## C2 TEMPERATURE DATA RECORDS

Temperature Data Records (TDRs) contain calibrated and earth-located data prior to irreversible antenna pattern correction. The temperature data represents microwave energy levels measured by the seven channels of the radiometer instrument. The energy levels are expressed as an equivalent black body temperature (antenna temperature). A file containing SSM/I constants accompany the TDR file. These constants are sensor- characteristic data, such as alignment bias and temperature. Files containing sensor constants are used to assist archive data users who wish to recover raw SSM/I data. SSM/I preprocessor software uses the same file for the Earth location and calibration processes.

### C2.1 TDR Data Product File Naming Convention

TDR data products shall obey the SPP guidelines for file naming. Examples and definitions of the TDR file names are shown below:

***US058SORB-DEFspp.tdrmi_f13_dYYYYMMDD_sHHMMSS_eHHMMSS_rNNNNN_cfnoc.def***

Where:

| | |
|---|---|
| ***US058*** | = FNMOC's universal identifier according to WMO standards. |
| ***S*** | = Satellites. |
| ***ORB*** | = Orbital data. |
| **--** | = Separator. |
| ***DEF*** | = Data Exchange Format (data format descriptor). |
| ***spp*** | = Shared Processing Program. |
| | |
| ***tdrmi*** | = Data type identifier for Temperature Data Record data products. |
| ***f13, f14, f15*** | = DMSP satellite designator. |
| ***dYYYYMMDD*** | = Year, Month, Day. |
| ***sHHMMSS*** | = Start time Hour, Minute, Second. |
| ***eHHMMSS*** | = End time Hour, Minute, Second. |
| ***rNNNNN*** | = Readout orbit number. |
| ***cfnoc*** | = SPP site designator for FNMOC. |
| ***.def*** | = File format extension designator for Data Exchange Format |

### C2.2 Temperature Data Records Data File Format

The TDR data are inserted into contiguous data blocks to form the TDR file format as shown in Figure C1. The TDR file also contains DEF descriptor blocks such as the Product Identification (ID), Data Sequence, Data Description, Data, and End of Product blocks. FNMOC transmits files containing these data via the SPP ATM Network to NOAA/NESDIS in DEF file format.

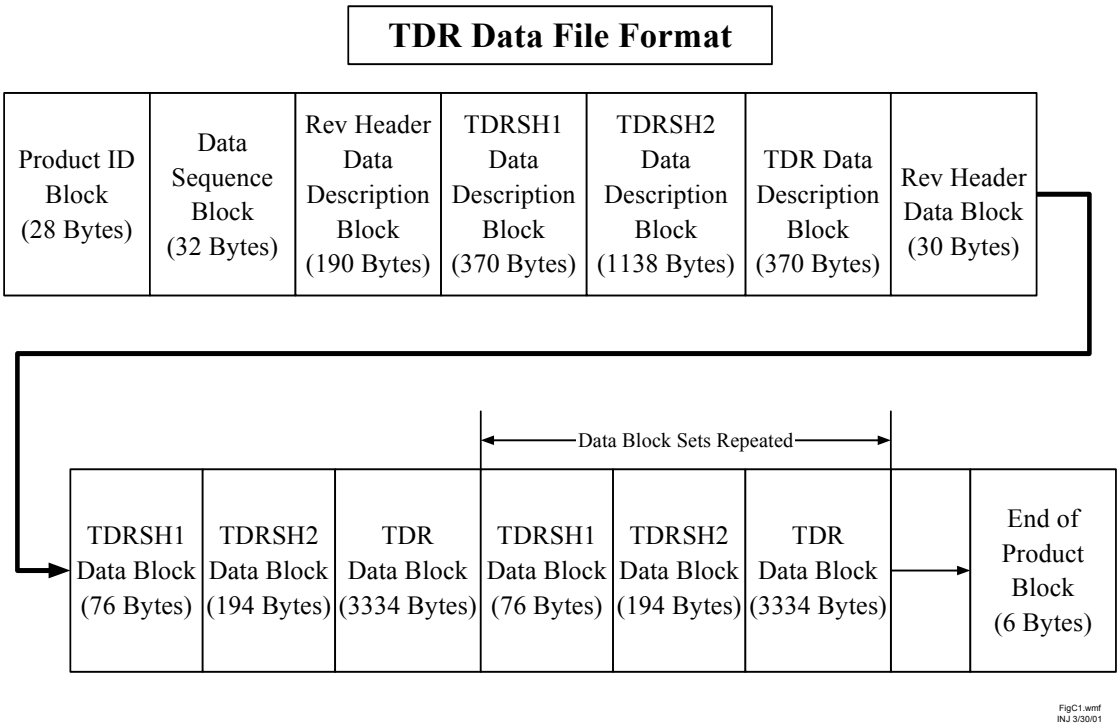


**Figure C1. TDR Data File Format**

### C2.3 SSM/I Temperature Data Record DEF Descriptor Formats

The TDR file contains DEF descriptors and Data Blocks as shown in Figure C2. The DEF descriptors are identified as the Product ID, Data Sequence, Data Description, Data, and End-of-Product Blocks.

| |
|---|
| PRODUCT IDENTIFICATION BLOCK<br>(28 Bytes) |
| DATA SEQUENCE BLOCK<br>(32 Bytes) |
| DATA DESCRIPTION BLOCKS<br>Revolution (Rev) Header Data Descriptor Block (190 Bytes)<br>TDR Scan Header #1 Data Descriptor Block (370 Bytes)<br>TDR Scan Header #2 Data Descriptor Block (1138 Bytes)<br>TDR Data Descriptor Block (370 Bytes) |
| DATA BLOCKS<br>Rev Header Data Block (30 Bytes)<br>TDR Scan Data Block #1 (76 Bytes)*<br>TDR Scan Data Block #2 (194 Bytes)*<br>TDR Data Block (3334 Bytes)*<br>*Appears multiple times throughout the file. |
| END-of-PRODUCT BLOCK<br>(6 Bytes) |

**Figure C2. TDR File Format**

Each DEF block type has an identifying mode and submode. As shown in Figure C2, there are several Data Descriptor Blocks and corresponding Data Blocks included in this file. The Descriptor Blocks and the Rev Header Data Block appear only once in the file. TDR Scan Data Blocks and Data Blocks are repeated until the entire data set is included within the product file. The following subparagraphs include information about DEF descriptor blocks used in SSM/I products. This information is consistent with the data in the *Standard Formats for Weather Data Exchange Among Automated Weather Information*

*Systems* (FCM-S2-1994), and *Special Sensor Microwave/Imager Data Requirements Document DRD for FNMOC*, which describe the SSM/I product data content and formats used for Shared Processing Program.

### C2.3.1 TDR Product ID Block

The DEF Product ID Block for the TDR is shown in Figure C3. This block holds 28 bytes of information, which includes an identifying header and a checksum for the block. Table C1 shows the nine-character product identifiers (bytes 12-20) used within Product ID Blocks to identify the product.

