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ERB Master Archival Tape Specification No. T134081 ERB MAT

May 1984

National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

NIMBUS-7

NIMBUS OBSERVATION PROCESSING SYSTEM (NOPS)

REQUIREMENTS DOCUMENT #NG-13

ERB MASTER ARCHIVAL TAPE

TAPE SPECIFICATION NO. T134081 ERB MAT

REVISION I

MAY, 1984

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This revision represents the current ERB Archival Tape Specifications.

16. Abstract

ERB MAT Tapes are generated by the ERB MATGEN software using the IBM 3081 computer system operated by the Science and Applications Computer Center at Goddard Space Flight Center. All MATs are 9-track and MAT data will be in ascending time order. The gross tape format for Nimbus Year-1 and Year-2 MATs is different from the format of MATs starting with Year-3. MATs from the first two years will contain one day's worth of data while all other MATs will contain multiple day's worth of data stacked onto the tapes.

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Revision D: April 7, 1980 (RDH)

Calibration Adjustment Table (CAT) added.

Revision E: May 13, 1980 (RDH)

Updated CAT specs.

Revision F: July 22, 1981 (LHB)

Changed GHA from degrees to radians (Page 22).

Revision G: November 3, 1981 (SNR)

Tables VI-1, VI-4, and VI-5 added.

Revision H: November 4, 1982 (SNR)

Specified fill values for location errors and solar channels. Also specified range of GHA values correctly and corrected the numbering system of SUBFOV's (Page 22).

Revision I: April 17, 1984 (STN)

Added Trailing Documentation File (TDF) description. Also added description of Stacked (multi-day) MAT which became effective at start of Year-3.

ABSTRACT

ERB MAT tapes are generated by the ERB MATGEN software using the IBM 3081 computer system operated by the Science and Applications Computing Center at Goddard Space Flight Center. All MATs are 9-track and MAT data will be in ascending time order. The gross tape format for Nimbus Year-1 and Year-2 MATs is different from the format of MATs starting with Year-3. MATs from the first two years will contain one day's worth of data while all other MATs will contain multiple day's worth of data stacked onto the tapes. Each data file will represent one ERB instrument "ON" day. The gross tape format for a Year-1 or Year-2 MAT is shown in Figure 1 and is summarized here:

- Tape density is 1600 BPI.
- File 1 contains a standard header record written twice.
- File 2 contains one day's worth of data.
- File 3, the calibration file, is the last file on the tape.

The gross tape format for stacked MATs starting with Year-3 is shown in Figure 2 and is summarized as follows:

- Tape density is 6250 BPI.
- File 1 contains a standard header record written twice.
- Files 2 to N-2 will be data files that contain one day's worth of data per file. Normally there will be three data files stacked onto a MAT, but a few tapes have only two data files.
- File N-1 is the calibration file.
- File N is the Trailing Documentation File (TDF).

An orbit data block is defined as beginning at one descending node and ending at the following descending node. However, the data orbit number is incremented at each ascending node such that each orbit data block will contain data from two data orbits. Each record within the orbit data block and each orbit data block from the beginning of the tape to the end of the tape will contain data in ascending time order. Data will only be written when ERB subsystem is "ON" and no duplicate data will be written.

Each VIP frame of data occupies one logical data record. There are up to two logical data records to every physical record. After all the logical data records have been output, an Orbital Summary logical record will be written. This record will indicate the end of an orbit data block. In the last orbit data block of the day, a Daily Summary logical record will be written after the Orbital Summary logical record. Figure 3 shows the data file format for all MATs.

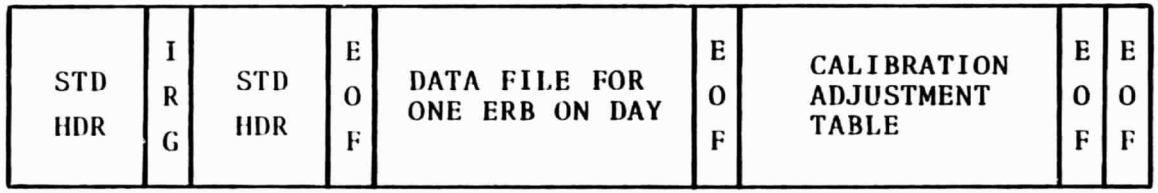

FIGURE 1. Gross Tape Format of Year-1 and Year-2 MATs

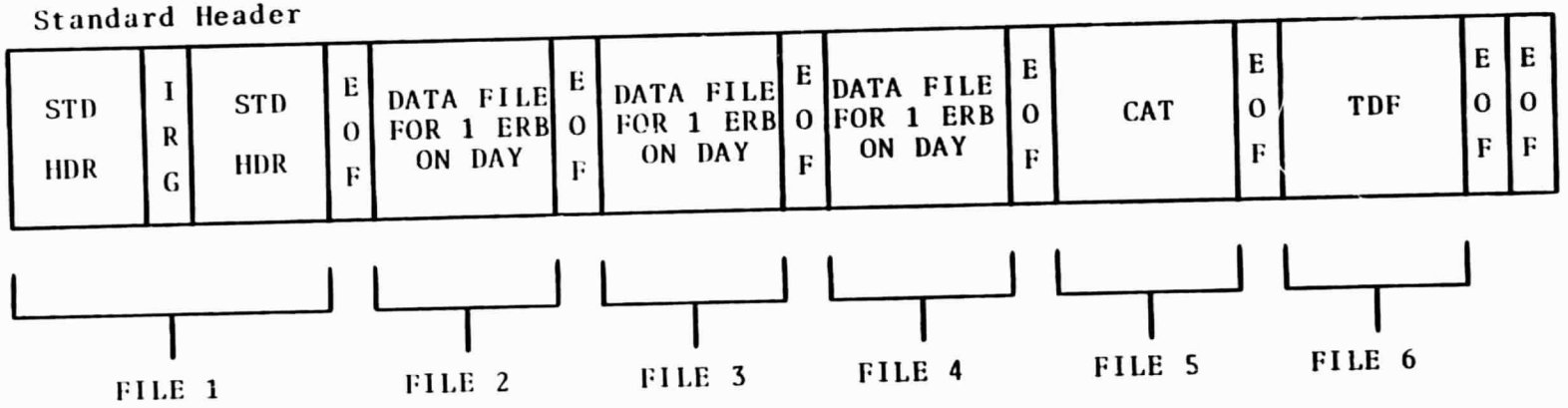

FIGURE 2. Gross Tape Format of a Typical Stacked MAT

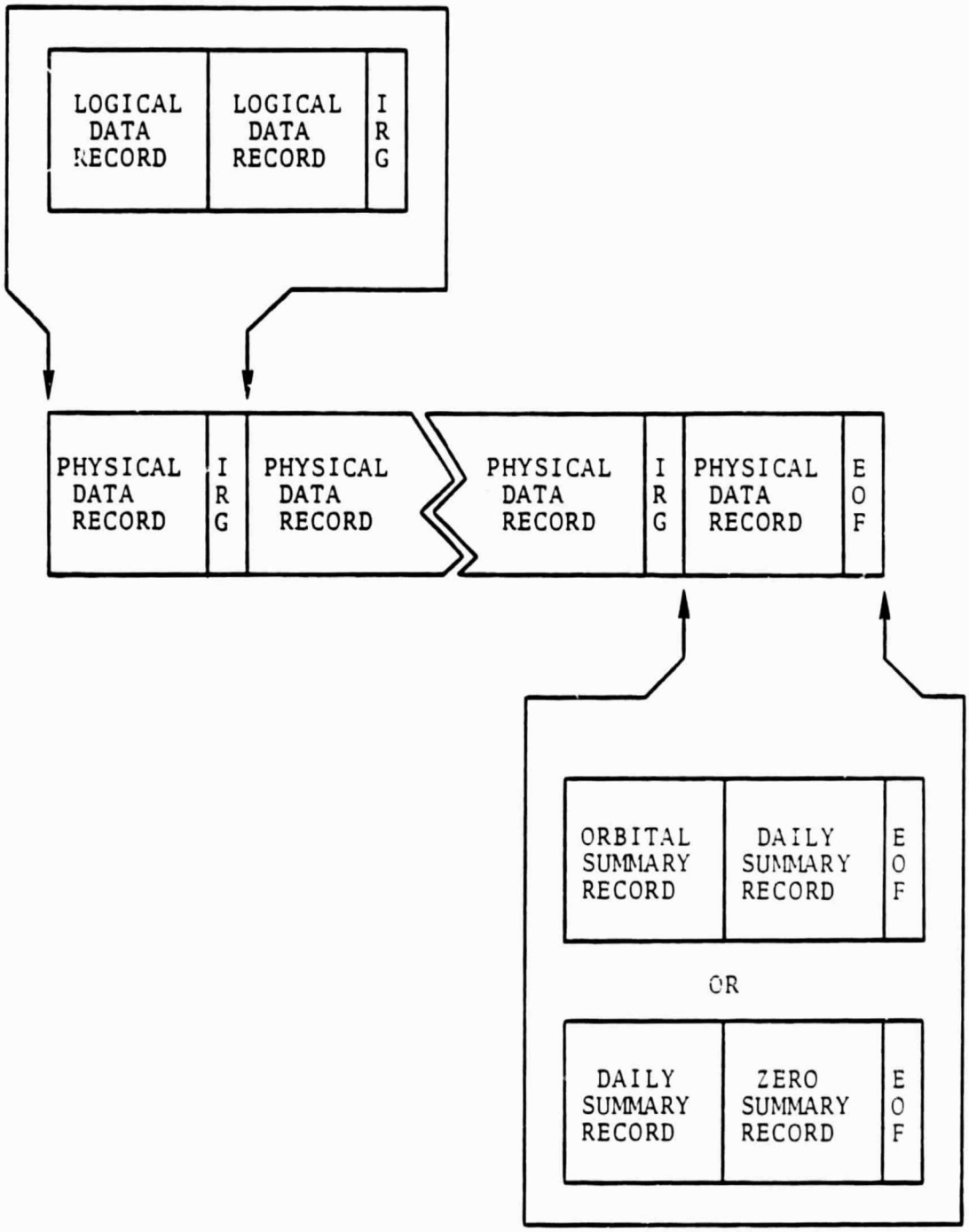

FIGURE 3. Data File Format for all MATs

I. REQUIREMENT IDENTIFICATION

ERB Master Archival Tape (MAT) Specification Number T134081.

II. INPUT DATA SOURCE

UFO-E (T113011) and ERB ILT (T123044).

III. OPERATING MODE

Data is available only when the instrument in "ON". When the ERB Subsystem is "OFF", data records covering that time period will not be available.

When the tape has covered one 24-hour period, the tape will be terminated and a new tape initiated. The tape sequence number will be incremented by one and the whole process restarted.

IV. GROSS OUTPUT FORMAT

Refer to Figure 1 and Figure 2.

V. STANDARD HEADER

All magnetic tapes used as interfaces within NOPS will require some form of identification. A standardized series of records in the initial file on each tape will be used and will be called a NOPS Standard Header File. Some tapes used within a NOPS facility, which do not pass an interface, will be exempt from this requirement, although it is a recommended procedure.

The Standard Header will contain the specification number of the tape generated. The interface specification numbering system is shown in Table V-1.

Each Standard Header will be written in EBCDIC so that it can be easily printed for quick identification of the tape. Figure V-1 shows the standard header format using 24-bit words.

Because of the real possibility of an original tape being damaged in handling (resulting in the loss of many computations) each processing facility within NOPS will generate duplicate copies of master tapes. These duplicates will be delivered to IPD for data product generation or user copy generation and will be indicated by the character 2 added to the sequence number in the Standard Header. The original will be indicated by the character 1 and will be retained in a secure environment at the originating facility. When IPD returns Copy No. 2 due to tape errors, a new copy will be sent to IPD with the copy number incremented by 1 (No. 3).

IPD will include a shipping letter with every tape distributed. The shipping letter will be printed directly from the Standard Header on the tape. In the case of copies made from tapes not generated in IPD, the original tapes Standard Header will be copied into a group of 126 characters in each record provided for that purpose and normally left blank.

V.1 GENERAL

All computer compatible tapes (CCTs) that are used as interfaces within NOPS, require some form of identification. This applies to all CCTs that are currently defined by a NOPS tape specification, and that are also used for distribution or archiving purposes.

In addition to defining a "latest" product, data relating to previous products that went into the making of the "latest" product provides useful information when system problems occur.

The purpose of this revision to existing NOPS tape specifications is to define a scheme that allows the recording of the genealogy of a "latest" product, and in general, adheres to existing tape documentation standards.

In brief, the system is as follows:

1) A documentation file that consists of a string of physical records follows the data on any tape defined by a current NOPS tape specification. This will be referred to as a Trailing Documentation File (TDF), and will be the last file on a tape when it exists.

2) The standard NOPS header file remains as defined, with minor modifications to the Standard Header record that reflect both the existence of a TDF and adherence to the IPD standard for sequence numbers.

The following sections define the NOPS Standard Header records and file, and the TDF. Data files as currently defined in NOPS tape specification remain unchanged.

V.2 STANDARD HEADER RECORD (SHR)

The SHR will consist of one physical record that consists of five logical records of 126 EBCDIC characters. The first 126 characters will remain as previously defined with the exception of CHARACTER 1, and those characters that define the sequence number (40-45). CHARACTER 1 will contain an asterisk (*) and serves to notify all systems that a TDF is likely to follow the main data files and that the next logical record contains information relevant to complete identification. As of the implementation date of this specification, all sequence numbers will have the following form that is an IPD standard:*

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*This does not apply to CZCS data. For CZCS data, Characters 40 to 45 represent a 6-digit sequence number.

CHARACTER 40 = The last digit of the year in which the data were acquired.

CHARACTERS 41-43 = Julian day of the year in which the data were acquired.

CHARACTER 44 = Sequence number for this particular product (usually a 1) (eg., CLDTs will have a 1 and 2, as there are 2 products per day).

CHARACTER 45 = The existing hyphen remains unless there is a remake of the tape for any reason. In this case, an ascending alpha character will replace the hyphen, and the most recent reasons for remake will be recorded in logical record 4 of the header.

CHARACTER 47 = This will remain as a blank unless it is needed to remove ambiguities in CHARACTER 40. This may occur if data are being acquired on October 24, 1988.

This scheme will uniquely identify any tape when used in conjunction with the tape specification number, the PDFC code, and the subsystem identification.

The second logical record consisting of 126 characters will contain information that is required to complete the history of the product.

CHARACTERS 1-12 = Software program name and version number.

CHARACTERS 13-18 = Program documentation reference number, if it exists.

CHARACTERS 20-126 = User defined comments that may be more relevant to the user than the preceding ones.

