# TEST PROCEDURE

# Data Pipeline Test Procedure

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CONTENTS

## 1. INTRODUCTION

This document describes the test files required to validate the build of the data pipeline software when installed on a computer together with the procedure required to generate the output data.

## 2. SUMMARY OF PIPELINE OPERATION

The data pipeline functional block diagram is shown in Figure 2 -1. In order to process the C1XS science data three instrument files are needed together with three calibration files. All six of these files are PDS format text files, the labels are given in the appendices to this document.

The pipeline reads in the spectral data and then applies five correction steps:

1) Converts the variable bin width type 12 spectrum into a 1024 bin spectrum with a uniform bin width.
2) Uses the type 9 packet to determine the zero energy value for each SCD. This sets a certain x value to be equivalent to zero energy.
3) Corrects the gain of each SCD based upon the gain calibration data and the SCD temperature. The SCD temperature is extracted from the housekeeping data. The gain correction is multiplicative and applied to the y values.
4) The particle background, determined from quiet time data, is subtracted from the y value depending on the energy .
5) Finally the efficiency of each SCD is taken into account using the efficiency correction calibration data. The efficiency correction is multiplicative and applied to the y values depending on the energy .

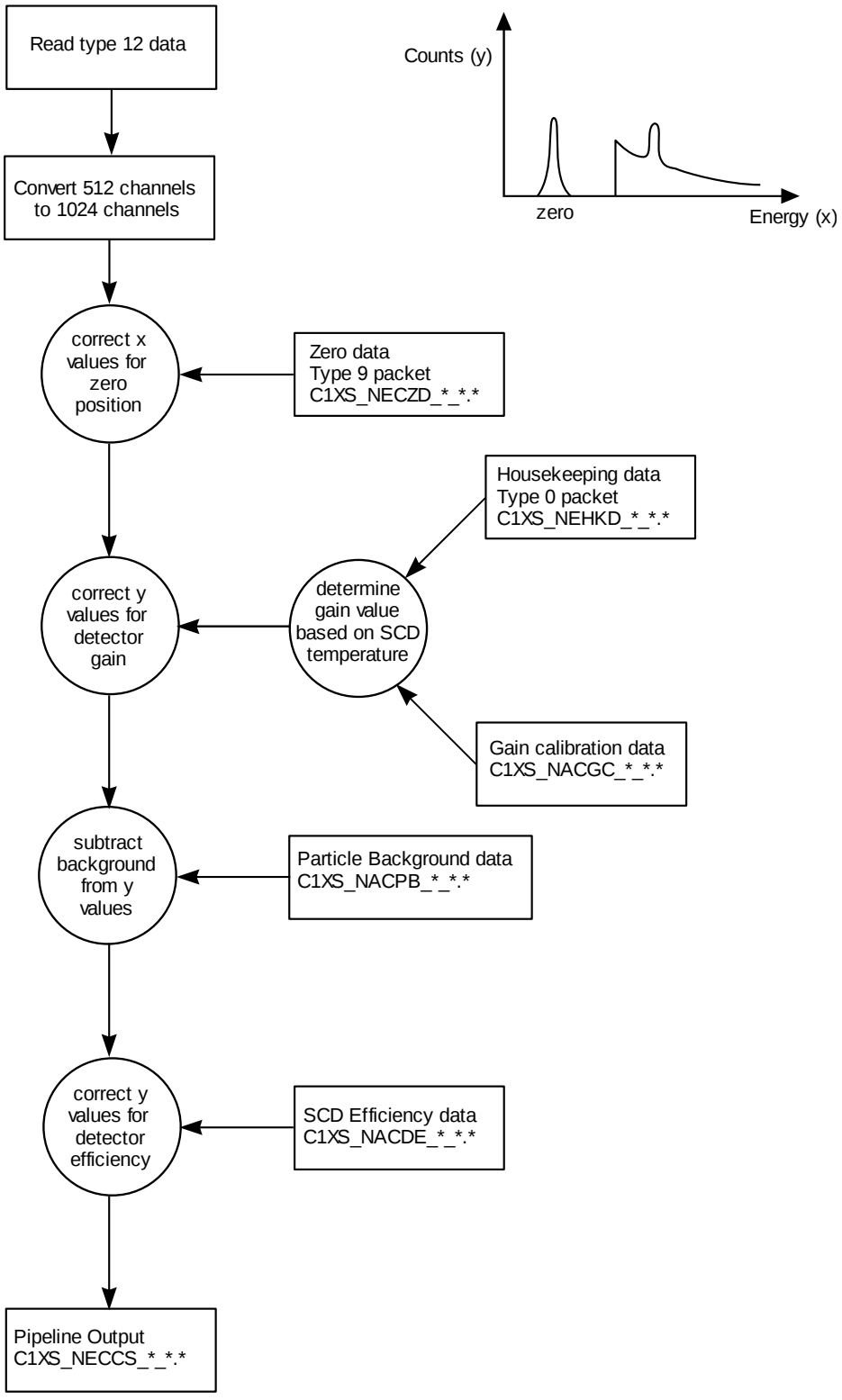


**Figure 2-1 Pipeline block diagram**

## 3. TEST STRATEGY

In order to validate the pipeline after it has been built on a specific machine test cases are needed. This will consist of a number of input files containing pseudo-data and the expected output file generated by the pipeline. The basic steps will be:

1) Run pipeline on input file
2) Check that the output produced by the pipeline matches the expected output file, i.e. the '.TAB' files match.
3) Check that the PDS label file output matches the example with the exception of run specific values.

The test cases are defined in the following section.

## 4. TEST CASES

### 4.1 Basic operation

Verify that with no gain/efficiency/background corrections applied the correct data is output.
Check the spectrum is re-binned correctly.
Check maximum, minimum values
Check that adjacent bin values don't affect one-another
Check maximum, minimum values
Check that omitting an SCD works
Check negative data values
Check error propagation

### 4.2 Zero Correction

Check zero correction works for all SCDs independently
Check maximum, minimum values
Check negative data values
Check error propagation

### 4.3 Gain Correction

Check gain correction works for all SCDs independently
Check maximum, minimum values
Check negative data values
Check temperature look-up works
Check interpolation works
Check error propagation

### 4.4 Background Subtraction

Check background subtraction works for all SCDs independently
Check maximum, minimum values
Check negative data values
Check interpolation works
Check error propagation

### 4.5 Efficiency Correction

Check efficiency correction works for all SCDs independently
Check maximum, minimum values
Check negative data values
Check interpolation works
Check error propagation

## 5. VALIDATION USING CALIBRATION DATA PRODUCTS

To ensure that the pipeline calibration files generated by the Science Team have the correct effect the test cases in the following sections will be required each time a calibration data product is updated.

### 5.1 Gain Correction

Verify that the output data product has the correct values when the background and efficiency correction files are configured to have no effect.

### 5.2 Background Subtraction

Verify that the output data product has the correct values when the gain correction and efficiency correction files are configured to have no effect.

### 5.3 Efficiency Correction

Verify that the output data product has the correct values when the gain correction and background correction files are configured to have no effect.

## 6. TEST DATA FILES

The following sections describe the contents of the different input and output files for the test cases.

### 6.1 Type 12 data

C1XS_NEHRS_090210_TEST01
Same for all detectors
1 record per detector @ 10:00:00, 8 s integration time
All bins 100 counts

C1XS_NEHRS_090210_TEST02
Same for all detectors
1 record per detector @ 10:00:00, 8 s integration time
All bins 1 count

C1XS_NEHRS_090210_TEST03
1 record per detector @ 10:00:00, 8 s integration time
Counts increase up to 255, then start from 0 again
All detectors out of sync

C1XS_NEHRS_090210_TEST04
Same for all detectors

1 record per detector @ 10:00:00, 8 s integration time
1 count in 1st bin, -1 counts in second bin, 0 counts in all other bins

C1XS_NEHRS_090210_TEST05
9 record per detector, 8s interval, 10:00:00 – 10:01:04, 8 s integration time
Some records have -1 counts in bin 1, 1 count in all other bins

C1XS_NEHRS_090210_TEST06
Same for all detectors
9 record per detector, 8s interval, 10:00:00 – 10:01:04, 8 s integration time
Alternates 10 bins of 1 count, 10 bins of 0 counts, etc.

