8.0 NOAA LEVEL 1B DATABASE

This section describes the NOAA-KLM and NOAA-N,-N' Polar Orbiter Level 1b databases archived by NOAA. Also descirbed are the formats in which NOAA distributes raw data to the users.

NOAA Level 1b (following FGGE terminology) is raw data that have been quality controlled, assembled into discrete data sets, and to which Earth location and calibration information have been appended (but not applied). Please note that NASA and EUMETSAT use a different definition for Level 1b, so the following information may not apply to data sets produced by other organizations.

The data are assembled in the database as a collection of data sets and made available from the archive within twenty-four hours after receipt. Each data set contains data of one type for a discrete time period. Thus, there are separate data sets for HRPT, LAC, GAC, HIRS/3, HIRS/4, AMSU-A, AMSU-B, MHS and SEM-2 data (SBUV/2 data sets do not meet the NOAA Level 1b definition, and are described under Section 9.7, NESDIS Operational Products). Time periods are arbitrary subsets of orbits, and may cross orbits (i.e., may contain data along a portion of an orbital track that includes the ascending node, the reference point for counting orbits). Generally, GAC, HIRS/3, HIRS/4, MHS, AMSU-A, and AMSU-B data sets will be available for corresponding time periods and usually have a three to five minute overlap between consecutive data sets.

8.1 DATA REPRESENTATION AND STORAGE

This section describes the bit and byte numbering conventions used in this document, and the storage methods for integers and floating point numbers. This information is especially critical when transporting data from one computer architecture to another. Without special handling, data produced on one system may be unusable on another due to differences in internal data storage.

Within this section, a byte is defined as containing 8 bits (i.e., an octet), and a word can be either 8, 16 or 32 bits in length. In all cases, the least significant bit (lsb) is designated as bit 0 and has a base10 value of $2^0 = 1$. Therefore, in a 8-bit word, the most significant bit (msb) is designated as bit 15, and has a base-10 value of 2^7=128. In a 16-bit word, the msb is designated as bit 15, and has a base-10 value of 2^{15} =32,768. In a 32-bit word, the msb is designated as bit 31, and has a base10 value of 2^{31} = 2,147,483,648.

For signed binary integers, the msb represents the sign of the number. The remaining bits (bits 6 through 0 for 8-bit words, 14 through 0 for 16-bit words and 30 through 0 for 32-bit words) are used to designate the magnitude of the number. Therefore, the range of signed binary integers is based on word size as follows:

- 1 byte -128 to 127
- 2 bytes -32,768 to 32,767

o 4 bytes -2,147,483,648 to 2,147,483,647

Positive binary integers are in true binary notation with the sign bit set to zero. Negative binary integers are in two's-complement notation with sign bit set to one. Negative binary integers are formed in two's-complement notation by inverting each bit of the positive binary integer and adding one.

Unsigned binary integers use all bits including the msb to represent the magnitude of the number. Therefore, their range is as follows, again, based on word size:

o 1 byte 0 to 255
o 2 bytes 0 to 65,535
o 4 bytes 0 to 4,294,967,295

A field containing a binary integer is give the data type of unsigned integer if its content will never be a negative or if a negative value just does not make sense for that field. For example, the idea of a negative scan line number or negative date or time is nonsensical. Therefore, fields containing scan line numbers, dates and times are labeled as unsigned integers.

Unfortunately, this data type is not supported by all computer languages (e.g., FORTRAN), so additional data manipulation may be necessary. In the case of reading a 16-bit unsigned integer (DATA), a FORTRAN user could use the following code snippet to extract the actual value (VALUE):

```
...
INTEGER*2 DATA
INTEGER*4 VALUE
...
READ DATA
IF (DATA .LT. 0) THEN
     VALUE = 65536 + DATA
ELSE
     VALUE = DATA
ENDIF
...
```

But note that nearly all unsigned integer fields can be safely read into signed integer data types of the same word sizes. This is because they were originally written to the Level 1b using signed integer data types, and thus will be within the positive range of the corresponding signed integer data type. The Level 1b format specifications will clearly indicate, by providing ranges, those unsigned integer fields that must be strictly treated as unsigned integer data types - using the data manipulation described above, if necessary - to ensure that correct values are retrieved.

However, not all fields of an unsigned integer data type contain unsigned binary integers. Fields containing packed data are also identified as unsigned integers. While its msb is not a sign bit, a field containing packed data does not represent an unsigned binary integer. Such a field requires the user to perform some type of special unpacking technique in order to extract the information of interest from the field in order for correct interpretation. Packed data may be bit fields, packed integers, or both. A bit field is one or more consecutive bits used to indicate one of two or more possible conditions or states. (A bit flag is a specialized instance of a bit field. It is a single bit indicating one of only two possible conditions.) For example, a three-bit field may indicate which of seven different modes that an instrument is operating in (i.e., 0 implies "power on mode', 1 implies "warm up mode", 2 implies "standby mode", etc.). A packed integer is simply a binary number that is stored in just a subset of an unsigned integer field's bits. Although similar to a bit field, a packed integer is not an indicator of a condition, but an actual numeric value having magnitude, that once unpacked, could be used in arithmetic computations.

To provide maximum portability of the Level 1b data sets across different computer platforms, floating point data is represented by scaled integers. Scaled integers can be either signed or unsigned, and are simply floating point numbers multiplied by a fixed scaling factor so that a sufficiently precise representation of the original number can be stored in integer form. For example, the floating point value 1.2313 might be multiplied by 10^2 to achieve an integer value of 123. To achieve better precision, the floating point value might be multiplied by 10^3 or 10^4 to achieve an integer value of 1231 or 12313, respectively. In the Level 1b data sets, the scaling factors are powers of ten, and only the exponents (2, 3 and 4 in the previous examples) are documented within the data set. To recover an approximation of the original floating point value, divide the integer value by ten raised to the given exponent.

A major problem impeding the free transport of binary data from one computer system to another is the "Big Endian - Little Endian" dichotomy. "Big Endian" systems (e.g. IBM 370, Macintosh, SGI, Sun SPARC) store bytes of binary numeric data in reverse order relative to "Little Endian" systems (e.g. IBM PC, DEC Alpha). For example, a 32-bit hexadecimal value of x01020304 (decimal value 16,909,060) written to a binary file by a Big Endian system would be read from the file as x04030201 (decimal value 67,305,985) by a Little Endian system. Level 1b data sets generated and archived by NOAA are in Big Endian order; users with Little Endian systems must include an additional byte-swapping step when reading binary numeric data from Level 1b data sets produced by NOAA. Some processors support byte swapping in their instruction sets, but others must use compiler dependent functions.

8.2 NOAA LEVEL 1B DATA SET NAMES

This section describes the data set naming convention which is used for all NOAA Level 1b data sets. Each data set has a unique data set name which is generated when the data set is created. This 42-character name will be used to reference the data sets. The data set name is composed of a set of alphanumeric qualifiers separated by periods (.). The complete data set name with all of its qualifiers will be as follows:

PROCESSING-CENTER.DATA-TYPE.SPACECRAFT-UNIQUE-ID.YEAR-DAY.START-TIME.STOP-TIME.PROCESSING-BLOCK-ID.SOURCE

The qualifiers of the data set name are defined in Table 8.2-1:

Table 8.2-1. NOAA Level 1b Data Set Names.

Qualifier	Example
PROCESSING CENTER	Three characters identifying where the data set was created. Recognized character groups are: CMS = Centre de Meteorologie Spatiale - Lannion, France DSS = Dundee Satellite Receiving Station - Dundee, Scotland, UK NSS = NOAA/NESDIS - Suitland, Maryland, USA UKM =United Kingdom Meteorological Office - Bracknell, England, UK
DATA TYPE	Four characters identifying the data type and transmission method. Recognized character groups are: HRPT= HRPT (direct readout full resolution AVHRR) GHRR= GAC (recorded reduced resolution AVHRR) LHRR= LAC (recorded HRPT AVHRR) HIRX= HIRS/3 or HIRS/4 data set derived from GAC embedded TIP AMAX= AMSU-A data set derived from GAC embedded TIP AMBX= AMSU-B data set derived from GAC embedded TIP MHSX=MHS data set derived from AIP MHSS=MHS data derived from stored AIP MHSH=MHS data derived from HRPT HIRS= HIRS/3 or HIRS/4 data set derived from stored TIP AMAS= AMSU-A data set derived from stored TIP AMBS= AMSU-B data set derived from stored TIP
SPACECRAFT UNIQUE ID	Two characters identifying the spacecraft platform from which the data was received. Recognized character groups are: NK = NOAA-15 (formerly NOAA-K, launched 13 May 1998) NL = NOAA-16 (formerly NOAA-L, launched 21 September 2000) NM = NOAA-17 (formerly NOAA-M, launched 24 June 2002) NN = NOAA-18 (formerly NOAA-N, launched 20 May 2005)
YEAR DAY	Six character date identification field in the form XYYDDD, where "X" is a delimiter, "YY" identifies the year of century and "DDD" identifies the day of the year on which the spacecraft began recording the data set. Example: D98304 for day 304 of year 1998
START TIME	S1355, where “S” identifies this group as a start time delimiter. “1355" denotes 13 hours 55 minutes UTC (to the nearest minute) and represents the time at which spacecraft recording began.

STOP TIME	E1456, where “E” identifies this group as an end time delimiter. “1456" denotes 14 hours 56 minutes UTC (to the nearest minute) and denotes the time of spacecraft recording of the last usable data in the data set.
PROCESSING BLOCK ID	B0016465, where "B" identifies this group as a processing block ID delimiter. "0016465" is a seven digit number identifying the spacecraft revolution in which recording of this data set began and the revolution in which the data ended (the first five digits identifying the beginning revolution and last two being the two least significant digits of the orbit number identifying the ending revolution).
SOURCE	Two characters identifying data acquisition source. Valid character groups are: CF - Cape Ferguson, Queensland, Australia DU = Dundee, Scotland, UK EB - Ewa Beach, Oahu, Hawaii GC = Fairbanks, Alaska, USA (formerly Gilmore Creek) HO = Honolulu, Hawaii, USA MI = Miami, Florida, USA MO = Monterey, California, USA SO = Satellite Operations Control Center, Suitland, Maryland, USA SV=Svalbard, Norway WE = Western Europe, Lannion, France WI = Wallops Island, Virginia, USA

8.3 DATA DISTRIBUTION FORMATS

This section describes the digital data formats which NOAA/NESDIS uses to distribute data from the NOAA Level 1b database.

8.3.1 NOAA LEVEL 1B (NATIVE) FORMAT AND SELECTIVE EXTRACTS

This section describes the NOAA Level 1b digital data format. This includes the data formats archived by NOAA/NESDIS and distributed to near-realtime users, and the formats produced by NESDIS archive retrieval systems for customers of retrospective data (data older than 24 hours).

NOAA began using a new NOAA Level 1b format (version 3) for data processed from the NOAA-15, 16 and 17 instruments on April 28, 2005. Version 2 formats (v2) were used on all NOAA KLM (NOAA-15, 16 and 17) data prior to April 28, 2005. After this date, the Version 3 format (v3), also known as the NOAA-N format, was implemented for **all** operational POES spacecraft. On January 25, 2006, the version number contained in the header was incremented from 3 to 4 to reflect the inclusion of cloud mask information. All level 1b documentation will reflect that version until another change is made. On November 14, 2006 another version number update (v5) was made that affects the AVHRR LAC/HRPT data. There are no plans at this time to reprocess archived data into the new format.

8.3.1.1 Data Set Structure

The record structure of each data set (file) as archived by NOAA and provided directly to near-realtime users is shown below:

Record 1:	Data Set Header Record
Record 2 - EOF:	Data Records

The Data Set Header Record contains information which applies to the following data records, such as data set and time identification, overall data set quality, orbital parameters, and conversion factors for calibration and telemetry data.

The Data Records contain information specific to one scan or time segment of data including time, quality, calibration, navigation, telemetry, and sensor data.

When retrospective data sets are retrieved for users from NOAA archive systems (e.g. CLASS or NCDC), supplementary records are added to the data set to provide archive processing information. These data sets have the following record structure:

Record 1:	Archive Retrieval System (ARS) Header Record
Record 2:	Data Set Header Record
Record 3 - n:	Supplementary Header Records (optional)
Record (n+1) - EOF:	Data Records

The format of the ARS Header Record is the same for all data types. Although the fundamental structure of the NOAA Level 1b data set header records and data records is consistent across data types, the differences are significant, and will be addressed separately for each data type.

All the tables in this section share a common legend, which is as follows:

Legend:

Field Name:

The name or brief description of the field.

Start Octet:

Offset location of first octet (8-bit byte) in the defined field from beginning of record. Starting with octet 1. (Note that the terms “octet” and “byte” are used interchangeably and mean the same thing.)

End Octet:

Offset location of last octet in the defined field from beginning of record.

DT:

Data Type (i - integer, u - unsigned integer, c - character). Character data is stored as ASCII.

Word Size:

Number of octets per data word.

Number of Words:

Number of words of indicated size and type contained in the defined field.

Scale Factor:

Scaling Factor: $x=y/10^n$, where x is the desired floating point value, y is the stored integer value for the defined field, and n is the number indicated in the scale factor column for that field.

Units:

The field's unit of measurement (e.g., octets, counts, Kelvin, volts), if applicable.

Notes:

References to notes that follow the format specifications.

8.3.1.2 Archive Retrieval System (ARS) Header Record

The ARS Header Record is created by NOAA/NESDIS when data is retrieved from the NOAA Level 1b archive, and includes information on the data request and how the data was processed from the archive. A detailed description of the contents of this record is presented in Table 8.3.1.2-1.

Table 8.3.1.2-1. Format of ARS Header Record.

Start Octet	**End Octet**	**DT**	**Word Size**	**SF**	**Number of Words**	Order ID
1	6	c	6	0	1	NeS Number

7	14	c	8	0	1	CLASS Number (if applicable)
15	18	c	4	0	1	Order Creation Year (e.g., ‘1998')
19	21	c	3	0	1	Order Creation Day of Year (e.g., ‘365')
22	22	c	1	0	1	Processing Site Code A = CLASS S = NCDC/Suitland N = NCDC/Asheville
23	30	c	8	0	1	Processing Software ID (e.g., ‘Extract2')
DATA SELECTION CRITERIA						
31	72	c	42	0	1	Data Set Name
73	74	c	2	0	1	<ASCII blank = 0x20>
75	75	c	1	0	1	Select Flag T = total data set copy S = selective data set copy (subset)
76	78	c	3	0	1	Beginning Latitude
79	81	c	3	0	1	Ending Latitude
82	85	c	4	0	1	Beginning Longitude
86	89	c	4	0	1	Ending Longitude
90	91	c	2	0	1	Start Hour (UTC)
92	93	c	2	0	1	Start Minute
94	96	c	3	0	1	Number of Minutes
97	97	c	1	0	1	Appended Data Flag
98	117	c	1	0	20	Channel Select Flags Y = channel selected N = channel not selected
DATASET SUMMARY						
118	119	c	2	0	1	Sensor Data Word Size in bits 08 = 8 bits per word (reduced and packed) 10 = 10 bits per word (packed) 16 = 16 bits per word (unpacked)

120	144	c	27	0	1	<ASCII blank = 0x20>
145	145	c	1	0	1	Ascend/Descend Flag A = ascending only D = descending only B = both ascending and descending
146	148	c	3	0	1	First Latitude first latitude value in the first data record
149	151	c	3	0	1	Last Latitude last latitude value in the last data record
152	155	c	4	0	1	First Longitude first longitude value in the first data record
156	159	c	4	0	1	Last Longitude last longitude value in the last data record
160	179	c	20	0	1	Data Format (e.g., 'NOAA Level 1b v4')
180	185	c	6	0	1	Size of Records (in octets)
186	191	c	6	0	1	Number of Records (total, including ARS and Data Set Header Records)
FILLER						
192	510	c	1	0	319	<ASCII blank = 0x20>

8.3.1.3 LAC and HRPT Data Sets

This section describes the characteristics and format of Local Area Coverage (LAC) and High Resolution Picture Transmission (HRPT) data sets for both NOAA KLM and NOAA-N, -N' satellites.

8.3.1.3.1 Data Characteristics

The AVHRR data are digitized to 10-bit precision. The digitized data are both transmitted from the satellite in real-time as High Resolution Picture Transmission (HRPT) data, and selectively recorded on board the satellite for subsequent playback as Local Area Coverage (LAC) data. A maximum of ten minutes of LAC data may be recorded per orbit. In all other respects, HRPT and LAC are identical. Table 8.3.1.3.1-1 summarizes fundamental characteristics of the data.

Table 8.3.1.3.1-1. LAC/HRPT Data Characteristics.	
Parameter	**Value**
Sample word size	10 bits
Number of sampled channels/available channels	5/6
Number of Earth samples per scan	2,048 per channel
Scan rate	360 scans per minute
Scan direction	East to West (northbound)
Instantaneous Field of View (IFOV)	0.07449 degrees (all channels)
Spatial resolution at nadir	1.09 km at 833 km altitude
Cross track distance between sample centers at nadir	1.09 km at 833 km altitude
Along track distance between sample centers at nadir	1.09 km at 833 km altitude
Cross-track scan coverage	± 55.4 degrees from nadir
Swath width	2,399 km at 833 km altitude

8.3.1.3.2 Header Records

The Data Set Header Record contains quality, navigation, calibration, and conversion coefficient information which applies to the LAC/HRPT data records which follow. This section describes the header records for NOAA KLM (version 2) and NOAA-N, -N' (version 4/5) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the Version 3 format (v3), also known as the NOAA-N format, was implemented for all operational POES spacecraft. On January 25, 2006, Version 4 format (v4) was implemented to reflect the start of CLAVR-x (*Cl* ouds from *AV* HR *R* E *x* teded cloud mask) processing which began on that date. **On November 14, 2006, version 5 was implemented for the LAC/HRPT only. The GAC version number remains at 4.**

8.3.1.3.2.1 NOAA KLM Format (Version 2, pre-April 28, 2005)

The content of the LAC/HRPT Data Set Header Record for NOAA KLM (Version 2, pre-April 28, 2005) is documented in Table 8.3.1.3.2.1-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.3.2.1-1. Format of LAC/HRPT Data Set Header Record (Version 2, pre-April 28, 2005).								
Field Name	**Start Octet**	**End Octet**	**Data Type**	**Word Size**	**Number of Words**	**Scale Factor**	**Units**	**Notes**
GENERAL INFORMATION								
Data Set Creation Site ID CMS = Centre de Meteorologie Spatiale/France; DSS = Dundee Satellite Receiving Station/UK; NSS = National Environmental Satellite, Data and Information Service/USA; UKM = United Kingdom Meteorological Office/UK	1	3	c	3	1	0		
<ASCII blank = x20>	4	4	c	1	1	0		
NOAA Level 1b Format Version Number: 1=TIROS-N,NOAA-6 through NOAA-14; 2=NOAA-15, -16, -17 (pre-April 28, 2005); 3=all satellites post April 28, 2005; 4=cloud mask flag (CLAVRx) – Jan 25, 2006 5=no format change (LAC/HRPT only) – November 14, 2006	5	6	u	2	1	0		
NOAA Level 1b Format Version Year (e.g. 1999)	7	8	u	2	1	0		
NOAA Level 1b Format Version Day of Year (e.g. 365)	9	10	u	2	1	0		
<Reserved for Logical Record Length> For Creation Site use only. Logical Record Length of NOAA Level 1b data set prior to processing.	11	12	u	2	1	0		
<Reserved for Block Size> For Creation Site use only. Block Size of NOAA Level 1b data set prior to processing.	13	14	u	2	1	0		
Count of Header Records in this Data Set	15	16	u	2	1	0		
<Zero fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		
NOAA Spacecraft Identification Code: 2 = NOAA-16; 4 = NOAA-15; 6 = NOAA-17; 7 = NOAA-18: 8 = NOAA-N' 11 = MetOp-1 12 = MetOp-2	73	74	u	2	1	0		
Instrument ID	75	76	u	2	1	0		

301 = s/n A301 (NOAA-L); 302 = s/n A302 (NOAA-K); 304 = s/n A304 (NOAA-M); 308 = s/n A308 (NOAA-N'); 306 = s/n A306 (NOAA-N); 307 = s/n A307 (MetOp-1); 305 = s/n A305 (MetOp-2)								
Data Type Code 1 = LAC; 2 = GAC 3 = HRPT; 4 = TIP; 5 = HIRS; 6 = MSU; 7 = SSU; 8 = DCS; 9 = SEM; 10 = AMSU-A; 11 = AMSU-B.	77	78	u	2	1	0		
TIP Source Code 0 = unused, GAC/HRPT/LAC data; 1 = GAC embedded AMSU and TIP; 2 = stored TIP; 3 = HRPT/LAC embedded AMSU and TIP; 4 = stored AIP.	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year (e.g., 1999)	85	86	u	2	1	0		
Start of Data Set Day of Year (e.g., 365)	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	millisec	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year (e.g., 1999)	97	98	u	2	1	0		
End of Data Set Day of Year (e.g., 365)	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	millisec	
Year of Last CPIDS Update (e.g., 1999)	105	106	u	2	1	0		
Day of Year of Last CPIDS Update (e.g., 365)	107	108	u	2	1	0		
<Zero fill>	109	116	i	2	4	0		
DATA SET QUALITY INDICATORS								
Instrument Status bits 31-16: <Zero fill>	117	120	u	4	1	0		

bit 15: motor/telemetry (0 = off; 1 = on) bit 14: electronics/telemetry (0 = off; 1 = on) bit 13: channel 1 status (0 = disable; 1 = enable) bit 12: channel 2 status (0 = disable; 1 = enable) bit 11: channel 3a status (0 = disable; 1 = enable) bit 10: channel 3b status (0 = disable; 1 = enable) bit 9: channel 4 status (0 = disable; 1 = enable) bit 8: channel 5 status (0 = disable; 1 = enable) bit 7: channel 3a/3b select status bit 6: voltage calibrate status (0 = off; 1 = on) bit 5: cooler heat (0 = off; 1 = on) bit 4: scan motor (0 = low; 1 = high) bit 3: telemetry lock (0 = off; 1 = lock) bit 2: earth shield (0 = disable; 1 = deploy) bit 1: patch control (0 = off; 1 = on) bit 0: <Zero fill>								
<Zero fill>	121	122	i	2	1	0		
Record Number of Status Change (*if 0, none occurred; range: 0 - 65,535*)	123	124	u	2	1	0		
Second Instrument Status (*if previous word is 0, no change*)	125	128	u	4	1	0		
Count of Data Records in this Data Set (*range: 0 - 65,535*)	129	130	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set (*range: 0 - 65,535*)	131	132	u	2	1	0		
Count of Missing Scan Lines (*range: 0 - 65,535*)	133	134	u	2	1	0		
Count of Data Gaps in this Data Set	135	136	u	2	1	0		
Count of Data Frames Without Frame Sync Word Errors	137	138	u	2	1	0		
Count of PACS Detected TIP Parity Errors	139	140	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data	141	142	u	2	1	0		
Time Sequence Error (*range: 0 - 65,535*) (0 = none; otherwise the record number of the first occurrence)	143	144	u	2	1	0		
Time Sequence Error Code These are bit flags taken from Scan Line Quality Flags Time Problem Code on data record reported in Time Sequence Error field above. If a bit is on (=1) then the statement is true. bits 15 - 8: <Zero fill> bit 7: time field is bad but can probably be inferred from the previous good time. bit 6: time field is bad and can't be inferred from the previous good	145	146	u	2	1	0		

time. bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. bit 4: start of a sequence that apparently repeats scan times that have been previously accepted. bits 3 - 0: <Zero fill>								
SOCC Clock Update Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	147	148	u	2	1	0		
Earth Location Error Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	149	150	u	2	1	0		
Earth Location Error Code These are bit flags taken from Scan Line Quality Flags Earth Location Problem Code on data record reported in Earth Location Error Indicator field above. If a bit is on (=1) then the statement is true. bits 15 - 8: <Zero fill> bit 7: not earth located because of bad time; earth location fields Zero filled. bit 6: earth location questionable because of questionable time code. (See time problem flags above.) bit 5: earth location questionable - only marginal agreement with reasonableness check. bit 4: earth location questionable - fails reasonableness check. bits 3-0: <Zero fill>	151	152	u	2	1	0		
PACS Status Bit Field bit15-3: <zero fill> bit 2: pseudo noise (0 = normal data; 1 = P/N data) bit 1: tape direction (0 = reverse playback, time decrementing) bit 0: data mode (0 = test data; 1 = flight data)	153	154	u	2	1	0		
PACS Data Source 0 = unused; 1 = Fairbanks; 2 = Wallops; 3 = SOCC; 4 = Svalbard, Norway; 5 = Monterey, CA	155	156	u	2	1	0		
<zero fill>	157	160	i	4	1	0		
<Reserved for the Ingester>	161	168	c	8	1	0		
<Reserved for Decommutation>	169	176	c	8	1	0		

<zero fill>	177	186	i	2	5	0		
CALIBRATION								
Ramp/Auto Calibration Indicators Bit Field The ramp calibration signal consists of the output of a D/A generator that increases one step per revolution of the radiometer scanning system. The nominal ramp calibration in the A/D output skips a step approximately once every 62 scan revolutions, and once every 62 steps of the D/A ramp generation. Channels 1, 2, and 3A increment linearly with the scan count, except as previously noted, until the dual gain break point to 500 counts is reached. Channels 3B, 4, and 5 ramp values increment linearly with scan line count, except as previously noted. The following bit fields indicate non-linearity in the ramp calibration signal: bits 15-6: <zero fill> bit 5: ramp non-linearity for GAC, LAC, and HRPT ch 5 bit 4: ramp non-linearity for GAC, LAC, and HRPT ch 4 bit 3: ramp non-linearity for GAC, LAC, and HRPT ch 3b bit 2: ramp non-linearity for GAC, LAC, and HRPT ch 3a bit 1: ramp non-linearity for GAC, LAC, and HRPT ch 2 bit 0: ramp non-linearity for GAC, LAC, and HRPT ch 1	187	188	u	2	1	0		
Year of Most Recent Solar Channel Calibration (e.g., 1999)	189	190	u	2	1	0		
Day of Year of Most Recent Solar Channel Calibration (e.g., 365)	191	192	u	2	1	0		
Primary Calibration Algorithm ID	193	194	u	2	1	0		
Primary Calibration Algorithm Selected Options bit 15: <zero fill> bit 14: Ch 5 resolution (0 = high; 1 = low) bit 13: Ch 5 substitution coefficients (0 = no; 1 = yes) bits 12-10: <zero fill> bit 9: Ch 4 resolution (0 = high; 1 = low) bit 8: Ch 4 substitution coefficients (0 = no; 1 = yes) bits 7-5: <zero fill> bit 4: Ch 3b resolution (0 = high; 1 = low) bit 3: Ch 3b substitution coefficients (0 = no; 1 = yes) bits 2-0: <zero fill>	195	196	u	2	1	0		
Secondary Calibration Algorithm ID	197	198	u	2	1	0		
Secondary Calibration Algorithm Selected Options bit 15: <zero fill> bit 14: Ch 5 resolution (0 = high; 1 = low) bit 13: Ch 5 substitution coefficients (0 = no; 1 = yes) bits 12-10: <zero fill>	199	200	u	2	1	0		

bit 9: Ch 4 resolution (0 = high; 1 = low) bit 8: Ch 4 substitution coefficients (0 = no; 1 = yes) bits 7-5: <zero fill> bit 4: Ch 3b resolution (0 = high; 1 = low) bit 3: Ch 3b substitution coefficients (0 = no; 1 = yes) bits 2-0: <zero fill>								
IR Target Temperature 1 Conversion Coefficient 1	201	202	i	2	1	2		
IR Target Temperature 1 Conversion Coefficient 2	203	204	i	2	1	5		
IR Target Temperature 1 Conversion Coefficient 3	205	206	i	2	1	8		
IR Target Temperature 1 Conversion Coefficient 4	207	208	i	2	1	11		
IR Target Temperature 1 Conversion Coefficient 5	209	210	i	2	1	14		
IR Target Temperature 1 Conversion Coefficient 6	211	212	i	2	1	17		
IR Target Temperature 2 Conversion Coefficient 1	213	214	i	2	1	2		
IR Target Temperature 2 Conversion Coefficient 2	215	216	i	2	1	5		
IR Target Temperature 2 Conversion Coefficient 3	217	218	i	2	1	8		
IR Target Temperature 2 Conversion Coefficient 4	219	220	i	2	1	11		
IR Target Temperature 2 Conversion Coefficient 5	221	222	i	2	1	14		
IR Target Temperature 2 Conversion Coefficient 6	223	224	i	2	1	17		
IR Target Temperature 3 Conversion Coefficient 1	225	226	i	2	1	2		
IR Target Temperature 3 Conversion Coefficient 2	227	228	i	2	1	5		
IR Target Temperature 3 Conversion Coefficient 3	229	230	i	2	1	8		
IR Target Temperature 3 Conversion Coefficient 4	231	232	i	2	1	11		
IR Target Temperature 3 Conversion Coefficient 5	233	234	i	2	1	14		
IR Target Temperature 3 Conversion Coefficient 6	235	236	i	2	1	17		
IR Target Temperature 4 Conversion Coefficient 1	237	238	i	2	1	2		
IR Target Temperature 4 Conversion Coefficient 2	239	240	i	2	1	5		
IR Target Temperature 4 Conversion Coefficient 3	241	242	i	2	1	8		
IR Target Temperature 4 Conversion Coefficient 4	243	244	i	2	1	11		
IR Target Temperature 4 Conversion Coefficient 5	245	246	i	2	1	14		
IR Target Temperature 4 Conversion Coefficient 6	247	248	i	2	1	17		
<zero fill>	249	256	i	4	2	0		

RADIANCE CONVERSION								
Ch 1 Solar Filtered Irradiance in Wavelength	257	260	i	4	1	1		
Ch 1 Equivalent Filter Width in Wavelength	261	264	i	4	1	3		
Ch 2 Solar Filtered Irradiance in Wavelength	265	268	i	4	1	1		
Ch 2 Equivalent Filter Width in Wavelength	269	272	i	4	1	3		
Ch 3a Solar Filtered Irradiance in Wavelength	273	276	i	4	1	1		
Ch 3a Equivalent Filter Width in Wavelength	277	280	i	4	1	3		
Ch 3b Central Wavenumber	281	284	i	4	1	2		
Ch 3b Constant 1	285	288	i	4	1	5		
Ch 3b Constant 2	289	292	i	4	1	6		
Ch 4 Central Wavenumber	293	296	i	4	1	3		
Ch 4 Constant 1	297	300	i	4	1	5		
Ch 4 Constant 2	301	304	i	4	1	6		
Ch 5 Central Wavenumber	305	308	i	4	1	3		
Ch 5 Constant 1	309	312	i	4	1	5		
Ch 5 Constant 2	313	316	i	4	1	6		
<zero fill>	317	328	i	4	3	0		
NAVIGATION								
Reference Ellipsoid Model ID The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately ± 65 meters. (WGS-72 = World Geodetic Survey 1972)	329	336	c	8	1	0		
Nadir Earth Location Tolerance	337	338	u	2	1	1	km	
Earth Location Bit Field bits 15 - 2: <zero fill> bit 1: reasonableness test active (0 = inactive) bit 0: attitude error correction (0 = not corrected)	339	340	u	2	1	0		
<zero fill>	341	342	i	2	1	0		
Constant Roll Attitude Error in Degrees	343	344	i	2	1	3	degrees	
Constant Pitch Attitude Error in Degrees	345	346	i	2	1	3	degrees	

Constant Yaw Attitude Error in Degrees	347	348	i	2	1	3	degrees	
Epoch Year for Orbit Vector	349	350	u	2	1	0		
Day of Epoch Year for Orbit Vector	351	352	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	353	356	u	4	1	0	millisec	
Semi-major Axis (*at the orbit vector epoch time*)	357	360	i	4	1	5	km	
Eccentricity (*at the orbit vector epoch time*)	361	364	i	4	1	8		
Inclination (*at the orbit vector epoch time*)	365	368	i	4	1	5	degrees	
Argument of Perigee (*at the orbit vector epoch time*)	369	372	i	4	1	5	degrees	
Right Ascension of the Ascending Node (*at the orbit vector epoch time*)	373	376	i	4	1	5	degrees	
Mean Anomaly (*at the orbit vector epoch time*)	377	380	i	4	1	5	degrees	
Position Vector X Component (*at the orbit vector epoch time*)	381	384	i	4	1	5	km	
Position Vector Y Component (*at the orbit vector epoch time*)	385	388	i	4	1	5	km	
Position Vector Z Component (*at the orbit vector epoch time*)	389	392	i	4	1	5	km	
Velocity Vector X-dot Component (*at the orbit vector epoch time*)	393	396	i	4	1	8	km/sec	
Velocity Vector Y-dot Component (*at the orbit vector epoch time*)	397	400	i	4	1	8	km/sec	
Velocity Vector Z-dot Component (*at the orbit vector epoch time*)	401	404	i	4	1	8	km/sec	
Earth/Sun Distance Ratio (*at the orbit vector epoch time; relative to the mean distance of 1 AU*)	405	408	u	4	1	6		
<zero fill>	409	424	i	4	4	0		
ANALOG TELEMETRY CONVERSION *Volts-to-engineering units conversion coefficients for the analog telemetry items.*								
Patch Temperature Conversion Coefficient 1	425	426	i	2	1	2		
Patch Temperature Conversion Coefficient 2	427	428	i	2	1	2		
Patch Temperature Conversion Coefficient 3	429	430	i	2	1	2		
Patch Temperature Conversion Coefficient 4	431	432	i	2	1	2		
Patch Temperature Conversion Coefficient 5	433	434	i	2	1	2		
<Reserved>	435	436	i	2	1	2		
Patch Temperature Extended Conversion Coefficient 1	437	438	i	2	1	2		
Patch Temperature Extended Conversion Coefficient 2	439	440	i	2	1	2		

Patch Temperature Extended Conversion Coefficient 3	441	442	i	2	1	2		
Patch Temperature Extended Conversion Coefficient 4	443	444	i	2	1	2		
Patch Temperature Extended Conversion Coefficient 5	445	446	i	2	1	2		
<Reserved>	447	448	i	2	1	2		
Patch Power Conversion Coefficient 1	449	450	i	2	1	2		
Patch Power Conversion Coefficient 2	451	452	i	2	1	2		
Patch Power Conversion Coefficient 3	453	454	i	2	1	2		
Patch Power Conversion Coefficient 4	455	456	i	2	1	2		
Patch Power Conversion Coefficient 5	457	458	i	2	1	2		
<Reserved>	459	460	i	2	1	2		
Radiator Temperature Conversion Coefficient 1	461	462	i	2	1	2		
Radiator Temperature Conversion Coefficient 2	463	464	i	2	1	2		
Radiator Temperature Conversion Coefficient 3	465	466	i	2	1	2		
Radiator Temperature Conversion Coefficient 4	467	468	i	2	1	2		
Radiator Temperature Conversion Coefficient 5	469	470	i	2	1	2		
<Reserved>	471	472	i	2	1	2		
Blackbody Temperature 1 Conversion Coefficient 1	473	474	i	2	1	2		
Blackbody Temperature 1 Conversion Coefficient 2	475	476	i	2	1	2		
Blackbody Temperature 1 Conversion Coefficient 3	477	478	i	2	1	2		
Blackbody Temperature 1 Conversion Coefficient 4	479	480	i	2	1	2		
Blackbody Temperature 1 Conversion Coefficient 5	481	482	i	2	1	2		
<Reserved>	483	484	i	2	1	2		
Blackbody Temperature 2 Conversion Coefficient 1	485	486	i	2	1	2		
Blackbody Temperature 2 Conversion Coefficient 2	487	488	i	2	1	2		
Blackbody Temperature 2 Conversion Coefficient 3	489	490	i	2	1	2		
Blackbody Temperature 2 Conversion Coefficient 4	491	492	i	2	1	2		
Blackbody Temperature 2 Conversion Coefficient 5	493	494	i	2	1	2		
<Reserved>	495	496	i	2	1	2		
Blackbody Temperature 3 Conversion Coefficient 1	497	498	i	2	1	2		

Blackbody Temperature 3 Conversion Coefficient 2	499	500	i	2	1	2		
Blackbody Temperature 3 Conversion Coefficient 3	501	502	i	2	1	2		
Blackbody Temperature 3 Conversion Coefficient 4	503	504	i	2	1	2		
Blackbody Temperature 3 Conversion Coefficient 5	505	506	i	2	1	2		
<Reserved>	507	508	i	2	1	2		
Blackbody Temperature 4 Conversion Coefficient 1	509	510	i	2	1	2		
Blackbody Temperature 4 Conversion Coefficient 2	511	512	i	2	1	2		
Blackbody Temperature 4 Conversion Coefficient 3	513	514	i	2	1	2		
Blackbody Temperature 4 Conversion Coefficient 4	515	516	i	2	1	2		
Blackbody Temperature 4 Conversion Coefficient 5	517	518	i	2	1	2		
<Reserved>	519	520	i	2	1	2		
Electronics Current Conversion Coefficient 1	521	522	i	2	1	2		
Electronics Current Conversion Coefficient 2	523	524	i	2	1	2		
Electronics Current Conversion Coefficient 3	525	526	i	2	1	2		
Electronics Current Conversion Coefficient 4	527	528	i	2	1	2		
Electronics Current Conversion Coefficient 5	529	530	i	2	1	2		
<Reserved>	531	532	i	2	1	2		
Motor Current Conversion Coefficient 1	533	534	i	2	1	2		
Motor Current Conversion Coefficient 2	535	536	i	2	1	2		
Motor Current Conversion Coefficient 3	537	538	i	2	1	2		
Motor Current Conversion Coefficient 4	539	540	i	2	1	2		
Motor Current Conversion Coefficient 5	541	542	i	2	1	2		
<Reserved>	543	544	i	2	1	2		
Earth Shield Position Conversion Coefficient 1	545	546	i	2	1	2		
Earth Shield Position Conversion Coefficient 2	547	548	i	2	1	2		
Earth Shield Position Conversion Coefficient 3	549	550	i	2	1	2		
Earth Shield Position Conversion Coefficient 4	551	552	i	2	1	2		
Earth Shield Position Conversion Coefficient 5	553	554	i	2	1	2		
<Reserved>	555	556	i	2	1	2		

Electronics Temperature Conversion Coefficient 1	557	558	i	2	1	2		
Electronics Temperature Conversion Coefficient 2	559	560	i	2	1	2		
Electronics Temperature Conversion Coefficient 3	561	562	i	2	1	2		
Electronics Temperature Conversion Coefficient 4	563	564	i	2	1	2		
Electronics Temperature Conversion Coefficient 5	565	566	i	2	1	2		
<Reserved>	567	568	i	2	1	2		
Cooler Housing Temperature Conversion Coefficient 1	569	570	i	2	1	2		
Cooler Housing Temperature Conversion Coefficient 2	571	572	i	2	1	2		
Cooler Housing Temperature Conversion Coefficient 3	573	574	i	2	1	2		
Cooler Housing Temperature Conversion Coefficient 4	575	576	i	2	1	2		
Cooler Housing Temperature Conversion Coefficient 5	577	578	i	2	1	2		
<Reserved>	579	580	i	2	1	2		
Baseplate Temperature Conversion Coefficient 1	581	582	i	2	1	2		
Baseplate Temperature Conversion Coefficient 2	583	584	i	2	1	2		
Baseplate Temperature Conversion Coefficient 3	585	586	i	2	1	2		
Baseplate Temperature Conversion Coefficient 4	587	588	i	2	1	2		
Baseplate Temperature Conversion Coefficient 5	589	590	i	2	1	2		
<Reserved>	591	592	i	2	1	2		
Motor Housing Temperature Conversion Coefficient 1	593	594	i	2	1	2		
Motor Housing Temperature Conversion Coefficient 2	595	596	i	2	1	2		
Motor Housing Temperature Conversion Coefficient 3	597	598	i	2	1	2		
Motor Housing Temperature Conversion Coefficient 4	599	600	i	2	1	2		
Motor Housing Temperature Conversion Coefficient 5	601	602	i	2	1	2		
<Reserved>	603	604	i	2	1	2		
A/D Converter Temperature Conversion Coefficient 1	605	606	i	2	1	2		
A/D Converter Temperature Conversion Coefficient 2	607	608	i	2	1	2		
A/D Converter Temperature Conversion Coefficient 3	609	610	i	2	1	2		
A/D Converter Temperature Conversion Coefficient 4	611	612	i	2	1	2		
A/D Converter Temperature Conversion Coefficient 5	613	614	i	2	1	2		

<Reserved>	615	616	i	2	1	2		
Detector #4 Bias Voltage Conversion Coefficient 1	617	618	i	2	1	2		
Detector #4 Bias Voltage Conversion Coefficient 2	619	620	i	2	1	2		
Detector #4 Bias Voltage Conversion Coefficient 3	621	622	i	2	1	2		
Detector #4 Bias Voltage Conversion Coefficient 4	623	624	i	2	1	2		
Detector #4 Bias Voltage Conversion Coefficient 5	625	626	i	2	1	2		
<Reserved>	627	628	i	2	1	2		
Detector #5 Bias Voltage Conversion Coefficient 1	629	630	i	2	1	2		
Detector #5 Bias Voltage Conversion Coefficient 2	631	632	i	2	1	2		
Detector #5 Bias Voltage Conversion Coefficient 3	633	634	i	2	1	2		
Detector #5 Bias Voltage Conversion Coefficient 4	635	636	i	2	1	2		
Detector #5 Bias Voltage Conversion Coefficient 5	637	638	i	2	1	2		
<Reserved>	639	640	i	2	1	2		
Channel 3b Blackbody View Conversion Coefficient 1	641	642	i	2	1	0		
Channel 3b Blackbody View Conversion Coefficient 2	643	644	i	2	1	0		
Channel 3b Blackbody View Conversion Coefficient 3	645	646	i	2	1	0		
Channel 3b Blackbody View Conversion Coefficient 4	647	648	i	2	1	0		
Channel 3b Blackbody View Conversion Coefficient 5	649	650	i	2	1	0		
<Reserved>	651	652	i	2	1	0		
Channel 4 Blackbody View Conversion Coefficient 1	653	654	i	2	1	2		
Channel 4 Blackbody View Conversion Coefficient 2	655	656	i	2	1	2		
Channel 4 Blackbody View Conversion Coefficient 3	657	658	i	2	1	2		
Channel 4 Blackbody View Conversion Coefficient 4	659	660	i	2	1	2		
Channel 4 Blackbody View Conversion Coefficient 5	661	662	i	2	1	2		
<Reserved>	663	664	i	2	1	2		
Channel 5 Blackbody View Conversion Coefficient 1	665	666	i	2	1	0		
Channel 5 Blackbody View Conversion Coefficient 2	667	668	i	2	1	0		
Channel 5 Blackbody View Conversion Coefficient 3	669	670	i	2	1	0		
Channel 5 Blackbody View Conversion Coefficient 4	671	672	i	2	1	0		

Channel 5 Blackbody View Conversion Coefficient 5	673	674	i	2	1	0		
<Reserved>	675	676	i	2	1	0		
Reference Voltage Conversion Coefficient 1	677	678	i	2	1	2		
Reference Voltage Conversion Coefficient 2	679	680	i	2	1	2		
Reference Voltage Conversion Coefficient 3	681	682	i	2	1	2		
Reference Voltage Conversion Coefficient 4	683	684	i	2	1	2		
Reference Voltage Conversion Coefficient 5	685	686	i	2	1	2		
<Reserved>	687	688	i	2	1	2		
FILLER								
<zero fill> <EOR> = 15872 for packed datasets <EOR> = 22528 for unpacked datasets	689	<EOR>	i	4	??	0		

8.3.1.3.2.2 NOAA-N Format (Version 5, post-November 14, 2006, all spacecraft)

The format specifications for the AVHRR Level 1b header record for NOAA-N satellite is given in this section. Please note that as part of the updates to the Level 1b formats for NOAA-N is the inclusion of additional, or secondary, header records. Applications that will access Level 1b data sets should use the “Count of Header Records in this Data Set” field, located in the first, or primary, header record to calculate the position of the first data record and skip the secondary header records.

Except for the zero-fill padding, the primary header record specification is identical no matter the type of AVHRR data (LAC, GAC or HRPT). Table 8.3.3.2.2-1 gives the format for the AVHRR Level 1b primary header record for NOAA-N (Version 4/5), post November 14, 2006, all spacecraft). The GAC data will be version 4 (v4) and the LAC/HRPT will be version 5 (v5).

Table 8.3.1.3.2.2-1. Format of LAC/HRPT Data Set Header Record (Version 5, post-November 14, 2006, all spacecraft).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
Field Name								
Data Set Creation Site ID CMS=Centre de Meteorologie Spatiale/France DSS=Dundee Satellite Receiving Station/UK NSS=National Environmental Satellite, Data and Information Service/USA	1	3	c	3	1	0		

UKM=United Kingdom Meteorological Office/UK								
<ASCII blank = x20>	4	4	c	1	1	0		
Level 1b Format Version Number: 1=TIROS-N, NOAA-6 through NOAA-14; 2=NOAA-15, -16, -17 (pre-April 28, 2005); 3=all satellites post-April 28, 2005; 4=cloud mask flag (CLAVRx)-Jan 25, 2006. 5=no format change (LAC/HRPT only) - Nov 14, 2006.	5	6	u	2	1	0		
Level 1b Format Version Year (e.g., 1999)	7	8	u	2	1	0		
Level 1b Format Version Day of Year (e.g., 365)	9	10	u	2	1	0		
<Reserved for Logical Record Length> *(For Creation Site use only. Logical Record Length of source Level 1b data set prior to processing.)*	11	12	u	2	1	0	octets	
<Reserved for Block Size> *(For Creation Site use only. Block Size of source Level 1b data set prior to processing.)*	13	14	u	2	1	0	octets	
Count of Header Records in this Data Set	15	16	u	2	1	0		
<zero fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		
NOAA Spacecraft Identification Code 2=NOAA-15 4=NOAA-16 6=NOAA-17 7=NOAA-18 8=NOAA-N' 11=MetOp-1 12=MetOp-A 13=MetOp-3	73	74	u	2	1	0		
Instrument ID 301=s/n A301 (NOAA-16) 302=s/n A302 (NOAA-15) 304=s/n A304 (NOAA-17) 308=s/n A308 (NOAA-N') 306=s/n A306 (NOAA-18) 307=s/n A307 (Met Op 1) 305=s/n A305 (Met Op 2)	75	76	u	2	1	0		
Data Type Code 1=LAC	77	78	u	2	1	0		

2=GAC (includes NOAA GAC and "GACized" Metop AVHRR) 3=NOAA HRPT 13=FRAC (MetOp only)								
TIP Source Code 0=unused, i.e., GAC/HRPT/LAC data 1=GAC-embedded AMSU and TIP 2=stored TIP (STIP) 3=HRPT/LAC-embedded AMSU and TIP 4=stored AIP (SAIP)	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year (e.g., 1999)	85	86	u	2	1	0		
Start of Data Set Day of Year (e.g., 365)	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	millisec	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year (e.g., 1999)	97	98	u	2	1	0		
End of Data Set Day of Year (e.g., 365)	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	millisec	
Year of Last CPIDS Update (e.g., 1999)	105	106	u	2	1	0		
Day of Year of Last CPIDS Update (e.g., 365)	107	108	u	2	1	0		
<zero fill>	109	116	i	2	4	0		
DATA SET QUALITY INDICATORS								

Instrument Status *(These are bit flags taken from the AVHRR Digital B Data field on first data record for which all of the individual status flags have been reported at least once.)* bits 31-16: <zero fill> bit 15: scan motor/telemetry status (0=off; 1=on) bit 14: electronics/telemetry status (0=off; 1=on) bit 13: channel 1 status (0=disable; 1=enable) bit 12: channel 2 status (0=disable; 1=enable) bit 11: channel 3A status (0=disable; 1=enable) bit 10: channel 3B status (0=disable; 1=enable) bit 9: channel 4 status (0=disable; 1=enable) bit 8: channel 5 status (0=disable; 1=enable) bit 7: channel 3A/3B select status (0=3B; 1=3A) bit 6: voltage calibration status (0=off; 1=on) bit 5: cooler heat status (0=off; 1=on) bit 4: scan motor mode status (0=low; 1=high) bit 3: telemetry lock status (0=not locked on; 1=locked on) bit 2: earth shield status (0=disable; 1=deploy) bit 1: patch control status (0=off; 1=on) bit 0: <zero fill>	117	120	u	4	1	0		
<zero fill>	121	122	i	2	1	0		
Record Number of Status Change *(if 0, none occurred; range: 0 - 65,535)*	123	124	u	2	1	0		
Second Instrument Status *(if previous word is 0, no change)*	125	128	u	4	1	0		
Count of Data Records in this Data Set *(range: 0 - 65,535)*	129	130	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set *(range: 0 - 65,535)*	131	132	u	2	1	0		
Count of Missing Scan Lines *(range: 0 - 65,535)*	133	134	u	2	1	0		
Count of Data Gaps in this Data Set	135	136	u	2	1	0		
Count of Data Frames Without Frame Sync Word Errors (NOAA) or <zero fill> MetOp	137	138	u	2	1	0		
Count of PACS Detected TIP Parity Errors (NOAA) or <zero fill> MetOp	139	140	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data (NOAA) or <zero fill> MetOp	141	142	u	2	1	0		
Time Sequence Error *(range: 0 - 65,535)* 0=none; otherwise, the record number of the first	143	144	u	2	1	0		

occurrence								
Time Sequence Error Code *(These are bit flags taken from Scan Line Quality Flags [Time Problem Code] on data record reported in Time Sequence Error field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity); may be associated with a spacecraft clock update bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	145	146	u	2	1	0		
SOCC Clock Update Indicator *(range: 0 - 65,535)* 0=none during this orbit; otherwise, the record number of the first occurrence	147	148	u	2	1	0		
Earth Location Error Indicator *(range: 0 - 65,535)* 0=none during this orbit; otherwise, the record number of the first occurrence	149	150	u	2	1	0		
Earth Location Error Code *(These are bit flags taken from Scan Line Quality Flags [Earth Location Problem Code] on data record reported in Earth Location Error Indicator field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bits 3-2: <zero fill> (NOAA) bit 1: not earth located because of satellite in-plane maneuver (MetOp) or <zero fill> (NOAA) bit 0: not earth located because of satellite out-of-plane maneuver (MetOp) or<zero fill> (NOAA)	151	152	u	2	1	0		
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudonoise (0=normal data; 1=pseudonoise data)	153	154	u	2	1	0		

bit 1: tape direction (0=reverse playback, time decrementing) bit 0: data mode (0=test data; 1=flight data)								
Data Source 0=unused 1=Fairbanks, AK 2=Wallops Is., VA 3=SOCC 4=Svalbard, Norway 5=Monterey, CA	155	156	u	2	1	0		
<zero fill>	157	160	i	4	1	0		
<Reserved for the Ingester>	161	168	c	8	1	0		
<Reserved for Decommutation>	169	176	c	8	1	0		
<zero fill>	177	186	i	2	5	0		
CALIBRATION								
Ramp Calibration Indicators Bit Field *(The ramp calibration signal consists of the output of a D/A generator that increases one step per revolution of the radiometer scanning system. The nominal ramp calibration in the A/D output skips a step approximately once every 62 scan revolutions, and once every 62 steps of the D/A ramp generation. Channels 1, 2, and 3A increment linearly with the scan count, except as previously noted, until the dual gain break point to 500 counts is reached. Channels 3B, 4, and 5 ramp values increment linearly with scan line count, except as previously noted. The following bit fields indicate non-linearity in the ramp calibration signal.)* bits 15-6: <zero fill> bit 5: ramp non-linearity for channel 5 bit 4: ramp non-linearity for channel 4 bit 3: ramp non-linearity for channel 3B bit 2: ramp non-linearity for channel 3A bit 1: ramp non-linearity for channel 2 bit 0: ramp non-linearity for channel 1	187	188	u	2	1	0		
Year of Most Recent Solar Channel Calibration (four digit year)	189	190	u	2	1	0		
Day of Year of Most Recent Solar Channel Calibration (three digit day)	191	192	u	2	1	0		
Primary Calibration Algorithm ID	193	194	u	2	1	0		

Primary Calibration Algorithm Selected Options bit 15: <zero fill> bit 14: Ch 5 resolution (0=high; 1=low) bit 13: Ch 5 substitution coefficients (0=no; 1=yes) bits 12-10: <zero fill> bit 9: Ch 4 resolution (0=high; 1=low) bit 8: Ch 4 substitution coefficients (0=no; 1=yes) bits 7-5: <zero fill> bit 4: Ch 3B resolution (0=high; 1=low) bit 3: Ch 3B substitution coefficients (0=no; 1=yes) bits 2-0: <zero fill>	195	196	u	2	1	0		
Secondary Calibration Algorithm ID	197	198	u	2	1	0		
Secondary Calibration Algorithm Selected Options bit 15: <zero fill> bit 14: Ch 5 resolution (0=high; 1=low) bit 13: Ch 5 substitution coefficients (0=no; 1=yes) bits 12-10: <zero fill> bit 9: Ch 4 resolution (0=high; 1=low) bit 8: Ch 4 substitution coefficients (0=no; 1=yes) bits 7-5: <zero fill> bit 4: Ch 3B resolution (0=high; 1=low) bit 3: Ch 3B substitution coefficients (0=no; 1=yes) bits 2-0: <zero fill>	199	200	u	2	1	0		
IR Target Temperature 1 Conversion Coefficient 1	201	202	i	2	1	2	K	
IR Target Temperature 1 Conversion Coefficient 2	203	204	i	2	1	5	K/counts	
IR Target Temperature 1 Conversion Coefficient 3	205	206	i	2	1	8	$K/counts^2$	
IR Target Temperature 1 Conversion Coefficient 4	207	208	i	2	1	11	$K/counts^3$	
IR Target Temperature 1 Conversion Coefficient 5	209	210	i	2	1	14	$K/counts^4$	
IR Target Temperature 1 Conversion Coefficient 6	211	212	i	2	1	17	$K/counts^5$	
IR Target Temperature 2 Conversion Coefficient 1	213	214	i	2	1	2	K	
IR Target Temperature 2 Conversion Coefficient 2	215	216	i	2	1	5	K/counts	
IR Target Temperature 2 Conversion Coefficient 3	217	218	i	2	1	8	$K/counts^2$	
IR Target Temperature 2 Conversion Coefficient 4	219	220	i	2	1	11	$K/counts^3$	
IR Target Temperature 2 Conversion Coefficient 5	221	222	i	2	1	14	$K/counts^4$	
IR Target Temperature 2 Conversion Coefficient 6	223	224	i	2	1	17	$K/counts^5$	
IR Target Temperature 3 Conversion Coefficient 1	225	226	i	2	1	2	K	
IR Target Temperature 3 Conversion Coefficient 2	227	228	i	2	1	5	K/counts	

IR Target Temperature 3 Conversion Coefficient 3	229	230	i	2	1	8	K/counts^2	
IR Target Temperature 3 Conversion Coefficient 4	231	232	i	2	1	11	K/counts^3	
IR Target Temperature 3 Conversion Coefficient 5	233	234	i	2	1	14	K/counts^4	
IR Target Temperature 3 Conversion Coefficient 6	235	236	i	2	1	17	K/counts^5	
IR Target Temperature 4 Conversion Coefficient 1	237	238	i	2	1	2	K	
IR Target Temperature 4 Conversion Coefficient 2	239	240	i	2	1	5	K/counts	
IR Target Temperature 4 Conversion Coefficient 3	241	242	i	2	1	8	K/counts^2	
IR Target Temperature 4 Conversion Coefficient 4	243	244	i	2	1	11	K/counts^3	
IR Target Temperature 4 Conversion Coefficient 5	245	246	i	2	1	14	K/counts^4	
IR Target Temperature 4 Conversion Coefficient 6	247	248	i	2	1	17	K/counts^5	
<zero fill>	249	256	i	4	2	0		
RADIANCE CONVERSION								
Ch 1 Solar filtered Irradiance in Wavelength	257	260	i	4	1	1		
Ch 1 Equivalent Filter Width in Wavelength	261	264	i	4	1	1		
Ch 2 Solar Filtered Irradiance in Wavelength	265	268	i	4	1	1		
Ch 2 Equivalent Filter Width in Wavelength	269	272	i	4	1	1		
Ch 3A Solar Filtered Irradiance in Wavelength	273	276	i	4	1	1		
Ch 3A Equivalent Filter Width in Wavelength	277	280	i	4	1	3		
Ch 3B Central Wavenumber	281	284	i	4	1	2	cm^{-1}	
Ch 3B Constant 1	285	288	i	4	1	5		
Ch 3B Constant 2	289	292	i	4	1	6		
Ch 4 Central Wavenumber	293	296	i	4	1	3	cm^{-1}	
Ch 4 Constant 1	297	300	i	4	1	5		
Ch 4 Constant 2	301	304	i	4	1	6		
Ch 5 Central Wavenumber	305	308	i	4	1	3	cm^{-1}	
Ch 5 Constant 1	309	312	i	4	1	5		
Ch 5 Constant 2	313	316	i	4	1	6		
<zero fill>	317	328	i	4	3	0		

NAVIGATION								
Reference Ellipsoid Model ID *(The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately ± 65 meters.)* WGS-72=World Geodetic Survey 1972 JGM3 =Joint Gravity Model 3	329	336	c	8	1	0		
Nadir Earth Location Tolerance	337	338	u	2	1	1	km	
Earth Location Bit Field bits 15-3: <zero fill> bit 2: dynamic attitude error correction (0=not performed; 1=performed) bit 1: reasonableness test (0=inactive; 1=active) bit 0: constant attitude error correction (0=not performed; 1=performed)	339	340	u	2	1	0		
<zero fill>	341	342	i	2	1	0		
Constant Roll Attitude Error	343	344	i	2	1	3	degrees	
Constant Pitch Attitude Error	345	346	i	2	1	3	degrees	
Constant Yaw Attitude Error	347	348	i	2	1	3	degrees	
Epoch Year for Orbit Vector	349	350	u	2	1	0		
Day of Epoch Year for Orbit Vector	351	352	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	353	356	u	4	1	0	millisec	
Semi-major Axis *(at the orbit vector epoch time)*	357	360	i	4	1	5	km	
Eccentricity *(at the orbit vector epoch time)*	361	364	i	4	1	8		
Inclination *(at the orbit vector epoch time)*	365	368	i	4	1	5	degrees	
Argument of Perigee *(at the orbit vector epoch time)*	369	372	i	4	1	5	degrees	
Right Ascension of the Ascending Node *(at the orbit vector epoch time)*	373	376	i	4	1	5	degrees	
Mean Anomaly *(at the orbit vector epoch time)*	377	380	i	4	1	5	degrees	
Position Vector X Component *(at the orbit vector epoch time)*	381	384	i	4	1	5	km	
Position Vector Y Component *(at the orbit vector epoch time)*	385	388	i	4	1	5	km	
Position Vector Z Component *(at the orbit vector epoch time)*	389	392	i	4	1	5	km	

Velocity Vector X-dot Component *(at the orbit vector epoch time)*	393	396	i	4	1	8	km/sec	
Velocity Vector Y-dot Component *(at the orbit vector epoch time)*	397	400	i	4	1	8	km/sec	
Velocity Vector Z-dot Component *(at the orbit vector epoch time)*	401	404	i	4	1	8	km/sec	
Earth/Sun Distance Ratio *(at the orbit vector epoch time; relative to the mean distance of 1 AU)*	405	408	u	4	1	6		
<zero fill>	409	424	i	4	4	0		
ANALOG TELEMETRY CONVERSION *Volts-to-engineering units conversion coefficients for the analog telemetry items.*								
Patch Temperature Conversion Coefficient 1	425	428	i	4	1	6	K	1
Patch Temperature Conversion Coefficient 2	429	432	i	4	1	6	K/volts	1
Patch Temperature Conversion Coefficient 3	433	436	i	4	1	7	K/volts^2	1
Patch Temperature Conversion Coefficient 4	437	440	i	4	1	8	K/volts^3	1
Patch Temperature Conversion Coefficient 5	441	444	i	4	1	9	K/volts^4	1
Patch Temperature Conversion Coefficient 6	445	448	i	4	1	10	K/volts^5	1
Patch Temperature Extended Conversion Coefficient 1	449	452	i	4	1	6	K	1
Patch Temperature Extended Conversion Coefficient 2	453	456	i	4	1	6	K/volts	1
Patch Temperature Extended Conversion Coefficient 3	457	460	i	4	1	7	K/volts^2	1
Patch Temperature Extended Conversion Coefficient 4	461	464	i	4	1	8	K/volts^3	1
Patch Temperature Extended Conversion Coefficient 5	465	468	i	4	1	9	K/volts^4	1
Patch Temperature Extended Conversion Coefficient 6	469	472	i	4	1	10	K/volts^5	1
Patch Power Conversion Coefficient 1	473	476	i	4	1	6	mW	1
Patch Power Conversion Coefficient 2	477	480	i	4	1	6	mW/volts	1
Patch Power Conversion Coefficient 3	481	484	i	4	1	7	mW/volts^2	1
Patch Power Conversion Coefficient 4	485	488	i	4	1	8	mW/volts^3	1
Patch Power Conversion Coefficient 5	489	492	i	4	1	9	mW/volts^4	1
Patch Power Conversion Coefficient 6	493	496	i	4	1	10	mW/volts^5	1
Radiator Temperature Conversion Coefficient 1	497	500	i	4	1	6	K	1

Radiator Temperature Conversion Coefficient 2	501	504	i	4	1	6	K/volts	1
Radiator Temperature Conversion Coefficient 3	505	508	i	4	1	7	$K/volts^2$	1
Radiator Temperature Conversion Coefficient 4	509	512	i	4	1	8	$K/volts^3$	1
Radiator Temperature Conversion Coefficient 5	513	516	i	4	1	9	$K/volts^4$	1
Radiator Temperature Conversion Coefficient 6	517	520	i	4	1	10	$C/volts^5$	1
Blackbody Temperature 1 Conversion Coefficient 1	521	524	i	4	1	6	C	1
Blackbody Temperature 1 Conversion Coefficient 2	525	528	i	4	1	6	C/volts	1
Blackbody Temperature 1 Conversion Coefficient 3	529	532	i	4	1	7	$C/volts^2$	1
Blackbody Temperature 1 Conversion Coefficient 4	533	536	i	4	1	8	$C/volts^3$	1
Blackbody Temperature 1 Conversion Coefficient 5	537	540	i	4	1	9	$C/volts^4$	1
Blackbody Temperature 1 Conversion Coefficient 6	541	544	i	4	1	10	$C/volts^5$	1
Blackbody Temperature 2 Conversion Coefficient 1	545	548	i	4	1	6	C	1
Blackbody Temperature 2 Conversion Coefficient 2	549	552	i	4	1	6	C/volts	1
Blackbody Temperature 2 Conversion Coefficient 3	553	556	i	4	1	7	$C/volts^2$	1
Blackbody Temperature 2 Conversion Coefficient 4	557	560	i	4	1	8	$C/volts^3$	1
Blackbody Temperature 2 Conversion Coefficient 5	561	564	i	4	1	9	$C/volts^4$	1
Blackbody Temperature 2 Conversion Coefficient 6	565	568	i	4	1	10	$C/volts^5$	1
Blackbody Temperature 3 Conversion Coefficient 1	569	572	i	4	1	6	C	1
Blackbody Temperature 3 Conversion Coefficient 2	573	576	i	4	1	6	C/volts	1
Blackbody Temperature 3 Conversion Coefficient 3	577	580	i	4	1	7	$C/volts^2$	1
Blackbody Temperature 3 Conversion Coefficient 4	581	584	i	4	1	8	$C/volts^3$	1
Blackbody Temperature 3 Conversion Coefficient 5	585	588	i	4	1	9	$C/volts^4$	1
Blackbody Temperature 3 Conversion Coefficient 6	589	592	i	4	1	10	$C/volts^5$	1
Blackbody Temperature 4 Conversion Coefficient 1	593	596	i	4	1	6	C	1
Blackbody Temperature 4 Conversion Coefficient 2	597	600	i	4	1	6	C/volts	1
Blackbody Temperature 4 Conversion Coefficient 3	601	604	i	4	1	7	$C/volts^2$	1
Blackbody Temperature 4 Conversion Coefficient 4	605	608	i	4	1	8	$C/volts^3$	1
Blackbody Temperature 4 Conversion Coefficient 5	609	612	i	4	1	9	$C/volts^4$	1

Blackbody Temperature 4 Conversion Coefficient 6	613	616	i	4	1	10	$C/volts^5$	1
Electronics Current Conversion Coefficient 1	617	620	i	4	1	6	mA	1
Electronics Current Conversion Coefficient 2	621	624	i	4	1	6	mA/volts	1
Electronics Current Conversion Coefficient 3	625	628	i	4	1	7	$mA/volts^2$	1
Electronics Current Conversion Coefficient 4	629	632	i	4	1	8	$mA/volts^3$	1
Electronics Current Conversion Coefficient 5	633	636	i	4	1	9	$mA/volts^4$	1
Electronics Current Conversion Coefficient 6	637	640	i	4	1	10	$mA/volts^5$	1
Motor Current Conversion Coefficient 1	641	644	i	4	1	6	mA	1
Motor Current Conversion Coefficient 2	645	648	i	4	1	6	mA/volts	1
Motor Current Conversion Coefficient 3	649	652	i	4	1	7	$mA/volts^2$	1
Motor Current Conversion Coefficient 4	653	656	i	4	1	8	$mA/volts^3$	1
Motor Current Conversion Coefficient 5	657	660	i	4	1	9	$mA/volts^4$	1
Motor Current Conversion Coefficient 6	661	664	i	4	1	10	$mA/volts^5$	1
Earth Shield Position Conversion Coefficient 1	665	668	i	4	1	6		1
Earth Shield Position Conversion Coefficient 2	669	672	i	4	1	6		1
Earth Shield Position Conversion Coefficient 3	673	676	i	4	1	7		1
Earth Shield Position Conversion Coefficient 4	677	680	i	4	1	8		1
Earth Shield Position Conversion Coefficient 5	681	684	i	4	1	9		1
Earth Shield Position Conversion Coefficient 6	685	688	i	4	1	10		1
Electronics Temperature Conversion Coefficient 1	689	692	i	4	1	6	C	1
Electronics Temperature Conversion Coefficient 2	693	696	i	4	1	6	C/volts	1
Electronics Temperature Conversion Coefficient 3	697	700	i	4	1	7	$C/volts^2$	1
Electronics Temperature Conversion Coefficient 4	701	704	i	4	1	8	$C/volts^3$	1
Electronics Temperature Conversion Coefficient 5	705	708	i	4	1	9	$C/volts^4$	1
Electronics Temperature Conversion Coefficient 6	709	712	i	4	1	10	$C/volts^5$	1
Cooler Housing Temperature Conversion Coefficient 1	713	716	i	4	1	6	C	1
Cooler Housing Temperature Conversion Coefficient 2	717	720	i	4	1	6	C/volts	1
Cooler Housing Temperature Conversion Coefficient 3	721	724	i	4	1	7	$C/volts^2$	1

Cooler Housing Temperature Conversion Coefficient 4	725	728	i	4	1	8	$C/volts^3$	1
Cooler Housing Temperature Conversion Coefficient 5	729	732	i	4	1	9	$C/volts^4$	1
Cooler Housing Temperature Conversion Coefficient 6	733	736	i	4	1	10	$C/volts^5$	1
Baseplate Temperature Conversion Coefficient 1	737	740	i	4	1	6	C	1
Baseplate Temperature Conversion Coefficient 2	741	744	i	4	1	6	C/volts	1
Baseplate Temperature Conversion Coefficient 3	745	748	i	4	1	7	$C/volts^2$	1
Baseplate Temperature Conversion Coefficient 4	749	752	i	4	1	8	$C/volts^3$	1
Baseplate Temperature Conversion Coefficient 5	753	756	i	4	1	9	$C/volts^4$	1
Baseplate Temperature Conversion Coefficient 6	757	760	i	4	1	10	$C/volts^5$	1
Motor Housing Temperature Conversion Coefficient 1	761	764	i	4	1	6	C	1
Motor Housing Temperature Conversion Coefficient 2	765	768	i	4	1	6	C/volts	1
Motor Housing Temperature Conversion Coefficient 3	769	772	i	4	1	7	$C/volts^2$	1
Motor Housing Temperature Conversion Coefficient 4	773	776	i	4	1	8	$C/volts^3$	1
Motor Housing Temperature Conversion Coefficient 5	777	780	i	4	1	9	$C/volts^4$	1
Motor Housing Temperature Conversion Coefficient 6	781	784	i	4	1	10	$C/volts^5$	1
A/D Converter Temperature Conversion Coefficient 1	785	788	i	4	1	6	C	1
A/D Converter Temperature Conversion Coefficient 2	789	792	i	4	1	6	C/volts	1
A/D Converter Temperature Conversion Coefficient 3	793	796	i	4	1	7	$C/volts^2$	1
A/D Converter Temperature Conversion Coefficient 4	797	800	i	4	1	8	$C/volts^3$	1
A/D Converter Temperature Conversion Coefficient 5	801	804	i	4	1	9	$C/volts^4$	1
A/D Converter Temperature Conversion Coefficient 6	805	808	i	4	1	10	$C/volts^5$	1
Detector #4 Bias Voltage Conversion Coefficient 1	809	812	i	4	1	6		1
Detector #4 Bias Voltage Conversion Coefficient 2	813	816	i	4	1	6		1
Detector #4 Bias Voltage Conversion Coefficient 3	817	820	i	4	1	7		1
Detector #4 Bias Voltage Conversion Coefficient 4	821	824	i	4	1	8		1
Detector #4 Bias Voltage Conversion Coefficient 5	825	828	i	4	1	9		1
Detector #4 Bias Voltage Conversion Coefficient 6	829	832	i	4	1	10		1
Detector #5 Bias Voltage Conversion Coefficient 1	833	836	i	4	1	6		1

Detector #5 Bias Voltage Conversion Coefficient 2	837	840	i	4	1	6		1
Detector #5 Bias Voltage Conversion Coefficient 3	841	844	i	4	1	7		1
Detector #5 Bias Voltage Conversion Coefficient 4	845	848	i	4	1	8		1
Detector #5 Bias Voltage Conversion Coefficient 5	849	852	i	4	1	9		1
Detector #5 Bias Voltage Conversion Coefficient 6	853	856	i	4	1	10		1
Blackbody Temperature, Channel 3B, Conversion Coefficient 1	857	860	i	4	1	6	C	1
Blackbody Temperature, Channel 3B, Conversion Coefficient 2	861	864	i	4	1	6	C/volts	1
Blackbody Temperature, Channel 3B, Conversion Coefficient 3	865	868	i	4	1	7	C/volts^2	1
Blackbody Temperature, Channel 3B, Conversion Coefficient 4	869	872	i	4	1	8	C/volts^3	1
Blackbody Temperature, Channel 3B, Conversion Coefficient 5	873	876	i	4	1	9	C/volts^4	1
Blackbody Temperature, Channel 3B, Conversion Coefficient 6	877	880	i	4	1	10	C/volts^5	1
Blackbody Temperature, Channel 4, Conversion Coefficient 1	881	884	i	4	1	6	C	1
Blackbody Temperature, Channel 4, Conversion Coefficient 2	885	888	i	4	1	6	C/volts	1
Blackbody Temperature, Channel 4, Conversion Coefficient 3	889	892	i	4	1	7	C/volts^2	1
Blackbody Temperature, Channel 4, Conversion Coefficient 4	893	896	i	4	1	8	C/volts^3	1
Blackbody Temperature, Channel 4, Conversion Coefficient 5	897	900	i	4	1	9	C/volts^4	1
Blackbody Temperature, Channel 4, Conversion Coefficient 6	901	904	i	4	1	10	C/volts^5	1
Blackbody Temperature, Channel 5, Conversion Coefficient 1	905	908	i	4	1	6	C	1
Blackbody Temperature, Channel 5, Conversion Coefficient 2	909	912	i	4	1	6	C/volts	1
Blackbody Temperature, Channel 5, Conversion Coefficient 3	913	916	i	4	1	7	C/volts^2	1

Blackbody Temperature, Channel 5, Conversion Coefficient 4	917	920	i	4	1	8	C/volts^3	1
Blackbody Temperature, Channel 5, Conversion Coefficient 5	921	924	i	4	1	9	C/volts^4	1
Blackbody Temperature, Channel 5, Conversion Coefficient 6	925	928	i	4	1	10	C/volts^5	1
Reference Voltage Conversion Coefficient 1	929	932	i	4	1	6		1
Reference Voltage Conversion Coefficient 2	933	936	i	4	1	6		1
Reference Voltage Conversion Coefficient 3	937	940	i	4	1	7		1
Reference Voltage Conversion Coefficient 4	941	944	i	4	1	8		1
Reference Voltage Conversion Coefficient 5	945	948	i	4	1	9		1
Reference Voltage Conversion Coefficient 6	949	952	i	4	1	10		1
METOP MANEUVERS IDENTIFICATION *The fields in this section are MetOP specific. No NOAA originated AVHRR data. These fields are spare (zero fill).*								
Start of Maneuver Year (e.g., 2000)	953	954	u	2	1	0		
Start of Maneuver Day (e.g., 365)	955	956	u	2	1	0		
Start of Maneuver UTC time of day	957	960	u	4	1	0	millisec	
End of Maneuver Year (e.g., 2000)	961	962	u	2	1	0		
End of Maneuver Day (e.g., 365)	963	964	u	2	1	0		
End of Maneuver UTC time of day	965	968	u	4	1	0	millisec	
Zero fill	969	980	i	4	2	0		
Change in Spacecraft Mass Word 1: Mass before maneuver Word 2: Mass after maneuver	981	988	i	4	2	kg	kg	
CLOUDS FROM AVHRR (CLAVR)								
Clavr Status Bit Field Bits 15-1: < zero fill > Bit 0: CLAVR processing (0=off; 1=on)	989	990	u	2	1	0		
<zero fill>	991	992	i	2	1	0		
<zero fill>*(size depends on type of AVHRR data, as devined below)* Reduced resolution: <eor> = 4608; words = 904 Full resolution: <eor> =15872; <words> =3720	993	<eor>	i	4	<words>	0		

Notes:
1) 1 count = 0.02 volts

8.3.1.3.3 Data Records

This section describes the format of Local Area Coverage (LAC) and High Resolution Picture Transmission (HRPT) data sets for both NOAA KLM (version 2) and NOAA-N (version 3) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the version 3 format (v3), also known as the NOAA-N format, was implemented for *all* operational POES spacecraft. On January 25, 2006, Version 4 format (v4) was implemented to reflect the start of CLAVR-x processing which began on that date. **On November 14, 2006 version 5 (v5) was implemented for LAC/HRPT.**

8.3.1.3.3.1 NOAA KLM Format (Version 2, pre-April 28, 2005)

The Data Records for LAC and HRPT data sets are archived in packed format to reduce storage requirements. Three 10-bit sensor samples are stored in a 32-bit word using the Band Interleaved by Pixel (BIP) method. The format for packed data sets is documented in Table 8.3.1.3.3.1-1. However, this format is inconvenient for data processing.

Table 8.3.1.3.3.1-1. Format of packed LAC/HRPT Data Sets (Version 2, pre-April 28, 2005).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number (cumulative, starting with 1)	1	2	u	2	1	0		
Scan Line Year (e.g., 1999)	3	4	u	2	1	0		
Scan Line Day of Year (e.g., 365)	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	millisec	
Scan Line UTC Time of Day	9	12	u	4	1	0	millisec	
Scan Line Bit Field bit 15: 0 = northbound data; 1 = southbound data bit 14: 1 = scan time corrected for clock drift bits 13-2: <zero fill> bits 1-0: channel 3 select (0 = 3b; 1 = 3a; 2 = transition)	13	14	u	2	1	0		
<zero fill>	15	24	i	2	5	0		

QUALITY INDICATORS								
Quality Indicator Bit Field If a bit is on (=1) then the statement is true. bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan bit 28: insufficient data for calibration (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bit 24: sync lock dropped during this frame bit 23: frame sync word error greater than zero bit 22: frame sync previously dropped lock bit 21: flywheeling detected during this frame bit 20: bit slippage detected during this frame bits 19-9: <zero fill> bit 8: TIP parity error detected bits 7-6: reflected sunlight detected ch 3b (0 = no anomaly; 1 = anomaly; 3 = unsure) bits 5-4: reflected sunlight detected ch 4 (0 = no anomaly; 1 = anomaly; 3 = unsure) bits 3-2: reflected sunlight detected ch 5 (0 = no anomaly; 1 = anomaly; 3 = unsure) bit 1: resync occurred on this frame bit 0: pseudo noise occurred on this frame	25	28	u	4	1	0		
Scan Line Quality Flags If a bit is on (=1) then the statement is true. *Time Problem Code* (All bits off implies the scan time is as expected.) bits 31-24: <zero fill> bit 23: time field is bad but can probably be inferred from the previous good time. bit 22: time field is bad and can't be inferred from the previous good time. bit 21: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field) bit 20: start of a sequence that apparently repeats scan times that have been previously accepted. bits 19-16: <zero fill> *Calibration Problem Code* (Note these bits complement the channel indicators; all bits set to 0 indicates normal calibration.) bit 15: scan line was not calibrated because of bad time. bit 14: scan line was calibrated using fewer than the preferred number of scan lines because of proximity to start or end of data set or to a	29	32	u	4	1	0		

data gap. bit 13: scan line was not calibrated because of bad or insufficient PRT data. bit 12: scan line was calibrated but with marginal PRT data. bit 11: some uncalibrated channels on this scan (see channel indicators) bits 10-8: <zero fill> *Earth Location Problem Code* (all bits set to 0 implies the earth location was normal) bit 7: not earth located because of bad time; earth location fields zero filled. bit 6: earth location questionable because of questionable time code. (See time problem flags above). bit 5: earth location questionable -- only marginal agreement with reasonableness check. bit 4: earth location questionable -- fails reasonableness check. bits 3-0: <zero fill>								
Calibration Quality Flags (all bits off implies a good calibration) *Word 1*: Channel 3b bits 15 - 8: <zero fill> bit 7: this channel is not calibrated bit 6: this channel is calibrated but questionable bit 5: all bad blackbody counts for scan line bit 4: all bad space view counts for scan line bit 3: <zero fill> bit 2: marginal blackbody view counts for this line bit 1: marginal space view counts for this line bit 0: <zero fill> *Word 2*: Channel 4 *Word 3*: Channel 5	33	38	u	2	3	0		
Count of Bit Errors in Frame Sync	39	40	u	2	1	0		
<zero fill>	41	48	i	4	2	0		
CALIBRATION COEFFICIENTS								
Visible Operational Cal Ch 1 Slope 1	49	52	i	4	1	7		
Visible Operational Cal Ch 1 Intercept 1	53	56	i	4	1	6		
Visible Operational Cal Ch 1 Slope 2	57	60	i	4	1	7		
Visible Operational Cal Ch 1 Intercept 2	61	64	i	4	1	6		
Visible Operational Cal Ch 1 Intersection	65	68	i	4	1	0		
Visible Test Cal Ch 1 Slope 1	69	72	i	4	1	7		

Visible Test Cal Ch 1 Intercept 1	73	76	i	4	1	6		
Visible Test Cal Ch 1 Slope 2	77	80	i	4	1	7		
Visible Test Cal Ch 1 Intercept 2	81	84	i	4	1	6		
Visible Test Cal Ch 1 Intersection	85	88	i	4	1	0		
Visible Prelaunch Cal Ch 1 Slope 1	89	92	i	4	1	7		
Visible Prelaunch Cal Ch 1 Intercept 1	93	96	i	4	1	6		
Visible Prelaunch Cal Ch 1 Slope 2	97	100	i	4	1	7		
Visible Prelaunch Cal Ch 1 Intercept 2	101	104	i	4	1	6		
Visible Prelaunch Cal Ch 1 Intersection	105	108	i	4	1	0		
Visible Operational Cal Ch 2 Slope 1	109	112	i	4	1	7		
Visible Operational Cal Ch 2 Intercept 1	113	116	i	4	1	6		
Visible Operational Cal Ch 2 Slope 2	117	120	i	4	1	7		
Visible Operational Cal Ch 2 Intercept 2	121	124	i	4	1	6		
Visible Operational Cal Ch 2 Intersection	125	128	i	4	1	0		
Visible Test Cal Ch 2 Slope 1	129	132	i	4	1	7		
Visible Test Cal Ch 2 Intercept 1	133	136	i	4	1	6		
Visible Test Cal Ch 2 Slope 2	137	140	i	4	1	7		
Visible Test Cal Ch 2 Intercept 2	141	144	i	4	1	6		
Visible Test Cal Ch 2 Intersection	145	148	i	4	1	0		
Visible Prelaunch Cal Ch 2 Slope 1	149	152	i	4	1	7		
Visible Prelaunch Cal Ch 2 Intercept 1	153	156	i	4	1	6		
Visible Prelaunch Cal Ch 2 Slope 2	157	160	i	4	1	7		
Visible Prelaunch Cal Ch 2 Intercept 2	161	164	i	4	1	6		
Visible Prelaunch Cal Ch 2 Intersection	165	168	i	4	1	0		
Visible Operational Cal Ch 3a Slope 1	169	172	i	4	1	7		
Visible Operational Cal Ch 3a Intercept 1	173	176	i	4	1	6		
Visible Operational Cal Ch 3a Slope 2	177	180	i	4	1	7		
Visible Operational Cal Ch 3a Intercept 2	181	184	i	4	1	6		
Visible Operational Cal Ch 3a Intersection	185	188	i	4	1	0		

Visible Test Cal Ch 3a Slope 1	189	192	i	4	1	7			
Visible Test Cal Ch 3a Intercept 1	193	196	i	4	1	6			
Visible Test Cal Ch 3a Slope 2	197	200	i	4	1	7			
Visible Test Cal Ch 3a Intercept 2	201	204	i	4	1	6			
Visible Test Cal Ch 3a Intersection	205	208	i	4	1	0			
Visible Prelaunch Cal Ch 3a Slope 1	209	212	i	4	1	7			
Visible Prelaunch Cal Ch 3a Intercept 1	213	216	i	4	1	6			
Visible Prelaunch Cal Ch 3a Slope 2	217	220	i	4	1	7			
Visible Prelaunch Cal Ch 3a Intercept 2	221	224	i	4	1	6			
Visible Prelaunch Cal Ch 3a Intersection	225	228	i	4	1	0			
IR Operational Cal Ch 3b Coefficient 1	229	232	i	4	1	6			
IR Operational Cal Ch 3b Coefficient 2	233	236	i	4	1	6			
IR Operational Cal Ch 3b Coefficient 3	237	240	i	4	1	6			
IR Test Cal Ch 3b Coefficient 1	241	244	i	4	1	6			
IR Test Cal Ch 3b Coefficient 2	245	248	i	4	1	6			
IR Test Cal Ch 3b Coefficient 3	249	252	i	4	1	6			
IR Operational Cal Ch 4 Coefficient 1	253	256	i	4	1	6			
IR Operational Cal Ch 4 Coefficient 2	257	260	i	4	1	6			
IR Operational Cal Ch 4 Coefficient 3	261	264	i	4	1	6			
IR Test Cal Ch 4 Coefficient 1	265	268	i	4	1	6			
IR Test Cal Ch 4 Coefficient 2	269	272	i	4	1	6			
IR Test Cal Ch 4 Coefficient 3	273	276	i	4	1	6			
IR Operational Cal Ch 5 Coefficient 1	277	280	i	4	1	6			
IR Operational Cal Ch 5 Coefficient 2	281	284	i	4	1	6			
IR Operational Cal Ch 5 Coefficient 3	285	288	i	4	1	6			
IR Test Cal Ch 5 Coefficient 1	289	292	i	4	1	6			
IR Test Cal Ch 5 Coefficient 2	293	296	i	4	1	6			
IR Test Cal Ch 5 Coefficient 3	297	300	i	4	1	6			
<zero fill>	301	312	i	4	3	0			

NAVIGATION								
Navigation Status Bit Field bits 31-17: <zero fill> bit 16: 1 = earth location corrected for TIP Euler angles bits 15 - 12: earth location indicator 0 = earth location available; 1 = user ephemeris files greater than 24 hours old; 2 = no earth location available bits 11 - 8: spacecraft attitude control 0 = operating in YGC or NOMINAL mode; 1 = operating in another mode; 2 = attitude exceeds nominal tolerance; 3 = both 1 and 2. bits 7 - 4: attitude SMODE 0 = NOMINAL mode; 1 = rate nulling mode; 2 = YGC mode; 3 = search mode; 4 = coast mode bits 3 - 0: attitude Passive Wheel Test In Progress 0 = NOMINAL mode/no test; 1 = yaw axis test in progress; 2 = roll axis test in progress; 3 = pitch axis test in progress.	313	316	u	4	1	0		
Time Associated with TIP Euler Angles (Seconds)	317	320	u	4	1	0		
TIP Euler Angles *Word 1*: Roll *Word 2*: Pitch *Word 3*: Yaw	321	326	i	2	3	3	degrees	
Spacecraft Altitude above Reference Ellipsoid in km	327	328	u	2	1	1		
Angular Relationships (relative azimuth range ± 180.00 degrees) *Word 1*: Solar Zenith Angle, Point 25 *Word 2*: Satellite Zenith Angle, Point 25 *Word 3*: Relative Azimuth Angle, Point 25 *Word 4*: Solar Zenith Angle, Point 65 ... (set of 3 angles every 40 points) ... *Word 153*: Relative Azimuth Angle, Point 2025	329	634	i	2	153	2		

<zero fill>	635	640	i	2	3	0		
Earth Location (North latitude and East longitude are positive) *Word 1*: Latitude in Degrees, Point 25 *Word 2*: Longitude in Degrees, Point 25 *Word 3*: Latitude in Degrees, Point 65 ... (lat/lon word pair every 40 points) ... *Word 102*: Longitude in Degrees, Point 2025	641	1048	i	4	102	4		
<zero fill>	1049	1056	i	4	2	0		
HRPT MINOR FRAME TELEMETRY								
Frame Sync The first sixty bits (six 10-bit values: 644, 367, 860, 413, 527, 149) from a 63 bit pseudonoise generator starting in the all 1's state. The generator polynomial is: $x^6 + x^5 + x^2 + 1$	1057	1068	u	2	6	0		
ID *Word 1* bits 15-10: <zero fill> bit 9: 0 = internal sync; 1 = AVHRR sync bits 8-7: 0 = not an HRPT frame but a GAC frame; 1 = minor frame 1; 2 = minor frame 2; 3 = minor frame 3 bits 6-3: spacecraft address bit 2: 0 = frame stable; 1 = frame resync occurred bit 1: 0 = pseudonoise AVHRR input; 1 = normal AVHRR input bit 0: 0 = AVHRR Ch 3b; 1 = AVHRR Ch 3a *Word 2* bits 15-10: <zero fill> bits 9-0: <undefined>	1069	1072	u	2	2	0		
Time Code *Word 1* bits 15-10: <zero fill> bits 9-1: binary day count bit 0 = 0 *Word 2* bits 15-10: <zero fill> bit 9 = 1 bit 8 = 0 bit 7 = 1 bits 6-0: most significant part of binary millisecond of day count *Word 3*	1073	1080	u	2	4	0		

bits 15-10: <zero fill> bits 9-0: part of binary millisecond of day count *Word 4* bits 15-10: <zero fill> bits 9-0: least significant part of binary millisecond of day count								
Telemetry *Word 1*: Ramp Calibration AVHRR Channel 1 *Word 2*: Ramp Calibration AVHRR Channel 2 *Word 3*: Ramp Calibration AVHRR Channel 3 *Word 4*: Ramp Calibration AVHRR Channel 4 *Word 5*: Ramp Calibration AVHRR Channel 5 *Words 6-9* AVHRR Internal Target Temperature Data Three readings from one of the four platinum resistance thermometers (PRT). A different PRT is sampled for each scan; every fifth scan will contain a reference value of 0 in place of each reading. *Word 6*: PRT Reading 1 *Word 7*: PRT Reading 2 *Word 8*: PRT Reading 3 *Word 9*: Patch Temperature *Word 10*: <undefined>	1081	1100	u	2	10	0		
Back Scan Ten words of calibration target view data from each AVHRR channel 3, 4, and 5. *Word 1*: Channel 3, Word 1 ... *Word 3*: Channel 5, Word 1 *Word 4*: Channel 3, Word 2 ... *Word 30*: Channel 5, Word 10	1101	1160	u	2	30	0		
Space Data Ten words of space view data from each AVHRR channel 1, 2, 3, 4, 5 *Word 1*: Channel 1, Word 1 ... *Word 5*: Channel 5, Word 1 *Word 6*: Channel 1, Word 2 ... *Word 50*: Channel 5, Word 10	1161	1260	u	2	50	0		

Sync Delta bits 15-10: <zero fill> bit 9: 0 = AVHRR sync early; 1 = AVHRR sync late bits 8-0: 9-bit binary count of 0.9984 MHz periods	1261	1262	u	2	1	0		
<zero fill>	1263	1264	i	2	1	0		
AVHRR SENSOR DATA								
Sensor Data, Band Interleaved by Pixel (BIP) *Word 1* bits 31-30: <zero fill> bits 29-20: Channel 1, Point 1 bits 19-10: Channel 2, Point 1 bits 9-0: Channel 3, Point 1 *Word 2* bits 31-30: <zero fill> bits 29-20: Channel 4, Point 1 bits 19-10: Channel 5, Point 1 bits 9-0: Channel 1, Point 2 ... *Word 3414* bits 31-30: <zero fill> bits 29-20: Channel 5, Point 2048	1265	14920	u	4	3414	0		
<zero fill>	14921	14928	i	4	2	0		
DIGITAL B TELEMETRY								
Invalid Word Bit Flags (if bit = 1, associated telemetry bit was not updated during most recent minor frame cycle - possibly due to lost frame) bit 15: motor/telemetry bit 14: electronics/telemetry bit 13: channel 1 status bit 12: channel 2 status bit 11: channel 3a status bit 10: channel 3b status bit 9: channel 4 status bit 8: channel 5 status bit 7: channel 3a/3b select status bit 6: voltage calibrate status bit 5: cooler heat bit 4: scan motor bit 3: telemetry lock bit 2: earth shield bit 1: patch control bit 0: <zero fill>	14929	14930	u	2	1	0		
AVHRR Digital B Data	14931	14932	u	2	1	0		

bit 15: motor/telemetry (0 = off; 1 = on) bit 14: electronics/telemetry (0 = off; 1 = on) bit 13: channel 1 status (0 = disable; 1 = enable) bit 12: channel 2 status (0 = disable; 1 = enable) bit 11: channel 3a status (0 = disable; 1 = enable) bit 10: channel 3b status (0 = disable; 1 = enable) bit 9: channel 4 status (0 = disable; 1 = enable) bit 8: channel 5 status (0 = disable; 1 = enable) bit 7: channel 3a/3b select status (0 = 3b; 1 = 3a) bit 6: voltage calibrate status (0 = off; 1 = on) bit 5: cooler heat (0 = off; 1 = on) bit 4: scan motor (0 = low; 1 = high) bit 3: telemetry lock (0 = off; 1 = lock) bit 2: earth shield (0 = disable; 1 = deploy) bit 1: patch control (0 = off; 1 = on) bit 0: <zero fill>								
<zero fill>	14933	14944	i	4	3	0		
ANALOG HOUSEKEEPING DATA (TIP)								
Invalid Word Bit Flags (if bit = 1, associated telemetry word was not updated during most recent minor frame cycle - possibly due to lost frame) bits 31 - 23: <zero fill> bit 22: reference voltage (word 22) bits 21-2: words 21 through 2 (in order) bit 1: patch temperature (word 1) bit 0: <zero fill>	14945	14948	u	4	1	0		

Word 1: Patch Temperature *Word 2*: Patch Temperature Extended *Word 3*: Patch Power *Word 4*: Radiator Temperature *Word 5*: Black Body Temperature 1 *Word 6*: Black Body Temperature 2 *Word 7*: Black Body Temperature 3 *Word 8*: Black Body Temperature 4 *Word 9*: Electronics Current *Word 10*: Motor Current *Word 11*: Earth Shield Position *Word 12*: Electronics Temperature *Word 13*: Cooler Housing Temperature *Word 14*: Baseplate Temperature *Word 15*: Motor Housing Temperature *Word 16*: A/D Converter Temperature *Word 17*: Detector #4 Bias Voltage *Word 18*: Detector #5 Bias Voltage *Word 19*: Channel 3b Blackbody View *Word 20*: Channel 4 Blackbody View *Word 21*: Channel 5 Blackbody View *Word 22*: Reference Voltage	14949	14970	u	1	22	0		
<zero fill>	14971	14976	i	2	3	0		
CLOUDS FROM AVHRR (CLAVR)								
<Reserved> CLAVR Status Bit Field bits 31 - 1: <undefined> bit 0: CLAVR status (0 = disable, CCM codes zero-filled; 1 = enable)	14977	14980	u	4	1	0		1
<Reserved>	14981	14984	u	4	1	0		
<Reserved>[CCM (Clear/Cloudy/Mixed) Codes (0 = clear; 1 = mixed clear; 2 = mixed cloudy; 3 = cloudy)] *Word 1* bits 15-14: CCM code, FOV 1 bits 13-12: CCM code, FOV 2 ... bits 1-0: CCM code, FOV 8 *Word 2* bits 15-14: CCM code, FOV 9 … bits 1-0: CCM code, FOV 16 … (set of 8 CCM codes per word) … *Word 256*	14985	15496	u	2	256	0		

bits 15-14: CCM code, FOV 2041 ... bits 1-0: CCM code, FOV 2048								
FILLER								
<zero fill>	15497	15872	i	4	94	0		1

NOTES:

1. 13 Nov 1998: Redefine reserved CLAVR section to include CLAVR Status Bit Field (Fagan, 24 Sep1998); adjust trailing zero-fill.