The NOPS Standard Header File will continue to consist of two records, the second being a duplicate of the first. Logical records 3 and 4 may be used for anything desired if no remake information is required.*

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*In the case of CZCS, these logical records are used to define the genealogy of the image rather than the method of V.3.

The Standard Header will contain the following:

Two identical records (physical) of 630 characters (8-bits each) followed by an End-Of-File (EOF).

The first 126 characters of the first record will consist of:

*NIMBUS-7$_b$NOPS$_b$SPEC$_b$NO$_b$T	(1, 24 CHAR)
XXXXXX (6-Digit Spec Number)	(25, 30 CHAR)
$_b$SQ$_b$NO$_b$	(31, 37 CHAR)
AIXXXXX (PDFC & 5-Digit Sequence Number)	(38, 44 CHAR)

NOTE: If sequence number is zero, tape is not a finished product (i.e., definitive ephemeris not used, artificial VIP data, etc.).[1]

-X (Copy Number 1 or 2) └── (Redo Character)	(45, 46 CHAR)
$_b$YYYY$_b$ (4-Character Subsystem ID)	(47, 52 CHAR)
YYYY (Generation Facility ID)	(53, 56 CHAR)
$_b$TO$_b$YYYY (4-Character Designation Facility ID)	(57, 64 CHAR)
$_b$START$_b$19XX$_b$DDD$_b$HHMMSS	(65, 86 CHAR)
(Start year, day of year, hours, minutes and seconds)	
$_b$TO$_b$19XX$_b$DDD$_b$HHMMSS$_b$	(87, 106 CHAR)
(End data and time of data)	
GEN$_b$19XX$_b$DDD$_b$HHMMSS$_b$	(107, 126 CHAR)
(Date and time tape was generated)	

The second group of 126 characters will contain continuation documentation of the original 126 characters when required.

---

[1]For CZCS, Characters 40 to 45 are a 6-digit sequence number.

The third, fourth, and fifth groups of 126 characters each are intended for the use of the Subsystem Analyst for further identifications of their data. They may contain blanks, EBCDIC, BDC, or binary characters or zeros.

The second record in the file is a duplicate of the first record of redundancy.

The PDFC codes are as defined in Table V-2.

EXAMPLE: An ERB MATRIX tape covering the month of February, 1979 is generated by SACC and sent to IPD for production of contour maps on 16mm microfilm. The NOPS Standard Header file on the tape that IPD receives would contain two of the following records:

*NIMBUS-7$_b$NOPS$_b$SPEC$_b$NO$_b$T134031$_b$SQ$_b$NO$_b$

First day of time period

AA90321-2$_b$ERB$_{bb}$SACC$_b$TO$_b$IPD$_b$START$_b$1979$_b$

032$_b$000432$_b$TO$_b$1979$_b$059$_b$235742$_b$GEN$_b$

1979$_b$104$_b$094500$_b$followed by 504 blanks

First day of time period may not be first data day in the event of multiday-stacked products that are based on an ILT week.

V.3 TRAILING DOCUMENTATION FILE (TDF)

The TDF will consist of all NOPS Standard Header records (non-duplicated) that relate to products that have gone into the making of the current product. Documentation records will be sequenced in accordance with their access; that is, first in is the first recorded. Every TDF is 630 bytes in length.

The first record of this file will serve to identify the file as a TDF. This will be accomplished by placing asterisks in CHARACTERS 1 to 10 followed by a NOPS TRAILER DOCUMENTATION FILE FOR TAPE PRODUCT T [SPEC NO. (6 digits)] GENERATED ON DDD HH MM. The exact spacing of this comment is noncritical as long as it is less than 116 characters. The second physical record will be a repeat of the header file NOPS Standard Header record for this type with the proviso that data referring to the end-time are correct for the data set. Following physical records will be an accumulation of TDFs of all input tapes. For those products that require more than one tape, the TDF will appear on the last tape only as well as the warning asterisk.

V.4 TAPE DUPLICATION

It has been determined that the duplication of master tapes is neither time nor cost effective, thus the requirement of duplication implied in the preceding specification is rescinded. However, some tapes that require a great deal of effort to produce in terms of manpower and computer time should be duplicated.

If a redo is required due to tape errors or algorithm changes, this will be noted both on the CCT (HEADER C-45) and on the canister.

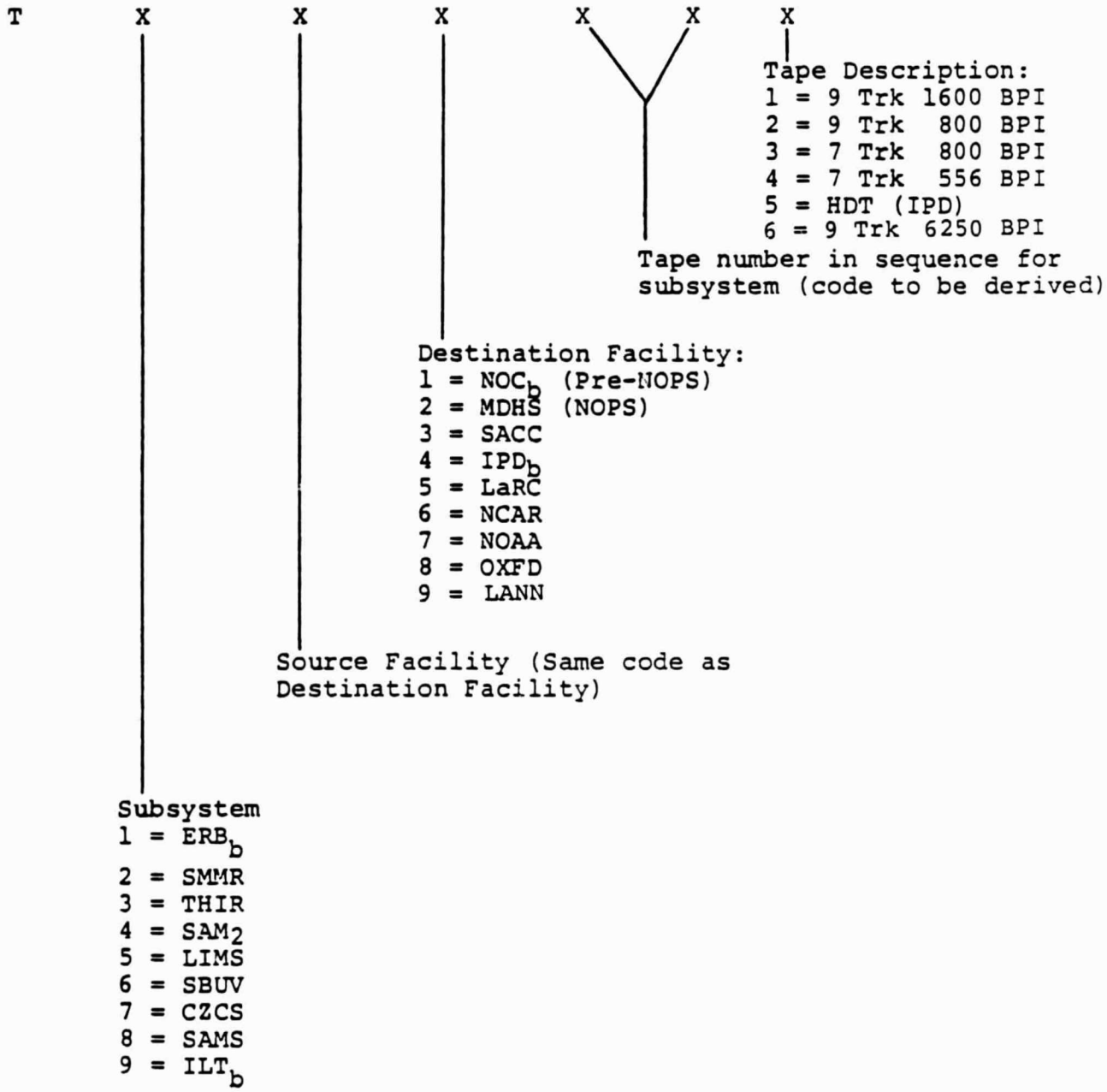
V.5 SHIPPING LETTERS

IPD will include a shipping letter with every tape distributed. The shipping letter will be printed directly from the first 126 (or 138) characters of the first physical record of SHF. In the event of copies made from CCTs that are not generated in IPD, a new physical record reflecting IPD as the source and the Nimbus experimentor to whom the tape is being sent as the destination, will be added as the second record of the TDF. All existing records in the TDF will be pushed down, but none will be lost. This record should also replace those in the SHF.

TABLE V-1

NOPS SPECIFICATION NUMBERING CODE

TAPES: A six digit number prefixed with a T to denote TAPE will be used.



STANDARD HEADER (PHYSICAL RECORD FORMAT)

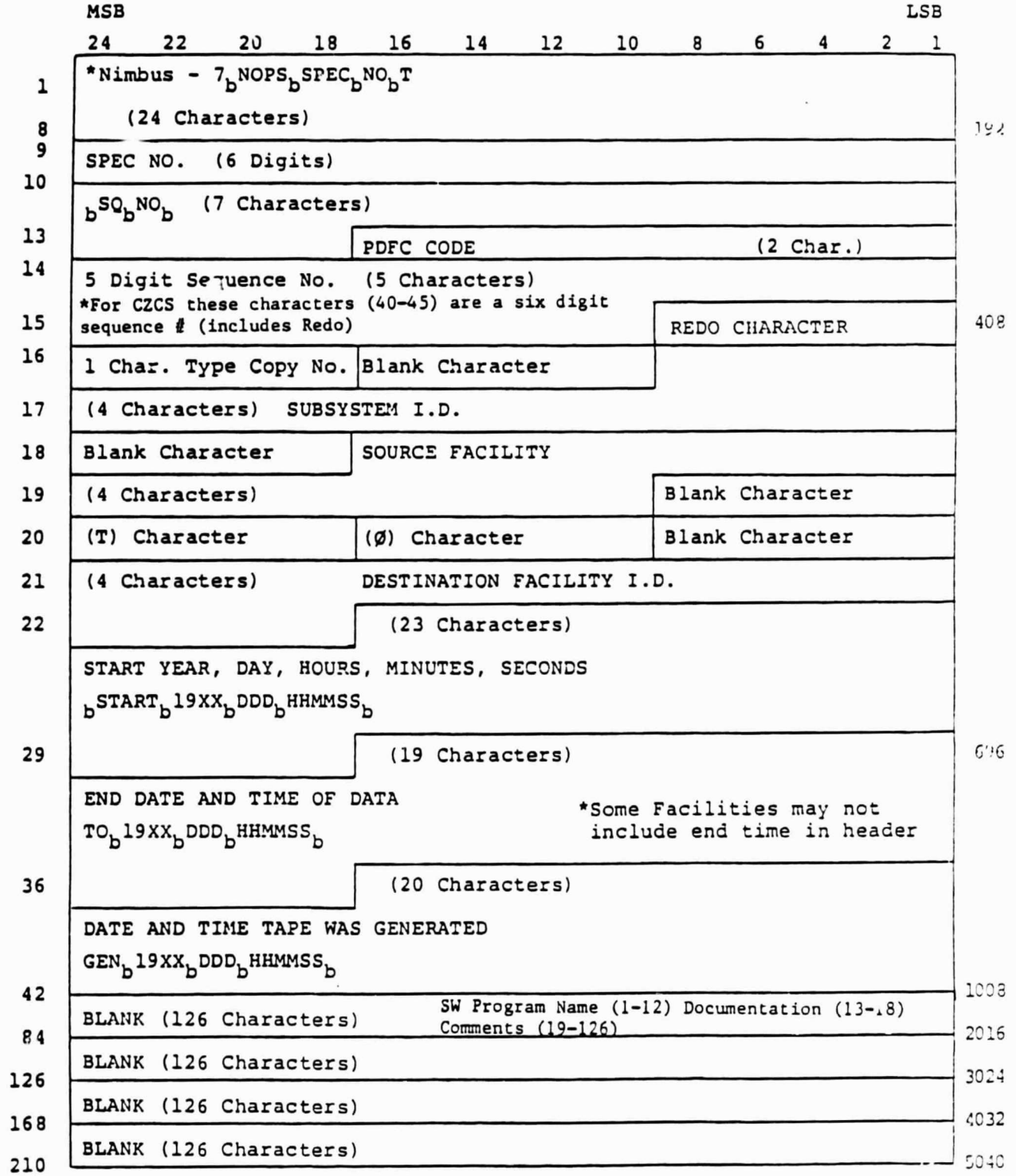


FIGURE V-1. EBCDIC Tape Format

TABLE V-2.

NIMBUS-7 PROJECT DATA FORMAT CODES, 1 AUG 81

(Rev. From 1 APR 81)

SENSOR	TAPE ID	ORIG.	COPIES	POF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
CZCS	MATRIX	12	72	AA	MAAA	D RED	/ L RED
	TABLES	12	-	AB	TAAB	D RED	/ D PINK
	MAT*	263	[illegible]	AC	MTAC	D RED	/ D RED
	SEFDT*	12	36	AD	SEAD	D RED	/ YELLOW
	ZMT*	2	12	AE	ZMAE	L RED	/ L PINK
	STACS	1	-	AG	STAG	D RED	/ D ORANGE
	MATRIX-C	12	60	AH	MAAH		
	SEASON	4	16	AI	SEAI		
TOTALS		*277	1100				
	OTHER	41	164				

SENSOR	TAPE ID	ORIG.	COPIES	POF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
LIMS	MATRIX-M	42	[illegible]	EA	MAEA	YELLOW	/ BLUE
	MATRIX-C	42	[illegible]	EB	MAEB	YELLOW	/ L GREEN
	PROFILE-A	7	[illegible]	EC	PREC	YELLOW	/ L PINK
	PROFILE-I	9	[illegible]	ED	PRED	YELLOW	/ M TAN
	BAT*	207	[illegible]	EE	BAEE	YELLOW	/ D PINK
	IPAT*	35	[illegible]	EF	IPEF	YELLOW	/ D ORANGE
	MAT*	35	[illegible]	EG	MTEG	YELLOW	/ YELLOW
	CAT*	9	[illegible]	EH	CTEH	YELLOW	/ GREY
	SMAT*	9	[illegible]	EI	SMEI	YELLOW	/ BROWN
	SCAT*	9	[illegible]	EM	SCEM	YELLOW	/ GREEN
	NMCTD+	6	-	EK	NMEK	YELLOW	EXP LABEL
	UFCD+	295	-	EE	UFEE	YELLOW	EXP LABEL
	ILTD+	30	-	EL	ILLE	YELLOW	EXP LABEL
TOTALS		*304	1328				
		+ 8331	-				
	OTHER (R)	100	561				

