618-306 Rev. D

VOYAGER

EXPERIMENT DATA RECORD FORMAT

SPECIFICATION

PREPARED BY: D.A. Wagner
D.A. Wagner

Change 3: 12 May 1981

APPROVED BY: N.N. Toy
N.N. Toy
Voyager Data Record System
Engineer

CONCURRED BY: Michael A. Orr
M.A. Orr
MDR/EDR Generation Subsystem
Cognizant Engineer

JET PROPULSION LABORATORY

California Institute of Technology

Pasadena, California

JET PROPULSION LABORATORY

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SECTION VII

EXPERIMENT DATA RECORD DESCRIPTIONS

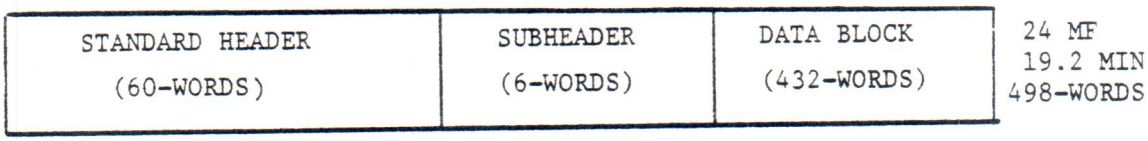
10.1 COSMIC RAY SCIENCE (CRS) EXPERIMENT

The CRS EDR physical science record corresponds to a 19.2 minute measurement period, or 24 minor frames. Five consecutive physical records correspond to a 96 minute instrument cycle. Any data not present within a given physical record will be filled with zeroes.

The science/physical record structure is shown in Figure 10.1-1 and the physical magnetic tape organization is shown in Figure 10.1-2. Figure 10.1-3 defines the structure and contents of the CRS science record subheader. Figure 10.1-4 defines the structure and contents of the CRS science data block. The standard EDR science header is defined for CR-7 in Appendix C.

FIGURE 10.1-1

CRS EDR PHYSICAL SCIENCE TAPE RECORDS



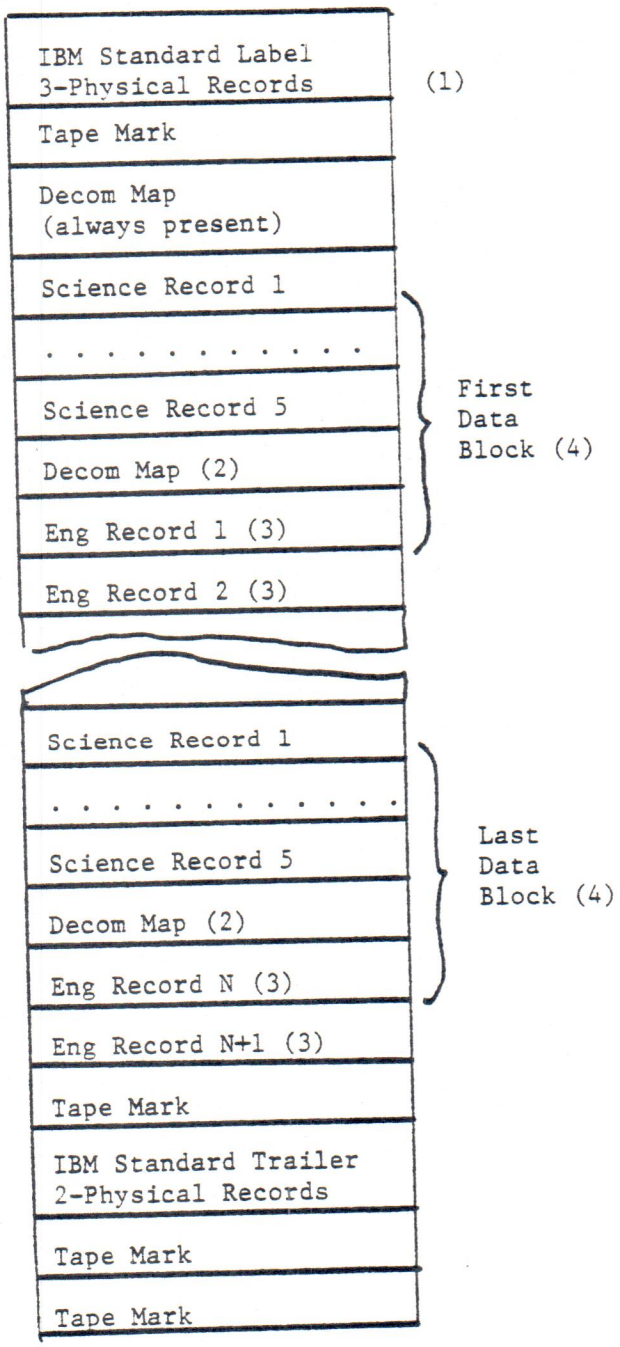
All words 32-bits.

One physical record contains a standard EDR header followed by a science subheader followed by a science data block. One physical record contains all the data from 24 telemetry frames relevant to the experiment.

One physical record contains one fifth of an instrument cycle.

FIGURE 10.1-2

CRS PHYSICAL TAPE ORGANIZATION



NOTES

(1) Lines imply IRG

(2) Present only if Decom Map changes during process interval.

(3) Any Eng Record can be preceeded by a Decom Map.

(4) Data Blocks and Eng Records may contain up to 48-minutes of data. TTS Record flushes will result in less data being written into these Data Blocks.

FIGURE 10.1-3

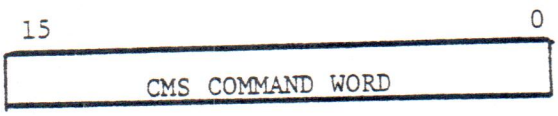
CRS SCIENCE SUBHEADER FORMAT

EDR WORD	BITS			
	31 16	15 0	31 16	15 0
1	CRS CMD MF 6	CRS STAT MF 3	CRS STAT MF 7	CRS CMD MF 14
3	CRS STAT MF11	CRS STAT MF 15	CRS CMD MF 22	CRS STAT MF 19
5	CRS STAT MF 23	SPARE	SPARE	

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

Total Block length is 6 EDR (32-bit) words (24 MF; 9 status/CMD words; 19.2 minutes).



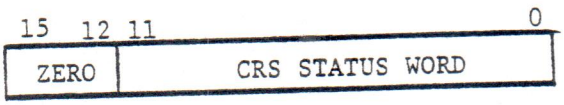


FIGURE 10.1-4

CRS EDR SCIENCE DATA BLOCK FORMAT

MF	EDR WORD	BITS 31 16	15 0	31 16	15 0
1	1	P1	P2	P3	P4
1	3	R1	P5	P6	P7
1	5	P8	P9	P10	P11
1	7	P12	R2	P13	P14
1	9	P15	P16	P17	P18
1	11	P19	P20	R3	P21
1	13	P22	P23	P24	P25
1	15	P26	P27	P28	R4
1	17	P29	P30	P31	P32

This structure is repeated 23 more times for a total of 432 EDR (32-bit) words (24 MF; 864 data words, 19.2 minutes).

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

P = PHA word R = Rate data

5 12	11 0
ZERO	CRS Data Word

10.2 INFRARED INTERFEROMETER SPECTROMETER AND RADIOMETER (IRIS) EXPERIMENT

There is no IRIS data contained in CR-7 spacecraft telemetry data frames.

10.3 LOW ENERGY CHARGED PARTICLE (LECP) EXPERIMENT

The LECP EDR science physical record consisting of 24 CR-7 MFs corresponds to a 19.2 minute measurement period which is equivalent to three LECP instrument data cycles.

The LECP CR-7 EDR physical record structure is shown in Figure 10.3-1 and the physical magnetic tape organization is shown in Figure 10.3-2. Figure 10.3-3 defines the structure and the contents of the LECP CR-7 EDR science record subheader. Figure 10.3-4 defines the structure and contents of the LECP CR-7 EDR science data block. The standard CR-7 EDR header is specified in Appendix C.

