#699

IMP -J

15-20 SEC MAG. FIELD VECTORS
1-2 MINUTE PLASMA ON MERGE TAPE
20.48 SEC RATES ON MERGE TAPE
20.48 SEC RATES ON MERGE TAPE

73-078A-01K
73-078A-02k
73-078A-05F
73-078A-08J

REQ. AGENT	RAND NO.	ACQ. AGENT
NC		JHK

IMP-J

15-20 SEC MAG. VRS ON MERGE TAPES

1-2 MIN PLASMA ON MERGE TAPES

20.48 - SEC RATES ON MERGE TAPES

20.48 - SEC RATES ON MERGE TAPES

73-078A-01K

73-078A-02K

73-078A-05F

73-078A-08J

This data set catalog consists of 277 tapes. The original tapes are 9-track, 6250 bpi, binary. The backup tapes are 3480 cartridges. The D and C numbers and time spans are as follows:

D #	C #	FILES	TIME SPAN
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D-82335	C-28354	1	11/18/73 - 12/07/73
D-82336	C-28355	1	12/07/73 - 12/26/73
D-82337	C-	1	
D-82338	C-28356	1	01/15/74 - 02/02/74
D-82339	C-	1	
D-82340	C-	1	
D-82341	C-28357	1	03/12/74 - 03/31/74
D-82342	C-28358	1	03/31/74 - 04/17/74
D-82343	C-28359	1	04/17/74 - 05/06/74
D-82344	C-28360	1	05/06/74 - 05/25/74
D-82345	C-28361	1	05/25/74 - 06/13/74
D-82346	C-28362	1	06/13/74 - 07/02/74
D-82347	C-28363	1	07/02/74 - 07/20/74
D-82348	C-28364	1	07/21/74 - 08/05/74
D-82349	C-28365	1	08/06/74 - 08/24/74
D-82350	C-28366	1	08/24/74 - 09/11/74
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D-82352	C-	1	
D-82353	C-	1	
D-82354	C-28367	1	01/18/75 - 02/16/75
D-82355	C-28368	1	02/06/75 - 02/18/75
D-82356	C-28369	1	02/18/75 - 03/09/75
D-82357	C-	1	
D-82358	C-28370	1	03/28/75 - 04/16/75

D-82359	C-28371	1	04/16/75 - 05/05/75
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D-82361	C-28373	1	05/23/75 - 06/11/75
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D-83116	C-28452	1	02/08/83 - 02/25/83
D-83117	C-28453	1	02/26/83 - 03/15/83
D-83118	C-28454	1	03/16/83 - 04/02/83
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D-83122	C-28457	1	05/27/83 - 06/13/83
D-83123	C-28458	1	06/14/83 - 07/01/83
D-83124	C-28459	1	07/02/83 - 07/19/83
D-83125	C-28460	1	07/20/83 - 08/06/83
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D-83138	C-	1	
D-83139	C-	1	
D-83140	C-	1	
D-83141	C-	1	
D-83142	C-	1	
D-83143	C-	1	
D-83144	C-	1	
D-83145	C-28469	1	07/07/84 - 08/03/84
D-83146	C-28470	1	08/04/84 - 08/21/84
D-83147	C-	1	
D-83148	C-28471	1	09/09/84 - 09/26/84
D-83149	C-	1	
D-83150	C-	1	
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D-83715	C-28483	1	04/21/86 - 05/08/86

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D-83953	C-28511	1	09/13/87 - 09/28/87
D-83954	C-28512	1	09/30/87 - 10/16/87
D-83955	C-28513	1	10/17/87 - 11/03/87
D-83956	C-28514	1	11/04/87 - 11/20/87
D-83957	C-28515	1	11/22/87 - 12/09/87
D-83958	C-28516	1	12/10/87 - 12/25/87
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WARNING _

Sometime after the production of the IMP-8 MERGE tapes at APL, and their transmission to NSSDC for archiving and dissemination, an error was discovered which affects the timing of the IMP magnetometer data. The IMP magnetometer data are not correctly time-associated with the accompanying CPME and EPE data, and there is no easy way to specify the misalignment. This problem is now being corrected at APL, and a corrected set of data volumes will be provided to NSSDC for archiving and dissemination.

In the meantime, NSSDC will provide copies of these tapes to those scientists needing only the CPME and EPE data, since NSSDC holds such data in no other data set. NSSDC does hold other data sets that are specific to the IMP magnetometer data and are correct.

(The IMP PLS data, also contained on the MERGE tapes, are correctly time-aligned, but will shortly be superseded by the data being reprocessed at MIT. Current flow speed values are not expected to change significantly.)

Joseph H. King JK

August 19, 1992

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Joseph H. King JK

August 19, 1992

THE

MERGE

MANUAL

Version 1.0 August 1990

THE

MERGE

MANUAL

A Description of the MERGE Data Set of Particle and Field Measurements from the IMP 8 spacecraft

Edited by P. R. Briggs

Version 1.0 August 1990

Contents and Illustrations ©1990 by Patrick R. Briggs

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I. Introduction

The MERGE project generates simultaneous time-synchronized data records from several experiment packages aboard the Explorer 50 spacecraft (also known as IMP 8 for "Interplanetary Monitoring Platform – 8"). These experiments include the measurement of charged particles with energies ranging from thermal solar wind to galactic cosmic ray energies, and the measurement of ambient magnetic field direction and strength. The availability of this data at high time resolution (20.48 seconds per record) should allow investigators to observe the microstructure of plasma-field interactions in space.

IMP 8 was launched on October 26, 1973 into a roughly circular orbit ($r \cong 35\ R_E$), which allows it to spend about 65% of its orbit upstream from Earth's bowshock; the rest of the time is spent in the magnetosheath or magnetotail regions. The spacecraft is spin-stabilized at ~23-24 rpm, with its spin axis perpendicular to the ecliptic plane; on December 4, 1973 the spin direction of the spacecraft was reversed, and the spin vector now points toward the North (Solar Ecliptic Coordinates).

The experiments included in the MERGE data records are listed in Table I.1 below.

TABLE I.1
IMP 8 Experiments Included in MERGE

Experiment Name	Affiliation	Princ. Invest.
Energetic Particle Experiment (EPE)	SEL(NOAA),JHU/APL	D.J. Williams
Charged Particle Measurement Experiment (CPME)	JHU/APL	S.M. Krimigis
Magnetic Field Experiment (MAG)	GSFC	[1] R.P. Lepping
Solar Wind Plasma Experiment (PLS)	MIT	[2] A. J. Lazarus

[1] Formerly N.F. Ness (now at Bartol Research Foundation).

[2] Formerly H.S. Bridge (now retired).

II. The MERGE Data Record

Each MERGE data record consists of 425 four-byte words of VAX type REAL. MERGE data is presented as a time-sequential file of uniform records representing 20.48-second blocks.

Item # Description

A. Header

1 Time duration of record, in units of 20.48 seconds (8 revolutions of the IMP spacecraft). For example, records averaged at highest time resolution will have item #1 = 1.0; for five-minute (307.2 second) averages, item #1 = 15.0

2 Data completeness flag. This (REAL) number indicates what experimental data are present on the record. It represents a 4-digit hexidecimal number which flags the appearance of valid data from each of the four experiments. The least significant bit (LSB) of the 4-digit hex number is 1 if CPME data is present; otherwise the LSB is 0. The next significant bit flags valid MAG data; the following bit flags valid EPE data. The most significant bit (MSB) flags valid PLS data. The table below summarizes the scheme:

item #2 =	1.0	CPME data only	= 0001
	2.0	MAG data only	= 0010
	3.0	CPME, MAG data	= 0011
	4.0	EPE data only	= 0100
	5.0	CPME, EPE data	= 0101
	6.0	EPE, MAG data	= 0110
	7.0	CPME, MAG, EPE data	= 0111
	8.0	PLS data only	= 1000
	9.0	CPME, PLS data	= 1001
	10.0	MAG, PLS data	= 1010
	11.0	CPME, MAG, PLS data	= 1011
	12.0	EPE, PLS data	= 1100
	13.0	CPME, EPE, PLS data	= 1101
	14.0	MAG, EPE, PLS data	= 1110
	15.0	all data sets present	= 1111
	16.0 – 31.0	other data present	

3 Number of 20.48-second average CPME records merged into this output record. Item #3 can run from 0.0 (no CPME data) up to the total number of records listed in item #1.

4 Number of high time resolution MAG records merged into this output record. For the Goddard magnetometer, the smallest sampling interval is 1.28 seconds, so item #4 can run from 0.0 (no MAG data) up to 12 times the total listed in item #1.

5 Number of EPE records merged into this output record. This number can run from 0.0 (no EPE data) up to the total listed in item #1.

6 Number of PLS records merged into this output record. This number can run from 0.0 (no PLS data) up to the total number of records listed in item #1.

7 Number of records holding other data in this output record.

8 Year of this record (e.g., 1978.0)

9 Day-of-year of current record (Jan 1 = 1.0)

10 Hour-of-day for this record (0.0 – 23.0)

11 Minute-of-hour for this record (0.0 – 59.0)

12 Second-of-minute for this record (0.0 – 59.0)

13-15 Spacecraft's x, y, and z position in Geocentric Solar Ecliptic (GSE) coordinates; expressed in kilometers. Taken from the CPME record.

16-18 Spacecraft's x, y, and z position in Geocentric Solar Magnetospheric (GSM) coordinates; expressed in kilometers. Taken from the CPME record.

19-21 Spacecraft's x, y, and z position in Geocentric Equatorial Inertial (GEI) coordinates; expressed in kilometers. Taken from the CPME record.

22 Radial distance of spacecraft from center of Earth; expressed in kilometers.

23 Right Ascension angle (RA) of spacecraft position in Celestial Inertial (CI) coordinates; expressed in degrees.

24 Declination angle (DEC) of spacecraft position in Celestial Inertial (CI) coordinates; expressed in degrees.

25 RA of the spacecraft's velocity vector in CI coordinates; expressed in degrees.

26 DEC of the spacecraft's velocity vector in CI coordinates; expressed in degrees.

27-29 Moon's x, y, and z position in GSE coordinates; expressed in kilometers.

30-32 Sun's x, y, and z position in GEI coordinates; expressed in Astronomical Units (AU).

