HELDRP

(DATA REDUCTION PROGRAMM)

has been modified FOR :

- CORRECTION OF DM7
- ENGINEERING DATA
- ERROR IN COMPUTATION OF THE ACCUMULATION TIME IN SOME BIT RATE/FORMAT
- ERROR IN CALCULATING RATIO WHEN BIT RATE CHANGES DURING ONE RECORD
- ERROR IN BIT RATE 512 ACCUMULATION TIME DURING DUMP OF γ RAYS DATA IN HELIOS 2

(Still working on Sept 17, 1980)

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September 20, 1978

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Goddard Space Flight Center
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Attention: G. Muckel
Code 664
Bldg. 2, Rm. S-207

Subject: Contract NAS 5-24350
Task Assignment 593
HELDRP Working Paper

Gentlemen:

Enclosed are 10 copies of the working paper entitled "Helios A/B Data Reduction Program (HELDRP) Maintenance Programmer's Introduction". This document has been prepared to assist programmers assigned to maintain HELDRP.

Please let me know if you have any questions regarding the document.

Very truly yours,

COMPUTER SCIENCES CORPORATION

L. P. Gunshol
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LPG:kag

Enclosures

HELIOS A/B DATA REDUCTION PROGRAM (HELDRP) MAINTENANCE PROGRAMMER'S INTRODUCTION

WORKING PAPER

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September 1978

This working paper has been prepared to assist programmers maintaining the Helios A/B Data Reduction Program, HELDRP. The top level production flow associated with Helios is first presented, followed by a brief description of the tape and disk data sets and printed summaries involved with the operation of HELDRP. The tape and disk data sets and hardcopy summaries are described in detail in appendices A through I. Finally, a computer listing of HELDRP subroutine prologues, a subroutine tree design, and common block diagram, and common block descriptions is attached. Additional details regarding the Helios experiments and the Helios data reduction system can be found in References 1 and 2.

1. Helios Production Flow

Please refer to Figure 1. HELDRP generates RATES and PHA tapes from a library (LIB) tape. The LIB tape is a compressed version of the EDR tape sent from IPD. It is generated by the Helios Library Generator Program (LIBGEN) (see Figure 2). (LIBGEN is described in Reference 3.) The RATES and PHA tapes generated by HELDRP form the basis of subsequent data analysis.

The main analysis is through FLXDBG which creates a 15 minute summary tape (FLUX tape in Figure 1) from which PHA and RATES plots can be made. RATPLT plots a time history of rates counts from the FLUX tape. Additional details regarding FLXDBG can be found in Reference 4. MATRIX plots the energy of one detector element vs. that of another. The MATRIX plot allows the experimenter to differentiate particle species. FLXPLT plots the counts vs. time for a particular particle species and energy.

The sectored counts analysis are plotted directly from the RATES tape. HSXRMN plots the sectored X-ray counts and HASDMN plots the sectored rates counts.

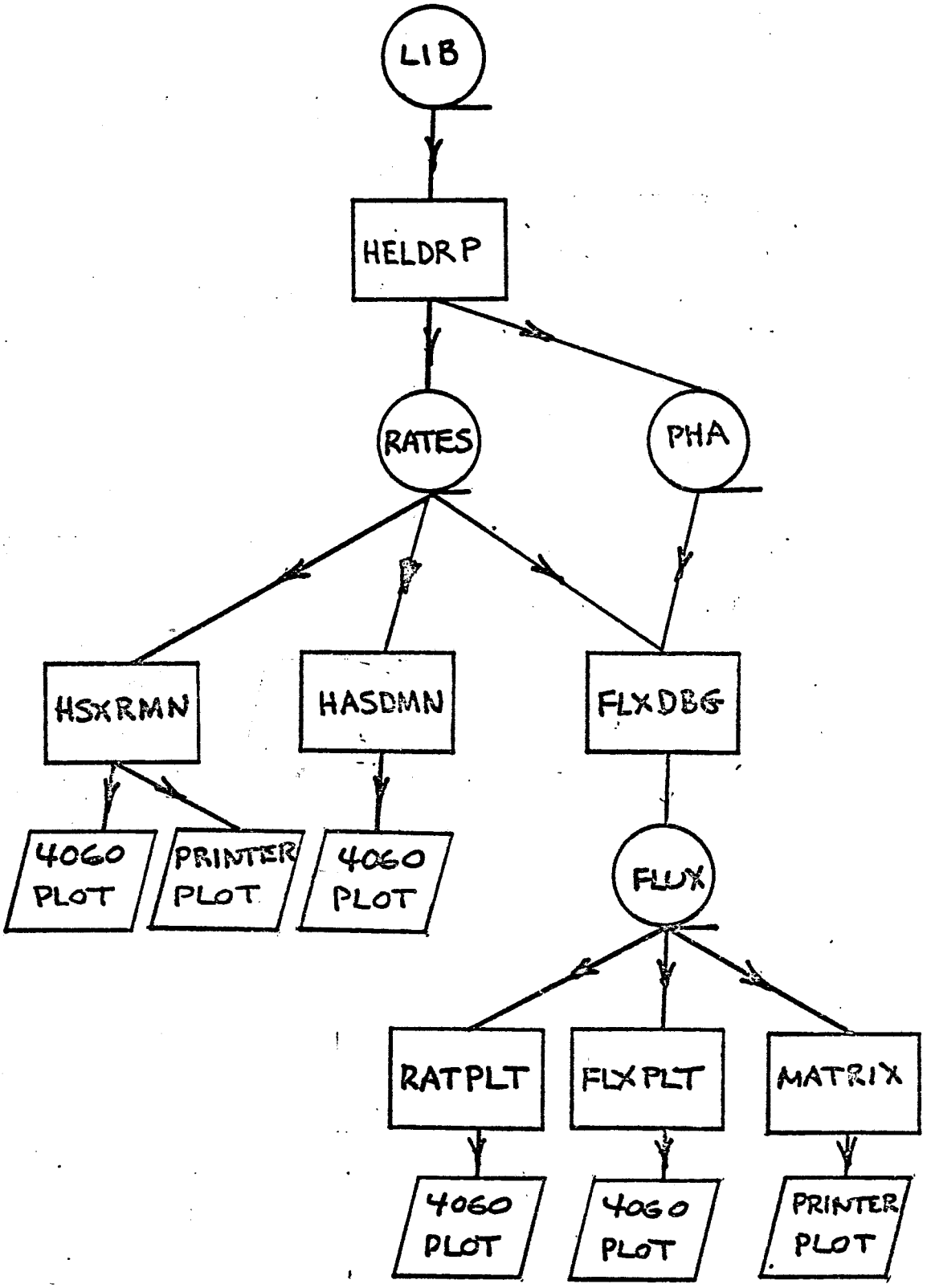


Figure 1. Helios Production Flow

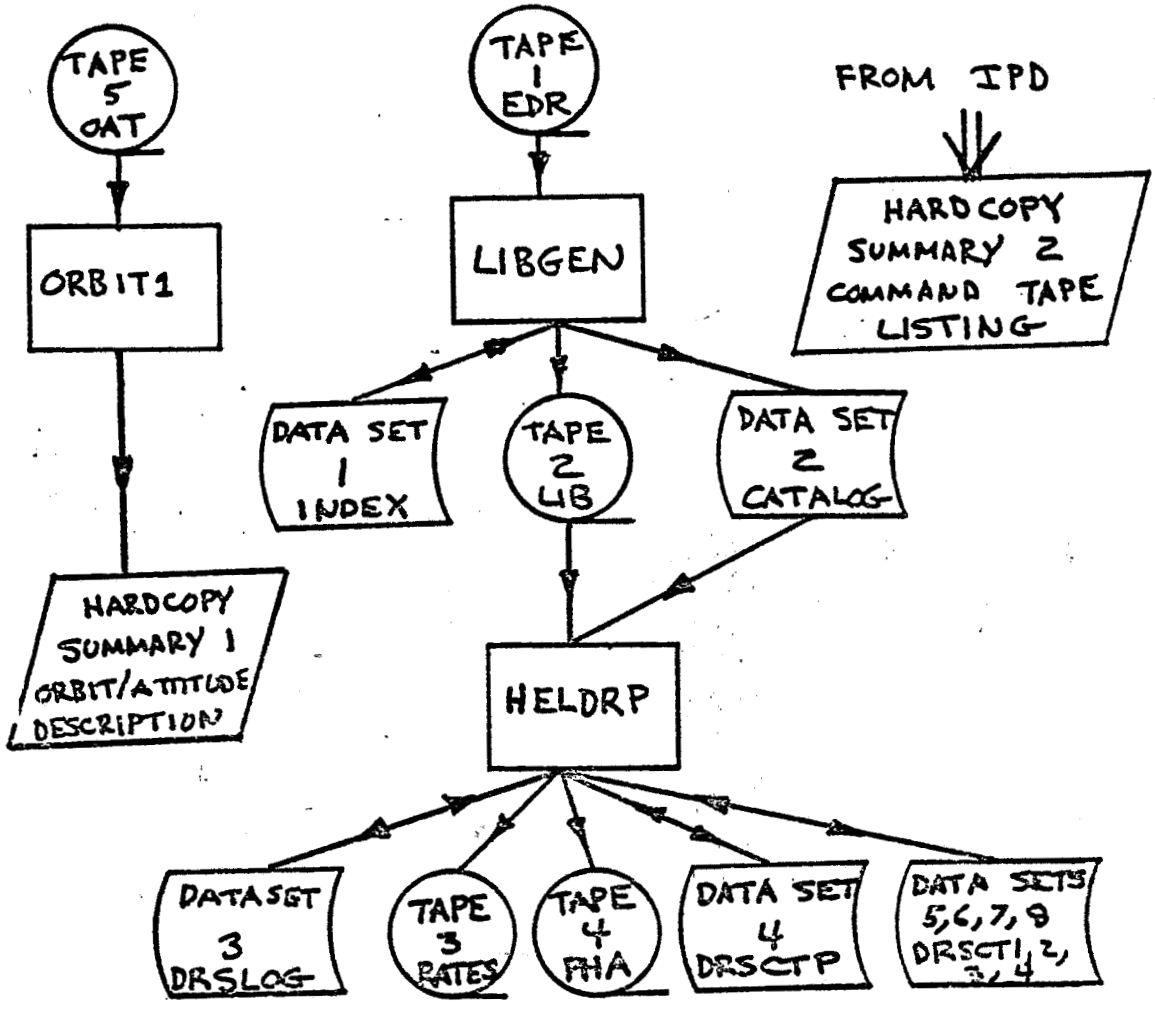


Figure 2. HELDRP Interfaces

2. Data Sets and Hardcopy Summaries

Please refer to Figure 2. There are five tape data sets, eight disk data sets, and two hardcopy summaries associated with the operation of HELDRP. Each of these items is described in an appendix as follows.

Item	Short Description	Detailed Description
Hardcopy Summary 1	Orbit/attitude tape description	Appendix B
Hardcopy Summary 2	Command tape listing provided to each U.S. experimenter on Helios A	Appendix I
Tape 1	Experimenter data record (EDR), from Information Processing Division (IPD)	Appendix A
Tape 2	Compressed EDR library tape	Appendix A
Tape 3	Rates output tape	Appendix D
Tape 4	Pulse Height Analyzer (PHA) output tape	Appendix C
Tape 5	Orbit/attitude tape	Appendix B
Data Set 1	Index of the EDR tapes processed	Appendix E
Data Set 2	Catalog of the EDR tapes processed	Appendix F
Data Set 3	DRSLOG, logistics and history log of each file processed by HELDRP	Appendix G
Data Set 4	DRSCTP, current catalog number for DRSCT1, 2, 3, and 4	Appendix H
Data Set 5, 6, 7, and 8	DRSCT1, 2, 3, and 4, catalogs of file times, quality, and production	Appendix H

3. Computer Listings

Attached to this working paper is a listing of prologues that have been prepared to assist programmers maintaining HELDRP. An alphabetical index of the 71 subroutine prologues is found on page 2. In addition, "FLOWCHART" (page 32) presents a subroutine tree diagram, and "COMMON" (page 7) provides a common block description and variable interaction chart.

APPENDIX A - EXPERIMENTER DATA RECORD (EDR) FORMATS

This appendix describes the Helios EDR formats on the tapes received from the Information Processing Division (IPD). Included are:

1. EDR Telemetry Label Format
2. EDR Format 1 (Experimenter 7)
3. EDR Format 2 (Experimenter 7)
4. EDR Format 3 (Experimenter 7)
5. EDR Format 5 (Experimenter 7)
6. Rate Data Format
7. PHA Data Format
8. Gamma Ray Burst (GRB) Data Formats
9. GRB Memory Data

A.1 GENERAL EDR INFORMATION

The experimenter data record (EDR) for the Helios A/B GSFC Cosmic Ray Experiment (Experiment 7) has the following general characteristics.

- An EDR consists of two tapes
  - -- TLM tape
  - -- ORB/ATT tape
- The format of the TLM EDR consists of one physical file of multiple telemetry (TLM) records
- The TLM EDR is 9 track 1600 BPI
- The end of tape is indicated by three physical end of file marks
- A new logical file (header preceding the records) is created after
  - -- An end of day
  - -- Change in bit rate
  - -- Change in format

- Each logical file of data is preceded by a label, all labels on the TLM EDR will be the same size
- EVT (on telemetry frames) is the time of the event of the frame of data at the spacecraft in milliseconds of day
- GMT is the ground receive time (milliseconds of day) of the first bit of the telemetry frame at a specified station (DSS)
- Missing frames of data are indicated by a 1 bit in bit 6 of the S2 status indicator
- Frames of missing data are filled with zeros
- Fill that is used to complete a record or a frame is binary ones
- Engineering data word positions remain constant throughout the experimenter frame of data. Eng words retain their last value until a new value is encountered
- EDR's are ordered on spacecraft event time (EVT). (If no spacecraft EVT exists for a minor frame of data, HELDRP rejects that frame.)
- Data from the two networks is merged on the EDR's
- Experimenter 7 receives data only in formats 1, 2, 3, 5

A label consisting of 78 characters precedes all files on the TLM EDR. The label format is defined in Table A-1.

Experimenter 7 formats 1, 2, 3, and 5 are defined in Tables A-2 through 5, respectively. The frame status indicators (SI) and the engineering data associated with these formats are defined in Tables A-6 and A-7, respectively.

Finally, the dependency of various telemetry-related parameters on bit rate, format, and data mode is summarized in Table A-8.

Table A-1. Helios A/B EDR Telemetry Label Format

This label will precede all files on the TLM EDR. The label will consist of 78 characters

1 - 7 + Space	International Code
9 -11 + Space	Tape Type (TLM or ORB)
13 -15 + Space	Data Type (TLM or CMD)
17 + Space	Format Number
19 -22 + Space	Bit Rate
24 -25 + Space	Year of Recording (last 2 digits)
27 -29 + Space	File Start Time (Day)
31 -36 + Space	File Start Time (HHMMSS)
38 -40 + Space	File Stop Time (Day)
42 -47 + Space	File Stop Time (HHMMSS)
49 -52 + Space	Master Data Tape Number
54 -55 + Space	Master Data Tape File
57 -62 + Space	Date EDR generated (YYMMDD)
64 -66 + Space	EDR Run Number
68 -69 + Space	EDR File number
71 -72 + Space	EDR reel number
74 -76	Experimenter ID
77 78	Spares

Labels written on nine (9) track tape will be written in EBCDIC.

Table A-2. Helios A/B Experimenter 7 EDR Format 1

	Description	Bytes
EVT	Spacecraft event time (MS)	4
GMT	Ground rec'd time (MS)	4
FN	Frame number	2
TI	Spacecraft clock	2
SI	Status indicators	4
LT	One way light time (MS)	4
8-13	Scientific data	6
*11	Engineering data	1
*16-17	Engineering data (spin rate)	2
*28	Engineering data	
*40-45	Engineering data	6
*64-69	Engineering data	6
*88-89	Engineering data	2
FILL	Fill ones	8
		52

*Engineering data words

Eng frm 0 - 11,16,17

Eng frm 0 - 11,16,17

Eng frm 1 - 11,28,40,41,42,43,44,45,
64,65,66,67,68,69,88,89

Eng frm 2 - 11,4041

Eng frm 3 - 11,28

EDR frame = 52 bytes (8 bits)
EDR record = 72 frames
= 3744 bytes

Table A-3. Helios A/B Experimenter 7 EDR Format 2

	Description	Bytes
EVT	Spacecraft event time (MS)	4
GMT	Ground rec'd time (MS)	4
FN	Frame number	2
TI	Spacecraft clock	2
SI	Status indicators	4
LT	One way light time (MS)	4
8-13	Scientific data	6
80-85	Scientific data	6
*11	Engineering data (spin rate)	1
*16-17	Engineering data (spin rate)	2
*28	Engineering data	1
*40-45	Engineering data	6
*64-69	Engineering data	6
*88-89	Engineering data	2
FILL	Fill ones	2
		52

*Engineering data words same as Format 1

Table A-4. Helios A/B Experimenter 7 EDR Format 3

	Description	Bytes
EVT	Spacecraft event time (MS)	4
GMT	Ground rec'd time (MS)	4
FN	Frame Number	2
TI	Spacecraft clock	2
SI	Status indicators	4
LT	One way light time (MS)	4
8-13	Scientific data	6
80-85	Scientific data	6
*11	Engineering data	1
*16-17	Engineering data (spin rate)	2
*28	Engineering data	1
*40-45	Engineering data	6
*64-69	Engineering data	6
*88-89	Engineering data	2
FILL	Fill ones or day	52

*Engineering data words same as Format 1

Table A-5. Helios A/B Experimenter 7 EDR Format 5

	Description	Bytes
EVT	Spacecraft event time (MS)	4
GMT	Ground rec'd time (MS)	4
FN	Frame number	2
TI	Spacecraft clock	2
SI	Status indicators	4
LT	One way light time (MS)	4
33-35	Scientific data	3
*11	Engineering data	1
*16-17	Engineering data (spin rate)	2
*28	Engineering data	1
*40-45	Engineering data	6
*64-69	Engineering data	6
*88-89	Engineering data	2
FILL	Fill ones	11

*Engineering data words same as format 1

TABLE A-6 - HELIOS A EDR FRAME STATUS INDICATORS

S1 (Byte 1)		Bits
GMT Time Correction Flag		
Correct	0	1-0
Corrected	1	
Uncorrectable	2	
Event Time Status Flag		3-2
Event time computed	0	
Computed but questionable	1	
Not computed	2	
Data Type		6-4
Real time	0	
Analog tape replay	5	
Digital tape replay	4	
S2 (Byte 2)		
Frame Counter Correction		2-0
Corrected	1	
Uncorrected	0	
Engineering Frame Number		5-3
Fill Data Present		6
Fill	1	
No fill	0	
S3 (Byte 3)		
Number of Bit Errors in S/C Sync Word		7-0
S4 (Byte 4)		
Data Quality		2-0
Data is Good	4	
Data is Suspect (SNR below minium requirement)	3	
Data is Suspect (errors in HSD block)	2	
Data is Suspect (SNR below minimum requirement and errors in HSD block	1	
Data is Bad (non synced, or deleted frame	0	
Distribution Mode		6-3

Note: Bits are numbered right to left within the byte (7-0)

Table A-7. Helios Experiment 7 Engineering Data (1 of 2)

ENGR FRAME	ENGR WORD		DESCRIPTION	
0	11		Power Status (E-040) 1 = ON, 0 = OFF	
0	16-17		Spin Rate (in RPM) (D-000/0-7→D-001/0-3) Z D000 / 0 = 2^{11} 1 = 2^{10} 2 = 2^{9} 3 = 2^{8} 4 = 2^{7} 5 = 2^{6} 6 = 2^{5} $\quad RPM = \frac{1024 * 60}{Z}$ 7 = 2^{4} D001 / 0 = 2^{3} 1 = 2^{2} 2 = 2^{1} 3 = 2^{0}	
1	11			
1	28	0	X-RAY Window Clock (E-187)	0=1, 1=0
		1	X-RAY Window Data (E-188)	0=ON, 1=OFF
		2	Internal calibrator A (E=189)	0=ON, 1=OFF
		3	Internal calibrator B (E-190)	0=ON, 1=OFF
		4	X-RAY High voltage (E-191)	0=ON, 1=OFF
		5	Sector synchronizer (E-192)	0=ON, 1=OFF
		6	Force blackout mode (E-193)	0=OFF, 1=ON
		7	X-RAY sector data mode (E-194)	0=ON, 1=OFF
1	40		HET (E7A) temperature (D-042)	
1	41		VLET2 (E7B2) temperature (D-043)	
1	42		Detector mounting plate temp. (D-044)	
1	43		X-RAY detector temperature (D-045)	
1	44		Thermal blanket support plate 1 temp. (D-046)	
1	45		Thermal blanket support plate 2 temp. (D-047)	
1	64		Electronics temperature (D-048)	
1	65		Base plate temperature (D-049)	
1	66		+12 volts monitor (D-050)	
1	67		+6 volts digital monitor (D-051)	
1	68		+6 volts analog monitor (D-052)	
1	69		+7.75 volts monitor (D-053)	
1	88		+4.7 volts monitor (D-054)	

Table A-7. Helios Experiment 7 Engineering Data (2 of 2)

ENGR FRAME	ENGR WORD	DESCRIPTION
1	89	Base plate temp. (front) (D-055)
2	11	
2	40	VLET1(E7B1) temperature (D-078)
2	41	LET (E7C) temperature (D-079)
3	11	
3	28	

1	2	3	4	5	6	7	8	9	10		11	12
BM	FM	DM	PHA Blocks RATE BLOCKS	BLOCKS P.CYCLE	WORDS P.CYCLE	WORDS P.FRAME	FRAMES P.CYCLE	MAIN xx FRAMES P.CYCLE	CYCLE TIME SEC.	MIN.	ROLLS SR COUNTERS	COUNTS PER SR READOUT
4096	5	-	5:1	768	4608	3	1536	22	432	7.2	53	13,568
2048	5	-	5:1	768	4608	3	1536	22	864	14.4	53	13,568
2048	1	-	5:1	768	4608	6	768	11	432	7.2	53	13,568
1024	1	-	3:1	512	3072	6	512	8	576	9.6	69	17,664
512	1	-	1:1	256	1536	6	256	4	576	9.6	69	17,664
512	2	-	3:1	512	3072	12	256	4	576	9.6	69	17,664
256	2	-	1:1	256	1536	12	128	2	576	9.6	69	17,664
128	2	-	1:1	256	1536	12	128	2	1152	19.2	138	35,328
64	2	-	1:1	256	1536	12	128	2	2304	38.4	276	70,656
64	3	-	1:1	256	1536	12	128	2	2304	38.4	276	70,656
32	3	-	1:1	256	1536	12	128	2	4608	76.8	552	141,312
16	3	-	1:1	256	1536	12	128	2	9216	153.6	1104	282,624
8	3	-	1:1	256	1536	12	128	2	18432	307.2	2208	565,248
8	3	B/O[x]	0:1	128	768	12	64	1	9216	153.6	1104	282,624

For explanation see page 2.

[x] Blackout

[xx] Rounded

1 EDMF ≙ 1 Cycle

Table A-8. Mode Table (1 of 2)

Table A-8. Mode Table (2 of 2)

The experiment cycle times and other parameters of interest as related to S/C bit rate and format is shown on page 1. Since the internal calibrators (CAL A and CAL B) are pulsed at the fine sector rate, the expected number of counts per sectored rate readout can be variable by 8 times number of rolls in the accumulation interval.

Explanation Mode Table

Col. 1. BM = Bit rate

Col. 2. FM = format

Col. 3. DM = Data mode

Col. 4. 1 PHA block or 1 PHA EDF = 48 bits
1 RATE Data Block or Line = 48 bits

Col. 5. 1 Cycle $\hat{=}$ 8 Rate - Data EDF $\hat{=}$ 128 Rate Blocks, with interspersed PHA blocks, e.g. for 4096 Bps - (5+1)x128 = 768 blocks. (Rate and PHA data)

Col. 10. Cycle time = $\frac{\text{Frames per Cycle x 1152}}{\text{BM}}$

Col. 11. Chosen accumulation interval for SR counters in rolls

Col. 12. Counts per Readout = $\frac{\text{Accumulation interval x 2048}}{8}$,

since the interval calibrators are pulsing at the fine sector rate. One SR counter is only counting during 1/8 of a roll or during one 45° sector.

1 EDMF $\equiv$ 1 Cycle $\equiv$ 1 Experiment Data Main Frame

A. 2 COSMIC RAY EXPERIMENT DATA

The GSFC Cosmic Ray Experiment on Helios A/B outputs minor frame data of two basic types, referred to as Rate Data and PHA data. In addition, Helios A provides Gamma Ray Burst (GRB) data. Rate data is simply a 12 bit binary number, packed four numbers to a block which represents the total number of times per accumulation interval that signals exceeding specified amplitudes from one or more detectors in each sensor array (telescope) occurred in coincidence. These rate events are counted (accumulated) in a 24 bit counter for a period of time dependent on bit rate and mode of spacecraft operation in use. Prior to transmission, data from each 24 bit counter is compressed to 12 bits by converting the number to its logarithm. After receipt of rate data on the ground, the log in each 12 bit rate word is converted back to its integer equivalent and divided by the length of the accumulation interval to yield counts per unit time. The rate data format is described in Section A.2.2.

PHA data represents the digitized amplitude of each of three specified detector signals appearing in coincidence. The Pulse Height Analyzer resolves the amplitude of each pulse into one part in 1024 (10 bits). Each amplitude is transmitted in binary form as 12 bit word. Each PHA readout is a quasi-randomly selected coincidence event during the accumulation interval and the data represents the amplitudes of the three detector signals rather than the number of events per unit time. Each PHA event is packed in one 48 bit block.

The ratio of PHA data to rate data is dependent upon the spacecraft mode and bit rate in use. The readout format is not necessarily synchronous with the modulo-72 major frame sequence. Hence, each 48 bit block contains identifying bits which uniquely identify the type and source of data in that block. At high bit rates (4096 and 2048 bps.) the ratio of PHA data to rate data can be as high as 7 to 1 (i.e., 7 each 48 bit PHA blocks for each 48 bit rate block). At 1024 through 256 bps, the ratio is 3:1. At still lower bit rates the ratio drops

to 1:1 and at the lowest bit rates as well as blackout mode, all PHA data and selected rate data is excluded from readout. The PHA data format is described in Section A.2.2.

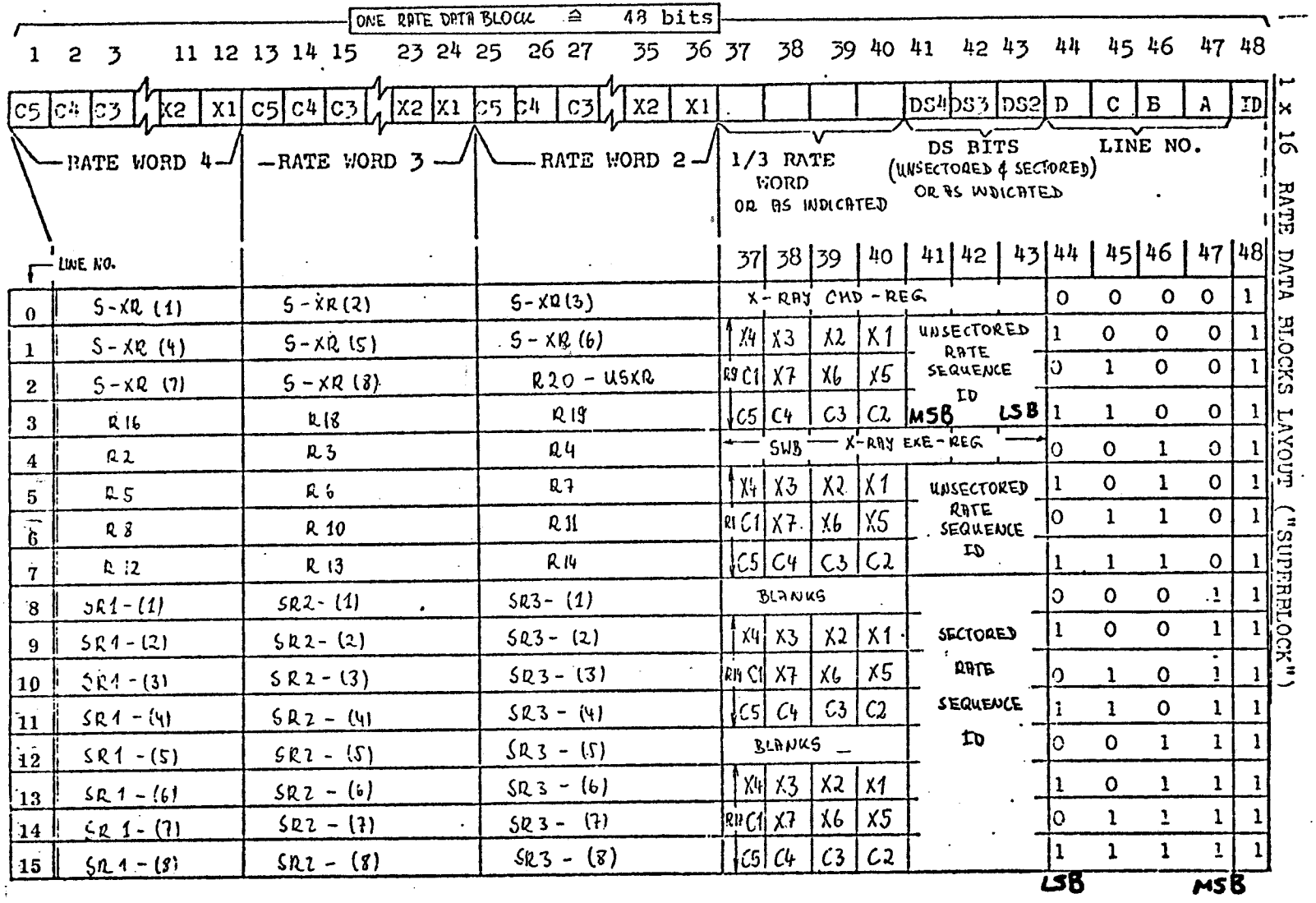
The Helios B Gamma Ray Burst (GRB) data is described in Section A.2.3.

A.2.1 Rate Data Format

Rate data is packed in 48 bit blocks as shown in Figure A-1. All rate data is ordered most significant bit (MSB) first in time and the ID bits are ordered LSB first. The bits are numbered in the order they appear in time, and have the following significance:

Bit #	Description
48	Always a "1" for rate data, always a "0" for PHA data.
44-47	A, B, C, D are 4 four bits from a modulo-16 counter (A = MSB), specifying one of 16 possible "lines" of rate data. Each line contains 3 1/3 rate works, or 3 words and 4 discreet bits.
41-43	DS2 through DS4 are discrete identifying bits which specify the commutator position for each of the rate words in that block.
37-40	The 4 bits are either DS bits or rate data bits as specified by the line number (bits 44-47). Four rate counters are readout, in lines 2-4, 6-8, 10-12, and 14-16.
25-36	All bits of word 2 of the specified line.
13-24	All 12 bits of word 3 of the specified line.
1-12	All 12 bits of word 4 of the specified line.

The 12 rate data bits are designated X1, X2, X3, . . . X7, C1, C2, . . . C5 and represent the true binary log of the number of counts accumulated. The X's are the bits of the mantissa and the C's are the bits of the characteristics.



LINE NO.				37	38	39	40	41	42	43	44	45	46	47	48
0	S-XR (1)	S-XR (2)	S-XR (3)	X-RAY CHD-REG							0	0	0	0	1
1	S-XR (4)	S-XR (5)	S-XR (6)	X4	X3	X2	X1	UNSECTORED RATE SEQUENCE ID			1	0	0	0	1
2	S-XR (7)	S-XR (8)	R20 - USXR	R9 C1	X7	X6	X5				0	1	0	0	1
3	R16	R18	R19	C5	C4	C3	C2	MSB		LSB	1	1	0	0	1
4	R2	R3	R4	← SWB — X-RAY EKE-REG →							0	0	1	0	1
5	R5	R6	R7	X4	X3	X2	X1	UNSECTORED RATE SEQUENCE ID			1	0	1	0	1
6	R8	R10	R11	R1 C1	X7	X6	X5				0	1	1	0	1
7	R12	R13	R14	C5	C4	C3	C2				1	1	1	0	1
8	SR1-(1)	SR2-(1)	SR3-(1)	BLANKS				SECTORED RATE SEQUENCE ID			0	0	0	1	1
9	SR1-(2)	SR2-(2)	SR3-(2)	X4	X3	X2	X1				1	0	0	1	1
10	SR1-(3)	SR2-(3)	SR3-(3)	R14 C1	X7	X6	X5				0	1	0	1	1
11	SR1-(4)	SR2-(4)	SR3-(4)	C5	C4	C3	C2				1	1	0	1	1
12	SR1-(5)	SR2-(5)	SR3-(5)	BLANKS							0	0	1	1	1
13	SR1-(6)	SR2-(6)	SR3-(6)	X4	X3	X2	X1				1	0	1	1	1
14	SR1-(7)	SR2-(7)	SR3-(7)	R19 C1	X7	X6	X5				0	1	1	1	1
15	SR1-(8)	SR2-(8)	SR3-(8)	C5	C4	C3	C2				1	1	1	1	1

Figure A-1. Rate Data Block Layout

Each 48 bit block contains three complete rate words (words 4, 5, and 2) and either 1/2 of another rate word (word 1) or discreet bits. When word number is combined with line number, one of 48 rate counters is specified in words 4, 3, or 2. Word 1 is distributed through 3 lines, hence 3 consecutive lines are required to read out each word 1. There are 4 additional counter readout in lines 1 through 16. The total number of rate counters is thus 48 plus 4, or 52. Each counter may be commutated through 1, 2, 4, or 8 different coincidence conditions or, in the case of sectored counters, may also be associated with only 45 degree increment as the S/C spins. Commutation levels are specified in the discreet bits DS2 through DS8.

Hence, each individual coincidence rate can be uniquely specified only by the combination of line number, word number, and commutation level. There are 230 such unique rates. In the ground computer, each must be extracted from the data converted to integer form, and summed with previous readouts of the same rate to maintain a running total. At the completion of a specified accumulation interval, the summed number of counts in each rate location is divided by the accumulation interval to yield counts per unit time.

Conversion from the logarithm to the integer number may be accomplished as follows. The A reg is a 24 bit binary counter which counts input pulses when permitted by the F and Δ_0 functions. The reset condition of this register is all "1"s, hence the first pulse counted produces all "0"s, the second produces 10000000, etc. At the end of an accumulation interval, the log compressor shifts right the A reg until a "1" appears in the MSB. The next 7 bits, not including the MSB, which is always a "1", are read out as X1 - X7, and the number of shifts is read out as C1 - C5.

The convert a log back to real, first replace the most significant "1" of the mantissa lost during readout, and then shift the appropriate number of shifts as read out in C1 -C5. Then add 1 to account for the reset condition of the A reg. For example, after 6 counts the A reg contains 101000 ... (total of

24 bits). LSB is in the left. There are 21 leading zeros on the right to be shifted out of the way until A3 appears at the end of the shift register. X1 - X7 will read 0000010(1), where the "1" is A3 which was last is shown in parentheses. C1 - C5 will contain 21 in binary. It re-convert:

(1) Shift left X1 - X7 once, adding the "1" which was lost. Now X1 - X7 - 0000101.

(2) Shift left 21 times, entering 21 zeros from the right. We now have 0000101 plus 21 zeros:

$$0000101\ \underbrace{000\ldots0}_{21},$$

(3) Truncate from the left to leave 24 places, right justified, including the 21 zeros. Contents of the A reg has not been restored. LSB is still on the left.

(4) Add 1 to give 11000,..., the binary equivalent of 6.

All the above was done referencing the bit field associated with accumulation. However, during readout the bits are reversed so that they are read out differently and hence will appear in core differently. For 6 input counts, readout is C5, C4, C3 . . . C1, X7, X6 . . . X1. C5 through C1 (the characteristic) will contain 11, or 11001 (MSE first). X7 through X1 is the mantissa and contains 0100101 (X7 is on the left). The readout of the rate word thus appears in Telemetry as

110010100000

To convert:

(1) Shift right double (i.e., so that the mantissa is entered into another register and saved) seven times entering 0's from the left. This

separates the characteristic and the mantissa, leaving the characteristic right justified and the mantissa left justified in two adjacent words.

(2) Shift right the mantissa once, entering "1" from the left. The mantissa is now 101000 . . . for the remainder of the computer word field.

(3) Shift right again, entering 0's from the left, the number of times indicated in the characteristic.

(4) Shift right again to right justify the 2-bit reconstructed field in the computer word. This number of shifts is the computer word length minus 24. The rate word is now in integer form.

(5) Add 1 to the shifted word, and the result is the binary equivalent, in 24 bits, of the total number of counts counted.

A.2.2 PHA Data Format

Each Pulse Height Analysis event is packed in a single 48 bit block as shown in Figure A-2. The block is uniquely identified as being PHA data by bit 48. The block contains three 12 bit amplitude words from either the High Energy Telescope (HET or E7A) or the Low Energy Telescope (LET or E7C) and appropriate tag bits specifying more information about the event. Each of the amplitude words is a binary digitization of the pulse amplitude from the corresponding detector. X12 is the MSB and X1 is the LSB. The bits are numbered in the order they appear in time and have the following significance:

Bit #	Description
48	Always a "0" for PHA data; always a "1" for rate data.
47	H/L bit indicates if PHA data is a HET event (H/L = 0) or a LET event (H/L = 1).

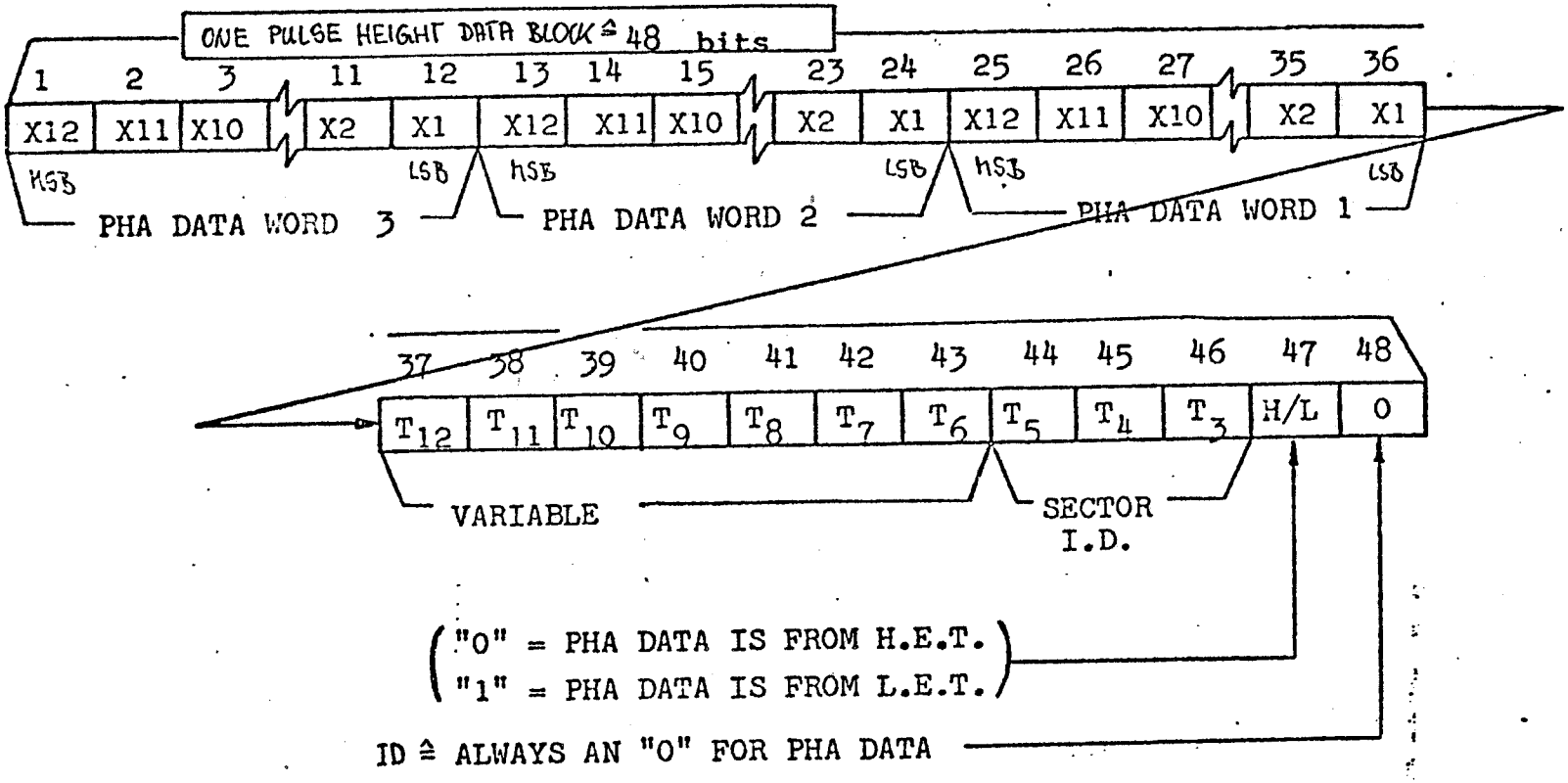


Figure A-2. Layout of One Pulse Height Data Block

Bit #	Description
44-46	T3, T4, and T5 are the sector tags. The orientation of the S/C at the time of each PHA is encoded in these bits (T8 is MSE) into octants (45 degree).
37-43	Depends on whether data is HET or LET. If HET, Tag bits T6 & T7 specify one of 4 possible coincidence conditions initiating the analysis. The detector pulse digitized in PHA word 1 from the A element of HET if T6 = 0, and is from the CIII e/event of HET if T6 = 1. Remaining bits not yet assigned.
25-36	PHA data word 1; 12 bits. If HET event, is amplitude of A or CIII (see T6). If LET event, is amplitude of DI
13-24	PHA data word 1; 12 bits. If HET event, is amplitude of B. If LET event, is amplitude of DII.
1-12	PHA data word 3; 12 bits. If HET event, is amplitude of (C1 + CII). If LET event, is amplitude of E.

Each amplitude word originates from a 12 bit counter which is reset to all "ones". A channel 1 event toggles each counter stage, producing a readout of all "zeros" for that word. A channel 2 event reads out as 1 (decimal), etc. Each amplitude word must be incremented by 1 in the ground computer to produce the correct amplitude.

The tag bit assignments for HET and LET PHA data blocks are as follows:

DATA CONTENTS

Tag Bit	HET (Bit 47 = 0)	LET (Bit 47 = 1)
T3	Sector ID (2^2)	Sector ID (2^2)
T4	Sector ID (2^1)	Sector ID (2^1)
T5	Sector ID (2^0)	Sector ID (2^0)
T6	Event Type Code (2^1)	Event Type Code
T7	Event Type Code (2^0)	Priority
T8	CII Range	B42
T9	Priority Rank Bit S1	A44
T10	Priority Rank Bit S2	A43
T11	γ Ray Mem. R/O Enable	A42
T12	γ Ray ID	γ Ray ID

Each PHA data word specifies the amplitude of the pulse in a specific detector as indicated below.

PHA Data Word	HET (E7a)	LET (E7c)
Word 1	A when H Tag T6 = 1 CIII when H Tag T6 = 0	DI
Word 2	B	DII
Word 3	CI + CII	E

The event type code (2 bits for HET, 1 bit for LET) specifies which of several coincidence conditions initiated the analysis. HET Tag T-6 is essentially an inverted CIII penetration indicator; when HT-6 = 0, the particle penetrated through the stack to CIII and the associated HET PHA Word 1 contains the amplitude of detector CIII. LET-Tag T-6 is also a penetration indicator, but includes amplitude requirements as well.

A.2.3 GRB Data Formats

The Helios A GRB addition transmits all data within the 48-bit blocks already assigned to E-7. GRB housekeeping (HK) data is present on a regular basis, and will occur in place of the first PHA block following a rate line #1 block for even numbered unsectored rate sequences (URS ID) only. There are four distinct types of GRB HK blocks. Memory dump data is present only after detection of a gamma ray burst, and will be transmitted in place of all PHA data following any GRB HK block and continuing until memory dump is complete (512 48-bit blocks).

The four types of GRB HK blocks are shown in Figure A-3a. These blocks are uniquely identified by Bits 48, 38 and 37 being zero. The type of HK data in each block is identified by Bits 43 and 44. The remaining data quantities are as follows:

- Bit 39, HK0. The A bit designates whether or not the A sensor is enabled as gamma ray burst detector. The A sensor corresponds to the TBD scintillator.
- Bit 39, HK1. The B bit serves the same function as the A bit, above, but corresponds to the TBD scintillator.
- Bit 39, HK2. The AUTO bit, when a "1", indicates that memory dump will occur automatically beginning with the first non-rate block to follow a GRB HK block. Automatic memory dump will occur only after completion of a memory load cycle (64 seconds) resulting from detection of a gamma ray burst. If AUTO-0, all data associated with a burst will remain in memory until completion of a memory dump initiated by ground command.
- Bit 39, HK3. The R01 bit = 1 indicates that memory dump will terminate after one complete readout cycle (512 48-bit blocks).

3.1 a HOUSEKEEPING DATA

HK TYPE	BIT NUMBER 1–12	13–24	25–36	37	38	39	40	41	42	43	44	45	46	47	48
0	RATE (SLOW)	RATE (MED)	RATE (FAST)	0	0	A	2^0	2^1	2^2	0	0	0	P	0	0
1	THRESHOLD(S)	THRESHOLD(M)	THRESHOLD(F)	0	0	B				1	0	0	P	0	0
2	PWR	CALENDAR TIME (35 BITS)		0	0	AUTO				0	1	0	P	0	0
3	ACCUM. A(18 BITS)	ACCUM. B(18 BITS)		0	0	ROI				1	1	0	P	0	0

γ-RAY ID
HK/MEM ID
MODE
TRIGGER COUNTER
HK TYPE ID
ANALOG DISCRIMINATOR BIT 43
PARITY
ANALOG DISCRIMINATOR BIT 44
γ-RAY/PHA ID ≡ 0
MEMORY ADDRESS
CALENDAR TIME

3.1 b MEMORY DATA

BIT NO.	1–12	13–24	25–36	37	38	39	40	41	42	43	44	45	46	47	48
	M(SLOW)	M (MED)	M(FAST)	0	1	2^2	2^3	2^4	2^5	2^6	2^7	2^8	P	T	0

Figure A-3. GRB Data Block

When R01-1, memory readout is repeated to provide a redundant dump to prevent loss of data.

- Bits 40-42. The trigger counter is a modulo-8 counter which is incremented each time a gamma ray burst is detected. It is never reset. This counter is used to indicate if a burst occurred during a time when the S/C was out of view of a ground station, and is used in conjunction with the AUTO mode to determine when a memory readout should be commanded.

- Bit 46. The parity bit is 1 = odd number of "1's" in the previous 48-bit GRB block. Parity appears in both HK and memory data and always corresponds to the previous GRB block, regardless of type (HK or M).

