#368

MARINER 10

42 SEC. MAG. FIELD VECTORS, SEQ COORDS

73-085A-04D SPHE-00692

VENUS ENCOUNTER DATA, VENUS COORDS

73-085A-04E PSFP-00131

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1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC INFORMATION SYSTEM:

http://nssdc.gsfc.nasa.gov/nmc/

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

a. Associated Documents To find associated documents you will need to know the document ID number and then click here.
http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/

b. Core Catalog Materials

Refer to 73-085A-04E

MARINER 10

42 SEC. MAG. FIELD VECTORS, SEQ COORDS

73-085A-04D SPHE-00692

THIS DATA SET HAS BREEN RESTORED. ORIGINALLY THERE WERE 32 9-TRACK, 1600 BPI TAPES WRITTEN IN STANDARD LABEL FORMAT. THE RESTORED TAPES ARE 9-TRACK, 6250 BPI WRITTEN IN NON-LABEL FORMAT. THE TAPES WERE CREATED ON AN IBM 360 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPAN ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR02729	DS02729	D28156	1	11/03/73 - 11/06/73
		D28157	2	11/07/73 - 11/11/73
		D28158	3	11/12/73 - 11/16/73
DR02730	DS02730	D28159	1	11/17/73 - 11/21/73
		D28160	2	11/22/73 - 11/26/73
		D28161	3	11/26/73 - 12/01/73
DR02731	DS02731	D28162	1	12/01/73 - 12/06/73
		D28163	2	12/06/73 - 12/11/73
		D28164	3	12/11/73 - 12/16/73
DR02732	DS02732	D28165	1	12/16/73 - 12/20/73
		D28166	2	12/20/73 - 12/26/73
		D28167	3	12/27/73 - 12/31/73
DR02733	DS02733	D28168	1	01/01/74 - 01/03/74
		D28169	2	01/07/74 - 01/10/74
		D28170	3	01/10/74 - 01/16/74
DR02734	DS02734	D28171	1	01/16/74 - 01/20/74
		D28172	2	01/20/74 - 01/26/74
		D28173	3	01/25/74 - 01/30/74
DR02735	DS02735	D28174	1	01/30/74 - 02/04/74
		D28175	2	02/04/74 - 02/09/74
		D28176	3	02/10/74 - 02/14/74
DR02736	DS02736	D28249	1	02/14/74 - 02/19/74
		D28250	2	02/19/74 - 02/24/74
		D28251	3	02/24/74 - 03/01/74
DR02737	DS02737	D28252	1	03/01/74 - 03/06/74
		D28253	2	03/06/74 - 03/11/74
		D28254	3	03/11/74 - 03/16/74
DR02738	DS02738	D28255	1	03/16/74 - 03/21/74
		D28256	2	03/21/74 - 03/26/74
		D28257	3	03/26/74 - 03/31/74
DR02739	DS02739	D28258	1	03/31/74 - 04/05/74
		D28259	2	04/05/74 - 04/09/74

MARINER 10

45 SEC. DATA, VENUS COORDS, TAPE

73-085A-04E PSFP-00131

This data set has been restored. There was originally 4 Binary 9-Track, 1600 BPI tapes. There is one restored tape. The input tapes were standard labelled and the DR/DS tapes are written in non-label format. The DR tapes are 3480 cartridges and the DS tapes are 9-track, 6250 BPI. The tapes were created on an IBM 360 computer. The DR and DS numbers along with the corresponding D numbers and the time spans are as follows:

DR#	DS#	D#	FILES	TIME SPAN
DR03335	DS03335	D28260	1	01/20/74 - 01/26/74
		D28261	2	01/25/74 - 01/29/74
		D28262	3	01/29/74 - 02/02/74
		D28263	4	02/02/74 - 02/06/74

REQ. AGENT	RAND NO.	ACQ. AGENT
CMP	RC 6978	JHK

MARINER 10
73-085A-04D
42 SECOND MAGNETIC FIELD VECTORS, SEQ COORDINATES
73-085A-04E
VENUS ENCOUNTER DATA, VENUS COORDINATES

The 42 Second Mag. Field Vectors contain 32 tapes and the Venus Encounter contains 4 tapes. These tapes are 9 track, 1600BPI and are written in BINARY. These tapes have a standard label format, with 1 data file per tape. On the following pages are the FP, D & C numbers as well as the time spans for each tape.

73-085A-04D MARINER 10

FP	D	C	TIME SPANS
6476	28156	18574	11/02/73 - 11/06/73
6477	28157	18575	11/07/73 - 11/11/73
6478	28158	18576	11/12/73 - 11/16/73
6479	28159	18577	11/17/73 - 11/21/73
6480	28160	18578	11/22/73 - 11/26/73
6481	28161	18579	11/26/73 - 12/01/73
6484	28162	18580	12/01/73 - 12/06/73
6485	28163	18581	12/06/73 - 12/11/73
6515	28164	18582	12/11/73 - 12/16/73
6486	28165	18583	12/16/73 - 12/20/73
6475	28166	18584	12/20/73 - 12/26/73
6488	28167	18585	12/27/73 - 12/31/73
2323	28168	18603	01/01/74 - 01/03/74
2325	28169	18604	01/07/74 - 01/10/74
6511	28170	18605	01/10/74 - 01/16/74
6512	28171	18606	01/16/74 - 01/20/74