Clouds from AVHRR (CLAVR) is a complex set of tests to detect daytime and nighttime cloud cover using multi-channel AVHRR sensor data and a surface type database. The first application of CLAVR at NOAA was to support the AVHRR Pathfinder Atmosphere (PATMOS) Project, which reprocessed AVHRR data to correct for calibration drift and produce a consistent record of atmospheric parameters for climate change studies. More information about the NOAA/NASA Pathfinder Program and PATMOS is available at http://cimss.ssec.wisc.edu/clavr/patmosx.html. Pathfinder products are available through the Comprehensive Large Array-data Stewardship System (CLASS): http://www.class.noaa.gov

At this time CLAVR is part of the operational processing system for NOAA Level 1b GAC, LAC, and HRPT data sets as of Jan 25, 2006. Therefore, bit 0 of the NOAA Level 1b CLAVR Status Bit Field is set to one, and the Clear/Cloudy/Mixed (CCM) Codes are in use. Please note that the NOAA Level 1b format allocates space for only a minimal subset of CLAVR parameters needed to generate products that require cloud masks. NESDIS intends to implement CLAVR operationally as part of the Modernized AVHRR Processing System (MAPS).

More information about current CLAVR research and development at NOAA is available online at: http://cimss.ssec.wisc.edu/clavr/patmosx.html.

NESDIS archive systems support the selection of any combination of one to five channels, and sensor data word sizes of 8 or 16 bits (this is known as the unpacked format). The unpacking process stores each (10-bit) sensor data value in a separate eight or sixteen bit word. When 8-bit words are selected, the sensor data is reduced from ten to eight bits by removing the least significant two bits. When 16-bit words are selected, the sensor data is stored in the least significant ten bits and the six most significant bits are zero-filled. If a customer does not require all five channels from the AVHRR instrument, the unpacked format can also be reduced to any subset of active channels. At this time, however, the archive extraction programs do not differentiate between channels 3A and 3B. Channel selected data sets are not available in packed format. In all cases, the sensor data is stored in BIP order.

Tables 8.3.1.3.3.1-2 and 8.3.1.3.3.1-3 (containing the 8 and 16-bit unpacked structure, respectively) summarize how the selection of channel and sensor data word size affects the data set structure and record length documented in Table 8.3.1.3.3.1-1. The alignment of data words on eight octet (i.e., 64 bit) boundaries is maintained by adding binary zero-fill after the sensor data section.

Table 8.3.1.3.3.1-2. LAC/HRPT 8-bit Extract Structure.

Table 8.3.1.3.3.1-2. LAC/HRPT 8-bit Extract Structure.					
Number of Channels	1	2	3	4	5
Pre-Data	1 - 1264	1 - 1264	1 - 1264	1 - 1264	1 - 1264
Sensor Data	1265 - 3312	1265 - 5360	1265 - 7408	1265 - 9456	1265 - 11504
Alignment Zero-Fill	3313-3320	5361-5368	7409-7416	9457-9464	11505-11512
Post-Data	3321-3880	5369-5928	7417-7976	9465-10024	11513-12072
Trailing Zero-Fill	3881-4096	5929-6144	7977-8192	10025-10240	12073-12288
Record Length	4096	6144	8192	10240	12288

Table 8.3.1.3.3.1-3. LAC/HRPT 16-bit Extract Structure.					
Number of Channels	1	2	3	4	5
Pre-Data	1 - 1264	1 - 1264	1 - 1264	1 - 1264	1 - 1264
Sensor Data	1265 - 5360	1265 - 9456	1265 - 13552	1265 - 17648	1265 - 21744
Alignment Zero-Fill	5361-5368	9457-9464	13553-13560	17649-17656	21745-21752
Post-Data	5369-5928	9465-10024	13561-14120	17657-18216	21753-22312
Trailing Zero-Fill	5929-6144	10025-10240	14121-14336	18217-18432	22313-22528
Record Length	6144	10240	14336	18432	22528

8.3.1.3.3.2 NOAA-N Format (Version 5, post-November 14, 2006, all spacecraft)

Table 8.3.1.3.3.2-1 gives the format for the LAC/HRPT Level 1b data record for NOAA-N (version 3, post-April 28, 2005, all spacecraft). Eight and 16-bit extracts of the LAC/HRPT Level 1b data will be supported by CLASS for NOAA-N, but are still to be determined at the time of this writing. **Version 4 (v4) was implemented on January 25, 2006, to reflect the start of CLAVR-x processing. Version 5 (v5) was implemented on November 14, 2006, for LAC/HRPT processing only.**

Table 8.3.1.3.3.2-1. Format of LAC/HRPT Data Record for NOAA-N (Version 5, post-November 14, 2006, all spacecraft).								
Field Name	**Start Octet**	**End Octet**	**Data Type**	**Word Size**	**Number of Words**	**Scale Factor**	**Units**	**Notes**
SCAN LINE INFORMATION								
Scan Line Number *(cumulative, starting with 1; range: 0 - 65,535)*	1	2	u	2	1	0		
Scan Line Year (e.g., 1999)	3	4	u	2	1	0		
Scan Line Day of Year (e.g., 365)	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	millisec	
Scan Line UTC Time of Day	9	12	u	4	1	0	millisec	
Scan Line Bit Field bit 15: satellite direction (0=northbound; 1=southbound) bit 14: clock drift correction (0=not corrected; 1=scan time corrected for clock drift) bits 13-2: <zero fill> bits 1-0: channel 3 select (0=3B; 1=3A; 2=transition)	13	14	u	2	1	0		
<zero fill>	15	24	i	2	5	0		
QUALITY INDICATORS								

Quality Indicator Bit Field *(if a bit is on (=1), the statement is true)* bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan bit 28: insufficient data for calibration (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bit 24: bit sync dropped lock during frame (NOAA) or <zero fill> MetOp bit 23: frame sync word has errors (NOAA) or <zero fill> MetOp bit 22: frame sync returned to lock (NOAA) or <zero fill> MetOp bit 21: frame sync word not valid (NOAA) or <zero fill> MetOp bit 20: bit slip occurred during this frame (NOAA) or <zero fill> MetOp bits 19-9: <zero fill> bit 8: TIP parity error detected (NOAA) or <zero fill> MetOp bits 7-6: reflected sunlight detected ch 3B (0=no anomaly; 1=anomaly; 3=unsure) bits 5-4: reflected sunlight detected ch 4 (0=no anomaly; 1=anomaly; 3=unsure) bits 3-2: reflected sunlight detected ch 5 (0=no anomaly; 1=anomaly; 3=unsure) bit 1: resync occurred on this frame (NOAA) or <zero fill> MetOp bit 0: pseudonoise occurred on this frame (NOAA) or <zero fill> MetOp	25	28	u	4	1	0		
Scan Line Quality Flags [<Reserved>] (zero fill)	29	29	u	1	1	0		
Scan Line Quality Flags [Time Problem Code] *(If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.)* bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	30	30	u	1	1	0		

Scan Line Quality Flags [Calibration Problem Code] *(If a bit is on (=1), the statement is true. These bits complement the channel indicators; all bits set to 0 indicate normal calibration.)* bit 7: scan line not calibrated: all IR channels failed calibration. bit 6: scan line marginally calibrated: one or more IR channels marginally calibrated, or one or more, but not all, IR channels failed calibration. bit 5: scan line not calibrated: bad or insufficient PRT data bit 4: scan line marginally calibrated: marginal PRT data bit 3: some uncalibrated channels for this scan line (i.e., one or more, but not all, IR channels failed calibration) bit 2: No visible calibration due to either the presence of MIRP pseudonoise in place of AVHRR data (NOAA only) or calibration processing turned off. bit 1: <zero fill> bit 0: scan line was not calibrated because of satellite maneuver (MetOp) or <zero fill> (NOAA)	31	31	u	1	1	0		
Scan Line Quality Flags [Earth Location Problem Code] *(If a bit is on (=1), the statement is true. All bits set to 0 imply the earth location was normal.)* bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code (see time problem flags above) bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bits 3-2: <zero fill> bit 1: not earth located because of satellite in-plane maneuver (MetOp) or <zero fill> (NOAA) bit 0: not earth located because of satellite out-of-plane maneuver (MetOp) or <zero fill> (NOAA)	32	32	u	1	1	0		
Calibration Quality Flags *(all bits off implies a good calibration)* *Word 1: Channel 3B* bits 15-8: <zero fill> bit 7: this channel is not calibrated bit 6: this channel is calibrated but questionable bit 5: all bad blackbody counts for scan line bit 4: all bad space view counts for scan line bit 3: <zero fill> bit 2: marginal blackbody view counts for this line bit 1: marginal space view counts for this line bit 0: <zero fill> *Words 2-3: Channels 4-5 (in order)*	33	38	U	2	3	0		
Count of Bit Errors in Frame Sync (NOAA) or <zero fill> (MetOp)	39	40	u	2	1	0		
<zero fill>	41	48	i	4	2	0		
CALIBRATION COEFFICIENTS								

Visible Operational Cal Ch 1 Slope 1	49	52	i	4	1	7		
Visible Operational Cal Ch 1 Intercept 1	53	56	i	4	1	6		
Visible Operational Cal Ch 1 Slope 2	57	60	i	4	1	7		
Visible Operational Cal Ch 1 Intercept 2	61	64	i	4	1	6		
Visible Operational Cal Ch 1 Intersection	65	68	i	4	1	0		
Visible Test Cal Ch 1 Slope 1	69	72	i	4	1	7		
Visible Test Cal Ch 1 Intercept 1	73	76	i	4	1	6		
Visible Test Cal Ch 1 Slope 2	77	80	i	4	1	7		
Visible Test Cal Ch 1 Intercept 2	81	84	i	4	1	6		
Visible Test Cal Ch 1 Intersection	85	88	i	4	1	0		
Visible Prelaunch Cal Ch 1 Slope 1	89	92	i	4	1	7		
Visible Prelaunch Cal Ch 1 Intercept 1	93	96	i	4	1	6		
Visible Prelaunch Cal Ch 1 Slope 2	97	100	i	4	1	7		
Visible Prelaunch Cal Ch 1 Intercept 2	101	104	i	4	1	6		
Visible Prelaunch Cal Ch 1 Intersection	105	108	i	4	1	0		
Visible Operational Cal Ch 2 Slope 1	109	112	i	4	1	7		
Visible Operational Cal Ch 2 Intercept 1	113	116	i	4	1	6		
Visible Operational Cal Ch 2 Slope 2	117	120	i	4	1	7		
Visible Operational Cal Ch 2 Intercept 2	121	124	i	4	1	6		
Visible Operational Cal Ch 2 Intersection	125	128	i	4	1	0		
Visible Test Cal Ch 2 Slope 1	129	132	i	4	1	7		
Visible Test Cal Ch 2 Intercept 1	133	136	i	4	1	6		
Visible Test Cal Ch 2 Slope 2	137	140	i	4	1	7		
Visible Test Cal Ch 2 Intercept 2	141	144	i	4	1	6		
Visible Test Cal Ch 2 Intersection	145	148	i	4	1	0		
Visible Prelaunch Cal Ch 2 Slope 1	149	152	i	4	1	7		
Visible Prelaunch Cal Ch 2 Intercept 1	153	156	i	4	1	6		
Visible Prelaunch Cal Ch 2 Slope 2	157	160	i	4	1	7		
Visible Prelaunch Cal Ch 2 Intercept 2	161	164	i	4	1	6		

Visible Prelaunch Cal Ch 2 Intersection	165	168	i	4	1	0		
Visible Operational Cal Ch 3A Slope 1	169	172	i	4	1	7		
Visible Operational Cal Ch 3A Intercept 1	173	176	i	4	1	6		
Visible Operational Cal Ch 3A Slope 2	177	180	i	4	1	7		
Visible Operational Cal Ch 3A Intercept 2	181	184	i	4	1	6		
Visible Operational Cal Ch 3A Intersection	185	188	i	4	1	0		
Visible Test Cal Ch 3A Slope 1	189	192	i	4	1	7		
Visible Test Cal Ch 3A Intercept 1	193	196	i	4	1	6		
Visible Test Cal Ch 3A Slope 2	197	200	i	4	1	7		
Visible Test Cal Ch 3A Intercept 2	201	204	i	4	1	6		
Visible Test Cal Ch 3A Intersection	205	208	i	4	1	0		
Visible Prelaunch Cal Ch 3A Slope 1	209	212	i	4	1	7		
Visible Prelaunch Cal Ch 3A Intercept 1	213	216	i	4	1	6		
Visible Prelaunch Cal Ch 3A Slope 2	217	220	i	4	1	7		
Visible Prelaunch Cal Ch 3A Intercept 2	221	224	i	4	1	6		
Visible Prelaunch Cal Ch 3A Intersection	225	228	i	4	1	0		
IR Operational Cal Ch 3B Coefficient 1	229	232	i	4	1	6		
IR Operational Cal Ch 3B Coefficient 2	233	236	i	4	1	6		
IR Operational Cal Ch 3B Coefficient 3	237	240	i	4	1	6		
IR Test Cal Ch 3B Coefficient 1	241	244	i	4	1	6		
IR Test Cal Ch 3B Coefficient 2	245	248	i	4	1	6		
IR Test Cal Ch 3B Coefficient 3	249	252	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 1	253	256	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 2	257	260	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 3	261	264	i	4	1	7		
IR Test Cal Ch 4 Coefficient 1	265	268	i	4	1	6		
IR Test Cal Ch 4 Coefficient 2	269	272	i	4	1	6		
IR Test Cal Ch 4 Coefficient 3	273	276	i	4	1	7		
IR Operational Cal Ch 5 Coefficient 1	277	280	i	4	1	6		

IR Operational Cal Ch 5 Coefficient 2	281	284	i	4	1	6		
IR Operational Cal Ch 5 Coefficient 3	285	288	i	4	1	7		
IR Test Cal Ch 5 Coefficient 1	289	292	i	4	1	6		
IR Test Cal Ch 5 Coefficient 2	293	296	i	4	1	6		
IR Test Cal Ch 5 Coefficient 3	297	300	i	4	1	7		
NAVIGATION								
Computed yaw Steering (MetOp: content defined below) or <zero fill> (NOAA) Word 1: Computed roll angle Word 2: Computed pitch angle Word 3: Computed yaw angle	301	306	i	2	3	0	degrees	
Total applied Attitude Correction Word 1: Roll Word 2: Pitch Word 3: Yaw	307	312	i	2	3	3	degrees	
Navigation Status Bit Field *(content, defined below, depends on origin of data, either NOAA or Metop)* *For NOAA Data:* bits 31-18: <zero fill> bit 17: earth location at the satellite subpoint is accurate and reasonable, i.e., is within tolerance defined by "Nadir Earth Location Tolerance" in header (0=out of tolerance; 1=in tolerance) bit 16: Euler error angles from the CPU telemetry used by AELDS to correct the earth locations (0=FALSE; 1=TRUE) bits 15-12: earth location indicator (0=earth location available; 1=first scan whose time is more than 24 hours older than the time [epoch] of the user ephemeris file; 2=no earth location available) bits 11-8: spacecraft attitude control (0=operating in YGC or NOMINAL mode and attitude is good; 1=operating in another mode but attitude is good; 2=operating in YGC or NOMINAL mode but tests are being conducted which may cause attitude to exceed nominal tolerance; 3=operating in another mode while tests are being conducted which may cause attitude to exceed nominal tolerance) bits 7-4: attitude SMODE (0=nominal mode; 1=rate nulling mode; 2=YGC mode; 3=search mode; 4=coast mode) bits 3-0: attitude PWTIP$AC (0=nominal mode/no test; 1=yaw axis test in progress; 2=roll axis test in progress; 3=pitch axis test in progress) *For Metop Data:* bits 31-21: <zero fill> bit 20-19: yaw steering parameters usage indicator (0=no yaw steering correction; 1=measured angles from the Metop SVM telemetry; 2=computed angles from AELDS; 3=measured angles + computed angles) bit 18: Metop maneuver indicator (0=scan does not occur during a Metop in-plane or out-of-plane maneuver; 1=scan, or some part of it, occurs during a maneuver) bit 17: <same as defined for NOAA, above> bit 16: <zero fill> bits 15-12: <same as defined for NOAA, above> bits 11-8: <zero fill> bits 7-4: OPM PF sub-mode (0=fine pointing mode (FPM); 1=yaw steering mode (YSM))	313	316	u	4	1	0		

bits 3-0: SVM PF mode (0=LHM; 1=RRM; 2=CAM; 3=FAM1; 4=FAM2; 5=FAM3; 6=OPM; 7=OCM1; 8=OCM2; 9=OCMT; 10=OCM0)								
Time Associated with Euler Angles	317	320	u	4	1	0	seconds	
Euler Angles *(NOAA, from TI CPU telemetry near end of scan; MerOp [in FPM], from SVM telemetry just before start of scan)* or Yaw Sterring Parameters *(MetOp [in YSM], from SVM telemetry or AELDS near nadir of scan)* Word 1: Roll Word 2: Pitch Word 3: Yaw	321	326	i	2	3	3	degrees	
Spacecraft Altitude above Reference Ellipsoid	327	328	u	2	1	1	km	
Angular Relationships *(relative azimuth range ± 180.00 degrees)* Word 1: Solar zenith angle, FOV 25 Word 2: Satellite zenith angle, FOV 25 Word 3: Relative azimuth angle, FOV 25 Word 4: Solar zenith angle, FOV 65 ... (set of 3 angles every 40 FOVs) ... Word 153: Relative azimuth angle, FOV 2025	329	634	i	2	153	2	degrees	
<zero fill>	635	640	i	2	3	0		
Earth Location *(north latitude and east longitude are positive)* Word 1: Latitude, FOV 25 Word 2: Longitude, FOV 25 Word 3: Latitude, FOV 65 ... (lat/lon word pair every 40 FOVs) ... Word 102: Longitude, FOV 2025	641	1048	i	4	102	4	degrees	
<zero fill>	1049	1056	i	4	2	0		
FRAME TELEMETRY								
Frame Sync *(The first 60 bits (in 6 10-bit values) from a 63-bit pseudonoise generator starting in the all 1's state. The generator polynomial is: $x^6 + x^5 + x^2 + 1$.)* (NOAA: content defined below) or <zero fill> MetOp Word 1: 644 Word 2: 367 Word 3: 860 Word 4: 413 Word 5: 527 Word 6: 149	1057	1068	u	2	6	0		

ID *Word 1* bits 15-10: <zero fill> bit 9: MIRP/AVHRR sync (0=internal sync; 1=AVHRR sync) bits 8-7: frame ID (0=GAC frame; 1=HRPT minor frame 1; 2=HRPT minor frame 2; 3=HRPT minor frame 3) bits 6-3: spacecraft address *(zero-fill for MetOp)* bit 2: resync (0=frame stable; 1=frame resync occurred) bit 1: AVHRR input (0=pseudonoise; 1=normal) bit 0: channel 3 status (0=AVHRR channel 3B; 1=AVHRR channel 3A) *Word 2* bits 15-10: <zero fill> bits 9-0: <undefined>	1069	1072	u	2	2	0		
Time Code (NOAA: content defined below) or <zero fill> MetOp *Word 1* bits 15-10: <zero fill> bits 9-1: binary day count bit 0: 0 (zero) *Word 2* bits 15-10: <zero fill> bit 9: 1 (one) bit 8: 0 (zero) bit 7: 1 (one) bits 6-0: most significant part of binary millisecond of day count *Word 3* bits 15-10: <zero fill> bits 9-0: part of binary millisecond of day count *Word 4* bits 15-10: <zero fill> bits 9-0: least significant part of binary millisecond of day count	1073	1080	u	2	4	0		
Ramp Calibration Word 1: Ramp calibration, channel 1 Word 2: Ramp calibration, channel 2 Word 3: Ramp calibration, channel 3 Word 4: Ramp calibration, channel 4 Word 5: Ramp calibration, channel 5	1081	1090	u	2	5	0	counts	
Internal Target Temperature *(Three readings from one of the four platinum resistance thermometers (PRT). A different PRT is sampled for each scan. Every fifth scan will contain a reference value of 0 in place of each reading.)* Word 1: PRT reading 1 Word 2: PRT reading 2 Word 3: PRT reading 3	1091	1096	u	2	3	0	counts	
Patch Temperature	1097	1098	u	2	1	0	counts	
<Undefined> (NOAA) or <zero fill> MetOp	1099	1100	u	2	1	0		

Back Scan *(Ten samples of calibration target view data from each of AVHRR channels 3, 4, and 5.)* Word 1: channel 3, sample 1 Word 2: channel 4, sample 1 Word 3: channel 5, sample 1 Word 4: channel 3, sample 2 ... Word 30: channel 5, sample 10	1101	1160	u	2	30	0	counts	
Space Data *(Ten samples of space view data from each of AVHRR channels 1, 2, 3, 4, and 5.)* Word 1: channel 1, sample 1 Word 2: channel 2, sample 1 ... Word 5: channel 5, sample 1 Word 6: channel 1, sample 2 ... Word 50: channel 5, sample 10	1161	1260	u	2	50	0	counts	
Sync Delta (NOAA: content defined below) or <zero fill> MetOp bits 15-10: <zero fill> bit 9: AVHRR sync (0=early; 1=late) bits 8-0: 9-bit binary count of 0.9984 MHz periods	1261	1262	u	2	1	0		
<zero fill>	1263	1264	i	2	1	0		
EARTH OBSERVATIONS								
Earth Data Word 1 bits 31-30: <zero fill> bits 29-20: channel 1, FOV 1 bits 19-10: channel 2, FOV 1 bits 9-0: channel 3, FOV 1 Word 2 bits 31-30: <zero fill> bits 29-20: channel 4, FOV 1 bits 19-10: channel 5, FOV 1 bits 9-0: channel 1, FOV 2 ... Word 3414 bits 31-30: <zero fill> bits 29-20: channel 5, FOV 2048 bits 19-0: <zero fill>	1265	14920	u	4	3414	0	counts	
<zero fill>	14921	14928	i	4	2	0		
DIGITAL B HOUSEKEEPING TELEMETRY								

Digital B Telemetry Update Flags *(If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.)* bit 15: scan motor/telemetry status bit 14: electronics/telemetry status bit 13: channel 1 status bit 12: channel 2 status bit 11: channel 3A status bit 10: channel 3B status bit 9: channel 4 status bit 8: channel 5 status bit 7: channel 3A/3B select status bit 6: voltage calibration status bit 5: cooler heat status bit 4: scan motor mode status bit 3: telemetry lock status bit 2: earth shield status bit 1: patch control status bit 0: <zero fill>	14929	14930	u	2	1	0		
AVHRR Digital B Data bit 15: scan motor/telemetry status (0=off; 1=on) bit 14: electronics/telemetry status (0=off; 1=on) bit 13: channel 1 status (0=disable; 1=enable) it 12: channel 2 status (0=disable; 1=enable) bit 11: channel 3A status (0=disable; 1=enable) bit 10: channel 3B status (0=disable; 1=enable) bit 9: channel 4 status (0=disable; 1=enable) bit 8: channel 5 status (0=disable; 1=enable) bit 7: channel 3A/3B select status (0=3B; 1=3A) bit 6: voltage calibration status (0=off; 1=on) bit 5: cooler heat status (0=off; 1=on) bit 4: scan motor mode status (0=low; 1=high) bit 3: telemetry lock status (0=not locked on; 1=locked on) bit 2: earth shield status (0=disable; 1=deploy) bit 1: patch control status (0=off; 1=on) bit 0: <zero fill>	14931	14932	u	2	1	0		
<zero fill>	14933	14944	i	4	3	0		
ANALOG HOUSEKEEPING TELEMETRY								

Analog Telemetry Update Flags *(If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.)* bits 31-23: <zero fill> bit 22: motor current bit 21: electronics current bit 20: blackbody temperature, channel 5 bit 19: detector #5 bias voltage bit 18: blackbody temperature, channel bit 17: blackbody temperature, channel 3B bit 16: A/D converter temperature bit 15: black body temperature 4 bit 14: black body temperature 3 bit 13: black body temperature 2 bit 12: black body temperature 1 bit 11: motor housing temperature bit 10: baseplate temperature bit 9: electronics temperature bit 8: cooler housing temperature bit 7: radiator temperature bit 6: patch power bit 5: earth shield position bit 4: patch temperature extended bit 3: detector #4 bias voltage bit 2: reference voltage bit 1: patch power bit 0: <zero fill>	14945	14948	u	4	1	0		
Patch Temperature *(range: 0 - 255)*	14949	14949	u	1	1	0	counts	
Patch Temperature Extended *(range: 0 - 255)*	14950	14950	u	1	1	0	counts	
Patch Power *(range: 0 - 255)*	14951	14951	u	1	1	0	counts	
Radiator Temperature *(range: 0 - 255)*	14952	14952	u	1	1	0	counts	
Black Body Temperature 1 *(range: 0 - 255)*	14953	14953	u	1	1	0	counts	
Black Body Temperature 2 *(range: 0 - 255)*	14954	14954	u	1	1	0	counts	
Black Body Temperature 3 *(range: 0 - 255)*	14955	14955	u	1	1	0	counts	
Black Body Temperature 4 *(range: 0 - 255)*	14956	14956	u	1	1	0	counts	
Electronics Current *(range: 0 - 255)*	14957	14957	u	1	1	0	counts	
Motor Current *(range: 0 - 255)*	14958	14958	u	1	1	0	counts	
Earth Shield Position *(range: 0 - 255)*	14959	14959	u	1	1	0	counts	
Electronics Temperature *(range: 0 - 255)*	14960	14960	u	1	1	0	counts	
Cooler Housing Temperature *(range: 0 - 255)*	14961	14961	u	1	1	0	counts	

Baseplate Temperature *(range: 0 - 255)*	14962	14962	u	1	1	0	counts	
Motor Housing Temperature *(range: 0 - 255)*	14963	14963	u	1	1	0	counts	
A/D Converter Temperature *(range: 0 - 255)*	14964	14964	u	1	1	0	counts	
Detector #4 Bias Voltage (range: 0 - 255)	14965	14965	u	1	1	0	counts	
Detector #5 Bias Voltage (range: 0 - 255)	14966	14966	u	1	1	0	counts	
Blackbody Temperature, Channel 3B *(range: 0 - 255)*	14967	14967	u	1	1	0	counts	
Blackbody Temperature, Channel 4 *(range: 0 - 255)*	14968	14968	u	1	1	0	counts	
Blackbody Temperature, Channel 5 *(range: 0 - 255)*	14969	14969	u	1	1	0	counts	
Reference Voltage *(range: 0 - 255)*	14970	14970	u	1	1	0	counts	
<zero fill>	14971	14976	i	2	3	0		
CLOUDS FROM AVHRR (CLAVR)								
<Reserved> [CLAVR Status Bit Field] bits 31-1: <undefined> bit 0: CLAVR status (0=disable, CCM codes zero-filled; 1=enable)	14977	14980	u	4	1	0		
<Reserved> [CLAVR]	14981	14984	u	4	1	0		
<Reserved> [CLAVR CCM (Clear/Cloudy/Mixed) Codes (0=clear; 1=mixed clear; 2=mixed cloudy; 3=cloudy)] Word 1 bits 15-14: CCM code, FOV 1 bits 13-12: CCM code, FOV 2 ... bits 1-0: CCM code, FOV 8 Word 2 bits 15-14: CCM code, FOV 9 ... bits 1-0: CCM code, FOV 16 ... (set of 8 CCM codes per word) ... Word 256 bits 15-14: CCM code, FOV 2041 ... bits 1-0: CCM code, FOV 2048	14985	15496	u	2	256	0		
FILLER								
<zero fill>	15497	15872	i	4	94	0		

8.3.1.4 GAC Data Sets

This section describes the characteristics and formats of Global Area Coverage (GAC) data sets for both NOAA KLM (version 2) and NOAA-N (version 3) satellites. Version 2 format (v2) was used on all NOAA KLM data until April 28, 2005. After this date, the Version 3 format (v3), also known as the NOAA-N format, was implemented for *all* operational POES spacecraft. **On January 25, 2006, Version 4 format (v4) was implemented to reflect the start of CLAVR-x processing began on that date**

There is no plan at this time to reprocess archived data into the new format.

8.3.1.4.1 Data Characteristics

The processor on board the satellite samples the real-time AVHRR data to produce reduced resolution GAC data. Four out of every five samples along the scan line are used to compute one average value, and the data from only every third scan line are processed. As a result, the spatial resolution of GAC data near the subpoint is actually 1.1 km by 4.4 km with a 3.3 km gap between pixels across the scan line, although generally treated as 4 km resolution. All of the GAC data computed during a complete pass are recorded on board the satellite for transmission to Earth on command. The 10-bit precision of the AVHRR data is retained. Table 8.3.1.4.1-1 summarizes fundamental characteristics of the data.

Table 8.3.1.4.1-1. GAC Data Characteristics.

Parameter	Value
Sample word size	10 bits
Number of sampled channels/available channels	5/6
Number of Earth samples per scan	409 per channel
Scan rate	120 scans per minute
Scan direction	East to West (northbound)
Instantaneous Field of View (IFOV)	0.07449 degrees (all channels)
Spatial resolution at nadir	4.36 km (cross track average) by 1.09 km (along track) at 833 km altitude
Cross track distance between sample centers at nadir	5.45 km at 833 km altitude
Along track distance between sample centers at nadir	3.27 km at 833 km altitude

Cross-track scan coverage	± 55.4 degrees from nadir
Swath width	2,399 km at 833 km altitude

8.3.1.4.2 Header Records

The Data Set Header Record contains quality, navigation, calibration, and conversion coefficient information which applies to the GAC data records which follow. This section describes the header records for both NOAA KLM (version 2) and NOAA-N (version 3) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the version 3 format (v3), also known as the NOAA-N format, was implemented for all operational POES spacecraft. **Version 4 (v4) was implemented on January 25, 2006, to reflect the start of CLAVR-x processing. Version 5 (v5) was implemented on November 14, 2006, for LAC/HRPT processing only. GAC will remain at version 4.**

8.3.1.4.2.1 NOAA KLM Header Records (Version 2, pre-April 28, 2005)

With the exception of the zero-fill padding, the format specifications for the GAC Level 1b primary header record for NOAA-KLM (Version 2, pre-April, 2005) is the same as the LAC/HRPT header record (Table 8.3.1.3.2.1-1). Please note that as part of the updates to the Level 1b formats for NOAA-N and -N' is the inclusion of additional, or secondary, header records. They will contain ancillary data set names and any metadata needed for reprocessing. Currently, the content and format of any secondary header records is to be determined. Applications that will access Level 1b data sets should use the "Count of Header Records in this Data Set" field, located in the first, or primary, header record, to calculate the position of the first data record and skip the secondary header records.

8.3.1.4.2.2 NOAA-N Header Records (Version 4, post-January 25, 2006, all spacecraft)

With the exception of the zero-fill padding, the format specifications for the GAC Level 1b primary header record for NOAA-N is the same as the LAC/HRPT header record (Table 8.3.1.3.2.2-1). Please note that as part of the updates to the Level 1b formats for NOAA-N and -N' is the inclusion of additional, or secondary, header records. They will contain ancillary data set names and any metadata needed for reprocessing. Currently, the content and format of any secondary header records is to be determined. Applications that will access Level 1b data sets should use the "Count of Header Records in this Data Set" field, located in the first, or primary, header record, to calculate the position of the first data record and skip the secondary header records.

8.3.1.4.3 Data Records

This section describes the Level 1b GAC data records for both the NOAA KLM and NOAA-N satellites. The Data Records for GAC data sets are archived in packed format to reduce storage requirements. Three 10-bit sensor samples are stored in a 32-bit word using the Band Interleaved by Pixel (BIP) method.

8.3.1.4.3.1 NOAA KLM Format (Version 2, pre-April 28, 2005)

The format for packed GAC data sets for NOAA KLM (version 2, pre-April 28, 2005) is documented in Table 8.3.1.4.3.1-1. However, this format is inconvenient for data processing. NESDIS archive systems support the selection of any combination of one to five channels, and sensor data word sizes of 8 or 16 bits (this is known as the unpacked format). The unpacking process stores each (10-bit) sensor data value in a separate eight or sixteen bit word. When 8-bit words are selected, the sensor data is reduced from ten to eight bits by removing the least significant two bits. When 16-bit words are selected, the sensor data is stored in the least significant ten bits and the six most significant bits are zero-filled. If a customer does not require all five channels from the AVHRR instrument, the unpacked format can also be reduced to any subset of active channels. At this time, however, the archive extraction programs do not differentiate between channels 3A and 3B. Channel selected data sets are not available in packed format. In all cases, the sensor data is stored in BIP order.

Table 8.3.1.4.3.1-1. Format of packed GAC Data Record for NOAA KLM (Version 2, pre-April 28, 2005).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number (cumulative, starting with 1)	1	2	u	2	1	0		
Scan Line Year (e.g., 1999)	3	4	u	2	1	0		
Scan Line Day of Year (e.g., 365)	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	millisec	
Scan Line UTC Time of Day	9	12	u	4	1	0	millisec	
Scan Line Bit Field bit 15: 0 = northbound data; 1 = southbound data bit 14: 1 = scan time corrected for clock drift bits 13-2: <zero fill> bits 1-0: channel 3 select (0 = 3b; 1 = 3a; 2 = transition)	13	14	u	2	1	0		
<zero fill>	15	24	i	2	5	0		
QUALITY INDICATORS								
Quality Indicator Bit Field If a bit is on (=1) then the statement is true.	25	28	u	4	1	0		

bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan bit 28: insufficient data for calibration (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bit 24: sync lock dropped during this frame bit 23: frame sync word error greater than zero bit 22: frame sync previously dropped lock bit 21: flywheeling detected during this frame bit 20: bit slippage detected during this frame bits 19-9: <zero fill> bit 8: TIP parity error detected bits 7-6: reflected sunlight detected ch 3b (0 = no anomaly; 1 = anomaly; 3 = unsure) bits 5-4: reflected sunlight detected ch 4 (0 = no anomaly; 1 = anomaly; 3 = unsure) bits 3-2: reflected sunlight detected ch 5 (0 = no anomaly; 1 = anomaly; 3 = unsure) bit 1: resync occurred on this frame bit 0: pseudo noise occurred on this frame								
Scan Line Quality Flags If a bit is on (=1) then the statement is true. *Time Problem Code* (All bits off implies the scan time is as expected.) bits 31-24: <zero fill> bit 23: time field is bad but can probably be inferred from the previous good time. bit 22: time field is bad and can't be inferred from the previous good time. bit 21: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field) bit 20: start of a sequence that apparently repeats scan times that have been previously accepted. bits 19-16: <zero fill> *Calibration Problem Code* (Note these bits complement the channel indicators; all bits set to 0 indicates normal calibration.) bit 15: scan line was not calibrated because of bad time. bit 14: scan line was calibrated using fewer than the preferred number of scan lines because of proximity to start or end of data set or to a data gap. bit 13: scan line was not calibrated because of bad or insufficient PRT data.	29	32	u	4	1	0		

bit 12: scan line was calibrated but with marginal PRT data. bit 11: some uncalibrated channels on this scan (see channel indicators) bits 10-8: <zero fill> *Earth Location Problem Code* (all bits set to 0 implies the earth location was normal) bit 7: not earth located because of bad time; earth location fields zero filled. bit 6: earth location questionable because of questionable time code. (See time problem flags above). bit 5: earth location questionable -- only marginal agreement with reasonableness check. bit 4: earth location questionable -- fails reasonableness check. bits 3-0: <zero fill>								
Calibration Quality Flags (all bits off implies a good calibration) *Word 1*: Channel 3b bits 15 - 8: <zero fill> bit 7: this channel is not calibrated bit 6: this channel is calibrated but questionable bit 5: all bad blackbody counts for scan line bit 4: all bad space view counts for scan line bit 3: <zero fill> bit 2: marginal blackbody view counts for this line bit 1: marginal space view counts for this line bit 0: <zero fill> *Word 2*: Channel 4 *Word 3*: Channel 5	33	38	u	2	3	0		
Count of Bit Errors in Frame Sync	39	40	u	2	1	0		
<zero fill>	41	48	i	4	2	0		
CALIBRATION COEFFICIENTS								
Visible Operational Cal Ch 1 Slope 1	49	52	i	4	1	7		
Visible Operational Cal Ch 1 Intercept 1	53	56	i	4	1	6		
Visible Operational Cal Ch 1 Slope 2	57	60	i	4	1	7		
Visible Operational Cal Ch 1 Intercept 2	61	64	i	4	1	6		
Visible Operational Cal Ch 1 Intersection	65	68	i	4	1	0		
Visible Test Cal Ch 1 Slope 1	69	72	i	4	1	7		
Visible Test Cal Ch 1 Intercept 1	73	76	i	4	1	6		
Visible Test Cal Ch 1 Slope 2	77	80	i	4	1	7		

Visible Test Cal Ch 1 Intercept 2	81	84	i	4	1	6		
Visible Test Cal Ch 1 Intersection	85	88	i	4	1	0		
Visible Prelaunch Cal Ch 1 Slope 1	89	92	i	4	1	7		
Visible Prelaunch Cal Ch 1 Intercept 1	93	96	i	4	1	6		
Visible Prelaunch Cal Ch 1 Slope 2	97	100	i	4	1	7		
Visible Prelaunch Cal Ch 1 Intercept 2	101	104	i	4	1	6		
Visible Prelaunch Cal Ch 1 Intersection	105	108	i	4	1	0		
Visible Operational Cal Ch 2 Slope 1	109	112	i	4	1	7		
Visible Operational Cal Ch 2 Intercept 1	113	116	i	4	1	6		
Visible Operational Cal Ch 2 Slope 2	117	120	i	4	1	7		
Visible Operational Cal Ch 2 Intercept 2	121	124	i	4	1	6		
Visible Operational Cal Ch 2 Intersection	125	128	i	4	1	0		
Visible Test Cal Ch 2 Slope 1	129	132	i	4	1	7		
Visible Test Cal Ch 2 Intercept 1	133	136	i	4	1	6		
Visible Test Cal Ch 2 Slope 2	137	140	i	4	1	7		
Visible Test Cal Ch 2 Intercept 2	141	144	i	4	1	6		
Visible Test Cal Ch 2 Intersection	145	148	i	4	1	0		
Visible Prelaunch Cal Ch 2 Slope 1	149	152	i	4	1	7		
Visible Prelaunch Cal Ch 2 Intercept 1	153	156	i	4	1	6		
Visible Prelaunch Cal Ch 2 Slope 2	157	160	i	4	1	7		
Visible Prelaunch Cal Ch 2 Intercept 2	161	164	i	4	1	6		
Visible Prelaunch Cal Ch 2 Intersection	165	168	i	4	1	0		
Visible Operational Cal Ch 3a Slope 1	169	172	i	4	1	7		
Visible Operational Cal Ch 3a Intercept 1	173	176	i	4	1	6		
Visible Operational Cal Ch 3a Slope 2	177	180	i	4	1	7		
Visible Operational Cal Ch 3a Intercept 2	181	184	i	4	1	6		
Visible Operational Cal Ch 3a Intersection	185	188	i	4	1	0		
Visible Test Cal Ch 3a Slope 1	189	192	i	4	1	7		
Visible Test Cal Ch 3a Intercept 1	193	196	i	4	1	6		

Visible Test Cal Ch 3a Slope 2	197	200	i	4	1	7		
Visible Test Cal Ch 3a Intercept 2	201	204	i	4	1	6		
Visible Test Cal Ch 3a Intersection	205	208	i	4	1	0		
Visible Prelaunch Cal Ch 3a Slope 1	209	212	i	4	1	7		
Visible Prelaunch Cal Ch 3a Intercept 1	213	216	i	4	1	6		
Visible Prelaunch Cal Ch 3a Slope 2	217	220	i	4	1	7		
Visible Prelaunch Cal Ch 3a Intercept 2	221	224	i	4	1	6		
Visible Prelaunch Cal Ch 3a Intersection	225	228	i	4	1	0		
IR Operational Cal Ch 3b Coefficient 1	229	232	i	4	1	6		
IR Operational Cal Ch 3b Coefficient 2	233	236	i	4	1	6		
IR Operational Cal Ch 3b Coefficient 3	237	240	i	4	1	6		
IR Test Cal Ch 3b Coefficient 1	241	244	i	4	1	6		
IR Test Cal Ch 3b Coefficient 2	245	248	i	4	1	6		
IR Test Cal Ch 3b Coefficient 3	249	252	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 1	253	256	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 2	257	260	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 3	261	264	i	4	1	6		
IR Test Cal Ch 4 Coefficient 1	265	268	i	4	1	6		
IR Test Cal Ch 4 Coefficient 2	269	272	i	4	1	6		
IR Test Cal Ch 4 Coefficient 3	273	276	i	4	1	6		
IR Operational Cal Ch 5 Coefficient 1	277	280	i	4	1	6		
IR Operational Cal Ch 5 Coefficient 2	281	284	i	4	1	6		
IR Operational Cal Ch 5 Coefficient 3	285	288	i	4	1	6		
IR Test Cal Ch 5 Coefficient 1	289	292	i	4	1	6		
IR Test Cal Ch 5 Coefficient 2	293	296	i	4	1	6		
IR Test Cal Ch 5 Coefficient 3	297	300	i	4	1	6		
<zero fill>	301	312	i	4	3	0		
NAVIGATION								
Navigation Status Bit Field	313	316	u	4	1	0		

bits 31-17: <zero fill> bit 16: 1 = earth location corrected for TIP Euler angles bits 15 - 12: earth location indicator 0 = earth location available; 1 = user ephemeris files greater than 24 hours old; 2 = no earth location available. bits 11 - 8: spacecraft attitude control 0 = operating in YGC or NOMINAL mode; 1 = operating in another mode; 2 = attitude exceeds nominal tolerance; 3 = both 1 and 2 bits 7 - 4: attitude SMODE 0 = NOMINAL mode; 1 = rate nulling mode; 2 = YGC mode; 3 = search mode; 4 = coast mode bits 3 - 0: attitude Passive Wheel Test In Progress 0 = NOMINAL mode/no test; 1 = yaw axis test in progress; 2 = roll axis test in progress; 3 = pitch axis test in progress.								
Time Associated with TIP Euler Angles	317	320	u	4	1	0	seconds	
TIP Euler Angles *Word 1*: Roll *Word 2*: Pitch *Word 3*: Yaw	321	326	i	2	3	3	degrees	
Spacecraft Altitude above Reference Ellipsoid	327	328	u	2	1	1	km	
Angular Relationships (relative azimuth range ± 180.00 degrees) *Word 1*: Solar Zenith Angle, Point 5 *Word 2*: Satellite Zenith Angle, Point 5 *Word 3*: Relative Azimuth Angle, Point 5 *Word 4*: Solar Zenith Angle, Point 13 ... (set of 3 angles every 8 points) ... *Word 153*: Relative Azimuth Angle, Point 405	329	634	i	2	153	2	degrees	
<zero fill>	635	640	i	2	3	0		

Earth Location (North latitude and East longitude are positive) *Word 1*: Latitude in Degrees, Point 5 *Word 2*: Longitude in Degrees, Point 5 *Word 3*: Latitude in Degrees, Point 13 ... (lat/lon word pair every 8 points) ... *Word 102*: Longitude in Degrees, Point 405	641	1048	i	4	102	4		
<zero fill>	1049	1056	i	4	2	0		
HRPT MINOR FRAME TELEMETRY								
Frame Sync The first sixty bits (six 10-bit values: 644, 367, 860, 413, 527, 149) from a 63 bit pseudonoise generator starting in the all 1's state. The generator polynomial is: $x^6 + x^5 + x^2 + 1$	1057	1068	u	2	6	0		
ID *Word 1* bits 15-10: <zero fill> bit 9: 0 = internal sync; 1 = AVHRR sync bits 8-7: 0 = not an HRPT frame but a GAC frame; 1 = minor frame 1; 2 = minor frame 2; 3 = minor frame 3 bits 6-3: spacecraft address bit 2: 0 = frame stable; 1 = frame resync occurred bit 1: 0 = pseudonoise AVHRR input; 1 = normal AVHRR input bit 0: 0 = AVHRR Ch 3b; 1 = AVHRR Ch 3a *Word 2* bits 15-10: <zero fill> bits 9-0: <undefined>	1069	1072	u	2	2	0		

Time Code *Word 1* bits 15-10: <zero fill> bits 9-1: binary day count bit 0 = 0 *Word 2* bits 15-10: <zero fill> bit 9 = 1 bit 8 = 0 bit 7 = 1 bits 6-0: most significant part of binary millisecond of day count *Word 3* bits 15-10: <zero fill> bits 9-0: part of binary millisecond of day count *Word 4* bits 15-10: <zero fill> bits 9-0: least significant part of binary millisecond of day count	1073	1080	u	2	4	0		
Telemetry *Word 1*: Ramp Calibration AVHRR Channel 1 *Word 2*: Ramp Calibration AVHRR Channel 2 *Word 3*: Ramp Calibration AVHRR Channel 3 *Word 4*: Ramp Calibration AVHRR Channel 4 *Word 5*: Ramp Calibration AVHRR Channel 5 *Words 6-9* AVHRR Internal Target Temperature Data Three readings from one of the four platinum resistance thermometers (PRT). A different PRT is sampled for each scan; every fifth scan will contain a reference value of 0 in place of each reading. *Word 6*: PRT Reading 1 *Word 7*: PRT Reading 2 *Word 8*: PRT Reading 3 *Word 9*: Patch Temperature *Word 10*: <undefined>	1081	1100	u	2	10	0		

Back Scan Ten words of calibration target view data from each AVHRR channel 3, 4, and 5. *Word 1*: Channel 3, Word 1 ... *Word 3*: Channel 5, Word 1 *Word 4*: Channel 3, Word 2 ... *Word 30*: Channel 5, Word 10	1101	1160	u	2	30	0		
Space Data Ten words of space view data from each AVHRR channel 1, 2, 3, 4, 5 *Word 1*: Channel 1, Word 1 ... *Word 5*: Channel 5, Word 1 *Word 6*: Channel 1, Word 2 ... *Word 50*: Channel 5, Word 10	1161	1260	u	2	50	0		
Sync Delta bits 15-10: <zero fill> bit 9: 0 = AVHRR sync early; 1 = AVHRR sync late bits 8-0: 9-bit binary count of 0.9984 MHz periods	1261	1262	u	2	1	0		
<zero fill>	1263	1264	i	2	1	0		
AVHRR SENSOR DATA								
Sensor Data, Band Interleaved by Pixel (BIP) *Word 1* bits 31-30: <zero fill> bits 29-20: Channel 1, Point 1 bits 19-10: Channel 2, Point 1 bits 9-0: Channel 3, Point 1 *Word 2* bits 31-30: <zero fill> bits 29-20: Channel 4, Point 1 bits 19-10: Channel 5, Point 1 bits 9-0: Channel 1, Point 2 ... *Word 682* bits 31-30: <zero fill> bits 29-20: Channel 4, Point 409 bits 19-10: Channel 5, Point 409 bits 9-0: <zero fill>	1265	3992	u	4	682	0		
<zero fill>	3993	4000	i	4	2	0		
DIGITAL B TELEMETRY								

Invalid Word Bit Flags (if bit = 1, associated telemetry bit was not updated during most recent minor frame cycle - possibly due to lost frame) bit 15: motor/telemetry bit 14: electronics/telemetry bit 13: channel 1 status bit 12: channel 2 status bit 11: channel 3a status bit 10: channel 3b status bit 9: channel 4 status bit 8: channel 5 status bit 7: channel 3a/3b select status bit 6: voltage calibrate status bit 5: cooler heat bit 4: scan motor bit 3: telemetry lock bit 2: earth shield bit 1: patch control bit 0: <zero fill>	4001	4002	u	2	1	0		
AVHRR Digital B Data bit 15: motor/telemetry (0 = off; 1 = on) bit 14: electronics/telemetry (0 = off; 1 = on) bit 13: channel 1 status (0 = disable; 1 = enable) bit 12: channel 2 status (0 = disable; 1 = enable) bit 11: channel 3a status (0 = disable; 1 = enable) bit 10: channel 3b status (0 = disable; 1 = enable) bit 9: channel 4 status (0 = disable; 1 = enable) bit 8: channel 5 status (0 = disable; 1 = enable) bit 7: channel 3a/3b select status (0 = 3b; 1 = 3a) bit 6: voltage calibrate status (0 = off; 1 = on) bit 5: cooler heat (0 = off; 1 = on) bit 4: scan motor (0 = low; 1 = high) bit 3: telemetry lock (0 = off; 1 = lock) bit 2: earth shield (0 = disable; 1 = deploy) bit 1: patch control (0 = off; 1 = on) bit 0: <zero fill>	4003	4004	u	2	1	0		
<zero fill>	4005	4016	i	4	3	0		
ANALOG HOUSEKEEPING DATA (TIP)								
Invalid Word Bit Flags (if bit = 1, associated telemetry word was not updated during most recent minor frame cycle - possibly due to lost frame) bits 31 - 23: <zero fill> bit 22: reference voltage (word 22) bits 21-2: words 21 through 2 (in order) bit 1: patch temperature (word 1) bit 0: <zero fill>	4017	4020	u	4	1	0		

Word 1: Patch Temperature *Word 2*: Patch Temperature Extended *Word 3*: Patch Power *Word 4*: Radiator Temperature *Word 5*: Black Body Temperature 1 *Word 6*: Black Body Temperature 2 *Word 7*: Black Body Temperature 3 *Word 8*: Black Body Temperature 4 *Word 9*: Electronics Current *Word 10*: Motor Current *Word 11*: Earth Shield Position *Word 12*: Electronics Temperature *Word 13*: Cooler Housing Temperature *Word 14*: Baseplate Temperature *Word 15*: Motor Housing Temperature *Word 16*: A/D Converter Temperature *Word 17*: Detector #4 Bias Voltage *Word 18*: Detector #5 Bias Voltage *Word 19*: Channel 3b Blackbody View *Word 20*: Channel 4 Blackbody View *Word 21*: Channel 5 Blackbody View *Word 22*: Reference Voltage	4021	4042	u	1	22	0		
<zero fill>	4043	4048	i	2	3	0		
CLOUDS FROM AVHRR (CLAVR)								
<Reserved>CLAVR Status Bit Field bits 31 - 1: <undefined> bit 0: CLAVR status 0 = disable, CCM codes zero-filled; 1 = enable	4049	4052	u	4	1	0		1
<Reserved>	4053	4056	u	4	1	0		

<Reserved>[CCM (Clear/Cloudy/Mixed) Codes (0 = clear; 1 = mixed clear; 2 = mixed cloudy; 3 =cloudy)] *Word 1* bits 15-14: CCM code, FOV 1 bits 13-12: CCM code, FOV 2 ... bits 1-0: CCM code, FOV 8 *Word 2* bits 15-14: CCM code, FOV 9 ... bits 1-0: CCM code, FOV 16 ... (set of 8 CCM codes per word) ... *Word 52* bits 15-14: CCM code, FOV 409 bits 13-0: <zero fill>	4057	4160	u	2	52	0		
FILLER								
<zero fill>	4161	4608	i	4	112	0		1

NOTES:

1. 12 Nov 1998: Redefine reserved CLAVR section to include CLAVR Status Bit Field (Fagan, 24 Sep1998); adjust trailing zero-fill.

Clouds from AVHRR (CLAVR) is a complex set of tests to detect daytime and nighttime cloud cover using multi-channel AVHRR sensor data and a surface type database. The first application of CLAVR at NOAA was to support the AVHRR Pathfinder Atmosphere (PATMOS) Project, which reprocessed AVHRR data to correct for calibration drift and produce a consistent record of atmospheric parameters for climate change studies. More information about the NOAA/NASA Pathfinder Program and PATMOS is available at http://cimss.ssec.wisc.edu/clavr/patmosx.html . Pathfinder products are available through the Comprehensive Large Array-data Stewardship System (CLASS): http://www.class.noaa.gov.

At this time CLAVR is part of the operational processing system for NOAA Level 1b GAC, LAC, and HRPT data sets as of Jan 25, 2006. Therefore, bit 0 of the NOAA Level 1b CLAVR Status Bit Field is set to one, and the Clear/Cloudy/Mixed (CCM) Codes are in use. Please note that the NOAA Level 1b format allocates space for only a minimal subset of CLAVR parameters needed to generate products that require cloud masks. NESDIS intends to implement CLAVR operationally as part of the Modernized AVHRR Processing System (MAPS).

More information about current CLAVR research and development at NOAA is available online at http://cimss.ssec.wisc.edu/clavr/patmosx.html.

Tables 8.3.1.4.3.1-2 and 8.3.1.4.3.1-3 (containing the 8 and 16-bit unpacked structure, respectively) summarize how the selection of channel and sensor data word size affects the octet placement of the data set structure documented in Table 8.3.1.4.3.1-1. While the alignment of data words on eight octet (i.e., 64 bit) boundaries is maintained by adding binary zero-fill after the sensor data section, in the interests of minimizing data set size the record lengths are no longer multiples of 512 octets.

Table 8.3.1.4.3.1-2. GAC 8-bit Extract Structure.

Number of Channels	1	2	3	4	5
Pre-Data	1 - 1264	1 - 1264	1 - 1264	1 - 1264	1 - 1264
Sensor Data	1265 -1673	1265 - 2082	1265 - 2491	1265 - 2900	1265 - 3309
Alignment Zero-Fill	1674-1680	2083-2088	2492-2496	2901-2904	3310-3312
Post-Data	1681-1832	2089-2240	2497-2648	2905-3056	3313-3464
Trailing Zero-Fill	1833-1952	2241-2360	2649-2768	3057-3176	3465-3584
Record Length	6454	7679	8904	10129	11354

Table 8.3.1.4.3.1-3. GAC 16-bit Extract Structure.

Number of Channels	1	2	3	4	5
Pre-Data	1 - 1264	1 - 1264	1 - 1264	1 - 1264	1 - 1264
Sensor Data	1265 - 2082	1265 - 2900	1265 - 3718	1265 - 4536	1265 - 5354
Alignment Zero-Fill	2083-2088	2901-2904	3719-3720	4537-4544	5355-5360
Post-Data	2089-2240	2905-3056	3721-3872	4545-4696	5361-5512
Trailing Zero-Fill	2241-2360	3057-3176	3873-3992	4697-4816	5513-5632
Record Length	2360	3176	3992	4816	5632

8.3.1.4.3.2 NOAA-N Format (Version 4, post-January 25, 2006 all spacecraft)

The format for packed GAC Level 1b data sets for NOAA-N (Version 4, post-January 25, 2006, all spacecraft) is documented in Table 8.3.1.4.3.2-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.4.3.2-1. Format of GAC Data Record for NOAA-N (Version 4, post-January 25, 2006, all spacecraft).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number *(cumulative, starting with 1; range: 0 - 65,535)*	1	2	u	2	1	0		
Scan Line Year (e.g., 1999)	3	4	u	2	1	0		
Scan Line Day of Year (e.g., 365)	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	millisec	
Scan Line UTC Time of Day	9	12	u	4	1	0	millisec	
Scan Line Bit Field bit 15: satellite direction (0=northbound; 1=southbound) bit 14: clock drift correction (0=not corrected; 1=scan time corrected for clock drift) bits 13-2: <zero fill> bits 1-0: channel 3 select (0=3B; 1=3A; 2=transition)	13	14	u	2	1	0		
<zero fill>	15	24	i	2	5	0		
QUALITY INDICATORS								

Quality Indicator Bit Field *(if a bit is on (=1), the statement is true)* bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scanbit 28: insufficient data for calibration (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bit 24: sync lock dropped lock during this frame (NOAA) or <zero fill> MetOp bit 23: frame sync word has errors (NOAA) or <zero fill> MetOp bit 22: frame sync returned to lock (NOAA) or <zero fill> MetOp bit 21: frame sync word not valid (NOAA) or <zero fill> MetOp bit 20: bit slippage detected during this frame (NOAA) or <zero fill> MetOp bits 19-9: <zero fill> bit 8: TIP parity error detected (NOAA) or <zero fill> MetOp bits 7-6: reflected sunlight detected ch 3B (0=no anomaly; 1=anomaly; 3=unsure) bits 5-4: reflected sunlight detected ch 4 (0=no anomaly; 1=anomaly; 3=unsure) bits 3-2: reflected sunlight detected ch 5 (0=no anomaly; 1=anomaly; 3=unsure) bit 1: resync occurred on this frame (NOAA) or <zero fill> MetOp bit 0: pseudonoise occurred on this frame (NOAA) or <zero fill> MetOp	25	28	u	4	1	0		
Scan Line Quality Flags [<Reserved>] (zero fill)	29	29	u	1	1	0		
Scan Line Quality Flags [Time Problem Code] *(If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.)* bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	30	30	u	1	1	0		

Scan Line Quality Flags [Calibration Problem Code] *(If a bit is on (=1), the statement is true. These bits complement the channel indicators; all bits set to 0 indicate normal calibration.)* bit 7: scan line not calibrated: all IR channels failed calibration bit 6: scan line marginally calibrated: one or more IR channels marginally calibrated or one or more, but not all, IR channels failed calibration bit 5: scan line was not calibrated: bad or insufficient PRT data bit 4: scan line marginally calibrated: marginal PRT data bit 3: some uncalibrated channels for this scan line (i.e., one or more, but not all, IR channels failed calibration) bit 2: No visible calibration due to either the presence of MIRP pseudonoise in place of AVHRR data (NOAA only) or calibration processing turned off bit 1-0: <zero fill>	31	31	u	1	1	0		
Scan Line Quality Flags [Earth Location Problem Code] *(If a bit is on (=1), the statement is true. All bits set to 0 imply the earth location was normal.)* bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code (see time problem flags above) bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bits 3-2: <zero fill> bit 1: not earth located because of satellite in-plane maneuver (MetOp) or <zero fill> (NOAA) bit 0: not earth located because of satellite out-of-plane maneuver (MetOp) or <zero fill> (NOAA)	32	32	u	1	1	0		
Calibration Quality Flags *(all bits off implies a good calibration)* *Word 1: Channel 3B* bits 15-8: <zero fill> bit 7: this channel is not calibrated bit 6: this channel is calibrated but questionable bit 5: all bad blackbody counts for scan line bit 4: all bad space view counts for scan line bit 3: <zero fill> bit 2: marginal blackbody view counts for this line bit 1: marginal space view counts for this line bit 0: <zero fill> *Words 2-3: Channels 4-5 (in order)*	33	38	u	2	3	0		
Count of Bit Errors in Frame Sync (NOAA) or <zero fill> (MetOp)	39	40	u	2	1	0		
<zero fill>	41	48	i	4	2	0		
CALIBRATION COEFFICIENTS								
Visible Operational Cal Ch 1 Slope 1	49	52	i	4	1	7		

Visible Operational Cal Ch 1 Intercept 1	53	56	i	4	1	6		
Visible Operational Cal Ch 1 Slope 2	57	60	i	4	1	7		
Visible Operational Cal Ch 1 Intercept 2	61	64	i	4	1	6		
Visible Operational Cal Ch 1 Intersection	65	68	i	4	1	0		
Visible Test Cal Ch 1 Slope 1	69	72	i	4	1	7		
Visible Test Cal Ch 1 Intercept 1	73	76	i	4	1	6		
Visible Test Cal Ch 1 Slope 2	77	80	i	4	1	7		
Visible Test Cal Ch 1 Intercept 2	81	84	i	4	1	6		
Visible Test Cal Ch 1 Intersection	85	88	i	4	1	0		
Visible Prelaunch Cal Ch 1 Slope 1	89	92	i	4	1	7		
Visible Prelaunch Cal Ch 1 Intercept 1	93	96	i	4	1	6		
Visible Prelaunch Cal Ch 1 Slope 2	97	100	i	4	1	7		
Visible Prelaunch Cal Ch 1 Intercept 2	101	104	i	4	1	6		
Visible Prelaunch Cal Ch 1 Intersection	105	108	i	4	1	0		
Visible Operational Cal Ch 2 Slope 1	109	112	i	4	1	7		
Visible Operational Cal Ch 2 Intercept 1	113	116	i	4	1	6		
Visible Operational Cal Ch 2 Slope 2	117	120	i	4	1	7		
Visible Operational Cal Ch 2 Intercept 2	121	124	i	4	1	6		
Visible Operational Cal Ch 2 Intersection	125	128	i	4	1	0		
Visible Test Cal Ch 2 Slope 1	129	132	i	4	1	7		
Visible Test Cal Ch 2 Intercept 1	133	136	i	4	1	6		
Visible Test Cal Ch 2 Slope 2	137	140	i	4	1	7		
Visible Test Cal Ch 2 Intercept 2	141	144	i	4	1	6		
Visible Test Cal Ch 2 Intersection	145	148	i	4	1	0		
Visible Prelaunch Cal Ch 2 Slope 1	149	152	i	4	1	7		
Visible Prelaunch Cal Ch 2 Intercept 1	153	156	i	4	1	6		
Visible Prelaunch Cal Ch 2 Slope 2	157	160	i	4	1	7		
Visible Prelaunch Cal Ch 2 Intercept 2	161	164	i	4	1	6		
Visible Prelaunch Cal Ch 2 Intersection	165	168	i	4	1	0		

Visible Operational Cal Ch 3A Slope 1	169	172	i	4	1	7		
Visible Operational Cal Ch 3A Intercept 1	173	176	i	4	1	6		
Visible Operational Cal Ch 3A Slope 2	177	180	i	4	1	7		
Visible Operational Cal Ch 3A Intercept 2	181	184	i	4	1	6		
Visible Operational Cal Ch 3A Intersection	185	188	i	4	1	0		
Visible Test Cal Ch 3A Slope 1	189	192	i	4	1	7		
Visible Test Cal Ch 3A Intercept 1	193	196	i	4	1	6		
Visible Test Cal Ch 3A Slope 2	197	200	i	4	1	7		
Visible Test Cal Ch 3A Intercept 2	201	204	i	4	1	6		
Visible Test Cal Ch 3A Intersection	205	208	i	4	1	0		
Visible Prelaunch Cal Ch 3A Slope 1	209	212	i	4	1	7		
Visible Prelaunch Cal Ch 3A Intercept 1	213	216	i	4	1	6		
Visible Prelaunch Cal Ch 3A Slope 2	217	220	i	4	1	7		
Visible Prelaunch Cal Ch 3A Intercept 2	221	224	i	4	1	6		
Visible Prelaunch Cal Ch 3A Intersection	225	228	i	4	1	0		
IR Operational Cal Ch 3B Coefficient 1	229	232	i	4	1	6		
IR Operational Cal Ch 3B Coefficient 2	233	236	i	4	1	6		
IR Operational Cal Ch 3B Coefficient 3	237	240	i	4	1	6		
IR Test Cal Ch 3B Coefficient 1	241	244	i	4	1	6		
IR Test Cal Ch 3B Coefficient 2	245	248	i	4	1	6		
IR Test Cal Ch 3B Coefficient 3	249	252	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 1	253	256	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 2	257	260	i	4	1	6		
IR Operational Cal Ch 4 Coefficient 3	261	264	i	4	1	7		
IR Test Cal Ch 4 Coefficient 1	265	268	i	4	1	6		
IR Test Cal Ch 4 Coefficient 2	269	272	i	4	1	6		
IR Test Cal Ch 4 Coefficient 3	273	276	i	4	1	7		
IR Operational Cal Ch 5 Coefficient 1	277	280	i	4	1	6		
IR Operational Cal Ch 5 Coefficient 2	281	284	i	4	1	6		

IR Operational Cal Ch 5 Coefficient 3	285	288	i	4	1	7		
IR Test Cal Ch 5 Coefficient 1	289	292	i	4	1	6		
IR Test Cal Ch 5 Coefficient 2	293	296	i	4	1	6		
IR Test Cal Ch 5 Coefficient 3	297	300	i	4	1	7		
NAVIGATION								
Computed Yaw Steering (MetOp: content defined below) or <zero fill> (NOAA) Word 1: Computed roll angle Word 2: Computed pitch angle Word 3: Computed yaw angle	301	306	i	2	3	0	degrees	
Total Applied Attitude Correction Word 1: Roll Word 2: Pitch Word 3: Yaw	307	312	i	2	3	0	degrees	

Navigation Status Bit Field *(content, defined below, depends on origin of data, either NOAA or Metop)* *For NOAA Data:* bits 31-18: <zero fill> bit 17: earth location at the satellite subpoint is accurate and reasonable, i.e., is within tolerance defined by "Nadir Earth Location Tolerance" in header (0=out of tolerance; 1=in tolerance) bit 16: Euler error angles from the CPU telemetry used by AELDS to correct the earth locations (0=FALSE; 1=TRUE) bits 15-12: earth location indicator (0=earth location available; 1=first scan whose time is more than 24 hours older than the time [epoch] of the user ephemeris file; 2=no earth location available) bits 11-8: spacecraft attitude control (0=operating in YGC or NOMINAL mode and attitude is good; 1=operating in another mode but attitude is good; 2=operating in YGC or NOMINAL mode but tests are being conducted which may cause attitude to exceed nominal tolerance; 3=operating in another mode while tests are being conducted which may cause attitude to exceed nominal tolerance) bits 7-4: attitude SMODE (0=nominal mode; 1=rate nulling mode; 2=YGC mode; 3=search mode; 4=coast mode) bits 3-0: attitude PWTIP$AC (0=nominal mode/no test; 1=yaw axis test in progress; 2=roll axis test in progress; 3=pitch axis test in progress) *For Metop Data:* bits 31-21: <zero fill> bit 20-19: yaw steering parameters usage indicator (0=no yaw steering correction; 1=measured angles from the Metop SVM telemetry; 2=computed angles from AELDS; 3=measured angles + computed angles) bit 18: Metop maneuver indicator (0=scan does not occur during a Metop in-plane or out-of-plane maneuver; 1=scan, or some part of it, occurs during a maneuver) bit 17: <same as defined for NOAA, above> bit 16: <zero fill> bits 15-12: <same as defined for NOAA, above> bits 11-8: <zero fill> bits 7-4: OPM PF sub-mode (0=fine pointing mode (FPM); 1=yaw steering mode (YSM)) bits 3-0: SVM PF mode (0=LHM; 1=RRM; 2=CAM; 3=FAM1; 4=FAM2; 5=FAM3; 6=OPM; 7=OCM1; 8=OCM2; 9=OCMT; 10=OCM0)	313	316	u	4	1	0		
Time Associated with Euler Angles	317	320	i	4	1	0	seconds	
Euler *Angles (NOAA, from TIP CPU telemetry near end of scan; MetOp[in FPM], from SVM telemetry just before star of scan)* or Yaw Steering Parameters *(MetOp[in YSM], from SVM telemetry or AELDS near nadir of scan)* Word 1: Roll Word 2: Pitch Word 3: Yaw	321	326	i	2	3	3	degrees	
Spacecraft Altitude above Reference Ellipsoid	327	328	u	2	1	1	km	

Angular Relationships *(relative azimuth range ± 180.00 degrees)* Word 1: Solar zenith angle, FOV 5 Word 2: Satellite zenith angle, FOV 5 Word 3: Relative azimuth angle, FOV 5 Word 4: Solar zenith angle, FOV 13 ... (set of 3 angles every 8 FOVs) ... Word 153: Relative azimuth angle, FOV 405	329	634	i	2	153	2	degrees	
<Zero fill>	635	640	i	2	3	0		
Earth Location *(north latitude and east longitude are positive)* Word 1: Latitude, FOV 5 Word 2: Longitude, FOV 5 Word 3: Latitude, FOV 13 ...(lat/lon word pair every 8 FOVs) ... Word 102: Longitude, FOV 405	641	1048	i	4	102	4	degrees	
<Zero fill>	1049	1056	i	4	2	0		
FRAME TELEMETRY								
Frame Sync *(The first 60 bits (in 6 10-bit values) from a 63-bit pseudonoise generator starting in the all 1's state. The generator polynomial is:* $x^6 + x^5 + x^2 + 1$.*)* (NOAA: content defined below*)* or <Zero fill> MetOp Word 1: 644 Word 2: 367 Word 3: 860 Word 4: 413 Word 5: 527 Word 6: 149	1057	1068	u	2	6	0		
ID *Word 1* bits 15-10: <Zero fill> bit 9: MIRP/AVHRR sync (0=internal sync; 1=AVHRR sync) bits 8-7: frame ID 0=GAC frame; 1=HRPT minor frame 1; 2=HRPT minor frame 2; 3=HRPT minor frame 3. bits 6-3: spacecraft address bit 2: resync (0=frame stable; 1=frame resync occurred) bit 1: AVHRR input (0=pseudonoise; 1=normal) bit 0: channel 3 status (0=AVHRR channel 3B; 1=AVHRR channel 3A) *Word 2* bits 15-10: <Zero fill> bits 9-0: <undefined>	1069	1072	u	2	2	0		

Time Code *Word 1* bits 15-10: <Zero fill> bits 9-1: binary day count bit 0: 0 (zero) *Word 2* bits 15-10: <Zero fill> bit 9: 1 (one) bit 8: 0 (zero) bit 7: 1 (one) bits 6-0: most significant part of binary millisecond of day count W*ord 3* bits 15-10: <Zero fill>bits 9-0: part of binary millisecond of day count *Word 4* bits 15-10: <Zero fill> bits 9-0: least significant part of binary millisecond of day count	1073	1080	u	2	4	0		
Ramp Calibration Word 1: Ramp calibration, channel 1 Word 2: Ramp calibration, channel 2 Word 3: Ramp calibration, channel 3 Word 4: Ramp calibration, channel 4 Word 5: Ramp calibration, channel 5	1081	1090	u	2	5	0	counts	
Internal Target Temperature *(Three readings from one of the four platinum resistance thermometers (PRT). A different PRT is sampled for each scan. Every fifth scan will contain a reference value of 0 in place of each reading.)* Word 1: PRT reading 1 Word 2: PRT reading 2 Word 3: PRT reading 3	1091	1096	u	2	3	0	counts	
Patch Temperature	1097	1098	u	2	1	0	counts	
<Undefined> (NOAA) or <Zero fill> MetOp	1099	1100	u	2	1	0		
Back Scan *(Ten samples of calibration target view data from each of AVHRR channels 3, 4, and 5.)* Word 1: channel 3, sample 1 Word 2: channel 4, sample 1 Word 3: channel 5, sample 1 Word 4: channel 3, sample 2 ... Word 30: channel 5, sample 10	1101	1160	u	2	30	0	counts	

Space Data *(Ten samples of space view data from each of AVHRR channels 1, 2, 3, 4, and 5.)* Word 1: channel 1, sample 1 Word 2: channel 2, sample 1 ... Word 5: channel 5, sample 1 Word 6: channel 1, sample 2 ... Word 50: channel 5, sample 10	1161	1260	u	2	50	0	count	
Sync Delta (NOAA: content defined below*)* or <Zero fill> MetOp bits 15-10: <Zero fill> bit 9: AVHRR sync (0=early; 1=late)bits 8-0: 9-bit binary count of 0.9984 MHz periods	1261	1262	u	2	1	0		
<Zero fill>	1263	1264	i	2	1	0		
EARTH OBSERVATIONS								
Earth Data Word 1 bits 31-30: <Zero fill> bits 29-20: channel 1, FOV 1 bits 19-10: channel 2, FOV 1 bits 9-0: channel 3, FOV 1 Word 2 bits 31-30: <Zero fill> bits 29-20: channel 4, FOV 1 bits 19-10: channel 5, FOV 1 bits 9-0: channel 1, FOV 2 ... Word 682 bits 31-30: <Zero fill> bits 29-20: channel 4, FOV 409 bits 19-10: channel 5, FOV 409 bits 9-0: <Zero fill>	1265	3992	u	4	682	0	counts	
<Zero fill>	3993	4000	i	4	2	0		
DIGITAL B HOUSEKEEPING TELEMETRY								

Digital B Telemetry Update Flags *(If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.)* bit 15: scan motor/telemetry status bit 14: electronics/telemetry status bit 13: channel 1 status bit 12: channel 2 status bit 11: channel 3A status bit 10: channel 3B status bit 9: channel 4 status bit 8: channel 5 status bit 7: channel 3A/3B select status bit 6: voltage calibration status bit 5: cooler heat status bit 4: scan motor mode status bit 3: telemetry lock status bit 2: earth shield status bit 1: patch control status bit 0: <Zero fill>	4001	4002	u	2	1	0		
AVHRR Digital B Data bit 15: scan motor/telemetry status (0=off; 1=on) bit 14: electronics/telemetry status (0=off; 1=on) bit 13: channel 1 status (0=disable; 1=enable) bit 12: channel 2 status (0=disable; 1=enable) bit 11: channel 3A status (0=disable; 1=enable) bit 10: channel 3B status (0=disable; 1=enable) bit 9: channel 4 status (0=disable; 1=enable) bit 8: channel 5 status (0=disable; 1=enable) bit 7: channel 3A/3B select status (0=3B; 1=3A) bit 6: voltage calibration status (0=off; 1=on) bit 5: cooler heat status (0=off; 1=on) bit 4: scan motor mode status (0=low; 1=high) bit 3: telemetry lock status (0=not locked on; 1=locked on) bit 2: earth shield status (0=disable; 1=deploy) bit 1: patch control status (0=off; 1=on) bit 0: <Zero fill>	4003	4004	u	2	1	0		
<Zero fill>	4005	4016	i	4	3	0		
ANALOG HOUSEKEEPING TELEMETRY								

Analog Telemetry Update Flags *(If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.)* bits 31-23: <Zero fill> bit 22: motor current bit 21: electronics current bit 20: blackbody temperature, channel 5 bit 19: detector #5 bias voltage bit 18: blackbody temperature, channel 4 bit 17: blackbody temperature, channel 3B bit 16: A/D converter temperature bit 15: black body temperature 4 bit 14: black body temperature 3 bit 13: black body temperature 2 bit 12: black body temperature 1 bit 11: motor housing temperature bit 10: baseplate temperature bit 9: electronics temperature bit 8: cooler housing temperature bit 7: radiator temperature bit 6: patch temperature bit 5: earth shield position bit 4: patch temperature extended bit 3: detector #4 bias voltage bit 2: reference voltage bit 1: patch power bit 0: <Zero fill>	4017	4020	u	4	1	0		
Patch Temperature *(range: 0 - 255)*	4021	4021	u	1	1	0	counts	
Patch Temperature Extended *(range: 0 - 255)*	4022	4022	u	1	1	0	counts	
Patch Power *(range: 0 - 255)*	4023	4023	u	1	1	0	counts	
Radiator Temperature *(range: 0 - 255)*	4024	4024	u	1	1	0	counts	
Black Body Temperature 1 *(range: 0 - 255)*	4025	4025	u	1	1	0	counts	
Black Body Temperature 2 *(range: 0 - 255)*	4026	4026	u	1	1	0	counts	
Black Body Temperature 3 *(range: 0 - 255)*	4027	4027	u	1	1	0	counts	
Black Body Temperature 4 *(range: 0 - 255)*	4028	4028	u	1	1	0	counts	
Electronics Current *(range: 0 - 255)*	4029	4029	u	1	1	0	counts	
Motor Current *(range: 0 - 255)*	4030	4030	u	1	1	0	counts	
Earth Shield Position *(range: 0 - 255)*	4031	4031	u	1	1	0	counts	
Electronics Temperature *(range: 0 - 255)*	4032	4032	u	1	1	0	counts	
Cooler Housing Temperature *(range: 0 - 255)*	4033	4033	u	1	1	0	counts	

Baseplate Temperature *(range: 0 - 255)*	4034	4034	u	1	1	0	counts	
Motor Housing Temperature *(range: 0 - 255)*	4035	4035	u	1	1	0	counts	
A/D Converter Temperature *(range: 0 - 255)*	4036	4036	u	1	1	0	counts	
Detector #4 Bias Voltage *(range: 0 - 255)*	4037	4037	u	1	1	0	counts	
Detector #5 Bias Voltage *(range: 0 - 255)*	4038	4038	u	1	1	0	counts	
Blackbody Temperature, Channel 3B *(range: 0 - 255)*	4039	4039	u	1	1	0	counts	
Blackbody Temperature, Channel 4 *(range: 0 - 255)*	4040	4040	u	1	1	0	counts	
Blackbody Temperature, Channel 5 *(range: 0 - 255)*	4041	4041	u	1	1	0	counts	
Reference Voltage *(range: 0 - 255)*	4042	4042	u	1	1	0	counts	
<Zero fill>	4043	4048	i	2	3	0		
CLOUDS FROM AVHRR (CLAVR)								
<Reserved> [CLAVR Status Bit Field] bits 31-1: <undefined> bit 0: CLAVR status (0=disable, CCM codes zero-filled; 1=enable)	4049	4052	u	4	1	0		
<Reserved> [CLAVR]	4053	4056	u	4	1	0		
<Reserved> [CLAVR CCM (Clear/Cloudy/Mixed) Codes (0=clear; 1=mixed clear; 2=mixed cloudy; 3=cloudy)] Word 1 bits 15-14: CCM code, FOV 1 bits 13-12: CCM code, FOV 2 ... bits 1-0: CCM code, FOV 8 Word 2 bits 15-14: CCM code, FOV 9 ... bits 1-0: CCM code, FOV 16 ... set of 8 CCM codes per word) ... Word 52 bits 15-14: CCM code, FOV 409 bits 13-0: <Zero fill>	4057	4160	u	2	52	0		
FILLER								
<Zero fill>	4161	4608	i	4	112	0		

8.3.1.5 HIRS Data Sets

This section describes the characteristics and formats of the High Resolution Infrared Radiation Sounder (both HIRS/3 and HIRS/4) data sets for both NOAA KLM (Version 2) and NOAA-N (version 3) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the Version 3 format (v3), also known as the NOAA-N format, will be implemented for all operational POES spacecraft. There is no plan at this time to reprocess archived data into the new format. **After January 25, 2006, the version number contained in the header was updated from 3 to 4 to reflect the inclusion of cloud mask information. All level 1b documentation should reflect that until another change is made.**

8.3.1.5.1 Data Characteristics

This section describes the characteristics of the High Resolution Infrared Radiation Sounder (both HIRS/3 and HIRS/4) instruments.

8.3.1.5.1.1 HIRS/3

HIRS/3 radiometric data is digitized to 13-bit precision. The data is recorded on the satellite and transmitted to Earth on command. Table 8.3.1.5.1.1-1 summarizes fundamental characteristics of the data.

Table 8.3.1.5.1.1-1. HIRS/3 Data Characteristics.

Parameter	Value
Sample word size	13 bits
Number of sampled channels/available channels	20/20
Number of Earth samples per scan	56 per channel
Scan rate	9.4 scans per minute
Scan direction	West to East (northbound)
Instantaneous Field of View (IFOV)	1.3 to 1.4 degrees
Spatial resolution at nadir	18.9 to 20.3 km at 833 km altitude
Cross track distance between sample centers at nadir	26.2 km at 833 km altitude

Along track distance between sample centers at nadir	42 km at 833 km altitude
Cross-track scan coverage	± 49.5 degrees from nadir
Swath width	2240 km at 833 km altitude

8.3.1.5.1.2 HIRS/4

The HIRS/4 instrument will be flown on NOAA-N and -N'. Several modifications have been made: 1) the field of view has decreased to 10 km from 19 km for the HIRS/3; 2) another PRT has been added to the blackbody. This is directly in the center and will give a better characterization of the temperature gradient as well as providing a better estimate of the blackbody temperature within the smaller angular field of view; and 3) there is a new temperature sensor near the field stop. Table 3.2.2.1-1 contains a detailed description of the characteristics of the HIRS/4 instrument.

8.3.1.5.2 Header Records

This section describes the header record formats for both HIRS/3 and HIRS/4 instruments for both NOAA KLM (version 2) and NOAA-N (version 3) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the version 3 format (v3), also known as the NOAA-N format, will be implemented for all operational POES spacecraft. **After January 25, 2006, the version number contained in the header was updated from 3 to 4 to reflect the inclusion of cloud mask information. All level 1b documentation should reflect that until another change is made.**

8.3.1.5.2.1 HIRS/3 (Flown on NOAA KLM, version 2, pre-April 28, 2005)

The HIRS/3 Data Set Header Record format HIRS/3 (Flown on NOAA KLM, version 2, pre-April 28, 2005) is documented in Table 8.3.1.5.2.1-1.