SENSOR	TAPE ID	ORIG.	COPIES	POF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
SAGE	MATRIX-30	12	-	BA	MABA	L TAN	/ YELLOW
	MATRIX-LO	12	-	BB	LOBB	L BRWN	/ L GRN
	MATRIX-SS	12	-	BC	SSBC	L BRWN	/ L ORAN
	MAP-30*	12	72	BD	MPBD	L BRWN	/ L PINK
	MAP-LO*	12	48	BE	LOBE	L BRWN	/ BLUE
	MAP-SS*	12	60	BF	SSBF	M TAN	/ M TAN
	PARM-30*	60	360	BG	PABG	M TAN	/ YELLOW
	PARM-LO*	30	120	BH	LOBH	M BRWN	/ YELLOW
	PARM-SS*	30	120	BI	SSBI	M BRWN	/ M BRWN
	TAT*	183	[illegible]	BJ	TABJ	D BRWN	/ YELLOW
	CELL-ALL*	61	[illegible]	BK	DEBK	D BRWN	/ L GRN
TOTALS		*400	1512				
	OTHER	36	-				

SENSOR	TAPE ID	ORIG.	COPIES	POF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
SBUV/ TOMS	MATRIX	[illegible]	[illegible]	FA	MAFA	D GRN	/ D ORAN
	TABLES	12	-	FB	TAFB	L GRN	/ L PINK
	MONTAGE	52	-	FC	MOFC	D GRN	/ D PINK
	AUT-SPO	52	-	FD	SAFD	GREY	/ D GRN
(R)	OZONE-S*	52	52	FE	OSFE	L GRN	/ L BRWN
(R)	OZONE-T*	120	120	FF	OTFF	D GRN	/ D GRN
	ZMT*	2	12	FH	ZMFH	L GRN	/ L PINK
	AUT-T*	120	120	FJ	TAFJ	D GRN	/ YELLOW
TOTALS (R)		52	[illegible]				
	OTHER	[illegible]	[illegible]				

SENSOR	TAPE ID	ORIG.	COPIES	POF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
TWIR	SOURCE	5110	-	IA	SOIA	D ORAN	/ D ORAN
	STT	1095	-	IB	STIB	D ORAN	/ YELLOW
	CLDT	730	730	ID	CLID	D ORAN	/ D GRN
	CLE	365	1460	IE	CLIE	D ORAN	/ D PINK
	CLT	365	365	IF	CLIF	M ORAN	/ GREY
	ILT-T	52	-	LI	ILLI	L ORAN	/ L PINK
	ILT-C	52	-	LC	ILLC	L ORAN	/ L BRWN
	MONTIN	2920	-	IQ	MOIQ	DK ORAN	/ DK ORAN
TOTALS (R)		10689	2555				

SENSOR	TAPE ID	ORIG.	COPIES	POF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
CZCS (R)	CRT360*@	10	[illegible]	ZF	CRZI	BLUE	/ BLUE
	SOURCE	4000	-	ZA	SOZA	STANDARD	STA LABEL
(R)	CRCST*	100	400	ZB	CRZB	BLUE	/ D GRN
	CAT	12	96	ZC	CAZC	BLUE	/ D ORAN
	CRT-L	100	200	ZD	CRZD	BLUE	/ YELLOW
	ILT	52	-	LZ	ILLZ	BLUE	/ M TAN
(R)	CRT	6400	10,800	ZE	CRZE	BLUE	/ D GRN
	ILT-LO	52	-	LL	ILLL	BLACK	EXP LABEL
(R)	CCT-F	100	-	ZN	CCZN	BLUE	/ PINK
(R)	LOIT@	10	-	ZF	LOZF	L GRN	/ GREY
(R)	DPIT@	100	-	ZG	DPZG	GRN	/ BLUE
TOTALS (R)		*166	400				
		@62	-				
(R)		@110	-				
(R)		10864	11,096				

SENSOR	TAPE ID	ORIG.	COPIES	POF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
SAM II	MATRIX	4	-	DA	MADA	D PURP	/ D PURP
	PROFILE	12	-	DB	PRDB	D PURP	/ D ORAN
	RDAT*@	12	-	DC	RDDC	M PURP	/ D GRN
	BANAT*@	12	-	DD	BADD	M PURP	/ YELLOW
	NMCTD+	6	-	DE	NMDE	D ORAN	EXP LABEL
	ILTD+	52	-	LD	ILLD	D ORAN	EXP LABEL
TOTALS		+59	-				
		@24	-				
	OTHER	16	-				

SENSOR	TAPE ID	ORIG.	COPIES	POF	DATA TYPE	HORIZ LABEL	/ VERTIC COLORS
SAMS	MATRIX	36	-	MA	MAMA	YEL-OR	/ L PINK
	BAT*@	180	-	MC	BAMC	YEL-OR	/ YELLOW
	ILTD+	183	-	LN	ILLN	GREY	EXP LABEL
	NMCTD+	6	-	MD	MMMD	GREY	EXP LABEL
TOTALS		+0109	-				
		@0180	-				
	OTHER	36	-				

		ORIGINALS	COPIES	POF
	+ TOTALS	[illegible]	-	
(R)	* TOTALS	1375	4699	27
	@ TOTALS	318	-	8
(R)	# TOTALS	110	-	2
(R)	OTHER TOTALS	21858	144932	31
(R)	GRAND TOTALS	24239	149876	67

* PROCESSED BY METOCC AND COPIED BY IPD (quality controlled by IPD)
@ PROCESSED BY METOCC AND [illegible]
# PROCESSED BY METOCC AND COPIED TO FILM BY IPF
+ PROCESSED BY METOCC AND SHIPPED BY TDCF

(R) - SENSORS WHERE REVISIONS WERE MADE. CHANGES TO LABEL COLORS MAY BE MADE DEPENDING ON AVAILABILITY AND QUANTITY.

NOTE: LOADING REFLECTS FIRST YEAR DATA SET ONLY (28 OCT 78 THRU 3 NOV 79)
TAPES SCHEDULED FOR QUALITY CONTROL CHECKING WILL BE PROCESSED ONLY ON WRITTEN REQUEST OF METOCC. ORIGINAL TAPES WILL BE FORWARDED TO ARCHIVAL CENTER UPON COMPLETION OF QUALITY CONTROL CHECK.

NIMBUS-7 PROJECT DATA FORMAT CODES

(Continued)

SENSOR	TAPE ID	PDFC CODE
Location	ILT/ERB	LA
	ILT/SMMR	LB
	ILT/THIR	LI
	ILT/SAMI I	LD
	ILT/LIMS	LE
	ILT/SBUV	LF
	ILT/CZCS	LZ
	ILT/SAMS	LH
User	UFO/ERB	UA
	UFO/SMMR	UB
	UFO/LIMS	UE
	UFO/SBUV	UF
	UFO/ILT	UL

1st CHARACTER	SOURCE/SENSOR	2nd CHARACTER	USER/SENSOR TAPE NUMBER
ERB	A		
SMMR	B		
THIR	I		
SAMI I	D		
LIMS	E		
SBUV/TOMS	F		
CZCS	Z		
SAMS	H		
ILT	L		
UFO	U		

VI. DATA RECORD

There are three types of logical records in each data file of the ERB MAT tape. Each file will begin with a data logical record and continue on a one VIP major frame per one data logical record basis until the end of the orbit data block or ERB S/S power is turned off, whichever occurs first. After the end of the data logical records, an orbital summary logical record will be written followed by more orbit data blocks until a day's worth of data have been written at which time a daily summary logical record will be written, the rest of that physical record padded out with zeroes, if necessary, and the file ended.

The format of the last physical record depends on the number of logical data records (VIP frames per orbit) in the file.

The orbital summary record contains the peak solar irradiances for Channels 1 through 10 as well as various quantities computed for the orbital summary. All physical records, except standard header records, will consist of 13,464 bytes of information.

Figure VI-1 is the basic physical record format. Formats and word descriptions for the three logical record formats are presented in Subsections VI-A, VI-B, and VI-C.

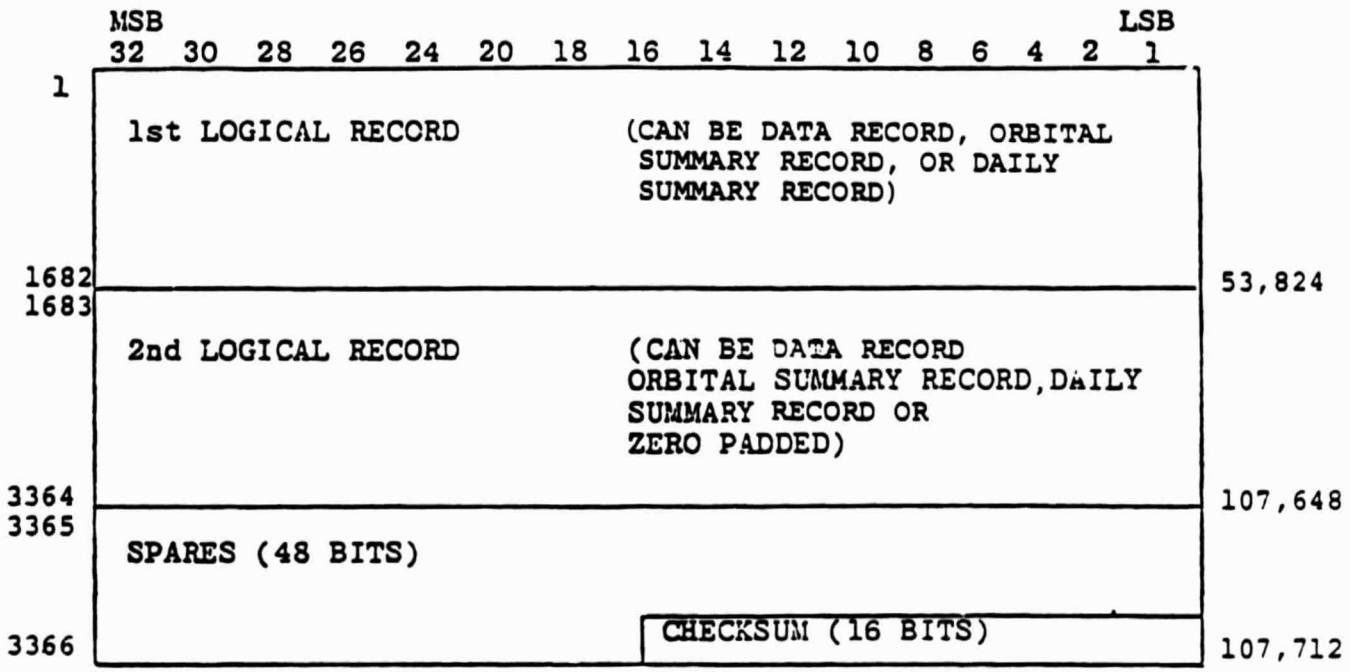
The last sixteen bits of the physical record is the checksum word. Each 32-bit word output to tape is divided into two 16-bit words and added with any overflow over sixteen bits added into the LSB side of the summation word. The final summation word is placed as the last word of the record as the checksum. An internal quality control program will check this number by recomputing what it has read in addition to other quality checks to ensure a quality output product.

When statistics for data are given, the order will be: minimum, mean, maximum, standard deviation, and number of samples. When only four statistics are given, the number of samples are omitted and the order remains the same.

The order in which data are presented on the MAT tape is given in the parameter description.

For example, if the description were (5 statistics x 10 channels x 16 bits = 800 bits) the words would be ordered as follows:

WORD	
1	Minimum for Channel 1
2	Mean for Channel 1
3	Maximum for Channel 1
4	Standard Deviation of Channel 1
5	Number of Samples for Chanel 1
6	Minimum for Channel 2
7	Mean for Channel 2
.	..
.	..
.	..
10	Number of samples for Channel 2
.	..
.	..
.	..
.	..
46	Minimum for Channel 10
.	..
.	..
.	..
.	..
50	Standard Deviation for Channel 10



2992	36 BIT WORD
3366	32 BIT WORD
4488	24 BIT WORD
6732	16 BIT WORD
8976	12 BIT WORD
13464	8 BIT BYTES

FIGURE VI-1. ERB MAT Physical Record Format

The scale factors indicated on the following word descriptions are used to retain the desired degree of signficance. For example, the quantity representing WFOV latitude if floated and divided by its scale factor of 100, will give the latitude in degrees.

VI-A. DAILY SUMMARY RECORD

This is the last unpadded logical record in each file. Figure VI-2 is the basic format for the daily summary record and the word description for this format is as follows:

(1) PHYSICAL RECORD NUMBER (12 BITS): This identifies the physical record within a file.

(2) RECORD ID (8 BITS): Identifies record type and the last record written in a file and records in the last file on the tape. The MSB of the first logical record of the last physical record will be set to "1", if that physical record is the last one written in the file. The second most MSB will be set on all logical records in the last file on the tape. The record type will use the six LSB of that byte to identify the type of record being read: 11 = LOGICAL DATA RECORD, 12 = ORBITAL SUMMARY RECORD, 13 = DAILY SUMMARY RECORD, 14 = CALIBRATION ADJUSTMENT TABLE RECORD.

(3) LOGICAL RECORD NUMBER (8 BITS): This identifies the logical record within a physical record.

(4) NUMBER OF ORBITS (16 BITS): The number indicates the number of orbits contained in this file.

(5) MONTH - FIRST ORBIT (16 BITS): This word is the month at the start of the first orbit block in this file.

(6) DAY - FIRST ORBIT (16 BITS): This word is the day at the start of the first orbit block in this file.

(7) YEAR - FIRST ORBIT (16 BITS): This word is the year at the start of the first orbit block in the file.

(8) TIME - FIRST ORBIT (16 BITS): This is the GMT hour and minutes (100 x hour + minute) at the start of the first orbit block in the file.

(9) MONTH - LAST ORBIT (16 BITS): This word is the month at the end of the last orbit block in the file.

(10) DAY - LAST ORBIT (16 BITS): This word is the day number at the end of the last orbit block in the file.

(11) YEAR - LAST ORBIT (16 BITS): This word is the year at the end of the last orbit block in the file.