FP	D	C	TIME SPANS
6529	28172	18607	01/20/74 -01/26/74
6530	28173	18608	01/25/74 - 01/30/74
6518	28174	18609	01/30/74 - 02/04/74
2179	28175	18610	02/04/74 - 02/09/74
6517	28176	18611	02/10/74 - 02/14/74
6473	28249	18615	02/14/74 - 02/19/74
6523	28250	18616	02/19/74 - 02/24/74
6519	28251	18617	02/24/74 - 03/01/74
6520	28252	18618	03/01/74 - 03/06/74
6474	28253	18619	03/06/74 - 03/11/74
6521	28254	18620	03/11/74 - 03/16/74
6528	28255	18621	03/16/74 - 03/21/74
6514	28256	18622	03/21/74 - 03/26/74
6522	28257	18623	03/26/74 - 03/31/74
6525	28258	18624	03/31/74 - 04/05/74
6526	28259	18625	04/05/74 - 04/09/74

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FP	D	C	TIME SPANS
7097	28260	18626	01/20/74 - 01/26/74
7098	28261	18627	01/25/74 - 01/29/74
7099	28262	18628	01/29/74 - 02/02/74
7100	28263	18629	02/02/74 - 02/06/74

DATA TAPE HEADER FORMAT

This header record will appear on all types of MARINER 10 tapes in exactly the same form.

WORD	COUNT	TYPE*LENGTH	NAME	DESCRIPTION
1	1	A*4	ID	'M-10'
2	1	I*4	IDAY	Day of year of first record January 1 = 0
3	1	I*4	MSEC	Milliseconds of day of first data record
4	1	I*4	FDSC	Spacecraft clock count of first data record
5	1	I*4	IYR	Year of data generation
6	1	I*4	IDY	Day of year of data generation January 1 = 0
7	1	A*4	MON	Month of data generation
8	1	I*4	IDM	Day of month of data generation
9	1	A*4	CORD	Coordinate system of the data on this tape 'SEN' 'PL' 'GE' 'GO' 'VE' 'VO' 'ME' 'MO' 'HE' 'SEQ'
10	1	A*4		'CRU' = cruise mode. See Appendix A for a description of these systems. This implies the reference line is the spacecraft-Sun line. 'ENC' = encounter mode. This implies the reference line is the planet-Sun line.
11	1	I*4		'ERT' = time on tape is Earth received time. 'SCE' = time on tape is spacecraft event time.
12-23	12	R*4	ZLEVEL	DIMENSION (2,2,3) Zero offsets. INDEX I1 = 1 = Low range I1 = 2 = High range I2 = 1 = Mag B I2 = 2 = Mag A I3 = 1 = X component I3 = 2 = Y component I3 = 3 = Z component

WORD	COUNT	TYPE*LENGTH	NAME	DESCRIPTION
24-35	12	R*4	SENS	Sensitivity levels for each sensor DIMENSION (2,2,3). See ZLEVEL above.
36-38	3	R*4	ALPHA	Magnetic coupling coefficient for each cartesian component.
39-44	6	R*4	BIAS	Sensor bias offset bandwidth in gamma DIMENSION (3,2) INDEX I1 = 1 = x component I1 = 2 = Y component I1 = 3 = Z component I2 = 1 = Mag B I2 = 2 = Mag A

The following four matrices are used in computing the rotation matricies to transform payload data to a given system. Each data record contains the unit vectors for the spacecraft axes in the Earth Mean Equator, Equinox of 1950 system. These matrices will rotate these unit vectors to the following systems:

45-62	9	R*8	EARTH	Earth true orbital of date, planet centered, space-fixed.
63-80	9	R*8	VENUS	Venus true orbital of date, planet centered, space-fixed.
81-98	9	R*8	MERCURY	Mercury true orbital of date, planet centered, space-fixed.
99-116	9	R*8	SUN	Sun true equator of date, Sun centered, space-fixed.
117-118	1	R*4	R(E)	Radius of Earth in km.
119-120	1	R*4	R(V)	Radius of Venus in km.
121-122	1	R*4	R(M)	Radius of Mercury in km.
123-124	1	R*4	AU	One Astronomical Unit in km.

42 SECOND SUMMARY TAPE FORMAT

This tape contains averages of the ambient magnetic field. Each record contains one 42 second average, seven 6 second averages, and thirty-five 1.2 second averages. The following JCL may be used to read this tape:

```
//ddname   DD UNIT=(9TRACK,,DEFER),LABEL=(,SL,,IN),DISP=SHR,
//         DCB=(RECFM=VB,LRECL=2912,BLKSIZE=11652,DEN=3,OPTCD=B),
//         DSN=MVM.SUMMARY.S42,VOL=SER=fptape
```

NOTE: THE FIRST RECORD ON A TAPE WILL BE A HEADER. See Data Tape Header Format. Also note that merged tapes may contain header records intermixed with data records.

WORD	COUNT	TYPE*LENGTH	NAME	DESCRIPTION
1	1	I*4	YR	Year of data
2	1	I*4	DAY	Day of year of data. January 1 = 0.
3	1	I*4	MSEC	Milliseconds of day of the beginning of the current 42 second block
4	1	I*4	FDSC	S/C clock (42 second sequence counter)
5	1	Z*4	STAT	Housekeeping and status word. (See Appendix B)
6-12	7	Z*4	Q6	Composite 6 second quality codes. (See Appendix B)
13	1	Z*4	Q42	Composite 42 second quality code. (See Appendix B)
14	1	Z*4	MDR	Master Data Record status word taken from Experimenter Data Records tape. (See Appendix B)
15-16	8	A*1	CLASS	Data quality flags summarized in character form. (See Appendix B)
17-18	6	A*1	MEDDLE	Any of the characters 'STBFRP' are present when the Analysis Program has modified the data. (See Appendix B)
19	1	Z*4	ASW	Analysis Status Word. A detail breakdown of the characters given in word 17 above. (See Appendix B)