Table 8.3.1.5.2.1-1. Format of HIRS/3 Data Set Header Record (Flown on NOAA KLM, version 2, pre-April 28, 2005)

Field Name	Start Octet	End Octet	DT	Word Size	Number of Words	SF	Units	Notes
FILE IDENTIFICATION								

Data Set Creation Site ID CMS = Centre de Meteorologie Spatiale/France; DSS = Dundee Satellite Receiving Station/UK; NSS = National Environmental Satellite, Data and Information Service/USA; UKM = United Kingdom Meteorological Office/UK	1	3	c	3	1	0		
<ASCII blank = x20>	4	4	c	1	1	0		
NOAA Level 1b Format Version Number 1=TIROS-N, NOAA-6 through NOAA-14 2=NOAA-15, -16, -17 (pre-April 28, 2005 3=all satellites post-April 28, 2005, 4=cloud mask flag (CLAVRx)-Jan 25, 2006	5	6	u	2	1	0		
NOAA Level 1b Format Version Year (e.g., 1999)	7	8	u	2	1	0		
NOAA Level 1b Format Version Day of Year (e.g., 365)	9	10	u	2	1	0		
<Reserved for Logical Record Length> For Creation Site use only. Logical Record Length of NOAA Level 1b data set prior to processing.	11	12	u	2	1	0	octets	
<Reserved for Block Size> For Creation Site use only. Block Size of NOAA Level 1b data set prior to processing.	13	14	u	2	1	0	octets	
Count of Header Records in this Data Set	15	16	u	2	1	0		
<zero fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		
NOAA Spacecraft Identification Code 2 = NOAA-16; 4 = NOAA-15; 6 = NOAA-17; 7 = NOAA-18; 8 = NOAA-N' 11 = MetOp-1 12 = MetOp-2 13 = MetOp-3	73	74	u	2	1	0		

Instrument ID 301 = s/n 301 (NOAA-16); 302 = s/n 302 (NOAA-15); 303 = s/n 303 (NOAA-17); 305 = s/n 305 (NOAA-18); 308 = s/n 308 (NOAA-N') 306 = s/n306 (MetOp-A) 307 = s/n307 (MetOp-1)	75	76	u	2	1	0		
Data Type Code 5 = HIRS	77	78	u	2	1	0		
TIP Source Code 0 = unused, GAC/HRPT/LAC data; 1 = GAC embedded AMSU and TIP; 2 = stored TIP; 3 = HRPT/LAC embedded AMSU and TIP; 4 = stored AIP	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year (e.g., 1999)	85	86	u	2	1	0		
Start of Data Set Day of Year (e.g., 365)	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	milli-second	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year (e.g., 1999)	97	98	u	2	1	0		
End of Data Set Day of Year (e.g., 365)	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	milli-second	
Year of Last CPIDS Update (e.g., 1999)	105	106	u	2	1	0		
Day of Year of Last CPIDS Update (e.g., 365)	107	108	u	2	1	0		
<zero fill>	109	116	i	2	4	0		
DATA SET QUALITY INDICATORS								

Instrument Status bits 31-16: <zero fill> bit 15: Instrument power bit 14: Electronics power bit 13: Filter motor power bit 12: Scan motor power bit 11: Cooler heater bit 10: Filter housing heater bit 9: Cooler door release bit 8: Cooler window heater bit 7: Go to NADIR position bit 6: Calibration sequence bit 5: Cooler door closed bit 4: Cooler door fully open bit 3: Filter motor power level bit 2: Patch temperature controller bits 1-0: <zero fill>	117	120	u	4	1	0		
<zero fill>	121	122	i	2	1	0		
Record Number of Status Change (if 0, none occurred)	123	124	u	2	1	0		
Second Instrument Status (if previous word is 0, no change)	125	128	u	4	1	0		
Count of Data Records in this Data Set	129	130	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set	131	132	u	2	1	0		
Count of Missing Scan Lines	133	134	u	2	1	0		
Count of Data Gaps in this Data Set	135	136	u	2	1	0		
Count of Data Frames Without Frame Sync Word Errors	137	138	u	2	1	0		
Count of PACS Detected TIP Parity Errors	139	140	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data	141	142	u	2	1	0		
Time Sequence Error (0 = none; otherwise the record number of the first occurrence)	143	144	u	2	1	0		

Time Sequence Error Code These are bit flags taken from Scan Line Quality Flags Time Problem Code on data record reported in Time Sequence Error field above. If a bit is on (=1) then the statement is true. bits 15 - 8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time. bit 6: time field is bad and can't be inferred from the previous good time. bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. bit 4: start of a sequence that apparently repeats scan times that have been previously accepted. bits 3 - 0: <zero fill>	145	146	u	2	1	0		
SOCC Clock Update Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	147	148	u	2	1	0		
Earth Location Error Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	149	150	u	2	1	0		
Earth Location Error Code These are bit flags taken from Scan Line Quality Flags Earth Location Problem Code on data record reported in Earth Location Error Indicator field above. If a bit is on (=1) then the statement is true. bits 15 - 8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero filled. bit 6: earth location questionable because of questionable time code. (See time problem flags above.) bit 5: earth location questionable -- only marginal agreement with reasonableness check. bit 4: earth location questionable -- fails reasonableness check. bits 3-0: <zero fill>	151	152	u	2	1	0		

PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudo noise (0 = normal data; 1 = P/N data) bit 1: tape direction (0 = time decrementing) bit 0: data mode (0 = test data; 1 = flight data)	153	154	u	2	1	0		
PACS Data Source 0 = unused; 1 = Fairbanks, AK; 2 = Wallops Is, VA; 3 = SOCC 4 = Svalbard, Norway 5 = Monterey, CA	155	156	u	2	1	0		
<zero fill>	157	160	i	4	1	0		
<Reserved for the Ingester>	161	168	c	8	1	0		
<Reserved for Decommutation>	169	176	c	8	1	0		
<zero fill>	177	186	i	2	5	0		
CALIBRATION								
Ramp/auto Calibration Indicators Bit Field bit 0: auto calibration override switch for HIRS/3	187	188	u	2	1	0		
Year of Most Recent Solar Channel Calibration (e.g., 1999)	189	190	u	2	1	0		
Day of Year of Most Recent Solar Channel Calibration (e.g., 365)	191	192	u	2	1	0		
Mean Calibration Slope of Channel 1	193	196	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 1	197	200	i	4	1	6		
B_1 for Channel 1	201	204	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 1	205	208	i	4	1	6		
Mean Calibration Slope of Channel 17	209	212	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 17	213	216	i	4	1	6		

B_1 for Channel 17	217	220	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 17	221	224	i	4	1	6		
Mean Calibration Slope of Channel 2	225	228	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 2	229	232	i	4	1	6		
B_1 for Channel 2	233	236	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 2	237	240	i	4	1	6		
Mean Calibration Slope of Channel 3	241	244	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 3	245	248	i	4	1	6		
B_1 for Channel 3	249	252	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 3	253	256	i	4	1	6		
Mean Calibration Slope of Channel 13	257	260	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 13	261	264	i	4	1	6		
B_1 for Channel 13	265	268	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 13	269	272	i	4	1	6		
Mean Calibration Slope of Channel 4	273	276	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 4	277	280	i	4	1	6		
B_1 for Channel 4	281	284	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 4	285	288	i	4	1	6		
Mean Calibration Slope of Channel 18	289	292	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 18	293	296	i	4	1	6		
B_1 for Channel 18	297	300	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 18	301	304	i	4	1	6		

Mean Calibration Slope of Channel 11	305	308	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 11	309	312	i	4	1	6		
B_1 for Channel 11	313	316	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 11	317	320	i	4	1	6		
Mean Calibration Slope of Channel 19	321	324	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 19	325	328	i	4	1	6		
B_1 for Channel 19	329	332	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 19	333	336	i	4	1	6		
Mean Calibration Slope of Channel 7	337	340	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 7	341	344	i	4	1	6		
B_1 for Channel 7	345	348	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 7	349	352	i	4	1	6		
Mean Calibration Slope of Channel 8	353	356	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 8	357	360	i	4	1	6		
B_1 for Channel 8	361	364	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 8	365	368	i	4	1	6		
Mean Calibration Slope of Channel 20	369	372	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 20	373	376	i	4	1	6		
B_1 for Channel 20	377	380	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 20	381	384	i	4	1	6		
Mean Calibration Slope of Channel 10	385	388	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 10	389	392	i	4	1	6		

B_1 for Channel 10	393	396	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 10	397	400	i	4	1	6		
Mean Calibration Slope of Channel 14	401	404	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 14	405	408	i	4	1	6		
B_1 for Channel 14	409	412	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 14	413	416	i	4	1	6		
Mean Calibration Slope of Channel 6	417	420	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 6	421	424	i	4	1	6		
B_1 for Channel 6	425	428	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 6	429	432	i	4	1	6		
Mean Calibration Slope of Channel 5	433	436	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 5	437	440	i	4	1	6		
B_1 for Channel 5	441	444	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 5	445	448	i	4	1	6		
Mean Calibration Slope of Channel 15	449	452	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 15	453	456	i	4	1	6		
B_1 for Channel 15	457	460	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 15	461	464	i	4	1	6		
Mean Calibration Slope of Channel 12	465	468	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 12	469	472	i	4	1	6		
B_1 for Channel 12	473	476	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 12	477	480	i	4	1	6		

Mean Calibration Slope of Channel 16	481	484	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 16	485	488	i	4	1	6		
B_1 for Channel 16	489	492	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 16	493	496	i	4	1	6		
Mean Calibration Slope of Channel 9	497	500	i	4	1	6		
Standard Deviation of Calibration Slope for Channel 9	501	504	i	4	1	6		
B_1 for Channel 9	505	508	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 9	509	512	i	4	1	6		
<zero fill>	513	520	i	4	2	0		
TEMPERATURE-RADIANCE CONVERSION								
Temperature-radiance Ch 1 Central Wavenumber	521	524	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 1 Constant 1	525	528	i	4	1	6		
Temperature-radiance Ch 1 Constant 2	529	532	i	4	1	6		
Temperature-radiance Ch 2 Central Wavenumber	533	536	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 2 Constant 1	537	540	i	4	1	6		
Temperature-radiance Ch 2 Constant 2	541	544	i	4	1	6		
Temperature-radiance Ch 3 Central Wavenumber	545	548	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 3 Constant 1	549	552	i	4	1	6		
Temperature-radiance Ch 3 Constant 2	553	556	i	4	1	6		
Temperature-radiance Ch 4 Central Wavenumber	557	560	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 4 Constant 1	561	564	i	4	1	6		
Temperature-radiance Ch 4 Constant 2	565	568	i	4	1	6		
Temperature-radiance Ch 5 Central Wavenumber	569	572	i	4	1	6	cm^{-1}	

Temperature-radiance Ch 5 Constant 1	573	576	i	4	1	6		
Temperature-radiance Ch 5 Constant 2	577	580	i	4	1	6		
Temperature-radiance Ch 6 Central Wavenumber	581	584	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 6 Constant 1	585	588	i	4	1	6		
Temperature-radiance Ch 6 Constant 2	589	592	i	4	1	6		
Temperature-radiance Ch 7 Central Wavenumber	593	596	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 7 Constant 1	597	600	i	4	1	6		
Temperature-radiance Ch 7 Constant 2	601	604	i	4	1	6		
Temperature-radiance Ch 8 Central Wavenumber	605	608	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 8 Constant 1	609	612	i	4	1	6		
Temperature-radiance Ch 8 Constant 2	613	616	i	4	1	6		
Temperature-radiance Ch 9 Central Wavenumber	617	620	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 9 Constant 1	621	624	i	4	1	6		
Temperature-radiance Ch 9 Constant 2	625	628	i	4	1	6		
Temperature-radiance Ch 10 Central Wavenumber	629	632	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 10 Constant 1	633	636	i	4	1	6		
Temperature-radiance Ch 10 Constant 2	637	640	i	4	1	6		
Temperature-radiance Ch 11 Central Wavenumber	641	644	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 11 Constant 1	645	648	i	4	1	6		
Temperature-radiance Ch 11 Constant 2	649	652	i	4	1	6		
Temperature-radiance Ch 12 Central Wavenumber	653	656	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 12 Constant 1	657	660	i	4	1	6		
Temperature-radiance Ch 12 Constant 2	661	664	i	4	1	6		
Temperature-radiance Ch 13 Central Wavenumber	665	668	i	4	1	5	cm^{-1}	

Temperature-radiance Ch 13 Constant 1	669	672	i	4	1	6		
Temperature-radiance Ch 13 Constant 2	673	676	i	4	1	6		
Temperature-radiance Ch 14 Central Wavenumber	677	680	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 14 Constant 1	681	684	i	4	1	6		
Temperature-radiance Ch 14 Constant 2	685	688	i	4	1	6		
Temperature-radiance Ch 15 Central Wavenumber	689	692	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 15 Constant 1	693	696	i	4	1	6		
Temperature-radiance Ch 15 Constant 2	697	700	i	4	1	6		
Temperature-radiance Ch 16 Central Wavenumber	701	704	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 16 Constant 1	705	708	i	4	1	6		
Temperature-radiance Ch 16 Constant 2	709	712	i	4	1	6		
Temperature-radiance Ch 17 Central Wavenumber	713	716	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 17 Constant 1	717	720	i	4	1	6		
Temperature-radiance Ch 17 Constant 2	721	724	i	4	1	6		
Temperature-radiance Ch 18 Central Wavenumber	725	728	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 18 Constant 1	729	732	i	4	1	6		
Temperature-radiance Ch 18 Constant 2	733	736	i	4	1	6		
Temperature-radiance Ch 19 Central Wavenumber	737	740	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 19 Constant 1	741	744	i	4	1	6		
Temperature-radiance Ch 19 Constant 2	745	748	i	4	1	6		
Albedo-radiance Ch 20 Solar Filtered Irradiance	749	750	i	2	1	6		
Albedo-radiance Ch 20 Equivalent Filter Width	751	752	i	2	1	6		
<zero fill>	753	760	i	4	2	0		
NAVIGATION								

Reference Ellipsoid Model ID The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately ± 65 meters. (WGS-72 = World Geodetic Survey 1972)	761	768	c	8	1	0		
Nadir Earth Location Tolerance	769	770	u	2	1	1	km	
Earth Location Bit Field bits 15 - 2: <zero fill> bit 1: reasonableness test active (0 = inactive) bit 0: attitude error correction (0 = not corrected)	771	772	u	2	1	0		
<zero fill>	773	774	i	2	1	0		
Constant Roll Attitude Error	775	776	i	2	1	3	degrees	
Constant Pitch Attitude Error	777	778	i	2	1	3	degrees	
Constant Yaw Attitude Error	779	780	i	2	1	3	degrees	
Epoch Year for Orbit Vector	781	782	u	2	1	0		
Day of Epoch Year for Orbit Vector	783	784	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	785	788	u	4	1	0	milli-second	
Semi-major Axis	789	792	i	4	1	5	km	
Eccentricity	793	796	i	4	1	8		
Inclination	797	800	i	4	1	5	degrees	
Argument of Perigee	801	804	i	4	1	5	degrees	
Right Ascension of the Ascending Node	805	808	i	4	1	5	degrees	
Mean Anomaly	809	812	i	4	1	5	degrees	
Position Vector X Component	813	816	i	4	1	5	km	
Position Vector Y Component	817	820	i	4	1	5	km	
Position Vector Z Component	821	824	i	4	1	5	km	
Velocity Vector X-dot Component	825	828	i	4	1	8	km /sec	
Velocity Vector Y-dot Component	829	832	i	4	1	8	km /sec	
Velocity Vector Z-dot Component	833	836	i	4	1	8	km /sec	

Earth/Sun Distance Ratio	837	840	u	4	1	6		
<zero fill>	841	856	i	4	4	0		
ANALOG TELEMETRY CONVERSION								
Radiator Temperature Coefficient 1	857	858	i	2	1	2	K	
Radiator Temperature Coefficient 2	859	860	i	2	1	2	K/volt	
Radiator Temperature Coefficient 3	861	862	i	2	1	3	$K/volt^2$	
Radiator Temperature Coefficient 4	863	864	i	2	1	3	$K/volt^3$	
Radiator Temperature Coefficient 5	865	866	i	2	1	3	$K/volt^4$	
Radiator Temperature Coefficient 6	867	868	i	2	1	5	$K/volt^5$	
Base Plate Temperature Coefficient 1	869	870	i	2	1	2	K	
Base Plate Temperature Coefficient 2	871	872	i	2	1	2	K/volt	
Base Plate Temperature Coefficient 3	873	874	i	2	1	3	$K/volt^2$	
Base Plate Temperature Coefficient 4	875	876	i	2	1	3	$K/volt^3$	
Base Plate Temperature Coefficient 5	877	878	i	2	1	3	$K/volt^4$	
Base Plate Temperature Coefficient 6	879	880	i	2	1	5	$K/volt^5$	
Electronics Temperature Coefficient 1	881	882	i	2	1	2	K	
Electronics Temperature Coefficient 2	883	884	i	2	1	2	K/volt	
Electronics Temperature Coefficient 3	885	886	i	2	1	3	$K/volt^2$	
Electronics Temperature Coefficient 4	887	888	i	2	1	3	$K/volt^3$	
Electronics Temperature Coefficient 5	889	890	i	2	1	3	$K/volt^4$	
Electronics Temperature Coefficient 6	891	892	i	2	1	5	$K/volt^5$	
Patch Temperature Coefficient 1	893	894	i	2	1	2	K	
Patch Temperature Coefficient 2	895	896	i	2	1	2	K/volt	
Patch Temperature Coefficient 3	897	898	i	2	1	3	$K/volt^2$	
Patch Temperature Coefficient 4	899	900	i	2	1	3	$K/volt^3$	
Patch Temperature Coefficient 5	901	902	i	2	1	3	$K/volt^4$	
Patch Temperature Coefficient 6	903	904	i	2	1	5	$K/volt^5$	

Filter Housing Controller Current Coefficient 1	905	906	i	2	1	2	amps	
Filter Housing Controller Current Coefficient 2	907	908	i	2	1	2	amps/ volt	
Filter Housing Controller Current Coefficient 3	909	910	i	2	1	3	amps/ $volt^2$	
Filter Housing Controller Current Coefficient 4	911	912	i	2	1	3	amps/ $volt^3$	
Filter Housing Controller Current Coefficient 5	913	914	i	2	1	3	amps/ $volt^4$	
Filter Housing Controller Current Coefficient 6	915	916	i	2	1	5	amps/ $volt^5$	
Scan Motor Temperature Coefficient 1	917	918	i	2	1	2	K	
Scan Motor Temperature Coefficient 2	919	920	i	2	1	2	K/volt	
Scan Motor Temperature Coefficient 3	921	922	i	2	1	3	$K/volt^2$	
Scan Motor Temperature Coefficient 4	923	924	i	2	1	3	$K/volt^3$	
Scan Motor Temperature Coefficient 5	925	926	i	2	1	3	$K/volt^4$	
Scan Motor Temperature Coefficient 6	927	928	i	2	1	5	$K/volt^5$	
Filter Wheel Motor Temperature Coefficient 1	929	930	i	2	1	2	K	
Filter Wheel Motor Temperature Coefficient 2	931	932	i	2	1	2	K/volt	
Filter Wheel Motor Temperature Coefficient 3	933	934	i	2	1	3	$K/volt^2$	
Filter Wheel Motor Temperature Coefficient 4	935	936	i	2	1	3	$K/volt^3$	
Filter Wheel Motor Temperature Coefficient 5	937	938	i	2	1	3	$K/volt^4$	
Filter Wheel Motor Temperature Coefficient 6	939	940	i	2	1	5	$K/volt^5$	
+5 VDC Monitor Coefficient 1	941	942	i	2	1	2		
+5 VDC Monitor Coefficient 2	943	944	i	2	1	2		
+5 VDC Monitor Coefficient 3	945	946	i	2	1	3		
+5 VDC Monitor Coefficient 4	947	948	i	2	1	3		

+5 VDC Monitor Coefficient 5	949	950	i	2	1	3		
+5 VDC Monitor Coefficient 6	951	952	i	2	1	5		
+10 VDC TLM/DC/DC Coefficient 1	953	954	i	2	1	2		
+10 VDC TLM/DC/DC Coefficient 2	955	956	i	2	1	2		
+10 VDC TLM/DC/DC Coefficient 3	957	958	i	2	1	3		
+10 VDC TLM/DC/DC Coefficient 4	959	960	i	2	1	3		
+10 VDC TLM/DC/DC Coefficient 5	961	962	i	2	1	3		
+10 VDC TLM/DC/DC Coefficient 6	963	964	i	2	1	5		
+7.5 VDC TLM/DC/DC Coefficient 1	965	966	i	2	1	2		
+7.5 VDC TLM/DC/DC Coefficient 2	967	968	i	2	1	2		
+7.5 VDC TLM/DC/DC Coefficient 3	969	970	i	2	1	3		
+7.5 VDC TLM/DC/DC Coefficient 4	971	972	i	2	1	3		
+7.5 VDC TLM/DC/DC Coefficient 5	973	974	i	2	1	3		
+7.5 VDC TLM/DC/DC Coefficient 6	975	976	i	2	1	5		
-7.5 VDC TLM/DC/DC Coefficient 1	977	978	i	2	1	2		
-7.5 VDC TLM/DC/DC Coefficient 2	979	980	i	2	1	2		
-7.5 VDC TLM/DC/DC Coefficient 3	981	982	i	2	1	3		
-7.5 VDC TLM/DC/DC Coefficient 4	983	984	i	2	1	3		
-7.5 VDC TLM/DC/DC Coefficient 5	985	986	i	2	1	3		
-7.5 VDC TLM/DC/DC Coefficient 6	987	988	i	2	1	5		
+15 VDC Monitor Coefficient 1	989	990	i	2	1	2		
+15 VDC Monitor Coefficient 2	991	992	i	2	1	2		
+15 VDC Monitor Coefficient 3	993	994	i	2	1	3		
+15 VDC Monitor Coefficient 4	995	996	i	2	1	3		
+15 VDC Monitor Coefficient 5	997	998	i	2	1	3		
+15 VDC Monitor Coefficient 6	999	1000	i	2	1	5		
-15 VDC Monitor Coefficient 1	1001	1002	i	2	1	2		
-15 VDC Monitor Coefficient 2	1003	1004	i	2	1	2		

-15 VDC Monitor Coefficient 3	1005	1006	i	2	1	3		
-15 VDC Monitor Coefficient 4	1007	1008	i	2	1	3		
-15 VDC Monitor Coefficient 5	1009	1010	i	2	1	3		
-15 VDC Monitor Coefficient 6	1011	1012	i	2	1	5		
Filter Wheel Motor Current Coefficient 1	1013	1014	i	2	1	2	amps	
Filter Wheel Motor Current Coefficient 2	1015	1016	i	2	1	2	amps/ volt	
Filter Wheel Motor Current Coefficient 3	1017	1018	i	2	1	3	amps/ $volt^2$	
Filter Wheel Motor Current Coefficient 4	1019	1020	i	2	1	3	amps/ $volt^3$	
Filter Wheel Motor Current Coefficient 5	1021	1022	i	2	1	3	amps/ $volt^4$	
Filter Wheel Motor Current Coefficient 6	1023	1024	i	2	1	5	amps/ $volt^5$	
Scan Motor Current Coefficient 1	1025	1026	i	2	1	2	amps	
Scan Motor Current Coefficient 3	1029	1030	i	2	1	3	amps/ $volt^2$	
Scan Motor Current Coefficient 4	1031	1032	i	2	1	3	amps/ $volt^3$	
Scan Motor Current Coefficient 5	1033	1034	i	2	1	3	amps/ $volt^4$	
Scan Motor Current Coefficient 6	1035	1036	i	2	1	5	amps/ $volt^5$	
Patch Controller Power Coefficient 1	1037	1038	i	2	1	2	watts	
Patch Controller Power Coefficient 2	1039	1040	i	2	1	2	watts/ volt	
Patch Controller Power Coefficient 3	1041	1042	i	2	1	3	watts/ $volt^2$	
Patch Controller Power Coefficient 4	1043	1044	i	2	1	3	watts/ $volt^3$	
Patch Controller Power Coefficient 5	1045	1046	i	2	1	3	watts/ $volt^4$	

Patch Controller Power Coefficient 6	1047	1048	i	2	1	5	watts/ $volt^5$	
FILLER								
<zero fill>	1049	4608	i	4	890	0		

8.3.1.5.2.2 HIRS/4 (Flown on NOAA-N, -N', version 4, post-January 25, 2006, all spacecraft)

This section describes the HIRS/4 Data Set Header Record format (version 4, post-January 25, 2006, all spacecraft) and is documented in Table 8.3.1.5.2.2-1.

Table 8.3.1.5.2.2-1. Format of HIRS/4 Data Set Header Record (Flown on NOAA KLM, version 4, post-January 25, 2006)

Field Name	Start Octet	End Octet	DT	Word Size	Number of Words	SF	Units	Notes
FILE IDENTIFICATION								
Data Set Creation Site ID CMS = Centre de Meteorologie Spatiale/France; DSS = Dundee Satellite Receiving Station/UK; NSS = National Environmental Satellite, Data and Information Service/USA; UKM = United Kingdom Meteorological Office/UK	1	3	c	3	1	0		
<ASCII blank = x20>	4	4	c	1	1	0		
NOAA Level 1b Format Version Number 1=TIROS-N, NOAA-6 through NOAA-14 2=NOAA-15, -16, -17 (pre-April 28, 2005 3=all satellites post-April 28, 2005, 4=cloud mask flag (CLAVR-x)-Jan 25, 2006	5	6	u	2	1	0		
NOAA Level 1b Format Version Year (e.g., 1999)	7	8	u	2	1	0		
NOAA Level 1b Format Version Day of Year (e.g., 365)	9	10	u	2	1	0		

<Reserved for Logical Record Length> For Creation Site use only. Logical Record Length of NOAA Level 1b data set prior to processing.	11	12	u	2	1	0	octets	
<Reserved for Block Size> For Creation Site use only. Block Size of NOAA Level 1b data set prior to processing.	13	14	u	2	1	0	octets	
Count of Header Records in this Data Set	15	16	u	2	1	0		
<zero fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		
NOAA Spacecraft Identification Code 2 = NOAA-16; 4 = NOAA-15; 6 = NOAA-17; 7 = NOAA-18; 8 = NOAA-N' 11 = MetOp-1 12 = MetOp-A 13 = MetOp-3	73	74	u	2	1	0		
Instrument ID 301 = s/n H301 (NOAA-16); 302 = s/n H302 (NOAA-15); 303 = s/n H303 (NOAA-17); 305 = s/n H305 (NOAA-18); 308 = s/n H308 (NOAA-N') 306 = s/n H306 (MetOp-A) 307 = s/n H307 (MetOp-1)	75	76	u	2	1	0		
Data Type Code 5 = HIRS	77	78	u	2	1	0		
TIP Source Code *(NOAA: values defined below)* or <Zero fill> *(MetOp)* 0 = unused, GAC/HRPT/LAC data; 1 = GAC embedded AMSU and TIP; 2 = stored TIP; 3 = HRPT/LAC embedded AMSU and TIP; 4 = stored AIP	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year (e.g., 1999)	85	86	u	2	1	0		

Start of Data Set Day of Year (e.g., 365)	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	milli-second	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year (e.g., 1999)	97	98	u	2	1	0		
End of Data Set Day of Year (e.g., 365)	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	milli-second	
Year of Last CPIDS Update (e.g., 1999)	105	106	u	2	1	0		
Day of Year of Last CPIDS Update (e.g., 365)	107	108	u	2	1	0		
Offset between Start of Scan and Center of First FOV	109	110	i	2	1	0	milli-second	
Instrument type HIRS/3 HIRS/4	111	116	c	6	1	0		
DATA SET QUALITY INDICATORS								
Instrument Status bits 31-16: <zero fill> bit 15: Instrument power (0=off; 1=on) bit 14: Electronics power (0=off; 1=on) bit 13: Filter motor power (0=off; 1=on) bit 12: Scan motor power (0=off; 1=on) bit 11: Cooler heater (0=off; 1=on) bit 10: Filter housing heater(0=off; 1=on) bit 9: Cooler door release (0=disabled; 1=enabled) bit 8: Cooler window heater (0=on; 1=off) bit 7: Go to NADIR position (0=no; 1=yes/initiated) bit 6: Calibration sequence (0=disabled; 1=enabled) bit 5: Cooler door closed (0=yes; 1=no) bit 4: Cooler door fully open (0=yes; 1=no) bit 3: Filter motor power level (0=normal; 1=high) bit 2: Patch temperature controller (0=off; 1=on) bits 1-0: <zero fill>	117	120	u	4	1	0		
<zero fill>	121	122	i	2	1	0		

Record Number of Status Change (if 0, none occurred)	123	124	u	2	1	0		
Second Instrument Status (if previous word is 0, no change)	125	128	u	4	1	0		
Count of Data Records in this Data Set	129	130	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set	131	132	u	2	1	0		
Count of Missing Scan Lines	133	134	u	2	1	0		
Count of Data Gaps in this Data Set	135	136	u	2	1	0		
Count of Data Frames Without Frame Sync Word Errors *(NOAA)* or <Zero fill> *(MetOp)*	137	138	u	2	1	0		
Count of PACS Detected TIP Parity Errors*(NOAA)* or <Zero fill> *(MetOp)*	139	140	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data *(NOAA)* or <Zero fill> *(MetOp)*	141	142	u	2	1	0		
Time Sequence Error (0 = none; otherwise the record number of the first occurrence)	143	144	u	2	1	0		
Time Sequence Error Code *These are bit flags taken from Scan Line Quality Flags Time Problem Code on data record reported in Time Sequence Error field above.* If a bit is on (=1) then the statement is true. bits 15 - 8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time. bit 6: time field is bad and can't be inferred from the previous good time. bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. bit 4: start of a sequence that apparently repeats scan times that have been previously accepted. bits 3 - 0: <zero fill>	145	146	u	2	1	0		

SOCC Clock Update Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	147	148	u	2	1	0		
Earth Location Error Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	149	150	u	2	1	0		
Earth Location Error Code *These are bit flags taken from Scan Line Quality Flags Earth Location Problem Code on data record reported in Earth Location Error Indicator field above.* If a bit is on (=1) then the statement is true. bits 15 - 8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero filled. bit 6: earth location questionable because of questionable time code. (See time problem flags above.) bit 5: earth location questionable -- only marginal agreement with reasonableness check. bit 4: earth location questionable -- fails reasonableness check. bits 3-2: <zero fill> bit 1: not earth located because of in-plane maneuver (MetOp) or <zero fill> (NOAA) bit 0: not earth located because of out-of-plane maneuver (MetOp) or <zero fill> (NOAA)	151	152	u	2	1	0		
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudo noise (0 = normal data; 1 = P/N data) bit 1: tape direction (0 = time decrementing) bit 0: data mode (0 = test data; 1 = flight data)	153	154	u	2	1	0		
PACS Data Source 0 = unused; 1 = Fairbanks, AK; 2 = Wallops Is, VA; 3 = SOCC; 4 = Svalbard, Norway; 5 = Monterey, CA	155	156	u	2	1	0		

<zero fill>	157	160	i	4	1	0		
<Reserved for the Ingester>	161	168	c	8	1	0		
<Reserved for Decommutation>	169	176	c	8	1	0		
<zero fill>	177	186	i	2	5	0		
CALIBRATION								
Auto Calibration Indicators Bit Field bits 15-1: <zero fill> bit 0: auto calibration override switch for HIRS/4 (0=normal calibration sequence enabled during entire time period of this data set; 1=calibration sequence was disabled at some point during time period of this data set)	187	188	u	2	1	0		
Year of Most Recent Solar Channel Calibration (e.g., 1999)	189	190	u	2	1	0		
Day of Year of Most Recent Solar Channel Calibration (e.g., 365)	191	192	u	2	1	0		
Ch. 1 Mean Calibration Slope	193	196	i	4	1	6		
Ch. 1 Standard Deviation of Calibration Slope	197	200	i	4	1	6		
Ch. 1 B_1	201	204	i	4	1	6		
Std Deviation of Linear Regression for B_1 Ch 1	205	208	i	4	1	6		
Ch. 17 Mean Calibration Slope	209	212	i	4	1	6		
Ch. 17 Standard Deviation of Calibration Slope	213	216	i	4	1	6		
Ch. 17 B_1	217	220	i	4	1	6		
Ch. 17 Std Deviation of Linear Regression for B_1	221	224	i	4	1	6		
Ch. 2 Mean Calibration Slope	225	228	i	4	1	6		
Ch. 2 Standard Deviation of Calibration Slope	229	232	i	4	1	6		
Ch. 2 B_1	233	236	i	4	1	6		

Ch. 2 Std Deviation of Linear Regression for B_1	237	240	i	4	1	6		
Ch. 3 Mean Calibration Slope	241	244	i	4	1	6		
Ch. 2 Standard Deviation of Calibration Slope	245	248	i	4	1	6		
Ch. 3 B_1	249	252	i	4	1	6		
Ch. 3 Std Deviation of Linear Regression for B_1	253	256	i	4	1	6		
Ch. 13 Mean Calibration Slope	257	260	i	4	1	6		
Ch. 13 Standard Deviation of Calibration Slope	261	264	i	4	1	6		
Ch. 13 B_1	265	268	i	4	1	6		
Ch. 13 Std Deviation of Linear Regression for B_1	269	272	i	4	1	6		
Ch. 4 Mean Calibration Slope	273	276	i	4	1	6		
Ch. 4 Standard Deviation of Calibration Slope	277	280	i	4	1	6		
Ch. 4 B_1	281	284	i	4	1	6		
Ch. 4 Std Deviation of Linear Regression for B_1	285	288	i	4	1	6		
Ch. 18 Mean Calibration Slope	289	292	i	4	1	6		
Ch. 18 Standard Deviation of Calibration Slope	293	296	i	4	1	6		
Ch. 18 B_1	297	300	i	4	1	6		
Ch. 18 Std Deviation of Linear Regression for B_1	301	304	i	4	1	6		
Ch. 11 Mean Calibration Slope	305	308	i	4	1	6		
Ch. 11 Standard Deviation of Calibration Slope	309	312	i	4	1	6		
Ch. 11 B_1	313	316	i	4	1	6		
Ch. 11 Std Deviation of Linear Regression for B_1	317	320	i	4	1	6		
Ch. 19 Mean Calibration Slope	321	324	i	4	1	6		

Ch. 19 Standard Deviation of Calibration Slope	325	328	i	4	1	6		
Ch. 19 B_1	329	332	i	4	1	6		
Ch. 19 Std Deviation of Linear Regression for B_1	333	336	i	4	1	6		
Ch. 7 Mean Calibration Slope	337	340	i	4	1	6		
Ch. 7 Standard Deviation of Calibration Slope	341	344	i	4	1	6		
Ch. 7 B_1	345	348	i	4	1	6		
Ch. 7 Std Deviation of Linear Regression for B_1	349	352	i	4	1	6		
Ch. 8 Mean Calibration Slope	353	356	i	4	1	6		
Ch. 8 Standard Deviation of Calibration Slope	357	360	i	4	1	6		
Ch. 8 B_1	361	364	i	4	1	6		
Ch. 8 Std Deviation of Linear Regression for B_1	365	368	i	4	1	6		
Ch. 20 Mean Calibration Slope	369	372	i	4	1	6		
Ch. 20 Standard Deviation of Calibration Slope	373	376	i	4	1	6		
Ch. 20 B_1	377	380	i	4	1	6		
Ch. 20 Std Deviation of Linear Regression for B_1	381	384	i	4	1	6		
Ch. 10 Mean Calibration Slope	385	388	i	4	1	6		
Ch. 10 Standard Deviation of Calibration Slope	389	392	i	4	1	6		
Ch. 10 B_1	393	396	i	4	1	6		
Ch. 10 Std Deviation of Linear Regression for B_1	397	400	i	4	1	6		
Ch. 14 Mean Calibration Slope	401	404	i	4	1	6		
Ch. 14 Standard Deviation of Calibration Slope	405	408	i	4	1	6		
Ch. 14 B_1	409	412	i	4	1	6		

Ch. 14 Std Deviation of Linear Regression for B_1	413	416	i	4	1	6		
Ch. 6 Mean Calibration Slope	417	420	i	4	1	6		
Ch. 6 Standard Deviation of Calibration Slope	421	424	i	4	1	6		
Ch. 6 B_1	425	428	i	4	1	6		
Ch. 6 Std Deviation of Linear Regression for B_1	429	432	i	4	1	6		
Ch. 5 Mean Calibration Slope	433	436	i	4	1	6		
Ch. 5 Standard Deviation of Calibration Slope	437	440	i	4	1	6		
Ch. 5 B_1	441	444	i	4	1	6		
Ch. 5 Std Deviation of Linear Regression for B_1	445	448	i	4	1	6		
Ch. 15 Mean Calibration Slope	449	452	i	4	1	6		
Ch. 15 Standard Deviation of Calibration Slope	453	456	i	4	1	6		
Ch. 15 B_1	457	460	i	4	1	6		
Ch. 15 Std Deviation of Linear Regression for B_1	461	464	i	4	1	6		
Ch. 12 Mean Calibration Slope	465	468	i	4	1	6		
Ch. 12 Standard Deviation of Calibration Slope	469	472	i	4	1	6		
Ch. 12 B_1	473	476	i	4	1	6		
Ch. 12 Std Deviation of Linear Regression for B_1	477	480	i	4	1	6		
Ch. 16 Mean Calibration Slope	481	484	i	4	1	6		
Ch. 16 Standard Deviation of Calibration Slope	485	488	i	4	1	6		
Ch. 16 B_1	489	492	i	4	1	6		
Ch. 16 Std Deviation of Linear Regression for B_1	493	496	i	4	1	6		
Ch. 9 Mean Calibration Slope	497	500	i	4	1	6		

Ch. 9 Standard Deviation of Calibration Slope	501	504	i	4	1	6		
Ch. 9 B_1	505	508	i	4	1	6		
Ch. 9 Std Deviation of Linear Regression for B_1	509	512	i	4	1	6		
<zero fill>	513	520	i	4	2	0		
TEMPERATURE-RADIANCE CONVERSION								
Temperature-radiance Ch 1 Central Wavenumber	521	524	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 1 Constant 1	525	528	i	4	1	6		
Temperature-radiance Ch 1 Constant 2	529	532	i	4	1	6		
Temperature-radiance Ch 2 Central Wavenumber	533	536	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 2 Constant 1	537	540	i	4	1	6		
Temperature-radiance Ch 2 Constant 2	541	544	i	4	1	6		
Temperature-radiance Ch 3 Central Wavenumber	545	548	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 3 Constant 1	549	552	i	4	1	6		
Temperature-radiance Ch 3 Constant 2	553	556	i	4	1	6		
Temperature-radiance Ch 4 Central Wavenumber	557	560	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 4 Constant 1	561	564	i	4	1	6		
Temperature-radiance Ch 4 Constant 2	565	568	i	4	1	6		
Temperature-radiance Ch 5 Central Wavenumber	569	572	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 5 Constant 1	573	576	i	4	1	6		
Temperature-radiance Ch 5 Constant 2	577	580	i	4	1	6		
Temperature-radiance Ch 6 Central Wavenumber	581	584	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 6 Constant 1	585	588	i	4	1	6		
Temperature-radiance Ch 6 Constant 2	589	592	i	4	1	6		

Temperature-radiance Ch 7 Central Wavenumber	593	596	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 7 Constant 1	597	600	i	4	1	6		
Temperature-radiance Ch 7 Constant 2	601	604	i	4	1	6		
Temperature-radiance Ch 8 Central Wavenumber	605	608	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 8 Constant 1	609	612	i	4	1	6		
Temperature-radiance Ch 8 Constant 2	613	616	i	4	1	6		
Temperature-radiance Ch 9 Central Wavenumber	617	620	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 9 Constant 1	621	624	i	4	1	6		
Temperature-radiance Ch 9 Constant 2	625	628	i	4	1	6		
Temperature-radiance Ch 10 Central Wavenumber	629	632	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 10 Constant 1	633	636	i	4	1	6		
Temperature-radiance Ch 10 Constant 2	637	640	i	4	1	6		
Temperature-radiance Ch 11 Central Wavenumber	641	644	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 11 Constant 1	645	648	i	4	1	6		
Temperature-radiance Ch 11 Constant 2	649	652	i	4	1	6		
Temperature-radiance Ch 12 Central Wavenumber	653	656	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 12 Constant 1	657	660	i	4	1	6		
Temperature-radiance Ch 12 Constant 2	661	664	i	4	1	6		
Temperature-radiance Ch 13 Central Wavenumber	665	668	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 13 Constant 1	669	672	i	4	1	6		
Temperature-radiance Ch 13 Constant 2	673	676	i	4	1	6		
Temperature-radiance Ch 14 Central Wavenumber	677	680	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 14 Constant 1	681	684	i	4	1	6		
Temperature-radiance Ch 14 Constant 2	685	688	i	4	1	6		

Temperature-radiance Ch 15 Central Wavenumber	689	692	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 15 Constant 1	693	696	i	4	1	6		
Temperature-radiance Ch 15 Constant 2	697	700	i	4	1	6		
Temperature-radiance Ch 16 Central Wavenumber	701	704	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 16 Constant 1	705	708	i	4	1	6		
Temperature-radiance Ch 16 Constant 2	709	712	i	4	1	6		
Temperature-radiance Ch 17 Central Wavenumber	713	716	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 17 Constant 1	717	720	i	4	1	6		
Temperature-radiance Ch 17 Constant 2	721	724	i	4	1	6		
Temperature-radiance Ch 18 Central Wavenumber	725	728	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 18 Constant 1	729	732	i	4	1	6		
Temperature-radiance Ch 18 Constant 2	733	736	i	4	1	6		
Temperature-radiance Ch 19 Central Wavenumber	737	740	i	4	1	5	cm^{-1}	
Temperature-radiance Ch 19 Constant 1	741	744	i	4	1	6		
Temperature-radiance Ch 19 Constant 2	745	748	i	4	1	6		
Albedo-radiance Ch 20 Solar Filtered Irradiance	749	750	i	2	1	6	Watts/ m^2	
Albedo-radiance Ch 20 Equivalent Filter Width	751	752	i	2	1	6	μm	
<zero fill>	753	760	i	4	2	0		
NAVIGATION								
Reference Ellipsoid Model ID The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately ± 65 meters. (WGS-72 = World Geodetic Survey 1972) JGM3 =Joint Gravity Model 3	761	768	c	8	1	0		

Nadir Earth Location Tolerance	769	770	u	2	1	1	km	
Earth Location Bit Field bits 15 - 3: <zero fill> bit 2: dynamic attitude error correction (0=not performed; 1=performed) bit 1: reasonableness test active (0 = inactive; 1=performed) bit 0: attitude error correction (0 = not corrected; 1=performed)	771	772	u	2	1	0		
<zero fill>	773	774	i	2	1	0		
Constant Roll Attitude Error	775	776	i	2	1	3	degrees	
Constant Pitch Attitude Error	777	778	i	2	1	3	degrees	
Constant Yaw Attitude Error	779	780	i	2	1	3	degrees	
Epoch Year for Orbit Vector	781	782	u	2	1	0		
Day of Epoch Year for Orbit Vector	783	784	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	785	788	u	4	1	0	milli-second	
Semi-major Axis (at the orbit vector epoch time)	789	792	i	4	1	5	km	
Eccentricity (at the orbit vector epoch time)	793	796	i	4	1	8		
Inclination (at the orbit vector epoch time)	797	800	i	4	1	5	degrees	
Argument of Perigee(at the orbit vector epoch time)	801	804	i	4	1	5	degrees	
Right Ascension of the Ascending Node *(at the orbit vector epoch time)*	805	808	i	4	1	5	degrees	
Mean Anomaly *(at the orbit vector epoch time)*	809	812	i	4	1	5	degrees	
Position Vector X Component *(at the orbit vector epoch time)*	813	816	i	4	1	5	km	
Position Vector Y Component *(at the orbit vector epoch time)*	817	820	i	4	1	5	km	
Position Vector Z Component *(at the orbit vector epoch time)*	821	824	i	4	1	5	km	
Velocity Vector X-dot Component *(at the orbit vector epoch time)*	825	828	i	4	1	8	km/sec	

Velocity Vector Y-dot Component *(at the orbit vector epoch time)*	829	832	i	4	1	8	km/sec	
Velocity Vector Z-dot Component *(at the orbit vector epoch time)*	833	836	i	4	1	8	km/sec	
Earth/Sun Distance Ratio (at the orbit vector epoch time; relative to the mean distance of 1 AU)	837	840	u	4	1	6		
<zero fill>	841	856	i	4	4	0		
ANALOG TELEMETRY CONVERSION *Volts-to engineering units (e.g. temperature in Kelvin) conversion coefficients for the analog telemetry items***.**								
Radiator Temperature Coefficient 1	857	860	i	4	1	2	K	1
Radiator Temperature Coefficient 2	861	864	i	4	1	2	K/volt	1
Radiator Temperature Coefficient 3	865	868	i	4	1	3	$K/volt^2$	1
Radiator Temperature Coefficient 4	869	872	i	4	1	3	$K/volt^3$	1
Radiator Temperature Coefficient 5	873	876	i	4	1	3	$K/volt^4$	1
Radiator Temperature Coefficient 6	877	880	i	4	1	5	$K/volt^5$	1
Base Plate Temperature Coefficient 1	881	884	i	4	1	2	K	1
Base Plate Temperature Coefficient 2	885	888	i	4	1	2	K/volt	1
Base Plate Temperature Coefficient 3	889	892	i	4	1	3	$K/volt^2$	1
Base Plate Temperature Coefficient 4	893	896	i	2	1	3	$K/volt^3$	1
Base Plate Temperature Coefficient 5	897	900	i	2	1	3	$K/volt^4$	1
Base Plate Temperature Coefficient 6	901	904	i	2	1	5	$K/volt^5$	1
Electronics Temperature Coefficient 1	905	908	i	4	1	2	K	1
Electronics Temperature Coefficient 2	909	912	i	4	1	2	K/volt	1
Electronics Temperature Coefficient 3	913	916	i	4	1	3	$K/volt^2$	1
Electronics Temperature Coefficient 4	917	920	i	4	1	3	$K/volt^3$	1
Electronics Temperature Coefficient 5	921	924	i	4	1	3	$K/volt^4$	1
Electronics Temperature Coefficient 6	925	928	i	4	1	5	$K/volt^5$	1
Patch Temperature Coefficient 1	929	932	i	4	1	2	K	1
Patch Temperature Coefficient 2	933	936	i	4	1	2	K/volt	1

Patch Temperature Coefficient 3	937	940	i	4	1	3	$K/volt^2$	1
Patch Temperature Coefficient 4	941	944	i	4	1	3	$K/volt^3$	1
Patch Temperature Coefficient 5	945	948	i	4	1	3	$K/volt^4$	1
Patch Temperature Coefficient 6	949	952	i	4	1	5	$K/volt^5$	1
Filter Housing Controller Current Coefficient 1	953	956	i	4	1	2	amps	1
Filter Housing Controller Current Coefficient 2	957	960	i	4	1	2	amps/ volt	1
Filter Housing Controller Current Coefficient 3	961	964	i	4	1	3	amps/ $volt^2$	1
Filter Housing Controller Current Coefficient 4	965	968	i	4	1	3	amps/ $volt^3$	1
Filter Housing Controller Current Coefficient 5	969	972	i	4	1	3	amps/ $volt^4$	1
Filter Housing Controller Current Coefficient 6	973	976	i	4	1	5	amps/ $volt^5$	1
Scan Motor Temperature Coefficient 1	977	980	i	4	1	2	K	1
Scan Motor Temperature Coefficient 2	981	984	i	4	1	2	K/volt	1
Scan Motor Temperature Coefficient 3	985	988	i	4	1	3	$K/volt^2$	1
Scan Motor Temperature Coefficient 4	989	992	i	4	1	3	$K/volt^3$	1
Scan Motor Temperature Coefficient 5	993	996	i	4	1	3	$K/volt^4$	1
Scan Motor Temperature Coefficient 6	997	1000	i	4	1	5	$K/volt^5$	1
Filter Wheel Motor Temperature Coefficient 1	1001	1004	i	4	1	2	K	1
Filter Wheel Motor Temperature Coefficient 2	1005	1008	i	4	1	2	K/volt	1
Filter Wheel Motor Temperature Coefficient 3	1009	1012	i	4	1	3	$K/volt^2$	1
Filter Wheel Motor Temperature Coefficient 4	1013	1016	i	4	1	3	$K/volt^3$	1
Filter Wheel Motor Temperature Coefficient 5	1017	1020	i	4	1	3	$K/volt^4$	1
Filter Wheel Motor Temperature Coefficient 6	1021	1024	i	4	1	5	$K/volt^5$	1

+5 VDC Monitor Coefficient 1	1025	1028	i	4	1	2		1
+5 VDC Monitor Coefficient 2	1029	1032	i	4	1	2		1
+5 VDC Monitor Coefficient 3	1033	1036	i	4	1	3		1
+5 VDC Monitor Coefficient 4	1037	1040	i	4	1	3		1
+5 VDC Monitor Coefficient 5	1041	1044	i	4	1	3		1
+5 VDC Monitor Coefficient 6	1045	1048	i	4	1	5		1
+10 VDC TLM/DC/DC Coefficient 1	1049	1052	i	4	1	2		1
+10 VDC TLM/DC/DC Coefficient 2	1053	1056	i	4	1	2		1
+10 VDC TLM/DC/DC Coefficient 3	1057	1060	i	4	1	3		1
+10 VDC TLM/DC/DC Coefficient 4	1061	1064	i	4	1	3		1
+10 VDC TLM/DC/DC Coefficient 5	1065	1068	i	4	1	3		1
+10 VDC TLM/DC/DC Coefficient 6	1069	1072	i	4	1	5		1
+7.5 VDC TLM/DC/DC Coefficient 1	1073	1076	i	4	1	2		1
+7.5 VDC TLM/DC/DC Coefficient 2	1077	1080	i	4	1	2		1
+7.5 VDC TLM/DC/DC Coefficient 3	1081	1084	i	4	1	3		1
+7.5 VDC TLM/DC/DC Coefficient 4	1085	1088	i	4	1	3		1
+7.5 VDC TLM/DC/DC Coefficient 5	1089	1092	i	4	1	3		1
+7.5 VDC TLM/DC/DC Coefficient 6	1093	1096	i	4	1	5		1
-7.5 VDC TLM/DC/DC Coefficient 1	1097	1100	i	4	1	2		1
-7.5 VDC TLM/DC/DC Coefficient 2	1101	1104	i	4	1	2		1
-7.5 VDC TLM/DC/DC Coefficient 3	1105	1108	i	4	1	3		1
-7.5 VDC TLM/DC/DC Coefficient 4	1109	1112	i	4	1	3		1
-7.5 VDC TLM/DC/DC Coefficient 5	1113	1116	i	4	1	3		1
-7.5 VDC TLM/DC/DC Coefficient 6	1117	1120	i	4	1	5		1
+15 VDC Monitor Coefficient 1	1121	1124	i	4	1	2		1
+15 VDC Monitor Coefficient 2	1125	1128	i	4	1	2		1
+15 VDC Monitor Coefficient 3	1129	1132	i	4	1	3		1
+15 VDC Monitor Coefficient 4	1133	1136	i	4	1	3		1

+15 VDC Monitor Coefficient 5	1137	1140	i	4	1	3		1
+15 VDC Monitor Coefficient 6	1141	1144	i	4	1	5		1
-15 VDC Monitor Coefficient 1	1145	1148	i	4	1	2		1
-15 VDC Monitor Coefficient 2	1149	1152	i	4	1	2		1
-15 VDC Monitor Coefficient 3	1153	1156	i	4	1	3		1
-15 VDC Monitor Coefficient 4	1157	1160	i	4	1	3		1
-15 VDC Monitor Coefficient 5	1161	1164	i	4	1	3		1
-15 VDC Monitor Coefficient 6	1165	1168	i	4	1	5		
Filter Wheel Motor Current Coefficient 1	1169	1172	i	4	1	2	amps	1
Filter Wheel Motor Current Coefficient 2	1173	1176	i	4	1	2	amps/ volt	1
Filter Wheel Motor Current Coefficient 3	1177	1180	i	4	1	3	amps/ $volt^2$	1
Filter Wheel Motor Current Coefficient 4	1181	1184	i	4	1	3	amps/ $volt^3$	1
Filter Wheel Motor Current Coefficient 5	1185	1188	i	4	1	3	amps/ $volt^4$	1
Filter Wheel Motor Current Coefficient 6	1189	1192	i	4	1	5	amps/ $volt^5$	1
Scan Motor Current Coefficient 1	1193	1196	i	4	1	2	amps	1
Scan Motor Current Coefficient 2	1197	1200	i	4	1	2	amps/ volt	1
Scan Motor Current Coefficient 3	1201	1204	i	4	1	3	amps/ $volt^2$	1
Scan Motor Current Coefficient 4	1205	1208	i	4	1	3	amps/ $volt^3$	1
Scan Motor Current Coefficient 5	1209	1212	i	4	1	3	amps/ $volt^4$	1
Scan Motor Current Coefficient 6	1213	1216	i	4	1	5	amps/ $volt^5$	1
Patch Controller Power Coefficient 1	1217	1220	i	4	1	2	watts	1
Patch Controller Power Coefficient 2	1221	1224	i	4	1	2	watts/ volt	1

Patch Controller Power Coefficient 3	1225	1228	i	4	1	3	watts/ $volt^2$	1
Patch Controller Power Coefficient 4	1229	1232	i	4	1	3	watts/ $volt^3$	1
Patch Controller Power Coefficient 5	1233	1236	i	4	1	3	watts/ $volt^4$	1
Patch Controller Power Coefficient 6	1237	1240	i	4	1	5	watts/ $volt^5$	1
Digital A Telemetry Conversion								
Internal Warm Target, Temperature Sensor #1, Coefficient 1	1241	1244	i	4	1	6	K	
Internal Warm Target, Temperature Sensor #1, Coefficient 2	1245	1248	i	4	1	9	K/ count	
Internal Warm Target, Temperature Sensor #1, Coefficient 3	1249	1252	i	4	1	14	K/ $count^2$	
Internal Warm Target, Temperature Sensor #1, Coefficient 4	1253	1256	i	4	1	17	K/ $count^3$	
Internal Warm Target, Temperature Sensor #1, Coefficient 5	1257	1260	i	4	1	21	K/ $count^4$	
Internal Warm Target, Temperature Sensor #1, Coefficient 6	1261	1264	i	4	1	25	K/ $count^5$	
Internal Warm Target, Temperature Sensor #2, Coefficient 1	1265	1268	i	4	1	6	K	
Internal Warm Target, Temperature Sensor #2, Coefficient 2	1269	1272	i	4	1	9	K/ count	
Internal Warm Target, Temperature Sensor #2, Coefficient 3	1273	1276	i	4	1	14	K/ $count^2$	
Internal Warm Target, Temperature Sensor #2, Coefficient 4	1277	1280	i	4	1	17	K/ $count^3$	
Internal Warm Target, Temperature Sensor #2, Coefficient 5	1281	1284	i	4	1	21	K/ $count^4$	
Internal Warm Target, Temperature Sensor #2, Coefficient 6	1285	1288	i	4	1	25	K/ $count^5$	
Internal Warm Target, Temperature Sensor #3, Coefficient 1	1289	1292	i	4	1	6	K	

Internal Warm Target, Temperature Sensor #3, Coefficient 2	1293	1296	i	4	1	9	K/ count	
Internal Warm Target, Temperature Sensor #3, Coefficient 3	1297	1300	i	4	1	14	K/ count^2	
Internal Warm Target, Temperature Sensor #3, Coefficient 4	1301	1304	i	4	1	17	K count^3	
Internal Warm Target, Temperature Sensor #3, Coefficient 5	1305	1308	i	4	1	21	K/ count^4	
Internal Warm Target, Temperature Sensor #3, Coefficient 6	1309	1312	i	4	1	25	K/ count^5	
Internal Warm Target, Temperature Sensor #4, Coefficient 1	1313	1316	i	4	1	6	K	
Internal Warm Target, Temperature Sensor #4, Coefficient 2	1317	1320	i	4	1	9	K/ count	
Internal Warm Target, Temperature Sensor #4, Coefficient 3	1320	1324	i	4	1	14	K/ count^2	
Internal Warm Target, Temperature Sensor #4, Coefficient 4	1325	1328	i	4	1	17	K/ count^3	
Internal Warm Target, Temperature Sensor #4, Coefficient 5	1329	1332	i	4	1	21	K/ count^4	
Internal Warm Target, Temperature Sensor #4, Coefficient 6	1333	1336	i	4	1	25	K/ count^5	
Internal Warm Target, Temperature Sensor #5, Coefficient 1 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1337	1340	i	4	1	6	K	
Internal Warm Target, Temperature Sensor #5, Coefficient 2 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1341	1344	i	4	1	9	K/ count	
Internal Warm Target, Temperature Sensor #5, Coefficient 3 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1345	1348	i	4	1	14	K/ count^2	
Internal Warm Target, Temperature Sensor #5, Coefficient 4 (NOAA-N, N' and MetOp) or <zero fill> (NOAA KLM)	1349	1352	i	4	1	17	K/ count^3	
Internal Warm Target, Temperature Sensor #5, Coefficient 5 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1353	1356	i	4	1	21	K/ count^4	

Internal Warm Target, Temperature Sensor #5, Coefficient 6 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1357	1360	i	4	1	25	K/ count^5	
Internal Cold Target, Temperature Sensor #1, Coefficient 1	1361	1364	I	4	1	6	K	
Internal Cold Target, Temperature Sensor #1, Coefficient 2	1365	1368	i	4	1	9	K/ count	
Internal Cold Target, Temperature Sensor #1, Coefficient 3	1369	1372	i	4	1	14	K/ count^2	
Internal Cold Target, Temperature Sensor #1, Coefficient 4	1373	1376	i	4	1	17	K/ count^3	
Internal Cold Target, Temperature Sensor #1, Coefficient 5	1377	1380	i	4	1	21	K/ count^4	
Internal Cold Target, Temperature Sensor #1, Coefficient 6	1381	1384	i	4	1	25	K/ count^5	
Internal Cold Target, Temperature Sensor #2 , Coefficient 1 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1385	1388	I	4	1	6	K	
Internal Cold Target, Temperature Sensor #2, Coefficient 2 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1389	1392	i	4	1	9	K/ count	
Internal Cold Target, Temperature Sensor #2, Coefficient 3 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1393	1396	i	4	1	14	K/ count^2	
Internal Cold Target, Temperature Sensor #2, Coefficient 4 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1397	1400	i	4	1	17	K/ count^3	
Internal Cold Target, Temperature Sensor #2, Coefficient 5 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1401	1404	i	4	1	21	K/ count^4	
Internal Cold Target, Temperature Sensor #2, Coefficient 6 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1405	1408	i	4	1	25	K/ count^5	
Internal Cold Target, Temperature Sensor #3 , Coefficient 1 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1409	1412	I	4	1	6	K	
Internal Cold Target, Temperature Sensor #3, Coefficient 2 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1413	1416	i	4	1	9	K/ count	

Internal Cold Target, Temperature Sensor #3, Coefficient 3 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1417	1420	i	4	1	14	K/ count^2	
Internal Cold Target, Temperature Sensor #3, Coefficient 4 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1421	1424	i	4	1	17	K/ count^3	
Internal Cold Target, Temperature Sensor #3, Coefficient 5 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1425	1428	i	4	1	21	K/ count^4	
Internal Cold Target, Temperature Sensor #3, Coefficient 6 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp) N'and MetOp)	1429	1432	i	4	1	25	K/ count^5	
Internal Cold Target, Temperature Sensor #4 , Coefficient 1 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1433	1436	I	4	1	6	K	
Internal Cold Target, Temperature Sensor #4, Coefficient 2 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1437	1440	i	4	1	9	K/ count	
Internal Cold Target, Temperature Sensor #4, Coefficient 3 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1441	1444	i	4	1	14	K/ count^2	
Internal Cold Target, Temperature Sensor #4, Coefficient 4 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1445	1448	i	4	1	17	K/ count^3	
Internal Cold Target, Temperature Sensor #4, Coefficient 5 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1449	1452	i	4	1	21	K/ count^4	
Internal Cold Target, Temperature Sensor #4, Coefficient 6 (NOAA KLM) or <zero fill> (NOAA-N, N'and MetOp)	1453	1456	i	4	1	25	K/ count^5	
Tertiary Telescope Temperature Sensor Coefficient 1 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1457	1460	i	4	1	6	K	
Tertiary Telescope Temperature Sensor Coefficient 2 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1461	1464	i	4	1	9	K/ count	
Tertiary Telescope Temperature Sensor Coefficient 3 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1465	1468	i	4	1	14	K/ count^2	

Tertiary Telescope Temperature Sensor Coefficient 4 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1469	1472	i	4	1	17	K/ count^3	
Tertiary Telescope Temperature Sensor Coefficient 5 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1473	1476	i	4	1	21	K/ count^4	
Tertiary Telescope Temperature Sensor Coefficient 6 (NOAA-N, N'and MetOp) or <zero fill> (NOAA KLM)	1477	1480	i	4	1	25	K/ count^5	
Filter Wheel Housing, Temperature Sensor #1, Coefficient 1	1481	1484	i	4	1	6	K	
Filter Wheel Housing, Temperature Sensor #1, Coefficient 2	1485	1488	i	4	1	9	K/ count	
Filter Wheel Housing, Temperature Sensor #1, Coefficient 3	1489	1492	i	4	1	14	K/ count^2	
Filter Wheel Housing, Temperature Sensor #1, Coefficient 4	1495	1496	i	4	1	17	K/ count^3	
Filter Wheel Housing, Temperature Sensor #1, Coefficient 5	1497	1500	i	4	1	21	K/ count^4	
Filter Wheel Housing, Temperature Sensor #1, Coefficient 6	1501	1504	i	4	1	25	K/ count^5	
Filter Wheel Housing, Temperature Sensor #2, Coefficient 1	1505	1508	i	4	1	6	K	
Filter Wheel Housing, Temperature Sensor #2, Coefficient 2	1509	1512	i	4	1	9	K/ count	
Filter Wheel Housing, Temperature Sensor #2, Coefficient 3	1513	1516	i	4	1	14	K/ count^2	
Filter Wheel Housing, Temperature Sensor #2, Coefficient 4	1517	1520	i	4	1	17	K/ count^3	
Filter Wheel Housing, Temperature Sensor #2, Coefficient 5	1521	1524	i	4	1	21	K/ count^4	
Filter Wheel Housing, Temperature Sensor #2, Coefficient 6	1525	1528	i	4	1	25	K/ count^5	
Filter Wheel Housing, Temperature Sensor #3, Coefficient 1	1529	1532	i	4	1	6	K	
Filter Wheel Housing, Temperature Sensor #3, Coefficient 2	1533	1536	i	4	1	9	K/ count	

Filter Wheel Housing, Temperature Sensor #3, Coefficient 3	1537	1540	i	4	1	14	K/ $count^2$	
Filter Wheel Housing, Temperature Sensor #3, Coefficient 4	1541	1544	i	4	1	17	K/ $count^3$	
Filter Wheel Housing, Temperature Sensor #3, Coefficient 5	1545	1548	i	4	1	21	K/ $count^4$	
Filter Wheel Housing, Temperature Sensor #3, Coefficient 6	1549	1552	i	4	1	25	K/ $count^5$	
Filter Wheel Housing, Temperature Sensor #4, Coefficient 1	1553	1556	i	4	1	6	K	
Filter Wheel Housing, Temperature Sensor #4, Coefficient 2	1557	1560	i	4	1	9	K/ count	
Filter Wheel Housing, Temperature Sensor #4, Coefficient 3	1561	1564	i	4	1	14	K/ $count^2$	
Filter Wheel Housing, Temperature Sensor #4, Coefficient 4	1565	1568	i	4	1	17	K/ $count^3$	
Filter Wheel Housing, Temperature Sensor #4, Coefficient 5	1569	1572	i	4	1	21	K/ $count^4$	
Filter Wheel Housing, Temperature Sensor #4, Coefficient 6	1573	1576	i	4	1	25	K/ $count^5$	
Patch Temperature (Expanded Scale) Coefficient 1	1577	1580	i	4	1	6	K	
Patch Temperature (Expanded Scale) Coefficient 2	1581	1584	i	4	1	9	K/ count	
Patch Temperature (Expanded Scale) Coefficient 3	1585	1588	i	4	1	14	K/ $count^2$	
Patch Temperature (Expanded Scale) Coefficient 4	1589	1592	i	4	1	17	K/ $count^3$	
Patch Temperature (Expanded Scale) Coefficient 5	1593	1596	i	4	1	21	K/ $count^4$	
Patch Temperature (Expanded Scale) Coefficient 6	1597	1600	i	4	1	25	K/ $count^5$	
First Stage Radiator Temperature Sensor Coefficient 1	1601	1604	i	4	1	6	K	
First Stage Radiator Temperature Sensor Coefficient 2	1605	1608	i	4	1	9	K/ count	

First Stage Radiator Temperature Sensor Coefficient 3	1609	1612	i	4	1	14	K/ $count^2$	
First Stage Radiator Temperature Sensor Coefficient 4	1613	1616	i	4	1	17	K/ $count^3$	
First Stage Radiator Temperature Sensor Coefficient 5	1617	1620	i	4	1	21	K/ $count^4$	
First Stage Radiator Temperature Sensor Coefficient 6	1621	1624	i	4	1	25	K/ $count^5$	
Scan Mirror Temperature Coefficient 1	1625	1628	i	4	1	6	K	
Scan Mirror Temperature Coefficient 2	1629	1632	i	4	1	9	K/ count	
Scan Mirror Temperature Coefficient 3	1633	1636	i	4	1	14	K/ $count^2$	
Scan Mirror Temperature Coefficient 4	1637	1640	i	4	1	17	K/ $count^3$	
Scan Mirror Temperature Coefficient 5	1641	1644	i	4	1	21	K/ $count^4$	
Scan Mirror Temperature Coefficient 6	1645	1648	i	4	1	25	K/ $count^5$	
Primary Telescope Temperature Coefficient 1	1649	1652	i	4	1	6	K	
Primary Telescope Temperature Coefficient 2	1653	1656	i	4	1	9	K/ count	
Primary Telescope Temperature Coefficient 3	1657	1660	i	4	1	14	K/ $count^2$	
Primary Telescope Temperature Coefficient 4	1661	1664	i	4	1	17	K/ $count^3$	
Primary Telescope Temperature Coefficient 5	1665	1668	i	4	1	21	K/ $count^4$	
Primary Telescope Temperature Coefficient 6	1669	1672	i	4	1	25	K/ $count^5$	
Secondary Telescope Temperature Coefficient 1	1673	1676	i	4	1	6	K	
Secondary Telescope Temperature Coefficient 2	1677	1680	i	4	1	9	K/ count	

Secondary Telescope Temperature Coefficient 3	1681	1684	i	4	1	14	K/ count^2	
Secondary Telescope Temperature Coefficient 4	1685	1688	i	4	1	17	K/ count^3	
Secondary Telescope Temperature Coefficient 5	1689	1692	i	4	1	21	K/ count^4	
Secondary Telescope Temperature Coefficient 6	1693	1696	i	4	1	25	K/ count^5	
Baseplate Temperature Coefficient 1	1697	1700	i	4	1	6	K	
Baseplate Temperature Coefficient 2	1701	1704	i	4	1	9	K/ count	
Baseplate Temperature Coefficient 3	1705	1708	i	4	1	14	K/ count^2	
Baseplate Temperature Coefficient 4	1709	1712	i	4	1	17	K/ count^3	
Baseplate Temperature Coefficient 5	1713	1716	i	4	1	21	K/ count^4	
Baseplate Temperature Coefficient 6	1717	1720	i	4	1	25	K/ count^5	
Electronics Temperature Coefficient 1	1721	1724	i	4	1	6	K	
Electronics Temperature Coefficient 2	1725	1728	i	4	1	9	K/ count	
Electronics Temperature Coefficient 3	1729	1732	i	4	1	14	K/ count^2	
Electronics Temperature Coefficient 4	1733	1736	i	4	1	17	K/ count^3	
Electronics Temperature Coefficient 5	1737	1740	i	4	1	21	K/ count^4	
Electronics Temperature Coefficient 6	1741	1744	i	4	1	25	K/ count^5	
Patch Temperature Full Range Coefficient 1	1745	1748	i	4	1	6	K	
Patch Temperature Full Range Coefficient 2	1749	1752	i	4	1	9	K/ count	
Patch Temperature Full Range Coefficient 3	1753	1756	i	4	1	14	K/ count^2	

Patch Temperature Full Range Coefficient 4	1757	1760	i	4	1	17	K/ $count^3$	
Patch Temperature Full Range Coefficient 5	1761	1764	i	4	1	21	K/ $count^4$	
Patch Temperature Full Range Coefficient 6	1765	1768	i	4	1	25	K/ $count^5$	
Scan Motor Temperature Coefficient 1	1769	1772	i	4	1	6	K	
Scan Motor Temperature Coefficient 2	1773	1776	i	4	1	9	K/ count	
Scan Motor Temperature Coefficient 3	1777	1780	i	4	1	14	K/ $count^2$	
Scan Motor Temperature Coefficient 4	1781	1784	i	4	1	17	K/ $count^3$	
Scan Motor Temperature Coefficient 5	1785	1788	i	4	1	21	K/ $count^4$	
Scan Motor Temperature Coefficient 6	1789	1792	i	4	1	25	K/ $count^5$	
Filter Wheel Motor Temperature Coefficient 1	1793	1796	i	4	1	6	K	
Filter Wheel Motor Temperature Coefficient 2	1797	1800	i	4	1	9	K/ count	
Filter Wheel Motor Temperature Coefficient 3	1801	1804	i	4	1	14	K/ $count^2$	
Filter Wheel Motor Temperature Coefficient 4	1805	1808	i	4	1	17	K/ $count^3$	
Filter Wheel Motor Temperature Coefficient 5	1809	1812	i	4	1	21	K/ $count^4$	
Filter Wheel Motor Temperature Coefficient 6	1813	1816	i	4	1	25	K/ $count^5$	
Cooler Housing Temperature Coefficient 1	1817	1820	i	4	1	6	K	
Cooler Housing Temperature Coefficient 2	1821	1824	i	4	1	9	K/ count	
Cooler Housing Temperature Coefficient 3	1825	1828	i	4	1	14	K/ $count^2$	
Cooler Housing Temperature Coefficient 4	1829	1832	i	4	1	17	K/ $count^3$	

Cooler Housing Temperature Coefficient 5	1833	1836	i	4	1	21	K/ count^4	
Cooler Housing Temperature Coefficient 6	1837	1840	i	4	1	25	K/ count^5	
Filter Wheel Housing Heater Current Conversion Constant	1841	1844	i	4	1	9	amps/ count	
Electronic Calibration Digital to Analog Converter Conversion Constant	1845	1848	i	4	1	1		
Patch Control Power Conversion Constant	1849	1852	i	4	1	17	watts/ count^2	
Scan Motor Current Conversion Constant	1853	1856	i	4	1	9	amps/ count^3	
Filter Motor Current Conversion Constant	1857	1860	i	4	1	9	amps/ count	
+15 VDC Conversion Constant	1861	1864	i	4	1	8	volts/ count	
-15 VDC Conversion Constant	1865	1868	i	4	1	8	volts/ count	
+7.5 VDC Conversion Constant	1869	1872	i	4	1	8	volts/ count	
-7.5 VDC Conversion Constant	1873	1876	i	4	1	8	volts/ count	
+10 VDC Conversion Constant	1877	1880	i	4	1	8	volts/ count	
+5 VDC Conversion Constant	1881	1884	i	4	1	8	volts/ count	
Lunar Contamination								
Count of Space View Scans Containing Lunar Contaminated Space Views *(Also, see bits 1 and 0 of "Scan Line Quality Flags [Calibration Problem Code]" field in data record.)* -1=the detection algorithm for lunar contamination is turned off 0=the detection algorithm is turned on: no lunar-contaminated space view scans were found >0=the detection algorithm is turned on: the value in this field represents the number of lunar-contaminated space view scans	1885	1886	i	2	1	0		

Lunar Angle Threshold *Any space view whose lunar angle -- see "Lunar Angle" field in data record -- is less than this value is flagged as being "lunar contaminated" and is not used in the calibration.*	1887	1888	i	2	1	2	degree	
<Spare> (content undefined)	1889	1890	i	4	20	0		
MetOp Maneuvers Identification The fields in this section are MetOp specific. For NOAA originated HRIS data, these fields are spare (zero fill).								
Start of Maneuver Year *(four digits, e.g. 2000)*	1969	1970	u	2	1	0		
Start of Maneuver Day *(three digits, e.g. 365)*	1971	1972	u	2	1	0		
Start of Maneuver UTC Time of Day	1973	1976	u	4	1	0		
End of Maneuver Year *(four digits, e.g. 2000)*	1977	1978	u	2	1	0		
End of Maneuver Day *(three digits, e.g. 365)*	1979	1980	u	2	1	0		
End of Maneuver UTC Time of Day	1981	1984	u	4	1	0		
<zero fill>	1985	1996	u	4	3	1		
Spacecraft Mass Word 1: Mass before Maneuver Word 2: Mass after Maneuver	1997	2004	u	4	2	3	kg	
Filler								
<zero fill>	1969	4608	i	2	1320	0		
Notes: 1) 1 count = 0.02 volts								

8.3.1.5.3 Data Records

8.3.1.5.3.1 NOAA KLM (Version 2, pre-April 28, 2005)

The HIRS/3 Data Record format (Version 2, pre-April 28, 2005) is documented in Table 8.3.1.5.3.1-1.

Table 8.3.1.5.3.1-1. Format of HIRS/3 Data Record (Version 2, pre-April 28, 2005)

Field Name	Start Octet	End Octet	DT	Word Size	Number of Words	S F	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number (cumulative, starting with 1)	1	2	u	2	1	0		
Scan Line Year (e.g., 1999)	3	4	u	2	1	0		
Scan Line Day of Year (e.g., 365)	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	milli-seconds	
Scan Line UTC Time of Day	9	12	u	4	1	0	milli-seconds	
Scan Line Bit Field bit 15: 0 = northbound data; 1 = southbound data bit 14: 1 = scan time corrected for clock drift bits 13-0: <zero fill>	13	14	u	2	1	0		
Major Frame Count (cumulative, starting with 1)	15	16	u	2	1	0		
Scan Position Number in 32 Second Cycle	17	18	u	2	1	0		
Scan Type Code 0 = earth view; 1 = space view; 2 = cold BB view; 3 = main BB view	19	20	u	2	1	0		
<zero fill>	21	28	i	4	2	0		
QUALITY INDICATORS								
Quality Indicator Bit Field If a bit is on (=1) then the statement is true. bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan bit 28: insufficient data for calibration anomaly detected (see below) bit 27: earth location data not available	29	32	u	4	1	0		

(see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bits 24 - 0: <zero fill>								
Scan Line Quality Flags If a bit is on (=1) then the statement is true. *Time Problem Code* (All bits off implies the scan time is as expected.) bits 31-24: <zero fill> bit 23: time field is bad but can probably be inferred from the previous good time. bit 22: time field is bad and can't be inferred from the previous good time. bit 21: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field) bit 20: start of a sequence that apparently repeats scan times that have been previously accepted. bits 19 - 16: <zero fill> *Calibration Anomaly Problem Code* (Note these bits complement the channel indicators; all bits set to 0 indicates normal calibration.) bit 15: scan line was not calibrated because of bad time. bit 14: scan line was calibrated using fewer than the preferred number of scan lines because of proximity to start or end of data set or to a data gap. bit 13: scan line was not calibrated because of bad or insufficient PRT data. bit 12: scan line was calibrated but with marginal PRT data. bit 11: some uncalibrated channels on this scan (see channel indicators). bit 10: uncalibrated due to instrument mode. bits 9: moonlight detected in space views bit- 8: <zero fill>	33	36	u	4	1	0		

Earth Location Problem Code (all bits set to 0 implies the earth location was normal) bit 7: not earth located because of bad time; earth location fields zero filled. bit 6: earth location questionable because of questionable time code (see time problem flags above). bit 5: earth location questionable -- only marginal agreement with reasonableness check. bit 4: earth location questionable -- fails reasonableness check. bits 3-0: <zero fill>								
Calibration Quality Flags (all bits off implies a good calibration) *Word 1*: Channel 1 bit 15-6: <zero fill> bit 5: all bad blackbody counts for scan line bit 4: all bad space view counts for scan line bit 3: all bad PRTs for this line bit 2: marginal blackbody view counts for this line bit 1: marginal space view counts for this line bit 0: marginal PRT temperatures on this line *Words 2-20* Channels 17, 2, 3, 13, 4, 18, 11, 19, 7, 8, 20, 10, 14, 6, 5, 15, 12, 16, 9 (in order)	37	76	u	2	20	0		
Minor Frame Quality Indicator Bit Fields For bits 7 through 1, if bit is on (=1) then statement is true. *Word 1*: Minor Frame 0 bit 7: this frame suspect due to a time error bit 6: this frame contains data gap data fill bit 5: this frame contains TIP dwell data fill bit 4: data suspect due to PACS QC error bit 3: mirror locked during this frame bit 2: mirror position error during this	77	140	u	1	64	0		

frame bit 1: mirror was moving during this frame bit 0: minor word odd parity bit *Words 2 - 64*: Minor Frames 1 - 63 (in order)								
<zero fill>	141	156	i	4	4	0		
CALIBRATION COEFFICIENTS Note: The following coefficients are <zero fill> in commanded position modes (nadir, space, internal cold target, internal warm target). Refer to Data Element 63, First and Second Status Words for the current mode.								
Primary Calibration Ch 1 Second Order Term	157	160	i	4	1	12		
Primary Calibration Ch 1 First Order Term	161	164	i	4	1	9		
Primary Calibration Ch 1 Zeroth Order Term	165	168	i	4	1	6		
Primary Calibration Ch 17 Second Order Term	169	172	i	4	1	12		
Primary Calibration Ch 17 First Order Term	173	176	i	4	1	9		
Primary Calibration Ch 17 Zeroth Order Term	177	180	i	4	1	6		
Primary Calibration Ch 2 Second Order Term	181	184	i	4	1	12		
Primary Calibration Ch 2 First Order Term	185	188	i	4	1	9		
Primary Calibration Ch 2 Zeroth Order Term	189	192	i	4	1	6		
Primary Calibration Ch 3 Second Order Term	193	196	i	4	1	12		
Primary Calibration Ch 3 First Order Term	197	200	i	4	1	9		
Primary Calibration Ch 3 Zeroth Order Term	201	204	i	4	1	6		
Primary Calibration Ch 13 Second Order Term	205	208	i	4	1	12		

Primary Calibration Ch 13 First Order Term	209	212	i	4	1	9		
Primary Calibration Ch 13 Zeroth Order Term	213	216	i	4	1	6		
Primary Calibration Ch 4 Second Order Term	217	220	i	4	1	12		
Primary Calibration Ch 4 First Order Term	221	224	i	4	1	9		
Primary Calibration Ch 4 Zeroth Order Term	225	228	i	4	1	6		
Primary Calibration Ch 18 Second Order Term	229	232	i	4	1	12		
Primary Calibration Ch 18 First Order Term	233	236	i	4	1	9		
Primary Calibration Ch 18 Zeroth Order Term	237	240	i	4	1	6		
Primary Calibration Ch 11 Second Order Term	241	244	i	4	1	12		
Primary Calibration Ch 11 First Order Term	245	248	i	4	1	9		
Primary Calibration Ch 11 Zeroth Order Term	249	252	i	4	1	6		
Primary Calibration Ch 19 Second Order Term	253	256	i	4	1	12		
Primary Calibration Ch 19 First Order Term	257	260	i	4	1	9		
Primary Calibration Ch 19 Zeroth Order Term	261	264	i	4	1	6		
Primary Calibration Ch 7 Second Order Term	265	268	i	4	1	12		
Primary Calibration Ch 7 First Order Term	269	272	i	4	1	9		
Primary Calibration Ch 7 Zeroth Order Term	273	276	i	4	1	6		
Primary Calibration Ch 8 Second Order Term	277	280	i	4	1	12		

Primary Calibration Ch 8 First Order Term	281	284	i	4	1	9		
Primary Calibration Ch 8 Zeroth Order Term	285	288	i	4	1	6		
Primary Calibration Ch 20 Second Order Term	289	292	i	4	1	12		
Primary Calibration Ch 20 First Order Term	293	296	i	4	1	9		
Primary Calibration Ch 20 Zeroth Order Term	297	300	i	4	1	6		
Primary Calibration Ch 10 Second Order Term	301	304	i	4	1	12		
Primary Calibration Ch 10 First Order Term	305	308	i	4	1	9		
Primary Calibration Ch 10 Zeroth Order Term	309	312	i	4	1	6		
Primary Calibration Ch 14 Second Order Term	313	316	i	4	1	12		
Primary Calibration Ch 14 First Order Term	317	320	i	4	1	9		
Primary Calibration Ch 14 Zeroth Order Term	321	324	i	4	1	6		
Primary Calibration Ch 6 Second Order Term	325	328	i	4	1	12		
Primary Calibration Ch 6 First Order Term	329	332	i	4	1	9		
Primary Calibration Ch 6 Zeroth Order Term	333	336	i	4	1	6		
Primary Calibration Ch 5 Second Order Term	337	340	i	4	1	12		
Primary Calibration Ch 5 First Order Term	341	344	i	4	1	9		
Primary Calibration Ch 5 Zeroth Order Term	345	348	i	4	1	6		
Primary Calibration Ch 15 Second Order Term	349	352	i	4	1	12		

Primary Calibration Ch 15 First Order Term	353	356	i	4	1	9		
Primary Calibration Ch 15 Zeroth Order Term	357	360	i	4	1	6		
Primary Calibration Ch 12 Second Order Term	361	364	i	4	1	12		
Primary Calibration Ch 12 First Order Term	365	368	i	4	1	9		
Primary Calibration Ch 12 Zeroth Order Term	369	372	i	4	1	6		
Primary Calibration Ch 16 Second Order Term	373	376	i	4	1	12		
Primary Calibration Ch 16 First Order Term	377	380	i	4	1	9		
Primary Calibration Ch 16 Zeroth Order Term	381	384	i	4	1	6		
Primary Calibration Ch 9 Second Order Term	385	388	i	4	1	12		
Primary Calibration Ch 9 First Order Term	389	392	i	4	1	9		
Primary Calibration Ch 9 Zeroth Order Term	393	396	i	4	1	6		
Spare Calibration Ch 1 Second Order Term	397	400	i	4	1	12		
Spare Calibration Ch 1 First Order Term	401	404	i	4	1	9		
Spare Calibration Ch 1 Zeroth Order Term	405	408	i	4	1	6		
Spare Calibration Ch 17 Second Order Term	409	412	i	4	1	12		
Spare Calibration Ch 17 First Order Term	413	416	i	4	1	9		
Spare Calibration Ch 17 Zeroth Order Term	417	420	i	4	1	6		
Spare Calibration Ch 2 Second Order Term	421	424	i	4	1	12		
Spare Calibration Ch 2 First Order Term	425	428	i	4	1	9		

Spare Calibration Ch 2 Zeroth Order Term	429	432	i	4	1	6		
Spare Calibration Ch 3 Second Order Term	433	436	i	4	1	12		
Spare Calibration Ch 3 First Order Term	437	440	i	4	1	9		
Spare Calibration Ch 3 Zeroth Order Term	441	444	i	4	1	6		
Spare Calibration Ch 13 Second Order Term	445	448	i	4	1	12		
Spare Calibration Ch 13 First Order Term	449	452	i	4	1	9		
Spare Calibration Ch 13 Zeroth Order Term	453	456	i	4	1	6		
Spare Calibration Ch 4 Second Order Term	457	460	i	4	1	12		
Spare Calibration Ch 4 First Order Term	461	464	i	4	1	9		
Spare Calibration Ch 4 Zeroth Order Term	465	468	i	4	1	6		
Spare Calibration Ch 18 Second Order Term	469	472	i	4	1	12		
Spare Calibration Ch 18 First Order Term	473	476	i	4	1	9		
Spare Calibration Ch 18 Zeroth Order Term	477	480	i	4	1	6		
Spare Calibration Ch 11 Second Order Term	481	484	i	4	1	12		
Spare Calibration Ch 11 First Order Term	485	488	i	4	1	9		
Spare Calibration Ch 11 Zeroth Order Term	489	492	i	4	1	6		
Spare Calibration Ch 19 Second Order Term	493	496	i	4	1	12		
Spare Calibration Ch 19 First Order Term	497	500	i	4	1	9		
Spare Calibration Ch 19 Zeroth Order Term	501	504	i	4	1	6		

Spare Calibration Ch 7 Second Order Term	505	508	i	4	1	12		
Spare Calibration Ch 7 First Order Term	509	512	i	4	1	9		
Spare Calibration Ch 7 Zeroth Order Term	513	516	i	4	1	6		
Spare Calibration Ch 8 Second Order Term	517	520	i	4	1	12		
Spare Calibration Ch 8 First Order Term	521	524	i	4	1	9		
Spare Calibration Ch 8 Zeroth Order Term	525	528	i	4	1	6		
Spare Calibration Ch 20 Second Order Term	529	532	i	4	1	12		
Spare Calibration Ch 20 First Order Term	533	536	i	4	1	9		
Spare Calibration Ch 20 Zeroth Order Term	537	540	i	4	1	6		
Spare Calibration Ch 10 Second Order Term	541	544	i	4	1	12		
Spare Calibration Ch 10 First Order Term	545	548	i	4	1	9		
Spare Calibration Ch 10 Zeroth Order Term	549	552	i	4	1	6		
Spare Calibration Ch 14 Second Order Term	553	556	i	4	1	12		
Spare Calibration Ch 14 First Order Term	557	560	i	4	1	9		
Spare Calibration Ch 14 Zeroth Order Term	561	564	i	4	1	6		
Spare Calibration Ch 6 Second Order Term	565	568	i	4	1	12		
Spare Calibration Ch 6 First Order Term	569	572	i	4	1	9		
Spare Calibration Ch 6 Zeroth Order Term	573	576	i	4	1	6		
Spare Calibration Ch 5 Second Order Term	577	580	i	4	1	12		
Spare Calibration Ch 5 First Order Term	581	584	i	4	1	9		

Spare Calibration Ch 5 Zeroth Order Term	585	588	i	4	1	6		
Spare Calibration Ch 15 Second Order Term	589	592	i	4	1	12		
Spare Calibration Ch 15 First Order Term	593	596	i	4	1	9		
Spare Calibration Ch 15 Zeroth Order Term	597	600	i	4	1	6		
Spare Calibration Ch 12 Second Order Term	601	604	i	4	1	12		
Spare Calibration Ch 12 First Order Term	605	608	i	4	1	9		
Spare Calibration Ch 12 Zeroth Order Term	609	612	i	4	1	6		
Spare Calibration Ch 16 Second Order Term	613	616	i	4	1	12		
Spare Calibration Ch 16 First Order Term	617	620	i	4	1	9		
Spare Calibration Ch 16 Zeroth Order Term	621	624	i	4	1	6		
Spare Calibration Ch 9 Second Order Term	625	628	i	4	1	12		
Spare Calibration Ch 9 First Order Term	629	632	i	4	1	9		
Spare Calibration Ch 9 Zeroth Order Term	633	636	i	4	1	6		
<zero fill>	637	648	i	4	3	0		
NAVIGATION								
Navigation Status Bit Field bits 31-17: <zero fill> bit 16: 1 = earth location corrected for TIP Euler angles bits 15 - 12: earth location indicator 0 = earth location available; 1 = user ephemeris files greater than 24 hours old; 2 = no earth location available	649	652	u	4	1	0		

bits 11 - 8: spacecraft attitude control 0 = operating in YGC or NOMINAL mode; 1 = operating in another mode; 2 = attitude exceeds nominal tolerance; 3 = both 1 and 2. bits 7 - 4: attitude SMODE 0 = NOMINAL mode; 1 = rate nulling mode; 2 = YGC mode; 3 = search mode; 4 = coast mode bits 3 - 0: attitude PWTIP$AC 0 = NOMINAL mode/no test; 1 = yaw axis test in progress; 2 = roll axis test in progress; 3 = pitch axis test in progress								
Time Associated with TIP Euler Angles	653	656	u	4	1	0	seconds	
TIP Euler Angles *Word 1*: Roll *Word 2*: Pitch *Word 3*: Yaw	657	662	i	2	3	3	degrees	
Spacecraft Altitude above Reference Ellipsoid	663	664	u	2	1	1	km	
Angular Relationships (local azimuth range ± 180.00 degrees) Word 1: Solar Zenith Angle, Point 1 *Word 2*: Satellite Zenith Angle, Point 1 *Word 3*: Local Azimuth Angle, Point 1 *Word 4*: Solar Zenith Angle, Point 2 ... (set of 3 angles for every point) ... *Word 168*: Local Azimuth Angle, Point 56	665	1000	i	2	168	2	degrees	

Earth Location (North latitude and East longitude are positive) *Word 1*: Latitude in Degrees, Point 1 *Word 2*: Longitude in Degrees, Point 1 *Word 3*: Latitude in Degrees, Point 2 ... (lat/lon word pair for every point) ... *Word 112*: Longitude in Degrees, Point 56	1001	1448	i	4	112	4	degrees	
<zero fill>	1449	1456	i	4	2	0		
HIRS DATA ELEMENTS								
Header for Element 0 (same format through Element 63) bits 31-24: scan encoder position bits 23-19: electronic cal level indicator bits 18-13: <zero fill> bits 12-7: channel 1 period monitor bits 6-1: element number bit 0: filter sync designator	1457	1460	u	4	1	0		
Radiometric Data (same format through Element 55) *Word 1*: Channel 1 bits 15-13: <zero fill> bits 12-0: 13 bit data. To retrieve, read in as signed 2 byte integer and then subtract 4096. The resultant value should be between -4095 and +4096. *Words 2-20*: Channels 17, 2, 3, 13, 4, 18, 11, 19, 7, 8, 20, 10, 14, 6, 5, 15, 12, 16, 9 (in order)	1461	1500	u	2	20	0		
Bit Flags (same format through Element 63) bit 15: valid data flag (0 = ignore data, 1 = good data) bit 14: odd bit parity bits 13-0: <zero fill>	1501	1502	u	2	1	0		
<zero fill>	1503	1504	i	2	1	0		
Header for Element 1	1505	1508	u	4	1	0		
Radiometric Data	1509	1548	u	2	20	0		

Bit Flags	1549	1550	u	2	1	0		
<zero fill>	1551	1552	i	2	1	0		
Header for Element 2	1553	1556	u	4	1	0		
Radiometric Data	1557	1596	u	2	20	0		
Bit Flags	1597	1598	u	2	1	0		
<zero fill>	1599	1600	i	2	1	0		
Header for Element 3	1601	1604	u	4	1	0		
Radiometric Data	1605	1644	u	2	20	0		
Bit Flags	1645	1646	u	2	1	0		
<zero fill>	1647	1648	i	2	1	0		
Header for Element 4	1649	1652	u	4	1	0		
Radiometric Data	1653	1692	u	2	20	0		
Bit Flags	1693	1694	u	2	1	0		
<zero fill>	1695	1696	i	2	1	0		
Header for Element 5	1697	1700	u	4	1	0		
Radiometric Data	1701	1740	u	2	20	0		
Bit Flags	1741	1742	u	2	1	0		
<zero fill>	1743	1744	i	2	1	0		
Header for Element 6	1745	1748	u	4	1	0		
Radiometric Data	1749	1788	u	2	20	0		
Bit Flags	1789	1790	u	2	1	0		
<zero fill>	1791	1792	i	2	1	0		
Header for Element 7	1793	1796	u	4	1	0		
Radiometric Data	1797	1836	u	2	20	0		
Bit Flags	1837	1838	u	2	1	0		
<zero fill>	1839	1840	i	2	1	0		
Header for Element 8	1841	1844	u	4	1	0		
Radiometric Data	1845	1884	u	2	20	0		

Bit Flags	1885	1886	u	2	1	0		
<zero fill>	1887	1888	i	2	1	0		
Header for Element 9	1889	1892	u	4	1	0		
Radiometric Data	1893	1932	u	2	20	0		
Bit Flags	1933	1934	u	2	1	0		
<zero fill>	1935	1936	i	2	1	0		
Header for Element 10	1937	1940	u	4	1	0		
Radiometric Data	1941	1980	u	2	20	0		
Bit Flags	1981	1982	u	2	1	0		
<zero fill>	1983	1984	i	2	1	0		
Header for Element 11	1985	1988	u	4	1	0		
Radiometric Data	1989	2028	u	2	20	0		
Bit Flags	2029	2030	u	2	1	0		
<zero fill>	2031	2032	i	2	1	0		
Header for Element 12	2033	2036	u	4	1	0		
Radiometric Data	2037	2076	u	2	20	0		
Bit Flags	2077	2078	u	2	1	0		
<zero fill>	2079	2080	i	2	1	0		
Header for Element 13	2081	2084	u	4	1	0		
Radiometric Data	2085	2124	u	2	20	0		
Bit Flags	2125	2126	u	2	1	0		
<zero fill>	2127	2128	i	2	1	0		
Header for Element 14	2129	2132	u	4	1	0		
Radiometric Data	2133	2172	u	2	20	0		
Bit Flags	2173	2174	u	2	1	0		
<zero fill>	2175	2176	i	2	1	0		
Header for Element 15	2177	2180	u	4	1	0		
Radiometric Data	2181	2220	u	2	20	0		

Bit Flags	2221	2222	u	2	1	0		
<zero fill>	2223	2224	i	2	1	0		
Header for Element 16	2225	2228	u	4	1	0		
Radiometric Data	2229	2268	u	2	20	0		
Bit Flags	2269	2270	u	2	1	0		
<zero fill>	2271	2272	i	2	1	0		
Header for Element 17	2273	2276	u	4	1	0		
Radiometric Data	2277	2316	u	2	20	0		
Bit Flags	2317	2318	u	2	1	0		
<zero fill>	2319	2320	i	2	1	0		
Header for Element 18	2321	2324	u	4	1	0		
Radiometric Data	2325	2364	u	2	20	0		
Bit Flags	2365	2366	u	2	1	0		
<zero fill>	2367	2368	i	2	1	0		
Header for Element 19	2369	2372	u	4	1	0		
Radiometric Data	2373	2412	u	2	20	0		
Bit Flags	2413	2414	u	2	1	0		
<zero fill>	2415	2416	i	2	1	0		
Header for Element 20	2417	2420	u	4	1	0		
Radiometric Data	2421	2460	u	2	20	0		
Bit Flags	2461	2462	u	2	1	0		
<zero fill>	2463	2464	i	2	1	0		
Header for Element 21	2465	2468	u	4	1	0		
Radiometric Data	2469	2508	u	2	20	0		
Bit Flags	2509	2510	u	2	1	0		
<zero fill>	2511	2512	i	2	1	0		
Header for Element 22	2513	2516	u	4	1	0		
Radiometric Data	2517	2556	u	2	20	0		