- Bits 1-36, HK0. These bits contain three 12-bit rate data words for one randomly chosen 4, 32, or 256 msec accumulation interval. Knowledge of these counts is used to help determine an appropriate reference threshold for detecting a gamma ray burst. The LSB is in Bits 1, 13 and 25 for the slow, medium and fast counters, respectively. Each counter data is only 11 bits (i.e. Bits 1-11, 13-23 and 25-35, respectively). The 12th bit in each field is either an overflow bit, or a trigger ID bit. Overflow is unambiguously indicated by a 1 in the 12th bit and all zeros in the preceding 11 bits. Trigger ID appears as a "1" when the present count exceeds the trigger threshold for that rate counter.

- Bits 1-36, HK1. These bits contain the three 12-bit command data words which establish the reference thresholds for detecting a gamma ray burst. The contents of each of the slow, medium and fast counters is compared with their respective threshold levels

and trigger a memory load cycle when any one of the thresholds is exceeded. The LSB of each word is in Bits 1, 13, and 25, respectively, and only the first 11 bits are used. The 12th bit in each 12-bit field is not used.

- Bit 1, HK2. The PWR bit is a status bit which indicates if power to E-7 has been interrupted since the previous memory readout. When E-7 is first turned on, this bit is set to a "1" and will readout a "1" until completion of the first memory dump. This bit is used to verify no interruption of power input which might affect the integrity of the internal 35-bit calendar counter. A long sequence of readings of the S/C clock and the GRB clock are necessary to obtain absolute calibration of the GRB clock.

- Bits 2-36, HK2. These bits represent the state of the 35-bit calender counter. Bit 2 is the LSB and has the weight 4.0 mSec. This time base is derived from the S/C OP CLOCK, scaled by 128. Bit 3 is the 9 mSec bit, etc., up to Bit 36, which has the weight 68, 719, 476.84 seconds, or about 795 days.

- Bits 1-18, HK3. These bits represent the number of events above threshold from the A detector since the last HK3 line. In contrast to the rate data in Line HK1, this data is over a significantly longer time base, is A counts only, and is not zero when A is disabled by command. LSB is in Location 1. MSB is in Location 18.

- Bits 19-36, HK3. These bits represent the same data from Detector B as described above for Detector A. LSB is Bit 19, MSB is Bit 36.

A.2.4 GRB Memory Data

The GRB addition contains 3 512 x 12 - bit memories for storing the count data accumulated during the 4, 32 and 256 mSec intervals. While searching for a

gamma ray burst, all count data is continuously being stored in locations 256-511, with the oldest data being replaced by newest data. Hence there are always 256 continuous data entries to provide a history of the last 64 seconds. When any one of the 3 thresholds is exceeded, a gamma-ray burst is detected and a "1" appears in the 12th bit of that rate data and the trigger counter is incremented by one. The data that caused the trigger is stored with the precursor data somewhere in the upper half of memory. Immediately, the state of the calendar counter is entered into address 0. The 255 succeeding count data are stored in their respective memory locations; thus filling the lower half of memory. No further memory entries are allowed until completion of memory readout, which in AUTO mode begins with the first 48-bit PHA data block following the next HK line. GRB memory data takes the place of all PHA data until completion of readout. When AUTO is disabled, memory readout may be initiated by ground command.

The data format for memory data is shown in Figure A-3b and contains the following information:

- 3.1.1 Bits 1-12. These bits contain the 11 bits of data from the slow (256 mSec interval) counter. Bit 1 is LSB. The 12th bit is either an overflow bit (in which case the 11 data bits are all zero), or a trigger indicator denoting that the count in Bits 1-11 exceeded the threshold for that counter. This is identical to the Rate Data in Line HK0.

NOTE: The first memory readout block only uses Bits 1-36 for PWR and calender time of a gamma ray event in the same format as used in Line HK2.

- Bits 13-24. Identical to the above, but corresponds to the medium (32 mSec) counter. LSB is Bit 13, MSB is Bit 23, and overflow/trigger is Bit 24.

- Bits 25-36. Identical to the above, but corresponds to the fast (4 mSec) counter. LSB is Bit 25, MSB is Bit 35, and overflow/ trigger is Bit 36.

- Bits 37, 38. These are ID bits and always have the values 0,1 for memory data.

- Bits 39-45. These bits form part of the current address from which memory data is being read out. The 2^0 and 2^1 bits are missing, so the address increments every fourth memory block.

- Bit 46. This is the parity check bit and has the same function as in HK blocks.

- Bit 47. This bit provides a one-bit-at-a-time repetition of the 36-bit calendar time field that is transmitted in the first memory block. The first block thus contains Bit 1 of the 36-bit field, or PWR. The next block contains the 4 mSec-weighted calendar bit, etc. This process continues throughout the entire 512 (or 1024) block readout cycle, and hence repeats the 36-bit field 14 times. In the event the first memory block is lost, reconstruction of the event time is possible using this bit in conjunction with the readout address.

APPENDIX B - ORBIT/ATTITUDE TAPE DESCRIPTION

This appendix describes the format of the orbit/attitude (ORB/ATT) tape received from IPD.

The general format consists of a label record followed by one or more records of orbit/attitude data.

- The label record described in Figure B-1 consists of 78 characters written in IBM BCD tape format, odd parity.
- The ORB/ATT parameters for HELIOS are shown as items 1-162 on Figure B-2.
- These parameters appear on the ORB/ATT tape in the same order as they are in the tables.
- Each item in the data record is a UNIVAC 1108 double precision word (72 bits).
- The ORB/ATT tape will be written on seven (7) track, 800 BPI magnetic tape.
- An ORB/ATT data record = 162 double precision words.
- Each record contains data for one point. The distance between two time points is:
    - 6 minutes for a distance of Earth-Helios less than one million kilometers and,
    - 60 minutes for distance more than one million kilometers.

This label will preceed all files on the ORB/ATT EDR. The label will consist of 78 characters.

Labels will be written in IBM BCD tape format, odd parity.

1 - 7 + Space	International Code
9 - 11	Tape Type (ORB)
12 - 23	Spaces
24 - 25 + Space	Year of Recording (last 2 digits)
27 - 29 + Space	File Start Time (DAY)
31 - 36 + Space	File Start Time (HHMMSS)
38 - 40 + Space	File Stop Time (DAY)
42 - 47 + Space	File Stop Time (HHMMSS)
49 - 52 + Space	O/A Master Data Tape Number
54 - 55 + Space	O/A Master Data Tape File Number
57 - 62 + Space	Date O/A EDR generated
64 - 66 + Space	O/A EDR Run Number
68 - 69 + Space	O/A EDR File Number
71 - 72 + Space	O/A EDR Reel Number
74 - 76	Experimenter ID
77 - 78	Spares

Figure B-1. Helios A/B Orbit/Attitude Label Format

Time Block

1. Julian date, ephemeris time
2. Time in seconds past January 1, 1950, ephemeris time
3. Year
4. Month
5. Day
6. Hour
7. Minutes

(3–7) of Gregorian calendar date

8. Seconds
9. Time from launch in seconds
10. ET - UTC, in seconds
11. ΔT (Time difference between Orbit and Attitude calculations)
12. Status switch — 0 = both Orbit & Attitude data present; 1 = Orbit data only; 2 = Attitude data only
13. Spare

Heliocentric Block

14. x
15. y
16. z

(14–16) Position coordinates of Helios in A. U.

17. U_x
18. U_y
19. U_z

(17–19) Velocity coordinates of Helios in A. U./DAY

20. - 25. Same as above for Mercury
26. - 31. Same as above for Venus
32. - 37. Same as above for Earth
38. - 43. Same as above for Mars

(20–43) Mean ecliptic and equinox of 1950 July 1, 0 hours.

Figure B-2. Helios A/B Orbit/Attitude Data Record Format (1 of 5)

Heliocentric Block cont'd

44. - 49. Same as above for Jupiter
50. - 55. Same as above for Moon

} Mean ecliptic equinox of 1950, July 1, 0 hrs.

56. Ecliptical longitude, counted from Mean Equinox
57. Ecliptical longitude, counted from Earth-Sun line
58. Ecliptical latitude of
59. Distance in A. U. of Sun -

} Helios

60. - 63. Same as above for Mercury
64. - 67. Same as above for Venus
68. - 71. Same as above for Earth
72. - 75. Same as above for Mars
76. - 79. Same as above for Jupiter
80. - 83. Same as above for Moon

84. Radial velocity
85. Normal velocity

} of Helios in A. U./ DAY.

86. Heliographic Longitude of Helios, counted from the Ascending Node
87. Heliographic latitude of Helios

Number of rotations of the Sun,

88. referred to the Earth
89. referred to Helios

} at 16° heliographic latitude since launch

Geocentric Block

90. Right Ascension of
91. Declination of
92. Distance in A. U. of Earth

} Helios

93. - 95. Same as above for the Moon
96. - 98. Same as above for the Sun

} True Earth Equator and Equinox of date

Figure B-2. Helios A/B Orbit/Attitude Data Record Format (2 of 5)

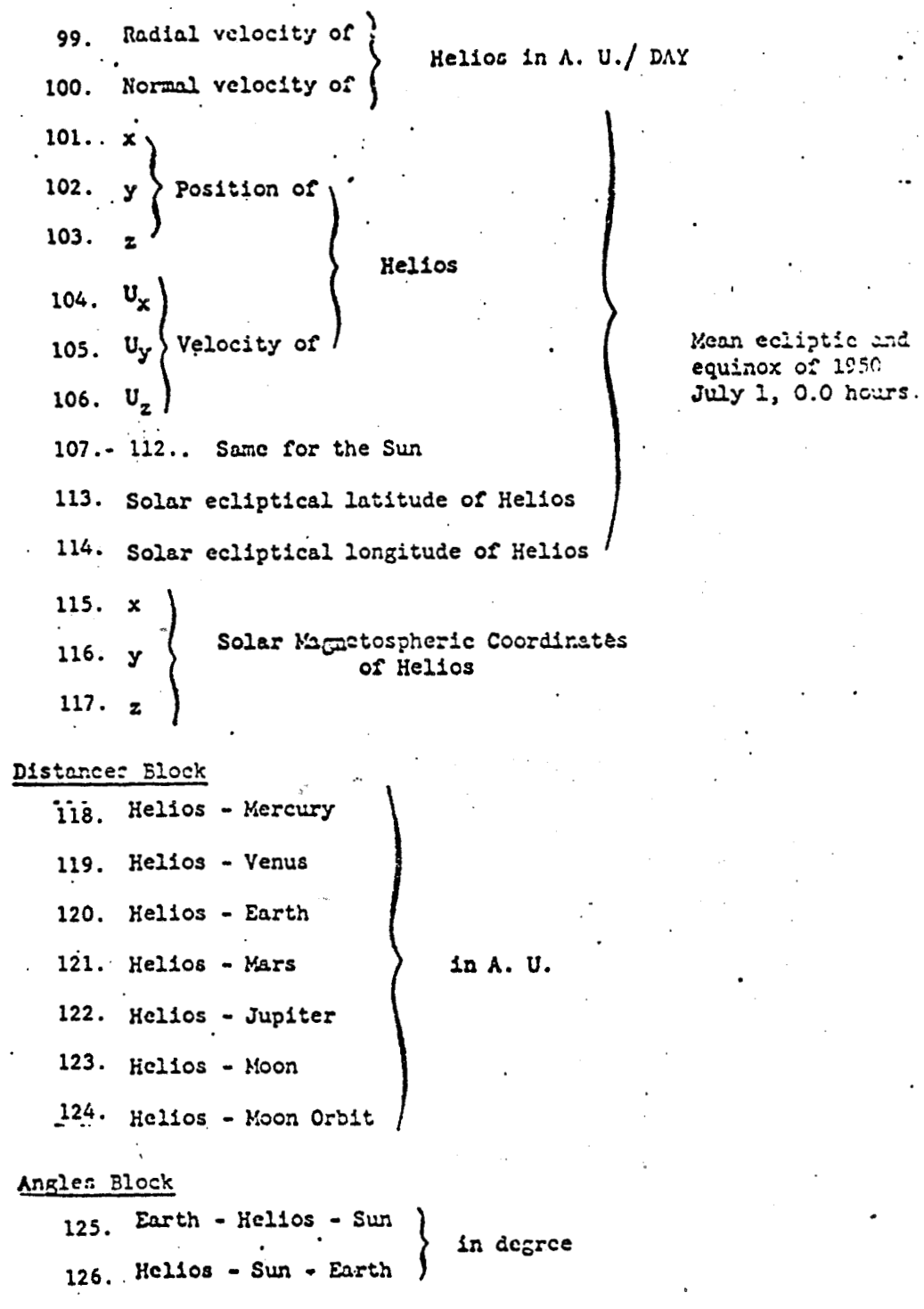


Figure B-2. Helios A/B Orbit/Attitude Data Record Format (3 of 5)

Angles Block (cont'd)

127.	Sun - Earth - HELIOS	In Degrees
128.	HELIOS - Earth - Moon	
129.	Ecliptic Plane - (Earth - Helios) Line	
130.	Right Ascension of Orbit Pole	
131.	Declination of Orbit Pole	

Attitude Block

132.	Flag for Blackout
133.	Solar Aspect Angle
134.	3-Sigma Value of the Solar Aspect Angle
135.	Pitch Angle
136.	3-Sigma Value of the Pitch Angle
137.	Angle Between Z-Axis and Orbit-Plane
138.	Mercury Aspect Angle (Angle between Z-Axis and HELIOS - Mercury Line)
139.	Venus Aspect Angle
140.	Mean Spin Rate
141.	Ecliptical Longitude of S/C - Spin Axis
142.	Ecliptical Longitude of S/C - Spin Axis Counted from Earth - Sun Line
143.	Ecliptical Latitude of S/C - Spin Axis

Figure B-2. Helios A/B Orbit/Attitude Data Record Format (4 of 5)

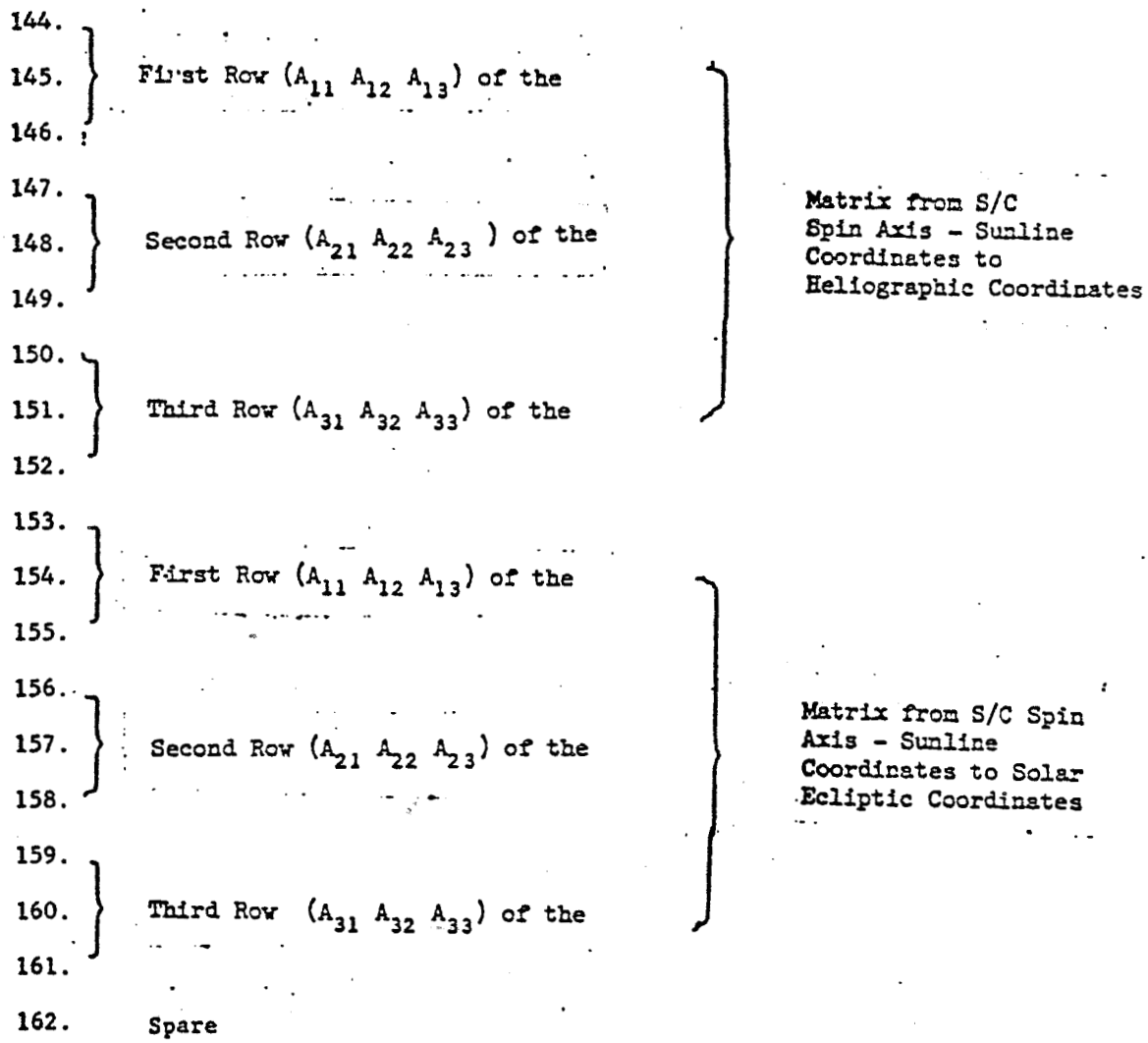


Figure B-2. Helios A/B Orbit/Attitude Data Record Format (5 of 5)

APPENDIX C - PHA TAPE LOGICAL RECORD FORMAT

This appendix describes the logical record format for the PHA tape produced by HELDRP. Also included is a description of the PHA tape subcom data for formats 1, 2, and 3 (Table 1), a description of the PHA tape subcom data for format 5 (Table 2), and a description of the PHA readout structure (Table 3).

PHA Tape Logical Record Format

Displacement	Type	Description
ø	I*4	Time of day (MS) for first page contained in record
4	I*4	Time of day (MS) for page which is expected to immediately follow the last page in this record
8	I*2	Day (RMJD) for first page contained in record
1ø	I*2	Day (RMJD) for page which is expected to immediately follow the last page in this record
12	I*4	Round Trip Light Time (MS)
16	I*4	Spacecraft Clock
2ø	I*2	Absolute File Number
22	I*2	Time Correction Flag
24	I*2	Ratio of PHA blocks to RATES blocks
26	I*2	Bit Rate (8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096)
28	I*2	Format (1, 2, 3, 5)
3ø	I*2	Frame Counter Correction
32	I*2	Data Type
34	I*2	Data Quality
36		All the subcom data associated with the first page of data contained in the record. Refer to Tables 1 and 2 for a description of the subcom data for the two format groups.
84 (128)	I*4	All the rates data associated with the first page of data contained in PHA record. The rates data associated with each page appear in eight consecutive words, as follows:

Displacement	Type	Description
		(1) HET RATE R1 - (A2K1 + A1C1)B CIII
		(2) HET RATE R1 - (A2K1 + A1C1)B CIII
		(3) HET RATE R2A - A1 $\overline{A2}$ B CIII
		(4) HET RATE R2B - A1 BK2 $\overline{CIII}$
		(5) HET RATE R3A - A2 B CII
		(6) LET RATE R11A - DI DII $\overline{F}$
		(7) LET RATE R11B - DI DII Σ D $\overline{F}$
		(8) Computed HET RATE R1 = (R6B + R7A + R7B + R8A + R8B)
		All rates which fail the trend check will be indicated by a negative rate value. Whenever a rate with a value of zero fails the trend check, it will be set to the value -21000000. Padded rates will be indicated by the value -20000000.
	I*2	All the PHA data associated with the first page of data contained in the PHA record. Each PHA entry, comprised of a HET and LET event, has a unique time associated with it and appears in three consecutive words, as follows:
		0(MSB).....31(LSB)
		(1) HET - 1 HET - 2
		(2) HET - 3 LET - 1
		(3) LET - 2 LET - 3
		Padded/missing PHA data is indicated by a negative one in the PHA entry. There is a varying number of PHA readouts per page depending upon the PHA/RATE block ratio: At a ratio of 5:1, there are 160 PHA readouts; at 3:1, there are 96 PHA readouts; and at 1:1, there are 32 PHA readouts. (See Table 3 for the structure of a PHA readout.)

PHA Tape Logical Record Format (continued)

Displacement	Type	Description
$D_2 (D_2^1)$		All the subcom Rates, and PHA data for the second page of data contained in the record
$D_3 (D_3^1)$		All the subcom, Rates, and PHA data for the third page of data contained in the record
$D_4 (D_4^1)$		All the subcom, Rates, and PHA data for the fourth page of data contained in the record

Note: The first displacement is for data transmitted in formats 1,2, or 3. The second displacement is for data transmitted in format 5. Actual displacement for pages C-2 - C-4 are dependent upon bit rate and the PHA/RATES block ratio.

Table 1. PHA Tape

(Subcom data for format group 1 - formats 1, 2, 3)

Displacement	Type	Description
ø	I*2	Spin Rate (in RPM)
2	I*2	HET (E7A) temperature
4	I*2	VLET1 (E7B1) temperature
6	I*2	VLET2 (E7B2) temperature
8	I*2	LET (E7C) temperature
1ø	I*2	detector mounting plate temp.
12	I*2	X-Ray detector temperature
14	I*2	thermal blanket support plate 1 temp.
16	I*2	thermal blanket support plate 2 temp.
18	I*2	electronics temperature
2ø	I*2	base plate temperature
22	I*2	+12 v monitor
24	I*2	+6 v digital monitor
26	I*2	+6 v analog monitor
28	I*2	+7.75 v monitor
3ø	I*2	+4.7 v monitor
32	I*2	base plate temperature (front)
34	I*2	Power status (1=on, ø=off)
36	L*1	X-Ray Window Clock
37	L*1	X-Ray Window Data
38	L*1	Internal Calibrator A
39	L*1	Internal Calibrator B
4ø	L*1	X-Ray high voltage
41	L*1	Sector synchronizer
42	L*1	Force blackout mode
43	L*1	X-Ray sector data mode
44	I*2	X-Ray command reg.
46	I*2	X-Ray XEQ. reg.

(12 words)

Table 2. PHA Tape

(Subcom Data for format group 2 - format 5)

Displacement	Type	Description
0 - 43	same as 0 - 43, Table 1,	for sequence 1
44 - 87	same as 0 - 43, Table 1,	for sequence 2
88 - 91	same as 44 - 47, Table 1	
(23 words)		

Table 3. Helios PHA Events

Halfword 1	METTAAAAAAAAAAA
Halfword 2	BBBBBBBBBBBCCCC
Halfword 3	CCCCCCCCRSSSQPPN

Where:

M = 0, data is good

= 1, data is missing 1 padded

E = 0, LET event

= 1, HET event

TT = 00, A1$\overline{A2}$BCIII (HET)/DIDII Σ D $\overline{F}$ (LET)

= 01, A2BCIII (HET)/DIDII $\overline{F}$ (LET)

= 10, (A2K1 + A1CI) B$\overline{CIII}$ (HET)/(No LET)

= 11, A1BK2$\overline{CIII}$ (HET)/(No LET)

R = 0, CII threshhold not exceeded
= 1, CII threshhold is exceeded
} HET only

SSS = 0-7, sectors 0-7, respectively

Q = 0, PHA word 1 is the A amplitude
= 1, PHA word 1 is the CIII amplitude
} HET only

PP = 0-3 priorities (HET)/0-1 priorities (LET)

N = 0, good event

= 1, null event

APPENDIX D - RATES TAPE LOGICAL RECORD FORMAT

The logical record format of the RATES tape produced by HELDRP is presented on pages D-2 and D-3. The RATES tape subcom data for format group 1 (formats 1, 2 and 3) are defined in Table 1 (page D-4 and D-5). The RATES tape subcom data for format group 2 (format 5) are defined in Table 2(page D-6). Finally, the RATES data - RATE sequence identification correlation is presented in Table 3 (pages D-7 through D-11).

RATES Tape Logical Record Format

Displacement (See Note)	Type	Description
ø	I*4	Time of day (MS) for first page contained in record
4	I*4	Time of day (MS) for page which is expected to immediately follow the last page in this record
8	I*2	Day (RMJD) for first page contained in record
1ø	I*2	Day (RMJD) for page which is expected to immediately follow the last page in this record
12	I*4	Round Trip Light Time
16	I*4	Spacecraft Clock
2ø	I*2	Absolute File Number
22	I*2	Time Correction Flag
24	I*2	Ratio of PHA blocks to RATES blocks
26	I*2	Bit Rate (8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096)
28	I*2	Format (1, 2, 3, 5)
3ø	I*2	Frame Counter Correction
32	I*2	Data Type
34	I*2	Data Quality
36		All the subcom data associated with the first page of data contained in the record. Refer to Tables 1 and 2 for a description of the subcom data for the two format groups.
92/136	I*4	All the rates data associated with the first page of data contained in record. Each page consists of 4 sets (2 sectored and 2 unsectored) of 32 and 20 rates respectively, which are uniquely identified by the corresponding rate sequence ID's appearing in the associated set of subcom data. The rates data associated with each page appears in 104 consecutive words, as follows: 1 - Sectored Rate (First Set) • • •

RATES Tape Logical Record Format (continued)

Displacement (See Note)	Type	Description
		32 - Sectored Rate (First Set) 33 - Unsectored Rate (First Set) • • • 52 - Unsectored Rate (First Set) 53 - Sectored Rate (Second Set) • • • 84 - Sectored Rate (Second Set) 85 - Unsectored Rate (Second Set) • • • 1Ø4 - Unsectored Rate (Second Set) Refer to Table 3 to determine the rates data associated with each unsectored and sectored rate sequence ID.
564/652		All the subcom and Rates data for the second page of data contained in the record.
1036/1168		All the subcom and Rates data for the third page of data contained in the record.
1508/1684		All the subcom and Rates data for the fourth page of data contained in the record.

Note: The first displacement is for data transmitted in formats 1, 2, or 3. The second displacement is for data transmitted in format 5.

Table 1. RATES Tape Subcom Data

(Subcom data for format group 1 - formats 1, 2, 3)

Displacement	Type	Description
ø	I*2	Spin Rate (in RPM)
2	I*2	HET (E7A) temperature
4	I*2	VLET1 (E7B1) temperature
6	I*2	VLET2 (E7B2) temperature
8	I*2	LET (E7C) temperature
1ø	I*2	detector mounting plate temp.
12	I*2	X-Ray detector temperature
14	I*2	thermal blanket support plate 1 temp.
16	I*2	thermal blanket support plate 2 temp.
18	I*2	electronics temperature
2ø	I*2	base plate temperature
22	I*2	+12 v monitor
24	I*2	+6 v digital monitor
26	I*2	+6 v analog monitor
28	I*2	+7.75 v monitor
3ø	I*2	+4.7 v monitor
32	I*2	base plate temperature (front)
34	I*2	Power status (1=on, ø=off)
36	L*1	X-Ray Window Clock
37	L*1	X-Ray Window Data
38	L*1	Internal Calibrator A
39	L*1	Internal Calibrator B
4ø	L*1	X-Ray high voltage
41	L*1	Sector synchronizer
42	L*1	Force blackout mode
43	L*1	X-Ray sector data mode
44	I*2	X-Ray command reg.
46	I*2	X-Ray XEQ. reg.
48	I*2	Unsectored Rate Sequence ID (First Set)

Table 1. (continued)

Displacement	Type	Description
50	I*2	Sectored Rate Sequence ID (First Set)
52	I*2	Unsectored Rate Sequence ID (Second Set)
54	I*2	Sectored Rate Sequence ID (Second Set)

----Total: 14-32 bit words

Table 2. RATES Tape

(Subcom data for format group 2 - format 5)

Displacement	Type	Description
ø - 43	(same as Table 1)	(same as Table 1)
44 - 87	(same as ø - 43)	(same as ø - 43)
88 - 99	(same as 44-54 in Table 1)	(same as 44-54 in Table 1)
(25 words)		

Table 3. RATE Sequence ID

Unsectored	Sectored	Rate (See Note)
N/A	Ø	SR1A $A_1\overline{A}_2$BCI $\overline{\text{CIII}}$
		SR2A SI_5 $\overline{\text{SII}}$ $\overline{\text{SII}_a}$ $\overline{\text{SIII}}$
		SR3A SI_5 $\overline{\text{SII}}$ $\overline{\text{SII}_a}$ $\overline{\text{SIII}}$
		SXRY Sectored X-Ray
Ø	N/A	R1 - $(A_2K_1 + A_1CI)$ $B\overline{CIII}$
		R2A - $A_1\overline{A}_2$BCIII
		R3A - A_2BCIII
		R4A - A_2BK_2CI $\overline{\text{CII}}$
		R5A - A_2BK_2CI CII $\overline{\text{CIII}}$
		R6A - $A_1\overline{A}_2B\overline{CI}$
		R7A - $A_1\overline{A}_2$BCI CII $\overline{\text{CIII}}$
		R8A - A_2BK_1CI $\overline{\text{CII}}$
		R9A - SI SII SII_a SIII
		R1ØA - DI_1
		R11A - DI DII $\overline{F}$
		R12A - DI DII E_1 $\overline{F}$
		R13A - DI DII E_2 $\overline{F}$
		R14A - DI
		R15A - SI_1 $\overline{\text{SII}}$ $\overline{\text{SII}_a}$ $\overline{\text{SIII}}$
		R16A - SI SII $\overline{\text{SII}_a}$ $\overline{\text{SIII}}$
		R17A - SI (VLET1)
		R18A - SI_1 $\overline{\text{SII}}$ $\overline{\text{SII}_a}$ $\overline{\text{SIII}}$
		R19A - SI SII_1 $\overline{\text{SII}_a}$ $\overline{\text{SIII}}$
		R2Ø - USXR

Table 3. (continued)

Unsectored	Sectored	Rate (See Note)
N/A	1	SR1B - A_2 BK_1 $\overline{CIII}$
		SR2B - SI_6 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		SR3B - SI_6 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		SXRY - Sectored X-Ray
1	N/A	R1
		R2B - A_1 BK_2 $\overline{CIII}$
		R3B - A_2 BK_2 $\overline{CI}$
		R4B - A_1
		R5B - A_2
		R6B - A_1 $\overline{A}_2$ BCI $\overline{CII}$
		R7B - A_2 BK_1 $\overline{CI}$
		R8B - A_2 BK_1 CI CII $\overline{CIII}$
		R9B - SI SII SII_a SIII
		R1ØB - DI_2
		R11B - DI DII Σ D $\overline{F}$
		R12B - DI DII Σ DE_3 $\overline{F}$
		R13B - DI DII Σ DE_4 $\overline{F}$
		R14B - DII
		R15B - SI_2 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		R16B - SI SII_2 $\overline{SII_a}$ $\overline{SIII}$
		R17B - SII (VLET 1)
		R18B - SI_2 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		R19B - SI SII_2 $\overline{SII_a}$ $\overline{SIII}$
		R2Ø

Table 3. (continued)

Unsectored	Sectored	Rate (See Note)
N/A	2	SR1C - DI DII $\overline{F}$
		SR2C - SI_7 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		SR3C - SI_7 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		SXRY - Sectored X-Ray
2	N/A	R1
		R2A - R9A
		R1ØC - DI_3
		R11A - R13A
		R14C - E_1
		R15C - SI_3 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		R16C - SI SII_3 $\overline{SII_a}$ $\overline{SIII}$
		R17C - SII_a (VLET 1)
		R18C - SI_3 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		R19C - SI SII_3 $\overline{SII_a}$ $\overline{SIII}$
		R2Ø
N/A	3	SR1D - DI DII E_1 F
		SR2D - SI_8 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		SR3D - SI_8 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$
		SXRY - Sectored X-Ray
3	N/A	R1
		R2B - R9B
		R1ØD - DI_4
		R11B - R13B
		R14D - F
		R15D - SI_4 $\overline{SII}$ $\overline{SII_a}$ $\overline{SIII}$

Table 3. (continued)

Unsectored	Sectored	Rate (See Note)
		R16D - SI SII_4 $\overline{SII}_a$ $\overline{SIII}$
		R17D - SIII (VLET 1)
		R18D - SI_4 $\overline{SII}$ $\overline{SII}_a$ $\overline{SIII}$
		R19D - SI SII_4 $\overline{SII}_a$ $\overline{SIII}$
		R2Ø
N/A	4	SR1A
		SR2E - $\overline{SI}$ SII_5 $\overline{SII}_a$ $\overline{SIII}$
		SR3E - $\overline{SI}$ SII_5 $\overline{SII}_a$ $\overline{SIII}$
		SXRY - Sectored X-Ray
4	N/A	R1
		R2A - R9A
		R1ØE - DI_5
		R11A - R13A
		R14E - B
		R15A - R16A
		R17E - SI (VLET 2)
		R18A - R19A
		R2Ø
N/A	5	SR1B
		SR2F - $\overline{SI}$ SII_6 $\overline{SII}_a$ $\overline{SIII}$
		SR3F - $\overline{SI}$ SII_6 $\overline{SII}_a$ $\overline{SIII}$
		SXRY - Sectored X-Ray
5	N/A	R1
		R2B - R9B
		R1ØF - DI_6
		R11B - R13B
		R14F - CI

Note: Sectored Rates apply to Sectors 1 through 8 inclusive.

Table 3. (continued)

Unsectored	Sectored	Rate (See Note)
		R15B - R16 B
		R17F - SII (VLET 2)
		R18B - R19B
		R2Ø
N/A	6	SR1C
		SR2G - $\overline{SI}$ SII_7 $\overline{SII}_a$ $\overline{SIII}$
		SR3G - $\overline{SI}$ SII_7 $\overline{SII}_a$ $\overline{SIII}$
		SXRY - Sectored X-Ray
6	N/A	R1
		R2A - R9A
		R1ØG - DI_7
		R11A - R13A
		R14G - CII
		R15C - R16C
		R17G - SII_a (VLET 2)
		R18C - R19C
		R2Ø
N/A	7	SR1D
		SR2H - $\overline{SI}$ SII_8 $\overline{SII}_a$ $\overline{SIII}$
		SR3H - $\overline{SI}$ SII_8 $\overline{SII}_a$ $\overline{SIII}$
		SXRY - Sectored X-Ray
7	N/A	R1
		R2B - R9B
		R1ØH - DI_8
		R11B - R13B
		R14H - CIII
		R15D - R16D
		R17H - SIII (VLET 2)
		R18D - R19D
		R2Ø

APPENDIX E - DATA SET INDEX

INDEX describes CATLOG for LIBGEN processing. The number of records and last record written into the catalog, the last LIB written, and the EDR tapes to be compressed are written and read by LIBGEN.

There is one record, 7292 bytes, 1823 words.

Word	Byte	Type	Name	Description
1	1	L*1	SATID	Satellite ID
2		I*4	MAXREC	Maximum number of records in CATLOG
3		I*4	OFFSET	Record offset of region two in CATLOG
4		I*4	LOCIN	Maximum EDR tapes allowed
5		I*4	LOCOUT	Maximum LIB tapes allowed
6		I*4	NEXTREC	Displacement in region two of first available blank record
7		I*4	OUTSER	Serial number of last LIB tape
8		I*4	OUTSEQ	File number of last LIB
9		R*4	FEETOUT	Number of feet used on LIB tape
10		I*4	INSERA	LAST EDR serial number
11		I*4	INSEQA	LAST file number on EDR
14		I*4	LINSER	Not used
15		I*4	LINSEQ	Not used
51	1-2	I*2	OUTPTR	Start EDR serial number on 1st LIB
	3-4	I*2		Start EDR file number on 1st LIB
52	1-2	I*2		Start EDR serial number on 2nd LIB
.	3-4	I*2		Start EDR file number on 2nd LIB

Word	Byte	Type	Name	Description
.	.	.		.
.	.	.		.
.	.	.		.
1051	1	L*1	INFLAGS	Disposition of 1st EDR 11 = allocated 01 = added to library 03 = I/O error
	2	L*1	INFLAGS	Disposition of 2nd EDR
.	.			.
.	.			.
.	.			.

APPENDIX F - DATA SET CATLOG

CATLOG contains information on each EDR compressed onto a LIB tape. The CATLOG is used by GETLIB to locate the correct file on the LIB tape given the serial number and file number of the EDR tape. There are 2250 records divided into two regions. Region one contains the first 6 files for every EDR, one EDR per record. Region two contains the overflow files from each EDR. Each file on a LIB tape has a DSN composed of the serial number and file number of the EDR tape. GETLIB uses CATLOG to construct the DSN as well as locate the LIB tape and file.

The record number corresponds to the EDR serial number. The single record format is as follows:

Word	Byte	Type	Name	Description
1	1-2	I*2	NXTREC	Displacement in record numbers from OFFSET to next record with file history for the EDR serial number given by the record in region one. A displacement of zero means there are no more than six remaining files on that particular EDR
	3-4	I*2	-	Number of files described by record
2	1-2	I*2	FOUTSER	LIB serial number of 1st file of EDR
	3-4	I*2	FOUTSEQ	LIB file number of 1st file of EDR
3	1-2	I*2	FINSERF	Serial number of next EDR file
	3-4	I*2	FINSEQF	File number of next EDR file
4	1-2	I*2	FMTAPE	Serial number of master tape
	3	L*1	FMFILE	File number of master tape
	4	L*1	FSHOUR	Hour of start time of 1st file

Word	Byte	Length	Name	Description
5	1	L*1	FSMIN	Minute of start time of 1st file
	2	L*1	FSSEC	Second of start time of 1st file
	3	L*1	FEHOUR	Hour of end time of 1st file
	4	L*1	FEMIN	Minute of end time of 1st file
6	1	L*1	FESEC	Second of end time of 1st file
	2	L*1	FYEAR	Year of 1st file
	3-4	I*2	FSDAY	Day of start time of 1st file
7	1-2	I*2	FEDAY	Day of end time of 1st file
	3-4	I*2	FBITRATE	Bit rate of 1st file
	1	L*1	FFORMAT	Data format
8	2	L*1	FIOERR	Number of records skipped
	3-4	I*2	OUTSER	LIB serial number of 2nd file of EDR
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
40	1-2	I*2	.	Bit rate of 6th file
			.	
			.	

APPENDIX G - DATA SET DRSLOG

The DRSLOG keeps track of the history of each file processed by HELDRP. The absolute file number, times, record count and quality. DRSLOG has 17 tracks and each track has 1823 4-byte words which contain the last file number and the history of 182 files. Each file is on one "line"; there are 182 lines per track.

The single track format is as follows:

Word	Byte	Length	Name	Description
1		I*4	NUMOLD	Number of last line in track
2		I*4	LOGOLD(1)	Milliseconds of start of file of line 1
3		I*4	LOGOLD(2)	Milliseconds of end of file of line 1
4	1-2	I*2		Absolute file number of line 1
	3-4	I*2		Modified Julian day of start of file of line 1
5	1-2	I*2		Modified Julian day of end of file of line 1
	3-4	I*2		EDR number of line 1
6	1-2	I*2		Modified Julian day EDR was generated
	3-4	I*2		Modified Julian day EDR was processed
7		I*4		Total number of records of lines 1
8		I*4		Number of good records of line 1
9	1-2	I*2		Highest quality of line 1
	3-4	I*2		Lowest quality of line 1

Word	Byte	Length	Name	Description
10	1 bit 1			PHA processed flag (MSB) of line 1
	1 bit 2			RATES processed flag of line 1
11		I*4		Spare
12		I*4		Milliseconds of start of file of line 2
.	.	.		.
.	.	.		.
1812		I*4	LOGOLD (1811)	Milliseconds of start of file of line 182
.	.	.		.
.	.	.		.
1821			LOGOLD (1820)	Rates processed flag of line 182

APPENDIX H - DESCRIPTION OF DATA SETS DRSCTP, DRSCT1, DRSCT2, DRSCT3, and DRSCT4

Data set DRSCTP is used to point to the current catalog, DRSCT1, 2, 3 or 4. The number is incremented by one each time HELDRP is run. DRSCTP is maintained under the title M2.SDHEL.SD002.HADRSCTP for Helios A; DRSCT1-4 has a similar name. Helios B substitutes B for A in the titles. The format for DRSCTP is as follows:

Word	Byte	Name	Description
1	1	LSTCAT	Number of last catalog (DRSCT1-4) used
2-20	2	IDTAP	Satellite ID unused

The format for any of the DRSCT X (X=1, 2, 3, 4) data sets is the same as the common area DRSTAP, presented below.

Word	Name	Type	Description
1	IDSAT	I*4	Satellite ID
2	HPHATP	I*4	Number of PHA tapes in the catalog
	HRATTP	I*2	Number of RATES tapes in the catalog
3-202	DPHATP	R*8	Array of PHA tape volume numbers
203-302	MSPHAS	I*4	Array of start ms of each PHA tape
303-402	MSPHAE	I*4	Array of end ms of each PHA tape
403-452	HDPHAS	I*2	Array of start days of each PHA tape
453-502	HDPHAE	I*2	Array of end days of each PHA tape
503-552	HPHAFT	I*2	Array of feet written on each PHA tape

Word	Name	Type	Description
553-752	DRATTP	R*8	Array of Rates tape volume serial numbers
753-852	MSRATS	I*4	Array of start ms of each RATES tape
853-952	MSRATE	I*4	Array of end ms of each RATES tape
953-1002	HDRATS	I*2	Array of start days of each RATES tape
1003-1052	HDRATE	I*2	Array of end days of each RATES tape
1053-1102	HRATFT	I*2	Array of feet written on each RATES tape
1103-1202	DBLNKP	R*8	Array of blank PHA tape volume numbers
1203-1302	DBLNKR	R*8	Array of blank RATES tape volume numbers
1303-1310	DCATLG	R*8	Array of catalog back up tapes
1311	HPHABK	I*2	Number of PHA tapes
	HRATBK	I*2	Number of RATES tapes
1312	LSTAFN	I*4	Last absolute file written by HELDRP
1313	LSTLOG	I*4	Last track on DRSLOG
1315-1366			Not used
1367-1368	DPHAS	R*8	Volume of first PHA tape
1369-1370	DPHAE	R*8	Volume of last PHA tape
1371-1372	DRATS	R*8	Volume of first RATES tape
1373-1374	DRATE	R*8	Volume of last RATE tape
1375-1385			Not used

APPENDIX I - HELIOS COMMAND TAPE LISTING

Figure I-1 presents an example of the Command Tape listing provided to each United States Experimenter for HELIOS. The items in the example are described as follows:

(1.) This item provides information on the tape from which the commands were extracted

(2.) The time of transmission of the first bit of the command from the station.

(3.) The command number in octal

(4.) Alpha characters describing the command

(5.) S/C receipt time of first command bit.

(6.) Station sending the command

(7.) Resolution of the command (confirmed, aborted, or undetermined).