**Table C1. Nine-Character Product Identifiers**

| Identifier | Product Definition |
|---|---|
| SMITDR 11 | SSM/I TDRs from DMSP F-11 |
| SMISDR 13 | SSM/I SDRs from DMSP F-13 |
| SMIEDR 14 | SSM/I EDRs from DMSP F-14 |

The originator, the product, and the date of the product information are included in the Product ID descriptor.

| Word | First Byte | Second Byte | |
|---|---|---|---|
| 1 | | 14 | Number of two-byte words in the Product ID Block |
| 2 | 001 | 001 | Octal mode and submode |
| 3 | F | N | Originator's identification |
| 4 | O | C | (ASCII code) |
| 5 | U | 255 | Classification |
| 6 | T | S | |
| 7 | M | I | Product identifier |
| 8 | T | D | (ASCII code) |
| 9 | R | O | |
| 10 | 9 | 32 | |
| 11 | Year | | Year, |
| 12 | Month | Day | Date, and |
| 13 | Hour | Minute | Time stamp of file |
| 14 | Checksum | | |

**Figure C3. Product ID Block (Mode 1, Submode 1)**

The Product ID is the first DEF descriptor block in the file. The block holds 28 bytes of information.

### C2.3.2 TDR Data Sequence Block

For the TDR file, a formatted Data Sequence Block follows the Product ID. The Data Sequence Block saves needless repetition of Data Description Blocks within a mixture of types of Data Blocks. The TDR Data Sequence Block is shown in Figure C4. The Information included in this block describes the sequence of Data Blocks and their corresponding Data Description Blocks (DDB). The block holds 32 bytes of information and precedes the Data Description Blocks.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | 10 | | Number of two-byte words of Data Sequence Block |
| 2 | 003 | 023 | Octal mode and submode |
| 3 | 4 | | Number of DDBs (or loops) |
| 4 | { | 1 | Start (1st byte) and DDB number (2nd byte) for Rev Header Block |
| 5 | 1 | | Number of data blocks |
| 6 | } | 1 | End (1st byte) and DDB number (2nd byte) for Rev Header Block |
| 7 | { | 2 | Start (1st byte) and DDB number (2nd byte) for Scan Header Block #1 |
| 8 | Set by Mi_def | | Number of data blocks |
| 9 | { | 3 | Start (1st byte) and DDB number (2nd byte) for Scan Header Block #2 |
| 10 | 1 | | Number of data blocks |
| 11 | { | 4 | Start (1st byte) and DDB number (2nd byte) for TDR Data Block |
| 12 | 1 | | Number of data blocks |
| 13 | } | 4 | End (1st byte) and DDB number (2nd byte) for TDR Data Block |
| 14 | } | 3 | End (1st byte) and DDB number (2nd byte) for Scan Header Block #2 |
| 15 | } | 2 | End (1st byte) and DDB number (2nd byte) for Scan Header Block #1 |
| 16 | Checksum | | |

**Figure C4. TDR Data Sequence Block (Mode 3, Submode 23)**

Notes:
**Number of DDBs** -- Represent the total number of formatted Data Description Blocks (Mode 3, Submode 21) immediately following the Data Sequence Block. This number also corresponds to the number of Data Block (Mode 3, Submode 1) and START/END sequences.
**START Indicators** -- Represent the DDB sequence start. An octal 173 (ASCII left brace) represents the START Indicator. Each START indicator for a sequence must have a matching END Indicator. DDB NUMBER is a relative number identifying a specific DDB within the total DDB set; e.g., the definition of *DDB Number two of five* means that the DDB Number is two and the Number of DDBs is five.
**Number of Data Blocks** -- Define the total number of formatted Data Blocks (Mode 3, Submode 1) included within the sequence. The Number of Data Blocks is specified immediately following the "START"/"DDB NUMBER" byte pair for each sequence.
**END Indicators** -- Represent the DDB sequence end. The END Indicator is represented by an ASCII right brace, which is an octal 175. Each END Indicator must match a specific START Indicator.

### C2.3.3 TDR Data Description Blocks

The Data Description Blocks serve as data interpretation tables for Data Blocks (Mode 3, Submode 1). Data Description Blocks for SSM/I data are described in the *Special Sensor Microwave/Imager Data Requirements Document DRD for FNMOC*. For the TDR file, there are four Data Description Blocks: Revolution (Rev) Header Description, TDR Scan Data Description #1, TDR Scan Data Description #2, and the TDR Data Description blocks. The following subparagraphs describe these blocks.

#### C2.3.3.1 TDR Revolution Header Data Description Block

Figure C5 shows the format of the Rev Header Data Description Block. The block is identified as Octal Mode 3, Submode 21 and holds 190 bytes of information. The first element is shown to occupy six (two-byte) words in the block (Words 5 through 10) and is identified as the Spacecraft ID.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | | 95 | Number of two-byte words of Rev Header Data Description Block |
| 2 | 003 | 021 | Octal mode and submode |
| 3 | 15 | 24 | Number of elements (1st byte) and bytes per section (2nd byte) |
| 4 | 1 | | Number of sections |
| 5 | S | C | Spacecraft ID (1st element) |
| 6 | I | D | |
| 7 | 4 | 4 | Start byte (1st byte) bytes per element (2nd byte) |
| 8 | 0 | 23 | 1st byte is not used; unit code (2nd byte) |
| 9 | 1 | 0 | Mult. Mantissa (1st byte); exponent (2nd byte) |
| 10 | | 0 | Additive constant |
| 11 - 94 | Repeat for Elements (2 - 15) | | Data for Elements 2 through 15 |
| 95 | Checksum | | |

**Figure C5. TDR Rev Header Data Description Block (Mode 3, Submode 21)**

The Revolution Header Data Description Block includes a six-byte header and a one-byte checksum. Table C2 shows the data contained in the Revolution Header Description Block.

**Table C2. TDR Revolution Header Data Description Block Contents**

| Element # | Mnemonic (4 Chars) | Start Byte | Bytes/Elem | Data Rep | Units | M Mant | M Char | Add. Const | Definition |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 'S' 'C' 'I' 'D' | 4 | 4 | 0 | 23 | 1 | 0 | 0 | Spacecraft ID |
| 2 | 'R' 'E' 'V' '#' | 8 | 4 | 0 | 23 | 1 | 0 | 0 | Rev/orbit number |
| 3 | 'B' 'J' 'L' 'D' | 12 | 2 | 0 | 63 | 1 | 0 | 0 | Julian day begins |
| 4 | 'B' 'H' 'R' ' ' | 14 | 1 | 0 | 62 | 1 | 0 | 0 | Hour of day data begins |
| 5 | 'B' 'M' 'N' ' ' | 15 | 1 | 0 | 61 | 1 | 0 | 0 | Minute of hour data begins |
| 6 | 'B' 'S' 'E''C' | 16 | 1 | 0 | 14 | 1 | 0 | 0 | Second of minute data begins |
| 7 | 'E' 'J' 'L' 'D' | 17 | 2 | 0 | 63 | 1 | 0 | 0 | Julian day data ends |
| 8 | E' 'H' 'R' ' ' | 19 | 1 | 0 | 62 | 1 | 0 | 0 | Hour of day data ends |
| 9 | 'E' 'M' 'N' ' ' | 20 | 1 | 0 | 61 | 1 | 0 | 0 | Minute of hour data ends |
| 10 | 'E' 'S' 'E' 'C' | 21 | 1 | 0 | 14 | 1 | 0 | 0 | Second of minute data ends |
| 11 | 'A' 'J' 'L' 'D' | 22 | 2 | 0 | 63 | 1 | 0 | 0 | Day of ascending node |
| 12 | 'A' 'H' 'R' ' ' | 24 | 1 | 0 | 62 | 1 | 0 | 0 | Hour of ascending node |
| 13 | 'A' 'M' 'N' ' ' | 25 | 1 | 0 | 61 | 1 | 0 | 0 | Minute of ascending node |
| 14 | 'A' 'S' 'E' 'C' | 26 | 1 | 0 | 14 | 1 | 0 | 0 | Second of ascending node |
| 15 | 'L' 'S' 'I' ' ' | 27 | 1 | 0 | 23 | 1 | 0 | 0 | Logical Satellite ID |

