticks (256 per
second).
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 2
NAME = SC_EV_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 9
DESCRIPTION = "
Spacecraft time at the middle of the pixel, in ticks.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 3
NAME = CEB_TIME
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 8
START_BYTE = 17
UNIT = MILLISECOND
DESCRIPTION = "
Clock count from the GRS Common Electronics Box at the beginning of the
pixel.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 4
NAME = UTC
DATA_TYPE = CHARACTER
BYTES = 23
START_BYTE = 25
DESCRIPTION = "
SC_EV_TIME converted to UTC, stored as yyyy-mm-ddThh:mm:ss.sss.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 5
NAME = GRS_PIXEL_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 48
```

```

INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of accumulation intervals, starts with one as grs
orbit begins. Special case on reboot when the CEB is in orbit 0,
pixel 0.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 6
NAME = GRS_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 52
INVALID_CONSTANT = 0
DESCRIPTION = "
Sequential counter of orbits from GRS CEB boot.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 7
NAME = ODY_ORBIT_NUMBER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 56
INVALID_CONSTANT = 0
DESCRIPTION = "
Orbit number common to all instruments aboard Odyssey. This orbit
number is incremented by one as the spacecraft passes through the
orbital descending node.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 8
NAME = BAD_CODE
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 4
START_BYTE = 60
DESCRIPTION = "
If non-zero, the data has been flagged bad. Definitions in
bad_code.txt.
"
END_OBJECT = COLUMN

OBJECT = COLUMN
COLUMN_NUMBER = 9
NAME = COUNTER
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1
START_BYTE = 64
DESCRIPTION = "
The packet counter from the pulser packet, values from 0 to 15.
"
END_OBJECT = COLUMN

```

```
OBJECT = COLUMN
COLUMN_NUMBER = 10
NAME = FIRST_CHAN
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 65
DESCRIPTION = "
Starting channel of first 500-channel wide spectrum.
"
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 11
NAME = MID_CHAN
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 67
DESCRIPTION = "
Starting channel of second 500-channel wide spectrum.
"
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 12
NAME = LAST_CHAN
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 2
START_BYTE = 69
DESCRIPTION = "
Starting channel of third 500-channel wide spectrum.
"
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
COLUMN_NUMBER = 13
NAME = SPECTRUM
DATA_TYPE = MSB_UNSIGNED_INTEGER
BYTES = 1500
START_BYTE = 71
ITEMS = 1500
ITEM_BYTES = 1
DESCRIPTION = "
Pulser Spectrum.
"
```

```
END_OBJECT = COLUMN
```