FIGURE 10.3-1

LECP SCIENCE PHYSICAL TAPE RECORDS

STANDARD HEADER (60-WORDS)	SUBHEADER (8-WORDS)	DATA BLOCK (384-WORDS)

24 MF
19.2 MIN
452 WORDS

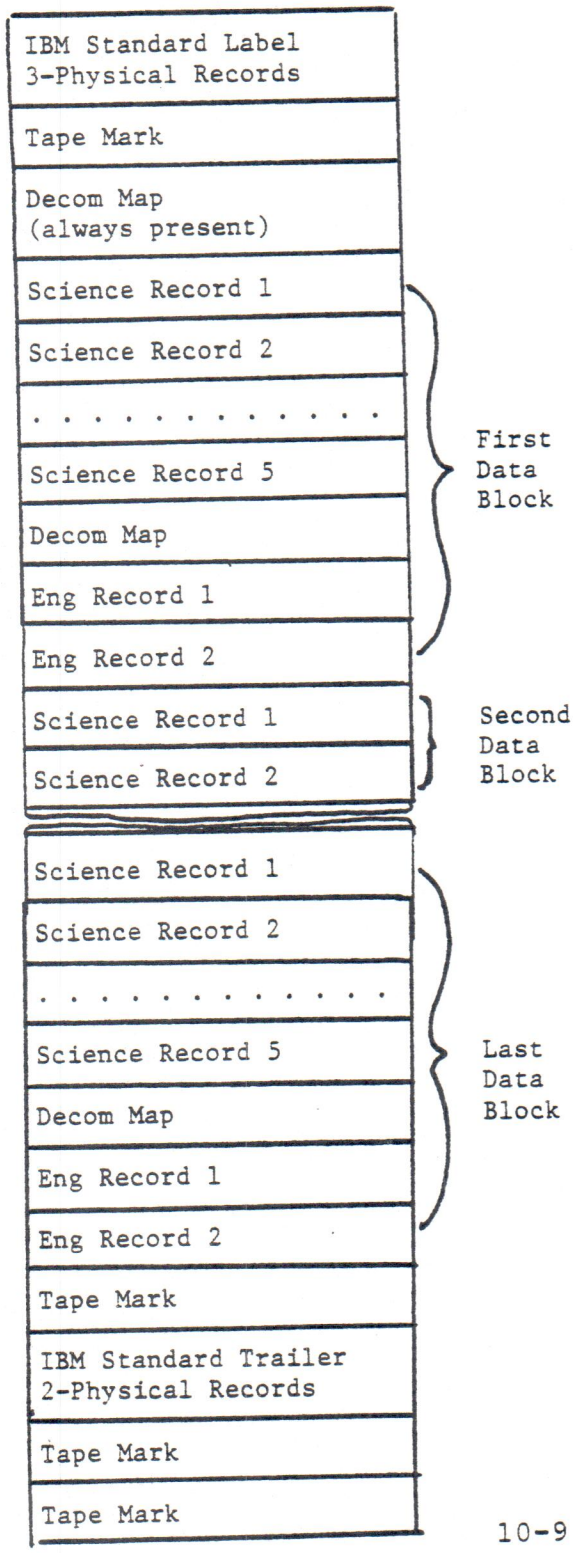
ALL WORDS 32-BITS

One physical record contains a standard EDR header followed by the LECP peculiar subheader and data block for 24 CR-7 telemetry frames.

One physical record contains 3 instrument cycles.

FIGURE 10.3-2

LECP EDR TAPE PHYSICAL CONFIGURATION



NOTES

(1) Lines imply inter-record gap.

(2) Present only if Decom Map changes during process interval.

(3) Any Eng Record may be preceded by a Decom Map.

(4) Data Blocks and Eng Records may contain up to 96 minutes of data. TTS record flushes will result in less data being written into these data blocks.

FIGURE 10.3-3

LECP SCIENCE SUBHEADER FORMAT

EDR WORD	BITS			
	31	15 0	31	15 0
1	LECP CMD 1 MF 6	LECP CMD 2 MF 14	LECP CMD 3 MF 22	SPARE
3	SPARE		SPARE	
5	SPARE		SPARE	
7	SPARE		SPARE	

Total block length is 8 (32-bit) EDR words (24 MF; 1 to 3 LECP CMD Words).

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} is even

SCT 60 = 12,36 when MOD 2^{16} is odd

FIGURE 10.3-4

LECP EDR SCIENCE LOGICAL RECORD FORMAT

MF	EDR WORD	BITS 31 16	15 0	31 16	15 0
1	1	P1	P2	P3	P4
1	3	P5	P6	P7	P8
1	5	P9	P10	P11	P12
1	7	P13	P14	P15	P16
1	9	R1	R2	R3	R4
1	11	R5	R6	R7	R8
1	13	R9	R10	R11	R12
1	15	R13	R14	R15	R16
2	17	P1	P2	P3	P4
↓	↓	↓	↓	↓	↓
24	383	R13	R14	R15	R16

P = PHA Word R = Rate/Status Word

Logical record length is 384 (32-bit) EDR words equivalent to 24 MF or 768 LECP 10-bit words.

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

10.4 MAGNETOMETER (MAG) EXPERIMENT

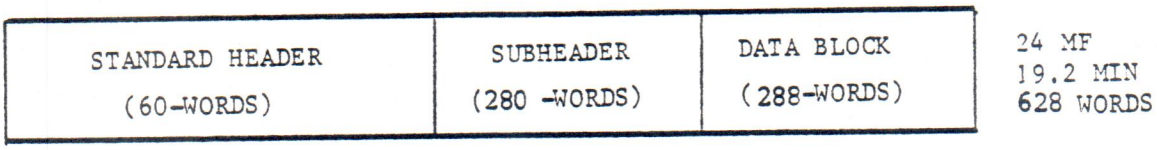
The MAG EDR science physical record corresponds to a 19.2 minute measurement period. Any data not present within a given physical record is filled with zeroes.

A MAG measurement cycle is 96 seconds. Hence, one physical record contains 12 MAG measurement cycles. There are 5 physical records (60 MAG cycles) per 96 minute period. The formats which follow are applicable to the CR-7 data mode.

The science physical record structure is shown in Figure 10.4-1 and the physical magnetic tape organization is shown in Figure 10.4-2. Figure 10.4-3 defines the structure and contents of the MAG science record subheader. Figure 10.4-4 defines the structure and contents of the MAG science data block. The standard EDR science header is defined for CR-7 in Appendix C.