WORD	COUNT	TYPE*LENGTH	NAME	DESCRIPTION
20-22	6	I*2	RGE	Range change location for each sensor. The order of the elements is: MAG B(x,y,z), MAG A(x,y,z).
23-25	6	I*2	BIAS	Bias levels (offsets) for each sensor. The order of the elements is the same as in 20-22 above.
		42 SECOND AVERAGE		
26	1	R*4	F1	(See Appendix A for definitions of all magnetic field parameters).
27	1	R*4	F2	
28	1	R*4	TH	
29	1	R*4	PH	
30	1	R*4	X	B(x)
31	1	R*4	Y	B(y)
32	1	R*4	Z	B(z)
33-35	3	R*4	RMS	Vector rms
36	1	I*4	N	Number of 6 second averages in 42 sec.
		6 SECOND AVERAGES		
37-43	7	R*4	F1	(See Appendix A for definitions of all magnetic field parameters).
44-50	7	R*4	F2	
51-57	7	R*4	TH	
58-64	7	R*4	PH	
65-71	7	R*4	X	B(x)
72-78	7	R*4	Y	B(y)
79-85	7	R*4	Z	B(z)
86-106	21	R*4	RMS	Vector rms, DIMENSION RMS(3,7)
107-113	7	I*4	N	Number of 1.2 second averages in each 6 second average.

WORD	COUNT	TYPE*LENGTH	NAME	DESCRIPTION
107-113	7	I*4	N	Number of 1.2 second averages in each 6 second average.
		1.2 SECOND AVERAGES		
114-148	35	R*4	F1	(See Appendix A for definitions of all magnetic field parameters).
149-183	35	R*4	F2	
184-218	35	R*4	TH	
219-253	35	R*4	PH	
254-288	35	R*4	X	B(x)
289-323	35	R*4	Y	B(y)
324-358	35	R*4	Z	B(z)
359-463	105	R*4	RMS	Vector rms, DIMENSION RMS(3,35)
464-498	35	I*4	N	Number of 40ms data samples in each 1.2 second average.
		SPACECRAFT MAGNETIC FIELD		
499	1	I*4	NSC	Number of spacecraft field averages in 42 seconds^2.
500-513	14	R*4	XSC	B(x)
514-527	14	R*4	YSC	B(y)
528-541	14	R*4	ZSC	B(z)
		TRANSFORMATION, ATTITUDE AND POSITIONAL INFORMATION		
542-550	9	R*4	ROT	Matrix used to transform this data from the payload system.
551-552	1	R*8	RLOC	Radial distance from the body of reference in planetary radii, or AU.
553-554	1	R*8	XLOC	X component of spacecraft position from the body of reference in planetary radii or AU. Coordinate system is the same as that of the data, unless it is payload. Payload data will use Geoecliptic coordinates for position.

WORD	COUNT	TYPE*LENGTH	NAME	DESCRIPTION
555-556	1	R*8	YLOC	Y component, see word 553 above.
557-558	1	R*8	ZLOC	Z component, see word 553 above.
559-560	1	R*8	XV	X component of velocity of spacecraft with respect to the body of reference, in km/sec. Coordinate system - see word 553 above.
561-562	1	R*8	YV	Y component of velocity - see word 559 above.
563-564	1	R*8	ZV	Z component of velocity - see word 559 above.
565-702	138	Z*4	TRAJ	This block contains spacecraft position and velocity information as well as some positional relationships of the mission relavant planets and the Sun. The entire block is copied bit for bit from the JPL supplied SEDR tape. See Detail Summary Tape Format, words 3219-3356 for a detailed breakdown.
703	1	R*4	PHISL	Solar longitude of spacecraft.
704	1	R*4	ALPHSL	Solar longitude of Earth.
705	1	I*4	CARSR	Solar Rotation Number.
706-712	7	I*4		Time of spacecraft attitude information. See Detail Summary Tape Format, words 3357-3363.
713-718	6	R*4		Cone, clock angles of spacecraft axis in Sun-Probe-Canopus reference (MAG).
719-727	9	R*4	FIP	Unit vector components of spacecraft axis, S/C centered, Earth Mean Equator, equinox of 1950.0 (MAG).

(1) These values are '0' unless the Analysis Program has predicted a range change for a given sensor, then the value is the FORTRAN index pointing to the location in the detail data array of 1050 elements. Also note that for MAG B these are true locations, but for MAG A, these are high by 1 for x, 2 for y, and 3 for z.

(2) The spacecraft magnetic field averaging code has six possible modes of operation, giving between 1 and 14 averages per 42 seconds. NSC is provided to identify how many averages there are for this 42 second period. Using 42.0/NSC will give the number of seconds in each average. Normal production runs use fourteen 3.0 second averages in each 42 seconds.

APPENDIX A

Mariner 10 data tapes are available in several different orthogonal coordinate systems. The system used on any given tape is defined in word 9 of the Header Record. The useful coordinates defined are "GE, GO, VE, VO, ME, MO, SEQ, and HE".

The first six are related in definition. The first character refers to the planetary body which serves as the center of the coordinate system (G ≡ Earth, V ≡ Venus, M ≡ Mercury). The second letter defines the plane of the X-Y axes. "E" is an orthogonal coordinate system in which the X-Y plane is parallel to the ecliptic plane and the X direction is along the projection of the planet-sun vector onto the ecliptic plane, positive sunward; Z is along the ecliptic plane normal, positive northward; and Y completes the right handed system. "O" orbital is an orthogonal coordinate system in which the X-Y plane is the orbital plane of the referenced planet and X is positive toward the sun; Z is along the orbital plane normal, positive "northward"; and Y completes the right-handed system. This definition always applies to spacecraft position. For the data coordinates, this holds only if word 10 of the tape header is "ENC" (for Encounter mode). If word 10 is "CRU" (Cruise mode) then the above definition is modified such that the X direction is positive sunward, along the <u>spacecraft-sun</u> line.