HELIOS A
COMMANDS

	SAT ID	TAPE REEL N	START TIME HH MM SS	DAY	YY	REC SIZE	BLOCK SIZE	NETWORK	MDR T NUM	MDR FILE	MDR MM	DATE DD	YY
(1)	HEACMD	000467	10 31 45	304	74	144	144	GCC	00001	02	02	22	74

(2) TRANSMIT HH MM SS	(3) OCT CMD	(4) COMMAND DESCRIPTION	(5) S/C RECD HH MM SS	(6) DSS TCP	(7) RESOLUTION
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED
10 31 45	301	XXXXXXXX	10 31 53	68A	CONFIRMED

Figure I-1. Sample Command Tape Listing

REFERENCES

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2. Computer Sciences Corporation, Helios A/B User's Guide (informal working draft), August 1978

3. Computer Sciences Corporation, Helios A/B Library Generator (LIBGEN) Program Maintenance Programmer's Introduction (working paper), E. Ronish, R. Cuddapah, September 1978

4. Computer Sciences Corporation, Pioneer/Helios Flux Data Base Generator (FLXDBG) Program Maintenance Programmer's Introduction (working paper), E. Ronish, R. Cuddapah, September 1978

NAME	PAGE	RECORDS	T T R C	USER INFORMATION (HEX)
ADDFRM	1	75	00000A00	
BCMODE	2	38	00010300	
BCMODEAC	3	38	00020100	
BTMNP	4	74	00020300	
CNVMJD	5	107	00030300	
CCMMON	7	539	00430100	
CONTIM	14	104	00050100	
COPPHA	16	84	00060300	
COPRAT	18	84	00070300	
DM7CHK	20	39	00080300	
DRPMES	21	34	00090100	
DRSRPT	22	36	000A0300	
EDRCAT	23	78	000A0100	
EDRCHK	25	53	000B0100	
EDRCHKAC	26	53	000C0100	
EDRSUM	27	47	000D0100	
ENGDAT	28	66	000E0100	
EOFMSG	29	40	000F0100	
EXTRCT	30	36	000F0300	
EXTRCTB	31	36	00100100	
FLOWCHRT	32	156	00410100	
FMSYNC	35	68	00100300	
GETLIB	36	44	00110300	
GRBACS	37	34	00120300	
GRBCLN	38	34	00120100	
GRBHHD	39	30	00130100	
GRBMHD	40	30	00130300	
GRBPMR	41	39	00140100	
GRBPRT	42	32	00140300	
GRBRTS	43	36	00150100	
GRBTRG	44	35	00150300	
HELDRP	45	44	00160100	
IBISUM	46	53	00170100	
IGRADR	47	52	00180100	
INDEXP	48	55	00190100	
ITBIT	49	52	001A0100	
LOG12	50	62	001B0100	
NXTPTO	51	51	001C0100	
NXTRTO	52	48	001D0100	
OVLAPP	53	51	003F0100	
OVLAPR	54	51	00400100	
PHACLR	55	49	003E0100	
PHALEN	56	23	003C0300	
PHAOUT	57	47	001E0100	
PHAUPK	58	46	001F0100	
PKBLK	59	40	00200100	
PKHET	60	78	00200300	
PKLET	62	76	00210300	
PTHIRD	64	54	00220300	
RATCLR	65	50	00230300	
RATOUT	66	32	00240100	
RATOUTAC	67	32	00240300	
RATUPK	68	61	00250100	
REVISP	69	81	00260100	
REVISR	71	97	00270100	
RTRIM0	73	39	00280300	
RTRIM5	74	39	00290100	
SETNMP	75	49	00290300	
SETNMR	76	49	002A0300	
SETOMP	77	50	002B0100	
SETOMR	78	49	002C0100	
SETSEQ	79	53	002D0100	
SKPMSG	80	39	002E0100	
TIMCHK	81	41	002E0300	
TIME	82	68	002F0100	
UPKLBL	83	28	003F0400	
UPKSTA	84	57	003D0100	
UPKXRY	85	51	00300100	
WRITEP	86	58	00310100	
WRITER	87	57	00320100	
WRTPHA	88	52	00330100	
WRTRAT	89	57	00340100	
ZBYTES	90	51	00350100	

*** END OF LIBRARY *** 73 MEMBERS PROCESSED WITH A TOTAL OF 4371 RECORDS

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    NAME       PAGE   RECORDS    T T R C    USER INFORMATION (HEX)
*** END OF RUN ***   01 LIBRARIES PROCESSED WITH A TOTAL OF     4371 RECORDS.  WORKAREA SIZE: 032K,  NEVER USED: 021K
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Cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
C 1.   Routine:
C          ADDFRM / COMFRM / MSFRAM
C 2.   System, Satellite, Version:
C          HELDBP HELIOS A,B 0
C 3.   English Name:
C          ADD A FRAME / COMPARE FRAME / MISSING FRAME
C 4.   Language:
C            FORTRANG or FORTRANH    level 21.6    360/91/75    OS/MVT
C 5.   Purpose:
C          ADDFRM: INCREASE TO OFFSET FOR MISSING FRAMES
C          COMFRM: COMPARE TIME OF FRAME TO ANOTHER
C          MSFRAM: CALCULATE TIME FOR FRAME BASED ON FORMAT AND BIT RATE
C 6.   Calling Sequence:
C      Argument           Type     I/O    Description
C          ADDFRM:
C          MSP1       I*4          MILLISECONDS OF LAST FRAME
C          HDP1       I*2          DAY OF LAST FRAME
C          HFRMS      I*2          NUMBER OF MINOR FRAMES TO ADD
C          HFM        I*2          FORMAT OF FILE
C          HBR        I*2          BIT RATE OF FILE
C          MSP2       I*4          MILLISECONDS OF NEXT FRAME RETURNED
C          HDP2       I*2          DAY OF NEXT FRAME RETURNED
C          COMFRM:
C          MSP1       I*4          MILLISECONDS OF 1ST FRAME
C          HDP1       I*2          DAY OF FIRST FRAME
C          MSP2       I*4          MILLISECONDS OF 2ND FRAME
C          HDP2       I*2          DAY OF 2ND FRAME
C          MTDIF      I*4          DIFFERENCE BETWEEN FRAMES RETURNED
C          MSFRAM:
C          HFMT       I*2          FORMAT OF FILE
C          HBR        I*2          BITRATE OF FILE
C          MSP1       I*4          MILLISECONDS PER MINOR FRAME RETURNED
C 7.   Notes:
C      7a.  Restrictions:
C          NONE
C      7b.  Special Features:
C          NONE
C 8.   Variables:
C      8a.  Local
C           Variable               Type    Description
C          MSDAY      I*4          MILLISECONDS IN DAY
C      8b.  COMMON
C           COMMON                 Variables
C          NONE
C 9.   I/O Information:
C      Unit No.          Use Description
C          NONE
C10.   Error Handling:
C          NONE
C11.   Subroutines Called:
C      Subroutine        Description
C          NONE
C12.   Called By:
C      Routine           Description
C          TIMCHK
C13.   Method:
C          ADDFRM
C                    LOOP THROUGH NUMBER OF FRAMES TO BE ADDED
C                    ADD FRAME TIME TO START TIME
C                    END LOOP
C          END ADDFRM
C          COMFRM
C                    SUBTRACT TIME OF FRAME 1 FROM TIME OF 2
C          END COMFRM
C          MSFRAM
C                    MILLISECONDS = 1152000/BITRATE
C          END MSFRAM
C14.   Reference:
C          NONE
C15.   Programmer and Date:
C          GERRY MARANDINO
C16.   Modifications:
C
Cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
```

*** END OF MEMBER ***   75 RECORDS PROCESSED   ***

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C                                                                       C
C THIS SUBROUTINE MAINLY CHECKS FOR DM7 MODE. IF PRESENT: RATIO IS SET
C  TO 0 AND RETURNED TO THE CALLING PROGRAM
C  HELIOS A&B VERSIONS USE THIS SUBROUTINE IN REJECTING DM7 DATA
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C 1.  NAME: BOMODE
C 2.  IDENTIFICATION: HELDRP,HELIOS A,B, REJDM7N VERSION
C 3.  ENGLISH NAME: BLACKOUT MODE
C 4.  LANGUAGE: FORTRANH, 360/91/75, OS/MVT
C 5.  PURPOSE: TO DIFFERENTIATE DM7 FROM BLACK OUT MODE. RATIO IS SAME
C               FOR BOTH
C 6.  CALLING SEQUENCE: CALL BCMODE(QDATA,INDX,HFMT,REJBOM,DTLABL,NTP,
C     MFILE,NREC,HBTRT,HDPFMS,MSPFMS,HRATIO,HRECYR)
C                'QDATA' IS  DATA RECORD; 'INDX' IS A INDEX FOR  MINOR FR
C      AME,'HFMT' TYPE OF FORMAT FOR RECORD 'REJBOM' IS THE FLAG TO CONTR
C        OL TO WRITE MESSAGE FOR BLACKOUT DATA. 'DTLABL' EDR TAPE NO.
C        'NTP' SEQ NO. OF EDR TAPE. 'MFILE' FILE NO. OF FILE ON TAPE.
C        'NREC' RECORD NO. 'HBTRT'BITRATE ON THAT RECORD.
C        'HDPFMS' START DAY FOR RECORD. 'MSPFMS' START MIL.SECS FOR RECORD
C         'HRATIO' RATIO FOR THE RECORD. 'HRECYR' YEAR NO. OF RECORD
C 7.  NOTES: NONE
C 8.  VARIABLES: NC COMMON BLOCK VARIABLES.
C 9.  I/C:NONE
C 10.ERROR HANDLING: NONE
C 11.CALLS: CONTIM,FTIME
C
C 12.CALLED BY: EDRCHK
C METHOD: IF DISTRIBUTION MODE IS 7; SET HRATIO=0,
C           RETURN TO CALLING PROGRAM.
C        GET BLACK CUT MODE BIT FROM ENGINEERING DATA;
C        IF BLACKOUT;SET HRATIO=0 .
C        IF MODE CHANGED WRITE OUT MESSAGE.
C 14.REFERENCE: NCNE
C 15.PROGRAMMER:
C 16.MODIFIED: ED RONISH 3/17/78
C************************************************************************
C************************************************************************
```

*** END OF MEMBER ***   38 RECORDS PROCESSED   ***

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AC30,810CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000030
C                                                                      C00000040
C  THIS SUBROUTINE MAINLY CHECKS FOR DM7 MODE. IF PRESENT RATIO IS SET    00000050
C   TO 0 AND RETURNED TO THE CALLING PROGRAM                              00000060
C   HELIOS A&B VERSIONS USE THIS SUBROUTINE IN ACCEPTING DM7 DATA         00000070
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000080
C 1. NAME: BOMODE                                                      00000090
C 2. IDENTIFICATION: HELDRP,HELIOS A,B, FOR ACCDM7                     00000100
C 3. ENGLISH NAME: BLACKOUT MODE ACCDM7                                00000110
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT                             00000120
C    PURPOSE: TO DIFFERENTIATE DM7 FROM BLACK OUT MODE DATA. RATIO IS  00000130
C             SAME FOR BOTH                                            00000140
C 6. CALLING SEQUENCE: CALL BCMODE(QDATA,INDX,HFMT,REJBOM,DTLABL,NTP,  00000150
C    MFILE,NREC,HBTRT,HDPFMS,MSPFMS,HRATIO,HRECYR)                     00000160
C          'QDATA' IS  DATA RECORD; 'INDX' IS A INDEX FOR  MINOR FR    00000170
C     AME,'HFMT' TYPE OF FORMAT FOR RECORD 'REJBOM' IS THE FLAG TO CONTR00000180
C      OL TO WRITE MESSAGE FOR BLACKOUT DATA. 'DTLABL' EDR TAPE NO.     00000190
C      'NTP' SEQ NO. OF EDR TAPE. 'MFILE' FILE NO. OF FILE ON TAPE.     00000200
C      'NREC' RECORD NO. 'HBTRT'BITRATE ON THAT RECORD.                 00000210
C      'HDPFMS' START DAY FOR RECORD. 'MSPFMS' START MIL.SECS FOR RECORD00000220
C       'HRATIO' RATIO FOR THE RECORD. 'HRECYR' YEAR NO. OF RECORD      00000230
C 7. NOTES: NONE                                                       00000240
C 8. VARIABLES: NO COMMON BLOCK VARIABLES.                             00000250
C 9. I/O:NONE                                                          00000260
C 10.ERROR HANDLING: NONE                                              00000270
C 11.CALLS: CONTIM,FTIME                                               00000280
C                                                                      00000290
C 12.CALLED BY: EDRCHK                                                 00000300
C METHOD: IF DISTRIBUTION MODE IS 7; SET HRATIO=0,                     00000310
C         RETURN TO CALLING PROGRAM.                                   00000320
C       GET BLACK OUT MODE BIT FROM ENGINEERING DATA;                  00000330
C       IF BLACKOUT;SET HRATIO=0                                       00000340
C       IF MODE CHANGED WRITE OUT MESSAGE.                             00000350
C 14.REFERENCE: NONE                                                   00000360
C 15.PROGRAMMER:                                                       00000370
C 16.MODIFIED: ED RONISH 3/17/78                                       00000380
C*********************************************************************00000390
C*********************************************************************00000400

*** END OF MEMBER ***     38 RECORDS PROCESSED   ***********************************************************************************
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*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
* 1.  Routine:
*        BTMNP / IGET / GETPUT
* 2.  System, Satellite, Version:
*        HELDRP    HELIOS A,B          0
* 3.  English Name:
*        BIT MANIPULATE / INTEGER GET / GET AND PUT A BIT
* 4.  Language:
*        ASMG    level G    release 21MAR76    360/91/75    OS/MVT
* 5.  Purpose:
*        IGET: EQUATE IGET TO A GIVEN SET OF BITS
*        GETPUT: MOVE A GIVEN SET OF BITS TO ANOTHER WORD
* 6.  Calling Sequence:
*     Argument          Type    I/O    Description
*        IGET:
*        WORD         I*4             SOURCE FOR THE BITS
*        I            I*4             FIRST BIT 1=MSB
*        J            I*4             LAST BIT
*        GETPUT:
*        WORD         I*4             SOURCE FOR THE BITS
*        I            I*4             FIRST BIT
*        J            I*4             LAST BIT
*        WORD1        I*4             DESTINATION OF BITS
*        K            I*4             FIRST LOCATION
*        L            I*4             LAST LOCATION
* 7.  Notes:
*     7a.  Restrictions:
*        NONE
*     7b.  Special Features:
*        NONE
* 8.  Variables:
*     8a.  Local
*          Variable              Type    Description
*        NONE
*     8b.  COMMON
*          COMMON                Variables
*        NONE
* 9.  I/O Information:
*     Unit No.          Use Description
*        NONE
*10.  Error Handling:
*        NONE
*11.  Subroutines Called:
*     Subroutine        Description
*        NONE
*12.  Called By:
*     Routine           Description
*        HELDRP
*13.  Method:
*        BTMNP      PROC
*        GETPUT
*                   IF J > I
*                              SWAP I AND J
*                   FI
*                   EXTRACT BITS I TO J , 1=MSB
*
*                   PLACE BITS IN WORD
*                   MOVE BITS INTO K-L POSTION OF WORD1
*           END GETPUT
*           IGET
*                   IF J > I
*                              SWAP I AND J
*                   FI
*                   EXTRACT BITS I TO J
*                   PLACE BITS IN WORD
*           END IGET
*           END BTMNP
*14.  Reference:
*        NONE
*15.  Programmer and Date:
*
*16.  Modifications:
*
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
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*** END OF MEMBER *** 74 RECORDS PROCESSED **********

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*CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
*** END OF MEMBER ***      74 RECORDS PROCESSED    ************************************************************
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CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C 1.   Routine:
C          CNVMJD / CNVDAT
C 2.   System, Satellite, Version:
C          HEIDRE     HELIOS A,B          0
C 3.   English Name:
C          CCNVERT    MODIFIED JULIAN DAY  / CCNVERT DATE
C 4.   Language:
C          FORTRANG or FORTRANH    level 21.6    360/91/75    OS/MVT
C 5.   Purpose:
C          SEE BELOW
C 6.   Calling Sequence:
C      Argument              Type      I/O     Description
C          CNVMJD:
C          HMOD          I*2              MODIFIED JULIAN DAY
C          HMCNTH        I*2              MONTH RETURNED
C          HDAY          I*2              DAY RETURNED
C          HYEAR         I*2              YEAR RETURNED
C          CNVDAT:
C          HMCNTH        I*2              MONTH
C          HDAY          I*2              DAY
C          HYEAR         I*2              YEAR
C          HMOD          I*2              MODIFIED JULIAN DAY RETURNED
C 7.    Notes:
C       7a.   Restrictions:
C          SET FOR 1972 TO 1987
C       7b.   Special Features:
C          NONE
C 8.    Variables:
C       8a.   Local
C             Variable                Type    Description
C          CNVMJD:
C          IMOD          I*4              MODIFIED JULIAN DAY
C          IMCNTH        I*4              TOTAL DAYS IN YEAR TO MONTH
C          IDYSYR        I*4              TOTAL DAYS SINCE 1972 TO YEAR
C          NUMYRS        I*4              MAXIMUM NUMBER OF YEARS
C          LASTYR        I*4              START YEAR 1971
C          IYR           I*4              LOOP COUNTER FOR YEARS
C          IYEAR         I*4              YEAR
C          IDY           I*4              DAY
C          IMO           I*4              MONTH
C          INC           I*4              LEAP YEAR INDEX
C          CNVDAT:
C          INC           I*4              LEAP YEAR INDEX
C          IMO           I*4              MONTH
C          IDY           I*4              DAY
C          IYEAR         I*4              YEAR
C       8b.   COMMON
C             COMMON                      Variables
C          NONE
C 9.    I/O Information:
C       Unit No.       Use Description
C          NONE
C10.    Error Handling:
C          CNVMJD: ABEND 702 IF HMOD TOO LARGE
C          CNVDAT: ABEND 703 IF YEAR < 0
C11.    Subroutines Called:
C       Subroutine         Description
C          ABEND          ERROR HANDLING
C          MOD            MODULO ARITHMETIC
C12.    Called By:
C       Routine            Description
C          HELDRE         HELIOS DATA REDUCTION
C          DRSRPT         DRS LOG PRINTOUT
C          EOFMSG         END OF FILE MESSAGE
C          EDRSUM         EDR SUMMARY
C          ENDCAT         END CATALOG SUMMARY
C          TIMCHK         TIME CHECK
C          DM7CHK         DM7 CHECK
C          SKFMSG
C13.    Method:
```

```
C        END CNVMJD                                                      00000790
C        CNVDAT                                                          00000800
C                  DETERMINE YEARS SINCE 1972                            00000810
C                  DETERMINE DAYS OF YEAR FROM TABLE                     00000820
C                  IF HMONTH < 0                                         00000830
C                        ADD HDAY                                        00000840
C                  ELSE DAY IS DAY OF MONTH                              00000850
C                        SET LEAP YEAR INDEX                             00000860
C                        DETERMINE DAY FROM TABLE                        00000870
C        END CNVDAT                                                      00000880
C14.  Reference:                                                         00000890
C        NONE                                                            00000900
C15.  Programmer and Date:                                               00000910
C        ROGER DUFORD                                                    00000920
C16.  Modifications:                                                     00000930
C                                                                        00000940
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC 00000950
      IMPLICIT  REAL*8(D),INTEGER*2(H),LOGICAL*1(O)                      00000960
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000970
C                                                                        C00000980
C        CNVMJD CONVERTS A DAY COUNT BASED ON DAY ZERO BEING             C00000990
C  JANUARY 0, 1972 TO A DATE OF THE FORM: MONTH/DAY/YEAR                 C00001000
C                                                                        C00001010
C        THIS PROGRAM IS SET UP TO WORK FOR FIFTEEN YEARS.  AFTER        C00001020
C  FIFTEEN YEARS, IT CAN BE EXPANDED SIMPLY BY INCREASING THE            C00001030
C  DIMENSION OF IDYSYR AND INCLUDING THE APPROPRIATE DATA IN THE         C00001040
C  IDYSYR DATA STATEMENT.  THE VALUES NUMYRS AND LASTYR MUST BE SET      C00001050
C  ACCORDINGLY.                                                          C00001060
C                                                                        C00001070
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00001080
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*** END OF MEMBER *** 107 RECORDS PROCESSED **********

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C COMMON BLOCK DESCRIPTION TABLE                                                00000010
C (R) MEANS VARIABLE IS READ BY THAT SUBROUTINE                                 00000020
C (W) MEANS VARIABLE IS MODIFIED BY THAT SUBROUTINE (WRITE)                     00000030
C (I) MEANS VARIABLE IS INITIALIZED BY THAT SUBROUTINE                          00000040
C DATREC/ COMMON BLOCK OF ONE RECORD OF DATA                                    00000050
C IDATA   I*4 THE DATA RECORD, 72 MINOR FRAMES, EACH FRAME IS 13 WORDS          00000060
C         BOMODE(R)  ,EDRCHK(R),ENGDAT(R),EXTRCT(R),GRBRPT(R),HELDRP(W)        00000070
C         PKBLK(R),TIMCHK(R),WRITEP(AR),WRITER(AR)                              00000080
C INDX    I*4 THE FRAME NUMBER WITHIN THE RECORD                                00000090
C         BOMODE(R)  ,EDRCHK(R),ENGDAT(R),EXTRCT(W),GRBRPT(R),PKBLK(R),        00000100
C         TIMCHK(R)                                                             00000110
C DISC/   COMMON BLOCK USED TO PASS PARAMETERS FROM GETLIB                      00000120
C TPNEXT  R*8 THE NEXT TAPE IN THE CATALOG                                      00000130
C         GETLIB(W)                                                             00000140
C DREF    R*8 THE NUMBER OF SECONDS IN THE YEAR                                 00000150
C         GETLIB(W)                                                             00000160
C NEXTFI  I*4 THE NEXT FILE IN THE CATALOG                                      00000170
C         GETLIB(W)                                                             00000180
C ISEC    I*4 THE NUMBER OF SECONDS IN A MAJOR FRAME                            00000190
C         GETLIB(W)                                                             00000200
C OUTSER  I*4 THE LIBRARY TAPE NUMBER                                           00000210
C         GETLIB(R),HELDRP(W)                                                   00000220
C OUTSEQ  I*4 THE LIBRARY FILE NUMBER                                           00000230
C         GETLIB(R),HELDRP(W)                                                   00000240
C IDM     I*4 PARAMETER USED TO BYPASS FORMAT 1,5 WHEN SET TO 7                 00000250
C         GETLIB(W)                                                             00000260
C INSER   I*4 THE EDR TAPE NUMBER                                               00000270
C         GETLIB(W),HELDRP(R)                                                   00000280
C SATID   L*1 THE SATELLITE IDENTIFICATION                                      00000290
C         GETLIB(R),HELDRP(W)                                                   00000300
C DRSTAP/THE DATA REDUCTION TAPE CATALOG COMMON BLOCK                           00000310
C IDSAT   I*4 THE SATELLITE IDENTIFICATION                                      00000320
C         DRSRPT(R),ENDCAT(R),EDRSUM(R),HELDRP(W),                              00000330
C HPHATP  I*2 THE NUMBER OF PHA TAPES IN THE CATALOG                            00000340
C         COPPHA(W)  ,DRSRPT(R),HELDRP(R),NXTPTO(W),OVLAPP(R),SETNMP(R)         00000350
C HRATTP  I*2 THE NUMBER OF RATES TAPES IN THE CATALOG                          00000360
C         COPRAT(W),DRSRPT(R),HELDRP(R),NXTRTO(W),OVLAPR(R),SETNMR(R)           00000370
C DPHATP  R*8 THE PHA TAPE ARRAY                                                00000380
C         COPPHA(W),DRSRPT(R),NXTPTO(W),OVLAPP(R),SETNMP(W),SETOMP(W)           00000390
C MSPHAS  I*4 THE ARRAY OF START MILLISECONDS OF EACH PHA TAPE                  00000400
C         COPPHA(W),DRSRPT(R),NXTPTO(W),OVLAPR(R),SETNMP(W)                     00000410
C MSPHAE  I*4 THE ARRAY OF END MILLISECONDS OF EACH PHA TAPE                    00000420
C         COPPHA(W),DRSRPT(R),NXTPTO(W),OVLAPP(R),SETNMP(W),SETOMP(W),          00000430
C         WRTPHA(W),ENDPHA(W)                                                   00000440
C HDPHAS  I*2 THE ARRAY OF START DAY NUMBERS OF EACH PHA TAPE                   00000450
C         COPPHA(W),DRSRPT(R),NXTPTO(W),OVLAPP(R),SETNMP(W)                     00000460
C HDPHAE  I*2 THE ARRAY OF END DAY NUMBERS OF EACH PHA TAPE                     00000470
C         COPPHA(W),DRSRPT(R),NXTPTO(W),OVLAPP(R),SETNMP(W),SETOMP(W),          00000480
C         WRTPHA(W),ENDPHA(W)                                                   00000490
C HPHAFT  I*2 THE ARRAY OF FEET WRITTEN ON EACH PHA TAPE                        00000500
C         COPPHA(W),DRSRPT(R),NXTPTO(W),SETNMP(W),SETOMP(W),ENDPHA(W)           00000510
C DRATTP  R*8 THE RATES TAPE ARRAY                                              00000520
C         COPRAT(W),DRSRPT(R),NXTRTO(W),OVLAPR(R),SETNMR(W),SETOMR(W)           00000530
C MSRATS  I*4 THE ARRAY OF START MILLISECONDS OF EACH RATE TAPE                 00000540
C         COPRAT(W),DRSRPT(R),NXTRTO(W),OVLAPR(R),SETNMR(W)                     00000550
C MSRATE  I*4 THE ARRAY OF END MILLISECONDS OF EACH RATE TAPE                   00000560
C         COPRAT(W),DRSRPT(R),NXTRTO(W),OVLAPR(R),SETNMR(W),SETOMR(W),          00000570
C         WRTRAT(W),ENDRAT(W)                                                   00000580
C HDRATS  I*2 THE ARRAY OF START DAY NUMBERS FOR EACH RATE TAPE                 00000590
C         COPRAT(W),DRSRPT(R),NXTRTO(W),OVLAPR(R),SETNMR(W)                     00000600
C HDRATE  I*2 THE ARRAY OF END DAY NUMBERS FOR EACH RATE TAPE                   00000610
C         COPRAT(W),DRSRPT(R),NXTRTO(W),OVLAPR(R),SETNMR(W),SETOMR(W),          00000620
C         WRTRAT(W),ENDRAT(W)                                                   00000630
C HRATFT  I*2 THE ARRAY OF FEET WRITTEN ON EACH RATE TAPE                       00000640
C         COPRAT(W),DRSRPT(R),NXTRTO(W),SETNMR(W),SETOMR(W),ENDRAT(W)           00000650
C DBLNKP  R*8 THE ARRAY OF BLANK PHA TAPES                                      00000660
C         DRSRPT(R),HELDRP(W),NXTPTO(W),SETNMP(W),SETOMP(W)                     00000670
C DBLNKR  R*8 THE ARRAY OF BLANK RATES TAPES                                    00000680
C         DRSRPT(R),HELDRP(W),NXTRTO(W),SETNMR(W),SETOMR(W)                     00000690
C DCATLG  R*8 THE ARRAY OF BACK UP TAPES FOR THE CATALOGS                       00000700
C         DRSRPT(R),NEWCAT(R),ENDCAT(W),HELDRP(W)                               00000710
C HPHABK  I*2 THE TOTAL NUMBER OF ASSIGNED PHA TAPES, INCLUDING BLANKS          00000720
C         DRSRPT(R),HELDRP(W),NXTPTO(W),SETNMP(W),SETOMP(W)                     00000730
C HRATBK  I*2 THE TOTAL NUMBER OF ASSIGNED RATES TAPES, INCLUDING BLANKS        00000740
C         DRSRPT(R),HELDRP(W),NXTRTO(W),SETNMR(W),SETOMR(W)                     00000750
C LSTAFN  I*4 THE LAST ABSOLUTE FILE NUMBER WRITTEN BY HELDRP                   00000760
C         DRSRPT(R),HELDRP(W)                                                   00000770
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C LSTLOG I*4 THE LAST TRACK USED BY FILE/LOGISTICS/HISTORY CATALOG      00000780
C        DRSRPT(R),EDRCAT(R),EDRCHK(W),HELDRP(W)                       00000790
C NUMLOG I*4 THE LAST ENTRY IN THE LAST TRACK                          00000800
C        DRSRPT(R),NEWCAT(R),ENDCAT(W),HELDRP(W)                       00000810
C DTRJTP R*8 NOT USED                                                  00000820
C MSTRJS I*4 NOT USED                                                  00000830
C MSTRJE I*4 NOT USED                                                  00000840
C HDTRJS I*2 NOT USED                                                  00000850
C HDTRJE I*2 NOT USED                                                  00000860
C NUMTRJ I*4 NOT USED                                                  00000870
C MYSPR1 I*4 NOT USED                                                  00000880
C DPHAS  R*8 THE FIRST TAPE IN THE PHA BLOCK                           00000890
C        DRSRPT(W)                                                     00000900
C DPHAE  R*8 THE LAST TAPE IN THE PHA BLOCK                            00000910
C        DRSRPT(W)                                                     00000920
C DRATS  R*8 THE FIRST TAPE IN THE RATES BLOCK                         00000930
C        DRSRPT(W)                                                     00000940
C DRATE  R*8 THE LAST TAPE IN THE RATES BLOCK                          00000950
C        DRSRPT(W)                                                     00000960
C MYSPR2 I*4 NOT USED                                                  00000970
C ENGR/  THE COMMON BLOCK FOR ENGINEERING DATA                         00000980
C HWORD  I*2 THE ARRAY OF ENGINEERING WORDS                            00000990
C        EDRINT(1),ENDDAT(W)                                           00001000
C ENGSW/ THE STATUS SWITCH COMMON BLOCK                                00001010
C QENGP  L*4 THE FLAG USED TO BYPASS PRINTOUT OF ENGINEERING WORDS     00001020
C        ENGLAT(R),HELDRP(W)                                           00001030
C ERATE/ THE COMMON CLOCK USED TO INITIALIZE THE EVENTS ARRAY          00001040
C KEVNT  I*4 THE ARRAY OF EVENTS DATA                                  00001050
C        EDRINT(1),PHAOUT(W),RATOUT(W)                                 00001060
C ERTEST/THE COMMON BLOCK FOR TIME ERRORS IN THE EDR RECORD            00001070
C ITALLY I*4 THE ARRAY OF PERCENTAGE ERRORS IN THE FRAME TIME          00001080
C        EDRCHK(W),HELDRP(I)                                           00001090
C IMAXY  I*4 THE MAXIMUM DIFFERENCE BETWEEN THE CALCULATED FRAME TIME  00001100
C        EDRCHK(W),HELDRP(I)                                           00001110
C            AND THE EDR FRAME TIME                                    00001120
C MAXLTM I*4 MILLISECONDS OF LAST MINOR FRAME                          00001130
C        EDRCHK(W)                                                     00001140
C MAXCTM I*4 MILLISECONDS OF PRESENT MINOR FRAME                       00001150
C        EDRCHK(W)                                                     00001160
C MAXFRT I*4 CALCULATED MILLISECONDS OF THE FRAME TIME                 00001170
C        EDRCHK(W)                                                     00001180
C MAXDIF I*4 MAXIMUM MILLISECONDS OF DIFFERENCE BETWEEN MINOR FRAMES   00001190
C        EDRCHK(W)                                                     00001200
C FERMSG/FREAD ERROR MESSAGE COMMON BLOCK                              00001210
C MESAGE I*4 ERROR MESSAGE                                             00001220
C GBLOCK/GAMMA RAY COMMON BLOCK BURST DATA                             00001230
C IGRTYP I*4 TYPE OF DATA TO BE OUTPUT BY GRBOUT                       00001240
C        GRBPRT(W)                                                     00001250
C IGTAPE I*4 FORTRAN LOGICAL UNIT FOR GRB OUTPUT TAPE                  00001260
C        GRBPRT(W)                                                     00001270
C IGFORM I*4 TYPE OF TELEMETRY FORMAT                                  00001280
C        GRPPRT(W)                                                     00001290
C IGRATS I*4 RATE DATA                                                 00001300
C        GRPPRT(W)                                                     00001310
C IGRSEQ I*4 SEQUENCE NUMBER FOR RATE DATA                             00001320
C        GRPPRT(W)                                                     00001330
C IGRLIN I*4 LINE NUMBER FOR RATE DATA                                 00001340
C        GRPPRT(W)                                                     00001350
C IACS   I*4 GAMMA RAY CLOCK DATA                                      00001360
C        GRBACS(W),GRBRTS(R)                                           00001370
C IADR   I*4 ADDRESS OF GRB MEMORY READOUT DATA                        00001380
C        GRBRPT(W)                                                     00001390
C IDATE  I*4 GAMMA RAY CLOCK DATE                                      00001400
C        GRBCLN(W),GRBRPT(R)                                           00001410
C ASTAT  L*4 STATUS OF A GRB DETECTOR                                  00001420
C        GRBPRT(W)                                                     00001430
C BSTAT  L*4 STATUS OF B GRB DETECTOR                                  00001440
C        GRPPRT(W)                                                     00001450
C PSTAT  L*4 POWER INTERRUPT SIGNAL FROM GRBPRT                        00001460
C        GRBPRT(W)                                                     00001470
C REPEAT L*4 SWITCH FOR A DOUBLE GRB MEMORY READOUT                    00001480
C        GRPPRT(W)                                                     00001490
C SECOND L*4 SWITCH INDICATING THAT CURRENT DATA IS 2ND PART           00001500
C HRATE  I*2 RATES FROM GRB H/K 0 BLOCK                                00001510
C        GRBRTS(W)                                                     00001520
C HTRATE I*2 RATES FROM GRB H/K 1 BLOCK                                00001530
C        GRBPRT(W)                                                     00001540
C HTRIG  I*2 4 BIT GRB TRIGGER COUNT FROM H/K DATA                     00001550
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C         GRBPRT(R),GRBTRG(W)                                                   00001560
C  INTERN/INTERNAL MESSAGE COMMON BLOCK                                         00001570
C  DCATSV R*8 ARRAY OF BACKUP TAPES FOR LOGISTICS CATALOGS                      00001580
C         ENDCAT(R),HELDRP(W)                                                   00001590
C  DTSLOT R*8 SLOT NUMBER FOR THE EDR TAPE                                      00001600
C         DM7CHK(R),EDRCHK(R),EOFMSG(R),HELDRP(W)                               00001610
C  DTIABL R*8 VOLUME LABEL FOR THE EDR TAPE                                     00001620
C         BOMODE(R),DRPMES(R),EDRCHK(R),EDRSUM(R),GRBPRT(R),HELDRP(W),          00001630
C         SKPMSK(R)                                                             00001640
C  MFILE  I*4 FILE NUMBER ON THE EDR TAPE                                       00001650
C         BOMODE(R),DM7CHK(R),DRPMES(R),EDRCHK(R),EOFMSG(R),GRBPRT(R),          00001660
C         HELDRP(W)                                                             00001670
C  NREC   I*4 RECORD NUMBER ON THE EDR TAPE                                     00001680
C         BOMODE(R),DM7CHK(R),DRPMES(R),EDRCHK(R),EOFMSG(R),GRBPRT(R),          00001690
C         HELDRP(W)                                                             00001700
C  NERR   I*4 NUMBER OF READ ERRORS ON EDR TAPE                                 00001710
C         HELDRP(W)                                                             00001720
C  NTP    I*4 SEQUENCE NUMBER OF THE EDR TAPE                                   00001730
C  ITEMS/ COMMON BLOCK OF INTERNAL FLAGS                                        00001740
C  NQ     I*4 HIGHEST QUALITY OF DATA ACCEPTED, DEFAULT IS 4                    00001750
C         EDRSUM(W),EXTRCT(R),HELDRP(W),PHAOUT(R)                               00001760
C  NQL    I*4 LOWEST QUALITY OF DATA ACCEPTED                                   00001770
C         EXTRCT(R),HELDRP(W),PHAOUT(R)                                         00001780
C  QFNEW  L*1 FLAG USED TO SIGNAL BEGINNING OF NEW FILE                         00001790
C         EDRCHK(R),EXTRCT(R),HELDRP(W)                                         00001800
C  QXRY   L*1 HOUSEKEEPING DATA                                                 00001810
C         FILINT(I),EXTRCT(W),PHAOUT(R),RATCUT(R)                               00001820
C  QFRST  L*1 THREE FLAGS SIGNALING START OF FILE                               00001830
C         FILINT(I),(3)PHAOUT(W),(2)RATOUT(W),(1)TIMCHK(W)                      00001840
C  QREND  L*1 FLAG SIGNALING END OF RATES FILE                                  00001850
C         EDRCHK(W),FILINT(I),RATOUT(W),TIMCHK(W)                               00001860
C  QPEND  L*1 FLAG SIGNALING END OF PHA FILE                                    00001870
C         EDRCHK(W),FILINT(I),PHAOUT(W),TIMCHK(W)                               00001880
C  LABEL/ COMMON BLOCK OF EDR LABEL INFORMATION                                 00001890
C  ICODE  I*4 CODE AT THE BEGINNING OF LABEL                                    00001900
C         HELDRP(W)                                                             00001910
C  ITPTYP I*4 TAPE TYPE                                                         00001920
C         HEIDRP(W)                                                             00001930
C  IDTTYP I*4 DATA TYPE                                                         00001940
C         HELDRP(W)                                                             00001950
C  HFMT   I*2 FILE FORMAT                                                       00001960
C         COMFRM(R),MSFRM(R),DM7CHK(R),EDRCHK(R),ENGDAT(R),EOFMSG(R),           00001970
C         EXTRCT(R),HELDRP(W),PHACLR(R),PHAOUT(R),RATOUT(R),SKPMSG(R),          00001980
C         TIMCHK(R)                                                             00001990
C  HBTRT  I*2 FILE BIT RATE                                                     00002000
C         COMFRM(R),MSFRM(R),DM7CHK(R),EDRCHK(R),EOFMSG(R),EXTRCT(R),           00002010
C         HELDRP(W),PHAOUT(R),RATOUT(R),SKPMSG(R),TIMCHK(R)                     00002020
C  HRECYR I*2 YEAR OF THE DATA                                                  00002030
C         BOMODE(R),DM7CHK(R),EDRCHK(R),EOFMSG(R),HELDRP(W),SKPMSG(R)           00002040
C  HSEDR  I*2 DAY,HOUR,MINUTE AND SECOND OF DATA START                          00002050
C         EDRCHK(R),HELDRP(W),TIMCHK(R)                                         00002060
C  HEEDR  I*2 DAY,HOUR,MINUTE AND SECOND OF DATA END                            00002070
C         HELDRP(W)                                                             00002080
C  HMRTAP I*2 THE MASTER TAPE NUMBER                                            00002090
C         HELDRP(W)                                                             00002100
C  HMRFIL I*2 MASTER TAPE FILE NUMBER                                           00002110
C         HELDRP(W)                                                             00002120
C  HGEN   I*2 DATE THE TAPE WAS GENERATED BY IPD                                00002130
C         HELDRP(W)                                                             00002140
C  HRUN   I*2 RUN NUMBER                                                        00002150
C         HELDRP(W)                                                             00002160
C  HFILE  I*2 FILE NUMBER FOR IPD                                               00002170
C         HELDRP(W)                                                             00002180
C  HREEL  I*2 REEL NUMBER FOR IPD                                               00002190
C         HELDRP(W)                                                             00002200
C  HID    I*2 SATELLITE IDENTIFICAATION                                         00002210
C         HELDRP(W)                                                             00002220
C  LOGCAT/COMMON BLOCK OF FILE/LOGISTICS HISTORY CATALOG INFORMATION            00002230
C  NUMNEW I*4 LINE NUMBER OF THE NEW ABSOLUTE FILE                              00002240
C         EDRCAT(W),EDREND(W),ENDCAT(R)                                         00002250
C  LOGNEW I*4 FILE/LOGISTICS/HISTORY INFORMATION ON THE NEW FILES               00002260
C         EDRCAT(W),ENDCAT(R)                                                   00002270
C  HNEW   I*2 NOT USED                                                          00002280
C         EDRCAT(W),ENDCAT(R)                                                   00002290
C  HPAD   I*2 NOT USED                                                          00002300
C  NUMOLD I*4 LINE NUMBER WITH A TRACK OF LAST ABSOLUTE FILE                    00002310
C         EDRCAT(W),NEWCAT(R),ENDCAT(R)                                         00002320
C  LOGOLD I*4 FILE/LOGISTICS/HISTORY INFORMATION ON THE OLD FILES               00002330
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C         EDRCAT(W),NEWCAT(R),ENDCAT(R)                                  00002340
C HOLD    I*2 NOT USED                                                   00002350
C         EDRCAT(W),NEWCAT(R),ENDCAT(R)                                  00002360
C LOGHIS/COMMON BLOCK OF LOGISTICS HISTORY                               00002370
C MSLOGS  I*4 MILLISECONDS OF START OF THE FILE                          00002380
C         EDRCAT(R),EDREND(R),EDRSUM(R),HELDRP(W)                        00002390
C MSLOGE  I*4 MILLISECONDS OF END OF THE FILE                            00002400
C         EDRCAT(R),EDRSUM(R),HELDRP(W)                                  00002410
C HLGAFN  I*2 ABSOLUTE FILE NUMBER                                       00002420
C         EDREND(R),EDRSUM(R),HELDRP(W)                                  00002430
C HLRMJD  I*2 MODIFIED JULIAN START DAY OF THE FILE                      00002440
C         EDRCAT(R),EDRSUM(R),HELDRP(W)                                  00002450
C HLMJDE  I*2 MODIFIED JULIAN END DAY OF THE FILE                        00002460
C         EDRSUM(R),HELDRP(W)                                            00002470
C HEDRNO  I*2 EDR NUMBER                                                 00002480
C         HELDRP(W)                                                      00002490
C HEDRG   I*2 DATE THE EDR WAS GENERATED                                 00002500
C         HELDRP(W)                                                      00002510
C HPPOCD  I*2 DATE THE EDR WAS PROCESSED BY HELDRP                       00002520
C         HELDRP(W)                                                      00002530
C NTLREC  I*4 TOTAL NUMBER OF RECORDS IN THE FILE                        00002540
C         EDRSUM(W)                                                      00002550
C NGDREC  I*4 NUMBER OF GOOD RECORDS IN THE FILE                         00002560
C         EDRSUM(W)                                                      00002570
C HQULHG  I*2 HIGHEST QUALITY ACCEPTED IN THE FILE                       00002580
C         HELDRP(W)                                                      00002590
C HQULLW  I*2 LOWEST QUALITY ACCEPTED IN THE FILE                        00002600
C         HELDRP(W)                                                      00002610
C HDTPRC  I*2 NOT USED                                                   00002620
C         HELDRP(W)                                                      00002630
C HLOGSP  I*2 NOT USED                                                   00002640
C PBLOCK/COMMON BLOCK OF PHA DATA                                        00002650
C HPPA3   I*2 PHA WORD NUMBER 3                                          00002660
C         PHAUPK(W),PKHET(R),PKLET(R)                                    00002670
C HPPA2   I*2 PHA WORD NUMBER 2                                          00002680
C         PHAUPK(W),PKHET(R),PKLET(R)                                    00002690
C HPPA1   I*2 PHA WORD NUMBER 1                                          00002700
C         PHAUPK(W),PKHET(R),PKLET(R)                                    00002710
C QPRI    L*1 PRIORITY FLAG                                              00002720
C         PHAOUT(R),PHAUPK(W),PKHET(R),PKLET(R)                          00002730
C QC2R    L*1 CII REGISTER FLAG                                          00002740
C         PHAUPK(W),PKHET(R),PKLET(R)                                    00002750
C QEVT    L*1 EVENT FLAG                                                 00002760
C         PHAOUT(R),PHAUPK(W),PKHET(R),PKLET(R)                          00002770
C QSECT   L*1 SECTOR I.D.                                                00002780
C         PHAUPK(W),PKHET(R),PKLET(R)                                    00002790
C QHELE   L*1 LET/HET FLAG, TRUE FOR LET                                 00002800
C         PHAOUT(R),PHAUPK(W),PKHET(R),PKLET(R)                          00002810
C QAC3    L*1 CIII FLAG, TRUE FOR NOT CIII                               00002820
C         PHAUPK(W),PKHET(R),PKLET(R)                                    00002830
C PHANEW/COMMON BLOCK FOR NEW PHA DATA                                   00002840
C MSPNS   I*4 MILLISECONDS OF START OF RECORD                            00002850
C         COPPHA(R),PHACLR(I),PHAOUT(W),REVISP(R),WRTPHA(R)              00002860
C MSPNE   I*4 MILLISECONDS OF END OF RECORD                              00002870
C         COPPHA(R),PHACLR(I),PHAOUT(W),REVISP(R),WRTPHA(R)              00002880
C HDPNS   I*2 DAY OF START OF RECORD                                     00002890
C         COPPHA(R),PHAOUT(W),REVISP(R),WRTPHA(R)                        00002900
C HDPNE   I*2 DAY OF END OF RECORD                                       00002910
C         COPPHA(R),PHAOUT(W),REVISP(R),WRTPHA(R)                        00002920
C NPNRTM  I*4 EVENT TIME STATUS FLAG                                     00002930
C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00002940
C NPNCLK  I*4 START SEQUENCE ID,START LINE NUMBER, END SEQUENCE ID        00002950
C             END LINE NUMBER                                            00002960
C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00002970
C HPNAFN  I*2 ABSOLUTE FILE NUMBER FROM HELDRP PROCESSING                00002980
C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00002990
C HPNTCF  I*2 TIME CORRECTION FLAG                                       00003000
C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00003010
C HPNRIO  I*2 PHA/RATES RATIO                                            00003020
C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00003030
C HPNBRT  I*2 RECORD BIT RATE                                            00003040
C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00003050
C HPNFMT  I*2 RECORD FORMAT                                              00003060
C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00003070
C HPNCTR  I*2 FRAME COUNTER CORRECTION                                   00003080
C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00003090
C HPNTYP  I*2 DATA TYPE                                                  00003100
C HPNQUL  I*2 QUALITY OF THE RECORD                                      00003110
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C         PHAOUT(W),REVISP(R),WRTPHA(R)                                  00003120
C MPNREC  I*4 ARRAY OF PHA WORDS.                                        00003130
C         EXTRCT(W),PHACLR(I),REVISP(R),WRTPHA(R)                        00003140
C PHAOLD/ COMMON BLOCK FOR OLD PHA DATA                                  00003150
C MOPOS   I*4 MILLISECONDS OF START OF RECORD                            00003160
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003170
C MOPOE   I*4 MILLISECONDS OF END OF RECORD                              00003180
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003190
C HDPOS   I*2 DAY OF START OF RECORD                                     00003200
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003210
C HDPOE   I*2 DAY OF END OF RECORD                                       00003220
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003230
C NPORTM  I*4 EVENT TIME STATUS FLAG                                     00003240
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003250
C NPOCLK  I*4 START SEQUENCE ID, START LINE NUMBER, END SEQUENCE ID,      00003260
C             END LINE NUMBER                                            00003270
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003280
C HPOAFN  I*2 ABSOLUTE FILE NUMBER FROM HELDRP PROCESSING                00003290
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003300
C HPOTCF  I*2 GMT TIME CORRECTION FLAG                                   00003310
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003320
C HPORIO  I*2 PHA/RATES RATIO                                            00003330
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003340
C HPOBRT  I*2 RECORD BIT RATE                                            00003350
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003360
C HPOFMT  I*2 RECORD FORMAT                                              00003370
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003380
C HPOCTR  I*2 FRAME COUNTER CORRECTION                                   00003390
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003400
C HPOTYP  I*2 DATA TYPE                                                  00003410
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003420
C HPOQUL  I*2 DATA QUALITY, 4=GOOD DATA                                  00003430
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003440
C MPOREC  I*4 ARRAY OF PHA WORDS                                         00003450
C         COPPHA(W),REVISP(R),WRTPHA(R)                                  00003460
C RATNEW/ COMMON BLOCK OF NEW RATES DATA                                 00003470
C MSRNS   I*4 MILLISECONDS OF START OF RECORD                            00003480
C         COPRAT(R),RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),   00003490
C         WRTRAT(R)                                                      00003500
C MSRNE   I*4 MILLISECONDS OF END OF RECORD                              00003510
C         COPRAT(R),RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),   00003520
C         WRTRAT(R)                                                      00003530
C HDRNS   I*2 DAY OF START OF RECORD                                     00003540
C         COPRAT(R),RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),   00003550
C         WRTRAT(R)                                                      00003560
C HDRNE   I*2 DAY OF END OF RECORD                                       00003570
C         COPRAT(R),RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),   00003580
C         WRTRAT(R)                                                      00003590
C NRNRTM  I*4 EVENT TIME STATUS FLAG                                     00003600
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003610
C NRNCLK  I*4 START SEQUENCE ID, START LINE NUMBER, END SEQUENCE ID,      00003620
C             END LINE NUMBER                                            00003630
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003640
C HRNAFN  I*2 ABSOLUTE FILE NUMBER FROM HELDRP PROCESSING                00003650
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003660
C HRNTCF  I*2 GMT TIME CORRECTION FLAG                                   00003670
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003680
C HRNRIO  I*2 PHA/RATES RATIO                                            00003690
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003700
C HRNBRT  I*2 RECORD BIT RATE                                            00003710
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003720
C HRNFMT  I*2 RECORD FORMAT                                              00003730
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003740
C HRNCTR  I*2 FRAME COUNTER CORRECTION                                   00003750
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003760
C HRNTYP  I*2 DATA TYPE                                                  00003770
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003780
C HRNQUL  I*2 DATA QUALITY                                               00003790
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003800
C MRNFM5  I*4 ARRAY OF RATES WORDS                                       00003810
C         RATCLR(I),RATOUT(W),REVISR(R),RTRIM0(R),RTRIM5(R),WRTRAT(R)    00003820
C RATOLD/ COMMON BLOCK FOR OLD RATES DATA                                00003830
C MSROS   I*4 MILLISECONDS OF START OF RECORD                            00003840
C         COPRAT(W),REVISR(R),WRTRAT(R)                                  00003850
C MSROE   I*4 MILLISECONDS OF END OF RECORD                              00003860
C         COPRAT(W),REVISR(R),WRTRAT(R)                                  00003870
C HDROS   I*2 DAY OF START OF RECORD                                     00003880
C         COPRAT(W),REVISR(R),WRTRAT(R)                                  00003890
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C HDROE  I*2 DAY OF END OF RECORD                                        00003900
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00003910
C NRORTM I*4 EVENT TIME STATUS FLAG                                      00003920
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00003930
C NRCCLK I*4 START SEQUENCE , START LINE NUMBER, END SEQUENCE ID,        00003940
C            END LINE NUMBER                                             00003950
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00003960
C HROAFN I*2 ABSOLUTE FILE NUMBER FROM HELDRP PROCESSING                 00003970
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00003980
C HROTCF I*2 GMT TIME CORRECTION FLAG                                    00003990
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00004000
C HRORIO I*2 PHA/RATES RATIO                                             00004010
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00004020
C HROBRT I*2 RECORD BIT RATE                                             00004030
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00004040
C HROFMT I*2 RECORD FORMAT                                               00004050
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00004060
C HROCTR I*2 FRAME COUNTER CORRECTION                                    00004070
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00004080
C HROTYP I*2 DATA TYPE                                                   00004090
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00004100
C HRCQUL I*2 DATA QUALITY                                                00004110
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00004120
C MROFM5 I*4 ARRAY OF RATES WORDS                                        00004130
C        COPRAT(W),REVISR(R),WRTRAT(R)                                   00004140
C RBIOCK/ COMMON BLOCK OF UNPACKED RATES DATA                            00004150
C HRATE4 I*2 RATES WORD NUMBER 4                                         00004160
C        EXTRCT(R),RATUPK(W)                                             00004170
C HRATE3 I*2 RATES WORD NUMBER 3                                         00004180
C        EXTRCT(R),RATUPK(W)                                             00004190
C HRATE2 I*2 RATES WORD NUMBER 2                                         00004200
C        EXTRCT(R),RATUPK(W)                                             00004210
C QRATE1 L*1 CURRENT PORTION OF THE SPLIT RATES WORD                     00004220
C        EXTRCT(R),RATUPK(W)                                             00004230
C QDS432 L*1 UNSECTORED SEQUENCE ID                                      00004240
C        EXTRCT(R),FMSYNC(W),RATUPK(W)                                   00004250
C QLINE  L*1 LINE NUMBER                                                 00004260
C        EXTRCT(R),FMSYNC(W),PHAOUT(R),RATOUT(R),RATUPK(W)               00004270
C QHPRI  L*1 HET PRIORITY BITS                                           00004280
C        RATUPK(W)                                                       00004290
C RECSTA/ COMMON BLOCK OF RECORD STATUS INFORMATION                      00004300
C MSPFMS I*4 MILLISECONDS OF START OF RECORD                             00004310
C        ADDFRM(R),COMFRM(R),MSFRAM(R),BOMODE(R),EDRCHK(R),EOFMSG(R),    00004320
C        EXTRCT(W),HELDRP(R),PHAOUT(R),RATOUT(R),SKPMSG(R),TIMCHK(R)     00004330
C MSPFME I*4 MILLISECONDS OF END OF RECORD                               00004340
C        PHAOUT(R),RATOUT(R)                                             00004350
C HDPFMS I*2 DAY OF START OF RECORD                                      00004360
C        ADDFRM(R),COMFRM(R),MSFRAM(R),BOMODE(R),EDRCHK(R),EXTRCT(W),    00004370
C        HELDRP(R),PHAOUT(R),RATOUT(R),SKPMSG(R),TIMCHK(W)               00004380
C HDPFME I*2 DAY OF END OF RECORD                                        00004390
C NHETDQ I*4 NUMBER OF HET EVENTS BELOW QUALITY                          00004400
C        EDRSUM(R),EDRINT(I),PHAOUT(W)                                   00004410
C NHETEV I*4 NUMBER OF GOOD HET EVENTS                                   00004420
C        EDRSUM(R),EDRINT(I),PHAOUT(W)                                   00004430
C NULHET I*4 NUMBER OF PADDED HET EVENTS                                 00004440
C        EDRSUM(R),EDRINT(I),PHAOUT(W)                                   00004450
C NLETDQ I*4 NUMBER OF LET EVENTS BELOW QUALITY                          00004460
C        EDRSUM(R),EDRINT(I),PHAOUT(W)                                   00004470
C NLETEV I*4 NUMBER OF GOOD LET EVENTS                                   00004480
C        EDRSUM(R),EDRINT(I),PHAOUT(W)                                   00004490
C NULLET I*4 NUMBER OF PADDED LET EVENTS                                 00004500
C        EDRSUM(R),EDRINT(I),PHAOUT(W)                                   00004510
C NRTOL  I*4 TOTAL NUMBER OF PHA EVENTS                                  00004520
C        EDRCHK(W),EDRSUM(R)                                             00004530
C NRTIM  I*4 EVENT TIME STATUS FLAG                                      00004540
C        EDRSUM(R),EDRINT(I),TIMCHK(W)                                   00004550
C NRQUL  I*4 TOTAL NUMBER OF PHA EVENTS THAT FAIL QUALITY                00004560
C        EDRCHK(W),EDRSUM(R),EDRINT(I)                                   00004570
C NRPAD  I*4 TOTAL NUMBER OF PHA EVENTS THAT ARE PADDED                  00004580
C        EDRCHK(W),EDRSUM(R),EDRINT(I)                                   00004590
C NRGOOD I*4 TOTAL NUMBER OF GOOD PHA EVENTS                             00004600
C        EDRCHK(W),EDRSUM(R),EDRINT(I)                                   00004610
C MRCAFN I*4 ABSOLUTE FILE NUMBER FROM HELDRP PROCESSING                 00004620
C        HELDRP(W),RATOUT(R)                                             00004630
C HCONT  I*2 FLAG USED TO SHOW CONTINUITY OF DATA                        00004640
C        EDRCHK(W),EXTRCT(W),PHAOUT(R),RATOUT(R),TIMCHK(W)               00004650
C ORCSKP L*1 FLAG TO BYPASS RECORD SKIP PRINTOUT                         00004660
C        EDRCHK(W),EXTRCT(R)                                             00004670
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C RUNDAT/ COMMCN BLOCK OF INFORMATION OF THE HELDRP RUN                  00004680
C HMNRN   I*2 MINUTES OF START OF RUN                                   00004690
C         DREMES(R),DRSRPT(R),ENDCAT(R),HELDRP(W)                       00004700
C HDYRN   I*2 DAY OF START OF RUN                                       00004710
C         DREMES(R),DRSRPT(R),ENDCAT(R),HELDRP(W)                       00004720
C HYRRN   I*2 YEAR OF RUN                                               00004730
C         DREMES(R),DRSRPT(R),ENDCAT(R),HELDRP(W)                       00004740
C HMJDRN  I*2 MODIFIED JULIAN DAY OF RUN                                00004750
C         HELDRP(W)                                                     00004760
C QMERGE  L*1 FLAG REQUESTING MERGE OF DATA                             00004770
C         DREMES(R),EDRCAT(R),HELDRP(W)                                 00004780
C QPHATP  L*1 FLAG REQUESTING PHA TAPE CREATION                         00004790
C         DREMES(R),DRSRPT(R),EXTRCT(R),HELDRP(W)                       00004800
C QRATTP  L*1 FLAG REQUESTING RATES TAPE CREATION                       00004810
C         DREMES(R),DRSRPT(R),EXTRCT(R),HELDRP(W)                       00004820
C QCTLGT  L*1 FLAG REQUESTING CATALOG TAPE                              00004830
C         DREMES(R),ENDCAT(R),HELDRP(W)                                 00004840
C QPRTID  L*1 FLAG REQUESTING PRINTOUT OF CATALOG                       00004850
C         DREMES(R),ENDCAT(R),HELDRP(W)                                 00004860
C QLOOK   L*1 FLAG REQUESTING QUICK-LOOK AT DATA                        00004870
C         DREMES(R),EDRCAT(R),ENDCAT(R),HELDRP(W)                       00004880
C QREPLC  L*1 FLAG REQUESTING REPLACE OLD DATA WITH NEW                 00004890
C         HELDRP(W),WRTPHA(R)                                           00004900
C SEQID/  COMMCN BLOCK OF SEQUENCE IDS                                  00004910
C HPHA    I*2 POSITION OF THE PHA WORD                                  00004920
C         EXTRCT(W),FMSYNC(W),INDEXP(R),PHAOUT(R),RATOUT(R)             00004930
C HUNSEQ  I*2 UNSECTORED SEQUENCE ID                                    00004940
C         FILINT(I),EXTRCT(W),FMSYNC(W),PHAOUT(R)                       00004950
C HSRSEQ  I*2 SECTORED SEQUENCE ID                                      00004960
C         EXTRCT(W),FMSYNC(W),RATOUT(R)                                 00004970
C QUNSEQ  L*1 FLAG INDICATING PRESENCE OF UNSECTORED ID                 00004980
C         FILINT(I),EXTRCT(W),FMSYNC(W),PHAOUT(R),RATOUT(R)             00004990
C QSRSEQ  L*1 FLAG INDICATING PRESENCE OF SECTORED ID                   00005000
C         FILINT(I),EXTRCT(W),FMSYNC(W),RATOUT(R)                       00005010
C STATUS/ COMMCN BLOCK OF STATUS OF DATA                                00005020
C HGMT    I*2 GMT TIME CORRECTION FLAG                                  00005030
C         HELDRP(I),UPKSTA(W)                                           00005040
C HEVT    I*2 EVENT TIME STATUS FLAG                                    00005050
C         HELDRP(I),UPKSTA(W)                                           00005060
C HTYP    I*2 DATA TYPE                                                 00005070
C         UPKSTA(W)                                                     00005080
C HENG    I*2 ENGINEERING FRAME NUMBER                                  00005090
C         UPKSTA(W)                                                     00005100
C HERR    I*2 NUMBER OF BIT ERRORS IN S/C SYNC WORD                     00005110
C         UPKSTA(W)                                                     00005120
C HQUAL   I*2 DATA QUALITY                                              00005130
C         PHAOUT(R),RATOUT(R),UPKSTA(W)                                 00005140
C QFRM    L*1 FRAME COUNTER CORRECTION                                  00005150
C         UPKSTA(W)                                                     00005160
C QFILL   L*1 FILL DATA PRESENT FLAG                                    00005170
C         EDRCHK(W),PHAOUT(R),RATOUT(R),UPKSTA(W)                       00005180
C QDM     L*1 DISTRIBUTION MODE                                         00005190
C         EDRCHK(R),UPKSTA(W)                                           00005200
C TAPLST/ COMMCN BLOCK OF TAPES ASSOCIATED WITH THIS RUN                00005210
C DNEWPH  R*8 ARRAY OF TAPES CREATED THIS RUN FOR PHA                   00005220
C         DRSRPT(R),NXTPTO(W),SETNMP(W),SETOMP(W),WRTPHA(R)             00005230
C DNEWRT  R*8 ARRAY OF TAPES CREATED THIS RUN FOR RATES                 00005240
C         DRSRPT(R),NXTRTO(W),SETNMR(W),SETOMR(W),WRTRAT(R)             00005250
C DCOPHA  R*8 ARRAY OF TAPES COPIED THIS RUN FOR PHA                    00005260
C         COPPHA(W),DRSRPT(R),SETNMP(W),SETOMP(W),WRTPHA(R)             00005270
C DCOPRT  R*8 ARRAY OF TAPES COPIED THIS RUN FOR RATES                  00005280
C         COPRAT(W),DRSRPT(R),SETNMR(W),SETOMR(W),WRTRAT(R)             00005290
C NEWPHA  I*4 NUMBER OF TAPES CREATED THIS RUN FOR PHA                  00005300
C         DRSRTP(W),HELDRP(I),NXTPTO(W),SETNMP(W),SETOMP(W),WRTPHA(R)   00005310
C NEWRAT  I*4 NUMBER OF TAPES CREATED THIS RUN FOR RATES                00005320
C         DRSPRT(W),HELDRP(I),NXTRTO(W),SETNMR(W),SETOMR(W),WRTRAT(R)   00005330
C HCOPHA  I*2 NUMBER OF TAPES COPIED THIS RUN FOR PHA                   00005340
C         DRSPRT(W),HELDRP(I),NXTPTO(W),SETNMP(W),SETOMP(W),WRTPHA(R)   00005350
C HCOPRT  I*2 NUMBER OF TAPES COPIED THIS RUN FOR RATES                 00005360
C         DRSPRT(W),HELDRP(I),NXTRTO(W),SETNMR(W),SETOMR(W),WRTRAT(R)   00005370
C LSTPFR  I*4 NOT USED                                                  00005380
C LSTRFR  I*4 NOT USED                                                  00005390
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*** END OF MEMBER *** 539 RECORDS PROCESSED **********

