#320

IMP-J

TRI-AXIS MAGNETOMETER

15 SEC. B. VECTORS

73-078A-01A

Table of Contents

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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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

REQ. AGENT

CMW

ACQ. AGENT

JHK

IMP-J

TRI-AXIS MAGNETOMETER

15 SECOND MAGNETIC FIELD VECTORS

73-078A-01A

SPHE-00513

Nine additional tapes were added to this data set. The tapes are 9 track, 6250 bpi, created on an IBM 370. Copied electronically/reblocked 100-1. D and C numbers and time span are as follows:

D#	C#	FILES	TIME SPAN
D-108047	C-031771	6	07/18/91 - 12/31/91
D-108048	C-031772	6	01/03/92 - 07/02/92
D-108049	C-031773	6	07/03/92 - 12/02/92
D-108050	C-031774	6	01/02/93 - 07/01/93
D-108051	C-031775	6	07/02/93 - 01/03/94
D-108052	C-031776	5	01/02/94 - 05/31/94
D-108053	C-031777	5	06/01/94 - 11/01/94
D-108383	C-032452	5	11/01/94 - 03/31/95
D-108384	C-032453	3	04/01/95 - 07/01/95
D-108778	C-032875	4	01/01/96 - 04/30/96
D-108779	C-032876	3	05/01/96 - 07/31/96

REQ. AGENT	ACQ. AGENT
CMW	JHK

IMP-J

TRI-AXIS MAGNETOMETER

15 SECOND MAGNETIC FIELD VECTORS

73-078A-01A

This data set consists of 50 tapes compressed from 131 originals created on an IBM 370. The tapes are binary, 6250 bpi, 9 track, with on file per tape. They are VBS with a Blocksize of 16564 and a logical record size of 276. All but the tape (D086215) is uniform length (9090 blocks; the last block containing 18 logical records). The 'D' and 'C' numbers and time spans follow:

D#	C#	FILES	TIME SPAN
DD 074731	DC 026285	1	10/30/73 - 02/14/74
DD 074732	DC 026286	1	02/14/74 - 05/30/74
DD 074733	DC 026287	1	05/30/74 - 09/12/74
DD 074734	DC 026288	1	09/12/74 - 12/27/74
DD 074735	DC 026289	1	12/27/74 - 04/17/75
DD 074736	DC 026290	1	04/17/75 - 08/09/75
DD 074737	DC 026291	1	08/09/75 - 12/20/75
DD 074738	DC 026292	1	12/20/75 - 04/23/76
DD 074739	DC 026293	1	04/23/76 - 08/21/76
DD 074740	DC 026294	1	08/21/76 - 12/17/76
DD 074741	DC 026295	1	12/17/76 - 04/14/77
DD 074742	DC 026296	1	04/14/77 - 08/08/77
DD 074743	DC 026297	1	08/08/77 - 12/07/77
DD 074744	DC 026298	1	12/07/77 - 04/25/78
DD 074745	DC 026299	1	04/25/78 - 10/03/78
DD 074746	DC 026300	1	10/03/78 - 02/26/79
DD 074747	DC 026301	1	02/26/79 - 07/14/79
DD 074748	DC 026302	1	07/14/79 - 12/08/79
DD 074749	DC 026303	1	01/01/80 - 06/04/80
DD 074750	DC 026304	1	06/04/80 - 10/04/80
DD 074751	DC 026305	1	10/04/80 - 04/10/81
DD 074752	DC 026306	1	04/10/81 - 10/09/81
DD 074753	DC 026307	1	10/09/81 - 07/10/82
DD 074754	DC 026308	1	07/10/82 - 02/08/83
DD 074755	DC 026309	1	02/08/83 - 09/15/83
DD 074756	DC 026310	1	09/15/83 - 02/25/84
DD 074757	DC 026311	1	02/25/84 - 12/14/84
DD 074758	DC 026312	1	12/14/84 - 07/28/85
DD 074759	DC 026313	1	07/28/85 - 02/07/86
DD 074760	DC 026314	1	02/07/86 - 08/12/86

D#	C#	FILES	TIME SPAN
DD 074761	DC 026315	1	08/12/86 - 01/27/87
DD 078027	DC 026703	1	01/27/87 - 07/19/87
DD 078788	DC 026817	1	07/19/87 - 12/27/87
DD 078789	DC 026818	1	12/27/87 - 05/30/88
DD 079060	DC 026872	1	05/30/88 - 11/07/88
DD 079727	DC 027221	1	11/07/88 - 04/09/89
DD 080587	DC 027785	1	04/09/89 - 08/29/89
DD 080588	DC 027786	1	08/29/89 - 12/31/89
DD 083160	DC 028051	1	02/19/90 - 04/10/90
DD 083161	DC 028052	1	01/01/90 - 02/19/90
DD 083162	DC 028053	1	04/10/90 - 05/30/90
DD 083163	DC 028054	1	05/28/90 - 07/17/90
DD 083164	DC 028055	1	07/18/90 - 09/06/90
DD 084069	DC 028243	1	09/06/90 - 10/26/90
DD 084070	DC 028244	1	10/26/90 - 12/14/90
DD 084071	DC 028245	1	12/14/90 - 12/31/90
DD 084072	DC 028246	1	01/01/91 - 02/19/91
DD 084073	DC 028247	1	02/19/91 - 04/10/91
DD 084074	DC 028248	1	04/11/91 - 05/31/91
DD 086215	DC 029236	1	06/01/91 - 07/21/91

The data contained on these 23 tapes were downloaded from LEPVAX and blocked 100 logical records/physical record. D and C numbers and time spans are as follows:

D#	C#	FILES	TIME SPAN
DD 108047	DC 031771	6	07/18/91 - 12/31/91
DD 108048	DC 031772	6	01/03/92 - 07/02/92
DD 108049	DC 031773	6	07/03/92 - 12/02/92
DD 108050	DC 031774	6	01/02/93 - 07/01/93
DD 108051	DC 031775	6	07/02/93 - 01/03/94
DD 108052	DC 031776	5	01/01/94 - 05/31/94
DD 108053	DC 031777	5	06/01/94 - 11/01/94
DD 108358	DC 032393	1	12/08/79 - 01/01/80
DD 108383	DC 032452	5	11/01/94 - 03/31/95
DD 108384	DC 032453	3	04/01/95 - 07/01/95
DD 108778	DC 032875	4	01/01/96 - 04/30/96
DD 108779	DC 032876	3	05/01/96 - 07/31/96
DD 108850	DC 032896	4	08/01/96 - 11/30/96
DD 108851	DC 032897	5	12/01/96 - 04/30/97
DD 108930	DC 032975	5	05/01/97 - 10/01/97
DD 108965	DC 032981	4	09/30/97 - 01/31/98
DD 109016	DC 033016	5	02/01/98 - 06/30/98
DD 109078	DC 033062	4	07/01/98 - 10/31/98
DD 109097	DC 033081	4	11/01/98 - 02/28/99
DD 109098	DC 033082	4	03/01/99 - 06/30/99
DD 109102	DC 033099	4	07/01/99 - 10/31/99
DD 109133	DC 033111	6	11/01/99 - 04/30/00
DD 109275	DC 033153	2	05/02/00 - 06/11/00

REQ AGENT	RAND NO	ACQ AGENT
MLR WTJ	RC3700 RC8116	JHK
CAW VJP	RC5364 RC1473	
RSH SAR	RC7808 V0323	
DHG		

IMP-J
TRI-AXIS MAGNETOMETER
15 SECOND MAGNETIC FIELD VECTORS
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D-74734	C-26288	1	09/12/74 - 12/27/74
D-74735	C-26289	1	12/27/74 - 04/17/75
D-74736	C-26290	1	04/17/75 - 08/09/75
D-74737	C-26291	1	08/09/75 - 12/20/75
D-74738	C-26292	1	12/20/75 - 04/23/76
D-74739	C-26293	1	04/23/76 - 08/21/76
D-74740	C-26294	1	08/21/76 - 12/17/76
D-74741	C-26295	1	12/17/76 - 04/14/77
D-74742	C-26296	1	04/14/77 - 08/08/77
D-74743	C-26297	1	08/08/77 - 12/07/77
D-74744	C-26298	1	12/07/77 - 04/25/78
D-74745	C-26299	1	04/25/77 - 10/03/78
D-74746	C-26300	1	10/03/78 - 02/26/79

D-074747	C-026301	1	02/26/79 - 07/14/79
D-074748	C-026302	1	07/14/79 - 12/08/79
D-108358	C-032393	1	12/08/79 - 01/01/80
D-074749	C-026303	1	01/01/80 - 06/04/80
D-074750	C-026304	1	06/04/80 - 10/04/80
D-074751	C-026305	1	10/04/80 - 04/10/81
D-074752	C-026306	1	04/10/81 - 10/09/81
D-074753	C-026307	1	10/09/81 - 07/10/82
D-074754	C-026308	1	07/10/82 - 02/08/83
D-074755	C-026309	1	02/08/83 - 09/15/83
D-074756	C-026310	1	09/15/83 - 02/25/84
D-074757	C-026311	1	02/25/84 - 12/14/84
D-074758	C-026312	1	12/14/84 - 07/28/85
D-074759	C-026313	1	07/28/85 - 02/07/86
D-074760	C-026314	1	02/07/86 - 08/12/86
D-074761	C-026315	1	08/12/86 - 01/27/87
D-078027	C-026703	1	01/27/87 - 07/17/87*
D-078788	C-026817	1	07/19/87 - 12/27/87*
D-078789	C-026818	1	12/27/87 - 05/30/88*
D-079060	C-026872	1	05/30/88 - 11/07/88*
D-079727	C-027221	1	11/07/88 - 04/09/89*
D-080587	C-027785	1	04/09/89 - 08/29/89*
D-080588	C-027786	1	08/29/89 - 12/31/89*
D-083161	C-028052	1	01/01/90 - 02/19/90
D-083160	C-028051	1	02/19/90 - 04/10/90
D-083162	C-028053	1	04/10/90 - 05/30/90
D-083163	C-028054	1	05/28/90 - 07/17/90
D-083164	C-028055	1	07/18/90 - 09/06/90
D-084069	C-028243	1	09/06/90 - 10/26/90