SEQ is Solar Equitorial and is a sun-centered system with the X-Y planed defined by the sun's equator. HE is Heliocentric Ecliptic,

a sun centered system with the X-Y plane parallel to the ecliptic plane. For more detailed description of SEQ and HE coordinates, see X-document by K.W. Behannon, "Observations of the Interplanetary Magnetic Field Between 0.46 and 1.0 AU. By the Mariner 10 Spacecraft".

The 42 second summary tapes contain averages of the ambient magnetic field, defined as follows:

$$F1 = \frac{1}{N} \sum_{i=1}^{N} f_i \qquad \text{Gamma}$$

$$F2 = \sqrt{(\bar{X}^2 + \bar{Y}^2 + \bar{Z}^2)} \qquad \text{Gamma}$$

$$\theta = \mathrm{Sin}^{-1} (\bar{Z}/F1) \qquad \pm 90^{\circ} \text{ degrees}$$

$$\phi = \mathrm{Tan}^{-1} (\bar{Y}/\bar{X}) \qquad 0\text{-}360 \text{ degrees}$$

$$\bar{X} = \frac{1}{N} \sum_{i=1}^{N} X_i \qquad \text{Gamma}$$

$$\bar{Y} = \frac{1}{N} \sum_{i=1}^{N} Y_i \qquad \text{Gamma}$$

$$\bar{Z} = \frac{1}{N} \sum_{i=1}^{N} Z_i \qquad \text{Gamma}$$

$$RMS_K = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (K_i - \bar{K})^2} \qquad K = \{X,Y,Z\}$$

APPENDIX B

STATUS AND HOUSEKEEPING WORD

THE STATUS WORD IS MADE UP OF 8 HEXADECIMAL DIGITS, 4 BINARY BITS PER DIGIT. NUMBERING STARTS FROM 0 AND RUNS LEFT TO RIGHT.

THIS IS THE FORMAT DISPLAYED AT THE TOP OF EACH PAGE OF BOTH THE 6 AND 42 SECOND AVERAGE PRINTOUTS, And on the summary tapes.

MAG A = OUTER MAGNETOMETER
MAG B = INNER MAGNETOMETER

HARDWARE AREA	HEX DIGIT	BIT	LOGICAL FUNCTION
MAG A	0	C-2	SPARE
		3	0 - CALIBRATE OFF
			1 - CALIBRATE ON
MAG A	1	0	0 - HEATER ENABLE OFF
			1 - HEATER ENABLE ON
		1	0 - MANUAL RANGE MODE
			1 - AUTOMATIC RANGE MODE
		2	0 - MANUAL BIAS MODE
			1 - AUTOMATIC BIAS MODE
		3	0 - HEATER OFF
			1 - HEATER ON
FLIPPER	2	0	0 - FLIPPER HEATER OFF
			1 - FLIPPER HEATER ON
		1	0 - LOCKED AT 180 DEGREES
			1 - OPEN AT 180 DEGREES
		2	0 - LOCKED AT 0 DEGREES
			1 - OPEN AT 0 DEGREES
		3	SPARE
MAG B	3	C-2	SPARE
		3	0 - CALIBRATE OFF
			1 - CALIBRATE ON

MAG B	4	0	0 - HEATER ENABLE OFF
			1 - HEATER ENABLE ON
		1	0 - MANUAL RANGE MODE
			1 - AUTOMATIC RANGE MODE
		2	0 - MANUAL BIAS MODE
			1 - AUTOMATIC BIAS MODE
		3	0 - HEATER OFF
			1 - HEATER ON
ENCODER	5	0	0 - B IS PRIME
			1 - A IS PRIME
		1	0 - PRIME IS DIRECT READOUT
			1 - PRIME IS DELTA MODULATED
		2	0 - SEC IS DIRECT READOUT
			1 - SEC IS AVERAGED MODE
		3	0 - NIS-1
			1 - NIS-2
MAG A RANGE	6	0	SPARE
		1	0 - X SENSOR LOW RANGE
			1 - X SENSOR HIGH RANGE
		2	0 - Y SENSOR LOW RANGE
			1 - Y SENSOR HIGH RANGE
		3	0 - Z SENSOR LOW RANGE
			1 - Z SENSOR HIGH RANGE
MAG B RANGE	7	0	SPARE
		1	0 - X SENSOR LOW RANGE
			1 - X SENSOR HIGH RANGE
		2	0 - Y SENSOR LOW RANGE
			1 - Y SENSOR HIGH RANGE
		3	0 - Z SENSOR LOW RANGE
			1 - Z SENSOR HIGH RANGE

COMPOSITE QUALITY CODES

I. 6 Second Composite Quality Code

This is a 32 bit binary word in three parts.

A. Bit (0) Missing segment indicator

0 = 6 second segment is present.

1 = 6 second segment is missing.

B. Bit (1-6) Composite Bit Error. The number of errors detected in 10^5 sync word bits. If CBE > 63, CBE set to 63.

C. Bit (7-31) Data Quality. One bit per minor frame, 25 minor frames/6 seconds.

0 = good frame

1 = missing frame-or non-zero MDR status word

II. 42 Second Composite Quality Code

The 42 second composite quality code format is identical to the 6 second word. However, it is the result of the logical ORing of the seven 6 second words in that 42 seconds.

MDR STATUS WORD

Ground communications status. This is the communications network between tracking stations and JPL. Use of this word requires knowledge of NASA/GSFC (Ground Communications Facility) operations and terminology. There are seven original MDR status words, one for each 6 second data block. This status word is the logical sum (OR operation) of seven original words.