Bit Flags	2557	2558	u	2	1	0		
<zero fill>	2559	2560	i	2	1	0		
Header for Element 23	2561	2564	u	4	1	0		
Radiometric Data	2565	2604	u	2	20	0		
Bit Flags	2605	2606	u	2	1	0		
<zero fill>	2607	2608	i	2	1	0		
Header for Element 24	2609	2612	u	4	1	0		
Radiometric Data	2613	2652	u	2	20	0		
Bit Flags	2653	2654	u	2	1	0		
<zero fill>	2655	2656	i	2	1	0		
Header for Element 25	2657	2660	u	4	1	0		
Radiometric Data	2661	2700	u	2	20	0		
Bit Flags	2701	2702	u	2	1	0		
<zero fill>	2703	2704	i	2	1	0		
Header for Element 26	2705	2708	u	4	1	0		
Radiometric Data	2709	2748	u	2	20	0		
Bit Flags	2749	2750	u	2	1	0		
<zero fill>	2751	2752	i	2	1	0		
Header for Element 27	2753	2756	u	4	1	0		
Radiometric Data	2757	2796	u	2	20	0		
Bit Flags	2797	2798	u	2	1	0		
<zero fill>	2799	2800	i	2	1	0		
Header for Element 28	2801	2804	u	4	1	0		
Radiometric Data	2805	2844	u	2	20	0		
Bit Flags	2845	2846	u	2	1	0		
<zero fill>	2847	2848	i	2	1	0		
Header for Element 29	2849	2852	u	4	1	0		
Radiometric Data	2853	2892	u	2	20	0		

Bit Flags	2893	2894	u	2	1	0		
<zero fill>	2895	2896	i	2	1	0		
Header for Element 30	2897	2900	u	4	1	0		
Radiometric Data	2901	2940	u	2	20	0		
Bit Flags	2941	2942	u	2	1	0		
<zero fill>	2943	2944	i	2	1	0		
Header for Element 31	2945	2948	u	4	1	0		
Radiometric Data	2949	2988	u	2	20	0		
Bit Flags	2989	2990	u	2	1	0		
<zero fill>	2991	2992	i	2	1	0		
Header for Element 32	2993	2996	u	4	1	0		
Radiometric Data	2997	3036	u	2	20	0		
Bit Flags	3037	3038	u	2	1	0		
<zero fill>	3039	3040	i	2	1	0		
Header for Element 33	3041	3044	u	4	1	0		
Radiometric Data	3045	3084	u	2	20	0		
Bit Flags	3085	3086	u	2	1	0		
<zero fill>	3087	3088	i	2	1	0		
Header for Element 34	3089	3092	u	4	1	0		
Radiometric Data	3093	3132	u	2	20	0		
Bit Flags	3133	3134	u	2	1	0		
<zero fill>	3135	3136	i	2	1	0		
Header for Element 35	3137	3140	u	4	1	0		
Radiometric Data	3141	3180	u	2	20	0		
Bit Flags	3181	3182	u	2	1	0		
<zero fill>	3183	3184	i	2	1	0		
Header for Element 36	3185	3188	u	4	1	0		
Radiometric Data	3189	3228	u	2	20	0		

Bit Flags	3229	3230	u	2	1	0		
<zero fill>	3231	3232	i	2	1	0		
Header for Element 37	3233	3236	u	4	1	0		
Radiometric Data	3237	3276	u	2	20	0		
Bit Flags	3277	3278	u	2	1	0		
<zero fill>	3279	3280	i	2	1	0		
Header for Element 38	3281	3284	u	4	1	0		
Radiometric Data	3285	3324	u	2	20	0		
Bit Flags	3325	3326	u	2	1	0		
<zero fill>	3327	3328	i	2	1	0		
Header for Element 39	3329	3332	u	4	1	0		
Radiometric Data	3333	3372	u	2	20	0		
Bit Flags	3373	3374	u	2	1	0		
<zero fill>	3375	3376	i	2	1	0		
Header for Element 40	3377	3380	u	4	1	0		
Radiometric Data	3381	3420	u	2	20	0		
Bit Flags	3421	3422	u	2	1	0		
<zero fill>	3423	3424	i	2	1	0		
Header for Element 41	3425	3428	u	4	1	0		
Radiometric Data	3429	3468	u	2	20	0		
Bit Flags	3469	3470	u	2	1	0		
<zero fill>	3471	3472	i	2	1	0		
Header for Element 41	3473	3476	u	4	1	0		
Radiometric Data	3477	3516	u	2	20	0		
Bit Flags	3517	3518	u	2	1	0		
<zero fill>	3519	3520	i	2	1	0		
Header for Element 43	3521	3524	u	4	1	0		
Radiometric Data	3525	3564	u	2	20	0		

Bit Flags	3565	3566	u	2	1	0		
<zero fill>	3567	3568	i	2	1	0		
Header for Element 44	3569	3572	u	4	1	0		
Radiometric Data	3573	3612	u	2	20	0		
Bit Flags	3613	3614	u	2	1	0		
<zero fill>	3615	3616	i	2	1	0		
Header for Element 45	3617	3620	u	4	1	0		
Radiometric Data	3621	3660	u	2	20	0		
Bit Flags	3661	3662	u	2	1	0		
<zero fill>	3663	3664	i	2	1	0		
Header for Element 46	3665	3668	u	4	1	0		
Radiometric Data	3669	3708	u	2	20	0		
Bit Flags	3709	3710	u	2	1	0		
<zero fill>	3711	3712	i	2	1	0		
Header for Element 47	3713	3716	u	4	1	0		
Radiometric Data	3717	3756	u	2	20	0		
Bit Flags	3757	3758	u	2	1	0		
<zero fill>	3759	3760	i	2	1	0		
Header for Element 48	3761	3764	u	4	1	0		
Radiometric Data	3765	3804	u	2	20	0		
Bit Flags	3805	3806	u	2	1	0		
<zero fill>	3807	3808	i	2	1	0		
Header for Element 49	3809	3812	u	4	1	0		
Radiometric Data	3813	3852	u	2	20	0		
Bit Flags	3853	3854	u	2	1	0		
<zero fill>	3855	3856	i	2	1	0		
Header for Element 50	3857	3860	u	4	1	0		
Radiometric Data	3861	3900	u	2	20	0		

Bit Flags	3901	3902	u	2	1	0		
<zero fill>	3903	3904	i	2	1	0		
Header for Element 51	3905	3908	u	4	1	0		
Radiometric Data	3909	3948	u	2	20	0		
Bit Flags	3949	3950	u	2	1	0		
<zero fill>	3951	3952	i	2	1	0		
Header for Element 51	3953	3956	u	4	1	0		
Radiometric Data	3957	3996	u	2	20	0		
Bit Flags	3997	3998	u	2	1	0		
<zero fill>	3999	4000	i	2	1	0		
Header for Element 53	4001	4004	u	4	1	0		
Radiometric Data	4005	4044	u	2	20	0		
Bit Flags	4045	4046	u	2	1	0		
<zero fill>	4047	4048	i	2	1	0		
Header for Element 54	4049	4052	u	4	1	0		
Radiometric Data	4053	4092	u	2	20	0		
Bit Flags	4093	4094	u	2	1	0		
<zero fill>	4095	4096	i	2	1	0		
Header for Element 55	4097	4100	u	4	1	0		
Radiometric Data	4101	4140	u	2	20	0		
Bit Flags	4141	4142	u	2	1	0		
<zero fill>	4143	4144	i	2	1	0		
Header for Element 56	4145	4148	u	4	1	0		
Positive Calibration *Word 1*: Channel 1 *Words 2-20*: Channels 17, 2, 3, 13, 4, 18, 11, 19, 7, 8, 20, 10, 14, 6, 5, 15, 12, 16, 9 (in order)	4149	4188	u	2	20	0		
Bit Flags	4189	4190	u	2	1	0		
<zero fill>	4191	4192	i	2	1	0		

Header for Element 57	4193	4196	u	4	1	0		
Negative Calibration *Word 1*: Channel 1 *Words 2-20*: Channels 17, 2, 3, 13, 4, 18, 11, 19, 7, 8, 20, 10, 14, 6, 5, 15, 12, 16, 9 (in order)	4197	4236	u	2	20	0		
Bit Flags	4237	4238	u	2	1	0		
<zero fill>	4239	4240	i	2	1	0		
Header for Element 58	4241	4244	u	4	1	0		
Internal Warm Target, Temperature Sensor #1 (zero fill in commanded position modes) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4245	4254	i	2	5	0		
Internal Warm Target, Temperature Sensor #2 (zero fill in commanded position modes) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4255	4264	i	2	5	0		
Internal Warm Target, Temperature Sensor #3 (zero fill in commanded position modes) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4265	4274	i	2	5	0		
Internal Warm Target, Temperature Sensor #4 (zero fill in commanded position modes) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4275	4284	i	2	5	0		
Bit Flags	4285	4286	u	2	1	0		
<zero fill>	4287	4288	i	2	1	0		
Header for Element 59	4289	4292	u	4	1	0		

Space View (zero fill in commanded position modes) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4293	4302	i	2	5	0		
Space View (zero fill in commanded position modes) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4303	4312	i	2	5	0		
Space View (zero fill in commanded position modes) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4313	4322	i	2	5	0		
Space View (zero fill in commanded position modes) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4323	4332	i	2	5	0		
Bit Flags	4333	4334	u	2	1	0		
<zero fill>	4335	4336	i	2	1	0		
Header for Element 60	4337	4340	u	4	1	0		
Internal Filter Wheel Housing, Temperature sensor #1 *Word 1*: Reading 1 ... *Word 5*: Reading 5	4341	4350	i	2	5	0		
Internal Filter Wheel Housing, Temperature sensor #2 *Word 1*: Reading 1 ... *Word 5*: Reading 5	4351	4360	i	2	5	0		
Internal Filter Wheel Housing, Temperature sensor #3 *Word 1*: Reading 1 ... *Word 5*: Reading 5	4361	4370	i	2	5	0		

Internal Filter Wheel Housing, Temperature sensor #4 *Word 1*: Reading 1 ... *Word 5*: Reading 5	4371	4380	i	2	5	0		
Bit Flags	4381	4382	u	2	1	0		
<zero fill>	4383	4384	i	2	1	0		
Header for Element 61	4385	4388	u	4	1	0		
Patch Temperature (Expanded Scale) *Word 1*: Reading 1 ... *Word 5*: Reading 5	4389	4398	i	2	5	0		
1st Stage Radiator Temperature Sensor *Word 1*: Reading 1 ... *Word 5*: Reading 5	4399	4408	i	2	5	0		
Filter Wheel Housing Heater Current *Word 1*: Reading 1 ... *Word 5*: Reading 5	4409	4418	i	2	5	0		
Electronic Cal. Digital to Analog Converter *Word 1*: Reading 1 ... *Word 5*: Reading 5	4419	4428	i	2	5	0		
Bit Flags	4429	4430	u	2	1	0		
<zero fill>	4431	4432	i	2	1	0		
Header for Element 62	4433	4436	u	4	1	0		
Scan Mirror Temperature	4437	4438	i	2	1	0		
Primary Telescope Temperature	4439	4440	i	2	1	0		
Secondary Telescope Temperature	4441	4442	i	2	1	0		
HIRS Baseplate Temperature	4443	4444	i	2	1	0		
HIRS Electronics Temperature	4445	4446	i	2	1	0		
Patch Temperature Full Range	4447	4448	i	2	1	0		
Scan Motor Temperature	4449	4450	i	2	1	0		
Filter Wheel Motor Temperature	4451	4452	i	2	1	0		

Cooler Housing Temperature	4453	4454	i	2	1	0		
Patch Control Power	4455	4456	i	2	1	0		
Scan Motor Current	4457	4458	i	2	1	0		
Filter Motor Current	4459	4460	i	2	1	0		
+15 VDC	4461	4462	i	2	1	0		
-15 VDC	4463	4464	i	2	1	0		
+7.5 VDC	4465	4466	i	2	1	0		
-7.5 VDC	4467	4468	i	2	1	0		
+10 VDC	4469	4470	i	2	1	0		
+5 VDC	4471	4472	i	2	1	0		
Analog Ground	4473	4474	i	2	1	0		
Analog Ground	4475	4476	i	2	1	0		
Bit Flags	4477	4478	u	2	1	0		
<zero fill>	4479	4480	i	2	1	0		
Header for Element 63	4481	4484	u	4	1	0		
Line Counter (The number of lines from the last auto calibration sequence)	4485	4486	u	2	1	0		
First Status Word bits 15-13: <zero fill> bits 12-8: instrument serial number (?? = s/n 301; 13 = s/n 302) bit 7: instrument on/off (0 = off; 1 = on) bit 6: scan motor on/off (0 = on; 1 = off) bit 5: filter wheel on/off (0 = on; 1 = off) bit 4: electronics on/off (0 = off; 1 = on) bit 3: cooler heat on/off (0 = on; 1 = off) bit 2: internal warm target position (0 = true) bit 1: internal cold target position (0 = true) bit 0: space position (0 = true)	4487	4488	u	2	1	0		
Second Status Word bits 15-8: <zero fill> bit 7: nadir position (0 = true) bit 6: calibration enable/disable (0 = enabled)	4489	4490	u	2	1	0		

bit 5: cooler door release enable/disable (0 = enabled) bit 4: cooler door open (0 = no; 1 = yes) bit 3: cooler door closed (0 = no; 1 = yes) bit 2: filter housing heat on/off (0 = on; 1 = off) bit 1: patch temperature control on/off (0 = on; 1 = off) bit 0: filter motor power high (0 = high; 1 = normal)								
Data Verification Binary Code	4491	4524	u	2	17	0		
Bit Flags	4525	4526	u	2	1	0		
<zero fill>	4527	4540	i	2	7	0		
DIGITAL B TELEMETRY								
Invalid Word Bit Flags (if bit = 1, associated telemetry bit was not updated during most recent minor frame cycle - possibly due to lost frame) bit 15: instrument power bit 14: electronics power bit 13: filter motor power bit 12: scan motor power bit 11: cooler heater bit 10: filter housing heater bit 9: cooler door release bit 8: cooler window heater bit 7: go to nadir position bit 6: calibration sequence bit 5: cooler door closed bit 4: cooler door fully open bit 3: filter motor power level bit 2: patch temperature controller bits 1-0: <zero fill>	4541	4542	u	2	1	0		
Digital B Data bit 15: instrument power (0 = off; 1 = on) bit 14: electronics power (0 = off; 1 = on) bit 13: filter motor power (0 = off; 1 = on) bit 12: scan motor power (0 = off; 1 = on) bit 11: cooler heater (0 = off; 1 = on) bit 10: filter housing heater (0 = off; 1 = on)	4543	4544	u	2	1	0		

bit 9: cooler door release (0 = disabled; 1 = enabled) bit 8: cooler window heater (0 = on; 1 = off) bit 7: go to nadir position (0 = no; 1 = yes/initiated) bit 6: calibration sequence (0 = disabled; 1 = enabled) bit 5: cooler door closed (0 = yes; 1 = no) bit 4: cooler door fully open (0 = yes; 1 = no) bit 3: filter motor power level (0 = normal; 1 = high) bit 2: patch temperature controller (0 = off; 1 = on) bits 1-0: <zero fill>								
ANALOG TELEMETRY								
Invalid Word Bit Flags (if bit = 1, associated telemetry word was not updated during most recent minor frame cycle - possibly due to lost frame) bits 31 - 17: <zero fill> bit 16: patch controller power (word 16) bits 15-2: words 15 through 2 (in order) bit 1: radiator temperature (word 1) bit 0: <zero fill>	4545	4548	u	4	1	0		
Word 1: Radiator Temperature *Word 2*: Base Plate Temperature *Word 3*: Electronics Temperature *Word 4*: Patch Temperature *Word 5*: Filter Housing Controller Current *Word 6*: Scan Motor Temperature *Word 7*: Filter Wheel Motor Temperature *Word 8*: +5 VDC Monitor *Word 9*: +10V VDC TLM/DC/DC Conv. *Word 10*: +7.5 VDC TLM/DC/DC Conv. *Word 11*: -7.5 VDC TLM/DC/DC Conv. *Word 12*: +15 VDC Monitor *Word 13*: -15 VDC Monitor *Word 14*: Filter Wheel Motor Current *Word 15*: Scan Motor Current *Word 16*: Patch Controller Power	4549	4564	u	1	16	0		

FILLER								
<zero fill>	4565	4608	i	4	11	0		

8.3.1.5.3.2 NOAA-N Format (Version 4, post-January 25, 2006, All Spacecraft)

The HIRS/4 Level 1b Data Format (Version 4, post-January 25, 2006, All Spacecraft) is described in Table 8.3.1.5.3.2-1.

Table 8.3.1.5.3.2-1. Format of HIRS/4 Data Format (Version 4, post-January 25, 2006, All Spacecraft)								
Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number (cumulative, starting with 1)	1	2	u	2	1	0		
Scan Line Year (e.g., 1999)	3	4	u	2	1	0		
Scan Line Day of Year (e.g., 365)	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	millisec	
Scan Line UTC Time of Day	9	12	u	4	1	0	millisec	
Scan Line Bit Field bit 15: satellite direction (0=northbound; 1=southbound) bit 14: clock drift correction (0=not corrected; 1=scan time corrected for clock drift) bits 13-0: <zero fill>	13	14	u	2	1	0		
Major Frame Count (cumulative, starting with 1)	15	16	u	2	1	0		
Scan Position Number in 32 Second Cycle	17	18	u	2	1	0		
Scan Type Code 0=earth view 1=space view 2=cold blackbody (BB) view 3=main (warm) BB view	19	20	u	2	1	0		
<zero fill>	21	28	i	4	2	0		
QUALITY INDICATORS								
Quality Indicator Bit Field (if a bit is on (=1), the statement is true) bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan bit 28: calibration anomaly detected (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bits 24 - 0: <zero fill>	29	32	u	4	1	0		
Scan Line Quality Flags [Additional Calibration Problem Code] (If a bit is on (=1), the statement is true. See "Scan Line Quality Flags [Calibration Problem Code]", below.) bits 7-0: <zero fill>	33	33	u	1	1	0		

Scan Line Quality Flags [Time Problem Code] (If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.) bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	34	34	u	1	1	0		
Scan Line Quality Flags [Calibration Problem Code] (If a bit is on (=1), the statement is true. These bits, along with those in "Scan Line Quality Flags [Additional Calibration Problem Code]", complement the channel indicators; all bits set to 0 indicates normal calibration.) bit 7: scan was not calibrated bit 6: anomalous space or BB view data, calibration slope value came from the HCF, or some QC tests could not be applied in some of the IR channels bit 5: PRT quality test failed bit 4: PRT data marginal, some readings were rejected bit 3: scan contains some uncalibrated channels bit 2: scan indicates that the normal HIRS calibration sequence is disabled bit 1: space view scan is lunar contaminated bit 0: <zero fill>	35	35	u	1	1	0		
Scan Line Quality Flags [Earth Location Problem Code] (If a bit is on (=1), the statement is true. All bits set to 0 implies the earth location was normal.) bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code (see time problem flags above) bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bits 3-0: <zero fill>	36	36	u	1	1	0		4

Calibration Quality Flags NOTE: (1) All bits off implies a good calibration. (2) These flags on the earth view scans for each channel will be inherited from the flags on the space view and blackbody view scans. Word 1: Channel 1 bit 15-6: <zero fill> bit 5: calibration failed bit 4: anomalous space or BB view data bit 3: calibration slope value came from the HCF bit 2: BB views failed NEDC test bit 1: space views failed NEDC test bit 0: some QC tests could not be applied Words 2-20: Channels 17, 2, 3, 13, 4, 18, 11, 19, 7, 8, 20, 10, 14, 6, 5, 15, 12, 16, 9 (in order)	37	76	u	2	20	0		3
Minor Frame Quality Indicator Bit Fields (for bits 7 through 1, if bit is on (=1) then statement is true) Word 1: Minor Frame 0 bit 7: this frame suspect due to a time error bit 6: this frame contains data gap data fill bit 5: this frame contains TIP dwell data fill bit 4: data suspect due to PACS QC error bit 3: mirror locked during this frame bit 2: mirror position error during this frame bit 1: mirror was moving during this frame bit 0: minor word odd parity bit Words 2 - 64: Minor Frames 1 - 63 (in order)	77	140	u	1	64	0		
<zero fill>	141	156	i	4	4	0		
CALIBRATION COEFFICIENTS *Note: The following coefficients are <zero fill> in commanded position modes (nadir, space, internal cold target, internal warm target). Refer to Data Element 63, First and Second Status Words for the current mode.*								
Primary Calibration Ch 1 Second Order Term	157	160	i	4	1	12		
Primary Calibration Ch 1 First Order Term	161	164	i	4	1	9		
Primary Calibration Ch 1 First Order Term	161	164	i	4	1	9		
Primary Calibration Ch 1 Zeroth Order Term	165	168	i	4	1	6		
Primary Calibration Ch 17 Second Order Term	169	172	i	4	1	12		
Primary Calibration Ch 17 First Order Term	173	176	i	4	1	9		
Primary Calibration Ch 17 Zeroth Order Term	177	180	i	4	1	6		
Primary Calibration Ch 2 Second Order Term	181	184	i	4	1	12		
Primary Calibration Ch 2 First Order Term	185	188	i	4	1	9		
Primary Calibration Ch 2 Zeroth Order Term	189	192	i	4	1	6		
Primary Calibration Ch 3 Second Order Term	193	196	i	4	1	12		
Primary Calibration Ch 3 First Order Term	197	200	i	4	1	9		
Primary Calibration Ch 3 First Order Term	197	200	i	4	1	9		
Primary Calibration Ch 3 Zeroth Order Term	201	204	i	4	1	6		
Primary Calibration Ch 13 Second Order Term	205	208	i	4	1	12		
Primary Calibration Ch 13 First Order Term	209	212	i	4	1	9		
Primary Calibration Ch 13 Zeroth Order Term	213	216	i	4	1	6		
Primary Calibration Ch 4 Second Order Term	217	220	i	4	1	12		

Primary Calibration Ch 4 First Order Term	221	224	i	4	1	9		
Primary Calibration Ch 4 Zeroth Order Term	225	228	i	4	1	6		
Primary Calibration Ch 18 Second Order Term	229	232	i	4	1	12		
Primary Calibration Ch 18 First Order Term	233	236	i	4	1	9		
Primary Calibration Ch 18 Zeroth Order Term	237	240	i	4	1	6		
Primary Calibration Ch 11 Second Order Term	241	244	i	4	1	12		
Primary Calibration Ch 11 First Order Term	245	248	i	4	1	9		
Primary Calibration Ch 11 Zeroth Order Term	249	252	i	4	1	6		
Primary Calibration Ch 19 Second Order Term	253	256	i	4	1	12		
Primary Calibration Ch 19 First Order Term	257	260	i	4	1	9		
Primary Calibration Ch 19 Zeroth Order Term	261	264	i	4	1	6		
Primary Calibration Ch 7 Second Order Term	265	268	i	4	1	12		
Primary Calibration Ch 7 First Order Term	269	272	i	4	1	9		
Primary Calibration Ch 7 Zeroth Order Term	273	276	i	4	1	6		
Primary Calibration Ch 8 Second Order Term	277	280	i	4	1	12		
Primary Calibration Ch 8 First Order Term	281	284	i	4	1	9		
Primary Calibration Ch 8 Zeroth Order Term	285	288	i	4	1	6		
Primary Calibration Ch 20 Second Order Term	289	292	i	4	1	12		
Primary Calibration Ch 20 First Order Term	293	296	i	4	1	9		
Primary Calibration Ch 20 Zeroth Order Term	297	300	i	4	1	6		
Primary Calibration Ch 10 Second Order Term	301	304	i	4	1	12		
Primary Calibration Ch 10 First Order Term	305	308	i	4	1	9		
Primary Calibration Ch 10 Zeroth Order Term	309	312	i	4	1	6		
Primary Calibration Ch 14 Second Order Term	313	316	i	4	1	12		
Primary Calibration Ch 14 First Order Term	317	320	i	4	1	9		
Primary Calibration Ch 14 Zeroth Order Term	321	324	i	4	1	6		
Primary Calibration Ch 6 Second Order Term	325	328	i	4	1	12		
Primary Calibration Ch 6 First Order Term	329	332	i	4	1	9		
Primary Calibration Ch 6 Zeroth Order Term	333	336	i	4	1	6		
Primary Calibration Ch 5 Second Order Term	337	340	i	4	1	12		
Primary Calibration Ch 5 First Order Term	341	344	i	4	1	9		
Primary Calibration Ch 5 Zeroth Order Term	345	348	i	4	1	6		
Primary Calibration Ch 15 Second Order Term	349	352	i	4	1	12		
Primary Calibration Ch 15 First Order Term	353	356	i	4	1	9		
Primary Calibration Ch 15 Zeroth Order Term	357	360	i	4	1	6		
Primary Calibration Ch 12 Second Order Term	361	364	i	4	1	12		
Primary Calibration Ch 12 First Order Term	365	368	i	4	1	9		
Primary Calibration Ch 12 Zeroth Order Term	369	372	i	4	1	6		
Primary Calibration Ch 16 Second Order Term	373	376	i	4	1	12		
Primary Calibration Ch 16 First Order Term	377	380	i	4	1	9		
Primary Calibration Ch 16 Zeroth Order Term	381	384	i	4	1	6		
Primary Calibration Ch 9 Second Order Term	385	388	i	4	1	12		
Primary Calibration Ch 9 First Order Term	389	392	i	4	1	9		
Primary Calibration Ch 9 Zeroth Order Term	393	396	i	4	1	6		

Spare Calibration Ch 1 Second Order Term	397	400	i	4	1	12		
Spare Calibration Ch 1 First Order Term	401	404	i	4	1	9		
Spare Calibration Ch 1 Zeroth Order Term	405	408	i	4	1	6		
Spare Calibration Ch 17 Second Order Term	409	412	i	4	1	12		
Spare Calibration Ch 17 First Order Term	413	416	i	4	1	9		
Spare Calibration Ch 17 Zeroth Order Term	417	420	i	4	1	6		
Spare Calibration Ch 2 Second Order Term	421	424	i	4	1	12		
Spare Calibration Ch 2 First Order Term	425	428	i	4	1	9		
Spare Calibration Ch 2 Zeroth Order Term	429	432	i	4	1	6		
Spare Calibration Ch 3 Second Order Term	433	436	i	4	1	12		
Spare Calibration Ch 3 First Order Term	437	440	i	4	1	9		
Spare Calibration Ch 3 Zeroth Order Term	441	444	i	4	1	6		
Spare Calibration Ch 13 Second Order Term	445	448	i	4	1	12		
Spare Calibration Ch 13 First Order Term	449	452	i	4	1	9		
Spare Calibration Ch 13 Zeroth Order Term	453	456	i	4	1	6		
Spare Calibration Ch 4 Second Order Term	457	460	i	4	1	12		
Spare Calibration Ch 4 First Order Term	461	464	i	4	1	9		
Spare Calibration Ch 4 Zeroth Order Term	465	468	i	4	1	6		
Spare Calibration Ch 18 Second Order Term	469	472	i	4	1	12		
Spare Calibration Ch 18 First Order Term	473	476	i	4	1	9		
Spare Calibration Ch 18 Zeroth Order Term	477	480	i	4	1	6		
Spare Calibration Ch 11 Second Order Term	481	484	i	4	1	12		
Spare Calibration Ch 11 First Order Term	485	488	i	4	1	9		
Spare Calibration Ch 11 Zeroth Order Term	489	492	i	4	1	6		
Spare Calibration Ch 19 Second Order Term	493	496	i	4	1	12		
Spare Calibration Ch 19 First Order Term	497	500	i	4	1	9		
Spare Calibration Ch 19 Zeroth Order Term	501	504	i	4	1	6		
Spare Calibration Ch 7 Second Order Term	505	508	i	4	1	12		
Spare Calibration Ch 7 First Order Term	509	512	i	4	1	9		
Spare Calibration Ch 7 Zeroth Order Term	513	516	i	4	1	6		
Spare Calibration Ch 8 Second Order Term	517	520	i	4	1	12		
Spare Calibration Ch 8 First Order Term	521	524	i	4	1	9		
Spare Calibration Ch 8 Zeroth Order Term	525	528	i	4	1	6		
Spare Calibration Ch 20 Second Order Term	529	532	i	4	1	12		
Spare Calibration Ch 20 First Order Term	533	536	i	4	1	9		
Spare Calibration Ch 20 Zeroth Order Term	537	540	i	4	1	6		
Spare Calibration Ch 10 Second Order Term	541	544	i	4	1	12		
Spare Calibration Ch 10 First Order Term	545	548	i	4	1	9		
Spare Calibration Ch 10 Zeroth Order Term	549	552	i	4	1	6		
Spare Calibration Ch 14 Second Order Term	553	556	i	4	1	12		
Spare Calibration Ch 14 First Order Term	557	560	i	4	1	9		
Spare Calibration Ch 14 Zeroth Order Term	561	564	i	4	1	6		
Spare Calibration Ch 6 Second Order Term	565	568	i	4	1	12		
Spare Calibration Ch 6 First Order Term	569	572	i	4	1	9		

Spare Calibration Ch 6 Zeroth Order Term	573	576	i	4	1	6		
Spare Calibration Ch 5 Second Order Term	577	580	i	4	1	12		
Spare Calibration Ch 5 First Order Term	581	584	i	4	1	9		
Spare Calibration Ch 5 Zeroth Order Term	585	588	i	4	1	6		
Spare Calibration Ch 15 Second Order Term	589	592	i	4	1	12		
Spare Calibration Ch 15 First Order Term	593	596	i	4	1	9		
Spare Calibration Ch 15 Zeroth Order Term	597	600	i	4	1	6		
Spare Calibration Ch 12 Second Order Term	601	604	i	4	1	12		
Spare Calibration Ch 12 First Order Term	605	608	i	4	1	9		
Spare Calibration Ch 12 Zeroth Order Term	609	612	i	4	1	6		
Spare Calibration Ch 16 Second Order Term	613	616	i	4	1	12		
Spare Calibration Ch 16 First Order Term	617	620	i	4	1	9		
Spare Calibration Ch 16 Zeroth Order Term	621	624	i	4	1	6		
Spare Calibration Ch 9 Second Order Term	625	628	i	4	1	12		
Spare Calibration Ch 9 First Order Term	629	632	i	4	1	9		
Spare Calibration Ch 9 Zeroth Order Term	633	636	i	4	1	6		
NAVIGATION								
Computed Yaw Steering (*MetOp: contend defined below)* or <Zero Fill> (NOAA)	637	642	i	2	3	0	degrees	
Total Applied Attitude Correction Word 1: Roll Word 2: Pitch Word 3: Yaw	643	648	i	2	3	3	degrees	

Navigation Status Bit Field *(content, defined below, depends on origin of data, either NOAA or Metop)* *For NOAA Data:* bits 31-18: <zero fill> bit 17: earth location at the satellite subpoint is accurate and reasonable, i.e., is within tolerance defined by "Nadir Earth Location Tolerance" in header (0=out of tolerance; 1=in tolerance) bit 16: Euler error angles from the CPU telemetry used by AELDS to correct the earth locations (0=FALSE; 1=TRUE) bits 15-12: earth location indicator (0=earth location available; 1=first scan whose time is more than 24 hours older than the time [epoch] of the user ephemeris file; 2=no earth location available) bits 11-8: spacecraft attitude control (0=operating in YGC or NOMINAL mode and attitude is good; 1=operating in another mode but attitude is good; 2=operating in YGC or NOMINAL mode but tests are being conducted which may cause attitude to exceed nominal tolerance; 3=operating in another mode while tests are being conducted which may cause attitude to exceed nominal tolerance) bits 7-4: attitude SMODE (0=nominal mode; 1=rate nulling mode; 2=YGC mode; 3=search mode; 4=coast mode) bits 3-0: attitude PWTIP$AC (0=nominal mode/no test; 1=yaw axis test in progress; 2=roll axis test in progress; 3=pitch axis test in progress) *For Metop Data:* bits 31-21: <zero fill> bit 20-19: yaw steering parameters usage indicator (0=no yaw steering correction; 1=measured angles from the Metop SVM telemetry; 2=computed angles from AELDS; 3=measured angles + computed angles) bit 18: Metop maneuver indicator (0=scan does not occur during a Metop in-plane or out-of-plane maneuver; 1=scan, or some part of it, occurs during a maneuver) bit 17: <same as defined for NOAA, above> bit 16: <zero fill> bits 15-12: <same as defined for NOAA, above> bits 11-8: <zero fill> bits 7-4: OPM PF sub-mode (0=fine pointing mode (FPM); 1=yaw steering mode (YSM)) bits 3-0: SVM PF mode (0=LHM; 1=RRM; 2=CAM; 3=FAM1; 4=FAM2; 5=FAM3; 6=OPM; 7=OCM1; 8=OCM2; 9=OCMT; 10=OCM0)	649	652	u	4	1	0		
Time Associated with Euler Angles	653	656	i	4	1	0	seconds	
Euler Angles *(NOAA, from TIP CPU telemetry near end of scan; MetOp [in FPM] from SVM telemetry just before start of scan)* or Yaw Steering Parameters *(MetOp [in YSM], from SVM telemetry or AELDS near nadir of scan)* Word 1: Roll Word 2: Pitch Word 3: Yaw	657	662	i	2	3	3	degrees	
Spacecraft Altitude above Reference Ellipsoid	663	664	u	2	1	1	km	

Angular *Relationships (relative azimuth range +/-180.00 degrees)* Word 1: Solar zenith angle, FOV 1 Word 2: Satellite zenith angle, FOV 1 Word 3: Relative azimuth angle, FOV 1 Word 4: Solar zenith angle, FOV 2 ... (set of 3 angles every FOV) ... Word 168: Relative azimuth angle, FOV56	665	1000	i	2	168	2	degrees	
Earth Location *(north latitude and east longitude are positive)* Word 1: Latitude, FOV 1 Word 2: Longitude, FOV 1 Word 3: Latitude, FOV 2 ... (lat/lon word pair every FOV) ... Word 112: Longitude, FOV 56	1001	1448	i	4	112	4	degrees	
Lunar Angle *(angle between moon and space view; only applicable for the space view scan, otherwise, undefined; range 0 to 180.00 degrees)*	1449	1450	u	2	1	2	degrees	
HIRS DATA ELEMENTS								
Header for Element *0 (same format through element 63)* bits 31-24: scan encoder position bits 23-19: electronic cal level indicator bits 18-13: <zero fill> bits 12-7: channel 1 period monitor bits 6-1: element number bit 0: filter sync designator	1457	1460	u	4	1	0		
Radiometric Data for Element 0 *(same format through element 55)* Word 1: Channel 1 bits 15-13: <zero fill> bits 12-0: 13-bit data *Words 2-20: Channels 17, 2, 3, 13, 4, 18, 11, 19, 7, 8, 20, 10, 14, 6, 5, 15, 12, 16, 9 (in order)*	1461	1500	u	2	20	0	counts	2
Bit Flags for Element 0 (same format through element 63)	1501	1502	u	2	1	0		
bit 15: valid data flag (0=ignore data; 1=good data) bit 14: odd bit parity bits 13-0: <zero fill>								
<zero fill>	1503	1504	i	2	1	0		
Header for Element 1	1505	1508	u	4	1	0		
Radiometric Data for Element 1	1509	1548	u	2	20	0	counts	
Bit Flags for Element 1	1549	1550	u	2	1	0		
<zero fill>	1551	1552	i	2	1	0		
Header for Element 2	1553	1556	u	4	1	0		

Radiometric Data for Element 2	1557	1596	u	2	20	0	counts	
Bit Flags for Element 2	1597	1598	u	2	1	0		
<zero fill>	1599	1600	i	2	1	0		
Header for Element 3	1601	1604	u	4	1	0		
Radiometric Data for Element 3	1605	1644	u	2	20	0	counts	
Bit Flags for Element 3	1645	1646	u	2	1	0		
<zero fill>	1647	1648	i	2	1	0		
Header for Element 4	1649	1652	u	4	1	0		
Radiometric Data for Element 4	1653	1692	u	2	20	0	counts	
Bit Flags for Element 4	1693	1694	u	2	1	0		
<zero fill>	1695	1696	i	2	1	0		
Header for Element 5	1697	1700	u	4	1	0		
Radiometric Data for Element 5	1701	1740	u	2	20	0	counts	
Bit Flags for Element 5	1741	1742	u	2	1	0		
<zero fill>	1743	1744	i	2	1	0		
Header for Element 6	1745	1748	u	4	1	0		
Radiometric Data for Element 6	1749	1788	u	2	20	0	counts	
Bit Flags for Element 6	1789	1790	u	2	1	0		
<zero fill>	1791	1792	i	2	1	0		
Header for Element 7	1793	1796	u	4	1	0		
Radiometric Data for Element 7	1797	1836	u	2	20	0	counts	
Bit Flags for Element 7	1837	1838	u	2	1	0		
<zero fill>	1839	1840	i	2	1	0		
Header for Element 8	1841	1844	u	4	1	0		
Radiometric Data for Element 8	1845	1884	u	2	20	0	counts	
Bit Flags for Element 8	1885	1886	u	2	1	0		
<zero fill>	1887	1888	i	2	1	0		
Header for Element 9	1889	1892	u	4	1	0		
Radiometric Data for Element 9	1893	1932	u	2	20	0	counts	
Bit Flags for Element 9	1933	1934	u	2	1	0		
<zero fill>	1935	1936	i	2	1	0		
Header for Element 10	1937	1940	u	4	1	0		
Radiometric Data for Element 10	1941	1980	u	2	20	0	counts	
Bit Flags for Element 10	1981	1982	u	2	1	0		
<zero fill>	1983	1984	i	2	1	0		
Header for Element 11	1985	1988	u	4	1	0		
Header for Element 11	1985	1988	u	4	1	0		
Bit Flags for Element 11	2029	2030	u	2	1	0		
<zero fill>	2031	2032	i	2	1	0		
Header for Element 12	2033	2036	u	4	1	0		
Radiometric Data for Element 12	2037	2076	u	2	20	0	counts	
Bit Flags for Element 12	2077	2078	u	2	1	0		
Header for Element 13	2081	2084	u	4	1	0		
Radiometric Data for Element 13	2085	2124	u	2	20	0	counts	

Bit Flags for Element 13	2125	2126	u	2	1	0		
<zero fill>	2127	2128	i	2	1	0		
Header for Element 14	2129	2132	u	4	1	0		
Radiometric Data for Element 14	2133	2172	u	2	20	0	counts	
Bit Flags for Element 14	2173	2174	u	2	1	0		
<zero fill>	2175	2176	i	2	1	0		
Header for Element 15	2177	2180	u	4	1	0		
Radiometric Data for Element 15	2181	2220	u	2	20	0	counts	
Bit Flags for Element 15	2221	2222	u	2	1	0		
<zero fill>	2223	2224	i	2	1	0		
Header for Element 16	2225	2228	u	4	1	0		
Radiometric Data for Element 16	2229	2268	u	2	20	0	counts	
Bit Flags for Element 16	2269	2270	u	2	1	0		
<zero fill>	2271	2272	i	2	1	0		
Header for Element 17	2273	2276	u	4	1	0		
Radiometric Data for Element 17	2277	2316	u	2	20	0	counts	
Bit Flags for Element 17	2317	2318	u	2	1	0		
<zero fill>	2319	2320	i	2	1	0		
Header for Element 18	2321	2324	u	4	1	0		
Radiometric Data for Element 18	2325	2364	u	2	20	0	counts	
Bit Flags for Element 18	2365	2366	u	2	1	0		
<zero fill>	2367	2368	i	2	1	0		
Header for Element 19	2369	2372	u	4	1	0		
Radiometric Data for Element 19	2373	2412	u	2	20	0	counts	
Bit Flags for Element 19	2413	2414	u	2	1	0		
<zero fill>	2415	2416	i	2	1	0		
Header for Element 20	2417	2420	u	4	1	0		
Radiometric Data for Element 20	2421	2460	u	2	20	0	counts	
Bit Flags for Element 20	2461	2462	u	2	1	0		
<zero fill>	2463	2464	i	2	1	0		
Header for Element 21	2465	2468	u	4	1	0		
Radiometric Data for Element 21	2469	2508	u	2	20	0	counts	
Bit Flags for Element 21	2509	2510	u	2	1	0		
<zero fill>	2511	2512	i	2	1	0		
Header for Element 22	2513	2516	u	4	1	0		
Radiometric Data for Element 22	2517	2556	u	2	20	0	counts	
Bit Flags for Element 22	2557	2558	u	2	1	0		
<zero fill>	2559	2560	i	2	1	0		
Header for Element 23	2561	2564	u	4	1	0		
Radiometric Data for Element 23	2565	2604	u	2	20	0	counts	
Bit Flags for Element 23	2605	2606	u	2	1	0		
<zero fill>	2607	2608	i	2	1	0		
Header for Element 24	2609	2612	u	4	1	0		
Radiometric Data for Element 24	2613	2652	u	2	20	0	counts	

Bit Flags for Element 24	2653	2654	u	2	1	0		
<zero fill>	2655	2656	i	2	1	0		
Header for Element 25	2657	2660	u	4	1	0		
Radiometric Data for Element 25	2661	2700	u	2	20	0	counts	
Bit Flags for Element 25	2701	2702	u	2	1	0		
<zero fill>	2703	2704	i	2	1	0		
Header for Element 26	2705	2708	u	4	1	0		
Radiometric Data for Element 26	2709	2748	u	2	20	0	counts	
Bit Flags for Element 26	2749	2750	u	2	1	0		
<zero fill>	2751	2752	i	2	1	0		
Header for Element 27	2753	2756	u	4	1	0		
Radiometric Data for Element 27	2757	2796	u	2	20	0	counts	
Bit Flags for Element 27	2797	2798	u	2	1	0		
<zero fill>	2799	2800	i	2	1	0		
Header for Element 28	2801	2804	u	4	1	0		
Radiometric Data for Element 28	2805	2844	u	2	20	0	counts	
Bit Flags for Element 28	2845	2846	u	2	1	0		
<zero fill>	2847	2848	i	2	1	0		
Header for Element 29	2849	2852	u	4	1	0		
Radiometric Data for Element 29	2853	2892	u	2	20	0	counts	
Bit Flags for Element 29	2893	2894	u	2	1	0		
<zero fill>	2895	2896	i	2	1	0		
Header for Element 30	2897	2900	u	4	1	0		
Radiometric Data for Element 30	2901	2940	u	2	20	0	counts	
Bit Flags for Element 30	2941	2942	u	2	1	0		
<zero fill>	2943	2944	i	2	1	0		
Header for Element 31	2945	2948	u	4	1	0		
Radiometric Data for Element 31	2949	2988	u	2	20	0	counts	
Bit Flags for Element 31	2989	2990	u	2	1	0		
<zero fill>	2991	2992	i	2	1	0		
Header for Element 32	2993	2996	u	4	1	0		
Radiometric Data for Element 32	2997	3036	u	2	20	0	counts	
Bit Flags for Element 32	3037	3038	u	2	1	0		
<zero fill>	3039	3040	i	2	1	0		
Header for Element 33	3041	3044	u	4	1	0		
Radiometric Data for Element 33	3045	3084	u	2	20	0	counts	
Bit Flags for Element 33	3085	3086	u	2	1	0		
<zero fill>	3087	3088	i	2	1	0		
Header for Element 34	3089	3092	u	4	1	0		
Radiometric Data for Element 34	3093	3132	u	2	20	0	counts	
Bit Flags for Element 34	3133	3134	u	2	1	0		
<zero fill>	3135	3136	i	2	1	0		
Header for Element 35	3137	3140	u	4	1	0		
Radiometric Data for Element 35	3141	3180	u	2	20	0	counts	

Bit Flags for Element 35	3181	3182	u	2	1	0		
<zero fill>	3183	3184	i	2	1	0		
Header for Element 36	3185	3188	u	4	1	0		
Radiometric Data for Element 36	3189	3228	u	2	20	0	counts	
Bit Flags for Element 36	3229	3230	u	2	1	0		
<zero fill>	3231	3232	i	2	1	0		
Header for Element 37	3233	3236	u	4	1	0		
Radiometric Data for Element 37	3237	3276	u	2	20	0	counts	
Bit Flags for Element 37	3277	3278	u	2	1	0		
<zero fill>	3279	3280	i	2	1	0		
Header for Element 38	3281	3284	u	4	1	0		
Radiometric Data for Element 38	3285	3324	u	2	20	0	counts	
Bit Flags for Element 38	3325	3326	u	2	1	0		
<zero fill>	3327	3328	i	2	1	0		
Header for Element 39	3329	3332	u	4	1	0		
Radiometric Data for Element 39	3333	3372	u	2	20	0	counts	
Bit Flags for Element 39	3373	3374	u	2	1	0		
<zero fill>	3375	3376	i	2	1	0		
Header for Element 40	3377	3380	u	4	1	0		
Radiometric Data for Element 40	3381	3420	u	2	20	0	counts	
Bit Flags for Element 40	3421	3422	u	2	1	0		
<zero fill>	3423	3424	i	2	1	0		
Header for Element 41	3425	3428	u	4	1	0		
Radiometric Data for Element 41	3429	3468	u	2	20	0	counts	
Bit Flags for Element 41	3469	3470	u	2	1	0		
<zero fill>	3471	3472	i	2	1	0		
Header for Element 42	3473	3476	u	4	1	0		
Radiometric Data for Element 42	3477	3516	u	2	20	0	counts	
Bit Flags for Element 42	3517	3518	u	2	1	0		
<zero fill>	3519	3520	i	2	1	0		
Header for Element 43	3521	3524	u	4	1	0		
Radiometric Data for Element 43	3525	3564	u	2	20	0	counts	
Bit Flags for Element 43	3565	3566	u	2	1	0		
<zero fill>	3567	3568	i	2	1	0		
Header for Element 44	3569	3572	u	4	1	0		
Radiometric Data for Element 44	3573	3612	u	2	20	0	counts	
Bit Flags for Element 44	3613	3614	u	2	1	0		
<zero fill>	3615	3616	i	2	1	0		
Header for Element 45	3617	3620	u	4	1	0		
Radiometric Data for Element 45	3621	3660	u	2	20	0	counts	
Bit Flags for Element 45	3661	3662	u	2	1	0		
<zero fill>	3663	3664	i	2	1	0		
Header for Element 46	3665	3668	u	4	1	0		
Radiometric Data for Element 46	3669	3708	u	2	20	0	counts	

Bit Flags for Element 46	3709	3710	u	2	1	0		
<zero fill>	3711	3712	i	2	1	0		
Header for Element 47	3713	3716	u	4	1	0		
Radiometric Data for Element 47	3717	3756	u	2	20	0	counts	
Bit Flags for Element 47	3757	3758	u	2	1	0		
<zero fill>	3759	3760	i	2	1	0		
Header for Element 48	3761	3764	u	4	1	0		
Radiometric Data for Element 48	3765	3804	u	2	20	0	counts	
Bit Flags for Element 48	3805	3806	u	2	1	0		
<zero fill>	3807	3808	i	2	1	0		
Header for Element 49	3809	3812	u	4	1	0		
Radiometric Data for Element 49	3813	3852	u	2	20	0	counts	
Bit Flags for Element 49	3853	3854	u	2	1	0		
<zero fill>	3855	3856	i	2	1	0		
Header for Element 50	3857	3860	u	4	1	0		
Radiometric Data for Element 50	3861	3900	u	2	20	0	counts	
Bit Flags for Element 50	3901	3902	u	2	1	0		
<zero fill>	3903	3904	i	2	1	0		
Header for Element 51	3905	3908	u	4	1	0		
Radiometric Data for Element 51	3909	3948	u	2	20	0	counts	
Bit Flags for Element 51	3949	3950	u	2	1	0		
<zero fill>	3951	3952	i	2	1	0		
Header for Element 52	3953	3956	u	4	1	0		
Radiometric Data for Element 52	3957	3996	u	2	20	0	counts	
Bit Flags for Element 52	3997	3998	u	2	1	0		
<zero fill>	3999	4000	i	2	1	0		
Header for Element 53	4001	4004	u	4	1	0		
Radiometric Data for Element 53	4005	4044	u	2	20	0	counts	
Bit Flags for Element 53	4045	4046	u	2	1	0		
<zero fill>	4047	4048	i	2	1	0		
Header for Element 54	4049	4052	u	4	1	0		
Radiometric Data for Element 54	4053	4092	u	2	20	0	counts	
Bit Flags for Element 54	4093	4094	u	2	1	0		
<zero fill>	4095	4096	i	2	1	0		
Header for Element 55	4097	4100	u	4	1	0		
Radiometric Data for Element 55	4101	4140	u	2	20	0	counts	
Bit Flags for Element 55	4141	4142	u	2	1	0		
<zero fill>	4143	4144	i	2	1	0		
Header for Element 56	4145	4148	u	4	1	0		
Positive Calibration Word 1: Channel 1 Words 2-20: Channels 17, 2, 3, 13, 4, 18, 11, 19, 7, 8, 20, 10, 14, 6, 5, 15, 12, 16, 9 (in order)	4149	4188	u	2	20	0	counts	
Bit Flags for Element 56	4189	4190	u	2	1	0		
<zero fill>	4191	4192	i	2	1	0		

Header for Element 57	4193	4196	u	4	1	0		
Negative Calibration Word 1: Channel 1 Words 2-20: Channels 17, 2, 3, 13, 4, 18, 11, 19, 7, 8, 20, 10, 14, 6, 5, 15, 12, 16, 9 (in order)	4197	4236	u	2	20	0	counts	
Bit Flags for Element 57	4237	4238	u	2	1	0		
<zero fill>	4239	4240	i	2	1	0		
Header for Element 58	4241	4244	u	4	1	0		
Internal Warm Target, Temperature Sensor #1 *(Zero fill in commanded position modes)* Word 1: Reading 1 ... Word 5: Reading 5	4245	4254	i	2	5	0	counts	
Internal Warm Target, Temperature Sensor #2 *(Zero fill in commanded position modes)* Word 1: Reading 1 ... Word 5: Reading 5	4255	4264	i	2	5	0	counts	
Internal Warm Target, Temperature Sensor #3 *(Zero fill in commanded position modes)* Word 1: Reading 1 ... Word 5: Reading 5	4265	4274	i	2	5	0	counts	
Internal Warm Target, Temperature Sensor #4 *(Zero fill in commanded position modes)* Word 1: Reading 1 ... Word 5: Reading 5	4275	4284	i	2	5	0	counts	
Bit Flags for Element 58	4285	4286	u	2	1	0		
Bit Flags for Element 58	4285	4286	u	2	1	0		
Header for Element 59	4289	4292	u	4	1	0		
Internal Cold Target, Temperature Sensor #1 (Zero fill in commanded position modes) Word 1: Reading 1 ... Word 5: Reading 5	4293	4302	i	2	5	0	counts	
Internal Cold Target, Temperature Sensor #2 *(NOAA-KLM)* Analog Ground *3 (NOAA-N,N' and MetOp)* *(Zero fill in commanded position modes)* Word 1: Reading 1 ... Word 5: Reading 5	4303	4312	i	2	5	0	counts	

Internal Cold Target, Temperature Sensor #3 *(NOAA-KLM)* Internal Warm Target, Temperature Sensor #5 *(NOAA-N,N' and MetOp)* *(Zero fill in commanded position modes)* Word 1: Reading 1 ... Word 5: Reading 5	4313	4322	i	2	5	0	counts	
Internal Cold Target, Temperature Sensor #4 *(NOAA-KLM)* Tertiary Telescope Temperature Sensor *(NOAA-N,N' and MetOp)* *(Zero fill in commanded position modes*) Word 1: Reading 1 ... Word 5: Reading 5	4323	4332	i	2	5	0	counts	
Bit Flags for Element 59	4333	4334	u	2	1	0		
<zero fill>	4335	4336	i	2	1	0		
Header for Element 60	4337	4340	u	4	1	0		
Filter Wheel Housing, Temperature Sensor #1 Word 1: Reading 1 ... Word 5: Reading 5	4341	4350	i	2	5	0	counts	
Filter Wheel Housing, Temperature Sensor #2 Word 1: Reading 1 ... Word 5: Reading 5	4351	4360	i	2	5	0	counts	
Filter Wheel Housing, Temperature Sensor #3 Word 1: Reading 1 ... Word 5: Reading 5	4361	4370	i	2	5	0	counts	
Filter Wheel Housing, Temperature Sensor #3 Word 1: Reading 1 ... Word 5: Reading 5	4361	4370	i	2	5	0	counts	
Bit Flags for Element 60	4381	4382	u	2	1	0		
Bit Flags for Element 60	4381	4382	u	2	1	0		
<zero fill>	4383	4384	i	2	1	0		
Header for Element 61	4385	4388	u	4	1	0		
Patch Temperature (Expanded Scale) Word 1: Reading 1 ... Word 5: Reading 5	4389	4398	i	2	5	0	counts	
First Stage Radiator Temperature Sensor Word 1: Reading 1 ... Word 5: Reading 5	4399	4408	i	2	5	0	counts	

Filter Wheel Housing Heater Current Word 1: Reading 1 ... Word 5: Reading 5	4409	4418	i	2	5	0	counts	
Electronic Calibration Digital to Analog Converter Word 1: Reading 1 ... Word 5: Reading 5	4419	4428	i	2	5	0	counts	
Bit Flags for Element 61	4429	4430	u	2	1	0		
<zero fill>	4431	4432	i	2	1	0		
Header for Element 62	4433	4436	u	4	1	0		
Scan Mirror Temperature	4437	4438	i	2	1	0	counts	
Primary Telescope Temperature	4439	4440	i	2	1	0	counts	
Secondary Telescope Temperature	4441	4442	i	2	1	0	counts	
Baseplate Temperature	4443	4444	i	2	1	0	counts	
Electronics Temperature	4445	4446	i	2	1	0	counts	
Patch Temperature Full Range	4447	4448	i	2	1	0	counts	
Scan Motor Temperature	4449	4450	i	2	1	0	counts	
Filter Wheel Motor Temperature	4451	4452	i	2	1	0	counts	
Cooler Housing Temperature	4453	4454	i	2	1	0	counts	
Patch Control Power	4455	4456	i	2	1	0	counts	
Scan Motor Current	4457	4458	i	2	1	0	counts	
Filter Motor Current	4459	4460	i	2	1	0	counts	
+15 VDC	4461	4462	i	2	1	0	counts	
-15 VDC	4463	4464	i	2	1	0	counts	
+7.5 VDC	4465	4466	i	2	1	0	counts	
-7.5 VDC	4467	4468	i	2	1	0	counts	
+10 VDC	4469	4470	i	2	1	0	counts	
+5 VDC	4471	4472	i	2	1	0	counts	
Analog Ground 1	4473	4474	i	2	1	0	counts	
Analog Ground 2	4475	4476	i	2	1	0	counts	
Bit Flags for Element 62	4477	4478	u	2	1	0		
<zero fill>	4479	4480	i	2	1	0		
Header for Element 63	4481	4484	u	4	1	0		
Line Counter (number of lines from the last auto calibration sequence)	4485	4486	u	2	1	0		
First Status Word bits 15-13: <zero fill> bits 12-8: instrument serial number bit 7: instrument (0=off; 1=on) bit 6: scan motor (0=on; 1=off) bit 5: filter wheel (0=on; 1=off) bit 4: electronics (0=off; 1=on) bit 3: cooler heat (0=on; 1=off) bit 2: internal warm target position (0=true; 1=false) bit 1: internal cold target position (0=true; 1=false) bit 0: space position (0=true; 1=false)	4487	4488	u	2	1	0		

Second Status Word bits 15-8: <zero fill> bit 7: nadir position (0=true; 1=false) bit 6: calibration (0=enabled; 1=disabled) bit 5: cooler door release (0=enabled; 1=disabled) bit 4: cooler door open (0=no; 1=yes) bit 3: cooler door closed (0=no; 1=yes) bit 2: filter housing heat (0=on; 1=off) bit 1: patch temperature control (0=on; 1=off) bit 0: filter motor power (0=high; 1=normal)	4489	4490	u	2	1	0		
Data Verification Binary Code Words 1-17: +3875, +1443, -1522, -1882, -1631, -1141, +1125, +3655, -2886, -3044, -3764, -3262, -2283, -2251, +3214, +1676, +1992	4491	4524	u	2	17	0		
Bit Flags for Element 63	4525	4526	u	2	1	0		
<zero fill>	4527	4540	i	2	7	0		
DIGITAL B HOUSEKEEPING TELEMETRY								
Digital B Telemetry Update Flags (If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.) bit 15: instrument power bit 14: electronics power bit 13: filter motor power bit 12: scan motor power bit 11: cooler heater bit 10: filter housing heater bit 9: cooler door release bit 8: cooler window heater bit 7: go to nadir position bit 6: calibration sequence bit 5: cooler door closed bit 4: cooler door fully open bit 3: filter motor power level bit 2: patch temperature controller bits 1-0: <zero fill>	4541	4542	u	2	1	0		

Digital B Data bit 15: instrument power (0=off; 1=on) bit 14: electronics power (0=off; 1=on) bit 13: filter motor power (0=off; 1=on) bit 12: scan motor power (0=off; 1=on) bit 11: cooler heater (0=off; 1=on) bit 10: filter housing heater (0=off; 1=on) bit 9: cooler door release (0=disabled; 1=enabled) bit 8: cooler window heater (0=on; 1=off) bit 7: go to nadir position (0=no; 1=yes/initiated) bit 6: calibration sequence (0=disabled; 1=enabled) bit 5: cooler door closed (0=yes; 1=no) bit 4: cooler door fully open (0=yes; 1=no) bit 3: filter motor power level (0=normal; 1=high) bit 2: patch temperature controller (0=off; 1=on) bits 1-0: <zero fill>	4543	4544	u	2	1	0			
ANALOG HOUSEKEEPING TELEMETRY									
Analog Telemetry Update Flags (If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.) bits 31-17: <zero fill> bit 16: patch controller power bit 15: scan motor current bit 14: filter wheel motor current bit 13: -15 VDC monitor bit 12: +15 VDC monitor bit 11: -7.5 VDC TLM/DC/DC conv. bit 10: +7.5 VDC TLM/DC/DC conv. bit 9: +10V VDC TLM/DC/DC conv. bit 8: +5 VDC monitor bit 7: filter wheel motor temperature bit 6: scan motor temperature bit 5: filter housing controller current bit 4: patch temperature bit 3: electronics temperature bit 2: base plate temperature bit 1: radiator temperature bit 0: <zero fill>	4545	4548	u	4	1	0			
Radiator Temperature (range: 0 - 255)	4549	4549	u	1	1	0	counts		
Base Plate Temperature (range: 0 - 255)	4550	4550	u	1	1	0	counts		
Electronics Temperature (range: 0 - 255)	4551	4551	u	1	1	0	counts		
Patch Temperature (range: 0 - 255)	4552	4552	u	1	1	0	counts		
Filter Housing Controller Current (range: 0 - 255)	4553	4553	u	1	1	0	counts		
Scan Motor Temperature (range: 0 - 255)	4554	4554	u	1	1	0	counts		
Filter Wheel Motor Temperature (range: 0 - 255)	4555	4555	u	1	1	0	counts		
+5 VDC Monitor (range: 0 - 255)	4556	4556	u	1	1	0	counts		
+10V VDC TLM/DC/DC Conv. (range: 0 - 255)	4557	4557	u	1	1	0	counts		
+7.5 VDC TLM/DC/DC Conv. (range: 0 - 255)	4558	4558	u	1	1	0	counts		
-7.5 VDC TLM/DC/DC Conv. (range: 0 - 255)	4559	4559	u	1	1	0	counts		

+15 VDC Monitor (range: 0 - 255)	4560	4560	u	1	1	0	counts	
-15 VDC Monitor (range: 0 - 255)	4561	4561	u	1	1	0	counts	
Filter Wheel Motor Current (range: 0 - 255)	4562	4562	u	1	1	0	counts	
Scan Motor Current (range: 0 - 255)	4563	4563	u	1	1	0	counts	
Patch Controller Power (range: 0 - 255)	4564	4564	u	1	1	0	counts	
FILLER								
<zero fill>	4565	4608	i	4	11	0		

NOTES:

1) The interpretation of the HIRS data is dependent on the element in which it resides. Each 13-bit HIRS word in the 56 FOVs (elements 0-55) is stored in the least significant 13 bits of a 2-byte word. Therefore, bits 15-13 are zero fill, bit 12 is the HIRS inverted sign bit, and bits 11-0 is the radiant signal amplitude. However, if the HIRS word is negative, bits 11-0 are in a "two's complement-like" form (see description in "Radiometric Data for Element 0"). Each 13-bit HIRS word in the remaining 8 elements (56-63) that represents a value (i.e., not packed bit flags and fields) is "unpacked" into a 2-byte word. Therefore, bit 15 is the sign bit (not inverted) and bits 14-0 is the magnitude of the value (in two's complement form if the value is negative).

2) To unpack a channel's 2-byte, radiometric reading, subtract 4,096 from it--i.e., "u = p - 4096", where 'p' is the channel's reading as stored in the Level 1b (described below), and 'u' is the unpacked reading.

3) Anomalous is defined as the absolute value (mean - median) > NEDC where mean and median are after 3 sigma filtering. The channel calibration quality flags for earth views for each channel will be inherited from the flags in the space and blackbody view scan lines.

4) This is triggered if bit 4, 3, or 0 in channel calibration quality flag is set for any IR channel.

8.3.1.6 AMSU-A Data Sets

This section describes the characteristics and format of Advanced Microwave Sounding Unit-A (AMSU-A) data sets for both NOAA KLM (version 2) and NOAA-N (version 3) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the Version 3 format (v3), also known as the NOAA-N format, will be implemented for all operational POES spacecraft. **After January 25, 2006, the version number contained in the header was updated from 3 to 4 to reflect the inclusion of cloud mask information. All level 1b documentation should reflect that until another change is made.**

8.3.1.6.1 Data Characteristics

Table 8.3.1.6.1-1 summarizes fundamental characteristics of the data.

Table 8.3.1.6.1-1. AMSU-A Data Characteristics.

Parameter	Value
Sample word size	16 bits
Number of sampled channels/available channels	15/15
Number of Earth samples per scan	30 per channel
Scan rate	7.5 scans per minute
Scan direction	West to East (northbound)

Instantaneous Field of View (IFOV)	3.3 degrees (all channels)
Spatial resolution at nadir	48 km at 833 km altitude
Cross track distance between sample centers at nadir	48 km at 833 km altitude
Along track distance between sample centers at nadir	52.7 km at 833 km altitude
Cross-track scan coverage	± 50 degrees from nadir
Swath width	2069.6 km at 833 km altitude

8.3.1.6.2 Header Records

The Data Set Header Record contains quality, navigation, calibration and conversion coefficient information which applies to the AMSU-A data records which follow. This section describes the header records for both NOAA KLM (Version 2) and NOAA-N (Version 3) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the Version 3 format (v3), also known as the NOAA-N format, was implemented for all operational POES spacecraft. **After January 25, 2006, the version number contained in the header was updated from 3 to 4 to reflect the inclusion of cloud mask information. All level 1b documentation should reflect that until another change is made.**

8.3.1.6.2.1 NOAA KLM Format (Version 2, pre-April 28, 2005)

The AMSU-A Data Set Header Record format (version 2, pre-April 28, 2005) is documented in Table 8.3.1.6.2.1-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
FILE IDENTIFICATION								
Data Set Creation Site ID CMS=Centre de Meteorologie Spatiale/France DSS=Dundee Satellite Receiving Station/UK NSS=National Environmental Satellite, Data and Information Service/USA UKM=United Kingdom Meteorological Office/UK	1	3	c	3	1	0		
<ASCII blank = x20>	4	4	c	1	1	0		
Level 1b Format Version Number	5	6	u	2	1	0		
Level 1b Format Version Year *(four digits, e.g., 2000)*	7	8	u	2	1	0		
Level 1b Format Version Day of Year *(e.g., 365)*	9	10	u	2	1	0		
<Reserved for Logical Record Length> *(For Creation Site use only. Logical Record Length of source 1b data set prior to processing.)*	11	12	u	2	1	0	octets	
<Reserved for Block Size> *(For Creation Site use only. Block Size of source 1b data set prior to processing.)*	13	14	u	2	1	0	octets	
Count of Header Records in this Data Set	15	16	u	2	1	0		
<Zero Fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		

Spacecraft Identification Code 2=NOAA-16 4=NOAA-15 6=NOAA-17 7=NOAA-18 8=NOAA-N' 11=Metop-1 12=Metop-A 13=Metop-3	73	74	u	2	1	0		
Instrument ID *Word 1: AMSU-A2 ID Number* 6=protoflight model (PFM), s/n 102 (NOAA-15) 10=flight model (FM) 1, s/n 103 (NOAA-16) 14=FM 2, s/n 104 (NOAA-17) 18=FM 3, s/n 105 (NOAA-18) 30=FM 6, s/n 108 (Metop-A) *Word 2: AMSU-A1 ID Number* *5=PFM, s/n 102 (NOAA-16)* 9=FM 1, s/n 103 (NOAA-15) 13=FM 2, s/n 104 (NOAA-17) 21=FM 4, s/n 106 (Metop-A) 33=FM 7, s/n 109 (NOAA-18)	75	76	u	1	2	0		
Data Type Code 10=AMSU-A	77	78	u	2	1	0		
TIP Source Code *(NOAA: values defined below)* or <Zero Fill> *(Metop)* 0=unused, i.e., GAC/HRPT/LAC data 1=GAC-embedded AMSU and TIP 2=stored TIP (STIP) 3=HRPT/LAC-embedded AMSU and TIP 4=stored AIP (SAIP)	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year *(four digits, e.g., 2000)*	85	86	u	2	1	0		
Start of Data Set Day of Year *(e.g., 365)*	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	milliseconds	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year *(four digits, e.g., 2000)*	97	98	u	2	1	0		
End of Data Set Day of Year *(e.g., 365)*	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	milliseconds	
Year of Last CPIDS Update *(four digits, e.g., 2000)*	105	106	u	2	1	0		
Day of Year of Last CPIDS Update *(e.g., 365)*	107	108	u	2	1	0		
Offset between Start of Scan and Center of First FOV	109	110	i	2	1	0	milliseconds	
<Zero Fill>	111	120	i	2	5	0		
DATA SET QUALITY INDICATORS								

Instrument Status A2 *(see "Digital B Telemetry for AMSU-A2" field in data record)* bits 31-15: <zero fill> bit 14: cold cal position, msb bit 13: cold cal position, lsb bit 12: antenna in nadir position (0=no; 1=yes) bit 11: antenna in cold cal position (0=no; 1=yes) bit 10: antenna in warm cal position (0=no; 1=yes) bit 9: full scan mode (0=no; 1=yes) bits 5-8: <zero fill> bit 4: survival heater (0=off; 1=on) bit 3: module power (0=disconnect; 1=connect) bit 2: compensator motor (0=off; 1=on) bit 1: scanner A2 power (0=off; 1=on) bit 0: <zero fill>	121	124	u	4	1	0		
<Zero Fill>	125	126	i	2	1	0		
Record Number of Status Change of A2 *(if 0, none occurred)*	127	128	u	2	1	0		
Second Instrument Status A2 *(if previous word is 0, no change)*	129	132	u	4	1	0		
Instrument Status A1 *(see "Digital B Telemetry for AMSU-A1" field in data record)* bits 31-15: <zero fill> bit 14: cold cal position, msb bit 13: cold cal position, lsb bit 12: antenna in nadir position (0=no; 1=yes) bit 11: antenna in cold cal position (0=no; 1=yes)bit 10: antenna in warm cal position (0=no; 1=yes) bit 9: full scan mode (0=no; 1=yes) bits 8-6: <zero fill> bit 5: module power (0=disconnect; 1=connect) bit 4: survival heater (0=off; 1=on) bit 3: phase lock loop (0=redundant; 1=primary) bit 2: scanner A1-2 power (0=off; 1=on) bit 1: scanner A1-1 power (0=off; 1=on) bit 0: <zero fill>	133	136	u	4	1	0		
<Zero Fill>	137	138	i	2	1	0		
Record Number of Status Change of A1 *(if 0, none occurred)*	139	140	u	2	1	0		
Second Instrument Status A1 *(if previous word is 0, no change)*	141	144	u	4	1	0		
Count of Data Records in this Data Set	145	146	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set	147	148	u	2	1	0		
Count of Missing Scan Lines	149	150	u	2	1	0		
Count of Data Gaps in this Data Set	151	152	u	2	1	0		
Count of Data Frames Without Frame Sync Word Errors	153	154	u	2	1	0		
Count of PACS Detected TIP Parity Errors	155	156	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data	157	158	u	2	1	0		

Time Sequence Error 0=none; otherwise, the record number of the first occurrence	159	160	u	2	1	0		
Time Sequence Error Code *(These are bit flags taken from "Scan Line Quality Flags [Time Problem Code]" on data record reported in "Time Sequence Error" field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity); may be associated with a spacecraft clock update bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	161	162	u	2	1	0		
SOCC Clock Update Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	163	164	u	2	1	0		
Earth Location Error Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	165	166	u	2	1	0		
Earth Location Error Code *(These are bit flags taken from "Scan Line Quality Flags [Earth Location Problem Code]" on data record reported in "Earth Location Error Indicator" field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bit 3: earth location questionable because of antenna position check bit 2: <zero fill> bit 1: earth location questionable: satellite in-plane maneuver (Metop) or <zero fill> (NOAA) bit 0: earth location questionable: satellite out-of-plane maneuver (Metop) or <zero fill> (NOAA)	167	168	u	2	1	0		
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudonoise (0=normal data; 1=pseudonoise data) bit 1: tape direction (0=reverse playback, time decrementing) bit 0: data mode (0=test data; 1=flight data)	169	170	u	2	1	0		

Data Source 0=unused 1=Fairbanks, AK 2=Wallops Is., VA 3=SOCC 4=Svalbard, Norway 5=Monterey, CA	171	172	u	2	1	0		
<Zero Fill>	173	176	i	4	1	0		
<Reserved for the Ingester>	177	184	c	8	1	0		
<Reserved for Decommutation>	185	192	c	8	1	0		
<Zero Fill>	193	208	i	4	4	0		
CALIBRATION								
<Zero Fill>	209	210	i	2	1	0		
Instrument Temperature Sensor ID Word 1: 0=RF Shelf A1-1; 1=RF Mux A1-1 Word 2: 0=RF Shelf A1-2; 1=RF Mux A1-2 Word 3: 0=RF Shelf A2; 1=RF Mux/Diplexer A2	211	216	u	2	3	0		2
RF Shelf A1-1 Minimum Reference Temperature, PLLO#1	217	218	i	2	1	2	K	
RF Shelf A1-1 Nominal Reference Temperature, PLLO#1	219	220	i	2	1	2	K	
RF Shelf A1-1 Maximum Reference Temperature, PLLO#1	221	222	i	2	1	2	K	
RF Shelf A1-2 Minimum Reference Temperature	223	224	i	2	1	2	K	
RF Shelf A1-2 Nominal Reference Temperature	225	226	i	2	1	2	K	
RF Shelf A1-2 Maximum Reference Temperature	227	228	i	2	1	2	K	
RF Shelf A2 Minimum Reference Temperature	229	230	i	2	1	2	K	
RF Shelf A2 Nominal Reference Temperature	231	232	i	2	1	2	K	
RF Shelf A2 Maximum Reference Temperature	233	234	i	2	1	2	K	
RF Shelf A1-1 Minimum Reference Temperature, PLLO#2	235	236	i	2	1	2	K	
RF Shelf A1-1 Nominal Reference Temperature, PLLO#2	237	238	i	2	1	2	K	
RF Shelf A1-1 Maximum Reference Temperature, PLLO#2	239	240	i	2	1	2	K	
RF Mux A1-1 Minimum Reference Temperature, PLLO#1	241	242	i	2	1	2	K	
RF Mux A1-1 Nominal Reference Temperature, PLLO#1	243	244	i	2	1	2	K	
RF Mux A1-1 Maximum Reference Temperature, PLLO#1	245	246	i	2	1	2	K	
RF Mux A1-2 Minimum Reference Temperature	247	248	i	2	1	2	K	
RF Mux A1-2 Nominal Reference Temperature	249	250	i	2	1	2	K	
RF Mux A1-2 Maximum Reference Temperature	251	252	i	2	1	2	K	
RF Mux/Diplexer A2 Minimum Reference Temperature	253	254	i	2	1	2	K	2
RF Mux/Diplexer A2 Nominal Reference Temperature	255	256	i	2	1	2	K	2
RF Mux/Diplexer A2 Maximum Reference Temperature	257	258	i	2	1	2	K	2
RF Mux A1-1 Minimum Reference Temperature, PLLO#2	259	260	i	2	1	2	K	
RF Mux A1-1 Nominal Reference Temperature, PLLO#2	261	262	i	2	1	2	K	

RF Mux A1-1 Maximum Reference Temperature, PLLO#2	263	264	i	2	1	2	K	
Warm Target Fixed Bias Corr Ch1 at Min RF Shelf Temp	265	266	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch1 at Nom RF Shelf Temp	267	268	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch1 at Max RF Shelf Temp	269	270	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch1	271	272	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch2 at Min RF Shelf Temp	273	274	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch2 at Nom RF Shelf Temp	275	276	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch2 at Max RF Shelf Temp	277	278	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch2	279	280	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch3 at Min RF Shelf Temp	281	282	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch3 at Nom RF Shelf Temp	283	284	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch3 at Max RF Shelf Temp	285	286	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch3	287	288	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch4 at Min RF Shelf Temp	289	290	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch4 at Nom RF Shelf Temp	291	292	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch4 at Max RF Shelf Temp	293	294	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch4	295	296	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch5 at Min RF Shelf Temp	297	298	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch5 at Nom RF Shelf Temp	299	300	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch5 at Max RF Shelf Temp	301	302	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch5	303	304	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch6 at Min RF Shelf Temp	305	306	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch6 at Nom RF Shelf Temp	307	308	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch6 at Max RF Shelf Temp	309	310	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch6	311	312	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch7 at Min RF Shelf Temp	313	314	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch7 at Nom RF Shelf Temp	315	316	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch7 at Max RF Shelf Temp	317	318	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch7	319	320	i	2	1	3	K	

Warm Target Fixed Bias Corr Ch8 at Min RF Shelf Temp	321	322	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch8 at Nom RF Shelf Temp	323	324	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch8 at Max RF Shelf Temp	325	326	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch8	327	328	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch9 at Min RF Shelf Temp	329	330	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch9 at Nom RF Shelf Temp	331	332	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch9 at Max RF Shelf Temp	333	334	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch9	335	336	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch10 at Min RF Shelf Temp	337	338	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch10 at Nom RF Shelf Temp	339	340	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch10 at Max RF Shelf Temp	341	342	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch10	343	344	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch11 at Min RF Shelf Temp	345	346	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch11 at Nom RF Shelf Temp	347	348	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch11 at Max RF Shelf Temp	349	350	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch11	351	352	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch12 at Min RF Shelf Temp	353	354	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch12 at Nom RF Shelf Temp	355	356	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch12 at Max RF Shelf Temp	357	358	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch12	359	360	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch13 at Min RF Shelf Temp	361	362	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch13 at Nom RF Shelf Temp	363	364	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch13 at Max RF Shelf Temp	365	366	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch13	367	368	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch14 at Min RF Shelf Temp	369	370	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch14 at Nom RF Shelf Temp	371	372	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch14 at Max RF Shelf Temp	373	374	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch14	375	376	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch15 at Min RF Shelf Temp	377	378	i	2	1	3	K	

Warm Target Fixed Bias Corr Ch15 at Nom RF Shelf Temp	379	380	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch15 at Max RF Shelf Temp	381	382	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch15	383	384	i	2	1	3	K	
Warm Target Bias Corr Ch9 at PLLO#2 RF Shelf A1-1 Min Ref Temp	385	386	i	2	1	3	K	
Warm Target Bias Corr Ch9 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	387	388	i	2	1	3	K	
Warm Target Bias Corr Ch9 at PLLO#2 RF Shelf A1-1 Max Ref Temp	389	390	i	2	1	3	K	
Warm Target Bias Corr Ch10 at PLLO#2 RF Shelf A1-1 Min Ref Temp	391	392	i	2	1	3	K	
Warm Target Bias Corr Ch10 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	393	394	i	2	1	3	K	
Warm Target Bias Corr Ch10 at PLLO#2 RF Shelf A1-1 Max Ref Temp	395	396	i	2	1	3	K	
Warm Target Bias Corr Ch11 at PLLO#2 RF Shelf A1-1 Min Ref Temp	397	398	i	2	1	3	K	
Warm Target Bias Corr Ch11 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	399	400	i	2	1	3	K	
Warm Target Bias Corr Ch11 at PLLO#2 RF Shelf A1-1 Max Ref Temp	401	402	i	2	1	3	K	
Warm Target Bias Corr Ch12 at PLLO#2 RF Shelf A1-1 Min Ref Temp	403	404	i	2	1	3	K	
Warm Target Bias Corr Ch12 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	405	406	i	2	1	3	K	
Warm Target Bias Corr Ch12 at PLLO#2 RF Shelf A1-1 Max Ref Temp	407	408	i	2	1	3	K	
Warm Target Bias Corr Ch13 at PLLO#2 RF Shelf A1-1 Min Ref Temp	409	410	i	2	1	3	K	
Warm Target Bias Corr Ch13 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	411	412	i	2	1	3	K	
Warm Target Bias Corr Ch13 at PLLO#2 RF Shelf A1-1 Max Ref Temp	413	414	i	2	1	3	K	
Warm Target Bias Corr Ch14 at PLLO#2 RF Shelf A1-1 Min Ref Temp	415	416	i	2	1	3	K	
Warm Target Bias Corr Ch14 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	417	418	i	2	1	3	K	
Warm Target Bias Corr Ch14 at PLLO#2 RF Shelf A1-1 Max Ref Temp	419	420	i	2	1	3	K	
Nonlinearity Coef. Ch 1 at Min Ref Temp	421	424	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 1 at Nom Ref Temp	425	428	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 1 at Max Ref Temp	429	432	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 2 at Min Ref Temp	433	436	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 2 at Nom Ref Temp	437	440	i	4	1	6	m^2-sr-cm^{-1} /mW	

Nonlinearity Coef. Ch 2 at Max Ref Temp	441	444	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 3 at Min Ref Temp	445	448	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 3 at Nom Ref Temp	449	452	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 3 at Max Ref Temp	453	456	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 4 at Min Ref Temp	457	460	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 4 at Nom Ref Temp	461	464	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 4 at Max Ref Temp	465	468	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 5 at Min Ref Temp	469	472	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 5 at Nom Ref Temp	473	476	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 5 at Max Ref Temp	477	480	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 6 at Min Ref Temp	481	484	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 6 at Nom Ref Temp	485	488	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 6 at Max Ref Temp	489	492	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 7 at Min Ref Temp	493	496	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 7 at Nom Ref Temp	497	500	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 7 at Max Ref Temp	501	504	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 8 at Min Ref Temp	505	508	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 8 at Nom Ref Temp	509	512	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 8 at Max Ref Temp	513	516	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 9 at Min Ref Temp	517	520	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 9 at Nom Ref Temp	521	524	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 9 at Max Ref Temp	525	528	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 10 at Min Ref Temp	529	532	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 10 at Nom Ref Temp	533	536	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 10 at Max Ref Temp	537	540	i	4	1	6	m^2-sr-cm^{-1} /mW	

Nonlinearity Coef. Ch 11 at Min Ref Temp	541	544	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 11 at Nom Ref Temp	545	548	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 11 at Max Ref Temp	549	552	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 12 at Min Ref Temp	553	556	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 12 at Nom Ref Temp	557	560	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 12 at Max Ref Temp	561	564	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 13 at Min Ref Temp	565	568	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 13 at Nom Ref Temp	569	572	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 13 at Max Ref Temp	573	576	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 14 at Min Ref Temp	577	580	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 14 at Nom Ref Temp	581	584	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 14 at Max Ref Temp	585	588	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 15 at Min Ref Temp	589	592	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 15 at Nom Ref Temp	593	596	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 15 at Max Ref Temp	597	600	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 9 for PLLO#2 at Min Ref Temp	601	604	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 9 for PLLO#2 at Nom Ref Temp	605	608	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 9 for PLLO#2 at Max Ref Temp	609	612	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 10 for PLLO#2 at Min Ref Temp	613	616	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 10 for PLLO#2 at Nom Ref Temp	617	620	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 10 for PLLO#2 at Max Ref Temp	621	624	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 11 for PLLO#2 at Min Ref Temp	625	628	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 11 for PLLO#2 at Nom Ref Temp	629	632	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 11 for PLLO#2 at Max Ref Temp	633	636	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 12 for PLLO#2 at Min Ref Temp	637	640	i	4	1	6	m^2-sr-cm^{-1} /mW	

Nonlinearity Coef. Ch 12 for PLLO#2 at Nom Ref Temp	641	644	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 12 for PLLO#2 at Max Ref Temp	645	648	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 13 for PLLO#2 at Min Ref Temp	649	652	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 13 for PLLO#2 at Nom Ref Temp	653	656	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 13 for PLLO#2 at Max Ref Temp	657	660	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 14 for PLLO#2 at Min Ref Temp	661	664	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 14 for PLLO#2 at Nom Ref Temp	665	668	i	4	1	6	m^2-sr-cm^{-1} /mW	
Nonlinearity Coef. Ch 14 for PLLO#2 at Max Ref Temp	669	672	i	4	1	6	m^2-sr-cm^{-1} /mW	
<Zero Fill>	673	688	i	4	4	0		
TEMPERATURE-RADIANCE CONVERSION								
Temperature-radiance Ch 1 Central Wavenumber	689	692	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 1 Constant 1	693	696	i	4	1	6		
Temperature-radiance Ch 1 Constant 2, Slope	697	700	i	4	1	6		
Temperature-radiance Ch 2 Central Wavenumber	701	704	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 2 Constant 1	705	708	i	4	1	6		
Temperature-radiance Ch 2 Constant 2, Slope	709	712	i	4	1	6		
Temperature-radiance Ch 3 Central Wavenumber	713	716	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 3 Constant 1	717	720	i	4	1	6		
Temperature-radiance Ch 3 Constant 2, Slope	721	724	i	4	1	6		
Temperature-radiance Ch 4 Central Wavenumber	725	728	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 4 Constant 1	729	732	i	4	1	6		
Temperature-radiance Ch 4 Constant 2, Slope	733	736	i	4	1	6		
Temperature-radiance Ch 5 Central Wavenumber	737	740	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 5 Constant 1	741	744	i	4	1	6		
Temperature-radiance Ch 5 Constant 2, Slope	745	748	i	4	1	6		
Temperature-radiance Ch 6 Central Wavenumber	749	752	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 6 Constant 1	753	756	i	4	1	6		
Temperature-radiance Ch 6 Constant 2, Slope	757	760	i	4	1	6		
Temperature-radiance Ch 7 Central Wavenumber	761	764	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 7 Constant 1	765	768	i	4	1	6		
Temperature-radiance Ch 7 Constant 2, Slope	769	772	i	4	1	6		
Temperature-radiance Ch 8 Central Wavenumber	773	776	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 8 Constant 1	777	780	i	4	1	6		
Temperature-radiance Ch 8 Constant 2, Slope	781	784	i	4	1	6		
Temperature-radiance Ch 9 Central Wavenumber	785	788	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 9 Constant 1	789	792	i	4	1	6		
Temperature-radiance Ch 9 Constant 2, Slope	793	796	i	4	1	6		
Temperature-radiance Ch 10 Central Wavenumber	797	800	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 10 Constant 1	801	804	i	4	1	6		

Temperature-radiance Ch 10 Constant 2, Slope	805	808	i	4	1	6		
Temperature-radiance Ch 11 Central Wavenumber	809	812	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 11 Constant 1	813	816	i	4	1	6		
Temperature-radiance Ch 11 Constant 2, Slope	817	820	i	4	1	6		
Temperature-radiance Ch 12 Central Wavenumber	821	824	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 12 Constant 1	825	828	i	4	1	6		
Temperature-radiance Ch 12 Constant 2, Slope	829	832	i	4	1	6		
Temperature-radiance Ch 13 Central Wavenumber	833	836	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 13 Constant 1	837	840	i	4	1	6		
Temperature-radiance Ch 13 Constant 2, Slope	841	844	i	4	1	6		
Temperature-radiance Ch 14 Central Wavenumber	845	848	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 14 Constant 1	849	852	i	4	1	6		
Temperature-radiance Ch 14 Constant 2, Slope	853	856	i	4	1	6		
Temperature-radiance Ch 15 Central Wavenumber	857	860	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 15 Constant 1	861	864	i	4	1	6		
Temperature-radiance Ch 15 Constant 2, Slope	865	868	i	4	1	6		
<Zero Fill>	869	880	i	4	3	0		
NAVIGATION								
Reference Ellipsoid Model ID *(The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately +/- 65 meters.)* WGS-72=World Geodetic Survey 1972	881	888	c	8	1	0		
Nadir Earth Location Tolerance	889	890	u	2	1	1	kilometers	
Earth Location Bit Field bits 15-3: <zero fill> bit 2: dynamic attitude error correction (0=not performed; 1=performed) bit 1: reasonableness test (0=inactive; 1=active) bit 0: constant attitude error correction (0=not performed; 1=performed)	891	892	u	2	1	0		
<Zero Fill>	893	894	i	2	1	0		
Constant Roll Attitude Error	895	896	i	2	1	3	degrees	
Constant Pitch Attitude Error	897	898	i	2	1	3	degrees	
Constant Yaw Attitude Error	899	900	i	2	1	3	degrees	
Epoch Year for Orbit Vector	901	902	u	2	1	0		
Day of Epoch Year for Orbit Vector	903	904	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	905	908	u	4	1	0	milliseconds	
Semi-major Axis *(at the orbit vector epoch time)*	909	912	i	4	1	5	kilometers	
Eccentricity *(at the orbit vector epoch time)*	913	916	i	4	1	8		
Inclination *(at the orbit vector epoch time)*	917	920	i	4	1	5	degrees	
Argument of Perigee *(at the orbit vector epoch time)*	921	924	i	4	1	5	degrees	
Right Ascension of the Ascending Node *(at the orbit vector epoch time)*	925	928	i	4	1	5	degrees	
Mean Anomaly *(at the orbit vector epoch time)*	929	932	i	4	1	5	degrees	
Position Vector X Component *(at the orbit vector epoch time)*	933	936	i	4	1	5	kilometers	

Position Vector Y Component *(at the orbit vector epoch time)*	937	940	i	4	1	5	kilometers	
Position Vector Z Component *(at the orbit vector epoch time)*	941	944	i	4	1	5	kilometers	
Velocity Vector X-dot Component *(at the orbit vector epoch time)*	945	948	i	4	1	8	km/second	
Velocity Vector Y-dot Component *(at the orbit vector epoch time)*	949	952	i	4	1	8	km/second	
Velocity Vector Z-dot Component *(at the orbit vector epoch time)*	953	956	i	4	1	8	km/second	
Earth/Sun Distance Ratio *(at the orbit vector epoch time; relative to the mean distance of 1 AU)*	957	960	u	4	1	6		
<Zero Fill>	961	976	i	4	4	0		
AMSU-A1 DIGITAL A CONVERSION *Counts-to-temperature conversion coefficients for the AMSU-A1 digital A telemetry items*								
Scan Motor A1-1 Temperature Coefficient 0	977	980	i	4	1	4	K	
Scan Motor A1-1 Temperature Coefficient 1	981	984	i	4	1	9	K/count	
Scan Motor A1-1 Temperature Coefficient 2	985	988	i	4	1	16	K/count^2	
Scan Motor A1-1 Temperature Coefficient 3	989	992	i	4	1	20	K/count^3	
Scan Motor A1-2 Temperature Coefficient 0	993	996	i	4	1	4	K	
Scan Motor A1-2 Temperature Coefficient 1	997	1000	i	4	1	9	K/count	
Scan Motor A1-2 Temperature Coefficient 2	1001	1004	i	4	1	16	K/count^2	
Scan Motor A1-2 Temperature Coefficient 3	1005	1008	i	4	1	20	K/count^3	
Feed Horn A1-1 Temperature Coefficient 0	1009	1012	i	4	1	4	K	
Feed Horn A1-1 Temperature Coefficient 1	1013	1016	i	4	1	9	K/count	
Feed Horn A1-1 Temperature Coefficient 2	1017	1020	i	4	1	16	K/count^2	
Feed Horn A1-1 Temperature Coefficient 3	1021	1024	i	4	1	20	K/count^3	
Feed Horn A1-2 Temperature Coefficient 0	1025	1028	i	4	1	4	K	
Feed Horn A1-2 Temperature Coefficient 1	1029	1032	i	4	1	9	K/count	
Feed Horn A1-2 Temperature Coefficient 2	1033	1036	i	4	1	16	K/count^2	
Feed Horn A1-2 Temperature Coefficient 3	1037	1040	i	4	1	20	K/count^3	
RF Mux A1-1 Temperature Coefficient 0	1041	1044	i	4	1	4	K	
RF Mux A1-1 Temperature Coefficient 1	1045	1048	i	4	1	9	K/count	
RF Mux A1-1 Temperature Coefficient 2	1049	1052	i	4	1	16	K/count^2	
RF Mux A1-1 Temperature Coefficient 3	1053	1056	i	4	1	20	K/count^3	
RF Mux A1-2 Temperature Coefficient 0	1057	1060	i	4	1	4	K	
RF Mux A1-2 Temperature Coefficient 1	1061	1064	i	4	1	9	K/count	
RF Mux A1-2 Temperature Coefficient 2	1065	1068	i	4	1	16	K/count^2	
RF Mux A1-2 Temperature Coefficient 3	1069	1072	i	4	1	20	K/count^3	
Local Oscillator Channel 3 Temperature Coefficient 0	1073	1076	i	4	1	4	K	
Local Oscillator Channel 3 Temperature Coefficient 1	1077	1080	i	4	1	9	K/count	
Local Oscillator Channel 3 Temperature Coefficient 2	1081	1084	i	4	1	16	K/count^2	
Local Oscillator Channel 3 Temperature Coefficient 3	1085	1088	i	4	1	20	K/count^3	
Local Oscillator Channel 4 Temperature Coefficient 0	1089	1092	i	4	1	4	K	
Local Oscillator Channel 4 Temperature Coefficient 1	1093	1096	i	4	1	9	K/count	
Local Oscillator Channel 4 Temperature Coefficient 2	1097	1100	i	4	1	16	K/count^2	
Local Oscillator Channel 4 Temperature Coefficient 3	1101	1104	i	4	1	20	K/count^3	
Local Oscillator Channel 5 Temperature Coefficient 0	1105	1108	i	4	1	4	K	
Local Oscillator Channel 5 Temperature Coefficient 1	1109	1112	i	4	1	9	K/count	
Local Oscillator Channel 5 Temperature Coefficient 2	1113	1116	i	4	1	16	K/count^2	