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*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000020
* 1.  Routine:                                                       00000030
*       CONTIM                                                      00000040
* 2.  System, Satellite; Version:                                   00000050
*       HELDRE    HELIOS A,B          0                           00000060
* 3.  English Name:                                                 00000070
*       CONVERT TIME                                                00000080
* 4.  Language:                                                     00000090
*       ASMG   level G    release 21MAR76   360/91/75   OS/MVT    00000100
* 5.  Purpose:                                                      00000110
*       CONVERT TIME OF DAY FROM MILLISECONDS TO HR/MIN/SEC         00000120
* 6.  Calling Sequence:                                             00000130
*       Argument          Type    I/O    Description              00000140
*          MILSEC     I*4        MILLISECONDS TO BE CONVERTED     00000150
*          HOUR       I*2        HOURS RETURNED                   00000160
*           MINUTE     I*2        MINUTES RETURNED                00000170
*          SECOND     I*2        SECONDS RETURNED                 00000180
*          TYPE       I*4        FLAG TO SET ATTRIBUTES TO SECONDS00000190
* 7.  Notes:                                                        00000200
*       7a.  Restrictions:                                          00000210
*                                                                   00000220
*       7b.  Special Features:                                      00000230
*          SECONDS CAN BE EITHER INTEGER OR REAL                    00000240
* 8.  Variables:                                                    00000250
*       8a.  Local                                                  00000260
*            Variable             Type    Description              00000270
*          TYPE       I*4        ATTRIBUTES ASSIGNED TO SECOND    00000280
*          MSEC       I*4        MILLISECONDS                     00000290
*          HOUR       I*4        HOURS                            00000300
*          MIN        I*4        MINUTES                          00000310
*          SEC        I*4        SECONDS                          00000320
*          EVEN       I*4        EVEN FLAG                        00000330
*          ODD        I*4        ODD FLAG                         00000340
*       8b.  COMMON                                                 00000350
*            COMMON               Variables                       00000360
*          NONE                                                     00000370
* 9.  I/O Information:                                              00000380
*       Unit No.          Use Description                         00000390
*          NONE                                                     00000400
*10.  Error Handling:                                              00000410
*       NONE                                                        00000420
*11.  Subroutines Called:                                          00000430
*       Subroutine        Description                             00000440
*          NONE                                                     00000450
*12.  Called By:                                                   00000460
*       Routine           Description                             00000470
*          DMCEND     DM7 END                                     00000480
*          EOFMSG     END OF FILE MESSAGE                         00000490
*          EDRSUM     EDR SUMMARY                                 00000500
*          DM7CHK     DM7 CHECK                                   00000510
*          SKIMSG     SKIP MESSAGE                                00000520
*          ENDCAT     END CATALOG                                 00000530
*13.  Method:                                                      00000540
*          TIME       TITLE                                       00000550
*          CONTIM     PROC                                        00000560
*          IF TYPE IS PRESENT                                     00000570
*                     SAVE TYPE                                   00000580
*          ELSE ZERO TYPE                                         00000590
*          FI                                                     00000600
*          DIVIDE MILLISECONDS BY 3600000                         00000610
*                     STORE HOURS                                 00000620
*          DIVIDE REMAINDER BY 60000                              00000630
*                     STORE MINUTES                               00000640
*          IF TYPE IS PRESENT                                     00000650
*                     CONVERT REMAINDER TO FLOATING POINT         00000660
*                     DIVIDE BY 1000                              00000670
*                                STORE SECONDS                    00000680
*          ELSE DIVIDE BY 1000                                    00000690
*                     STORE SECONDS                               00000700
*          END CONTIM                                             00000710
*          END TIME                                               00000720
*14.  Reference:                                                   00000730
*       NONE                                                        00000740
*15.  Programmer and Date:                                         00000750
*       ROGER DUBORD                                               00000760
*16.  Modifications:                                               00000770
*                                                                  00000780
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*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000790
CONTIM   START 0                                                     00000800
*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*  00000810
*                                                                    00000820
*     CONTIM  CONVERTS TIME OF DAY FROM MILLISECONDS TO HOURS, MINUTES, 00000830
*  AND SECONDS.  THE INPUT MILLISECONDS IS A FULL WORD INTEGER.  THE  00000840
*  RETURNED HOURS AND MINUTES ARE HALF WORD INTEGERS.  THE RETURNED   00000850
*  SECONDS IS A FULL WORD FLOATING POINT, UNLESS AN OPTIONAL FIFTH    00000860
*  PARAMETER, A FULL WORD INTEGER, IS PRESENT AND CONTAINS A NEGATIVE 00000870
*  NUMBER.  IF THESE CONDITIONS ARE MET, SECONDS ARE RETURNED AS TWO  00000880
*  ADJACENT HALF WORD INTEGERS OVERLAYING THE FULL WORD SECONDS, THE  00000890
*  FIRST BEING SECONDS AND THE OTHER BEING THOUSANDTHS OF SECOND.     00000900
*                                                                    00000910
*     CALLING SEQUENCE:  CALL CONTIM (MILSEC,HOUR,MINUTE,SECOND,TYPE) 00000920
*               WHERE:  MILSEC IS THE FULL WORD LOCATION CONTAINING  00000930
*                         THE MILLISECONDS TO BE CONVERTED           00000940
*                       HOUR IS THE HALF WORD LOCATION INTO WHICH THE 00000950
*                         RESULTING HOURS ARE PLACED                 00000960
*                       MINUTE IS THE HALF WORD LOCATION INTO WHICH  00000970
*                         THE RESULTING MINUTES ARE PLACED           00000980
*                       SECOND IS THE FULL WORD LOCATION INTO WHICH  00000990
*                         THE RESULTING SECONDS ARE PLACED           00001000
*                       TYPE IS AN OPTIONAL PARAMETER INDICATING THE 00001010
*                         ATTRIBUTES ASSIGNED TO SECOND              00001020
*                                                                    00001030
*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*C*  00001040
*                                                                    00001050

*** END OF MEMBER ***     104 RECORDS PROCESSED   ********************************************************************
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```
C      THIS ROUTINE COPIES OLD DATA FROM A PREVIOUS TAPE ON IRINU TO      00000060
C      TO AN UPIATED TAPE ON IROUTU                                       00000070
C      DATA IS COPIED UNTIL THERE IS AN OVERLAP OR UNTIL THE END          00000080
C      TIME OF THE NEW RECORD IS PASSED BY THE END TIME OF A NEW RECORD   00000090
C      IF THERE IS A RECORD OVERLAP THE ROVER SWITCH IS SET TO TRUE AND   00000100
C      THE RINBUF SWITCH INDICATING A RECORD TO BE TESTED IS SET TO FALSE 00000110
C      IF THERE IS NC OVERLAP ROVER IS SET TO FALSE AND RINBUF TO TRUE    00000120
C      TO INDICATE THAT THERE REMAINS AN ACTIVE OLD RECORD TO BE TESTED   00000130
C      ON THE NEXT PASS THROUGH THE PROGRAM                               00000140
C*********************************************************************** 00000150
C 1.   NAME: COPPHA                                                       00000160
C 2.   INDENTIFICATICN: HELDRP HELIOS A,B                                 00000170
C 3.   ENGLISH NAME: COPY PHA                                            00000180
C 4.   LANGUAGE: FORTRANH, OS/MVT, 360/91/75                             00000190
C 5.   PURPOSE: SEE ABOVE                                                00000200
C 6.   CALLING SEQUENCE: CALL COPPHA(NDATA,ODATA,NDAYS,NDAYE,ODAYS,ODAYE,00000210
C      NMSS,NMSE,OMSS,OMSE,ITAPEC,HPHATP,DPHATP,MSPHAS,MSPHAE,HDPHAS,     00000220
C      HDPHAE,HPHAFT,DBLNKP,HPHABK,DNEWPH,DCOPHA,NEWPHA,HCOPHA,ROVER,     00000230
C      RINBUF,HDLAST,MSLAST,FEET,LENOLD)                                  00000240
C      NDATA   I*4 NEW PHA DATA RECORD                                    00000250
C      ODATA   I*4 OLD PHA DATA RECORD                                    00000260
C      NDAYS   I*2 START DAY OF NEW PHA RECORD                            00000270
C      NDAYE   I*2 END DAY OF NEW PHA RECORD                              00000280
C      ODAYS   I*2 START DAY OF OLD PHA RECORD                            00000290
C      ODAYE   I*2 END DAY OF OLD PHA RECORD                              00000300
C      NMSS    I*4 START MILLISECONDS OF NEW PHA RECORD                   00000310
C      NMSE    I*4 END MILLISECONDS OF NEW PHA RECORD                     00000320
C      OMSS    I*4 START MILLISECONDS OF OLD PHA RECORD                   00000330
C      OMSE    I*4 END MILLISECONDS OF OLD PHA RECORD                     00000340
C      ITAPEC  I*4 CATALOG NUMBER OF TAPE TO COPY                         00000350
C      HPHATP  I*2 CATALOG NUMBER OF PHA TAPES                            00000360
C      DPHATP  R*8 CATALOG LIST OF PHA TAPES                              00000370
C      MSPHAS  I*4 CATALOG LIST OF START MILLISECONDS OF PHA TAPES        00000380
C      MSPHAE  I*4 CATALOG LIST OF END MILLISECONDS OF PHA TAPES          00000390
C      HDPHAS  I*2 CATALOG LIST OF START DAYS OF PHA TAPES                00000400
C      HDPHAE  I*2 CATALOG LIST OF END DAYS OF PHA TAPES                  00000410
C      HPHAFT  I*2 CATALOG LIST OF FEET WRITTEN ON PHA TAPES              00000420
C      DBLNKP  R*8 CATALOG LIST OF BLANK PHA TAPES                        00000430
C      HPHABK  I*2 TOTAL NUMBER OF ASSIGNED PHA TAPES IN CATALOG          00000440
C      DNEWPH  R*8 LIST OF NEW PHA TAPES                                  00000450
C      DCOPPH  R*8 LIST OF COPIED PHA TAPES                               00000460
C      NEWPHA  I*4 NUMBER OF NEW PHA TAPES                                00000470
C      HCOPHA  I*2 NUMBER OF COPIED PHA TAPES                             00000480
C      ROVER   L*4 RECORD OVERLAP SWITCH                                  00000490
C      RINBUF  L*4 RECORD IN BUFFER SWITCH                                00000500
C      HDLAST  I*2 DAY OF LAST RECORD WRITTEN                             00000510
C      MSLAST  I*4 MILLISECONDS OF LAST RECORD WRITTEN                    00000520
C      FEET    R*4 TOTAL FEET WRITTEN ON OUTPUT TAPE                      00000530
C      LENOLD  I*4 LENGTH IN BYTES OF OLD PHA RECORD                      00000540
C 7.   NOTES: NONE                                                        00000550
C 8.   VARIABLES: NO COMMON BLOCKS ARE USED                               00000560
C 9.   I/O: INPUT: UNIT 13 OLD PHA TAPE UNIT                              00000570
C          OUTPUT: NONE                                                   00000580
C 10.  ERROR HANDLING: ABEND 1,2,3,4 FOR TAPE READ ERRORS                 00000590
C 11.  CALLS: FREAD,UNLOAD,MOUNT,WRITEP,ABEND                             00000600
C 12.  CALLED BY: WRTPHA                                                  00000610
C 13.  METHOD:                                                            00000620
C      COPPHA  IF THERE IS A RECORD IN BUFFER                             00000630
C                  GOTO OVERLAP                                           00000640
C              ELSE GOTO READ                                             00000650
C              FI                                                         00000660
C      OVERLAP IF      RECORD TIME IS GREATER THAN NEW RECORD             00000670
C                        SET ROVER TO FALSE, NO OVERLAP                   00000680
C                        EXIT COPPHA                                      00000690
C              ELSE                                                       00000700
C                   IF NO OVERLAP CALL WRITEP TO COPY OLD RECORD          00000710
C                        RETURN TO READ                                   00000720
C                   ELSE SET ROVER TO TRUE, OVERLAP                      00000730
C                        EXIT COPPHA                                      00000740
C      READ    READ ANOTHER OLD RECORD                                    00000750
C                   IF END OF TAPE REACHED                                00000760
C                        DISMOUNT OLD TAPE                                00000770
C                        MOUNT NEW TAPE TO BE COPIED                      00000780
C                        MODIFY CATALOG                                   00000790
C                        READ A RECORD FROM TAPE                          00000800
C                        GOTO OVERLAP                                     00000810
C                   ELSE SET RINBUF TO  TRUE                              00000820
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C                     GOTO OVERLAP                                          00000830
C                  FI                                                       00000840
C 14. REFERENCE: NONE                                                       00000850
C 15. PROGRAMMER: GERRY MARANDINO                                           00000860
C 16. MODIFIED:                                                             00000870
C*************************************************************************00000880
C*************************************************************************00000890

*** END OF MEMBER ***      84 RECORDS PROCESSED  ********************************************************************
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```
C      THIS ROUTINE COPIES OLD DATA FROM A PREVIOUS TAPE ON IRINU TO      00000060
C      TO AN UPDATED TAPE ON IROUTU                                       00000070
C      DATA IS COPIED UNTIL THERE IS AN OVERLAP OR UNTIL THE END          00000080
C      TIME OF THE NEW RECORD IS PASSED BY THE END TIME OF A NEW RECORD   00000090
C      IF THERE IS A RECORD OVERLAP THE ROVER SWITCH IS SET TO TRUE AND   00000100
C      THE RINBUF SWITCH INDICATING A RECORD TO BE TESTED IS SET TO FALSE00000110
C      IF THERE IS NO OVERLAP ROVER IS SET TO FALSE AND RINBUF TO TRUE    00000120
C      TO INDICATE THAT THERE REMAINS AN ACTIVE OLD RECORD TO BE TESTED   00000130
C      ON THE NEXT PASS THROUGH THE PROGRAM                               00000140
C*****************************************************************      00000150
C 1.   NAME: COPRAT                                                       00000160
C 2.   INDENTIFICATION: HELDRP HELIOS A,B                                 00000170
C 3.   ENGLISH NAME: COPY RATES                                           00000180
C 4.   LANGUAGE: FCRIRANH, OS/MVT, 360/91/75                             00000190
C 5.   PURPOSE: SEE ABOVE                                                 00000200
C 6.   CALLING SEQUENCE: CALL COPRAT(NDATA,ODATA,NDAYS,NDAYE,ODAYS,ODAYE,00000210
C      NMSS,NMSE,OMSS,OMSE,ITAPEC,HRATTP,DRATTE,MSRATS,MSRATE,HDRATS,     00000220
C      HDRATE,HRATPT,DBLNKR,HRATBK,DNEWRT,DCOPRT,NEWRAT,HCOPRT,ROVER,     00000230
C      RINBUF,HDLAST,MSLAST,FEET,LENOLD)                                  00000240
C      NDATA  I*4 NEW RATES DATA RECORD                                   00000250
C      ODATA  I*4 OLD RATES DATA RECORD                                   00000260
C      NDAYS  I*2 START DAY OF NEW RATES RECORD                           00000270
C      NDAYE  I*2 END DAY OF NEW RATES RECORD                             00000280
C      ODAYS  I*2 START DAY OF OLD RATES RECORD                           00000290
C      ODAYE  I*2 END DAY OF OLD RATES RECORD                             00000300
C      NMSS   I*4 START MILLISECONDS OF NEW RATES RECORD                  00000310
C      NMSE   I*4 END MILLISECONDS OF NEW RATES RECORD                    00000320
C      OMSS   I*4 START MILLISECONDS OF OLD RATES RECORD                  00000330
C      OMSE   I*4 END MILLISECONDS OF OLD RATES RECORD                    00000340
C      ITAPEC I*4 CATALOG NUMBER OF TAPE TO COPY                          00000350
C      HRATTP I*2 CATALOG NUMBER OF RATES TAPES                           00000360
C      DRATTE R*8 CATALOG LIST OF RATES TAPES                             00000370
C      MSRATS I*4 CATALOG LIST OF START MILLISECONDS OF RATES TAPES       00000380
C      MSRATE I*4 CATALOG LIST OF END MILLISECONDS OF RATES TAPES         00000390
C      HDRATS I*2 CATALOG LIST OF START DAYS OF RATES TAPES               00000400
C      HDRATE I*2 CATALOG LIST OF END DAYS OF RATES TAPES                 00000410
C      HRATPT I*2 CATALOG LIST OF FEET WRITTEN ON RATES TAPES             00000420
C      DBLNKR R*8 CATALOG LIST OF BLANK TAPES                             00000430
C      HRATBK I*2 TOTAL NUMBER OF ASSIGNED RATES IN CATALOG               00000440
C      DNEWRT R*8 LIST OF NEW RATES TAPES                                 00000450
C      DCOPRT R*8 LIST OF COPIED RATES TAPES                              00000460
C      NEWRAT I*4 NUMBER OF NEW RATES TAPES                               00000470
C      HCOPRT I*2 NUMBER OF COPIED RATES TAPES                            00000480
C      ROVER  L*4 RECORD OVERLAP SWITCH                                   00000490
C      RINBUF L*4 RECORD IN BUFFER SWITCH                                 00000500
C      HDLAST I*2 DAY OF LAST RECORD WRITTEN                              00000510
C      MSLAST I*4 MILLESECONDS OF LAST RECORD WRITTEN                     00000520
C      FEET   R*4 TOTAL FEET WRITTEN ON OUTPUT TAPE                       00000530
C      LENOLD I*4 LENGTH IN BYTES OF OLD RATES RECORD                     00000540
C 7.   NOTES: NONE                                                        00000550
C 8.   VARIABLES: NO COMMON BLOCK VARIABLES ARE USED                      00000560
C 9.   I/O: INPUT: UNIT 16 OLD RATES TAPE UNIT                           00000570
C          OUTPUT: NONE                                                  00000580
C 10.  ERROR HANDLING: ABEND 1,2,3,4 FOR TAPE READ ERRORS                00000590
C 11.  CALLS: FREAD,UNLOAD,MOUNT,WRITER,ABEND                            00000600
C 12.  CALLED BY: WRTRAT                                                 00000610
C 13.  METHOD:                                                           00000620
C      COPRAT  IF THERE IS A RECORD IN BUFFER                            00000630
C                 GOTO OVERLAP                                         00000640
C              ELSE GOTO READ                                           00000650
C              FI                                                       00000660
C      OVERLAP IF      RECORD TIME IS GREATER THAN NEW RECORD            00000670
C                        SET ROVER TO FALSE, NO OVERLAP                 00000680
C                        EXIT COPRAT                                    00000690
C              ELSE                                                     00000700
C                   IF NO OVERLAP CALL WRITER TO COPY OLD RECORD        00000710
C                        RETURN TO READ                                 00000720
C                   ELSE SET ROVER TO TRUE, OVERLAP                     00000730
C                        EXIT COPRAT                                    00000740
C      READ    READ ANOTHER OLD RECORD                                   00000750
C                   IF END OF TAPE REACHED                             00000760
C                        DISMOUNT OLD TAPE                             00000770
C                        MOUNT NEW TAPE TO BE COPIED                   00000780
C                        MODIFY CATALOG                                00000790
C                        READ A RECORD FROM TAPE                       00000800
C                        GOTO OVERLAP                                  00000810
C                   ELSE SET RINBUF TO  TRUE                           00000820
```

```
C                     GOTO OVERLAP                                          00000830
C                   FI                                                      00000840
C 14. REFERENCE: NONE                                                       00000850
C 15. PROGRAMMER: GERRY MARANDINO                                           00000860
C 16. MODIFIED:                                                             00000870
C*************************************************************************00000880
C*************************************************************************00000890
```

*** END OF MEMBER *** 84 RECORDS PROCESSED **********

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C  THIS SUBROUTINE CHECKS FOR DM7 DATA AND WRITES OUT MESSAGE FOR
C      STARTING AND ENDING TIMES    WHILE PROCESSING DATA
C  HELIOS A,B VERSIONS
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C 1. NAME:DM7CHK
C 2. TDENTIFICATICN:=HELDRP HELIOS A,B
C 3. ENGLISH NAME: DISTRIBUTION MODE 7 CHECK
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT
C 5. PURPOSE: TO FLAG ALL DM7 RECORDS
C 6. CALLING  SEQUENCE: CALL DM7CHK(IDMODE,HSDAY,IMCS,DTSLOT,MFILE,NREC,
C                                NTP,HBTRT,HFMT,HRECYR)
C                'IDMODE' DISTRIBUTICN MODE
C                'HSDAY ' DAY NO. OF THE RECORD
C                'IMSCS'  MIL.SECS OF THE RECORD
C                 'DTSLOT' TAPE NO.OF AN EDR
C                 'MFILE'  FILE NO. OF AN EDR
C                 'NREC '  RECORD NO. OF AN EDR
C                 'NTP   ' SEQ NO. OF AN EDR IN PROCESSING
C                 'HBTRT ' BITRATE FOR THAT RECORD
C                 'HFMT '  FORMAT  FOR THAT RECORD
C                 'HRECYR' YEAR NO.FCR THAT RECORD
C 7. NOTES:NONE
C VARIABLES: NO COMMON BLOCK VARIABLES.
C 9.I/O:    INPUT:ALL THE ABOVE MENTICNED VARIABLES AS CALLING SEQ
C          OUTPUT:DM7 MESSAGES ON UNIT 30
C 10. ERROR HANDLING: NONE.
C 11. CALLS: CCNTIM
C 12. CALLED BY: HELDRP
C METHOD: IF DISTRIBUTION MODE 7 SET FLAG =T. WRITE A MESSAGE FOR DM7.
C      ACCUMALATE ALL RECORDS FOR DM7.
C       IF NOT DM7 SET FLAG=F. AND WRITE TOTAL NO. OF RECORDS
C      IN DISTRIBUTION MODE
C
C 14. REFERFNCE: NONE.
C 15. PROGRAMMER: RAMI CUDDAPAH.
C 16. MODIFIED:
```

*** END OF MEMBER ***   39 RECORDS PROCESSED   **

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C    THIS SUBROUTINE WRITES OUT ALL ERROR MESSAGES FOR DATA REDUCTION
C    PROCESS FOR USER AS'PROCESSING MESSAGE
C
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C 1. NAME:DRPMES
C 2. IDENTIFICATION: HELDRP HELIOS A,B
C 3. ENGLISH NAME: DATA REDUCTION MESSAGES
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT
C 5. PURPOSE: ALL ERROR MESSAGES ARE FORMATTED & WRITTEN OUT HERE
C 6. CALLING  SEQUENCE: CALL DRPMES(DPROG,IMES,IPRM)                     ,
C                 'DPROG '  PROGRAMME NAME
C                 'IMES  '  MESSAGE CODE OR NUMBER.
C                 'IPRM '   DIMENSIONED(20)  INFO PASSED FOR ERROR MESSAGE
C 7. NOTES:NONE
C 8. VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN APPENDICES
C               OF HELIOS DATA REDUCTION PROGRAMME DESCRIPTION.
C 9.I/O:    INPUT:ALL THE ABOVE MENTIONED VARIABLES AS CALLING SEQ
C           OUTPUT:DRP MESSAGES ON UNIT 30 SOME AS USER ABENDS WITH CODES
C 10. ERROR HANDLING: DONE. WITH USER ABENDS
C 11. CALLS: CONTIM ,FTIME.
C 12. CALLED BY: HELDRP,EDRCHK,TIMCHK,EDRCAT,
C 13. METHOD: GETS THE PROGRAMME NAME & ERROR CODE FROM THE CALLING
C     ROUTINE, IF MESSAGE CODE IS WITHIN THE NUMBER OF MESSAGES;
C     WRITES THAT MESSAGE WITH PROGRAMME NAME.
C     ELSE ABENDS WITH THAT CODE AS USER ABEND.
C     FI
C 14. REFERENCE: NONE.
C 15. PROGRAMMER: ROGER DUBORD.
C 16. MODIFIED:   BY RAMI CUDDAPAH.              7/1/77
C***********************************************************************
C***********************************************************************

*** END OF MEMBER ***      34 RECORDS PROCESSED    *************************************************************
```

```
C 1. NAME: DRSRPT                                                       00000030
C 2. IDENTIFICATION: HELDRP HELIOS A&B                                  00000040
C 3. ENGLISH NAME: DATA REDUCTION SYSTEM PRINT ROUTINE                  00000050
C 4. LANGUAGE: FORTRANH; 360/91/75, OS/MVT                              00000060
C 5. PURPOSE:                                                           00000070
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000080
C                                                                       C00000090
C   THIS ROUTINE WRITES THE DRS STATUS REPORT AT THE END OF EACH RUN    C00000100
C   OF THE HELIOS DATA REDUCTION PROGRAM.                               C 00000110
C                                                                       C00000120
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000130
C 6. CALLING SEQUENCE: CALL DRSRPT(NCAT)                                00000140
C            'NCAT' ' I*4 FORTRAN LOGICAL UNIT FOR THE ACTIVE CATALOG   00000150
C 7. NOTES: NONE                                                        00000160
C 8. VARIABLES: COMMON BLOCK VARIABLES ARE DESCRIBED IN DATA REDUCTION  00000170
C         SYSTEM APPENDICES.                                            00000180
C 9. I/O: INPUT  IS THE ABOVE CALLING ARGUMENT                          00000190
C      OUTPUT: DATA REDUCTION CATALOG INFORMATION ON UNIT 33            00000200
C 10..ERROR HANDLING: NONE.                                             00000210
C 11.CALLS: CNVMJD, CONTIM.                                             00000220
C 12.CALLED BY: HELDRP                                                  00000230
C 13.METHOD: GET TAPE CATLOG POINTER I.E(NCAT-40)                       00000240
C      WRITE HEADING FOR GIVEN SATELITTE ;                              00000250
C     IF QUICK LOOK PROCESSING SKIP TO WRITE                            00000260
C       IF RATES & PHA TAPES ARE REQUETED; SET                          00000270
C       DPS =-DPHAS                                                     00000280
C       DPE =-DPHAE                                                     00000290
C       DRS =-DRATS                                                     00000300
C       DRE =-DRATE                                                     00000310
C     CONVERT MIL.SECS IN TI HR MN SC                                   00000320
C WRITES ALL TAPES INFORMATION IN THE CATALOG ON UNIT 33.               00000330
C 14.PROGRAMMER:ROGER DUFORD.                                           00000340
C  15.DOCUMENTED BY: RAMI CUDDAPAH.                                     00000350
C 16.MODIFIED: GERRY MARINDINO                                          00000360
C*************************************************************************00C00370
C*************************************************************************00000380

*** END OF MEMBER ***      36 RECORDS PROCESSED   ***********************************************************
```

```
C 1. NAME: EDRCAT/NEWCAT/ENDCAT/EDRCAT                                  00000020
C 2. IDENTIFICATION: HELDRP,HELIOS A & B                                00000030
C 3. ENGLISH NAME: EXPERIMENTAL DATA REDUCTION CATALOG                  00000040
C      EDRENT: END OF EDR TAPE                                          00000050
C      NEWCAT: RESTORES DISK CATALOG FROM SPECIFIED TAPE                00000060
C      ENDCAT: END OF CATALOG                                           00000070
C 4. LANGUAGE: FORTRAN, 360/91/75, OS/MVT                               00000080
C 5. PURPOSE:                                                           00000090
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000100
C                                                                       C00000110
C    THIS ROUTINE HANDLES THE PIONEER GSFC/CRT FILE/LOGISTICS/HISTORY   C00000120
C    CATALOG WHICH IS MAINTAINED ON DISK WITH A TAPE BACKUP.  THIS      C00000130
C    ROUTINE CONSISTS OF FOUR ENTRY POINTS WHICH PERFORM THE FOLLOWING  C00000140
C    FUNCTIONS:                                                         C00000150
C                                                                       C00000160
C      (1) EDRCAT - DETERMINES IF DATA IS TO BE PROCESSED FROM TAPE AND C00000170
C                   SETS UP LOCATION TO SAVE CATALOG ENTRY FOR EDR TAPE.C00000180
C                                                                       C00000190
C      (2) EDREND - END OF EDR TAPE - ADDS ENTRY TO CATALOG.            C00000200
C                                                                       C00000210
C      (3) NEWCAT - RESTORES DISK CATALOG FROM SPECIFIED BACKUP TAPE.   C00000220
C                                                                       C00000230
C      (4) ENDCAT - END OF JOB - CLEANS UP CATALOG PROCESSING AND       C00000240
C                   CREATES TAPES AND PRINTS CATALOG INFORMATION IF     C00000250
C                   NECESSARY.                                          C00000260
C                                                                       C00000270
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000280
C 6. CALLING SEQUENCE:CALL EDRCAT(*)                                    00000290
C                     '*' STATEMENT NUMBER FOR ALTERNATE ROUTINE.       00000300
C 7. NOTES: NONE                                                        00000310
C 8. VARIABLES: COMMON BLOCK VARIABLES ARE DESCRIBED IN DATA REDUCTION  00000320
C    APPENDICES FOR COMMON BLOCK DESCRIPTIONS.                          00000330
C 9. I/O: OUTPUT OF THE CATALOG STATUS IS WRITTEN OUT                   00000340
C 10. ERROR HANDLING:FTIO AND DAIO ERRORS ARE WRITTEN IN DRPMES         00000350
C 11.CALLS: DREAD,DWRITE,FMOVE,MOUNT,FREAD,FWRITE,POSN,DRPMES           00000360
C 12.CALLED BY: HELDRP                                                  00000370
C 13.METHOD:IF QFIRST SET NRD,NWT,NUMNEW =0; NIN=20                     00000380
C           IF QLCOK =T       NOUT=T QCAT=F                             00000390
C             FI                                                        00000400
C           IF NOT QMERGE SET QCATMG=F, NOUT=NPERM                      00000410
C           IF LSTLOG=0 RETURN                                          00000420
C         ELSE READ LOGISTICS CATALOG SET NWT =LSTLOG                   00000430
C           IF ENTRY IS LT LSTLOG TAKE ALTERNATE RETURN.                00000440
C           IF DATA NOT IN TIME ORDER TAKE ALTERNATE RETURN.            00000450
C             FI                                                        00000460
C            IF QMERGE=TRUE SET QCATMG=T                                00000470
C          FIND CATALOG ENTRY FOR THAT DAY.                             00000480
C          WRITE ENTRY ON LOGISTICS CATALOG                             00000490
C          FI                                                           00000500
C    NEWCAT: IF LSTLOG =0 RETURN.                                       00000510
C             ELSE NCAT=1 NEWLOG=0                                      00000520
C            MOUNT TAPE FILE 2 READ OLD CATLOG;                         00000530
C            IF WRONG LEN RECORD WRITE ERROR MESSAGE.                   00000540
C      ELSE  WRITE NEW LOG ON THE DISK.                                 00000550
C            IF NEW LOG N.E LOGNUM WRITE MESSAGE                        00000560
C             FI                                                        00000570
C    ENDCAT: IF QCTMG =F; SET QFRSTE=T RETURN                           00000580
C            IF NEWLOG GT MAXLOG OR NEWTRK GT MAXTRK                    00000590
C            WRITE A MESSAGE.                                           00000600
C            IF QFRSTE= T RETURN                                        00000610
C      ELSE  COPY ALL OLD  DATA.                                        00000620
C            IF NOT QCATLGT OR QLOOK                                    00000630
C          WRITE OUT NECESSARY LOGISTICS                                00000640
C      ELSE MOUNT REQUESTE TAPES FOR PRIMARY &BAKUP                     00000650
C          WRITE ON THE TAPE CATALOG & LOGISTICS                        00000660
C          FI                                                           00000670
C    EDREND:IF QFRSTE=T SET HAFNST=HLGAFN; &QFRSTE=F                    00000680
C           IF NUMNEW+1 LE MAXLOG SET NUMNEW= NUMNEW+1                  00000690
C             MOVE LOGISTICS INFORMATION ON THAT FILE                   00000700
C           SET LAFNEW =HLGAFN , NWT=NWT+1                              00000710
C            IF NWT .GE. MAXTRK WRITE AN ERROR MESSAGE                  00000720
```

```
C*************************************************************************00000790
*** END OF MEMBER ***     78 RECORDS PROCESSED   ***************************************************************
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000020
C                                                                       C00000030
C   THE FUNCTION OF THIS SUBROUTINE IS TO CHECK THE INCOMING EDR        C00000040
C   TELEMETRY DATA FOR INTEGRITY AND CONTINUITY.                        C00000050
C                                                                       C00000060
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000070
C 1.  NAME: EDRCHK                                                      00000080
C 2.  INDENTIFICATION: HELDRP HELIOS A,B                                00000090
C 3.  ENGLISH NAME: EXPERIMENTAL DATA RECORD CHECK                      00000100
C 4.  LANGUAGE: FORTRANH, OS/MVT, 360/91/75                             00000110
C 5.  PURPOSE: SEE ABOVE                                                00000120
C 6.  CALLING SEQUENCE: CALL EDRCHK(KPAD,HRATIO,&100)                   00000130
C     KPAD   I*4 NUMBER OF PADDED FRAMES                                00000140
C     HRATIO I*2 EHA/RATES RATIO                                        00000150
C     &100       ALTERNATE RETURN FOR SKIPPING RECORD                   00000160
C 7.  NOTES: NONE                                                       00000170
C 8.  VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN           00000180
C     APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION           00000190
C 9.  I/O: INPUT: NONE                                                  00000200
C          OUTPUT: UNIT 8 ERROR MESSAGES                                00000210
C 10. ERROR HANDLING: BAD RATIO IS NOTED WITH A PRINTOUT                00000220
C                     BAD FRAME TIME IS NOTED WITH A PRINTOUT           00000230
C                     NO ENGINEERING DATA IS NOTED AND MF SKIPPED       00000240
C                     PADDED FRAME IS NOTED AND SKIPPED                 00000250
C                     BAD QUALITY FRAME IS SKIPPED                      00000260
C                     TIME CHECK FAILURE IS NOTED AND MF SKIPPED        00000270
C 11. CALLS: UPKSTA,FTIME,DM7CHK,IGET,MOD,DRPMES,SKPMSG,BOMODE,TIMCHK   00000280
C 12. CALLED BY: EXTRCT                                                 00000290
C 13. METHOD: UNPACK STATUS WORD                                        00000300
C             IF NOT DM7                                                00000310
C                  IF FIRST RECORD                                      00000320
C                     SKIP RECORD                                       00000330
C                  ELSE CHECK FRAME TIME                                00000340
C                  IF FORMAT 5 BRANCH TO SPECIAL SECTION                00000350
C                  ELSE                                                 00000360
C                       IF RATIO NOT SAME AS PREDICTED                  00000370
C                          WRITE MESSAGE                                00000380
C                       FI                                              00000390
C                       IF ENGINEERING DATA NOT PRESENT                 00000400
C                          WRITE MESSAGE                                00000410
C                       IF BIT RATE INVALID                             00000420
C                          WRITE MESSAGE AND SKIP RECORD                00000430
C                       IF NEW FILE WRITE MESSAGE                       00000440
C                       IF DATA NOT CONTINUOUS WRITE MESSAGE            00000450
C                       IF FRAME PADDED SKIP FRAME                      00000460
C                       IF TIME CHECK FAILED SKIP FRAME                 00000470
C                  FI HANDLE FORMAT 5 DATA                              00000480
C 14. REFERENCE: NONE                                                   00000490
C 15. PROGRAMMER: ROGER DUBORD                                          00000500
C 16. MODIFIED:                                                         00000510
C***********************************************************************00000520
C***********************************************************************00000530
C***********************************************************************00000550