B. CPME Data

Rate Channels [All rates are measured in counts/second]

Item	Channel	Major Species	Energy (MeV/nuc)	sampling period (sec)
33	P1	protons	0.29 – 0.50	10.24
34	P2	protons	0.50 – 0.96	10.24
35	P3	protons	0.96 – 2.00	10.24
36	P4	protons	2.00 – 4.60	10.24
37	P5	protons	4.60 – 15.0	10.24

Item	Channel	Major Species	Energy (MeV/nuc)	sampling period (sec)
[3] 38	Z4	medium nuclei	6.0 – 105.	10.24
39	P7	protons	15.0 – 25.0	5.12
40	P8	protons	25.0 – 48.0	10.24
41	P9	protons	48.0 – 96.0	5.12
42	P10	protons	96.0 – 145.	10.24
43	P11	protons	190. – 440.	10.24
44	A1	alphas	0.59 – 1.14	20.48
45	A2	alphas	1.14 – 1.80	10.24
46	A3	alphas	1.80 – 4.20	10.24
47	A4	alphas	4.20 – 12.0	10.24
48	A5	alphas	12.0 – 28.0	5.12
49	A6	alphas	28.0 – 52.0	5.12
50	Z1	medium nuclei	0.70 – 3.30	5.12
[4] 51	Z1′	medium nuclei	0.70 – 1.45	----
52	Z2	medium nuclei	1.45 – 3.30	10.24
53	Z3	heavy nuclei	3.10 – 8.80	10.24
54	E4	electrons	0.22 – 2.5 MeV	10.24
55	E5	electrons	0.50 – 2.5 MeV	10.24
56	E6	electrons	0.80 – 2.5 MeV	10.24
57	M	protons	35 → (omnidirectional)	5.12
58	S	protons	50 → (omnidirectional)	5.12

[5] 59-84 Uncertainties of items #33-58, in counts/sec.

85-110 Data quality flags (dqfs) for items #33-58. Equal to the number of valid records for the item in this record.

[6] High time resolution data

111 P1 (first half of record)

112 P2 (first half of record)

113 P3 (first half of record)

114 E4 (first half of record)

115 E5 (first half of record)

116 E6 (first half of record)

117-122 Uncertainties of items #111.-116.

123-128 dqfs for items #111.-116.

3 There is no channel P6 on the IMP 8 CPME. The logic channel corresponding to P6 predominantly measures medium nuclei (C,N, and O), and carries the label Z4.

4 The channels Z1 and Z2 form a set of nested energy passbands. Both channels are subsectored into eight directional channels, but Z1 has a 5.12-second resolution, while Z2 has a 10.24-second resolution. The item labeled Z1′ is the difference between the 20.48-second averages of channels Z1 and Z2.

5 An explanation of the method for calculating uncertainties appears in Appendix A .

6 The "magnetospheric" channels P1-P3 and E4-E6 are here broken out into two 10.24-second measurements for each 20.48-second record.

129	P1 (second half of record)
130	P2 (second half of record)
131	P3 (second half of record)
132	E4 (second half of record)
133	E5 (second half of record)
134	E6 (second half of record)
135-140	Uncertainties of items #129-134.
141-146	dqfs for items #129-134.

Sectored Data

147-154	Count rates from sectors 1–8 of channel P1. This data comes from the *first* 10.24-sec. half of the averaging interval.
155-162	Uncertainties of items #147-154.
163	dqf of items #147-154.
164-171	Count rates from sectors 1–8 of channel P1. This data comes from the *second* 10.24-sec. half of the averaging interval.
172-179	Uncertainties of items #164-171.
180	dqf of items #164-171.
181-188	Count rates from sectors 1–8 of channel E4. This data comes from the *first* 10.24-sec. half of the averaging interval.
189-196	Uncertainties of items #181-188.
197	dqf of items #181-188.
198-205	Count rates from sectors 1–8 of channel E4. This data comes from the *second* 10.24-sec. half of the averaging interval.
206-213	Uncertainties of items #198-205.
214	dqf of items #198-205.
215-222	Count rates from sectors 1–8 of channel A1.
223-230	Uncertainties of items #215-222.
231	dqf of items #215-222.
232-239	Count rates from sectors 1–8 of channel A3.
240-247	Uncertainties of items #232-239.
248	dqf of items #232.-239.
249-256	Count rates from sectors 1–8 of channel Z1.
257-264	Uncertainties of items #249-256.
265	dqf of items #249-256.
266-273	Count rates from sectors 1–8 of channel Z2.
274-281	Uncertainties of items #266-273.
282	dqf of items #266-273.
283	S/C clock. This item contains a running counter generated by the IMP.
284	Pseudo Sequence Counter

C. Magnetic Field Data

[7]Interpolated (weighted average) data

285-287 Magnetic field vector x, y, and z components in Geocentric Solar Ecliptic (GSE) coordinates; expressed in nanoTeslas (nT).

288 Average vector field magnitude; expressed in nT. This item is the magnitude of the vector whose components are given by items #285-287.

289 Latitude of the magnetic field vector in GSE coordinates; expressed in degrees.

290 Longitude of the magnetic field vector in GSE coordinates; expressed in degrees.

291-296 Uncertainties of items #285-290.

[8]297 Average of the field magnitudes from the high time resolution data contained in this record.

298-300 Magnetic field vector x, y, and z components in Geocentric Solar Magnetospheric (GSM) coordinates; expressed in (nT).

301 Latitude of the magnetic field vector in GSM coordinates; expressed in degrees.

302 Longitude of the magnetic field vector in GSM coordinates; expressed in degrees.

Raw Average Data

303 Number of 15.36-second MAG records used in the weighted averages; item #303 can take on the values 0.0, 1.0, 2.0, or 3.0 (see Appendix B).

304 Offset time between the first MAG record and the corresponding CPME record, in seconds; item #304 = (MAG time) – (CPME time), so positive values represent a MAG record that is *later* than the CPME record.

305-307 Magnetic field vector x, y, and z components in Geocentric Solar Ecliptic (GSE) coordinates for the first MAG record; expressed in nanoTeslas (nT).

308-310 Uncertainties of items #305-307.

311 Offset time between the second MAG record and the corresponding CPME record, in seconds; item #311 = (MAG time) – (CPME time), so positive values represent a MAG record that is *later* than the CPME record.

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[7] The method of generating the weighted average data from Goddard Space Flight Center's 15.36-second magnetometer data is discussed in Appendix B.

[8] There is a distinction between the data in items #288 and #297. Item #288 is the *vector* average of high time resolution field *vectors*, while item #297 is the *arithmetic* average of the high resolution *magnitudes* .

312-314 Magnetic field vector x, y, and z components in Geocentric Solar Ecliptic (GSE) coordinates for the second MAG record; expressed in nanoTeslas (nT).

315-317 Uncertainties of items #312-314.

318 Offset time between the third MAG record and the corresponding CPME record, in seconds; item #318 = (MAG time) – (CPME time), so positive values represent a MAG record that is *later* than the CPME record.

319-321 Magnetic field vector x, y, and z components in Geocentric Solar Ecliptic (GSE) coordinates for the third MAG record; expressed in nanoTeslas (nT).

322-324 Uncertainties of items #319-322.

D. EPE DATA

325-340 Number of counts in channel L1 for each of 16 sectors.

341-356 Number of counts in channel L2 for each of 16 sectors.

357-372 Number of counts in channel L7 for each of 16 sectors.

373-388 Number of counts in channel L8 for each of 16 sectors.

389-404 Number of counts in channel F for each of 16 sectors.

405 Offset time between the EPE record and the corresponding CPME record, in seconds; item #405 = (EPE time) – (CPME time), so positive values represent an EPE record that is *later* than the CPME record.

E. Solar Wind Data

406 Source i.d. for the solar wind plasma data in this record:

item #406	=	1.0	for MIT data
	=	2.0	for LASL data.

407 Offset time between the solar wind record and the corresponding CPME record, in seconds; item #407 = (SW time) – (CPME time), so positive values represent a solar wind record that is *later* than the CPME record.

[9]408 Solar wind record duration, in seconds.

409 Solar wind velocity, in km/sec.

[10]410 Plasma temperature, in Kelvins.

411 Solar wind ion number density, in #/cm^3.

---

[9] For solar wind data from the MIT experiment, item #408 is an estimate of the record's duration; the input records only label a start time, and accumulation times vary according to the operating mode.

[10] The MIT experiment estimates plasma temperature by fitting the currents in each energy window to a convected Maxwellian distribution.

412 North/South flow angle of the observed solar wind; item #412 is positive for flow from South of the ecliptic to North of the ecliptic.

413 East/West flow angle of the observed solar wind; item #413 is positive for flow from West of the Sun to East of the Sun (*i.e.* opposite to the Earth's orbital motion). The natural aberration due to the orbital motion of the Earth has **not** been removed from this data.

414-418 Uncertainties of items #409-413. These items are blank for the MIT experiment, except #414 which contains the experiment data mode during the current record:

#414	=	1.0	acquisition mode
	=	2.0	tracking mode
	=	3.0	non-tracking mode
	=	4.0	no data

F. Other Data

419 K_p index

420 AE index

421 C9 index

422 Dst index

423 Sunspot index

424-425 Spares

III. Charged Particle Measurement Experiment (CPME)

The Charged Particle Measurement Experiment (CPME) is a charged-particle telescope consisting of stacked detector chips inside an anticoincidence scintillator cup; the configuration of the experiment (see Figure III.1) allows detection of ions (300 keV/nuc - 500 MeV/nuc) and relativistic electrons (0.2 - 2.5 MeV) with a large geometric factor.

Taking advantage of IMP's spin rate, the CPME separately averages counts over 8 or 16 directional sectors for selected channels (see Figure III.2); averaging periods are 5.12, 10.24, or 20.48 seconds. CPME channel passbands are summarized in Table III.1 (all listed channels appear in the MERGE records).