0-13	Unused DSIF Lock Status
14	_____RCVR
15	_____SDA
16	_____TCP
17	_____SSA
18	_____DDA
19	_____BDA
	0 = IN LOCK; 1 = OUT OF LOCK
20	Corrected FDS count/minor frame count/SCI. 0 = Not corrected, 1 = Corrected.
21	Corrected earth received GMT. 0 = Not corrected, 1 = Corrected.
22	Errors in sync words of NIS frames. 0 = No errors, 1 = Errors within BET.
23	Bad leading or trailing sync word of NIS frames. 0 = No bad words, 1 = Bad word(s).
24	GCF block error flag status. 0 = No errors, 1 = Error flag was set.
25	Not used.
26	Complete frame flag. Indicates if any of the words in the data block of this record do not contain valid data. 0 = Complete frame, 1 = Data missing.
27-31	Not used.

CHARACTER DATA QUALITY FLAGS

The Composite Quality Codes are summarized into classes to provide rapid 'visual' inspection.

These characters are as follows

Class	Definition
A	Nonzero composite bit errors in 10^5 bits
B	Missing minor frame/or MDR status word is non-zero
C	Class 'A + B'
D	Missing major frame (6 seconds) frame
E	Class 'D + A'
F	Class 'D + B'
G	Class 'D + C'

"MEDDLE" CHARACTER DEFINITIONS

The Mariner 10 analysis program provides some checks and modifications to data in an attempt to recover as much data as possible. "Meddle" is a visual status word that warns that a given 42 second sequence has been altered or modified. These alterations are caused by missing data, bit errors, or changes in hardware status.

These codes are:

S = Status correction. A portion of the status word was found to be either invalid or missing. The status from the previous sequence is used.

T = Time correction. Missing major frames caused the time to be late. Time was corrected to point to the beginning of the 42 second sequence.

B = Bias correction. Bias step changes follow a fixed rule. The bias steps of each sensor are monitored according to this rule. When violations occur, the bias of the previous sequence is used.

R = Range correction. If a bias error was large (more than 10 steps), it is assumed the problem is a high order bit error and therefore the range is suspect. The range is the high order bit of the bias word. The range is then checked against the last sequence and corrected.

P = A predicted range change occurred. Any of the six sensors may independently change from low range to high at any time during a 42 second sequence. The analysis program has detected conditions which appear to be an upward range change on at least one sensor.

F = Filter removed some data. All digital numbers pass through a digital filter which looks for single noise peaks usually cuased by bit errors in the high order bits. Multiple bad numbers are passed.

ASW

Analysis Status Word. This word is used to carry an accurate accounting of all program modifications or interventions taken place in the current 42 second sequence.

Bits are numdered left to right, bit 0 is high order bit.

Bit	Meaning	
0	Time was corrected	
1	Status word was corrected	
2	Bias fixup taken	Secondary X
3		Secondary Y
4		Secondary Z
5		Prime X
6		Prime Y
7		Prime Z
8	Range fixup taken	Secondary X
9		Secondary Y
10		Secondary Z
11		Prime X
12		Prime Y
13		Prime Z
14	Data was removed by filter	Secondary X
15		Secondary Y
16		Secondary Z
17		Prime X
18		Prime Y
19		Prime Z
20-31	Unused	

11/8/76

73-085A-04D MARINER 10 IMF SUMMARY TAPES

SEQ COORDINATES

DAYS (CALENDAR)*		TAPE NO.
1973/307 ✓	310 ✓	✓ FP6476
311 ✓	315 ✓	✓ FP6477
316 ✓	320 ✓	✓ FP6478
321 ✓	325 ✓	✓ FP6479
326 ✓	330 ✓	✓ FP6480
331 330	335 ✓	✓ FP6481
336 335	340 ✓	✓ FP6484
341 340	345 ✓	✓ FP6485
346 345	350 ✓	✓ FP6515
351 350	355 ✓	✓ FP6486
356 355	360 ✓	✓ FP6475
361 361	365 ✓	✓ FP6488
001 ✓	003 ✓	✓ FP2323
007 ✓	010 ✓	✓ FP2325
1974/01110	01516	✓ FP6511
016 ✓	020 ✓	✓ FP6512
021 20	025 26	✓ FP6529
026 25	030 ✓	✓ FP6530
031 30	035 ✓	✓ FP6518
036 35	040 ✓	✓ FP2179
041 ✓	045 ✓	✓ FP6517
046 45	050 ✓	✓ FP6473
051 50	055 ✓	✓ FP6523
056 55	060 ✓	✓ FP6519
061 60	065 ✓	✓ FP6520
066 65	070 ✓	✓ FP6474
071 70	075 ✓	✓ FP6521
076 75	080 ✓	✓ FP6528

DAYS (CALENDAR)*		TAPE NO.
08180	085 ✓	✓ FP6514
086 85	090 ✓	✓ FP6522
09190	095 ✓	✓ FP6525
096 95	10099	✓ FP6526

GEOCENTRIC ECLIPTIC COORDS. [redacted]