*** END OF MEMBER ***     53 RECORDS PROCESSED   ***************************************************************************
```

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000020
C                                                                       C00000030
C   THE FUNCTION OF THIS SUBROUTINE IS TO CHECK THE INCOMING EDR        C00000040
C   TELEMETRY DATA FOR INTEGRITY AND CONTINUITY.                        C00000050
C                                                                       C00000060
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000070
C 1.  NAME: EDRCHK                                                      00000080
C 2.  INDENTIFICATION: HELDRP HELIOS A,B  ACCEPT DM7 VERSION            00000090
C 3.  ENGLISH NAME: EXPERIMENTAL DATA RECORD CHECK                      00000100
C 4.  LANGUAGE: FORTRANH, OS/MVT, 360/91/75                             00000110
C 5.  PURPOSE: SEE ABOVE                                                00000120
C 6.  CALLING SEQUENCE: CALL EDRCHK(KPAD,HRATIO,&100)                   00000130
C     KPAD   I*4 NUMBER OF PADDED FRAMES                                00000140
C     HRATIO I*2 PHA/RATES RATIO                                        00000150
C     &100       ALTERNATE RETURN FOR SKIPPING RECORD                   00000160
C 7.  NOTES: NONE                                                       00000170
C 8.  VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN           00000180
C     APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION           00000190
C 9.  I/O: INPUT: NONE                                                  00000200
C          OUTPUT: UNIT 8 ERROR MESSAGES                                00000210
C 10. ERROR HANDLING: BAD RATIO IS NOTED WITH A PRINTOUT                00000220
C                     BAD FRAME TIME IS NOTED WITH A PRINTOUT           00000230
C                     NO ENGINEERING DATA IS NOTED AND MF SKIPPED       00000240
C                     PADDED FRAME IS NOTED AND SKIPPED                 00000250
C                     BAD QUALITY FRAME IS SKIPPED                      00000260
C                     TIME CHECK FAILURE IS NOTED AND MF SKIPPED        00000270
C 11. CALLS: UPKSTA,PTIME,DM7CHK,IGET,MOD,DREMES,SKPMSG,BOMODE,TIMCHK   00000280
C 12. CALLED BY: EXTRCT                                                 00000290
C 13. METHOD: UNPACK STATUS WORD                                        00000300
C             IF DM7                                                    00000310
C                IF FIRST RECORD                                        00000320
C                   SKIP RECORD                                         00000330
C                ELSE CHECK FRAME TIME                                  00000340
C                IF FORMAT 5 BRANCH TO SPECIAL SECTION                  00000350
C                ELSE                                                   00000360
C                     IF RATIO NOT SAME AS PREDICTED                    00000370
C                        WRITE MESSAGE                                  00000380
C                     FI                                                00000390
C                     IF ENGINEERING DATA NOT PRESENT                   00000400
C                        WRITE MESSAGE                                  00000410
C                     IF BIT RATE INVALID                               00000420
C                        WRITE MESSAGE AND SKIP RECORD                  00000430
C                     IF NEW FILE WRITE MESSAGE                         00000440
C                     IF DATA NOT CONTINUOUS WRITE MESSAGE              00000450
C                     IF FRAME PADDED SKIP FRAME                        00000460
C                     IF TIME CHECK FAILED SKIP FRAME                   00000470
C                FI HANDLE FORMAT 5 DATA                                00000480
C             ELSE SKIP NON DM7 RECORDS                                 00000490
C 14. REFERENCE: NONE                                                   00000500
C 15. PROGRAMMER: ROGER DUBORD                                          00000510
C 16. MODIFIED:                                                         00000520
C*************************************************************************00000530
C*************************************************************************00000540
```

*** END OF MEMBER *** 53 RECORDS PROCESSED **********

```
C 1. NAME: EDRSUM/EDRINT/FILINT                                          00000020
C 2. IDENTIFICATION: HELDRP HELIOS A&B                                   00000030
C 3. ENGLISH NAME: SUMMARIZATION OF EDR                                  00000040
C      EDRINT: INITIALISE ALL STATIC COUNTERS & VARIABLES.               00000050
C      FILINT:INITIALISE ALL VARIABLES FOR A FILE.                       00000060
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT                               00000070
C 5. PURPOSE:                                                            00000080
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000090
C                                                                       C00000100
C    THIS ROUTINE PRINTS THE DATA QUALITY SUMMARY REPORT FOR            C00000110
C    EACH EDR TAPE PROCESSED BY HELDRP.                                 C00000120
C                                                                       C00000130
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000140
C 6. CALLING SEQUENCE: CALL EDRSUM                                       00000150
C 7. NOTES: NONE                                                         00000160
C 8. VARIABLES: COMMON BLOCK VARIABLES ARE DESCRIBED IN DATA REDUCTION   00000170
C          SYSTEM APPENDICES.                                            00000180
C 9. I/O: OUTPUT    THE ACCUMULATED VARIABLES SUMMARY                    00000190
C             ON UNIT FT31.                                              00000200
C 10..ERROR HANDLING: NONE.                                              00000210
C 11.CALLS: CNVMJD, CONTIM.                                              00000220
C 12.CALLED BY: HELDRP                                                   00000230
C 13. METHOD:IF NUMSUM .LT. 3 WRITE HEADER OF THAT SATELLITE.            00000240
C       ADVANCE THE PAGE NUMBER &SET NUMSUM=0.                           00000250
C       ELSE BRANCH TO ADD 1 TO NUMSUM.                                  00000260
C      INITIALISE ALL COUNTERS WITH '0' TOTAL UP ALL.                    00000270
CONVERT START & END TIMES OF EDR.                                        00000280
C     WRITE OUT ALL SUMMARIES FOR THAT FILE.                             00000290
C      SAVE NTREC IN NTLREC & NTRGD IN NGDREC FOR                        00000300
C      FILE/LOGISTICS/HISTORY CATALOG                                    00000310
C        FI                                                              00000320
C      EDRINT:INITIALISE ALL COUNTERS WITH '0' ;                         00000330
C    NRGOOD,NRTCL,NRBAD,NRQUL,NULLET,NRTIM                               00000340
C    ALL THESE = 0                                                       00000350
C    MOVE 0'S TO BWORD ARRAY.                                            00000360
C    PAD KEYNT ARRAY                                                     00000370
C    EDRINT:INITIALISE VARIABLES FOR FILE                                00000380
C    QFRST(1),(2),(3) =TRUE                                              00000390
C    QXRY(1),(2)      =FALSE                                             00000400
C    QREND,QBEND,QURSEQ,QSRSEQ = FALSE                                   00000410
C    &  HURSEQ =0                                                        00000420
C    FI                                                                  00000430
C 14.PROGRAMMER:ROGER DUBORD.                                            00000440
C  15.DOCUMENTED BY: RAMI CUDDAPAH.                                      00000450
C 16.MODIFIED: GERRY MARINDINO                                           00000460
C*************************************************************************00000470
C*************************************************************************00000480
```

*** END OF MEMBER *** 47 RECORDS PROCESSED

```
Cccccccccccccccccccccccccccccccccccccccccccccccccccccc
C 1.   Routine:
C         ENGDAT
C 2.   System, Satellite, Version:
C         HELDRP    HELIOS A,B          0
C 3.   English Name:
C         ENGINEERING DATA
C 4.   Language:
C         FORTRANG or FORTRANH   level 21.6    360/91/75    OS/MVT
C 5.   Purpose:
C         EXTRACT THE ENGINEERING DATA FROM THE EDR RECORD
C 6.   Calling Sequence:
C      Argument           Type     I/O     Description
C         NONE
C 7.   Notes:
C      7a.  Restrictions:
C         NONE
C      7b.  Special Features:
C         NONE
C 8.   Variables:
C      8a.  Local
C           Variable             Type     Description
C         HINX        I*2        OFFSETS FOR DIFFERENT FORMATS
C         HSWORD      I*2        LAST ENGINEERING WORD
C         HLOC        I*2        OFFSETS FOR QWORD
C         DALPH       R*8        NAMES OF ENGINEERING WORDS
C         QDATA       L*1        DATA RECORD
C         MESAGE      I*4        ERROR MESSAGE
C         QWORD       L*1        ENGINEERING WORDS RETURNED
C         QSWORD      L*1        LAST ENGINEERING WORD
C         QTEMP       L*1        TEMPERATURE WORD
C         HENT        I*2        OFFSET FOR DIFFERENT FORMATS
C         HTEMP       I*2        TEMPERATURE WORD
C         HX          I*2        OFFSETS FOR QWORD
C      8b.  COMMON
C           COMMON               Variables
C         COMMON VARIABLES USED ARE DESCRIBED IN
C         APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION
C 9.   I/O Information:
C      Unit No.        Use Description
C         NONE
C10.   Error Handling:
C         NONE
C11.   Subroutines Called:
C      Subroutine      Description
C         IGET        INTEGER GET
C         PMOVE       MOVE BITS
C         DRIMES      DROP MESSAGE
C12.   Called By:
C      Routine         Description
C         PHAOUT      PHA OUTPUT
C         RATOUT      RATES OUTPUT
C13.   Method:
C         ENGDAT PROC
C         EXTRACT ENGINEERING WORDS   USING TABLE
C         IF ENGINEERING WORDS HAVE CHANGED
C                   WRITE MESSAGE IF ASKED FOR
C         FI
C         END ENGDAT
C14.   Reference:
C         NONE
C15.   Programmer and Date:
C         ROGER DUFORD
C16.   Modifications:
C
Cccccccccccccccccccccccccccccccccccccccccccccccccccccc
```

*** END OF MEMBER ***   66 RECORDS PROCESSED   **

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C    MAIN FUNCTION OF THIS SUBROUTINE IS TO WRITE OUT ENDFILE MESSAGE
C    WHENEVER HELDRP SENSES EOF ON EDR TAPE. THIS MESSAGE IS HELPFUL
C    TO LOCATE DATA TIMES FOR EACH FILE.
C
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C 1. NAME:EOFMSG
C 2. IDENTIFICATION: HELDRP HELIOS A,B
C 3. ENGLISH NAME: END OF FILE MESSAGE
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT
C 5. PURPOSE: TO WRITE END OF FILE MESSAGE ALONG WITH MESSAGES FOR EDR
C 6. CALLING  SEQUENCE: CALL EOFMSG(HDPFMS,DISLOT,NTP,MFILE,NREC,HBTRT,
C                                   HFMT,MSPFMS,HRECYR)
C 7. NOTES:NONE
C 8. VARIABLES:
C                 'HDEFMS' DAY NO. OF THE RECORD
C                 'IMSCS'  MIL.SECS OF THE RECORD
C                  'DISLOT' TAPE NO.OF AN EDR
C                  'MFILE'  FILE NO. OF AN EDR
C                  'NREC '  RECORD NO. OF AN EDR
C                  'NTP   ' SEQ NO. OF AN EDR IN PROCESSING
C                  'HBTRT ' BITRATE FOR THAT RECORD
C                  'HFMT '  FORMAT  FOR THAT RECORD
C                  'HRECYR' YEAR NO.FOR THAT RECORD
C 9.I/O:     INPUT:ALL THE ABOVE MENTIONED VARIABLES AS CALLING SEQ
C            OUTPUT:END OF FILE MESSAGE  ON UNIT 30
C            WITH LAST GOOD DATA FOR THAT FILE
C 10. ERROR HANDLING: NONE.
C 11. CALLS: CONTIM,CNVMJD
C 12. CALLED BY: HELDRP
C 13. METHOD: FOR EACH FILE AN END OF FILE MESSAGE IS WRITTEN OUT
C             AS: WHERE EXACTLY THE FILE ENDS, & LAST GOOD RECORD
C             HISTORY. END OF FILE OF EDR IS SENSED IN HELDRP.
C
C 14. REFERENCE: NONE.
C 15. PROGRAMMER: RAMI CUDDAPAH.
C 16. MODIFIED:
C***********************************************************************
C***********************************************************************
```

*** END OF MEMBER ***   40 RECORDS PROCESSED   **

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C  THIS SUBROUTINE SERVES AS THE EXECUTIVE FOR ALL DATA EXTRACTION AND
C CALLS TO ROUTINES WHICH VERIFY AND STORE THE INFORMATION IN THE
C  PROPER TIME-ORDERED DATA BASE.
C     HELIOS-A VERSION              MODIFIED BY G.E.MARANDINO 76/03/01
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C 1.  NAME: EXTRCT
C 2.  IDENTIFICATION: HELDRP,HELIOS A,B,
C 3.  ENGLISH NAME: EXTRACT
C 4.  LANGUAGE: FORTRANH, 360/91/75, OS/MVT
C 5.  PURPOSE: SEE ABOVE
C 6.  CALLING SEQUENCE: CALL EXTRCT(&120), ARGUMENT IS ALTERNATE RETURN
C     IF NO SCIENTIFIC DATA IS PROCESSED
C 7.  NOTES: NONE
C 8.   VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN
C      APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION
C 9.  I/O: NONE
C 10.ERROR HANDLING: ALL DONE BY SUBROUTINES EXCEPT WHEN A SEQUENCE ID
C    CANNOT BE DETERMINED.
C 11.CALLS: ALOG10,HFIX,EDRCHK,PKBLK,FMSYNC,RATUPK,UPKXRY,MOD,DRPMES,
C     LOG12,FATCUT,PTHIRD,KTM,GRBPRT,PHAUPK,PHAOUT
C 12.CALLED BY: HELDRP
C 13.METHOD: ONE RECORD OF DATA IS EXAMINED ONE MINOR FRAME AT A TIME.
C     EDRCHK IS USED TO CHECK FOR PADDING AND QUALITY OF DATA.
C     FORMAT 5 IS HANDLED IN A SPECIAL SECTION
C     A START TIME IS ASSIGNED FOR A RECORD AND THE RECORD BEGINS ON
C     LINE 1 OF A RATE LINE.
C     THE RATE WORDS ARE UNPACKED IN RATUPK AND OUTPUT IN RATOUT.
C     THE PHA WORDS ARE UNPACKED IN PHAUPK AND OUTPUT IN PHAOUT, OR
C     THE GAMMA RAY DATA IS UNPACKED.
C 14.REFERENCE: NONE
C 15.  PROGRAMMER: ROGER DUBORD
C 16.MODIFIED: EWR 3/17/78
C***********************************************************************
C***********************************************************************
```

*** END OF MEMBER ***   36 RECORDS PROCESSED   ***

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000020
C                                                                       C00000030
C  THIS SUBROUTINE SERVES AS THE EXECUTIVE FOR ALL DATA EXTRACTION AND  C00000040
C CALLS TO ROUTINES WHICH VERIFY AND STORE THE INFORMATION IN THE        C00000050
C  PROPER TIME-ORDERED DATA BASE.                                       C00000060
C    HELIOS B VERSION                                                   C00000070
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000080
                                                                        00000090
C 1. NAME: EXTRCT                                                       00000100
C 2. IDENTIFICATION: HELDRP,HELIOS B VERSION                            00000110
C 3. ENGLISH NAME: EXTRACT                                              00000120
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT                              00000130
C 5. PURPOSE: SEE ABOVE                                                 00000140
C 6. CALLING SEQUENCE: CALL EXTRCT(&120), ARGUMENT IS ALTERNATE RETURN  00000150
C    IF NO SCIENTIFIC DATA IS PROCESSED                                 00000160
C 7. NOTES: NONE                                                        00000170
C 8.  VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN           00000180
C     APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION           00000190
C 9. I/O: NONE                                                          00000200
C 10.ERROR HANDLING: ALL DONE BY SUBROUTINES EXCEPT WHEN A SEQUENCE ID  00000210
C    CANNOT BE DETERMINED.                                              00000220
C 11.CALLS: ALOG10,HFIX,EDRCHK,FKBLK,FMSYNC,RATUPK,UPKXRY,MOD,DRPMES,   00000230
C     LOG12,RATOUT,PTHIRD,KTM,GRBPRT,PHAUPK,PHAOUT                      00000240
C 12.CALLED BY: HELDRP                                                  00000250
C 13.METHOD: ONE RECORD OF DATA IS EXAMINED ONE MINOR FRAME AT A TIME.  00000260
C     EDRCHK IS USED TO CHECK FOR PADDING AND QUALITY OF DATA.          00000270
C     FORMAT 5 IS HANDLED IN A SPECIAL SECTION                          00000280
C     A START TIME IS ASSIGNED FOR A RECORD AND THE RECORD BEGINS ON    00000290
C     LINE 1 OF A RATE LINE.                                            00000300
C     THE RATE WORDS ARE UNPACKED IN RATUPK AND OUTPUT IN RATOUT.       00000310
C     THE PHA WORDS ARE UNPACKED IN PHAUPK AND OUTPUT IN PHAOUT, OR     00000320
C     THE GAMMA RAY DATA IS UNPACKED.                                   00000330
C 14.REFERENCE: NONE                                                    00000340
C 15.PROGRAMMER: ROGER DUBORD                                           00000350
C 16.MODIFIED:NAND LAL, GERRY MARANDINO, RAMI CUDDAPAH, ED RONISH       00000360
C***********************************************************************00000370
```

*** END OF MEMBER *** 36 RECORDS PROCESSED **********

```
H E L I O S   D A T A   R E D U C T I O N   P R O G R A M                00000010
                                                                         00000020
THE FOLLOWING IS A SUBROUTINE CHART OF THE HELIOS DATA REDUCTION         00000030
PROGRAM                                                                  00000040
                                                                         00000050
HELDRP          CONTROL DATA PROCESSING READ DATA SETS                   00000060
     ENDRAT(WRTRAT)                  END RATES PROCESSING                00000070
          FTIO,15,16                                                     00000080
          WRITER                WRITE RATES                              00000090
               NXTRTO           SET CATALOG POINTERS                     00000100
               FTIO,15                                                   00000110
          ABEND,101,102                                                  00000120
     DMCEND(DM7CHK)             DM7 PROCESSING                          00000130
          CONTIM                TIME CONVERSION                          00000140
          WRITE,30                                                       00000150
     DRSRPT                     CATALOG REPORT                          00000160
          CNVMJD                CONVERT TO MODIFIED JULIAN               00000170
               ABEND,701,702                                             00000180
          CONTIM                                                         00000190
          WRITE,33                                                       00000200
     RATEND(RATOUT)             RATES OUTPUT                            00000210
          WRTRAT                WRITE RATES OUTPUT                       00000220
               WRITER                                                    00000230
               SETAMR           RATES TAPE CONTROL                       00000240
                    NXTRTO                                               00000250
                    FTIO,15                                              00000260
                    ABEND,1,2                                            00000270
               REVISE           RECORD SIZE CONTROL                      00000280
                    ABEND,39                                             00000290
               SETCMR           RATES TAPE CONTROL                       00000300
                    FTIO,15,16                                           00000310
                    WRITER                                               00000320
                    ABEND,1,2                                            00000330
               RETRIMO          PADDED RECORD REMOVAL                    00000340
               RETRIM5          PADDED RECORD REMOVAL                    00000350
               COPRAT           COPY RATES                               00000360
                    FTIO,16                                              00000370
                    WRITER                                               00000380
               CVLAPR           CALCULATE OVERLAPS                       00000390
     GETPUT                                                              00000400
     PHAEND(PHAOUT)             END PHA OUTPUT                          00000410
          WRTPHA                OUTPUT PHA                               00000420
               WRITEP           WRITE PHA                                00000430
                    NXTPTO      SET CATALOG FOR NEW PHA                  00000440
                    FTIO,12                                              00000450
               SETNMP           PHA NEW TAPE CONTROL                     00000460
                    NXTPTO                                               00000470
                    FTIO,12,13                                           00000480
                    WRITEP                                               00000490
                    ABEND,1,2                                            00000500
               PHALEN           PHA RECORD LENGTH                        00000510
               REVISE           PHA RECORD LENGTH                        00000520
                    SETSEQ      SET SEQUENCE ID                          00000530
                    ABEND,1                                              00000540
               SETCMP           PHA OLD TAPE CONTROL                     00000550
               COPPHA           COPY PHA                                 00000560
                    FTIO,13                                              00000570
                    WRITEP                                               00000580
                    ABEND,1-4                                            00000590
               CVLAPP           CALCULATE OVERLAPS                       00000600
     EOFMSG                     END OF FILE MESSAGE                     00000610
          WRITE,30                                                       00000620
          CONTIM                                                         00000630
          CNVMJD                                                         00000640
          YMDD                  TIME CONVERSION                          00000650
          FTIME(DTIME)          FIND TIME                                00000660
     EDRSUM                     EDR SUMMARY                             00000670
          CONTIM                                                         00000680
          CNVMJD                                                         00000690
          WRITE,31                                                       00000700
     EDRCAT                     EDR CATALOG CONTROL                     00000710
          DATO,20,21                                                     00000720
          DRFMES,10-13          MESSAGE OUTPUT                           00000730
               FTIME(DTIME)                                              00000740
               CONTIM                                                    00000750
               ABEND,701,702                                             00000760
               WRITE,30                                                  00000770
```

```
     WRITE,31
EDRCAT                  EDR CATALOG CONTROL
     DATO,20,21
     DREMES,10-13       MESSAGE OUTPUT
          FTIME(DTIME)
          CONTIM
          ABEND,701,702
          WRITE,30
```



```
     DREMES,1-9,40-42,47
     CNVMJD
     CNVDAT(CNVMJD)         TIME CONVERSION
          ABEND,703
     EXTRCT                 EXTRACT DATA
          PHAOUT            OUTPUT PHA
               PHACLR       CLEAR PHA AREAS
               PRINT,6
               INDEXP       PHA INDEX
               ENGDAT       EXTRACT ENGINEERING
               PKHET        PACK HET
               PKLET        PACK LET
               WRTPHA
               ABEND,30
          FMSYNC            FRAME SYNCHRONIZATION
          EDRCHK            EDR CHECK
               UPKSTA       UNPACK STATUS
               FTIME(DTIME)
               DREMES,16,17,23,48
               ECMCDE       BLACK CUT MODE
               TIMCHK       TIME CHECK
                    CNVDAT
                    COMFRM  COMPARE FRAME
               DM7CHK       DM7 CHECK
                    CONTIM
               SKPMSG       SKIP MESSAGE PRINT
                    CONTIM
                    FTIME
                    CNVMJD
                    YMDD
          PHAUPK            PHA UNPACK
          PTHIRD            PHA THIRD UNPACK
          RATUPK            RATE UNPACK
          UPKXRY            UNPACK X RAY
          LOG12             LOG TO DECIMAL
          PKBLK             PACK PHA
          GRBPRT(HELIOS B ONLY) GAMMA RAY PRINT
               IGRADR       BIT SUM
               IBTSUM       UNPACK DATA BLOCK
               GRBCLN       TRIGGER BITS
               GRBTRG       LOAD SCIENCE WORDS
               GRBRTS       COUNT HOUSEKEEPING
               GRBHHD       ZERO ARRAYS
               ZBYTES       UNPACK ACCUMULATORS
               GRBACS       WRITE,80,SYSOUT=8
               WRITE,80,SYSOUT=8
               GRBMHD       HEADER
               GREEMR       PAGE CONTROL
               ITBIT        BIT TEST
          DREMES,12
     DTIME
     FTIO,10,41-44
     REMTIM                 REMAINING TIME
     GETLIB                 GET LIBRARY TAPE
          SERDSN            SERIAL DATA SET NAME
          MCUNTL            TAPE MOUNT
     ABEND,103
     EDRINT(EDRSUM)         INITIALIZE EDR
     UPKLBL                 UNPACK LABEL
     SETDMC(DM7CHK)         SET DM7 FLAGS
     FILINT(EDRSUM)         FILE INITIALIZATION
     READ,WRITE,5,6,8,30,40
     EDREND(EDRCAT)         EDR END PROCESSING
          DATO,21
     NEWCAT(EDRCAT)         NEW CATALOG SET UP
          FTIO,17
          DATO,20
          DREMES,12,14,15
     EDRCAT(EDRCAT)         END CATALOG PROCESSING
```

```
        ABEND,101,102                                          00001560
*** END OF MEMBER ***     156 RECORDS PROCESSED   ************************************************************
```

```
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000030
C 1.  Routine:                                                         00000040
C        FMSYNC                                                        00000050
C 2.  System, Satellite; Version:                                      00000060
C        HELDRE    HELIOS A,B          0                             00000070
C 3.  English Name:                                                    00000080
C        FRAME SYNCHRONIZATION                                         00000090
C 4.  Language:                                                        00000100
C          FORTRANG or FORTRANH   level 21.6    360/91/75   OS/MVT    00000110
C 5.  Purpose:                                                         00000120
C        MAINTAIN SYNC WHENEVER A DATA FRAME IS MISSING                00000130
C 6.  Calling Sequence:                                                00000140
C        Argument          Type    I/O    Description                 00000150
C           HRATIO      I*2         PHA/RATES RATIO                   00000160
C 7.  Notes:                                                           00000170
C        7a.  Restrictions:                                            00000180
C           NONE                                                       00000190
C        7b.  Special Features:                                        00000200
C           NONE                                                       00000210
C 8.  Variables:                                                       00000220
C        8a.  Local                                                    00000230
C           Variable            Type    Description                   00000240
C           QDS         L*1     UNSECTORED SEQUENCE ID                00000250
C           QLN         L*1     LINE NUMBER                           00000260
C           ILINE       I*4     LINE NUMBER                           00000270
C           LINE        I*4     LINE NUMBER                           00000280
C           QSCTR       L*1     SECTORED   SEQUENCE ID FLAG           00000290
C        8b.  COMMON                                                   00000300
C           COMMON              Variables                             00000310
C        COMMON BLOCK VARIABLES USED ARE DESCRIBED IN APPENDICES       00000320
G        OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION                  00000330
C 9.  I/O Information:                                                 00000340
C        Unit No.          Use Description                             00000350
C           NONE                                                       00000360
C10.  Error Handling:                                                  00000370
C        NONE                                                          00000380
C11.  Subroutines Called:                                              00000390
C        Subroutine        Description                                 00000400
C           MOD         MODULO ARITHMETIC                             00000410
C12.  Called By:                                                       00000420
C        Routine           Description                                 00000430
C           EXTRCT      EXTRACT DATA                                  00000440
C13.  Method:                                                          00000450
C           FMSYNC      PROC                                          00000460
C           IF START OF FILE  AND NO UNSECTORED ID YET                 00000470
C                       REJECT DATA                                    00000480
C           FI                                                         00000490
C           IF HRATIC NE 0 AND HRATIO NE HPHA                          00000500
C                       INCREASE HPHA BY 1                             00000510
C           ELSE MISSING BLOCK SHOULD HAVE BEEN A RATES BLOCK          00000520
C                       IF LINE = 1 OR 0 AND HRATIO = 0                00000530
C                                   INCREASE UNSECTORED ID BY 1        00000540
C                       FI                                             00000550
C                       INCREASE LINE BY 1                             00000560
C                       IF LINE = 1-8 BUT NOT 5                        00000570
C                                   EXTRACT UNSECTORED ID              00000580
C                       ELSE                                           00000590
C                                   SET SECTORED ID TO TRUE            00000600
C                       FI                                             00000610
C           FI                                                         00000620
C           END FMSYNC                                                 00000630
C14.  Reference:                                                       00000640
C        NONE                                                          00000650
C15.  Programmer and Date:                                             00000660
C        ROGER DUEORD                                                  00000670
C16.  Modifications:                                                   00000680
C                                                                      00000690
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000700

*** END OF MEMBER ***     68 RECORDS PROCESSED   ********************************************************************************
```

```
C*****************************************************************00000030
C 1.   NAME: GETLIE                                                00000040
C 2.   IDENTIFICATION: HELDRP HELIOS A,B                           00000050
C 3.   ENGLISH NAME: GET LIBRARY TAPE                              00000060
C 4.   LANGUAGE: FORTRANH, OS/MVT, 360/91/75                       00000070
C 5.   PURPOSE: TO RETRIEVE THE CORRECT LIBRARY TAPE GIVEN THE EDR 00000080
C      TAPE AND FILE NUMBER                                        00000090
C 6.   CALLING SEQUENCE:                                          00000100
C      CALL GETLIB(CATUNI,NDXUNI,TPUNIT,TPNAME,FILE,MOUNTS,RETCOD) 00000110
C      SEE BELOW FOR DESCRIPTION OF CALLING ARGUMENTS              00000120
C 7.   NOTES: NONE                                                00000130
C 8.   VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN     00000140
C      APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION     00000150
C 9.   I/O: INPUT: CATUNI CATALOG DATA SET OF LIBRARY FILES       00000160
C                   NDXUNI INDEX DATA SET OF OFFSET OF CATALOG FILES 00000170
C           OUTPUT: NONE                                           00000180
C 10.  ERROR HANDLING: RETCOD SETS THE CONDITION RESULTING FROM SEARCH 00000190
C 11.  CALLS: DREAD,SERDSN,MOUNTL                                  00000200
C 12.  CALLED BY: HELDRP                                           00000210
C 13.  METHOD: EXTRACT SATELLITE ID AND EDR SERIAL NUMBER          00000220
C              SET OFFSET FOR SATELLITE                            00000230
C              CONVERT SERIAL TO INTEGER                           00000240
C              SEARCH CATALOG FOR DATA FILE                        00000250
C                   GET RECORD WITH SERIAL NUMBER                  00000260
C                    LOOP THROUGH FILES FROM 1 TO FILE             00000270
C                         IF FILE > 6                              00000280
C                              SEEK = FILE - 6                     00000290
C                              RECORD = SERIAL + OFFSET            00000300
C                         FI                                       00000310
C                    END LOOP WITH CORRECT FILE IN PRIMARY OR SECONDARY 00000320
C              AREA                                                00000330
C               OPEN DATA SET                                      00000340
C                    SET NEXT TAPE AND FILE                        00000350
C                    CALL SERDSN TO CREATE DSN FROM SERIAL AND FILE 00000360
C                    SET YEAR, DAY, BITRATE, LIBRARY NUMBER AND FILE 00000370
C                    IF DM = 7 REJECT NON FORMAT 3 FILE            00000380
C                    CALL MOUNTL TO MOUNT LIBRARY TAPE             00000390
C                END OPEN                                          00000400
C 14.  REFERENCE: FOR DOCUMENTATION ON SERDSN AND MOUNTL SEE LIBGEN 00000410
C                 DOCUMENTATION                                    00000420
C 15.  PROGRAMMER: NAND LAL                                        00000430
C 16.  MODIFIED: EWR 1978 TO HAVE OPTION OF REJECTING NON DM7 DATA 00000440
C*****************************************************************00000450
C*****************************************************************00000460
```

*** END OF MEMBER *** 44 RECORDS PROCESSED

```
*************************************************************************00000010
* THIS SUBROUTINE UNPACKS THE TWO 16 BIT ACCUMULATORS FROM THE           00000020
*   6 BYTE SCIENTIFIC DATA BLOCK FOR HELIOS-B GAMMA RAY BURST EXPERIMENT 00000030
*************************************************************************00000040
*     VECTOR ARGUMENTS :                                                 00000050
*           QBLOCK L*1  THE FIRST BYTE OF 6 BYTE SCI DATA BLOCK          00000060
*            IACS I*4   ARRAY DIMENSIONED IN(2) FOR OUTPUT OF 2          00000070
*              ACCUMULATOR VALUES.                                       00000080
*************************************************************************00000090
* 1. NAME: GRBACS                                                       00000100
* 2. IDENTIFICATION: HELDRP,HELIOS B ONLY                               00000110
* 3. ENGLISH NAME: GAMMA RAY BURST ACCUMULATORS.                        00000120
* 4. LANGUAGE: ASSEMBLER, 360/91/75, OS/MVT                             00000130
* 5. PURPOSE: TO UNPACK THE 16 BIT ACCUMULATORS FROM THE SCIENTIFIC DATA00000140
*             FOR   HELIOS     B SATELITE                               00000150
* 6. CALLING SEQUENCE: CALL GRBACS(QBLOCK,IACS)                         00000160
* 7. NOTES: NONE                                                        00000170
* 8. VARIABLES: 'QBLOCK' LOGICAL*1  THE FIRST BYTE OF 6 BYTE SCIENCE DAT00000180
*        IACS I*4 DIMENSIONED IN TWO ACCUMULATORS                       00000190
* 9. I/O: INPUT IS QBLOCK;                                              00000200
*    OUTPUT: THE TWO 16 BIT ACCUMULATORS                                00000210
* 10..ERROR HANDLING: NONE.                                             00000220
* 11.CALLS: NONE.                                                       00000230
* 12.CALLED BY: GRBPRT                                                  00000240
* METHOD:LOAD FIRST ACCUMULATOR FROM GRB SCIENCE WORD                   00000250
*     REVERSE ORDER OF BITS STORE REVERSED BITS  INTO                   00000260
*    IACS(1); LOAD 2ND  ACCUMULATOR FROM GRB SCIENCE WORD               00000270
*    REVERSE ORDER OF BITS STORE REVERSED  BITS INTO IACS(2)            00000280
* 15.PROGRAMMER: GERRY MARINDINO.                                       00000290
*  DOCUMENTED BY: RAMI CUDDAPAH.                                        00000300
* 16.MODIFIED:                                                          00000310
*************************************************************************00000320
*************************************************************************00000330
*************************************************************************00000340

*** END OF MEMBER ***     34 RECORDS PROCESSED   ***************************
```

```
************************************************************************00000010
* THIS SUBROUTINE USES BITS 2 TO 36 OF GRB DATA BLOCK TO FORM A DATE    00000020
* AND IT IS RETURNED IN AN ARRAY OF 2 I*4 INTEGERS.                     00000030
************************************************************************00000040
*      VECTOR ARGUMENTS :                                               00000050
*             QBLOCK L*1  THE FIRST BYTE OF 6 BYTE SCI DATA BLOCK       00000060
*             IDATE I*4  ARRAY DIMENSIONED IN(2) FOR OUTPUT OF 2        00000070
*             INTEGERS                                                  00000080
************************************************************************00000090
* 1. NAME: GRBCLN                                                       00000100
* 2. IDENTIFICATION: HELDRP,HELIOS B ONLY                               00000110
* 3. ENGLISH NAME: GAMMA RAY BURST CLEANING DATE.                       00000120
* 4. LANGUAGE: ASSEMBLER, 360/91/75, OS/MVT                             00000130
* 5. PURPOSE: TO UNPACK DATE FROM 2 TO 36 BITS OF GRB DATA BLOCK TO FORM00000140
*       DATE       FOR   HELIOS     B GRB.                            00000150
* 6. CALLING SEQUENCE: CALL GRBACS(QBLOCK,IDATE)                        00000160
* 7. NOTES: NONE                                                        00000170
* 8. VARIABLES: 'QBLOCK' LOGICAL*1  THE FIRST BYTE OF 6 BYTE SCIENCE DAT00000180
*         IDATE 1*4 DIMENSIONED IN TWO                                  00000190
* 9. I/O: INPUT IS QBLOCK;                                              00000200
*      OUTPUT: THE TWO INTEGERS ARE RETURNED IN THIS ARRAY              00000210
* 10..ERROR HANDLING: NONE.                                             00000220
* 11.CALLS: NONE.                                                       00000230
* 12.CALLED BY: GRBERT                                                  00000240
* METHOD:LOAD WITH G.R.B. SCI     WORD; STORE BITS 33 TO 40             00000250
*        IN REGISTER 2 . PUSH BIT 36,35,34,33 &STORE THESE 4 HIGH ORDER 00000260
*        BITS IN TO FIRST 4WORD INTEGER. LOAD REMAINING 31 BITS INTO    00000270
*        REGISTER 8. LOAD BITS 9 TO 16 SHIFT 1 BIT TO LEFT ;LOAD        00000280
*        BITS 25 TO 32  & STORE THE LAST RATE IN TO LAST HALF WORD.     00000290
* 15.PROGRAMMER: GERRY MARINDINO.                                       00000300
C  DOCUMENTED BY: RAMI CUDDAPAH.                                        00000310
C 16.MODIFIED:                                                          00000320
C************************************************************************00000330
C************************************************************************00000340

*** END OF MEMBER ***     34 RECORDS PROCESSED   ***********************************************************************************
```

```
C*******************************************************************00000020
C THIS ROUTINE PRINTS THE LAST & FIRST LINE FOR G.R.B. HOUSE KEEPING  00000030
C LISTINGS.                                                           00000040
C*******************************************************************00000050
C     VECTOR ARGUMENTS :                                              00000060
C  IGRB  I*4 FORTRAN LOGICAL UNIT NUMBER                              00000070
C  HLINE I*2 LINE COUNT.                                              00000080
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000090
C 1. NAME: GRBHHD                                                     00000100
C 2. IDENTIFICATION: HELDRP,HELIOS B ONLY                             00000110
C 3. ENGLISH NAME: GAMMA RAY BURST HOUSE KEEPING  DATA HEADER.        00000120
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT                            00000130
C 5. PURPOSE: TO KEEP COUNT FOR LAST & FIRST LINE NO. FOR H/K DATA    00000140
C    LISTINGS.                                                        00000150
C 6. CALLING SEQUENCE: CALL GRBHHD(IGRB,HLINE)                        00000160
C 7. NOTES: NONE                                                      00000170
C      IGRB: I*4 LOGICAL UNIT NUMBER FOR H/K                          00000180
C        HLINE I*2 LINE COUNT                                         00000190
C 9. I/O: NO INPUT; OUTPUT IS WRITTEN IGRB UNIT                       00000200
C 10..ERROR HANDLING: NONE.                                           00000210
C 11.CALLS: NONE.                                                     00000220
C 12.CALLED BY: GRBPRT                                                00000230
C 13.METHOD: KEEPS 77 LINE COUNTS.WHEN THERE ARE 77 LINES             00000240
C  IT ADVANCES OUTPUT  PAGE AND RESETS THE LINE NUMBER.               00000250
C 15.PROGRAMMER: GERRY MARINDINO.                                     00000260
C  DOCUMENTED BY: RAMI CUDDAPAH.                                      00000270
C 16.MODIFIED:                                                        00000280
C*******************************************************************00000290
C*******************************************************************00000300
C*******************************************************************00000310
```

*** END OF MEMBER *** 30 RECORDS PROCESSED **********

```
C 1. NAME: GRBMHD                                                       00000020
C 2. IDENTIFICATICN: HELDRP,HELIOS B ONLY                               00000030
C 3. ENGLISH NAME: GAMMA RAY BURST BEADERROUTINE FOR MEMORY DATA.       00000040
C 4. LANGUAGE: FORTRANH; 360/91/75, OS/MVT                              00000050
C 5. PURPOSE:                                                           00000060
C***********************************************************************00000070
C THIS PRINTS LAST AND FIRST LINES ON A PAGE FOR G.R.B. LISTINGS WHEN    00000080
C M/R TYPE DATA ARE BEING PRINTED. IT ALSO RESETS THE LINE NUMBER.       00000090
C THE ARGUMENTS ARE-     IGRB    I*4 FORTRAN LOGICAL UNIT FOR LISTING   00000100
C                        HLINE   I*2 CURRENT LINE NUMBER ON PAGE        00000110
C                                      G.E. MARANDINO 76/02/27          00000120
C***********************************************************************00000130
C 6. CALLING SEQUENCE: CALL GRBMHD(IGRB,HLINE)                          00000140
C                'IGRB ' I*4 FORTRAN LOGICAL UNIT FOR LISTING           00000150
C                'HLINE ' I*2 LINE COUNT                                00000160
C 7. NOTES: NONE                                                        00000170
C 8. VARIABLES: NC COMMON BLOCK                                         00000180
C 9. I/O: INPUT ALL THE ABOVE CALLING ARGUMENTS                         00000190
C  OUTPUT: MEMORY DATA HEADER PRINTED OUT ON IGRB UNIT.                 00000200
C 10..ERROR HANDLING: NONE.                                             00000210
C 11.CALLS: NONE.                                                       00000220
C 12.CALLED BY: GRBPRT                                                  00000230
C 13. METHOD: WRITE HEADER FOR M/R DATA,                                00000240
C            SET HLINE =4                                               00000250
C            FI                                                         00000260
C 15.PROGRAMMER: GERRY MARANDINO.                                       00000270
C  DOCUMENTED BY: RAMI CUDDAPAH.                                        00000280
C 16.MODIFIED:                                                          00000290
C***********************************************************************00000300
C***********************************************************************00000310
```

*** END OF MEMBER *** 30 RECORDS PROCESSED **********

```
C 1. NAME: GRBPMR                                                       00000020
C 2. IDENTIFICATION: HELDRP,HELIOS B ONLY                               00000030
C 3. ENGLISH NAME: GAMMA RAY BURST PRINT ROUTINE FOR MEMORY DATA.       00000040
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT                              00000050
C 5. PURPOSE:                                                           00000060
C*********************************************************************00000070
C THIS PRINTS THE SAVED ARRAY OF M/B TYPE G.R.B. DATA WHEN THE MEMORY   00000080
C READOUT SEQUENCE HAS BEEN BROKEN BY A RETURN TO H/K TYPE DATA.  THIS  00000090
C IS TO PREVENT LOSS OF MEMORY DATA FROM PRINTOUT UNDER NORMAL OPERATION00000100
C THIS WILL NOT BE USED                                                 00000110
C  THE LINE COUNT IS INCREMENTED AND THE MEMORY ON SWITCH TURNED OFF    00000120
C THE ARGUMENTS ARE:   HRMEM  I*2 ARRAY OF SAVED MEMORY READOUT RATES   00000130
C                      QMEMSV L*1 ARRAY OF SAVED MEMORY READOUT PACKED  00000140
C                      HLINE  I*2 CURRENT LINE NUMBER                   00000150
C                      IGRB   I*4 THE FORTRAN LOGICAL UNIT FOR LISTING  00000160
C                      QMEMON L*1 LOGICAL SWITCH FOR MEMORY CYCLE ON    00000170
C                             G.E. MARANDINO 76/02/27                   00000180
C*********************************************************************00000190
C 6. CALLING SEQUENCE: CALL GRBPMR(HRMEM,QMEMSV,HLINE,IGRB,QMEMON)      00000200
C                'HRMEM' I*2 ARRAY OF SAVED MEMORY READ OUTERATES.      00000210
C                 QMEMSAV L*1 ARRAY OF SAVED MEMORY READOUT PACKED.     00000220
C                  'HLINE' I*2 CURRENT LINE NUMBER.                     00000230
C                  'IGRB'  I*4 FORTRAN LOGICAL UNIT FOR LISTING.        00000240
C                 'QMEMON' L*1 LOGICAL SWITCH FOR MEMORY CYCLE ON       00000250
C 7. NOTES: NONE                                                        00000260
C 8. VARIABLES: NO COMMON BLOCK                                         00000270
C 9. I/O: INPUT ALL THE ABOVE CALLING ARGUMENTS                         00000280
C  OUTPUT: MEMORY DATA PRINTED OUT ON IGRB UNIT.                        00000290
C 10. ERROR HANDLING: NONE.                                             00000300
C 11.CALLS: NONE.                                                       00000310
C 12.CALLED BY: GRBPRT                                                  00000320
C METHOD: WRITE 80 LINES PER PAGE ; IF LINE NO G.T. 80 CALL HEADER WRITE00000330
C       ROUTINE; OR ELSE WRITE ALL MEMORY DATA ON IGRB UNIT 80 LINES    00000340
C       PER PAGE. AFTER 80 KEEP COUNTER HLINE INCREMENTED               00000350
C 15.PROGRAMMER: GERRY MARANDINO 76/02/27                               00000360
C  DOCUMENTED BY: RAMI CUDDAPAH.                                        00000370
C 16.MODIFIED:                                                          00000380
C*********************************************************************00000390
C*********************************************************************00000400

*** END OF MEMBER ***      39 RECORDS PROCESSED   ***********************************************************************
```

```
C 1. NAME: GRBPRT                                                       00000020
C 2. IDENTIFICATION: HELDRP,HELIOS B ONLY                               00000030
C 3. ENGLISH NAME: GAMMA RAY BURST PRINT                                00000040
C 4. LANGUAGE: FORTRANH, 360/91/75, OS/MVT                              00000050
C 5. PURPOSE: TO PRINT OUT ALL GAMMA RAY IN TLEMETRY DATA TAPES         00000060
C                 FOR   HELIOS     B SATELITE                           00000070
C 6. CALLING SEQUENCE: CALL GRBPRT(QBLOCK)                              00000080
C           'QBLOCK' LOGICAL*1  THE FIRST BYTE OF 6 BYTE SCIENCE DAT    00000090
C 7. NOTES: NONE                                                        00000100
C 8. VARIABLES: SEE COMMON BLOCK DESCRIPTION IN HELIOS DATA REDUCTION   00000110
C               APPENDICES                                              00000120
C 9. I/O: INPUT IS QBLOCK;                                              00000130
C      OUTPUT: ALL GAMMA RAY BURST INFO. 77 LINES PER PAGE ON SYSOUT 8  00000140
C 10.ERROR HANDLING: PARITY ERROR : WRITE MESSAGE                       00000150
C             BAD MEMORY ADDRESS :WRITE MESSAGE                         00000160
C 11.CALLS: CONTIM,FTIME                                                00000170
C 11.CALLS: GRBMHD,GRBHHD,GRBEMR,GRBRTS,GRBTRG,GRBACS,ZBYTES.           00000180
C 12.CALLED BY: EXTRCTb                                                 00000190
C 13. METHOD:GET THE SCIENTIFIC DATA BLOCK. WRITE INITIAL HEADER;       00000200
C      CHECK FOR PARITY IN BIT 46 FOR FIRST RECORD. BYPASS  THE FOLLOWING00000210
C      RECORDS. TEST QBLOCK(5) AGAINST MASK 'Z4' IF =0 IT IS H/K DATA.  00000220
C      ELSE MEMORY DATA.DECODE H/K DATA BIT 1 TO 36 FOR 4 TYPES OF H/K  00000230
C     DATA. IF MEMORY DATA :  GO TO DECODE MEMORY DATA. CHECK IN BIT 47  00000240
C     FOR CONSISTANCY IN MEMORY ADDRESS & DATA SEQUENCE ELSE WRITE ERROR 00000250
C     MESSAGE. CHECK FOR  REDUNDANCY OF CALENDAR BY COMPARING BIT 47     00000260
C     AGAINST RIGHT BIT IN CALENDAR SAVED WORD:IF SO WRITE MESSAGE       00000270
C     ET                                                                00000280
C 15.PROGRAMMER: GERRY MARINDINO.                                       00000290
C                                                                       00000300
C 16.MODIFIED: BY RAMI CUDDAPAH TO PUT OUT DAY# &YEAR NO. FOR EACH FILE.00000310
C*********************************************************************00000320
C*********************************************************************00000330

*** END OF MEMBER ***     32 RECORDS PROCESSED   ************************************************************************
```