### C2.3.3.2 TDR Scan Header #1 Data Description Block

Figure C6 shows the TDR Scan Header #1 Data Description Block. The block is identified as Octal Mode 3, Submode 21 and holds 370 bytes of information. The first element shown occupies six (two-byte) words in the block (Words 5 through 10) and is identified as a counter.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | 185 | | Number of two-byte words for the Scan Header #1 Data Description Block |
| 2 | 003 | 021 | Octal mode and submode |
| 3 | 30 | 76 | Number of elements (1st byte) and bytes per section (2nd byte) |
| 4 | 1 | | Number of sections |
| 5 | C | N | Counter (1st element) |
| 6 | T | R | |
| 7 | 4 | 2 | Start byte (1st byte) bytes per element (2nd byte) |
| 8 | 0 | 23 | 1st byte is not used; unit code (2nd byte) |
| 9 | 1 | 0 | Mult. Mantissa (1st byte); exponent (2nd byte) |
| 10 | | 0 | Addictive constant |
| 11-184 | Repeat for Elements (2-30) | | Data for Elements 2 through 30 |
| 185 | Checksum | | |

**Figure C6. TDR Scan Header #1 Data Description Block (Mode 3, Submode 21)**

The data contained within this header block are shown in Table C3. There are 30 elements, each occupying 12 bytes in the Scan Header Description Block. The block is identified as Octal Mode 3, Submode 21 and holds 370 bytes of information. The first element of data is shown in Words 5 through 10 of Figure C6.

**Table C3. TDR Scan Header #1 Data Description Block Contents**

| Element # | Mnemonic (4 Chars) | Start Byte | Bytes/ Elem | Data Rep | Units | M Mant | M Char | Add. Const | Definition |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ‘C’ ‘N’ ‘T’ ‘R’ | 4 | 2 | 0 | 23 | 1 | 0 | 0 | Counter |
| 2 | ‘B’ ‘S’ ‘T’ ‘M’ | 6 | 4 | 0 | 14 | 1 | 0 | 0 | B Scan Start Time |
| 3 | ‘E’ ‘M’ ‘V’ ‘ ’ | 10 | 4 | 0 | 14 | 1 | -1 | 0 | Ephemeris Minute Vector |
| 4 | ‘L’ ‘A’ ‘T’ ‘ ’ | 14 | 4 | 0 | 55 | 1 | ? | 0 | Latitude |
| 5 | ‘L’ ‘O’ ‘N’ ‘ ’ | 18 | 4 | 0 | 55 | 1 | ? | 0 | Longitude |
| 6 | ‘A’ ‘L’ ‘T’ ‘ ’ | 22 | 4 | 0 | 3 | 1 | 0 | 0 | Altitude |
| 7 | ‘H’ ‘L’ ‘D’ ‘3’ | 26 | 2 | 0 | 1 | 1 | -2 | 0 | Hot Load Thermal Temp. 3 |
| 8 | ‘H’ ‘L’ ‘D’ ‘2’ | 28 | 2 | 0 | 1 | 1 | -2 | 0 | Hot Load Thermal Temp. 2 |
| 9 | ‘H’ ‘L’ ‘D’ ‘1’ | 30 | 2 | 0 | 1 | 1 | -2 | 0 | Hot Load Thermal Temp. 1 |
| 10 | ‘C’ ‘R’ ‘2’ ‘ ’ | 32 | 2 | 0 | 23 | 1 | 0 | 0 | Reference Voltage 2 |
| 11 | ‘C’ ‘R’ ‘1’ ‘ ’ | 34 | 2 | 0 | 23 | 1 | 0 | 0 | Reference Voltage 1 |
| 12 | ‘T’ ‘R’ ‘ ’ ‘ ’ | 36 | 2 | 0 | 1 | 1 | -2 | 0 | RF Mixer Temp. |
| 13 | ‘T’ ‘P’ ‘C’ ‘ ’ | 38 | 2 | 0 | 1 | 1 | -2 | 0 | Forward Radiator Temp. |
| 14 | ‘A’ ‘G’ ‘C’ ‘3’ | 40 | 2 | 0 | 23 | 1 | 0 | 0 | Auto Gain Control Setting 3 |
| 15 | ‘A’ ‘G’ ‘C’ ‘2’ | 42 | 2 | 0 | 23 | 1 | 0 | 0 | Auto Gain Control Setting 2 |
| 16 | ‘A’ ‘G’ ‘C’ ‘1’ | 44 | 2 | 0 | 23 | 1 | 0 | 0 | Auto Gain Control Setting 1 |
| 17 | ‘S’ ‘1’ ‘9’ ‘V’ | 46 | 2 | 0 | 105 | 1 | -5 | 0 | Slope 19GHz Vertical |
| 18 | ‘O’ ‘1’ ‘9’ ‘V’ | 48 | 2 | 0 | 1 | -1 | -2 | 0 | Offset 19GHz Vertical |
| 19 | ‘S’ ‘1’ ‘9’ ‘H’ | 50 | 2 | 0 | 105 | 1 | -5 | 0 | Slope 19GHz Horizontal |
| 20 | ‘O’ ‘1’ ‘9’ ‘H’ | 52 | 2 | 0 | 1 | -1 | -2 | 0 | Offset 19GHz Horizontal |
| 21 | ‘S’ ‘2’ ‘2’ ‘V’ | 54 | 2 | 0 | 105 | 1 | -5 | 0 | Slope 22GHz Vertical |
| 22 | ‘O’ ‘2’ ‘2’ ‘V’ | 56 | 2 | 0 | 1 | -1 | -2 | 0 | Offset 22GHz Vertical |
| 23 | ‘S’ ‘3’ ‘7’ ‘V’ | 58 | 2 | 0 | 105 | 1 | -5 | 0 | Slope 37GHz Vertical |
| 24 | ‘O’ ‘3’ ‘7’ ‘V’ | 60 | 2 | 0 | 1 | -1 | -2 | 0 | Offset 37GHz Vertical |
| 25 | ‘S’ ‘3’ ‘7’ ‘H’ | 62 | 2 | 0 | 105 | 1 | -5 | 0 | Slope 37GHz Horizontal |
| 26 | ‘O’ ‘3’ ‘7’ ‘H’ | 64 | 2 | 0 | 1 | -1 | -2 | 0 | Offset 37GHz Horizontal |
| 27 | ‘S’ ‘8’ ‘5’ ‘V’ | 66 | 2 | 0 | 105 | 1 | -5 | 0 | Slope 85GHz Vertical |
| 28 | ‘O’ ‘8’ ‘5’ ‘V’ | 68 | 2 | 0 | 1 | -1 | -2 | 0 | Offset 85GHz Vertical |
| 29 | ‘S’ ‘8’ ‘5’ ‘H’ | 70 | 2 | 0 | 105 | 1 | -5 | 0 | Slope 85GHz Horizontal |
| 30 | ‘O’ ‘8’ ‘5’ ‘H’ | 72 | 2 | 0 | 1 | -1 | -2 | 0 | Offset 85GHz Horizontal |

### C2.3.3.3 TDR Scan Header #2 Data Description Block

Figure C7 shows the TDR Scan Header #2 Data Description Block. The block is identified as Mode 3, Submode 21 and holds 1138 bytes of information.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | Ox239 | | Number of two-byte words |
| 2 | 003 | 021 | Octal mode and submode |
| 3 | 94 | 188 | Number of elements (1st byte) and bytes per section (2nd byte) |
| 4 | 1 | | Number of sections |
| 5 | C | N | Counter (1st element) |
| 6 | T | R | |
| 7 | 4 | 2 | Start byte (1st byte) bytes per element (2nd byte) |
| 8 | 0 | 23 | 1st byte is not used; Unit code (2nd byte) |
| 9 | 1 | 0 | Mult. Mantissa (1st byte); exponent (2nd byte) |
| 10 | 0 | | Additive constant |
| 11 - 568 | Repeat for Elements (2 - 94 ) | | Data for Elements 2 through 94 |
| 569 | Checksum | | |

**Figure C7. TDR Scan Header #2 Data Description Block (Mode 3, Submode 21)**

Table C4 shows the data that are contained within the Scan Header #2 Data Description Block.