1973/307	310	FP5978

VENUS ORBITAL COORDS. ** 04E

1974/021 20	025 26	✓ FP7097
026 25	029 ✓	✓ FP7098
030 29	033 ✓	✓ FP7099
034 33	037 ✓	✓ FP7100

* DAY NOS. ON TAPES ARE DECIMAL DAYS WHERE DD = CD - 1

** WILL be different DATA SET

9tk, SL, DCB=(RECFM=VB, LRECL=2912, BLKSIZE=11652, DEN=3) optcd=B
DSNAME MUM.SUMMARY.S42, VOL=SER=FP6476

VENUS ENCNTR DATA, VENUS COORDS

BEHANNON

LITHOGRAPHED IN U.S.A. ADDISON-WESLEY PUBLISHING COMPANY, INC. READING, MASS. A-W Datagram 10PLV

```
IEF285I   VOL SER NOS= K3SYS2.
IEF285I   SYS1.FORTLIB                                  KEPT
IEF285I   VOL SER NOS= K3SYS1.
IEF285I   SYS2.FORTLIB                                  KEPT
IEF285I   VOL SER NOS= K3SYS2.
IEF285I   SYS1.PL1LIB                                   KEPT
IEF285I   VOL SER NOS= K3SYS1.
IEF285I   SYS1.FORTSSP                                  KEPT
IEF285I   VOL SER NOS= K3SYS2.
IEF285I   SYS2.COBLIB                                   KEPT
IEF285I   VOL SER NOS= M2J08Q.
IEF285I   SYS1.ALGLIB                                   KEPT
IEF285I   VOL SER NOS= K3SYS1.
IEF285I   SYS76338.T134307.RV000.YZJRJMD1.LODMOD        PASSED
IEF285I   VOL SER NOS= K3SCR2.
IEF285I   SYS76338.T134307.SV000.YZJRJMD1.R0000576      SYSOUT
IEF285I   VOL SER NOS= K3SCR2.
IEF285I   SYS76338.T134307.SV000.YZJRJMD1.R0000577      SYSOUT
IEF285I   VOL SER NOS= K3SCR3.
IEF285I   SYS76338.T134307.RV000.YZJRJMD1.R0000578      DELETED
IEF285I   VOL SER NOS= K3SCR3.
IEF285I   SYS76338.T134307.RV000.YZJRJMD1.S0000579      SYSIN
IEF285I   VOL SER NOS= K3SCR2.
IEF285I   SYS76338.T134307.RV000.YZJRJMD1.S0000579      DELETED
IEF285I   VOL SER NOS= K3SCR2.
IEF373I STEP /LINK     / START 76338.2101
IEF374I STEP /LINK     / STOP  76338.2102 CPU    0MIN 01.15SEC MAIN 130K LCS    0K
- STEP 03 -      RETURN CODE = 0000                                STEP TIME =      .19 MINS=(CPU=      .01,IO=      .18)
                                          IO IN SECS. DISK=    10.45,DRUM=      .56,TAPE=      .00,CELL=      .00,OTHR=      .18
- SURCHARGES=(DRIVES ALOC=000,TAPE MOUNTS=000,CORE=000,PAPER=000,PRIORITY=00000)SECS.   TOTAL STP TIME=      .19 MINS.  -
     XXGO        EXEC PGM=*.LINK.SYSLMOD.COND=(4,LT),REGION=70K                    00000230
     XXFT05F001 DD  DDNAME=DATA5                                                   00000240
     XXFT06F001 DD  SYSOUT=6OUT,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=6BLKSIZE)         00000250
     IEF653I SUBSTITUTION JCL -  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265)
     XXFT07F001 DD  SYSOUT=B,DCB=(RECFM=FB,BLKSIZE=7280,LRECL=80)                  00000260
     XXSYSPRINT DD  SYSOUT=6OUT,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=6BLKSIZE),        00000270
     IEF653I SUBSTITUTION JCL -  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265),
     XX              SPACE=(CYL,(0,1)),UNIT=(DISK,3)                               00000280
     XXSYSUDUMP DD  SYSOUT=A,SPACE=(CYL,(0,5))                                     00000290
     //GO.FT08F001 DD UNIT=(9TRACK,,DEFER),LABEL=(,BLP,,IN),DISP=SHR,
     //          DCB=(RECFM=U,BLKSIZE=32500,DEN=3),DSN=JRJDMP,
     //          VOL=SER=JJ0C44
     //GO.DATA5 DD *
     //
IEF236I ALLOC. FOR YZJRJMD1 GO
IEF237I 231    ALLOCATED TO PGM=*.DD
IEF237I 333    ALLOCATED TO FT05F001
IEF237I 331    ALLOCATED TO FT06F001
IEF237I 331    ALLOCATED TO FT07F001
IEF237I 333    ALLOCATED TO SYSPRINT
IEF237I 231    ALLOCATED TO SYSPRINT
IEF237I 232    ALLOCATED TO SYSPRINT
IEF237I 331    ALLOCATED TO SYSUDUMP
IEF237I 0C3    ALLOCATED TO FT08F001
```

```
                                   RECORD      1  OF FILE    2
                                   LENGTH =  10152  BYTES

27A80000  05840000  D46CF1F0  00000018  05251B32  00008BB7  00000788  00000012  40D1C1D5  00000013
F2C5D840  C3D9E440  F2C3C540  4327B268  4321604F  432F7486  432291D4  43274A71  432168EF  4324FF85
43217669  4322E67A  432C59F3  43215CF8  43209225  3F7D566C  403F765F  3F7D566C  403F1412  3F793DD9
403F1412  3F7E2824  403ECB92  3F7E2824  403E62B6  3E79A6B5  403E62B6  404C710C  404C710C  404C710C
41886A7E  41B6F560  41C11687  41B44189  41AA3126  41B1C6A7  40FFFFDD  344C588B  BF161DE5  EEEB3556
BE99D402  509ED2C4  3F1E1DB8  3838AED1  40EADD84  8B71ECC9  4065D7D5  7D10ED46  3C59D177  FF1D3C58
C065D849  A94553BC  40EADF8F  207A6BDA  C0FDAB85  16981 98F  C022739E  07A3F687  3E7FB2D6  2FAECADF
401F2799  08CDE6F5  C0F6EB0A  35A9264A  C06A077E  214BC451  3FEB72A9  18612AA6  C069011A  67E44700
40E9027F  C7B2E149  4C7C8449  B9D20530  C0C5B358  3D8348F5  C0756FCD  5F24527F  40E4C933  F2565A89
406D5FF9  62ABFF37  402312F7  5C88E733  401716 0E  45ECB4FB  C0785D5F  CDDA6B89  40E0C197  94322ED8
C0429680  223150AD  C0E2C8FE  D7C95CF3  C06256C6  E2ADFAEA  40F53565  B4F65847  C02FBD15  E56C3988
C037F1C3  F053B81A  401F38CA  80662E4F  C06CBEC7  88D2F02D  40E5AA79  EFC85717  44188633  33333333
4417A200  00000000  43986000  00000000  478EAB12  40000000  41280000  418CCCCC  4216CCCC  42240000
4230B333  423A6666  424C9999  42553333  42649999  426A9999  425B0000  42664CCC  42721999  42784CCC
427D1999  00000000  00000000  00000000  00000000  00000000  42784CCC  427F6666  42829999  42878000
```