FIGURE 10.4-1

MAG EDR PHYSICAL SCIENCE TAPE RECORDS



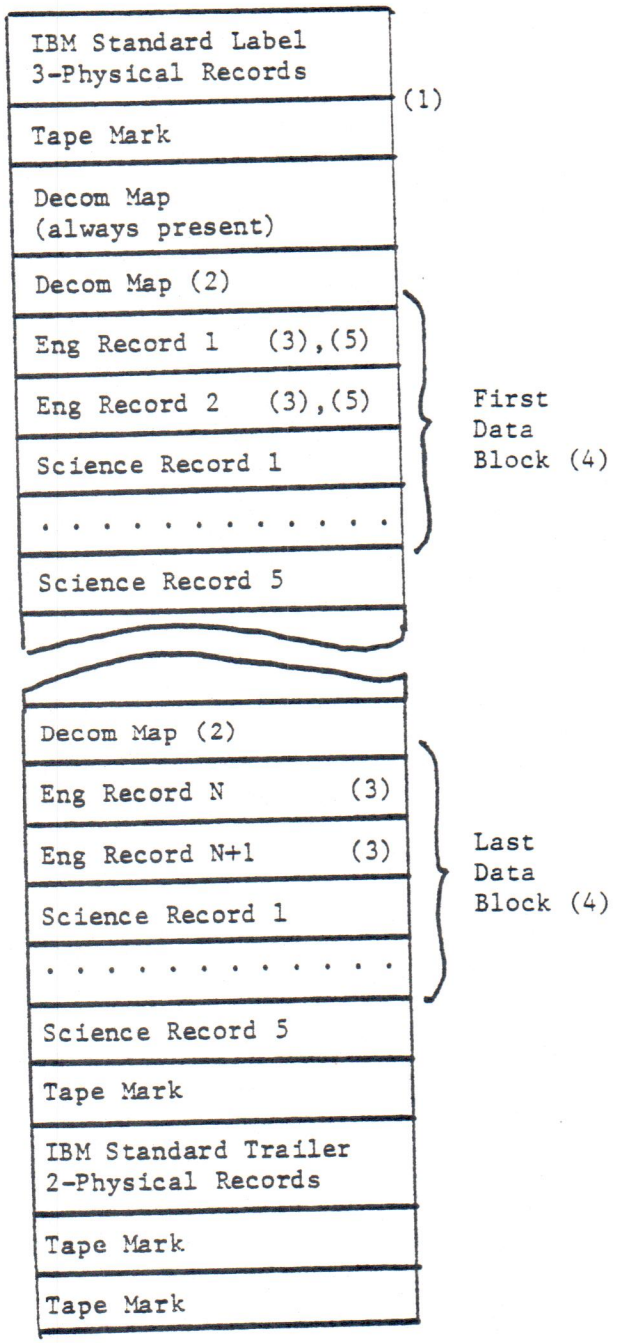
ALL WORDS 32-BITS

One physical record contains a standard EDR header followed by a science subheader followed by a science data block. One physical record contains all the data from 24 telemetry frames relevant to the experiment.

One physical records contains 12 instrument cycles.

FIGURE 10.4-2

MAG PHYSICAL TAPE ORGANIZATION



NOTES

(1) Lines imply IRG.

(2) Present only if Decom Map changes during process interval.

(3) Any Eng Record can be preceded by a Decom Map.

(4) Data Blocks and Eng Blocks may contain up to 96 minutes of data. TTS Record flushes will result in less data being written into these data blocks.

(5) Eng Records precede Science Records for MAG only.

FIGURE 10.4-3

MAG SCIENCE SUBHEADER

(This block is the same as the PLS Subheader)

EDR WORD	BITS			
	31	0	31	0
1	PLS M-Mode MF 4	PLS L-Mode MF 8	MAG CMD 1 MF 2	MAG CMD 2 MF 2
3	MAG STAT 2 MF 1	MAG STAT 1 MF 1	MAG STAT 2 MF 5	MAG STAT 1 MF 5
5	PLS M-Mode MF 12	PLS L-Mode MF 16	MAG CMD 1 MF 10	MAG CMD 2 MF 10
7	MAG STAT 2 MF 9	MAG STAT 1 MF 9	MAG STAT 2 MF 13	MAG STAT 1 MF 13
9	PLS M-Mode MF 20	PLS L-Mode MF 24	MAG CMD 1 MF 18	MAG CMD 2 MF 18
11	MAG STAT 2 MF 17	MAG STAT 1 MF 17	MAG STAT 2 MF 21	MAG STAT 1 MF 21
13	SPARE	SPARE	SPARE	SPARE
15	START SCE IN MILLI-SECS OF A DAY		SPARE	SPARE

MF 1 is in: SCT 60 = 0,24,28 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

Table Continued on Next Page

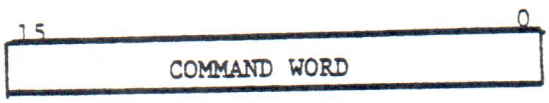






FIGURE 10.4-3 (continued)

MAG SCIENCE SUBHEADER
(This block is the same as the PLS Data Block)

MF	EDR WORD	BITS 31	23	15	7 0	31	23	15	7 0
1	17	M(AX+37)	M(BX+37)	M(CX+37)	M(AX+38)	M(BX+38)	M(CX+38)	M(AX+39)	M(BX+39)
1	19	M(CX+39)	M(AX+40)	M(BX+40)	M(CX+40)	M(AX+41)	M(BX+41)	M(CX+41)	M(AX+42)
1	21	M(BX+42)	M(CX+42)	M(AX+43)	M(BX+43)	M(CX+43)	M(AX+44)	M(BX+44)	M(CX+44)
1	23	M(AX+45)	M(BX+45)	M(CX+45)	M(AX+46)	M(BX+46)	M(CX+46)	M(AX+47)	M(BX+47)
1	25	M(CX+47)	M(AX+48)	M(BX+48)	M(CX+48)	M(AX+49)	M(BX+49)	M(CX+49)	M(AX+50)
1	27	M(BX+50)	M(CX+50)	M(AX+51)	M(BX+51)	M(CX+51)	M(AX+52)	M(BX+52)	M(CX+52)
2	29	M(AX+53)	M(BX+53)	M(CX+53)	M(AX+54)	M(BX+54)	M(CX+54)	M(AX+55)	M(BX+55)
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	49	M(CX+79)	M(AX+80)	M(BX+80)	M(CX+80)	M(AX+81)	M(BX+81)	M(CX+81)	M(AX+82)
4	51	M(BX+82)	M(CX+82)	E1 STAT	E1(D1)	E1(D2)	E1(D3)	E1(D3)	E1(D4)
4	53	E1(D6)	E1(D7)	E1(D8)	E1(D9)	E1(D10)	E1(D11)	E1(D12)	E1(D13)
4	55	E1(D14)	E1(D15)	E1(D16)	L STAT	L(A1)	L(B1)	L(C1)	L(D1)
4	57	L(A2)	L(B2)	L(C2)	L(D2)	L(A3)	L(B3)	L(C3)	L(D3)
4	59	L(A4)	L(B4)	L(C4)	L(D4)	L(A5)	L(B5)	L(C5)	L(D5)
5	61	L(A6)	L(B6)	L(C6)	L(D6)	L(A7)	L(B7)	L(C7)	L(D7)
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
5	71	L(A16)	L(B16)	L(C16)	L(D16)	E2 STAT	E2(D1)	E2(D2)	E2(D3)
6	73	E2(D4)	E2(D5)	E2(D6)	E2(D7)	E2(D8)	E2(D9)	E2(D10)	E2(D11)
6	75	E2(D12)	E2(D13)	E2(D14)	E2(D15)	E2(D16)	MS1	MS2	L/S FLAG
6	77	M STAT	M(AX)	M(BX)	M(CX)	M(AX+1)	M(BX+1)	M(CX+1)	M(AX+2)
6	79	M(BX+2)	M(CX+2)	M(AX+3)	M(BX+3)	M(CX+3)	M(AX+4)	M(BX+4)	M(CX+4)
6	81	M(AX+5)	M(BX+5)	M(CX+5)	M(AX+6)	M(BX+6)	M(CX+6)	M(AX+7)	M(BX+7)
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
8	103	M(BX+34)	M(CX+34)	M(AX+35)	M(BX+35)	M(CX+35)	M(AX+36)	M(BX+36)	M(CX+36)

The PLS Data structure is repeated 2 more times for a total of 280 EDR (32 bit) words (24 MF; 19.2 MIN).

X represents the value of M Start word used.