C1XS_NEHRS_090210_TEST07
Detector 0 only
151 records, 8s interval, 10:00:00 – 10:20:00, 8 s integration time
All bins 1 count

C1XS_NEHRS_090210_TEST08
Detector 0 only
151 records, 8s interval, 10:00:00 – 10:20:00, 8 s integration time
Records alternate between all 0 counts and all 1 count

C1XS_NEHRS_090210_TEST09
Detector 0 only
112 records, 8s interval, 10:00:00 – 10:20:00, 8 s integration time
Gaps at 10:02:00 and 10:12:00
All bins 1 count

C1XS_NEHRS_090210_TEST10
Detector 0 only
151 records, 8s interval, 10:00:00 – 10:20:00, 8 s integration time
Some erroneous time values (not valid times or out-of-range)
All bins 1 count

C1XS_NEHRS_090210_TEST11
Same for all detectors
1 record per detector @ 10:00:00, 8 s integration time
Counts increase from 4, 8, 16, 24 to match bin width

C1XS_NEHRS_090210_TEST12
Same for all detectors
151 records per detector8s interval, 10:00:00 – 10:20:00, 8 s integration time
Counts increase from 4, 8, 16, 24 to match bin width

### 6.2 Type 9 data

C1XS_NECZD_090210_TEST01

Same for all detectors
10 records, 4 min intervals, 10:00:00 – 10:36:00
Offset: 0, High threshold: 300, Low Threshold 200

C1XS_NECZD_090210_TEST02

10 records, 2 min intervals, 10:00:00 – 10:18:00
Offset varies with time and is different for each detector
High threshold same for each detector, intervals of 50, 300 – 750
Low threshold same for each detector, intervals of 50, 200 - 650

C1XS_NECZD_090210_TEST03

Like C1XS_NECZD_090210_TEST01, but offset varies in first record

C1XS_NECZD_090210_TEST04

Like C1XS_NECZD_090210_TEST01, but offset has out-of-bounds values in 3rd record

C1XS_NECZD_090210_TEST05

Same for all detectors
10 records, 4 min intervals, 10:00:00 – 10:36:00
Offset: 0, High threshold: 300, Low Threshold 200

### 6.3 Type 0 data

C1XS_NEHKD_090210_TEST01

96 records, 00:1:04 intervals, 10:00:00 – 11:41:20
Both temperatures -20 degrees

C1XS_NEHKD_090210_TEST02

96 records, 00:1:04 intervals, 10:00:00 – 11:41:20
Temperatures varies between -5 and -25 degrees, the two temperatures are slightly out of sync.

### 6.4 Gain calibration data

C1XS_NECGC_090210_TEST01

1 record per detector
Gain is 1 at all temperatures

C1XS_NECGC_090210_TEST02

1 record per detector
Gain changes from 5 to 1 at a certain temperature

C1XS_NECGC_090210_TEST03

1 record per detector
Gain different for each detector
Gain changes at a certain temperature

C1XS_NECGC_090210_TEST04
1 record per detector
Gain of -1 on detector 0

C1XS_NECGC_090210_TEST05
1 record per detector
Gain of 10 at all temperatures

### 6.5 Particle background data

C1XS_NECPB_090210_TEST01
501 records, 0.05 keV intervals, 0 – 25 keV, 5000 s integration time
0 background, 0 error

C1XS_NECPB_090210_TEST02
501 records, 0.05 keV intervals, 0 – 25 keV, 8 s integration time
Background changes with energy and detector, 0 error

C1XS_NECPB_090210_TEST03
501 records, 0.05 keV intervals, 0 – 25 keV, 8 s integration time
Background 2 counts, error changes with each detector

### 6.6 SCD Efficiency data

C1XS_NECDE_090210_TEST01
Same for all detectors
451 records, 0.02 keV intervals, 1 – 10 keV
All values 1, all errors 0

C1XS_NECDE_090210_TEST02
451 records, 0.02 keV intervals, 1 – 10 keV
Values vary with energy and detector, all errors 0

C1XS_NECDE_090210_TEST03
451 records, 0.02 keV intervals, 1 – 10 keV
All values 2, error varies with energy and detector

### 6.7 Pipeline output

Each test will have an output TAB file which can be verified using the POSIX diff programme. The LBL files can also be checked using diff, to check that there is the expected number of differences (2 expected, where the current date is output).

### 6.8 SPICE Kernels

Because the spice libraries are packaged separately, the test files will not contain SPICE-derived data.

## 7. TEST PROCEDURE

The tests should be run by typing `make check' once the pipeline has been compiled.

The test validation files were produced without spice data, so the tests should be run on a pipeline compiled without spice support. To create a pipeline with spice support the following should be done:

```
$ ./configure --without-cspice
$ make
$ make check
$ make distclean
$ ./configure --with-cspice=/path/to/cspice
$ make
$ make install
```

The tests can be run independently by typing, e.g. `srcdir=. ./test_A.test' in the test directory to run test A.

## APPENDIX A – TYPE 12 DATA PDS LABEL

```
/*  DATA OBJECTS DEFINITION */

OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = ASCII
   ROWS                         = number of rows
   ROW_BYTES                    = 2595
   COLUMNS                      = 4
   NAME                         = "C1XS HR SPECTRA"
   DESCRIPTION                  = "C1XS HIGH RESOLUTION SPECTRA"

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

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

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

   OBJECT                       = COLUMN
      DESCRIPTION               = "NUMBER OF X-RAY EVENTS in EACH OF
                                   THE 512 X-RAY SPECTRUM ELEMENTS"
      NAME                      = "X-RAY SPECTRUM ELEMENT"
      START_BYTE                = 35
      UNIT                      = "N/A"
      ITEMS                     = 512
      ITEM_BYTES                = 4
      BYTES                     = 2559
      DATA_TYPE                 = ASCII_INTEGER
      ITEM_OFFSET               = 5
      VALID_MAXIMUM             = 255
      VALID_MINIMUM             = 0
   END_OBJECT                   = COLUMN

END_OBJECT                      = TABLE
```