**Table C 4. TDR Scan Header #2 Data Description Block Contents**

| Element # | Mnemonic (4 Chars) | Start Byte | Bytes/ Elem | Data Rep | Units | M Mant | M Char | Add. Const | Definition |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ‘C’ ‘N’ ‘T’‘R’ | 4 | 2 | 0 | 23 | 1 | 0 | 0 | Counter |
| 2 | ‘C’ ‘1’ | 6 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Cold Load Reading |
| 3 | ‘C’ ‘1’ | 8 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Cold Load Reading |
| 4 | ‘C’ ‘1’ | 10 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Cold Load Reading |
| 5 | ‘C’ ‘1’ | 12 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Cold Load Reading |
| 6 | ‘C’ ‘1’ | 14 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Cold Load Reading |
| 7 | ‘C’ ‘2’ | 16 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Cold Load Reading |
| 8 | ‘C’ ‘2’ | 18 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Cold Load Reading |
| 9 | ‘C’ ‘2’ | 20 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Cold Load Reading |
| 10 | ‘C’ ‘2’ | 22 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Cold Load Reading |
| 11 | ‘C’ ‘2’ | 24 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Cold Load Reading |
| 12 | ‘C’ ‘3’ | 26 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Cold Load Reading |
| 13 | ‘C’ ‘3’ | 28 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Cold Load Reading |
| 14 | ‘C’ ‘3’ | 30 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Cold Load Reading |
| 15 | ‘C’ ‘3’ | 32 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Cold Load Reading |
| 16 | ‘C’ ‘3’ | 34 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Cold Load Reading |
| 17 | ‘C’ ‘4’ | 36 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Cold Load Reading |
| 18 | ‘C’ ‘4’ | 38 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Cold Load Reading |
| 19 | ‘C’ ‘4’ | 40 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Cold Load Reading |
| 20 | ‘C’ ‘4’ | 42 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Cold Load Reading |
| 21 | ‘C’ ‘4’ | 44 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Cold Load Reading |
| 22 | ‘C’ ‘5’ | 46 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Cold Load Reading |
| 23 | ‘C’ ‘5’ | 48 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Cold Load Reading |
| 24 | ‘C’ ‘5’ | 50 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Cold Load Reading |
| 25 | ‘C’ ‘5’ | 52 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Cold Load Reading |
| 26 | ‘C’ ‘5’ | 54 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Cold Load Reading |
| 27 | ‘C’ ‘6’ | 56 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 28 | ‘C’ ‘6’ | 58 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 29 | ‘C’ ‘6’ | 60 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 30 | ‘C’ ‘6’ | 62 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 31 | ‘C’ ‘6’ | 64 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 32 | ‘C’ ‘7’ | 66 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 33 | ‘C’ ‘7’ | 68 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 34 | ‘C’ ‘7’ | 70 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 35 | ‘C’ ‘7’ | 72 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 36 | ‘C’ ‘7’ | 74 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 37 | ‘H’ ‘1’ | 76 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Hot Load Reading |
| 38 | ‘H’ ‘1’ | 78 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Hot Load Reading |
| 39 | ‘H’ ‘1’ | 80 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Hot Load Reading |
| 40 | ‘H’ ‘1’ | 82 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Hot Load Reading |
| 41 | ‘H’ ‘1’ | 84 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz V Hot Load Reading |
| 42 | ‘H’ ‘2’ | 86 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Hot Load Reading |
| 43 | ‘H’ ‘2’ | 88 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Hot Load Reading |
| 44 | ‘H’ ‘2’ | 90 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Hot Load Reading |
| 45 | ‘H’ ‘2’ | 92 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Hot Load Reading |
| 46 | ‘H’ ‘2’ | 94 | 2 | 0 | 23 | 1 | 0 | 0 | 19GHz H Hot Load Reading |
| 47 | ‘H’ ‘3’ | 96 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Hot Load Reading |
| 48 | ‘H’ ‘3’ | 98 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Hot Load Reading |
| 49 | ‘H’ ‘3’ | 100 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Hot Load Reading |
| 50 | ‘H’ ‘3’ | 102 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Hot Load Reading |
| 51 | ‘H’ ‘3’ | 104 | 2 | 0 | 23 | 1 | 0 | 0 | 22GHz V Hot Load Reading |
| 52 | ‘H’ ‘4’ | 106 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Hot Load Reading |
| 53 | ‘H’ ‘4’ | 108 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Hot Load Reading |
| 54 | ‘H’ ‘4’ | 110 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Hot Load Reading |
| 55 | ‘H’ ‘4’ | 112 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Hot Load Reading |
| 56 | ‘H’ ‘4’ | 114 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz V Hot Load Reading |
| 57 | ‘H’ ‘5’ | 116 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Hot Load Reading |
| 58 | ‘H’ ‘5’ | 118 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Hot Load Reading |
| 59 | ‘H’ ‘5’ | 120 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Hot Load Reading |
| 60 | ‘H’ ‘5’ | 122 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Hot Load Reading |
| 61 | ‘H’ ‘5’ | 124 | 2 | 0 | 23 | 1 | 0 | 0 | 37GHz H Hot Load Reading |
| 62 | ‘H’ ‘6’ | 126 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 63 | ‘H’ ‘6’ | 128 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 64 | ‘H’ ‘6’ | 130 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 65 | ‘H’ ‘6’ | 132 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 66 | ‘H’ ‘6’ | 134 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 67 | ‘H’ ‘7’ | 136 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |
| 68 | ‘H’ ‘7’ | 138 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |
| 69 | ‘H’ ‘7’ | 140 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |
| 70 | ‘H’ ‘7’ | 142 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |
| 71 | ‘H’ ‘7’ | 144 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |
| 72 | ‘A’ ‘G’ ‘C’ ‘3’ | 146 | 2 | 0 | 23 | 1 | 0 | 0 | Auto Gain Control Setting 3 |
| 73 | ‘A’ ‘G’ ‘C’ ‘2’ | 148 | 2 | 0 | 23 | 1 | 0 | 0 | Auto Gain Control Setting 2 |
| 74 | ‘A’ ‘G’ ‘C’ ‘1’ | 150 | 2 | 0 | 23 | 1 | 0 | 0 | Auto Gain Control Setting 1 |
| 75 | ‘C’ ‘6’ | 152 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 76 | ‘C’ ‘6’ | 154 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 77 | ‘C’ ‘6’ | 156 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 78 | ‘C’ ‘6’ | 158 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 79 | ‘C’ ‘6’ | 160 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Cold Load Reading |
| 80 | ‘C’ ‘7’ | 162 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 81 | ‘C’ ‘7’ | 164 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 82 | ‘C’ ‘7’ | 166 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 83 | ‘C’ ‘7’ | 168 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 84 | ‘C’ ‘7’ | 170 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Cold Load Reading |
| 85 | ‘H’ ‘6’ | 172 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 86 | ‘H’ ‘6’ | 174 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 87 | ‘H’ ‘6’ | 176 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 88 | ‘H’ ‘6’ | 178 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 89 | ‘H’ ‘6’ | 180 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz V Hot Load Reading |
| 90 | ‘H’ ‘7’ | 182 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |
| 91 | ‘H’ ‘7’ | 184 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |
| 92 | ‘H’ ‘7’ | 186 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 93 | ‘H’ ‘7’ | 188 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |
| 94 | ‘H’ ‘7’ | 190 | 2 | 0 | 23 | 1 | 0 | 0 | 85GHz H Hot Load Reading |