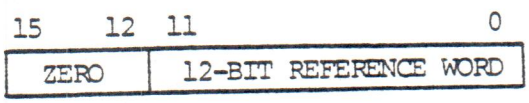
FIGURE 10.4-4

MAG EDR SCIENCE DATA BLOCK FORMAT

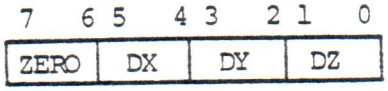
MF	EDR WORD	BITS							
		31 24	23 16	15 8	7 0	31 24	23 16	15 8	7 0
1	1	PXREF		PYREF		PZREF		PDELTAS	PDELTAS
1	3	SXREF		SYREF		SZREF		SDELTAS	PDELTAS
1	5	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS
1	7	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS
1	9	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS
1	11	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS
1	13	PDELTAS	SPARE	PXREF		PYREF		PZREF	
2	15	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS
2	17	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS
2	19	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS
2	21	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS
2	23	PDELTAS	PDELTAS	SDELTAS	PDELTAS	PDELTAS	SDELTAS	SPARE	SPARE

The above structure is repeated 11 more times for a total physical record length of 288 EDR (32-bit) words. (24 MF; 19.2 MIN; 2808 Data Words.)

MF 1 is in even numbered SCT60 counts.



MAG DATA WORD FORMATS



DX, DY, DZ are 2-bit Delta Words

10.5 PLASMA (PLS) EXPERIMENT

The PLS EDR science physical record corresponds to a 19.2 minute measurement period. Any data not present within a given physical record is filled with zeroes.

A PLS measurement cycle is 384 seconds. Hence, there are three PLS instrument cycles per physical EDR record. There are 5 physical records (15 PLS cycles) per 96 minute period. The formats which follow are applicable to the CR-7 data mode.

The science physical record structure is shown in Figure 10.5-1 and the physical magnetic tape organization is shown in Figure 10.5-2. Figure 10.5-3 defines the structure and contents of the PLS science record subheader. Figure 10.5-4 defines the structure and contents of the PLS science data block within a logical record. The standard EDR science header is defined for CR-7 in Appendix C.

FIGURE 10.5-1

PLS EDR PHYSICAL SCIENCE TAPE RECORDS

STANDARD HEADER (60 WORDS)	SUBHEADER (16 WORDS)	DATA BLOCK (264WORDS)

24 MF
19.2 MIN
340 WORDS

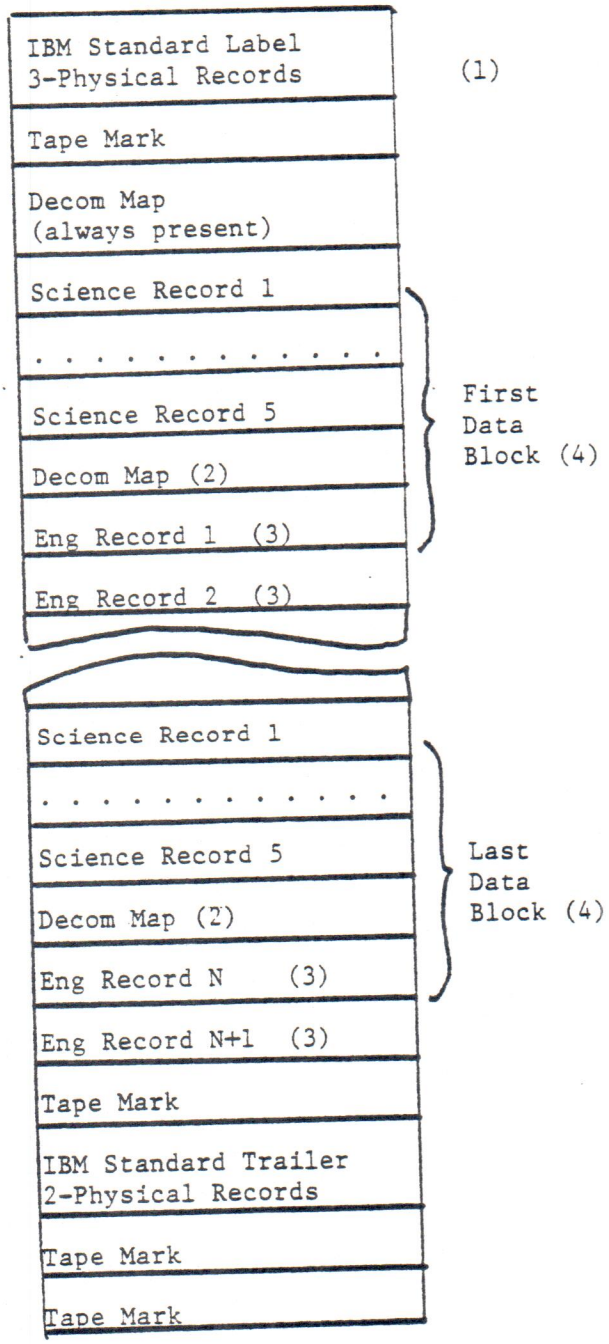
ALL WORDS 32-BITS

One logical record contains a standard EDR header followed by a science subheader followed by a science data block. One logical record contains all the data from 24 telemetry frames relevant to the experiment.

One physical record contains 3 instrument cycles.

FIGURE 10.5-2

PLS PHYSICAL TAPE ORGANIZATION



NOTES

(1) Lines imply IRG.

(2) Present only if Decom Map changes during process interval.

(3) Any Eng Record can be preceeded by a Decom Map.

(4) Data Blocks and Eng Records may contain up to 48 minutes of data. TTS Record flushes will result in less data being written into these Data Blocks

FIGURE 10.5-3

PLS SCIENCE SUBHEADER

EDR WORD	BITS 31 — 0		31 — 0	
1	PLS M-Mode MF 4	PLS L-Mode MF 8	MAG CMD 1 MF 2	MAG CMD 2 MF 2
3	MAG STAT 2 MF 1	MAG STAT 1 MF 1	MAG STAT 2 MF 5	MAG STAT 1 MF 5
5	PLS M-Mode MF 12	PLS L-Mode MF 16	MAG CMD 1 MF 10	MAG CMD 2 MF 10
7	MAG STAT 2 MF 9	MAG STAT 1 MF 9	MAG STAT 2 MF 13	MAG STAT 1 MF 13
9	PLS M-Mode MF 20	PLS L-Mode MF 24	MAG CMD 1 MF 18	MAG CMD 2 MF 18
11	MAG STAT 2 MF 17	MAG STAT 1 MF 17	MAG STAT 2 MF 21	MAG STAT 1 MF 21
13	SPARE	SPARE	SPARE	SPARE
15	START SCE IN MILLI-SECS OF A DAY		SPARE	SPARE

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

Total block length is 16 EDR (32-bit) words (24 MF; 25 CMD/STAT/FDSC words).