Local Oscillator Channel 5 Temperature Coefficient 3	1117	1120	i	4	1	20	K/count^3	
Local Oscillator Channel 6 Temperature Coefficient 0	1121	1124	i	4	1	4	K	
Local Oscillator Channel 6 Temperature Coefficient 1	1125	1128	i	4	1	9	K/count	
Local Oscillator Channel 6 Temperature Coefficient 2	1129	1132	i	4	1	16	K/count^2	
Local Oscillator Channel 6 Temperature Coefficient 3	1133	1136	i	4	1	20	K/count^3	
Local Oscillator Channel 7 Temperature Coefficient 0	1137	1140	i	4	1	4	K	
Local Oscillator Channel 7 Temperature Coefficient 1	1141	1144	i	4	1	9	K/count	
Local Oscillator Channel 7 Temperature Coefficient 2	1145	1148	i	4	1	16	K/count^2	
Local Oscillator Channel 7 Temperature Coefficient 3	1149	1152	i	4	1	20	K/count^3	
Local Oscillator Channel 8 Temperature Coefficient 0	1153	1156	i	4	1	4	K	
Local Oscillator Channel 8 Temperature Coefficient 1	1157	1160	i	4	1	9	K/count	
Local Oscillator Channel 8 Temperature Coefficient 2	1161	1164	i	4	1	16	K/count^2	
Local Oscillator Channel 8 Temperature Coefficient 3	1165	1168	i	4	1	20	K/count^3	
Local Oscillator Channel 15 Temperature Coefficient 0	1169	1172	i	4	1	4	K	
Local Oscillator Channel 15 Temperature Coefficient 1	1173	1176	i	4	1	9	K/count	
Local Oscillator Channel 15 Temperature Coefficient 2	1177	1180	i	4	1	16	K/count^2	
Local Oscillator Channel 15 Temperature Coefficient 3	1181	1184	i	4	1	20	K/count^3	
PLLO #2 Channels 9 Through 14 Temperature Coefficient 0	1185	1188	i	4	1	4	K	
PLLO #2 Channels 9 Through 14 Temperature Coefficient 1	1189	1192	i	4	1	9	K/count	
PLLO #2 Channels 9 Through 14 Temperature Coefficient 2	1193	1196	i	4	1	16	K/count^2	
PLLO #2 Channels 9 Through 14 Temperature Coefficient 3	1197	1200	i	4	1	20	K/count^3	
PLLO #1 Channels 9 Through 14 Temperature Coefficient 0	1201	1204	i	4	1	4	K	
PLLO #1 Channels 9 Through 14 Temperature Coefficient 1	1205	1208	i	4	1	9	K/count	
PLLO #1 Channels 9 Through 14 Temperature Coefficient 2	1209	1212	i	4	1	16	K/count^2	
PLLO #1 Channels 9 Through 14 Temperature Coefficient 3	1213	1216	i	4	1	20	K/count^3	
PLLO (Reference Oscillator) Temperature Coefficient 0 *(NOAA-KLM)* or <Zero Fill> *(NOAA-NN', Metop)*	1217	1220	i	4	1	4	K	
PLLO (Reference Oscillator) Temperature Coefficient 1 *(NOAA-KLM)* or <Zero Fill> *(NOAA-NN', Metop)*	1221	1224	i	4	1	9	K/count	
PLLO (Reference Oscillator) Temperature Coefficient 2 *(NOAA-KLM)* or <Zero Fill> *(NOAA-NN', Metop)*	1225	1228	i	4	1	16	K/count^2	
PLLO (Reference Oscillator) Temperature Coefficient 3 *(NOAA-KLM)* or <Zero Fill> *(NOAA-NN', Metop)*	1229	1232	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 3 Temperature Coefficient 0	1233	1236	i	4	1	4	K	
Mixer/IF Amplifier Channel 3 Temperature Coefficient 1	1237	1240	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 3 Temperature Coefficient 2	1241	1244	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 3 Temperature Coefficient 3	1245	1248	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 4 Temperature Coefficient 0	1249	1252	i	4	1	4	K	
Mixer/IF Amplifier Channel 4 Temperature Coefficient 1	1253	1256	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 4 Temperature Coefficient 2	1257	1260	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 4 Temperature Coefficient 3	1261	1264	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 5 Temperature Coefficient 0	1265	1268	i	4	1	4	K	
Mixer/IF Amplifier Channel 5 Temperature Coefficient 1	1269	1272	i	4	1	9	K/count	

Mixer/IF Amplifier Channel 5 Temperature Coefficient 2	1273	1276	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 5 Temperature Coefficient 3	1277	1280	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 6 Temperature Coefficient 0	1281	1284	i	4	1	4	K	
Mixer/IF Amplifier Channel 6 Temperature Coefficient 1	1285	1288	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 6 Temperature Coefficient 2	1289	1292	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 6 Temperature Coefficient 3	1293	1296	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 7 Temperature Coefficient 0	1297	1300	i	4	1	4	K	
Mixer/IF Amplifier Channel 7 Temperature Coefficient 1	1301	1304	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 7 Temperature Coefficient 2	1305	1308	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 7 Temperature Coefficient 3	1309	1312	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 8 Temperature Coefficient 0	1313	1316	i	4	1	4	K	
Mixer/IF Amplifier Channel 8 Temperature Coefficient 1	1317	1320	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 8 Temperature Coefficient 2	1321	1324	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 8 Temperature Coefficient 3	1325	1328	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 9/14 Temperature Coefficient 0	1329	1332	i	4	1	4	K	
Mixer/IF Amplifier Channel 9/14 Temperature Coefficient 1	1333	1336	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 9/14 Temperature Coefficient 2	1337	1340	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 9/14 Temperature Coefficient 3	1341	1344	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 15 Temperature Coefficient 0	1345	1348	i	4	1	4	K	
Mixer/IF Amplifier Channel 15 Temperature Coefficient 1	1349	1352	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 15 Temperature Coefficient 2	1353	1356	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 15 Temperature Coefficient 3	1357	1360	i	4	1	20	K/count^3	
IF Amplifier Channel 11/14 Temperature Coefficient 0	1361	1364	i	4	1	4	K	
IF Amplifier Channel 11/14 Temperature Coefficient 1	1365	1368	i	4	1	9	K/count	
IF Amplifier Channel 11/14 Temperature Coefficient 2	1369	1372	i	4	1	16	K/count^2	
IF Amplifier Channel 11/14 Temperature Coefficient 3	1373	1376	i	4	1	20	K/count^3	
IF Amplifier Channel 9 Temperature Coefficient 0	1377	1380	i	4	1	4	K	
IF Amplifier Channel 9 Temperature Coefficient 1	1381	1384	i	4	1	9	K/count	
IF Amplifier Channel 9 Temperature Coefficient 2	1385	1388	i	4	1	16	K/count^2	
IF Amplifier Channel 9 Temperature Coefficient 3	1389	1392	i	4	1	20	K/count^3	
IF Amplifier Channel 10 Temperature Coefficient 0	1393	1396	i	4	1	4	K	
IF Amplifier Channel 10 Temperature Coefficient 1	1397	1400	i	4	1	9	K/count	
IF Amplifier Channel 10 Temperature Coefficient 2	1401	1404	i	4	1	16	K/count^2	
IF Amplifier Channel 10 Temperature Coefficient 3	1405	1408	i	4	1	20	K/count^3	
IF Amplifier Channel 11 Temperature Coefficient 0	1409	1412	i	4	1	4	K	
IF Amplifier Channel 11 Temperature Coefficient 1	1413	1416	i	4	1	9	K/count	
IF Amplifier Channel 11 Temperature Coefficient 2	1417	1420	i	4	1	16	K/count^2	
IF Amplifier Channel 11 Temperature Coefficient 3	1421	1424	i	4	1	20	K/count^3	
DC/DC Converter Temperature Coefficient 0	1425	1428	i	4	1	4	K	
DC/DC Converter Temperature Coefficient 1	1429	1432	i	4	1	9	K/count	
DC/DC Converter Temperature Coefficient 2	1433	1436	i	4	1	16	K/count^2	
DC/DC Converter Temperature Coefficient 3	1437	1440	i	4	1	20	K/count^3	
IF Amplifier Channel 13 Temperature Coefficient 0	1441	1444	i	4	1	4	K	

IF Amplifier Channel 13 Temperature Coefficient 1	1445	1448	i	4	1	9	K/count	
IF Amplifier Channel 13 Temperature Coefficient 2	1449	1452	i	4	1	16	K/count^2	
IF Amplifier Channel 13 Temperature Coefficient 3	1453	1456	i	4	1	20	K/count^3	
IF Amplifier Channel 14 Temperature Coefficient 0	1457	1460	i	4	1	4	K	
IF Amplifier Channel 14 Temperature Coefficient 1	1461	1464	i	4	1	9	K/count	
IF Amplifier Channel 14 Temperature Coefficient 2	1465	1468	i	4	1	16	K/count^2	
IF Amplifier Channel 14 Temperature Coefficient 3	1469	1472	i	4	1	20	K/count^3	
IF Amplifier Channel 12 Temperature Coefficient 0	1473	1476	i	4	1	4	K	
IF Amplifier Channel 12 Temperature Coefficient 1	1477	1480	i	4	1	9	K/count	
IF Amplifier Channel 12 Temperature Coefficient 2	1481	1484	i	4	1	16	K/count^2	
IF Amplifier Channel 12 Temperature Coefficient 3	1485	1488	i	4	1	20	K/count^3	
RF Shelf A1-1 Temperature Coefficient 0	1489	1492	i	4	1	4	K	
RF Shelf A1-1 Temperature Coefficient 1	1493	1496	i	4	1	9	K/count	
RF Shelf A1-1 Temperature Coefficient 2	1497	1500	i	4	1	16	K/count^2	
RF Shelf A1-1 Temperature Coefficient 3	1501	1504	i	4	1	20	K/count^3	
RF Shelf A1-2 Temperature Coefficient 0	1505	1508	i	4	1	4	K	
RF Shelf A1-2 Temperature Coefficient 1	1509	1512	i	4	1	9	K/count	
RF Shelf A1-2 Temperature Coefficient 2	1513	1516	i	4	1	16	K/count^2	
RF Shelf A1-2 Temperature Coefficient 3	1517	1520	i	4	1	20	K/count^3	
Detector/preamp Assembly Temperature Coefficient 0	1521	1524	i	4	1	4	K	
Detector/preamp Assembly Temperature Coefficient 1	1525	1528	i	4	1	9	K/count	
Detector/preamp Assembly Temperature Coefficient 2	1529	1532	i	4	1	16	K/count^2	
Detector/preamp Assembly Temperature Coefficient 3	1533	1536	i	4	1	20	K/count^3	
A1-1 Warm Load 1 Temperature Coefficient 0	1537	1540	i	4	1	4	K	
A1-1 Warm Load 1 Temperature Coefficient 1	1541	1544	i	4	1	9	K/count	
A1-1 Warm Load 1 Temperature Coefficient 2	1545	1548	i	4	1	16	K/count^2	
A1-1 Warm Load 1 Temperature Coefficient 3	1549	1552	i	4	1	20	K/count^3	
A1-1 Warm Load 2 Temperature Coefficient 0	1553	1556	i	4	1	4	K	
A1-1 Warm Load 2 Temperature Coefficient 1	1557	1560	i	4	1	9	K/count	
A1-1 Warm Load 2 Temperature Coefficient 2	1561	1564	i	4	1	16	K/count^2	
A1-1 Warm Load 2 Temperature Coefficient 3	1565	1568	i	4	1	20	K/count^3	
A1-1 Warm Load 3 Temperature Coefficient 0	1569	1572	i	4	1	4	K	
A1-1 Warm Load 3 Temperature Coefficient 1	1573	1576	i	4	1	9	K/count	
A1-1 Warm Load 3 Temperature Coefficient 2	1577	1580	i	4	1	16	K/count^2	
A1-1 Warm Load 3 Temperature Coefficient 3	1581	1584	i	4	1	20	K/count^3	
A1-1 Warm Load 4 Temperature Coefficient 0	1585	1588	i	4	1	4	K	
A1-1 Warm Load 4 Temperature Coefficient 1	1589	1592	i	4	1	9	K/count	
A1-1 Warm Load 4 Temperature Coefficient 2	1593	1596	i	4	1	16	K/count^2	
A1-1 Warm Load 4 Temperature Coefficient 3	1597	1600	i	4	1	20	K/count^3	
A1-1 Warm Load Center Temperature Coefficient 0	1601	1604	i	4	1	4	K	
A1-1 Warm Load Center Temperature Coefficient 1	1605	1608	i	4	1	9	K/count	
A1-1 Warm Load Center Temperature Coefficient 2	1609	1612	i	4	1	16	K/count^2	
A1-1 Warm Load Center Temperature Coefficient 3	1613	1616	i	4	1	20	K/count^3	
A1-2 Warm Load 1 Temperature Coefficient 0	1617	1620	i	4	1	4	K	
A1-2 Warm Load 1 Temperature Coefficient 1	1621	1624	i	4	1	9	K/count	
A1-2 Warm Load 1 Temperature Coefficient 2	1625	1628	i	4	1	16	K/count^2	
A1-2 Warm Load 1 Temperature Coefficient 3	1629	1632	i	4	1	20	K/count^3	
A1-2 Warm Load 2 Temperature Coefficient 0	1633	1636	i	4	1	4	K	
A1-2 Warm Load 2 Temperature Coefficient 1	1637	1640	i	4	1	9	K/count	
A1-2 Warm Load 2 Temperature Coefficient 2	1641	1644	i	4	1	16	K/count^2	

A1-2 Warm Load 2 Temperature Coefficient 3	1645	1648	i	4	1	20	K/count^3	
A1-2 Warm Load 3 Temperature Coefficient 0	1649	1652	i	4	1	4	K	
A1-2 Warm Load 3 Temperature Coefficient 1	1653	1656	i	4	1	9	K/count	
A1-2 Warm Load 3 Temperature Coefficient 2	1657	1660	i	4	1	16	K/count^2	
A1-2 Warm Load 3 Temperature Coefficient 3	1661	1664	i	4	1	20	K/count^3	
A1-2 Warm Load 4 Temperature Coefficient 0	1665	1668	i	4	1	4	K	
A1-2 Warm Load 4 Temperature Coefficient 1	1669	1672	i	4	1	9	K/count	
A1-2 Warm Load 4 Temperature Coefficient 2	1673	1676	i	4	1	16	K/count^2	
A1-2 Warm Load 4 Temperature Coefficient 3	1677	1680	i	4	1	20	K/count^3	
A1-2 Warm Load Center Temperature Coefficient 0	1681	1684	i	4	1	4	K	
A1-2 Warm Load Center Temperature Coefficient 1	1685	1688	i	4	1	9	K/count	
A1-2 Warm Load Center Temperature Coefficient 2	1689	1692	i	4	1	16	K/count^2	
A1-2 Warm Load Center Temperature Coefficient 3	1693	1696	i	4	1	20	K/count^3	
<Zero Fill>	1697	1700	i	4	1	0		
AMSU-A1 ANALOG TELEMETRY CONVERSION *Volts-to-engineering units (e.g., temperature in Kelvin) conversion coefficients for the AMSU-A1 analog telemetry items. (NOTE: 1 count = 0.02 volts.)*								
A1-1 Scan Motor Temp Intercept	1701	1704	i	4	1	3	K	
A1-1 Scan Motor Temp Slope	1705	1708	i	4	1	3	K/volt	
A1-2 Scan Motor Temp Intercept	1709	1712	i	4	1	3	K	
A1-2 Scan Motor Temp Slope	1713	1716	i	4	1	3	K/volt	
A1-1 RF Shelf Temp Intercept	1717	1720	i	4	1	3	K	
A1-1 RF Shelf Temp Slope	1721	1724	i	4	1	3	K/volt	
A1-2 RF Shelf Temp Intercept	1725	1728	i	4	1	3	K	
A1-2 RF Shelf Temp Slope	1729	1732	i	4	1	3	K/volt	
A1-1 Warm Load Temp Intercept	1733	1736	i	4	1	3	K	
A1-1 Warm Load Temp Slope	1737	1740	i	4	1	3	K/volt	
A1-2 Warm Load Temp Intercept	1741	1744	i	4	1	3	K	
A1-2 Warm Load Temp Slope	1745	1748	i	4	1	3	K/volt	
A1-1 Antenna Motor Current Intercept	1749	1752	i	4	1	3	mA	
A1-1 Antenna Motor Current Slope	1753	1756	i	4	1	3	mA/volt	
A1-2 Antenna Motor Current Intercept	1757	1760	i	4	1	3	mA	
A1-2 Antenna Motor Current Slope	1761	1764	i	4	1	3	mA/volt	
+15v Signal Processing Intercept	1765	1768	i	4	1	3	volts	
+15v Signal Processing Slope	1769	1772	i	4	1	3		
+15v Antenna Drive Intercept	1773	1776	i	4	1	3	volts	
+15v Antenna Drive Slope	1777	1780	i	4	1	3		
-15v Signal Processing Intercept	1781	1784	i	4	1	3	volts	
-15v Signal Processing Slope	1785	1788	i	4	1	3		
-15v Antenna Drive Intercept	1789	1792	i	4	1	3	volts	
-15v Antenna Drive Slope	1793	1796	i	4	1	3		
+8v Receiver Amps Intercept	1797	1800	i	4	1	3	volts	
+8v Receiver Amps Slope	1801	1804	i	4	1	3		
+5v Signal Processing Intercept	1805	1808	i	4	1	3	volts	
+5v Signal Processing Slope	1809	1812	i	4	1	3		
+5v Antenna Drive Intercept	1813	1816	i	4	1	3	volts	
+5v Antenna Drive Slope	1817	1820	i	4	1	3		
+8.5v Phase Lock Loop Ch 9/14	1821	1824	i	4	1	3	volts	

+8.5v Phase Lock Loop Ch 9/14 Slope	1825	1828	i	4	1	3		
+15v Phase Lock Loop Ch 9/14 Intercept	1829	1832	i	4	1	3	volts	
+15v Phase Lock Loop Ch 9/14 Slope	1833	1836	i	4	1	3		
-15v Phase Lock Loop Ch 9/14 Intercept	1837	1840	i	4	1	3	volts	
-15v Phase Lock Loop Ch 9/14 Slope	1841	1844	i	4	1	3		
LO Voltage 50.3 GHz Ch 3 Intercept	1845	1848	i	4	1	3	volts	3
LO Voltage 50.3 GHz Ch 3 Slope	1849	1852	i	4	1	3		3
LO Voltage 52.8 GHz Ch 4 Intercept	1853	1856	i	4	1	3	volts	3
LO Voltage 52.8 GHz Ch 4 Slope	1857	1860	i	4	1	3		3
LO Voltage 53.596 GHz Ch 5 Intercept	1861	1864	i	4	1	3	volts	3
LO Voltage 53.596 GHz Ch 5 Slope	1865	1868	i	4	1	3		3
LO Voltage 54.4 GHz Ch 6 Intercept	1869	1872	i	4	1	3	volts	3
LO Voltage 54.4 GHz Ch 6 Slope	1873	1876	i	4	1	3		3
LO Voltage 54.94 GHz Ch 7 Intercept	1877	1880	i	4	1	3	volts	3
LO Voltage 54.94 GHz Ch 7 Slope	1881	1884	i	4	1	3		3
LO Voltage 55.5 GHz Ch 8 Intercept	1885	1888	i	4	1	3	volts	3
LO Voltage 55.5 GHz Ch 8 Slope	1889	1892	i	4	1	3		3
PLLO Primary Lock Detect Intercept	1893	1896	i	4	1	3	volts	
PLLO Primary Lock Detect Slope	1897	1900	i	4	1	3		
PLLO Redundant Lock Detect Intercept	1901	1904	i	4	1	3	volts	
PLLO Redundant Lock Detect Slope	1905	1908	i	4	1	3		
GDO Voltage 89.0 GHz Ch 15 Intercept	1909	1912	i	4	1	3	volts	3
GDO Voltage 89.0 GHz Ch 15 Slope	1913	1916	i	4	1	3		3
<Zero Fill>	1917	1920	i	4	1	0		
AMSU-A2 DIGITAL A CONVERSION *Counts-to-temperature conversion coefficients for the AMSU-A2 digital A telemetry items.*								
Scan Motor Temp. Conv. Coeff 0	1921	1924	i	4	1	4	K	
Scan Motor Temp. Conv. Coeff 1	1925	1928	i	4	1	9	K/count	
Scan Motor Temp. Conv. Coeff 2	1929	1932	i	4	1	16	K/count^2	
Scan Motor Temp. Conv. Coeff 3	1933	1936	i	4	1	20	K/count^3	
Feed Horn Temp. Conv. Coeff 0	1937	1940	i	4	1	4	K	
Feed Horn Temp. Conv. Coeff 1	1941	1944	i	4	1	9	K/count	
Feed Horn Temp. Conv. Coeff 2	1945	1948	i	4	1	16	K/count^2	
Feed Horn Temp. Conv. Coeff 3	1949	1952	i	4	1	20	K/count^3	
RF Mux/Diplexer Temp. Conv. Coeff 0	1953	1956	i	4	1	4	K	2
RF Mux/Diplexer Temp. Conv. Coeff 1	1957	1960	i	4	1	9	K/count	2
RF Mux/Diplexer Temp. Conv. Coeff 2	1961	1964	i	4	1	16	K/count^2	2
RF Mux/Diplexer Temp. Conv. Coeff 3	1965	1968	i	4	1	20	K/count^3	2
Mixer/IF Amplifier Channel 1 Temp. Conv. Coeff 0	1969	1972	i	4	1	4	K	
Mixer/IF Amplifier Channel 1 Temp. Conv. Coeff 1	1973	1976	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 1 Temp. Conv. Coeff 2	1977	1980	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 1 Temp. Conv. Coeff 3	1981	1984	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 2 Temp. Conv. Coeff 0	1985	1988	i	4	1	4	K	
Mixer/IF Amplifier Channel 2 Temp. Conv. Coeff 1	1989	1992	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 2 Temp. Conv. Coeff 2	1993	1996	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 2 Temp. Conv. Coeff 3	1997	2000	i	4	1	20	K/count^3	
Local Oscillator Channel 1 Temp. Conv. Coeff 0	2001	2004	i	4	1	4	K	

Local Oscillator Channel 1 Temp. Conv. Coeff 1	2005	2008	i	4	1	9	K/count	
Local Oscillator Channel 1 Temp. Conv. Coeff 2	2009	2012	i	4	1	16	$K/count^2$	
Local Oscillator Channel 1 Temp. Conv. Coeff 3	2013	2016	i	4	1	20	$K/count^3$	
Local Oscillator Channel 2 Temp. Conv. Coeff 0	2017	2020	i	4	1	4	K	
Local Oscillator Channel 2 Temp. Conv. Coeff 1	2021	2024	i	4	1	9	K/count	
Local Oscillator Channel 2 Temp. Conv. Coeff 2	2025	2028	i	4	1	16	$K/count^2$	
Local Oscillator Channel 2 Temp. Conv. Coeff 3	2029	2032	i	4	1	20	$K/count^3$	
Compensation Motor Temp. Conv. Coeff 0	2033	2036	i	4	1	4	K	
Compensation Motor Temp. Conv. Coeff 1	2037	2040	i	4	1	9	K/count	
Compensation Motor Temp. Conv. Coeff 2	2041	2044	i	4	1	16	$K/count^2$	
Compensation Motor Temp. Conv. Coeff 3	2045	2048	i	4	1	20	$K/count^3$	
Subreflector Temp. Conv. Coeff 0	2049	2052	i	4	1	4	K	
Subreflector Temp. Conv. Coeff 1	2053	2056	i	4	1	9	K/count	
Subreflector Temp. Conv. Coeff 2	2057	2060	i	4	1	16	$K/count^2$	
Subreflector Temp. Conv. Coeff 3	2061	2064	i	4	1	20	$K/count^3$	
DC/DC Converter Temp. Conv. Coeff 0	2065	2068	i	4	1	4	K	
DC/DC Converter Temp. Conv. Coeff 1	2069	2072	i	4	1	9	K/count	
DC/DC Converter Temp. Conv. Coeff 2	2073	2076	i	4	1	16	$K/count^2$	
DC/DC Converter Temp. Conv. Coeff 3	2077	2080	i	4	1	20	$K/count^3$	
RF Shelf Temp. Conv. Coeff 0	2081	2084	i	4	1	4	K	
RF Shelf Temp. Conv. Coeff 1	2085	2088	i	4	1	9	K/count	
RF Shelf Temp. Conv. Coeff 2	2089	2092	i	4	1	16	$K/count^2$	
RF Shelf Temp. Conv. Coeff 3	2093	2096	i	4	1	20	$K/count^3$	
Detector/preamp Assembly Temp. Conv. Coeff 0	2097	2100	i	4	1	4	K	
Detector/preamp Assembly Temp. Conv. Coeff 1	2101	2104	i	4	1	9	K/count	
Detector/preamp Assembly Temp. Conv. Coeff 2	2105	2108	i	4	1	16	$K/count^2$	
Detector/preamp Assembly Temp. Conv. Coeff 3	2109	2112	i	4	1	20	$K/count^3$	
Warm Load Center Temp. Conv. Coeff 0	2113	2116	i	4	1	4	K	
Warm Load Center Temp. Conv. Coeff 1	2117	2120	i	4	1	9	K/count	
Warm Load Center Temp. Conv. Coeff 2	2121	2124	i	4	1	16	$K/count^2$	
Warm Load Center Temp. Conv. Coeff 3	2125	2128	i	4	1	20	$K/count^3$	
Warm Load 1 Temp. Conv. Coeff 0	2129	2132	i	4	1	4	K	
Warm Load 1 Temp. Conv. Coeff 1	2133	2136	i	4	1	9	K/count	
Warm Load 1 Temp. Conv. Coeff 2	2137	2140	i	4	1	16	$K/count^2$	
Warm Load 1 Temp. Conv. Coeff 3	2141	2144	i	4	1	20	$K/count^3$	
Warm Load 2 Temp. Conv. Coeff 0	2145	2148	i	4	1	4	K	
Warm Load 2 Temp. Conv. Coeff 1	2149	2152	i	4	1	9	K/count	
Warm Load 2 Temp. Conv. Coeff 2	2153	2156	i	4	1	16	$K/count^2$	
Warm Load 2 Temp. Conv. Coeff 3	2157	2160	i	4	1	20	$K/count^3$	
Warm Load 3 Temp. Conv. Coeff 0	2161	2164	i	4	1	4	K	
Warm Load 3 Temp. Conv. Coeff 1	2165	2168	i	4	1	9	K/count	
Warm Load 3 Temp. Conv. Coeff 2	2169	2172	i	4	1	16	$K/count^2$	
Warm Load 3 Temp. Conv. Coeff 3	2173	2176	i	4	1	20	$K/count^3$	
Warm Load 4 Temp. Conv. Coeff 0	2177	2180	i	4	1	4	K	
Warm Load 4 Temp. Conv. Coeff 1	2181	2184	i	4	1	9	K/count	
Warm Load 4 Temp. Conv. Coeff 2	2185	2188	i	4	1	16	$K/count^2$	
Warm Load 4 Temp. Conv. Coeff 3	2189	2192	i	4	1	20	$K/count^3$	
Warm Load 5 Temp. Conv. Coeff 0	2193	2196	i	4	1	4	K	
Warm Load 5 Temp. Conv. Coeff 1	2197	2200	i	4	1	9	K/count	
Warm Load 5 Temp. Conv. Coeff 2	2201	2204	i	4	1	16	$K/count^2$	

Warm Load 5 Temp. Conv. Coeff 3	2205	2208	i	4	1	20	K/count^3	
Warm Load 6 Temp. Conv. Coeff 0	2209	2212	i	4	1	4	K	
Warm Load 6 Temp. Conv. Coeff 1	2213	2216	i	4	1	9	K/count	
Warm Load 6 Temp. Conv. Coeff 2	2217	2220	i	4	1	16	K/count^2	
Warm Load 6 Temp. Conv. Coeff 3	2221	2224	i	4	1	20	K/count^3	
<Zero Fill>	2225	2228	i	4	1	0		
AMSU-A2 ANALOG TELEMETRY CONVERSION *Volts-to-engineering units (e.g., temperature in Celsius) conversion coefficients for the AMSU-A2 analog telemetry items. (NOTE: 1 count = 0.02 volts.)*								
A2 Scan Motor Temp Intercept	2229	2232	i	4	1	3	K	
A2 Scan Motor Temp Slope	2233	2236	i	4	1	3	K/volt	
Compensator Motor Temp Intercept	2237	2240	i	4	1	3	K	
Compensator Motor Temp Slope	2241	2244	i	4	1	3	K/volt	
RF Shelf Temp Intercept	2245	2248	i	4	1	3	K	
RF Shelf Temp Slope	2249	2252	i	4	1	3	K/volt	
Warm Load Temp Intercept	2253	2256	i	4	1	3	K	
Warm Load Temp Slope	2257	2260	i	4	1	3	K/volt	
Compensator Motor Current Intercept	2261	2264	i	4	1	3	mA	
Compensator Motor Current Slope	2265	2268	i	4	1	3	mA/volt	
Antenna Motor Current Intercept	2269	2272	i	4	1	3	mA	
Antenna Motor Current Slope	2273	2276	i	4	1	3	mA/volt	
+15v Signal Processing Intercept	2277	2280	i	4	1	3	volts	
+15v Signal Processing Slope	2281	2284	i	4	1	3		
+15v Antenna Drive Intercept	2285	2288	i	4	1	3	volts	
+15v Antenna Drive Slope	2289	2292	i	4	1	3		
-15v Signal Processing Intercept	2293	2296	i	4	1	3	volts	
-15v Signal Processing Slope	2297	2300	i	4	1	3		
-15v Antenna Drive Intercept	2301	2304	i	4	1	3	volts	
-15v Antenna Drive Slope	2305	2308	i	4	1	3		
+8v Receiver Amps Intercept *(NOAA-KLM)* or +10v Receiver/Mixer/IF Amps Intercept *(NOAA-NN', Metop)*	2309	2312	i	4	1	3	volts	
+8v Receiver Amps Slope *(NOAA-KLM)* or +10v Receiver/Mixer/IF Amps Slope *(NOAA-NN', Metop)*	2313	2316	i	4	1	3		
+5v Signal Processing Intercept	2317	2320	i	4	1	3	volts	
+5v Signal Processing Slope	2321	2324	i	4	1	3		
+5v Antenna Drive Intercept	2325	2328	i	4	1	3	volts	
+5v Antenna Drive Slope	2329	2332	i	4	1	3		
LO Voltage 23.8 GHz Ch 1 Intercept	2333	2336	i	4	1	3	volts	3
LO Voltage 23.8 GHz Ch 1 Slope	2337	2340	i	4	1	3		3
LO Voltage 31.4 GHz Ch 2 Intercept	2341	2344	i	4	1	3	volts	3
LO Voltage 31.4 GHz Ch 2 Slope	2345	2348	i	4	1	3		3
<Zero Fill>	2349	2560	i	4	53	0		

8.3.1.6.2.2 NOAA-N Format (Version 4, post-January 25, 2006, All Spacecraft)

The AMSU-A Data Set Header Record format (Version 4, post-January 25, 2006, All Spacecraft) is documented in Table 8.3.1.6.2.2-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.6.2.2-1. Format of AMSU-A Data Set Header Record (Version 4, post-January 25, 2006, All Spacecraft).

Field Name	Start Octet	End Octet	DT	Word Size	Number of Words	SF	Units	Notes
FILE IDENTIFICATION								
Data Set Creation Site ID CMS=Centre de Meteorologie Spatiale/France DSS=Dundee Satellite Receiving Station/UK NSS=National Environmental Satellite, Data and Information Service/USA UKM=United Kingdom Meteorological Office/UK	1	3	c	3	1	0		
<ASCII blank = x20>	4	4	c	1	1	0		
Level 1b Format Version Number	5	6	u	2	1	0		
Level 1b Format Version Year (e.g., 2000)	7	8	u	2	1	0		
Level 1b Format Version Day of Year (e.g., 365)	9	10	u	2	1	0		
<Reserved for Logical Record Length> *(For Creation Site use only. Logical Record Length of source 1b data set prior to processing.)*	11	12	u	2	1	0	octets	
<Reserved for Block Size> *(For Creation Site use only. Block Size of source 1b data set prior to processing.)*	13	14	u	2	1	0	octets	
Count of Header Records in this Data Set	15	16	u	2	1	0		
<zero fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		
NOAA Spacecraft Identification Code 2=NOAA-16 4=NOAA-15 6=NOAA-17 7=NOAA-18 8=NOAA-N' 11=MetOp-1 12=MetOp-A	73	74	u	2	1	0		
Instrument ID Word 1: AMSU-A2 ID Number 6= PFM, s/n 102 (NOAA-15) 10= FM 1, s/n 103 (NOAA-16) 14=FM 2, s/n 104 (NOAA-17) 18=FM 3, s/n 105 (NOAA-N) 26=FM 5, s/n 107 (NOAA-N')	75	76	u	1	2	0		

Word 2: AMSU-A1 ID Number 5=PFM, s/n 102 (NOAA-16) 9=FM 1, s/n 103 (NOAA-15) 13=FM 2, s/n 104 (NOAA-17) 17=FM 3, s/n 105 (NOAA-N') 33=FM 7, s/n 109 (NOAA-N)								
Data Type Code	77	78	u	2	1	0		
10=AMSU-A								
TIP Source Code 0=unused, i.e., GAC/HRPT/LAC data 1=GAC-embedded AMSU and TIP 2=stored TIP (STIP) 3=HRPT/LAC-embedded AMSU and TIP 4=stored AIP (SAIP)	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year (e.g., 2000)	85	86	u	2	1	0		
Start of Data Set Day of Year (e.g., 365)	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	milli-seconds	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year (e.g., 2000)	97	98	u	2	1	0		
End of Data Set Day of Year (e.g., 365)	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	milli-seconds	
Year of Last CPIDS Update (e.g., 2000)	105	106	u	2	1	0		
Day of Year of Last CPIDS Update (e.g., 365)	107	108	u	2	1	0		
Offset between Start of Scan and Center of First FOV	109	110	i	2	1	0	milli-seconds	
<zero fill>	111	120	i	2	5	0		
DATA SET QUALITY INDICATORS								
Instrument Status A2 *(see "Digital B Telemetry for AMSU-A2" field in data record)* bits 31-15: <zero fill> bit 14: cold cal position, msb bit 13: cold cal position, lsb bit 12: antenna in nadir position (0=no; 1=yes) bit 11: antenna in cold cal position (0=no; 1=yes) bit 10: antenna in warm cal position (0=no; 1=yes) bit 9: full scan mode (0=no; 1=yes) bits 5-8: <zero fill> bit 4: survival heater (0=off; 1=on) bit 3: module power (0=disconnect; 1=connect) bit 2: compensator motor (0=off; 1=on) bit 1: scanner A2 power (0=off; 1=on) bit 0: <zero fill>	121	124	u	4	1	0		
<zero fill>	125	126	i	2	1	0		

Record Number of Status Change of A2 *(if 0, none occurred)*	127	128	u	2	1	0		
Second Instrument Status A2 *(if previous word is 0, no change)*	129	132	u	4	1	0		
Instrument Status A1 *(see "Digital B Telemetry for AMSU-A1" field in data record)* bits 31-15: <zero fill> bit 14: cold cal position, msb bit 13: cold cal position, lsb bit 12: antenna in nadir position (0=no; 1=yes) bit 11: antenna in cold cal position (0=no; 1=yes) bit 10: antenna in warm cal position (0=no; 1=yes) bit 9: full scan mode (0=no; 1=yes) bits 8-6: <zero fill> bit 5: module power (0=disconnect; 1=connect) bit 4: survival heater (0=off; 1=on) bit 3: phase lock loop (0=redundant; 1=primary) bit 2: scanner A1-2 power (0=off; 1=on) bit 1: scanner A1-1 power (0=off; 1=on) bit 0: <zero fill>	133	136	u	4	1	0		
<zero fill>	137	138	i	2	1	0		
Record Number of Status Change of A1 *(if 0, none occurred)*	139	140	u	2	1	0		
Second Instrument Status A1 *(if previous word is 0, no change)*	141	144	u	4	1	0		
Count of Data Records in this Data Set	145	146	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set	147	148	u	2	1	0		
Count of Missing Scan Lines	149	150	u	2	1	0		
Count of Data Gaps in this Data Set	151	152	u	2	1	0		
Count of Data Frames Without Frame Sync Word Errors	153	154	u	2	1	0		
Count of PACS Detected TIP Parity Errors	155	156	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data	157	158	u	2	1	0		
Time Sequence Error 0=none; otherwise, the record number of the first occurrence	159	160	u	2	1	0		

Time Sequence Error Code *(These are bit flags taken from "Scan Line Quality Flags [Time Problem Code]" on data record reported in "Time Sequence Error" field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity); may be associated with a spacecraft clock update bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	161	162	u	2	1	0		
SOCC Clock Update Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	163	164	u	2	1	0		
Earth Location Error Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	165	166	u	2	1	0		
Earth Location Error Code *(These are bit flags taken from "Scan Line Quality Flags [Earth Location Problem Code]" on data record reported in "Earth Location Error Indicator" field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bit 3: earth location questionable because of antenna position checkbits 2-0: <zero fill>	167	168	u	2	1	0		
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudonoise (0=normal data; 1=pseudonoise data) bit 1: tape direction (0=reverse playback, time decrementing) bit 0: data mode (0=test data; 1=flight data)	169	170	u	2	1	0		

Data Source 0=unused 1=Fairbanks, AK 2=Wallops Is., VA 3=SOCC 4=Svalbard, Norway 5=Monterey, CA	171	172	u	2	1	0		
<zero fill>	173	176	i	4	1	0		
<Reserved for the Ingester>	177	184	c	8	1	0		
<Reserved for Decommutation>	185	192	c	8	1	0		
<zero fill>	193	208	i	4	4	0		
CALIBRATION								
<zero fill>	209	210	i	2	1	0		
Instrument Temperature Sensor ID	211	216	u	2	3	0		2
Word 1: 0=RF Shelf A1-1; 1=RF Mux A1-1 Word 2: 0=RF Shelf A1-2; 1=RF Mux A1-2 Word 3: 0=RF Shelf A2; 1=RF Mux/Diplexer A2								
RF Shelf A1-1 Minimum Reference Temperature, PLLO#1	217	218	i	2	1	2	K	
RF Shelf A1-1 Nominal Reference Temperature, PLLO#1	219	220	i	2	1	2	K	
RF Shelf A1-1 Maximum Reference Temperature, PLLO#1	221	222	i	2	1	2	K	
RF Shelf A1-2 Minimum Reference Temperature	223	224	i	2	1	2	K	
RF Shelf A1-2 Nominal Reference Temperature	225	226	i	2	1	2	K	
RF Shelf A1-2 Maximum Reference Temperature	227	228	i	2	1	2	K	
RF Shelf A2 Minimum Reference Temperature	229	230	i	2	1	2	K	
RF Shelf A2 Nominal Reference Temperature	231	232	i	2	1	2	K	
RF Shelf A2 Maximum Reference Temperature	233	234	i	2	1	2	K	
RF Shelf A1-1 Minimum Reference Temperature, PLLO#2	235	236	i	2	1	2	K	
RF Shelf A1-1 Nominal Reference Temperature, PLLO#2	237	238	i	2	1	2	K	
RF Shelf A1-1 Maximum Reference Temperature, PLLO#2	239	240	i	2	1	2	K	
RF Mux A1-1 Minimum Reference Temperature, PLLO#1	241	242	i	2	1	2	K	
RF Mux A1-1 Nominal Reference Temperature, PLLO#1	243	244	i	2	1	2	K	
RF Mux A1-1 Maximum Reference Temperature, PLLO#1	245	246	i	2	1	2	K	
RF Mux A1-2 Minimum Reference Temperature	247	248	i	2	1	2	K	
RF Mux A1-2 Nominal Reference Temperature	249	250	i	2	1	2	K	
RF Mux A1-2 Maximum Reference Temperature	251	252	i	2	1	2	K	
RF/Mux/Diplexer A2 Minimum Reference Temperature	253	254	i	2	1	2	K	2
RF/Mux/Diplexer A2 Nominal Reference	255	256	i	2	1	2	K	2

Temperature								
RF/Mux/Diplexer A2 Minimum Reference Temperature	257	258	i	2	1	2	K	2
RF Mux A1-1 Minimum Reference Temperature, PLLO#2	259	260	i	2	1	2	K	
RF Mux A1-1 Nominal Reference Temperature, PLLO#2	261	262	i	2	1	2	K	
RF Mux A1-1 Maximum Reference Temperature, PLLO#2	263	264	i	2	1	2	K	
Warm Target Fixed Bias Corr Ch1 Min RF Shelf Temp	265	266	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch1 Nom RF Shelf Temp	267	268	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch1 Max RF Shelf Temp	269	270	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch1	271	272	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch2 Min RF Shelf Temp	273	274	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch2 Nom RF Shelf Temp	275	276	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch2 Max RF Shelf Temp	277	278	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch2	279	280	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch3 Min RF Shelf Temp	281	282	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch3 Nom RF Shelf Temp	283	284	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch3 Max RF Shelf Temp	285	286	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch3	287	288	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch4 Min RF Shelf Temp	289	290	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch4 Nom RF Shelf Temp	291	292	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch4 Max RF Shelf Temp	293	294	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch4	295	296	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch5 Min RF Shelf Temp	297	298	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch5Nom RF Shelf Temp	299	300	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch5 Max RF Shelf Temp	301	302	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch5	303	304	I	2	1	3	K	
Warm Target Fixed Bias Corr Ch6 Min RF Shelf Temp	305	306	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch6 Nom RF Shelf Temp	307	308	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch6 Max RF Shelf	309	310	i	2	1	3	K	

Temp								
Cold Space Fixed Bias Corr Ch6	311	312	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch7 Min RF Shelf Temp	313	314	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch7 Nom RF Shelf Temp	315	316	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch7 Max RF Shelf Temp	317	318	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch7	319	320	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch8 Min RF Shelf Temp	321	322	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch8 Nom RF Shelf Temp	323	324	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch8 Max RF Shelf Temp	325	326	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch8	327	328	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch9 Min RF Shelf Temp	329	330	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch9 Nom RF Shelf Temp	331	332	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch9 Max RF Shelf Temp	333	334	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch9	335	336	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch10 Min RF Shelf Temp	337	338	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch10 Nom RF Shelf Temp	339	340	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch10 Max RF Shelf Temp	341	342	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch10	343	344	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch11 Min RF Shelf Temp	345	346	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch11 Nom RF Shelf Temp	347	348	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch11 Max RF Shelf Temp	349	350	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch11	351	352	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch12 Min RF Shelf Temp	353	354	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch12 Nom RF Shelf Temp	355	356	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch12 Max RF Shelf Temp	357	258	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch12	359	360	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch13 Min RF Shelf Temp	361	362	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch13 Nom RF Shelf Temp	363	364	i	2	1	3	K	

Warm Target Fixed Bias Corr Ch13 Max RF Shelf Temp	365	366	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch13	367	368	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch14 Min RF Shelf Temp	369	370	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch14 Nom RF Shelf Temp	371	372	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch14 Max RF Shelf Temp	373	374	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch14	375	376	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch15 Min RF Shelf Temp	377	378	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch15 Nom RF Shelf Temp	379	380	i	2	1	3	K	
Warm Target Fixed Bias Corr Ch15 Max RF Shelf Temp	381	382	i	2	1	3	K	
Cold Space Fixed Bias Corr Ch15	383	384	i	2	1	3	K	
Warm Target Bias Corr Ch9 at PLLO#2 RF Shelf A1-1 Min Ref Temp	385	386	i	2	1	3	K	
Warm Target Bias Corr Ch9 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	387	388	i	2	1	3	K	
Warm Target Bias Corr Ch9 at PLLO#2 RF Shelf A1-1 Max Ref Temp	389	390	i	2	1	3	K	
Warm Target Bias Corr Ch10 at PLLO#2 RF Shelf A1-1 Min Ref Temp	391	392	i	2	1	3	K	
Warm Target Bias Corr Ch10 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	393	394	i	2	1	3	K	
Warm Target Bias Corr Ch10 at PLLO#2 RF Shelf A1-1 Max Ref Temp	395	396	i	2	1	3	K	
Warm Target Bias Corr Ch11 at PLLO#2 RF Shelf A1-1 Min Ref Temp	397	398	i	2	1	3	K	
Warm Target Bias Corr Ch11 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	399	400	i	2	1	3	K	
Warm Target Bias Corr Ch11 at PLLO#2 RF Shelf A1-1 Max Ref Temp	401	402	i	2	1	3	K	
Warm Target Bias Corr Ch12 at PLLO#2 RF Shelf A1-1 Min Ref Temp	403	404	i	2	1	3	K	
Warm Target Bias Corr Ch12 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	405	406	i	2	1	3	K	
Warm Target Bias Corr Ch12 at PLLO#2 RF Shelf A1-1 Max Ref Temp	407	408	i	2	1	3	K	
Warm Target Bias Corr Ch13 at PLLO#2 RF Shelf A1-1 Min Ref Temp	409	410	i	2	1	3	K	
Warm Target Bias Corr Ch13 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	411	412	i	2	1	3	K	
Warm Target Bias Corr Ch13 at PLLO#2 RF Shelf A1-1 Max Ref Temp	413	414	i	2	1	3	K	
Warm Target Bias Corr Ch14 at PLLO#2 RF Shelf A1-1 Min Ref Temp	415	416	i	2	1	3	K	

Warm Target Bias Corr Ch14 at PLLO#2 RF Shelf A1-1 Nom Ref Temp	417	418	i	2	1	3	K	
Warm Target Bias Corr Ch14 at PLLO#2 RF Shelf A1-1 Max Ref Temp	419	420	i	2	1	3	K	
Nonlinearity Coef. Ch 1 at Minimum Reference Temperature	421	424	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 1 at Nominal Reference Temperature	425	428	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 1 at Maximum Reference Temperature	429	432	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 2 at Minimum Reference Temperature	433	436	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 2 at Nominal Reference Temperature	437	440	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 2 at Maximum Reference Temperature	441	444	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 3 at Minimum Reference Temperature	445	448	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 3 at Nominal Reference Temperature	449	452	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 3 at Maximum Reference Temperature	453	456	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 4 at Minimum Reference Temperature	457	460	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 4 at Nominal Reference Temperature	461	464	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 4 at Maximum Reference Temperature	465	468	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 5 at Minimum Reference Temperature	469	472	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 5 at Nominal Reference Temperature	473	476	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 5 at Maximum Reference Temperature	477	480	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 6 at Minimum Reference Temperature	481	484	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 6 at Nominal Reference Temperature	485	488	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 6 at Maximum Reference Temperature	489	492	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 7 at Minimum Reference Temperature	493	496	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 7 at Nominal Reference Temperature	497	500	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 7 at Maximum Reference Temperature	501	504	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 8 at Minimum Reference Temperature	505	508	i	4	1	6	m^2-sr-cm^{-1}/mW	

Nonlinearity Coef. Ch 8 at Nominal Reference Temperature	509	512	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 8 at Maximum Reference Temperature	513	516	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 9 at Minimum Reference Temperature	517	520	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 9 at Nominal Reference Temperature	521	524	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 9 at Maximum Reference Temperature	525	528	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 10 at Minimum Reference Temperature	529	532	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 10 at Nominal Reference Temperature	533	536	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 10 at Maximum Reference Temperature	537	540	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 11 at Minimum Reference Temperature	541	544	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 11 at Nominal Reference Temperature	545	548	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 11 at Maximum Reference Temperature	549	552	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 12 at Minimum Reference Temperature	553	556	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 12 at Nominal Reference Temperature	557	560	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 12 at Maximum Reference Temperature	561	564	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 13 at Minimum Reference Temperature	565	568	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 13 at Nominal Reference Temperature	569	572	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 13 at Maximum Reference Temperature	573	576	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 14 at Minimum Reference Temperature	577	580	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 14 at Nominal Reference Temperature	581	584	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 14 at Maximum Reference Temperature	585	588	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 15 at Minimum Reference Temperature	589	592	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 15 at Nominal Reference Temperature	593	596	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 15 at Maximum Reference Temperature	597	600	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 9 for PLLO #2 at Minimum Reference Temperature	601	604	i	4	1	6	m^2-sr-cm^{-1}/mW	

Nonlinearity Coef. Ch 9 for PLLO #2 at Nominal Reference Temperature	605	608	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 9 for PLLO #2 at Maximum Reference Temperature	609	612	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 10 for PLLO #2 at Minimum Reference Temperature	613	616	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 10 for PLLO #2 at Nominal Reference Temperature	617	620	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 10 for PLLO #2 at Maximum Reference Temperature	621	624	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 11 for PLLO #2 at Minimum Reference Temperature	625	628	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 11 for PLLO #2 at Nominal Reference Temperature	629	632	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 11 for PLLO #2 at Maximum Reference Temperature	633	636	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 12 for PLLO #2 at Minimum Reference Temperature	637	640	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 12 for PLLO #2 at Nominal Reference Temperature	641	644	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 12 for PLLO #2 at Maximum Reference Temperature	645	648	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 13 for PLLO #2 at Minimum Reference Temperature	649	652	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 13 for PLLO #2 at Nominal Reference Temperature	653	656	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 13 for PLLO #2 at Maximum Reference Temperature	657	660	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 14 for PLLO #2 at Minimum Reference Temperature	661	664	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 14 for PLLO #2 at Nominal Reference Temperature	665	668	i	4	1	6	m^2-sr-cm^{-1}/mW	
Nonlinearity Coef. Ch 14 for PLLO #2 at Maximum Reference Temperature	669	672	i	4	1	6	m^2-sr-cm^{-1}/mW	
<zero fill>	673	688	i	4	4	0		
Temperature-Radiance Conversion								
Temperature-radiance Ch 1 Central Wavenumber	689	692	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 1 Constant 1	693	696	i	4	1	6		
Temperature-radiance Ch 1 Constant 2, Slope	697	700	i	4	1	6		
Temperature-radiance Ch 2 Central Wavenumber	701	704	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 2 Constant 1	705	708	i	4	1	6		
Temperature-radiance Ch 2 Constant 2, Slope	709	712	i	4	1	6		
Temperature-radiance Ch 3 Central Wavenumber	713	716	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 3 Constant 1	717	720	i	4	1	6		
Temperature-radiance Ch 3 Constant 2, Slope	721	724	i	4	1	6		
Temperature-radiance Ch 4 Central Wavenumber	725	728	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 4 Constant 1	729	732	i	4	1	6		

Temperature-radiance Ch 4 Constant 2, Slope	733	736	i	4	1	6		
Temperature-radiance Ch 5 Central Wavenumber	737	740	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 5 Constant 1	741	744	i	4	1	6		
Temperature-radiance Ch 5 Constant 2, Slope	745	748	i	4	1	6		
Temperature-radiance Ch 6 Central Wavenumber	749	752	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 6 Constant 1	753	756	i	4	1	6		
Temperature-radiance Ch 6 Constant 2, Slope	757	760	i	4	1	6		
Temperature-radiance Ch 7 Central Wavenumber	761	764	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 7 Constant 1	765	768	i	4	1	6		
Temperature-radiance Ch 7 Constant 2, Slope	769	772	i	4	1	6		
Temperature-radiance Ch 8 Central Wavenumber	773	776	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 8 Constant 1	777	780	i	4	1	6		
Temperature-radiance Ch 8 Constant 2, Slope	781	784	i	4	1	6		
Temperature-radiance Ch 9 Central Wavenumber	785	788	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 9 Constant 1	789	792	i	4	1	6		
Temperature-radiance Ch 9 Constant 2, Slope	793	796	i	4	1	6		
Temperature-radiance Ch 10 Central Wavenumber	797	800	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 10 Constant 1	801	804	i	4	1	6		
Temperature-radiance Ch 10 Constant 2, Slope	805	808	i	4	1	6		
Temperature-radiance Ch 11 Central Wavenumber	809	812	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 11 Constant 1	813	816	i	4	1	6		
Temperature-radiance Ch 11 Constant 2, Slope	807	820	i	4	1	6		
Temperature-radiance Ch 12 Central Wavenumber	821	824	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 12 Constant 1	825	828	i	4	1	6		
Temperature-radiance Ch 12 Constant 2, Slope	829	832	i	4	1	6		
Temperature-radiance Ch 13 Central Wavenumber	833	836	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 13 Constant 1	837	840	i	4	1	6		
Temperature-radiance Ch 13 Constant 2, Slope	841	844	i	4	1	6		
Temperature-radiance Ch 14 Central Wavenumber	845	848	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 14 Constant 1	849	852	i	4	1	6		
Temperature-radiance Ch 14 Constant 2, Slope	853	856	i	4	1	6		
Temperature-radiance Ch 15 Central Wavenumber	857	860	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 15 Constant 1	861	864	i	4	1	6		
Temperature-radiance Ch 15 Constant 2, Slope	865	868	i	4	1	6		
<zero fill>	869	880	i	4	3	0		
Navigation								
Reference Ellipsoid Model ID (The ellipsoid is a mathematically tractable approximation of the geid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately $\pm$ 65	881	888	c	8	1	0		

meters.) WGS-72 = World Geodetic Survey 1972 JGM3 =Joint Gravity Model 3								
Nadir Earth Location Tolerance	889	890	u	2	1	1	km	
Earth Location Bit Field bits 15-3: <zero fill> bit 2: dynamic attitude error correction (0=not performed; 1=performed) bit 1: reasonableness test (0=inactive; 1=active) bit 0: constant attitude error correction (0=not performed; 1=performed)	891	892	u	2	1	0		
<zero fill>	893	894	i	2	1	0		
Constant Roll Attitude Error	895	896	i	2	1	3	Degrees	
Constant Pitch Attitude Error	897	898	i	2	1	3	Degrees	
Constant Yaw Attitude Error	899	900	i	2	1	3	Degrees	
Epoch Year for Orbit Vector (e.g., 1999)	901	902	u	2	1	0		
Day of Epoch Year for Orbit Vector (e.g., 365)	903	904	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	905	908	u	4	1	0	Milli-seconds	
Semi-major Axis (at the orbit vector epoch time)	909	912	i	4	1	5	km	
Eccentricity (at the orbit vector epoch time)	913	916	i	4	1	8		
Inclination (at the orbit vector epoch time)	917	920	i	4	1	5	Degrees	
Argument of Perigee (at orbit vector epoch time)	921	924	i	4	4	5	Degrees	
Right Ascension of the Ascending Node (at the orbit vector epoch time)	925	928	i	4	1	5	Degrees	
Mean Anomaly (at the orbit vector epoch time)	929	932	i	4	1	5	Degrees	
Position Vector X Component (at the orbit vector epoch time)	933	936	i	4	1	5	km	
Position Vector Y Component (at the orbit vector epoch time)	937	940	i	4	1	5	km	
Position Vector Z Component (at the orbit vector epoch time)	941	944	i	4	1	5	km	
Position Vector X-dot Component (at the orbit vector epoch time)	945	948	i	4	1	8	Km/sec	
Position Vector Y-dot Component (at the orbit vector epoch time)	949	952	i	4	1	8	Km/sec	
Position Vector Z-dot Component (at the orbit vector epoch time)	953	956	i	4	1	8	Km/sec	
Earth/Sun Distance Ration (at the orbit vector epoch time; relative to the mean distance of 1 AU	957	960	u	4	1	6		
<zero fill>	961	976	i	4	4	0		
AMSU-A1 Digital A Conversion *Counts-to-temperature conversion coefficients for the AMSU-A1 digital A telemetry items.*								
Scan Motor A1-1 Temperature Coefficient 0	977	980	i	4	1	4	K	
Scan Motor A1-1 Temperature Coefficient 1	981	984	i	4	1	9	K/count	
Scan Motor A1-1 Temperature Coefficient 2	985	988	i	4	1	16	K/count^2	
Scan Motor A1-1 Temperature Coefficient 3	989	992	i	4	1	20	K/count^3	
Scan Motor A1-2 Temperature Coefficient 0	993	996	i	4	1	4	K	
Scan Motor A1-2 Temperature Coefficient 1	997	1000	i	4	1	9	K/count	

Scan Motor A1-2 Temperature Coefficient 2	1001	1004	i	4	1	16	K/count^2	
Scan Motor A1-2 Temperature Coefficient 3	1005	1008	i	4	1	20	K/count^3	
Feed Horn A1-1 Temperature Coefficient 0	1009	1012	i	4	1	4	K	
Feed Horn A1-1 Temperature Coefficient 1	1013	1016	i	4	1	9	K/count	
Feed Horn A1-1 Temperature Coefficient 2	1017	1020	i	4	1	16	K/count^2	
Feed Horn A1-1 Temperature Coefficient 3	1021	1024	i	4	1	20	K/count^3	
Feed Horn A1-2 Temperature Coefficient 0	1025	1028	i	4	1	4	K	
Feed Horn A1-2 Temperature Coefficient 1	1029	1032	i	4	1	9	K/count	
Feed Horn A1-2 Temperature Coefficient 2	1033	1036	i	4	1	16	K/count^2	
Feed Horn A1-2 Temperature Coefficient 3	1037	1040	i	4	1	20	K/count^3	
RF Mux A1-1 Temperature Coefficient 0	1041	1044	i	4	1	4	K	
RF Mux A1-1 Temperature Coefficient 1	1045	1048	i	4	1	9	K/count	
RF Mux A1-1 Temperature Coefficient 2	1049	1052	i	4	1	16	K/count^2	
RF Mux A1-1 Temperature Coefficient 3	1053	1056	i	4	1	20	K/count^3	
RF Mux A1-2 Temperature Coefficient 0	1057	1060	i	4	1	4	K	
RF Mux A1-2 Temperature Coefficient 1	1061	1064	i	4	1	9	K/count	
RF Mux A1-2 Temperature Coefficient 2	1065	1068	i	4	1	16	K/count^2	
RF Mux A1-2 Temperature Coefficient 3	1069	1072	i	4	1	20	K/count^3	
Local Oscillator Channel 3 Temperature Coefficient 0	1073	1076	i	4	1	4	K	
Local Oscillator Channel 3 Temperature Coefficient 1	1077	1080	i	4	1	9	K/count	
Local Oscillator Channel 3 Temperature Coefficient 2	1081	1084	i	4	1	16	K/count^2	
Local Oscillator Channel 3 Temperature Coefficient 3	1085	1088	i	4	1	20	K/count^3	
Local Oscillator Channel 4 Temperature Coefficient 0	1089	1092	i	4	1	4	K	
Local Oscillator Channel 4 Temperature Coefficient 1	1093	1096	i	4	1	9	K/count	
Local Oscillator Channel 4 Temperature Coefficient 2	1097	1100	i	4	1	16	K/count^2	
Local Oscillator Channel 4 Temperature Coefficient 3	1101	1104	i	4	1	20	K/count^3	
Local Oscillator Channel 5 Temperature Coefficient 0	1105	1108	i	4	1	4	K	
Local Oscillator Channel 5 Temperature Coefficient 1	1109	1112	i	4	1	9	K/count	
Local Oscillator Channel 5 Temperature Coefficient 2	1103	1116	i	4	1	16	K/count^2	
Local Oscillator Channel 5 Temperature Coefficient 3	1107	1120	i	4	1	20	K/count^3	
Local Oscillator Channel 6 Temperature Coefficient 0	1121	1124	i	4	1	4	K	
Local Oscillator Channel 6 Temperature Coefficient 1	1125	1128	i	4	1	9	K/count	
Local Oscillator Channel 6 Temperature Coefficient 2	1129	1132	i	4	1	16	K/count^2	

Local Oscillator Channel 6 Temperature Coefficient 3	1133	1136	i	4	1	20	K/count^3	
Local Oscillator Channel 7 Temperature Coefficient 0	1137	1140	i	4	1	4	K	
Local Oscillator Channel 7 Temperature Coefficient 1	1141	1144	i	4	1	9	K/count	
Local Oscillator Channel 7 Temperature Coefficient 2	1145	1148	i	4	1	16	K/count^2	
Local Oscillator Channel 7 Temperature Coefficient 3	1149	1152	i	4	1	20	K/count^3	
Local Oscillator Channel 8 Temperature Coefficient 0	1153	1156	i	4	1	4	K	
Local Oscillator Channel 8 Temperature Coefficient 1	1157	1160	i	4	1	9	K/count	
Local Oscillator Channel 8 Temperature Coefficient 2	1161	1164	i	4	1	16	K/count^2	
Local Oscillator Channel 8 Temperature Coefficient 3	1165	1168	i	4	1	20	K/count^3	
Local Oscillator Channel 15 Temperature Coefficient 0	1169	1172	i	4	1	4	K	
Local Oscillator Channel 15 Temperature Coefficient 1	1173	1176	i	4	1	9	K/count	
Local Oscillator Channel 15 Temperature Coefficient 2	1177	1180	i	4	1	16	K/count^2	
Local Oscillator Channel 15 Temperature Coefficient 3	1181	1184	i	4	1	20	K/count^3	
PLLO #2 Channels 9 Through 14 Temperature Coefficient 0	1185	1188	i	4	1	4	K	
PLLO #2 Channels 9 Through 14 Temperature Coefficient 1	1189	1192	i	4	1	9	K/count	
PLLO #2 Channels 9 Through 14 Temperature Coefficient 2	1193	1196	i	4	1	16	K/count^2	
PLLO #2 Channels 9 Through 14 Temperature Coefficient 3	1197	1200	i	4	1	20	K/count^3	
PLLO #1 Channels 9 Through 14 Temperature Coefficient 0	1201	1204	i	4	1	4	K	
PLLO #1 Channels 9 Through 14 Temperature Coefficient 1	1205	1208	i	4	1	9	K/count	
PLLO #1 Channels 9 Through 14 Temperature Coefficient 2	1209	1212	i	4	1	16	K/count^2	
PLLO #1 Channels 9 Through 14 Temperature Coefficient 3	1213	1216	i	4	1	20	K/count^3	
PLLO (Reference Oscillator) Temperature Coefficient 0 (NOAA KLM) or <zero fill> (NOAA-N-N’)	1217	1220	i	4	1	4	K	
PLLO (Reference Oscillator) Temperature Coefficient 1 (NOAA KLM) or <zero fill> (NOAA-N-N’)	1221	1224	i	4	1	9	K/count	
PLLO (Reference Oscillator) Temperature	1225	1228	i	4	1	16	K/count^2	

Coefficient 2 (NOAA KLM) or <zero fill> (NOAA-N-N')								
PLLO (Reference Oscillator) Temperature Coefficient 3 (NOAA KLM) or <zero fill> (NOAA-N-N')	1229	1232	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 3 Temperature Coefficient 0	1233	1236	i	4	1	4	K	
Mixer/IF Amplifier Channel 3 Temperature Coefficient 1	1237	1240	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 3 Temperature Coefficient 2	1241	1244	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 3 Temperature Coefficient 3	1245	1248	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 4 Temperature Coefficient 0	1249	1252	i	4	1	4	K	
Mixer/IF Amplifier Channel 4 Temperature Coefficient 1	1253	1256	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 4 Temperature Coefficient 2	1257	1260	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 4 Temperature Coefficient 3	1261	1264	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 5 Temperature Coefficient	1265	1268	i	4	1	4	K	
Mixer/IF Amplifier Channel 5 Temperature Coefficient 1	1269	1272	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 5 Temperature Coefficient 2	1273	1276	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 5 Temperature Coefficient 3	1277	1280	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 6 Temperature Coefficient 0	1281	1284	i	4	1	4	K	
Mixer/IF Amplifier Channel 6 Temperature Coefficient 1	1285	1288	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 6 Temperature Coefficient 2	1289	1292	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 6 Temperature Coefficient 3	1293	1296	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 7 Temperature Coefficient 0	1297	1300	i	4	1	4	K	
Mixer/IF Amplifier Channel 7 Temperature Coefficient 1	1301	1304	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 7 Temperature Coefficient 2	1305	1308	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 7 Temperature Coefficient 3	1309	1312	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 8 Temperature Coefficient 0	1313	1316	i	4	1	4	K	
Mixer/IF Amplifier Channel 8 Temperature Coefficient 1	1317	1320	i	4	1	9	K/count	

Mixer/IF Amplifier Channel 8 Temperature Coefficient 2	1321	1324	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 8 Temperature Coefficient 3	1325	1328	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 9/14 Temperature Coefficient 0	1329	1332	i	4	1	4	K	
Mixer/IF Amplifier Channel 9/14 Temperature Coefficient 1	1333	1336	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 9/14 Temperature Coefficient 2	1337	1340	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 9/14 Temperature Coefficient 3	1341	1344	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 15 Temperature Coefficient 0	1345	1348	i	4	1	4	K	
Mixer/IF Amplifier Channel 15 Temperature Coefficient 1	1349	1352	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 15 Temperature Coefficient 2	1353	1356	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 15 Temperature Coefficient 3	1357	1360	i	4	1	20	K/count^3	
IF Amplifier Channel 11/14 Temperature Coefficient 0	1361	1364	i	4	1	4	K	
IF Amplifier Channel 11/14 Temperature Coefficient 1	1365	1368	i	4	1	9	K/count	
IF Amplifier Channel 11/14 Temperature Coefficient 2	1369	1372	i	4	1	16	K/count^2	
IF Amplifier Channel 11/14 Temperature Coefficient 3	1373	1376	i	4	1	20	K/count^3	
IF Amplifier Channel 9 Temperature Coefficient 0	1377	1380	i	4	1	4	K	
IF Amplifier Channel 9 Temperature Coefficient 1	1381	1384	i	4	1	9	K/count	
IF Amplifier Channel 9 Temperature Coefficient 2	1385	1388	i	4	1	16	K/count^2	
IF Amplifier Channel 9 Temperature Coefficient 3	1389	1392	i	4	1	20	K/count^3	
IF Amplifier Channel 10 Temperature Coefficient 0	1393	1396	i	4	1	4	K	
IF Amplifier Channel 10 Temperature Coefficient 1	1397	1400	i	4	1	9	K/count	
IF Amplifier Channel 10 Temperature Coefficient 2	1401	1404	i	4	1	16	K/count^2	
IF Amplifier Channel 10 Temperature Coefficient 3	1405	1408	i	4	1	20	K/count^3	
IF Amplifier Channel 11 Temperature Coefficient 0	1409	1412	i	4	1	4	K	
IF Amplifier Channel 11 Temperature Coefficient 1	1413	1416	i	4	1	9	K/count	
IF Amplifier Channel 11 Temperature Coefficient 2	1417	1420	i	4	1	16	K/count^2	
IF Amplifier Channel 11 Temperature Coefficient 3	1421	1424	i	4	1	20	K/count^3	
DC/DC Converter Temperature Coefficient 0	1425	1428	i	4	1	4	K	

DC/DC Converter Temperature Coefficient 1	1429	1432	i	4	1	9	K/count	
DC/DC Converter Temperature Coefficient 2	1433	1436	i	4	1	16	K/count^2	
DC/DC Converter Temperature Coefficient 3	1437	1440	i	4	1	20	K/count^3	
IF Amplifier Channel 13 Temperature Coefficient 0	1441	1444	i	4	1	4	K	
IF Amplifier Channel 13 Temperature Coefficient 0	1445	1448	i	4	1	9	K/count	
IF Amplifier Channel 13 Temperature Coefficient 0	1449	1452	i	4	1	16	K/count^2	
IF Amplifier Channel 13 Temperature Coefficient 0	1453	1456	i	4	1	20	K/count^3	
IF Amplifier Channel 14 Temperature Coefficient 0	1457	1460	i	4	1	4	K	
IF Amplifier Channel 14 Temperature Coefficient 1	1461	1464	i	4	1	9	K/count	
IF Amplifier Channel 14 Temperature Coefficient 2	1465	1468	i	4	1	16	K/count^2	
IF Amplifier Channel 14 Temperature Coefficient 3	1469	1472	i	4	1	20	K/count^3	
IF Amplifier Channel 12 Temperature Coefficient 0	1473	1476	i	4	1	4	K	
IF Amplifier Channel 12 Temperature Coefficient 1	1477	1480	i	4	1	9	K/count	
IF Amplifier Channel 12 Temperature Coefficient 2	1481	1484	i	4	1	16	K/count^2	
IF Amplifier Channel 12 Temperature Coefficient 3	1485	1488	i	4	1	20	K/count^3	
RF Shelf A1-1 Temperature Coefficient 0	1489	1492	i	4	1	4	K	
RF Shelf A1-1 Temperature Coefficient 1	1493	1496	i	4	1	9	K/count	
RF Shelf A1-1 Temperature Coefficient 2	1497	1500	i	4	1	16	K/count^2	
RF Shelf A1-1 Temperature Coefficient 3	1501	1504	i	4	1	20	K/count^3	
RF Shelf A1-2 Temperature Coefficient 0	1505	1508	i	4	1	4	K	
RF Shelf A1-2 Temperature Coefficient 1	1509	1512	i	4	1	9	K/count	
RF Shelf A1-2 Temperature Coefficient 2	1513	1516	i	4	1	16	K/count^2	
RF Shelf A1-2 Temperature Coefficient 3	1517	1520	i	4	1	20	K/count^3	
Detector/preamp Assembly Temperature Coefficient 0	1521	1524	i	4	1	4	K	
Detector/preamp Assembly Temperature Coefficient 1	1525	1528	i	4	1	9	K/count	
Detector/preamp Assembly Temperature Coefficient 2	1529	1532	i	4	1	16	K/count^2	
Detector/preamp Assembly Temperature Coefficient 3	1533	1536	i	4	1	20	K/count^3	
A1-1 Warm Load 1 Temperature Coefficient 0	1537	1540	i	4	1	4	K	
A1-1 Warm Load 1 Temperature Coefficient 1	1541	1544	i	4	1	9	K/count	
A1-1 Warm Load 1 Temperature Coefficient 2	1545	1548	i	4	1	16	K/count^2	
A1-1 Warm Load 1 Temperature Coefficient 3	1549	1552	i	4	1	20	K/count^3	
A1-1 Warm Load 2 Temperature Coefficient 0	1553	1556	i	4	1	4	K	

A1-1 Warm Load 2 Temperature Coefficient 1	1557	1560	i	4	1	9	K/count	
A1-1 Warm Load 2 Temperature Coefficient 2	1561	1564	i	4	1	16	K/count^2	
A1-1 Warm Load 2 Temperature Coefficient 3	1565	1568	i	4	1	20	K/count^3	
A1-1 Warm Load 3 Temperature Coefficient 0	1569	1572	i	4	1	4	K	
A1-1 Warm Load 3 Temperature Coefficient 1	1573	1576	i	4	1	9	K/count	
A1-1 Warm Load 3 Temperature Coefficient 2	1577	1580	i	4	1	16	K/count^2	
A1-1 Warm Load 3 Temperature Coefficient 3	1581	1584	i	4	1	20	K/count^3	
A1-1 Warm Load 4 Temperature Coefficient 0	1585	1588	i	4	1	4	K	
A1-1 Warm Load 4 Temperature Coefficient 1	1589	1592	i	4	1	9	K/count	
A1-1 Warm Load 4 Temperature Coefficient 2	1593	1596	i	4	1	16	K/count^2	
A1-1 Warm Load 4 Temperature Coefficient 3	1597	1600	i	4	1	20	K/count^3	
A1-1 Warm Load Center Temperature Coefficient 0	1601	1604	i	4	1	4	K	
A1-1 Warm Load Center Temperature Coefficient 1	1605	1608	i	4	1	9	K/count	
A1-1 Warm Load Center Temperature Coefficient 2	1609	1612	i	4	1	16	K/count^2	
A1-1 Warm Load Center Temperature Coefficient 3	1613	1616	i	4	1	20	K/count^3	
A1-2 Warm Load 1Temperature Coefficient 0	1617	1620	i	4	1	4	K	
A1-2 Warm Load 1 Temperature Coefficient 1	1621	1624	i	4	1	9	K/count	
A1-2 Warm Load 1Temperature Coefficient 2	1625	1628	i	4	1	16	K/count^2	
A1-2 Warm Load 1Temperature Coefficient 3	1629	1632	i	4	1	20	K/count^3	
A1-2 Warm Load 2 Temperature Coefficient 0	1633	1636	i	4	1	4	K	
A1-2 Warm Load 2 Temperature Coefficient 1	1637	1640	i	4	1	9	K/count	
A1-2 Warm Load 2 Temperature Coefficient 2	1641	1644	i	4	1	16	K/count^2	
A1-2 Warm Load 2 Temperature Coefficient 3	1645	1648	i	4	1	20	K/count^3	
A1-2 Warm Load 3 Temperature Coefficient 0	1649	1652	i	4	1	4	K	
A1-2 Warm Load 3 Temperature Coefficient 1	1653	1656	i	4	1	9	K/count	
A1-2 Warm Load 3 Temperature Coefficient 2	1657	1660	i	4	1	16	K/count^2	
A1-2 Warm Load 3 Temperature Coefficient 3	1661	1664	i	4	1	20	K/count^3	
A1-2 Warm Load 4 Temperature Coefficient 0	1665	1668	i	4	1	4	K	
A1-2 Warm Load 4 Temperature Coefficient 1	1669	1672	i	4	1	9	K/count	
A1-2 Warm Load 4 Temperature Coefficient 2	1673	1676	i	4	1	16	K/count^2	
A1-2 Warm Load 4 Temperature Coefficient 3	1677	1680	i	4	1	20	K/count^3	
A1-2 Warm Load Center Temperature Coefficient 0	1681	1684	i	4	1	4	K	
A1-2 Warm Load Center Temperature Coefficient 1	1685	1688	i	4	1	9	K/count	
A1-2 Warm Load Center Temperature Coefficient 2	1689	1692	i	4	1	16	K/count^2	
A1-2 Warm Load Center Temperature Coefficient 3	1693	1696	i	4	1	20	K/count^3	
<zero fill>	1697	1700	i	4	1	0		

AMSU-A1 Analog Telemetry Conversion

Volts to engineering units (e.g., temperature in Kelvin) conversion coefficients for the AMSU-A1 analog telemetry items. (Note: 1 count = 0.02 volts)

A1-1 Scan Motor Temp Intercept	1701	1704	i	4	1	3	K	
A1-1 Scan Motor Temp Slope	1705	1708	i	4	1	3	K/volt	
A1-2 Scan Motor Temp Intercept	1709	1712	i	4	1	3	K	
A1-2 Scan Motor Temp Slope	1713	1716	i	4	1	3	K/volt	
A1-1 RF Shelf Temp Intercept	1717	1720	i	4	1	3	K	
A1-1 RF Shelf Temp Slope	1721	1724	i	4	1	3	K/volt	
A1-2 RF Shelf Temp Intercept	1725	1728	i	4	1	3	K	
A1-2 RF Shelf Temp Slope	1729	1732	i	4	1	3	K/volt	
A1-1 Warm LoadTemp Intercept	1733	1736	i	4	1	3	K	
A1-1 Warm LoadTemp Slope	1737	1740	i	4	1	3	K/volt	
A1-2 Warm Load Temp Intercept	1741	1744	i	4	1	3	K	
A1-2 Warm Load Temp Slope	1745	1748	i	4	1	3	K/volt	
A1-1 Antenna Motor Current Intercept	1749	1752	i	4	1	3	milli-amps	
A1-1 Antenna Motor Current Slope	1753	1756	i	4	1	3	milli-amps/volt	
A1-2 Antenna Motor Current Intercept	1757	1760	i	4	1	3	milli-amps	
A1-2 Antenna Motor Current Slope	1761	1764	i	4	1	3	milli-amps/volt	
+15v Signal Processing Intercept	1765	1768	i	4	1	3	volts	
+15v Signal Processing Slope	1769	1772	i	4	1	3		
+15v Antenna Drive Intercept	1773	1776	i	4	1	3	volts	
+15v Antenna Drive Slope	1777	1780	i	4	1	3		
-15v Signal Processing Intercept	1781	1784	i	4	1	3	volts	
-15v Signal Processing Slope	1785	1788	i	4	1	3		
-15v Antenna Drive Intercept	1789	1792	i	4	1	3	volts	
-15v Antenna Drive Slope	1793	1796	i	4	1	3		
+8v Receiver Amps Intercept	1797	1800	i	4	1	3	volts	
+8v Receiver Amps Slope	1801	1804	i	4	1	3		
+5v Signal Processing Intercept	1805	1808	i	4	1	3	volts	
+5v Signal Processing Slope	1809	1812	i	4	1	3		
+5v Antenna Drive Intercept	1813	1816	i	4	1	3	volts	
+5v Antenna Drive Slope	1817	1820	i	4	1	3		
+8.5v Phase Lock Loop Ch 9/14 Intercept (NOAA KLM) or +10 VDC Receiver Mixer/IF Intercept (NOAA-N,-N')	1821	1824	i	4	1	3	volts	
+8.5v Phase Lock Loop Ch 9/14 Slope (NOAA KLM) or +10 VDC Receiver Mixer/IF Slope (NOAA-N,-N')	1825	1828	i	4	1	3		
+15v Phase Lock Loop Ch 9/14 Intercept	1829	1832	i	4	1	3	volts	
+15v Phase Lock Loop Ch 9/14 Slope	1833	1836	i	4	1	3		
-15v Phase Lock Loop Ch 9/14 Intercept	1837	1840	i	4	1	3	volts	
-15v Phase Lock Loop Ch 9/14 Slope	1841	1844	i	4	1	3		
LO Voltage 50.3 GHz Ch 3 Intercept	1845	1848	i	4	1	3	volts	3
LO Voltage 50.3 GHz Ch 3 Slope	1849	1852	i	4	1	3		3
LO Voltage 52.8 GHz Ch 4 Intercept	1853	1858	i	4	1	3	volts	3

LO Voltage 52.8 GHz Ch 4 Slope	1857	1860	i	4	1	3		3
LO Voltage 53.596 GHz Ch 5 Intercept	1861	1864	i	4	1	3	volts	3
LO Voltage 53.596 GHz Ch 5 Slope	1865	1868	i	4	1	3		3
LO Voltage 54.4 GHz Ch 6 Intercept	1869	1872	i	4	1	3	volts	3
LO Voltage 54.4 GHz Ch 6 Slope	1873	1876	i	4	1	3		3
LO Voltage 54.94 GHz Ch 7 Intercept	1877	1880	i	4	1	3	volts	3
LO Voltage 54.94 GHz Ch 7 Slope	1881	1884	i	4	1	3		3
LO Voltage 55.5 GHz Ch 8 Intercept	1885	1888	i	4	1	3	volts	3
LO Voltage 55.5 GHz Ch 8 Slope	1889	1892	i	4	1	3		3
PLLO Primary Lock Detect Intercept	1893	1896	i	4	1	3	volts	
PLLO Primary Lock Detect Slope	1897	1900	i	4	1	3		
PLLO Redundant Lock Detect Intercept	1901	1904	i	4	1	3	volts	
PLLO Redundant Lock Detect Slope	1905	1908	i	4	1	3		
GDO Voltage 89.0 GHz Ch 15 Intercept	1909	1912	i	4	1	3		3
GDO Voltage 89.0 GHz Ch 15 Slope	1913	1916	i	4	1	3	volts	3
<zero fill>	1917	1920	i	4	1	3		
AMSU-A2 DIGITAL A CONVERSION *Counts to temperature conversion coefficients for the AMSU-A2 digital A telemetry items.*								
Scan Motor Temp. Conv. Coeff 0	1921	1924	i	4	1	4	K	
Scan Motor Temp. Conv. Coeff 1	1925	1928	i	4	1	9	K/count	
Scan Motor Temp. Conv. Coeff 2	1929	1932	i	4	1	16	K/count^2	
Scan Motor Temp. Conv. Coeff 3	1933	1936	i	4	1	20	K/count^3	
Feed Horn Temp. Conv. Coeff 0	1937	1940	i	4	1	4	K	
Feed Horn Temp. Conv. Coeff 1	1941	1944	i	4	1	9	K/count	
Feed Horn Temp. Conv. Coeff 2	1945	1948	i	4	1	16	K/count^2	
Feed Horn Temp. Conv. Coeff 3	1949	1952	i	4	1	20	K/count^3	
RF Mux/Diplexer Temp. Conv. Coeff 0	1953	1956	i	4	1	4	K	2
RF Mux/Diplexer Temp. Conv. Coeff 1	1957	1960	i	4	1	9	K/count	2
RF Mux/Diplexer Temp. Conv. Coeff 2	1961	1964	i	4	1	16	K/count^2	2
RF Mux/Diplexer Temp. Conv. Coeff 3	1965	1968	i	4	1	20	K/count^3	2
Mixer/IF Amplifier Channel 1 Temp. Conv. Coeff 0	1969	1972	i	4	1	4	K	
Mixer/IF Amplifier Channel 1 Temp. Conv. Coeff 1	1973	1976	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 1 Temp. Conv. Coeff 2	1977	1980	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 1 Temp. Conv. Coeff 3	1981	1984	i	4	1	20	K/count^3	
Mixer/IF Amplifier Channel 2 Temp. Conv. Coeff 0	1985	1988	i	4	1	4	K	
Mixer/IF Amplifier Channel 2 Temp. Conv. Coeff 1	1989	1992	i	4	1	9	K/count	
Mixer/IF Amplifier Channel 2 Temp. Conv. Coeff 2	1993	1996	i	4	1	16	K/count^2	
Mixer/IF Amplifier Channel 2 Temp. Conv. Coeff 3	1997	2000	i	4	1	20	K/count^3	
Local Oscillator Channel 1 Temp. Conv. Coeff 0	2001	2004	i	4	1	4	K	

Local Oscillator Channel 1 Temp. Conv. Coeff 1	2005	2008	i	4	1	9	K/count	
Local Oscillator Channel 1 Temp. Conv. Coeff 2	2009	2012	i	4	1	16	K/count^2	
Local Oscillator Channel 1 Temp. Conv. Coeff 3	2013	2016	i	4	1	20	K/count^3	
Local Oscillator Channel 2 Temp. Conv. Coeff 0	2017	2020	i	4	1	4	K	
Local Oscillator Channel 2 Temp. Conv. Coeff 1	2021	2024	i	4	1	9	K/count	
Local Oscillator Channel 2 Temp. Conv. Coeff 2	2025	2028	i	4	1	16	K/count^2	
Local Oscillator Channel 2 Temp. Conv. Coeff 3	2029	2032	i	4	1	20	K/count^3	
Compensation Motor Temp. Conv. Coeff 0	2033	2036	i	4	1	4	K	
Compensation Motor Temp. Conv. Coeff 1	2037	2040	i	4	1	9	K/count	
Compensation Motor Temp. Conv. Coeff 2	2041	2044	i	4	1	16	K/count^2	
Compensation Motor Temp. Conv. Coeff 3	2045	2048	i	4	1	20	K/count^3	
Subreflector Temp. Conv. Coeff 0	2049	2052	i	4	1	4	K	
Subreflector Temp. Conv. Coeff 1	2053	2056	i	4	1	9	K/count	
Subreflector Temp. Conv. Coeff 2	2057	2060	i	4	1	16	K/count^2	
Subreflector Temp. Conv. Coeff 3	2061	2064	i	4	1	20	K/count^3	
DC/DC Converter Temp. Conv. Coeff 0	2065	2068	i	4	1	4	K	
DC/DC Converter Temp. Conv. Coeff 1	2069	2072	i	4	1	9	K/count	
DC/DC Converter Temp. Conv. Coeff 2	2073	2076	i	4	1	16	K/count^2	
DC/DC Converter Temp. Conv. Coeff 3	2077	2080	i	4	1	20	K/count^3	
RF Shelf Temp. Conv. Coeff 0	2081	2084	i	4	1	4	K	
RF Shelf Temp. Conv. Coeff 1	2085	2088	i	4	1	9	K/count	
RF Shelf Temp. Conv. Coeff 2	2089	2092	i	4	1	16	K/count^2	
RF Shelf Temp. Conv. Coeff 3	2093	2096	i	4	1	20	K/count^3	
Detector/preamp Assembly Temp. Conv. Coeff 0	2097	2100	i	4	1	4	K	
Detector/preamp Assembly Temp. Conv. Coeff 1	2101	2104	i	4	1	9	K/count	
Detector/preamp Assembly Temp. Conv. Coeff 2	2105	2108	i	4	1	16	K/count^2	
Detector/preamp Assembly Temp. Conv. Coeff 3	2109	2112	i	4	1	20	K/count^3	
Warm Load Center Temp. Conv. Coeff 0	2113	2116	i	4	1	4	K	
Warm Load Center Temp. Conv. Coeff 1	2117	2120	i	4	1	9	K/count	
Warm Load Center Temp. Conv. Coeff 2	2121	2124	i	4	1	16	K/count^2	
Warm Load Center Temp. Conv. Coeff 3	2125	2128	i	4	1	20	K/count^3	
Warm Load 1 Temp. Conv. Coeff 0	2129	2132	i	4	1	4	K	
Warm Load 1 Temp. Conv. Coeff 1	2133	2136	i	4	1	9	K/count	
Warm Load 1 Temp. Conv. Coeff 2	2137	2140	i	4	1	16	K/count^2	
Warm Load 1 Temp. Conv. Coeff 3	2141	2144	i	4	1	20	K/count^3	
Warm Load 2 Temp. Conv. Coeff 0	2145	2148	i	4	1	4	K	
Warm Load 2 Temp. Conv. Coeff 1	2149	2152	i	4	1	9	K/count	
Warm Load 2 Temp. Conv. Coeff 2	2153	2156	i	4	1	16	K/count^2	
Warm Load 2 Temp. Conv. Coeff 3	2157	2160	i	4	1	20	K/count^3	
Warm Load 3 Temp. Conv. Coeff 0	2161	2164	i	4	1	4	K	
Warm Load 3 Temp. Conv. Coeff 1	2165	2168	i	4	1	9	K/count	
Warm Load 3 Temp. Conv. Coeff 2	2169	2172	i	4	1	16	K/count^2	
Warm Load 3 Temp. Conv. Coeff 3	2173	2176	i	4	1	20	K/count^3	
Warm Load 4 Temp. Conv. Coeff 0	2177	2180	i	4	1	4	K	
Warm Load 4 Temp. Conv. Coeff 1	2181	2184	i	4	1	9	K/count	
Warm Load 4 Temp. Conv. Coeff 2	2185	2188	i	4	1	16	K/count^2	

Warm Load 4 Temp. Conv. Coeff 3	2189	2192	i	4	1	20	$K/count^3$	
Warm Load 5 Temp. Conv. Coeff 0	2193	2196	i	4	1	4	K	
Warm Load 5 Temp. Conv. Coeff 1	2197	2200	i	4	1	9	K/count	
Warm Load 5 Temp. Conv. Coeff 2	2201	2204	i	4	1	16	$K/count^2$	
Warm Load 5 Temp. Conv. Coeff 3	2205	2208	i	4	1	20	$K/count^3$	
Warm Load 6 Temp. Conv. Coeff 0	2209	2212	i	4	1	4	K	
Warm Load 6 Temp. Conv. Coeff 1	2213	2216	i	4	1	9	K/count	
Warm Load 6 Temp. Conv. Coeff 2	2217	2220	i	4	1	16	$K/count^2$	
Warm Load 6 Temp. Conv. Coeff 3	2221	2224	i	4	1	20	$K/count^3$	
<zero fill>	2225	2228	i	4	1	0		
AMSU-A2 ANALOG TELEMETRY CONVERSION *Volts to engineering units (e.g., temperature in Kelvin) conversion coefficients for the AMSU-A2 analog telemetry items. (Note: 1 count = 0.02 volts.)*								
A2 Scan Motor Temp Intercept	2229	2232	i	4	1	3	K	
A2 Scan Motor Temp Slope	2233	2236	i	4	1	3	K/volt	
Compensator Motor Temp Intercept	2237	2240	i	4	1	3	K	
Compensator Motor Temp Slope	2241	2244	i	4	1	3	K/volt	
RF Shelf Temp Intercept	2245	2248	i	4	1	3	K	
RF Shelf Temp Slope	2249	2252	i	4	1	3	K/volt	
Warm Load Temp Intercept	2253	2256	i	4	1	3	K	
Warm Load Temp Slope	2257	2260	i	4	1	3	K/volt	
Compensator Motor Current Intercept	2261	2264	i	4	1	3	milliamp	
Compensator Motor Current Slope	2265	2268	i	4	1	3	milliamp/ volt	
Antenna Motor Current Intercept	2269	2272	i	4	1	3	milliamp	
Antenna Motor Current Intercept	2273	2276	i	4	1	3	milliamp/ volt	
+15v Signal Processing Intercept	2277	2280	i	4	1	3	volts	
+15v Signal Processing Slope	2281	2284	i	4	1	3		
+15v Antenna Drive Intercept	2285	2288	i	4	1	3	volts	
+15v Antenna Drive Slope	2289	2292	i	4	1	3		
-15v Signal Processing Intercept	2293	2296	i	4	1	3	volts	
-15v Signal Processing Slope	2297	2300	i	4	1	3		
-15v Antenna Drive Intercept	2301	2304	i	4	1	3	volts	
-15v Antenna Drive Slope	2305	2308	i	4	1	3		
+8v Receiver Amps Intercept (NOAA KLM) or +10v Receiver/Mixer/IF Amps Intercept (NOAA-N,-N')	2309	2312	i	4	1	3	volts	
+8v Receiver Amps Slope (NOAA KLM) or +10v Receiver/Mixer/IF Amps Slope (NOAA-N,-N')	2313	2316	i	4	1	3		
+5v Signal Processing Intercept	2317	2320	i	4	1	3	volts	
+5v Signal Processing Slope	2321	2324	i	4	1	3		
+5v Antenna Drive Intercept	2325	2328	i	4	1	3	volts	
+5v Antenna Drive Slope	2329	2332	i	4	1	3		
LO Voltage 23.8 GHz Ch 1 Intercept	2333	2336	i	4	1	3	volts	3
LO Voltage 23.8 GHz Ch 1 Slope	2337	2340	i	4	1	3		3
LO Voltage 31.4 GHz Ch 2 Intercept	2341	2344	i	4	1	3	volts	3

LO Voltage 31.4 GHz Ch 2 Slope	2345	2348	i	4	1	3		3
<zero fill>	2349	2356	i	4	2	0		
LUNAR CONTAMINATION CORRECTION								
Count of Scans containing Lunar-Contaminated Space Views (Also, see bits 6 and 7 of "Calibration Quality Flags" field in data record.) -1=the detection algorithm for lunar-contamination is turned off 0=the detection algorithm is turned on: no scans containing lunar-contaminated space views were found 0=the detection algorithm is turned on: the value in this field represents the number of scans found that contain lunar-contaminated space views	2557	2558	i	2	1	0		
Distance between the Earth and Moon (average of distance computed on first and last scans of orbit)	2359	2360	u	2	1	2	Earth radii (R_E)	
Angle between the Moon and Sun (as seen from the earth; average of angle computed on first and last scans of orbit; range: 0 - 180)	2361	2362	u	2	1	2	degrees	
<zero fill>	2363	2364	i	2	1	0		
For NOAA originated AMSU-A data, these fields are spare (<zero fill>)	2365	2400	i	2	18	0		
Filler								
<zero fill>	2401	2560	i	2	80	0		

NOTES:

1) An AMSU-A instrument on NOAA-N,-N' may produce a brief period of erroneous data during its transition between one mode and another. This transition period is defined as "NO" mode. Some "NO" mode events will occur during on-orbit validation (OV). After OV it is expected that the instrument will be kept in the normal scan mode, and thus will not get into "NO" mode.