## APPENDIX B – TYPE 9 DATA PDS LABEL

```
/*  DATA OBJECTS DEFINITION */

OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = ASCII
   ROWS                         = number of rows
   ROW_BYTES                    = 385
   COLUMNS                      = 73
   NAME                         = "C1XS ZERO POSITION DATA"
   DESCRIPTION                  = "C1XS ZERO POSITION AND THRESHOLD
PARAMETERS"

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

    OBJECT                       = COLUMN
       NAME                      = "SCD0_ZERO_POSITION"
       START_BYTE                = 25
       BYTES                     = 4
       DATA_TYPE                 = ASCII_INTEGER
       UNIT                      = "N/A"
       DESCRIPTION               = "SCD0 ZERO POSITION"
       VALID_MAXIMUM             = 8192
       VALID_MINIMUM             = 0
    END_OBJECT                   = COLUMN
    OBJECT                       = COLUMN
       NAME                      = "SCD1_ZERO_POSITION"
       START_BYTE                = 30
       BYTES                     = 4
       DATA_TYPE                 = ASCII_INTEGER
       UNIT                      = "N/A"
       DESCRIPTION               = "SCD1 ZERO POSITION"
       VALID_MAXIMUM             = 8192
       VALID_MINIMUM             = 0
    END_OBJECT                   = COLUMN

    OBJECT                       = COLUMN

       NAME                      = "SCD2_ZERO_POSITION"
       START_BYTE                = 35
       BYTES                     = 4
       DATA_TYPE                 = ASCII_INTEGER
       UNIT                      = "N/A"
       DESCRIPTION               = "SCD2 ZERO POSITION"
       VALID_MAXIMUM             = 8192
       VALID_MINIMUM             = 0
    END_OBJECT                   = COLUMN

    OBJECT                       = COLUMN
       NAME                      = "SCD3_ZERO_POSITION"
       START_BYTE                = 40
       BYTES                     = 4
       DATA_TYPE                 = ASCII_INTEGER
       UNIT                      = "N/A"
```

```
    DESCRIPTION              = "SCD3 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD4_ZERO_POSITION"
    START_BYTE               = 45
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD4 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD5_ZERO_POSITION"
    START_BYTE               = 50
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD5 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD6_ZERO_POSITION"
    START_BYTE               = 55
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD6 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD7_ZERO_POSITION"
    START_BYTE               = 60
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD7 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD8_ZERO_POSITION"
    START_BYTE               = 65
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD8 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD9_ZERO_POSITION"
    START_BYTE               = 70
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD9 ZERO POSITION "
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD10_ZERO_POSITION"
    START_BYTE               = 75
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD10 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD11_ZERO_POSITION"
    START_BYTE               = 80
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD11 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD12_ZERO_POSITION"
    START_BYTE               = 85
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD12 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD13_ZERO_POSITION"
    START_BYTE               = 90
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD13 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD14_ZERO_POSITION"
    START_BYTE               = 95
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD14 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD15_ZERO_POSITION"
    START_BYTE               = 100
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD15 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD16_ZERO_POSITION"
    START_BYTE               = 105
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD16 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD17_ZERO_POSITION"
    START_BYTE               = 110
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD17 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD18_ZERO_POSITION"
    START_BYTE               = 115
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD18 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD19_ZERO_POSITION"
    START_BYTE               = 120
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD19 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD20_ZERO_POSITION"
    START_BYTE               = 125
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD20 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD21_ZERO_POSITION"
    START_BYTE               = 130
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD21 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD22_ZERO_POSITION"
    START_BYTE               = 135
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD22 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD23_ZERO_POSITION"
    START_BYTE               = 140
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD23 ZERO POSITION"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD0_H_THRESHOLD"
    START_BYTE               = 145
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD0 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD1_H_THRESHOLD"
    START_BYTE               = 150
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD1 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD2_H_THRESHOLD"
    START_BYTE               = 155
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD2 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD3_H_THRESHOLD"
    START_BYTE               = 160
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD3 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD4_H_THRESHOLD"
    START_BYTE               = 165
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD4 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD5_H_THRESHOLD"
    START_BYTE               = 170
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD5 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD6_H_THRESHOLD"
    START_BYTE               = 175
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD6 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD7_H_THRESHOLD"
    START_BYTE               = 180
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD7 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD8_H_THRESHOLD"
    START_BYTE               = 185
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD8 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD9_H_THRESHOLD"
    START_BYTE               = 190
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD9 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD10_H_THRESHOLD"
    START_BYTE               = 195
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD10 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD11_H_THRESHOLD"
    START_BYTE               = 200
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD11 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD12_H_THRESHOLD"
    START_BYTE               = 205
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD12 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD13_H_THRESHOLD"
    START_BYTE               = 210
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD13 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD14_H_THRESHOLD"
    START_BYTE               = 215
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD14 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD15_H_THRESHOLD"
    START_BYTE               = 220
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD15 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD16_H_THRESHOLD"
    START_BYTE               = 225
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD16 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD17_H_THRESHOLD"
    START_BYTE               = 230
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD17 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD18_H_THRESHOLD"
    START_BYTE               = 235
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD18 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD19_H_THRESHOLD"
    START_BYTE               = 240
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD19 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD20_H_THRESHOLD"
    START_BYTE               = 245
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD20 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD21_H_THRESHOLD"
    START_BYTE               = 250
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD21 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD22_H_THRESHOLD"
    START_BYTE               = 255
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD22 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD23_H_THRESHOLD"
    START_BYTE               = 260
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD23 H THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD0_L_THRESHOLD"
    START_BYTE               = 265
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD0 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD1_L_THRESHOLD"
    START_BYTE               = 270
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD1 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD2_L_THRESHOLD"
    START_BYTE               = 275
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD2 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD3_L_THRESHOLD"
    START_BYTE               = 280
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD3 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD4_L_THRESHOLD"
    START_BYTE               = 285
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD4 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD5_L_THRESHOLD"
    START_BYTE               = 290
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD5 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD6_L_THRESHOLD"
    START_BYTE               = 295
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD6 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD7_L_THRESHOLD"
    START_BYTE               = 300
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD7 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD8_L_THRESHOLD"
    START_BYTE               = 305
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD8 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD9_L_THRESHOLD"
    START_BYTE               = 310
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD9 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD10_L_THRESHOLD"
    START_BYTE               = 315
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD10 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD11_L_THRESHOLD"
    START_BYTE               = 320
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD11 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD12_L_THRESHOLD"
    START_BYTE               = 325
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD12 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD13_L_THRESHOLD"
    START_BYTE               = 330
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD13 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD14_L_THRESHOLD"
    START_BYTE               = 335
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD14 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD15_L_THRESHOLD"
    START_BYTE               = 340
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
    DESCRIPTION              = "SCD15 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD16_L_THRESHOLD"
    START_BYTE               = 345
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD16 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD17_L_THRESHOLD"
    START_BYTE               = 350
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD17 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD18_L_THRESHOLD"
    START_BYTE               = 355
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD18 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD19_L_THRESHOLD"
    START_BYTE               = 360
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD19 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD20_L_THRESHOLD"
    START_BYTE               = 365
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
    DESCRIPTION              = "SCD20 L THRESHOLD"
    VALID_MAXIMUM            = 8192
    VALID_MINIMUM            = 0
END_OBJECT                   = COLUMN
OBJECT                       = COLUMN
    NAME                     = "SCD21_L_THRESHOLD"
    START_BYTE               = 370
    BYTES                    = 4
    DATA_TYPE                = ASCII_INTEGER
    UNIT                     = "N/A"
```

```
      DESCRIPTION              = "SCD21 L THRESHOLD"
      VALID_MAXIMUM            = 8192
      VALID_MINIMUM            = 0
   END_OBJECT                  = COLUMN
   OBJECT                      = COLUMN
      NAME                     = "SCD22_L_THRESHOLD"
      START_BYTE               = 375
      BYTES                    = 4
      DATA_TYPE                = ASCII_INTEGER
      UNIT                     = "N/A"
      DESCRIPTION              = "SCD22 L THRESHOLD"
      VALID_MAXIMUM            = 8192
      VALID_MINIMUM            = 0
   END_OBJECT                  = COLUMN
   OBJECT                      = COLUMN
      NAME                     = "SCD23_L_THRESHOLD"
      START_BYTE               = 380
      BYTES                    = 4
      DATA_TYPE                = ASCII_INTEGER
      UNIT                     = "N/A"
      DESCRIPTION              = "SCD23 L THRESHOLD"
      VALID_MAXIMUM            = 8192
      VALID_MINIMUM            = 0
   END_OBJECT                  = COLUMN

END_OBJECT                    = TABLE
```