D-84070	C-28244	1	10/26/90 - 12/14/90
D-84071	C-28245	1	12/14/90 - 12/31/90
D-84072	C-28246	1	01/01/91 - 02/19/91
D-84073	C-28247	1	02/19/91 - 04/10/91
D-84074	C-28248	1	04/11/91 - 05/31/91
D-86215	C-29236	1	06/01/91 - 07/21/91

MEMO

Date: June 8, 1993

To: Users of IMP-8 magnetic field data

From: Ron Lepping/IMP-8 Magnetometer PI, NASA-GSFC, Code 695, SPAN address LEPVAX::U5RPL, phone: (301) 286 5413

Re: IMP-8 magnetic field data: Notification of day-count designation change

As all or most of you know, our IMP-8 magnetic field data since launch has been labeled according to a Decimal Day scheme, where Jan 1 = Decimal Day 0, instead of the more common Day-of-Year (DOY) scheme, where Jan 1 = DOY 1. Since our data have been, and are being, processed within the International Solar-Terrestrial Physics (ISTP) program since late 1992 as so-called Key Parameters where the DOY designation is used, we will now convert our in-house processed data (i.e., on LEPVAX/GSFC) to a DOY time base, starting for that data occurring at the first instant of year 1992. Obviously, we wish to avoid the uncomfortable position of having two identical magnetic field data sets possessing two different day-count designations, arising because of the two different sources. All future data products (tapes, electronic-mail files, paper plots, etc.) will reflect this change. And as soon as we are able to make the modification, most of these products will also contain Month and Day-of-Month with the hope that the chance of future day-count errors is reduced by this redundancy. If we should reprocess any data for periods earlier than the first instant of 1992, for any reason, we will retain the Decimal Day designation for such data.

We are sorry for any inconvenience that this may cause you or your teams. As Joe King (IMP-8 Project Scientist) commented recently, "Maybe we can say with pride, at the end of the IMP mission, that the magnetic field day-count change took place about half way through the mission!"

NSSDC will hold its IMP-8 MAG data in adherence to the Decimal Day and DOY conventions described above, with the 1/1/92 shift in conventions. Exception to this is OMNI where all data, IMP-8 MAG included, use DOY throughout. Joe King 6/24/94

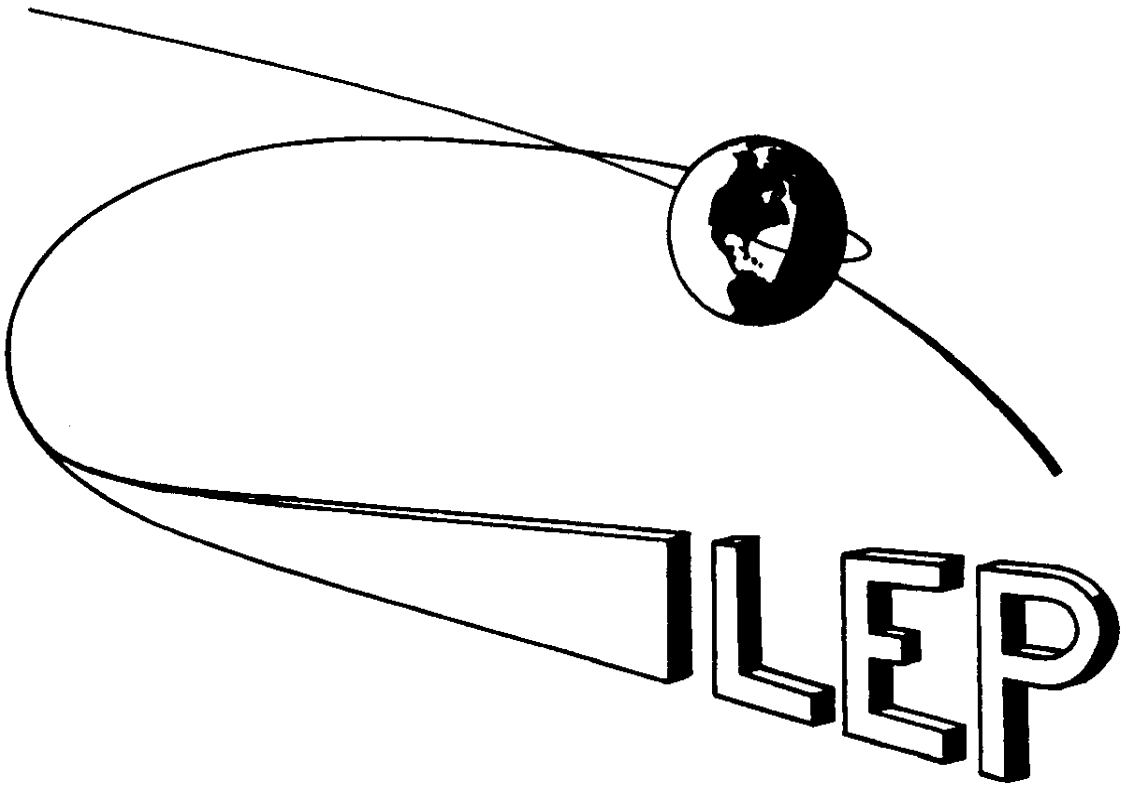
NASA

IMP-8 SOLAR WIND MAGNETIC FIELD AND PLASMA DATA IN SUPPORT OF ULYSSES - JUPITER ENCOUNTER: 13-31 JANUARY 1992

R. P. LEPPING, A. J. LAZARUS, L. J. MORIARTY, P. MILLIGAN,
R. S. KENNON, R. E. McGUIRE, AND W. H. MISH

DECEMBER 25,1992

LABORATORY FOR EXTRATERRESTRIAL PHYSICS



National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

APPENDIX A

The magnetic field experiment on the IMP-8 spacecraft (See Figure A-1) utilizes a tri-axial fluxgate [saturable inductor] magnetometer (see Ness, 1970). See Scearce et al. (1992) for a complete description of the experiment. The instrument originally had three, automatically determined, ranges, ±12 nT, ±36 nT, and ±108 nT, full scale. Because of a range-change circuit failure occurring in early July 1975, the experiment was commanded into a fixed ±36 nT range on July 11 at 1255:09 UT and has been in that range ever since. The measurements are A-to-D converted onboard, to an 8-bit resolution, yielding ±0.14 nT quantization sensitivity, which is larger than the intrinsic sensor noise level of 0.025 nT RMS. The data from the two-bit (per component) adaptive delta modulator, incorporated into the instrument, and applied to the intrinsic sample rate of 25 vectors/s, was never utilized, and hence the rate of the full (8-bit) vector words, which occur every 320 ms, represents the effective sample period of the instrument. The sampling rate is synchronized to the spacecraft clock; the basic spacecraft clock frequency is 6.4 kHz. The sensor unit is mounted on the end of a boom approximately 4 m from the center of the spacecraft.

Figures A-2 and A-3 show pictures of the magnetometer board and data processing unit, respectively, and a list of experiment specifications are provided in Table I. These units are mounted on the instrument shelf of the spacecraft, which is passively thermally controlled to the range of -30°C to 50°C. The sensor unit (on the boom) is also passively thermally controlled, but to a range of -50°C to 50°C. Figure A-4 shows the functional block diagram of the experiment. Originally planned magnetic field science objectives were listed by Ness (1966) and those objectives for the IMP-8 mission, as a whole, appear in a GSFC document entitled "Interplanetary Monitoring Platform, IMP-J."

TECHNICAL DESCRIPTION OF INSTRUMENT

FLUXGATE MAGNETOMETER

The fluxgate magnetometer is a tri-axial instrument developed and manufactured by Schonstedt Instrument Company (Figure A-2). All fluxgate magnetometers have in common a ferromagnetic core(s) which is excited by driving, or gating, a magnetic field generated by current in a coil which contains the core. The magnetic flux induced in the core by the gating field is modified by an external magnetic field which generates even

harmonics on the output winding whose amplitude depends on the magnitude of the external field.

The Heliflux sensor is a cross between a parallel and orthogonal gated core; see Schonstedt (1961). When the AC current is applied to the primary winding, the magnetizing field has components both parallel and transverse to the core strips. The entire core is cylindrically saturated by the gating field to minimize the remanent magnetization, or core memory. The secondary winding is wound around the core, perpendicular to the primary winding. Thus, the coupling between the gating field and core output is minimized by the physical orientation of the gating and output windings. (See Schonstedt, 1961, for detailed construction.)