2) For AMSU-A2, "RF Mux" is only applicable for NOAA KLM, while "RF Diplexer" is only applicable for NOAA-N,-N'.

3) The local oscillators (LOs) for the NOAA KLM AMSU-A instruments are Gunn Diode Oscillators (GDOs). The LOs for channels 1-8 of the NOAA-N,-N' AMSU-A instruments are Dielectric Resonant Oscillators (DROs). A GDO is still used for channel 15.

4) There are no conversion coefficients available for the last item, "Reference voltage", so none are specified in the header.

8.3.1.6.3 Data Record Format

8.3.1.6.3.1 NOAA-KLM (Version-2, pre-april 28, 2005)

8.3.1.6.3.2 Format of AMSU-A Data Record Format (Version 4, post-January 25, 2006, All Spacecraft).

Table 8.3.1.6.3.2-1. Format of AMSU-A Data Record Format (Version 4, post-January 25, 2006, All Spacecraft).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number *(cumulative, starting with 1)*	1	2	u	2	1	0		
Scan Line Year *(four digits, e.g., 2000)*	3	4	u	2	1	0		
Scan Line Day of Year *(e.g., 365)*	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	milli-sec	
Scan Line UTC Time of Day	9	12	u	4	1	0	milli-sec	
Scan Line Bit Field bit 15: satellite direction (0=northbound; 1=southbound) bit 14: clock drift correction (0=not corrected; 1=scan time corrected for clock drift) bits 13-0: <zero fill>	13	14	u	2	1	0		
Major Frame Count *(cumulative, starting with 1) (NOAA)* or <Zero Fill> *(Metop)*	15	16	u	2	1	0		
<Zero Fill>	17	24	i	4	2	0		
QUALITY INDICATORS								
Quality Indicator Bit Field *(if a bit is on (=1), the statement is true)* bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see "Scan Line Quality Flags [Time Problem Code]") bit 29: data gap precedes this scan bit 28: insufficient data for calibration (see "Scan Line Quality Flags [Calibration Problem Code]" and "Scan Line Quality Flags [Additional Calibration Problem Code]") bit 27: earth location data not available (see "Scan Line Quality Flags [Earth Location Problem Code]") bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bits 24-4: <zero fill> bit 3: AMSU sync error detected (NOAA) or <zero fill> (Metop) bit 2: AMSU minor frame error detected (NOAA) or <zero fill> (Metop) bit 1: AMSU major frame error detected (NOAA) or <zero fill> (Metop) bit 0: AMSU parity error detected (NOAA) or <zero fill> (Metop)	25	28	u	4	1	0		
Scan Line Quality Flags [Additional Calibration Problem Code] *(If a bit is on (=1), the statement is true. See "Scan Line Quality Flags [Calibration Problem Code]", below.)* bits 7-0: <zero fill>	29	29	u	1	1	0		
Scan Line Quality Flags [Time Problem Code] *(If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.)* bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	30	30	u	1	1	0		

Scan Line Quality Flags [Calibration Problem Code] *(If a bit is on (=1), the statement is true. These bits, along with those in "Scan Line Quality Flags [Additional Calibration Problem Code]", complement the channel indicators; all bits set to 0 indicates normal calibration.)* bit 7: scan line was not calibrated because of bad time bit 6: scan line was calibrated using fewer than the preferred number of scan lines because of proximity to start or end of data set or to a data gap bit 5: scan line was not calibrated because of bad or insufficient PRT data bit 4: scan line was calibrated but with marginal PRT data bit 3: some uncalibrated channels on this scan (see channel indicators) it 2: uncalibrated due to instrument mode bit 1: questionable calibration because of antenna position error of space view bit 0: questionable calibration because of antenna position error of blackbody view	31	31	u	1	1	0		
Scan Line Quality Flags [Earth Location Problem Code] *(If a bit is on (=1), the statement is true. All bits set to 0 implies the earth location was normal.)* bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code (see time problem flags above) bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bit 3: earth location questionable because of antenna position check bit 2: <zero fill> bit 1: earth location questionable: satellite in-plane maneuver (Metop) or <zero fill> (NOAA) bit 0: earth location questionable: satellite out-of-plane maneuver (Metop) or <zero fill> (NOAA)	32	32	u	1	1	0		
Calibration Quality Flags *(all bits off implies a good calibration)* *Word 1: Channel 1* bits 15-9: <zero fill> bit 8: this scan line is either the last one before or the first one after a sudden, anomalous jump (or drop) in calibration counts bit 7: lunar contamination was detected in the space view counts of this channel bit 6: the space view counts of this channel were corrected for lunar contamination when used in the calibration (only applicable if the previous flag [bit 7] is 1; otherwise, zero) bit 5: all bad blackbody view counts for scan line bit 4: all bad space view counts for scan line bit 3: all bad PRTs for this line bit 2: marginal blackbody view counts for this line bit 1: marginal space view counts for this line bit 0: marginal PRT temps on this line *Words 2-15: Channels 2-15 (in order)* *Word 16: <zero fill>*	33	64	u	2	16	0		
<Zero Fill>	65	80	i	4	4	0		
CALIBRATION COEFFICIENTS								

Note: The following coefficients are only available in Full Scan mode, otherwise the coefficient fields are <Zero Fill>. Refer to Digital A Telemetry, Digital Housekeeping Word 1 for the current mode.								
Primary Calibration Ch 1 Second Order Term, a2	81	84	i	4	1	19		
Primary Calibration Ch 1 First Order Term, a1	85	88	i	4	1	13		
Primary Calibration Ch 1 Zeroth Order Term, a0	89	92	i	4	1	9		
Primary Calibration Ch 2 Second Order Term, a2	93	96	i	4	1	19		
Primary Calibration Ch 2 First Order Term, a1	97	100	i	4	1	13		
Primary Calibration Ch 2 Zeroth Order Term, a0	101	104	i	4	1	9		
Primary Calibration Ch 3 Second Order Term, a2	105	108	i	4	1	19		
Primary Calibration Ch 3 First Order Term, a1	109	112	i	4	1	13		
Primary Calibration Ch 3 Zeroth Order Term, a0	113	116	i	4	1	9		
Primary Calibration Ch 4 Second Order Term, a2	117	120	i	4	1	19		
Primary Calibration Ch 4 First Order Term, a1	121	124	i	4	1	13		
Primary Calibration Ch 4 Zeroth Order Term, a0	125	128	i	4	1	9		
Primary Calibration Ch 5 Second Order Term, a2	129	132	i	4	1	19		
Primary Calibration Ch 5 First Order Term, a1	133	136	i	4	1	13		
Primary Calibration Ch 5 Zeroth Order Term, a0	137	140	i	4	1	9		
Primary Calibration Ch 6 Second Order Term, a2	141	144	i	4	1	19		
Primary Calibration Ch 6 First Order Term, a1	145	148	i	4	1	13		
Primary Calibration Ch 6 Zeroth Order Term, a0	149	152	i	4	1	9		
Primary Calibration Ch 7 Second Order Term, a2	153	156	i	4	1	19		
Primary Calibration Ch 7 First Order Term, a1	157	160	i	4	1	13		
Primary Calibration Ch 7 Zeroth Order Term, a0	161	164	i	4	1	9		
Primary Calibration Ch 8 Second Order Term, a2	165	168	i	4	1	19		
Primary Calibration Ch 8 First Order Term, a1	169	172	i	4	1	13		
Primary Calibration Ch 8 Zeroth Order Term, a0	173	176	i	4	1	9		
Primary Calibration Ch 9 Second Order Term, a2	177	180	i	4	1	19		
Primary Calibration Ch 9 First Order Term, a1	181	184	i	4	1	13		
Primary Calibration Ch 9 Zeroth Order Term, a0	185	188	i	4	1	9		
Primary Calibration Ch 10 Second Order Term, a2	189	192	i	4	1	19		
Primary Calibration Ch 10 First Order Term, a1	193	196	i	4	1	13		
Primary Calibration Ch 10 Zeroth Order Term, a0	197	200	i	4	1	9		
Primary Calibration Ch 11 Second Order Term, a2	201	204	i	4	1	19		
Primary Calibration Ch 11 First Order Term, a1	205	208	i	4	1	13		
Primary Calibration Ch 11 Zeroth Order Term, a0	209	212	i	4	1	9		
Primary Calibration Ch 12 Second Order Term, a2	213	216	i	4	1	19		
Primary Calibration Ch 12 First Order Term, a1	217	220	i	4	1	13		
Primary Calibration Ch 12 Zeroth Order Term, a0	221	224	i	4	1	9		
Primary Calibration Ch 13 Second Order Term, a2	225	228	i	4	1	19		
Primary Calibration Ch 13 First Order Term, a1	229	232	i	4	1	13		
Primary Calibration Ch 13 Zeroth Order Term, a0	233	236	i	4	1	9		

Primary Calibration Ch 14 Second Order Term, a2	237	240	i	4	1	19		
Primary Calibration Ch 14 First Order Term, a1	241	244	i	4	1	13		
Primary Calibration Ch 14 Zeroth Order Term, a0	245	248	i	4	1	9		
Primary Calibration Ch 15 Second Order Term, a2	249	252	i	4	1	19		
Primary Calibration Ch 15 First Order Term, a1	253	256	i	4	1	13		
Primary Calibration Ch 15 Zeroth Order Term, a0	257	260	i	4	1	9		
Secondary Calibration Ch 1 Second Order Term, a2	261	264	i	4	1	19		
Secondary Calibration Ch 1 First Order Term, a1	265	268	i	4	1	13		
Secondary Calibration Ch 1 Zeroth Order Term, a0	269	272	i	4	1	9		
Secondary Calibration Ch 2 Second Order Term, a2	273	276	i	4	1	19		
Secondary Calibration Ch 2 First Order Term, a1	277	280	i	4	1	13		
Secondary Calibration Ch 2 Zeroth Order Term, a0	281	284	i	4	1	9		
Secondary Calibration Ch 3 Second Order Term, a2	285	288	i	4	1	19		
Secondary Calibration Ch 3 First Order Term, a1	289	292	i	4	1	13		
Secondary Calibration Ch 3 Zeroth Order Term, a0	293	296	i	4	1	9		
Secondary Calibration Ch 4 Second Order Term, a2	297	300	i	4	1	19		
Secondary Calibration Ch 4 First Order Term, a1	301	304	i	4	1	13		
Secondary Calibration Ch 4 Zeroth Order Term, a0	305	308	i	4	1	9		
Secondary Calibration Ch 5 Second Order Term, a2	309	312	i	4	1	19		
Secondary Calibration Ch 5 First Order Term, a1	313	316	i	4	1	13		
Secondary Calibration Ch 5 Zeroth Order Term, a0	317	320	i	4	1	9		
Secondary Calibration Ch 6 Second Order Term, a2	321	324	i	4	1	19		
Secondary Calibration Ch 6 First Order Term, a1	325	328	i	4	1	13		
Secondary Calibration Ch 6 Zeroth Order Term, a0	329	332	i	4	1	9		
Secondary Calibration Ch 7 Second Order Term, a2	333	336	i	4	1	19		
Secondary Calibration Ch 7 First Order Term, a1	337	340	i	4	1	13		
Secondary Calibration Ch 7 Zeroth Order Term, a0	341	344	i	4	1	9		
Secondary Calibration Ch 8 Second Order Term, a2	345	348	i	4	1	19		
Secondary Calibration Ch 8 First Order Term, a1	349	352	i	4	1	13		
Secondary Calibration Ch 8 Zeroth Order Term, a0	353	356	i	4	1	9		
Secondary Calibration Ch 9 Second Order Term, a2	357	360	i	4	1	19		
Secondary Calibration Ch 9 First Order Term, a1	361	364	i	4	1	13		
Secondary Calibration Ch 9 Zeroth Order Term, a0	365	368	i	4	1	9		
Secondary Calibration Ch 10 Second Order Term, a2	369	372	i	4	1	19		
Secondary Calibration Ch 10 First Order Term, a1	373	376	i	4	1	13		
Secondary Calibration Ch 10 Zeroth Order Term, a0	377	380	i	4	1	9		
Secondary Calibration Ch 11 Second Order Term, a2	381	384	i	4	1	19		
Secondary Calibration Ch 11 First Order Term, a1	385	388	i	4	1	13		
Secondary Calibration Ch 11 Zeroth Order Term, a0	389	392	i	4	1	9		
Secondary Calibration Ch 12 Second Order Term, a2	393	396	i	4	1	19		
Secondary Calibration Ch 12 First Order Term, a1	397	400	i	4	1	13		
Secondary Calibration Ch 12 Zeroth Order Term, a0	401	404	i	4	1	9		

Secondary Calibration Ch 13 Second Order Term, a2	405	408	i	4	1	19		
Secondary Calibration Ch 13 First Order Term, a1	409	412	i	4	1	13		
Secondary Calibration Ch 13 Zeroth Order Term, a0	413	416	i	4	1	9		
Secondary Calibration Ch 14 Second Order Term, a2	417	420	i	4	1	19		
Secondary Calibration Ch 14 First Order Term, a1	421	424	i	4	1	13		
Secondary Calibration Ch 14 Zeroth Order Term, a0	425	428	i	4	1	9		
Secondary Calibration Ch 15 Second Order Term, a2	429	432	i	4	1	19		
Secondary Calibration Ch 15 First Order Term, a1	433	436	i	4	1	13		
Secondary Calibration Ch 15 Zeroth Order Term, a0	437	440	i	4	1	9		
<Zero Fill>	441	444	i	2	2	0		
NAVIGATION								
Computed Yaw Steering *(Metop: content defined below)* or <Zero Fill> *(NOAA)* Word 1: Computed roll angle Word 2: Computed pitch angle Word 3: Computed yaw angle	445	450	i	2	3	3	degrees	
Total Applied Attitude Correction Word 1: Roll Word 2: Pitch Word 3: Yaw	451	456	i	2	3	3	degrees	
Navigation Status Bit Field *(content, defined below, depends on origin of data, either NOAA or Metop)* *For NOAA Data:* bits 31-18: <zero fill> bit 17: earth location at the satellite subpoint is accurate and reasonable, i.e., is within tolerance defined by "Nadir Earth Location Tolerance" in header (0=out of tolerance; 1=in tolerance) bit 16: Euler error angles from the CPU telemetry used by AELDS to correct the earth locations (0=FALSE; 1=TRUE) bits 15-12: earth location indicator (0=earth location available; 1=first scan whose time is more than 24 hours older than the time [epoch] of the user ephemeris file; 2=no earth location available) bits 11-8: spacecraft attitude control (0=operating in YGC or NOMINAL mode and attitude is good; 1=operating in another mode but attitude is good; 2=operating in YGC or NOMINAL mode but tests are being conducted which may cause attitude to exceed nominal tolerance; 3=operating in another mode while tests are being conducted which may cause attitude to exceed nominal tolerance) bits 7-4: attitude SMODE (0=nominal mode; 1=rate nulling mode; 2=YGC mode; 3=search mode; 4=coast mode) bits 3-0: attitude PWTIP$AC (0=nominal mode/no test; 1=yaw axis test in progress; 2=roll axis test in progress; 3=pitch axis test in progress)	457	460	u	4	1	0		

For Metop Data: bits 31-21: <zero fill> bit 20-19: yaw steering parameters usage indicator (0=no yaw steering correction; 1=measured angles from the Metop SVM telemetry; 2=computed angles from AELDS; 3=measured angles + computed angles) bit 18: Metop maneuver indicator (0=scan does not occur during a Metop in-plane or out-of-plane maneuver; 1=scan, or some part of it, occurs during a maneuver) bit 17: <same as defined for NOAA, above> bit 16: <zero fill> bits 15-12: <same as defined for NOAA, above> bits 11-8: <zero fill> bits 7-4: OPM PF sub-mode (0=fine pointing mode (FPM); 1=yaw steering mode (YSM)) bits 3-0: SVM PF mode (0=LHM; 1=RRM; 2=CAM; 3=FAM1; 4=FAM2; 5=FAM3; 6=OPM; 7=OCM1; 8=OCM2; 9=OCMT; 10=OCM0)								
Time Associated with Euler Error Angles	461	464	i	4	1	0	seconds	
Euler Error Angles *(NOAA, from TIP CPU telemetry near end of scan; Metop [in FPM], from SVM telemetry just before start of scan)* or Yaw Steering Parameters *(Metop [in YSM], from SVM telemetry or AELDS near nadir of scan)* Word 1: Roll Word 2: Pitch Word 3: Yaw	465	470	i	2	3	3	degrees	
Spacecraft Altitude above Reference Ellipsoid	471	472	u	2	1	1	km	
Angular Relationships *(relative azimuth range +/- 180.00 degrees)* Word 1: Solar zenith angle, FOV 1 Word 2: Satellite zenith angle, FOV 1 Word 3: Relative azimuth angle, FOV 1 Word 4: Solar zenith angle, FOV 2 ... (set of 3 angles every FOV) ... Word 90: Relative azimuth angle, FOV 30	473	652	i	2	90	2	degrees	
Earth Location *(north latitude and east longitude are positive)* Word 1: Latitude, FOV 1 Word 2: Longitude, FOV 1 Word 3: Latitude, FOV 2 ... (lat/lon word pair every FOV) ... Word 60: Longitude, FOV 30	653	892	i	4	60	4	degrees	
<Zero Fill>	893	896	i	4	1	0		
AMSU-A1 DIGITAL A TELEMETRY								
Synchronization Sequence *(hex FF)*	897	899	u	1	3	0		
Unit Identification and Serial Number 5=PFM, s/n 102 (NOAA-L) 9=FM 1, s/n 103 (NOAA-K) 13=FM 2, s/n 104 (NOAA-M) 21=FM 4, s/n 106 (Metop-2) 33=FM 7, s/n 109 (NOAA-N)	900	900	u	1	1	0		
Digital Housekeeping	901	904	u	1	4	0		

Word 1: Data 1 bit 7: <zero fill> bit 6: cold cal position msb bit 5: cold cal position lsb (cold cal position: 0=6.667°, 1=8.333°, 2=9.999°, 3=13.332°; angles measured from -Z (NOAA) or -X (Metop)) bit 4: nadir mode (0=not in nadir; 1=nadir) bit 3: cold cal mode (0=not in cold cal; 1=cold cal) bit 2: warm cal mode (0=not in warm cal; 1=warm cal) bit 1: full scan mode (0=not full scan; 1=full scan) bit 0: <zero fill> *Word 2: Data 2* bits 7-5: <zero fill> bit 4: survival heater power (0=off; 1=on) bit 3: PLL power (0=redundant; 1=primary) bit 2: scanner A1-2 power (0=off; 1=on) bit 1: scanner A1-1 power (0=off; 1=on) bit 0: <zero fill> *Words 3-4: <Zero Fill>*								
Scene Telemetry *(Scanner is parked at warm cal position while in warm cal mode, cold cal position while in cold cal mode, and nadir position while in nadir mode (see Digital Housekeeping Word 1, above). In parked modes, words 1 through 17 are repeated 29 times for a total of 30 data sets at the designated scanner position. In full scan mode, the scanner is stepped from positions 1 to 30 as indicated.)* Word 1: Reflector A1-1, position 1, first reading Word 2: Reflector A1-2, position 1, first reading Word 3: Reflector A1-1, position 1, second reading Word 4: Reflector A1-2, position 1, second reading Words 5-17: Scene count at position 1, channels 3 through 15 (in order) Word 18: Reflector A1-1, position 2, first reading ... (17 words every position) ... Words 498-510: Scene count at position 30, channels 3 through 15 (in order)	905	1924	u	2	510	0		
Cold Calibration Telemetry *(These words are zero-filled in warm cal, cold cal, and nadir modes. In full scan mode, these words contain the following data.)* Word 1: Reflector A1-1, cold calibration position, first reading Word 2: Reflector A1-2, cold calibration position, first reading Word 3: Reflector A1-1, cold calibration position, second reading Word 4: Reflector A1-2, cold calibration position, second reading Words 5-17: Cold cal count 1, channels 3 through 15 (in order) Words 18-30: Cold cal count 2, channels 3 through 15 (in order)	1925	1984	u	2	30	0	counts	

Temperature Sensor Telemetry Word 1: Scan motor A1-1 Word 2: Scan motor A1-2 Word 3: Feed horn A1-1 Word 4: Feed horn A1-2 Word 5: RF mux A1-1 Word 6: RF mux A1-2 Words 7-12: Local oscillator channels 3 – 8 Word 13: Local oscillator channel 15 Word 14: PLL LO #2 Channels 9 – 14 Word 15: PLL LO #1 Channels 9 – 14 Word 16: PLLO (reference oscillator) (NOAA-KLM) or <zero fill> (NOAA-NN', Metop) Words 17-22: Mixer/IF amplifier channels 3 – 8 Word 23: Mixer/IF amplifier channel 9/14 Word 24: Mixer/IF amplifier channel 15 Word 25: IF amplifier channel 11/14 Words 26-28: IF amplifier channels 9 – 11 Word 29: DC/DC converter Words 30-31: IF amplifier channels 13 – 14 Word 32: IF amplifier channel 12 Word 33: RF shelf A1-1 Word 34: RF shelf A1-2 Word 35: Detector/preamplifier assembly Words 36-39: A1-1 warm load 1 – 4 Word 40: A1-1 warm load center Words 41-44: A1-2 warm load 1 – 4 Word 45: A1-2 warm load center Word 46: Reference voltage	1985	2076	u	2	46	0	counts	4
Warm Calibration Telemetry *(These words are zero-filled in warm cal, cold cal, and nadir modes. In full scan mode, these words contain the following data.)* Word 1: Reflector A1-1, warm calibration position, first reading Word 2: Reflector A1-2, warm calibration position, first reading Word 3: Reflector A1-1, warm calibration position, second reading Word 4: Reflector A1-2, warm calibration position, second reading Words 5-17: Warm cal count 1, channels 3 through 15 (in order) Words 18-30: Warm cal count 2, channels 3 through 15 (in order)	2077	2136	u	2	30	0	counts	
<Zero Fill>	2137	2140	i	4	1	0		
AMSU-A1 DIGITAL B TELEMETRY								
Digital B Telemetry Update Flags *(If bit = 1, associated telemetry item was not updated during most recent minor frame cycle - possibly due to lost frame.)* bit 15: <zero fill> bit 14: cold cal position, msb bit 13: cold cal position, lsb bit 12: antenna in nadir position bit 11: antenna in cold cal position bit 10: antenna in warm cal position bit 9: full scan mode bits 8-6: <zero fill> bit 5: module power bit 4: survival heater bit 3: phase lock loop bit 2: scanner A1-2 power bit 1: scanner A1-1 power bit 0: <zero fill>	2141	2142	u	2	1	0		

Digital B Telemetry for AMSU-A1 ** If bits 9-12 are all set to 0, the instrument is either in the warm calibration position (NOAA-KLM) or operating in "NO" mode (NOAA-NN', Metop). When in "NO" mode, digital A telemetry, analog telemetry, and bits 3, 13, and 14 of the digital B telemetry should be ignored.* ** For cold cal position bits 13 and 14: 0=6.667°, 1=8.333°, 2=9.999°, 3=13.332° (angles measured from -Z (NOAA) or -X (Metop)).* bit 15: <zero fill> bit 14: cold cal position, msb bit 13: cold cal position, lsb bit 12: antenna in nadir position (0=no; 1=yes) bit 11: antenna in cold cal position (0=no; 1=yes) bit 10: antenna in warm cal position (0=no; 1=yes) bit 9: full scan (0=no; 1=yes) bits 8-6: <zero fill> bit 5: module power (0=disconnect; 1=connect) bit 4: survival heater (0=off; 1=on) bit 3: phase lock loop (0=redundant; 1=primary) bit 2: scanner A1-2 power (0=off; 1=on) bit 1: scanner A1-1 power (0=off; 1=on) bit 0: <zero fill>	2143	2144	u	2	1	0		1
<Zero Fill>	2145	2148	i	4	1	0		
AMSU-A1 ANALOG TELEMETRY								
Analog Telemetry Update Flags *(If bit = 1, associated telemetry item was not updated during most recent minor frame cycle - possibly due to lost frame.)* bits 31-28: <zero fill> bit 27: GDO voltage 89.0 GHz ch. 15 bit 26: PLLO redundant lock detect bit 25: PLLO primary lock detect bit 24: LO voltage 55.5 GHz ch. 8 bit 23: LO voltage 54.94 GHz ch. 7 bit 22: LO voltage 54.4 GHz ch. 6 bit 21: LO voltage 53.596 GHz ch. 5 bit 20: LO voltage 52.8 GHz ch. 4 bit 19: LO voltage 50.3 GHz ch. 3 bit 18: -15 VDC phase lock loop ch. 9/14 bit 17: +15 VDC phase lock loop ch. 9/14 bit 16: +8.5 VDC phase lock loop ch. 9/14 (NOAA-KLM) or +10 VDC Receiver mixer/IF (NOAA-NN', Metop) bit 15: +5 VDC (antenna drive) bit 14: +5 VDC (signal processing) bit 13: +8 VDC (receiver amplifiers) bit 12: -15 VDC (antenna drive) bit 11: -15 VDC (signal processing) bit 10: +15 VDC (antenna drive) bit 9: +15 VDC (signal processing) bit 8: antenna A1-2 drive motor current (avg) bit 7: antenna A1-1 drive motor current (avg) bit 6: warm load A1-2 temperature bit 5: warm load A1-1 temperature bit 4: RF shelf A1-2 temperature bit 3: RF shelf A1-1 temperature bit 2: A1-2 scanner motor temperature bit 1: A1-1 scanner motor temperature bit 0: <zero fill>	2149	2152	u	4	1	0		3
A1 Analog Telemetry *(range: 0 - 255)*	2153	2180	u	1	28	0	counts	3

Word 1: A1-1 scanner motor temperature Word 2: A1-2 scanner motor temperature Word 3: RF shelf A1-1 temperature Word 4: RF shelf A1-2 temperature Word 5: Warm load A1-1 temperature Word 6: Warm load A1-2 temperature Word 7: Antenna A1-1 drive motor current (Avg) Word 8: Antenna A1-2 drive motor current (Avg) Word 9: +15 VDC (signal processing) Word 10: +15 VDC (antenna drive) Word 11: -15 VDC (signal processing) Word 12: -15 VDC (antenna drive) Word 13: +8 VDC (receiver amplifiers) Word 14: +5 VDC (signal processing) Word 15: +5 VDC (antenna drive) Word 16: +8.5 VDC phase lock loop ch. 9/14 (NOAA-KLM) or +10 VDC Receiver mixer/IF (NOAA-NN', Metop)Word 17: +15 VDC phase lock loop ch. 9/14 Word 18: -15 VDC phase lock loop ch. 9/14 Word 19: LO voltage 50.3 Ghz ch. 3 Word 20: LO voltage 52.8 Ghz ch. 4 Word 21: LO voltage 53.596 Ghz ch. 5 Word 22: LO voltage 54.4 Ghz ch. 6 Word 23: LO voltage 54.94 Ghz ch. 7 Word 24: LO voltage 55.5 Ghz ch. 8 Word 25: PLLO primary lock detect Word 26: PLLO redundant lock detect Word 27: GDO voltage 89.0 Ghz ch. 15 Word 28: <zero fill>								
<Zero Fill>	2181	2184	i	4	1	0		
AMSU-A2 DIGITAL A TELEMETRY								
Synchronization Sequence *(hex FF)*	2185	2187	u	1	3	0		
Unit Identification and Serial Number 6=PFM, s/n 102 (NOAA-K) 10=FM 1, s/n 103 (NOAA-L) 14=FM 2, s/n 104 (NOAA-M) 18=FM 3, s/n 105 (NOAA-N) 30=FM 6, s/n 108 (Metop-2)	2188	2188	u	1	1	0		
Digital Housekeeping	2189	2192	u	1	4	0		

Word 1: Data 1 bit 7: <zero fill> bit 6: cold cal position msb bit 5: cold cal position lsb (cold cal position: 0=6.667°, 1=8.333°, 2=9.999°, 3=13.332°; angles measured from -Z (NOAA) or -X (Metop)) bit 4: nadir mode (0=not in nadir; 1=nadir) bit 3: cold cal mode (0=not in cold cal; 1=cold cal) bit 2: warm cal mode (0=not in warm cal; 1=warm cal) bit 1: full scan mode (0=not full scan; 1=full scan) bit 0: <zero fill> *Word 2: Data 2* bits 7-5: <zero fill> bit 4: survival heater power (0=off; 1=on) bit 3: <zero fill> bit 2: scanner compensator power (0=off; 1=on) bit 1: scanner A2 power (0=off; 1=on) bit 0: <zero fill> *Word 3: Data 3* bits 7-0: <zero fill> *Word 4: Data 4* bits 7-0: <zero fill>								
Scene Telemetry *(Scanner is parked at warm cal position while in warm cal mode, cold cal position while in cold cal mode, and nadir position while in nadir mode (see Digital Housekeeping Word 1, above). In parked modes, words 1 through 4 are repeated 29 times for a total of 30 data sets at the designated scanner position. In full scan mode, the scanner is stepped from positions 1 to 30 as indicated.)* Word 1: Reflector, position 1, first reading Word 2: Reflector, position 1, second reading Words 3-4: Scene count at position 1, Channels 1 and 2 (in order) Word 5: Reflector, position 2, first reading ... (4 words every position) ... Words 119-120: Scene count at position 30, Channels 1 and 2 (in order)	2193	2432	u	2	120	0		
Cold Calibration Telemetry *(These words are zero-filled in warm cal, cold cal, and nadir modes. In full scan mode, these words contain the following data.)* Word 1: Reflector, cold calibration position, first reading Word 2: Reflector, cold calibration position, second reading Words 3-4: Cold cal count 1, channels 1 and 2 Words 5-6: Cold cal count 2, channels 1 and 2	2433	2444	u	2	6	0	counts	

Temperature Sensor Telemetry Word 1: Scan motor Word 2: Feed horn Word 3: RF mux/diplexer Words 4-5: Mixer/IF amplifier channels 1 and 2 Words 6-7: Local oscillator channels 1 and 2 Word 8: Compensation motor Word 9: Subreflector Word 10: DC/DC converter Word 11: RF shelf A2 Word 12: Detector/preamplifier assembly Word 13: Warm load center Words 14-19: Warm load 1 – 6 Word 20: Reference voltage	2445	2484	u	2	20	0	counts	2,4
Warm Calibration Telemetry *(These words are zero-filled in warm cal, cold cal, and nadir modes. In full scan mode, these words contain the following data.)* Word 1: Reflector, warm calibration position, first reading Word 2: Reflector, warm calibration position, second reading Words 3-4: Warm calibration 1, channels 1 and 2 Words 5-6: Warm calibration 2, channels 1 and 2	2485	2496	u	2	6	0	counts	
<Zero Fill>	2497	2500	i	4	1	0		
AMSU-A2 DIGITAL B TELEMETRY								
Digital B Telemetry Update Flags *(If bit = 1, associated telemetry item was not updated during most recent minor frame cycle - possibly due to lost frame.)* bit 15: <zero fill> bit 14: cold cal position, msb bit 13: cold cal position, lsb bit 12: antenna in nadir position bit 11: antenna in cold cal position bit 10: antenna in warm cal position bit 9: full scan mode bits 8-5: <zero fill> bit 4: survival heater bit 3: module power bit 2: compensator motor bit 1: scanner A2 power bit 0: <zero fill>	2501	2502	u	2	1	0		

Digital B Telemetry for AMSU-A2 ** If bits 9-12 are all set to 0, the instrument is either in the warm calibration position (NOAA-KLM) or operating in "NO" mode (NOAA-NN', Metop). When in "NO" mode, digital A telemetry, analog telemetry, and bits 13 and 14 of the digital B telemetry should be ignored.* ** For cold cal position bits 13 and 14: 0=6.667°, 1=8.333°, 2=9.999°, 3=13.332° (angles measured from -Z (NOAA) or -X (Metop)).* bit 15: <zero fill> bit 14: cold cal position, msb bit 13: cold cal position, lsb bit 12: antenna in nadir position (0=no; 1=yes) bit 11: antenna in cold cal position (0=no; 1=yes) bit 10: antenna in warm cal position (0=no; 1=yes) bit 9: full scan mode (0=no; 1=yes) bits 8-5: <zero fill> bit 4: survival heater (0=off; 1=on) bit 3: module power (0=disconnect; 1=connect) bit 2: compensator motor (0=off; 1=on) bit 1: scanner A2 power (0=off; 1=on) bit 0: <zero fill>	2503	2504	u	2	1	0		1
<Zero Fill>	2505	2508	i	4	1	0		
AMSU-A2 ANALOG TELEMETRY DATA								
Analog Telemetry Update Flags *(If bit = 1, associated telemetry item was not updated during most recent minor frame cycle - possibly due to lost frame.)* bits 31-16: <zero fill> bit 15: LO voltage ch. 2 (31.4 GHz) bit 14: LO voltage ch. 1 (23.8 GHz) bit 13: +5 VDC (antenna drive) bit 12: +5 VDC (signal processing) bit 11: +8 VDC (receiver) (NOAA-KLM) or +10 VDC(receiver/mixer/IF) (NOAA-NN', Metop) bit 10: -15 VDC (antenna drive) bit 9: -15 VDC (signal processing) bit 8: +15 VDC (antenna drive) bit 7: +15 VDC (signal processing) bit 6: antenna drive motor current (avg) bit 5: compensator motor current (avg) bit 4: warm load A2 temperature it 3: RF shelf temperature bit 2: compensator motor temperature bit 1: scanner motor temperature bit 0: <zero fill>	2509	2512	u	4	1	0		3

A2 Analog Telemetry *(range: 0 - 255)* Word 1: Scanner motor temperature Word 2: Compensator motor temperature Word 3: RF shelf temperature Word 4: Warm load A2 temperature Word 5: Compensator motor current (Avg) Word 6: Antenna drive motor current (Avg) Word 7: +15 VDC (signal processing) Word 8: +15 VDC (antenna drive) Word 9: -15 VDC (signal processing) Word 10: -15 VDC (antenna drive) Word 11: +8 VDC (receiver) (NOAA-KLM) or +10 VDC (receiver/mixer/IF) (NOAA-NN', Metop) Word 12: +5 VDC (signal processing) Word 13: +5 VDC (antenna drive) Word 14: LO voltage ch. 1 (23.8 GHz) Word 15: LO voltage ch. 2 (31.4 GHz) Word 16: <zero fill>	2513	2528	u	1	16	0	counts	3
LUNAR CONTAMINATION CORRECTION								
Space View Count Corrections, ΔC_c *ΔC_c = raw space count - corrected space count. If the ΔC_c value is subtracted from the raw space counts, the value of the corrected space counts used in the calibration is obtained. A value of $\Delta C_c = 0$ indicates that no correction was made. NOTE: The raw space counts are the "cold cal" counts of the "Cold Calibration Telemetry" fields. Range: 0 - 100* Word 1: ΔC_c for channel 1 Words 2-15: ΔC_c's for channels 2-15, in order	2529	2543	u	1	15	0	counts	
<Zero Fill>	2544	2544	i	1	1	0		
Lunar Azimuth Angles *(with respect to the space view position of each AMSU-A antenna; range: -180 to +180)* Word 1: Angle for A1-1 antenna Word 2: Angle for A1-2 antenna Word 3: Angle for A2 antenna	2545	2550	i	2	3	2	degrees	
Lunar Elevation Angles *(with respect to the space view position of each AMSU-A antenna; range: -90 to +90)* Word 1: Angle for A1-1 antenna Word 2: Angle for A1-2 antenna Word 3: Angle for A2 antenna	2551	2556	i	2	3	2	degrees	
FILLER								
<Zero Fill>	2557	2560	i	4	1	0		

8.3.1.7 AMSU-B Data Sets

This section describes the characteristics and format of Advanced Microwave Sounding Unit-B (AMSU-B) data sets for both NOAA KLM (Version 2) and NOAA-N (version 4) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the Version 3 format (v3), also known as the NOAA-N format, was implemented for all operational POES spacecraft. **After January 25, 2006, the version number contained in the header was updated from 3 to 4 to reflect the inclusion of cloud mask information. All level 1b documentation should reflect that until another change is made.**

Note: even though there is no AMSU-B instrument on NOAA-N, its Level 1b format is being updated for consistency with the other instruments' formats, which are also being updated at this time.

8.3.1.7.1 Data Characteristics

Table 8.3.1.7.1-1 summarizes fundamental characteristics of the data.

Table 8.3.1.7.1-1. AMSU-B Data Characteristics.

Parameter	Value
Sample word size	16 bits
Number of sampled channels/available channels	5/5
Number of Earth samples per scan	90 per channel
Scan rate	22.5 scans per minute
Scan direction	West to East (northbound)
Instantaneous Field of View (IFOV)	1.1 degrees (all channels)
Spatial resolution at nadir	16 km at 833 km altitude
Cross track distance between sample centers at nadir	16 km at 833 km altitude
Along track distance between sample centers at nadir	17.6 km at 833 km altitude
Cross-track scan coverage	$\pm$ 49.5 degrees from nadir
Swath width	2126.2 km at 833 km altitude

8.3.1.7.2 Header Records

The Data Set Header Record contains quality, navigation, calibration and conversion coefficient information which applies to the AMSU-B data records which follow. This section describes the header records for both NOAA KLM (version 2) and NOAA-N (version 3) satellites. Version 2 formats (v2) were used on all NOAA KLM data until April 28, 2005. After this date, the Version 3 format (v3), also known as the NOAA-N format, will be implemented for all operational POES spacecraft. **After January 25, 2006, the version number contained in the header was updated from 3 to 4 to reflect the inclusion of cloud mask information. All level 1b documentation should reflect that until another change is made.** Note: even though there is no AMSU-B instrument on NOAA-N, its Level 1b format is being updated for consistency with the other instruments' formats, which are also being updated at this time.

8.3.1.7.2.1 NOAA KLM (Version 2, pre-April 28, 2005)

The AMSU-B Data Set Header Record format for NOAA KLM (Version 2, pre-April 28, 2005) is documented in Table 8.3.1.7.2.1-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.7.2.1-1. Format of AMSU-B Data Set Header Record for NOAA KLM (Version 2, pre-April 28, 2005)						
GENERAL INFORMATION	**Start Octet**	**End Octet**	**DT**	**Word Size**	**SF**	**Number of Words**
Data Set Creation Site ID CMS = Centre de Meteorologie Spatiale/France; DSS = Dundee Satellite Receiving Station/UK; NSS = National Environmental Satellite, Data and Information Service/USA; UKM = United Kingdom Meteorological Office/UK)	1	3	c	3	0	1
<ASCII blank = x20>	4	4	c	1	0	1
NOAA Level 1b Format Version Number 1=TIROS-N, NOAA-6 through NOAA-14; 2=NOAA-15, -16, -17(pre-April 28, 2005); 3=all satellites post-April 28, 2005; 4=cloud mask flag (CLAVRx) Jan 25, 2006.	5	6	u	2	0	1
NOAA Level 1b Format Version Year (e.g., 1999)	7	8	u	2	0	1
NOAA Level 1b Format Version Day of Year (e.g., 365)	9	10	u	2	0	1
<Reserved for Logical Record Length> For Creation Site use only. Logical Record Length of NOAA Level 1b data set prior to processing.	11	12	u	2	0	1
<Reserved for Block Size> For Creation Site use only. Block Size of NOAA Level 1b data set prior to processing.	13	14	u	2	0	1
Count of Header Records in this Data Set	15	16	u	2	0	1
<zero fill>	17	22	i	2	0	3
Data Set Name	23	64	c	42	0	1
Processing Block Identification	65	72	c	8	0	1
NOAA Spacecraft Identification Code 2=NOAA-16 4=NOAA-15 6=NOAA-17 7=NOAA-18 8=NOAA-N' 11=MetOp-1 12=MetOp-A	73	74	u	2	0	1
Instrument ID 0 = Engineering Model; 4 = Protoflight Model; 8 = Flight Model 2; 12 = Flight Model 3	75	76	u	2	0	1

Data Type Code 1 = LAC; 2 = GAC; 3 = HRPT; 4 = TIP; 5 = HIRS; 6 = MSU; 7 = SSU; 8 = DCS; 9 = SEM; 10 = AMSU-A; 11 = AMSU-B	77	78	u	2	0	1
TIP Source Code 0 = unused, GAC/HRPT/LAC data; 1 = GAC embedded AMSU and TIP; 2 = stored TIP; 3 = HRPT/LAC embedded AMSU and TIP; 4 = stored AIP	79	80	u	2	0	1
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	0	1
Start of Data Set Year (e.g., 1999)	85	86	u	2	0	1
Start of Data Set Day of Year (e.g., 365)	87	88	u	2	0	1
Start of Data Set UTC Time of Day in Milliseconds	89	92	u	4	0	1
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	0	1
End of Data Set Year (e.g., 1999)	97	98	u	2	0	1
End of Data Set Day of Year (e.g., 365)	99	100	u	2	0	1
End of Data Set UTC Time of Day in Milliseconds	101	104	u	4	0	1
Year of Last CPIDS Update (e.g., 1999)	105	106	u	2	0	1
Day of Year of Last CPIDS Update (e.g., 365)	107	108	u	2	0	1
Offset between Start of Scan and Center of first FOV in Milliseconds	109	110	i	2	0	1
<zero fill>	111	120	i	2	0	6
DATA SET QUALITY INDICATORS						

Instrument Status bits 31 - 29: <not defined> bit 28: processor check flag (0 = passed; 1 = failed) bit 27: scan control status (0 = running; 1 = aborted) bit 26: pixel data invalid flag (0 = valid; 1 = invalid) bit 25: scan synchronization (0 = error < 0.1 deg; 1 = error >= 0.1 deg) bit 24: mode transition flag (0 = transition complete; 1 = transition in progress) bit 23: module ID (msb) (0 = EM; 4 = PFM; 8 = FM2; 12 = FM3) bits 22 - 17: module ID bit 16: module ID (lsb) bit 15: RAM check flag (0 = passed; 1 = failed) bit 14: ROM check flag (0 = passed; 1 = failed) bit 13: memory checks status (0 = disabled; 1 = enabled) bit 12: space view select (lsb) bit 11: space view select (msb) bit 10: channel 18/19/20 on/off (relay 5 status) (0 = off; 1 = on) bit 9: channel 17 on/off (relay 4 status) (0 = off; 1 = on) bit 8: channel 16 on/off (relay 3 status) (0 = off; 1 = on) bit 7: stepped mode (0 = no; 1 = yes) bit 6: investigation mode (0 = no; 1 = yes) bit 5: parked in space view mode (0 = no; 1 = yes) bit 4: parked in nadir view mode (0 = no; 1 = yes) bit 3: parked in target view mode (0 = no; 1 = yes) bit 2: scan normal mode (0 = no; 1 = yes) bit 1: survival heater on/off (relay 2 status) (0 = off; 1 = on) bit 0: power on/off (relay 1 status) (0 = off; 1 = on)	121	124	u	4	0	1
<zero fill>	125	126	i	2	0	1
Record Number of Status Change (if 0, none occurred)	127	128	u	2	0	1
Second Instrument Status (if previous word is 0, no change)	129	132	u	4	0	1
Count of Data Records in this Data Set	133	134	u	2	0	1
Count of Calibrated, Earth Located Scan Lines in this Data Set	135	136	u	2	0	1
Count of Missing Scan Lines	137	138	u	2	0	1
Count of Data Gaps in this Data Set	139	140	u	2	0	1
Count of Data Frames Without Frame Sync Word Errors	141	142	u	2	0	1
Count of PACS Detected TIP Parity Errors	143	144	u	2	0	1
Sum of All Auxiliary Sync Errors Detected in the Input Data	145	146	u	2	0	1
Time Sequence Error (0 = none; otherwise the record number of the first occurrence)	147	148	u	2	0	1

Time Sequence Error Code These are bit flags taken from Scan Line Quality Flags Time Problem Code on data record reported in Time Sequence Error field above. If a bit is on (=1) then the statement is true. bits 15 - 8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time. bit 6: time field is bad and can't be inferred from the previous good time. bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. bit 4: start of a sequence that apparently repeats scan times that have been previously accepted. bits 3 - 0: <zero fill>	149	150	u	2	0	1
SOCC Clock Update Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	151	152	u	2	0	1
Earth Location Error Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	153	154	u	2	0	1
Earth Location Error Code These are bit flags taken from Scan Line Quality Flags Earth Location Problem Code on data record reported in Earth Location Error Indicator field above. If a bit is on (=1) then the statement is true. bits 15 - 8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero filled. bit 6: earth location questionable because of questionable time code. (See time problem flags.) bit 5: earth location questionable -- only marginal agreement with reasonableness check. bit 4: earth location questionable -- fails reasonableness check. bit 3: earth location questionable because of antenna position check [rs060794.doc & rs062094.do1] bits 2-0: <zero fill>	155	156	u	2	0	1
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudo noise (0 = normal data; 1 = P/N data) bit 1: tape direction (0 = time decrementing) bit 0: data mode (0 = test data; 1 = flight data)	157	158	u	2	0	1

PACS Data Source 0 = unused; 1 = Fairbanks, AK; 2 = Wallops Island, VA; 3 = SOCC; 4=Svalbard, Norway; 5=Monterey, CA	159	160	u	2	0	1
<Reserved for the Ingester>	161	168	c	8	0	1
<Reserved for Decommutation>	169	176	c	8	0	1
<zero fill>	177	192	i	4	0	4
CALIBRATION						
Instrument Temperature Sensor ID 0 = Mixer Temp of Ch 18 - 20; 1 = Mixer Temp of Ch 16	193	194	i	2	0	1
<zero fill>	195	196	i	2	0	1
Minimum Reference Temperature, mixer of Ch 18 - 20	197	198	i	2	2	1
Nominal Reference Temperature, mixer of Ch 18 - 20	199	200	i	2	2	1
Maximum Reference Temperature, mixer of Ch 18 - 20	201	202	i	2	2	1
Minimum Reference Temperature, mixer of Ch 16	203	204	i	2	2	1
Nominal Reference Temperature, mixer of Ch 16	205	206	i	2	2	1
Maximum Reference Temperature, mixer of Ch 16	207	208	i	2	2	1
Warm Target Fixed Bias Correction Ch 16 Min Temperature	209	210	i	2	3	1
Warm Target Fixed Bias Correction Ch 16 Nominal Temperature	211	212	i	2	3	1
Warm Target Fixed Bias Correction Ch 16 Max Temperature	213	214	i	2	3	1
Space Fixed Bias Correction Ch 16	215	216	i	2	3	1
Warm Target Fixed Bias Correction Ch 17 Min Temperature	217	218	i	2	3	1
Warm Target Fixed Bias Correction Ch 17 Nominal Temperature	219	220	i	2	3	1
Warm Target Fixed Bias Correction Ch 17 Max Temperature	221	222	i	2	3	1
Space Fixed Bias Correction Ch 17	223	224	i	2	3	1
Warm Target Fixed Bias Correction Ch 18 Min Temperature	225	226	i	2	3	1
Warm Target Fixed Bias Correction Ch 18 Nominal Temperature	227	228	i	2	3	1
Warm Target Fixed Bias Correction Ch 18 Max Temperature	229	230	i	2	3	1
Space Fixed Bias Correction Ch 18	231	232	i	2	3	1
Warm Target Fixed Bias Correction Ch 19 Min Temperature	233	234	i	2	3	1
Warm Target Fixed Bias Correction Ch 19 Nominal Temperature	235	236	i	2	3	1
Warm Target Fixed Bias Correction Ch 19 Max Temperature	237	238	i	2	3	1
Space Fixed Bias Correction Ch 19	239	240	i	2	3	1

Warm Target Fixed Bias Correction Ch 20 Min Temperature	241	242	i	2	3	1
Warm Target Fixed Bias Correction Ch 20 Nominal Temperature	243	244	i	2	3	1
Warm Target Fixed Bias Correction Ch 20 Max Temperature	245	246	i	2	3	1
Space Fixed Bias Correction Ch 20	247	248	i	2	3	1
Nonlinearity Coeff. Ch 1 at Reference Temperature 1	249	252	i	4	3	1
Nonlinearity Coeff. Ch 1 at Reference Temperature 2	253	256	i	4	3	1
Nonlinearity Coeff. Ch 1 at Reference Temperature 3	257	260	i	4	3	1
Nonlinearity Coeff. Ch 2 at Reference Temperature 1	261	264	i	4	3	1
Nonlinearity Coeff. Ch 2 at Reference Temperature 2	265	268	i	4	3	1
Nonlinearity Coeff. Ch 2 at Reference Temperature 3	269	272	i	4	3	1
Nonlinearity Coeff. Ch 3 at Reference Temperature 1	273	276	i	4	3	1
Nonlinearity Coeff. Ch 3 at Reference Temperature 2	277	280	i	4	3	1
Nonlinearity Coeff. Ch 3 at Reference Temperature 3	281	284	i	4	3	1
Nonlinearity Coeff. Ch 4 at Reference Temperature 1	285	288	i	4	3	1
Nonlinearity Coeff. Ch 4 at Reference Temperature 2	289	292	i	4	3	1
Nonlinearity Coeff. Ch 4 at Reference Temperature 3	293	296	i	4	3	1
Nonlinearity Coeff. Ch 5 at Reference Temperature 1	297	300	i	4	3	1
Nonlinearity Coeff. Ch 5 at Reference Temperature 2	301	304	i	4	3	1
Nonlinearity Coeff. Ch 5 at Reference Temperature 3	305	308	i	4	3	1
<zero fill>	309	324	i	4	0	4
TEMPERATURE-RADIANCE CONVERSION						
Temperature-radiance Ch 16 Central Wavenumber	325	328	i	4	6	1
Temperature-radiance Ch 16 Constant 1	329	332	i	4	6	1
Temperature-radiance Ch 16 Constant 2	333	336	i	4	6	1
Temperature-radiance Ch 17 Central Wavenumber	337	340	i	4	6	1
Temperature-radiance Ch 17 Constant 1	341	344	i	4	6	1
Temperature-radiance Ch 17 Constant 2	345	348	i	4	6	1
Temperature-radiance Ch 18 Central Wavenumber	349	352	i	4	6	1
Temperature-radiance Ch 18 Constant 1	353	356	i	4	6	1
Temperature-radiance Ch 18 Constant 2	357	360	i	4	6	1
Temperature-radiance Ch 19 Central Wavenumber	361	364	i	4	6	1
Temperature-radiance Ch 19 Constant 1	365	368	i	4	6	1
Temperature-radiance Ch 19 Constant 2	369	372	i	4	6	1
Temperature-radiance Ch 20 Central Wavenumber	373	376	i	4	6	1
Temperature-radiance Ch 20 Constant 1	377	380	i	4	6	1
Temperature-radiance Ch 20 Constant 2	381	384	i	4	6	1
<zero fill>	385	400	i	4	0	4
NAVIGATION						
Reference Ellipsoid Model ID The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately $\pm$ 65 meters. (WGS-72 = World Geodetic Survey 1972) JGM3 =Joint Gravity Model 3	401	408	c	8	0	1

Nadir Earth Location Tolerance in Kilometers	409	410	u	2	1	1
Earth Location Bit Field bits 15 - 2: <zero fill> bit 1: reasonableness test active (0 = inactive) bit 0: attitude error correction (0 = not corrected)	411	412	u	2	0	1
<zero fill>	413	414	i	2	0	1
Constant Roll Attitude Error in Degrees	415	416	i	2	3	1
Constant Pitch Attitude Error in Degrees	417	418	i	2	3	1
Constant Yaw Attitude Error in Degrees	419	420	i	2	3	1
Epoch Year for Orbit Vector (e.g., 1999)	421	422	u	2	0	1
Day of Epoch Year for Orbit Vector (e.g., 365)	423	424	u	2	0	1
Epoch UTC Time of Day in Milliseconds for Orbit Vector	425	428	u	4	0	1
Semi-major Axis in Kilometers	429	432	i	4	5	1
Eccentricity	433	436	i	4	8	1
Inclination in Degrees	437	440	i	4	5	1
Argument of Perigee in Degrees	441	444	i	4	5	1
Right Ascension of the Ascending Node in Degrees	445	448	i	4	5	1
Mean Anomaly in Degrees	449	452	i	4	5	1
Position Vector x Component in Kilometers	453	456	i	4	5	1
Position Vector y Component in Kilometers	457	460	i	4	5	1
Position Vector z Component in Kilometers	461	464	i	4	5	1
Velocity Vector x-dot Component in Kilometers/second	465	468	i	4	8	1
Velocity Vector y-dot Component in Kilometers/second	469	472	i	4	8	1
Velocity Vector z-dot Component in Kilometers/second	473	476	i	4	8	1
Earth/Sun Distance Ratio	477	480	u	4	6	1
<zero fill>	481	496	i	4	0	4
DIGITAL A CONVERSION						
Mixer 16 Temperature Coefficient 0	497	498	i	2	2	1
Mixer 16 Temperature Coefficient 1	499	500	i	2	7	1
Mixer 16 Temperature Coefficient 2	501	502	i	2	1	1
Mixer 16 Temperature Coefficient 3	503	504	i	2	1	1
Mixer 17 Temperature Coefficient 0	505	506	i	2	2	1
Mixer 17 Temperature Coefficient 1	507	508	i	2	7	1
Mixer 17 Temperature Coefficient 2	509	510	i	2	1	1
Mixer 17 Temperature Coefficient 3	511	512	i	2	1	1
Mixer 18, 19, & 20 Temperature Coefficient 0	513	514	i	2	2	1
Mixer 18, 19, & 20 Temperature Coefficient 1	515	516	i	2	7	1
Mixer 18, 19, & 20 Temperature Coefficient 2	517	518	i	2	1	1
Mixer 18, 19, & 20 Temperature Coefficient 3	519	520	i	2	1	1
FET Amplifier 16 Temperature Coefficient 0	521	522	i	2	2	1
FET Amplifier 16 Temperature Coefficient 1	523	524	i	2	7	1
FET Amplifier 16 Temperature Coefficient 2	525	526	i	2	1	1
FET Amplifier 16 Temperature Coefficient 3	527	528	i	2	1	1
FET Amplifier 17 Temperature Coefficient 0	529	530	i	2	2	1
FET Amplifier 17 Temperature Coefficient 1	531	532	i	2	7	1

FET Amplifier 17 Temperature Coefficient 2	533	534	i	2	1	1
FET Amplifier 17 Temperature Coefficient 3	535	536	i	2	1	1
FET Amplifier 18 Temperature Coefficient 0	537	538	i	2	2	1
FET Amplifier 18 Temperature Coefficient 1	539	540	i	2	7	1
FET Amplifier 18 Temperature Coefficient 2	541	542	i	2	1	1
FET Amplifier 18 Temperature Coefficient 3	543	544	i	2	1	1
FET Amplifier 19 Temperature Coefficient 0	545	546	i	2	2	1
FET Amplifier 19 Temperature Coefficient 1	547	548	i	2	7	1
FET Amplifier 19 Temperature Coefficient 2	549	550	i	2	1	1
FET Amplifier 19 Temperature Coefficient 3	551	552	i	2	1	1
FET Amplifier 20 Temperature Coefficient 0	553	554	i	2	2	1
FET Amplifier 20 Temperature Coefficient 1	555	556	i	2	7	1
FET Amplifier 20 Temperature Coefficient 2	557	558	i	2	1	1
FET Amplifier 20 Temperature Coefficient 3	559	560	i	2	1	1
Calibration Target Temperature 1 Coefficient 0	561	562	i	2	2	1
Calibration Target Temperature 1 Coefficient 1	563	564	i	2	7	1
Calibration Target Temperature 1 Coefficient 2	565	566	i	2	1	1
Calibration Target Temperature 1 Coefficient 3	567	568	i	2	1	1
Calibration Target Temperature 2 Coefficient 0	569	570	i	2	2	1
Calibration Target Temperature 2 Coefficient 1	571	572	i	2	7	1
Calibration Target Temperature 2 Coefficient 2	573	574	i	2	12	1
Calibration Target Temperature 2 Coefficient 3	575	576	i	2	18	1
Calibration Target Temperature 3 Coefficient 0	577	578	i	2	2	1
Calibration Target Temperature 3 Coefficient 1	579	580	i	2	7	1
Calibration Target Temperature 3 Coefficient 2	581	582	i	2	12	1
Calibration Target Temperature 3 Coefficient 3	583	584	i	2	18	1
Calibration Target Temperature 4 Coefficient 0	585	586	i	2	2	1
Calibration Target Temperature 4 Coefficient 1	587	588	i	2	7	1
Calibration Target Temperature 4 Coefficient 2	589	590	i	2	12	1
Calibration Target Temperature 4 Coefficient 3	591	592	i	2	18	1
Calibration Target Temperature 5 Coefficient 0	593	594	i	2	2	1
Calibration Target Temperature 5 Coefficient 1	595	596	i	2	7	1
Calibration Target Temperature 5 Coefficient 2	597	598	i	2	12	1
Calibration Target Temperature 5 Coefficient 3	599	600	i	2	18	1
Calibration Target Temperature 6 Coefficient 0	601	602	i	2	2	1
Calibration Target Temperature 6 Coefficient 1	603	604	i	2	7	1
Calibration Target Temperature 6 Coefficient 2	605	606	i	2	12	1
Calibration Target Temperature 6 Coefficient 3	607	608	i	2	18	1
Calibration Target Temperature 7 Coefficient 0	609	610	i	2	2	1
Calibration Target Temperature 7 Coefficient 1	611	612	i	2	7	1
Calibration Target Temperature 7 Coefficient 2	613	614	i	2	12	1
Calibration Target Temperature 7 Coefficient 3	615	616	i	2	18	1
Sub-reflector Temperature 1 Coefficient 0	617	618	i	2	2	1
Sub-reflector Temperature 1 Coefficient 1	619	620	i	2	7	1
Sub-reflector Temperature 1 Coefficient 2	621	622	i	2	12	1
Sub-reflector Temperature 1 Coefficient 3	623	624	i	2	18	1
LO Monitor Current Ch 16 Coefficient 0	625	626	i	2	3	1
LO Monitor Current Ch 16 Coefficient 1	627	628	i	2	5	1
LO Monitor Current Ch 16 Coefficient 2	629	630	i	2	0	1

LO Monitor Current Ch 16 Coefficient 3	631	632	i	2	0	1
LO Monitor Current Ch 17 Coefficient 0	633	634	i	2	3	1
LO Monitor Current Ch 17 Coefficient 1	635	636	i	2	5	1
LO Monitor Current Ch 17 Coefficient 2	637	638	i	2	0	1
LO Monitor Current Ch 17 Coefficient 3	639	640	i	2	0	1
LO Monitor Current Ch 18, 19, & 20 Coefficient 0	641	642	i	2	3	1
LO Monitor Current Ch 18, 19, & 20 Coefficient 1	643	644	i	2	5	1
LO Monitor Current Ch 18, 19, & 20 Coefficient 2	645	646	i	2	0	1
LO Monitor Current Ch 18, 19, & 20 Coefficient 3	647	648	i	2	0	1
LO Ch 16 Temperature Coefficient 0	649	650	i	2	2	1
LO Ch 16 Temperature Coefficient 1	651	652	i	2	7	1
LO Ch 16 Temperature Coefficient 2	653	654	i	2	12	1
LO Ch 16 Temperature Coefficient 3	655	656	i	2	18	1
LO Ch 17 Temperature Coefficient 0	657	658	i	2	2	1
LO Ch 17 Temperature Coefficient 1	659	660	i	2	7	1
LO Ch 17 Temperature Coefficient 2	661	662	i	2	12	1
LO Ch 17 Temperature Coefficient 3	663	664	i	2	18	1
LO Ch 18, 19, & 20 Temperature Coefficient 0	665	666	i	2	2	1
LO Ch 18, 19, & 20 Temperature Coefficient 1	667	668	i	2	7	1
LO Ch 18, 19, & 20 Temperature Coefficient 2	669	670	i	2	12	1
LO Ch 18, 19, & 20 Temperature Coefficient 3	671	672	i	2	18	1
PRT Bridge Voltage Coefficient 0	673	674	i	2	0	1
PRT Bridge Voltage Coefficient 1	675	676	i	2	5	1
PRT Bridge Voltage Coefficient 2	677	678	i	2	0	1
PRT Bridge Voltage Coefficient 3	679	680	i	2	0	1
PRT Board Temperature Coefficient 0	681	682	i	2	1	1
PRT Board Temperature Coefficient 1	683	684	i	2	6	1
PRT Board Temperature Coefficient 2	685	686	i	2	10	1
PRT Board Temperature Coefficient 3	687	688	i	2	15	1
<zero fill>	689	704	i	4	0	4
ANALOG TELEMETRY CONVERSION						
+12V (A) Secondary Conversion Coefficient 0	705	708	I	4	6	1
+12V (A) Secondary Conversion Coefficient 1	709	712	i	4	6	1
+12V (A) Secondary Conversion Coefficient 2	713	716	i	4	6	1
+12V (A) Secondary Conversion Coefficient 3	717	720	i	4	6	1
-12V (A) Secondary Conversion Coefficient 0	721	724	i	4	6	1
-12V (A) Secondary Conversion Coefficient 1	725	728	i	4	6	1
-12V (A) Secondary Conversion Coefficient 2	729	732	i	4	6	1
-12V (A) Secondary Conversion Coefficient 3	733	736	i	4	6	1
+15V (A) Secondary Conversion Coefficient 0	737	740	i	4	6	1
+15V (A) Secondary Conversion Coefficient 1	741	744	i	4	6	1
+15V (A) Secondary Conversion Coefficient 2	745	748	i	4	6	1
+15V (A) Secondary Conversion Coefficient 3	749	752	i	4	6	1
-15V (A) Secondary Conversion Coefficient 0	753	756	i	4	6	1
-15V (A) Secondary Conversion Coefficient 1	757	760	i	4	6	1
-15V (A) Secondary Conversion Coefficient 2	761	764	i	4	6	1
-15V (A) Secondary Conversion Coefficient 3	765	768	i	4	6	1
+8v (A) Secondary Conversion Coefficient 0	769	772	i	4	6	1
+8v (A) Secondary Conversion Coefficient 1	773	776	i	4	6	1

+8v (A) Secondary Conversion Coefficient 2	777	780	i	4	6	1
+8v (A) Secondary Conversion Coefficient 3	781	784	i	4	6	1
+5V (D) Secondary Conversion Coefficient 0	785	788	i	4	6	1
+5V (D) Secondary Conversion Coefficient 1	789	792	i	4	6	1
+5V (D) Secondary Conversion Coefficient 2	793	796	i	4	6	1
+5V (D) Secondary Conversion Coefficient 3	797	800	i	4	6	1
+5V (A) Secondary Conversion Coefficient 0	801	804	i	4	6	1
+5V (A) Secondary Conversion Coefficient 1	805	808	i	4	6	1
+5V (A) Secondary Conversion Coefficient 2	809	812	i	4	6	1
+5V (A) Secondary Conversion Coefficient 3	813	816	i	4	6	1
-5V (A) Secondary Conversion Coefficient 0	817	820	i	4	6	1
-5V (A) Secondary Conversion Coefficient 1	821	824	i	4	6	1
-5V (A) Secondary Conversion Coefficient 2	825	828	i	4	6	1
-5V (A) Secondary Conversion Coefficient 3	829	832	i	4	6	1
+5V Reference Secondary Conv Coefficient 0	833	836	i	4	6	1
+5V Reference Secondary Conv Coefficient 1	837	840	i	4	6	1
+5V Reference Secondary Conv Coefficient 2	841	844	i	4	6	1
+5V Reference Secondary Conv Coefficient 3	845	848	i	4	6	1
ICE Temperature Conversion Coefficient 0	849	852	i	4	6	1
ICE Temperature Conversion Coefficient 1	853	856	i	4	6	1
ICE Temperature Conversion Coefficient 2	857	860	i	4	6	1
ICE Temperature Conversion Coefficient 3	861	864	i	4	6	1
MDE Temperature Conversion Coefficient 0	865	868	i	4	6	1
MDE Temperature Conversion Coefficient 1	869	872	i	4	6	1
MDE Temperature Conversion Coefficient 2	873	876	i	4	6	1
MDE Temperature Conversion Coefficient 3	877	880	i	4	6	1
PEU Temperature Conversion Coefficient 0	881	884	i	4	6	1
PEU Temperature Conversion Coefficient 1	885	888	i	4	6	1
PEU Temperature Conversion Coefficient 2	889	892	i	4	6	1
PEU Temperature Conversion Coefficient 3	893	896	i	4	6	1
PSU Temperature Conversion Coefficient 0	897	900	i	4	6	1
PSU Temperature Conversion Coefficient 1	901	904	i	4	6	1
PSU Temperature Conversion Coefficient 2	905	908	i	4	6	1
PSU Temperature Conversion Coefficient 3	909	912	i	4	6	1
Scan Motor Temperature Conv Coefficient 0	913	916	i	4	6	1
Scan Motor Temperature Conv Coefficient 1	917	920	i	4	6	1
Scan Motor Temperature Conv Coefficient 2	921	924	i	4	6	1
Scan Motor Temperature Conv Coefficient 3	925	928	i	4	6	1
Scan Motor Current Conversion Coefficient 0	929	932	i	4	6	1
Scan Motor Current Conversion Coefficient 1	933	936	i	4	6	1
Scan Motor Current Conversion Coefficient 2	937	940	i	4	6	1
Scan Motor Current Conversion Coefficient 3	941	944	i	4	6	1
Ch 16 LO Temperature Conversion Coefficient 0	945	948	i	4	6	1
Ch 16 LO Temperature Conversion Coefficient 1	949	952	i	4	6	1
Ch 16 LO Temperature Conversion Coefficient 2	953	956	i	4	6	1
Ch 16 LO Temperature Conversion Coefficient 3	957	960	i	4	6	1
Ch 17 LO Temperature Conversion Coefficient 0	961	964	i	4	6	1
Ch 17 LO Temperature Conversion Coefficient 1	965	968	i	4	6	1
Ch 17 LO Temperature Conversion Coefficient 2	969	972	i	4	6	1

Ch 17 LO Temperature Conversion Coefficient 3	973	976	i	4	6	1
Ch 18/19/20 LO Temp Conversion Coefficient 0	977	980	i	4	6	1
Ch 18/19/20 LO Temp Conversion Coefficient 1	981	984	i	4	6	1
Ch 18/19/20 LO Temp Conversion Coefficient 2	985	988	i	4	6	1
Ch 18/19/20 LO Temp Conversion Coefficient 3	989	992	i	4	6	1
<zero fill>	993	1000	i	4	6	2
BIAS CORRECTION 1						
Bias Correction Values 2 (values are given in counts) Ordered by channel, field of view (FOV), and transmitter as follows: Word 1: Channel 16, FOV 1, STX-1 Word 2: Channel 17, FOV 1, STX-1 Word 3: Channel 18, FOV 1, STX-1 Word 4: Channel 19, FOV 1, STX-1 Word 5: Channel 20, FOV 1, STX-1 Word 6: Channel 16, FOV 5, STX-1 ... (channel values for FOVs 5, 10, 15, ... , 90) ... Word 95: Channel 20, FOV 90, STX-1 Word 96: Channel 16, Space View, STX-1 ... Word 100: Channel 20, Space View, STX-1 Word 101: Channel 16, Warm View, STX-1 ... Word 106: Channel 16, FOV 1, STX-2 ... Word 211: Channel 16, FOV 1, STX-3 ... Word 316: Channel 16, FOV 1, SARR ... Word 420: Channel 20, Warm View, SARR	1001	1840	i	2	0	420
<zero fill>	1841	1848	i	4	0	2
TRANSMITTER 1						
Transmitter Reference Power Mean power at the time bias corrections were derived. (values are given in counts from 0 to 255, representing analog voltages from 0 to 5.1) Word 1: STX-1 Word 2: STX-2 Word 3: STX-3 Word 4: SARR	1849	1856	i	2	1	4
<zero fill>	1857	1864	i	4	0	2
“NEW” BIAS CORRECTION 2						

"New" Bias Correction Values (values are given in counts) Ordered by channel, field of view (FOV), and cycle within 8 second period as follows: Word 1: Channel 16, FOV 1, Cycle 1 Word 2: Channel 17, FOV 1, Cycle 1 Word 3: Channel 18, FOV 1, Cycle 1 Word 4: Channel 19, FOV 1, Cycle 1 Word 5: Channel 20, FOV 1, Cycle 1 Word 6: Channel 16, FOV 3, Cycle 1 ... (channel correction values for FOVs 3, 6, 9, ... , 90) ... Word 155: Channel 20, FOV 90, Cycle 1 Word 156: Channel 16, Space View, Cycle 1 ... Word 160: Channel 20, Space View, Cycle 1 Word 161: Channel 16, Warm View, Cycle 1 ... Word 165: Channel 20, Warm View, Cycle 1 Word 166: Channel 16, FOV 1, Cycle 2 ... Word 330: Channel 20, Warm View, Cycle 2 Word 331: Channel 16, FOV 1, Cycle 3 ... Word 495: Channel 20, Warm View, Cycle 3	1865	2854	i	2	0	495
FILLER 2						
<zero fill>	2855	3072	i	2	0	109
Notes (Revision History): 1) 12 Nov 1998 (NOAA-15 Orbit B0260303): Add bias correction and transmitter power fields; adjust trailing zero fill. 2) 04 Mar 1999 (NOAA-15 Orbit B0419595): Add "new" biea correctionsl rename bias correction Cold and Warm Cal FOV to Space and Warm View ,respectively; adjust trailing zero fill.						

8.3.1.7.2.2 NOAA-N Format (Version 4, post-January 25, 2006, All Spacecraft)

The AMSU-B Data Set Header Record format for NOAA-N (Version 3, post-April 28, 2005, All Spacecraft) is documented in Table 8.3.1.7.2.2-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.7.2.2-1. Format of AMSU-B Data Set Header Record for NOAA-N (Version 4, post-January 25, 2006, All Spacecraft).

Field Name	Start Octet	End Octet	D T	Word Size	Number of Words	S F	Units	Notes
FILE IDENTIFICATION								
Data Set Creation Site ID CMS=Centre de Meteorologie Spatiale/France	1	3	c	3	1	0		

DSS=Dundee Satellite Receiving Station/UK NSS=National Environmental Satellite, Data and Information Service/USA UKM=United Kingdom Meteorological Office/UK								
<ASCII blank = x20>	4	4	c	1	1	0		
Level 1b Format Version Number 1=TIROS-N, NOAA-6 through NOAA-14; 2=NOAA-15, -16, -17 (pre-April 28, 2005); 3=all satellites post-April 28, 2005 4=cloud mask flag (CLAVR-x)-Jan 25, 2006	5	6	u	2	1	0		
Level 1b Format Version Year *(four digits, e.g., 2000)*	7	8	u	2	1	0		
Level 1b Format Version Day of Year *(e.g., 365)*	9	10	u	2	1	0		
<Reserved for Logical Record Length> *(For Creation Site use only. Logical Record Length of source 1b data set prior to processing.)*	11	12	u	2	1	0	octets	
<Reserved for Block Size> *(For Creation Site use only. Block Size of source 1b data set prior to processing.)*	13	14	u	2	1	0	octets	
Count of Header Records in this Data Set	15	16	u	2	1	0		
<zero fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		
NOAA Spacecraft Identification Code 2=NOAA-16 4=NOAA-15 6=NOAA-17 7=NOAA-18 8=NOAA-N' 11=MetOp-1 12=MetOp-2	73	74	u	2	1	0		
Instrument ID 0=Engineering Model; 4=protoflight model (PFM); 8=FM 2 ; 12=FM 3.	75	76	u	2	1	0		
Data Type Code	77	78	u	2	1	0		
11=AMSU-B								
TIP Source Code 0=unused, i.e., GAC/HRPT/LAC data 1=GAC-embedded AMSU and TIP 2=stored TIP (STIP) 3=HRPT/LAC-embedded AMSU and TIP 4=stored AIP (SAIP)	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year *(four digits, e.g., 2000)*	85	86	u	2	1	0		
Start of Data Set Day of Year *(e.g., 365)*	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	milli-	

							second	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year *(four digits, e.g., 2000)*	97	98	u	2	1	0		
End of Data Set Day of Year *(e.g., 365)*	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	milli-second	
Year of Last CPIDS Update *(four digits, e.g., 2000)*	105	106	u	2	1	0		
Day of Year of Last CPIDS Update *(e.g., 365)*	107	108	u	2	1	0		
Offset between Start of Scan and Center of First FOV	109	110	i	2	1	0	milli-second	
<zero fill>	111	120	i	2	5	0		
DATA SET QUALITY INDICATORS								
Instrument Status bits 31-29: <not defined> bit 28: processor check flag (0=passed; 1=failed) bit 27: scan control status (0=running; 1=aborted) bit 26: pixel data invalid flag (0=valid; 1=invalid) bit 25: scan synchronization (0=error < 0.1 deg; 1=error >= 0.1 deg) bit 24: mode transition flag (0=transition complete; 1=transition in progress) bit 23: module ID, msbbits 22 - 17: module ID bit 16: module ID, lsbbit 15: RAM check flag (0=passed; 1=failed) bit 14: ROM check flag (0=passed; 1=failed) bit 13: memory checks status (0=disabled; 1=enabled) bit 12: space view select, lsbbit 11: space view select, msbbit 10: channel 18/19/20 (relay 5 status) (0=off; 1=on) bit 9: channel 17 (relay 4 status) (0=off; 1=on) bit 8: channel 16 (relay 3 status) (0=off; 1=on) bit 7: stepped mode (0=no; 1=yes) bit 6: investigation mode (0=no; 1=yes) bit 5: parked in space view mode (0=no; 1=yes) bit 4: parked in nadir view mode (0=no; 1=yes) bit 3: parked in target view mode (0=no; 1=yes) bit 2: scan normal mode (0=no; 1=yes) bit 1: survival heater (relay 2 status) (0=off; 1=on) bit 0: power (relay 1 status) (0=off; 1=on)	121	124	u	4	1	0		
<zero fill>	125	126	i	2	1	0		
Record Number of Status Change *(if 0, none occurred)*	127	128	u	2	1	0		
Second Instrument Status *(if previous word is 0, no change)*	129	132	u	4	1	0		

Count of Data Records in this Data Set	133	134	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set	135	136	u	2	1	0		
Count of Missing Scan Lines	137	138	u	2	1	0		
Count of Data Gaps in this Data Set	139	140	u	2	1	0		
Count of Data Frames Without Frame Sync Word Errors	141	142	u	2	1	0		
Count of PACS Detected TIP Parity Errors	143	144	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data	145	146	u	2	1	0		
Time Sequence Error	147	148	u	2	1	0		
0=none; otherwise, the record number of the first occurrence								
Time Sequence Error Code *(These are bit flags taken from "Scan Line Quality Flags [Time Problem Code]" on data record reported in "Time Sequence Error" field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity); may be associated with a spacecraft clock update bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	149	150	u	2	1	0		
SOCC Clock Update Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	151	152	u	2	1	0		
Earth Location Error Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	153	154	u	2	1	0		
Earth Location Error Code *(These are bit flags taken from "Scan Line Quality Flags [Earth Location Problem Code]" on data record reported in "Earth Location Error Indicator" field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check	155	156	u	2	1	0		

bit 3: earth location questionable because of antenna position checkbits 2-0: <zero fill>								
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudonoise (0=normal data; 1=pseudonoise data) bit 1: tape direction (0=reverse playback, time decrementing) bit 0: data mode (0=test data; 1=flight data)	157	158	u	2	1	0		
Data Source 0=unused 1=Fairbanks, AK 2=Wallops Island,VA 3=SOCC 4=Svalbard, Norway 5=Monterey, CA	159	160	u	2	1	0		
<Reserved for the Ingester>	161	168	c	8	1	0		
<Reserved for Decommutation>	169	176	c	8	1	0		
<zero fill>	177	192	i	4	4	0		
CALIBRATION								
Instrument Temperature Sensor ID 0=mixer temperature of channels 18-201=mixer temperature of channel 16	193	194	i	2	1	0		
<zero fill>	195	196	i	2	1	0		
Minimum Reference Temperature, mixer of Ch 18 - 20	197	198	i	2	1	2	K	
Nominal Reference Temperature, mixer of Ch 18 - 20	199	200	i	2	1	2	K	
Maximum Reference Temperature, mixer of Ch 18 - 20	201	202	i	2	1	2	K	
Minimum Reference Temperature, mixer of Ch 16	203	204	i	2	1	2	K	
Nominal Reference Temperature, mixer of Ch 16	205	206	i	2	1	2	K	
Maximum Reference Temperature, mixer of Ch 16	207	208	i	2	1	2	K	
Warm Target Fixed Bias Correction Ch 16 Min Temperature	209	210	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 16 Nominal Temperature	211	212	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 16 Max Temperature	213	214	i	2	1	3	K	
Space Fixed Bias Correction Ch 16	215	216	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 17 Min Temperature	217	218	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 17 Nominal Temperature	219	220	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 17 Max Temperature	221	222	i	2	1	3	K	
Space Fixed Bias Correction Ch 17	223	224	i	2	1	3	K	

Warm Target Fixed Bias Correction Ch 18 Min Temperature	225	226	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 18 Nominal Temperature	227	228	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 18 Max Temperature	229	230	i	2	1	3	K	
Space Fixed Bias Correction Ch 18	231	232	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 19 Min Temperature	233	234	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 19 Nominal Temperature	235	236	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 19 Max Temperature	237	238	i	2	1	3	K	
Space Fixed Bias Correction Ch 19	239	240	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 20 Min Temperature	241	242	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 20 Nominal Temperature	243	244	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 20 Max Temperature	245	246	i	2	1	3	K	
Space Fixed Bias Correction Ch 20	247	248	i	2	1	3	K	
Nonlinearity Coeff. Ch 1 at Reference Temperature 1	249	252	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 1 at Reference Temperature 2	253	256	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 1 at Reference Temperature 3	257	260	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 2 at Reference Temperature 1	261	264	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 2 at Reference Temperature 2	265	268	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 2 at Reference Temperature 3	269	272	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 3 at Reference Temperature 1	273	276	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 3 at Reference Temperature 2	277	280	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 3 at Reference Temperature 3	281	284	i	4	1	3	m^2-sr-cm^1/mW	
Nonlinearity Coeff. Ch 4 at Reference	285	288	i	4	1	3	m^2-sr-	

Temperature 1							cm1/m W	
Nonlinearity Coeff. Ch 4 at Reference Temperature 2	289	292	i	4	1	3	m^2-sr-cm1/m W	
Nonlinearity Coeff. Ch 4 at Reference Temperature 3	293	296	i	4	1	3	m^2-sr-cm1/m W	
Nonlinearity Coeff. Ch 5 at Reference Temperature 1	297	300	i	4	1	3	m^2-sr-cm1/m W	
Nonlinearity Coeff. Ch 5 at Reference Temperature 2	301	304	i	4	1	3	m^2-sr-cm1/m W	
Nonlinearity Coeff. Ch 5 at Reference Temperature 3	305	308	i	4	1	3	m^2-sr-cm1/m W	
<zero fill>	309	324	i	4	4	0		
TEMPERATURE-RADIANCE CONVERSION								
Temperature-radiance Ch 16 Central Wavenumber	325	328	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 16 Constant 1	329	332	i	4	1	6		
Temperature-radiance Ch 16 Constant 2	333	336	i	4	1	6		
Temperature-radiance Ch 17 Central Wavenumber	337	340	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 17 Constant 1	341	344	i	4	1	6		
Temperature-radiance Ch 17 Constant 2	345	348	i	4	1	6		
Temperature-radiance Ch 18 Central Wavenumber	349	352	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 18 Constant 1	353	356	i	4	1	6		
Temperature-radiance Ch 18 Constant 2	357	360	i	4	1	6		
Temperature-radiance Ch 19 Central Wavenumber	361	364	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 19 Constant 1	365	368	i	4	1	6		
Temperature-radiance Ch 19 Constant 2	369	372	i	4	1	6		
Temperature-radiance Ch 20 Central Wavenumber	373	376	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 20 Constant 1	377	380	i	4	1	6		
Temperature-radiance Ch 20 Constant 2	381	384	i	4	1	6		
<zero fill>	385	400	i	4	4	0		
NAVIGATION								
Reference Ellipsoid Model ID *(The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately ± 65 meters.)* WGS-72=World Geodetic Survey 1972 JGM3 =Joint Gravity Model 3	401	408	c	8	1	0		
Nadir Earth Location Tolerance	409	410	u	2	1	1	Kilo-meters	
Earth Location Bit Field bits 15-3: <zero fill>bit 2: dynamic attitude error correction (0=not performed; 1=performed)bit 1: reasonableness test (0=inactive; 1=active)bit 0:	411	412	u	2	1	0		

constant attitude error correction (0=not performed; 1=performed)								
<zero fill>	413	414	i	2	1	0		
Constant Roll Attitude Error	415	416	i	2	1	3	degrees	
Constant Pitch Attitude Error	417	418	i	2	1	3	degrees	
Constant Yaw Attitude Error	419	420	i	2	1	3	degrees	
Epoch Year for Orbit Vector	421	422	u	2	1	0		
Day of Epoch Year for Orbit Vector	423	424	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	425	428	u	4	1	0	milli-second	
Semi-major Axis *(at the orbit vector epoch time)*	429	432	i	4	1	5	km	
Eccentricity *(at the orbit vector epoch time)*	433	436	i	4	1	8		
Inclination *(at the orbit vector epoch time)*	437	440	i	4	1	5	degrees	
Argument of Perigee *(at the orbit vector epoch time)*	441	444	i	4	1	5	degrees	
Right Ascension of the Ascending Node *(at the orbit vector epoch time)*	445	448	i	4	1	5	degrees	
Mean Anomaly *(at the orbit vector epoch time)*	449	452	i	4	1	5	degrees	
Position Vector X Component *(at the orbit vector epoch time)*	453	456	i	4	1	5	km	
Position Vector Y Component *(at the orbit vector epoch time)*	457	460	i	4	1	5	km	
Position Vector Z Component *(at the orbit vector epoch time)*	461	464	i	4	1	5	km	
Velocity Vector X-dot Component *(at the orbit vector epoch time)*	465	468	i	4	1	8	km/sec	
Velocity Vector Y-dot Component *(at the orbit vector epoch time)*	469	472	i	4	1	8	km/sec	
Velocity Vector Z-dot Component *(at the orbit vector epoch time)*	473	476	i	4	1	8	km/sec	
Earth/Sun Distance Ratio *(at the orbit vector epoch time; relative to the mean distance of 1 AU)*	477	480	u	4	1	6		
<zero fill>	481	496	i	4	4	0		
DIGITAL A TELEMETRY CONVERSION								
Mixer 16 Temperature Coefficient 0	497	498	i	2	1	2	K	
Mixer 16 Temperature Coefficient 1	499	500	i	2	1	7	K/ count	
Mixer 16 Temperature Coefficient 2	501	502	i	2	1	12	K/ $count^2$	
Mixer 16 Temperature Coefficient 3	503	504	i	2	1	18	K/ $count^3$	
Mixer 17 Temperature Coefficient 0	505	506	i	2	1	2	K	
Mixer 17 Temperature Coefficient 1	507	508	i	2	1	7	K/ count	
Mixer 17 Temperature Coefficient 2	509	510	i	2	1	12	K/ $count^2$	
Mixer 17 Temperature Coefficient 3	511	512	i	2	1	18	K/ $count^3$	

Mixer 18, 19, & 20 Temperature Coefficient 0	513	514	i	2	1	2	K	
Mixer 18, 19, & 20 Temperature Coefficient 1	515	516	i	2	1	7	K/ count	
Mixer 18, 19, & 20 Temperature Coefficient 2	517	518	i	2	1	12	K/ $count^2$	
Mixer 18, 19, & 20 Temperature Coefficient 3	519	520	i	2	1	18	K/ $count^3$	
FET Amplifier 16 Temperature Coefficient 0	521	522	i	2	1	2	K	
FET Amplifier 16 Temperature Coefficient 1	523	524	i	2	1	7	K/ count	
FET Amplifier 16 Temperature Coefficient 2	525	526	i	2	1	12	K/ $count^2$	
FET Amplifier 16 Temperature Coefficient 3	527	528	i	2	1	18	K/ $count^3$	
FET Amplifier 17 Temperature Coefficient 0	529	530	i	2	1	2	K	
FET Amplifier 17 Temperature Coefficient 1	531	532	i	2	1	7	K/ count	
FET Amplifier 17 Temperature Coefficient 2	533	534	i	2	1	12	K/ $count^2$	
FET Amplifier 17 Temperature Coefficient 3	535	536	i	2	1	18	K/ $count^3$	
FET Amplifier 18 Temperature Coefficient 0	537	538	i	2	1	2	K	
FET Amplifier 18 Temperature Coefficient 1	539	540	i	2	1	7	K/ count	
FET Amplifier 18 Temperature Coefficient 2	541	542	i	2	1	12	K/ $count^2$	
FET Amplifier 18 Temperature Coefficient 3	543	544	i	2	1	18	K/ $count^3$	
FET Amplifier 19 Temperature Coefficient 0	545	546	i	2	1	2	K	
FET Amplifier 19 Temperature Coefficient 1	547	548	i	2	1	7	K/ count	
FET Amplifier 19 Temperature Coefficient 2	549	550	i	2	1	12	K/ $count^2$	
FET Amplifier 19 Temperature Coefficient 3	551	552	i	2	1	18	K/ $count^3$	
FET Amplifier 20 Temperature Coefficient 0	553	554	i	2	1	2	K	
FET Amplifier 20 Temperature Coefficient 1	555	556	i	2	1	7	K/ count	
FET Amplifier 20 Temperature Coefficient 2	557	558	i	2	1	12	K/ $count^2$	
FET Amplifier 20 Temperature Coefficient 3	559	560	i	2	1	18	K/ $count^3$	
Calibration Target Temperature 1 Coefficient 0	561	562	i	2	1	2	K	
Calibration Target Temperature 1 Coefficient 1	563	564	i	2	1	7	K/ count	
Calibration Target Temperature 1 Coefficient 2	565	566	i	2	1	12	K/ $count^2$	
Calibration Target Temperature 1 Coefficient 3	567	568	i	2	1	18	K/	

							$count^3$	
Calibration Target Temperature 2 Coefficient 0	569	570	i	2	1	2	K	
Calibration Target Temperature 2 Coefficient 1	571	572	i	2	1	7	K/ count	
Calibration Target Temperature 2 Coefficient 2	573	574	i	2	1	12	K/ $count^2$	
Calibration Target Temperature 2 Coefficient 3	575	576	i	2	1	18	K/ $count^3$	
Calibration Target Temperature 3 Coefficient 0	577	578	i	2	1	2	K	
Calibration Target Temperature 3 Coefficient 1	579	580	i	2	1	7	K/ count	
Calibration Target Temperature 3 Coefficient 2	581	582	i	2	1	12	K/ $count^2$	
Calibration Target Temperature 3 Coefficient 3	583	584	i	2	1	18	K/ $count^3$	
Calibration Target Temperature 4 Coefficient 0	585	586	i	2	1	2	K	
Calibration Target Temperature 4 Coefficient 1	587	588	i	2	1	7	K/ count	
Calibration Target Temperature 4 Coefficient 2	589	590	i	2	1	12	K/ $count^2$	
Calibration Target Temperature 4 Coefficient 3	591	592	i	2	1	18	K/ $count^3$	
Calibration Target Temperature 5 Coefficient 0	593	594	i	2	1	2	K	
Calibration Target Temperature 5 Coefficient 1	595	596	i	2	1	7	K/ count	
Calibration Target Temperature 5 Coefficient 2	597	598	i	2	1	12	K/ $count^2$	
Calibration Target Temperature 5 Coefficient 3	599	600	i	2	1	18	K/ $count^3$	
Calibration Target Temperature 6 Coefficient 0	601	602	i	2	1	2	K	
Calibration Target Temperature 6 Coefficient 1	603	604	i	2	1	7	K/ count	
Calibration Target Temperature 6 Coefficient 2	605	606	i	2	1	12	K/ $count^2$	
Calibration Target Temperature 6 Coefficient 3	607	608	i	2	1	18	K/ $count^3$	
Calibration Target Temperature 7 Coefficient 0	609	610	i	2	1	2	K	
Calibration Target Temperature 7 Coefficient 1	611	612	i	2	1	7	K/ count	
Calibration Target Temperature 7 Coefficient 2	613	614	i	2	1	12	K/ $count^2$	
Calibration Target Temperature 7 Coefficient 3	615	616	i	2	1	18	K/ $count^3$	
Sub-reflector Temperature 1 Coefficient 0	617	618	i	2	1	2	K	
Sub-reflector Temperature 1 Coefficient 1	619	620	i	2	1	7	K/ count	
Sub-reflector Temperature 1 Coefficient 2	621	622	i	2	1	12	K/ $count^2$	