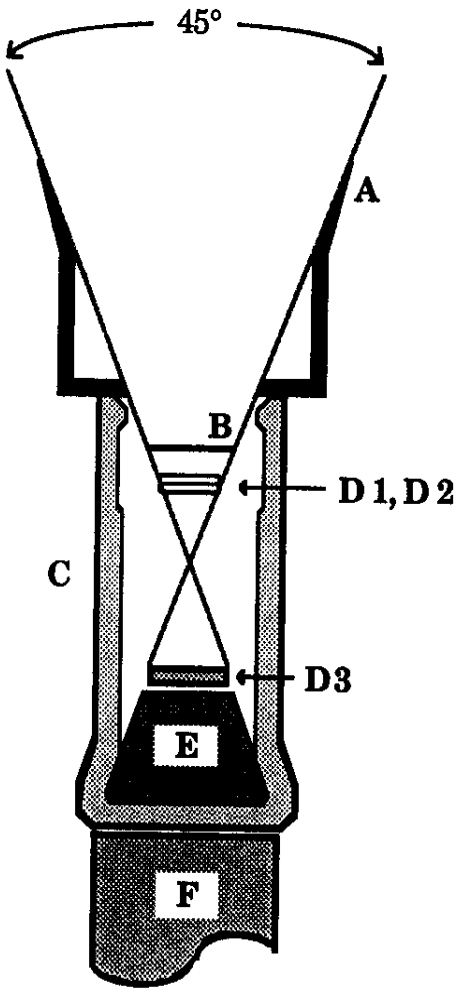
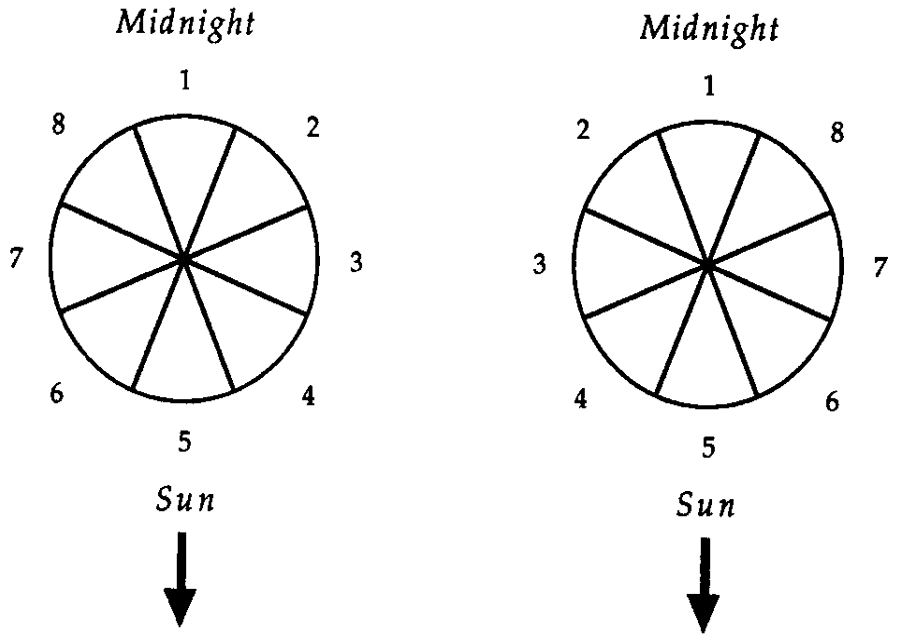


Fig. III.1 JHU/APL Charged Particle Telescope aboard the IMP-8 (Explorer 50) spacecraft. (A) brass defining aperture; (B) nickel foil; (C) plastic scintillator anticoincidence cup; (D1 – D3) Detectors; (E) Tungsten Absorber; (F) photomultiplier tube.

CPME SECTOR ORIENTATION ON IMP 8



a) before 1100 UT, 4 Dec 1973 b) after 1100 UT, 4 Dec 1973

Fig. III.2 Orientation of the 8 azimuthal sectors defined for the IMP 8 CPME detector.

The CPME data reside on magnetic tapes at JHU/APL. The data records (known as ARCHIVE records) hold 14508 bytes written in IBM 360 format. The program MERGE converts selected items to VAX REAL format and fills these items into the output record. For more information on CPME ARCHIVE records, see [Armstrong, 1976].

TABLE III.1
Energy Passbands for Ion Species in IMP 8 CPME Channels
Energy in MeV/nuc except channels E4-E6 (MeV)

channel	P	α	Be	B	C	N	O	F-Ne	Mg-Si	S-Ca	Fe	geo. factor (cm^2sr)	resolution (seconds)
P1	0.29	0.10	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.02	1.51	10.24
	0.50	0.16	0.09	0.08	0.08	0.08	0.07	0.05	0.05	0.04	0.03		
P2	0.50	0.16	0.09	0.08	0.08	0.08	0.07	0.05	0.05	0.04	0.03	1.51	10.24
	0.96	0.28	0.15	0.14	0.14	0.13	0.11	0.09	0.08	0.07	0.04		
P3	0.96	0.28	0.15	0.14	0.14	0.13	0.11	0.09	0.08	0.07	0.04	1.51	10.24
	2.00	1.80	2.40	2.60	3.15	3.30	3.50	3.55	3.65	3.90	3.90		
P4	2.00	1.80	2.40	2.60	3.15	3.30	3.50	3.55	3.65	3.90	3.90	1.51	10.24
	4.60	2.20	2.60	2.80	3.30	3.50	3.50	3.65	3.75	4.15	4.15		
P5	4.60	2.20	2.60	2.80	3.30	--	3.65	3.65	4.05	--	--	1.51	10.24
	15.0	60.0	2.80	3.00	3.50	--	3.75	3.75	4.15	--	--		
P7	15.0	60.0	--	--	--	--	--	--	--	--	--	0.32	5.12
	25.0	145.	--	--	--	--	--	--	--	--	--		
P8	25.0	142.	--	--	--	--	--	--	--	--	--	0.32	10.24
	48.0	146.	--	--	--	--	--	--	--	--	--		
P9	48.0	--	--	--	--	--	--	--	--	--	--	0.32	5.12
	96.0	--	--	--	--	--	--	--	--	--	--		
P10	96.0	--	--	--	--	--	--	--	--	--	--	0.32	10.24
	145.	--	--	--	--	--	--	--	--	--	--		
P11	190.	--	--	--	--	--	--	--	--	--	--	0.32	10.24
	440.	--	--	--	--	--	--	--	--	--	--		
A1	--	0.59	0.31	0.27	0.25	0.22	0.22	0.17	0.15	0.13	0.07	1.51	20.48
	--	1.14	0.64	0.46	0.43	0.38	0.36	0.30	0.26	0.21	0.12		
A2	--	1.14	0.64	0.46	0.43	0.38	0.36	0.30	0.26	0.21	0.12	1.51	10.24
	--	1.80	2.00	2.60	3.15	3.30	3.55	3.55	3.70	3.90	3.90		
A3	--	1.80	2.00	2.60	3.15	3.30	3.55	3.55	3.70	3.90	3.90	1.51	10.24
	--	4.20	3.00	3.30	3.90	3.90	3.90	4.10	4.25	4.50	4.55		
A4	--	4.20	3.00	3.30	3.90	3.90	3.90	4.10	4.25	4.50	4.55	1.51	10.24
	--	12.0	14.0	18.0	22.0	22.0	25.0	26.5	29.5	33.0	41.5		
A5	--	14.5	17.0	18.5	22.0	22.0	26.0	27.0	31.0	33.0	41.5	0.32	5.12
	--	28.0	160.	240.	275.	300.	330.	360.	400.	460.	700.		
A6	--	28.0	160.	--	--	--	--	--	--	--	--	0.32	5.12
	--	50.0	200.	--	--	--	--	--	--	--	--		
Z1	--	--	1.05	0.83	0.82	0.70	0.64	0.54	0.46	0.39	0.22	1.51	5.12
	--	--	2.30	1.70	1.70	1.45	1.30	1.05	0.89	0.77	0.42		
Z2	--	--	2.30	1.70	1.70	1.45	1.30	1.05	0.89	0.77	0.42	1.51	10.24
	--	--	2.40	2.60	3.15	3.30	3.55	3.55	3.70	3.90	3.90		
Z3	--	--	--	--	--	--	--	--	--	--	3.10	1.51	10.24
	--	--	--	--	--	--	--	--	--	--	8.80		
Z4	--	--	7.60	6.50	6.50	6.00	6.00	5.50	5.50	5.45	5.55	1.51	10.24
	--	--	28.0	46.0	69.0	105.	145.	200.	400.	460.	700.		
E4	(electrons)				0.22 - 2.5 MeV							1.51	10.24
E5	(electrons)				0.50 - 2.5 MeV							1.51	10.24
E6	(electrons)				0.80 - 2.5 MeV							1.51	10.24
M	(scintillator)				> 35 MeV/nuc							28 cm^2	5.12
S	(scintillator)				> 50 MeV/nuc							28 cm^2	5.12

IV. Energetic Particle Experiment (EPE)

The Energetic Particles Experiment (EPE) is a solid-state detector system which uses both magnetic deflection and detector stacking to discriminate particle types and energies. Its objective is to determine the composition, spectra, and directionality of charged particle fluxes in the range 30 keV – 35 MeV. With the CPME, this experiment covers most of the suprathermal kinetic energy spectrum for electrons and light nuclei.

The experiment comes in two parts: a multi-element telescope with magnetic sweeping to separately detect low energy electrons (see Figure IV.1); and a pair of single-element detectors mounted at 45° to the telescope's main axis. Counts are collected over either 8 or 16 angular sectors every spacecraft spin (see Figure IV.2), accumulated once every 2.64-second spin period (for IMP 8), and read out every 20.48 seconds.