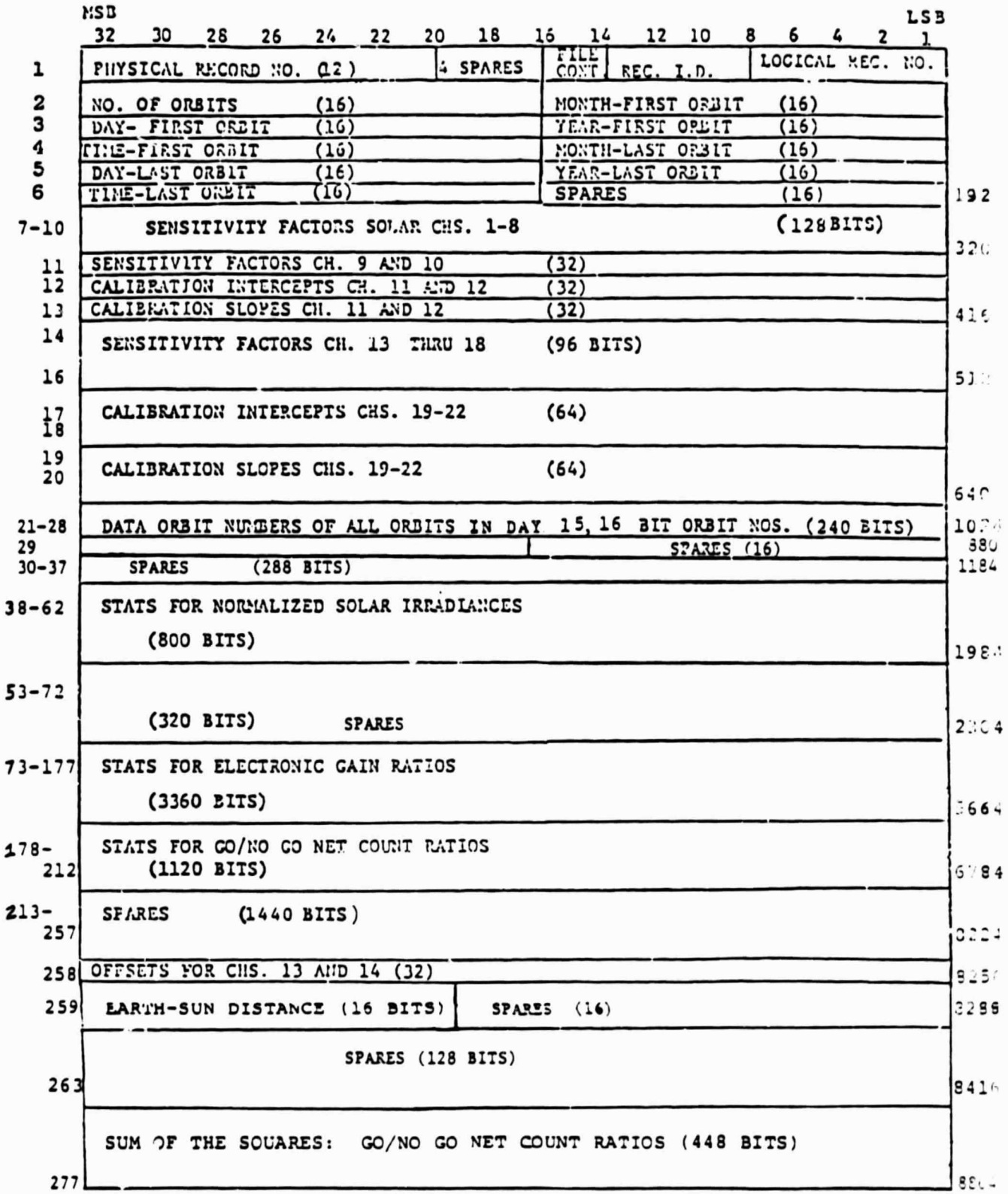


FIGURE VI-2. ERB MAT Daily Summary Logical Record Format

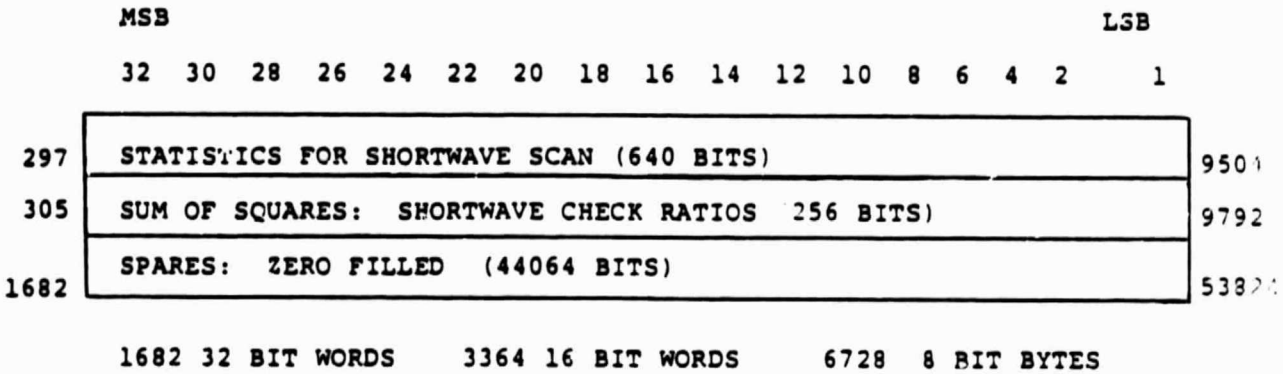


FIGURE VI-2. ERB MAT Daily Summary Logical Record Format

(Continued)

(12) TIME - LAST ORBIT (16 BITS): This is the GMT hour and minute (100 x hour + minute) at the end of the last orbit block in the file.

(13) SPARES (16 BITS): Zero filled.

(14) SENSITIVITY FACTORS, CHANNELS 1 THROUGH 8 (8 CHANNELS x 16 BITS = 128 BITS): Sensitivity factors for solar Channels 1 through 8 (with a scale factor of 10^3).

(15) SENSITIVITY FACTORS, CHANNELS 9 AND 10 (2 CHANNELS x 16 BITS = 32 BITS): Sensitivity factors for solar Channels 9 and 10 (with a scale factor of 10^2).

(16) CALIBRATION INTERCEPTS, CHANNELS 11 AND 12 (2 CHANNELS x 16 BITS = 32 BITS): Calibration intercepts for fixed Earth flux Channels 11 and 12 (with a scale factor of 100).

(17) CALIBRATION SLOPES, CHANNELS 11 AND 12 (2 CHANNELS x 16 BITS = 32 BITS): Calibration slopes for fixed Earth flux Channels 11 and 12 (with a scale factor of 10^3).

(18) SENSITIVITY FACTORS, CHANNELS 13 THROUGH 18 (6 CHANNELS x 16 BITS = 96 BITS): Sensitivity factors for fixed Earth flux Channels 13 and 14 and shortwave scanning Channels 15, 16, 17, and 18 (with a scale factor of 10^3).

(19) CALIBRATION INTERCEPTS, CHANNELS 19 THROUGH 22 (4 CHANNELS x 16 BITS = 64 BITS): Calibration intercepts for longwave scanning Channels 19, 20, 21, and 22 (with a scale factor of 100).

(20) CALIBRATION SLOPES, CHANNELS 19 THROUGH 22 (4 CHANNELS x 16 BITS = 64 BITS): Calibration slopes for longwave scanning Channels 19, 20, 21, and 22 (with a scale factor of 10^4).

(21) DATA ORBIT NUMBERS (15 ORBITS x 16 BITS = 240 BITS): Data orbit numbers at the start of all orbit blocks in this file including up to a maximum of 15 orbit numbers.

(22) SPARES (304 BITS): Zero filled.

(23) STATISTICS FOR SOLAR IRRADIANCE (5 STATISTICS x 10 CHANNELS x 16 BITS = 800 BITS): Statistics which include the minimum, mean, maximum, and standard deviation values plus the number of samples for normalized solar irradiances (scale factor for Channels 1 through 5 and 10 is 10, scale factor for Channels 6 through 9 is 100). The number of samples is not scaled.

(24) SPARES (320 BITS): Zero filled.

(25) STATISTICS FOR ELECTRONIC GAIN RATIOS (5 STATISTICS x 3 STEPS x 14 CHANNELS x 16 BITS = 3360 BITS): The statistics for electronic gain ratios have a scale factor of 1000, except for the number of samples which is unscaled.

(26) STATISTICS FOR GO/NO GO NET COUNT RATIOS (5 STATISTICS x 14 CHANNELS x 16 BITS = 1120 BITS): The statistics for the GO/NO GO net count ratios have a scale factor of 1000, except for the number of samples which is unscaled.

(27) SPARES (1440 BITS): Zero filled.

(28) OFFSET FOR CHANNELS 13, 14 (2 CHANNELS x 16 BITS = 32 BITS): The offset in counts for Channels 13 and 14.

(29) EARTH-SUN DISTANCE (16 BITS): The Earth-Sun distance in astronomical units (with a scale factor of 10^4).

(30) SPARES (144 BITS): Zero filled.

(31) SUM OF THE SQUARES: GO/NO GO NET COUNT RATIOS (14 CHANNELS x 32 BITS = 448 BITS): The sum of the squares for the GO/NO GO net count ratios for Channels 1 to 14, scaled by 100.

(32) STATISTICS FOR SHORTWAVE SCANS (5 STATISTICS x 4 SHORTWAVE CHANNELS x 2 SOLAR CHANNELS x 16 BITS = 640 BITS): These statistics are the count ratios during shortwave check for the shortwave scan channels (with a scale factor of 1000, except for number of samples).

(33) SUM OF THE SQUARES: SHORTWAVE CHECK RATIOS (4 SHORTWAVE CHANNELS x 2 SOLAR CHANNELS x 32 BITS = 256 BITS): The sum of the squares for the shortwave check ratios scaled by 1000.

(34) SPARES (44,064 BITS): These spare bits are used to fill out to logical record size and will be zero filled.

VI-B. LOGICAL DATA RECORD

Each logical data record contains one VIP major frame of ERB data. The format for this record is shown in Figure VI-3 with word descriptions as follows:

(1) PHYSICAL RECORD NUMBER (12 BITS): This word identifies the physical record number within a data file.

WORD	MSB 32				LSB 1	BITS
1	PHYSICAL RECORD NO. 12 BITS	4 SPARES	FILE CONT.	6 BITS RECORD I.D.	8 BITS LOGICAL RECORD NO.	32
2	YEAR (16)		DAY OF YEAR (16)			64
3	HOUR/MINUTE (16)		GMT SECONDS (16)			96
4	ORBIT NUMBER (16)		SPARE			128
5	TIME FROM ERB TURN ON (32)					160
17	POSITIONS OF THE SPACECRAFT (384)					544
29	VELOCITIES OF THE SPACECRAFT (384)					928
31	SUBSATELLITE LATITUDES (64)					992
33	SUBSATELLITE LONGITUDES (64)					1056
35	LATITUDES OF THE WIDE FIELDS OF VIEW (64)					1120
37	LONGITUDES OF THE WIDE FIELDS OF VIEW (64)					1184
41	SPACECRAFT ALTITUDES (128)					1312
42	SPACECRAFT PITCH ANGLE (16)		SPACECRAFT ROLL ANGLE (16)			1344
43	SPACECRAFT YAW ANGLE (16)		GAMMA ENCODER POSITION (16)			1376
44	SOLAR ZENITH ANGLE (16)		SOLAR AZIMUTH ANGLE (16)			1408
46	SOLAR RIGHT ASCENSIONS (64)					1472
47	SOLAR DECLINATION (16)		SPARES (16)			1504
48	SPARES (16)		SPARES (16)			1536
49	DSAS BETA ANGLE (16)		DSAS ALPHA ANGLE (16)			1568
51	GREENWICH HOUR ANGLES (64)					1632
67	32 ALPHA ENCODER POSITIONS 0-264 (512)					2144
75	16 BETA ENCODER POSITIONS 0-885 (256)					2400
651	LATITUDES FOR 1152 SUB FOVs FOR CHANNELS 15-22 (NFOV) (18432)					20832
1227	LONGITUDES FOR 1152 SUBFOVs FOR CHANNELS 15-22 (NFOV) (18432)					39264
1235	CHANNEL 11-14 (WFOV) IRRADIANCES (256)					39520
1363	CHANNEL 15-22 (NFOV) IRRADIANCES (4096)					43616
1375	INSTRUMENT TEMPERATURES (PLATINUM) (384)					44000
1415	INSTRUMENT TEMPERATURES (THERMISTOR) (1280)					45280
1495	SOLAR CHANNELS DETECTOR OUTPUT (2560)					47840

FIGURE VI-3. Logical Data Record Format

WORD	MSB 32 — LSB 1	BITS
1503	EARTH FLUX CHANNELS DETECTOR OUTPUT (256)	48096
1631	SCANNING CHANNELS DETECTOR OUTPUT (4096)	52192
1639	ERB DIGITAL A WORDS (256)	52448
1640	INSTRUMENT STATUS (16) | SCAN INFO WORD (16)	52480
1646	SPACECRAFT STATUS BITS (192)	52672
1651	SOLAR CHANNEL FLAGS (160)	52832
1652	EARTH FLUX CHANNEL FLAGS (16) | SPARES (16)	52864
1660	SCANNING CHANNEL FLAGS (256)	53120
1661	ALPHA ANGLE FLAGS (32)	53152
1662	BETA ANGLE FLAGS (16) | SPARES (16)	53184
	PLATINUM TEMPERATURE MONITOR FLAGS (48)	
	TERMISTOR TEMPERATURE MONITOR FLAGS (80)	
1666	REFERENCE TIME (32)	53312
1682	SPARES (480)	53824

1682 32-BIT WORDS

3364 16-BIT WORDS

6728 8-BIT BYTES

FIGURE VI-3. Logical Data Record Format

(Continued)

(2) RECORD ID (8 BITS): Identifies record type and the last record written in a file and records in the last file on the tape. The MSB of the first logical record of the last physical record will be set to "1", if that physical record is the last one written in the file. The second most MSB will be set on all logical records in the last file on the tape. The record type will use the six LSB of that byte to identify the type of record being read: 11 = LOGICAL DATA RECORD, 12 = ORBITAL SUMMARY RECORD, 13 = DAILY SUMMARY RECORD, 14 = CALIBRATION ADJUSTMENT TABLE RECORD.

(3) LOGICAL RECORD NUMBER (8 BITS): This identifies the logical record within a physical record.

(4) YEAR (16 BITS): The two least significant numbers of the calendar year.

(5) DAY OF YEAR (16 BITS): The day of the year (1 to 365 or 366).

(6) HOUR/MINUTE (16 BITS): This word is the GMT hour and minute (100 x Hour + Minute) of the start of data in this record.

(7) GMT SECONDS (16 BITS): This word is the GMT seconds (0 through 59) of the start of data in this record.

(8) ORBIT NUMBER (16 BITS): The orbit data block number associated with this data.

(9) SPARE (16 BITS): Not zero filled. May contain Channel 12 shutter temperature.

(10) TIME FROM ERB TURN ON (32 BITS): Time, in seconds, from the ERB instrument being turned on, to the beginning of this major frame.

(11) POSITIONS OF THE SPACECRAFT (3 COORDINATES x 4 TIMES x 32 BITS = 384 BITS): The Earth-centered inertial cartesian position of the spacecraft at 2, 6, 10, and 14 seconds from the beginning of the major frame in kilometers scaled by 10^4.