The electronics unit is comprised of a single oscillator-driver, and a preamplifier, phase detector, voltage bias and output driver for each channel (Figure A-5). Since the output channels are the same, only one channel will be discussed. The oscillator generates an AC signal of 24 kHz which is power amplified and fed through the primary windings of the sensors to cyclically drive the magnetic cores of the sensors into saturation. The presence of an external magnetic field along the axis of the sensor results in the generation of even harmonics in the secondary winding of the sensor. The amplitude of the second-harmonic voltage is proportional to the magnitude of the magnetic field and the phase depends upon the direction of the magnetic field when the direction is reversed. The second-harmonic signal is amplified by a tuned amplifier. The tuned pre-amplifier is temperature compensated.

The excitation signal is doubled. This reference signal is then applied to the gate of an FET and it gates the amplified second harmonic signal. The gated signal is integrated to form the DC output. With no signal, the phase detector is set to 2.5 VDC. The DC output is isolated by a DC amplifier.

The sensitivity is controlled by the negative feedback, and the desired range is obtained by changing the feedback elements. The operating range is determined by 2 binary bits generated by two relays. The range is selected by range change commands generated in the Magnetometer Processor; 4 command lines are required (but see page A-1 [top]).

MAGNETOMETER PROCESSOR

The magnetometer processor in the magnetic field experiment (see Figure A-6) does the following:

1. Analog to Digital (A/D) conversion of the magnetic field signals.
2. Digital filtering of the magnetic field signals.
3. Delta modulation of the magnetic field signals. (This data stream was not used on-ground.)
4. Data multiplexing of the two processing systems, (one redundant), high and low bit rate data, and the combining of the absolute value words and delta modulation 2-bit words into a serial output bit stream.
5. Interfacing with the spacecraft data encoder.
6. Interfacing with the spacecraft for commands.
7. Automatic range switching, sensing, control and range relay drive.
8. Sensitivity calibration control and signal generation.
9. Mechanical flipper control and drive.
10. Monitoring of the engineering status.

The magnetometer processor is housed in a standard spacecraft wedge shaped unit 12-7/8 inches high (see Figure A-3). The processor electrical hardware is primarily low power TTL. The digital filter memory is dynamic MOS, where transistors are used for driving circuits. Monolithic integrated circuit operational amplifiers and field effect transistors are used in the A/D converters.

ANALOG TO DIGITAL CONVERTERS

Sampling of the data is done every forty milliseconds in synchronism with an encoder furnished signal. The data is stored in a sample-and-hold circuit until the internal timing of the magnetometer processor is ready to commence its sample cycle. All three axes are sampled simultaneously.

The analog to digital conversion is done by a double ramp (RC charge-discharge) A/D converter. The converter works by charging the RC circuit with the voltage to be

measured during a precise time period, discharging the circuit into a negative reference voltage, and then measuring the discharge time with a crystal controlled clock. Most component induced errors are canceled out due to charge and discharge of the same RC components.

There are three sample-and-hold circuits and three A/D converters (one per axis) per system. For the total of two systems there are six sample-and-hold circuits and A/D converters. The three A/D converters per system have been used to provide redundancy so that the system is not lost in the case of a single converter failure.

SYSTEM REDUNDANCY

Redundancy has been built into the processor and encoder to circumvent failures and/or minimize their impact. There are two main data handling systems (A or B) in the processor. Each system has a digital filter, a delta modulator, range sensing logic, and sets of A/D converters. A double set of encoders has also been provided in the spacecraft, and either of the two processor systems can work with either of the two encoder systems, so that proper operation can occur with any combination of failures of one processor system and/or one encoder system. Three A/D converters per system have been provided, for a total of 6 in the processor, in order to reduce the data loss if one A/D converter is lost.

RANGE SWITCHING LOGIC

The description of the range switching scheme and supporting electronics is described by Scearce et al., 1992. Since the instrument was commanded into the fixed ±36 nT range, as mentioned above, we do not discuss it further here.

OUTPUT MULTIPLEXER

The output multiplexer performs three basic functions:

1. Mixing of the X, Y, and Z absolute data words and delta modulation 2-bit words into a serial bit stream.
2. Selection of system A or system B data.
3. Selecting the proper number of samples for high and low bit rates.

All of these functions are performed for both the data, and for the clocks for the data.

TIMING

There are three timing standards for the experiment. Two are derived from crystal controlled clocks and the other is derived from the encoder timing signals. There are two separate and identical crystal controlled timing units, one per system (A or B). The experiment sampling is done in synchronism with a 40 millisecond encoder signal. The internal data processing within the experiment is done in synchronism with the crystal clocks.

Because the memory for the digital filter is dynamic, it is kept running all of the time. After sampling is done and the data stored in a sample-and-hold circuit, processing and A/D conversion of the data are held up until the MOS memory is in the proper position with respect to the processing timing. The data processing sequence is divided into 8 equal time periods and one variable time period. Period 0 is the variable time period between the time when the sample-and-hold takes the data and the time that the MOS memory is in its desired starting state. During periods 1 and 2 the previous sample of X-axis data is processed in the digital filter. In time period 2 the A/D charge takes place. The A/D discharge (for all axes) takes place during time periods 3, 4, 5, and 6. In time period 3 the X-axis data which has been processed by the digital filter is processed by the delta modulator. During time periods 3 and 4 the Y-axis data is processed by the digital filter; this data is also from the previous sample time. In time period 5 the filtered Y-axis data is processed in the delta modulator. In time period 7 the Z-axis data from the previous sample is processed by the delta modulator. In time period 8 of every eighth sample period the Z-axis is separately processed for both high and low bit rates.

REFERENCES

Interplanetary Monitoring Platform, IMP-J, NASA/GSFC publication.

Mish, W. H., and R. P. Lepping, Magnetic field experiment data processing systems: Explorers 47 and 50, NASA/GSFC, X-694-76-158, August 1976.

Ness, N. F., A proposal for the magnetic field experiment for IMPs H and J, NASA/GSFC, X-612-66-461, September 1966.

Ness, N. F., Magnetometers for space research, Space Sci. Rev., 11, 111-222, 1970.

Scearce, C. S., C. V. Moyer, R. P. Lepping, and N. F. Ness, GSFC magnetic field experiments, Explorers 47 and 50, NASA/GSFC, X-695-76-191, October 1976. Modification in preparation, 1992.

Schonstedt, E. O., Saturable measuring device and magnetic core therefor, U.S. Patent 2916696 (December 1959) and U.S. Patent 2981885 (April 1961).

Smith, B. D., Ulysses spacecraft travels toward sun after completing Jupiter observations, Aviation Week and Space Technology (p. 65), February 17, 1992.

Tsurutani, B., Results for Ulysses' Jupiter flyby, EOS, Transactions of AGU, 73, p. 114, March 17, 1992.

APPENDIX

TABLES

FIGURES

TABLE I

MAGNETIC FIELD EXPERIMENT SPECIFICATIONS

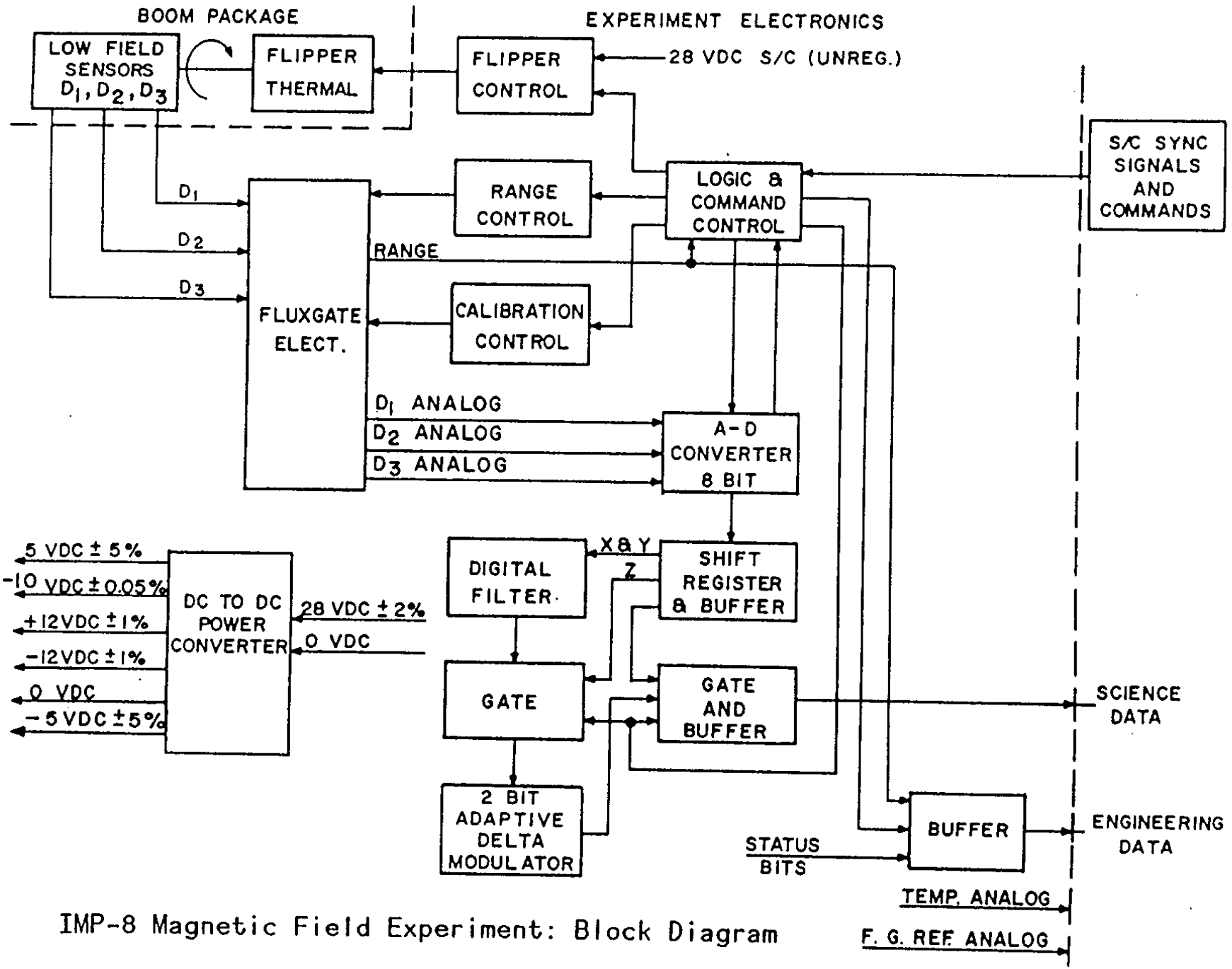
Weight	
Electronics	5.5 lb
Sensor	1.25 lb
Power	
Electronics	5 W
Thermally oscillating Actuator (10 min every 46 hours)	5 W
Thermal Calibration	
Electronics	-40°C to +60°C
Sensor	-75°C to +75°C
Zero drift/year	±1 nT
Linearity	±1%
Resolution (Sensitivity)	±0.05 nT