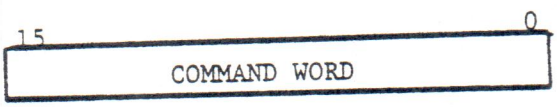




FIGURE 10.5-4

PLS EDR SCIENCE DATA BLOCK FORMAT

MF	EDR WORD	BITS 31	23	15	7 0	31	23	15	7 0
1	1	M(AX+37)	M(BX+37)	M(CX+37)	M(AX+38)	M(BX+38)	M(CX+38)	M(AX+39)	M(BX+39)
1	3	M(CX+39)	M(AX+40)	M(BX+40)	M(CX+40)	M(AX+41)	M(BX+41)	M(CX+41)	M(AX+42)
1	5	M(BX+42)	M(CX+42)	M(AX+43)	M(BX+43)	M(CX+43)	M(AX+44)	M(BX+44)	M(CX+44)
1	7	M(AX+45)	M(BX+45)	M(CX+45)	M(AX+46)	M(BX+46)	M(CX+46)	M(AX+47)	M(BX+47)
1	9	M(CX+47)	M(AX+48)	M(BX+48)	M(CX+48)	M(AX+49)	M(BX+49)	M(CX+49)	M(AX+50)
1	11	M(BX+50)	M(CX+50)	M(AX+51)	M(BX+51)	M(CX+51)	M(AX+52)	M(BX+52)	M(CX+52)
2	13	M(AX+53)	M(BX+53)	M(CX+53)	M(AX+54)	M(BX+54)	M(CX+54)	M(AX+55)	M(BX+55)
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	33	M(CX+79)	M(AX+80)	M(BX+80)	M(CX+80)	M(AX+81)	M(BX+81)	M(CX+81)	M(AX+82)
4	35	M(BX+82)	M(CX+82)	E1 STAT	E1(D1)	E1(D2)	E1(D3)	E1(D3)	E1(D4)
4	37	E1(D6)	E1(D7)	E1(D8)	E1(D9)	E1(D10)	E1(D11)	E1(D12)	E1(D13)
4	39	E1(D14)	E1(D15)	E1(D16)	L STAT	L(A1)	L(B1)	L(C1)	L(D1)
4	41	L(A2)	L(B2)	L(C2)	L(D2)	L(A3)	L(B3)	L(C3)	L(D3)
4	43	L(A4)	L(B4)	L(C4)	L(D4)	L(A5)	L(B5)	L(C5)	L(D5)
5	45	L(A6)	L(B6)	L(C6)	L(D6)	L(A7)	L(B7)	L(C7)	L(D7)
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
5	55	L(A16)	L(B16)	L(C16)	L(D16)	E2 STAT	E2(D1)	E2(D2)	E2(D3)
6	57	E2(D4)	E2(D5)	E2(D6)	E2(D7)	E2(D8)	E2(D9)	E2(D10)	E2(D11)
6	59	E2(D12)	E2(D13)	E2(D14)	E2(D15)	E2(D16)	MS1	MS2	L/S FLAG
6	61	M STAT	M(AX)	M(BX)	M(CX)	M(AX+1)	M(BX+1)	M(CX+1)	M(AX+2)
6	63	M(BX+2)	M(CX+2)	M(AX+3)	M(BX+3)	M(CX+3)	M(AX+4)	M(BX+4)	M(CX+4)
6	65	M(AX+5)	M(BX+5)	M(CX+5)	M(AX+6)	M(BX+6)	M(CX+6)	M(AX+7)	M(BX+7)
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
8	87	M(BX+34)	M(CX+34)	M(AX+35)	M(BX+35)	M(CX+35)	M(AX+36)	M(BX+36)	M(CX+36)

This structure is repeated 2 more times for a total of 264 EDR (32-bit) words (24 MF; 1056 data words).

X represents the value of M Start word used.

10.6 PHOTOPOLARIMETER (PPS) EXPERIMENT

The PPS science physical record corresponds to a 96 minute measurement period. Any data not present within a given physical record is filled with zeroes.

A PPS measurement cycle is 96 minutes. Hence, one physical record contains one PPS instrument cycle.

The science logical record structure is shown in Figure 10.6-1 and the physical magnetic tape organization is shown in Figure 10.6-2. Figure 10.6-3 defines the structure and contents of the PPS science record subheader. Figure 10.6-4 defines the structure and contents of the MAG science data block. The standard EDR science header is defined for CR-7 in Appendix C.

FIGURE 10.6-1

PPS EDR LOGICAL SCIENCE RECORDS

STANDARD HEADER (60-WORDS)	SUBHEADER (6-WORDS)	DATA BLOCK (12-WORDS)	24 MF 19.2 MIN 78 WORDS

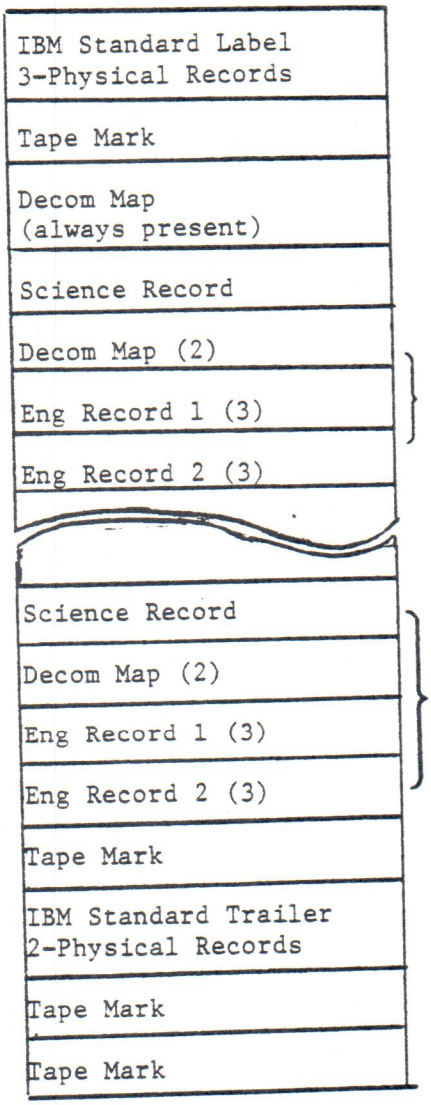
ALL WORDS 32-BITS

One logical record contains a standard EDR header followed by a science subheader followed by a science data block. One logical record contains all PPS data from 12 even numbered minor frames or a total of 24 minor frames.

One physical tape record is made up of five logical records and contains all the data relevant to one instrument cycle of 96 minutes.

FIGURE 10.6-2

PPS PHYSICAL TAPE ORGANIZATION



NOTES

(1) Lines imply IRG.

(2) Present only if Decom Map changes during process interval.

(3) Any Eng Record can be preceeded by a Decom Map.

(4) Data Blocks and Eng Records may contain up to 48-minutes of data. TTS Record flushes will result in less data being written into these Data Blocks.

A 48 minute Eng cycle contains 3 physical records.

FIGURE 10.6-3

PPS SCIENCE SUBHEADER FORMAT

EDR WORD	BITS			
	31 16	15 0	31 16	15 0
1	PPS CMD MF 1	PPS CMD MF 9	PPS CMD MF 17	SPARE
3	SPARE		SPARE	
5	SPARE		SPARE	

MF 1 is in: SCT 60 = 0,24, 48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

Total Block length is 6 EDR (32-bit) words (24 MF, 3 CMD words, 19.2 minutes).

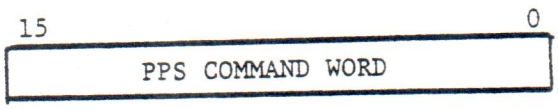


FIGURE 10.6-4

PPS EDR SCIENCE DATA BLOCK FORMAT

EDR WORD	BITS 31 8 7 16 15 24 23 0			
1	S1 MF 2	S2 MF 2,4	S3 MF4,6	S4 MF 6
4	S5 MF 8	S6 MF 8,10	S7 MF10,12	S8 MF12
7	S9 MF 14	S10 MF 14,16	S11 MF 16,18	S12 MF18
10	S13 MF 20	S14 MF 20,22	S15 MF 22,24	S16 MF24

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

Each MF contains one and one third 24-bit data words.

Each EDR word contains one and one third 24-bit data words.

This structure is complete for a total block length of 12 EDR (32-bit) words (24 MF; 16 data words; 19.2 minutes).

10.7 PLANETARY RADIO ASTRONOMY (PRA) EXPERIMENT

The PRS EDR science physical record corresponds to a 19.2 minute measurement period. Any data not present within a given physical record is filled with zeroes.

A PRA measurement cycle is 384 seconds. Hence, there are 3 instrument cycles per EDR physical record. The formats which follow are applicable to the CR-7 data mode.

The science physical record structure is shown in Figure 10.7-1 and the physical magnetic tape organization is shown in Figure 10.7-2. Figure 10.7-3 and Table 10.7-1 define the structure and contents of the PRA science record subheader. Figure 10.7-4 and Table 10.7-2 define the structure and contents of the PRA science data block. The standard EDR science header is defined for CR-7 in Appendix C.