(12) VELOCITIES OF THE SPACECRAFT (3 COORDINATES x 4 TIMES x 32 BITS = 384 BITS): The Earth-centered inertial cartesian velocity of the spacecraft at 2, 6, 10, and 14 seconds from the beginning of the major frame, in kilometers per second scaled by 10^4.

(13) SUBSATELLITE LATITUDES (4 LATITUDES x 16 BITS = 64 BITS): The geodetic subsatellite latitude (-90 degrees South to +90 degrees North) at 2, 6, 10, and 14 seconds from the beginning of the major frame, scaled by 100. A fill value of 22222 is used if no information is available.

(14) SUBSATELLITE LONGITUDES (4 LONGITUDES x 16 BITS = 64 BITS): The geodetic subsatellite longitude (-180 degrees West to +180 degrees East) at 2, 6, 10, and 14 seconds from the beginning of the major frame, scaled by 100. A fill value of 22222 is used if no information is available.

(15) LATITUDES OF THE WIDE FIELD OF VIEW (4 LATITUDES x 16 BITS = 64 BITS): The geodetic latitudes (-90 degrees South to +90 degrees North) for the Wide Field of View at 2, 6, 10, and 14 seconds from the beginning of the major frame, scaled by 100. A fill value of 22222 is used if no information is available.

(16) LONGITUDES OF THE WIDE FIELD OF VIEW (4 LONGITUDES x 16 BITS = 64 BITS): The geodetic longitude (-180 degrees West to +180 degrees East) at 2, 6, 10, and 14 seconds from the beginning of the major frame, scaled by 100. A fill value of 22222 is used if no information is available.

(17) SPACECRAFT ALTITUDES (4 ALTITUDES x 32 BITS = 128 BITS): The spacecraft altitude in kilometers at 2, 6, 10, and 14 seconds from the beginning of the major frame, scaled by 10^3.

(18) SPACECRAFT PITCH ANGLE (16 BITS): The spacecraft pitch angle in degrees at the middle of this major frame (with a scale factor of 100).

(19) SPACECRAFT ROLL ANGLE (16 BITS): The spacecraft roll angle in degrees at the middle of this major frame (with a scale factor of 100).

(20) SPACECRAFT YAW ANGLE (16 BITS): The spacecraft yaw angle in degrees at the middle of this major frame (with a scale factor of 100).

(21) GAMMA ENCODER POSITION (16 BITS): Identifies the solar channel subassembly position at the middle of this major frame (-20 to +20).

(22) SOLAR ZENITH ANGLE (16 BITS): This word is the solar zenith angle in degrees at the subsatellite point (0 degree - 180 degrees) with a scale factor of 10. A fill value of 22222 is used if no information is available.

(23) SOLAR AZIMUTH ANGLE (16 BITS): This word is the solar azimuth angle at the subsatellite point relative to the subsatellite TRACK on the Earth in degrees (0 degree - 360 degrees) with a scale factor of 10. A fill value of 22222 is used if no information is available.

(24) SOLAR RIGHT ASCENSION (4 RIGHT ASCENSIONS x 16 BITS = -180 degrees to +180 degrees, 64 BITS): Right ascension of the Sun in degrees at 2, 6, 10, and 14 seconds from the beginning of the major frame, scaled by 100. From ERB-ILT Ephemeris data.

(25) SOLAR DECLINATION (16 BITS): Declination of the Sun in degrees (-90 degrees to +90 degrees) from the ERB-ILT Ephemeris data (scaled by a factor of 100).

(26) SPARES (16 BITS): Zero filled spare bits.

(27) SPARES (16 BITS): Zero filled spare bits.

(28) SPARES (16 BITS): Zero filled spare bits.

(29) DSAS ALPHA ANGLE (16 BITS): The DSAS Alpha Angle (elevation of Sun relative to S/C axes) from the ERB-ILT. Value is in degrees (-180 degrees to +180 degrees) scaled by 10. If no DSAS data is available, the value will be set to -999.9 x 10.

(30) DSAS BETA ANGLE (16 BITS): The DSAS beta angle (azimuth of the sun relative to S/C axes) from the ERB-ILT. Value is in degrees (-180 degrees to +180 degrees) scaled by 10. If no DSAS data is available, the value will be set to -999.9 x 10.

(31) GREENWICH HOUR ANGLE (4 ANGLES x 16 BITS = 64 BITS): The angle between the x-axis in the Earth-centered inertial coordinate system and the x-axis in the Earth-centered fixed coordinate system (Greenwich Meridian) at 2, 6, 10, and 14 seconds from the beginning of the major frame. The values are in radians (0 to 2) scaled by 100. Negative when Greenwich Meridian West of vernal equinox.

(32) ALPHA ENCODE POSITIONS (32 POSITIONS x 16 BITS = 512 BITS): Contains 32 alpha angle positions from the scanhead encoder (0-264).

(33) BETA ENCODER POSITIONS (16 POSITIONS x 16 BITS = 256 BITS): Contains 16 beta angle positions (0-885) from the gimbal encoder.

(34) LATITUDE FOR SCANNING CHANNELS SUB FOV'S (4 CHANNELS x 9 SUBFOV x 32 FOV x 16 BITS = 18,432 BITS): Each of the 4 scanning channel telescopes has 32 FOVs per VIP frame. Each FOV is subdivided into 9 sub FOVs, each of which is located and assigned geodetic latitude and longitude corresponding to the center of the sub FOV. The sub FOVs are numbered as follows:

ERB FOV

The values of the latitudes are in degrees scaled by 100. When the NFOV telescopes do not see the Earth, the latitude and longitude are given a value of 22222.

The latitude words are ordered first by FOV, then by sub FOV, and finally by scanning channel group (telescope) as shown below:

WORD NO.	FOV	SUB FOV	CHANNEL GROUP
1	1	1	15,19
2	1	1	16,20
3	1	1	17,21
4	1	1	18,22
5	1	2	15,19
.	.	.	.
.	.	.	.
.	.	.	.
36	1	9	18,22
37	2	1	15,19
.	.	.	.
.	.	.	.
.	.	.	.
1152	32	9	18,22

(35) LONGITUDES FOR SCANNING CHANNELS SUB FOV'S (4 CHANNELS x 9 SUBFOVS x 32 FOVS x 16 BITS = 18432 BITS): Each of the four scanning channel telescopes has 32 FOVs per VIP frame. Each FOV is subdivided into nine sub FOVs, each of which is located and assigned a geodetic latitude and longitude corresponding to the center of the sub FOV. The longitude words are ordered as shown in Item 34. The longitude values are in degrees scaled by 100. A fill value of 22222 is used if no information is available.

(36) IRRADIANCES FOR CHANNELS 11 THRU 14 (4 IRRADIANCES x 4 CHANNELS x 16 BITS = 256 BITS): Four irradiances each for Channels 11 thru 12 (0-12000), four irradiances for Channel 13 (0-9000), and four irradiances for Channel 14 (0-5000), all with a scale factor of 10.

(37) IRRADIANCES FOR CHANNELS 15 THRU 22 (32 IRRADIANCES x 8 CHANNELS x 16 BITS = 4096 BITS): Thirty-two irradiances each for Channels 15 thru 18 (0-3000) and thirty-two irradiances each for Channels 19 thru 22 (0-1950), all with a scale factor of 10.

(38) INSTRUMENT TEMPERATURES (PLATINUM) (24 TEMPERATURES x 16 BITS = 384 BITS): Instrument temperatures in degrees Celsius from platinum thermometers (with a scale factor of 10).

(39) INSTRUMENT TEMPERATURE AND VOLTAGE MONITORS (80 x 16 BITS = 1280 BITS): Instrument temperatures in degrees Celsius from thermistors and logic level voltage in volts (all except the last quantity, which has a scaling factor of 100, are with a scale factor of 10). See Table VI-1 for description. For Channels 1 thru 10, thermopile base temperatures a fill value of 29 degrees Celsius is used if temperatures are out of range.

(40) SOLAR CHANNELS DETECTOR OUTPUT (10 CHANNELS x 16 SECONDS x 16 BITS = 2560 BITS): This is the solar channels detector output in counts.

(41) EARTH FLUX CHANNELS DETECTOR OUTPUT (4 CHANNELS x 4 SECONDS x 16 BITS = 256 BITS): This is the Earth flux channels detector output in counts).

(42) SCANNING CHANNELS DETECTOR OUTPUT (8 CHANNELS x 32 HALF SECONDS x 16 BITS = 4096 BITS): The detector output in counts of the scanning channels.

(43) "DIGITAL" WORDS (16 DIGITAL WORDS x 16 BITS = 256 BITS): 16 Digital words. The even 8 digital words are:

	COL	ROW
+ PTM Excitation Voltage BB	24	06
- PTM Excitation Voltage BB	24	16
+ PTM Excitation Voltage Scan Channel	24	26
- PTM Excitation Voltage Scan Channel	24	36
+ PTM Excitation Voltage Earth Channel	24	46
- PTM Excitation Voltage Earth Channel	24	56
+ 15 Volt Monitor	24	66
- 15 Volt Monitor	24	76

The odd eight digital words are also located in Column 24. These eight words are status words and each bit of each word indicates unique instrument status. The status for each of these bits is defined in Table VI-2.

TABLE VI-1.

Instrument Temperatures and Voltage Monitors

Number	Description
1	CH 11 Shutter Temperature
2	CH 12 Shutter Temperature
3	CH 19 Telescope Port Temperature
4	CH 20 Telescope Port Temperature
5	CH 21 Telescope Port Temperature
6	CH 22 Telescope Port Temperature
7	CH 9 Module Temperature
8	CH 10 Module Temperature
9	CH 13 Module Temperature
10	CH 14 Module Temperature
11	CH 1 Thermopile Base Temperature
12	CH 2 Thermopile Base Temperature
13	CH 3 Thermopile Base Temperature
14	CH 4 Thermopile Base Temperature
15	CH 5 Thermopile Base Temperature
16	CH 6 Thermopile Base Temperature
17	CH 7 Thermopile Base Temperature
18	CH 8 Thermopile Base Temperature
19	CH 9 Thermopile Base Temperature
20	CH 10 Thermopile Base Temperature
21	CH 11 Shutter Temperature
22	CH 12 Shutter Temperature
23	CH 19 Telescope Port Temperature
24	CH 20 Telescope Port Temperature
25	CH 21 Telescope Port Temperature
26	CH 22 Telescope Port Temperature
27	CH 19 Telescope Baffle Temperature
28	CH 20 Telescope Baffle Temperature
29	Shorted Out
30	Shorted Out
31	CH 1 Module Temperature
32	CH 2 Module Temperature

TABLE VI-1.

Instrument Temperatures and Voltage Monitors

(Continued)

Number	Description
33	CH 3 Module Temperature
34	CH 6 Module Temperature
35	Solar Channel Assembly Casting Top Temperature
36	Solar Channel Assembly Casting Bottom Temperature
37	Solar Channel Assembly Shield Attach Point
38	Solar Channel Assembly Amplifier Heat Sink
39	Earth Flux Channel Assembly, Front
40	Earth Flux Channel Assembly, Back
41	CH 11 Shutter Temperature
42	CH 12 Shutter Temperature
43	CH 19 Telescope Port Temperature
44	CH 20 Telescope Port Temperature
45	CH 21 Telescope Port Temperature
46	CH 22 Telescope Port Temperature
47	CH 9 Module Temperature
48	CH 10 Module Temperature
49	CH 13 Module Temperature
50	CH 14 Module Temperature
51	Earth FLux Channel Assembly Heat Sink
52	Main Frame Mounting Tab, Front
53	Main Frame Mounting Tab, Back
54	β Gimbal Bearing and Gear Box Temperature
55	β Gimbal Motor Temperature
56	Solar Channel Assembly Drive Motor Temperature
57	SWSC Det. Temperature
58	α Sweep Gear Box and Motor Temperature
59	Shorted Out
60	Post Amplifier Synch Demod Area Temperature
61	CH 11 Shutter Temperature
62	CH 12 Shutter Temperature
63	CH 19 Telescope Port Temperature

TABLE VI-1.

Instrument Temperatures and Voltage Monitors

(Continued)

Number	Description
64	CH 20 Telescope Port Temperature
65	CH 21 Telescope Port Temperature
66	CH 22 Telescope Port Temperature
67	CH 19 Telescope Baffle Temperature
68	CH 20 Telescope Baffle Temperature
69	Shorted Out
70	Shorted Out
71	Power Supply Area Temperature
72	A/D Area Temperature
73	Heat Radiator Temperature
74	Remote Scan Mech. (α) Axis Bearing Temperature
75	CH 12 FOV Stop Temperature
76	CH 11 Thermopile Base Temperature
77	CH 12 Thermopile Base Temperature
78	CH 13 Thermopile Base Temperature
79	CH 14 Thermopile Base Temperature
80	$\pm$ 5 V. Logic Level

(44) INSTRUMENT STATUS WORD (16 BITS): This status word indicates the status of the scanhead, the shutters for Channels 11 and 12, the Channel 12 Field Of View, the electronics calibration and the GO/NO GO heater. The status is interpreted as follows:

Units Decimal Digit (Indicates Position of Scanhead)

0 = Scan Mode
1 = Nadir Position
2 = Space Position
3 = LW Check Position
4 = SW Check Position
9 = Transition Mode

Tens Decimal Digit (Indicates Status of Shutters, Channels 11 and 12)

0 = Reference Channels CLOSED, Channel 12 OPEN
1 = Reference Channels CLOSED, Channel 12 CLOSED
2 = Reference Channels OPEN, Channel 12 OPEN
3 = Reference Channels OPEN, Channel 12 CLOSED
9 = Status Unknown

Hundreds Decimal Digit (Indicates Status of Channel 12 FOV).

0 = Channel 12 FOV Wide
1 = Channel 12 FOV Narrow
9 = Status Unknown

Thousands Decimal Digit (Indicates Status of El. Cal. and GO/NO GO Heater)

0 = GO/NO GO Heater OFF, El. Cal. OFF
1 = GO/NO GO Heater OFF, El. Cal. ON
2 = GO/NO GO Heater ON, El. Cal. OFF
3 = GO/NO GO Heater ON, El. Cal. ON
9 = Status Unknown

(45) SCAN INFORMATION WORD (16 BITS): This word provides scan information such as scan mode, position, and errors. If the instrument is not scanning, these bits will be zero.

Units Decimal Digit	:	Major Frame Count (1-7)
Tens Decimal Digit	:	Scan Mode (1-5)
Hundreds Decimal Digit	:	0 = Mode 4 Portion of Mode 5
		1 = Mode 3 Portion of Mode 5
Thousands Decimal Digit:		0 = No Scan Errors
		1 = Alpha Scan Errors
		2 = Beta Scan Errors
		3 = Alpha and Beta Errors

TABLE VI-2.