```
* 1. NAME: GRBRTS                                                      00000010
* 2. IDENTIFICATION: HELDRP,HELIOS B ONLY                              00000020
* 3. ENGLISH NAME: GAMMA RAY BURST RATE TYPE OF.DATA.                  00000030
* 4. LANGUAGE: ASSEMBLER,360/91/75, OS/MVT                             00000040
* 5. PURPOSE:                                                          00000050
*********************************************************************** 00000060
*      THIS ROUTINE UNLOADS THE GRB RATE TYPE OF DATA WHICH IS         00000070
*      FOUND IN 3 WORDS OF 12 BITS EACH WITH SIGNIFICANCE ORDER        00000080
*      REVERSED THE RATES ARE RETURNED TO AN ARRAY OF THREE            00000090
*      HALF-WORD INTERGERS THE CALLING SEQUENCE IS :                   00000100
*                                                                      00000110
*        CALL GRBRTS(QBLOCK,HRATE)                                     00000120
*                                                                      00000130
*      WHERE : QBLOCK IS THE BEGINNING OF THE GRB DATA BLOCK           00000140
*              HRATE  IS THE START OF THE I*2 ARRAY OF 3 ELEMENTS      00000150
*********************************************************************** 00000160
* 6. CALLING SEQUENCE: CALL GRBACS(QBLOCK,HRATE)                       00000170
*          'QBLOCK' LOGICAL*1  THE FIRST BYTE OF 6 BYTE SCIENCE DAT    00000180
*        HRATE I*2 THREE RATE ARRAY                                    00000190
* 7. NOTES: NONE                                                       00000200
* 9. I/O: INPUT IS QBLOCK;                                             00000210
*     OUTPUT: HRATE 3 HALF WORD RATE ELEMENTS                          00000220
* 10..ERROR HANDLING: NONE.                                            00000230
* 11.CALLS: NONE.                                                      00000240
* 12.CALLED BY: GRBPRT                                                 00000250
* METHOD: LOAD GRE SCIENCE WORD BITS 16 TO 24 DELETE LAST 4 BITS;      00000260
*          REVERSE THE BITS,STORE FIRST RATE IN 1ST ARRAY ELEMENT.     00000270
*        LOAD BITS FROM SCIENCE WORD 25 TO 32,DELETE LAST 4 BITS;      00000280
*        STORE 2ND RATE IN 2ND ELEMENT;LOAD BITS 33 TO 40              00000290
*          REVERSE THEM AND STORE 3RD RATE  INTO 3RD ELEMENT OF        00000300
*        RATE ARRAY.                                                   00000310
* 15.PROGRAMMER: GERRY MARANDINO.                                      00000320
*  DOCUMENTED BY: RAMI CUDDAPAH.                                       00000330
* 16.MODIFIED:                                                         00000340
***********************************************************************00000350
***********************************************************************00000360

*** END OF MEMBER ***     36 RECORDS PROCESSED   ************************************************************************************
```

```
* 1. NAME: GRBTRG                                                        00000010
* 2. IDENTIFICATION: HELDRP,HELIOS B ONLY                                00000020
* 3. ENGLISH NAME: GAMMA RAY BURST TRIGGER                               00000030
* 4. LANGUAGE: ASSEMBLER,360/91/75, OS/MVT                               00000040
* 5. PURPOSE:                                                            00000050
************************************************************************ 00000060
*  THIS IS A ROUTINE TO UNPACK THE THREE BIT  TRIGGER COUNT              00000070
* FROM THE HELIOS B GRB EXPERIMENT THE INFORMATION IS IN BITS            00000080
* 40,41,42 WITH THE M.S.B. LAST SO THAT THE STRING MUST BE               00000090
* TURNED END FOR END AS WELL AS EXTRACTED THE FORTRAN CALLING            00000100
* SEQUENCE IS :                                                         00000110
*     CALL GRBTRG(QBLOCK,HTRIG)                                         00000120
*  WHERE:  QBLOCK IS THE ADDRESS OF THE START OF 48 BIT GRB BLOCK       00000130
*          HTRIG  IS THE I*2 INTEGER FOR STORING THE EXTRACTED NUMB     00000140
************************************************************************ 00000150
* 6. CALLING SEQUENCE: CALL GRBACS(QBLOCK,HTRIG)                         00000160
*          'QBLOCK' LOGICAL*1  THE FIRST BYTE OF 6 BYTE SCIENCE DAT     00000170
*        HRATE I*2 FOR STORING EXTRACTED NUMBER.                         00000180
* 7. NOTES: NONE                                                         00000190
* 8. VARIABLES: NO COMMON BLOCK                                          00000200
* 9. I/O: INPUT IS QBLOCK;                                               00000210
*     OUTPUT: G.R.B. TRIGGER NUMBER                                      00000220
* 10..ERROR HANDLING: NONE.                                              00000230
* 11.CALLS: NONE.                                                        00000240
* 12.CALLED BY: GRBPRT                                                   00000250
* METHOD: LOAD GRB SCIENCE WORD BITS 41 TO 48 MOVE BIT 42 TO SIGN BIT    00000260
*          TRANSFER THIS BIT TO REG 7.    MOVE THIS TO END OF REG 6.     00000270
*         LOAD BITS FROM SCIENCE WORD 33 TO 40 MOVE BIT 40 TO SIGN BIT   00000280
*       TRANSFER THIS BIT REG 6 FROM REG 7 NOW REG 6 WILL HAVE           00000290
*      ALL 3 TRIGGERED BITS.                                             00000300
* 15.PROGRAMMER: GERRY MARANDINO.                                        00000310
*  DOCUMENTED BY: RAMI CUDDAPAH.                                         00000320
* 16.MODIFIED:                                                           00000330
************************************************************************00000340
************************************************************************00000350
```

*** END OF MEMBER *** 35 RECORDS PROCESSED ***

```
C 1.  NAME: HELDRP                                                      00000010
C 2.  INDENTIFICATION: HELDRP, HELIOS A,B                               00000020
C 3.  ENGLISH NAME: HELIOS DATA REDUCTION PROGRAM                       00000030
C 4.  LANGUAGE: FORTRAN, OS/MVT ,360/91/75                              00000040
C 5.  PURPOSE: HELDRP IS THE MAIN EXECUTIVE FOR REDUCING THE LIBRARY    00000050
C     DATA TAPES TO SEPARATE PHA AND RATES TAPES.                       00000060
C 6.  CALLING SEQUENCE: NONE                                            00000070
C 7.  NOTES: NONE                                                       00000080
C 8.  VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN           00000090
C     APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION           00000100
C 9.  I/O: INPUT: NAMELIST OPTION ON UNIT 5                             00000110
C                 UNIT 40 PRESENT CATALOG                               00000120
C                 UNIT 41,42,43,44 CATALOG OF RATES AND PHA TAPES       00000130
C                 NAMELIST EDRTAP ON UNIT 5                             00000140
C                 UNIT 25 EDR TAPE                                      00000150
C                 UNIT 10 EDR TAPE IF NOT IN COMPRESSED LIBRARY         00000160
C          OUTPUT: UNIT 6 EDR RETURN CODES                              00000170
C                 UNIT 8 MINOR FRAME PERIOD ERROR                       00000180
C                 UNIT 40 NEW CATALOG                                   00000190
C 10. ERROR HANDLING: CALL DRPMES FOR WRONG SATELLITE ID                00000200
C                                   WRONG TAPE ID                       00000210
C                                   WRONG RUN ID                        00000220
C                                   LABEL IDTTYP AND TLM NOT EQUAL      00000230
C                                   RECORD LENGTH NOT 3744              00000240
C                                   NOT ENOUGH TIME TO PROCESS JOB      00000250
C     RETURN CODES FROM EDR SEARCH ARE PRINTED                          00000260
C 11. CALLS: FMOVE,DTIME,CNVDAT,CNVMJD,GETPUT,DRPMES,MOD,FREAD,UNLOAD,  00000270
C     NEWCAT,REMTIM,GETLIB,ABEND,MOUNT,EDRINT,UPKLBL,EDRCAT,SETDMC,     00000280
C     EXTRCT,DMCEND,EDRSUM,RATEND,PHAEND,FILINT,EOFMSG,POSN,EDREND,     00000290
C     ENDRAT,ENDPHA,ENDCAT,DRSRPT,FWRITE                                00000300
C 12. CALLED BY: NONE                                                   00000310
C 13. METHOD: HELDRP HAS A QUICK LOOK OPTION WHICH BYPASSES THE         00000320
C     CATALOGS, OTHERWISE THE RUN OPTIONS AND ID AND LOAD MODULES       00000330
C     ARE ENTERED AS PARAMETERS.  THE EDR TAPE IS MOUNTED DIRECTLY      00000340
C     OR THROUGH THE COMPRESSED LIBRARY WITH GETLIB.  THE BLANK RATES   00000350
C     AND PHA TAPES ARE READ FROM THE CATALOGS AND MOUNTED.  A CALL     00000360
C     TO EXTRCT PROCESSES THE RATES AND PHA DATA AND WRITES THE RATES   00000370
C     AND PHA TAPES.  THE CATALOG IS ADVANCED,THE NEW TIMES ARE ENTERED,00000380
C     AND THE JOB FINISHED.                                             00000390
C 14. REFERENCE: NONE                                                   00000400
C 15. PROGRAMMER: ROGER DUBORD                                          00000410
C 16. MODIFIED:                                                         00000420
C*************************************************************************00000430
C*************************************************************************00000440

*** END OF MEMBER ***     44 RECORDS PROCESSED   ***************************
```

```
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000020
* 1.  Routine:                                                       00000030
*       IBTSUM                                                       00000040
* 2.  System, Satellite; Version:                                    00000050
*       HELDRP    HELIOS A,B          0                            00000060
* 3.  English Name:                                                  00000070
*       INTEGER BIT SUM                                              00000080
* 4.  Language:                                                      00000090
*       ASMG   level G    release 21MAR76   360/91/75   OS/MVT     00000100
* 5.  Purpose:                                                       00000110
*       SUM THE NUMBER OF ON BITS IN A BYTE STRING OF                00000120
*       ARBITRARY LENGTH                                             00000130
* 6.  Calling Sequence:                                              00000140
*       Argument          Type    I/O    Description                 00000150
*       BYTES     I*4             @ OF BYTE STRING                   00000160
*       NBYTES    I*4             NUMBER OF ON BITS                  00000170
* 7.  Notes:                                                         00000180
*       7a.  Restrictions:                                           00000190
*       NONE                                                         00000200
*       7b.  Special Features:                                       00000210
*       NONE                                                         00000220
* 8.  Variables:                                                     00000230
*       8a.  Local                                                   00000240
*       Variable          Type    Description                        00000250
*       TABLE     I*4             NUMBER OF ON BITS FOR BYTES 0 TO 255 00000260
*       8b.  COMMON                                                  00000270
*       COMMON                    Variables                          00000280
*       NONE                                                         00000290
* 9.  I/O Information:                                               00000300
*       Unit No.          Use Description                            00000310
*       NONE                                                         00000320
*10.  Error Handling:                                               00000330
*       NONE                                                         00000340
*11.  Subroutines Called:                                           00000350
*       Subroutine        Description                                00000360
*       NONE                                                         00000370
*12.  Called By:                                                    00000380
*       Routine           Description                                00000390
*       GRBPRT               GAMMA RAY PRINT                       00000400
*13.  Method:                                                       00000410
*       IBTSUM    PROC                                             00000420
*                 LOOP THROUGH ALL BYTES                           00000430
*                 COMPARE BYTE TO TABLE                            00000440
*                 ADD NUMBER OF ON BITS FROM TABLE                 00000450
*                 END LOOP                                         00000460
*       END IBTSUM                                                 00000470
*14.  Reference:                                                    00000480
*       NONE                                                         00000490
*15.  Programmer and Date:                                          00000500
*       ROGER DUEORD                                               00000510
*16.  Modifications:                                                00000520
*                                                                  00000530
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000540

*** END OF MEMBER ***     53 RECORDS PROCESSED  ********************************************************************************
```

```
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000020
* 1.  Routine:                                                       00000030
*       IGRADR                                                      00000040
* 2.  System, Satellite; Version:                                   00000050
*       HELDRP    HELIOS A,B          0                           00000060
* 3.  English Name:                                                 00000070
*       INTEGER GAMMA RAY ADDRESS REVERSE                           00000080
* 4.  Language:                                                     00000090
*        ASMG   level G    release 21MAR76   360/91/75   OS/MVT    00000100
* 5.  Purpose:                                                      00000110
*       DECODE REVERSED GAMMA RAY MEMORY ADDRESS                    00000120
* 6.  Calling Sequence:                                             00000130
*       Argument          Type     I/O    Description              00000140
*         QBLOCK    L*1          SCIENCE DATA BLOCK                00000150
* 7.  Notes:                                                        00000160
*       7a.  Restrictions:                                          00000170
*         NONE                                                      00000180
*       7b.  Special Features:                                      00000190
*         NONE                                                      00000200
* 8.  Variables:                                                    00000210
*       8a.  Local                                                  00000220
*            Variable          Type    Description                  00000230
*         ONE          I*4          LOOP INCREMENT                00000240
*         SIX          I*4          LOOP VALUE                    00000250
*       8b.  COMMON                                                 00000260
*            COMMON               Variables                       00000270
*         NONE                                                      00000280
* 9.  I/O Information:                                              00000290
*       Unit No.          Use Description                         00000300
*         NONE                                                      00000310
*10.  Error Handling:                                              00000320
*         NONE                                                      00000330
*11.  Subroutines Called:                                          00000340
*       Subroutine        Description                             00000350
*         NONE                                                      00000360
*12.  Called By:                                                   00000370
*       Routine           Description                             00000380
*         GRPPRT     GAMMA RAY PRINT                              00000390
*13.  Method:                                                      00000400
*         IGRADR      PROC                                        00000410
*                     LOOP THROUGH BITS 39-45                     00000420
*                     LOAD ONE BIT AT A TIME INTO REG9            00000430
*                     SHIFT INTO REG10                            00000440
*                     END LOOP                                    00000450
*         END IGRADR                                              00000460
*14.  Reference:                                                   00000470
*         NONE                                                      00000480
*15.  Programmer and Date:                                         00000490
*         GERRY MABANDINO                                         00000500
*16.  Modifications:                                               00000510
*                                                                  00000520
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000530

*** END OF MEMBER ***      52 RECORDS PROCESSED  ********************************************************************************
```

```
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000020
C 1.  Routine:                                                         00000030
C        INDEXP                                                        00000040
C 2.  System, Satellite; Version:                                      00000050
C        HELDRP    HELIOS A,B          0                             00000060
C 3.  English Name:                                                    00000070
C        INDEX PROPER                                                  00000080
C 4.  Language:                                                        00000090
C         FORTRANG or FORTRANH   level 21.6    360/91/75   OS/MVT    00000100
C 5.  Purpose:                                                         00000110
C        CALCULATE INDEX NEEDED TO STORE PHA WORD                      00000120
C 6.  Calling Sequence:                                                00000130
C     Argument          Type    I/O    Description                   00000140
C        IDS432      I*4         UNSECTORED SEQUENCE ID                00000150
C        ILINE       I*4         LINE NUMBER                           00000160
C        HPHA        I*2         PHA LINE NUMBER                       00000170
C        HRATIO      I*2         PHA/RATES RATIO                       00000180
C 7.  Notes:                                                           00000190
C     7a.  Restrictions:                                               00000200
C        NONE                                                          00000210
C     7b.  Special Features:                                           00000220
C        NONE                                                          00000230
C 8.  Variables:                                                       00000240
C     8a.  Local                                                       00000250
C          Variable          Type    Description                     00000260
C        N I*4       PHA LINE NUMBER                                   00000270
C     8b.  COMMON                                                      00000280
C          COMMON            Variables                               00000290
C        NONE                                                          00000300
C 9.  I/O Information:                                                 00000310
C     Unit No.        Use Description                                  00000320
C        NONE                                                          00000330
C10.  Error Handling:                                                  00000340
C        NONE                                                          00000350
C11.  Subroutines Called:                                              00000360
C     Subroutine      Description                                      00000370
C        NONE                                                          00000380
C12.  Called By:                                                       00000390
C     Routine         Description                                      00000400
C        PHAOUT      PHA OUTPUT                                        00000410
C13.  Method:                                                          00000420
C        INDEXP PROC                                                   00000430
C                    SET N TO FIRST OR SECOND HALF OF PAGE             00000440
C                    ADD LINE NUMBER                                   00000450
C                    SET N TO AREA ACCORDING TO HRATIO                 00000460
C                    SET N TO FIRST OR SECOND SCIENCE WORD             00000470
C                    SET INDEXP TO 3 * N FOR THREE HALF WORDS          00000480
C        END INDEXP                                                    00000490
C14.  Reference:                                                       00000500
C        NONE                                                          00000510
C15.  Programmer and Date:                                             00000520
C        GERRY MABANDINO                                               00000530
C16.  Modifications:                                                   00000540
C                                                                      00000550
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000560
```

*** END OF MEMBER *** 55 RECORDS PROCESSED **********

```
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000020
* 1.  Routine:                                                       00000030
*       ITBIT                                                       00000040
* 2.  System, Satellite; Version:                                   00000050
*       HELDRE     HELIOS A,B          0                          00000060
* 3.  English Name:                                                 00000070
*       INTEGER TEST BIT                                            00000080
* 4.  Language:                                                     00000090
*         ASMG   level G    release 21MAR76   360/91/75   OS/MVT  00000100
* 5.  Purpose:                                                      00000110
*       TEST BIT NBIT , RETURN 1 IF ON , 0 IF OFF                   00000120
* 6.  Calling Sequence:                                             00000130
*       Argument          Type    I/O    Description              00000140
*         BYTE       L*1          BYTE TO BE TESTED               00000150
*         NBIT       I*4          NUMBER OF BIT TO TEST 1 = MSB   00000160
* 7.  Notes:                                                        00000170
*       7a.  Restrictions:                                          00000180
*         NONE                                                      00000190
*       7b.  Special Features:                                      00000200
*         NONE                                                      00000210
* 8.  Variables:                                                    00000220
*       8a.  Local                                                  00000230
*            Variable             Type    Description             00000240
*         EIGHT      I*4          NUMBER OF BITS IN BYTE COUNT    00000250
*         MASK       I*4          MASK FOR ALL BUT LAST BIT       00000260
*       8b.  COMMON                                                 00000270
*            COMMON               Variables                      00000280
*         NONE                                                      00000290
* 9.  I/O Information:                                              00000300
*       Unit No.          Use Description                         00000310
*         NONE                                                      00000320
*10.  Error Handling:                                              00000330
*         NONE                                                    00000340
*11.  Subroutines Called:                                          00000350
*       Subroutine        Description                             00000360
*         NONE                                                    00000370
*12.  Called By:                                                   00000380
*       Routine           Description                             00000390
*         GRBPRT    GAMMA RAY BLOCK PRINT                       00000400
*13.  Method:                                                      00000410
*         ITBIT PROC                                              00000420
*                   SHIFT MASK OVER TO BIT TO TEST                00000430
*                   TEST BIT                                      00000440
*                   STORE RETURN QUANTITY                         00000450
*         END ITBIT                                               00000460
*14.  Reference:                                                   00000470
*         NONE                                                    00000480
*15.  Programmer and Date:                                         00000490
*         GERRY MARANDINO JAN 23,1976                             00000500
*16.  Modifications:                                               00000510
*                                                                 00000520
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000530

*** END OF MEMBER ***     52 RECORDS PROCESSED  ********************************************************************************
```

```
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000020
* 1.  Routine:                                                     00000030
*       LOG12                                                     00000040
* 2.  System, Satellite; Version:                                 00000050
*       HELDRP     HELIOS     A,B       0                       00000060
* 3.  English Name:                                               00000070
*       LOGARITHM 12                                              00000080
*                                                                 00000090
* 4.  Language:                                                   00000100
*       ASMG   level G    release 21MAR76   360/91/75   OS/MVT    00000110
* 5.  Purpose:                                                    00000120
*       CONVERT LOGARITHM RATE WORD TO DECIMAL COUNTS              00000130
* 6.  Calling Sequence:                                           00000140
*       Argument          Type    I/O    Description              00000150
*          HRATE          I*2           LOGARITMIC RATE WORD     00000160
*          LRATE          I*4           DECIMAL COUNT RETURNED   00000170
* 7.  Notes:                                                      00000180
*       7a.  Restrictions:                                        00000190
*          NONE                                                   00000200
*       7b.  Special Features:                                    00000210
*          NONE                                                   00000220
* 8.  Variables:                                                  00000230
*       8a.  Local                                                00000240
*          Variable          Type    Description                  00000250
*          NONE                                                   00000260
*       8b.  COMMON                                               00000270
*          COMMON            Variables                          00000280
*          NONE                                                   00000290
* 9.  I/O Information:                                            00000300
*       Unit No.        Use Description                           00000310
*          NONE                                                   00000320
*10.  Error Handling:                                            00000330
*          NONE                                                   00000340
*11.  Subroutines Called:                                        00000350
*       Subroutine      Description                               00000360
*          NONE                                                   00000370
*12.  Called By:                                                 00000380
*       Routine         Description                               00000390
*          EXTRCT    EXTRACT DATA                                00000400
*13.  Method:                                                    00000410
*          LOG12 PROC                                             00000420
*                    EXP = FIRST 7 BITS                           00000430
*                    INTEGER = REMAINDER                          00000440
*                    IF EXP=31                                    00000450
*                              LRATE = 1                          00000460
*                    ELSE                                         00000470
*                              IF EXP=0 AND INTEGER=FE            00000480
*                                        LRATE=0                  00000490
*                              ELSE                               00000500
*                                        IF 16-EXP > 0            00000510
*                                                  R10=(2**16-1)/2 00000520
*                                                  LRATE=INTEGER+R10 00000530
*                                        ELSE LRATE=INTEGER+1     00000540
*                              FI                                 00000550
*                    FI                                           00000560
*          END LOG12                                              00000570
*14.  Reference:                                                 00000580
*          NONE                                                   00000590
*15.  Programmer and Date:                                       00000600
*          ROGER DUFORD                                           00000610
*16.  Modifications:                                             00000620
*                                                                 00000630
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
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*** END OF MEMBER *** 62 RECORDS PROCESSED **********

```
      SUBROUTINE NXTPTO(ITAPEC,HPHATP,DPHATP,MSPHAS,MSPHAE,HDPHAS,
     *HDPHAE,HPHAFT,DBLNKP,HPHABK,DNEWPH,NEWPHA)
C 1.  NAME: NXTPTC
C 2.  INDENTIFICATION: HELDRP, HELIOS A,B
C 3.  ENGLISH NAME: NEXT TAPE POINTER FOR PHA OLD TAPES
C 4.  LANGUAGE: FORTRANH, OS/MVT, 360/91/75
C 5.  PURPOSE: TO SET TAPE CATALOG POINTERS AS THE NEW PHA TAPES ARE
C               CREATED.
C 6.  CALLING SEQUENCE: CALL NXTPTO(ITAPEC,HPHATP,DPHATP,MSPHAS,MSPHAE,
C     HDPHAS,HDPHAE,HPHAFT,,DBLNKP,HPHABK,DNEWPH,NEWPHA).
C     ITAPEC I*4 CATALOG  NUMBER OF LAST TAPE COPIED
C     HPHATP I*2 NUMBER  OF PHA TAPES
C     DPHATP R*8 ARRAY  OF PHA TAPES
C     MSPHAS I*4 MILLISECONDS  OF START OF NEW PHA RECORD
C     MSPHAE I*4 MILLISECONDS  CF END OF NEW PHA RECORD
C     HDPHAE I*2 DAY  OF END OF NEW PHA RECORD
C     HPHAFT I*2 ARRAY  OF FEET WRITTEN ON EACH PHA TAPE
C     DBLNKP R*8 ARRAY  OF BLANK PHA TAPES
C     HPHABK I*2 TOTAL  NUMBER OF PHA TAPES
C     DNEWPH R*8 ARRAY  OF NEW PHA TAPES
C     NEWPHA I*4 NUMBER  OF NEW PHA TAPES
C 7.  NCTES: NCNE
C 8.  VARIABLES: NO COMMON BLCCK VARIABLES
C 9.  I/O: INPUT: NCNE
C          OUTPUT: UNIT 12 NEW PHA TAPE
C 10. ERROR HANDLING: ABEND,1 WHEN NEW PHA TAPES > 10
C                     ABEND,2 WHEN NO BLANK TAPES
C 11. CALLS: ABEND
C 12. CALLED BY: SETNMR,WRITER
C  13. METHOD:  IF THERE NO BLANK PHA TAPES TO MOUNT CALL USER ABEND
C             (02)
C          ALL TAPES BELOW CURRENT TAPE POINTER GO DOWN BY
C             ONE LEVEL. IF NOT NEXT TO CURRENT BRANCH BACK.
C             IF CURRENT TAPE EQ TO NUMBER OF PHA TAPES IN CATALOG
C               INCREMENT  HPHATP =HPHATP+1, & ASSIGN PHA TAPE NO.
C               TO THE NEXT POINTER IN CATALCG. DECREMENT NUMBER OF
C             BLANKS BY ONE.
C             IF BLANKS AT THIS LEVEL SET TO '0' BRANCH TO
C           BLANK OUT THE PHA VOLUME SERIAL NUMBER IN THE CATALOG.
C         ELSE READJUST THE BLANK TAPE ARRAY BY MOVING IT UP
C             BY CNE.
C     UPDATE THE CATALOG WITH NEW PHA TAPES BY INCREMENTING
C         NO. OF PHA BY ONE
C       IF MORE THAN 10 NEWRAT TAPES ARE CREATED CALL ABEND(01)
C     ELSE SET NEWRAT TAPE IN CATALOG
C         FI
C 14. REFERENCE: NONE
C 15. PROGRAMMER: GERRY MARANDINO
C 16. MODIFIED: EWR 78
C**********************************************************************
C**********************************************************************

*** END OF MEMBER ***      51 RECORDS PROCESSED
```

```
C 1.   NAME: NXTRTO                                                          00000030
C 2.   INDENTIFICATION: HELDRP, HELIOS A,B                                   00000040
C 3.   ENGLISH NAME: NEXT TAPE POINTER FOR RATE TAPES                        00000050
C 4.   LANGUAGE: FORTRAN4, OS/MVT, 360/91/75                                 00000060
C 5.   PURPOSE: TO SET TAPE CATALOG POINTERS AS THE NEW RAT TAPES ARE         00000070
C            CREATED.                                                        00000080
C 6.   CALLING SEQUENCE: CALL NXTRTO(ITAPEC,HRATTP,DRATTP,MSRATS,MSRATE,     00000090
C      HDRATS,HDRATE,HRATFT,,DBLNKR,HRATBK,DNEWRT,NEWRAT)                    00000100
C      ITAPEC I*4 CATALOG  NUMBER OF LAST TAPE COPIED                        00000110
C      HRATTP I*2 NUMBER  OF RATE TAPES                                      00000120
C      DRATTP R*8 ARRAY  OF RATE TAPES                                       00000130
C      MSRATS I*4 MILLISECONDS  OF START OF NEW RATE RECORD                  00000140
C      MSRATE I*4 MILLISECONDS  OF END OF NEW RATE RECORD                    00000150
C      HDRATE I*2 DAY  OF END OF NEW RATE RECORD                             00000160
C      HRATFT I*2 ARRAY  OF FEET WRITTEN ON EACH RATE TAPE                   00000170
C      DBLNKR R*8 ARRAY  OF BLANK RATE TAPES                                 00000180
C      HRATBK I*2 TOTAL  NUMBER OF RATE TAPES                                00000190
C      DNEWRT R*8 ARRAY  OF NEW RATE TAPES                                   00000200
C      NEWRAT I*4 NUMBER  OF NEW RATE TAPES                                  00000210
C 7.   NOTES: NONE                                                           00000220
C 8.   VARIABLES: NO COMMON BLOCK VARIABLES                                  00000230
C 9.   I/O: INPUT: NONE                                                      00000240
C         OUTPUT: UNIT 12 NEW RATE TAPE                                      00000250
C 10.  ERROR HANDLING: ABEND,1 MORE THAN 10 RATES TAPES                      00000260
C 11.  CALLS: ABEND                                                          00000270
C 12.  CALLED BY: SETNMR,WRITER                                              00000280
C  13. METHOD:  IF THERE NO BLANK RATE TAPE TO MOUNT CALL USER ABEND         00000290
C                 (02)                                                       00000300
C              ALL TAPES BELOW CURRENT TAPE POINTER GO DOWN BY               00000310
C                 ONE LEVEL. IF NOT NEXT TO CURRENT BRANCH BACK.             00000320
C                 IF CURRENT TAPE EQ TO NUMBER OF     TAPES IN CATALOG       00000330
C                  INCREMENT  HRATTP =HRATTP+1, & ASSIGN     TAPE NO.        00000340
C                  TO THE NEXT POINTER IN CATALOG. DECREMENT NUMBER OF       00000350
C                BLANKS BY ONE.                                              00000360
C                IF BLANKS AT THIS LEVEL SET TO '0' BRANCH TO                00000370
C               BLANK OUT THE     VOLUME SERIAL NUMBER IN THE CATALOG.       00000380
C             ELSE READJUST THE BLANK TAPE ARRAY BY MOVING IT UP             00000390
C                  BY ONE.                                                   00000400
C          UPDATE THE CATALOG WITH NEW     TAPES BY INCREMENTING             00000410
C             NO. OF RATES BY ONE                                            00000420
C            IF MORE THAN 10 NEWRAT TAPES ARE CREATED CALL ABEND(01)         00000430
C          ELSE SET NEWRAT TAPE IN CATALOG                                   00000440
C             FI                                                             00000450
C 14. REFERENCE: NONE                                                        00000460
C 15. PROGRAMMER: GERRY MARANDINO                                            00000470
C 16. MODIFIED: EWR 78                                                       00000480
C*************************************************************************  00000490
C*************************************************************************00000500
```

*** END OF MEMBER ** 48 RECORDS PROCESSED **********

```
C 1.   NAME: CVLAPP                                                    00000030
C 2.   INDENTIFICATION: HELDRP, HELIOS A,B                             00000040
C 3.   ENGLISH NAME: PULSE HEIGHT ANALYSIS OVERLAP                     00000050
C 4.   LANGUAGE: FORTRAN4, OS/MVT, 360/91/75                           00000060
C 5.   PURPOSE: TO FIND IF THERE IS ANY OVERLAP IN THE PROCESSING DATA  00000070
C            IF SO TO CHECK WHERE THE DATA WILL FIT IN                 00000080
C 6.   CALLING SEQUENCE: OVLAPP IS A LOGICAL FUNCTION                  00000090
C FUNCTION CVLAPP(MSNS,MSNE,HDNS,HDNE,ITAPEC,ITAPER,HPHATP,DPHATP,MSPHAS00000100
C   ,MSPHAE,HDPHAS,HDPHAE)                                             00000110
C     ITAPEC I*4 CATALOG  NUMBER OF LAST TAPE COPIED                   00000120
C     HPHATP I*2 NUMBER  OF PHA TAPES                                  00000130
C     DPHATP R*8 ARRAY  OF PHA TAPES                                   00000140
C     MSPHAS I*4 MILLISECONDS  OF START OF NEW PHA RECORD              00000150
C     MSPHAE I*4 MILLISECONDS  OF END OF NEW PHA RECORD                00000160
C     HDPHAE I*2 DAY  OF END OF NEW PHA RECORD                         00000170
C      HDPHAS I*2 DAY OF START OF PHA RECORD.                          00000180
C      ITAPER I*4 TAPE POINTER                                         00000190
C      MSNS   I*4 NEW TIME FOR START OF RECORD                         00000200
C      MSNE   I*4 NEW TIME FOR END OF RECORD                           00000210
C      HDNS   I*2 NEW DAY NO. FOR START RECORD                         00000220
A 200  HDNE    I*2 NEW DAY NO. FOR END                                  00000230
C                                                                      00000240
C 7.   NOTES: NONE                                                     00000250
C 8.   VARIABLES: NO COMMON BLOCK VARIABLES                            00000260
C 9.   I/O: INPUT: NONE                                                00000270
C 10.  ERROR HANDLING: NONE.                                           00000280
C 11.  CALLS: NONE.                                                    00000290
C 12.  CALLED BY: WRTPHA                                               00000300
C 13.  METHOD:SET INCLUSIVE ENDED SET FUNCTION                         00000310
C       IF HPHATP EQ 0 SET ITAPER =1; &OVLAPP=FALSE                    00000320
G       RETURN                                                         00000330
C        ELSE  TEST IF NEW TIMES ARE AFTER END TIMES OF DATA BASE      00000340
C      SET ITAPER=HPHATP ; & OVLAPP=FALSE RETURN                       00000350
C     IF HDNS GT. HDPHAS &MSNS .GE. MSPHAS SET ITAPER =1; OVLAPP=.TRUE; 00000360
C     & RETURN.                                                        00000370
C     IF  ITAPEC .LT. 1 OR ITAPEC .GE. HPHATP SET ITAPER =HPHATP &     00000380
C     IF TIMES ARE WITHIN SET CVLAPP=TRUE                              00000390
C      RETURN                                                          00000400
C     OR ELSE CHECK IF NOT WITHIN  SET OVLAPP =TRUE, ITAPER =HPHATP    00000410
C     RETURN. OTHERWISE SET ITAPER=ITAPEC, OVLAPP=TRUE                 00000420
C    RETURN                                                            00000430
C     IF DATA NOT WITHIN START SEARCH LOOP WITH ITAPER=1               00000440
C      IF TIMES ARE WITHIN  SET OVLAPP=TRUE & RETURN.                  00000450
C      INCREMENT ITAPER BY ONE SEARCH UNTIL FOUND                      00000460
C       WHEN FOUND SET OVLAPP=TRUE                                     00000470
C   FI                                                                 00000480
C 14.  REFERENCE: NONE                                                 00000490
C 15.  PROGRAMMER: GERRY MARANDINO                                     00000500
C 16.  MODIFIED: FWR 78                                                00000510
C*********************************************************************00000520
C*********************************************************************00000530

*** END OF MEMBER ***     51 RECORDS PROCESSED   ************************************************************
```

```
C 1.   NAME: OVLAPR                                                    00000010
C 2.   INDENTIFICATION: HELDRP, HELIOS A,B                             00000020
C 3.   ENGLISH NAME: RATE OVERLAPP                                     00000030
C 4.   LANGUAGE: FCPHRANM, OS/MVT, 360/91/75                           00000040
C 5.   PURPOSE: TO FIND IF THERE IS ANY OVERLAP IN THE PROCESSING DATA  00000050
C              IF SO TO CHECK WHERE THE DATA WILL FIT IN               00000060
C 6.   CALLING SEQUENCE: OVLAPR IS A LOGICAL FUNCTION                  00000070
C FUNCTION CVLAPP(MSNS,MSNE,HDNS,HDNE,ITAPEC,ITAPER,HRATTP,DRATTP,MSRATS00000080
C    ,MSRATE,HDRATS,HDRATE)                                            00000090
C      ITAPEC I*4 CATALOG  NUMBER OF LAST TAPE COPIED                  00000100
C      HRATTP I*2 NUMBER  OF RAT TAPES                                 00000110
C      DRATTP R*8 ARRAY  OF RAT TAPES                                  00000120
C      MSRATES I*4 MILLISECONDS  OF STAPH OF NEW RATE RECORD           00000130
C      MSRATE I*4 MILLISECONDS  OF END OF NEW RATE RECORD              00000140
C      HDRATE  I*2 DAY  OF END OF NEW RATE RECORD                      00000150
C       HDRATES I*2 DAY OF START OF RATE RECORD.                       00000160
C       ITAPER I*4 TAPE POINTER                                        00000170
C       MSNS    I*4 NEW TIME FOR START OF RECORD                       00000180
C       MSNE    I*4 NEW TIME FOR END OF RECORD                         00000190
C       HDNS    I*2 NEW DAY NO. FOR START RECORD                       00000200
C       HDNE     I*2 NEW DAY NO. FOR END                               00000210
C                                                                      00000220
C 7.   NOTES: NONE                                                     00000230
C 8.   VARIABLES: NO COMMON BLOCK VARIABLES                            00000240
C 9.   I/O: INPUT: NONE                                                00000250
C 10.  ERROR HANDLING: NONE.                                           00000260
C 11.  CALLS: NONE.                                                    00000270
C 12.  CALLED BY: WRIRAT                                               00000280
C 13.  METHOD:SET INCLUSIVE ENDED SET FUNCTION                         00000290
C       IF HRATTP EQ 0 SET ITAPER =1; &OVLAPR=FALSE                    00000300
C       RETURN                                                         00000310
C        ELSE  TEST IF NEW TIMES ARE AFTER END TIMES OF DATA BASE      00000320
C       SET ITAPER=HRATTP ; & OVLAPR=FALSE RETURN                      00000330
C      IF HDNS GT. HDRATS &MSNS .GE. MSRATS SET ITAPER =1; OVLAPR=.TRUE; 00000340
C      & RETURN.                                                       00000350
C      IF  ITAPEC .LT. 1 OR ITAPEC .GE. HRATTP SET ITAPER =HRATTP &    00000360
       IF TIMES ARE WITHIN SET CVLAPR=TRUE                             00000370
C       RETURN                                                         00000380
C      OR ELSE CHECK IF NOT WITHIN  SET OVLAPR =TRUE, ITAPER =HRATTP   00000390
       RETURN. CTHERWISE SET ITAPER=ITAPEC, OVIAPR=TRUE                00000400
     RETURN                                                            00000410
C      IF DATA NOT WITHIN START SEARCH LOOP WITH ITAPER=1              00000420
        IF TIMES ARE WITHIN  SET OVLAPR=TRUE & RETURN.                 00000430
C       INCREMENT ITAPER BY ONE SEARCH UNTIL FOUND                     00000440
C        WHEN FOUND SET OVLAPR=TRUE                                    00000450
C   FI                                                                 00000460
C 14.  REFERENCE: NONE                                                 00000470
C 15.  PROGRAMMER: GERRY MARINCINO                                     00000480
C 16.  MODIFIED: EWR 78                                                00000490
C*********************************************************************00000500
C*********************************************************************00000510
```

*** END OF MEMBER *** 51 RECORDS PROCESSED **********

```
C 1.   NAME: PHACLR                                                    00000010
C 2.   INDENTIFICATION: HELDRP, HELIOS A,B                             00000020
C 3.   ENGLISH NAME: PHA, CLEAR                                        00000030
C 4.   LANGUAGE: FCPHRAN, OS/MVT, 360/91/75                            00000040
C 5.   PURPOSE: TO CLEAR THE COMMON AREA CALLED PHANEW FOR FURTHER PROCES00000050
C            SING                                                      00000060
C 6.   CALLING SEQUENCE: PHACLR (HFMT,MPNREC,JFDM)                     00000070
C      ITAPEC I*4 CATALOG  NUMBER OF LAST TAPE COPIED                  00000100
C      HRATTP I*2 NUMBER  OF RAT TAPES                                 00000110
C      DRATTP R*8 ARRAY  OF RAT TAPES                                  00000120
C      MSRATES I*4 MILLISECONDS  OF STAPH OF NEW RATE RECORD           00000130
C      MSRATE I*4 MILLISECONDS  OF END OF NEW RATE RECORD              00000140
C      HDRATE  I*2 DAY  OF END OF NEW RATE RECORD                      00000150
C       HDRATES I*2 DAY OF START OF RATE RECORD.                       00000160
C       ITAPER I*4 TAPE POINTER                                        00000170
C       MSNS   I*4 NEW TIME FOR START OF RECORD                        00000180
C       MSNE   I*4 NEW TIME FOR END OF RECORD                          00000190
        HDNS   I*2 NEW DAY NO. FOR START RECORD                        00000200
C       HDNE    I*2 NEW DAY NO. FOR END                                00000210
C                                                                      00000220
C 7.   NOTES: NONE                                                     00000230
C 8.   VARIABLES: NO COMMON BLOCK VARIABLES                            00000240
C 9.   I/O: INPUT: NONE                                               00000250
C 10.  ERROR HANDLING: NONE.                                           00000260
C 11.  CALLS: NONE.                                                    00000270
C 12.  CALLED BY:  OVLAPP                                              00000280
C 13.  METHOD:SET INCLUSIVE ENDED SET FUNCTION                         00000290
C       IF HRATTP EQ 0 SET ITAPER =1; &OVLAPP=FALSE                    00000300
        RETURN                                                         00000310
C        ELSE  TEST IF NEW TIMES ARE AFTER END TIMES OF DATA BASE      00000320
C       SET ITAPER=HRATTP ; & OVLAPP=FALSE RETURN                      00000330
C      IF HDNS GT. HDRATS &MSNS .GE. MSRATS SET ITAPER =1; OVLAPP=.TRUE; 00000340
C      & RETURN.                                                       00000350
C      IF  ITAPEC .LT. 1 OR ITAPEC .GE. HRATTP SET ITAPER =HRATTP &    00000360
       IF TIMES ARE WITHIN SET OVLAPP=TRUE                             00000370
C       RETURN                                                         00000380
C      OR ELSE CHECK IF NOT WITHIN  SET OVLAPP =TRUE, ITAPER =HRATTP   00000390
       RETURN. OTHERWISE SET ITAPER=ITAPEC, OVLAPP=TRUE                00000400
      RETURN                                                           00000410
C      IF DATA NOT WITHIN START SEARCH LOOP WITH ITAPER=1              00000420
        IF TIMES ARE WITHIN  SET OVLAPP=TRUE & RETURN.                 00000430
C       INCREMENT ITAPER BY ONE SEARCH UNTIL FOUND                     00000440
C        WHEN FOUND SET OVLAPP=TRUE                                    00000450
C    FI                                                                00000460
C 14.  REFERENCE: NONE                                                 00000470
C 15.  PROGRAMMER: GERRY MARINDINO                                     00000480
C 16.  MODIFIED: EWR 78                                                00000490
C*************************************************************************00000500
C*************************************************************************00000510
```

*** END OF MEMBER *** 49 RECORDS PROCESSED . **********

```
C 1. NAME:PHALEN                                                        00000010
C 2. IDENTIFICATION: HELDRP HELIOS A,B                                  00000020
C 3. ENGLISH NAME: LENGTH FOR PHA RECORD                                00000030
C 4. LANGUAGE: FORTRANH' 360/91/75, OS/MVT                              00000040
C 5. PURPOSE: TO CALCULATE THE LENGTH OF A PHA RECORD.                  00000050
C 6. CALLING  SEQUENCE: CALL PHALEN(QSEQ,JP,LEN)                        00000060
C                'QSEQ' L*1  SEQUENCE                                   00000070
C                'JP' I*4  INDEX FOR PHAERECORD LOATION                 00000080
C                 'LEN' LENGTH FO RECORD                                00000090
C 7. NOTES:NONE                                                         00000100
C 8. VARIABLES:NO COMMON VARIABLES.                                     00000110
C 9.I/O:  INPUT:ALL THE ABOVE MENTIONED VARIABLES AS CALLING            00000120
C 10. ERROR HANDLING: NONE.                                             00000130
C 11. CALLS: NONE.                                                      00000140
C 12. CALLED BY: WRTPHA                                                 00000150
C 13. METHOD:   IF ITEMP .LT. 0 SET QSEQ(3) = 7                         00000160
C            ELSE ITEMP =0 , QTEMP(4) = QSEQ(3)                         00000170
C           ITEMP =ITEMP+1/2                                            00000180
C           THEN LENGTH =36+ JP*4*ITEMP                                 00000190
C           FI                                                          00000200
C 14. REFERENCE: NONE.                                                  00000210
C 15. PROGRAMMER: GERRY MARINDINO                                       00000220
C 16. MODIFIED:                                                         00000230
```

*** END OF MEMBER *** 23 RECORDS PROCESSED **********

```
C-----------------------------------------------------------
C    THIS ROUTINE FORMATS A PHA OUTPUT RECORD. PHA ENTRIES
C    HAVE A UNIQUE TIME ASSOCIATED WITH THEM. THEY ARE WRITTEN
C    ONTO THE DATA RECORD ON A TIME ORDERED SEQUENCE. ENTRIES
C    WHICH ARE MISSING OR FAIL QUALITY CHECKS ARE PADDED WITH
C    -1'S. AT THE END OF PROCESSING FOR EACH PAGE THE TREND
C    CHECK ALGORITHM IS APPLIED TO THE EVENT RATES. AFTER FOUR
C    PAGES OF DATA HAVE BEEN PROCESSED, THE RECORD IS WRITTEN
C    INTO THE PHA TAPE DATA BASE VIA A CALL TO WRTPHA
C-----------------------------------------------------------
C 1.   NAME: PHAOUT
C 1A   ENTRY: PHAEND
C 2.   IDENTIFICATION: HELDRP, HELIOS A,B
C 3.   ENGLISH NAME: PULSE HEIGHT ANALYSIS OUTPUT
C 3A                 PULSE HEIGHT ANALYSIS END
C 4.   LANGUAGE: FCRTRANH, 360 75/91, OS/MVT
C 5.   PURPOSE: SEE ABOVE
C 6.   CALLING SEQUENCE: MPNREC - I*4 RECORD OF PHA EVENTS OUTPUT
C                        HPNREC - I*2 THE SAME
C                        JFDM   - I*4 DIMENSICN OF MPNREC
C                        JHDM   - I*4 DIMENSION OF HPNREC
C                        HRATIO - PHA/RATES RATIO
C 7.   NOTES: NONE
C 8.   VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN
C      APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION
C 9.   I/O: NONE
C 10.  ERROR HANDLING: ABEND(030) - ILLEGAL FORMAT
C 11.  CALLS: MOD, INDEXP,ENGDAT,FMOVE,PKHET,PKLET,WRTPHA,PHACLR,
C             ALOG10,HFIX,IGET,ABEND
C 12.  CALLED BY: EXTRCT
C 13.  METHOD: LOCATE POSITTON WITHIN MPNREC USING INDEXP
C              PACK THREE HALFWORDS ACCORDING TO:
C              HALFWORD 1  METTAAAAAAAAAAAA
C              HALFWCRD 2  BBBBBBBBBBBBCCCC
C              HALFWORD 3  CCCCCCCCRSSSQPPN
C       WHERE: TT = QEVT
C              R  = QC2R
C              SSS= CSECT
C              Q  = QAC3
C              PP = QPR1
C              N  = 0
C              A CALL TO WRTPHA OUTPUTS THE RECORD MPNREC
C 14.  REFERENCE: NONE
C 15.  PROGRAMMER: ROGER DUBORD
C 16.  MODIFIED:
C************************************************************
C************************************************************

*** END OF MEMBER ***     47 RECORDS PROCESSED    ****************************************
```

```
*CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
*
*    THIS SUBROUTINE UNPACKS PHA DATA FROM TELEMETRY DATA & PUTS IN  C
*    3 PHAWORDS WHICH IS 48 BITS LONG UNPACKING ALL THE BITS & PLACINGC
*    THEM IN TO PROPER PHA QUALITY                                    C
*CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
* 1. NAME:PHAUPK
*  2.IDENTIFICATION: HELDRP HELIOS A,B
*   3. ENGLISH NAME: UNPACKING PHA OR(PULSE HEIGHT ANALYSIS)
*   4. LANGUAGE: ASSEMBLER 360/91/75, OS/MVT
*   5. PURPOSE: TO UNPACK PHA FROM TLM
*   6. CALLING SEQUENCE: CALL PHAUPK(QBLOCK(M,I))
*   7. NOTES: NONE
*   8. VARIABLES: NO COMMON BLOCK VARIABLES
*   9. I/O INPUT:QBLOCK(M,I) IS BEGINING OF FIRST SCIENCE WORD
*          OUTPUT: 48 BITS HERE ARE PACKED IN SUCH AWAY:
*                  BIT 1 TO 12 IN PHA DATA WORD 3, 13TO 24 IN WORD 2
*                  & 25 TO 36 IN WORD 1
*       REST OF 12 BITS ARE PACKED  37 TO 43 VARIABLE ; 39,40 QPRI
*   41 QC2R 42 TO 43 QEVT 44 TO 46 QSECT; BIT 47 IF IT IS '0' HET
*   IF '1' LET BIT 48 IS ALWAYS SET TO '0' FOR PHA
*   10. ERROR HANDLING: NONE.
*   11. CALLS NONE.
*   12. CALLED BY: EXTRCT
* METHOD:BIT NUMBERING IS 1=MSB.
*         LOAD BIT 1-12 OF PHA WORD; STORE REGISTER 2 IN HPHA3
*         LOAD BIT 13-24  OF PHA SCIECNCE WORD IN TO R2 IN HPHA2.
*        LOAD BITS 25-36 OF PHA WORD IN R2; STORE R2 IN HPHA1.
*         IF BIT 47=0 (HET BLOCK)
*          SET QHELE =0; SET QPRI= BIT 39-40
*          SET QC2R = BIT 41
*    IF BIT 42-43 =0    QEVT =0
*    IF BIT         1   QEVT =2
*          IF BIT 2     QEVT=3
*                 3          =4
*         SET QSECT = BIT 44-46
*        ELSE LET BLOCK
*         SET QHELE =1
*         SET  QPRI = BIT 42
*         SET QEVT = BIT 43
*         SET QSEC = BIT 44-46
*   14. REFERENCE: NONE
*   15. PROGRAMMER: ROGER DUBORD
*   16. MODIFIED:
*   ********************************************************************
************************************************************************
```