### C2.3.3.4 TDR Data Description Block

Figure C8 shows the TDR Data Description Block. The block is identified as Mode 3, Submode 21 and holds 370 bytes of information.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | | 185 | Number of two-byte words for the Data Description Block |
| 2 | 003 | 021 | Octal mode and submode |
| 3 | 30 | 52 | Number of elements (1st byte) and bytes per section (2nd byte) |
| 4 | 64 | | Number of sections |
| 5 | C | N | Counter (1st element) |
| 6 | T | R | |
| 7 | 4 | 2 | Start byte (1st byte) bytes per element (2nd byte) |
| 8 | 0 | 23 | 1st byte is not used; unit code (2nd byte) |
| 9 | 1 | 0 | Mult. Mantissa (1st byte); exponent (2nd byte) |
| 10 | | 0 | Additive constant |
| 11 - 184 | Repeat Elements (2 - 30 ) | | Data for Elements 2 through 30 |
| 185 | Checksum | | |

**Figure C8. TDR Data Description Block (Mode 3, Submode 21)**

Table C5 shows the information that is contained within this TDR Data Description Block.

**Table C5. TDR Data Description Block Contents**

| Element # | Mnemonic (4 Chars) | Start Byte | Bytes/ Elem | Data Rep | Units | M Mant | M Char | Add. Const | Definition |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ‘C’ ‘N’ ‘T’ ‘R’ | 4 | 2 | 0 | 23 | 1 | 0 | 0 | Counter |
| 2 | ‘L’ ‘A’ ‘T’ ‘ ’ | 6 | 2 | 0 | 55 | 1 | -2 | 0 | Latitude |
| 3 | ‘L’ ‘O’ ‘N’ ‘ ’ | 8 | 2 | 0 | 55 | 1 | -2 | 0 | Longitude |
| 4 | ‘T’ ‘1’ ‘9’ ‘V’ | 10 | 2 | 0 | 1 | 1 | -2 | 0 | 19GHz V Antenna Temp. |
| 5 | ‘T’ ‘1’ ‘9’ ‘H’ | 12 | 2 | 0 | 1 | 1 | -2 | 0 | 19GHz H Antenna Temp. |
| 6 | ‘T’ ‘2’ ‘2’ ‘V’ | 14 | 2 | 0 | 1 | 1 | -2 | 0 | 22GHz V Antenna Temp. |
| 7 | ‘T’ ‘3’ ‘7’ ‘V’ | 16 | 2 | 0 | 1 | 1 | -2 | 0 | 37GHz V Antenna Temp. |
| 8 | ‘T’ ‘3’ ‘7’ ‘H’ | 18 | 2 | 0 | 1 | 1 | -2 | 0 | 37GHz H Antenna Temp. |
| 9 | ‘T’ ‘8’ ‘5’ ‘V’ | 20 | 2 | 0 | 1 | 1 | -2 | 0 | 85GHz V Antenna Temp. |
| 10 | ‘T’ ‘8’ ‘5’ ‘H’ | 22 | 2 | 0 | 1 | 1 | -2 | 0 | 85GHz H Antenna Temp. |
| 11 | ‘S’ ‘T’ ‘Y’ ‘P’ | 24 | 1 | 0 | 23 | 1 | 0 | 0 | Surface Type |
| 12 | ‘P’ ‘O’ ‘N’ ‘O’ | 25 | 1 | 0 | 23 | 1 | 0 | 0 | Position Number |
| 13 | ‘L’ ‘A’ ‘T’ ‘ ’ | 26 | 2 | 0 | 55 | 1 | -2 | 0 | Latitude |
| 14 | ‘L’ ‘O’ ‘N’ ‘ ’ | 28 | 2 | 0 | 55 | 1 | -2 | 0 | Longitude |
| 15 | ‘T’ ‘8’ ‘5’ ‘V’ | 30 | 2 | 0 | 1 | 1 | -2 | 0 | 85GHz V Antenna Temp. |
| 16 | ‘T’ ‘8’ ‘5’ ‘H’ | 32 | 2 | 0 | 1 | 1 | -2 | 0 | 85GHz H Antenna Temp. |
| 17 | ‘S’ ‘T’ ‘Y’ ‘P’ | 34 | 1 | 0 | 23 | 1 | 0 | 0 | Surface Type |
| 18 | ‘P’ ‘O’ ‘N’ ‘O’ | 35 | 1 | 0 | 23 | 1 | 0 | 0 | Position Number |
| 19 | ‘L’ ‘A’ ‘T’ ‘ ’ | 36 | 2 | 0 | 55 | 1 | -2 | 0 | Latitude |
| 20 | ‘L’ ‘O’ ‘N’ ‘ ’ | 38 | 2 | 0 | 55 | 1 | -2 | 0 | Longitude |
| 21 | ‘T’ ‘8’ ‘5’ ‘V’ | 40 | 2 | 0 | 1 | 1 | -2 | 0 | 85GHz V Antenna Temp. |
| 22 | ‘T’ ‘8’ ‘5’ ‘H’ | 42 | 2 | 0 | 1 | 1 | -2 | 0 | 85GHz H Antenna Temp. |
| 23 | ‘S’ ‘T’ ‘Y’ ‘P’ | 44 | 1 | 0 | 23 | 1 | 0 | 0 | Surface Type |
| 24 | ‘P’ ‘O’ ‘N’ ‘O’ | 45 | 1 | 0 | 23 | 1 | 0 | 0 | Position Number |
| 25 | ‘L’ ‘A’ ‘T’ ‘ ’ | 46 | 2 | 0 | 55 | 1 | -2 | 0 | Latitude |
| 26 | ‘L’ ‘O’ ‘N’ ‘ ’ | 48 | 2 | 0 | 55 | 1 | -2 | 0 | Longitude |
| 27 | ‘T’ ‘8’ ‘5’ ‘V’ | 50 | 2 | 0 | 1 | 1 | -2 | 0 | 85GHz V Antenna Temp. |
| 28 | ‘T’ ‘8’ ‘5’ ‘H’ | 52 | 2 | 0 | 1 | 1 | -2 | 0 | 85GHz H Antenna Temp. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 29 | 'S' 'T' 'Y' 'P' | 54 | 1 | 0 | 23 | 1 | 0 | 0 | Surface Type |
| 30 | 'P' 'O' 'N' 'O' | 55 | 1 | 0 | 23 | 1 | 0 | 0 | Position Number |

### C2.3.3.5 End-of-Product

Figure C9 shows the format for the TDR End-of-Product Block. Data are read until the End-of-Product Block is detected.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | 3 | | Number of two-byte words for the End of Product Block |
| 2 | 001 | 002 | Octal mode and submode |
| 3 | Checksum | | |

**Figure C9. TDR End-of-Product Block (Mode 1, Submode 2)**

## C2.4 Data Blocks

A TDR file contains several Data Blocks: Rev Header Data, TDR Scan #1 Data, TDR Scan #2 Data, and the TDR Data blocks. Each block corresponds to a data description block discussed in the previous subsection. The following subparagraphs describe these blocks.