## APPENDIX C – TYPE 0 DATA PDS LABEL

```
/*  DATA OBJECTS DEFINITION */

OBJECT                = TABLE
  INTERCHANGE_FORMAT  = ASCII
  ROWS                = number of rows
  ROW_BYTES           = 738
  COLUMNS             = 121

  NAME                = "C1XS HK"
  DESCRIPTION         = "C1XS Housekeeping Data in engineering units"

  OBJECT              = COLUMN
    NAME              = TIME
    BYTES             = 23
    DATA_TYPE         = TIME
    START_BYTE        = 1
    DESCRIPTION       = "TIME OF OBSERVATION "
    FORMAT            = A23
    UNIT              = UT
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = TC_FLAGS
    BYTES             = 3
    DATA_TYPE         = ASCII_INTEGER
    START_BYTE        = 25
    DESCRIPTION       = "TC ERROR FLAGS"
    FORMAT            = I3
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = SW_VER
    BYTES             = 3
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 29
    DESCRIPTION       = "SOFTWARE VERSION"
    FORMAT            = F3.1
    VALID_MAXIMUM     = 6
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = TC_OK
    BYTES             = 3
    DATA_TYPE         = ASCII_INTEGER
    START_BYTE        = 33
    DESCRIPTION       = "TC ACCEPTED COUNTER"
    FORMAT            = I3
    VALID_MAXIMUM     = 255
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = TC_REJ
    BYTES             = 3
    DATA_TYPE         = ASCII_INTEGER
    START_BYTE        = 37
```

```
    DESCRIPTION      = "TC REJECTED COUNTER"
    FORMAT           = I3
    VALID_MAXIMUM    = 255
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = TC_ECODE
    BYTES            = 3
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 41
    DESCRIPTION      = "TC ERROR CODE"
    FORMAT           = I3
    VALID_MAXIMUM    = 255
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = SW_FLAGS_LB
    BYTES            = 8
    DATA_TYPE        = CHARACTER
    START_BYTE       = 45
    DESCRIPTION      = "THE SOFTWARE FLAGS LOW BYTE PARAMETER IS DEFINED
WITH
                       A CHARACTER STRING FORMED FROM EIGHT COMPONENTS
                       : A0 A1 A2 A3 A4 A5 A6 A7
                       VALID ASSIGNMENTS FOR EACH COMPONENT ARE:

                        A0: XSM PROCESSING
                        A1: C1XS PROCESSING
                        A2: DOOR RADIATION STATUS
                        A3: DOOR RADIATION MOVEMENT
                        A4: XSM SHUTTER STATUS
                        A5: XSM ENTERING ANNEALING
                        A6: XSM ON FOR >1s
                        A7: XSM SWITCHED ON ."
    FORMAT           = A8
  END_OBJECT         = COLUMN

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

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

```
   OBJECT              = COLUMN
     NAME              = DOOR_STATE
     BYTES             = 2
     DATA_TYPE         = CHARACTER
     START_BYTE        = 66
     DESCRIPTION       = "THE DOOR STATE PARAMETER IS DEFINED WITH A
 CHARACTER
                         STRING FORMED FROM TWO COMPONENTS: S E
                         VALID ASSIGNMENTS FOR EACH COMPONENT ARE:

                          S :
                          0 = OPEN
                          1 = CLOSING
                          2 = OPENING
                          3 = CLOSED
                          4 = SWITCH_FAIL

                          E :
                          0 = OPEN
                          1 = CLOSING
                          2 = OPENING
                          3 = CLOSED"
     FORMAT            = A2
   END_OBJECT          = COLUMN

   OBJECT              = COLUMN
     NAME              = MODE
     BYTES             = 2
     DATA_TYPE         = CHARACTER
     START_BYTE        = 69
     DESCRIPTION       = "THE MODE PARAMETER IS DEFINED WITH A CHARACTER
 STRING
                         FORMED FROM TWO COMPONENTS: M S
                         VALID ASSIGNMENTS FOR EACH COMPONENT ARE:

                          M :
                          0 = STANDBY
                          1 = OPERATING
                          2 = TEST
                          3 = CALIBRATE
                          4 = RESTING
                          15 = EMERGENCY

                          S :
                          0 = TIME_TAGGED
                          1 = LC_SPECTRUM
                          2 = HC_SPECTRUM
                          3 = LUNAR
                          4 = COMPRESSED_LC
                          5 = TT_3PIX
                          6 = TT
                          7 = HRLCS
                          8 = AUTO2"
     FORMAT            = A2
   END_OBJECT          = COLUMN

   OBJECT              = COLUMN
     NAME              = MAX_CAN
     BYTES             = 4
```

```
   DATA_TYPE          = ASCII_INTEGER
   START_BYTE         = 72
   DESCRIPTION        = "MAX CAN PACKETS IN OUTPUT QUEUE THIS HK PERIOD"
   FORMAT             = I4
   VALID_MAXIMUM      = 50
   VALID_MINIMUM      = 0
END_OBJECT            = COLUMN

OBJECT                = COLUMN
   NAME               = TIME_ADJ
   BYTES              = 10
   DATA_TYPE          = ASCII_INTEGER
   START_BYTE         = 77
   DESCRIPTION        = "LAST CALCULATED TIME ADJUSTMENT"
   FORMAT             = I10
   VALID_MAXIMUM      = 134217727
   VALID_MINIMUM      = -134217728
END_OBJECT            = COLUMN

OBJECT                = COLUMN
   NAME               = TIME_ADJF
   BYTES              = 5
   DATA_TYPE          = ASCII_INTEGER
   START_BYTE         = 88
   DESCRIPTION        = "LAST CALCULATED TIME ADJUSTMENT
                         65535ths OF A SECOND"
   FORMAT             = I5
   VALID_MAXIMUM      = 65535
   VALID_MINIMUM      = 0
END_OBJECT            = COLUMN

OBJECT                = COLUMN
   NAME               = TIME_WBG
   BYTES              = 5
   DATA_TYPE          = ASCII_INTEGER
   START_BYTE         = 94
   DESCRIPTION        = "WORST BACKGROUND ELAPSED TIME THIS HK PERIOD"
   FORMAT             = I5
   VALID_MAXIMUM      = 65535
   VALID_MINIMUM      = 0
END_OBJECT            = COLUMN

OBJECT                = COLUMN
   NAME               = TIME_WIDL
   BYTES              = 5
   DATA_TYPE          = ASCII_INTEGER
   START_BYTE         = 100
   DESCRIPTION        = "WORST IDLE LOOP COUNT THIS HK PERIOD"
   FORMAT             = I5
   VALID_MAXIMUM      = 65535
   VALID_MINIMUM      = 0
END_OBJECT            = COLUMN