TABLE II

IMP-8 INITIAL SENSITIVITY CALIBRATION

Range*	Counts/nT		
	D1	D2	D3
±12 nT	10.1	10.2	10.0
±36 nT	3.39	3.37	3.34
±108	0.927	0.923	0.930

*Since July 11, 1975 the instrument has been fixed in the ±36 nT range (see text).



IMP-8 Magnetic Field Experiment: Block Diagram

FIGURE A-4

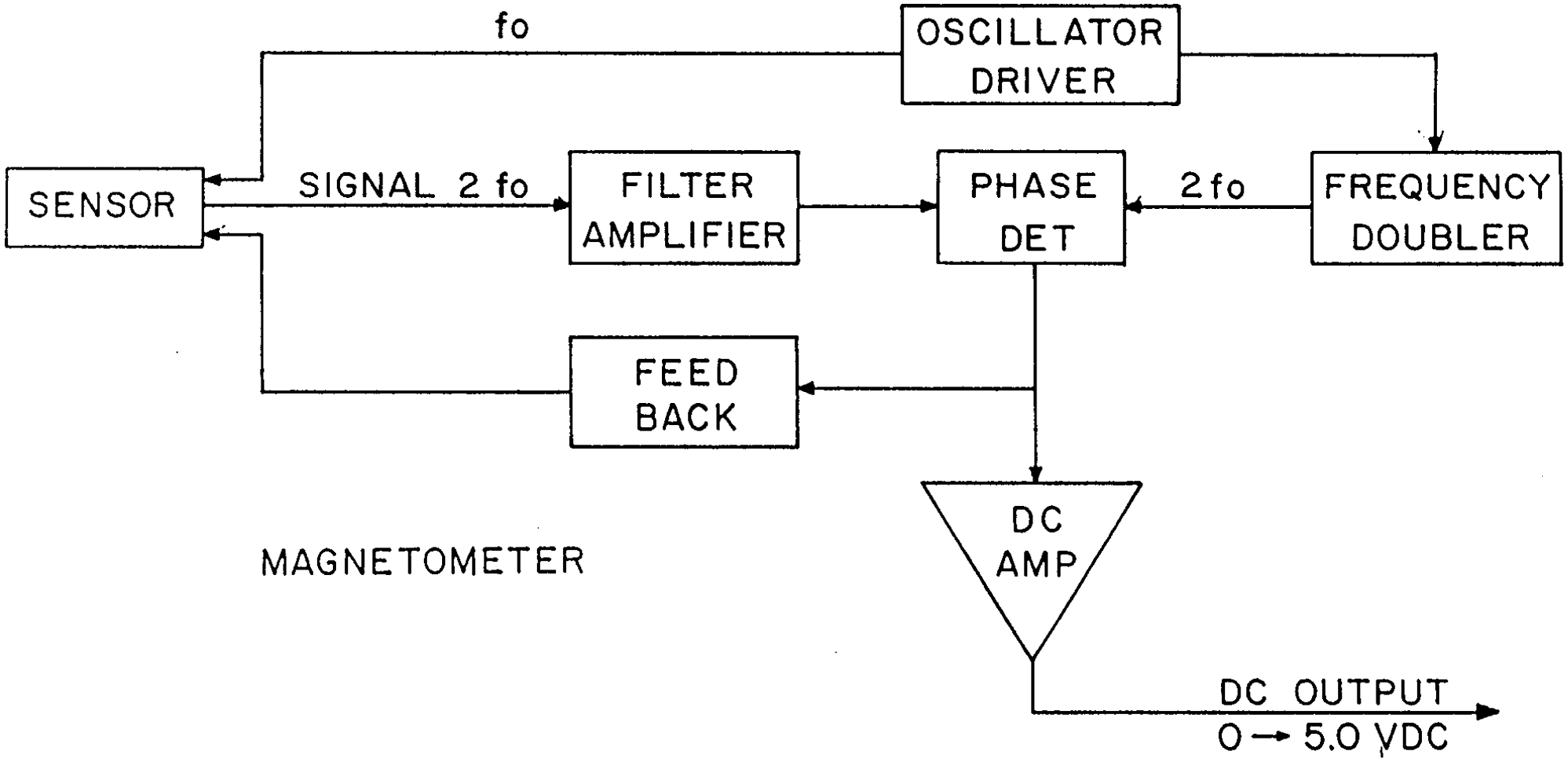
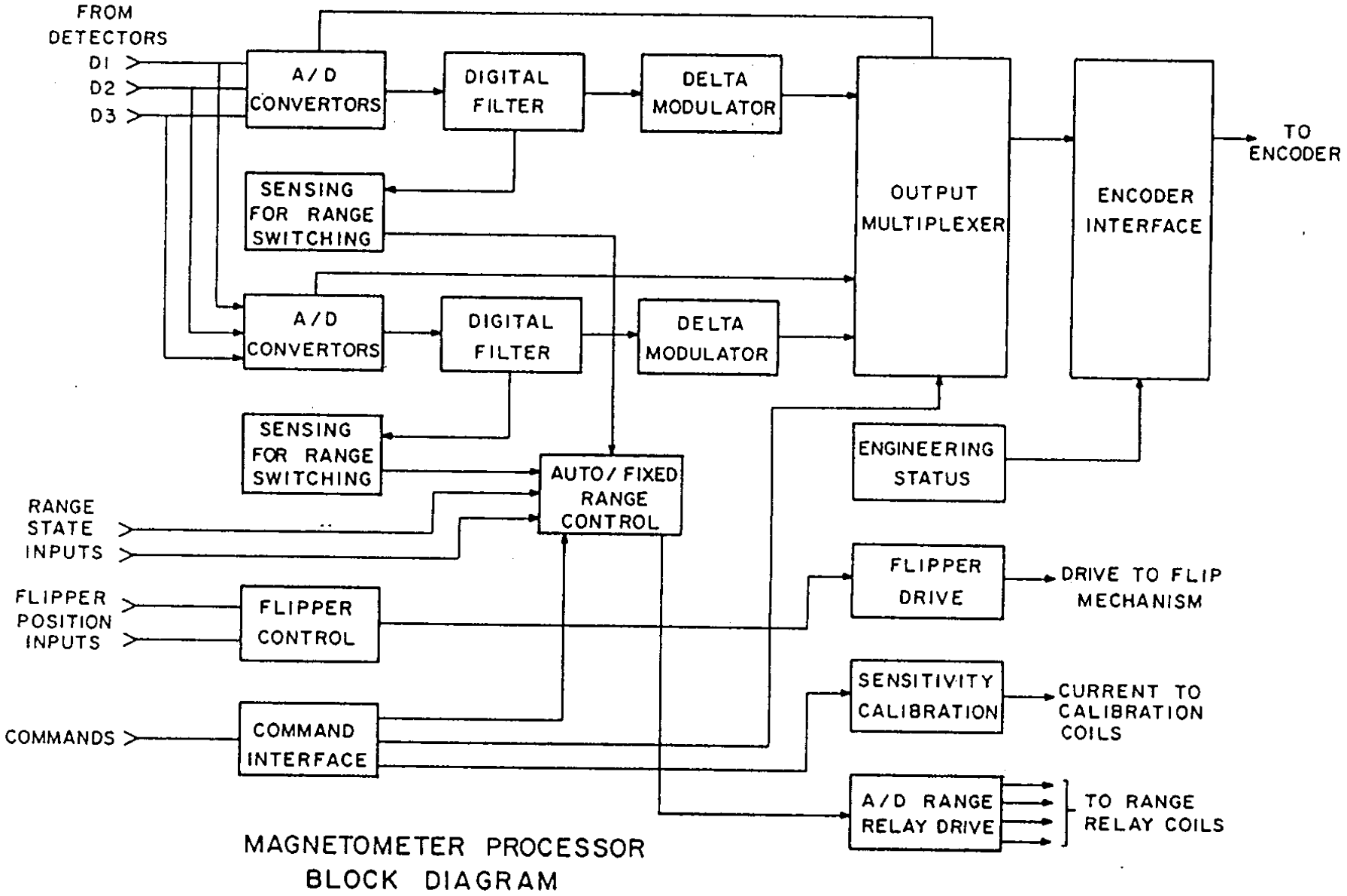


FIGURE A-5 Electronics Block Diagram



MAGNETOMETER PROCESSOR
BLOCK DIAGRAM

FIGURE A-6

September 22, 1982

Dear Colleague,

An error has been discovered in the IMP-J(8) magnetometer data for the period January 1, 1980 (hr 0) through May 23, 1980 (hr 17). This error is such that the y and z components of the magnetic field vector (GSE and GSM coordinates) have the wrong sign. The field angles derived therefrom are also incorrect: the field latitude angle has the wrong sign and the field longitude angle is best recomputed as $\tan^{-1}(B_y/B_x)$.