FIGURE 10.7-1

PRA EDR PHYSICAL SCIENCE TAPE RECORDS

STANDARD HEADER (60-WORDS)	SUBHEADER (8-WORDS)	DATA BLOCK (78-WORDS)

24 MF
19.2 MIN
146 WORDS

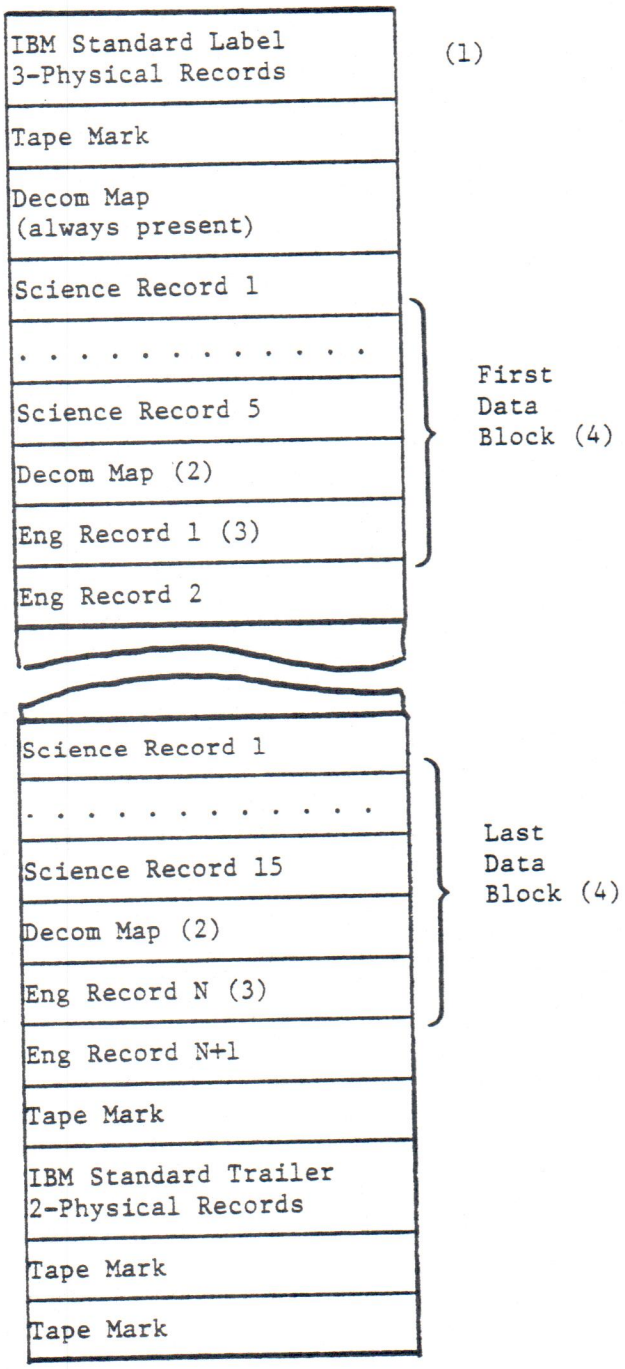
ALL WORDS 32-BITS

One physical record contains a standard EDR header followed by a science subheader followed by a science data block. One physical record contains all the PRA data from 12 odd numbered minor frames of 24 total telemetry frames.

One physical record contains three instrument cycles.

FIGURE 10.7-2

PRA PHYSICAL TAPE ORGANIZATION



NOTES

(1) Lines imply IRG.

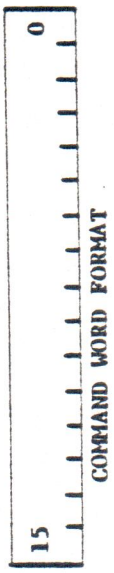
(2) Present only if Decom Map changes during process interval.

(3) Any Eng Record can be preceeded by a Decom Map.

(4) Data Blocks and Eng Records may contain up to 48-minutes of data. TTS Record flushes will result in less data being written into these Data Blocks.

FIGURE 10.7-3

PRA SCIENCE SUBHEADER FORMAT



EDR WORD	BITS			
	31 16	15 0	31 16	15 0
1	PRA MODE MF 5	PRA CONFIG MF 5	PRA MODE MF 13	PRA CONFIG MF 13
3	PRA MODE MF 21	PRA CONFIG MF 21	SPARE	
5	SPARE		SPARE	
7	SPARE		SPARE	

TOTAL BLOCK LENGTH IS 8 EDR (32-BIT)

WORDS (24 MF; 6 CMD WORDS)

MF1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

TABLE 10.7-1

PRA EDR SCIENCE SUBHEADER BLOCK TABLE

ITEM	WORD	BITS	DESCRIPTION
1	1	31-16	PRA Mode MF 5
2	1	15-0	PRA Config MF 5
3	2	31-16	PRA Mode MF 13
4	2	15-0	PRA Config MF 13
5	3	31-16	PRA Mode MF 21
6	3	15-0	PRA Config MF 21
7	5	31-0	Spare
8	6	31-0	Spare
9	7	31-0	Spare
10	8	31-0	Spare

FIGURE 10.7-4

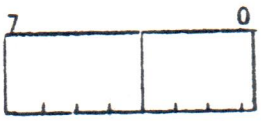
PRA EDR SCIENCE DATA BLOCK FORMAT

MF	EDR WORD	BITS							
		31	23	15	7 0	31	23	15	7 0
1	1	S1	S2	C103	C104	C105	C106	C107	C108
1	3	C109	C110	C111	C112	C113	C114	C115	C116
1	5	C117	C118	C119	C120	C121	C122	C123	C124
1,3	7	C125	C126	C127	C128	C129	C130	C131	C132
3	9	C133	C134	C135	C136	C137	C138	C139	C140
3	11	C141	C142	C143	C144	C145	C146	C147	C148
3,5	13	C149	C150	C151	C152	C153	C154	C155	C156
5	15	C157	C158	C159	C160	C161	C162	C163	C164
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
7	23	C189	C190	C191	C192	C193	C194	C195	C196
7	25	C197	C198	C199	C200	SPARE	SPARE	SPARE	SPARE

This structure is repeated two more times for a total block length of 78 EDR (32-bit) words (24 MF: 300 data words).

S = Status Word

C = PWS Data Word



PRA DATA WORD FORMAT

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

TABLE 10.7-2

PRA EDR SCIENCE DATA BLOCK TABLE

ITEM	WORD	BITS	DESCRIPTION	
1	1	31-24	PRA STAT Word 1	MF 1
2	1	23-16	PRA Stat Word 2	MF 1
3	1	15-8	PRA Data Word 103	MF 1
4	1	7-0	PRA Data Word 104	MF 1
5	2	31-24	PRA Data Word 105	MF 1
6	2	23-16	PRA Data Word 106	MF 1
↓	↓	↓	↓	
23	6	15-8	PRA Data Word 123	MF 1
24	6	7-0	PRA Data Word 124	MF 1
25	7	31-24	PRA Data Word 125	MF 1
26	7	23-16	PRA Data Word 126	MF 3
27	7	15-8	PRA Data Word 127	MF 3
↓	↓	↓	↓	
95	24	15-9	PRA Data Word 195	MF 7
96	24	7-0	PRA Data Word 196	MF 7
97	25	31-24	PRA Data Word 197	MF 7
98	25	23-16	PRA Data Word 198	MF 7
99	25	15-8	PRA Data Word 199	MF 7
100	25	7-0	PRA Data Word 200	MF 7
101	26	31-0	SPARE	

This structure repeats two more times for a total block length of 78 EDR (32-bit) words (24 MF: 300 Data Words).

10.8 PLASMA WAVE (PWS) EXPERIMENT

The PWS EDR science record corresponds to a 19.2 minute measurement period. Any data not present within a given physical record is filled with zeroes.

A PWS measurement cycle is 192 seconds. Hence, there are 5 physical records (30 instrument cycles) per 96 minute period. The formats which follow are applicable to the CR-7 data mode.