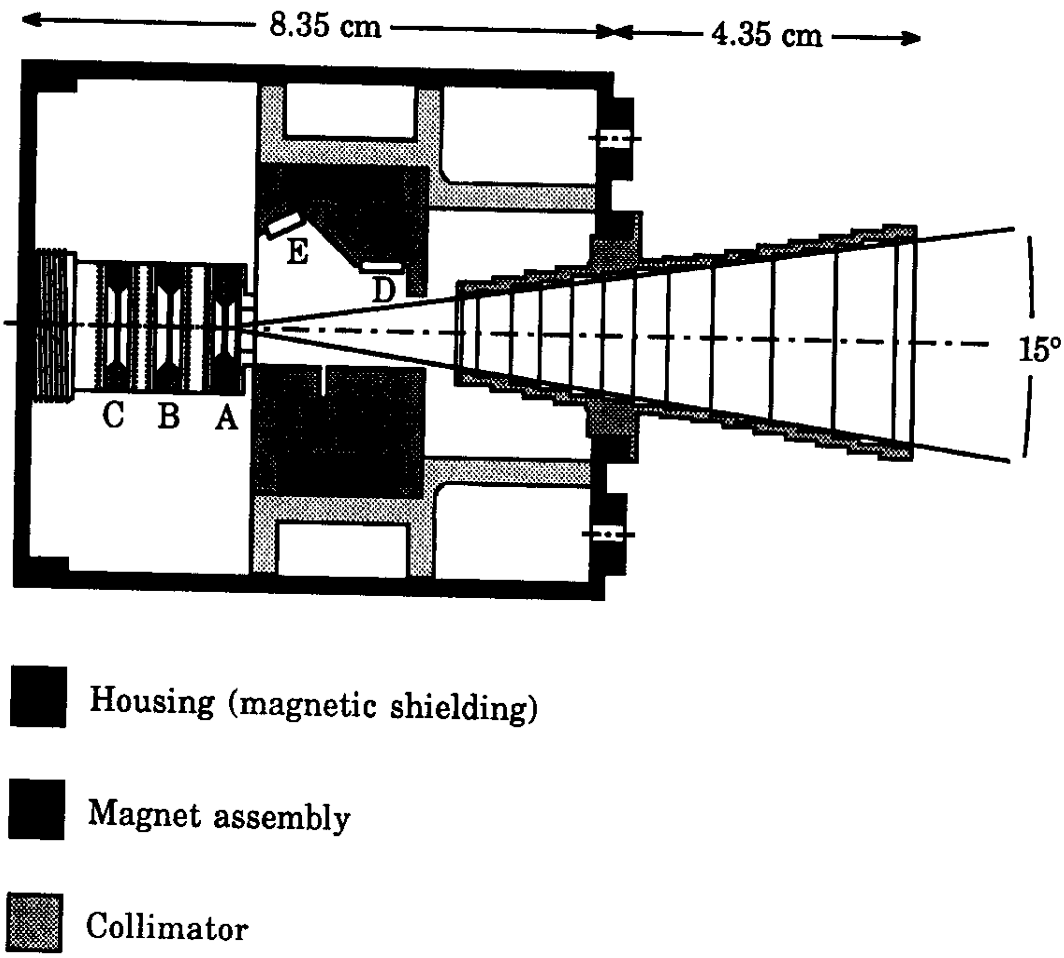
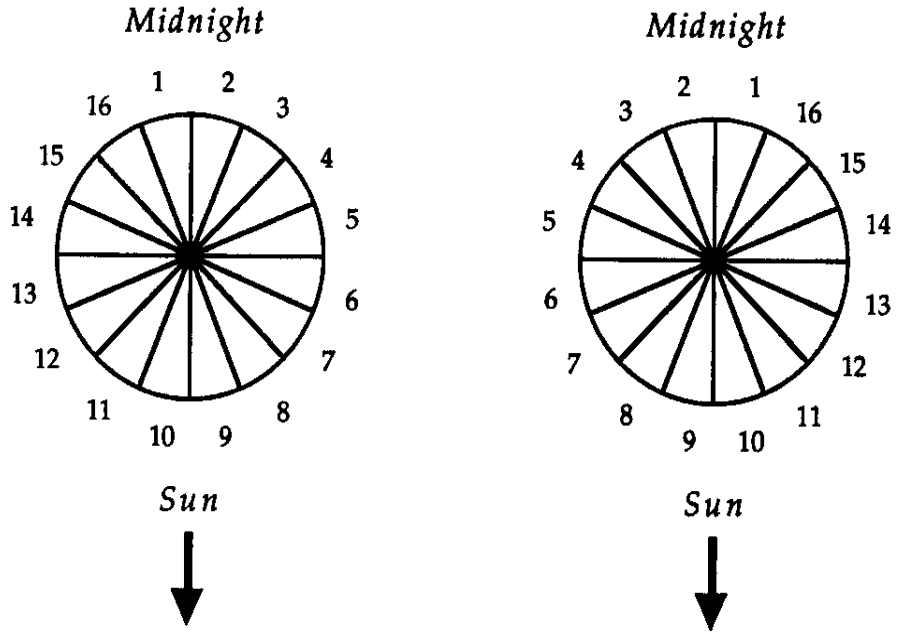


Fig. IV.1 Schematic of the EPE main magnet assembly, including detectors A-E.

EPE SECTOR ORIENTATION ON IMP 8



a) before 1100 UT, 4 Dec 1973 b) after 1100 UT, 4 Dec 1973

Fig. IV.2 Orientation of the 16 azimuthal sectors defined for the IMP 8 EPE detector.

Table IV.1 displays the channel definitions for the EPE. Data tapes containing EPE input records come from NOAA in Boulder, CO written in IBM 360 format as 4-byte INTEGERs. MERGE converts selected items to VAX REAL format and places them into the output record.

TABLE IV.1
Energy Passbands for Ion Species in IMP 8 EPE Channels

Channel	Energy (MeV)	Charge	samples/spin	detectors	geo. factor (10^{-2}cm^{2}sr)
*L1	0.05 - 0.22	Z≥1	16	A,B	1.114
*L2	0.22 - 0.80	Z≥1	16	A,B	1.114
L3	0.80 - 2.1	Z≥1	16	A,B	1.114
L4	2.1 - 4.5	Z≥1	16	A,B,C	1.065
L5	4.5 - 8.5	Z=1	8	A,B,C	1.065
L6	8.5 - 25.0	Z=1	8	A,B,C	0.966
*L7	0.03 - 0.10	(electrons)	16	D	1.5
*L8	0.10 - 0.20	(electrons)	16	E	0.9
L9	(background)	—	8	A,B,C	1.0
L10	2.2 - 8.4	Z≥2	8	A,B	1.0
L11	8.4 - 16.0	Z=2	8	A,B,C	1.0
L12	16.0 - 35.0	Z=2	8	A,B,C	1.0
*F	> 0.015	(all)	16	F	3.21
G1	> 0.6	Z≥2	16	G	3.21
G2	> 1.0	Z≥2	8	G	3.21
G3	> 2.0	Z≥3	8	G	3.21

*These channels are included in the MERGE record.

V. Magnetic Field Experiment (MAG)

The Goddard Space Flight Center magnetometer is a three-axis saturable core fluxgate device, with three sensitivity ranges: ±12γ, ±36γ, and ±108γ full range, with corresponding digital data uncertainty of ±0.1γ, ±0.28γ, and ±0.84γ. The highest sample rate is 25/second; data supplied to the MERGE program has been averaged to 1.28 seconds, and then to 15.36 second intervals.

Data from the Goddard Space Flight Center magnetometer reside on archive tapes provided by the National Space Science Data Center (NSSDC); these are referred to as Phase 2 summary tapes. The records are blocked 60:1; each physical record contains 160564 bytes written in IBM 360 format. The program READMAG converts IBM to VAX words and prepares an output file consisting of about 20 days' worth of data (approximately 9.2 Megabytes). This file resides on disk and is accessed by the program MERGE to combine the magnetometer data with the CPME and EPE records.

TABLE V.1
Items present on the input MAG data records

Item	Description
*1	Year of record in two-digit format (*e.g.* 78)
*2	Day of record in decimal day (Jan. 1 = 0)
*3	Elapsed milliseconds in current day (0 – 86400000)
4	Data quality flag
5	Orbit number
6	Bit rate flag
7	Pseudo Sequence Count
8	Fill = 0
9	Housekeeping data
*10	Field magnitude (F1), in nT; arithmetic average of the 1.28-second field magnitudes over the 15.36-second record interval
*11	Field magnitude (F2), in nT; vector average of the 1.28-second field vectors over the 15.36-second record interval
12	Field vector latitude ($-90° < \theta < 90°$) averaged over 15.36 seconds
13	Field vector longitude ($0° < \phi < 360°$)
*14 – 19	Variance matrix for 15.36-second averages
*20	Number of high-resolution sequences used in the average (0 – 384)
21	Number of detail points used in the average (0 – 384)

Item	Description
22	Day (Jan 1 = 0)
23	Elapsed millisecond in day(0 - 86400000)
24	Geomagnetic latitude of spacecraft (degrees)
25	Geomagnetic longitude of spacecraft (degrees)
26 - 28	XSE, YSE, ZSE of spacecraft (km)
29	radial distance of spacecraft from Earth center (km)
30 - 31	YSM, ZSM of spacecraft (km)
32	Geomagnetic latitude of Sun (degrees)
33	Geomagnetic longitude of Sun (degrees)
34 - 36	XSE, YSE, ZSE of Moon (km)
37 - 45	Coordinate rotation matrix from Solar Ecliptic to Solar Magnetospheric system
46 - 54	Coordinate rotation matrix from Celestial Inertial to Solar Ecliptic system
55 - 56	Fill
57	RA of spacecraft spin vector in CI coordinates (degrees)
58	DEC of spacecraft spin vector in CI coordinates (degrees)
*59	Magnetic field latitude in SE coordinates (degrees)
*60	Magnetic field latitude in SM coordinates (degrees)
*61	Magnetic field longitude in SE coordinates (degrees)
*62	Magnetic field longitude in SM coordinates (degrees)
*63 - 65	B_x, B_y, and B_z in SE coordinates (nT)
*66 - 68	B_x, B_y, and B_z in SM coordinates (nT)

*These channels are included in the MERGE record.

VI. Solar Wind Experiment (PLS)

The Massachusetts Institute of Technology (MIT) Solar Wind Plasma experiment consists of a modified Faraday cup measuring charged particles in the energy ranges 7 eV - 7.6 keV (electrons) and 50 eV - 7.6 keV (ions).

Figure VI.1 shows a sketch of the experiment. DC voltage corresponding to one of 27 energy levels is applied to the modulator grid; an AC square-wave signal corresponding to the width of the energy window is superimposed on the grid voltage. Charged particles entering the cup will be rejected unless they have kinetic energies within the range $KE = q(V_{DC} \pm V_{AC})$, where q is the electric charge. The particle count rate is proportional to the current measured at the collectors. As shown in Figure VI.2, energy passbands are arranged at equal logarithmic intervals. Since the experiment package rotates in the equatorial plane along with the spacecraft, directional information is available by integrating current measurements over subintervals of each rotation. Analysis of the energy-level data produces a plasma bulk speed and a plasma ion temperature (see Table VI.1).