This error resulted from the confluence of two factors--the December 1973 180° flip of the spacecraft about the spacecraft-sun line and the fact that the tapes provided to IMP experimenters by the Information Processing Division at Goddard have one digit year identifiers. Magnetometer data taken through May 23, 1980 were processed in this laboratory before our software was changed to account for our being in 1980 and not 1970. Unfortunately, prior to that change, coordinate transformations appropriate to the pre-December 1973 spacecraft orientation were applied, resulting in erroneous signs for the field components normal to the spacecraft sun line.

This error affects both data tapes and plots at 15.36 sec resolution, a 5-min resolution tape, and also hourly averages which were folded onto the NSSDC Interplanetary medium composite tape (the "omnitape"). Corrected versions of all these data sets will be generated. In the event that someday you possess both the incorrect version and the corrected version, and you are not sure which is which, note the following. The incorrect data show for January 1, 1980, an increasingly positive field latitude from hour 4 into hour 21, when the latitude (and B_z) becomes negative. The correct data will show oppositely-signed behavior.

I want to thank Dr. Peter Bythrow of the Applied Physics Laboratory for bringing to my attention the possibility of a problem in the early 1980 IMP-J magnetometer data.

Sincerely yours,

Joseph H. King
Interplanetary Physics Branch
Laboratory for Extraterrestrial Physics

June, 1988: The 15-sec tapes held by NSSDC contain data corrected for the error discussed above. (JHK)

IMP H/J 15.36 STATISTICS TAPE PRODUCED BY PHASE II PROGRAM

This tape is written by the Phase II program using the following DD card.

```
          IMPJ.SUMMARY
//FT20F001 DD DSN=IMPH.SUMMARY,LABEL=(1,SL,,OUT),
// DISP=(SHR,KEEP),DCB=(RECFM=VBS,BLKSIZE=16564,
// LRECL=276,DEN=3)
```

ITEM	DESCRIPTION	(TYPE)(SIZE)	UNITS	NOTES
1*	Year	I*4		Last two digits only
2*	Day	I*4	Days	Jan 1 = 0
3*	Milliseconds of day	I*4	Millisec	Elapsed Millisec in day
4*	Data Quality Flag	I*4		
5*	Orbit Number	I*4		
6*	Bit Rate Flag	I*4		
7*	Pseudo Sequence Count	I*4		
8*	Fill = Zero (0)	I*4		
9*	Housekeeping Data	I*4		See Footnote (1)
10	Field Magnitude (F1) (Average over 15.36 sec.)	F6.1	γ	$F1 = \frac{1}{n}\sum_{}^{n} F_i$ where F_i is computed by PAYSTA subroutine over 1.28 seconds.
11	Field Magnitude (F2) (Average over 15.36 sec.)	R*4	γ	See Footnote (2)
12	Field Latitude (or inclination θ)(Average over 15.36 sec.)	R*4	Degrees	$-90° \leq \theta \leq +90°$ (Footnote 4)
13	Field Longitude (or azimuthal angle) ϕ (Average over 15.36 sec.)	R*4	Degrees	$0° \leq \phi \leq 360°$ (Footnote 4)

---

* Items 1 thru 9 are for the last sequence included in the 15.36 second statistical computation.

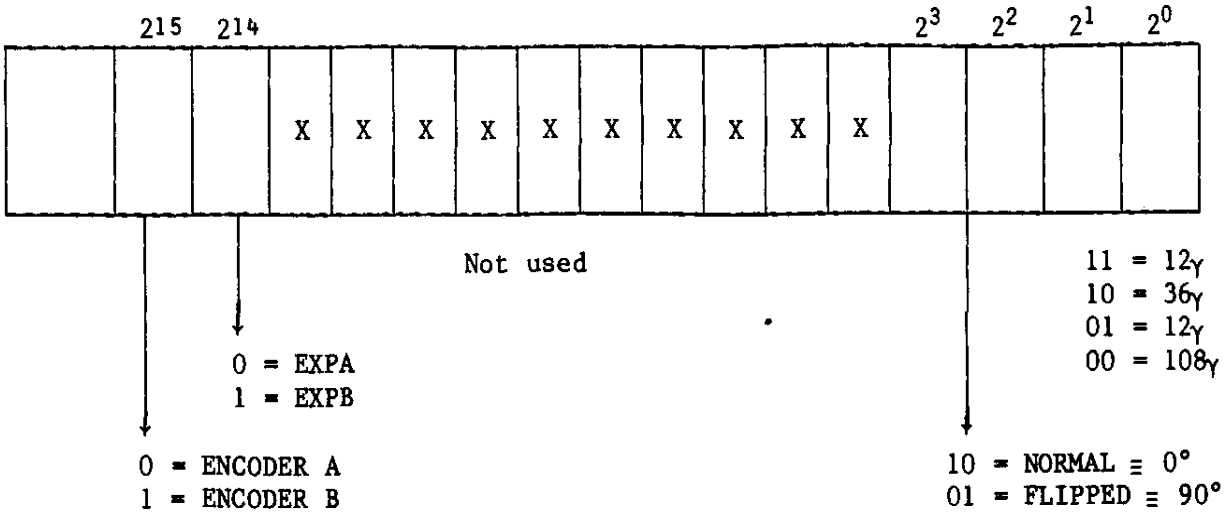
ITEM	DESCRIPTION	(TYPE)(SIZE)	UNITS	NOTES
14	Variance XX from averages	R*4	γ^2	Variance Matrix over 15.36 sec
15	Variance YY from averages	R*4	γ^2	$\begin{vmatrix} V_{XX} & -- & -- \\ V_{YX} & V_{YY} & -- \\ V_{ZX} & V_{ZY} & V_{ZZ} \end{vmatrix}$
16	Variance ZZ from averages	R*4	γ^2	
17	Variance YX from averages	R*4	γ^2	
18	Variance ZX from averages	R*4	γ^2	See footnote (3)
19	Variance ZY from averages	R*4	γ^2	
20	N	I*4		Number of sequences over which statistics were computed. N_{max} = 384
21	ND	I*4		Number of detail points over which statistics were computed. ND_{max} = 384
22	Trajectory (Day)	I*4	Day	January 1 = 0
23	Trajectory (millisec of day)	I*4	Millisec	
24	Geomagnetic Latitude of S/C	R*4	Degrees	
25	Geomagnetic Longitude of S/C	R*4	Degrees	
26	X Geocentric SE position of S/C	R*4	Kilometers	
27	Y Geocentric SE position of S/C	R*4	Kilometers	
28	Z Geocentric SE position of S/C	R*4	Kilometers	
29	Radial Distance	R*4	Kilometers	

ITEM	DESCRIPTION	(TYPE)(SIZE)	UNITS	NOTES
30	Y Solar Magnetospheric position of S/C	R*4	Kilometers	
31	Z Solar Magnetospheric position of S/C	R*4	Kilometers	
32	Geomagnetic Latitude of Sun	R*4	Degrees	
33	Geomagnetic Longitude of Sun	R*4	Degrees	
34	X Moon's Position in Geocentric SE	R*4	Kilometers	
35	Y Moon's Position in Geocentric SE	R*4	Kilometers	
36	Z Moon's Position in Geocentric SE	R*4	Kilometers	
37		R*4		Element given in following order:
38		R*4		1st row, 1st col.
39		R*4		1st row, 2nd col.
40	Items 37 thru 45	R*4		1st row, 3rd col. 2nd row, 1st col.
41	Rotation Matrix from SE to SM	R*4		2nd row, 2nd col. 2nd row, 3rd col.
42		R*4		3rd row, 1st col. 3rd row, 2nd col.
43		R*4		3rd row, 3rd col.
44		R*4		37 thru 45
45		R*4		
46		R*4		Same order for elements
47	Items 46 thru 54	R*4		
48	Rotation Matrix from CI to SE (CI=Celestial Inertial)	R*4		46 thru 54
49		R*4		
50		R*4		
51		R*4		

ITEM	DESCRIPTION	(TYPE)(SIZE)	UNITS	NOTES
52		R*4		
53		R*4		
54		R*4		
55	Fill = Zero (0)	R*4		
56	Fill = Zero (0)	R*4		
57	Angle of right ascension of spin vector of S/C in C.I.	R*4	Degrees	
58	Angle of declenation of spin vector of S/C in C.I.	R*4	Degrees	
59	Field latitude, θ_{SE}, in SE coordinates (Averaged over 15.36 sec)	R*4	Degrees	
60	Field latitude, θ_{SM}, in SM coordinates (Averaged over 15.36 sec)	R*4	Degrees	
61	Field longitude, ϕ_{SE}, in SE coordinates (Averaged over 15.36 sec)	R*4	Degrees	
62	Field Longitude, ϕ_{SM}, in SM coordinates (Averaged over 15.36 sec)	R*4	Degrees	
63	$B_{X_{SE}}$ Averaged over 15.36 sec	R*4	γ	
64	$B_{Y_{SE}}$ Averaged over 15.36 sec	R*4	γ	
65	$B_{Z_{SE}}$ Averaged over 15.36 sec	R*4	γ	
66	$B_{X_{SM}}$ Averaged over 15.36 sec	R*4	γ	
67	$B_{Y_{SM}}$ Averaged over 15.36 sec	R*4	γ	
68	$B_{Z_{SM}}$ Averaged over 15.36 sec	R*4	γ	

Footnotes

(1)



(2) $F2 = SQRT((\frac{1}{N}\sum_{i=1}^{N} X_i)^2 + (\frac{1}{N}\sum_{i=1}^{N} Y_i)^2 + (\frac{1}{N}\sum_{i=1}^{N} Z_i)^2)$ where X_i, Y_i, & Z_i are computed by PAYSTA subroutine over 1.28 seconds.