### C2.4.1 Rev Header Data Block

Figure C10 shows the format of the Rev Header Data Block. The block is identified as Mode 3, Submode 1 and holds 30 bytes of information. The Rev Data Block is the first data block following the last description block and appears only once in the entire TDR file.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | 15 | | Number of two-byte words for the End Of Product Block |
| 2 | 003 | 001 | Octal mode and submode |
| 3 – 14 | TDR Rev Header Data | | |
| 15 | Checksum | | |

**Figure C10. TDR Rev Header Data Block (Mode 3, Submode 1)**

Table C6 shows the data contained within the Rev Header Data Block.

**Table C6. Rev Header Data Block Contents**

| Word # | Definition | Start Byte | Bytes/ Elem | Units | M Mant | M Char | Add. Const |
|---|---|---|---|---|---|---|---|
| 3 – 4 | Spacecraft ID | 4 | 4 | 23 | 1 | 0 | 0 |
| 5 – 6 | Rev/Orbit Number | 8 | 4 | 23 | 1 | 0 | 0 |
| 7 | Julian Day Data Begins | 12 | 2 | 63 | 1 | 0 | 0 |
| 8 | Hour of Day Data Begins | 14 | 1 | 62 | 1 | 0 | 0 |
| 8 | Minute of Hour Data Begins | 15 | 1 | 61 | 1 | 0 | 0 |
| 9 | Second of Min. Data Begins | 16 | 1 | 14 | 1 | 0 | 0 |
| 9 – 10 | Julian Day Data Ends | 17 | 2 | 63 | 1 | 0 | 0 |
| 10 | Hour of Day Data Ends | 19 | 1 | 62 | 1 | 0 | 0 |
| 11 | Minute of Hour Data Ends | 20 | 1 | 61 | 1 | 0 | 0 |
| 11 | Second of Min. Data Ends | 21 | 1 | 14 | 1 | 0 | 0 |
| 12 | Day of Ascending Node | 22 | 2 | 63 | 1 | 0 | 0 |
| 13 | Hour of Ascending Node | 24 | 1 | 62 | 1 | 0 | 0 |
| 13 | Minute of Ascending Node | 25 | 1 | 61 | 1 | 0 | 0 |
| 14 | Second of Ascending Node | 26 | 1 | 14 | 1 | 0 | 0 |
| 14 | Logical Satellite ID | 27 | 1 | 23 | 1 | 0 | 0 |

Notes:
**Words 1 and 2** – are four bytes which are reserved for the four-character spacecraft identification.
**Words 3 and 4** – are four bytes which are reserved for the orbit number (count).
**Word 5** – is two bytes which are reserved for the Julian day that data collection begins.
**Word 6 (1st byte)** – is reserved for the hour of the day that data collection begins.
**Word 6 (2nd byte)** – is reserved for the minute of the hour that data collection begins.
**Word 7 (1st byte)** – is reserved for the second of the minute that data collection begins.
**Words 7 (2nd byte) and 8 (1st byte)** – are two bytes which are reserved for the Julian day that data collection ends.
**Word 8 (2nd byte)** – is reserved for the hour of day that data collection ends.
**Word 9 (1st byte)** – is reserved for the minute of the hour that data collection ends.
**Word 9 (2nd byte) –** is reserved for the second of the minute that data collection ends.
**Word 10** – is two bytes which are reserved for the Julian day of ascending node.
**Word 11 (1st byte)** – is reserved for the hour of the day of the ascending node.
**Word 11 (2nd byte) –** is reserved for the minute of the hour of the ascending node.
**Word 12 (1st byte)** – is reserved for the second of the minute of the ascending node.
**Word 12 (2nd byte)** – is reserved for the logical satellite identification.

### C2.4.2 TDR Scan Header #1 Data Block

Figure C-11 shows the format of the TDR Scan Header #1 Data Block. The block is identified as Mode 3, Submode 1 and holds 76 bytes of information.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | 38 | | Number of two-byte words for the Scan Header #1 Data Block |
| 2 | 003 | 001 | Octal mode and submode |
| 3 – 37 | TDR Scan Header #1 Data | | |
| 38 | Checksum | | |

**Figure C11. TDR Scan Header #1 Data Block (Mode 3, Submode 1)**

Table C7 shows the data contained within the TDR Scan Header #1 Data block. A Scan Header #1 Data block precedes each corresponding TDR Data Block throughout the TDR file.

**Table C7. TDR Scan Header #1 Data Block Contents**

| Word # | Definition | Start Byte | Bytes /Elem | Units | M Mant | M Char | Add. Const |
|---|---|---|---|---|---|---|---|
| 3 | Counter | 4 | 2 | 23 | 1 | 0 | 0 |
| 4 –5 | B Scan Start Time | 6 | 4 | 14 | 1 | 0 | 0 |
| 6 – 7 | Ephemeris Minute Vector | 10 | 4 | 14 | 1 | -1 | 0 |
| 8 – 9 | Latitude | 14 | 4 | 55 | 1 | ? | 0 |
| 10 – 11 | Longitude | 18 | 4 | 55 | 1 | ? | 0 |
| 12 - 13 | Altitude | 22 | 4 | 3 | 1 | 0 | 0 |
| 14 | Hot Load Thermal Temp. 3 | 26 | 2 | 1 | 1 | -2 | 0 |
| 15 | Hot Load Thermal Temp. 2 | 28 | 2 | 1 | 1 | -2 | 0 |
| 16 | Hot Load Thermal Temp. 1 | 30 | 2 | 1 | 1 | -2 | 0 |
| 17 | Reference Voltage 2 | 32 | 2 | 23 | 1 | 0 | 0 |
| 18 | Reference Voltage 1 | 34 | 2 | 23 | 1 | 0 | 0 |
| 19 | RF Mixer Temp. | 36 | 2 | 1 | 1 | -2 | 0 |
| 20 | Forward Radiator Temp. | 38 | 2 | 1 | 1 | -2 | 0 |
| 21 | Auto Gain Control Setting 3 | 40 | 2 | 23 | 1 | 0 | 0 |
| 22 | Auto Gain Control Setting 2 | 42 | 2 | 23 | 1 | 0 | 0 |
| 23 | Auto Gain Control Setting 1 | 44 | 2 | 23 | 1 | 0 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 24 | Slope 19GHz Vertical | 46 | 2 | 105 | 1 | -5 | 0 |
| 25 | Offset 19GHz Vertical | 48 | 2 | 1 | -1 | -2 | 0 |
| 26 | Slope 19GHz Horizontal | 50 | 2 | 105 | 1 | -5 | 0 |
| 27 | Offset 19GHz Horizontal | 52 | 2 | 1 | -1 | -2 | 0 |
| 28 | Slope 22GHz Vertical | 54 | 2 | 105 | 1 | -5 | 0 |
| 29 | Offset 22GHz Vertical | 56 | 2 | 1 | -1 | -2 | 0 |
| 30 | Slope 37GHz Vertical | 58 | 2 | 105 | 1 | -5 | 0 |
| 31 | Offset 37GHz Vertical | 60 | 2 | 1 | -1 | -2 | 0 |
| 32 | Slope 37GHz Horizontal | 62 | 2 | 105 | 1 | -5 | 0 |
| 33 | Offset 37GHz Horizontal | 64 | 2 | 1 | -1 | -2 | 0 |
| 34 | Slope 85GHz Vertical | 66 | 2 | 105 | 1 | -5 | 0 |
| 35 | Offset 85GHz Vertical | 68 | 2 | 1 | -1 | -2 | 0 |
| 36 | Slope 85GHz Horizontal | 70 | 2 | 105 | 1 | -5 | 0 |
| 37 | Offset 85GHz Horizontal | 72 | 2 | 1 | -1 | -2 | 0 |