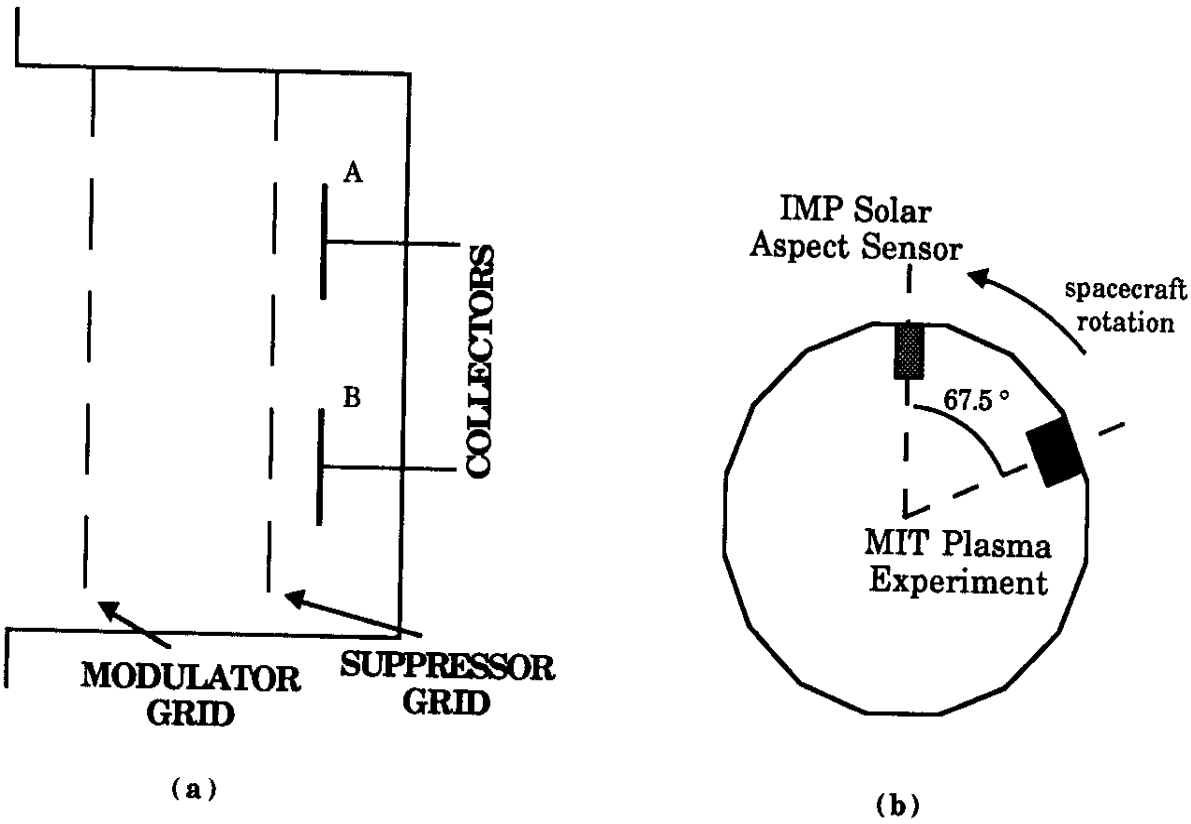


Fig. VI.1 **a**) a sketch of the MIT plasma experiment; **b**) location of MIT experiment aboard the IMP spacecraft

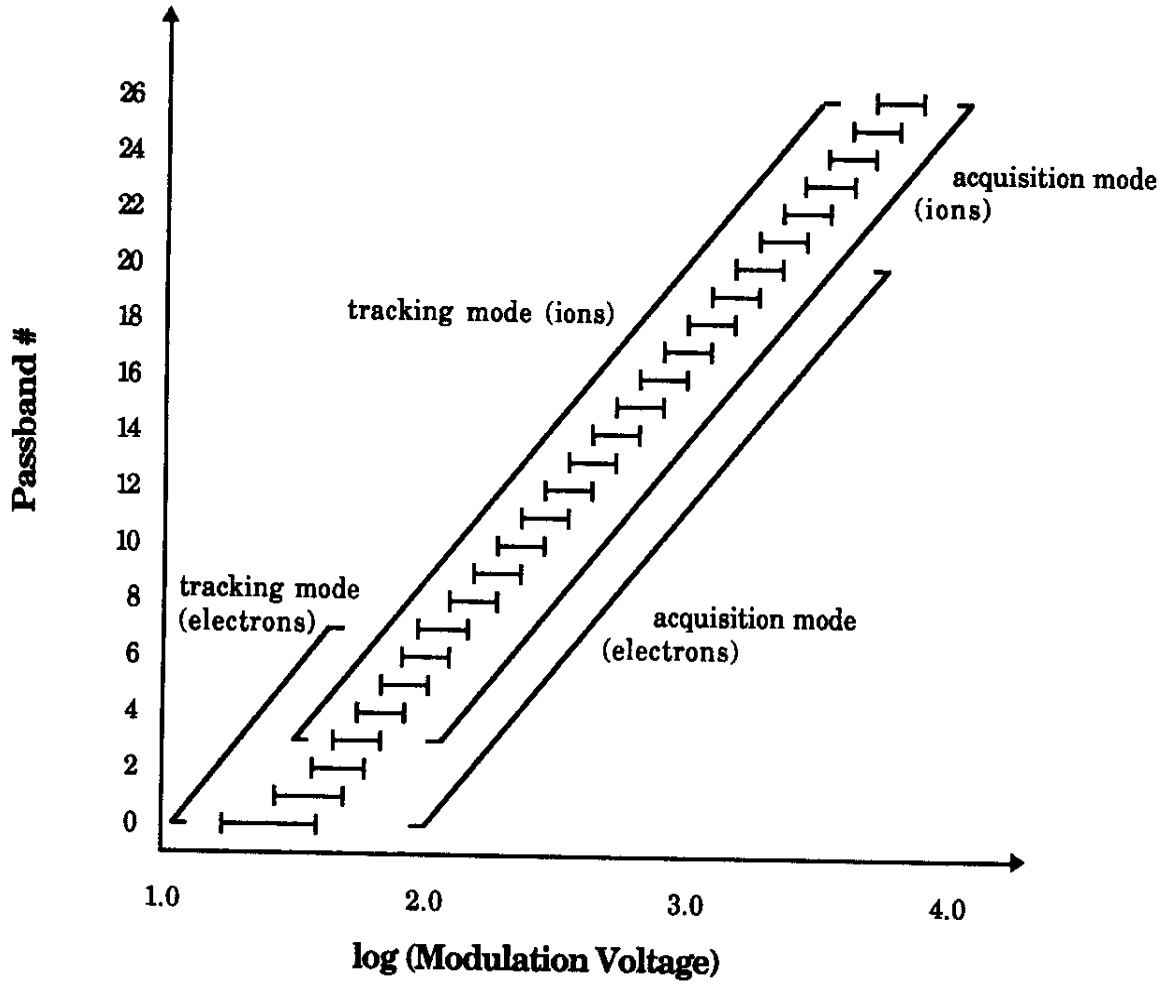


Fig. VI.2 Energy passbands defined for the plasma experiment

Since the instrument must perform effectively under two different plasma environments (interplanetary space and the magnetosphere), it operates in a variety of data-gathering modes depending on the ambient plasma conditions:

i) **Acquisition Mode** (see Figure VI.3) is the default state; ions are measured over 24 energy levels and 14 angular sectors, while electrons are measured over 21 energy levels and 8 angular directions [photoelectrons from solar irradiance contaminate electron measurements made within ±45° of the solar direction, so the instrument skips those sectors].

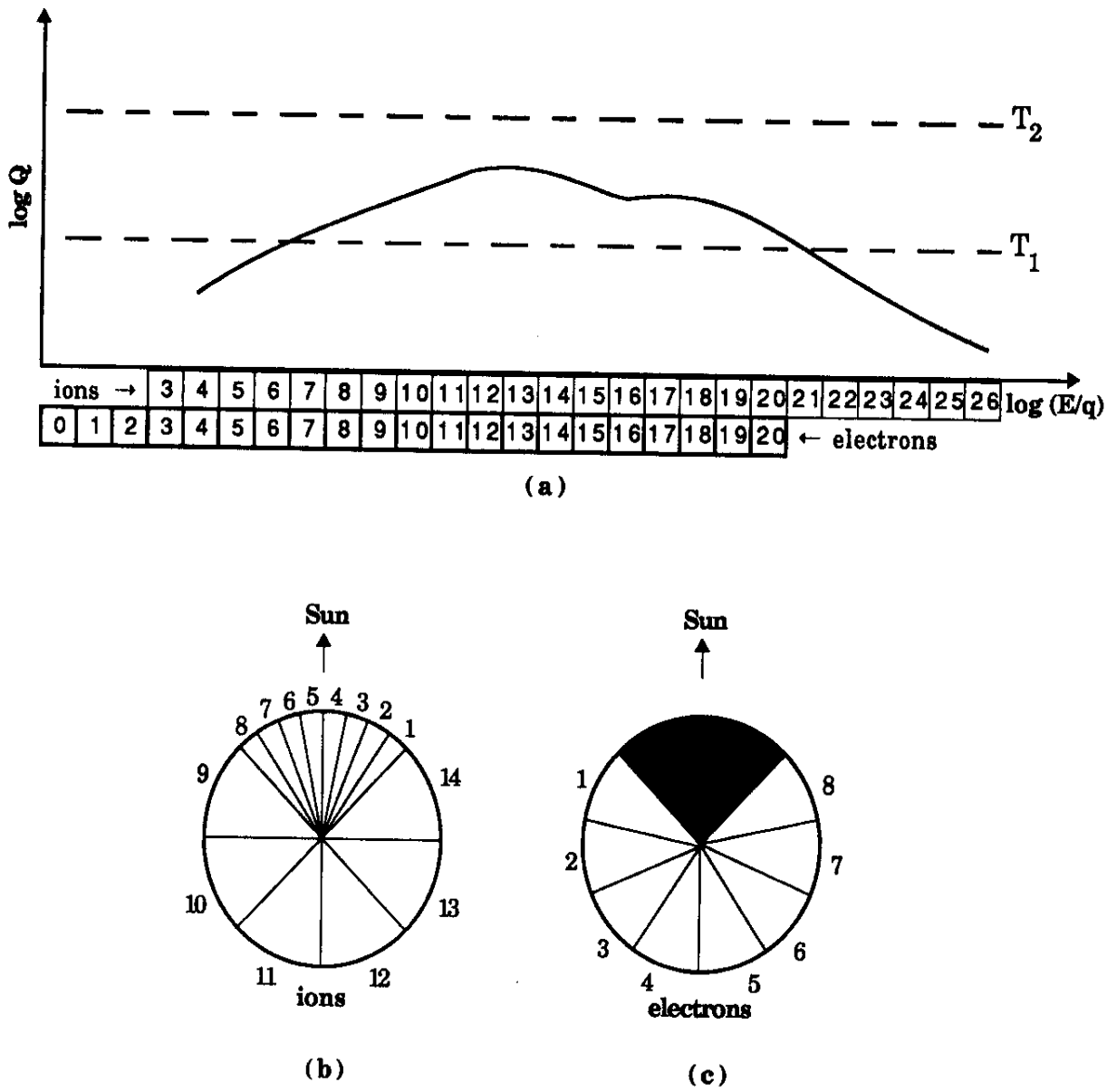


Fig. VI.3 Acquisition Mode. **a**) typical spectrum; **b**), **c**) angular sectors for ions and electrons

ii) If the current in any of the ion energy channels rises above a preset level (T_2), the instrument switches to **Tracking Mode** (see Figure VI.4); these conditions arise most often in the interplanetary medium. The experiment collects ions over eight contiguous energy levels, determined by the channel having the maximum current during the previous cycle; electrons are measured over the first eight energy levels. Ion energy-level tracking starts with the channel two levels below the maximum-count channel, so the eight sampled channels should contain evidence of the peak proton energy as well as the peak alpha particle energy. [Since the particle's kinetic energy is proportional to its mass, and since the detector voltage is inversely proportional to the particle's charge, alpha particles ($m_\alpha = 4m_p$, $q_\alpha = 2q_p$) that move with the proton plasma would appear at twice the voltage of the protons, or approximately three channels higher in the detector].