*** END OF MEMBER ***   46 RECORDS PROCESSED   **

```
C*******************************************************************00000030
C 1.   NAME: PKBLKL                                                  00000040
C 2.   IDENTIFICATION: HELDRP HELIOS A,B                             00000050
C 3.   ENGLISH NAME:  PACK BLOCK                                     00000060
C 4.   LANGUAGE: FORTRANH, OS/MVT, 360/91/75                         00000070
C 5.   PURPOSE:                                                      00000080
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000090
C   THIS ROUTINE WILL STORE THE 24-BIT SECTION OF THE FORMAT 5 SCIENTIFIC00000100
C   DATA BLOCKS UNTIL THE ENTIRE 48-BIT BLOCK IS FORMED. IT WILL THEN  00000110
C   REFORMAT THE FRAME TO PARALLEL A FORMAT 1 FRAME AND RETURN CONTROL C00000120
C   TO THE CALLING PROGRAM FOR FURTHER PROCESSING                   C 00000130
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000140
C 6.   CALLING SEQUENCE:                                            00000150
C        CALL PKBLK (*)                                             00000160
C        (*) ALTENATE RETURN IS GIVEN TO THE SUBROUTINE             00000170
C 7.   NOTES: NONE                                                  00000180
C 8. VARIABLES:    COMMON BLOCK VARIABLES  USED ARE DESCRIBED IN HELIOS 00000190
C             DATA REDUCTION APPENDICES                              00000200
C 9.    I/C:NONE.                                                   00000210
C 10. ERROR HANDLING: NONE.                                         00000220
C 11. CALLS: NONE.                                                  00000230
C 12. CALLED BY:  EXTRCT                                            00000240
C 13. METHOD: SET I= INDX-1                                         00000250
C       IF MOD I,2 .EQ.1  AND QH IS SET TO FALSE                    00000260
C         SET QH= F TAKE ALTERNATE RETURN                           00000270
C       ELSE SET QH =TRUE ; LAST = INDX-1                           00000280
C       MOVE QSAVE(1) 3 BYTES  FROM QDATA(21,INDX)                  00000290
C       TAKE ALTERNATE RETURN                                       00000300
C     IF I NE 1                                                     00000310
C     TAKE ALTERNATE RETURN.                                        00000320
C       ELSE MOVE QSAVE(4) 3 BYTES FROM QDATA(21,INDX)              00000330
C       FILL ALL THE REST OF 18 BYTES  INTO  QDATA                  00000340
C       MOVE BACK PACKED QSAVE  INTO QDTATA(21,INDX) 6 BYTES        00000350
C       SET QH = F                                                  00000360
C       RETURN                                                      00000370
C 14. REFERENCE:NONE.                                               00000380
C 15. PROGRAMMER: ROGER DUBORD                                      00000390
C 16. MODIFIED:                                                     00000400
C*******************************************************************00000410
C*******************************************************************00000420
```

*** END OF MEMBER *** 40 RECORDS PROCESSED **********

```
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
* 1.  Routine:
*       PKEET
* 2.  System, Satellite; Version:
*       HELDRP    HELIOS A,B          0
* 3.  English Name:
*       PACK HET
* 4.  Language:
*        ASMG   level G    release 21MAR76   360/91/75   OS/MVT
* 5.  Purpose:
*       EXTRACT PHA WORDS TAGS AND STATUS FROM SCIENCE WORD
* 6.  Calling Sequence:
*       Argument              Type    I/O    Description
*          HHFT(1)    I*2             METTAAAAAAAAAAAA
*          HHFT(2)    I*2             BBBBBBBBBBBBCCCC
*          HHFT(3)    I*2             CCCCCCCCRSSSQEPN
*          THREE HALF WORDS RETURNED
*          120                        ALTERNATE RETURN IF NULL EVENT
* 7.  Notes:
*       7a.  Restrictions:
*          NONE
*       7b.  Special Features:
*          NONE
* 8.  Variables:
*       8a.  Local
*            Variable              Type     Description
*          A           I*4         NUMBER 7
*          B           I*4         NUMBER 8
*          C           I*4         NUMBER 9
*          ALLOFF      I*4         NUMBER 0
*          ALLON       I*4         MASK FFF
*       8b.  COMMON
*            COMMON                Variables
*          COMMON BLOCK VARIABLES USED ARE DESCRIBED IN APPENDICES
*          OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION
* 9.  I/O Information:
*       Unit No.          Use Description
*          NONE
*10.  Error Handling:
*          NONE
*11.  Subroutines Called:
*       Subroutine        Description
*          NONE
*12.  Called By:
*       Routine           Description
*          PHAOUT      PHA OUTPUT
*13.  Method:
*PKHET
*          NULL        IF NULL EVENT SET SWITCH FOR ALTERNATE RETURN
*                                    SET A,B,C TO FFF
*          NOTNULL     ELSE
*                                    SET SWITCH FOR NORMAL RETURN
*                      RESET         IF RESET EVENT
*                                       SET A,B,C TO FFF
*                                    ELSE INCREASE A,B,C EVENT COUNTS BY 1
*                                    FI
*                      FI
*          PKEVT       LOAD QEVT INTO TT
*                      LOAD PHA3 INTO A
*                      LOAD PHA2 INTO B
*                      LOAD PHA1 INTO C
*                      LOAD QC2R INTO R
*                      LOAD QSECT INTO SSS
*                      LOAD QAC3 INTO Q
*                      LOAD QPRI INTO PP
*          END PKEVT
*          NULLRET     IF NULL EVENT
*                                    SET N TO 1
*                                    TAKE ALTERNATE RETURN
*                      ELSE NORMAL RETURN
*          END PKHET
*14.  Reference:
*
*15.  Programmer and Date:
*
*16.  Modifications:
*
```

```
00000020
00000030
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00000100
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00000780
```

```
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000790
*** END OF MEMBER ***     78 RECORDS PROCESSED   ********************************************************************************
```

```
*cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
* 1.   Routine:
*         PKLET
* 2.   System, Satellite, Version:
*         HELDRE    HELIOS A,B          0
* 3.   English Name:
*         PACK LET
* 4.   Language:
*         ASMG   level G    release 21MAR76   360/91/75    OS/MVT
* 5.   Purpose:
*         EXTRACT EHA WORDS TAGS AND STATUS FROM SCIENCE WORD
* 6.   Calling Sequence:
*      Argument          Type     I/O    Description
*         HLET(1)    I*2         METTAAAAAAAAAAAA
*         HLET(2)    I*2         BBBBBBBBBBBBCCCC
*         HLET(3)    I*2         CCCCCCCCRSSSQPPN
*         THREE HALF WORDS RETURNED
*         120                    ALTERNATE RETURN IF NULL EVENT
* 7.   Notes:
*      7a.  Restrictions:
*         NONE
*      7b.  Special Features:
*         NONE
* 8.   Variables:
*      8a.  Local
*           Variable             Type    Description
*         A          I*4         NUMBER 7
*         B          I*4         NUMBER 8
*         C          I*4         NUMBER 9
*         ALLOFF     I*4         NUMBER 0
*         ALLON      I*4         MASK FFF
*      8b.  COMMON
*           COMMON               Variables
*         COMMON BLOCK VARIABLES USED ARE DESCRIBED IN APPENDICES
*         OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION
* 9.   I/O Information:
*      Unit No.         Use Description
*         NONE
*10.   Error Handling:
*         NONE
*11.   Subroutines Called:
*      Subroutine       Description
*         NONE
*12.   Called By:
*      Routine          Description
*         PHAOUT     PHA OUTPUT
*13.   Method:
*PKLET
*         NULL       IF NULL EVENT SET SWITCH FOR ALTERNATE RETURN
*                              SET A,B,C TO FFF
*         NOTNULL    ELSE
*                              SET SWITCH FOR NORMAL RETURN
*                    RESET     IF RESET EVENT
*                                        SET A,B,C TO FFF
*                              ELSE INCREASE A,B,C EVENT COUNTS BY 1
*                              FI
*                    FI
*         PKEVT      LOAD QEVT INTO TT
*                    LOAD PHA3 INTO A
*                    LOAD PHA2 INTO B
*                    LOAD PHA1 INTO C
*                    LOAD QSECT INTO SSS
*                    LOAD QPRI INTO PP
*         END PKEVT
*         NULLRET    IF NULL EVENT
*                              SET N TO 1
*                              TAKE ALTERNATE RETURN
*                    ELSE NORMAL RETURN
*         END PKLET
*14.   Reference:
*         NONE
*15.   Programmer and Date:
*         ROGER DUBORD
*16.   Modifications:
*
*cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
```

*** END OF MEMBER *** 76 RECORDS PROCESSED **********

```
*cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
*  1.   Routine:
*          PTHIRD
*  2.   System, Satellite, Version:
*          HELDBE    HELIOS A,B           0
*  3.   English Name:
*          PACK THIRD
*  4.   Language:
*           ASMG    level G    release 21MAR76   360/91/75   OS/MVT
*  5.   Purpose:
*          PACK THREE SPLIT RATE WORDS INTO HRATE1
*  6.   Calling Sequence:
*       Argument           Type     I/O     Description
*          QT1        L*1         FIRST PART OF SPLIT RATE
*          QT2        L*1         SECOND PART OF SPLIT RATE
*          QRATE1     L*1         LAST PART OF SPLIT RATE
*          HRATE1     I*2         PACKED RATE QT1QT2QRATE1 RETURNED
*  7.   Notes:
*       7a.  Restrictions:
*          HRATE1 IS RETURNED LEFT JUSTIFIED
*       7b.  Special Features:
*          NONE
*  8.   Variables:
*       8a.  Local
*            Variable             Type     Description
*          NONE
*       8b.  COMMON
*            COMMON               Variables
*          NONE
*  9.   I/O Information:
*       Unit No.          Use Description
*          NONE
* 10.   Error Handling:
*          NONE
* 11.   Subroutines Called:
*       Subroutine        Description
*          NONE
* 12.   Called By:
*       Routine           Description
*          EXTRCT     EXTRACT DATA
* 13.   Method:
*PTHIRD  CSECT
*          LOAD QT1 INTO HRATE1
*          LOAD QT2 INTO HRATE1
*          LOAD QRATE1 INTO HRATE1
*END PTHIRD
* 14.   Reference:
*          NONE
* 15.   Programmer and Date:
*          ROGER DUFORD
* 16.   Modifications:
*
*cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
         BC     15,12(0,15)
```

*** END OF MEMBER ***   54 RECORDS PROCESSED   **

```
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000020
C 1.  Routine:                                                         00000030
C        RATCLR                                                        00000040
C 2.  System, Satellite, Version:                                      00000050
C        HELDRP    HELIOS A,B          0                             00000060
C 3.  English Name:                                                    00000070
C        RATES CLEAR                                                   00000080
C 4.  Language:                                                        00000090
C         FORTRANG or FORTRANH   level 21.6    360/91/75   OS/MVT    00000100
C 5.  Purpose:                                                         00000110
C        CLEAR COMMON AREA RATNEW                                      00000120
C 6.  Calling Sequence:                                                00000130
C        Argument          Type    I/O    Description                 00000140
C           HFMT      I*2          FORMAT                            00000150
C 7.  Notes:                                                           00000160
C     7a.  Restrictions:                                               00000170
C        NONE                                                          00000180
C     7b.  Special Features:                                           00000190
C        NONE                                                          00000200
C 8.  Variables:                                                       00000210
C     8a.  Local                                                       00000220
C           Variable          Type    Description                    00000230
C        NONE                                                          00000240
C     8b.  COMMON                                                      00000250
C           COMMON            Variables                              00000260
C        COMMON BLOCK VARIABLES USED ARE DESCRIBED IN TH               00000270
C        APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION       00000280
C 9.  I/O Information:                                                 00000290
C     Unit No.        Use Description                                  00000300
C        NONE                                                          00000310
C10.  Error Handling:                                                  00000320
C        NONE                                                          00000330
C11.  Subroutines Called:                                              00000340
C     Subroutine      Description                                      00000350
C        FMOVE     MOVE BYTE THROUGHOUT A FIELD                        00000360
C12.  Called By:                                                       00000370
C     Routine         Description                                      00000380
C        RATOUT    RATES OUTPUT                                        00000390
C13.  Method:                                                          00000400
CRATCLR  CSECT                                                         00000410
C        MOVE -1 INTO SUBCOM AREA                                      00000420
C        MOVE -20000000 INTO DATA AREA                                 00000430
CEND RATCLR                                                            00000440
C14.  Reference:                                                       00000450
C        NONE                                                          00000460
C15.  Programmer and Date:                                             00000470
C        JERRY MARANDINO                                               00000480
C16.  Modifications:                                                   00000490
C                                                                      00000500
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000510
```

*** END OF MEMBER *** 50 RECORDS PROCESSED

```
C 1.   NAME: RATOUT                                                          00000020
C 1A   ENTRY: RATEND                                                         00000030
C 2.   IDENTIFICATION: HELDRP HELIOS A,B                                     00000040
C 3.   ENGLISH NAME: RATES OUTPUT                                            00000050
C 3A   ENGLISH NAME: RATES END                                               00000060
C 4.   LANGUAGE: FORTRANH, 360 91/75 OS/MVT                                  00000070
C 5.   PURPOSE: RATOUT PLACES THE RATES HEADER AND DATA INTO A RECORD        00000080
C      FOR OUTPUTTING.  IT ALSO PLACES THE ENGINEERING DATA IN THE           00000090
C      RECORD AND WRITES THE RECORDS OUT WITH WRTRAT ONTO A RATES TAPE.      00000100
C 5A   PURPOSE: CLOSE RATES PROCESSING                                       00000110
C 6.   CALLING SEQUENCE: CALL RATOUT(LRATE,QLINE,HRATIO,N)                  00000120
C      LRATE=RATES COUNTS                                                    00000130
C      QLINE=LINE NUMBER                                                     00000140
C      HRATIO=PHA/RATES RATIO                                                00000150
C      N=THE NUMBER OF THE RATE WORD                                         00000160
C 7.   NOTES: NONE                                                          00000170
C 8.   VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN              00000180
C      APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION               00000190
C 9.   I/O: NONE                                                           00000200
C 10.  ERROR HANDLING: ABEND(902) FOR FAILED TREND CHECK                    00000210
C                      ABEND(025) ILLEGAL FORMAT                            00000220
C 11.  CALLS: FMOVE,MOD,ENGDAT,WRTRAT,RATCLR,ALOG10,HFIX,IGET               00000230
C 12.  CALLED BY: EXTRCT                                                     00000240
C 13.  METHOD: THE DATA IS PACKED 16 LINES AT A TIME INTO A HALF            00000250
C      PAGE.  EACH PAGE IS DETERMINED BY THE UNSECTORED SEQUENCE ID.         00000260
C      THE ENGINEERING DATA IS PLACED IN THE FIRST 13 WORDS OF THE           00000270
C      RECORD.                                                               00000280
C 14.  REFERENCE: NONE                                                       00000290
C 15.  PROGRAMMER: ROGER DUBORD                                              00000300
C 16.  MODIFIED: GERRY MARANDINO, RAMI CUDDAPAH, ED RONISH 3/23/78           00000310
C*************************************************************************  00000320
C*************************************************************************  00000330

*** END OF MEMBER ***     32 RECORDS PROCESSED   ***************************************************************************
```

```
C 1.   NAME: RATOUT                                                        00000020
C 1A   ENTRY: RATEND                                                       00000030
C 2.   IDENTIFICATION: HELDRP HELIOS A,B ACCEPT DM7 VERSION                00000040
C 3.   ENGLISH NAME: RATES OUTPUT, ACCEPT DM7 VERSION                      00000050
C 3A   ENGLISH NAME: RATES END                                             00000060
C 4.   LANGUAGE: FORTRANH, 360 91/75 OS/MVT                                00000070
C 5.   PURPOSE: RATOUT PLACES THE RATES HEADER AND DATA INTO A RECORD      00000080
C      FOR OUTPUTTING.  IT ALSO PLACES THE ENGINEERING DATA IN THE         00000090
C      RECORD AND WRITES THE RECORDS OUT WITH WRTRAT ONTO A RATES TAPE.    00000100
C 5A   PURPOSE: CLOSE RATES PROCESSING                                     00000110
C 6.   CALLING SEQUENCE: CALL RATOUT(LRATE,QLINE,HRATIO,N)                00000120
C      LRATE=RATES COUNTS                                                  00000130
C      QLINE=LINE NUMBER                                                   00000140
C      HRATIO=PHA/RATES RATIO                                              00000150
C      N=THE NUMBER OF THE RATE WORD                                       00000160
C 7.   NOTES: NONE                                                        00000170
C 8.   VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN            00000180
C      APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION             00000190
C 9.   I/O: NONE                                                          00000200
C 10.  ERROR HANDLING: ABEND(902)  FOR FAILED TREND CHECK                  00000210
C                      ABEND(025)  ILLEGAL FORMAT                          00000220
C 11.  CALLS: FMOVE,MOD,ENGDAT,WRTRAT,RATCLR,ALOG10,HFIX,IGET              00000230
C 12.  CALLED BY: EXTRCT                                                   00000240
C 13.  METHOD: THE DATA IS PACKED 16 LINES AT A TIME INTO A HALF           00000250
C      PAGE.  EACH PAGE IS DETERMINED BY THE UNSECTORED SEQUENCE ID.       00000260
C      THE ENGINEERING DATA IS PLACED IN THE FIRST 13 WORDS OF THE         00000270
C      RECORD.                                                             00000280
C 14.  REFERENCE: NONE                                                     00000290
C 15.  PROGRAMMER: ROGER DUBORD                                            00000300
C 16.  MODIFIED: GERRY MARANDINO, RAMI CUDDAPAH, ED RONISH 3/23/78         00000310
C*****************************************************************      00000320
C*****************************************************************      00000330
```

*** END OF MEMBER *** 32 RECORDS PROCESSED **********

```
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000020
* 1.  Routine:                                                       00000030
*       RATUPK                                                       00000040
* 2.  System, Satellite; Version:                                    00000050
*       HELDRP     HELIOS A,B          0                           00000060
* 3.  English Name:                                                  00000070
*       RATE UNPACK                                                  00000080
* 4.  Language:                                                      00000090
*         ASMG   level G    release 21MAR76   360/91/75   OS/MVT   00000100
* 5.  Purpose:                                                       00000110
*       UNPACK RATES DATA FROM SCIENCE WORD INTO COMMON RBLOCK        00000120
* 6.  Calling Sequence:                                              00000130
*       Argument          Type     I/O    Description               00000140
*         QBLOCK(M,I)          L*1        @ OF SCIENCE DATA WORD    00000150
* 7.  Notes:                                                         00000160
*     7a.  Restrictions:                                             00000170
*       NONE                                                         00000180
*     7b.  Special Features:                                         00000190
*       NONE                                                         00000200
* 8.  Variables:                                                     00000210
*     8a.  Local                                                     00000220
*          Variable          Type    Description                   00000230
*       LINETABL  I*4        TABLE OF REVERSED BYTE VALUES         00000240
*       PRITABLE  I*4        TABLE OF PRIORITY BIT VALUES          00000250
*     8b.  COMMON                                                    00000260
*          COMMON            Variables                             00000270
*       COMMON BLOCK VARIABLES USED ARE DESCRIBED IN THE APPENDICES  00000280
*       OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION                 00000290
* 9.  I/O Information:                                               00000300
*     Unit No.        Use Description                                00000310
*       NONE                                                         00000320
*10.  Error Handling:                                               00000330
*       NONE                                                         00000340
*11.  Subroutines Called:                                           00000350
*     Subroutine      Description                                    00000360
*       NONE                                                         00000370
*12.  Called By:                                                    00000380
*     Routine         Description                                    00000390
*       RATOUI    RATE OUTPUT                                      00000400
*13.  Method:                                                       00000410
*RATUPK  CSECT                                                      00000420
*         STORE 1ST 12 BITS IN HRATE4 LEFT JUSTIFIED                00000430
*         STORE 2ND 12 BITS IN HRATE3                               00000440
*         STORE 3RD 12 BITS IN HRATE2                               00000450
*         STORE SPLIT RATE BITS IN QRATE1                           00000460
*         STORE SEQUENCE ID BITS IN QDS432                          00000470
*         EXTRACT LINE NUMBER                                       00000480
*                 REVERSE BIT ORDER ACCORDING TO TABLE              00000490
*                 STORE IN QLINE                                    00000500
*         EXTRACT HET PRIORITY BITS                                 00000510
*                 INTERPRET ACCORDING TO PRITABLE                   00000520
*                 0-0 1-2 2-1 3-3                                   00000530
*                 STORE IN QHPRI                                    00000540
*END RATUPK                                                         00000550
*14.  Reference:                                                    00000560
*       NONE                                                         00000570
*15.  Programmer and Date:                                          00000580
*       ROGER DUFORD                                                 00000590
*16.  Modifications:                                                00000600
*                                                                    00000610
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000620

*** END OF MEMBER ***     61 RECORDS PROCESSED  ********************************************************************
```

```
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
C 1.   Routine:
C         REVISP
C 2.   System, Satellite, Version:
C         HEIDRP    HELIOS A,B          0
C 3.   English Name:
C         REVISE PHA
C 4.   Language:
C           FORTRANG or FORTRANH   level 21.6    360/91/75    OS/MVT
C 5.   Purpose:
C         MERGE AN OLD PHA RECORD INTO A NEW RECORD WHEN THERE
C         IS A TIME OVERLAP BETWEEN THEM
C 6.   Calling Sequence:
C      Argument          Type     I/O    Description
C         INEW       I*4        NEW RECORD TIME
C         HNEW       I*2        NEW RECORD TIME
C         IOLD       I*4        OLD RECORD TIME
C         HOLD       I*2        OLD RECORD TIME
C         NPHA       I*4        NUMBER OF PAGES
C         QRPLCE     L*1        FLAG TO REPLACE BAD DATA
C 7.   Notes:
C      7a.  Restrictions:
C         NONE
C      7b.  Special Features:
C         NONE
C 8.   Variables:
C      8a.  local
C           Variable            Type    Description
C         LSUBCOM    I*4        LENGTH OF SUBCOM AREA
C         NPAGES     I*4        NUMBER OF PAGES
C         IFW        I*4        OFFSET INTO RATES AREA
C         IHW        I*4        OFFSET INTO RATES AREA
C         IR         I*2        LOOP COUNTER
C         IP         I*2        LOOP COUNTER
C      8b.  COMMON
C           COMMON              Variables
C         NONE
C 9.   I/O Information:
C      Unit No.         Use Description
C         NONE
C10.   Error Handling:
C         NONE
C11.   Subroutines Called:
C      Subroutine        Description
C         SETSEQ     SET EARLIER SEQUENCE
C         FMOVE      MOVE BYTE THROUGHOUT AREA
C12.   Called By:
C      Routine           Description
C         WRTPHA     WRITE PHA
C13.   Method:
CREVISP   CSECT
C         IF BIT RATE AND FORMATS MATCH
C                    IF OLD TIME > NEW TIME
C                              SET HEADER TO NEW TIME
C                    ELSE SET HEADER TO OLD TIME
C                    FI
C                    SET END TIME
C                    CALL SETSEQ TO SET LINE AND SEQUENCE ID
C                    IF FORMAT 5 SET HEADER LENGTH TO 23
C                    ELSE HEADER LENGTH = 12
C                    FI
C                    SET NUMBER OF PAGES
C                    LOOP THROUGH PAGES
C                              CHECK AND SET SUBCOM DATA IN RECORD
C                              LOOP THROUGH RATES
C                                        PLACE BEST RATES IN RECORD
C                              END LOOP
C                              LOOP THROUGH PHA
C                                        PLACE BEST PHA IN RECORD
C                              END LOOP
C                    END LOOP
C         ELSE ABEND
C         FI
CEND REVISP
C14.   Reference:
C         NONE
C15.   Programmer and Date:
```

```
C        GERRY MARANDINO                                                00000790
C16.  Modifications:                                                    00000800
C                                                                       00000810
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc   00000820
*** END OF MEMBER ***      81 RECORDS PROCESSED  ************************************************************************
```

```
Cccccccccccccccccccccccccccccccccccccccccccccccccccccc
C 1.   Routine:
C         REVISR
C 2.   System, Satellite, Version:
C         HELDRE    HELIOS A,B          0
C 3.   English Name:
C         REVISE RATES
C 4.   Language:
C         FORTRANG or FORTRANH    level 21.6    360/91/75    OS/MVT
C 5.   Purpose:
C         MERGE AN OLD RATES RECORD INTO A NEW RECORD WHEN THERE
C         IS A TIME OVERLAP BETWEEN THEM
C 6.   Calling Sequence:
C      Argument          Type    I/O    Description
C         INEW       I*4         INPUT ARRAY OF NEW RATES DATA
C         HNEW       I*2         "
C         QNEW       L*1         "
C         IOLD       I*4         INPUT ARRAY OF OLD RATES DATA
C         HOLD       I*2         "
C         QOLD       L*1         "
C         IREV       I*4         OUTPUT ARRAY OF THE MERGED DATA
C         QREV       L*1         "
C         REPLCE     L*1         SWITCH TO REPLACE BAD DATA WITH BETTOR
C 7.   Notes:
C      7a.  Restrictions:
C         NONE
C      7b.  Special Features:
C         NONE
C 8.   Variables:
C      8a.  Local
C           Variable             Type    Description
C         ISEQNS     I*4         START SEQUENCE ID
C         ISEQNE     I*4         END SEQUENCE ID
C         ISEQOS     I*4         START SEQUENCE ID OF OLD DATA
C         ISEQOE     I*4         END SEQUENCE ID OF OLD DATA
C         QSEQNS     L*1         START SEQUENCE OF NEW DATA
C         QSEQNE     L*1         END SEQUENCE OF NEW DATA
C         QSEQOS     L*1         START SEQUENCE OF OLD DATA
C         QSEQOE     L*1         END SEQUENCE OF OLD DATA
C         NPGNEW     I*4         PAGE NUMBER OF NEW DATA
C         NPGOLD     I*4         PAGE NUMBER OF OLD DATA
C         LOCNEW     I*4         LOCATION OF NEW DATA
C         LOCOLD     I*4         LOCATION COUNTER OF OLD DATA
C         LOCREV     I*4         LOCATION COUNTER OF MERGED DATA
C      8b.  COMMON
C           COMMON               Variables
C         NONE
C 9.   I/O Information:
C      Unit No.         Use Description
C         NONE
C10.   Error Handling:
C         NONE
C11.   Subroutines Called:
C      Subroutine       Description
C         FMOVE      MOVE BYTE THROUGHOUT AN AREA
C12.   Called By:
C      Routine          Description
C         WRTRAT     WRITE RATES
C13.   Method:
CREVISR  CSECT
C         IF BIT RATES AND FORMATS MATCH
C                    IF OLD TIME > NEW TIME
C                              SET HEADER TO NEW TIME
C                    ELSE SET HEADER TO OLD TIME
C                    FI
C                    EXTRACT SEQUENCE ID
C                    CALCULATE NUMBER OF PAGES
C                    IF NOT FORMAT 5
C                              LOOP THROUGH PAGES
C                                        IF OLD SEQ ID NE NEW ID
C                                             IF OLD ID < NEW ID
C                                                  COPY OLD DATA
C                                             ELSE COPY NEW DATA
C                                             FI
C                                        ELSE COPY BEST DATA
C                                        FI
C                              END LOOP
```

```
C                   ELSE FORMAT 5                                          00000790
C                                LOOP THROUGH PAGES                        00000800
C                                     IF OLD SEQ ID NE NEW ID              00000810
C                                          IF OLD ID < NEW ID              00000820
C                                               COPY OLD DATA              00000830
C                                          ELSE COPY NEW DATA              00000840
C                                          FI                              00000850
C                                     ELSE COPY BEST DATA                  00000860
C                                     FI                                   00000870
C                                END LOOP                                  00000880
C                              FI                                          00000890
C          ELSE ABEND                                                      00000900
CEND REVISR                                                               00000910
C14.  Reference:                                                          00000920
C          NONE                                                           00000930
C15.  Programmer and Date:                                                00000940
C          GERRY MARANDINO OCT 14,76                                      00000950
C16.  Modifications:                                                      00000960
C                                                                         00000970
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc   00000980
```

*** END OF MEMBER *** 97 RECORDS PROCESSED **********

```
C 1. NAME: RTRIMO                                                       00000020
C 2. IDENTIFICATION: HELDRP,HELIOS A & B                                00000030
C 3. ENGLISH NAME: RATE TRIMMING FOR FORMATS 1,2,3 ONLY.                00000040
C 4. LANGUAGE: FORTRANH; 360/91/75, OS/MVT                              00000050
C 5. PURPOSE:                                                           00000060
C THIS ROUTINE TRIMS OFF LEADING AND TRAILING PAGES OF FILL DATA IN     00000070
C RATES RECORDS FOR FORMATS 1,2,3. THERE IS A SEPARATE PROGRAM FOR FMT5 00000080
C THIS EXAMINES THE SEQUENCE ID'S FOR EACH PAGE TO DECIDE IF PAGES HAVE 00000090
C FILL.      LEADING FILL PAGES ARE SQUEZED OUT AND TRAILING FILL ARE   00000100
C DROPPED.  IN THE LENGTH CALCULATION.                                  00000110
C 6. CALLING SEQUENCE: CALL RTRIMO(IDATA,LEN)                           00000120
C          IDATA  I*4 ARRAY CONTAINING RATES RECORD                     00000130
C          LEN    I*4 LENGTH OF THE RECORD AFTER TRIMMING               00000140
C 7. NOTES: NONE                                                        00000150
C 8. VARIABLES: NO COMMON BLOCK                                         00000160
C 9. I/O:                                                               00000170
C     INPUT VARIABLE:                                                  00000180
C                IDATA  I*4 ARRAY CONTAINING A RATES RECORD             00000190
C     OUTPUT VARIABLE:                                                 00000200
C                LEN    I*4 LENGTH OF THE RECORD AFTER TRIMMING        00000210
C*************************************************************************00000220
C 10..ERROR HANDLING: NONE.                                             00000230
C 11.CALLS: NONE.                                                       00000240
C 12.CALLED BY: WRTRAT                                                  00000250
C 13. METHOD: SET UP IN DATA STATEMENT PROPER LEN FOR EACH PAGE:I.E     00000260
C          FOR 4 PAGES. CALCULATE THE CASE POINTER FOR SEARCHING        00000270
C        FOR MINUS ONES;INTIALISE THE POINTER.                          00000280
C   IDATA(22) & IDATA(23) NOT EQ TO MINUS 1 ICASE =2                    00000290
C   IDATA(140) & IDATA((141)          "     ICASE =ICASE +2             00000300
C     "   258        "   259           "     ICASE =ICASE +4           00000310
C     "   376        "   378           "     ICASE =ICASE +8           00000320
C DO A COMPUTED GO TO ACCORDING TO THE CASE, CALL FMOVE TO MOVE         00000330
C IN PADDED DATA TO IDATA ARRAY USING THE PAGE LENGTH.                  00000340
C  END.                                                                 00000350
C 15.PROGRAMMER: GERRY MARANDINO.                                       00000360
C  DOCUMENTED BY: RAMI CUDDAPAH.                                        00000370
C 16.MODIFIED:                                                          00000380
C*************************************************************************00000390
C*************************************************************************00000400
```

*** END OF MEMBER *** 39 RECORDS PROCESSED **********

```
C 1. NAME: RTRIM5                                                              00000020
C 2. IDENTIFICATION: HELDRP,HELIOS A & B                                       00000030
C 3. ENGLISH NAME: RATE TRIMMING FOR FORMAT  5 ONLY                            00000040
C 4. LANGUAGE: FORTRANH; 360/91/75, OS/MVT                                     00000050
C 5. PURPOSE:                                                                  00000060
C THIS ROUTINE TRIMS OFF LEADING AND TRAILING PAGES OF FILL DATA IN            00000070
C RATES RECORDS FOR FORMATS 1,2,3. THERE IS SEPARATE PROGRAM FOR FMT5          00000080
C THIS EXAMINES THE SEQUENCE ID'S FOR EACH PAGE TO DECIDE IF PAGES HAVE        00000090
C FILL.  LEADING FILL PAGES ARE SQUEEZED OUT AND TRAILING FILL ARE             00000100
C DROPPED   IN THE LENGTH CALCULATION.                                         00000110
C 6. CALLING SEQUENCE: CALL RTRIM5(IDATA,LEN)                                  00000120
C         IDATA I*4 ARRAY CONTAINING RATES RECORD                              00000130
C         LEN   I*4 LENGTH OF THE RECORD AFTER TRIMMING                        00000140
C 7. NOTES: NONE                                                               00000150
C 8. VARIABLES: NO COMMON BLOCK                                                00000160
C 9. I/O:                                                                      00000170
C     INPUT VARIABLE:                                                          00000180
C                    IDATA  I*4 ARRAY CONTAINING A RATES RECORD                00000190
C     OUTPUT VARIABLE:                                                         00000200
C                    LEN    I*4 LENGTH OF THE RECORD AFTER TRIMMING           00000210
C*****************************************************************************00000220
C 10..ERROR HANDLING: NONE.                                                    00000230
C 11.CALLS: FMOVE                                                              00000240
C 12.CALLED BY: WRTRAT                                                         00000250
C 13. METHOD: SET UP IN DATA STATEMENT PROPER LEN FOR EACH PAGE;I.E            00000260
C          FOR 4 PAGES. CALCULATE THE CASE POINTER FOR SEARCHING               00000270
C        FOR MINUS ONES INTIALISE THE POINTER.                                 00000280
C   IDATA(33) & IDATA(34) NOT EQ TO MINUS 1 ICASE =ICASE+1                     00000290
C   IDATA(162) & IDATA((163)          "     ICASE =ICASE +2                    00000300
C     "   291        "   292            "     ICASE =ICASE +4                 00000310
C     "   420        "   421            "     ICASE =ICASE +8                 00000320
C DO A COMPUTED GO TO ACCORDING TO THE CASE, CALL FMOVE TO MOVE                00000330
C IN PADDED DATA TO IDATA ARRAY USING THE PAGE LENGTH.                         00000340
C  END.                                                                        00000350
C 15.PROGRAMMER: GERRY MARANDINO.                                              00000360
C  DOCUMENTED BY: RAMI CUDDAPAH.                                               00000370
C 16.MODIFIED:                                                                 00000380
C*****************************************************************************00000390
C*****************************************************************************00000400
```

*** END OF MEMBER *** 39 RECORDS PROCESSED **********

```
C 1. NAME:SETNMP                                                        00000040
C 2. IDENTIFICATION: HELDRP,HELIOS A&B                                  00000050
C 3.ENGLISH NAME: SET NEW MODE  PHA  TAPE.                              00000060
C 4. LANGUAGE: FORTRANH'&G 360/91/75 OS/MVT                             00000070
C 5. PURPOSE:TO MOUNT NECESSARY PHA   TAPES FOR COPYING TO BE MERGED    00000080
C           INTO DATA                                                   00000090
C 6. CALLING SEQUENCE: CALL SETNMP(ITAPEC,ITAPER,HPHATP,DPHATP,MSPHAS,  00000100
C HDPHAS HDPHAE,HPHAFT,DBLNKP,HPHABK,DNEWPH,DCOPHA,HCOPHA,NEWPHA,NMODE,  00000110
C     OMODE,FEET,HDLAST,MSLAST,MSPNS,HDPNS,ODATA)                       00000120
C     'ITAPEC' I*4 SEQ NUMBER FOR TAPE TO BE COPIED.                    00000130
C     'ITAPER' I*4 SEQ NUMBER FOR PHA TAPE.                             00000140
C     'HPHATP' I*2 NUMBER OF PHAE  TAPES IN CATALOG.                    00000150
C     'DPHATP' R*8 PHAE  VOLUME SERIAL NUMBER.                          00000160
C     'MSPHAS' I*4 STARTING TIME FOR PHA RECORD IN MIL.SECS.            00000170
C     'MSPHAE' I*4 ENDING   TIME FOR PHA   RECORD IN MIL. SECS.         00000180
C     'HDPHAS' I*2 START DAY NO. FOR  PHA  RECORD.                      00000190
C     'HDPHAF' I*2 END  DAY  NO. FOR  PHA  RECORD.                      00000200
C     'HPHAFT' I*2 NUMBER OF FEET WRITTEN  PHA  TAPE.                   00000210
C     'DBLNKP' R*8 BLANK PHA TAPE VOL. SER.                             00000220
C     'HPHABK' I*2 NUMBER OF BLANK  PHA  TAPES IN CATALOG.              00000230
C     'DNEWRT' R*8 VOL.SER.NO. OF NEW PHA TAPE.                         00000240
C     'DCOPHA' R*8 VOL.SER.NO. OF PHA TAPE TO BE COPIED.                00000250
C     'HCOPHA' I*2 SEQ NUMBER OF CURRENT PHA TAPE.                      00000260
C     'NEWPHA' I*4 SEQ NUMBER FOR NEW PHA TAPE.                         00000270
C     'NMODE'  L*1  NEW MODE                                            00000280
C     'OMODE'  L*1  OLD MODE                                            00000290
C     'FEET'   R*4  NUMBER OF FEET                                      00000300
C     'HDLAST' I*2  DAY NO. FOR LAST PHA RECORD.                        00000310
C     'MSLAST' I*4  MIL. SECS FOR LAST PHA RECORD.                      00000320
C     'MSPNS'  I*4  MIL.SECS FOR NEW PHA RECORD.                        00000330
C     'HDPNS'  I*2  DAY NO. FOR NEW PHA RECORD.                         00000340
C      'ODATA' R*4   OLD DATA.                                          00000350
C 7. NOTES:NONE.                                                        00000360
C 8. VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN APPENDICES 00000370
C           OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION.               00000380
C 9. I/O NONE.                                                          00000390
C 10. ERROR HANDLING: IF BOTH MODES ARE ON GETS USER(01) ABEND.         00000400
C       IF IT GETS READ ERROR ON OLD PHA TAPE GETS USER(02) ABEND.      00000410
C 11.CALLS:FREAD,MOUNT,UNLOAD,WRITEP,ABEND,NXTPTO.                      00000420
C 12.CALLED BY :WRTPHA                                                  00000430
C 13.METHOD: IF BOTH MODES ARE ON CALL ABEND. IF HRATTP =0 BRANCH TO    00000440
C   MOUNT FIRST BLANK PHA TAPE IN CATALOG, INITIALISE ALL THE VARIABLES 00000450
C    FOR THAT TAPE.IF BOTH MODES ARE NOT ON JUST MOUNT OUTPUT TAPE.     00000460
C   IF NEW MODE DROP CURRENT TAPE &MOUNT REQUIRED TAPE.ELSE FINISH      00000470
C   CLD MODE PROCESSING  BY COPYING THE OLD TAPE; STORE THE ITAPEC      00000480
C   INTO IOLDTC.; BEFORE IT GETS WIPED BY NEXT TAPE.                    00000490
C 15. PROGRAMMER: GERRY MARANDINO.                                      00000500
C 16. MODIFIED: RAMI CUDDAPAH ON OCT, 1977.                             00000510
C********** ********************************************************** 00000520
```

*** END OF MEMBER *** 49 RECORDS PROCESSED . **********

```
C 1. NAME:SETNMR                                                        00000040
C 2. IDENTIFICATICN: HELDRP,HELIOS A&B                                  00000050
C 3.ENGLISH NAME: SET NEW MODE RATES TAPE.                              00000060
C 4. LANGUAGE: FORTRANH &G 360/91/75 OS/MVT                             00000070
C 5. PURPOSE:TO MOUNT NECESSARY RATES TAPES FOR COPYING TO BE MERGED    00000080
C               INTO DATA                                               00000090
C 6. CALLING SEQUENCE: CALL SETNMR(ITAPEC,ITAPER,HRATTP,DRRATTP,MSRATS, 00000100
C    HDRATE,HRATFT,DBLNKR,HRATBK,DNEWRT,DCOPRT,HCOPRT,NEWRAT,NMODE,OMODE00000110
C    ,CMODE,FEET,HDLAST,MSLAST,MSRNS,HDRNS,ODATA)                       00000120
C     'ITAPEC' I*4 SEQ NUMBER FOR TAPE TO BE COPIED.                    00000130
C     'ITAPER' I*4 SEQ NUMBER FOR RATES TAPE.                           00000140
C     'HRATTP' I*2 NUMBER OF RATES TAPES IN CATALOG.                    00000150
C     'DRATTP' R*8 RATES VOLUME SERIAL NUMBER.                          00000160
C     'MSRATS' I*4 STARTING TIME FOR RATES RECORD IN MIL.SECS.          00000170
C     'MSRATE' I*4 ENDING   TIME FOR RATES RECORD IN MIL. SECS.         00000180
C     'HDRATS' I*2 START DAY NO. FOR RATES RECORD.                      00000190
C     'HDRATE' I*2 END  DAY  NC. FOR RATES RECORD.                      00000200
C     'HRATFT' I*2 NUMBER OF FEET WRITTEN RATES TAPE.                   00000210
C     'DBLNKR' R*8 BLANK RATES TAPE VOL. SER.                           00000220
C     'HRATBK' I*2 NUMBER OF BLANK RATES TAPES IN CATALOG.              00000230
C     'DNEWRT' R*8 VCL.SER.NO. OF NEW RATES TAPE.                       00000240
C     'DCOPRT' R*8 VOL.SER.NO. OF RATES TAPE TO BE COPIED.              00000250
C     'HCOPRT' I*2 SEQ NUMBER OF CURRENT RATES TAPE.                    00000260
C     'NEWRAT' I*4 SEQ NUMBER FOR NEW RATES TAPE.                       00000270
C     'NMODE'  L*1  NEW MODE                                            00000280
C     'OMODE'  L*1  CLD MODE                                            00000290
C     'FEET'   R*4  NUMBER OF FEET                                      00000300
C     'HDLAST' I*2  DAY NO. FOR LAST RATES RECORD.                      00000310
C     'MSLAST' I*4  MIL. SECS FOR LAST RATES RECORD.                    00000320
C     'MSRNS'  I*4  MIL.SECS FOR NEW RATES RECORD.                      00000330
C     'HDRNS'  I*2  DAY NO. FOR NEW RATES RECORD.                       00000340
C      'ODATA' R*4   OLD DATA.                                          00000350
C 7. NOTES:NONE.                                                        00000360
C 8. VARIABLES: CCMMON BLOCK VARIABLES USED ARE DESCRIBED IN APPENDICES 00000370
C              OF HELIOS DATA REDUCTICN PROGRAM DESCRIPTION.            00000380
C 9. I/C NONE.                                                          00000390
C 10. ERROR HANDLING: IF BOTH MODES ARE ON GETS USER(01) ABEND.         00000400
C         IF IT GETS READ ERROR ON OLD RATES TAPE GETS USER(02) ABEND.  00000410
C 11.CALLS:FREAD,MOUNT,UNLOAD,WRITER,ABEND,NXTRTO.                      00000420
C 12.CALLED BY :WRTRAT                                                  00000430
C 13.METHOD: IF BCTH MODES ARE ON CALL ABEND. IF HRATTP =0 BRANCH TO    00000440
C   MOUNT FIRST BLANK RATES TAPE IN CATALOG, INITIALISE ALL THE VARIABLE00000450
C    FOR THAT TAPE.IF BOTH MODES ARE NOT ON JUST MOUNT OUTPUT TAPE.     00000460
C   IF NEW MODE DROP CURRENT TAPE &MOUNT REQUIRED TAPE.ELSE FINISH      00000470
C   CLD MCDE PROCESSING  BY COPYING THE OLD TAPE; STORE THE ITAPEC      00000480
C   INTO TOLDTC.; BEFORE IT GETS WIPED BY NEXT TAPE.                    00000490
C 15. PROGRAMMER: GERRY MARANDINO.                                      00000500
C 16. MODIFIED: RAMI CUDDAPAH ON OCT, 1977.                             00000510
C********** ****************************************************** 00000520

*** END OF MEMBER ***      49 RECORDS PROCESSED . ****************************************************************
```

```
C 1. NAME:SETOMP                                                        00000040
C 2. IDENTIFICATION: HELDRP,HELIOS A&B                                  00000050
C 3.ENGLISH NAME: MCUNT OLD PHA TAPE.                                   00000060
C 4. LANGUAGE: FORTRANH'&G 360/91/75 OS/MVT                             00000070
C 5. PURPOSE:TO MCUNT OLD  PHA TAPES FOR COPYING  & TO BE MERGED        00000080
C          INTO DATA                                                    00000090
C 6. CALLING SEQUENCE: CALL SETNMP(ITAPEC,ITAPER,HPHATP,DPHATP,MSPHAS,  00000100
C       MSPHAE,HDPHAS,HDPHAE,                                           00000110
C     HPHAPT,DBLNKP,HPHABK,DNEWPH,DCOPHA,HCOPHA,NEWPHA,NMODE,OMODE      00000120
C     OMODE,FEET,HDLAST,MSLAST,MSPNS,HDPNS,ODATA)                       00000130
C     'ITAPEC' I*4 SEQ NUMBER FOR TAPE TO BE COPIED.                    00000140
C     'ITAPER' I*4 SEQ NUMBER FOR PHA TAPE.                             00000150
C     'HPHATP' I*2 NUMBER OF PHA TAPES IN CATALOG.                      00000160
C     'DPHATP' R*8 PHA VOLUME SERIAL NUMBER.                            00000170
C     'MSPHAS' I*4 STARTING TIME FOR PHA RECORD IN MIL.SECS.            00000180
C     'MSPHAE' I*4 ENDING   TIME FOR PHA RECORD IN MIL. SECS.           00000190
C     'HDPHAS' I*2 STARI DAY NO. FOR PHA RECORD.                        00000200
C     'HDPHAE' I*2 END  DAY  NO. FOR PHA RECORD.                        00000210
C     'HPHAPT' I*2 NUMBER OF FEET WRITTEN PHA TAPE.                     00000220
C     'DBLNKP' R*8 BLANK PHA TAPE VOL. SER.                             00000230
C     'HPHABK' I*2 NUMBER OF BLANK PHA TAPES IN CATALOG.                00000240
C     'DNEWPH' R*8 VOL.SER.NO. OF NEW PHA TAPE.                         00000250
C     'DCOPHA' R*8 VOL.SER.NO. OF PHA TAPE TO BE COPIED.                00000260
C     'HCOPHA' I*2 SEQ NUMBER OF CURRENT PHA TAPE.                      00000270
C     'NEWPHA' I*4 SEQ NUMBER FOR NEW PHA TAPE.                         00000280
C     'NMODE'  L*1  NEW MODE                                            00000290
C     'OMODE'  L*1  OLD MODE                                            00000300
C     'FEET'   R*4  NUMBER OF FEET                                      00000310
C     'HDLAST' I*2  DAY NO. FOR LAST PHA RECORD.                        00000320
C     'MSLAST' I*4  MIL. SECS FOR LAST PHA RECORD.                      00000330
C     'MSPNS'  I*4  MIL.SECS FOR NEW PHA RECORD.                        00000340
C     'HDPNS'  I*2  DAY NO. FOR NEW PHA RECORD.                         00000350
C     'ODATA' R*4   OLD DATA.                                           00000360
C 7. NOTES:NONE.                                                        00000370
C 8. VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN APPENDICES 00000380
C          OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION.                00000390
C 9. I/O NONE.                                                          00000400
C 10. ERROR HANDLING: IF BOTH MODES ARE ON GETS USER(01) ABEND.         00000410
C       IF IT GETS READ ERROR ON OLD PHA TAPE GETS USER(02) ABEND.      00000420
C 11.CALLS:FREAD,MOUNT,UNLOAD,WRITEP,ABEND,NXTPTO.                      00000430
C 12.CALLED BY :WRTPHA                                                  00000440
C 13.METHOD: IF BOTH MODES ARE ON CALL ABEND. IF HPHATP =0 BRANCH TO    00000450
C   MOUNT FIRST BLANK PHA TAPE IN CATALOG, INITIALISE ALL THE VARIABLES 00000460
C    FOR THAT TAPE.IF BOTH MODES ARE NOT ON JUST MOUNT OUTPUT TAPE.     00000470
C   IF NEW MODE DROP CURRENT TAPE &MOUNT REQUIRED TAPE.RESET CATALOG    00000480
C    WITH NEW TAPE AS GOOD PHA TAPE;DROP THE TAPE NUMBER FROM BLANKS.   00000490
C    SET NEWPHA =NEWPHA+1.                                              00000500
C 15. PROGRAMMER: GERRY MARANDINO.                                      00000510
C 16. MODIFIED:                                                         00000520
C*********************************************************************  00000530
```