### C2.4.3 TDR Scan Header #2 Data Block

Figure C shows the format of the TDR Scan Header #2 Data Block. The block is identified as Mode 3, Submode 1 and holds 194 bytes of information.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | 97 | | Number of two-byte words for the Scan Header #2 Data Block |
| 2 | 003 | 001 | Octal mode and submode |
| 3 - 73 | TDR Scan #2 Data Load Reading | | Cold and hot load reading |
| 74 - 76 | Auto Gain Control | | Auto gain control settings |
| 77 – 86 | Repeat Words 29 through 38 | | 85GHz vertical and horizontal cold load readings |
| 87 - 96 | Repeat Words 64 through 73 | | 85GHz vertical and horizontal hot load readings |
| 97 | Checksum | | |

**Figure C12. TDR Scan Header #2 Data Block (Mode 3, Submode 1)**

Table C8 shows the data that are contained within the TDR Scan Header #2 Data Block. Each Scan Header #2 Data Block is preceded by a Scan Header #1Data Block. A Scan Header #2 Data Block precedes each corresponding TDR Data Block throughout the TDR file.

**Table C8. TDR Scan Header #2 Data Description Block Contents**

| Word # | Definition | Start Byte | Bytes/ Elem | Units | M Mant | M Char | Add. Const |
|---|---|---|---|---|---|---|---|
| 3 | Counter | 4 | 2 | 23 | 1 | 0 | 0 |
| 4 | 19GHz V Cold Load Reading | 6 | 2 | 23 | 1 | 0 | 0 |
| 5 | 19GHz V Cold Load Reading | 8 | 2 | 23 | 1 | 0 | 0 |
| 6 | 19GHz V Cold Load Reading | 10 | 2 | 23 | 1 | 0 | 0 |
| 7 | 19GHz V Cold Load Reading | 12 | 2 | 23 | 1 | 0 | 0 |
| 8 | 19GHz V Cold Load Reading | 14 | 2 | 23 | 1 | 0 | 0 |
| 9 | 19GHz H Cold Load Reading | 16 | 2 | 23 | 1 | 0 | 0 |
| 10 | 19GHz H Cold Load Reading | 18 | 2 | 23 | 1 | 0 | 0 |
| 11 | 19GHz H Cold Load Reading | 20 | 2 | 23 | 1 | 0 | 0 |
| 12 | 19GHz H Cold Load Reading | 22 | 2 | 23 | 1 | 0 | 0 |
| 13 | 19GHz H Cold Load Reading | 24 | 2 | 23 | 1 | 0 | 0 |
| 14 | 22GHz V Cold Load Reading | 26 | 2 | 23 | 1 | 0 | 0 |
| 15 | 22GHz V Cold Load Reading | 28 | 2 | 23 | 1 | 0 | 0 |
| 16 | 22GHz V Cold Load Reading | 30 | 2 | 23 | 1 | 0 | 0 |
| 17 | 22GHz V Cold Load Reading | 32 | 2 | 23 | 1 | 0 | 0 |
| 18 | 22GHz V Cold Load Reading | 34 | 2 | 23 | 1 | 0 | 0 |
| 19 | 37GHz V Cold Load Reading | 36 | 2 | 23 | 1 | 0 | 0 |
| 20 | 37GHz V Cold Load Reading | 38 | 2 | 23 | 1 | 0 | 0 |
| 21 | 37GHz V Cold Load Reading | 40 | 2 | 23 | 1 | 0 | 0 |
| 22 | 37GHz V Cold Load Reading | 42 | 2 | 23 | 1 | 0 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 23 | 37GHz V Cold Load Reading | 44 | 2 | 23 | 1 | 0 | 0 |
| 24 | 37GHz H Cold Load Reading | 46 | 2 | 23 | 1 | 0 | 0 |
| 25 | 37GHz H Cold Load Reading | 48 | 2 | 23 | 1 | 0 | 0 |
| 26 | 37GHz H Cold Load Reading | 50 | 2 | 23 | 1 | 0 | 0 |
| 27 | 37GHz H Cold Load Reading | 52 | 2 | 23 | 1 | 0 | 0 |
| 28 | 37GHz H Cold Load Reading | 54 | 2 | 23 | 1 | 0 | 0 |
| 29 | 85GHz V Cold Load Reading | 56 | 2 | 23 | 1 | 0 | 0 |
| 30 | 85GHz V Cold Load Reading | 58 | 2 | 23 | 1 | 0 | 0 |
| 31 | 85GHz V Cold Load Reading | 60 | 2 | 23 | 1 | 0 | 0 |
| 32 | 85GHz V Cold Load Reading | 62 | 2 | 23 | 1 | 0 | 0 |
| 33 | 85GHz V Cold Load Reading | 64 | 2 | 23 | 1 | 0 | 0 |
| 34 | 85GHz H Cold Load Reading | 66 | 2 | 23 | 1 | 0 | 0 |
| 35 | 85GHz H Cold Load Reading | 68 | 2 | 23 | 1 | 0 | 0 |
| 36 | 85GHz H Cold Load Reading | 70 | 2 | 23 | 1 | 0 | 0 |
| 37 | 85GHz H Cold Load Reading | 72 | 2 | 23 | 1 | 0 | 0 |
| 38 | 85GHz H Cold Load Reading | 74 | 2 | 23 | 1 | 0 | 0 |
| 39 | 19GHz V Hot Load Reading | 76 | 2 | 23 | 1 | 0 | 0 |
| 40 | 19GHz V Hot Load Reading | 78 | 2 | 23 | 1 | 0 | 0 |
| 41 | 19GHz V Hot Load Reading | 80 | 2 | 23 | 1 | 0 | 0 |
| 42 | 19GHz V Hot Load Reading | 82 | 2 | 23 | 1 | 0 | 0 |
| 43 | 19GHz V Hot Load Reading | 84 | 2 | 23 | 1 | 0 | 0 |
| 44 | 19GHz H Hot Load Reading | 86 | 2 | 23 | 1 | 0 | 0 |
| 45 | 19GHz H Hot Load Reading | 88 | 2 | 23 | 1 | 0 | 0 |
| 46 | 19GHz H Hot Load Reading | 90 | 2 | 23 | 1 | 0 | 0 |
| 47 | 19GHz H Hot Load Reading | 92 | 2 | 23 | 1 | 0 | 0 |
| 48 | 19GHz H Hot Load Reading | 94 | 2 | 23 | 1 | 0 | 0 |
| 49 | 22GHz V Hot Load Reading | 96 | 2 | 23 | 1 | 0 | 0 |
| 50 | 22GHz V Hot Load Reading | 98 | 2 | 23 | 1 | 0 | 0 |
| 51 | 22GHz V Hot Load Reading | 100 | 2 | 23 | 1 | 0 | 0 |
| 52 | 22GHz V Hot Load Reading | 102 | 2 | 23 | 1 | 0 | 0 |
| 53 | 22GHz V Hot Load Reading | 104 | 2 | 23 | 1 | 0 | 0 |
| 54 | 37GHz V Hot Load Reading | 106 | 2 | 23 | 1 | 0 | 0 |
| 55 | 37GHz V Hot Load Reading | 108 | 2 | 23 | 1 | 0 | 0 |
| 56 | 37GHz V Hot Load Reading | 110 | 2 | 23 | 1 | 0 | 0 |
| 57 | 37GHz V Hot Load Reading | 112 | 2 | 23 | 1 | 0 | 0 |
| 58 | 37GHz V Hot Load Reading | 114 | 2 | 23 | 1 | 0 | 0 |
| 59 | 37GHz H Hot Load Reading | 116 | 2 | 23 | 1 | 0 | 0 |
| 60 | 37GHz H Hot Load Reading | 118 | 2 | 23 | 1 | 0 | 0 |
| 61 | 37GHz H Hot Load Reading | 120 | 2 | 23 | 1 | 0 | 0 |
| 62 | 37GHz H Hot Load Reading | 122 | 2 | 23 | 1 | 0 | 0 |
| 63 | 37GHz H Hot Load Reading | 124 | 2 | 23 | 1 | 0 | 0 |
| 64 | 85GHz V Hot Load Reading | 126 | 2 | 23 | 1 | 0 | 0 |
| 65 | 85GHz V Hot Load Reading | 128 | 2 | 23 | 1 | 0 | 0 |
| 66 | 85GHz V Hot Load Reading | 130 | 2 | 23 | 1 | 0 | 0 |
| 67 | 85GHz V Hot Load Reading | 132 | 2 | 23 | 1 | 0 | 0 |
| 68 | 85GHz V Hot Load Reading | 134 | 2 | 23 | 1 | 0 | 0 |
| 69 | 85GHz H Hot Load Reading | 136 | 2 | 23 | 1 | 0 | 0 |
| 70 | 85GHz H Hot Load Reading | 138 | 2 | 23 | 1 | 0 | 0 |
| 71 | 85GHz H Hot Load Reading | 140 | 2 | 23 | 1 | 0 | 0 |
| 72 | 85GHz H Hot Load Reading | 142 | 2 | 23 | 1 | 0 | 0 |
| 73 | 85GHz H Hot Load Reading | 144 | 2 | 23 | 1 | 0 | 0 |
| 74 | Auto Gain Control Setting 3 | 146 | 2 | 23 | 1 | 0 | 0 |
| 75 | Auto Gain Control Setting 2 | 148 | 2 | 23 | 1 | 0 | 0 |
| 76 | Auto Gain Control Setting 1 | 150 | 2 | 23 | 1 | 0 | 0 |
| 77 - 86 | Repeat of Words 29 through 38 | 152 | 20 | 23 | 1 | 0 | 0 |
| 87 - 96 | Repeat of Words 64 through 73 | 172 | 20 | 23 | 1 | 0 | 0 |