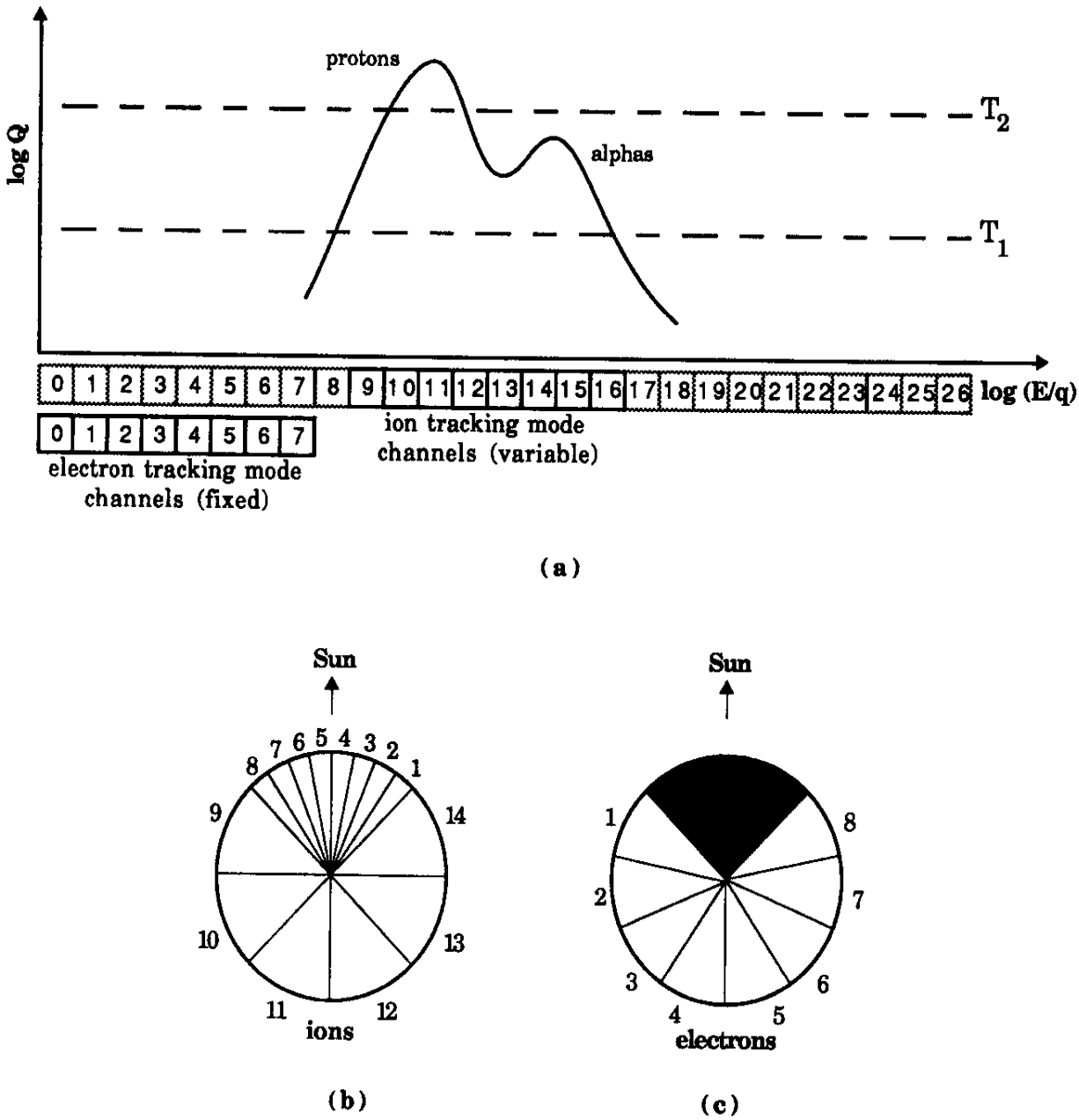


Fig. VI.4 Tracking Mode. **a**) typical spectrum; **b**), **c**) angular sectors for ions and electrons

ii) If the current in all of the ion energy channels falls below a preset level (T_1), the instrument switches to **Non-Tracking Mode** (see Figure VI.5); these conditions arise most often in the magnetosphere. The instrument collects ions and electrons over the same channels as in the Acquisition Mode, but reduces its angular resolution by sampling ions over eight 45° sectors.

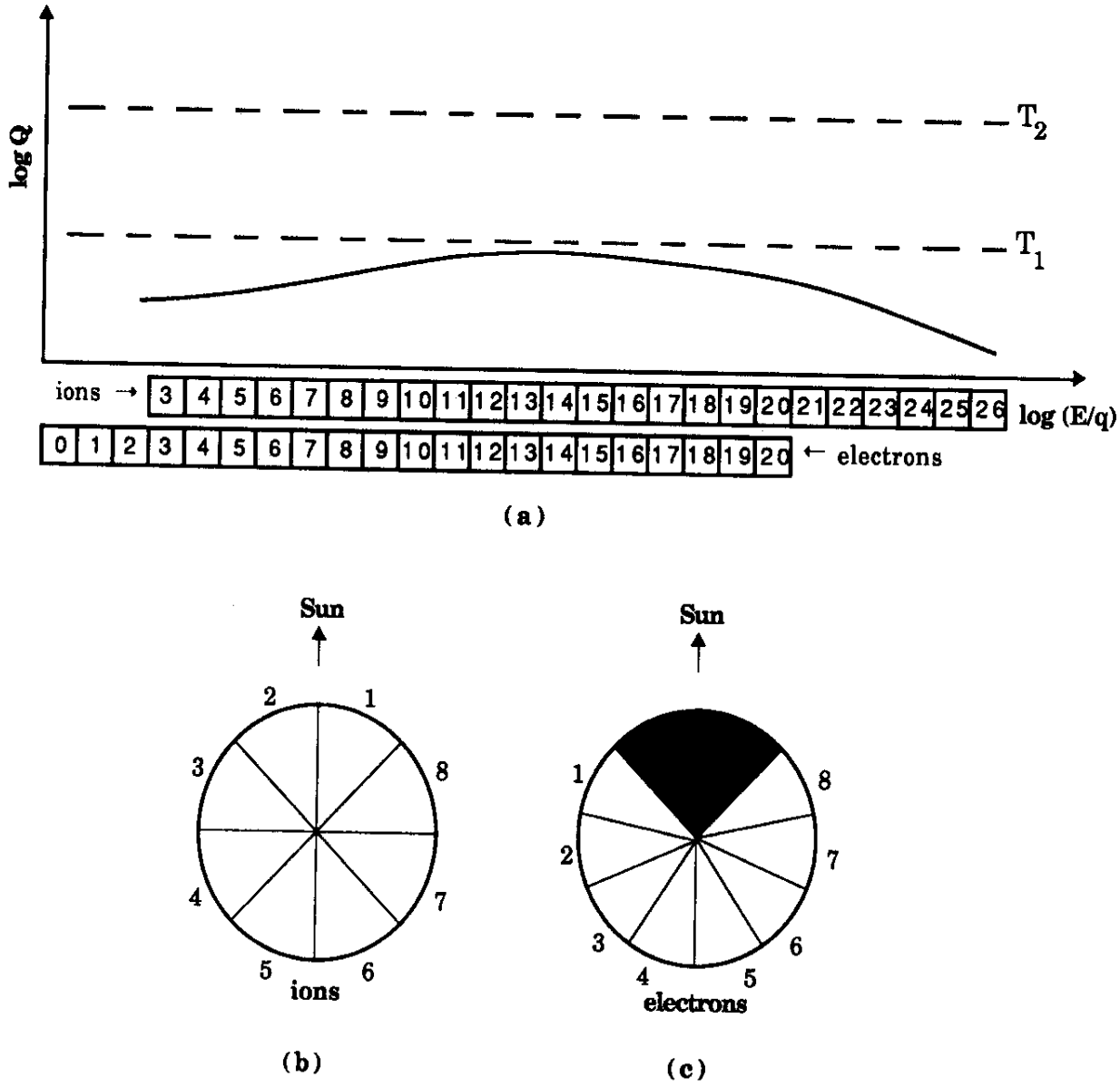


Fig. VI.4 Non-Tracking Mode. **a**) typical spectrum; **b**), **c**) angular sectors for ions and electrons

The SPectrum Analysis Tape (SPAT) contains fine time resolution plasma parameters from the PLS experiment aboard IMP 8. The version we have processed is in 9-track format at 6250 bpi with odd parity. It contains ASCII records blocked 50:1, with each record containing a header (8I5) and a data section (15E10.3); so each record contains $(8 \times 5) + (15 \times 10) = 190$ bytes.