Sub-reflector Temperature 1 Coefficient 3	623	624	i	2	1	18	K/ count^3	
LO Monitor Current Ch 16 Coefficient 0	625	626	i	2	1	3	mA	
LO Monitor Current Ch 16 Coefficient 1	627	628	i	2	1	5	mA/ count	
LO Monitor Current Ch 16 Coefficient 2	629	630	i	2	1	0	mA/ count^2	
LO Monitor Current Ch 16 Coefficient 3	631	632	i	2	1	0	mA/ count^3	
LO Monitor Current Ch 17 Coefficient 0	633	634	i	2	1	3	mA	
LO Monitor Current Ch 17 Coefficient 1	635	636	i	2	1	5	mA/ count	
LO Monitor Current Ch 17 Coefficient 2	637	638	i	2	1	0	mA/ count^2	
LO Monitor Current Ch 17 Coefficient 3	639	640	i	2	1	0	mA/ count^3	
LO Monitor Current Ch 18, 19, & 20 Coefficient 0	641	642	i	2	1	3	mA	
LO Monitor Current Ch 18, 19, & 20 Coefficient 1	643	644	i	2	1	5	mA/ count	
LO Monitor Current Ch 18, 19, & 20 Coefficient 2	645	646	i	2	1	0	mA/ count^2	
LO Monitor Current Ch 18, 19, & 20 Coefficient 3	647	648	i	2	1	0	mA/ count^3	
LO Ch 16 Temperature Coefficient 0	649	650	i	2	1	2	K	
LO Ch 16 Temperature Coefficient 1	651	652	i	2	1	7	K/ count	
LO Ch 16 Temperature Coefficient 2	653	654	i	2	1	12	K/ count^2	
LO Ch 16 Temperature Coefficient 3	655	656	i	2	1	18	K/ count^3	
LO Ch 17 Temperature Coefficient 0	657	658	i	2	1	2	K	
LO Ch 17 Temperature Coefficient 1	659	660	i	2	1	7	K/ count	
LO Ch 17 Temperature Coefficient 2	661	662	i	2	1	12	K/ count^2	
LO Ch 17 Temperature Coefficient 3	663	664	i	2	1	18	K/ count^3	
LO Ch 18, 19, & 20 Temperature Coefficient 0	665	666	i	2	1	2	K	
LO Ch 18, 19, & 20 Temperature Coefficient 1	667	668	i	2	1	7	K/ count	
LO Ch 18, 19, & 20 Temperature Coefficient 2	669	670	i	2	1	12	K/ count^2	
LO Ch 18, 19, & 20 Temperature Coefficient 3	671	672	i	2	1	18	K/ count^3	
PRT Bridge Voltage Coefficient 0	673	674	i	2	1	0	V	
PRT Bridge Voltage Coefficient 1	675	676	i	2	1	5	V/ count	
PRT Bridge Voltage Coefficient 2	677	678	i	2	1	0	V/	

							$count^2$	
PRT Bridge Voltage Coefficient 3	679	680	i	2	1	0	V/ $count^3$	
PRT Board Temperature Coefficient 0	681	682	i	2	1	1	K	
PRT Board Temperature Coefficient 1	683	684	i	2	1	6	K/ count	
PRT Board Temperature Coefficient 2	685	686	i	2	1	10	K/ $count^2$	
PRT Board Temperature Coefficient 3	687	688	i	2	1	15	K/ $count^3$	
<zero fill>	689	704	i	4	4	0		
ANALOG TELEMETRY CONVERSION								
+12V (A) Secondary Conversion Coefficient 0	705	708	i	4	1	6	V	
+12V (A) Secondary Conversion Coefficient 1	709	712	i	4	1	6	V/ count	
+12V (A) Secondary Conversion Coefficient 2	713	716	i	4	1	6	V/ $count^2$	
+12V (A) Secondary Conversion Coefficient 3	717	720	i	4	1	6	V/ $count^3$	
-12V (A) Secondary Conversion Coefficient 0	721	724	i	4	1	6	V	
-12V (A) Secondary Conversion Coefficient 1	725	728	i	4	1	6	V/ count	
-12V (A) Secondary Conversion Coefficient 2	729	732	i	4	1	6	V/ $count^2$	
-12V (A) Secondary Conversion Coefficient 3	733	736	i	4	1	6	V/ $count^3$	
+15V (A) Secondary Conversion Coefficient 0	737	740	i	4	1	6	V	
+15V (A) Secondary Conversion Coefficient 1	741	744	i	4	1	6	V/ count	
+15V (A) Secondary Conversion Coefficient 2	745	748	i	4	1	6	V/ $count^2$	
+15V (A) Secondary Conversion Coefficient 3	749	752	i	4	1	6	V/ $count^3$	
-15V (A) Secondary Conversion Coefficient 0	753	756	i	4	1	6	V	
-15V (A) Secondary Conversion Coefficient 1	757	760	i	4	1	6	V/ count	
-15V (A) Secondary Conversion Coefficient 2	761	764	i	4	1	6	V/ $count^2$	
-15V (A) Secondary Conversion Coefficient 3	765	768	i	4	1	6	V/ $count^3$	
+8v (A) Secondary Conversion Coefficient 0	769	772	i	4	1	6	V	
+8v (A) Secondary Conversion Coefficient 1	773	776	i	4	1	6	V/ count	
+8v (A) Secondary Conversion Coefficient 2	777	780	i	4	1	6	V/ $count^2$	
+8v (A) Secondary Conversion Coefficient 3	781	784	i	4	1	6	V/ $count^3$	

+5V (D) Secondary Conversion Coefficient 0	785	788	i	4	1	6	V	
+5V (D) Secondary Conversion Coefficient 1	789	792	i	4	1	6	V/ count	
+5V (D) Secondary Conversion Coefficient 2	793	796	i	4	1	6	V/ $count^2$	
+5V (D) Secondary Conversion Coefficient 3	797	800	i	4	1	6	V/ $count^3$	
+5V (A) Secondary Conversion Coefficient 0	801	804	i	4	1	6	V	
+5V (A) Secondary Conversion Coefficient 1	805	808	i	4	1	6	V/ count	
+5V (A) Secondary Conversion Coefficient 2	809	812	i	4	1	6	V/ $count^2$	
+5V (A) Secondary Conversion Coefficient 3	813	816	i	4	1	6	V/ $count^3$	
-5V (A) Secondary Conversion Coefficient 0	817	820	i	4	1	6	V	
-5V (A) Secondary Conversion Coefficient 1	821	824	i	4	1	6	V/ count	
-5V (A) Secondary Conversion Coefficient 2	825	828	i	4	1	6	V/ $count^2$	
-5V (A) Secondary Conversion Coefficient 3	829	832	i	4	1	6	V/ $count^3$	
+5V Reference Secondary Conv Coefficient 0	833	836	i	4	1	6	V	
+5V Reference Secondary Conv Coefficient 1	837	840	i	4	1	6	V/ count	
+5V Reference Secondary Conv Coefficient 2	841	844	i	4	1	6	V/ $count^2$	
+5V Reference Secondary Conv Coefficient 3	845	848	i	4	1	6	V/ $count^3$	
ICE Temperature Conversion Coefficient 0	849	852	i	4	1	6	K	
ICE Temperature Conversion Coefficient 1	853	856	i	4	1	6	K/ count	
ICE Temperature Conversion Coefficient 2	857	860	i	4	1	6	K/ $count^2$	
ICE Temperature Conversion Coefficient 3	861	864	i	4	1	6	K/ $count^3$	
MDE Temperature Conversion Coefficient 0	865	868	i	4	1	6	K	
MDE Temperature Conversion Coefficient 1	869	872	i	4	1	6	K/ count	
MDE Temperature Conversion Coefficient 2	873	876	i	4	1	6	K/ $count^2$	
MDE Temperature Conversion Coefficient 3	877	880	i	4	1	6	K/ $count^3$	
PEU Temperature Conversion Coefficient 0	881	884	i	4	1	6	K	
PEU Temperature Conversion Coefficient 1	885	888	i	4	1	6	K/ count	
PEU Temperature Conversion Coefficient 2	889	892	i	4	1	6	K/ $count^2$	
PEU Temperature Conversion Coefficient 3	893	896	i	4	1	6	K/	

								count^3	
PSU Temperature Conversion Coefficient 0	897	900	i	4	1	6	K		
PSU Temperature Conversion Coefficient 1	901	904	i	4	1	6	K/ count		
PSU Temperature Conversion Coefficient 2	905	908	i	4	1	6	K/ count^2		
PSU Temperature Conversion Coefficient 3	909	912	i	4	1	6	K/ count^3		
Scan Motor Temperature Conv Coefficient 0	913	916	i	4	1	6	K		
Scan Motor Temperature Conv Coefficient 1	917	920	i	4	1	6	K/ count		
Scan Motor Temperature Conv Coefficient 2	921	924	i	4	1	6	K/ count^2		
Scan Motor Temperature Conv Coefficient 3	925	928	i	4	1	6	K/ count^3		
Scan Motor Current Conversion Coefficient 0	929	932	i	4	1	6	A		
Scan Motor Current Conversion Coefficient 1	933	936	i	4	1	6	A/ count		
Scan Motor Current Conversion Coefficient 2	937	940	i	4	1	6	A/ count^2		
Scan Motor Current Conversion Coefficient 3	941	944	i	4	1	6	A/ count^3		
Ch 16 LO Temperature Conversion Coefficient 0	945	948	i	4	1	6	K		
Ch 16 LO Temperature Conversion Coefficient 1	949	952	i	4	1	6	K/ count		
Ch 16 LO Temperature Conversion Coefficient 2	953	956	i	4	1	6	K/ count^2		
Ch 16 LO Temperature Conversion Coefficient 3	957	960	i	4	1	6	K/ count^3		
Ch 17 LO Temperature Conversion Coefficient 0	961	964	i	4	1	6	K		
Ch 17 LO Temperature Conversion Coefficient 1	965	968	i	4	1	6	K/ count		
Ch 17 LO Temperature Conversion Coefficient 2	969	972	i	4	1	6	K/ count^2		
Ch 17 LO Temperature Conversion Coefficient 3	973	976	i	4	1	6	K/ count^3		
Ch 18/19/20 LO Temperature Conversion Coefficient 0	977	980	i	4	1	6	K		
Ch 18/19/20 LO Temperature Conversion Coefficient 1	981	984	i	4	1	6	K/ count		
Ch 18/19/20 LO Temperature Conversion Coefficient 2	985	988	i	4	1	6	K/ count^2		
Ch 18/19/20 LO Temperature Conversion Coefficient 3	989	992	i	4	1	6	K/ count^3		
<zero fill>	993	1000	i	4	2	0			
Bias Correction									
Bias Correction Values (values are given in counts)	1001	1840	i	2	420	0	counts		

Ordered by channel, field of view (FOV), and transmitter as follows: *Word 1*: Channel 16, FOV 1, STX-1 *Word 2*: Channel 17, FOV 1, STX-1 *Word 3*: Channel 18, FOV 1, STX-1 *Word 4*: Channel 19, FOV 1, STX-1 *Word 5*: Channel 20, FOV 1, STX-1 *Word 6*: Channel 16, FOV 5, STX-1 ... (channel values for FOVs 5, 10, 15, ... , 90) ... *Word 95*: Channel 20, FOV 90, STX-1 *Word 96*: Channel 16, Space View, STX-1 ... *Word 100*: Channel 20, Space View, STX-1 *Word 101*: Channel 16, Warm View, STX-1 ... *Word 106*: Channel 16, FOV 1, STX-2 ... *Word 211*: Channel 16, FOV 1, STX-3 ... *Word 316*: Channel 16, FOV 1, SARR ... *Word 420*: Channel 20, Warm View, SARR								
<zero fill>	1841	1848	i	4	2	0		
Transmitter								
Transmitter Reference Power (Mean power at the time bias corrections were derived. Range: 0 to 255, representing analog voltages from 0 to 5.1.) *Word 1*: STX-1 *Word 2*: STX-2 *Word 3*: STX-3 *Word 4*: SARR	1849	1856	i	2	4	1	counts	
<zero fill>	1857	1864	i	4	2	0		
“New” Bias Correction								
"New" Bias Correction Values (Ordered by channel, field of view (FOV), and cycle within 8 second period) *Word 1*: Channel 16, FOV 1, Cycle 1 *Word 2*: Channel 17, FOV 1, Cycle 1 *Word 3*: Channel 18, FOV 1, Cycle 1 *Word 4*: Channel 19, FOV 1, Cycle 1 *Word 5*: Channel 20, FOV 1, Cycle 1 *Word 6*: Channel 16, FOV 3, Cycle 1 ... (channel correction values for FOVs 3, 6, 9, ... , 90) ... *Word 155*: Channel 20, FOV 90, Cycle 1	1865	2854	i	2	495	0	counts	

Word 156: Channel 16, Space View, Cycle 1 ... *Word 160*: Channel 20, Space View, Cycle 1 *Word 161*: Channel 16, Warm View, Cycle 1 ... *Word 165*: Channel 20, Warm View, Cycle 1 *Word 166*: Channel 16, FOV 1, Cycle 2 ... *Word 330*: Channel 20, Warm View, Cycle 2 *Word 331*: Channel 16, FOV 1, Cycle 3 ... *Word 495*: Channel 20, Warm View, Cycle 3								
LUNAR CONTAMINATION								
Count of Scans Containing Lunar-Contaminated Space Views (Also, see bits 7 and 6 of "Scan Line Quality Flags [Additional Calibration Problem Code]" field in data record.) -1 = the detection algoritihm for lunar contamination is turned off; 0 = the detection algorithm is turned on: no scans containing lunar-contaminated space views were found; >0 = the detection algorithm is turned on: the value in this field represents the number of scans found that contain lunar-contaminated space views.	2855	2856	i	2	1	0		
Lunar Angle Threshold (Any space view whose lunar angle - see "Lunar Angles" field in data record - is less than this value is flagged as being "lunar contaminated" and is not used in the calibration.)	2857	2858	u	2	1	2	degrees	
Filler								
<zero fill>	2859	3072	i	2	107	0		

8.3.1.7.3 Data Record Format

8.3.1.7.3.1 NOAA KLM (Version 2, pre-April 28, 2005)

Table 8.3.1.7.3.1-1. NOAA KLM (Version 2, pre-April 22, 2005)

Field Name	Start Octet	End Octet	Data Type	Word Size	Scale Facter	Number of Words	Units	Notes
Data Set Creation Site ID CMS = Centre de Meteorologie Spatiale/France; DSS = Dundee Satellite Receiving Station/UK; NSS = National Environmental Satellite, Data and	1	3	c	3	0	1		

Information Service/USA; UKM = United Kingdom Meteorological Office/UK								
<ASCII blank = x20>	4	4	c	1	0			
OAA Level 1b Format Version Number 1=TIROS-N, NOAA-6 through NOAA-14; 2=NOAA-15, -16, -17(pre-April 28, 2005); 3=all satellites post-April 28, 2005.	5	6			u	2		
NOAA Level 1b Format Version Year (e.g., 1999)	7	8	u	2	0	1		
NOAA Level 1b Format Version Day of Year (e.g., 365)	9	10	u	2	0	1		
<Reserved for Logical Record Length> For Creation Site use only. Logical Record Length of NOAA Level 1b data set prior to processing.	11	12	u	2	0	1		
<Reserved for Block Size> For Creation Site use only. Block Size of NOAA Level 1b data set prior to processing.	13	14	u	2	0	1		
Count of Header Records in this Data Set	15	16	u	2	0	1		
<Zero Fill>	17	22	i	2	0	3		
Data Set Name	23	64	c	42	0	1		
Processing Block Identification	65	72	c	8	0	1		
NOAA Spacecraft Identification Code 2 = NOAA-16; 4 = NOAA-15; 6 = NOAA-17	73	74	u	2	0			
Instrument ID (0 = Engineering Model; 4 = Protoflight Model; 8 = Flight Model 2; 12 = Flight Model 3	75	76	u	2	0	1		
Data Type Code 1 = LAC; 2 = GAC; 3 = HRPT; 4 = TIP; 5 = HIRS; 6 = MSU; 7 = SSU; 8 = DCS; 9 = SEM; 10 = AMSU-A; 11 = AMSU-B	77	78	u	2	0	1		
TIP Source Code 0 = unused, GAC/HRPT/LAC data; 1 = GAC embedded AMSU and TIP; 2 = stored TIP; 3 = HRPT/LAC embedded AMSU and TIP, 4 = stored AIP	79	80	u	2	0	1		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	0	1		
Start of Data Set Year (e.g., 1999)	85	86	u	2	0	1		
Start of Data Set Day of Year (e.g., 365)	87	88	u	2	0	1		

Start of Data Set UTC Time of Day in Milliseconds	89	92	u	4	0	1		
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	0	1		
End of Data Set Year (e.g., 1999)	97	98	u	2	0	1		
End of Data Set Day of Year (e.g., 365)	99	100	u	2	0	1		
End of Data Set UTC Time of Day in Milliseconds	101	104	u	4	0	1		
Year of Last CPIDS Update (e.g., 1999)	105	106	u	2	0	1		
Day of Year of Last CPIDS Update (e.g., 365)	107	108	u	2	0	1		
Offset between Start of Scan and Center of first FOV in Milliseconds	109	110	i	2	0	1		
<Zero Fill>	111	120	i	2	0	6		
Instrument Status bits 31 - 29: <not defined> bit 28: processor check flag (0 = passed; 1 = failed) bit 27: scan control status (0 = running; 1 = aborted) bit 26: pixel data invalid flag (0 = valid; 1 = invalid) bit 25: scan synchronization (0 = error < 0.1 deg; 1 = error >= 0.1 deg) bit 24: mode transition flag (0 = transition complete; 1 = transition in progress) bit 23: module ID (msb) (0 = EM; 4 = PFM; 8 = FM2; 12 = FM3) bits 22 - 17: module ID bit 16: module ID (lsb) bit 15: RAM check flag (0 = passed; 1 = failed) bit 14: ROM check flag (0 = passed; 1 = failed) bit 13: memory checks status (0 = disabled; 1 = enabled) bit 12: space view select (lsb) bit 11: space view select (msb) bit 10: channel 18/19/20 on/off (relay 5 status) (0 = off; 1 = on) bit 9: channel 17 on/off (relay 4 status) (0 = off; 1 = on) bit 8: channel 16 on/off (relay 3 status) (0 = off; 1 = on) bit 7: stepped mode (0 = no; 1 = yes) bit 6: investigation mode (0 = no; 1 = yes) bit 5: parked in space view mode (0 = no; 1 = yes) bit 4: parked in nadir view mode (0 = no; 1 = yes) bit 3: parked in target view mode (0 = no; 1 = yes) bit 2: scan normal mode (0 = no; 1 = yes) bit 1: survival heater on/off (relay 2 status) (0 = off; 1 = on) bit 0: power on/off (relay 1 status) (0 = off; 1 = on)	121	124	u	4	0	1		
<Zero Fill>	125	126	i	2	0	1		
Record Number of Status Change (if 0, none occurred)	127	128	u	2	0	1		
Second Instrument Status (if previous word is 0, no change)	129	132	u	4	0	1		
Count of Data Records in this Data Set	133	134	u	2	0	1		
Count of Calibrated, Earth Located Scan Lines in this Data Set	135	136	u	2	0	1		

Count of Missing Scan Lines	137	138	u	2	0	1		
Count of Data Gaps in this Data Set	139	140	u	2	0	1		
Count of Data Frames Without Frame Sync Word Errors	141	142	u	2	0	1		
Count of PACS Detected TIP Parity Errors	143	144	u	2	0	1		
Sum of All Auxiliary Sync Errors Detected in the Input Data	145	146	u	2	0	1		
Time Sequence Error (0 = none; otherwise the record number of the first occurrence)	147	148	u	2		1		
Time Sequence Error Code These are bit flags taken from Scan Line Quality Flags Time Problem Code on data record reported in Time Sequence Error field above. If a bit is on (=1) then the statement is true. bits 15 - 8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time. bit 6: time field is bad and can't be inferred from the previous good time. bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. bit 4: start of a sequence that apparently repeats scan times that have been previously accepted. bits 3 - 0: <zero fill>	149	150	u	2	0	1		
SOCC Clock Update Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	151	152	u	2	0	1		
Earth Location Error Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	153	154	u	2	0	1		
Earth Location Error Code These are bit flags taken from Scan Line Quality Flags Earth Location Problem Code on data record reported in Earth Location Error Indicator field above. If a bit is on (=1) then the statement is true. bits 15 - 8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero filled. bit 6: earth location questionable because of questionable time code. (See time problem flags.) bit 5: earth location questionable -- only marginal agreement with reasonableness check. bit 4: earth location questionable -- fails reasonableness check. bit 3: earth location questionable because of antenna	155	156	u	2	0	1		

position check [rs060794.doc & rs062094.do1] bits 2-0: <zero fill>									
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudo noise (0 = normal data; 1 = P/N data) bit 1: tape direction (0 = time decrementing) bit 0: data mode (0 = test data; 1 = flight data)	157	158	u	2	0	1			
PACS Data Source (0 = unused; 1 = Fairbanks, AK; 2 = Wallops Island, VA; 3 = SOCC; 4=Svalbard, Norway; 5=Monterey, CA)	159	160	u	2	0	1			
<Reserved for the Ingester>	161	168	c	8	0	1			
<Reserved for Decommutation>	169	176	c	8	0	1			
<Zero Fill>	177	192	i	4	0	4			
CALIBRATION									
Instrument Temperature Sensor ID 0 = Mixer Temp of Ch 18 - 20; 1 = Mixer Temp of Ch 16	193	194	i	2	0				
<Zero Fill>	195	196	i	2	0				
Minimum Reference Temperature, mixer of Ch 18 - 20	197	198	i	2	2				
Nominal Reference Temperature, mixer of Ch 18 - 20	199	200	i	2	2				
Maximum Reference Temperature, mixer of Ch 18 - 20	201	202	i	2	2				
Minimum Reference Temperature, mixer of Ch 16	203	204	i	2	2				
Nominal Reference Temperature, mixer of Ch 16	205	206	i	2	2				
Maximum Reference Temperature, mixer of Ch 16	207	208	i	2	2				
Warm Target Fixed Bias Correction Ch 16 Min Temperature	209	210	i	2	3				
Warm Target Fixed Bias Correction Ch 16 Nominal Temperature	211	212	i	2	3				
Warm Target Fixed Bias Correction Ch 16 Max Temperature	213	214	i	2	3				
Space Fixed Bias Correction Ch 16	215	216	i	2	3				
Warm Target Fixed Bias Correction Ch 17 Min Temperature	217	218	i	2	3				
Warm Target Fixed Bias Correction Ch 17 Nominal Temperature	219	220	i	2	3				
Warm Target Fixed Bias Correction Ch 17 Max Temperature	221	222	i	2	3				
Space Fixed Bias Correction Ch 17	223	224	i	2	3				
Warm Target Fixed Bias Correction Ch 18 Min Temperature	225	226	i	2	3				
Warm Target Fixed Bias Correction Ch 18 Nominal Temperature	227	228	i	2	3				
Warm Target Fixed Bias Correction Ch 18 Max Temperature	229	230	i	2	3				
Space Fixed Bias Correction Ch 18	231	232	i	2	3				
Warm Target Fixed Bias Correction Ch 19 Min Temperature	233	234	i	2	3				
Warm Target Fixed Bias Correction Ch 19 Nominal Temperature	235	236	i	2	3				

Warm Target Fixed Bias Correction Ch 19 Max Temperature	237	238	i	2	3			
Space Fixed Bias Correction Ch 19	239	240	i	2	3			
Warm Target Fixed Bias Correction Ch 20 Min Temperature	241	242	i	2	3			
Warm Target Fixed Bias Correction Ch 20 Nominal Temperature	243	244	i	2	3			
Warm Target Fixed Bias Correction Ch 20 Max Temperature	245	246	i	2	3			
Space Fixed Bias Correction Ch 20	247	248	i	2	3			
Nonlinearity Coeff. Ch 1 at Reference Temperature 1	249	252	i	4	3			
Nonlinearity Coeff. Ch 1 at Reference Temperature 2	253	256	i	4	3			
Nonlinearity Coeff. Ch 1 at Reference Temperature 3	257	260	i	4	3			
Nonlinearity Coeff. Ch 2 at Reference Temperature 1	261	264	i	4	3			
Nonlinearity Coeff. Ch 2 at Reference Temperature 2	265	268	i	4	3			
Nonlinearity Coeff. Ch 2 at Reference Temperature 3	269	272	i	4	3			
Nonlinearity Coeff. Ch 3 at Reference Temperature 1	273	276	i	4	3			
Nonlinearity Coeff. Ch 3 at Reference Temperature 2	277	280	i	4	3			
Nonlinearity Coeff. Ch 3 at Reference Temperature 3	281	284	i	4	3			
Nonlinearity Coeff. Ch 4 at Reference Temperature 1	285	288	i	4	3			
Nonlinearity Coeff. Ch 4 at Reference Temperature 2	289	292	i	4	3			
Nonlinearity Coeff. Ch 4 at Reference Temperature 3	293	296	i	4	3			
Nonlinearity Coeff. Ch 5 at Reference Temperature 1	297	300	i	4	3			
Nonlinearity Coeff. Ch 5 at Reference Temperature 2	301	304	i	4	3			
Nonlinearity Coeff. Ch 5 at Reference Temperature 3	305	308	i	4	3			
<Zero Fill>	309	324	i	4	0			
TEMPERATURE-RADIANCE CONVERSION								
Temperature-radiance Ch 16 Central Wavenumber	325	328	i	4	6			
Temperature-radiance Ch 16 Constant 1	329	332	i	4	6			
Temperature-radiance Ch 16 Constant 2	333	336	i	4	6			
Temperature-radiance Ch 17 Central Wavenumber	337	340	i	4	6			
Temperature-radiance Ch 17 Constant 1	341	344	i	4	6			
Temperature-radiance Ch 17 Constant 2	345	348	i	4	6			
Temperature-radiance Ch 18 Central Wavenumber	349	352	i	4	6			
Temperature-radiance Ch 18 Constant 1	353	356	i	4	6			
Temperature-radiance Ch 18 Constant 2	357	360	i	4	6			
Temperature-radiance Ch 19 Central Wavenumber	361	364	i	4	6			
Temperature-radiance Ch 19 Constant 1	365	368	i	4	6			
Temperature-radiance Ch 19 Constant 2	369	372	i	4	6			
Temperature-radiance Ch 20 Central Wavenumber	373	376	i	4	6			
Temperature-radiance Ch 20 Constant 1	377	380	i	4	6			
Temperature-radiance Ch 20 Constant 2	381	384	i	4	6			
<Zero Fill>	385	400	i	4	0			
NAVIGATION								
Reference Ellipsoid Model ID The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately ± 65	401	408	c	8	0			

meters. (WGS-72 = World Geodetic Survey 1972)								
Nadir Earth Location Tolerance in Kilometers	409	410	u	2	1			
Earth Location Bit Field bits 15 - 2: <zero fill> bit 1: reasonableness test active (0 = inactive) bit 0: attitude error correction (0 = not corrected)	411	412	u	2	0			
<Zero Fill>	413	414	i	2	0			
Constant Roll Attitude Error in Degrees	415	416	i	2	3			
Constant Pitch Attitude Error in Degrees	417	418	i	2	3			
Constant Yaw Attitude Error in Degrees	419	420	i	2	3			
Epoch Year for Orbit Vector (e.g., 1999)	421	422	u	2	0			
Day of Epoch Year for Orbit Vector (e.g., 365)	423	424	u	2	0			
Epoch UTC Time of Day in Milliseconds for Orbit Vector	425	428	u	4	0			
Semi-major Axis in Kilometers	429	432	i	4	5			
Eccentricity	433	436	i	4	8			
Inclination in Degrees	437	440	i	4	5			
Argument of Perigee in Degrees	441	444	i	4	5			
Right Ascension of the Ascending Node in Degrees	445	448	i	4	5			
Mean Anomaly in Degrees	449	452	i	4	5			
Position Vector x Component in Kilometers	453	456	i	4	5			
Position Vector y Component in Kilometers	457	460	i	4	5			
Position Vector z Component in Kilometers	461	464	i	4	5			
Velocity Vector x-dot Component in Kilometers/second	465	468	i	4	8			
Velocity Vector y-dot Component in Kilometers/second	469	472	i	4	8			
Velocity Vector z-dot Component in Kilometers/second	473	476	I	4	8			
Earth/Sun Distance Ratio	477	480	u	4	6			
<Zero Fill>	481	496	i	4	0			
DIGITAL A CONVERSION								
Mixer 16 Temperature Coefficient 0	497	498	i	2	2			
Mixer 16 Temperature Coefficient 1	499	500	i	2	7			
Mixer 16 Temperature Coefficient 2	501	502	i	2	12			
Mixer 16 Temperature Coefficient 3	503	504	i	2	18			
Mixer 17 Temperature Coefficient 0	505	506	i	2	2			
Mixer 17 Temperature Coefficient 1	507	508	i	2	7			
Mixer 17 Temperature Coefficient 2	509	510	i	2	12			
Mixer 17 Temperature Coefficient 3	511	512	i	2	18			
Mixer 18, 19, & 20 Temperature Coefficient 0	513	514	i	2	2			
Mixer 18, 19, & 20 Temperature Coefficient 1	515	516	i	2	7			
Mixer 18, 19, & 20 Temperature Coefficient 2	517	518	i	2	12			
Mixer 18, 19, & 20 Temperature Coefficient 3	519	520	i	2	18			
FET Amplifier 16 Temperature Coefficient 0	521	522	i	2	2			
FET Amplifier 16 Temperature Coefficient 1	523	524	i	2	7			
FET Amplifier 16 Temperature Coefficient 2	525	526	i	2	12			
FET Amplifier 16 Temperature Coefficient 3	527	528	i	2	18			

FET Amplifier 17 Temperature Coefficient 0	529	530	i	2	2			
FET Amplifier 17 Temperature Coefficient 1	531	532	i	2	7			
FET Amplifier 17 Temperature Coefficient 2	533	534	i	2	12			
FET Amplifier 17 Temperature Coefficient 3	535	536	i	2	18			
FET Amplifier 18 Temperature Coefficient 0	537	538	i	2	2			
FET Amplifier 18 Temperature Coefficient 1	539	540	i	2	7			
FET Amplifier 18 Temperature Coefficient 2	541	542	i	2	12			
FET Amplifier 18 Temperature Coefficient 3	543	544	i	2	18			
FET Amplifier 19 Temperature Coefficient 0	545	546	i	2	2			
FET Amplifier 19 Temperature Coefficient 1	547	548	i	2	7			
FET Amplifier 19 Temperature Coefficient 2	549	550	i	2	12			
FET Amplifier 19 Temperature Coefficient 3	551	552	i	2	18			
FET Amplifier 20 Temperature Coefficient 0	553	554	i	2	2			
FET Amplifier 20 Temperature Coefficient 1	555	556	i	2	7			
FET Amplifier 20 Temperature Coefficient 2	557	558	i	2	12			
FET Amplifier 20 Temperature Coefficient 3	559	560	i	2	18			
Calibration Target Temperature 1 Coefficient 0	561	562	i	2	2			
Calibration Target Temperature 1 Coefficient 1	563	564	i	2	7			
Calibration Target Temperature 1 Coefficient 2	565	566	i	2	12			
Calibration Target Temperature 1 Coefficient 3	567	568	i	2	18			
Calibration Target Temperature 2 Coefficient 0	569	570	i	2	2			
Calibration Target Temperature 2 Coefficient 1	571	572	i	2	7			
Calibration Target Temperature 2 Coefficient 2	573	574	i	2	12			
Calibration Target Temperature 2 Coefficient 3	575	576	i	2	18			
Calibration Target Temperature 3 Coefficient 0	577	578	i	2	2			
Calibration Target Temperature 3 Coefficient 1	579	580	i	2	7			
Calibration Target Temperature 3 Coefficient 2	581	582	i	2	12			
Calibration Target Temperature 3 Coefficient 3	583	584	i	2	18			
Calibration Target Temperature 4 Coefficient 0	585	586	i	2	2			
Calibration Target Temperature 4 Coefficient 1	587	588	i	2	7			
Calibration Target Temperature 4 Coefficient 2	589	590	i	2	12			
Calibration Target Temperature 4 Coefficient 3	591	592	i	2	18			
Calibration Target Temperature 5 Coefficient 0	593	594	i	2	2			
Calibration Target Temperature 5 Coefficient 1	595	596	i	2	7			
Calibration Target Temperature 5 Coefficient 2	597	598	i	2	12			
Calibration Target Temperature 5 Coefficient 3	599	600	i	2	18			
Calibration Target Temperature 6 Coefficient 0	601	602	i	2	2			
Calibration Target Temperature 6 Coefficient 1	603	604	i	2	7			
Calibration Target Temperature 6 Coefficient 2	605	606	i	2	12			
Calibration Target Temperature 6 Coefficient 3	607	608	i	2	18			
Calibration Target Temperature 7 Coefficient 0	609	610	i	2	2			
Calibration Target Temperature 7 Coefficient 1	611	612	i	2	7			
Calibration Target Temperature 7 Coefficient 2	613	614	i	2	12			
Calibration Target Temperature 7 Coefficient 3	615	616	i	2	18			
Sub-reflector Temperature 1 Coefficient 0	617	618	i	2	2			
Sub-reflector Temperature 1 Coefficient 1	619	620	i	2	7			
Sub-reflector Temperature 1 Coefficient 2	621	622	i	2	12			
Sub-reflector Temperature 1 Coefficient 3	623	624	i	2	18			

LO Monitor Current Ch 16 Coefficient 0	625	626	i	2	3			
LO Monitor Current Ch 16 Coefficient 1	627	628	i	2	5			
LO Monitor Current Ch 16 Coefficient 2	629	630	i	2	0			
LO Monitor Current Ch 16 Coefficient 3	631	632	i	2	0			
LO Monitor Current Ch 17 Coefficient 0	633	634	i	2	3			
LO Monitor Current Ch 17 Coefficient 1	635	636	i	2	5			
LO Monitor Current Ch 17 Coefficient 2	637	638	i	2	0			
LO Monitor Current Ch 17 Coefficient 3	639	640	i	2	0			
LO Monitor Current Ch 18, 19, & 20 Coefficient 0	641	642	i	2	3			
LO Monitor Current Ch 18, 19, & 20 Coefficient 1	643	644	i	2	5			
LO Monitor Current Ch 18, 19, & 20 Coefficient 2	645	646	i	2	0			
LO Monitor Current Ch 18, 19, & 20 Coefficient 3	647	648	i	2	0			
LO Ch 16 Temperature Coefficient 0	649	650	i	2	2			
LO Ch 16 Temperature Coefficient 1	651	652	i	2	7			
LO Ch 16 Temperature Coefficient 2	653	654	i	2	12			
LO Ch 16 Temperature Coefficient 3	655	656	i	2	18			
LO Ch 17 Temperature Coefficient 0	657	658	i	2	2			
LO Ch 17 Temperature Coefficient 1	659	660	i	2	7			
LO Ch 17 Temperature Coefficient 2	661	662	i	2	12			
LO Ch 17 Temperature Coefficient 3	663	664	i	2	18			
LO Ch 18, 19, & 20 Temperature Coefficient 0	665	666	i	2	2			
LO Ch 18, 19, & 20 Temperature Coefficient 1	667	668	i	2	7			
LO Ch 18, 19, & 20 Temperature Coefficient 2	669	670	i	2	12			
LO Ch 18, 19, & 20 Temperature Coefficient 3	671	672	i	2	18			
PRT Bridge Voltage Coefficient 0	673	674	i	2	0			
PRT Bridge Voltage Coefficient 1	675	676	i	2	5			
PRT Bridge Voltage Coefficient 2	677	678	i	2	0			
PRT Bridge Voltage Coefficient 3	679	680	i	2	0			
PRT Board Temperature Coefficient 0	681	682	i	2	1			
PRT Board Temperature Coefficient 1	683	684	i	2	6			
PRT Board Temperature Coefficient 2	685	686	i	2	10			
PRT Board Temperature Coefficient 3	687	688	i	2	15			
<Zero Fill>	689	704	i	4	0			
ANALOG TELEMETRY CONVERSION								
+12V (A) Secondary Conversion Coefficient 0	705	708	i	4	6			
+12V (A) Secondary Conversion Coefficient 1	709	712	i	4	6			
+12V (A) Secondary Conversion Coefficient 2	713	716	i	4	6			
+12V (A) Secondary Conversion Coefficient 3	717	720	i	4	6			
-12V (A) Secondary Conversion Coefficient 0	721	724	i	4	6			
-12V (A) Secondary Conversion Coefficient 1	725	728	i	4	6			
-12V (A) Secondary Conversion Coefficient 2	729	732	i	4	6			
-12V (A) Secondary Conversion Coefficient 3	733	736	i	4	6			
+15V (A) Secondary Conversion Coefficient 0	737	740	i	4	6			
+15V (A) Secondary Conversion Coefficient 1	741	744	i	4	6			
+15V (A) Secondary Conversion Coefficient 2	745	748	i	4	6			
+15V (A) Secondary Conversion Coefficient 3	749	752	i	4	6			
-15V (A) Secondary Conversion Coefficient 0	753	756	i	4	6			
-15V (A) Secondary Conversion Coefficient 1	757	760	i	4	6			

-15V (A) Secondary Conversion Coefficient 2	761	764	i	4	6			
-15V (A) Secondary Conversion Coefficient 3	765	768	i	4	6			
+8v (A) Secondary Conversion Coefficient 0	769	772	i	4	6			
+8v (A) Secondary Conversion Coefficient 1	773	776	i	4	6			
+8v (A) Secondary Conversion Coefficient 2	777	780	i	4	6			
+8v (A) Secondary Conversion Coefficient 3	781	784	i	4	6			
+5V (D) Secondary Conversion Coefficient 0	785	788	i	4	6			
5V (D) Secondary Conversion Coefficient 1	789	792	i	4	6			
+5V (D) Secondary Conversion Coefficient 2	793	796	i	4	6			
+5V (D) Secondary Conversion Coefficient 3	797	800	i	4	6			
+5V (A) Secondary Conversion Coefficient 0	801	804	i	4	6			
+5V (A) Secondary Conversion Coefficient 1	805	808	i	4	6			
+5V (A) Secondary Conversion Coefficient 2	809	812	i	4	6			
+5V (A) Secondary Conversion Coefficient 3	813	816	i	4	6			
-5V (A) Secondary Conversion Coefficient 0	817	820	i	4	6			
-5V (A) Secondary Conversion Coefficient 1	821	824	i	4	6			
-5V (A) Secondary Conversion Coefficient 2	825	828	i	4	6			
-5V (A) Secondary Conversion Coefficient 3	829	832	i	4	6			
+5V Reference Secondary Conv Coefficient 0	833	836	i	4	6			
+5V Reference Secondary Conv Coefficient 1	837	840	i	4	6			
+5V Reference Secondary Conv Coefficient 2	841	844	i	4	6			
+5V Reference Secondary Conv Coefficient 3	845	848	i	4	6			
ICE Temperature Conversion Coefficient 0	849	852	i	4	6			
ICE Temperature Conversion Coefficient 1	853	856	i	4	6			
ICE Temperature Conversion Coefficient 2	857	860	i	4	6			
ICE Temperature Conversion Coefficient 3	861	864	i	4	6			
MDE Temperature Conversion Coefficient 0	865	868	i	4	6			
MDE Temperature Conversion Coefficient 1	869	872	i	4	6			
MDE Temperature Conversion Coefficient 2	873	876	i	4	6			
MDE Temperature Conversion Coefficient 3	877	880	i	4	6			
PEU Temperature Conversion Coefficient 0	881	884	i	4	6			
PEU Temperature Conversion Coefficient 1	885	888	i	4	6			
PEU Temperature Conversion Coefficient 2	889	892	i	4	6			
PEU Temperature Conversion Coefficient 3	893	896	i	4	6			
PSU Temperature Conversion Coefficient 0	897	900	i	4	6			
PSU Temperature Conversion Coefficient 1	901	904	i	4	6			
PSU Temperature Conversion Coefficient 2	905	908	i	4	6			
PSU Temperature Conversion Coefficient 3	909	912	i	4	6			
Scan Motor Temperature Conv Coefficient 0	913	916	i	4	6			
Scan Motor Temperature Conv Coefficient 1	917	920	i	4	6			
Scan Motor Temperature Conv Coefficient 2	921	924	i	4	6			
Scan Motor Temperature Conv Coefficient 3	925	928	i	4	6			
Scan Motor Current Conversion Coefficient 0	929	932	i	4	6			
Scan Motor Current Conversion Coefficient 1	933	936	i	4	6			
Scan Motor Current Conversion Coefficient 2	937	940	i	4	6			
Scan Motor Current Conversion Coefficient 3	941	944	i	4	6			
Ch 16 LO Temperature Conversion Coefficient 0	945	948	i	4	6			
Ch 16 LO Temperature Conversion Coefficient 1	949	952	i	4	6			

Ch 16 LO Temperature Conversion Coefficient 2	953	956	i	4	6			
Ch 16 LO Temperature Conversion Coefficient 3	957	960	i	4	6			
Ch 17 LO Temperature Conversion Coefficient 0	961	964	i	4	6			
Ch 17 LO Temperature Conversion Coefficient 1	965	968	i	4	6			
Ch 17 LO Temperature Conversion Coefficient 2	969	972	i	4	6			
Ch 17 LO Temperature Conversion Coefficient 3	973	976	i	4	6			
Ch 18/19/20 LO Temp Conversion Coefficient 0	977	980	i	4	6			
Ch 18/19/20 LO Temp Conversion Coefficient 1	981	984	i	4	6			
Ch 18/19/20 LO Temp Conversion Coefficient 2	985	988	i		6			
Ch 18/19/20 LO Temp Conversion Coefficient 3	989	992	i	4	6			
<Zero Fill>	993	1000	i	4	0			
BIAS CORRECTION 1								
Bias Correction Values 2 (values are given in counts) Ordered by channel, field of view (FOV), and transmitter as follows: Word 1: Channel 16, FOV 1, STX-1 Word 2: Channel 17, FOV 1, STX-1 Word 3: Channel 18, FOV 1, STX-1 Word 4: Channel 19, FOV 1, STX-1 Word 5: Channel 20, FOV 1, STX-1 Word 6: Channel 16, FOV 5, STX-1 ... (channel values for FOVs 5, 10, 15, ... , 90) ... Word 95: Channel 20, FOV 90, STX-1 Word 96: Channel 16, Space View, STX-1 ... Word 100: Channel 20, Space View, STX-1 Word 101: Channel 16, Warm View, STX-1 ... Word 106: Channel 16, FOV 1, STX-2 ... Word 211: Channel 16, FOV 1, STX-3 ... Word 316: Channel 16, FOV 1, SARR ... Word 420: Channel 20, Warm View, SARR	1001	1840	i	2	0			
<Zero Fill>	1841	1848	i	4	0			
TRANSMITTER 1								
Transmitter Reference Power Mean power at the time bias corrections were derived. (values are given in counts from 0 to 255, representing analog voltages from 0 to 5.1) Word 1: STX-1 Word 2: STX-2 Word 3: STX-3 Word 4: SARR	1849	1856	i	2	1			

<Zero Fill>	1857	1864	i	4	0			
"NEW" BIAS CORRECTION 2	1865	1864						
New" Bias Correction Values (values are given in counts) Ordered by channel, field of view (FOV), and cycle within 8 second period as follows: Word 1: Channel 16, FOV 1, Cycle 1 Word 2: Channel 17, FOV 1, Cycle 1 Word 3: Channel 18, FOV 1, Cycle 1 Word 4: Channel 19, FOV 1, Cycle 1 Word 5: Channel 20, FOV 1, Cycle 1 Word 6: Channel 16, FOV 3, Cycle 1 ... (channel correction values for FOVs 3, 6, 9, ... , 90) ... Word 155: Channel 20, FOV 90, Cycle 1 Word 156: Channel 16, Space View, Cycle 1 ... Word 160: Channel 20, Space View, Cycle 1 Word 161: Channel 16, Warm View, Cycle 1 ... Word 165: Channel 20, Warm View, Cycle 1 Word 166: Channel 16, FOV 1, Cycle 2 ... Word 330: Channel 20, Warm View, Cycle 2 Word 331: Channel 16, FOV 1, Cycle 3 ... Word 495: Channel 20, Warm View, Cycle 3	1865	2854	i	2	0			
Filler 2								
<Zero Fill>	2855	3072	i	2	0			

8.3.1.7.3.2 NOAA-N Format (Version 4, post-January 25, 2006, All Spacecraft)

Table 8.3.1.7.3.2-1 NOAA-N Format (Version 4, post-January 25, 2006, All Spacecraft)

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
FILE IDENTIFICATION								
Data Set Creation Site ID CMS=Centre de Meteorologie Spatiale/France DSS=Dundee Satellite Receiving Station/UK NSS=National Environmental Satellite, Data and Information Service/USA UKM=United Kingdom Meteorological Office/UK	1	3	c	3	1	0		
<ASCII blank = x20>	4	4	c	1	1	0		
Level 1b Format Version Number	5	6	u	2	1	0		
Level 1b Format Version Year *(four digits, e.g., 2000)*	7	8	u	2	1	0		
Level 1b Format Version Day of Year *(e.g., 365)*	9	10	u	2	1	0		

<Reserved for Logical Record Length> *(For Creation Site use only. Logical Record Length of source 1b data set prior to processing.)*	11	12	u	2	1	0	octets	
<Reserved for Block Size> *(For Creation Site use only. Block Size of source 1b data set prior to processing.)*	13	14	u	2	1	0	octets	
Count of Header Records in this Data Set	15	16	u	2	1	0		
<Zero Fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		
NOAA Spacecraft Identification Code 2=NOAA-L 4=NOAA-K 6=NOAA-M	73	74	u	2	1	0		
Instrument ID 4=protoflight model (PFM) (NOAA-K) 8=FM 2 (NOAA-L) 12=FM 3 (NOAA-M)	75	76	u	2	1	0		
Data Type Code 11=AMSU-B	77	78	u	2	1	0		
TIP Source Code 0=unused, i.e., GAC/HRPT/LAC data 1=GAC-embedded AMSU and TIP 2=stored TIP (STIP) 3=HRPT/LAC-embedded AMSU and TIP 4=stored AIP (SAIP)	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year *(four digits, e.g., 2000)*	85	86	u	2	1	0		
Start of Data Set Day of Year *(e.g., 365)*	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	millisec	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year *(four digits, e.g., 2000)*	97	98	u	2	1	0		
End of Data Set Day of Year *(e.g., 365)*	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	millisec	
Year of Last CPIDS Update *(four digits, e.g., 2000)*	105	106	u	2	1	0		
Day of Year of Last CPIDS Update *(e.g., 365)*	107	108	u	2	1	0		
Offset between Start of Scan and Center of First FOV	109	110	i	2	1	0	millisec	
<Zero Fill>	111	120	i	2	5	0		

DATA SET QUALITY INDICATORS								
Instrument Status bits 31-29: <not defined> bit 28: processor check flag (0=passed; 1=failed) bit 27: scan control status (0=running; 1=aborted) bit 26: pixel data invalid flag (0=valid; 1=invalid) bit 25: scan synchronization (0=error < 0.1 deg; 1=error >= 0.1 deg) bit 24: mode transition flag (0=transition complete; 1=transition in progress) bit 23: module ID, msb bits 22 - 17: module ID bit 16: module ID, lsb bit 15: RAM check flag (0=passed; 1=failed) bit 14: ROM check flag (0=passed; 1=failed) bit 13: memory checks status (0=disabled; 1=enabled) bit 12: space view select, lsb bit 11: space view select, msb bit 10: channel 18/19/20 (relay 5 status) (0=off; 1=on) bit 9: channel 17 (relay 4 status) (0=off; 1=on) bit 8: channel 16 (relay 3 status) (0=off; 1=on) bit 7: stepped mode (0=no; 1=yes) bit 6: investigation mode (0=no; 1=yes) bit 5: parked in space view mode (0=no; 1=yes) bit 4: parked in nadir view mode (0=no; 1=yes) bit 3: parked in target view mode (0=no; 1=yes) bit 2: scan normal mode (0=no; 1=yes) bit 1: survival heater (relay 2 status) (0=off; 1=on) bit 0: power (relay 1 status) (0=off; 1=on)	121	124	u	4	1	0		
<Zero Fill>	125	126	i	2	1	0		
Record Number of Status Change *(if 0, none occurred)*	127	128	u	2	1	0		
Second Instrument Status *(if previous word is 0, no change)*	129	132	u	4	1	0		
Count of Data Records in this Data Set	133	134	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set	135	136	u	2	1	0		
Count of Missing Scan Lines	137	138	u	2	1	0		
Count of Data Gaps in this Data Set	139	140	u	2	1	0		
Count of Data Frames Without Frame Sync Word Errors	141	142	u	2	1	0		
Count of PACS Detected TIP Parity Errors	143	144	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data	145	146	u	2	1	0		
Time Sequence Error 0=none; otherwise, the record number of the first occurrence	147	148	u	2	1	0		

Time Sequence Error Code *(These are bit flags taken from "Scan Line Quality Flags [Time Problem Code]" on data record reported in "Time Sequence Error" field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity); may be associated with a spacecraft clock update bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	149	150	u	2	1	0		
SOCC Clock Update Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	151	152	u	2	1	0		
Earth Location Error Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	153	154	u	2	1	0		
Earth Location Error Code *(These are bit flags taken from "Scan Line Quality Flags [Earth Location Problem Code]" on data record reported in "Earth Location Error Indicator" field above. If a bit is on (=1) then the statement is true.)* bits 15-8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bit 3: earth location questionable because of antenna position check bits 2-0: <zero fill>	155	156	u	2	1	0		
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudonoise 0=normal data; 1=pseudonoise data bit 1: tape direction (0=reverse playback, time decrementing) bit 0: data mode 0=test data; 1=flight data	157	158	u	2	1	0		
Data Source 0=unused 1=Fairbanks, AK 2=Wallops Is., VA 3=SOCC 4=Svalbard, Norway 5=Monterey, CA	159	160	u	2	1	0		
<Reserved for the Ingester>	161	168	c	8	1	0		
<Reserved for Decommutation>	169	176	c	8	1	0		
<Zero Fill>	177	192	i	4	4	0		
CALIBRATION								

Instrument Temperature Sensor ID 0=mixer temperature of channels 18-20 1=mixer temperature of channel 16	193	194	i	2	1	0		
<Zero Fill>	195	196	i	2	1	0		
Minimum Reference Temperature, mixer of Ch 18 - 20	197	198	i	2	1	2	K	
Nominal Reference Temperature, mixer of Ch 18 - 20	199	200	i	2	1	2	K	
Maximum Reference Temperature, mixer of Ch 18 - 20	201	202	i	2	1	2	K	
Minimum Reference Temperature, mixer of Ch 16	203	204	i	2	1	2	K	
Nominal Reference Temperature, mixer of Ch 16	205	206	i	2	1	2	K	
Maximum Reference Temperature, mixer of Ch 16	207	208	i	2	1	2	K	
Warm Target Fixed Bias Correction Ch 16 Min Temperature	209	210	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 16 Nominal Temperature	211	212	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 16 Max Temperature	213	214	i	2	1	3	K	
Space Fixed Bias Correction Ch 16	215	216	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 17 Min Temperature	217	218	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 17 Nominal Temperature	219	220	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 17 Max Temperature	221	222	i	2	1	3	K	
Space Fixed Bias Correction Ch 17	223	224	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 18 Min Temperature	225	226	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 18 Nominal Temperature	227	228	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 18 Max Temperature	229	230	i	2	1	3	K	
Space Fixed Bias Correction Ch 18	231	232	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 19 Min Temperature	233	234	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 19 Nominal Temperature	235	236	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 19 Max Temperature	237	238	i	2	1	3	K	
Space Fixed Bias Correction Ch 19	239	240	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 20 Min Temperature	241	242	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 20 Nominal Temperature	243	244	i	2	1	3	K	
Warm Target Fixed Bias Correction Ch 20 Max Temperature	245	246	i	2	1	3	K	
Space Fixed Bias Correction Ch 20	247	248	i	2	1	3	K	
Nonlinearity Coeff. Ch 1 at Reference Temperature 1	249	252	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 1 at Reference Temperature 2	253	256	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 1 at Reference Temperature 3	257	260	i	4	1	3	m^2-sr-cm^{-1}/mW	

Nonlinearity Coeff. Ch 2 at Reference Temperature 1	261	264	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 2 at Reference Temperature 2	265	268	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 2 at Reference Temperature 3	269	272	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 3 at Reference Temperature 1	273	276	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 3 at Reference Temperature 2	277	280	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 3 at Reference Temperature 3	281	284	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 4 at Reference Temperature 1	285	288	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 4 at Reference Temperature 2	289	292	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 4 at Reference Temperature 3	293	296	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 5 at Reference Temperature 1	297	300	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 5 at Reference Temperature 2	301	304	i	4	1	3	m^2-sr-cm^{-1}/mW	
Nonlinearity Coeff. Ch 5 at Reference Temperature 3	305	308	i	4	1	3	m^2-sr-cm^{-1}/mW	
<Zero Fill>	309	324	i	4	4	0		
TEMPERATURE-RADIANCE CONVERSION								
Temperature-radiance Ch 16 Central Wavenumber	325	328	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 16 Constant 1	329	332	i	4	1	6		
Temperature-radiance Ch 16 Constant 2	333	336	i	4	1	6		
Temperature-radiance Ch 17 Central Wavenumber	337	340	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 17 Constant 1	341	344	i	4	1	6		
Temperature-radiance Ch 17 Constant 2	345	348	i	4	1	6		
Temperature-radiance Ch 18 Central Wavenumber	349	352	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 18 Constant 1	353	356	i	4	1	6		
Temperature-radiance Ch 18 Constant 2	357	360	i	4	1	6		
Temperature-radiance Ch 19 Central Wavenumber	361	364	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 19 Constant 1	365	368	i	4	1	6		
Temperature-radiance Ch 19 Constant 2	369	372	i	4	1	6		
Temperature-radiance Ch 20 Central Wavenumber	373	376	i	4	1	6	cm^{-1}	
Temperature-radiance Ch 20 Constant 1	377	380	i	4	1	6		
Temperature-radiance Ch 20 Constant 2	381	384	i	4	1	6		
<Zero Fill>	385	400	i	4	4	0		
NAVIGATION								
Reference Ellipsoid Model ID *(The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately +/- 65 meters.)* WGS-72=World Geodetic Survey 1972	401	408	c	8	1	0		
Nadir Earth Location Tolerance	409	410	u	2	1	1	km	

Earth Location Bit Field bits 15-3: <zero fill> bit 2: dynamic attitude error correction 0=not performed; 1=performed bit 1: reasonableness test 0=inactive; 1=active bit 0: constant attitude error correction 0=not performed; 1=performed	411	412	u	2	1	0		
<Zero Fill>	413	414	i	2	1	0		
Constant Roll Attitude Error	415	416	i	2	1	3	degrees	
Constant Pitch Attitude Error	417	418	i	2	1	3	degrees	
Constant Yaw Attitude Error	419	420	i	2	1	3	degrees	
Epoch Year for Orbit Vector	421	422	u	2	1	0		
Day of Epoch Year for Orbit Vector	423	424	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	425	428	u	4	1	0	millisec	
Semi-major Axis *(at the orbit vector epoch time)*	429	432	i	4	1	5	km	
Eccentricity *(at the orbit vector epoch time)*	433	436	i	4	1	8		
Inclination *(at the orbit vector epoch time)*	437	440	i	4	1	5	degrees	
Argument of Perigee *(at the orbit vector epoch time)*	441	444	i	4	1	5	degrees	
Right Ascension of the Ascending Node *(at the orbit vector epoch time)*	445	448	i	4	1	5	degrees	
Mean Anomaly *(at the orbit vector epoch time)*	449	452	i	4	1	5	degrees	
Position Vector X Component *(at the orbit vector epoch time)*	453	456	i	4	1	5	km	
Position Vector Y Component *(at the orbit vector epoch time)*	457	460	i	4	1	5	km	
Position Vector Z Component *(at the orbit vector epoch time)*	461	464	i	4	1	5	km	
Velocity Vector X-dot Component *(at the orbit vector epoch time)*	465	468	i	4	1	8	km/sec	
Velocity Vector Y-dot Component *(at the orbit vector epoch time)*	469	472	i	4	1	8	km/sec	
Velocity Vector Z-dot Component *(at the orbit vector epoch time)*	473	476	i	4	1	8	km/sec	
Earth/Sun Distance Ratio *(at the orbit vector epoch time; relative to the mean distance of 1 AU)*	477	480	u	4	1	6		
<Zero Fill>	481	496	i	4	4	0		
DIGITAL A TELEMETRY CONVERSION								
Mixer 16 Temperature Coefficient 0	497	498	i	2	1	2	K	
Mixer 16 Temperature Coefficient 1	499	500	i	2	1	7	K/count	
Mixer 16 Temperature Coefficient 2	501	502	i	2	1	12	K/count^2	
Mixer 16 Temperature Coefficient 3	503	504	i	2	1	18	K/count^3	
Mixer 17 Temperature Coefficient 0	505	506	i	2	1	2	K	
Mixer 17 Temperature Coefficient 1	507	508	i	2	1	7	K/count	
Mixer 17 Temperature Coefficient 2	509	510	i	2	1	12	K/count^2	
Mixer 17 Temperature Coefficient 3	511	512	i	2	1	18	K/count^3	
Mixer 18, 19, & 20 Temperature Coefficient 0	513	514	i	2	1	2	K	

Mixer 18, 19, & 20 Temperature Coefficient 1	515	516	i	2	1	7	K/count	
Mixer 18, 19, & 20 Temperature Coefficient 2	517	518	i	2	1	12	K/count^2	
Mixer 18, 19, & 20 Temperature Coefficient 3	519	520	i	2	1	18	K/count^3	
FET Amplifier 16 Temperature Coefficient 0	521	522	i	2	1	2	K	
FET Amplifier 16 Temperature Coefficient 1	523	524	i	2	1	7	K/count	
FET Amplifier 16 Temperature Coefficient 2	525	526	i	2	1	12	K/count^2	
FET Amplifier 16 Temperature Coefficient 3	527	528	i	2	1	18	K/count^3	
FET Amplifier 17 Temperature Coefficient 0	529	530	i	2	1	2	K	
FET Amplifier 17 Temperature Coefficient 1	531	532	i	2	1	7	K/count	
FET Amplifier 17 Temperature Coefficient 2	533	534	i	2	1	12	K/count^2	
FET Amplifier 17 Temperature Coefficient 3	535	536	i	2	1	18	K/count^3	
FET Amplifier 18 Temperature Coefficient 0	537	538	i	2	1	2	K	
FET Amplifier 18 Temperature Coefficient 1	539	540	i	2	1	7	K/count	
FET Amplifier 18 Temperature Coefficient 2	541	542	i	2	1	12	K/count^2	
FET Amplifier 18 Temperature Coefficient 3	543	544	i	2	1	18	K/count^3	
FET Amplifier 19 Temperature Coefficient 0	545	546	i	2	1	2	K	
FET Amplifier 19 Temperature Coefficient 1	547	548	i	2	1	7	K/count	
FET Amplifier 19 Temperature Coefficient 2	549	550	i	2	1	12	K/count^2	
FET Amplifier 19 Temperature Coefficient 3	551	552	i	2	1	18	K/count^3	
FET Amplifier 20 Temperature Coefficient 0	553	554	i	2	1	2	K	
FET Amplifier 20 Temperature Coefficient 1	555	556	i	2	1	7	K/count	
FET Amplifier 20 Temperature Coefficient 2	557	558	i	2	1	12	K/count^2	
FET Amplifier 20 Temperature Coefficient 3	559	560	i	2	1	18	K/count^3	
Calibration Target Temperature 1 Coefficient 0	561	562	i	2	1	2	K	
Calibration Target Temperature 1 Coefficient 1	563	564	i	2	1	7	K/count	
Calibration Target Temperature 1 Coefficient 2	565	566	i	2	1	12	K/count^2	
Calibration Target Temperature 1 Coefficient 3	567	568	i	2	1	18	K/count^3	
Calibration Target Temperature 2 Coefficient 0	569	570	i	2	1	2	K	
Calibration Target Temperature 2 Coefficient 1	571	572	i	2	1	7	K/count	
Calibration Target Temperature 2 Coefficient 2	573	574	i	2	1	12	K/count^2	
Calibration Target Temperature 2 Coefficient 3	575	576	i	2	1	18	K/count^3	
Calibration Target Temperature 3 Coefficient 0	577	578	i	2	1	2	K	
Calibration Target Temperature 3 Coefficient 1	579	580	i	2	1	7	K/count	
Calibration Target Temperature 3 Coefficient 2	581	582	i	2	1	12	K/count^2	
Calibration Target Temperature 3 Coefficient 3	583	584	i	2	1	18	K/count^3	
Calibration Target Temperature 4 Coefficient 0	585	586	i	2	1	2	K	
Calibration Target Temperature 4 Coefficient 1	587	588	i	2	1	7	K/count	
Calibration Target Temperature 4 Coefficient 2	589	590	i	2	1	12	K/count^2	
Calibration Target Temperature 4 Coefficient 3	591	592	i	2	1	18	K/count^3	
Calibration Target Temperature 5 Coefficient 0	593	594	i	2	1	2	K	
Calibration Target Temperature 5 Coefficient 1	595	596	i	2	1	7	K/count	
Calibration Target Temperature 5 Coefficient 2	597	598	i	2	1	12	K/count^2	
Calibration Target Temperature 5 Coefficient 3	599	600	i	2	1	18	K/count^3	
Calibration Target Temperature 6 Coefficient 0	601	602	i	2	1	2	K	
Calibration Target Temperature 6 Coefficient 1	603	604	i	2	1	7	K/count	
Calibration Target Temperature 6 Coefficient 2	605	606	i	2	1	12	K/count^2	
Calibration Target Temperature 6 Coefficient 3	607	608	i	2	1	18	K/count^3	
Calibration Target Temperature 7 Coefficient 0	609	610	i	2	1	2	K	
Calibration Target Temperature 7 Coefficient 1	611	612	i	2	1	7	K/count	
Calibration Target Temperature 7 Coefficient 2	613	614	i	2	1	12	K/count^2	

Calibration Target Temperature 7 Coefficient 3	615	616	i	2	1	18	K/count^3	
Sub-reflector Temperature 1 Coefficient 0	617	618	i	2	1	2	K	
Sub-reflector Temperature 1 Coefficient 1	619	620	i	2	1	7	K/count	
Sub-reflector Temperature 1 Coefficient 2	621	622	i	2	1	12	K/count^2	
Sub-reflector Temperature 1 Coefficient 3	623	624	i	2	1	18	K/count^3	
LO Monitor Current Ch 16 Coefficient 0	625	626	i	2	1	3	mA	
LO Monitor Current Ch 16 Coefficient 1	627	628	i	2	1	5	mA/count	
LO Monitor Current Ch 16 Coefficient 2	629	630	i	2	1	0	mA/count^2	
LO Monitor Current Ch 16 Coefficient 3	631	632	i	2	1	0	mA/count^3	
LO Monitor Current Ch 17 Coefficient 0	633	634	i	2	1	3	mA	
LO Monitor Current Ch 17 Coefficient 1	635	636	i	2	1	5	mA/count	
LO Monitor Current Ch 17 Coefficient 2	637	638	i	2	1	0	mA/count^2	
LO Monitor Current Ch 17 Coefficient 3	639	640	i	2	1	0	mA/count^3	
LO Monitor Current Ch 18, 19, & 20 Coefficient 0	641	642	i	2	1	3	mA	
LO Monitor Current Ch 18, 19, & 20 Coefficient 1	643	644	i	2	1	5	mA/count	
LO Monitor Current Ch 18, 19, & 20 Coefficient 2	645	646	i	2	1	0	mA/count^2	
LO Monitor Current Ch 18, 19, & 20 Coefficient 3	647	648	i	2	1	0	mA/count^3	
LO Ch 16 Temperature Coefficient 0	649	650	i	2	1	2	K	
LO Ch 16 Temperature Coefficient 1	651	652	i	2	1	7	K/count	
LO Ch 16 Temperature Coefficient 2	653	654	i	2	1	12	K/count^2	
LO Ch 16 Temperature Coefficient 3	655	656	i	2	1	18	K/count^3	
LO Ch 17 Temperature Coefficient 0	657	658	i	2	1	2	K	
LO Ch 17 Temperature Coefficient 1	659	660	i	2	1	7	K/count	
LO Ch 17 Temperature Coefficient 2	661	662	i	2	1	12	K/count^2	
LO Ch 17 Temperature Coefficient 3	663	664	i	2	1	18	K/count^3	
LO Ch 18, 19, & 20 Temperature Coefficient 0	665	666	i	2	1	2	K	
LO Ch 18, 19, & 20 Temperature Coefficient 1	667	668	i	2	1	7	K/count	
LO Ch 18, 19, & 20 Temperature Coefficient 2	669	670	i	2	1	12	K/count^2	
LO Ch 18, 19, & 20 Temperature Coefficient 3	671	672	i	2	1	18	K/count^3	
PRT Bridge Voltage Coefficient 0	673	674	i	2	1	0	V	
PRT Bridge Voltage Coefficient 1	675	676	i	2	1	5	V/count	
PRT Bridge Voltage Coefficient 2	677	678	i	2	1	0	V/count^2	
PRT Bridge Voltage Coefficient 3	679	680	i	2	1	0	V/count^3	
PRT Board Temperature Coefficient 0	681	682	i	2	1	1	K	
PRT Board Temperature Coefficient 1	683	684	i	2	1	6	K/count	
PRT Board Temperature Coefficient 2	685	686	i	2	1	10	K/count^2	
PRT Board Temperature Coefficient 3	687	688	i	2	1	15	K/count^3	
<Zero Fill>	689	704	i	4	4	0		
ANALOG TELEMETRY CONVERSION								
+12V (A) Secondary Conversion Coefficient 0	705	708	i	4	1	6	V	
+12V (A) Secondary Conversion Coefficient 1	709	712	i	4	1	6	V/count	
+12V (A) Secondary Conversion Coefficient 2	713	716	i	4	1	6	V/count^2	
+12V (A) Secondary Conversion Coefficient 3	717	720	i	4	1	6	V/count^3	
-12V (A) Secondary Conversion Coefficient 0	721	724	i	4	1	6	V	
-12V (A) Secondary Conversion Coefficient 1	725	728	i	4	1	6	V/count	
-12V (A) Secondary Conversion Coefficient 2	729	732	i	4	1	6	V/count^2	
-12V (A) Secondary Conversion Coefficient 3	733	736	i	4	1	6	V/count^3	
+15V (A) Secondary Conversion Coefficient 0	737	740	i	4	1	6	V	
+15V (A) Secondary Conversion Coefficient 1	741	744	i	4	1	6	V/count	
+15V (A) Secondary Conversion Coefficient 2	745	748	i	4	1	6	V/count^2	

+15V (A) Secondary Conversion Coefficient 3	749	752	i	4	1	6	V/count^3	
-15V (A) Secondary Conversion Coefficient 0	753	756	i	4	1	6	V	
-15V (A) Secondary Conversion Coefficient 1	757	760	i	4	1	6	V/count	
-15V (A) Secondary Conversion Coefficient 2	761	764	i	4	1	6	V/count^2	
-15V (A) Secondary Conversion Coefficient 3	765	768	i	4	1	6	V/count^3	
+8v (A) Secondary Conversion Coefficient 0	769	772	i	4	1	6	V	
+8v (A) Secondary Conversion Coefficient 1	773	776	i	4	1	6	V/count	
+8v (A) Secondary Conversion Coefficient 2	777	780	i	4	1	6	V/count^2	
+8v (A) Secondary Conversion Coefficient 3	781	784	i	4	1	6	V/count^3	
+5V (D) Secondary Conversion Coefficient 0	785	788	i	4	1	6	V	
+5V (D) Secondary Conversion Coefficient 1	789	792	i	4	1	6	V/count	
+5V (D) Secondary Conversion Coefficient 2	793	796	i	4	1	6	V/count^2	
+5V (D) Secondary Conversion Coefficient 3	797	800	i	4	1	6	V/count^3	
+5V (A) Secondary Conversion Coefficient 0	801	804	i	4	1	6	V	
+5V (A) Secondary Conversion Coefficient 1	805	808	i	4	1	6	V/count	
+5V (A) Secondary Conversion Coefficient 2	809	812	i	4	1	6	V/count^2	
+5V (A) Secondary Conversion Coefficient 3	813	816	i	4	1	6	V/count^3	
-5V (A) Secondary Conversion Coefficient 0	817	820	i	4	1	6	V	
-5V (A) Secondary Conversion Coefficient 1	821	824	i	4	1	6	V/count	
-5V (A) Secondary Conversion Coefficient 2	825	828	i	4	1	6	V/count^2	
-5V (A) Secondary Conversion Coefficient 3	829	832	i	4	1	6	V/count^3	
+5V Reference Secondary Conv Coefficient 0	833	836	i	4	1	6	V	
+5V Reference Secondary Conv Coefficient 1	837	840	i	4	1	6	V/count	
+5V Reference Secondary Conv Coefficient 2	841	844	i	4	1	6	V/count^2	
+5V Reference Secondary Conv Coefficient 3	845	848	i	4	1	6	V/count^3	
ICE Temperature Conversion Coefficient 0	849	852	i	4	1	6	K	
ICE Temperature Conversion Coefficient 1	853	856	i	4	1	6	K/count	
ICE Temperature Conversion Coefficient 2	857	860	i	4	1	6	K/count^2	
ICE Temperature Conversion Coefficient 3	861	864	i	4	1	6	K/count^3	
MDE Temperature Conversion Coefficient 0	865	868	i	4	1	6	K	
MDE Temperature Conversion Coefficient 1	869	872	i	4	1	6	K/count	
MDE Temperature Conversion Coefficient 2	873	876	i	4	1	6	K/count^2	
MDE Temperature Conversion Coefficient 3	877	880	i	4	1	6	K/count^3	
PEU Temperature Conversion Coefficient 0	881	884	i	4	1	6	K	
PEU Temperature Conversion Coefficient 1	885	888	i	4	1	6	K/count	
PEU Temperature Conversion Coefficient 2	889	892	i	4	1	6	K/count^2	
PEU Temperature Conversion Coefficient 3	893	896	i	4	1	6	K/count^3	
PSU Temperature Conversion Coefficient 0	897	900	i	4	1	6	K	
PSU Temperature Conversion Coefficient 1	901	904	i	4	1	6	K/count	
PSU Temperature Conversion Coefficient 2	905	908	i	4	1	6	K/count^2	
PSU Temperature Conversion Coefficient 3	909	912	i	4	1	6	K/count^3	
Scan Motor Temperature Conv Coefficient 0	913	916	i	4	1	6	K	
Scan Motor Temperature Conv Coefficient 1	917	920	i	4	1	6	K/count	
Scan Motor Temperature Conv Coefficient 2	921	924	i	4	1	6	K/count^2	
Scan Motor Temperature Conv Coefficient 3	925	928	i	4	1	6	K/count^3	
Scan Motor Current Conversion Coefficient 0	929	932	i	4	1	6	A	
Scan Motor Current Conversion Coefficient 1	933	936	i	4	1	6	A/count	
Scan Motor Current Conversion Coefficient 2	937	940	i	4	1	6	A/count^2	
Scan Motor Current Conversion Coefficient 3	941	944	i	4	1	6	A/count^3	
Ch 16 LO Temperature Conversion Coefficient 0	945	948	i	4	1	6	K	

Ch 16 LO Temperature Conversion Coefficient 1	949	952	i	4	1	6	K/count	
Ch 16 LO Temperature Conversion Coefficient 2	953	956	i	4	1	6	K/count^2	
Ch 16 LO Temperature Conversion Coefficient 3	957	960	i	4	1	6	K/count^3	
Ch 17 LO Temperature Conversion Coefficient 0	961	964	i	4	1	6	K	
Ch 17 LO Temperature Conversion Coefficient 1	965	968	i	4	1	6	K/count	
Ch 17 LO Temperature Conversion Coefficient 2	969	972	i	4	1	6	K/count^2	
Ch 17 LO Temperature Conversion Coefficient 3	973	976	i	4	1	6	K/count^3	
Ch 18/19/20 LO Temp Conversion Coefficient 0	977	980	i	4	1	6	K	
Ch 18/19/20 LO Temp Conversion Coefficient 1	981	984	i	4	1	6	K/count	
Ch 18/19/20 LO Temp Conversion Coefficient 2	985	988	i	4	1	6	K/count^2	
Ch 18/19/20 LO Temp Conversion Coefficient 3	989	992	i	4	1	6	K/count^3	
<Zero Fill>	993	1000	i	4	2	0		
BIAS CORRECTION								
Bias Correction Values *(ordered by channel, field of view (FOV), and transmitter)* Word 1: Channel 16, FOV 1, STX-1 Word 2: Channel 17, FOV 1, STX-1 Word 3: Channel 18, FOV 1, STX-1 Word 4: Channel 19, FOV 1, STX-1 Word 5: Channel 20, FOV 1, STX-1 Word 6: Channel 16, FOV 5, STX-1 ... (channel values for FOVs 5, 10, 15, ... , 90) ... Word 95: Channel 20, FOV 90, STX-1 Word 96: Channel 16, space view, STX-1 ... Word 100: Channel 20, space view, STX-1 Word 101: Channel 16, warm view, STX-1 ... Word 106: Channel 16, FOV 1, STX-2 ... Word 211: Channel 16, FOV 1, STX-3 ... Word 316: Channel 16, FOV 1, SARR ... Word 420: Channel 20, warm view, SARR	1001	1840	i	2	420	0	counts	
<Zero Fill>	1841	1848	i	4	2	0		
TRANSMITTER								
Transmitter Reference Power *(Mean power at the time bias corrections were derived. Range: 0 to 255, representing analog voltages from 0 to 5.1.)* Word 1: STX-1 Word 2: STX-2 Word 3: STX-3 Word 4: SARR	1849	1856	i	2	4	1	counts	
<Zero Fill>	1857	1864	i	4	2	0		
"NEW" BIAS CORRECTION								

"New" Bias Correction Values *(ordered by channel, field of view (FOV), and cycle within 8 second period)* Word 1: Channel 16, FOV 1, cycle 1 Word 2: Channel 17, FOV 1, cycle 1 Word 3: Channel 18, FOV 1, cycle 1 Word 4: Channel 19, FOV 1, cycle 1 Word 5: Channel 20, FOV 1, cycle 1 Word 6: Channel 16, FOV 3, cycle 1 ... (channel correction values for FOVs 3, 6, 9, ... , 90) ... Word 155: Channel 20, FOV 90, cycle Word 156: Channel 16, space view, cycle 1 ... Word 160: Channel 20, space view, cycle 1 Word 161: Channel 16, warm view, cycle 1 ... Word 165: Channel 20, warm view, cycle 1 Word 166: Channel 16, FOV 1, cycle 2 ... Word 330: Channel 20, warm view, cycle 2 Word 331: Channel 16, FOV 1, cycle 3 ... Word 495: Channel 20, warm view, cycle 3	1865	2854	i	2	495	0	counts	
LUNAR CONTAMINATION								
Count of Scans Containing Lunar-Contaminated Space Views *(Also, see bits 7 and 6 of "Scan Line Quality Flags [Additional Calibration Problem Code]" field in data record.)* -1=the detection algorithm for lunar contamination is turned off 0=the detection algorithm is turned on: no scans containing lunar-contaminated space views were found >0=the detection algorithm is turned on: the value in this field represents the number of scans found that contain lunar-contaminated space views	2855	2856	i	2	1	0		
Lunar Angle Threshold *(Any space view whose lunar angle--see "Lunar Angles" field in data record--is less than this value is flagged as being "lunar contaminated" and is not used in the calibration.)*	2857	2858	u	2	1	2	degrees	
FILLER								
<Zero Fill>	2859	3072	i	2	107	0		

8.3.1.8 SEM-2 Data Sets

This section describes the data characteristics and data format of Space Environment Monitor (SEM/2) data. The data stream is processed by NESDIS into NOAA Level 1b format and delivered electronically to NOAA's Space Environment Center (SEC) in Boulder, Colorado. SEC reformats the data and is responsible for archiving and distributing the data. As such, the NOAA Level 1b format described in this section is ephemeral and should not be used for data retrieved from the SEC archive.

8.3.1.8.1 Data Characteristics

NESDIS extracts SEM-2 Minor Frame data from words 20 and 21 of the TIP Minor Frame telemetry at a rate of twenty 8-bit words per second. The characteristics of the SEM-2 instrument are summarized in Table 1.2.2.4-1.

8.3.1.8.2 Header Records

The SEM-2 Data Set Header Record format is documented in Table 8.3.1.8.2-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.8.2-1. Format of SEM-2 Data Set Header Record.

GENERAL INFORMATION	Start Octet	End Octet	DT	Word Size	Number of Words	SF	Notes
Data Set Creation Site ID CMS = Centre de Meteorologie Spatiale/France; DSS = Dundee Satellite Receiving Station/UK; NSS = National Environmental Satellite, Data and Information Service/USA; UKM = United Kingdom Meteorological Office/UK)	1	3	c	3	1	0	
<ASCII blank = x20>	4	4	c	1	1	0	
NOAA Level 1b Format Version Number 1=TIROS-N, NOAA-6 through NOAA-14; 2=NOAA-15, -16, -17 (pre-April 28, 2005); 3=all satellites post-April 28, 2005 4=cloud mask flag (CLAVR-x)-Jan 25, 2006	5	6	u	2	1	0	
NOAA Level 1b Format Version Year (e.g., 1999)	7	8	u	2	1	0	
NOAA Level 1b Format Version Day of Year (e.g., 365)	9	10	u	2	1	0	
<Reserved for Logical Record Length> For Creation Site use only. Logical Record Length of NOAA Level 1b data set prior to processing.	11	12	u	2	1	0	
<Reserved for Block Size> For Creation Site use only. Block Size of NOAA Level 1b data set prior to processing.	13	14	u	2	1	0	
Count of Header Records in this Data Set	15	16	u	2	1	0	
<zero fill>	17	18	i	2	1	0	
Data Set Name	19	60	c	42	1	0	
Processing Block Identification	61	68	c	8	1	0	

NOAA Spacecraft Identification Code 2=NOAA-15 4=NOAA-16 6=NOAA-17 7=NOAA-18 8=NOAA-N' 11=MetOp-1 12=MetOp-A	69	70	u	2	1	0	
Instrument ID <Undefined> The SEM Instrument ID is not included in telemetry, so this field is undefined. PFM (Prototype Flight Model) is on NOAA-15, FM1 is on NOAA-16, and FM2 is on NOAA-17.	71	72	u	2	1	0	
Data Type Code 9 = SEM	73	74	u	2	1	0	
TIP Source Code (normally 000) 0 = unused, GAC/HRPT/LAC data; 1 = GAC embedded AMSU and TIP; 2 = stored TIP; 3 = HRPT/LAC embedded AMSU and TIP; 4 = stored AIP)	75	76	u	2	1	0	
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	77	80	u	4	1	0	
Start of Data Set Year (4 digit year)	81	82	u	2	1	0	
Start of Data Set Day of Year (3 digit day)	83	84	u	2	1	0	
Start of Data Set UTC Time of Day in Milliseconds	85	88	u	4	1	0	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	89	92	u	4	1	0	
End of Data Set Year (4 digit year)	93	94	u	2	1	0	
End of Data Set Day of Year (3 digit day)	95	96	u	2	1	0	
End of Data Set UTC Time of Day in Milliseconds	97	100	u	4	1	0	
Year of Last CPIDS Update (4 digit year)	101	102	u	2	1	0	1
Day of Year of Last CPIDS Update (3 digit day)	103	104	u	2	1	0	1
<zero fill>	105	112	i	4	2	0	
DATA SET QUALITY INDICATORS							
Instrument Status (contents of TIP word 8, status 1 and status 2 at the beginning time of the data set) bytes 113 and 114:<zero fill> bit 8, MSB of byte 115: Microprocessor System ID bit 7: TED IFC flag bit 6: MEPED IFC flag bit 5: MSB of the TED electron pulse discriminator level setting bit 4: LSB of the TED electron pulse discriminator level setting	113	116	u	4	1	0	

bits 3-2: <zero fill> bit 1, LSB of byte 115: <zero fill> bit 8, MSB of byte 116: Microprocessor A Watch Dog error bit 7: Microprocessor B Watch Dog error bit 6: MSB of the TED proton pulse discriminator level setting bit 5: LSB of the TED proton pulse discriminator level setting bits 4-1: <zero fill>							
<zero fill>	117	118	i	2	1	0	
Record Number of Status Change in TIP word 8 (if 0, none occurred)	119	120	u	2	1	0	2
TIP word 8, status 1 and status 2 after a Status change	121	124	u	4	1	0	2
Count of 2-second Data Records in this Data Set	125	126	u	2	1	0	3
Count of Data Gaps in this Data Set	127	128	u	2	1	0	
Count of TIP Minor Frames Without Frame Sync Word Errors	129	130	u	2	1	0	3
Count of PACS Detected TIP Parity Errors	131	132	u	2	1	0	
Sum of All Sync Errors Detected in the Input Data	133	134	u	2	1	0	
Time Sequence Error (0 = no time error; otherwise the record number of the first occurrence of an error)	135	136	u	2	1	0	
Time Sequence Error Code These are bit flags taken from Scan Line Quality Flags Time Problem Code on data record reported in Time Sequence Error field above. If a bit is on (=1) then the statement is true. byte 137: <zero fill> bit 8: MSB of byte 138: time field is bad but can probably be inferred from the previous good time. bit 7: time field is bad and cannot be inferred from the previous good time. bit 6: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may or may not be associated with a spacecraft clock update. bit 5: start of a sequence that apparently repeats scan times that have been previously accepted. bits 4-1: <zero fill>	137	138	u	2	1	0	
SOCC Clock Update Indicator (0 = no clock update during this orbit; otherwise the record number of the first occurrence. Typically, there is a spacecraft clock update of a few milliseconds each day.)	139	140	u	2	1	0	

Earth Location Error Indicator (0 = none during this orbit; otherwise the record number of the first occurrence)	141	142	u	2	1	0	
Earth Location Error Code (If there is an earth location error, the following provides details of that error. If a bit is on (=1) then the statement is true.) byte 143: <zero fill> bit 8: MSB of byte 144: not earth located because of bad time; earth location fields zero filled. bit 7: earth location questionable because of questionable time code. (See time problem flags.) bit 6: earth location questionable -- only marginal agreement with reasonableness check. bit 5: earth location questionable -- fails reasonableness check. bits 4-1: <zero fill>	143	144	u	2	1	0	
PACS Status Bit Field (These bytes are not used in SEM data processing.) byte 145: <zero fill> bit 8: MSB of byte 146: <zero fill> bits 7-4: <zero fill> bit 3: 0 if data is pseudo noise bit 2: tape direction (0 = reverse playback, 1=forward) bit 1: LSB of byte 146: data mode (0 = test data; 1 = flight data; normally, the value of byte 146 is decimal 3, bits 1 and 2 set to 1.)	145	146	u	2	1	0	
PACS Data Source 0 = unused; 1 = Fairbanks, AK; 2 = Wallops Island, VA; 3 = SOCC 4 = Svalbard, Norway 5 = Monterey, CA	147	148	u	2	1	0	
<zero fill>	149	176	i	28	1	0	
NAVIGATION							
Reference Ellipsoid Model ID (The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately ± 65 meters. In ASCII.) WGS-72 = World Geodetic Survey 1972 JGM3 =Joint Gravity Model 3	177	184	c	8	1	0	
Nadir Earth Location Tolerance in Kilometers	185	186	u	2	1	1	4
Earth Location Bit Field bits 15 - 2: <zero fill> bit 1: reasonableness test active (0 = inactive) bit 0: attitude error correction (0 = not corrected)	187	188	u	2	1	0	

<zero fill>	189	190	i	2	1	0	
Constant Roll Attitude Error in Degrees	191	192	i	2	1	3	
Constant Pitch Attitude Error in Degrees	193	194	i	2	1	3	
Constant Yaw Attitude Error in Degrees	195	196	i	2	1	3	
Epoch Year for Orbit Vector (4 digit year)	197	198	u	2	1	0	
Day of Epoch Year for Orbit Vector (3 digit day)	199	200	u	2	1	0	
Epoch UTC Time of Day in Milliseconds for Orbit Vector	201	204	u	4	1	0	
Semi-major Axis in Kilometers	205	208	i	4	1	5	
Orbit eccentricity	209	212	i	4	1	8	5
Orbit Inclination in Degrees (This is used in SEM data processing.)	213	216	i	4	1	5	
Argument of Perigee in Degrees	217	220	i	4	1	5	
Right Ascension of the Ascending Node in Degrees	221	224	i	4	1	5	
Mean Anomaly in Degrees	225	228	i	4	1	5	
Satellite location, x coordinate in Kilometers	229	232	i	4	1	5	6
Satellite location, y coordinate in Kilometers	233	236	i	4	1	5	6
Satellite location, z coordinate in Kilometers	237	240	i	4	1	5	6
Satellite Velocity Vector x Component in Kilometers/second	241	244	i	4	1	8	7
Satellite Velocity Vector y Component in Kilometers/second	245	248	i	4	1	8	7
Satellite Velocity Vector z Component in Kilometers/second	249	252	i	4	1	8	7
Earth/Sun Distance Ratio	253	256	u	4	1	6	
<zero fill>	257	272	i	4	4	0	
ANALOG TELEMETRY CONVERSION							
<Reserved> (<Zero fill> at this time)	273	492	i	2	110	0	
FILLER							
<Reserved>	493	512	i	4	5	0	

NOTES:

1. CPIDS refers to a comprehensive calibration data set and these bytes provide the year and day of year of the latest data set update.
2. If the contents of status1 or status2 change during the course of this data set, bytes 119-120 contain the data record number of that change. Bytes 121-124 contain the contents of status1 and status2 after that change with the bit assignments in bytes 113-116. Normally a change in the contents of status1 and status2 is associated with an in-flight calibration.
3. Bytes 125-126 contain the number of 2-second SEM data records in this incremental file. Bytes 129-130 contain the number of TIP minor frames within this incremental file that did not have sync errors. If there were no sync error records, the integer number in bytes 129-130 should be exactly 20 times the integer number in bytes 125-126 because there are 20 TIP minor frames in each 2-second data record. If sync errors are present, the value of bytes 129-130 will be less than 20 times the integer value of bytes 125-126.
4. This is not used in SEM processing.
5. A survey of header files shows the eccentricity (and the semi-major axis) varies a great deal day to day. The orbit eccentricity given in the 2-line NORAD orbit elements obtained from http://celestrak.com/NORAD/elements/noaa.txt do not show nearly that variation and the NORAD eccentricities generally do not agree with those obtained from this header record. There is no explanation for this.
6. These values are in earth-centered inertial coordinates. That is, the Z axis directed north parallel to earth's axis of rotation, X axis directed toward the vernal equinox, and the Y axis completing the right handed Cartesian coordinate system.

7. The coordinate system is earth-centered inertial.

8.3.1.8.3 Data Records

A sequence of SEM data records follow the header record in an incremental file. Usually an incremental file contains about one orbit's data or about 6000 seconds. A single physical 512 byte data record in the file contains two seconds of data so that each incremental file contains about 3000 physical data records. Each two second data record contains 20 TIP minor frames of data, parsed so that the first minor frame is always mod 020. That is, the first TIP minor frame in each data record is either 000, 020, 040, 060, 080, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280 or 300. Table 8.3.1.8.3-1 contains a byte-by-byte description of the contents of an incremental file data record.

The SEM-2 Data Record format is documented in Table 8.3.1.8.3-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.8.3-1. Format of SEM-2 Data Record.