(3) e.g., $V_{XX} = (N\sum_{i=1}^{N} X_i^2 - \sum_{i=1}^{N} X_i \sum_{i=1}^{N} X_i)/N(N-1)$

and $V_{ZY} = (N\sum_{i=1}^{N} Z_iY_i - \sum_{i=1}^{N} Z_i \sum_{i=1}^{N} Y_i)/N(N-1)$, etc.

(4) The quasi-payload coordinate system is spacecraft centered with $\hat{X}_p$ toward the Sun, Z_p aligned with the spin axis and positive at or near North-SE (usually within 2°), and $\hat{X}_p \times \hat{Y}_p = \hat{Z}_p$.

```
**** TSO FOREGROUND HARDCOPY ****
DSNAME=W3HAL.HAL.FORT                                    (CNVIMPJ )

      DIMENSION IBUF(68),BUF(68)                                        00000020
      EQUIVALENCE(IBUF(1),BUF(1))                                       00000030
      NREC = 0                                                          00000040
      NRECW= 0                                                          00000050
    1 CONTINUE                                                          00000060
      NREC = NREC + 1                                                   00000070
      IF(MOD(NREC,1000).EQ.0)WRITE(6,5005)NREC,NRECW                    00000080
 5005 FORMAT(' READING RECORD#',2(1X,I6))                               00000090
      CALL FREAD(IBUF,8,LEN,&20,&10)                                    00000100
      GO TO 50                                                          00000110
   10 CONTINUE                                                          00000120
      WRITE(6,5100)NREC                                                 00000130
 5100 FORMAT(' ERROR DETECTED READING RECORD#',I6)                      00000140
      GO TO 1                                                           00000150
   20 CONTINUE                                                          00000160
      NREC = NREC - 1                                                   00000170
      WRITE(6,5200)NREC,NRECW                                           00000190
 5200 FORMAT(' END OF FILE DETECTED, RECORDS    READ=',I6,/,           00000200
     *       '                       RECORDS WRITTEN=',I6)            00000210
      CALL REWIND(8)                                                    00000220
      READ(5,5555,END=999)VOLSER                                        00000230
 5555 FORMAT(6A1)                                                       00000240
      WRITE(6,5556)VOLSER                                               00000250
 5556 FORMAT(' MOUNTING VOLSER ',6A1)                                   00000260
      CALL MOUNT(1,8,VOLSER)                                            00000270
      GO TO 1                                                           00000280
   50 CONTINUE                                                          00000290
      DO 60 I = 26,31                                                   00000300
      BUF(I) = BUF(I) / 6378.                                           00000310
   60 CONTINUE                                                          00000320
      WRITE(9,5000)(IBUF(I),I=1,9),(BUF(I),I=10,19),                    00000330
     *             (IBUF(I),I=20,23),(BUF(I),I=24,33),                00000340
     *             (BUF(I),I=37,68)                                   00000350
      NRECW = NRECW + 1                                                 00000351
     GO TO 1                                                            00000360
  999 CONTINUE                                                          00000370
      CALL LEAVE(9)                                                     00000380
      CALL REWIND(9)                                                    00000390
      STOP                                                              00000400
 5000 FORMAT(I2,I3,I8,I2,I4,I2,I9,I2,I6,4F6.1,6F7.2,                    00000410
     *       I2,2I3,I8,42F6.1)                                          00000420
      END                                                               00000430
```

From: NCFMRB::OPERATOR 19-DEC-1996 08:06:49.47
To: NCF::ALOPEZ
CC:
Subj: dd108778 hex listing