FP-6530

```
00359BFF  C16820E8  C78CBA9F  C62F18A0  494DF43D  46280E0F  9F5DE940  45D16174  11050BE6  4162A70C
93A28189  C15678A1  ED72AF7A  C11B6CCA  E837CDE0  C6C9A748  9FDF675F  C72F0CBD  8E69ACEF  C1E3B574
13C0F000  42FFEF5B  C130C197  42EB3F52  C15F8DDA  42EFC576  C135FBA3  4274A2D3  412591D4  429E15BC
422FF951  4210FDEA  424FFD4F  419A33EC  41F80CA4  42CF4631  C130C197  4221A929  429A577B  4295A772
00000781  00000786  0000001F  00000017  00000037  0000000F  00000277  0000B3E0  4259C33E  4312BF33
425A1F80  421DF316  4043C166  425D4BB1  C09BDD03  C03DBC2C  C0C178D1  406840FC  40B8F8FF  CC8F02E5
40AE47D6  C0A5DC6A  CC577A5E
```

RECORD 2483 OF FILE 2
LENGTH = 8740 BYTES

```
22240000  0B6C0000  000007B6  00000001D  0522A93E  0000B3E1  0F40FA00  00000000  00000000  00000000
00000000  00000000  00000000  00000000  00000000  00000000  40404040  40404040  40404040  40404040
00000000  00000000  00000000  00000000  00000000  0000FFFF  00000000  4169692D  4168F423  C14F366C
43150D48  416020E4  C1252402  C090EB92  404A214A  405C9EE0  4068A38C  00000007  416824DC  41E7EDD0
416A5940  416A1F0C  416ABD6C  4168D696  416B1219  4168178C  4167989E  416A3BD1  4169F091  416A976C
41686766  416B050D  C1C21F9E  C17E716D  C14F9FFE  C12932F5  C13F4171  C1306BFA  C03D11A9  431499A7
4314C29C  4315379D  43154C07  431F2AF9  43150807  43153F57  4157C753  415ABCFC  41631D90  4163EAA9
41631086  415FBF80  416489DC  C1337E00  C12FEA4B  C1251AEB  C122E392  C126A6DA  C12941B5  C124ACBB
C115E097  C0E3E59C  C093730C  C04C26BC  C07595F6  C0583159  BF721139  40228B79  4014D18B  40258BD1
403595FC  402E8DC5  4C714B0A  40120B39  4030A6FC  403ED637  4023353A  4026D587  4058C113  40147BAD
4034FA72  4046D97B  40324869  407DDCB2  404B3870  401B6844  401F9008  40239FCA  00000005  00000005
00000005  00000005  00000005  00000005  00000005  41679EAA  4169DCB0  4168B2B0  4166EFE0  41678477
41680159  4166D3FC  4167D79C  4167B48D  41697C63  416C6848  416ABAB5  4168A618  416A56BE  4169E19D
41684314  416868A3  4169E1FE  416BBA87  416C8B01  416B5BFC  416BD4AD  4169D595  416A458E  416A9D04
4168D9D2  4168AAD5  4167915C  41688BBB  416AEDAE  416A91AC  416C246E  4168E63B  416BBF7B  4169BE0D
41679B1C  4169D82F  4168AF73  4166EC4F  4167AC6B  4167F8E3  4166C436  4167C8C4  4167A653  41697BFB
416C55B6  416AB799  4168S704  416A4C3D  4169CDDC  416830E6  41685E3F  4169D93F  416BB877  416C7A8D
416B566B  416BD0E2  4169CAFC  416A2A24  416A96C5  4168D042  41688189  41677F0A  41687E00  416AE245
416A988D  416C2076  416B6281  416BBCDD  41698250  C1B4B27B  C1A7C525  C1C827B7  C1EA23A3  C1BC6BBE
C186D13C  C1CFB99A  C18C814D  C14FE381  C122D025  C150557A  C16ED211  C1413A3C  C117B728  C175AEB2
C185EC92  C12D1DE4  403AF5D3  C0688DE9  C11AA755  C13BEDFE  C1193A12  C11D5AC9  C146478B  C1839A81
C1723E8F  C1334530  C08AE902  C069C35C  C13BB5B8  C12334C9  C0421A42  C0923630  406836A7  411716BF
431486D2  4314AA96  4314B07F  431481BC  431498D  4314AB3A  431492F2  4314B2CD  4314E79F  4314F1BA
431519DD  431545FF  4315245C  43152FF0  431562AE  43156372  4315388D  43152AB9  43155F5A  431555CB
4315302E  43151FC2  431510AA  43151530  431562BC  43158F84  43151649  4314E1B4  4314B312  4314FD66
431530CB  43154B38  43154A8D  43155777  43151DCC  41568CC9  415ABA70  415969B4  41548D5A  4157A67A
4158F029  4155FF82  415A0889  415D2DCC  415F9B06  4163C9C4  4163C8C1  4160E9DF  41633300  4163E47F
41622782  4161A993  41629BF3  41666C1B  4166BF15  41640076  4163DF6B  4161SCE5  4161ABA9  41646A43