OBJECT                = COLUMN
   NAME               = CAN_NOT_READY
   BYTES              = 5
   DATA_TYPE          = ASCII_INTEGER
   START_BYTE         = 106
   DESCRIPTION        = "COUNT OF TIMES CAN TX NOT READY"
   FORMAT             = I5
```

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

  OBJECT             = COLUMN
    NAME             = LOST_PUS
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 112
    DESCRIPTION      = "COUNT OF LOST TM PUS PACKETS"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = RET_STACK
    BYTES            = 3
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 118
    DESCRIPTION      = "RETURN STACK POINTER"
    FORMAT           = I3
    VALID_MAXIMUM    = 255
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = PAR_STACK
    BYTES            = 3
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 122
    DESCRIPTION      = "PARAMETER STACK POINTER"
    FORMAT           = I3
    VALID_MAXIMUM    = 255
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = EEW_RETRY
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 126
    DESCRIPTION      = "EEPROM WRITE RETRIES"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = EEW_FAIL
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 132
    DESCRIPTION      = "EEPROM WRITE FAILURES"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
```

```
    NAME              = DOOR_CLS_DT
    BYTES             = 10
    DATA_TYPE         = ASCII_INTEGER
    START_BYTE        = 138
    DESCRIPTION       = "SECONDS REMAINING OF MINIMUM DOOR CLOSED INTERVAL"
    FORMAT            = I10
    UNIT              = s
    VALID_MAXIMUM     = 4294967295
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = SW_FLAGS_HB
    BYTES             = 4
    DATA_TYPE         = CHARACTER
    START_BYTE        = 149
    DESCRIPTION       = "THE SOFTWARE FLAGS HIGH BYTE PARAMETER IS DEFINED
                         WITH A CHARACTER STRING FORMED FROM FIVE COMPONENTS
                         : B0 B1 B2 B3 B4
                         VALID ASSIGNMENTS FOR EACH COMPONENT ARE:
                          B0: XSM CAL SEQUENCE
                          B1: XSM ANNEALING HEATER
                          B2: TC XSM ANNEAL START RXD
                          B3: TC XSM ANNEAL STOP RXD "
    FORMAT            = A4
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = DOOR_INTEGRATOR
    BYTES             = 3
    DATA_TYPE         = ASCII_INTEGER
    START_BYTE        = 154
    DESCRIPTION       = "DOOR CLOSE INTEGRATOR COUNT"
    FORMAT            = I3
    VALID_MAXIMUM     = 65535
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = TIME_SINCE_CAL
    BYTES             = 5
    DATA_TYPE         = ASCII_INTEGER
    START_BYTE        = 158
    DESCRIPTION       = "SECONDS SINCE LAST CALIBRATION"
    FORMAT            = I5
    VALID_MAXIMUM     = 65535
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = LAST_TC
    BYTES             = 7
    DATA_TYPE         = ASCII_INTEGER
    START_BYTE        = 164
    DESCRIPTION       = "LAST TC"
    FORMAT            = I7
    VALID_MAXIMUM     = 1677215
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN
```

```
    OBJECT              = COLUMN
      NAME              = LAST_TC1
      BYTES             = 7
      DATA_TYPE         = ASCII_INTEGER
      START_BYTE        = 172
      DESCRIPTION       = "LAST BUT 1 TC TYPE"
      FORMAT            = I7
      VALID_MAXIMUM     = 1677215
      VALID_MINIMUM     = 0
    END_OBJECT          = COLUMN

    OBJECT              = COLUMN
      NAME              = SCD1623_OFF
      BYTES             = 8
      DATA_TYPE         = ASCII_INTEGER
      START_BYTE        = 180
      DESCRIPTION       = "THE SENSOR 16-23 INHIBIT PARAMETER IS DEFINED WITH
A
                          CHARACTER STRING FORMED FROM EIGHT COMPONENTS

                           Sii: SENSOR INHIBIT  ii=16..23"
      FORMAT            = A8
    END_OBJECT          = COLUMN

    OBJECT              = COLUMN
      NAME              = SCD0815_OFF
      BYTES             = 8
      DATA_TYPE         = ASCII_INTEGER
      START_BYTE        = 189
      DESCRIPTION       = "THE SENSOR 8-15 INHIBIT PARAMETER IS DEFINED WITH A
                          CHARACTER STRING FORMED FROM EIGHT COMPONENTS

                          Sii: SENSOR INHIBIT  ii=8..15"
      FORMAT            = A8
    END_OBJECT          = COLUMN

    OBJECT              = COLUMN
      NAME              = SCD0007_OFF
      BYTES             = 8
      DATA_TYPE         = ASCII_INTEGER
      START_BYTE        = 198
      DESCRIPTION       = "THE SENSOR 0-7 INHIBIT PARAMETER IS DEFINED WITH A
                          CHARACTER STRING FORMED  FROM EIGHT COMPONENTS

                          Sii: SENSOR INHIBIT  ii=0..7"
      FORMAT            = A8
    END_OBJECT          = COLUMN

    OBJECT              = COLUMN
      NAME              = VIDEO_PWR_STATUS
      BYTES             = 3
      DATA_TYPE         = ASCII_INTEGER
      START_BYTE        = 207
      DESCRIPTION       = "POWER MONITOR"
      FORMAT            = I3
      VALID_MAXIMUM     = 255
      VALID_MINIMUM     = 0
    END_OBJECT          = COLUMN

    OBJECT              = COLUMN
```

```
    NAME                = SCD0_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 211
    DESCRIPTION         = "BANK1 CHANNEL A EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD1_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 217
    DESCRIPTION         = "BANK1 CHANNEL B EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD2_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 223
    DESCRIPTION         = "BANK1 CHANNEL C EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD3_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 229
    DESCRIPTION         = "BANK1 CHANNEL D EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD4_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 235
    DESCRIPTION         = "BANK1 CHANNEL E EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD5_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 241
    DESCRIPTION         = "BANK1 CHANNEL F EVENT COUNT"
```

```
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD6_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 247
    DESCRIPTION         = "BANK1 CHANNEL G EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD7_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 253
    DESCRIPTION         = "BANK1 CHANNEL H EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD8_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 259
    DESCRIPTION         = "BANK1 CHANNEL I EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD9_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 265
    DESCRIPTION         = "BANK1 CHANNEL J EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN

  OBJECT                = COLUMN
    NAME                = SCD10_EVENTS
    BYTES               = 5
    DATA_TYPE           = ASCII_INTEGER
    START_BYTE          = 271
    DESCRIPTION         = "BANK1 CHANNEL K EVENT COUNT"
    FORMAT              = I5
    VALID_MAXIMUM       = 65535
    VALID_MINIMUM       = 0
  END_OBJECT            = COLUMN
```

```
OBJECT              = COLUMN
  NAME              = SCD11_EVENTS
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 277
  DESCRIPTION       = "BANK1 CHANNEL L EVENT COUNT"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = SCD12_EVENTS
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 283
  DESCRIPTION       = "BANK2 CHANNEL A EVENT COUNT"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = SCD13_EVENTS
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 289
  DESCRIPTION       = "BANK2 CHANNEL B EVENT COUNT"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = SCD14_EVENTS
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 295
  DESCRIPTION       = "BANK2 CHANNEL C EVENT COUNT"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = SCD15_EVENTS
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 301
  DESCRIPTION       = "BANK2 CHANNEL D EVENT COUNT"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = SCD16_EVENTS
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 307
```

```
    DESCRIPTION      = "BANK2 CHANNEL E EVENT COUNT"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = SCD17_EVENTS
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 313
    DESCRIPTION      = "BANK2 CHANNEL F EVENT COUNT"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = SCD18_EVENTS
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 319
    DESCRIPTION      = "BANK2 CHANNEL G EVENT COUNT"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = SCD19_EVENTS
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 325
    DESCRIPTION      = "BANK2 CHANNEL H EVENT COUNT"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = SCD20_EVENTS
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 331
    DESCRIPTION      = "BANK2 CHANNEL I EVENT COUNT"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = SCD21_EVENTS
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 337
    DESCRIPTION      = "BANK2 CHANNEL J EVENT COUNT"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN
```

```
OBJECT              = COLUMN
  NAME              = SCD22_EVENTS
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 343
  DESCRIPTION       = "BANK2 CHANNEL K EVENT COUNT"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = SCD23_EVENTS
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 349
  DESCRIPTION       = "BANK2 CHANNEL L EVENT COUNT"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = XSM_V_5
  BYTES             = 5
  DATA_TYPE         = ASCII_REAL
  START_BYTE        = 355
  DESCRIPTION       = "XSM +5V MONITOR"
  FORMAT            = F5.1
  UNIT              = V
  VALID_MAXIMUM     = 5.5
  VALID_MINIMUM     = -0.5
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = XSM_V_12
  BYTES             = 5
  DATA_TYPE         = ASCII_REAL
  START_BYTE        = 361
  DESCRIPTION       = "XSM +12V MONITOR"
  FORMAT            = F5.1
  UNIT              = V
  VALID_MAXIMUM     = 12.5
  VALID_MINIMUM     = -0.5
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = XSM_V_M12
  BYTES             = 5
  DATA_TYPE         = ASCII_REAL
  START_BYTE        = 367
  DESCRIPTION       = "XSM -12V MONITOR"
  FORMAT            = F5.1
  UNIT              = V
  VALID_MAXIMUM     = 0.5
  VALID_MINIMUM     = -12.5
END_OBJECT          = COLUMN

OBJECT              = COLUMN
```

```
    NAME              = XSM_T_PIN
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 373
    DESCRIPTION       = "XSM PIN DETECTOR TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 60
    VALID_MINIMUM     = -25
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = XSM_T_BOX
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 379
    DESCRIPTION       = "XSM DETECTOR BOX TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 40
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = XSM_HV
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 385
    DESCRIPTION       = "XSM HV BIAS VOLTAGE"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 80
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = XSM_LEAK
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 391
    DESCRIPTION       = "XSM LEAKAGE CURRENT"
    FORMAT            = F5.1
    UNIT              = pA
    VALID_MAXIMUM     = 30
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = T_PSU
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 397
    DESCRIPTION       = "DC CONVERTER TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 50
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
```

```
    NAME              = T_CANPCB
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 403
    DESCRIPTION       = "CAN/HK PCB TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 50
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = T_BOX
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 409
    DESCRIPTION       = "MY PLATE TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 50
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = T_VIDPCB
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 415
    DESCRIPTION       = "VIDEO DIGITAL PCB TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 50
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = T_3DP1
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 421
    DESCRIPTION       = "VIDEO1 3D+ TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 50
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = T_3DP2
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 427
    DESCRIPTION       = "VIDEO2 3D+ TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 50
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
```

```
    NAME              = T_SCDB
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 433
    DESCRIPTION       = "SCD COLUMN B TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 20
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = T_SCDE
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 439
    DESCRIPTION       = "SCD COLUMN E TEMPERATURE"
    FORMAT            = F5.1
    UNIT              = C
    VALID_MAXIMUM     = 20
    VALID_MINIMUM     = -40
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_12
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 445
    DESCRIPTION       = "12V REGULATED SUPPLY"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 12.5
    VALID_MINIMUM     = 11.5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_5
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 451
    DESCRIPTION       = "5V REGULATED SUPPLY"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 5.5
    VALID_MINIMUM     = 4.6
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_3_3
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 457
    DESCRIPTION       = "3.3V REGULATED SUPPLY"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 3.5
    VALID_MINIMUM     = 3
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
```

```
    NAME              = XSM_V_PELT
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 463
    DESCRIPTION       = "XSM PELTIER SUPPLY VOLTAGE"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 1.8
    VALID_MINIMUM     = 1.4
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_M12
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 469
    DESCRIPTION       = "M12V REGULATED SUPPLY"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = -11.5
    VALID_MINIMUM     = -12.5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_M5
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 475
    DESCRIPTION       = "M5V REGULATED SUPPLY"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = -4.6
    VALID_MINIMUM     = -5.5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_MOTOR_P1
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 481
    DESCRIPTION       = "MOTOR PHASE 1 VOLTAGE"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 5
    VALID_MINIMUM     = -5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_MOTOR_P2
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 487
    DESCRIPTION       = "MOTOR PHASE 2 VOLTAGE"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 5
    VALID_MINIMUM     = -5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
```

```
    NAME              = V_SCD_SS
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 493
    DESCRIPTION       = "SCD SUBSTRATE VOLTAGE MONITOR"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 9.5
    VALID_MINIMUM     = -0.5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_SCD_OG
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 499
    DESCRIPTION       = "SCD OUTPUT GATE VOLTAGE MONITOR"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 3.5
    VALID_MINIMUM     = -0.5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_SCD_RD
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 505
    DESCRIPTION       = "SCD RESET DRAIN VOLTAGE MONITOR"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 17.5
    VALID_MINIMUM     = -0.5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_SCD_OD
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 511
    DESCRIPTION       = "SCD OUTPUT DRAIN VOLTAGE MONITOR"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 31
    VALID_MINIMUM     = -0.5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = V_39
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 517
    DESCRIPTION       = "39V SUPPLY VOLTAGE"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 42
    VALID_MINIMUM     = -1
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
```

```
    NAME              = V_0
    BYTES             = 5
    DATA_TYPE         = ASCII_REAL
    START_BYTE        = 523
    DESCRIPTION       = "0V"
    FORMAT            = F5.1
    UNIT              = V
    VALID_MAXIMUM     = 0.5
    VALID_MINIMUM     = -0.5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = DOOR_MECH_STATUS
    BYTES             = 5
    DATA_TYPE         = CHARACTER
    START_BYTE        = 529
    DESCRIPTION       = "THE DOOR MECHANISM STATUS PARAMETER IS DEFINED WITH
                         A CHARACTER STRING FORMED FROM FIVE COMPONENTS:
                            B0 B1 B2 B3 B4
                         VALID ASSIGNMENTS FOR EACH COMPONENT ARE:
                          B0: LAUNCH-LOCK LATCH ENABLED
                          B1: LAUNCH-LOCK BYPASS ENABLED
                          B2: LAUNCH-LOCK LATCH OPEN
                          B3: LAUNCH-LOCK LATCH CLOSED
                          B4: DOOR MOTOR RUNNING "
    FORMAT            = A5
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = DOOR_STEP
    BYTES             = 5
    DATA_TYPE         = ASCII_INTEGER
    START_BYTE        = 535
    DESCRIPTION       = "DOOR MOTOR STEP COUNT"
    FORMAT            = I5
    VALID_MAXIMUM     = 65535
    VALID_MINIMUM     = 0
  END_OBJECT          = COLUMN

  OBJECT              = COLUMN
    NAME              = XSM_CONTROL
    BYTES             = 5
    DATA_TYPE         = CHARACTER
    START_BYTE        = 541
    DESCRIPTION       = "THE XSM CONTROL STATUS PARAMETER IS DEFINED WITH A
                         CHARACTER STRING FORMED FROM FIVE COMPONENTS
                         : B0 B1 B2 B3 B4
                         VALID ASSIGNMENTS FOR EACH COMPONENT ARE:
                          B0: PELTIER SUPPLY
                          B1: PELTIER MODE
                          B2: HV BIAS
                          B3: HV OVERRIDE
                          B4: XSM FIFO WRITE "
    FORMAT            = A5
  END_OBJECT          = COLUMN
  OBJECT              = COLUMN
    NAME              = XSM_STATUS
    BYTES             = 2
    DATA_TYPE         = CHARACTER
    START_BYTE        = 547
```

```
    DESCRIPTION      = "THE XSM STATUS PARAMETER IS DEFINED WITH A
CHARACTER
                        STRING FORMED FROM TWO COMPONENTS : B0 B1
                        VALID ASSIGNMENTS FOR EACH COMPONENT ARE:
                         B0: XSM DETECTOR OVER-TEMP
                         B1: XSM HV OVER-VOLTAGE "
    FORMAT           = A2
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = XSM_DAC0
    BYTES            = 3
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 550
    DESCRIPTION      = "XSM DAC 0 "
    FORMAT           = I3
    VALID_MAXIMUM    = 255
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = XSM_DAC1
    BYTES            = 3
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 554
    DESCRIPTION      = "XSM DAC 1 "
    FORMAT           = I3
    VALID_MAXIMUM    = 255
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = XSM_STATE
    BYTES            = 2
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 558
    DESCRIPTION      = "VALID ASSIGNMENTS FOR THE XSM STATE PARAMETER ARE:
                         0 = OFF
                         1 = STARTING
                         2 = COOLING
                         3 = COOL
                         4 = CALIBRATE
                         5 = OPENING
                         6 = OPERATING
                         7 = CLOSING
                         8 = HIGH-LEAKAGE
                         9 = PRE-ANNEAL
                        10 = ANNEAL
                        11 = CLOSING"
    FORMAT           = I2
    VALID_MAXIMUM    = 15
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = XSM_SECONDS
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 561
    DESCRIPTION      = "THE TIME XSM HAS BEEN IN ITS CURRENT STATE "
```

```
    FORMAT           = I5
    UNIT             = SECONDS
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = SW_PATCH_ID
    BYTES            = 3
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 567
    DESCRIPTION      = "SOFTWARE PATCH ID"
    FORMAT           = I3
    VALID_MAXIMUM    = 255
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = BOOT_PG
    BYTES            = 3
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 571
    DESCRIPTION      = "THE PAGE NUMBER THAT THE SOFTWARE BOOTED FROM"
    FORMAT           = I3
    VALID_MAXIMUM    = 255
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = SS_DAC_AV
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 575
    DESCRIPTION      = "SS DAC MONITOR AVERAGE"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = OG_DAC_AV
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 581
    DESCRIPTION      = "OG DAC MONITOR AVERAGE"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = RD_DAC_AV
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 587
    DESCRIPTION      = "RD DAC MONITOR AVERAGE"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN
```

```
OBJECT              = COLUMN
  NAME              = OD_DAC_AV
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 593
  DESCRIPTION       = "OD DAC MONITOR AVERAGE"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = SS_DAC_REQ
  BYTES             = 3
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 599
  DESCRIPTION       = "SS DAC DEMAND"
  FORMAT            = I3
  VALID_MAXIMUM     = 255
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = OG_DAC_REQ
  BYTES             = 3
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 603
  DESCRIPTION       = "OG DAC DEMAND"
  FORMAT            = I3
  VALID_MAXIMUM     = 255
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = RD_DAC_REQ
  BYTES             = 3
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 607
  DESCRIPTION       = "RD DAC DEMAND"
  FORMAT            = I3
  VALID_MAXIMUM     = 255
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = OD_DAC_REQ
  BYTES             = 3
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 611
  DESCRIPTION       = "OD DAC DEMAND"
  FORMAT            = I3
  VALID_MAXIMUM     = 255
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = EVENTS_SEC
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
```

```
    START_BYTE       = 615
    DESCRIPTION      = "MOST EVENTS/SEC THIS PERIOD"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = CK_SUMS
    BYTES            = 10
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 621
    DESCRIPTION      = "MEMORY CHECKSUMS"
    FORMAT           = I10
    VALID_MAXIMUM    = 4294967295
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = T6PAR55
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 632
    DESCRIPTION      = "DATA IN ADDRESS POINTED TO BY TABLE 6 PARAM. 55"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = ITL_ID
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 638
    DESCRIPTION      = "ITL ID TABLE 6 PARAMETER 56"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = XSM_TOTAL_COUNTS
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 644
    DESCRIPTION      = "EVENTS IN LATEST XSM SPECTRA"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
  END_OBJECT         = COLUMN

  OBJECT             = COLUMN
    NAME             = XSM_SPECTRA_CNT
    BYTES            = 5
    DATA_TYPE        = ASCII_INTEGER
    START_BYTE       = 650
    DESCRIPTION      = "COUNT OF XSM SPECTRA TRANSMITTED"
    FORMAT           = I5
    VALID_MAXIMUM    = 65535
    VALID_MINIMUM    = 0
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = XSM_FIFO_2
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 656
  DESCRIPTION       = "XSM RICA FIFO PORT 2 REGISTER CONTENTS"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = XSM_FIFO_3
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 662
  DESCRIPTION       = "XSM RICA FIFO PORT 3 REGISTER CONTENTS"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = XSM_RICA
  BYTES             = 5
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 668
  DESCRIPTION       = "XSM RICA SOFTWARE CONTROL REGISTER CONTENTS"
  FORMAT            = I5
  VALID_MAXIMUM     = 65535
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = XSM_FIFO_ERR1
  BYTES             = 10
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 674
  DESCRIPTION       = "XSM FIFO ERR1 "
  FORMAT            = I10
  VALID_MAXIMUM     = 4294967295
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = XSM_FIFO_ERR2
  BYTES             = 10
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 685
  DESCRIPTION       = "XSM FIFO ERR2 "
  FORMAT            = I10
  VALID_MAXIMUM     = 4294967295
  VALID_MINIMUM     = 0
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = C1XS_DOOR_POSN
  BYTES             = 5
```

```
    DATA_TYPE          = ASCII_REAL
    START_BYTE         = 696
    DESCRIPTION        = "C1XS DOOR POSITION"
    FORMAT             = F5.1
    UNIT               = V
    VALID_MAXIMUM      = 1.5
    VALID_MINIMUM      = 0
  END_OBJECT           = COLUMN

  OBJECT               = COLUMN
    NAME               = RAD_MON_VLG
    BYTES              = 5
    DATA_TYPE          = ASCII_REAL
    START_BYTE         = 702
    DESCRIPTION        = "RADIATION MON VLG"
    FORMAT             = F5.1
    UNIT               = V
    VALID_MAXIMUM      = 5
    VALID_MINIMUM      = 0
  END_OBJECT           = COLUMN

  OBJECT               = COLUMN
    NAME               = RAD_MON_LG
    BYTES              = 5
    DATA_TYPE          = ASCII_REAL
    START_BYTE         = 708
    DESCRIPTION        = "RADIATION MON LG"
    FORMAT             = F5.1
    UNIT               = V
    VALID_MAXIMUM      = 5
    VALID_MINIMUM      = 0
  END_OBJECT           = COLUMN

  OBJECT               = COLUMN
    NAME               = RAD_MON_MG
    BYTES              = 5
    DATA_TYPE          = ASCII_REAL
    START_BYTE         = 714
    DESCRIPTION        = "RADIATION MON MG"
    FORMAT             = F5.1
    UNIT               = V
    VALID_MAXIMUM      = 5
    VALID_MINIMUM      = 0
  END_OBJECT           = COLUMN

  OBJECT               = COLUMN
    NAME               = RAD_MON_HG
    BYTES              = 5
    DATA_TYPE          = ASCII_REAL
    START_BYTE         = 720
    DESCRIPTION        = "RADIATION MON HG"
    FORMAT             = F5.1
    UNIT               = V
    VALID_MAXIMUM      = 5
    VALID_MINIMUM      = 0
  END_OBJECT           = COLUMN

  OBJECT               = COLUMN
    NAME               = RAD_MON_SUPPLY
    BYTES              = 5
```

```
    DATA_TYPE          = ASCII_REAL
    START_BYTE         = 726
    DESCRIPTION        = "RADIATION MON 12V SUPPLY"
    FORMAT             = F5.1
    UNIT               = V
    VALID_MAXIMUM      = 12.5
    VALID_MINIMUM      = 11
  END_OBJECT           = COLUMN

  OBJECT               = COLUMN
    NAME               = RAD_MON_VHG
    BYTES              = 5
    DATA_TYPE          = ASCII_REAL
    START_BYTE         = 732
    DESCRIPTION        = "RADIATION MON VHG"
    FORMAT             = F5.1
    UNIT               = V
    VALID_MAXIMUM      = 5
    VALID_MINIMUM      = 0
  END_OBJECT           = COLUMN

END_OBJECT             = TABLE
```