ERB Odd Digital Word Format (VIP Column 24)

DIGITAL WORD NUMBERS	BIT NUMBERS: 1 (MSB)	2	3	4	5	6	7	8	9	10
1	SCAN COMMAND	MF 4	MF 2	MF 1	γ 6	γ 5	γ 4	γ 3	γ 2	γ 1
2	CAL 4	CAL 2	CAL 1	SCAN MODE 4	SCAN MODE 2	SCAN MODE 1	SHORT GRID	LONG GRID 2	RAD "A" 2	RAD "A" 1
5	PRP ON	ELECT ON (VERIFICATION)	SCAN OFF	SPACE LOOK COMMAND	SHORT WAVE CHECK COMMAND	LONG WAVE CHECK COMMAND	SOLAR LEFT COMMAND	SOLAR RIGHT COMMAND	GO/NO GO OFF	TEMP CONT ON
7	LONG GRID 2	SHORT GRID	12E FOV SMALL COMMAND	STEP OFF COMMAND	CAL CHECK COMMAND	NOT SPACE POSITION	SHORT WAVE $\alpha \neq 113°$	SHORT WAVE $\beta \neq 0°$	LONG WAVE $\alpha \neq 113°$	LONG WAVE $\beta \neq 9$
9	CAL 4	CAL 2	CAL 1	ID 4	ID 2	ID 1	REFERENCE SHUTTER CLOSED COMMAND	CH 12 CLOSE COMMAND	RAD "B" 2	RAD "B" 1
11	B ≠ 273	$\alpha \neq 0°$	SYNC ERROR	SCAN ENABLED	ROUTINE 5 - 4	LONG GRID 2	SHORT GRID	SCAN ON COMMAND	SOLAR DOOR CLOSED	PRP NO ON
13	EX BB	B ≠ 357	B ≠ 3	B ≠ 67	B ≠ 177	B ≠ 205	B ≠ 183	B ≠ 19.5	B ≠ 154	B ≠ 3
15	TBD	ELECT ON	SCAN OFF	CALIBRATE CHECK	SHORT WAVE CHECK	LONG WAVE CHECK	NOT SPACE POSITION	LONG GRID 2	SHORT GRID	$\alpha \neq 0$

(46) SPACECRAFT STATUS BITS (192 BITS): 192 Individual bits. Where digital B functions are used for status, all samples will be used. Events will use 3 bits (0-7) each time it is sampled, which is twice per major frame. The status and events are from the ERB-ILT and are given in the proper order in Table VI-3.

(47) SOLAR CHANNEL FLAGS (10 CHANNELS x 16 SECONDS x 1 BIT = 160 BITS): 1-Bit flags indicating that the data was (BIT=1), or was not (BIT=0) taken in a data quality loss interval. In addition, these bits are set to 1 when locations are filled.

(48) EARTH FLUX CHANNEL FLAGS (4 CHANNELS x 4 VALUES x 1 BIT = 16 BITS): 1-Bit flags indicating that the data was (BIT=1), or was not (BIT=0) taken in a data quality loss interval. In addition, these bits are set to 1 when locations are filled.

(49) SPARES (16 BITS): Zero filled.

(50) SCANNING CHANNEL FLAGS (8 CHANNELS x 32 HALF SECONDS x 1 BIT = 256 BITS): 1-Bit flags indicating that the data was (BIT=1), or was not (BIT=0) taken in a data quality loss interval. In addition, these bits are set to 1 when locations are filled.

(51) ALPHA ANGLE FLAGS (32 HALF SECONDS x 1 BIT = 32 BITS): 1-Bit flags indicating that the data was (BIT=1), or was not (BIT=0) taken in a data quality loss interval. In addition, these bits are set to 1 when locations are filled.

(52) BETA ANGLE FLAGS (16 SECONDS x 1 BIT = 16 BITS): 1-Bit flags indicating that the data was (BIT=1), or was not (BIT=0), taken in a data quality loss interval. In addition, these bits are set to 1 when locations are filled.

(53) SPARES (16 BITS) - Zero filled.

(54) PLATINUM TEMPERATURE MONITOR FLAGS (48 MONITORS x 1 BIT = 48 BITS): 1-Bit flags indicating that the data was (BIT=1), or was not (BIT=0) taken in a data quality loss interval. In addition, these bits are set to 1 when locations are filled.

(55) THERMISTOR TEMPERATURE MONITOR FLAGS (80 MONITORS x 1 BIT = 80 BITS): 1-Bit flags indicating that the data was (BIT=1), or was not (BIT=0) taken in a data quality loss interval. In addition, these bits are set to 1 when locations are filled.

TABLE VI-3.

Spacecraft Status and Events

No.	Description	(1)/(0) BIT/STATE	FUNC/EVENT Nos	COL/ROW
1	SATELLITE DAY/NIGHT	DAY=1/NIGHT=0	EV-17	
2	TLM PWR ON/OFF	ON/OFF	FN-6601	6/8
3	DSAS PWR ON/OFF	ON/OFF	FN-16001	6/6
4	IR ZIP/DIP TO TR1	ZIP/DIP	FN-22008	6/16
5	IR ZIP/DIP TO TR2	ZIP/DIP	FN-22009	6/17
6	IR ZIP/DIP TO TR3	ZIP/DIP	FN-22010	6/26
7	TR1 POWER ON/OFF	ON/OFF	FN-18006	71/4
8	TR2 POWER ON/OFF	ON/OFF	FN-18036	71/4
9	TR3 POWER ON/OFF	ON/OFF	FN-18056	71/3
10	XPONDER A/B POWER	0=Both OFF/1=A ON		
		2=B ON/3=Both ON	(SPECIAL EVENT)	
11	XPONDER RANGING A	ON/OFF	FN-19002	6/2
12	" " B	ON/OFF	FN-19006	6/6
13	W B XMTR A PWR	ON/OFF	FN-7160	6/8
14	W B XMTR B PWR	ON/OFF	FN-7260	6/9
	W B XMTR A/B SELECTED	A/B	FN-7165	6/2
16	CZCS CHANNEL 1 PWR	ON/OFF	FN-8001	6/1
17	CZCS " 2 "	ON/OFF	FN-8002	6/2
18	" " 3 "	ON/OFF	FN-8003	6/3
19	" " 4 "	ON/OFF	FN-8004	6/4
20	" " 5 "	ON/OFF	FN-8005	6/5
21	" " 6 "	ON/OFF	FN-8006	6/6
22	CZCS ELECT. PWR	ON/OFF	FN-8007	6/7
23	CZCS SCAN DRIVE	ON/OFF	FN-8008	6/10
24	CZCS CAL LAMP STATUS	0=Both OFF/1=1 ON		
		2=2 ON/3=UNK	(SPECIAL EVENT	
25	CZCS RECORDING CZCS DATA	1=YES/0=NO	SPECIAL EVENT	
26	REAL TIME DATA COLLECTION	1=YES/0=NO	SPECIAL EVENT	
27	THIR STATUS	0=OFF/1=RAD.ON		
		2=ALL ON/≥ 3=FAIL	EV-88	
28	LIMS ELECT	ON/OFF	FN-11001	6/16
29	LIMS ADAPT SCAN	ON/OFF	FN-11004	6/19
30	LIMS ACQ SCAN	ON/OFF	FN-11005	6/20

TABLE VI-3. Spacecraft Status and Events

(Continued)

No.	Description	(1)/(0) BIT/STATE	FUNC/EVENT Nos	Col./Row
31	LIMS CALIB SPACE	YES/NO	FN-11006	6/21
32	LIMS SOURCE CALIBRATE	YES/NO	FN-11007	6/22
33	SAMS POWER	ON/OFF	FN-12001	6/1
34	SAMS LIMB SCAN DRIVE	ON/OFF	FN-12002	6/2
35	SAMS AZIMUTH SCAN DRIVE	ON/OFF	FN-12003	6/3
36	SBUV/TOMS MASTER POWER	ON/OFF	FN-13001	6/1
37	SBUV PWR ENABLE	ENA/DIS	FN-13002	6/2
38	SBUV STEP SCAN	SET/RESET	FN-13005	6/5
39	SBUV CONTINUOUS SCAN	SET/RESET	FN-13006	6/7
40	SBUV CAGE CAM	SET/RESET	FN-13007	6/14
41	SBUV/TOMS WAVSLENGTH CAL	SET/RESET	FN-13008	6/15
42	TOMS PWR ENABLE	ENA/DIS	FN-13009	6/16
43	SBUV/TOMS ELECT CAL	ON/OFF	FN-13020	6/22
44	SBUV/TOMS FRAME COUNTER (First in Time)	the 4th LSB, the 3rd LSB, the 2nd LSB of Col. 12 Row 0	SPECIAL EVENT	
45	(Second in Time)	the 4th LSB, the 3rd LSB, the 2nd LSB of Col. 12 Row 40	SPECIAL EVENT	
46	ERB ELECT	ON/OFF	FN-14001	6/1
47	ERB SCAN	ON/OFF	FN-14002	6/2
48	ERB STEPPER DRIVER	OFF/NO	FN-14011	6/21
49	ERB CHOPPER OPERATING	YES/NO	FN-14016	6/23
50	SMMR DATA SYSTEM	ON/OFF	FN-15001	6/3
51	SMMR CHANNEL 1 PWR	ON/OFF	FN-15002	6/4
52	" " 2 "	ON/OFF	FN-15003	6/7
53	" " 3 "	ON/OFF	FN-15004	6/17
54	" " 4 "	ON/OFF	FN-15005	6/18
55	" " 5 "	ON/OFF	FN-15006	6/19
56	SMMR SCAN POWER ON/OFF	ON/OFF	FN-15007	6/22
57	ENCODER OUTPUT A/B	A/B	FN-15009	6/26
58	SAM II POWER	ON/OFF	FN-17001	6/1
59	SAM II STANDBY	ON/OFF	FN-17015	6/26
60	SAM II SCAN MODE	ON/OFF	FN-17014	6/22
61	SAM II SLEW MODE	ON/OFF	FN-17013	6/21
62	SAM II GIMBAL MODE	ON/OFF	FN-17012	6/20
63	SBUV/TOMS DATA TAKING MODE	YES/NO	SPECIAL EVENT	
64	SPARE	---	---	

• Indicates frame status for the previous VIP major frame.

(56) REFERENCE TIME (32 BITS) - Time from 0^h 0^m 0^s GMT January 1, 1978 to the beginning of this major frame in seconds.

(57) SPARES (480 BITS) - Zero filled.

VI-C. ORBITAL SUMMARY RECORD

After the last logical data record in each orbit block is the orbital summary record. This record contains the peak solar irradiances for Channels 1 through 10 as well as various quantities computed for the orbital summary. The format for this record is shown in Figure VI-4 and contains the following:

(1) PHYSICAL RECORD NUMBER (12 BITS): This word identifies the physical record number within a data file.

(2) RECORD ID (8 BITS): Identifies record type and the last record written in a file and records in the last file on the tape. The MSB will be set to "1" if that record is the last one written in the file. The second most MSB will be set on all records in the last file on the tape. The record type will use the 6 LSB of that byte to identify the type of record being read: 11 = LOGICAL DATA RECORD, 12 = ORBITAL SUMMARY RECORD, 13 = DAILY SUMMARY RECORD, 14 = CALIBRATION ADJUSTMENT TABLE RECORD.

(3) LOGICAL RECORD NUMBER (8 BITS): This identifies the logical record within the physical record.

(4) ORBIT NUMBER (16 BITS): The data orbit number at the beginning of this orbit block.

(5) START YEAR (16 BITS): The units and tens digits of the calendar year.

(6) START NUMERIC DAY (16 BITS): The numeric day of the year (1 to 365 or 366).

(7) START HOUR/MINUTE (16 BITS): This word is the GMT hour and minute (100 x hour + minute) of the start of data contained in this orbit block.

(8) START LATITUDE (16 BITS): This is the subsatellite latitude (-90 degrees to 90 degrees) at the start of data in this orbit block (with a scale factor of 100).

(9) START LONGITUDE (16 BITS): This is the subsatellite longitude (-180 degrees to 180 degrees) at the start of data in this orbit block (with a scale factor of 100).

	MSB 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 LSB 1	
1	PHYSICAL RECORD NO. (12 BITS) | 4 SPARES | FILE CONT | 6 BITS RECORD I.D. | (6 BITS) LOGICAL REC NO.	
2	ORBIT NO. (16) | START YEAR (16)	
3	START DAY OF YEAR (16) | START HOUR/MINUTE (16)	
4	START LATITUDE (16) | START LONGITUDE (16)	
5	MAJOR FRAMES/ORBIT (16) | END YEAR (16)	
6	END DAY OF YEAR (16) | END HOUR/MINUTE (16)	
7	END LATITUDE (16) | END LONGITUDE (16)	
8	NORTH TERMINATOR HOUR/MINUTE (16) | NORTH TERMINATOR SECONDS (16)	
9	SOUTH TERMINATOR HOUR/MINUTE (16) | SOUTH TERMINATOR SECONDS (16)	
10	GMT SAT. DAY (16) | SECONDS SAT. DAY (16)	
11	GMT SAT. NIGHT (16) | SECONDS SAT. NIGHT (16)	
12	GMT SOLAR PEAK HR/MIN (16) | SECONDS-SOLAR PEAK (16)	384
37	2 - MAJOR FRAME AVERAGES (800 BITS)	1184
47	NET SOLAR IRRADIANCE AND ZERO LEVEL IRRADIANCE (320 BITS)	1504
72	2 - MF AVERAGES (THERMOPILE BASE TEMP) (800 BITS)	2304
87	2 - MF AVERAGES (MODULE TEMP) (480 BITS)	2784
100	2 - MF AVERAGES (SOLAR CH. ASSEMBLY) (400 BITS) | GAMMA ANGLE AT CNTR. OF SOLAR PEAK (16)	3200
125	STATUS SUMMARY (% OF TIME) (784 BITS) | SUN-EARTH DISTANCE IN A.U. (16)	4000
253	STATISTICS FOR ERB INSTRUMENT TEMPERATURES (4096 BITS)	8096
301	STATISTICS FOR SCAN CH. COUNTS IN SPACE AND B. B. (1536 BITS)	9632
303	SW SCAN CHS. NET COUNT RATIOS (64 BITS)	9696
304	# MAJOR FRAMES GAMMA $> 20^{\circ}$ (16) | LWSC CALIBRATIONS (16)	9728
305	SPACE LOOKS DURING SCAN (16) | MAJOR FRAMES CHS. 11, 12 OPEN (16)	9760
306	MAJOR FRAMES CHS. 11, 12 CLOSED (16) | SPARES (16 BITS)	9792
390	STATISTICS FOR GAIN RATIOS (2688 BITS)	12480
398	L.W. CALIBRATION INTERCEPTS (256 BITS)	12736
406	L.W. CALIBRATION SLOPES (256 BITS)	12992
408	CH. 11 IRRADIANCE WITH SHUTTERS OPEN, 12 W (64 BITS)	13056
410	CH. 12 IRRADIANCE WITH SHUTTERS OPEN, 12 W (64 BITS)	13120
412	CH. 12 - CH. 11 IRRADIANCE WITH SHUTTERS OPEN, 12W (64 BITS)	13184
414	CH. 11 IRRADIANCE WITH SHUTTER CLOSED (64 BITS)	13248
416	CH. 12 IRRADIANCE WITH SHUTTER CLOSED (64 BITS)	13312
418	CH. 12 - CH. 11 IRRADIANCE WITH SHUTTER CLOSED (64 BITS)	13376
434	DIGITAL A WORDS (512 BITS)	13888
436	STATISTICS FOR GIMBAL SLEW RATE (64 BITS)	13952