### C2.4.4 TDR Data Block

Figure C13 shows the format for the TDR Data Blocks. Data are constructed as interpreted from the corresponding Data Description Block. The TDR Data Block holds 3334 bytes of TDR data. Every TDR Data Block is preceded by corresponding Scan #1 and Scan #2 Header Data Blocks. Word sections of this block are repeated as shown in Figure C13.

| Word # | First Byte | Second Byte | |
|---|---|---|---|
| 1 | | 1667 | Number of two-byte words for the Data Block |
| 2 | 003 | 001 | Octal mode and submode |
| 3 | Scene Station Counter | | |
| 4 - 5 | Latitude and Longitude | | |
| 6 - 12 | Antenna Temps. | | |
| 13 | Surface and Position | | |
| 14 - 15 | Latitude and Longitude | | |
| 16 - 17 | 85GHz Antenna Temps. | | |
| 18 | Surface and Position | | |
| 19 - 28 | Repeat Words 14 through 18 (twice) | | |
| 29 - 1666 | Repeat Words 3 through 28 (63 times) | | |
| 1667 | Checksum | | |

**Figure C13. TDR Data Block (Mode 3, Submode 1)**

Table C9 shows the data contained within the TDR Data Block. The TDR Data Block and corresponding Scan Header Data Blocks will continue as formatted until the TDR data is contained within the file. An End-of-Product Descriptor Block will indicate that the file is complete.

**Table C9. TDR Data Block Contents**

| Word # | Definition | Start Byte | Bytes/ Elem | Units | M Mant | M Char | Add. Const |
|---|---|---|---|---|---|---|---|
| 3 | Scene Station Counter | 4 | 2 | 23 | 1 | 0 | 0 |
| 4 | Latitude | 6 | 2 | 55 | 1 | -2 | 0 |
| 5 | Longitude | 8 | 2 | 55 | 1 | -2 | 0 |
| 6 | 19GHz V Antenna Temp. | 10 | 2 | 1 | 1 | -2 | 0 |
| 7 | 19GHz H Antenna Temp. | 12 | 2 | 1 | 1 | -2 | 0 |
| 8 | 22GHz V Antenna Temp. | 14 | 2 | 1 | 1 | -2 | 0 |
| 9 | 37GHz V Antenna Temp. | 16 | 2 | 1 | 1 | -2 | 0 |
| 10 | 37GHz H Antenna Temp. | 18 | 2 | 1 | 1 | -2 | 0 |
| 11 | 85GHz V Antenna Temp. | 20 | 2 | 1 | 1 | -2 | 0 |
| 12 | 85GHz H Antenna Temp. | 22 | 2 | 1 | 1 | -2 | 0 |
| 13 | Surface Type | 24 | 1 | 23 | 1 | 0 | 0 |
| 13 | Position Number | 25 | 1 | 23 | 1 | 0 | 0 |
| 14 | Latitude | 26 | 2 | 55 | 1 | -2 | 0 |
| 15 | Longitude | 28 | 2 | 55 | 1 | -2 | 0 |
| 16 | 85GHz V Antenna Temp. | 30 | 2 | 1 | 1 | -2 | 0 |
| 17 | 85GHz H Antenna Temp. | 32 | 2 | 1 | 1 | -2 | 0 |
| 18 | Surface Type | 34 | 1 | 23 | 1 | 0 | 0 |
| 18 | Position Number | 35 | 1 | 23 | 1 | 0 | 0 |
| 19 | Latitude | 36 | 2 | 55 | 1 | -2 | 0 |
| 20 | Longitude | 38 | 2 | 55 | 1 | -2 | 0 |
| 21 | 85GHz V Antenna Temp. | 40 | 2 | 1 | 1 | -2 | 0 |
| 22 | 85GHz H Antenna Temp. | 42 | 2 | 1 | 1 | -2 | 0 |
| 23 | Surface Type | 44 | 1 | 23 | 1 | 0 | 0 |
| 23 | Position Number | 45 | 1 | 23 | 1 | 0 | 0 |
| 24 | Latitude | 46 | 2 | 55 | 1 | -2 | 0 |
| 25 | Longitude | 48 | 2 | 55 | 1 | -2 | 0 |
| 26 | 85GHz V Antenna Temp. | 50 | 2 | 1 | 1 | -2 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 27 | 85GHz H Antenna Temp. | 52 | 2 | 1 | 1 | -2 | 0 |
| 28 | Surface Type | 54 | 1 | 23 | 1 | 0 | 0 |
| 28 | Position Number | 55 | 1 | 23 | 1 | 0 | 0 |
| 29 - 1666 | Repeat Words 3 through 28 (63 times) | 56 | - | - | - | - | - |