## APPENDIX D – GAIN CALIBRATION DATA PDS LABEL

```
/***      DATA OBJECT                                ***/
OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = ASCII
   ROWS                         = number of records
   ROW_BYTES                    = 11290
   COLUMNS                      = 5
   NAME                         = "C1XS GAIN CORRECTION"
   DESCRIPTION                  = "C1XS GAIN CORRECTION DATA"
   OBJECT                       = COLUMN
      NAME                      = "SCD_NUMBER"
      BYTES                     = 2
      DATA_TYPE                 = REAL
      START_BYTE                = 1
      UNIT                      = "N/A"
      DESCRIPTION               = "DETECTOR NUMBER"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "START_TEMP"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 4
      UNIT                      = "N/A"
      DESCRIPTION               = "TEMPERATURE VALUE OF FIRST ELEMENT IN
                                   THE GAIN CORRECTION TABLE"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "TEMPERATURE_STEP"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 15
      UNIT                      = "N/A"
      DESCRIPTION               = "TEMPERATURE INCREMENT FOR EACH SUCCESSIVE
                                   VALUE IN THE GAIN CORRECTION TABLE"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      DESCRIPTION               = "GAIN CORRECTION AT SPECIFIED TEMPERATURE"
      NAME                      = "GAIN_CORRECTION"
      START_BYTE                = 26
      UNIT                      = "N/A"
      ITEMS                     = 512
      ITEM_BYTES                = 10
      BYTES                     = 5120
      DATA_TYPE                 = REAL
      ITEM_OFFSET               = 11
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      DESCRIPTION               = "ERROR IN GAIN_CORRECTION AT SPECIFIED
                                   TEMPERATURE"
      NAME                      = "GAIN_CORRECTION_ERROR"
      START_BYTE                = 5658
      UNIT                      = "N/A"
      ITEMS                     = 512
      ITEM_BYTES                = 10
      BYTES                     = 5120
      DATA_TYPE                 = REAL
      ITEM_OFFSET               = 11
   END_OBJECT                   = COLUMN
```

```
END_OBJECT                    = TABLE
END
```