FIGURE VI-4. Logical Record Format for Orbital Summary

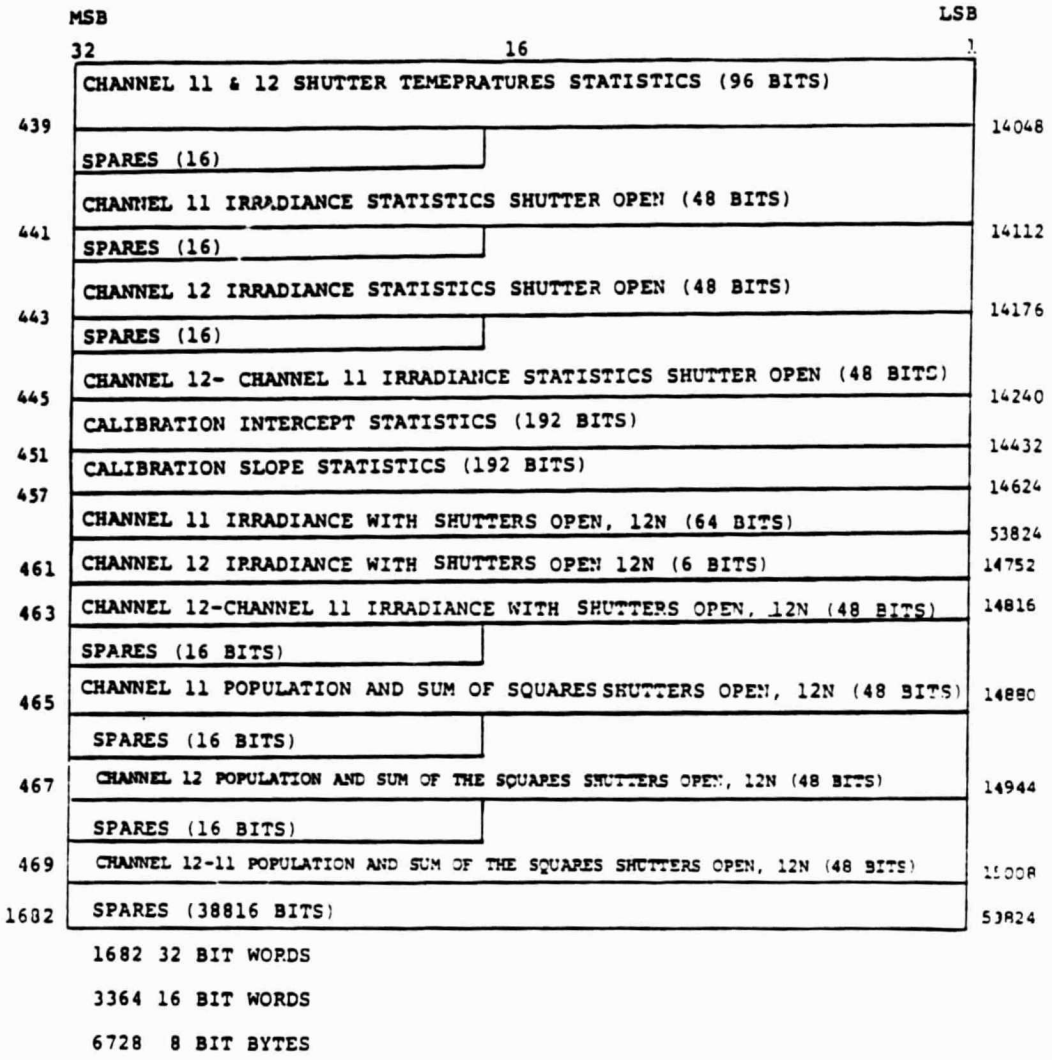


FIGURE VI-4. Logical Record Format for Orbital Summary

(Continued)

(10) MAJOR FRAMES PER ORBIT (16 BITS): The number of VIP major frames in this orbit block.

(11) END YEAR (16 BITS): The units and tens digits of the calendar year at the end of the orbit block.

(12) END DAY OF YEAR (16 BITS): The numeric day of the year (1 to 365 or 366) at end of the orbit block.

(13) END HOUR/MINUTE (16 BITS): The GMT hour and minute (100 x hour + minute) at the end of this orbit block.

(14) END LATITUDE (16 BITS): This is the subsatellite longitude (-90 degrees to 90 degrees) at the end of the orbit block (with a scale factor of 100).

(15) END LONGITUDE (16 BITS): This is the subsatellite longitude (-180 degrees to 180 degrees) at the end of this orbit block (with a scale factor of 100).

(16) TIME AT NORTHERN TERMINATOR (16 BITS): The GMT hour and minute (100 x hour + minute) of the northern terminator crossing.

(17) TIME AT NORTHERN TERMINATOR (16 BITS): The GMT seconds at the northern terminator crossing.

(18) TIME AT SOUTHERN TERMINATOR (16 BITS): The GMT hour and minute (100 x hour + minute) of the southern terminator crossing.

(19) TIME AT SOUTHERN TERMINATOR (16 BITS): The GMT seconds at the southern terminator crossing.

(20) GMT AT SATELLITE DAY (16 BITS): The GMT hour and minute (100 x hour + minute) at the satellite night to day transition.

(21) SECONDS AT SATELLITE DAY (16 BITS): The seconds portion of the GMT at the satellite night to day transition.

(22) GMT AT SATELLITE NIGHT (16 BITS): The GMT hour and minute (100 x hour + minute) at the satellite day to night transition.

(23) SECONDS OF SATELLITE NIGHT (16 BITS): The seconds portion of the GMT at the satellite day to night transition.

(24) GMT SOLAR PEAKS (16 BITS)*: The GMT (T_0 time of the solar channels peak signal. This word is hours and minutes (100 x hour + minute).

(25) SECONDS OF SOLAR PEAK (16 BITS)*: The seconds (T_0 time) of the solar channels peak signal.

(26) TWO MAJOR FRAME AVERGES (10 CHANNELS x 5 TIMES x 16 BITS = 800 BITS)*: Two major frame averages in counts for Channels 1 through 10 centered at times relative to T_0 as follows*:

V_1 at T_0-26 minutes

V_2 at T_0-13 minutes

V_3 at T_0

V_4 at T_0+13 minutes

V_5 at T_0+26 minutes

(27) NET SOLAR (R_p) AND ZERO (R_o) LEVEL IRRADIANCE (2 PARAMETERS x 10 CHANNELS x 16 BITS = 320 BITS)*: The net solar irradiance and the zero level irradiance:

$$R_p = V_3 - 1/2\,(V_2 + V_4)\,.\,S_v^{-1}\,.\,(STC)^{-1}$$

Channels 1 through 10 and $R_o = V_1$

$S_v^{-1}\,.\,(STC)^{-1}$, Channels 1 through 10

where

R_p = net solar irradiances

V_1 = two major frame averages of detector outputs as described in Item 26.

R_o = zero level irradiance (at T_0-26 minutes)

STC = sensitivity temperature correction factor

S_v^{-1} = channel sensitivity in a vacuum at 25°C

*This information was derived using a coarse method and is provided only as tentative information. A more precise method was used in producing the ERB Solar and Earth Flux Data Tape (SEFDT). A complete set of solar data is also on the SEFDT for those who wish to develop their own algorithm.

For net solar irradiance, scale factor for Channels 1 through 5 and 10 is 10, and for Channels 6 through 9 the scale factor is 100. For zero level irradiance, scale factor for Channels 1 through 5 is 10, and for Channels 6 through 9 it is 100.

(28) TWO MAJOR FRAME AVERAGE THERMOPILE BASE TEMPERTURES (10 TEMPERATURES x 5 TIMES x 16 BITS = 800 BITS): The two major frame average for thermopile base temperatures (Celsius) for Channels 1 through 10 at T_0-26 minutes, T_0-13 minutes, T_0, T_0+13 minutes, and T_0+26 minutes. All values use a scale factor of 10.

(29) TWO MAJOR FRAME AVERAGE MODULE TEMPERATURES (6 TEMPERATURES x 5 TIMES x 16 BITS = 480 BITS): The two major frame average of module temperatures (Celsius) for Channels 1 through 3, 6, 9, and 10 at T_0-26 minutes, T_0-13 minutes, T_0, T_0+13 minutes, and T_0+16 minutes. All values use a scale factor of 10.

(30) TWO MAJOR FRAME AVERAGE ASSEMBLY TEMPERATURES (5 TEMPERATURES x 5 TIMES x 16 BITS = 400 BITS): The two major frame averages of five solar channel assembly temperatures at T_0-26 minutes, T_0-13 minutes, T_0, T_0+13 minutes, and T_0+26 minutes. All values use a scale factor of 10.

(31) GAMMA ANGLE (16 BITS): Gamma angle at the center of the solar peak.

(32) STATUS SUMMARY (49 STATUS PARAMETERS x 16 BITS = 784 BITS): Status summary (percent of time) as expressed in the orbital summary histogram (with a scale factor of 10). See Table VI-4.

(33) SUN-EARTH DISTANCE (16 BITS): The Sun to Earth distance in astronomical units (with a scale factor of 10^4).

(34) STATISTICS OF TEMPERATURES AND ± 5V LOGIC LEVEL (64 x 4 STATISTICS x 16 BITS = 4096 BITS): Statistics of ERB instrument temperatures and ± 5V logic level (all with a scale factor of 10, except the logic level voltage which is with a scale factor of 100). See Table VI-5.

(35) STATISTICS FOR SCAN CHANNELS (8 CHANNELS x 4 STATISTICS x 3 MODES x 16 BITS = 1536 BITS): Statistics for scan channels count during: (1) internal black body views, (2) fixed views of space, and (3) scanning views of space.

(36) SHORTWAVE SCAN NET COUNT RATIOS (4 CHANNELS x 16 BITS = 64 BITS): Shortwave scan channels net count ratios (with a scale factor of 1000 obtained during shortwave check positions.

TABLE VI-4

Status Summary

NUMBER	DESCRIPTION
1	Percent of Major Frames with DSAS Unused or Unavailable
2	Errors in Beta Scan During Transition
3	Percent of Major Frames with Invalid Time
4	Duty Cycle DSAS Sensor #1
5	Duty Cycle DSAS Sensor #2
6	Duty Cycle DSAS Sensor #3
7	Duty Cycle DSAS Sensor #4
8	Percent Major Frames with Gross Longitude Error
9	Scan On Command(5) Verified
10	PRP On
11	Electronics On Command(1) Verified
12	Scan Off Command(3) Verified
13	Temperature Controller on Command(13) Verified
14	CH 12 FOV Narrow Command(19) Verified
15	Stepper Drives Off Command(20) Verified
16	Electronic Cal. Check Command(21) Verified
17	Reference Channels Shutters Closed Command(16) Verified
18	CH 12 Shutter Closed Command(17) Verified
19	Scan Logic Enabled
20	PRP Number 2 On
21	Space View Command(6) Verified
22	Shortwave Check Command(7) Verified
23	Longwave Check Command(8) Verified
24	Solar Channels Left Command(10) Verified
25	Solar Channels Right Command(11) Verified
26	GO/NO GO Test Off Command(12) Verified
27	Solar Door Close Command(25) Verified
28	Errors in Scan Pattern(α)
29	Errors in Scan Pattern(β)
30	Missing Major Frame in Scan Sequence
31	Scanning in Mode 1

TABLE VI-4

Status Summary

(Continued)

NUMBER	DESCRIPTION
32	Scanning in Mode 2
33	Scanning in Mode 3
34	Scanning in Mode 4
35	Scanning in Mode 5
36	Gamma Angle Less Than -20 Degrees
37	Heat Radiator A Front Open, Rear Open
38	Heat Radiator A Front Closed, Rear Open
39	Heat Radiator A Front Open, Rear Closed
40	Heat Radiator A Front Closed, Rear Closed
41	Heat Radiator B Front Open, Rear Open
42	Heat Radiator B Front Closed, Rear Open
43	Heat Radiator B Front Open, Rear Closed
44	Heat Radiator B Front Closed, Rear Closed
45	S Band-A Transmitter On
46	S Band-B Transmitter On
47	Electronics Bit Turned On in Header Block
48	Not Used
49	Not Used

TABLE VI-5

Statistics of Temperatures

The four (4) Statistics are: MIN, MEAN, MAX, and Standard Deviation. The first 53 temperatures refer to thermistor data. The 54th location refers to ± 5 V Logic Level. The last 10 temperatures refer to platinum temperature data.

NUMBER	DESCRIPTION
1-14	CHs 1-14 Thermopile Base
15	CH 1 Module
16	CH 2 Module
17	CH 3 Module
18	CH 6 Module
19	CH 9 Module
20	CH 10 Module
21	CH 13 Module
22	CH 14 Module
23	CH 11 Shutter Hub
24	CH 12 Shutter Hub
25	CH 10 Port
26	CH 20 Port
27	CH 21 Port
28	CH 22 Port
29	CH 19 Baffle
30	CH 20 Baffle
31	CH 21 Baffle
32	CH 22 Baffle
33	Solar Channels Assembly Casting, Top
34	Solar Channels Assembly Casting, Bottom
35	Solar Channels Assembly Shield Attached Point
36	Solar Channels Assembly Amplifier Heat Sink
37	Earth Flux Channels Assembly, Front
38	Earth Flux Channels Assembly, Back
39	Earth Flux Channels Assembly, Heat Sink
40	Main Frame Mounting Tab, Front
41	Main Frame Mounting Tab, Back

TABLE VI-5

Statistics of Temperatures

(Continued)

NUMBER	DESCRIPTION
42	Beta Gimble Bearing and Gear Box
43	Beta Gimble Motor
44	Solar Channels Assembly Drive Motors
45	Shortwave Scanning Channel Detectors
46	Alpha Sweep Gear Box and Motor
47	Chopper Motor
48	Post Amp. Synch Demod. Area
49	Power Supply Area
50	A/D Area
51	Heat Radiator
52	Remote Scan Mech. Axis Bearing
53	CH 12 FOV Stop
54	$\pm$ 5 Volt Logic Level
55	CH 11 Module
56	CH 12 Module
57	CH 19 Module
58	CH 20 Module
59	CH 21 Module
60	CH 22 Module
61	CH 19 Blackbody
62	CH 20 Blackbody
63	CH 21 Blackbody
64	CH 22 Blackbody

(37) MAJOR FRAMES (16 BITS): The number of major frames with a gamma angle greater than 20 degrees.