FRAME INFORMATION	Start Octet	End Octet	DT	Word Size	Number of Words	SF	Notes
TIP Major Frame number (0 to 7)	1	2	u	2	1	0	
TIP Minor Frame Number (cyclic: 0, 20,...,280,300; at start of this 2-second data record)	3	4	u	2	1	0	
Minor Frame Year (at start of this 2-second data record)	5	6	u	2	1	0	
Minor Frame Day of Year (at start of this 2-second data record)	7	8	u	2	1	0	
<zero fill>	9	10	i	2	1	0	
Satellite Clock Drift Delta (relative to UTC; nominally near zero)	11	12	i	2	1	0	
Minor Frame UTC Time of Day in milliseconds	13	16	u	4	1	0	
Satellite Travel Direction indicator (required for calculation of sensor look angles with respect to the geomagnetic field) 0 = northbound data; 1 = southbound data	17	18	u	2	1	0	1
<zero fill>	19	28	i	2	5	0	
QUALITY INDICATORS							
Quality Indicator Flags (These bytes indicate various timing and earth location problems according to the following bit assignments. If a bit is on (=1) then the statement is true.) bit 8 (MSB of byte 29): this 2-second frame is not valid bit 7: time sequence error in this 2-second frame bit 6: data gap precedes this 2-second frame bit 5: <Zero fill>	29	32	u	4	1	0	

bit 4: earth location data not available (bytes 65-72 set to zero) bit 3: first good time following a spacecraft clock update bit 2: SEM instrument status changed beginning with this frame bit 1 (LSB of byte 29): <zero fill> bytes 30-32: <zero fill>							
Time Quality and Satellite Location Quality Flags (If a bit is on (=1) then the statement is true. These bytes provide details of the problems flagged in bytes 29-32.) Time Problem Code byte 33: <zero fill> bit 8, MSB of byte 34: time is bad but can probably be inferred from the previous good time. bit 7: time is bad and cannot be inferred from the previous good time. bit 6: there is a time discontinuity, including a spacecraft clock update. bit 5: this time starts a sequence that duplicates previous times bits 4-1: <zero fill> byte 35: <zero fill> bit 8, MSB of byte 36: No earth location because of bad time; bytes 65-72: <zero fill> bit 7: Earth location questionable because of questionable time code. bit 6: Earth location questionable - marginal agreement with reasonableness check. bit 5: Earth location questionable -- fails reasonableness check. bits 4-1: <zero fill>	33	36	u	4	1	0	
<zero fill>	37	48	i	2	6	0	
NAVIGATION							
Navigation Status Bit Field bits 31-17: <zero fill> bit 16: 1 = earth location corrected for TIP Euler angles (not applicable for SEM) bits 15 - 12: earth location indicator (0 = earth location available; 1 = user ephemeris files greater than 24 hours old; 2 = no earth location available) bits 11 - 8: spacecraft attitude control (0 =	49	52	u	4	1	0	2

operating in YGC or NOMINAL mode; 1 = operating in another mode; 2 = attitude exceeds nominal tolerance; 3 = both 1 and 2) bits 7 - 4: attitude SMODE (0 = NOMINAL mode; 1 = rate nulling mode; 2 = YGC mode; 3 = search mode; 4 = coast mode) bits 3 - 0: attitude PWTIP$AC (0 = NOMINAL mode/no test; 1 = yaw axis test in progress; 2 = roll axis test in progress; 3 = pitch axis test in progress)							
Time Associated with TIP Euler Angles (Seconds)	53	56	u		1	0	
TIP Euler Angles in Degrees Bytes 57-58: Roll Euler Angle Bytes 59-60: Pitch Euler Angle Bytes 61-62: Yaw Euler Angle	57	62	i	2	3	3	3
Spacecraft Altitude above Reference Ellipsoid in km	63	64	u	2	1	1	
Earth Location (Geodetic subsatellite point normal to ellipsoid; North latitude and East longitude are positive) Bytes 65-68: Latitude in Degrees Bytes 69-72: Longitude in Degrees	65	72	i	4	2	4	
<zero fill>	73	80	i	4	2	0	
SEM MINOR FRAME							
Missing Data Bit Flags (20 entries each for TIP words 20 and 21; used for instances when data from TIP words 20 and 21 could not be recovered because of bit sync loss and the data padded with value 000. This information is important to the further processing of SEM-2 data.) Bits 8-1, byte 81: <zero fill> Bits 8-1, byte 82: <zero fill> Bits 8-1, byte 83: <zero fill> bit 1 (LSB of byte 83): if 1, TIP word 21, minor frame + 19 is padded bit 8 (MSB of byte 84): if 1, TIP word 20, minor frame + 19 is padded bit 7: if 1, TIP word 21, minor frame + 14 is padded bit 6: if 1, TIP word 20, minor frame + 14 is padded bit 5: if 1, TIP word 21, minor frame + 13 is padded bit 4: if 1, TIP word 20, minor frame + 13 is	81	88	u	4	2	0	

padded bit 3: if 1, TIP word 21, minor frame +12 is padded bit 2: if 1, TIP word 21, minor frame + 12 is padded bit 1 (LSB of byte 85): if 1, TIP word 21, minor frame + 11 is padded bit 8 (MSB of byte 86): if 1, TIP word 20, minor frame +11 is padded bit 7: if 1, TIP word 21, minor frame +10 is padded bit 6: if 1, TIP word 20, minor frame +10 is padded bit 5: if 1, TIP word 21, minor frame +09 is padded bit 4: if 1, TIP word 20, minor frame +09 is padded bit 3: if 1, TIP word 21, minor frame +08 is padded bit 2: if 1, TIP word 20, minor frame +08 is padded bit 1 (LSB of byte 86): if 1, TIP word 21, minor frame +07 is padded bit 8 (MSB of byte 87): if 1, TIP word 20, minor frame +07 is padded bit 7: if 1, TIP word 21, minor frame +06 is padded bit 6: if 1, TIP word 20, minor frame +06 is padded bit 5: if 1, TIP word 21, minor frame +05 is padded bit 4: if 1, TIP word 20, minor frame +05 is padded bit 3: if 1, TIP word 21, minor frame +04 is padded bit 2: if 1, TIP word 20, minor frame +04 is padded bit 1 (LSB of byte 87): if 1, TIP word 21, minor frame +03 is padded bit 8 (MSB of byte 88): if 1, TIP word 20, minor frame +03 is padded bit 7: if 1, TIP word 21, minor frame +02 is padded bit 6: if 1, TIP word 20, minor frame +02 is padded bit 5: if 1, TIP word 21, minor frame +01 is padded bit 4: if 1, TIP word 20, minor frame +01 is padded bit 3: if 1, TIP word 21, minor frame +00 is padded bit 2: if 1, TIP word 20, minor frame +00 is padded bit 1 (LSB of byte 88): <zero fill>							
TIP word 20, start TIP minor frame plus 00	89	89	u	1	1	0	
TIP word 21, start TIP minor frame plus 00	90	90	u	1	1	0	
TIP word 20, start TIP minor frame plus 01	91	91	u	1	1	0	
TIP word 21, start TIP minor frame plus 01	92	92	u	1	1	0	
TIP word 20, start TIP minor frame plus 02	93	93	u	1	1	0	
TIP word 21, start TIP minor frame plus 02	94	94	u	1	1	0	
TIP word 20, start TIP minor frame plus 03	95	95	u	1	1	0	
TIP word 21, start TIP minor frame plus 03	96	96	u	1	1	0	
TIP word 20, start TIP minor frame plus 04	97	97	u	1	1	0	
TIP word 21, start TIP minor frame plus 04	98	98	u	1	1	0	
TIP word 20, start TIP minor frame plus 05	99	99	u	1	1	0	
TIP word 21, start TIP minor frame plus 05	100	100	u	1	1	0	
TIP word 20, start TIP minor frame plus 06	101	101	u	1	1	0	
TIP word 21, start TIP minor frame plus 06	102	102	u	1	1	0	

TIP word 20, start TIP minor frame plus 07	103	103	u	1	1	0	
TIP word 21, start TIP minor frame plus 07	104	104	u	1	1	0	
TIP word 20, start TIP minor frame plus 08	105	105	u	1	1	0	
TIP word 21, start TIP minor frame plus 08	106	106	u	1	1	0	
TIP word 20, start TIP minor frame plus 09	107	107	u	1	1	0	
TIP word 21, start TIP minor frame plus 09	108	108	u	1	1	0	
TIP word 20, start TIP minor frame plus 10	109	109	u	1	1	0	
TIP word 21, start TIP minor frame plus 10	110	110	u	1	1	0	
TIP word 20, start TIP minor frame plus 11	111	111	u	1	1	0	
TIP word 21, start TIP minor frame plus 11	112	112	u	1	1	0	
TIP word 20, start TIP minor frame plus 12	113	113	u	1	1	0	
TIP word 21, start TIP minor frame plus 12	114	114	u	1	1	0	
TIP word 20, start TIP minor frame plus 13	115	115	u	1	1	0	
TIP word 21, start TIP minor frame plus 13	116	116	u	1	1	0	
TIP word 20, start TIP minor frame plus 14	117	117	u	1	1	0	
TIP word 21, start TIP minor frame plus 14	118	118	u	1	1	0	
TIP word 20, start TIP minor frame plus 15	119	119	u	1	1	0	
TIP word 21, start TIP minor frame plus 15	120	120	u	1	1	0	
TIP word 20, start TIP minor frame plus 16	121	121	u	1	1	0	
TIP word 21, start TIP minor frame plus 16	122	122	u	1	1	0	
TIP word 20, start TIP minor frame plus 17	123	123	u	1	1	0	
TIP word 21, start TIP minor frame plus 17	124	124	u	1	1	0	
TIP word 20, start TIP minor frame plus 18	125	125	u	1	1	0	
TIP word 21, start TIP minor frame plus 18	126	126	u	1	1	0	
TIP word 20, start TIP minor frame plus 19	127	127	u	1	1	0	
TIP word 21, start TIP minor frame plus 19	128	128	u	1	1	0	
<zero fill>	129	132	i	4	1	0	
DIGITAL B TELEMETRY							
Invalid Word Bit Flags (Indicates whether updated instrument status data from TIP word 8 is in this minor frame.) bit 8, MSB of byte 133: if 0, update of microprocessor System ID occurred bit 7: if 0, update of TED IFC status occurred bit 6: if 0, update of MEPED IFC status occurred bit 5: if 0, update of TED electron PHD level occurred, MSB bit 4: if 0, update of TED electron PHD level occurred, LSB bits 3-1: <zero fill>bit 8, MSB of byte 134: if 0, update of microprocessor A Watchdog occurred bit 7: if 0, update of microprocessor B Watchdog occurred bit 6: if 0, update of TED proton PHD level occurred, MSB bit 5: if 0, update of TED proton PHD level occurred, LSB bits 4-1: <zero fill>	133	134	u	2	1	0	
Digital B Telemetry (contain the actual instrument status bits)bit 8, MSB of byte 135: Microprocessor System ID, 0 for processor A bit 7: TED IFC (0 = off; 1 = on)bit 6: MEPED	135	136	u	2	1	0	

IFC (0 = off; 1 = on)bit 5: TED electron PHD level, MSB bit 4: TED electron PHD level, LSB bits 3-1: <zero fill>bit 8, MSB of byte 136: microprocessor A watchdog, 0=normal bit 7: microprocessor B watchdog, 0=normal bit 6: TED proton PHD level, MSB bit 5: TED proton PHD level, LSB bits 4-1: <zero fill>							
<zero fill>	137	140		4	1	0	
ANALOG HOUSEKEEPING DATA (TIP)							
Invalid Word Bit Flags (TIP word 09 and 10 housekeeping availability flags. These indicate whether updated instrument analog housekeeping data from TIP words 9 and 10 are in this minor frame.)byte 141: <zero fill>bit 8, MSB of byte 142: <zero fill>bit 7: if 0, update of primary bus voltage monitor bit 6: if 0, update of backup pitch coil driver monitor (attitude control)bit 5: if 0, update of primary pitch coil driver monitor (attitude control) bit 4: if 0, update of backup roll/yaw coil driver bit 3: if 0, update of primary roll/yaw coil driver bit 2: if 0, update of Z axis gyro torque current monitor bit 1, LSB of byte 142: if 0, update of Y axis gyro torque current monitor bit 8, MSB of byte 143: if 0, update of X axis gyro torque current monitor bit 7: if 0, update of S gyro torque current monitor bit 6: if 0, update of DPU temperature monitor bit 5: if 0, update of TED temperature monitor bit 4: if 0, update MEPED proton telescope temperature monitor bit 3: if 0, update of MEPED circuit temperature monitor bit 2: if 0, update of Omni detector bias voltage monitor bit 1, LSB of byte 143: if 0, update of TED proton CEM high voltage monitor bit 8, MSB of byte 144: if 0, update of TED electron CEM high voltage monitor bit 7: if 0, update of TED sweep voltage monitor bit 6: if 0, update of TED +5V monitor bit 5: if 0, update of MEPED +5V monitor bit 4: if 0, update of DPU +5V monitor bit 3: if 0, update of microprocessor B +5V monitor bit 2: if 0, update of microprocessor A +5V monitor bit 1, LSB of byte 144: <zero fill>	141	144	u	4	1	0	
Analog Telemetry (Actual values of TIP analog housekeeping words 09 and 10 refreshed only when the corresponding bit in bytes 142-144 is set to 0.)byte 145: microprocessor A +5V monitor byte 146: microprocessor B +5V monitor byte 147: DPU +5V Monitor byte 148: MEPED +5V Monitor	145	166	u	1	22	0	

byte 149: TED +5V Monitor byte 150: TED Sweep Voltage monitor byte 151: TED electron CEM High Voltage monitor byte 152: TED proton CEM High Voltage monitor byte 153: MEPED Omni detector Bias Voltage monitor byte 154: MEPED electronics circuit temperature monitor byte 155: MEPED proton telescope temperature monitor byte 156: TED Temperature monitor byte 157: DPU Temperature monitor byte 158: S Gyro Torque Current monitor byte 159: X Gyro Torque Current monitor byte 160: Y Gyro Torque Current monitor byte 161: Z Gyro Torque Current monitor byte 162: Primary Roll/Yaw Coil Driver current monitor byte 163: Backup Roll/Yaw Coil Driver current monitor byte 164: Primary Pitch Coil Driver current monitor byte 165: Backup Pitch Coil Driver current monitor byte 166: Primary Bus Voltage monitor							
FILLER							
<zero fill>	167	512	i	2	173	0	
NOTES: 1. The direction of satellite travel is required for calculation of sensor look angles with respect to the geomagnetic field. 2. A survey of the data in the incremental files shows that bytes 49-52 are always zero and it seems that satellite attitude quality flags are not introduced in the SEM-2 incremental data file. 3. A survey of the data in the incremental files shows that bytes 53-62 are always zero and it seems that satellite attitude status data are not introduced in the SEM-2 incremental data file.							

An extensive survey of SEM incremental data files was done to verify this documentation. Of the bytes between 29 and 62 inclusive, that include navigation error flags and information about the Euler angles, only bytes 29, 34, and 36, ever show values other than 000. The conclusion is that navigation/attitude status flags (bytes 49-52) and Euler angle information (bytes 53-62) are not provided.

Moreover, certain bits in bytes 29, 34 and 36, that are defined as providing status, never seem to be used. Specifically, bit 3 in byte 29 (first good time following a spacecraft clock update) is never set to 1; bit 8 in byte 34 (time is bad but probably can be inferred from previous time) nor bit 5 in byte 34 (this time starts a sequence that duplicates previous times) are never set to 1; bit 6 in byte 36 (earth location questionable - marginal agreement with reasonableness check) nor bit 5 in byte 36 (earth location questionable - fails reasonableness check) are never set to 1.

The study did confirm that bit 2 in byte 29 (SEM instrument status changed beginning this frame) is a reliable indicator of when the TED or MEPED are undergoing IFC. The combination of bit 8 in byte 29 (this 2-second frame is not valid) set to 1, bit 7 in byte 29 (time sequence error in this 2-second frame) set to 1, bit 4 in byte 29 (earth location data not available) set to 1, and bit 8 in byte 36 (no earth location because of bad time) set to 1 proves to be a reliable indicator of zero fill in the earth location field (bytes 65 to 72).

Information about when the magnetic torque coils were energized, a procedure required to maintain spacecraft attitude control, was introduced into the SEM data record. This was done because of concern that when the coils were energized the measurement of low energy particles by the TED would be compromised. The analysis to determine whether or not the TED observations are influenced by the torque coils has not been done. However, it was verified that data in bytes 162-165 do reflect those times when the roll/yaw and pitch coils are energized and so that analysis of any impact on TED can be done.

8.3.1.9 MHS Data Sets

This section describes the characteristics and format of Microwave Humidity Sounder (MHS) data sets.

8.3.1.9.1 <u>Data Characteristics</u>

Although the Microwave Humidity Sounder (MHS) is a new instrument on NOAA-N and -N‘, it shares some commonality with the AMSU-B that it replaces. Therefore, similarities with the AMSU-B Level 1b format were maintained as much as possible. For example, a number of MHS Level 1b fields that are similar to AMSU-B Level 1b fields (e.g., calibration coefficients, earth location data, and earth FOV counts) have the same byte offsets as their corresponding AMSU-B fields. Also, the MHS Level 1b record length is 3,072 bytes, which is the same as the AMSU-B Level 1b record length. However, in addition to some obvious telemetry differences, nomenclature used by the instrument manufacturer in MHS documentation is used in this document for consistency. For example, the channels are referred to as H1, H2, H3, H4 and H5, as opposed to 16, 17, 18, 19 and 20, respectively, as is the case for AMSU-B.

The MHS instrument, and its associated interface unit (the MIU) on the NOAA satellites, can operate in a variety of different modes and output several different packets, or formats, of data. The MHS Level 1b format given in this document is applicable for any mode of the MHS instrument and for the “nominal” modes of the MIU, i.e., the modes in which the MIU passes through its received MHS data without replacement with its own telemetry data. The MHS Level 1b data will not contain any MIU telemetry. (Note: the MIU is a NOAA-specific piece of hardware. Therefore, references to the MIU and how it affects the data stream are only applicable to the MHS data from the NOAA satellites.)

Table 8.3.1.9.1-1 shows the nine MHS modes in which packet data is output and the three types of packets that are output in these modes.

Table 8.3.1.9.1-1. MHS modes.	
MHS Mode	MHS Output
Power-on	Empty Science Data Packet
Warm-up	Empty Science Data Packet
Standby	Empty Science Data Packet
Scan	Science Data Packet
Fixed View	Science Data Packet
Self-test	Extended Test Data Packet
Safeing	Empty Science Data Packet
Fault	Empty Science Data Packet
Memory Dump	Extended Memory Data Packet

An empty science data packet has the same format as the science data packet. However, except for the initial 39 bytes of housekeeping data, the packet is empty - i.e., zero filled. In fixed view mode, the instrument is not scanning, but is set, or fixed, at one view position. Therefore, all of its normal views of earth, space, and the on-board calibration target (OBCT) are of this fixed view position instead. When an empty science data packet is received or when the instrument is in fixed view mode, calibration is unable to be performed. Therefore, scans generated in either of these two situations are marked as unusable.

Technically, memory dump mode is not an actual mode of the MHS. Instead, the MHS can be commanded to perform a memory dump during most of its modes. The extended memory data packet generated during a memory dump supersedes the packet normally output during that particular mode. For the sake of simplicity, this document treats memory dump mode as a unique MHS mode.

According to Table 8.3.1.9.1-1, when MHS is in "self-test" mode or "memory dump" mode, it will output an extended test data packet or extended memory dump packet, respectively. In all other modes, including "scan" mode, it will output a (possibly empty) science data packet. The instrument will normally be in "scan" mode. Each different type of packet output by MHS results in a different type of data record output to the MHS Level 1b data set. This document provides Level 1b format specifications for all three types of data records. However, no matter the type of data record, they all share the same basic three-part organization: a header section, a packet data section, and a trailer section. The format of the header and trailer sections are identical across the three types of data records. The header section is composed of the first 29 bytes of the data record, which comprise the fields "Scan Line Number" through "Scan Line Quality Flags [Time Problem Code]", inclusively. The trailer section is composed of the last 238 bytes of the data record, which begins with the field "Main Bus Select Status" and continues through the "<zero fill>" padding at end of record. The content and format of the packet data section varies depending on the type of data record. In all cases though, the actual data from the particular MHS packet within this section begins at the same byte offset (1481). Additionally, in the case of data records containing either extended test data packets or extended memory data packets, the packet data is inserted exactly as received from the spacecraft without modification.

(Some of the data in a science packet is slightly re-ordered, to align with common fields of the AMSU-B Level 1b data record, with a few additional fields inserted.)

As mentioned above, an empty science data packet and a science data packet have the same format. The difference is that most of the content of an empty science data packet is, as its name implies, empty. In terms of a Level 1b data record containing an empty science data packet, the following fields are zero filled (empty):

· "Scene (Earth View) Data" (bytes 1481-2560) through "OBCT View Position Validity Flags" (bytes 2686-2686)

· "Status Word" (byte 2727) through "Science Packet Spare Words" (bytes 2787-2831)

However, an empty science data packet does contain valid housekeeping data. So, in a data record containing an empty science data packet, the "Mode and Sub-commutation Code" field (byte 2687) through the "Raw Current Consumption Data" field (bytes 2720-2725) contain valid data.

8.3.1.9.2 Header Records

The MHS Primary Header Record format is documented in Table 8.3.1.9.2-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.9.2-1. MHS Primary Header Record Format.

Field Name	Start Octet	End Octet	DT	Word Size	Number of Words	SF	Units	Notes
FILE IDENTIFICATION								
Data Set Creation Site ID CMS=Centre de Meteorologie Spatiale/France DSS=Dundee Satellite Receiving Station/UK NSS=National Environmental Satellite, Data and Information Service/USA UKM=United Kingdom Meteorological Office/UK	1	3	c	3	1	0		
<ASCII blank = x20>	4	4	c	1	1	0		
Level 1b Format Version Number 1=TIROS-N, NOAA-6 through NOAA-14; 2=NOAA-15, -16, -17 (pre-April 28, 2005); 3=all satellites post-April 28, 2005; 4=cloud mask flag (CLAVR-x)-Jan 25, 2006.	5	6	u	2	1	0		
Level 1b Format Version Year (four digits, e.g., 2000)	7	8	u	2	1	0		
Level 1b Format Version Day of Year (e.g., 365)	9	10	u	2	1	0		
<Reserved for Logical Record Length> (For Creation Site use only. Logical Record Length of source Level 1b data set prior to processing.)	11	12	u	2	1	0	octets	

<Reserved for Block Size> (For Creation Site use only. Block Size of source 1b data set prior to processing.)	13	14	u	2	1	0	octets	
Count of Header Records in this Data Set	15	16	u	2	1	0		
<zero fill>	17	22	i	2	3	0		
Data Set Name	23	64	c	42	1	0		
Processing Block Identification	65	72	c	8	1	0		
NOAA Spacecraft Identification Code 2=NOAA-15 4=NOAA-16 6=NOAA-17 7=NOAA-18 8=NOAA-N' 11=MetOp-1 12=MetOp-A	73	74	u	2	1	0		
Instrument ID 0 = Proto-Flight Model (PFM) (NOAA-N) 2 = Flight Model 2 (FM2) (NOAA-N')	75	76	u	2	1	0		
Data Type Code 12=MHS	77	78	u	2	1	0		
TIP Source Code 0=unused, i.e., GAC/HRPT/LAC data 1=GAC-embedded AMSU and TIP 2=stored TIP (STIP) 3=HRPT/LAC-embedded AMSU and TIP 4=stored AIP (SAIP)	79	80	u	2	1	0		
Start of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	81	84	u	4	1	0		
Start of Data Set Year (four digits, e.g., 2000)	85	86	u	2	1	0		
Start of Data Set Day of Year (e.g., 365)	87	88	u	2	1	0		
Start of Data Set UTC Time of Day	89	92	u	4	1	0	msec	
End of Data Set Day Count starting from 0 at 00h, 1 Jan 1950	93	96	u	4	1	0		
End of Data Set Year (four digits, e.g., 2000)	97	98	u	2	1	0		
End of Data Set Day of Year (e.g., 365)	99	100	u	2	1	0		
End of Data Set UTC Time of Day	101	104	u	4	1	0	msec	
Year of Last CPIDS Update (four digits, e.g., 2000)	105	106	u	2	1	0		
Day of Year of Last CPIDS Update (e.g., 365)	107	108	u	2	1	0		
Offset between Start of Scan and Center of First FOV	109	110	i	2	1	0	msec	
<zero fill>	111	120	i	2	5	0		
DATA SET QUALITY INDICATORS								
Instrument Status (These are bit flags taken from "Mode and Sub-commutation Code" field and "Switch Status" field on first data record for which all of the individual status flags have been reported at least once.) bits 31-28: mode code (0=power on; 1=warm up;	121	124	u	4	1	0		

2=stand by; 3=scan; 4=fixed view; 5=self test; 6=safeing; 7=fault; 8-14=<unused>; 15=memory data packet ID) bit 27: PIE ID (0=PIE A; 1=PIE B) bits 26-24: sub-commutation code (only meaningful for telemetry packet data) bit 23: receiver channel H4 backend (0=off; 1=on) bit 22: receiver channel H3 backend (0=off; 1=on) bit 21: receiver channel H3/H4 local oscillator selected (0=A; 1=B) bit 20: receiver channel H3/H4 front-end (0=off; 1=on) bit 19: receiver channel H2 local oscillator selected (0=A; 1=B) bit 18: receiver channel H2 (0=off; 1=on) bit 17: receiver channel H1 local oscillator selected (0=A; 1=B) bit 16: receiver channel H1 (0=off; 1=on) bit 15: PROM (1=a PROM segment switch has failed ON) bit 14: signal processing electronics/scan control electronics (0=off; 1=on) bit 13: auxiliary operational heaters (0=off; 1=on) bit 12: scan mechanism operational heaters (0=off; 1=on) bit 11: receiver operational heaters (0=off; 1=on) bit 10: Rx CV (0=off; 1=on) bit 9: receiver channel H5 local oscillator selected (0=A; 1=B) bit 8: receiver channel H5 (0=off; 1=on) bit 7: FDM motor current trip status (0=enabled; 1=disabled) bit 6: RDM motor current trip status (0=enabled; 1=disabled) bit 5: FDM motor supply (0=off; 1=on) bit 4: RDM motor supply (0=off; 1=on) bit 3: FDM motor sensors selected (0=A; 1=B) bit 2: RDM motor sensors selected (0=A; 1=B) bit 1: FDM zero position sensors (0=A; 1=B) bit 0: RDM zero position sensors (0=A; 1=B)								
<zero fill>	125	126	i	2	1	0		
Record Number of Status Change (if 0, none occurred)	127	128	u	2	1	0		
Second Instrument Status (if previous word is 0, no change)	129	132	u	4	1	0		
Count of Data Records in this Data Set	133	134	u	2	1	0		
Count of Calibrated, Earth Located Scan Lines in this Data Set	135	136	u	2	1	0		

Count of Missing Scan Lines	137	138	u	2	1	0		
Count of Data Gaps in this Data Set (NOTE: Gaps are due to either actual lost data, such as during transmissions, or ignored data when the instrument science data is superseded by other telemetry data during non-nominal modes of the TIP or MIU.)	139	140	u	2	1	0		
Count of Scans Containing Lunar-Contaminated Space Views (Also, see bits 8 and 9 of "Scan Line Quality Flags [Calibration Problem Code]" field in data record.) -1=the detection algorithm for lunar contamination is turned off0=the detection algorithm is turned on: no scans containing lunar-contaminated space views were found>0=the detection algorithm is turned on: the value in this field represents the number of scans found that contain lunar- contaminated space views	141	142	i	2	1	0		
Count of Data Frames Without Frame Sync Word Errors	143	144	u	2	1	0		
Count of PACS Detected TIP Parity Errors	145	146	u	2	1	0		
Sum of All Auxiliary Sync Errors Detected in the Input Data	147	148	u	2	1	0		
Time Sequence Error 0=none; otherwise, the record number of the first occurrence	149	150	u	2	1	0		
Time Sequence Error Code (These are bit flags taken from "Scan Line Quality Flags [Time Problem Code]" on data record reported in "Time Sequence Error" field above. If a bit is on (=1) then the statement is true.) bits 15-8: <zero fill>bit 7: time field is bad but can probably be inferred from the previous good timebit 6: time field is bad and can't be inferred from the previous good timebit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity); may be associated with a spacecraft clock updatebit 4: start of a sequence that apparently repeats scan times that have been previously acceptedbits 3-0: <zero fill>	151	152	u	2	1	0		
SOCC Clock Update Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	153	154	u	2	1	0		
Earth Location Error Indicator 0=none during this orbit; otherwise, the record number of the first occurrence	155	156	u	2	1	0		

Earth Location Error Code (These are bit flags taken from "Scan Line Quality Flags [Earth Location Problem Code]" on data record reported in "Earth Location Error Indicator" field above. If a bit is on (=1) then the statement is true.) bits 15-8: <zero fill> bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code bit 5: earth location questionable: marginal agreement with reasonableness checkbit 4: earth location questionable: fails reasonableness checkbit 3: earth location questionable because of antenna position checkbits 2-0: <zero fill>	157	158	u	2	1	0		
PACS Status Bit Field bits 15-3: <zero fill> bit 2: pseudonoise (0=normal data; 1=pseudonoise data) bit 1: tape direction (0=reverse playback, time decrementing) bit 0: data mode (0=test data; 1=flight data)	159	160	u	2	1	0		
Data Source 0=unused 1=Fairbanks, AK 2=Wallops Is., VA 3=SOCC 4=Svalbard, Norway 5=Monterey, CA	161	162	u	2	1	0		
<Reserved for the Ingester>	163	170	c	8	1	0		
<Reserved for Decommutation>	171	178	c	8	1	0		
<zero fill>	179	194	i	2	8	0		
CALIBRATION								
Instrument Temperature Sensor ID 0=primary (H5 Local Oscillator (LO) temperature Q-band Source [QBS5])1=backup (H1 LO temperature [QBS1])	195	196	i	2	1	0		
<zero fill>	197	198	i	2	1	0		
Primary Reference Temperature (from QBS5), Minimum	199	200	i	2	1	2	K	
Primary Reference Temperature (from QBS5), Nominal	201	202	i	2	1	2	K	
Primary Reference Temperature (from QBS5), Maximum	203	204	i	2	1	2	K	
Backup Reference Temperature (from QBS1), Minimum	205	206	i	2	1	2	K	
Backup Reference Temperature (from QBS1), Nominal	207	208	i	2	1	2	K	

Backup Reference Temperature (from QBS1), Maximum	209	210	i	2	1	2	K	
Ch. H1 Warm Load Correction Factor (minimum temperature)	211	212	i	2	1	3	K	
Ch. H1 Warm Load Correction Factor (nominal temperature)	213	214	i	2	1	3	K	
Ch. H1 Warm Load Correction Factor (maximum temperature)	215	216	i	2	1	3	K	
Ch. H1 Cold Space Temperature Correction (profile 0)	217	218	i	2	1	3	K	
Ch. H1 Cold Space Temperature Correction (profile 1)	219	220	i	2	1	3	K	
Ch. H1 Cold Space Temperature Correction (profile 2)	221	222	i	2	1	3	K	
<Reserved for Profile 3>	223	224	i	2	1	0		
Ch. H2 Warm Load Correction Factor (minimum temperature)	225	226	i	2	1	3	K	
Ch. H2 Warm Load Correction Factor (nominal temperature)	227	228	i	2	1	3	K	
Ch. H2 Warm Load Correction Factor (maximum temperature)	229	230	i	2	1	3	K	
Ch. H2 Cold Space Temperature Correction (profile 0)	231	232	i	2	1	3	K	
Ch. H2 Cold Space Temperature Correction (profile 1)	233	234	i	2	1	3	K	
Ch. H2 Cold Space Temperature Correction (profile 2)	235	236	i	2	1	3	K	
<Reserved for Profile 3>	237	238	i	2	1	0		
Ch. H3 Warm Load Correction Factor (minimum temperature)	239	240	i	2	1	3	K	
Ch. H3 Warm Load Correction Factor (nominal temperature)	241	242	i	2	1	3	K	
Ch. H3 Warm Load Correction Factor (maximum temperature)	243	244	i	2	1	3	K	
Ch. H3 Cold Space Temperature Correction (profile 0)	245	246	i	2	1	3	K	
Ch. H3 Cold Space Temperature Correction (profile 1)	247	248	i	2	1	3	K	
Ch. H3 Cold Space Temperature Correction (profile 2)	249	250	i	2	1	3	K	
<Reserved for Profile 3>	251	252	i	2	1	0		
Ch. H4 Warm Load Correction Factor (minimum temperature)	253	254	i	2	1	3	K	
Ch. H4 Warm Load Correction Factor (nominal temperature)	255	256	i	2	1	3	K	
Ch. H4 Warm Load Correction Factor (maximum temperature)	257	258	i	2	1	3	K	
Ch. H4 Cold Space Temperature Correction (profile 0)	259	260	i	2	1	3	K	

Ch. H4 Cold Space Temperature Correction (profile 1)	261	262	i	2	1	3	K	
Ch. H4 Cold Space Temperature Correction (profile 2)	263	264	i	2	1	3	K	
<Reserved for Profile 3>	265	266	i	2	1	0		
Ch. H5 Warm Load Correction Factor (minimum temperature)	267	268	i	2	1	3	K	
Ch. H5 Warm Load Correction Factor (nominal temperature)	269	270	i	2	1	3	K	
Ch. H5 Warm Load Correction Factor (maximum temperature)	271	272	i	2	1	3	K	
Ch. H5 Cold Space Temperature Correction (profile 0)	273	274	i	2	1	3	K	
Ch. H5 Cold Space Temperature Correction (profile 1)	275	276	i	2	1	3	K	
Ch. H5 Cold Space Temperature Correction (profile 2)	277	278	i	2	1	3	K	
<Reserved for Profile 3>	279	280	i	2	1	0		
LO A Ch. H1 Nonlinearity Coefficient (minimum temperature)	281	284	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H1 Nonlinearity Coefficient (nominal temperature)	285	288	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H1 Nonlinearity Coefficient (maximum temperature)	289	292	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H2 Nonlinearity Coefficient (minimum temperature)	293	296	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H2 Nonlinearity Coefficient (nominal temperature)	297	300	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H2 Nonlinearity Coefficient (maximum temperature)	301	304	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H3 Nonlinearity Coefficient (minimum temperature)	305	308	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H3 Nonlinearity Coefficient (nominal temperature)	309	312	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H3 Nonlinearity Coefficient (maximum temperature)	313	316	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H4 Nonlinearity Coefficient (minimum temperature)	317	320	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H4 Nonlinearity Coefficient (nominal temperature)	321	324	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H4 Nonlinearity Coefficient (maximum temperature)	325	328	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H5 Nonlinearity Coefficient (minimum temperature)	329	332	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H5 Nonlinearity Coefficient (nominal temperature)	333	336	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO A Ch. H5 Nonlinearity Coefficient (maximum temperature)	337	340	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H1 Nonlinearity Coefficient (minimum temperature)	341	344	i	4	1	8	m^2-sr-cm^{-1}/mW	

LO B Ch. H1 Nonlinearity Coefficient (nominal temperature)	345	348	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H1 Nonlinearity Coefficient (maximum temperature)	349	352	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H2 Nonlinearity Coefficient (minimum temperature)	353	356	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H2 Nonlinearity Coefficient (nominal temperature)	357	360	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H2 Nonlinearity Coefficient (maximum temperature)	361	364	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H3 Nonlinearity Coefficient (minimum temperature)	365	368	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H3 Nonlinearity Coefficient (nominal temperature)	369	372	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H3 Nonlinearity Coefficient (maximum temperature)	373	376	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H4 Nonlinearity Coefficient (minimum temperature)	377	380	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H4 Nonlinearity Coefficient (nominal temperature)	381	384	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H4 Nonlinearity Coefficient (maximum temperature)	385	388	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H5 Nonlinearity Coefficient (minimum temperature)	389	392	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H5 Nonlinearity Coefficient (nominal temperature)	393	396	i	4	1	8	m^2-sr-cm^{-1}/mW	
LO B Ch. H5 Nonlinearity Coefficient (maximum temperature)	397	400	i	4	1	8	m^2-sr-cm^{-1}/mW	
<zero fill>	401	416	i	4	4	0		
TEMPERATURE-RADIANCE CONVERSION								
Temperature-radiance Ch H1 Central Wavenumber	417	420	i	4	1	6	cm^{-1}	
Temperature-radiance Ch H1 Constant 1	421	424	i	4	1	6		
Temperature-radiance Ch H1 Constant 2	425	428	i	4	1	6		
Temperature-radiance Ch H2 Central Wavenumber	429	432	i	4	1	6	cm^{-1}	
Temperature-radiance Ch H2 Constant 1	433	436	i	4	1	6		
Temperature-radiance Ch H2 Constant 2	437	440	i	4	1	6		
Temperature-radiance Ch H3 Central Wavenumber	441	444	i	4	1	6	cm^{-1}	
Temperature-radiance Ch H3 Constant 1	445	448	i	4	1	6		
Temperature-radiance Ch H3 Constant 2	449	452	i	4	1	6		
Temperature-radiance Ch H4 Central Wavenumber	453	456	i	4	1	6	cm^{-1}	
Temperature-radiance Ch H4 Constant 1	457	460	i	4	1	6		
Temperature-radiance Ch H4 Constant 2	461	464	i	4	1	6		
Temperature-radiance Ch H5 Central Wavenumber	465	468	i	4	1	6	cm^{-1}	
Temperature-radiance Ch H5 Constant 1	469	472	i	4	1	6		
Temperature-radiance Ch H5 Constant 2	473	476	i	4	1	6		

<zero fill>	477	492	i	4	4	0		
NAVIGATION								
Reference Ellipsoid Model ID (The ellipsoid is a mathematically tractable approximation of the geoid, which is an equipotential surface at mean sea level. The maximum departure of the ellipsoid from the geoid is approximately ± 65 meters.) WGS-72=World Geodetic Survey 1972 JGM3 =Joint Gravity Model 3	493	500	c	8	1	0		
Nadir Earth Location Tolerance	501	502	u	2	1	1	Km	
Earth Location Bit Field bits 15-3: <zero fill> bit 2: dynamic attitude error correction (0= not performed; 1=performed) bit 1: reasonableness test (0=inactive; 1=active) bit 0: constant attitude error correction (0=not performed; 1=performed)	503	504	u	2	1	0		
<zero fill>	505	506	i	2	1	0		
Constant Roll Attitude Error	507	508	i	2	1	3	degrees	
Constant Pitch Attitude Error	509	510	i	2	1	3	degrees	
Constant Yaw Attitude Error	511	512	i	2	1	3	degrees	
Epoch Year for Orbit Vector	513	514	u	2	1	0		
Day of Epoch Year for Orbit Vector	515	516	u	2	1	0		
Epoch UTC Time of Day for Orbit Vector	517	520	u	4	1	0	ms	
Semi-major Axis (at the orbit vector epoch time)	521	524	i	4	1	5	km	
Eccentricity (at the orbit vector epoch time)	525	528	i	4	1	8		
Inclination (at the orbit vector epoch time)	529	532	i	4	1	5	degrees	
Argument of Perigee (at the orbit vector epoch time)	533	536	i	4	1	5	degrees	
Right Ascension of the Ascending Node (at the orbit vector epoch time)	537	540	i	4	1	5	degrees	
Mean Anomaly (at the orbit vector epoch time)	541	544	i	4	1	5	degrees	
Position Vector X Component (at the orbit vector epoch time)	545	548	i	4	1	5	km	
Position Vector Y Component (at the orbit vector epoch time)	549	552	i	4	1	5	km	
Position Vector Z Component (at the orbit vector epoch time)	553	556	i	4	1	5	km	
Velocity Vector X-dot Component (at the orbit vector epoch time)	557	560	i	4	1	8	km/sec	
Velocity Vector Y-dot Component (at the orbit vector epoch time)	561	564	i	4	1	8	km/sec	
Velocity Vector Z-dot Component (at the orbit vector epoch time)	565	568	i	4	1	8	km/sec	
Earth/Sun Distance Ratio (at the orbit vector epoch time; relative to the mean distance of 1 AU)	569	572	u	4	1	6		
<zero fill>	573	588	i	4	4	0		
THERMISTOR TELEMETRY CONVERSION Counts-to-temperature (K) conversion coefficients for the 24 housekeeping thermistors.								

Thermistor Temperature Coefficient 0	589	592	i	4	1	4	K	
Thermistor Temperature Coefficient 1	593	596	i	4	1	7	K/count	
Thermistor Temperature Coefficient 2	597	600	i	4	1	10	K/count^2	
Thermistor Temperature Coefficient 3	601	604	i	4	1	12	K/count^3	
Thermistor Temperature Coefficient 4	605	608	i	4	1	15	K/count^4	
<zero fill>	609	624	i	4	4	0		
RAW CURRENT CONSUMPTION CONVERSION								
EE and SM +5V Current Coefficient 0	625	628	i	4	1	6	amps	
EE and SM +5V Current Coefficient 1	629	632	i	4	1	6	amps/ count	
Receiver +8V Current Coefficient 0	633	636	i	4	1	6	amps	
Receiver +8V Current Coefficient 1	637	640	i	4	1	6	amps/ count	
Receiver +15V Current Coefficient 0	641	644	i	4	1	6	amps	
Receiver +15V Current Coefficient 1	645	648	i	4	1	6	amps/ count	
Receiver -15V Current Coefficient 0	649	652	i	4	1	6	amps	
Receiver -15V Current Coefficient 1	653	656	i	4	1	6	amps/ count	
RDM Motor Current Coefficient 0	657	660	i	4	1	6	amps	
RDM Motor Current Coefficient 1	661	664	i	4	1	6	amps/ count	
FDM Motor Current Coefficient 0	665	668	i	4	1	6	amps	
FDM Motor Current Coefficient 1	669	672	i	4	1	6	amps/ count	
OBCT TEMPERATURE CONVERSION PRT resistance-to-temperature conversion coefficients, where resistance is in ohms and temperature is in K.								
PIE-A PRT 1 Coefficient 0	673	676	i	4	1	6	K	
PIE-A PRT 1 Coefficient 1	677	680	i	4	1	6	K/ohm	
PIE-A PRT 1 Coefficient 2	681	684	i	4	1	10	K/ohm^2	
PIE-A PRT 1 Coefficient 3	685	688	i	4	1	13	K/ohm^3	
PIE-A PRT 2 Coefficient 0	689	692	i	4	1	6	K	
PIE-A PRT 2 Coefficient 1	693	696	i	4	1	6	K/ohm	
PIE-A PRT 2 Coefficient 2	697	700	i	4	1	10	K/ohm^2	
PIE-A PRT 2 Coefficient 3	701	704	i	4	1	13	K/ohm^3	
PIE-A PRT 3 Coefficient 0	705	708	i	4	1	6	K	
PIE-A PRT 3 Coefficient 1	709	712	i	4	1	6	K/ohm	
PIE-A PRT 3 Coefficient 2	713	716	i	4	1	10	K/ohm^2	
PIE-A PRT 3 Coefficient 3	717	720	i	4	1	13	K/ohm^3	
PIE-A PRT 4 Coefficient 0	721	724	i	4	1	6	K	
PIE-A PRT 4 Coefficient 1	725	728	i	4	1	6	K/ohm	
PIE-A PRT 4 Coefficient 2	729	732	i	4	1	10	K/ohm^2	
PIE-A PRT 4 Coefficient 3	733	736	i	4	1	13	K/ohm^3	
PIE-A PRT 5 Coefficient 0	737	740	i	4	1	6	K	
PIE-A PRT 5 Coefficient 1	741	744	i	4	1	6	K/ohm	
PIE-A PRT 5 Coefficient 2	745	748	i	4	1	10	K/ohm^2	
PIE-A PRT 5 Coefficient 3	749	752	i	4	1	13	K/ohm^3	
PIE-B PRT 1 Coefficient 0	753	756	i	4	1	6	K	
PIE-B PRT 1 Coefficient 1	757	760	i	4	1	6	K/ohm	

PIE-B PRT 1 Coefficient 2	761	764	i	4	1	10	K/ohm^2	
PIE-B PRT 1 Coefficient 3	765	768	i	4	1	13	K/ohm^2	
PIE-B PRT 2 Coefficient 0	769	772	i	4	1	6	K	
PIE-B PRT 2 Coefficient 1	773	776	i	4	1	6	K/ohm	
PIE-B PRT 2 Coefficient 2	777	780	i	4	1	10	K/ohm^2	
PIE-B PRT 2 Coefficient 3	781	784	i	4	1	13	K/ohm^3	
PIE-B PRT 3 Coefficient 0	785	788	i	4	1	6	K	
PIE-B PRT 3 Coefficient 1	789	792	i	4	1	6	K/ohm	
PIE-B PRT 3 Coefficient 2	793	796	i	4	1	10	K/ohm^2	
PIE-B PRT 3 Coefficient 3	797	800	i	4	1	13	K/ohm^3	
PIE-B PRT 4 Coefficient 0	801	804	i	4	1	6	K	
PIE-B PRT 4 Coefficient 1	805	808	i	4	1	6	K/ohm	
PIE-B PRT 4 Coefficient 2	809	812	i	4	1	10	K/ohm^2	
PIE-B PRT 4 Coefficient 3	813	816	i	4	1	13	K/ohm^3	
PIE-B PRT 5 Coefficient 0	817	820	i	4	1	6	K	
PIE-B PRT 5 Coefficient 1	821	824	i	4	1	6	K/ohm	
PIE-B PRT 5 Coefficient 2	825	828	i	4	1	10	K/ohm2	
PIE-B PRT 5 Coefficient 3	829	832	i	4	1	13	K/ohm3	
SURVIVAL TEMPERATURE CONVERSION Volts-to-temperature (K) conversion coefficients for the 3 survival temperature parameters. (NOTE: volts = 0.02 x counts.)								
Survival Temperature Coefficient 0	833	836	i	4	1	6	K	
Survival Temperature Coefficient 1	837	840	i	4	1	6	K/volt	
Survival Temperature Coefficient 2	841	844	i	4	1	6	K/volt^2	
Survival Temperature Coefficient 3	845	848	i	4	1	6	K/volt^2	
Survival Temperature Coefficient 4	849	852	i	4	1	6	K/volt^4	
Survival Temperature Coefficient 5	853	856	i	4	1	6	K/volt^5	
ANTENNA POSITION CONVERSION								
Antenna Position Conversion Factor (for converting "mid-pixel position" data of earth, space, and OBCT views to degrees)	857	860	u	4	1	8	degrees/ count	
value = 7.2/1024 = 0.00703125 degrees/count								
PRT CALIBRATION CHANNELS								
PIE-A Calibration Channel 1 Resistance	861	864	i	4	1	4	ohms	
PIE-A Calibration Channel 2 Resistance	865	868	i	4	1	4	ohms	
PIE-A Calibration Channel 3 Resistance	869	872	i	4	1	4	ohms	
PIE-B Calibration Channel 1 Resistance	873	876	i	4	1	4	ohms	
PIE-B Calibration Channel 2 Resistance	877	880	i	4	1	4	ohms	
PIE-B Calibration Channel 3 Resistance	881	884	i	4	1	4	ohms	
LUNAR CONTAMINATION DETECTION								
Lunar Angle Threshold (Any space view whose lunar angle--see "Lunar Angles" field in data record--is less than this value is flagged as being "lunar contaminated" and is not used in the calibration.)	885	886	u	2	1	2	degrees	
RFI CORRECTION								

Bias Correction Values (ordered by channel, FOV, and transmitter) Word 1: Channel H1, FOV 1, STX_1 Word 2: Channel H2, FOV 1, STX_1 Word 3: Channel H3, FOV 1, STX_1 Word 4: Channel H4, FOV 1, STX_1 Word 5: Channel H5, FOV 1, STX_1 Word 6: Channel H1, FOV 5, STX_1...(channel values for FOVs 5, 10, 15, ... , 90)...Word 95: Channel H5, FOV 90, STX_1Word 96: Channel H1, space view, STX_1...Word 100: Channel H5, space view, STX_1Word 101: Channel H1, OBCT view, STX_1...Word 106: Channel H1, FOV 1, STX_2...Word 211: Channel H1, FOV 1, STX_3...Word 316: Channel H1, FOV 1, SARR...Word 420: Channel H5, OBCT view, SARR	887	1726	i	2	420	0	counts	1
<zero fill>	1727	1734	i	4	2	0		
Transmitter Reference Power (mean power at the time bias corrections were derived. Range: 0 to 255, representing analog voltages from 0 to 5.1.) Word 1: STX-1Word 2: STX-2Word 3: STX-3Word 4: SARR	1735	1742	i	2	4	1	counts	1
<zero fill>	1743	1752	i	2	5	0		
<zero fill> (for NOAA-originated MHS data, these fields are spare)	1753	1788	i	2	13	0		
FILLER								
<zero fill>	1789	3072	i	2	642	0		

NOTES:
1) The RFI/bias correction data is based on experience with the AMSU-B instrument from the NOAA KLM series of satellites. While it may not be necessary, it is being left in the MHS Level 1b format. Until a determination is made that it is necessary, it will be zero filled.

8.3.1.9.3 Data Records (Version 3, post-April 28, 2005, All Spacecraft)

The MHS instrument and its associated interface unit (MIU) on the NOAA satellites can operate in a variety of different modes and output several different packets, or formats, of data. This section describes the different packets that the MHS instrument outputs.

8.3.1.9.3.1 Science Packet

The MHS Level 1b Record Format (Science Packet) is documented in Table 8.3.1.9.3.1-1. See Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.9.3.1-1. Format of MHS Level 1b Record (Science Packet).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								

Scan Line Number *(cumulative, starting with 1)*	1	2	u	2	1	0		
Scan Line Year *(four digits, e.g., 2000)*	3	4	u	2	1	0		
Scan Line Day of Year *(e.g., 365)*	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	msec	
Scan Line UTC Time of Day	9	12	u	4	1	0	msec	
Scan Line Bit Field bit 15: satellite direction (0=northbound; 1=southbound) bit 14: clock drift correction (0=not corrected; 1=scan time corrected for clock drift) bits 13-0: <zero fill>	13	14	u	2	1	0		
Major Frame Count *(cumulative, starting with 1)*	15	16	u	2	1	0		
Coarse MHS On-board Time (OBT) *(time since last reset to zero)*	17	20	u	4	1	0	seconds	
Fine MHS OBT *(fraction of second since last increment of coarse MHS OBT. Resolution: 2^{-16} seconds; range: 0 - 65,535.)*	21	22	u	2	1	0		
MHS Mode Flag 0=power-on ("empty" MHS science data) 1=warm-up ("empty" MHS science data) 2=standby ("empty" MHS science data) 3=scan (valid MHS science data) 4=fixed view (valid MHS science data, but instrument is viewing a fixed location) 5=self test (test data) 6=safeing ("empty" MHS science data) 7=fault ("empty" MHS science data) 8-14=<undefined> (unknown data) 15=memory dump (memory dump data)	23	23	u	1	1	0		
<zero fill>	24	24	i	1	1	0		
QUALITY INDICATORS								
Quality Indicator Bit Field *(if a bit is on (=1), the statement is true)* bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan (gap may be due to actual lost scans or scans in which the TIP or MIU are in non-nominal modes) bit 28: insufficient data for calibration (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bits 24 -5: <zero fill> bit 4: transmitter status change occurred (see note 2) bit 3: AMSU sync error detected bit 2: AMSU minor frame error detected bit 1: AMSU major frame error detected bit 0: AMSU parity error detected	25	28	u	4	1	0		2

Scan Line Quality Flags [Time Problem Code] *(If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.)* bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	29	29	u	1	1	0		
Scan Line Quality Flags [Calibration Problem Code] *(If a bit is on (=1), the statement is true. These bits complement the channel indicators; all bits set to 0 indicates normal calibration.)* Word 1 bits 7-2: <zero fill> bit 1: scan line contains one or more space views that are lunar contaminated bit 0: lunar-contaminated scan line was able to be calibrated (only applicable if the previous flag [bit 1] is 1; otherwise, zero) Word 2 bit 7: scan line was not calibrated because of bad time bit 6: scan line was calibrated using fewer than the preferred number of scan lines because of proximity to start or end of data set or to a data gap bit 5: scan line was not calibrated because of bad or insufficient PRT data bit 4: scan line was calibrated but with marginal PRT data bit 3: some uncalibrated channels on this scan (see channel indicators) bit 2: uncalibrated due to instrument mode bit 1: questionable calibration because of antenna position error of space view bit 0: questionable calibration because of antenna position error of OBCT view	30	31	u	2	1	0		
Scan Line Quality Flags [Earth Location Problem Code] *(If a bit is on (=1), the statement is true. All bits set to 0 implies the earth location was normal.)* bit 7: not earth located because of bad time; earth location fields zero-filled bit 6: earth location questionable: questionable time code (see time problem flags above) bit 5: earth location questionable: marginal agreement with reasonableness check bit 4: earth location questionable: fails reasonableness check bit 3: earth location questionable because of antenna position checkbits 2-0: <zero fill>	32	32	u	1	1	0		

Calibration Quality Flags *(all bits off implies a good calibration)* *Word 1: Channel H1* bits 15-7: <zero fill> bit 6: this scan line is either the last one before or the first one after a sudden, anomalous jump (or drop) in calibration counts bit 5: all bad OBCT view counts for scan line bit 4: all bad space view counts for scan line bit 3: all bad PRTs for this line bit 2: marginal OBCT view counts for this line bit 1: marginal space view counts for this line bit 0: marginal PRT temps on this line *Words 2-5: Channels H2-H5 (in order)*	33	42	u	2	5	0		
<zero fill>	43	60	i	2	9	0		
CALIBRATION COEFFICIENTS *Note: The following coefficients are only available in Scan and Fixed View modes otherwise the coefficient fields are <zero fill>. Refer to bits 7-4 of the Mode and Sub-commutation Code field for the current mode.*								
Primary Calibration Ch H1 Second Order Term, a2	61	64	i	4	1	16		
Primary Calibration Ch H1 First Order Term, a1	65	68	i	4	1	10		
Primary Calibration Ch H1 Zeroth Order Term, a0	69	72	i	4	1	6		
Primary Calibration Ch H2 Second Order Term, a2	73	76	i	4	1	16		
Primary Calibration Ch H2 First Order Term, a1	77	80	i	4	1	10		
Primary Calibration Ch H2 Zeroth Order Term, a0	81	84	i	4	1	6		
Primary Calibration Ch H3 Second Order Term, a2	85	88	i	4	1	16		
Primary Calibration Ch H3 First Order Term, a1	89	92	i	4	1	10		
Primary Calibration Ch H3 Zeroth Order Term, a0	93	96	i	4	1	6		
Primary Calibration Ch H4 Second Order Term, a2	97	100	i	4	1	16		
Primary Calibration Ch H4 First Order Term, a1	101	104	i	4	1	10		
Primary Calibration Ch H4 Zeroth Order Term, a0	105	108	i	4	1	6		
Primary Calibration Ch H5 Second Order Term, a2	109	112	i	4	1	16		
Primary Calibration Ch H5 First Order Term, a1	113	116	i	4	1	10		
Primary Calibration Ch H5 Zeroth Order Term, a0	117	120	i	4	1	6		
Secondary Calibration Ch H1 Second Order Term, a2	121	124	i	4	1	16		
Secondary Calibration Ch H1 First Order Term, a1	125	128	i	4	1	10		
Secondary Calibration Ch H1 Zeroth Order Term, a0	129	132	i	4	1	6		
Secondary Calibration Ch H2 Second Order Term, a2	133	136	i	4	1	16		
Secondary Calibration Ch H2 First Order Term, a1	137	140	i	4	1	10		
Secondary Calibration Ch H2 Zeroth Order Term, a0	141	144	i	4	1	6		
Secondary Calibration Ch H3 Second Order Term, a2	145	148	i	4	1	16		
Secondary Calibration Ch H3 First Order Term, a1	149	152	i	4	1	10		
Secondary Calibration Ch H3 Zeroth Order Term, a0	153	156	i	4	1	6		
Secondary Calibration Ch H4 Second Order Term, a2	157	160	i	4	1	16		
Secondary Calibration Ch H4 First Order Term, a1	161	164	i	4	1	10		
Secondary Calibration Ch H4 Zeroth Order Term, a0	165	168	i	4	1	6		
Secondary Calibration Ch H5 Second Order Term, a2	169	172	i	4	1	16		
Secondary Calibration Ch H5 First Order Term, a1	173	176	i	4	1	10		
Secondary Calibration Ch H5 Zeroth Order Term, a0	177	180	i	4	1	6		
<zero fill>	181	184	i	2	2	0		
NAVIGATION								

Computed Yaw Steering<zero fill> for NOAA	185	190	i	2	3	0		
Total Applied Attitude Correction Word 1: Roll Word 2: Pitch Word 3: Yaw	191	196	i	2		3	degrees	
Navigation Status Bit Field bits 31-18: <zero fill> bit 17: earth location at the satellite subpoint is accurate and reasonable, i.e., is within tolerance defined by ”nadir Earth Location Tolerance“ in header (0=out of tolerance; 1=in tolerance) bit 16: earth location corrected for Euler angles (0=FALSE; 1=TRUE) bits 15-12: earth location indicator (0=earth location available; 1=user ephemeris files greater than 24 hours old; 2=no earth location available) bits 11-8: spacecraft attitude control (0=operating in YGC or NOMINAL mode; 1=operating in another mode; 2=attitude exceeds nominal tolerance; 3=both 1 and 2) bits 7-4: attitude SMODE (0=nominal mode; 1=rate nulling mode; 2=YGC mode; 3=search mode; 4=coast mode) bits 3-0: attitude PWTIP$AC (0=nominal mode/no test; 1=yaw axis test in progress; 2=roll axis test in progress; 3=pitch axis test in progress)	197	200	u	4	1	0		
Time Associated with Euler Angles	201	204	i	4	1	0	seconds	
Euler Angles	205	210	i	2	3	3	degrees	
Word 1: Roll Word 2: Pitch Word 3: Yaw								
Spacecraft Altitude above Reference Ellipsoid	211	212	u	2	1	1	km	
Angular Relationships *(local azimuth range ± 180.00 degrees)* Word 1: Solar zenith angle, FOV 1 Word 2: Satellite zenith angle, FOV 1 Word 3: Local azimuth angle, FOV 1 Word 4: Solar zenith angle, FOV 2...(set of 3 angles every FOV) ... Word 270: Local azimuth angle, FOV 90	213	752	i	2	270	2	degrees	
Earth Location *(north latitude and east longitude are positive)* Word 1: Latitude, FOV 1 Word 2: Longitude, FOV 1 Word 3: Latitude, FOV 2...(lat/lon word pair every FOV) ... Word 180: Longitude, FOV 90	753	1472	i	4	180	4	degrees	
Lunar Angles *(angles between moon and individual space views; range 0 to 180.00 degrees)* Word 1: Angle between moon and space view 1 Word 2: Angle between moon and space view 2 Word 3: Angle between moon and space view 3 Word 4: Angle between moon and space view 4	1473	1480	u	2	4	2	degrees	
MHS SENSOR DATA *In fixed view mode, the pixel data is the same format as scan mode, but the concept of earth, space, and OBCT views does not apply. All 98 views (i.e., 90 earth + 4 space + 4 OBCT) are for the fixed view position.*								

Scene (Earth View) Data *(range: 0 - 65,535)* Word 1: Mid-pixel position for FOV 1 Word 2: Scene counts for FOV 1, channel H1 Word 3: Scene counts for FOV 1, channel H2 Word 4: Scene counts for FOV 1, channel H3 Word 5: Scene counts for FOV 1, channel H4 Word 6: Scene counts for FOV 1, channel H5 Word 7: Mid-pixel position for FOV 2 Words 8-12: Scene counts for FOV 2, channels H1-H5 (in order) ... (6 words for every FOV) ... Word 535: Mid-pixel position for FOV 90 Words 536-540: Scene counts for FOV 90, channels H1-H5 (in order)	1481	2560	u	2	540	0	counts	
<zero fill>	2561	2568	i	4	2	0		
CALIBRATION DATA								
Space View Data *(range: 0 - 65,535)* Word 1: Mid-pixel position for space view 1 Word 2: Counts for space view 1, channel H1 Word 3: Counts for space view 1, channel H2 Word 4: Counts for space view 1, channel H3 Word 5: Counts for space view 1, channel H4 Word 6: Counts for space view 1, channel H5 Word 7: Mid-pixel position for space view 2 Word 8-12: Counts for space view 2, channel H1-H5 (in order) Word 13: Mid-pixel position for space view 3 Word 14-18: Counts for space view 3, channel H1-H5 (in order) Word 19: Mid-pixel position for space view 4 Word 20-24: Counts for space view 4, channel H1-H5 (in order)	2569	2616	u	2	24	0	counts	
OBCT View Data *(range: 0 - 65,535)* Word 1: Mid-pixel position for OBCT view 1 Word 2: Counts for OBCT view 1, channel H1 Word 3: Counts for OBCT view 1, channel H2 Word 4: Counts for OBCT view 1, channel H3 Word 5: Counts for OBCT view 1, channel H4 Word 6: Counts for OBCT view 1, channel H5 Word 7: Mid-pixel position for OBCT view 2 Word 8-12: Counts for OBCT view 2, channel H1-H5 (in order) Word 13: Mid-pixel position for OBCT view 3	2617	2664	u	2	24	0	counts	

Word 14-18: Counts for OBCT view 3, channel H1-H5 (in order) Word 19: Mid-pixel position for OBCT view 4 Word 20-24: Counts for OBCT view 4, channel H1-H5 (in order)								
<zero fill>	2665	2672	i	4	2	0		
POSITION VALIDITY FLAGS *There is one bit flag for each FOV (earth, space, and OBCT). If bit flag = 0, then mid-pixel antenna position for corresponding FOV is within its nominal range. Otherwise (if = 1), position is outside of its nominal range.*								
Earth View Position Validity Flags Word 1: position flags for FOVs 1-8 (bits 0-7) Word 2: position flags for FOVs 9-16 (bits 0-7) ... Word 11: position flags for FOVs 81-88 (bits 0-7) Word 12: position flags for FOVs 89-90 (bits 0-1; bits 2-7 are <zero fill>)	2673	2684	u	1	12	0		2
Space View Position Validity Flags bits 7-4: <zero fill> bit 3: position flag for space view 4 bit 2: position flag for space view 3 bit 1: position flag for space view 2 bit 0: position flag for space view 1	2685	2685	u	1	1	0		2
OBCT View Position Validity Flags bits 7-4: <zero fill> bit 3: position flag for OBCT view 4 bit 2: position flag for OBCT view 3 bit 1: position flag for OBCT view 2 bit 0: position flag for OBCT view 1	2686	2686	u	1	1	0		2
FULL HOUSEKEEPING DATA								
Mode and Sub-commutation Code bits 7-4: mode code (0=power on; 1=warm up; 2=stand by; 3=scan; 4=fixed view; 5=self test; 6=safeing; 7=fault; 8-14=<unused>; 15=memory data packet ID) bit 3: PIE ID (0=PIE A; 1=PIE B)bits 2-0: sub-commutation code *(only meaningful for telemetry packet data)*	2687	2687	u	1	1	0		
Telecomm and Acknowledgement and Fault Code *Words 1-2:*bit 15: TC clean (1=no parity or checksum error found in received packet) bit 14: TC conforms (1=header of received command conforms to the CCSDS format) bit 13: TC recognized (1=received command is a recognized MHS command of the correct format) bit 12: TC legal (1=received command is legal for execution in the current MHS operating mode) bit 11: FDM motor current trip status (1=instantaneous current in the FDM motor has exceeded a pre-set level, resulting in the disabling of the FDM motor drive circuit) bits 10-0: TC application ID (taken from the packet ID field of the primary header of the received serial command)	2688	2692	u	1	5	0		3,4

*Words 3-4:*bits 15-2: TC packet sequence count bits 1-0: TC received count *Word 5:*bit 7: current monitor fault (1=one or more PSU current monitor parameters exceed their expected limits); see note 3 bit 6: thermistor monitor fault (1=one or more thermistor temperature monitor parameters exceed their expected limits); see note 3 bit 5: switch fault (1=a switch status telemetry parameter does not agree with its last commanded state, or a PROM board switch error has occurred) bit 4: processor fault (1=a processor internal fault has occurred (overflow, illegal address, BIT failure)) bit 3: RDM motor current trip status (1=instantaneous current in the RDM motor has exceeded a pre-set level, resulting in the disabling of the RDM motor drive circuit) bit 2: DC offset error (1=one or more channel calibration target's readings indicate a change in the DC offset is required) bit 1: scan control error (1=the measured mid-pixel position of the reflector during earth, space, or OBCT views is outside the limits for the scan mode profile, or the reflector position is outside the limits of the requested position for fixed view mode, or the position acquisition initialization has failed); see note 4 bit 0: REF CK error (1=scan control clock stops as a result of the platform reference clock stopping for a period of >= 2.5 ms)								
Switch Status *Word 1:* bit 7: receiver channel H4 backend (0=off; 1=on) bit 6: receiver channel H3 backend (0=off; 1=on) bit 5: receiver channel H3/H4 local oscillator selected (0=A; 1=B) bit 4: receiver channel H3/H4 front-end (0=off; 1=on) bit 3: receiver channel H2 local oscillator selected (0=A; 1=B) bit 2: receiver channel H2 (0=off; 1=on) bit 1: receiver channel H1 local oscillator selected (0=A; 1=B) bit 0: receiver channel H1 (0=off; 1=on) *Word 2:* bit 7: PROM (1=a PROM segment switch has failed ON) bit 6:signal processing electronics/scan control electronics (0=off; 1=on) bit 5: auxiliary operational heaters (0=off; 1=on) bit 4: scan mechanism operational heaters (0=off; 1=on) bit 3: receiver operational heaters (0=off; 1=on) bit 2: Rx CV (0=off; 1=on) bit 1: receiver channel H5 local oscillator selected (0=A; 1=B) bit 0: receiver channel H5 (0=off; 1=on)	2693	2695	u	1	3	0		

Word 3: bit 7: FDM motor current trip status (0=enabled; 1=disabled) bit 6: RDM motor current trip status (0=enabled; 1=disabled) bit 5: FDM motor supply (0=off; 1=on) bit 4: RDM motor supply (0=off; 1=on) bit 3: FDM motor sensors selected (0=A; 1=B) bit 2: RDM motor sensors selected (0=A; 1=B) bit 1: FDM zero position sensors (0=A; 1=B) bit 0: RDM zero position sensors (0=A; 1=B)								
Temperature Data *(range: 0-255)* Word 1: LO H1 temperature Word 2: LO H2 temperature Word 3: LO H3/H4 temperature Word 4: LO H5 temperature Word 5: Mixer/LNA/Multiplexer H1 temperature Word 6: Mixer/LNA/Multiplexer H2 temperature Word 7: Mixer/LNA/Multiplexer H3/H4 temperature Word 8: Mixer/LNA/Multiplexer H5 temperature Word 9: Quasi-optics baseplate temperature #1 (dichroic D1(A) or polarizer(B)) Word 10: Quasi-optics baseplate temperature #2 (dichroic D2(A) or mirror(B)) Word 11: IF baseplate temperature #1 Word 12: IF baseplate temperature #2 Word 13: Scan mechanism core temperature Word 14: Scan mechanism housing temperature Word 15: RDM SSHM temperature Word 16: FDM SSHM temperature Word 17: Structure 1 temperature (-A edge, next to baseplate cutout) Word 18: Structure 2 temperature (-A edge, in-between Rx and SM) Word 19: Structure 3 temperature (-V edge, in-between EE and SM) Word 20: Processor module temperature Word 21: Main DC/DC converter module temperature Word 22: SCE RDM module temperature Word 23: SCE FDM module temperature Word 24: RF DC/DC converter module temperature	2696	2719	u	1	24	0	counts	
Raw Current Consumption Data *(internal PSU current analog telemetry; range: 0-255)* Word 1: EE and SM +5V current Word 2: receiver +8V current Word 3: receiver +15V current Word 4: receiver -15V current Word 5: RDM motor current Word 6: FDM motor current	2720	2725	u	1	6	0	counts	
<zero fill>	2726	2726	i	1	1	0		
STATUS WORD								
Status Word	2727	2727	u	1	1	0		

bit 7: DC offset valid (1=all channels' calibration target's readings lie within acceptable limits) bit 6: scan control valid: only set in scan mode or fixed view mode (1=all mid-pixel positions of the reflector during earth, space, or OBCT views are within limits) bits 5-4: profile (0=profile 0--the nominal scan mode profile with nominal space view position; 1=profile 1--alternate space view position; 2=profile 2--alternate space view position; 3=no profile calculated--profile will be manually loaded and modified) bits 3-0: <unused>								
<zero fill>	2728	2734	i	1	7	0		
SIGNAL PROCESSING STATUS								
DC Offset Words *(range: 0-255)* Word 1: Channel H1 DC offset word Word 2: Channel H2 DC offset word Word 3: Channel H3 DC offset word Word 4: Channel H4 DC offset word Word 5: Channel H5 DC offset word	2735	2739	u	1	5	0	counts	
bit 7: H1 valid (1=all samples of channel H1 for this scan lie within the ADC dynamic range) bit 6: H2 valid (1=all samples of channel H2 for this scan lie within the ADC dynamic range) bit 5: H3 valid (1=all samples of channel H3 for this scan lie within the ADC dynamic range) bit 4: H4 valid (1=all samples of channel H4 for this scan lie within the ADC dynamic range) bit 3: H5 valid (1=all samples of channel H5 for this scan lie within the ADC dynamic range) bits 2-0: SPE MUX code (0=channel H1 connected to SPE 6; 1=H2 to SPE 6; 2=H3 to SPE 6; 3=SPE 6 not used; 4=H4 to SPE 6; 5=H5 to SPE 6; 6=SPE 6 not used; 7=SPE 6 not used)	2740	2740	u	1	1	0		
Channel Gain *(i.e., gain setting of the receiver video output channels)* *Values of 0 to 3 imply 0 db gain to 3 dB gain, respectively. Values of 4 to 7 are not used.* *Word 1:* bits 7-5: channel H1 gain bits 4-2: channel H2 gain bits 1-0: <unused> *Word 2:* bits 7-5: channel H3 gain bits 4-2: channel H4 gain bits 1-0: <unused> *Word 3:* bits 7-5: channel H5 gain bits 4-2: <unused> bits 1-0: <unused>	2741	2743	u	1	3	0		
<zero fill>	2744	2750	i	1	7	0		
OBCT TEMPERATURE DATA								
OBCT (PRT) Readings	2751	2760	u	2	5	0	counts	

Word 1: PRT 1 Word 2: PRT 2 Word 3: PRT 3 Word 4: PRT 4 Word 5: PRT 5								
PRT Calibration Channels Word 1: Calibration channel 1 (upper value) Word 2: Calibration channel 2 (middle value) Word 3: Calibration channel 3 (lower value)	2761	2766	u	2	3	0	counts	
<zero fill>	2767	2768	i	2	1	0		
Computed OBCT Temperatures Word 1: OBCT temperature 1 (based on PRT 1 reading) Word 2: OBCT temperature 2 (based on PRT 2 reading) Word 3: OBCT temperature 3 (based on PRT 3 reading) Word 4: OBCT temperature 4 (based on PRT 4 reading) Word 5: OBCT temperature 5 (based on PRT 5 reading)	2769	2788	u	4	5	3	K	
Science Packet Spare Words *(set to zero)*	2789	2833	u	1	45	0		
<zero fill>	2834	2834	i	1	1	0		
DISCRETE TELEMETRY *Equivalent to digital B and analog housekeeping telemetry in other instruments.*								
Main Bus Select Status *(indicate which main bus (A or B) is used by the MHS)* 1 (0V)=A bus (relay closed) 0 (5V)=B bus (relay opened)	2835	2835	u	1	1	0		1
MHS Survival Heater 1=on 0=off	2836	2836	u	1	1	0		1
RF Converter Protect Disable 1=no 0=yes	2837	2837	u	1	1	0		1
MHS Power A 1=on 0=off	2838	2838	u	1	1	0		1
MHS Power B 1=on 0=off	2839	2839	u	1	1	0		1
Main Converter Protect Disable 1=no 0=yes	2840	2840	u	1	1	0		1
Survival Temperatures Word 1: Receiver temperature Word 2: Electronics equipment temperature Word 3: Scan mechanism temperature	2841	2846	u	2	3	0	counts	1

Transmitter Telemetry Word 1: STX-1 status Word 2: STX-2 status Word 3: STX-3 status Word 4: STX-4 status Word 5: STX-1 power Word 6: STX-2 power Word 7: STX-3 power Word 8: SARR-A power Word 9: SARR-B power	2847	2864	u	2	9	0	counts	1
Discrete Telemetry Update Flags *(If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.)* bits 31-18: <zero fill> bit 17: SARR-B power bit 16: SARR-A power bit 15: STX-3 power bit 14: STX-2 power bit 13: STX-1 power bit 12: STX-4 status bit 11: STX-3 status bit 10: STX-2 status bit 9: STX-1 status bit 8: Scan mechanism temperature bit 7: Electronics equipment temperature bit 6: Receiver temperature bit 5: Main converter protect disable bit 4: MHS power B bit 3: MHS power A bit 2: RF converter protect disable bit 1: MHS survival heater bit 0: Main bus select status	2865	2868	u	1	4	0		1
FILLER								
<zero fill>	2869	3072	i	2	102	0		

NOTES:

1. The MHS Level 1b data will not contain any MIU related analog or digital B telemetry items from the NOAA data stream. These items will be archived in a separate NOAA telemetry file.
2. To determine the word location and bit location within the word of a particular FOV's validity flag, use the following equations: word = truncate((FOV - 1) / 8) + 1bit = (FOV - 1) mod 8For example, FOV 64's validity flag is located in bit 7 of word 8, computed as follows :word = truncate (64 - 1) / 8) + 1 = truncate (63 / 8) + 1 = truncate (7.875) + 1 = 7 + 1 = 8; bit = (64 - 1) mod 8 = 63 mod 8 = 7.
3. The limits are defined in the Telemetry Limits Table, which is loaded into the instrument's memory. This table can be found in Appendix B of *MHS TM-TC and Science Data Format Directory*, and in Table 3.2.2.2.9-3 of *MHS Instrument ICD*. There are two levels of limits: "warning" limits and "fault" limits. If a telemetry item goes outside of the "warning" limits, then this bit is set. If the telemetry item goes outside of the "fault" limits, then an error flag is raised in the "fault code" field and the instrument switches to "fault" mode.
4. This bit is related to the Earth/Space/OBCT View Position Validity Flags. It is set by the instrument and comes in the data stream. The Position Validity Flags are set by the preprocessor. If this bit is set, then at least one bit of the Position Validity Flags should be set also.

8.3.1.9.3.2 Extended Test Data Packet

The MHS Level 1b Record Format (Extended Test Data Packet) is documented in Table 8.3.1.9.3-2. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.9.3.2-1. Format of MHS Level 1b Record (Extended Test Data Packet).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number *(cumulative, starting with 1)*	1	2	u	2	1	0		
Scan Line Year *(four digits, e.g., 2000)*	3	4	u	2	1	0		
Scan Line Day of Year *(e.g., 365)*	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	msec	
Scan Line UTC Time of Day	9	12	u	4	1	0	msec	
Scan Line Bit Field bit 15: satellite direction (0=northbound; 1=southbound) bit 14: clock drift correction (0=not corrected; 1=scan time corrected for clock drift)bits 13-0: <zero fill>	13	14	u	2	1	0		
Major Frame Count *(cumulative, starting with 1)*	15	16	u	2	1	0		
Coarse MHS On-board Time (OBT) *(time since last reset to zero)*	17	20	u	4	1	0	seconds	
Fine MHS OBT *(fraction of second since last increment of coarse MHS OBT. Resolution: 2^{-16} seconds; range: 0 - 65,535.)*	21	22	u	2	1	0		
MHS Mode Flag 0=power-on ("empty" MHS science data) 1=warm-up ("empty" MHS science data) 2=Standby ("empty" MHS science data) 3=scan (valid MHS science data) 4=fixed view (valid MHS science data, but instrument is viewing a fixed location) 5=self test (test data) 6=safeing ("empty" MHS science data) 7=fault ("empty" MHS science data) 8-14=<undefined> (unknown data) 15=memory dump (memory dump data)	23	23	u	1	1	0		
<zero fill>	24	24	i	1	1	0		
QUALITY INDICATORS								
Quality Indicator Bit Field *(if a bit is on (=1), the statement is true)* bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan (gap may be	25	28	u	4	1	0		2

due to actual lost scans or scans in which the TIP or MIU are in non-nominal modes) bit 28: insufficient data for calibration (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bits 24 - 5: <zero fill> bit 4: transmitter status change occurred (see note 2) bit 3: AMSU sync error detected bit 2: AMSU minor frame error detected bit 1: AMSU major frame error detected bit 0: AMSU parity error detected Scan Line Quality Flags [Time Problem Code] *(If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.)* bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>								
Scan Line Quality Flags [Time Problem Code] *(If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.)* bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	29	29	u	1	1	0		
<zero fill>	30	1480	i	1	1451	0		
EXTENDED TEST DATA PACKET								
Mode Code/PIE ID/Self-Test Code bits 7-4: mode code (5=self test) bit 3: PIE ID (0=PIE A; 1=PIE B) bits 2-0: self-test code	1481	1481	u	1	1	0		

Unused *(set to zero)*	1482	1519	u	1	38	0		
Extended Test Data	1520	2766	u	1	1247	0		3
<zero fill>	2767	2834	i	2	34	0		
DISCRETE TELEMETRY *Equivalent to digital B and analog housekeeping telemetry in other instruments.*								
Main Bus Select Status *(indicate which main bus (A or B) is used by the MHS)* 1 (0V)=A bus (relay closed) 0 (5V)=B bus (relay opened)	2835	2835	u	1	1	0		1
MHS Survival Heater	2836	2836	u	1	1	0		1
1=on 0=off								
RF Converter Protect Disable 1=no 0=yes	2837	2837	u	1	1	0		1
MHS Power A	2838	2838	u	1	1	0		1
1=on 0=off								
MHS Power B 1=on 0=off	2839	2839	u	1	1	0		1
Main Converter Protect Disable 1=no 0=yes	2840	2840	u	1	1	0		1
Survival Temperatures Word 1: Receiver temperature Word 2: Electronics equipment temperature Word 3: Scan mechanism temperature	2841	2846	u	2	3	0	counts	1
Transmitter Telemetry Word 1: STX-1 status Word 2: STX-2 status Word 3: STX-3 status Word 4: STX-4 status Word 5: STX-1 power Word 6: STX-2 power Word 7: STX-3 power Word 8: SARR-A power Word 9: SARR-B power	2847	2864	u	2	9	0	counts	1
Discrete Telemetry Update Flags *(If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.)*	2865	2868	u	1	4	0		1
bits 31-18: <zero fill> bit 17: SARR-B power bit 16: SARR-A power bit 15: STX-3 power bit 14: STX-2 power								

bit 13: STX-1 power bit 12: STX-4 status bit 11: STX-3 status bit 10: STX-2 status bit 9: STX-1 status bit 8: Scan mechanism temperature bit 7: Electronics equipment temperature bit 6: Receiver temperature bit 5: Main converter protect disable bit 4: MHS power B bit 3: MHS power A bit 2: RF converter protect disable bit 1: MHS survival heater bit 0: Main bus select status								
FILLER								
<zero fill>	2869	3072	i	2	102	0		

NOTES:

1. The MHS Level 1b will not contain any MIU-related analog or digital B telemetry items from the NOAA data stream. These items will be archived in a separate NOAA telemetry file.

2. The RFI bias correction data is based on experience with the AMSU-B instrument from the NOAA KLM series of satellites. While it may not be necessary, it is being left in the MHS Level 1b format. Until a determination is made that it is necessary, it will be zero filled.

3. Refer to Section 4.3.2.3 of *MHS TM-TC and Science Data Format Directory* for a detailed description of the content of this field.

8.3.1.9.3.3 Extended Memory Data Packet

The MHS Level 1b Record Format (Extended Memory Data Packet) is documented in Table 8.3.1.9.3.3-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.9.3.3-1. Format of MHS Level 1b Record (Extended Memory Data Packet).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number *(cumulative, starting with 1)*	1	2	u	2	1	0		
Scan Line Year *(four digits, e.g., 2000)*	3	4	u	2	1	0		
Scan Line Day of Year *(e.g., 365)*	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	msec	
Scan Line UTC Time of Day	9	12	u	4	1	0	msec	
Scan Line Bit Field bit 15: satellite direction (0=northbound; 1=southbound) bit 14: clock drift correction (0=not corrected; 1=scan time corrected for	13	14	u	2	1	0		

clock drift) bits 13-0: <zero fill>								
Major Frame Count *(cumulative, starting with 1)*	15	16	u	2	1	0		
Coarse MHS On-board Time (OBT) *(time since last reset to zero)*	17	20	u	4	1	0	seconds	
Fine MHS OBT *(fraction of second since last increment of coarse MHS OBT. Resolution: 2^{-16} seconds; range: 0 - 65,535.)*	21	22	u	2	1	0		
MHS Mode Flag 0=power-on ("empty" MHS science data) 1=warm-up ("empty" MHS science data) 2=Standby ("empty" MHS science data) 3=scan (valid MHS science data) 4=fixed view (valid MHS science data, but instrument is viewing a fixed location) 5=self test (test data) 6=safeing ("empty" MHS science data) 7=fault ("empty" MHS science data) 8-14=<undefined> (unknown data) 15=memory dump (memory dump data)	23	23	u	1	1	0		
<zero fill>	24	24	i	1	1	0		
QUALITY INDICATORS								
Quality Indicator Bit Field *(if a bit is on (=1), the statement is true)* bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan (gap may be due to actual lost scans or scans in which the TIP or MIU are in non-nominal modes) bit 28: insufficient data for calibration (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bits 24 - 5: <zero fill> bit 4: transmitter status change occurred (see note 2) bit 3: AMSU sync error detected bit 2: AMSU minor frame error detected bit 1: AMSU major frame error detected bit 0: AMSU parity error detected	25	28	u	4	1	0		2

Scan Line Quality Flags [Time Problem Code] *(If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.)* bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e., there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>	29	29	u	1	1	0		
<zero fill>	30	1480	i	1	1451	0		
EXTENDED MEMORY DATA PACKET								
Packet ID/PIE ID bits 7-4: packet ID (15=memory data packet) bit 3: PIE ID (0=PIE A; 1=PIE B) bits 2-0: unused (undefined)	1481	1481	u	1	1	0		
Start Address *(where, word 1 is the most significant byte of address and word 3 is the least significant byte)*	1482	1484	u	1	3	0		
Data Words	1485	2508	u	2	512	0		
<zero fill>	2509	2834	i	2	163	0		
DISCRETE TELEMETRY *Equivalent to digital B and analog housekeeping telemetry in other instruments.*								
Main Bus Select Status *(indicate which main bus (A or B) is used by the MHS)* 1 (0V)=A bus (relay closed) 0 (5V)=B bus (relay opened)	2835	2835	u	1	1	0		1
MHS Survival Heater 1=on 0=off	2836	2836	u	1	1	0		1
RF Converter Protect Disable 1=no 0=yes	2837	2837	u	1	1	0		1
MHS Power A 1=on 0=off	2838	2838	u	1	1	0		1
MHS Power B 1=on 0=off	2839	2839	u	1	1	0		1
Main Converter Protect Disable	2840	2840	u	1	1	0		1
1=no								

0=yes								
Survival Temperatures Word 1: Receiver temperature Word 2: Electronics equipment temperature Word 3: Scan mechanism temperature	2841	2846	u	2	3	0	counts	1
Transmitter Telemetry Word 1: STX-1 status Word 2: STX-2 status Word 3: STX-3 status Word 4: STX-4 status Word 5: STX-1 power Word 6: STX-2 power Word 7: STX-3 power Word 8: SARR-A power Word 9: SARR-B power	2847	2864	u	2	9	0	counts	1
Discrete Telemetry Update Flags *(If bit = 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.)* bits 31-18: <zero fill> bit 17: SARR-B power bit 16: SARR-A power bit 15: STX-3 power bit 14: STX-2 power bit 13: STX-1 power bit 12: STX-4 status bit 11: STX-3 status bit 10: STX-2 status bit 9: STX-1 status bit 8: Scan mechanism temperature bit 7: Electronics equipment temperature bit 6: Receiver temperature bit 5: Main converter protect disable bit 4: MHS power B bit 3: MHS power A bit 2: RF converter protect disable bit 1: MHS survival heater bit 0: Main bus select status	2865	2868	u	1	4	0		1
FILLER								
<zero fill>	2869	3072	i	2	102	0		

NOTES:

1. The MHS Level 1b will not contain any MIU-related analog or digital B telemetry items from the NOAA data stream. These items will be archived in a separate NOAA telemetry file.
2. The RFI bias correction data is based on experience with the AMSU-B instrument from the NOAA KLM series of satellites. While it may not be necessary, it is being left in the MHS Level 1b format. Until a determination is made that it is necessary, it will be zero filled.
3. Refer to Section 4.3.2.2 of *MHS TM-TC and Science Data Format Directory* for a detailed description of the content of this field.

8.3.1.9.3.4 Unknown Packet

If the mode code in the MHS data stream is missing or corrupt, the mode of the instrument (and therefore the type of packet) is unknown. If this is the case, the packet data is placed into this field without modification. The MHS unknown packet is documented in Table 8.3.1.9.3.4-1. See the legend in Section 8.3.1.1 for further explanation of the headings on this table.

Table 8.3.1.9.3.4-1. Format of MHS Level 1b Record (Unknown Packet).

Field Name	Start Octet	End Octet	Data Type	Word Size	Number of Words	Scale Factor	Units	Notes
SCAN LINE INFORMATION								
Scan Line Number *(cumulative, starting with 1)*	1	2	u	2	1	0		
Scan Line Year *(four digits, e.g., 2000)*	3	4	u	2	1	0		
Scan Line Day of Year *(e.g., 365)*	5	6	u	2	1	0		
Satellite Clock Drift Delta	7	8	i	2	1	0	msec	
Scan Line UTC Time of Day	9	12	u	4	1	0	msec	
Scan Line Bit Field bit 15: satellite direction (0=northbound; 1=southbound) bit 14: clock drift correction (0=not corrected; 1=scan time corrected for clock drift) bits 13-0: <zero fill>	13	14	u	2	1	0		
Major Frame Count *(cumulative, starting with 1)*	15	16	u	2	1	0		
Coarse MHS On-board Time (OBT) *(time since last reset to zero)*	17	20	u	4	1	0	seconds	
Fine MHS OBT *(fraction of second since last increment of coarse MHS OBT. Resolution: 2^{-16} seconds; range: 0 - 65,535.)*	21	22	u	2	1	0		

MHS Mode Flag 0=power-on ("empty" MHS science data) 1=warm-up ("empty" MHS science data) 2=Standby ("empty" MHS science data) 3=scan (valid MHS science data) 4=fixed view (valid MHS science data, but instrument is viewing a fixed location) 5=self test (test data) 6=safeing ("empty" MHS science data) 7=fault ("empty" MHS science data) 8-14=<undefined> (unknown data) 15=memory dump (memory dump data)	23	23	u	1	1	0		
<zero fill>	24	24	i	1	1	0		
QUALITY INDICATORS								
Quality Indicator Bit Field *(if a bit is on (=1), the statement is true)* bit 31: do not use scan for product generation bit 30: time sequence error detected within this scan (see below) bit 29: data gap precedes this scan (gap may be due to actual lost scans or scans in which the TIP or MIU are in non-nominal modes) bit 28: insufficient data for calibration (see below) bit 27: earth location data not available (see below) bit 26: first good time following a clock update (nominally 0) bit 25: instrument status changed with this scan bits 24 - 5: <zero fill> bit 4: transmitter status change occurred (see note 2) bit 3: AMSU sync error detected bit 2: AMSU minor frame error detected bit 1: AMSU major frame error detected bit 0: AMSU parity error detected	25	28	u	4	1	0		2
Scan Line Quality Flags [Time Problem Code] *(If a bit is on (=1), the statement is true. All bits off implies the scan time is as expected.)* bit 7: time field is bad but can probably be inferred from the previous good time bit 6: time field is bad and can't be inferred from the previous good time bit 5: this record starts a sequence that is inconsistent with previous times (i.e.,	29	29	u	1	1	0		

there is a time discontinuity). This may be associated with a spacecraft clock update. (See bit 26, Quality Indicator Bit Field.) bit 4: start of a sequence that apparently repeats scan times that have been previously accepted bits 3-0: <zero fill>								
<zero fill>	30	1480	i	1	1451	0		
UNKNOWN PACKET DATA								
Packet Data	1481	2766	u	1	1286	0		3
<zero fill>	2767	2834	i	2	34	0		
DISCRETE TELEMETRY *Equivalent to digital B and analog housekeeping telemetry in other instruments.*								
Main Bus Select Status *(indicate which main bus (A or B) is used by the MHS)* 1 (0V)=A bus (relay closed) 0 (5V)=B bus (relay opened)	2835	2835	u	1	1	0		1
MHS Survival Heater 1=on 0=off	2836	2836	u	1	1	0		1
RF Converter Protect Disable 1=no 0=yes	2837	2837	u	1	1	0		1
MHS Power A 1=on 0=off	2838	2838	u	1	1	0		1
MHS Power B 1=on 0=off	2839	2839	u	1	1	0		1
Main Converter Protect Disable 1=no 0=yes	2840	2840	u	1	1	0		1
Survival Temperatures Word 1: Receiver temperature Word 2: Electronics equipment temperature Word 3: Scan mechanism temperature	2841	2846	u	2	3	0	counts	1
Transmitter Telemetry Word 1: STX-1 status Word 2: STX-2 status Word 3: STX-3 status Word 4: STX-4 status Word 5: STX-1 power Word 6: STX-2 power Word 7: STX-3 power Word 8: SARR-A power Word 9: SARR-B power	2847	2864	u	2	9	0	counts	1
Discrete Telemetry Update Flags *(If bit*	2865	2868	u	1	4	0		1

= 0, associated telemetry item is up-to-date. If bit = 1, associated telemetry item was not updated during most recent telemetry cycle - possibly due to lost frame.) bits 31-18: <zero fill> bit 17: SARR-B power bit 16: SARR-A power bit 15: STX-3 power bit 14: STX-2 power bit 13: STX-1 power bit 12: STX-4 status bit 11: STX-3 status bit 10: STX-2 status bit 9: STX-1 status bit 8: Scan mechanism temperature bit 7: Electronics equipment temperature bit 6: Receiver temperature bit 5: Main converter protect disable bit 4: MHS power B bit 3: MHS power A bit 2: RF converter protect disable bit 1: MHS survival heater bit 0: Main bus select status								
FILLER								
<zero fill>	2869	3072	i	2	102	0		

NOTES:

1. The MHS Level 1b will not contain any MIU-related analog or digital B telemetry items from the NOAA data stream. These items will be archived in a separate NOAA telemetry file.
2. The RFI bias correction data is based on experience with the AMSU-B instrument from the NOAA KLM series of satellites. While it may not be necessary, it is being left in the MHS Level 1b format. Until a determination is made that it is necessary, it will be zero filled.
3. The mode of the instrument and therefore the type of packet is unknown if the mode code in the data stream is either missing (due to a missing minor frame, for example) or corrupt (i.e., set to one of the "unused" values). In the event of an unknown mode/packet, the packet data is placed into this field without modification.