## APPENDIX E – PARTICLE BACKGROUND DATA PDS LABEL

```
/***      DATA OBJECT                                ***/
OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = ASCII
   ROWS                         = >>number of records<<
   ROW_BYTES                    = 551
   COLUMNS                      = 4
   NAME                         = "C1XS PARTICLE BACKGROUND"
   DESCRIPTION                  = "C1XS PARTICLE BACKGROUND DATA"
   OBJECT                       = COLUMN
      NAME                      = "ENERGY"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 1
      UNIT                      = "N/A"
      DESCRIPTION               = "X-RAY ENERGY VALUE"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "INT_TIME"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 12
      UNIT                      = "N/A"
      DESCRIPTION               = "INTEGRATION TIME USED TO CALCULATE
                                   BACKGROUND COUNT RATE"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      DESCRIPTION               = "BACKGROUND_COUNTS AT SPECIFIED ENERGY
VALUE"
      NAME                      = "BACKGROUND_COUNTS"
      START_BYTE                = 12
      UNIT                      = "N/A"
      ITEMS                     = 24
      ITEM_BYTES                = 10
      BYTES                     = 240
      DATA_TYPE                 = REAL
      ITEM_OFFSET               = 11
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      DESCRIPTION               = "ERROR IN BACKGROUND_COUNTS AT SPECIFIED
                                   ENERGY VALUE"
      NAME                      = "BACKGROUND_COUNTS_ERROR"
      START_BYTE                = 287
      UNIT                      = "N/A"
      ITEMS                     = 24
      ITEM_BYTES                = 10
      BYTES                     = 240
      DATA_TYPE                 = REAL
      ITEM_OFFSET               = 11
   END_OBJECT                   = COLUMN
END_OBJECT                      = TABLE
END
```