TABLE VI.1
Items present on the SPAT data records

Item	Name	Description
1	MODE	record type flag: MODE = 1 Acquisition mode 2 Tracking Mode 3 Non-Tracking Mode 4 Calibration Mode 5 Bad Data
2	IYR	4-digit year (*e.g.* 1974)
3	IDOY	day of year (Jan. 1 = 1)
4	IHR	hour of day (0 – 23)
5	IMIN	minute of hour (0 – 59)
6	ISEC	second of minute (0 – 59)
7	IMP	spacecraft i.d. (7 or 8)
8	ITYP	spectrum type: ITYP = 1 tracking mode spectrum 2 (not implemented) 3 non-tracking mode spectrum 4 acquisition mode spectrum
9	[11]FLUXS	flux measured from solar direction ($-45° < \phi < 45°$)
10	VFIT	plasma bulk speed in spacecraft frame; usually measured by a 3-point fit to a convected Maxwellian distribution
11	VEST	moment calculation of plasma bulk speed
12	[11]FLUXY	plasma flux from solar-ecliptic "y" direction ($45° < \phi < 135°$)
13	WFIT	most probable plasma thermal speed (from Maxwellian fit), in km/sec; the plasma ion temperature in Kelvins (MERGE item #410) is calculated from the expression $T = \frac{(WFIT)^2 \times 1000}{16}$
14	WEST	moment calculation of plasma bulk speed
15	[11]FLUXAS	plasma flux from the antisolar direction ($135° < \phi < 225°$)
16	DFIT	plasma number density in cm^{-3}
17	DEST	moment calculation of plasma bulk speed
18	[11]FLUXAY	plasma flux from the "anti-y" direction ($225° < \phi < -45°$)
19	[12]ALFRAC	ratio of alpha particle current to peak proton curent
20	AEST	North/South flow angle (> 0 for flow from South)
21	[11]PEAK	4-digit peak flag
22	BFIT	East/West flow angle (> 0 for flow from West)
23	BEST	moment calculation of plasma bulk speed

[11] Channels FLUXS, FLUXY, FLUXAS, FLUXAY, and PEAK are not currently implemented.

[12] The output of this channel has not been thoroughly validated.

VII. Other Data

Items #419-425 are not included on the 20.48-second MERGE records. These data (primarily geomagnetic or solar in origin) represent long-term average values. They are archived by the NSSDC on tape files along with 3-hour averaged interplanetary medium parameters, and will be included when longer-term averages are made from the MERGE records.

Appendix A: Calculating Uncertainties

I. General Considerations

In estimating error or uncertainty, we distinguish between uncertainty in the *raw data* and uncertainty associated with a *calculated value*. In compiling an average count rate for a given channel over a fixed time period, we process the raw data with a mathematical procedure. The uncertainty in the result (or, conversely, the accuracy) depends not only on the input data, but also on the particular mathematical procedure.

Raw data (usually in the form of a telemetered binary string) is not useful *as such* for scientific inquiry. We must make inferences about how the physical environment produced the data. Our inferences take the form of mathematical models; usually these are equations relating lower-level results (*e.g.* the number of counts in two channels) to a higher-level result (the particle flux at a given energy). Since a mathematical model is only an approximation of the physical reality, it contributes to the uncertainty in the calculated result.

Suppose that several data $x_1, x_2, x_3 \ldots x_n$ are combined to produce a quantity called r ; the mathematical model is represented by the function f :

$$r = f(x_1, x_2, x_3 \ldots x_n)$$

Each of the data x_i has an associated uncertainty Δx_i. If each of the input data is *independent* and if their uncertainties are *small*, we can estimate the uncertainty in r by using the chain rule in quadrature:

$$(\Delta r)^2 \approx (\frac{\partial f}{\partial x_1})^2 \cdot (\Delta x_1)^2 + (\frac{\partial f}{\partial x_2})^2 \cdot (\Delta x_2)^2 + \ldots + (\frac{\partial f}{\partial x_n})^2 \cdot (\Delta x_n)^2$$

$$= \sum_i (\frac{\partial f}{\partial x_i})^2 \cdot (\Delta x_i)^2.$$

As an example, averaging four independent readings involves the formula

$$x_{ave} = \frac{(x_1 + x_2 + x_3 + x_4)}{4}$$

The uncertainty in the mean is then

$$(\Delta x_{ave})^2 = (\frac{\Delta x_1}{4})^2 + (\frac{\Delta x_2}{4})^2 + (\frac{\Delta x_3}{4})^2 + (\frac{\Delta x_4}{4})^2$$

so $$(\Delta x_{ave}) = \frac{1}{4}\sqrt{(\Delta x_1)^2 + (\Delta x_2)^2 + (\Delta x_3)^2 + (\Delta x_4)^2} \quad .$$

II. CPME Rate Channels

Counting uncertainties for CPME channels arise from two sources:

1) Random fluctuations, assumed to have a Poisson distribution; here the estimated uncertainty is $\Delta N_p = \sqrt{N}$, where N is the number of counts.
2) Systematic error due to data decompression; for 12-bit compression, "round-off" error is zero for $N \leq 255$, and is $\Delta N_d = {(2^{\alpha-7} - 1)}/{2}$ for $N > 255$, where α is the highest power of 2 in N.

If these two sources are independent, then the overall uncertainty should be the sum in quadrature: $(\Delta N) = \sqrt{(\Delta N_p)^2 + (\Delta N_d)^2}$.

Appendix B: Averaging Magnetic Field Data

The magnetic field data from the Goddard Space Flight Center magnetometer arrives to the MERGE processing system in the form of 15.36-second averages. These averages have been derived from higher time resolution data (1.28 second resolution); the number of 1.28-second averages used in each 15.36-second record appears in the Phase 2 record. Since the Phase 2 time lengths are different from those of the other experiments, we must find a way to reconcile them.

If we start with a fixed 20.48-second time period (into which all the experiments will contribute data), the magnetic field data records will not "fill up" the time block; at least two – and under certain conditions three – magnetic field records will partially span the time block. We have decided to form a "weighted sample average" of the overlapping magnetic field records to represent the behavior of the magnetic field during the 20.48-second MERGE record.

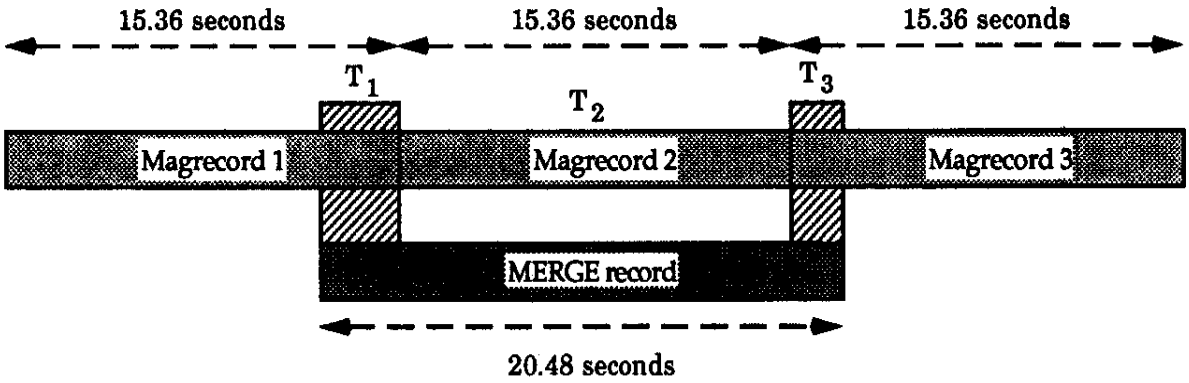


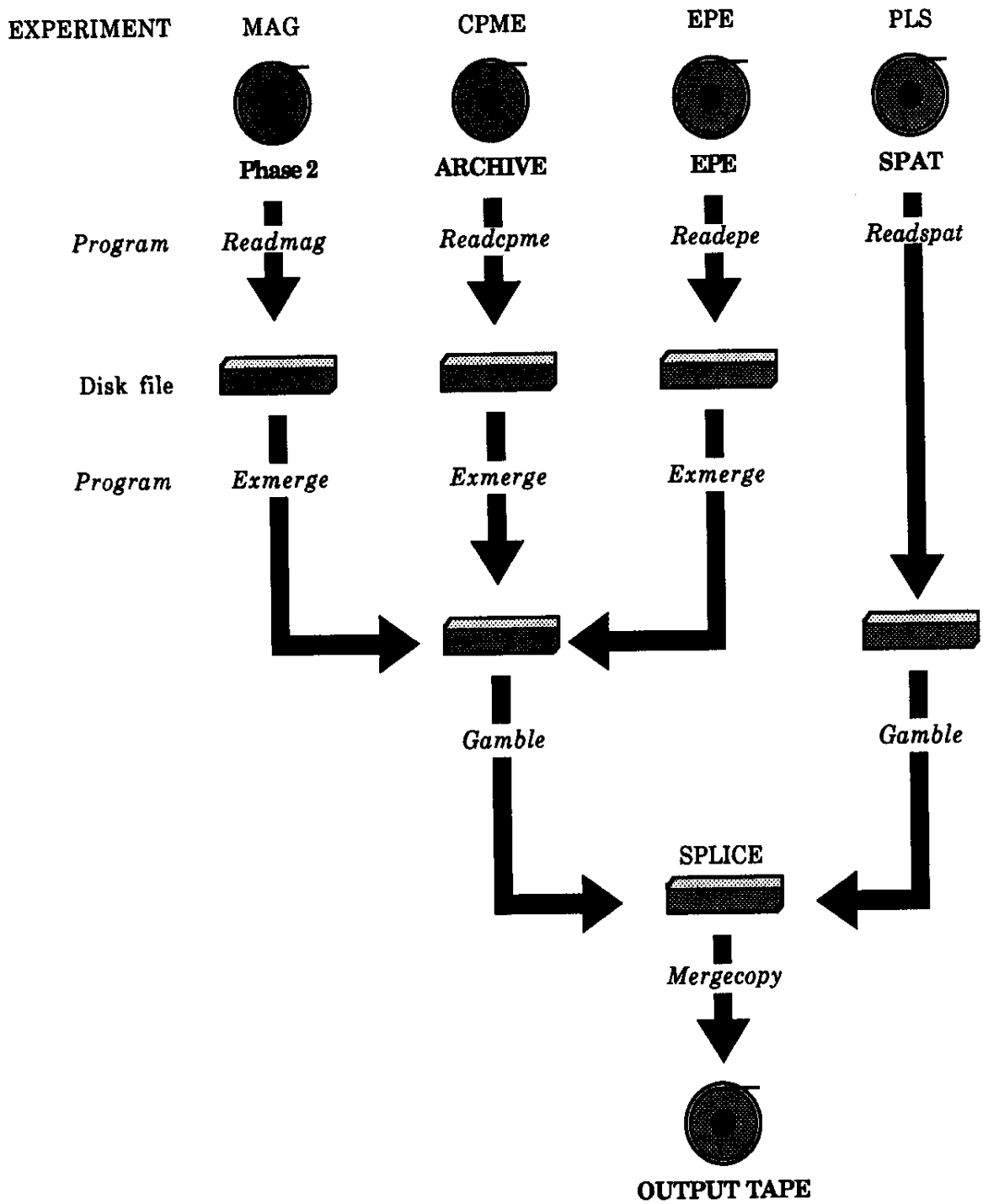
Fig. B.1 Magnetic field records overlapping a MERGE record time block.