*** END OF MEMBER *** 50 RECORDS PROCESSED **********

```
C 1. NAME:SETOMR                                                        00000040
C 2. IDENTIFICATION: HELDRP,HELIOS A&B                                  00000050
C 3.ENGLISH NAME: MOUNT OLD RATES TAPE.                                 00000060
C 4. LANGUAGE: FORTRANH'&G 360/91/75 OS/MVT                             00000070
C 5. PURPOSE:TO MOUNT OLD  RATES TAPES FOR COPYING  & TO BE MERGED      00000080
C           INTO DATA                                                   00000090
C 6. CALLING SEQUENCE: CALL SETNMR(ITAPEC,ITAPER,HRATTP,DRRATTP,MSRATS, 00000100
C    HDRATE,HRATFT,DBLNKR,HRATBK,DNEWRT,DCOPRT,HCOPRT,NEWRAT,NMODE,OMODE00000110
C     CMODE,FEET,HDLAST,MSLAST,MSRNS,HDRNS,ODATA)                       00000120
C     'ITAPEC' I*4 SEQ NUMBER FOR TAPE TO BE COPIED.                    00000130
C     'ITAPER' I*4 SEQ NUMBER FOR RATES TAPE.                           00000140
C     'HRATTP' I*2 NUMBER OF RATES TAPES IN CATALOG.                    00000150
C     'DRATTP' R*8 RATES VOLUME SERIAL NUMBER.                          00000160
C     'MSRATS' I*4 STARTING TIME FOR RATES RECORD IN MIL.SECS.          00000170
C     'MSRATE' I*4 ENDING   TIME FOR RATES RECORD IN MIL. SECS.         00000180
C     'HDRATS' I*2 START DAY NO. FOR RATES RECORD.                      00000190
C     'HDRATE' I*2 END  DAY  NO. FOR RATES RECORD.                      00000200
C     'HRATFT' I*2 NUMBER OF FEET WRITTEN RATES TAPE.                   00000210
C     'DBLNKR' R*8 BLANK RATES TAPE VOL. SER.                           00000220
C     'HRATBK' I*2 NUMBER OF BLANK RATES TAPES IN CATALOG.              00000230
C     'DNEWRT' R*8 VOL.SER.NO. OF NEW RATES TAPE.                       00000240
C     'DCOPRT' R*8 VOL.SER.NO. OF RATES TAPE TO BE COPIED.              00000250
C     'HCOPRT' I*2 SEQ NUMBER OF CURRENT RATES TAPE.                    00000260
C     'NEWRAT' I*4 SEQ NUMBER FOR NEW RATES TAPE.                       00000270
C     'NMODE'  L*1  NEW MODE                                            00000280
C     'CMODE'  L*1  OLD MODE                                            00000290
C     'FEET'   R*4  NUMBER OF FEET                                      00000300
C     'HDLAST' I*2  DAY NO. FOR LAST RATES RECORD.                      00000310
C     'MSLAST' I*4  MIL. SECS FOR LAST RATES RECORD.                    00000320
C     'MSRNS'  I*4  MIL.SECS FOR NEW RATES RECORD.                      00000330
C     'HDRNS'  I*2  DAY NO. FOR NEW RATES RECORD.                       00000340
C      'ODATA' R*4   OLD DATA.                                          00000350
C 7. NOTES:NONE.                                                        00000360
C 8. VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN APPENDICES 00000370
C             OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION.             00000380
C 9. I/O NONE.                                                          00000390
C 10. ERROR HANDLING: IF BOTH MODES ARE ON GETS USER(01) ABEND.         00000400
C       IF IT GETS READ ERROR ON OLD RATES TAPE GETS USER(02) ABEND.    00000410
C 11.CALLS:FREAD,MOUNT,UNLOAD,WRITER,ABEND,NXTRTO.                      00000420
C 12.CALLED BY :WRTRAT                                                  00000430
C 13.METHOD: IF BOTH MODES ARE ON CALL ABEND. IF HRATTP =0 BRANCH TO    00000440
C   MOUNT FIRST BLANK RATES TAPE IN CATALOG, INITIALISE ALL THE VARIABLE00000450
C    FOR THAT TAPE.IF BOTH MODES ARE NOT ON JUST MOUNT OUTPUT TAPE.     00000460
C   IF NEW MODE DROP CURRENT TAPE &MOUNT REQUIRED TAPE.RESET CATALOG    00000470
C    WITH NEW TAPE AS GOOD RATES TAPE;DROP THE TAPE NUMBER FROM BLANKS. 00000480
C    SET NEWRAT =NEWRAT+1; WRITE MESSAGE FOR NEW MOUNT.                 00000490
C 15.  PROGRAMMER: GERRY MARANDINO.                                     00000500
C 16. MODIFIED: RAMI CUDDAPAH ON OCT, 1977.                             00000510
C********** ************************************************************ 00000520

*** END OF MEMBER ***     49 RECORDS PROCESSED . ************************************************************
```

```
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000020
C 1.  Routine:                                                         00000030
C        SETSEQ                                                        00000040
C 2.  System, Satellite; Version:                                      00000050
C        HELDRP     HELIOS A,B          0                            00000060
C 3.  English Name:                                                    00000070
C        SET SEQUENCE                                                  00000080
C 4.  Language:                                                        00000090
C        FORTRANG or FORTRANH   level 21.6    360/91/75   OS/MVT    00000100
C 5.  Purpose:                                                         00000110
C        SET THE EARLIER SEQUENCE AND LINE FOR START AND THE           00000120
C        LATER AS END                                                  00000130
C 6.  Calling Sequence:                                                00000140
C        Argument          Type    I/O    Description                 00000150
C           NEW          I*4         ARRAY OF NEW INPUT DATA          00000160
C           OLD          I*4         ARRAY OF OLD INPUT DATA          00000170
C           LAST         I*4         ARRAY OF LATEST DATA RETURNED    00000180
C 7.  Notes:                                                           00000190
C     7a.  Restrictions:                                               00000200
C        NONE                                                          00000210
C     7b.  Special Features:                                           00000220
C        NONE                                                          00000230
C 8.  Variables:                                                       00000240
C     8a.  Local                                                       00000250
C           Variable          Type    Description                    00000260
C        ILAST        I*4         STORAGE FOR VARIABLE TRANSFER       00000270
C        QLAST        L*1         STORAGE FOR VARIABLE TRANSFER       00000280
C     8b.  COMMON                                                      00000290
C           COMMON               Variables                           00000300
C        NONE                                                          00000310
C 9.  I/O Information:                                                 00000320
C     Unit No.        Use Description                                  00000330
C        NONE                                                          00000340
C10.  Error Handling:                                                  00000350
C        NONE                                                          00000360
C11.  Subroutines Called:                                              00000370
C     Subroutine       Description                                     00000380
C        NONE                                                          00000390
C12.  Called By:                                                       00000400
C     Routine          Description                                     00000410
C        REVISE     REVISE PHA                                        00000420
C13.  Method:                                                          00000430
C        SETSEQ     CSECT                                             00000440
C                   SET OLD TO EARLIEST OF OLD AND NEW                 00000450
C                   SET NEW TO LATES OF OLD AND NEW                    00000460
C        END                                                           00000470
C14.  Reference:                                                       00000480
C        NONE                                                          00000490
C15.  Programmer and Date:                                             00000500
C        GERRY MABANDINO                                               00000510
C16.  Modifications:                                                   00000520
C                                                                      00000530
Ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc          00000540
```

*** END OF MEMBER *** 53 RECORDS PROCESSED **********

```
C 1. NAME:SKPMSG                                                        00000030
C 2. IDENTIFICATION: HELDRP HELIOS A,B                                  00000040
C 3. ENGLISH NAME: DATA SKIP MESSAGE                                    00000050
C 4. LANGUAGE: FORTRANH; 360/91/75, OS/MVT                              00000060
C 5. PURPOSE: TO WRITE SKIP MESSAGE FOR DATA SKIPS & THEIR REASON       00000070
C 6. CALLING  SEQUENCE: CALL EOFMSG(HDPFMS,DTSLOT,NTP,MFILE,NREC,HBTRT, 00000080
C                                   HFMT,MSPFMS,HRECYR)                 00000090
C                'HDPFMS' DAY NO. OF THE RECORD                         00000100
C                'IMSCS'  MIL.SECS OF THE RECORD                        00000110
C                 'DTSLOT' TAPE NO.OF AN EDR                            00000120
C                 'MFILE'  FILE NO. OF AN EDR                           00000130
C                 'NREC '  RECORD NO. OF AN EDR                        00000140
C                 'NTP   ' SEQ NO. OF AN EDR IN PROCESSING              00000150
C                 'HBTRT ' BITRATE FOR THAT RECORD                      00000160
C                 'HFMT '  FORMAT  FOR THAT RECORD                      00000170
C                 'HRECYR' YEAR NO.FOR THAT RECORD                      00000180
C 7. NOTES:NONE                                                         00000190
C 8. VARIABLES:NO COMMON VARIABLES.                                     00000200
C 9.I/O:    INPUT:ALL THE ABOVE MENTIONED VARIABLES AS CALLING SEQ      00000210
C          OUTPUT: SKIP  RECORD MESSAGE ON UNIT 30                      00000220
C          WITH LAST GOOD DATA FOR THAT FILE                            00000230
C 10. ERROR HANDLING: NONE.                                             00000240
C 11. CALLS: CCNTIM,CNVMJD,FTIME                                        00000250
C 12. CALLED BY: EDRCHK                                                 00000260
C 13.METHOD: IF MSPFMS IS  NOT SET,SET HR,MN,SCS =0                     00000270
C             ELSE CONVT MSPFMS INTO  HR MN SCS.                        00000280
C            IF QFLAG & QRSKP =T & HDPFMS .GT. 0 OR LE 3660             00000290
C             CONVT HDPFMS TO MONTH DAY YR ; INPUT MONTH,DAY,YR TO      00000300
C           YMDD & CONVERT MODIFIED JULIAN DAY.WRITE START  OF          00000310
C         OR LAST GOOD RECORD ACCEPTED MESSAGE; SET QFLAG= F            00000320
C        QLREDY=T & DOLD=REASON                                         00000330
C        FI                                                             00000340
C        IF QLREDY=T & REASON NE DOLD WRITE START OF NEW SKIP MESSAGE.  00000350
C        ELSE IF QRSKP=F & QIN=F WRITE START OF DATA ACCEPTANCE OF      00000360
C       HELDRP WITHOUT INTERRUPTIONS.                                   00000370
C             SET QFLAG= TRUE                                           00000380
C 14. REFERENCE: NONE.                                                  00000390
C 15. PROGRAMMER: RAMI CUDDAPAH.                                        00000400
C 16. MODIFIED:                                                         00000410
```

*** END OF MEMBER *** 39 RECORDS PROCESSED **********

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000020
C                                                                       C00000030
C  THIS SUBROUTINE VERIFIES THAT THE INCOMING DATA IS TIME CONTINUOUS -C00000040
C  IF NOT THEN LOGICAL SWITCHES ARE SET TO FORCE RE-INITIALIZATION OF  C00000050
C  SIGNIFICANT VARIABLES.                                               C00000060
C                                                                       C00000070
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC00000080
C 1.   NAME: TIMCHK                                                     00000090
C 2.   IDENTIFICATION: HELDRP, HELIOS A,B                               00000100
C 3.   ENGLISH NAME: TIME CHECK                                         00000110
C 4.   LANGUAGE: FORTRANH, 360/91/75, OS/MVT                           00000120
C 5.   PURPOSE: SEE ABOVE                                              00000130
C 6.   CALLING SEQUENCE: CALL TIMCHK(KPAD,HRATIO,QEDR,&90)             00000140
C      KPAD   I*4 NUMBER OF PADDED FRAMES                              00000150
C      HRATIO I*2 EHA/RATES RATIO                                      00000160
C      QEDR   L*1 LOGICAL SWITCH TO FORCE RE-INITIALIZATION            00000170
C      &90        ALTERNATE RETURN CAUSEING FRAME TO BE SKIPPED        00000180
C 7.   NOTES: NONE                                                     00000190
C 8.   VARIABLES:  SEE COMMON BLOCK DESCRIPTION IN APPENDICES OF HELDRP 00000200
C                  DATA REDUCTION PROGRAM                               00000210
C9.  I/O: INPUT: NONE                                                  00000220
C         OUTPUT: UNIT 30 FRAME SPACE ERROR MESSAGE                    00000230
C 10. ERROR HANDLING: TIME BACK UP CAUSES ALTERNATE RETURN             00000240
C                     TIME GAP > 1 ALBUM CAUSES RECORD TO BE PRINTED   00000250
C 11. CALLS: CNVDAT,COMFRM,DREMES                                      00000260
C 12. CALLED BY: EDRCHK                                                00000270
C 13. METHOD: CALCULATE TIME OF FRAME                                  00000280
C             CONVERT LABEL TO MODIFIED JULIAN DAY                     00000290
C             IF TIME BACKUP OCCURRED                                  00000300
C                   WRITE MESSAGE                                      00000310
C                   ALTERNATE RETURN                                   00000320
C                                                                      00000330
C              IF TIME GAP OCCURRED                                    00000340
C                   IF TIME GAP > 1 ALBUM                              00000350
C                        SET FLAG TO PRINT RECORD                      00000360
C                   ELSE SET KPAD TO SKIP FRAMES                       00000370
C             ELSE TAKE NORMAL RETURN                                  00000380
C 14. REFERENCE: NONE                                                  00000390
C 15. PROGRAMMER:                                                      00000400
C 16. MODIFIED:EWR 6/15/78                                             00000410
C*********************************************************************00000420
```

*** END OF MEMBER *** 41 RECORDS PROCESSED **********

```
TIME     TITLE 'RETURNS TIME TO CALLING PRCGRAM'                        00000010
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc   00000020
* 1.  Routine:                                                          00000030
*        TIME / DTIME / FTIME                                           00000040
* 2.  System, Satellite, Version:                                       00000050
*        HELDRP    HELIOS A,B          0                             00000060
* 3.  English Name:                                                     00000070
*        TIME / DATE TIME / FULL TIME                                   00000080
* 4.  Language:                                                         00000090
*        ASMG   level G    release 21MAR76   360/91/75 . OS/MVT       00000100
* 5.  Purpose:                                                          00000110
*        GET DATE AND TIME FROM SYSTEM                                  00000120
* 6.  Calling Sequence:                                                 00000130
*     Argument          Type    I/O    Description                     00000140
*        DTIME:                                                         00000150
*        IYR         I*4         YEAR RETURNED                        00000160
*        IDY         I*4         DAY RETURNED                         00000170
*        FTIME:                                                         00000180
*        ITIME       I*4         HHMMSS TIME PACKED TOGETHER          00000190
* 7.  Notes:                                                            00000200
*     7a.  Restrictions:                                                00000210
*        NONE                                                           00000220
*     7b.  Special Features:                                            00000230
*        NONE                                                           00000240
* 8.  Variables:                                                        00000250
*     8a.  Local                                                        00000260
*        Variable          Type    Description                         00000270
*        WORK        A*8         WORK AREA FOR TIME CONVERSIONS       00000280
*     8b.  COMMON                                                       00000290
*        COMMON              Variables                                  00000300
*        NONE                                                           00000310
* 9.  I/O Information:                                                  00000320
*     Unit No.        Use Description                                   00000330
*        NONE                                                           00000340
*10.  Error Handling:                                                  00000350
*        NONE                                                           00000360
*11.  Subroutines Called:                                              00000370
*     Subroutine      Description                                       00000380
*        TIME        MACRO TO GET SYSTEM TIME                          00000390
*12.  Called By:                                                       00000400
*     Routine          Description                                      00000410
*        EOFMSG      END OF FILE MESSAGE                               00000420
*        HELDRP                                                        00000430
*        EDRCHK      EDR CHECK                                         00000440
*        SKIMSG      SKIP MESSAGE                                      00000450
*13.  Method:                                                          00000460
*        TIME        CSECT                                             00000470
*                    DTIME GET  TIME FROM TIME MACRO                   00000480
*                               REG 1 = 00YYDDDF                       00000490
*                               CONVERT TO BINARY                      00000500
*                               DIVIDE REG 1 BY 1000                   00000510
*                               STORE QUOTIENT YY IN IYR = YEAR        00000520
*                               STORE REMAINDER DDD IN IDY = DAY       00000530
*                    END DTIME                                         00000540
*                    FTIME GET  TIME FROM TIME MACRO                   00000550
*                               REG 0 = HHMMSSTH                       00000560
*                               CONVERT TO HHMMSSC                     00000570
*                               CONVERT TO BINARY                      00000580
*                               STORE IN ITIME = HHMMSS                00000590
*                    END FTIME                                         00000600
*        END TIME                                                      00000610
*14.  Reference:                                                       00000620
*        NONE                                                          00000630
*15.  Programmer and Date:                                             00000640
*        ROGER DUFORD                                                  00000650
*16.  Modifications:                                                   00000660
*                                                                      00000670
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc   00000680

*** END OF MEMBER ***     68 RECORDS PROCESSED   ************************************************************************************
```

```
C*****************************************************************00000010
C 1.   NAME: UPKLBL                                                00000020
C 2.   IDENTIFICATION: HELDRP HELIOS A,B                           00000030
C 3.   ENGLISH NAME: UNPACK LABEL                                  00000040
C 4.   LANGUAGE: FORTRANH, OS/MVT, 360/91/75                       00000050
C 5.   PURPOSE: TO RETRIEVE THE LABEL INFORMATION IN USABLE FORM   00000060
C 6.   CALLING SEQUENCE:                                           00000080
C      CALL UPKLBL(QLABEL)                                         00000090
C      SEE BELOW FOR DESCRIPTION OF CALLING ARGUMENTS              00000100
C 7.   NOTES: NONE                                                 00000110
C 8.   VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN     00000120
C      APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION     00000130
C 9.    I/O:INPUT IS THE EDR LABEL                                 00000140
C           OUTPUT IS THE LABEL CONVERTED IN TO USABLE FORM AND PLACED 00000150
C           IN COMMON BLOCK WRITES OUT ON UNIT 99                  00000160
C 10. ERROR HANDLING: RETCOD SETS THE CONDITION RESULTING FROM SEARCH 00000170
C 11. CALLS: NONE.                                                 00000180
C 12. CALLED BY: HELDRP                                            00000190
C 13. METHOD: A FORMATED WRITE STATEMENT REFERIMG TO UNIT 99 PLACES 00000200
C           LABEL STRING OF OUTPUT CHARACTERS IN TO BUFFER;        00000210
C          A FORMATTED READ STATEMENT REFERING TO UNIT 99 USES THE 00000220
C         BUFFER AS INPUT CONVERTS IN TO USABLE FORMAT PLACES IN   00000230
C       COMMON BLOCK LABEL.                                        00000240
C 14. REFERENCE:NONE.                                              00000250
C 15. PROGRAMMER: GERRY MARINDINO                                  00000410
C 16. MODIFIED:                                                    00000420
C*****************************************************************00000430
C*****************************************************************00000440
```

*** END OF MEMBER ***   28 RECORDS PROCESSED   **

```
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000020
* 1.  Routine:                                                     00000030
*       UPKSTA                                                     00000040
* 2.  System, Satellite; Version:                                  00000050
*       HELDRP    HELIOS A,B          0                          00000060
* 3.  English Name:                                                00000070
*       UNPACK STATUS                                              00000080
* 4.  Language:                                                    00000090
*       ASMG   level G    release 21MAR76   360/91/75   OS/MVT     00000100
* 5.  Purpose:                                                     00000110
*       UNPACK STATUS WORD IN EDR RECORD                           00000120
* 6.  Calling Sequence:                                            00000130
*       Argument          Type     I/O     Description           00000140
*       IDATA(4,K)        I*4              @ OF STATUS WORD       00000150
* 7.  Notes:                                                       00000160
*       7a.  Restrictions:                                         00000170
*          NONE                                                    00000180
*       7b.  Special Features:                                     00000190
*          NONE                                                    00000200
* 8.  Variables:                                                   00000210
*       8a.  Local                                                 00000220
*          Variable          Type     Description                 00000230
*          NONE                                                    00000240
*       8b.  COMMON                                                00000250
*          COMMON            Variables                           00000260
*          COMMON BLOCK VARIABLES USED ARE DESCRIBED IN THE APPENDICES 00000270
*          OF THE HELIOS DATA REDUCTION PROGRAM DESCRIPTION        00000280
* 9.  I/O Information:                                             00000290
*       Unit No.          Use Description                        00000300
*          NONE                                                    00000310
*10.  Error Handling:                                             00000320
*          NONE                                                    00000330
*11.  Subroutines Called:                                         00000340
*       Subroutine        Description                            00000350
*          NONE                                                    00000360
*12.  Called By:                                                  00000370
*       Routine           Description                            00000380
*          EDRCHK    EDR CHECK                                    00000390
*13.  Method:                                                     00000400
*UPKSTA  CSECT                                                    00000410
*         LOAD GMT TIME CORRECTION FLAG INTO HGMT                 00000420
*         LOAD EVENT TIME STATUS FLAG INTO HEVT                   00000430
*         LOAD DATA TYPE INTO HTYP                                00000440
*         LOAD FRAME COUNTER CORRECTION INTO QFRM                 00000450
*         LOAD ENGINEERING FRAME NUMBER INTO HENG                 00000460
*         LOAD FILL DATA PRESENT INTO QFILL                       00000470
*         LOAD NUMBER OF BIT ERRORS IS S/C SYNC INTO HERR         00000480
*         LOAD DATA QUALITY INTO HQUAL                            00000490
*         LOAD DISTRIBUTION MODE INTO QDM                         00000500
*END UPKSTA                                                       00000510
*14.  Reference:                                                  00000520
*          NONE                                                   00000530
*15.  Programmer and Date:                                        00000540
*       ROGER DUEORD                                              00000550
*16.  Modifications:                                              00000560
*                                                                 00000570
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc  00000580

*** END OF MEMBER ***     57 RECORDS PROCESSED  ********************************************************************************
```

```
UPKXRY   START  0                                                       00000010
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc   00000020
* 1.  Routine:                                                          00000030
*       UPKXRY                                                          00000040
* 2.  System, Satellite, Version:                                      00000050
*       HELDRP    HELIOS A,B          0                               00000060
* 3.  English Name:                                                    00000070
*       UNPACK X RAY                                                    00000080
* 4.  Language:                                                        00000090
*       ASMG   level G    release 21MAR76   360/91/75 , OS/MVT        00000100
* 5.  Purpose:                                                         00000110
*       PACK X-RAY COMMANDS INTO QXRY(1) AND X-RAY TAG WORD             00000120
*       INTO QXRY(2)                                                    00000130
* 6.  Calling Sequence:                                                00000140
*       Argument            Type    I/O     Description               00000150
*       QRLOCK(M,I)         L*1             @ OF SCIENCE WORD         00000160
*       QXRY(1)             L*1             @ OF REGISTER RETURNED    00000170
* 7.  Notes:                                                           00000180
*       7a.  Restrictions:                                              00000190
*       NONE                                                            00000200
*       7b.  Special Features:                                          00000210
*       NONE                                                            00000220
* 8.  Variables:                                                       00000230
*       8a.  Local                                                      00000240
*       Variable            Type    Description                       00000250
*       NONE                                                            00000260
*       8b.  COMMON                                                     00000270
*       COMMON              Variables                                   00000280
*       NONE                                                            00000290
* 9.  I/O Information:                                                 00000300
*       Unit No.        Use Description                                 00000310
*       NONE                                                            00000320
*10.  Error Handling:                                                 00000330
*       NONE                                                            00000340
*11.  Subroutines Called:                                             00000350
*       Subroutine      Description                                     00000360
*       NONE                                                            00000370
*12.  Called By:                                                      00000380
*       Routine         Description                                     00000390
*       EXTRC1    EXTRACT DATA                                          00000400
*13.  Method:                                                         00000410
*       UPKXRY CSECT                                                    00000420
*              LOAD BITS 37-48 OF SCIENCE WORD INTO QXRY                00000430
*       END UPKXRY                                                      00000440
*14.  Reference:                                                      00000450
*       NONE                                                            00000460
*15.  Programmer and Date:                                            00000470
*       ROGER DUEORD                                                    00000480
*16.  Modifications:                                                  00000490
*                                                                       00000500
*ccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc   00000510
```

*** END OF MEMBER *** 51 RECORDS PROCESSED **********

```
      SUBROUTINE WRITEP(IDATA,HDATA,LENREC,HDLAST,MSLAST,ITAPEC,          00000010
     *HPHATP,DPHATP,MSPHAS,MSPHAE,HDPHAS,HDPHAE,HPHAFT,DBLNKP,HPHABK,     00000020
     *DNEWPH,DCOPHA,NEWPHA,HCOPHA,FEET)                                   00000030
C      THIS ROUTINE WRITES THE FINAL VERSION OF THE RATES RECORD TO TAPE  00000040
C IF THE OUTPUT TAPE IS FULL AT THIS TIME IT UNLOADED AND THE NEXT RATES  00000050
C IS MOUNTED THE CATALOG IS UPDATED ACCORDINGLY                           00000060
C VARIABLES :                                                             00000070
C IDATA  I*4  THE ARRAY OF RATES DATA DIMENSIONED IN MAIN                 00000080
C*************************************************************************00000090
C 1.   NAME: WRITEP                                                       00000100
C 2.   INDENTIFICATION: HELDRP, HELIOS A,B                                00000110
C 3.   ENGLISH NAME: WRITE PHA TAPE                                       00000120
C 4.   LANGUAGE: FORTRANH, OS/MVT, 360/91/75                              00000130
C 5.   PURPOSE: SEE ABOVE                                                 00000140
C 6.   CALLING SEQUENCE: CALL WRITEP(IDATA,HDATA,LENREC,HDLAST,MSLAST,    00000150
C      ITAPEC,HPHATP,DPHATP,MSPHAS,MSPHAE,HDPHAE,HPHAFT,DBLNKP,HPHABK,    00000160
C      DNEWPH,DCOPHA,NEWPHA,HCOPHA,FEET)                                  00000170
C      IDATA  I*4 ONE RECORD OF DATA                                      00000180
C      HDATA  I*2 ONE RECORD OF DATA                                      00000190
C      LENREC I*4 LENGTH OF NEW PHA RECORD                                00000200
C      HDLAST I*2 DAY OF LAST PHA RECORD WRITTEN                          00000210
C      MSLAST I*4 MILLISECONDS OF LAST PHA RECORD WRITTEN                 00000220
C      ITAPEC I*4 CATALOG  NUMBER OF LAST TAPE COPIED                     00000230
C      HPHATP I*2 NUMBER  OF PHA TAPES                                    00000240
C      DPHATP R*8 ARRAY  OF PHA TAPES                                     00000250
C      MSPHAS I*4 MILLISECONDS  OF START OF NEW PHA RECORD                00000260
C      MSPHAE I*4 MILLISECONDS  OF END OF NEW PHA RECORD                  00000270
C      HDPHAE I*2 DAY  OF END OF NEW PHA RECORD                           00000280
C      HPHAFT I*2 ARRAY  OF FEET WRITTEN ON EACH PHA TAPE                 00000290
C      DBLNKP R*8 ARRAY  OF BLANK PHA TAPES                               00000300
C      HPHABK I*2 TOTAL  NUMBER OF PHA TAPES                              00000310
C      DNEWPH R*8 ARRAY  OF NEW PHA TAPES                                 00000320
C      DCOPHA R*8 ARRAY  OF COPIED PHA TAPES                              00000330
C      NEWPHA I*4 NUMBER  OF NEW PHA TAPES                                00000340
C      HCOPHA I*2 NUMBER  OF COPIED PHA TAPES                             00000350
C      FEET   R*4 FEET  WRITTEN ON NEW PHA TAPE                           00000360
C 7.   NOTES: NONE                                                        00000370
C 8.   VARIABLES: NO COMMON BLOCK VARIABLES                               00000380
C 9.   I/O: INPUT: NONE                                                  00000390
C          OUTPUT: UNIT 12 NEW PHA TAPE                                   00000400
C 10.  ERROR HANDLING: NONE                                               00000410
C 11.  CALLS: UNLOADNXTPTO,MOUNT,FWRITE                                   00000420
C 12.  CALLED BY: WRIPHA                                                  00000430
C 13.  METHOD: ADD LENGTH OF NEW RECORD TO FEET                           00000440
C              IF FEET LT MAX FEET                                        00000450
C                   WRITE RECORD TO TAPE                                  00000460
C                   SAVE END TIME OF DATA FOR FUTURE USE                  00000470
C              ELSE MOUNT THE NEXT TAPE FOR OUTPUT                        00000480
C                   UNLOAD OLD TAPE                                       00000490
C                   SAVE FINAL LENGTH IN CATALOG                          00000500
C                   SAVE FINAL TIMES IN CATALOG.                          00000510
C                   MOUNT NEW TAPE                                        00000520
C                   SET END TIMES FOR NEW TAPE                            00000530
C 14.  REFERENCE: NONE                                                    00000540
C 15.  PROGRAMMER: ROGER DUBORD                                           00000550
C 16.  MODIFIED: EWR 78                                                   00000560
C*************************************************************************00000570
C*************************************************************************00000580

*** END OF MEMBER ***     58 RECORDS PROCESSED   ********************************************************************
```

```
      SUBROUTINE WRITER(IDATA,HDATA,LENREC,HDLAST,MSLAST,ITAPEC,          00000010
     *HRATTP,DRATTP,MSRATS,MSRATE,HDRATS,HDRATE,HRATFT,DBLNKR,HRATBK,     00000020
     *DNEWRT,DCOPRT,NEWRAT,HCOPRT,FEET)                                   00000030
      INTEGER*2 HDATA(1),HDLAST,HRATTP,HDRATS(1),HDRATE(1),HRATFT(1),     00000040
     *HRATBK,HCOPRT                                                       00000050
C 1.  NAME:  WRITER                                                       00000060
C 2.  IDENTIFICATION: HELDRP, HELIOS A,B                                  00000070
C 3.  ENGLISH NAME: WRITE RATES                                           00000080
C 4.  LANGUAGE: FORTRANH, 360/91/75, OS/MVT                               00000090
C 5.  PURPOSE: SEE BELOW                                                  00000100
C 6.  CALLING SEQUENCE: CALL WRITER(IDATA,HDATA,LENREC,HDLAST,MSLAST,     00000110
C     ITAPEC,HRATTP,DRATTP,MSRATS,MSRATE,HDRATS,HDRATE,HRATFT,DBLNKR,     00000120
C     HRATBK,DNEWRT,DCOPRT,NEWRAT,HCOPRT,FEET)                            00000130
C     IDATA    I*4 ONE RECORD OF DATA                                     00000140
C     HDATA    I*2 ONE RECORD OF DATA                                     00000150
C     LENREC   I*4 LENGTH OF RATES OUTPUT RECORD                          00000160
C     HDLAST   I*2 DAY OF LAST RATES OUTPUT RECORD                        00000170
C     MSLAST   I*4 MILLISECONDS OF LAST RATES OUTPUT RECORD               00000180
C     ITAPEC   I*4 CATALOG NUMBER OF THE CURRENT RATES TAPE               00000190
C     HRATTP   I*2 NUMBER OF RATES TAPES IN THE CATALOG                   00000200
C     DRATTP   R*8 ARRAY OF RATES TAPES                                   00000210
C     MSRATS   I*4 MILLISECONDS  OF THE START OF THE RECORD               00000220
C     MSRATE   I*4 MILLISECONDS  OF THE END OF THE RECORD                 00000230
C     HDRATS   I*2 DAY  OF THE START OF THE RECORD                        00000240
C     HDRATE   I*2 DAY  OF THE END OF THE RECORD                          00000250
C     HRATFT   I*2 ARRAY  OF FEET WRITTEN ON THE RATES TAPES              00000260
C     DBLNKR   R*8 ARRAY  OF BLANK RATES TAPES                            00000270
C     HRATBK   I*2 TOTAL  OF ASSIGNED RATES TAPES                         00000280
C     DNEWRT   R*8 ARRAY  OF NEW RATES TAPES                              00000290
C     DCOPRT   R*8 ARRAY  OF COPIED RATES TAPES                           00000300
C     NEWRAT   I*4 NUMBER  OF NEW RATES TAPES                             00000310
C     HCOPRT   I*2 NUMBER  OF COPIED RATES TAPES                          00000320
C     FEET     R*4 NUMBER  OF FEET WRITTEN ON THE NEW RATES TAPE          00000330
C 7.  NOTES: NONE                                                         00000340
C 8.  VARIABLES: NO COMMON BLOCK VARIABLES                                00000350
C 9.  I/O: INPUT: NONE                                                    00000360
C          OUTPUT: UNIT 15 NEW RATES TAPE                                 00000370
C 10. ERROR HANDLING: NONE                                                00000380
C 11. CALLS: UNLOAD,NXTRTO,MOUNT,FWRITE                                   00000390
C 12. CALLED BY: WRTRAT                                                   00000400
C 13. METHOD: ADD FEET OF NEW RECORD TO FEET OF TAPE                      00000410
C             IF FEET LT MAX FEET                                         00000420
C                WRITE RECORD TO TAPE                                     00000430
C                SAVE END TIME OF RECORD FOR FUTURE USE                   00000440
C             ELSE MOUNT NEXT TAPE FOR OUTPUT                             00000450
C                SET LENGTH IN CATALOG                                    00000460
C                SET END TIME IN CATALOG                                  00000470
C                CALL NEXT RATES TAPE AND ADJUST CATALOG                  00000480
C                SET CORRECT END TIME FOR NEW TAPE                        00000490
C 14. REFERENCE: NONE                                                     00000500
C 15. PROGRAMMER: ROGER DUBORD                                            00000510
C 16. MODIFIED: EWR 78                                                    00000520
C*****************************************************************      00000530
C*****************************************************************      00000540
C     THIS ROUTINE WRITES THE FINAL VERSION OF THE RATES RECORD TO TAPE   00000550
C IF THE OUTPUT TAPE IS FULL AT THIS TIME IT UNLOADED AND THE NEXT RATES  00000560
C IS MOUNTED THE CATALOG IS UPDATED ACCORDINGLY                           00000570

*** END OF MEMBER ***     57 RECORDS PROCESSED   ************************************************************
```

```
      SUBROUTINE WRTPHA(JFDM)                                                00000010
C     THIS ROUTINE MERGES CURRENT RATES INTO EXISTING RATES DATA BASE        00000020
C 1.  NAME: WRTPHA / ENDPHA                                                  00000030
C 2.  INDENTIFICATION: HELDRP HELIOS A,B                                     00000040
C 3.  ENGLISH NAME: WRITE PULSE HEIGHT DATA / END PULSE HEIGHT DATA          00000050
C 4.  LANGUAGE: FORTRANH, OS/MVT, 360/91/75                                  00000060
C 5.  PURPOSE: THIS ROUTINE MERGES CURRENT PHA RECORDS INTO EXISTING         00000070
C     PHA DATA BASE RECORDS                                                  00000080
C 6.  CALLING SEQUENCE: CALL WRTPHA                                          00000090
C 7.  NOTES: NONE                                                            00000100
C 8.  VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN                00000110
C     APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION                00000120
C 9.  I/O: INPUT: UNIT 12 OLD PHA DATA RECORDS                               00000130
C          OUTPUT: UNIT 30 ERROR MESSAGE FOR INVALID RECORD INTERVAL         00000140
C 10. ERROR HANDLING: ABEND 101 FOR TAPE READ ERROR                          00000150
C                     ABEND 102 FOR ILLEGAL MODES                            00000160
C 11. CALLS: PHALEN,OVLAPP,WRITEP,SETOMP,COPPHA,REVISP,SETNMP,FREAD,         00000170
C          UNLOAD,ABEND                                                      00000180
C 12. CALLED BY: PHAOUT                                                      00000190
C 13. METHOD: IF INTERVAL IS INVALID EXIT WRTPHA                             00000200
C             CALL PHALEN TO CALCULATE LENGTH OF NEW RECORD                  00000210
C             IF NEW DATA DOES NOT OVERLAP CATALOG NEW MODE BLOCK            00000220
C                  IF RECORD IN BUFFER CALL WRITEP TO WRITE IT OUT           00000230
C                  CALL SETNMP TO SET UP NEW PHA TAPE                        00000240
C                  CALL WRITEP TO WRITE OUT NEW RECORD                       00000250
C             ELSE OLD MODE BLOCK                                            00000260
C                  IF RECORD IN BUFFER CALL WRITEP TO WRITE IT OUT           00000270
C                  CALL SETOMP TO SET UP OLD PHA TAPE                        00000280
C                  CALL COPPHA TO COPY OLD RECORD TO NEW TAPE                00000290
C                       IF RECORD OVERLAPS NEW DATA                          00000300
C                            CALL REVISP TO REVISE RECORD LENGTH             00000310
C                            CALL PHALEN TO CALCULATE NEW RECORD LENGTH      00000320
C                            CALL WRITEP TO WRITE OUT RECORD                 00000330
C                       ELSE CALL WRITEP TO WRITE NEW RECORD                 00000340
C                            SWITCH MODE                                     00000350
C             FI                                                             00000360
C  ENDPHA     BLOCK TO CLOSE PROCESSING                                      00000370
C             IF BOTH MODES FALSE EXIT ENDPHA                                00000380
C             IF NEW MODE THEN NEW MODE BLOCK                                00000390
C                  UPDATE CATALOG                                            00000400
C                  UNLOAD OUTPUT TAPE                                        00000410
C             ELSE OLD MODE BLOCK                                            00000420
C                  IF RECORD IN BUFFER CALL WRITEP TO WRITE IT OUT           00000430
C                  COPY OLD TAPE TO END OF FILE                              00000440
C                  UPDATE CATALOG                                            00000450
C                  UNLOAD INPUT AND OUTPUT TAPES                             00000460
C             FI                                                             00000470
C 14. REFERENCE: NONE                                                        00000480
C 15. PROGRAMMER: ROGER DUBORD                                               00000490
C 16. MODIFIED: GERRY MARANDINO                                              00000500
C*************************************************************************00000510
C*************************************************************************00000520
```

*** END OF MEMBER *** 52 RECORDS PROCESSED

```
      SUBROUTINE WRTRAT                                                 00000010
C     THIS ROUTINE MERGES CURRENT RATES INTO EXISTING RATES DATA BASE   00000020
C*****************************************************************    00000030
C 1.  NAME: WRTRAT/ ENDRAT                                              00000040
C 2.  INDENTIFICATION: HELDRP HELIOS A,B                                00000050
C 3.  ENGLISH NAME: WRITE RATES / END RATES                             00000060
C 4.  LANGUAGE: FORTRANH, OS/MVT, 360/91/75                             00000070
C 5.  PURPOSE: SEE ABOVE                                                00000080
C 6.  CALLING SEQUENCE: CALL WRTRAT                                     00000090
C 7.  NOTES: NONE                                                       00000100
C 8.  VARIABLES: COMMON BLOCK VARIABLES USED ARE DESCRIBED IN           00000110
C     APPENDICES OF HELIOS DATA REDUCTION PROGRAM DESCRIPTION           00000120
C 9.  I/O: INPUT: UNIT 16 TAPE CONTAINS RECORDS TO BE COPIED            00000130
C          OUTPUT: UNIT 30 MESSAGE FOR INVALID RECORD INTERVAL          00000140
C 10. ERROR HANDLING: ABEND 101 FOR TAPE READ ERROR                     00000150
C                     ABEND 102 FOR ILLEGAL MODE                        00000160
C 11. CALLS: RTRIM5,RTRIMO,OVLAPR,WRITER,SETOMR,COPRAT,REVISR,          00000170
C          SETNMR,PREAD,UNLOAD,ABEND                                    00000180
C 12. CALLED BY: RATOUT                                                 00000190
C 13. METHOD: CHECK FOR BAD RECORD INTERVAL                             00000200
C             CALCULATE LENGTH OF NEW RECORD                            00000210
C                   IF FORMAT 5 CALL RTRIM5                             00000220
C                   IF FORMAT NOT 5 CALL RTRIMO                         00000230
C                   IF RECORD IS ENTIRELY FULL EXIT WRTRAT              00000240
C             IF NO OVERLAP BETWEEN CURRENT DATA AND CATALOG            00000250
C                   NEW MODE BLOCK                                      00000260
C                   IF RECORD IN BUFFER WRITE IT OUT                    00000270
C                         INVOKE SETNMR TO SET UP OUTPUT TAPE           00000280
C                         INVOKE WRITER TO OUTPUT RECORD                00000290
C             ELSE OLD MODE BLOCK                                       00000300
C                   IF RECORD IN BUFFER WRITE IT OUT                    00000310
C                   INVOKE SETOMR TO SET UP OLD TAPE                    00000320
C                   CALL COPRAT TO COPY OLD DATA TO NEW TAPE            00000330
C                   IF NEW DATA OVERLAPS OLD DATA                       00000340
C                         CALL REVISR TO REVISE CURRENT RECORD          00000350
C                         CALCULATE LENGTH OF NEW RECORD                00000360
C                         CALL WRITER TO OUTPUT RECORD                  00000370
C                   ELSE CALL WRITER TO OUTPUT NEW RECORD               00000380
C             FI                                                        00000390
C     ENDRAT  BLOCK TO CLOSE PROCESSING                                 00000400
C             IF NO MODE IS TRUE EXIT ENDRAT                            00000410
C             IF NEW MODE                                               00000420
C                   UPDATE CATALOG                                      00000430
C                   UNLOAD OUTPUT TAPE UNIT 15                          00000440
C             ELSE OLD MODE                                             00000450
C                   IF RECORD IN BUFFER                                 00000460
C                         CALL WRITER TO WRITE IT OUT                   00000470
C                   READ OLD RATES TAPE TO END OF FILE                  00000480
C                   CALL WRITER TO WRITE OLD DATA TO NEW TAPE           00000490
C                   UPDATE CATALOG                                      00000500
C                   UNLOAD UNIT 16 AND UNIT 15.                         00000510
C             FI                                                        00000520
C 14. REFERENCE: NONE                                                   00000530
C 15. PROGRAMMER: ROGER DUBORD                                          00000540
C 15. MODIFIED: GERRY MARANDINO                                         00000550
C*****************************************************************    00000560
C*****************************************************************    00000570
```

*** END OF MEMBER *** 57 RECORDS PROCESSED **********

```
         PRINT    ON,GEN,DATA
*cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
* 1.   Routine:
*          ZBYTES
* 2.   System, Satellite, Version:
*          HELDRP    HELIOS A,B          0
* 3.   English Name:
*          ZERO BYTES
* 4.   Language:
*          ASMG   level G    release 21MAR76   360/91/75   OS/MVT
* 5.   Purpose:
*          ZERO AN UNLIMITED NUMBER OF ARRAYS OF VARIABLE LENGTH
* 6.   Calling Sequence:
*      Argument        Type    I/O    Description
*          ARRAY1    I*4         ARRAY TO BE ZEROED
*          LENGTH1   I*4         LENGTH OF ARRAY
*          ARRAY2    I*4         ARRAY TO BE ZEROED
*          LENGTH2   I*4         LENGTH OF ARRAY
*          ETC****
* 7.   Notes:
*      7a.  Restrictions:
*          NONE
*      7b.  Special Features:
*          ANY NUMBER OF ARRAYS MAY BE ZEROED
* 8.   Variables:
*      8a.  Local
*            Variable           Type    Description
*          NONE
*      8b.  COMMON
*            COMMON             Variables
*          NONE
* 9.   I/O Information:
*      Unit No.        Use Description
*          NONE
*10.   Error Handling:
*          NONE
*11.   Subroutines Called:
*      Subroutine      Description
*          NONE
*12.   Called By:
*      Routine         Description
*          GRBPRT    GAMMA RAY PRINT
*13.   Method:
*          MOVE ZEROES INTO ARRAY OF LENGTH GIVEN
*14.   Reference:
*          NONE
*15.   Programmer and Date:
*          GERRY MARANDINO JULY 31,74
*16.   Modifications:
*
*cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
```

*** END OF MEMBER ***   51 RECORDS PROCESSED