4164715A  41605341  415D1A10  415B8FD0  41615010  416379BE  41660CCA  41655107  416625D4  4161B337
C13530E1  C132FE72  C1317FD0  C1349C86  C1332A65  C131DEFA  C1334F2E  C1318BFF  C12C7DAC  C12C5CB9
C1291880  C12394E0  C1269FC6  C1261B23  C1202252  C11F7C2C  C124727D  C12680 1C  C1215BD0  C122A749
C1265D44  C1288217  C1293EB0  C128CEC9  C1205572  C11AF853  C1281C34  C12D31DA  C13259D0  C12BA85C
C1261609  C123BC17  C1238FE8  C1223E84  C127BF1F  C1144999  C1134335  C116ACE4  C11A0099  C1152BAB
C11498E7  C117165F  C0E80276  C09C7367  C04011ED  C0978376  C0CDE88C  C076F7E8  C02BFE3E  C0DBAD37
C0F2AC28  C052266C  3F6CEC70  BFC491A0  C03274E0  C0703123  C02F76E6  C0363132  C082184D  C0F3FC5D
C0D0738A  C05D7786  BFEAEAB0  BFC0E1D0  C06E4E01  C0417BB7  BF7CBF10  C0112073  3FC3F590  402A8360
3FFA80D9  40163504  3FF65087  401227B4  401495 6D  4010E257  40136B1D  3FD52AAA  4011918E  3FF2422B
3FFCA72F  3FB8F259  401CDC7C  3FD54113  401DBEAF  40155C6F  4020C4BD  40148502  401EE741  402BD697
4016F330  402B4F46  3FD03F6D  4022F307  40246598  40279CAE  3FD4B9B0  401B3105  4013C0C7  4010C323
4016D856  403A7A6F  3FF038B3  40153928  401212D1  40103384  3FF3A320  4032B0E3  4017CEFE  40114C0C
4029DF2D  4015537A  3FFB2A54  403DC286  401 0E677  4012D292  403A7203  3F9E25C7  3FC086A1  402CA38F
3FBE9D64  4016B478  402C11FC  401488BC  3FF93FAA  3FD60DC0  3FD2E07E  402C5F90  4025BC0D  4012AEDC
401064F7  401B78CF  40164B5C  3FDBEAFC  401A32F9  3FBA8938  40144305  40253CFF  40193D68  3FEAC1A8
404AA531  3FE63739  40127AFC  402C5929  3FB8A1CB  401D3500  401A2246  401EDCA0  4027C58C  4C54E3D1
3FF7CE4F  40228C0C  402EB5DE  40178E02  40152DA7  402F63F9  4012227B  40124BA0  402BCB6F  4C14A93C
401C66A7  3FF95A9A  401C7F67  40159443  4010A77B  3FEDF4F3  3FD6FF69  401595C5  40156B50  3FE504CE
40115SC3  4014C006  40121ADB  401A4AD4  401 0EDD2  00000018  0000001F  0000001E  0000001E  0CC00C1E
0000001F  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0C000C1E
0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0C000C1E
0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0000001E  0CC00C1B
0000000E  40B76FDB  40BC8E6D  40A84A2A  40AE9CD4  40B65663  40BE8822  40B3C610  40BD7E6B  4CC5C2D9
40C4E91C  40C08BBE  40BCEC2D  40BC4848  40C3ED0E  C0982A2E  C09A7E15  C09B0BD9  C09A4730  C0S46CD5
C0970A3A  C09D027A  C09CFFA3  C0967330  C095A4B5  C09AF3FA  C098C172  C0992C56  C096C4E3  41145606
4114D9D8  41158EE3  4115B010  41152700  4115D626  4115A6F0  41154213  4114D2C8  4115914C  4115DA3F
41158D91  411567BF  411558A8  3F2493E0  3FF9F810  40FF8338  C0C2A542  40A6112B  BF8699B0  CCA643AD
C0C2332F  3FD5C952  40BED1A1  8B9F694C  C0ABBFEB  5728F1F6  40528758  5A3370D5  BFA24D45  9825A7D7
00000000  00000000  00000000  00000000  00000000  00000000  482D4C47  3D0EDC13  000007B6  00000C1E
00000017  00000030  000C0000  0000003A  C5D36BD8  98748D9C  C576C76F  62F8940F  471060A5  D73D5920
C71FB1AF  A99F53A7  466C00FF  DFF5A96E  414595FB  5E55B756  C1AD1FA0  C04EE01C  C0A0ABC7  FAA0BFF3
C771A376  7B62B17B  C75CA179  9B60E01E  C66E9E10  693EA312  42A868A6  7A8E6EAB  C2234730  B1CCE489
4028AB25  FFDFC8A5  462S3768  836B1D4C  C62DDD9D  8F9DCCA0  459DAC61  C1B00B1  C15813F2  2788CF70
4162E9BF  D4C6B9E8  C1147FBA  8B7C7625  478C8E29  23A45D2E  47667F48  CF4DEE61  4730B564  DB2F4140
4724 2D30  6S5B161A  478B3503  69C6FD22  463E724F  99F822DC  476A57CE  3CCC741B  41583359  429E15BC
4210670F  415341FD  4276B19F  42A9FF3F  4210FDEA  405D81A7  4227A505  419A33EC  427B5D0F  C73EB6A0
```