(38) LWSC CALIBRATIONS (16 BITS): The number of longwave scanning channels calibrations during this orbit block.

(39) SPACE LOOKS (16 BITS): The number of space looks during the orbit block.

(40) MAJOR FRAMES - CHANNELS 11, 12 OPEN (16 BITS): The number of major frames with Channel 11 and Channel 12 open.

(41) MAJOR FRAMES - CHANNELS 11, 12 CLOSED (16 BITS): The number of major frames with Channel 11 and Channel 12 closed.

(42) SPARES (16 BITS): Zero filled.

(43) STATISTICS FOR GAIN RATIOS (4 STATISTICS x 3 STEPS x 14 CHANNELS x 16 BITS = 2688 BITS): These are statistics for electronic gain ratios (current/prelaunch) with a scale factor of 1000.

(44) CALIBRATION INTERCEPTS (4 STATISTICS x 4 CHANNELS x 16 BITS = 256 BITS): These are statistics for longwave scan channels calibration intercepts (with a scale factor of 1000).

(45) CALIBRATION SLOPES (4 STATISTICS x 4 CHANNELS x 16 BITS = 256 BITS): These are statistics for longwave scan channels calibration slopes (with a scale factor of 10^5).

(46) CHANNEL 11 IRRADIANCE WITH BOTH SHUTTERS OPEN, 12W (4 STATISTICS x 16 BITS = 64 BITS): These are statistics for Channel 11 irradiance with shutter open (with a scale factor of 100).

(47) CHANNEL 12 IRRADIANCE WITH BOTH SHUTTERS OPEN, 12W (4 STATISTICS x 16 BITS = 64 BITS): These are statistics for Channel 12 irradiance with the shutter open (with a scale factor of 100).

(48) CHANNEL 12 - CHANNEL 11 IRRADIANCE WITH BOTH SHUTTERS OPEN, 12W (4 STATISTICS x 16 BITS = 64 BITS): These are statistics for Channel 12 - Channel 11 irradiance with both shutters open (with a scale factor of 100).

(49) CHANNEL 11 IRRADIANCE WITH SHUTTER CLOSED (4 STATISTICS x 16 BITS = 64 BITS): These are the statistics for Channel 11 irradiance with the shutter closed (with a scale factor of 100).

(50) CHANNEL 12 IRRADIANCE WITH SHUTTER CLOSED (4 STATISTICS x 16 BITS = 64 BITS): These are the statistics for Channel 12 irradiance with the shutter closed (with a scale factor of 100).

(51) CHANNEL 12 - CHANNEL 11 IRRADIANCE WITH SHUTTER CLOSED (4 STATISTICS x 16 BITS = 64 BITS): These are the statistics for Channel 12 - Channel 11 irradiance with the shutter closed (with a scale factor of 100).

(52) EVEN DIGITAL WORDS (8 CHANNELS x 4 STATISTICS x 16 BITS = 512 BITS): Orbital average for the eight even digital words. See Section VI-B, Item 43 for a description of these words.

(53) GIMBAL SLEW RATE (4 STATISTICS x 16 BITS = 64 BITS): These words are statistics for the gimbal slew rate.

(54) CHANNEL 11 AND CHANNEL 12 SHUTTER TEMPERATURE STATISTICS (2 CHANNELS x 16 BITS + 2 CHANNELS x 32 BITS = 96 BITS): The number of samples (16 bits) for Channel 11 and Channel 12 shutter temperatures and the sum of square (32 bits) for Channel 11 and Channel 12 shutter tempertures, sum of the squares, scaled by 10.

(55) SPARES (16 BITS): Zero filled.

(56) CHANNEL 11 IRRADIANCE STATISTICS WITH SHUTTER OPEN, I2W (48 BITS): The number of samples (16 bits) and the sum of the squares (32 bits) for the Channel 11 irradiance when the shutter is open, sum of the squares, scaled by 100.

(57) SPARES (16 BITS): Zero filled.

(58) CHANNEL 12 IRRADIANCE STATISTICS WITH SHUTTER OPEN, I2W (48 BITS): The number of samples (16 bits) and the sum of the squares (32 bits) for Channel 12 irradiance when the shutter is open, sum of the squares, scaled by 100.

(60) CHANNEL 12 - CHANNEL 11 IRRADIANCE STATISTICS WITH SHUTTER OPEN (48 BITS): The number of samples (16 bits) and the sume of the squares (32 bits) for Channel 12 - Channel 11 irradiance with the shutter is open, sum of the squares, scaled by 100.

(61) CALIBRATION INTERCEPT STATISTICS (4 CHANNELS x 16 BITS + 4 CHANNELS x 32 BITS = 192 BITS): The number of samples (16 bits) for the longwave scan channels calibration intercepts, and the sum of the squares for the longwave calibration intercepts (32 bits), sum of squares, scaled by 1000.

(62) CALIBRATION SLOPE STATISTICS (4 CHANNELS x 16 BITS + 4 CHANNELS x 32 BITS = 192 BITS): The number of samples (16 bits) for the longwave scan channels calibration slopes, and the sum of the squares for the longwave calibration intercepts (32 bits) sum of the squares scaled by 10^5.

(63) CHANNEL 11 IRRADIANCE WITH BOTH SHUTTERS OPEN, 12N (4 STATISTICS x 16 BITS = 64 BITS): These are statistics for Channel 11 irradiance with both shutters open and Channel 12 stopped to narrow (with a scale factor of 100).

(64) CHANNEL 12 IRRADIANCE WITH BOTH SHUTTERS OPEN, 12N (4 STATISTICS x 16 BITS = 64 BITS): These are statistics for Channel 12 irradiance with both shutters open and Channel 12 stopped to narrow (with a scale factor of 100).

(65) CHANNEL 12 - CHANNEL 11 IRRADIANCE WITH BOTH SHUTTERS OPEN, 12N (4 STATISTICS x 16 BITS = 64 BITS): These are statistics for Channel 12 - Channel 11 irradiance with both shutters open and Channel 12 stopped to narrow (with a scale factor of 100).

(66) SPARES (16 BITS): Zero filled.

(67) CHANNEL 11 IRRADIANCE STATISTICS WITH BOTH SHUTTERS OPEN, 12N (48 BITS): The number of samples (16 bits) and the sum of the squares (32 bits) associated with Item 63.

(68) SPARES (16 BITS): Zero filled.

(69) CHANNEL 12 IRRADIANCE STATISTICS WITH BOTH SHUTTERS OPEN, 12N (48 BITS): The number of samples (16 bits) and the sum of the squares (32 bits) associated with Item 64.

(70) SPARES (16 BITS): Zero filled.

(71) CHANNEL 12 - CHANNEL 11 IRRADIANCE STATISTICS WITH BOTH SHUTTERS OPEN, 12N (48 BITS): The number of samples (16 bits) and the sum of the squares (32 bits) associated with Item 65.

(72) SPARES (38,816 BITS): These bits are used to fill out the standard logical record size. These bits will be set to zero.

VII. CALIBRATION RECORD/FILE

This file contains a table of suggested adjustments to the ERB radiances and irradiances (Calibration Adjustment Table) for Channels 1 through 10C, 11, 12, 12N,1 and 13 through 22. These adjustment factors are computed after the MAT has been produced and are added to MAT before archiving. The description of the constituent items are as follows:

(1) PHYSICAL RECORD NUMBER (12 BITS): This number will be 1.

(2) RECORD ID (8 BITS): Identifies record type and the last record written in a file and records in the last file on the tape. The MSB of the first logical record of the last physical record will be set to "1", if that physical record is the last one written in the file. The second most MSB will be set on all logical records in the last file on the tape. The record type will use the six LSB of that byte to identify the type of record being read: 11 = LOGICAL DATA RECORD, 12 = ORBITAL SUMMARY RECORD, 13 = DAILY SUMMARY RECORD, 14 = CALIBRATION ADJUSTMENT TABLE RECORD.

(3) LOGICAL RECORD NUMBER (8 BITS): This identifies the logical record within a physical record.

(4) START YEAR (16 BITS): The units and tens digits of the calendar year of the start of the period for which the adjustments apply.

(5) START MONTH (16 BITS): The month (1-12) of the start of the period for which the adjustments apply.

(6) START DAY (16 BITS): The day of month of the start of the period for which the adjustments apply.

(7) STOP YEAR (16 BITS): The units and tens digits of the calendar year of the end of the period for which the adjustments apply.

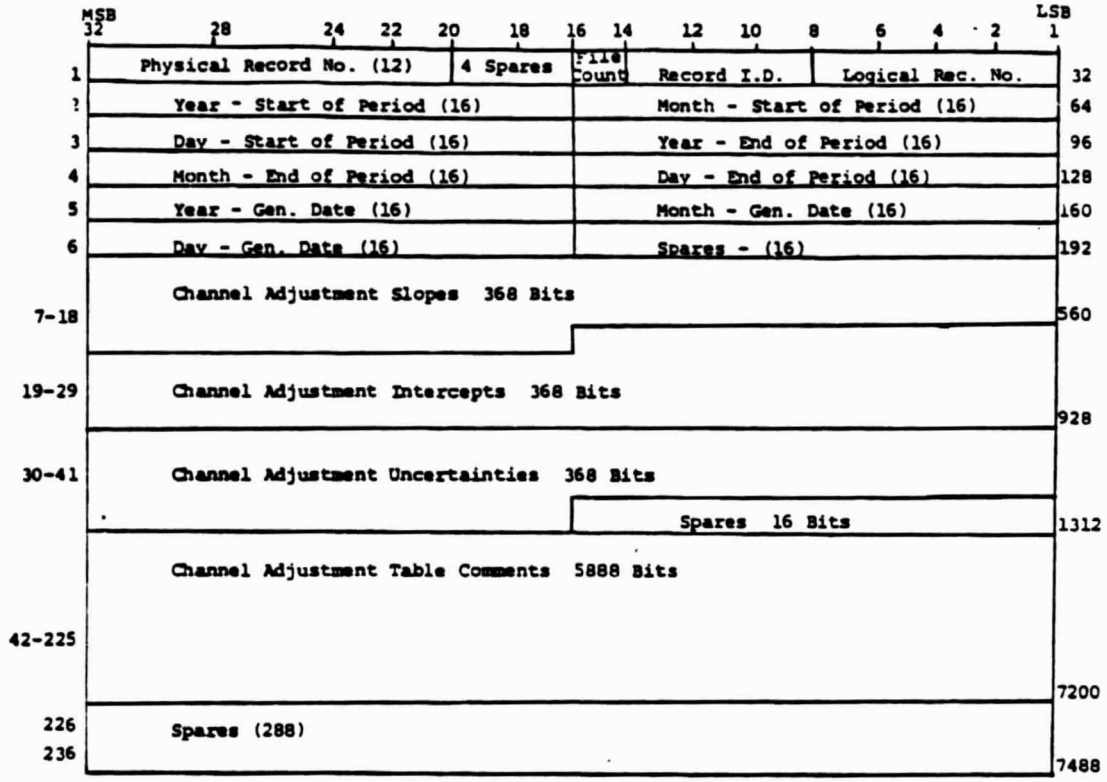
(8) STOP MONTH (16 BITS): The month (1-12) of the end of the period for which the adjustments apply.

(9) STOP DAY (16 BITS): The day of month of the end of the period for which the adjustments apply.

(10) GENERATION YEAR (16 BITS): The units and tens digit of the year in which Calibration Adjustment Table was generated.

(11) GENERATION MONTH (16 BITS): The month (1-12) in which the Calibration Adjustment Table was generated.

(12) GENERATION DAY (16 BITS): The day of month on which the Calibration Adjustment Table was generted.



208 36 BIT WORDS
234 32 BIT WORDS
312 24 BIT WORDS
624 12 BIT WORDS
936 8 BIT WORDS

FIGURE VII-1. ERB MAT Calibration Adjustment Table Record Format

(13) ADJUSTMENT SLOPES (23 CHANNELS x 16 BITS = 368 BITS): The adjustment slopes A_1 to be applied to the ERB channel radiances: $S^* = A_1 S + A_2$ where S* = corrected channel value, S = uncorrected channel value. The slopes are stored in the following order: Channels 1 through 10C, 11, 12, 12N, 13 through 22. The adjustment slopes are stored with a scale factor of 1000.

(14) ADJUSTMENT INTERCEPTS (23 CHANNELS x 16 BITS = 368 BITS): The adjustment intercepts A_2 to be applied to the ERB channel radiances: $S^* = A_1 S + A_2$ where S* = corrected channel radiance, S = uncorrected channel radiance. The intercepts are stored in the following order: Channels 1 through 10C, 11, 12, 12N, 13 through 22. The adjustment intercepts are stored with a scale factor of 10.

(15) ADJUSTMENT UNCERTAINTIES (23 CHANNELS x 16 BITS = 368 BITS): The percent uncertainty of the channel values after the correction has been applied (scaled by 10). The uncertainties are stored in the following order: Channels 1 through 10C, 11, 12, 12N, 13 through 22.

(16) ADJUSTMENT COMMENTS (32 CHARACTERS x 23 CHANNELS x 8 BITS): A comment field of 32 characters for each of the 23 adjustments above.

APPENDIX A.

MAT Tape Length Estimate

1. Standard Header = 6"

2. Data File

   394 VIPS/Orbit

   1 VIP/Logical Record

   2 Logical Records/Physical Record

   For an orbit have:

   394 VIPS + 1 Orbital Summary Record + VIP or Daily Summary Record or Zero-filled Record

   = 396 Logical Record/Orbit = 198 Physical Record/Orbit

   1 Physical Record = 13,464 bytes

   For 1600 BPI tape, 1 physical record = 8.415"

   Length of tape for orbit = 198 physical record x 8.415" + 198 IRG x 0.65" = 1794.9"

   Maximum of 14 orbits/day = 25,128.2"/data file

3. CAT File

   900 bytes long. This takes about .5" of tape

   Total length of tape = 25,128.2" + 6" + .5" = 25,134.7" = 2094.5'