## APPENDIX F – SCD EFFICIENCY DATA PDS LABEL

```
/***      DATA OBJECT                              ***/
OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = ASCII
   ROWS                         = >>number of records<<
   ROW_BYTES                    = 540
   COLUMNS                      = 3
   NAME                         = "C1XS DETECTOR EFFICIENCY"
   DESCRIPTION                  = "C1XS DETECTOR EFFICIENCY DATA"
   OBJECT                       = COLUMN
      NAME                      = "ENERGY"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 1
      UNIT                      = "N/A"
      DESCRIPTION               = "X-RAY ENERGY VALUE"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      DESCRIPTION               = "SCD EFFICIENCY AT SPECIFIED ENERGY VALUE"
      NAME                      = "EFFICIENCY_VALUE"
      START_BYTE                = 12
      UNIT                      = "N/A"
      ITEMS                     = 24
      ITEM_BYTES                = 10
      BYTES                     = 240
      DATA_TYPE                 = REAL
      ITEM_OFFSET               = 11
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      DESCRIPTION               = "ERROR IN SCD EFFICIENCY AT SPECIFIED
                                   ENERGY VALUE"
      NAME                      = "EFFICIENCY_VALUE_ERROR"
      START_BYTE                = 276
      UNIT                      = "N/A"
      ITEMS                     = 24
      ITEM_BYTES                = 10
      BYTES                     = 240
      DATA_TYPE                 = REAL
      ITEM_OFFSET               = 11
   END_OBJECT                   = COLUMN
END_OBJECT                      = TABLE
```

## APPENDIX G – PIPELINE OUTPUT PDS LABEL

```
/***      DATA OBJECT                              ***/
OBJECT                          = TABLE
   INTERCHANGE_FORMAT           = ASCII
   ROWS                         = >>number of records<<
   ROW_BYTES                    = 45167
   COLUMNS                      = 14
   NAME                         = "C1XS PROCESSED SPECTRA"
   DESCRIPTION                  = "C1XS SPECTRA"
   OBJECT                       = COLUMN
      NAME                      = "START TIME"
      BYTES                     = 23
      DATA_TYPE                 = TIME
      START_BYTE                = 1
      UNIT                      = UT
      DESCRIPTION               = "START TIME OF OBSERVATION"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "DETECTOR_NUMBER"
      BYTES                     = 2
      DATA_TYPE                 = ASCII_INTEGER
      START_BYTE                = 25
      UNIT                      = "N/A"
      DESCRIPTION               = "SCD NUMBER"
      VALID_MAXIMUM             = 23
      VALID_MINIMUM             = 0
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "INTEGRATION TIME"
      BYTES                     = 5
      DATA_TYPE                 = ASCII_INTEGER
      START_BYTE                = 28
      UNIT                      = "SECONDS"
      DESCRIPTION               = "INTEGRATION TIME"
      VALID_MAXIMUM             = 128
      VALID_MINIMUM             = 8
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "SUB_SPACECRAFT_LONGITUDE"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 34
      UNIT                      = "N/A"
      DESCRIPTION               = "LONGITUDE OF POINT BENEATH THE
SPACECRAFT"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "SUB_SPACECRAFT_LATITUDE"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 45
      UNIT                      = "N/A"
      DESCRIPTION               = "LATITUDE OF POINT BENEATH THE SPACECRAFT"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "BORESITE_LONGITUDE"
      BYTES                     = 10
      DATA_TYPE                 = REAL
```

```
      START_BYTE                = 56
      UNIT                      = "N/A"
      DESCRIPTION               = "LONGITUDE OF POINT C1XS IS POINTING AT"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "BORESITE_LATITUDE"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 67
      UNIT                      = "N/A"
      DESCRIPTION               = "LATITUDE OF POINT C1XS IS POINTING AT"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "ALTITUDE"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 78
      UNIT                      = "km"
      DESCRIPTION               = "SPACECRAFT ALTITUDE"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "TRACK_ANGLE"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 89
      UNIT                      = "N/A"
      DESCRIPTION               = "ANGLE BETWEEN C1XS Y AXIS AND THE
SPACECRAFT
                                   TRACK OVER THE MOON'S SURFACE"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      NAME                      = "SUN_ELEVATION"
      BYTES                     = 10
      DATA_TYPE                 = REAL
      START_BYTE                = 100
      UNIT                      = "N/A"
      DESCRIPTION               = "ANGLE BETWEEN LOCAL HORIZON AT
SUB-SATELITE
                                   POINT AND THE SUN"
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      DESCRIPTION               = "X-RAY ENERGY VALUE OF EACH BIN"
      NAME                      = "ENERGY_VALUE"
      START_BYTE                = 111
      UNIT                      = "eV"
      ITEMS                     = 1024
      ITEM_BYTES                = 10
      BYTES                     = 10240
      DATA_TYPE                 = REAL
      ITEM_OFFSET               = 11
      VALID_MAXIMUM             = 10000
      VALID_MINIMUM             = 0
   END_OBJECT                   = COLUMN
   OBJECT                       = COLUMN
      DESCRIPTION               = "ERROR IN X-RAY ENERGY VALUE FOR EACH BIN"
      NAME                      = "ENERGY_VALUE_ERROR"
      START_BYTE                = 11375
      UNIT                      = "eV"
      ITEMS                     = 1024
      ITEM_BYTES                = 10
```

```
      BYTES                    = 10240
      DATA_TYPE                = REAL
      ITEM_OFFSET              = 11
      VALID_MAXIMUM            = 100
      VALID_MINIMUM            = -100
   END_OBJECT                  = COLUMN
   OBJECT                      = COLUMN
      DESCRIPTION              = "NUMBER OF X-RAY EVENTS WITHIN EACH BIN"
      NAME                     = "EVENT_VALUE"
      START_BYTE               = 22639
      UNIT                     = "N/A"
      ITEMS                    = 1024
      ITEM_BYTES               = 10
      BYTES                    = 10240
      DATA_TYPE                = REAL
      ITEM_OFFSET              = 11
      VALID_MAXIMUM            = 1000
      VALID_MINIMUM            = 0
   END_OBJECT                  = COLUMN
   OBJECT                      = COLUMN
      DESCRIPTION              = "ERROR IN NUMBER OF X-RAY EVENTS WITHIN
                                  EACH BIN"
      NAME                     = "EVENT_VALUE_ERROR"
      START_BYTE               = 33903
      UNIT                     = "N/A"
      ITEMS                    = 1024
      ITEM_BYTES               = 10
      BYTES                    = 10240
      DATA_TYPE                = REAL
      ITEM_OFFSET              = 11
      VALID_MAXIMUM            = 1000
      VALID_MINIMUM            = -1000
   END_OBJECT                  = COLUMN
END_OBJECT                     = TABLE
```