The science physical record structure is shown in Figure 10.8-1 and the physical magnetic tape organization is shown in Figure 10.8-2. Figure 10.8-3 defines the structure and contents of the PWS science record subheader. Figure 10.8-4 defines the structure and contents of the PWS science data block. The standard EDR science header is defined for CR-7 in Appendix C.

FIGURE 10.8-1

PWS EDR PHYSICAL SCIENCE TAPE RECORDS

STANDARD HEADER (60-WORDS)	SUBHEADER (48-WORDS)	DATA BLOCK (48-WORDS)

24 MF
19.2 MIN
156 WORDS

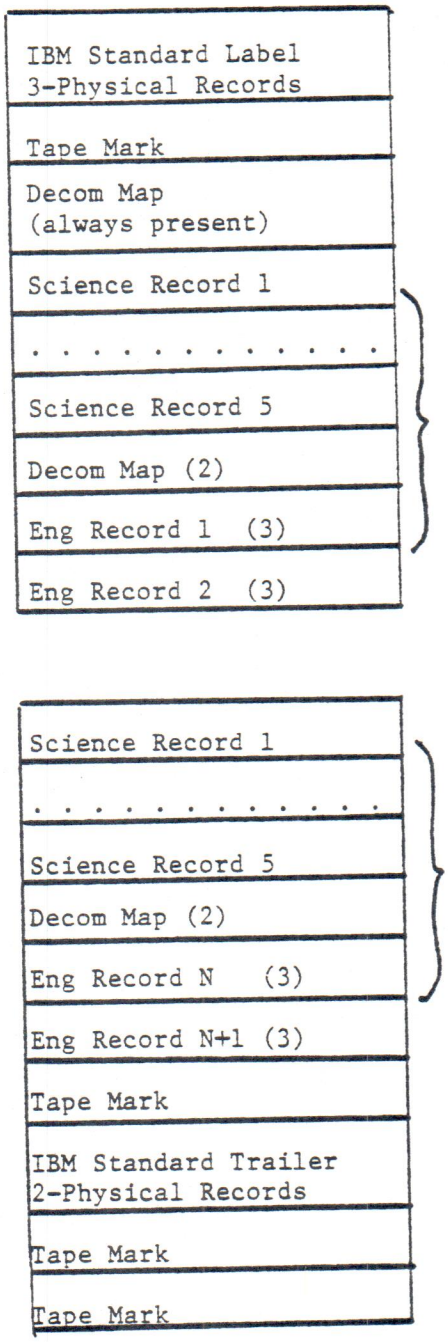
ALL WORDS 32-BITS

One physical record contains a standard EDR header followed by a science subheader followed by a science data block. One physical record contains all the data from 24 telemetry frames relevant to the experiment.

One physical record contains data from 6 instrument cycles.

FIGURE 10.8-2

PWS PHYSICAL TAPE ORGANIZATION



NOTES

(1) Lines imply IRG.

(2) Present only if Decom Map changes during process interval.

(3) Any Eng Record can be preceeded by a Decom Map.

(4) Data Blocks and Eng Records may contain up to 96 minutes of data. TTS Record flushes will result in less data being written into these Data Blocks.

FIGURE 10.8-3

PWS EDR SCIENCE SUBHEADER FORMAT

	EDR WORD	BITS 31 16	15 0	31 16	15 0
	1	MAG STAT 1 MF 1,9,17	MAG STAT 2 MF 1,9,17	PWS STAT MF 1,9,17	PPS CMD MF 1,9,17
	3	FDS CMD 1 MF 1,9,17	MAG CMD 1 MF 2,10,18	MAG CMD 2 MF 2,10,18	FDS CMD 2 MF 2,10,18
	5	UVS MODE CMD MF 3,11,19	UVS ROF MF 3,11,19	CRS STAT MF 3,11,19	PWS CMD MF 3,11,19
	7	FDS CMD 3 MF 3,11,19	PLS M-Mode MF 4,12,20	FDS CMD 4 MF 4,12,20	PRA Mode MF 5,13,21
	9	PRA CONF MF 5,13,21	MAG STAT 1 MF 5,13,21	MAG STAT 2 MF 5,13,21	PWS STAT MF 5,13,21
	11	FDS CMD 5 MF 5,13,21	CRS CMD MF 6,14,22	LECP CONF MF 6,14,22	FDS CMD 6 MF 6,14,22
	13	CRS STAT MF 7,15,23	UVS ROF MF 7,15,23	FDS CMD 7 MF 7,15,23	PLS L-Mode MF 8,16,24
	15	FDS CMD 8 MF 8,16,24	SPARE	SPARE	SPARE

The above table is repeated 2 more times for a total of 48 EDR words.

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD



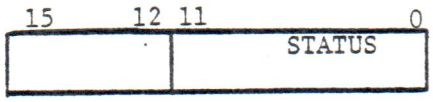


FIGURE 10.8-4

PWS EDR SCIENCE DATA BLOCK FORMAT

MF	EDR WORD	BITS 31 24 23 16 15 8 7 0			
1	1	A1	P1	A2	P2
1	2	A3	P3	A4	P4
2	3	A5	P5	A6	P6
2	4	A7	P7	A8	P8
3	5	A9	P9	A10	P10
3	6	A11	P11	A12	P12
4	7	A13	P13	A14	P14
4	8	A15	P15	A16	P16
↓	↓	↓	↓	↓	↓
24	48	A15	P15	A16	P16

Total block length is 48 EDR (32-bit) words (24 MF; 192 data words).

A = average measurement for channel

P = peak measurement for channel

MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

10.9 ULTRAVIOLET SPECTROMETER (UVS) EXPERIMENT

The UVS EDR science record corresponds to a 1152 second (19.2 minute) measurement period containing 3 UVS data cycles. Any data not present within a given physical record is filled with zeroes.

The science physical record structure is shown in Figure 10.9-1 and the physical magnetic tape organization is shown in Figure 10.9-2. Figure 10.9-3 defines the structure and content of the UVS science record subheader. Figure 10.9-4 defines the structure and contents of the UVS science data block. The standard EDR science header is defined for CR-7 in Appendix C.