HEX DUMP OF DD108778

(0)	60000000	01000000	AE890100	02000000	9A020000	01000000	9F5CE424	00000000	66110000	4F42FBCF
(40)	4F425269	4A4390C8	8544C5E6	2340965D	0C3F3343	2B3F33A3	72BF7363	C83ECD72	88BC0000	05000000
(80)	A0000000	00000000	60EA0000	704304C7	A5417213	05C904F6	1E4908D0	0349EC7E	7549E4E1	E548A81A
(120)	2B49B46F	D5C270A6	D2C30A7D	69C968BC	9B49B4F8	59C72C49	80400000	00000000	00000000	00000000
(160)	7540724C	92BF967C	00000000	923F967C	7540724C	2F3FF41B	67C0C368	C8BF22B1	7C40AA3A	203FB0A7
(200)	8B3E6054	00000000	CBBF3AB1	6A406ADE	206A616E	01000000	8644B8FE	884332B3	4943D368	064372EE
(240)	8644FB26	86448159	7ABFBF98	04C2AB48	1F420BB4	7ABFBF98	2CC24072	E6412C5C	60000000	01000000
(280)	99C50100	00000000	9A020000	01000000	AB5CE424	00000000	66110000	44427633	43424B9A	47432BE6
(320)	1D44814C	A13FD8C2	54409A3D	EA3DE438	C7BF7707	293EB660	7BBEBCBB	0A000000	40010000	00000000
(360)	60EA0000	704304C7	A5417213	05C904F6	1E4908D0	0349EC7E	7549E4E1	E548A81A	2B49B46F	D5C270A6
(400)	D2C30A7D	69C968BC	9B49B4F8	59C72C49	80400000	00000000	00000000	00000000	7540724C	92BF967C
(440)	00000000	923F967C	7540724C	2F3FF41B	67C0C368	C8BF22B1	7C40AA3A	203FB0A7	8B3E6054	00000000
(480)	CBBF3AB1	6A406ADE	206A616E	01000000	8644B8FE	884332B3	494316ED	574330EB	1D44FF82	3244FAC7
(520)	E6C14101	3E41AB6E	16424AE4	E6C14101	1C3F5098	1E428334	60000000	01000000	84010200	00000000
(560)	9A020000	01000000	B75CE424	00000000	66110000	3E425331	214210A5	8543B398	7244B85F	82424542
(600)	D542CE2B	AC3E6D32	A6C2690B	0B40C2D3	4AC04E3E	0C000000	80010000	00000000	C0D40100	704354CD
(640)	9B416267	06C92804	1E4944C7	0349F87A	7549D4E1	E548E022	2B49CC61	D6C2400B	D2C3CAFD	69C96CBB
(680)	9B4912F9	59C72C49	80400000	00000000	00000000	00000000	75404F51	92BFFC5B	00000000	923FFC5B
(720)	75404F51	2F3F241F	67C0A368	C8BF06B1	7C40863A	203F9CAA	8B3EE856	00000000	CBBF3AB1	6A406ADE
(760)	206A616E	01000000	8644B8FE	884332B3	8543D452	4C43B179	7344E994	7D442FB1	E3C059EE	65C1DC65
(800)	14425D6B	E3C059EE	C2C13CC4	FB4127AA	60000000	01000000	6F3D0200	00000000	9A020000	01000000
(840)	C35CE424	00000000	66110000	40429736	3D42E8D5	48439397	88447BA6	804010BB	D5409B5C	A540F009
(880)	81C0A17B	47C02B7F	B640D90C	0C000000	80010000	00000000	C0D40100	704354CD	9B416267	06C92804
(920)	1E4944C7	0349F87A	7549D4E1	E548E022	2B49CC61	D6C2400B	D2C3CAFD	69C96CBB	9B4912F9	59C72C49
(960)	80400000	00000000	00000000	00000000	75404F51	92BFFC5B	00000000	923FFC5B	75404F51	2F3F241F
(1000)	67C0A368	C8BF06B1	7C40863A	203F9CAA	8B3EE856	00000000	CBBF3AB1	6A406ADE	206A616E	01000000
(1040)	8644B8FE	884332B3	47433111	044322BC	884424E0	88447272	00400959	F4C14DB4	1042B4EC	00400959
(1080)	1EC2ACAC	CF41C0CD	60000000	01000000	5A790200	00000000	9A020000	01000000	CF5CE424	00000000
(1120)	66110000	42428DAB	42427225	4543A2CA	884425A7	A53F2186	C53F27FB	3A3F279B	8DBFC2CD	37BFE916
(1160)	7D3F6593	0C000000	80010000	00000000	C0D40100	704354CD	9B416267	06C92804	1E4944C7	0349F87A
(1200)	7549D4E1	E548E022	2B49CC61	D6C2400B	D2C3CAFD	69C96CBB	9B4912F9	59C72C49	80400000	00000000
(1240)	00000000	00000000	75404F51	92BFFC5B	00000000	923FFC5B	75404F51	2F3F241F	67C0A368	C8BF06B1
(1280)	7C40863A	203F9CAA	8B3EE856	00000000	CBBF3AB1	6A406ADE	206A616E	01000000	8644B8FE	884332B3
(1320)	44434144	014349EF	884466DF	88443E74	044066F1	FDC1BDDB	124212AC	044066F1	23C2628F	D0414289
(1360)	60000000	01000000	45B50200	00000000	9A020000	01000000	DB5CE424	00000000	66110000	41422B3C
(1400)	4042102E	424389BE	8D44AD72	9940F6A9	01403639	283F4617	163FAB82	04BF17BD	1C3F085F	0C000000
(1440)	80010000	00000000	C0D40100	704354CD	9B416267	06C92804	1E4944C7	0349F87A	7549D4E1	E548E022
(1480)	2B49CC61	D6C2400B	D2C3CAFD	69C96CBB	9B4912F9	59C72C49	80400000	00000000	00000000	00000000
(1520)	75404F51	92BFFC5B	00000000	923FFC5B	75404F51	2F3F241F	67C0A368	C8BF06B1	7C40863A	203F9CAA
(1560)	8B3EE856	00000000	CBBF3AB1	6A406ADE	206A616E	01000000	8644B8FE	884332B3	404378FD	FF42AAD4
(1600)	8D447F9F	8C44722E	EA406B96	F9C11424	0F422B5F	EA406B96	20C2395B	CB41308F	60000000	01000000
(1640)	30F10200	00000000	9A020000	01000000	E75CE424	00000000	66110000	4142CC48	41422014	3543BB4E
(1680)	8C44C3AE	333FB14A	FC3EE9A2	F83E5D74	C93D9027	B43EA34B	643E7EC3	0B000000	60010000	00000000
(1720)	C0D40100	704354CD	9B416267	06C92804	1E4944C7	0349F87A	7549D4E1	E548E022	2B49CC61	D6C2400B
(1760)	D2C3CAFD	69C96CBB	9B4912F9	59C72C49	80400000	00000000	00000000	00000000	75404F51	92BFFC5B
(1800)	00000000	923FFC5B	75404F51	2F3F241F	67C0A368	C8BF06B1	7C40863A	203F9CAA	8B3EE856	00000000
(1840)	CBBF3AB1	6A406ADE	206A616E	01000000	8644B8FE	884332B3	33435A96	E442677B	8C4424D8	8B44B7B3
(1880)	DD4062AC	05C2C2EF	0842F947	DD4062AC	27C2014E	B841789D	60000000	01000000	1E230300	02000000
(1920)	9A020000	01000000	F15CE424	00000000	66110000	3F423136	3E427EEA	38436319	8B444680	5A3FC922
(1960)	0E3FDBE6	373FB74D	BA3E6E67	7F3EDBA6	073F9264	08000000	00010000	00000000	20BF0200	704364D3
(2000)	9141DABA	06C94C12	1E4980BE	03490877	7549C4E1	E548802B	2B49C853	D6C2F86F	D3C39C7E	69C970BA
(2040)	9B4970F9	59C72C49	80400000	00000000	00000000	00000000	75404056	92BFD83A	00000000	923FD83A

```
( 2080)  75404056 2F3F5022 67C08268 C8BFEAB0 7C40633A 203F88AD 8B3E7059 00000000 CBBF3AB1 6A406ADE
( 2120)  206A616E 01000000 8644B8FE 884332B3 3643D96E E942A87F 8B44F7AC 8A4499BD AD406B9C 03C249C8
( 2160)  08426A6C AD406B9C 25C2AC41 BA41EC34 60000000 01000000 06690300 00000000 9A020000 01000000
( 2200)  FF5CE424 00000000 66110000 464220BA 46425F9C 2C436C95 8E44A2F0 C33E2F1A 6C3E58FB EA3E38AC
( 2240)  113CD6BE E43C9E12 883DDB37 0B000000 60010000 00000000 20BF0200 704364D3 9141DABA 06C94C12
( 2280)  1E4980BE 03490877 7549C4E1 E548802B 2B49C853 D6C2F86F D3C39C7E 69C970BA 9B4970F9 59C72C49
( 2320)  80400000 00000000 00000000 00000000 75404056 92BFD83A 00000000 923FD83A 75404056 2F3F5022
( 2360)  67C08268 C8BFEAB0 7C40633A 203F88AD 8B3E7059 00000000 CBBF3AB1 6A406ADE 206A616E 01000000
( 2400)  8644B8FE 884332B3 2A43B3C4 D5425503 8F44DA12 8D44F19B 2241A364 0CC2BD38 064273AB 2241A364
( 2440)  2CC2E9D7 B2415106 60000000 01000000 F1A40300 00000000 9A020000 01000000 0B5DE424 00000000
( 2480)  66110000 4B427F53 4A427629 2943622D 9244E712 D03F65C3 6640107E 4D40847F 8ABF74D1 C4BF1F4C
( 2520)  3D40CA86 0C000000 80010000 00000000 20BF0200 704364D3 9141DABA 06C94C12 1E4980BE 03490877
( 2560)  7549C4E1 E548802B 2B49C853 D6C2F86F D3C39C7E 69C970BA 9B4970F9 59C72C49 80400000 00000000
( 2600)  00000000 00000000 75404056 92BFD83A 00000000 923FD83A 75404056 2F3F5022 67C08268 C8BFEAB0
( 2640)  7C40633A 203F88AD 8B3E7059 00000000 CBBF3AB1 6A406ADE 206A616E 01000000 8644B8FE 884332B3
( 2680)  2743923F D1427EE1 9244362E 9044D936 6541204C 0BC22359 064280C7 6541204C 2CC2A209 B241CFBB
( 2720)  60000000 01000000 DCE00300 00000000 9A020000 01000000 175DE424 00000000 66110000 4542F8F3
( 2760)  45420212 2E431DBF 9044E5F2 1740E1E9 8640D96C 063F93CD 1540F888 B8BEB209 A33E175D 0C000000
( 2800)  80010000 00000000 20BF0200 704364D3 9141DABA 06C94C12 1E4980BE 03490877 7549C4E1 E548802B
( 2840)  2B49C853 D6C2F86F D3C39C7E 69C970BA 9B4970F9 59C72C49 80400000 00000000 00000000 00000000
( 2880)  75404056 92BFD83A 00000000 923FD83A 75404056 2F3F5022 67C08268 C8BFEAB0 7C40633A 203F88AD
( 2920)  8B3E7059 00000000 CBBF3AB1 6A406ADE 206A616E 01000000 8644B8FE 884332B3 2C430FDB DB42FC7F
( 2960)  9144D311 8F443036 454175CD 06C205D8 06425AF0 454175CD 27C237C4 B541C99C 60000000 01000000
( 3000)  C71C0400 00000000 9A020000 01000000 235DE424 00000000 66110000 49425994 47422BBC 534352D5
( 3040)  8944321E DC40A32B 4D406BBF 4440B6CF 86C09000 51C0C80B 28400E0B 0B000000 60010000 00000000
( 3080)  20BF0200 704364D3 9141DABA 06C94C12 1E4980BE 03490877 7549C4E1 E548802B 2B49C853 D6C2F86F
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( 3160)  00000000 923FD83A 75404056 2F3F5022 67C08268 C8BFEAB0 7C40633A 203F88AD 8B3E7059 00000000
( 3200)  CBBF3AB1 6A406ADE 206A616E 01000000 8644B8FE 884332B3 52438D48 10430712 8944DA5C 884447C6