FIGURE 10.9-1

UVS EDR PHYSICAL SCIENCE TAPE RECORDS

STANDARD HEADER (60-WORDS)	SUBHEADER (8-WORDS)	DATA BLOCK (144-WORDS)	24 MF 19.2 MIN 212 WORDS

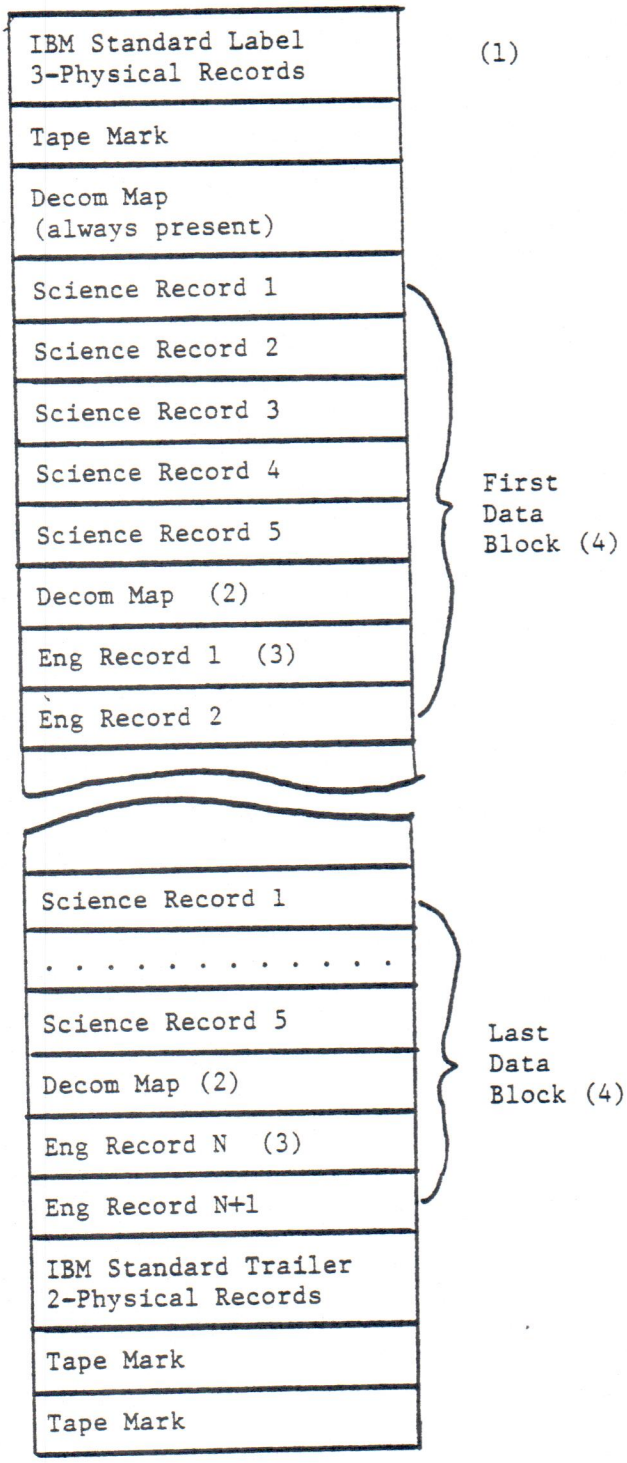
ALL WORDS 32-BITS

One physical record contains a standard EDR header followed by a science subheader followed by a science data block. One physical record contains all the UVS data from 12 minor frames with odd numbered MOD60 counts or 24 total, consecutive frames.

One physical record contains the data from 3 instrument cycles.

FIGURE 10.9-2

UVS PHYSICAL TAPE ORGANIZATION



NOTES

(1) Lines imply IRG.

(2) Present only if Decom Map changes during process interval.

(3) Any Eng Record may be preceeded by a Decom Map.

(4) Data Blocks and Eng Records may contain up to 96 minutes of data. TTS record flushes will result in less data being written into these data blocks.

FIGURE 10.9-3

UVS SCIENCE SUBHEADER FORMAT

EDR WORD	BITS			
	31 16	15 0	31 16	15 0
1	UVS Mode MF 3	UVS ROF MF 3	UVS ROF MF 7	UVS Mode MF 11
3	UVS ROF MF 11	UVS ROF MF 15	UVS Mode MF 19	UVS ROF MF 19
5	UVS ROF MF 23	SPARE	SPARE	SPARE
7	SPARE		SPARE	

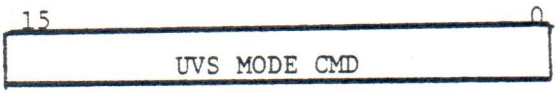
MF 1 is in: SCT 60 = 0,24,48 when MOD 2^{16} = EVEN

SCT 60 = 12,36 when MOD 2^{16} = ODD

Total block length is 8 EDR (32-bit) words (24 MF, 19.2 minutes).

UVS ROF = UVS read-out flag

UVS Mode = UVS mode and HU command



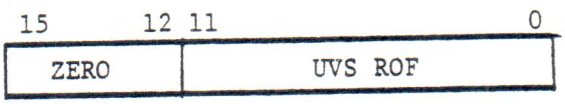
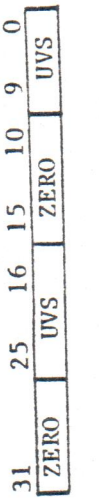


FIGURE 10.9-4

UVS SCIENCE DATA BLOCK FORMAT

MF	EDR WORD	BITS							
		31 16	15 0	31 16	15 0	31 16	15 0	31 16	15 0
2*	1	S1	S2	S3	S4	S5	S6	S7	S8
2	5	S9	S10	S11	S12	S13	S14	S15	S16
2	9	S17	S18	S19	S20	S21	S22	S23	S24
4	13	S25	S26	S27	S28	S29	S30	S31	S32
4	17	S33	S34	S35	S36	S37	S38	S39	S40
4	21	S41	S42	S43	S44	S45	S46	S47	S48
6	25	S49	S50	S51	S52	S53	S54	S55	S56
6	29	S57	S58	S59	S60	S61	S62	S63	S64
6	33	S65	S66	S67	S68	S69	S70	S71	S72
8	37	S73	S74	S75	S76	S77	S78	S79	S80
8	41	S81	S82	S83	S84	S85	S86	S87	S88
8	45	S89	S90	S91	S92	S93	S94	S95	S96
10	49	S97	S98	S99	S100	S101	S102	S103	S104
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
24	137	S273	S274	S275	S276	S277	S278	S279	S280
24	141	S281	S282	S283	S284	S285	S286	S287	S288



UVS DATA WORD FORMAT

This structure represents a total block length of 144 (32-bit) EDR words (12 MF*, 288 Data Words).

* UVS data is contained only in minor frames with odd MOD60 counts.

Note: S numbers do not necessarily correspond to UVS detector word numbers.

10.10 SUMMARY

The telemetry and EDR parameters for each experiment are summarized in Figure 10.10-1. The telemetry parameters include:

A. Experiment bit fields

B. Data word bit lengths

C. Data words per MF

D. Instrument cycles

The EDR parameters for subheader and data block include:

A. Minor frames

B. Time period

C. Experiment Data Words

D. EDR (32-bit words)

FIGURE 10.10-1

TELEMETRY/EDR FORMAT SUMMARY

INSTRUMENT ($BITS:MOD 2^{16}=even/odd)		ENG (416)	SUBCOM A (296) MAG (296/264)	SUBCOM A (296) PPS (0/32)	STATUS A (48)	SUBCOM B (240) PRA (200/0)	SUBCOM B (240) UVS (0/240)	SUBCOM B (240) STAT B (40/0)	LECP (320)	PWS (64)	PLS (352)	CRS (432)
	LOCATION BITS	73-488	489-784 489-752	0 753-784	785-832	833-872 0	873-1072 0	0 833-1072	1921-2240	1505-1568	1569-1920	1073-1504
DATA WORD	NO. BITS DW/MF	8 52	12,2 118/117*	24 0/1-1/3	16 3	8 25/0	10 0/24	12 4/0	10 32	8 8	8 44	12 36
INSTRUMENT CYCLE	MF PERIOD DW	60 48 M 3120	2 96 S 234	120 96 M 80	8 384 S 24	8 384 S 100	8 384 S 96	8 384 S 16	8 384 S 256	4 192 S 32	8 384 S 352	120 96 M 4320
INST. CYCLE /PHYS. REC.			12	1	3	3	3	3	3	6	3	1/5
EDR PHYSICAL RECORD	MF	--	24	120	--	24	24	--	24	24	24	24
	PERIOD	--	19.2 M	96 M	--	19.2 M	19.2 M	—	19.2 M	19.2 M	19.2 M	19.2 M
	DW	—	2808	80	--	300	288	—	768	192	1056	864
	WORDS	—	288	60	--	78	144	--	384	48	264	432
EDR SUBHEADER	MF	--	24	24	--	24	24	--	24	24	24	24
	PERIOD	--	19.2 M	19.2 M	--	19.2 M	19.2 M	--	19.2 M	19.2 M	19.2 M	19.2 M
	DW	--	1081	3	—	6	9	--	3	29	25	9
	WORDS	--	280	6	--	8	8	--	8	48	16	6

CR-7: 2240 Bits/MF
48 Sec/MF
46-2/3 Bits/Sec

24 MF = 19.2 MIN = 1152 SEC
DW = Data Word
Word = 32-bit EDR Word

* Even MOD60 frames: 6 12-bit ref words
111 2-bit deltas
1 2-bit filler
Odd MOD60 frames: 3 12-bit ref words
114 2-bit deltas