( 3240)  20407202 F1C1EFF6 1E42579C 20407202 21C23C3E EA41E5E6 60000000 01000000 B2580400 00000000
( 3280)  9A020000 01000000 2F5DE424 00000000 66110000 4E42C498 4E42C976 64438EB7 8444A517 AD3E4E3D
( 3320)  103F8CCE 343E103E 94BCABAA A1BD1F7C 2E3E1F7C 0C000000 80010000 00000000 E0930400 7043BCDE
( 3360)  7C41BCC0 06C9902E 1E49F4AC 0349206F 7549A4E1 E548C83D 2B495437 D7C2F838 D4C36E80 69C974B8
( 3400)  9B492EFA 59C72C49 80400000 00000000 00000000 00000000 75405D60 91BFE8F6 00000000 913FE8F6
( 3440)  75405D60 2F3FB428 67C04168 C8BFB2B0 7C401C3A 203F64B3 8B3E885E 00000000 CBBF3AB1 6A406ADE
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( 3680)  80400000 00000000 00000000 00000000 75405D60 91BFE8F6 00000000 913FE8F6 75405D60 2F3FB428
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( 3800)  24C2FAEB 02425C3E 60000000 01000000 88D00400 00000000 9A020000 01000000 475DE424 00000000
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( 3880)  5ABE74D1 0C000000 80010000 00000000 E0930400 7043BCDE 7C41BCC0 06C9902E 1E49F4AC 0349206F
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( 4000)  7C401C3A 203F64B3 8B3E885E 00000000 CBBF3AB1 6A406ADE 206A616E 01000000 8644B8FE 884332B3
( 4040)  474365CB 0743BF35 8E44BB64 8C4412B3 0641B40B FDC1CAE7 1C42B231 0641B40B 26C29936 E341200A
( 4080)  60000000 01000000 730C0500 00000000 9A020000 01000000 535DE424 00000000 66110000 4A42FD74
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( 4320)  8F4412E6 8D44EED8 1E415F81 F6C19CE1 1B423A64 1E415F81 22C23F9E E341E180 60000000 01000000
( 4360)  5E480500 00000000 9A020000 01000000 5F5DE424 00000000 66110000 4C4225CA 4C42C8B5 55439018
( 4400)  8C4463EF C83EA313 983E4617 6D3D6DB2 0ABE4637 FFBC6593 22BD840F 0C000000 80010000 00000000
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(26520)	9B4942C9	5AC7504D	80400000	00000000	00000000	00000000	7540FDD5	8EBFAAD6	00000000	8E3FAAD6
(26560)	7540FDD5	2F3F8468	67C0B665	C8BF7CAE	7C405637	203FF0ED	8B3E5091	00000000	CBBF3AB1	6A406ADE
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(26800)	80400000	00000000	00000000	00000000	75405AE3	8EBF887A	00000000	8E3F887A	75405AE3	2F3FE46E
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(27160)	5643DAFF	1F4350E0	69442D77	72444AA8	99C158B3	CFC10D74	30428E0F	99C158B3	14C2999F	0C42D43D

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(80)	00010000	1E000000	4057AF04	62C330B6	0BC46452	934890CC	11C9B47E	9EC8503E	3549405B	B7C8B0EF
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(160)	6240FE98	EEBF4E3D	00000000	EE3F4E3D	6240FE98	29404803	30C00168	98BF74FD	40400E47	1B40D80F
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(400)	8FC3B0DF	95C9E427	8149587C	03C85F40	80400000	00000000	00000000	00000000	6240FE98	EEBF4E3D
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(600)	BA3B00A0	613D00B9	1BBC0020	F0BC00FA	913C0034	02000000	40000000	1E000000	4057AF04	62C330B6
(640)	0BC46452	934890CC	11C9B47E	9EC8503E	3549405B	B7C8B0EF	09C91CBC	60C2D266	8FC3B0DF	95C9E427
(680)	8149587C	03C85F40	80400000	00000000	00000000	00000000	6240FE98	EEBF4E3D	00000000	EE3F4E3D

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(920)	11C9B879	9EC8882C	3549E85B	B7C8F0DA	09C9ACB8	61C23D2D	90C3F85A	95C97C27	8149D27C	03C85F40
(960)	80400000	00000000	00000000	00000000	62403E90	EEBF965E	00000000	EE3F965E	62403E90	2940E403
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(1040)	8644B8FE	884332B3	03C230A4	BFC2C4C6	5944835D	52444D96	58C19EB9	25C1A77D	1DC0C8B6	58C19EB9
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(1160)	633E0E5F	09000000	20010000	1E000000	A041B004	62C300CC	0BC4F193	934860F6	11C9B879	9EC8882C
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HEX DUMP OF DD108778

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HEX DUMP OF DD108778

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(160)	57401688	0AC05923	00000000	0A405923	57401688	7140A2A9	9ABFB2FE	06BFBC6B	A83F98F0	5D4004B7
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(320)	944487F4	C43C729C	443CC771	323D09A8	1DBB1111	A43CC7B1	40BA0BB6	0A000000	40010000	3C000000
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(920)	2F49EC8C	10497408	7F49E42A	8C487028	5749E0FD	57C2D028	EDC374FB	81C934E1	9449A00A	0EC81554
(960)	80400000	00000000	00000000	00000000	57401688	0AC05923	00000000	0A405923	57401688	7140A2A9
(1000)	9ABFB2FE	06BFBC6B	A83F98F0	5D4004B7	C03FD048	00000000	CBBF3AB1	6A406ADE	206D6172	01000000
(1040)	86448842	894328DC	8E40F278	DAC27F91	9544691D	97449714	D8403DA9	49C1A1C8	8E3E4764	D8403DA9
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(1120)	66110000	66414BE5	66419BBC	53410DF9	9544CFBB	383D55ED	E13C390E	1F3DD947	2B3B398E	6FBCAB06
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(2240)	FABF55F5	69BF1826	22C0E845	07000000	E0000000	5B000000	20496900	31C3288C	9B4394BA	C9C8181A
(2280)	10C9A447	A1C890BE	4149B490	A5C80023	0FC9E050	89C1FA35	0AC48BC8	9EC982E0	5A4900CC	B7C7A4B4
(2320)	80400000	00000000	00000000	00000000	5B40FBEF	03C07702	00000000	03407702	5B40FBEF	7A409DBD
(2360)	3D3F2474	A43E384E	4EBFB47F	66402A0B	C73FF281	00000000	CBBF3AB1	6A406ADE	20617072	01000000
(2400)	8444384A	8743C275	CAC26F01	20C31889	58447CED	46449EF8	1AC24F50	E7C111F5	B6C16017	1AC24F50
(2440)	54C1C030	09C2AA92	60000000	5C000000	4CC66900	00000000	A2020000	01000000	6D4C4225	00000000
(2480)	66000000	5142A5B2	50428D55	94C29149	554406FB	E03F491A	C740498D	31406EE5	C8BFB755	77BF2501
(2520)	A4BF9228	08000000	00010000	5B000000	20496900	31C3288C	9B4394BA	C9C8181A	10C9A447	A1C890BE
(2560)	4149B490	A5C80023	0FC9E050	89C1FA35	0AC48BC8	9EC982E0	5A4900CC	B7C7A4B4	80400000	00000000
(2600)	00000000	00000000	5B40FBEF	03C07702	00000000	03407702	5B40FBEF	7A409DBD	3D3F2474	A43E384E
(2640)	4EBFB47F	66402A0B	C73FF281	00000000	CBBF3AB1	6A406ADE	20617072	01000000	8444384A	8743C275
(2680)	98C2417A	05C3E2A2	554499F0	48441E0E	23C2255D	DBC1C1E1	88C17910	23C2255D	6EC1038D	E5C1486C
(2720)	60000000	5C000000	330C6A00	00000000	A2020000	01000000	7B4C4225	00000000	66110000	52422133
(2760)	504261E9	BCC2FAAD	56445E9E	9140498A	673F49EA	99402530	87BF9254	80C00069	D03EDB06	08000000
(2800)	00010000	5B000000	20496900	31C3288C	9B4394BA	C9C8181A	10C9A447	A1C890BE	4149B490	A5C80023
(2840)	0FC9E050	89C1FA35	0AC48BC8	9EC982E0	5A4900CC	B7C7A4B4	80400000	00000000	00000000	00000000
(2880)	5B40FBEF	03C07702	00000000	03407702	5B40FBEF	7A409DBD	3D3F2474	A43E384E	4EBFB47F	66402A0B
(2920)	C73FF281	00000000	CBBF3AB1	6A406ADE	20617072	01000000	8444384A	8743C275	C0C238E1	18C3E117
(2960)	56449491	4544A86C	1DC23C05	D8C19163	AAC126AD	1DC23C05	45C18E1F	00C294AF	60000000	5C000000
(3000)	1F486A00	00000000	A2020000	01000000	874C4225	00000000	66110000	4E423810	4D427D6A	B0C2FBE1
(3040)	57446CFA	8C3F2F5A	893FBAC8	3940A337	AF3BE183	DABEE9A2	BABFA3BB	0C000000	80010000	5B000000
(3080)	20496900	31C3288C	9B4394BA	C9C8181A	10C9A447	A1C890BE	4149B490	A5C80023	0FC9E050	89C1FA35
(3120)	0AC48BC8	9EC982E0	5A4900CC	B7C7A4B4	80400000	00000000	00000000	00000000	5B40FBEF	03C07702
(3160)	00000000	03407702	5B40FBEF	7A409DBD	3D3F2474	A43E384E	4EBFB47F	66402A0B	C73FF281	00000000
(3200)	CBBF3AB1	6A406ADE	20617072	01000000	8444384A	8743C275	B5C24D1A	15C38BBF	5744CFEF	47448EC1
(3240)	19C21F81	DEC19E89	9EC19B21	19C21F81	5CC13E87	F9C18DBD	60000000	5C000000	0A846A00	00000000
(3280)	A2020000	01000000	934C4225	00000000	66000000	4C42F809	4A420B38	ABC2B51B	57441910	1240F800
(3320)	C84055DD	974027B9	03C01F5C	92BE36D9	36C0B239	0C000000	80010000	5B000000	20496900	31C3288C
(3360)	9B4394BA	C9C8181A	10C9A447	A1C890BE	4149B490	A5C80023	0FC9E050	89C1FA35	0AC48BC8	9EC982E0
(3400)	5A4900CC	B7C7A4B4	80400000	00000000	00000000	00000000	5B40FBEF	03C07702	00000000	03407702
(3440)	5B40FBEF	7A409DBD	3D3F2474	A43E384E	4EBFB47F	66402A0B	C73FF281	00000000	CBBF3AB1	6A406ADE
(3480)	20617072	01000000	8444384A	8743C275	AFC2AF50	11C35282	5744FF04	47445A52	19C25DA4	D7C19551
(3520)	96C1D6F1	19C25DA4	57C1DD7A	EFC134DF						