The portions of each record overlap (marked T_1, T_2, and T_3) decide the weighting when a magnetic field data item is calculated for the MERGE record. For example, the vector magnetic field strength is determined from the x, y, and z components as measured by the magnetometer. Each component is averaged in the following way:

$$B_x = \frac{[T_1 \cdot (B_x)_1 + T_2 \cdot (B_x)_2 + T_3 \cdot (B_x)_3]}{T_1 + T_2 + T_3}$$

We then derive the vector magnetic field strength (magnitude and direction) from B_x, B_y, and B_z. Since this procedure may not yield enough detail for all investigators, the MERGE record contains not only the weighted average magnetic field data, but also the raw input data from the magnetic field experiment records.

Appendix C: Flow Chart for MERGE Processing



Appendix D: On Bugs and Bad Data

The IMP 8 spacecraft, launched in 1973, has generated a large and generally well-monitored set of data. From the labors of Principle Investigators, Co-Investigators, Guest Investigators, other scientists, and yeoman-like graduate assistants, a body of lore has arisen regarding the eccentricities, glitches, and outright failures of some items represented in the MERGE record.

This Appendix is our attempt to document these items: to point out why certain channels are suspect, to indicate when a piece of experiment hardware failed (through catastrophic or other means), and to suggest recalibrations or work-arounds which might make the data more reliable.

We expect this Appendix to be the most organic part of the MERGE manual; as new information on the reliability of specific items becomes available, this Appendix will be updated. Contributions are welcome: if the reader encounters an item in the MERGE record which seems to contain spurious data, please indicate the item number, include documentation and description of the problem, and send to: Patrick R. Briggs, Dept. of Physics, The Citadel, Charleston, SC 29409.

Current List of Suspect MERGE Items

item #	time period	problem
33-35	——	CPME channels P1-P3 occasionally record false counts due to pulse pileup of high energy electrons. In general, the effect is only significant during periods of high electron flux (typically, during the onset of robust particle flare events). The effect can be detected by observing the behavior of the CPME electron channel E4 (item #54): channels P1-P3 will show a burst-like rise simultaneous with E4. It is not known at this time whether the effect occurs during magnetopause crossings or during other burst-like phenomena. [PRB]
42	——	CPME channel P10 does not seem to be recording counts from the 96-145 MeV/nuc energy range; this may be due to a failure or miscalibration of the channel logic onboard IMP 8. Studies of the kinetic energy spectra using the CPME proton channels suggest that channel P10 may measuring particles in the range covered by channel P8 (item #40). [PRB]

item #	time period	problem
57	early 1978 ...	CPME channel M (M scintillator) underwent a catastrophic change during the series of very large solar particle events in early 1978. [PRB]
333-334	——	EPE channel L1 is sensitive to X-ray contamination in the solar-pointing sectors (9 and 10) due to Compton scattering and/or ionization. Noise counts are not ordinarily detected during quiet solar activity, but X-ray producing solar flares will produce significant contamination, and the background X-ray flux during solar maximum can generate a continuous noise background (often 10-100 counts above cosmic ray background). Since this X-ray contamination is largely a "line-of-sight" effect, the other L1 sectors are not affected. [DGM]
364-367, 380-383	——	Detector responses in EPE channels L7 and L8 are significantly degraded by sunlight in sectors 8, 9, 10, and 11. [DGM]
412	1977 –	The solar wind North-South flow angle has developed a systematic error of about 5° (excess from the South) due to a gradual change in amplifier gain on one of the collector plates. The change took place over ~ 6 months' duration, and has apparently stabilized. Future versions of MERGE may include a correction algorithm to compensate for this error. [AJL]
—	——	The IMP solar sensor occasionally (and randomly) emits spurious sun pulses ; since IMP determines its direction and orientation from the measured solar position, this can cause a misidentification of spacecraft azimuthal coordinates. [AJL]

Bibliography

CPME:

Handbook and Reference Manual for Charged Particle Measurement Experiment Data from Explorer 47 and 50. T.P. Armstrong. Johns Hopkins University/Applied Physics Laboratory Preprint 76 - 02. (1976)

EPE:

The Ion-Electron Magnetic Separation and Solid State Detector Detection System Flown on IMP 7 and 8: $E_p \geq 50$ keV, $E_e \geq 30$ keV. D.J. Williams. NOAA Technical Report ERL 393-SEL 40. (1977)

Magnetic Field Experiment:

Magnetic Field Experiment Data Processing Systems: Explorers 47 and 50. W.H. Mish and R.P. Lepping. GSFC technical report X-694-76-158. (1976)

Solar Wind Experiment:

Description of the MIT Plasma Experiment On IMP 7/8. A. Bellomo and A. Mavretic. Massachusetts Institute of Technology/Center for Space Research technical report TR-78-2. (1978)

Acknowledgments

T.P. Armstrong of the University of Kansas first broached the idea of updating the CPME archive tapes and merging their contents with other important data sets from the IMP 8 mission. He has been the "effective cause" of the MERGE project, and has displayed his legendary patience and encouragement on many occasions.

The author thanks Dr. A.T.Y. Lui and the Space Physics group at Johns Hopkins University / Applied Physics Laboratory for contract support. L. Suther (JHU/APL) provided many helpful suggestions during the programming and implementation phase. J.L. Gunther (JHU/APL) has been responsible for day-to-day production of intermediate and final output, and acted as liaison between programmer and program during development of MERGE.

D.G. Mitchell (JHU/APL) provided technical data and valuable discussions on the Energetic Particle Experiment. R.P. Lepping (Goddard Space Flight Center) contributed important background material on the GSFC magnetometer experiment. A.J. Lazarus (MIT) provided timely information on the MIT plasma experiment. J.L. King (National Space Science Data Center) has offered continued encouragement during the development and production of the MERGE data set.

I wish to thank The Citadel Development Foundation, which has provided consistent and generous support over the duration of this project.

This project could not have been completed without the encouragement and assistance of my wife, Kasey.

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FATAR CONTROL CARDS
   1--  ANALYZE BLP                                                                    00000130
   2--    PRINT LF=1,B=ALL,HEX                                                         00000131
FATS071 TAPE BUFFER SIZE IS 65535 BYTES
FATS040 TAPEIN IS NOT LABELED - LABELS=NO ASSUMED

                                   CHARACTERISTICS OF THE TAPE TO BE ANALYZED
                                            UNIT  SERIAL  DEN  TRTCH
                                             5B1  NC1062  38000

                                              FATAR DETAIL REPORT

 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                   (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  START FILE        1

     1 25500  PRINT REQUESTED        00000000 80410000 00000000 00000000  80400000 00000000 00000000 F64500C0
       +00033                        24440000 B8420000 58430000 E0410000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     2 25500  PRINT REQUESTED        00000000 00000000 00000000 00000000  00000000 00000000 00000000 F64500C0
       +00033                        24440000 B8420000 6C430000 E0410000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     3 25500  PRINT REQUESTED        00000000 00000000 00000000 00000000  00000000 00000000 00000000 F64500C0
       +00033                        25440000 00000000 80410000 00410000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     4 25500  PRINT REQUESTED        00000000 00000000 00000000 00000000  00000000 00000000 00000000 F64500C0
       +00033                        25440000 00000000 10420000 00410000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     5 25500  PRINT REQUESTED        00000000 00000000 00000000 00000000  00000000 00000000 00000000 F64500C0
       +00033                        25440000 00000000 60420000 00410000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     6 25500  PRINT REQUESTED        00000000 00410000 00000000 00000000  00000000 00000000 00000000 F64500C0
       +00033                        25440000 00000000 98420000 00410000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     7 25500  PRINT REQUESTED        00000000 00000000 00000000 00000000  00000000 00000000 00000000 F64500C0
       +00033                        25440000 00000000 C0420000 00410000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     8 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                        25440000 00000000 E8420000 6142004C  1B497E64 15490E7D 35C98A84 1B497E64
       +00065                        3D491A23 0BC936B9 00C9DD2C 67493D4B

     9 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                        25440000 00000000 04430000 6C430000  1B490537 15492EB3 35C93277 1B490537
       +00065                        3C4926F7 0CC9261D 00C9066B 67492F21
```

D82346

164

1974

D82346

FATAR DETAIL REPORT

```
BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
NUMBER DISPL   BLOCK TYPE                        (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

  5340 25500   PRINT REQUESTED        80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500C0
       +00033                         37440000 98420000 64430000 134300A8  90C7DCE7 32C9D4E0 2248C87D 90C7DCE7
       +00065                         36C90815 B147B0C4 3349F72C 20C6773D

* * * * * * *  END OF FILE      1  -- FILE CONTAINED    5340 BLOCKS

* * * * * * *  START FILE       2

* * * * * * *  END OF FILE      2  -- FILE CONTAINED       0 BLOCKS

FATS020 ANALYSIS TERMINATED AT TAPEMARK SEQUENCE
```

FINAL TOTALS

FILES READ	BLOCKS READ	BYTES READ	FEET READ	TEMP ERRS	PERM ERRS	FILES WRITTEN	BLOCKS WRITTEN
2	5340	136170000	335	0	0	0	0

```
FAST ANALYSIS OF TAPE AND RECOVERY -- FATAR   VER 4.2.0P  -- INNOVATION DATA PROCESSING  AUTHORIZED   9/11/91   PAGE   1

FATS070 CONTROL CARD TABLE SIZE IS   4096 BYTES

FATAR CONTROL CARDS

   1--  ANALYZE BLP                                                    00000130
   2--    PRINT LF=1,B=ALL,HEX                                         00000131

FATS071 TAPE BUFFER SIZE IS 65535 BYTES

FATS040 TAPEIN IS NOT LABELED - LABELS=NO ASSUMED

                                   CHARACTERISTICS OF THE TAPE TO BE ANALYZED
                                            UNIT  SERIAL  DEN  TRTCH
                                             5BB  NC1063  38000

                                              FATAR DETAIL REPORT

 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                   (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  START FILE       1

     1 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                          37440000 B8420000 40430000 2A410080  5FC65D75 3BC9D539 E747A3C1 5FC65D75
       +00065                          3DC9B964 99466920 3849ACA0 8947FC5F

     2 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                          37440000 B8420000 54430000 17420020  4AC69FA8 3BC9B963 E547E0A7 4AC69FA8
       +00065                          3DC97B83 9B46C037 3849F0B9 8C4780DB

     3 25500   PRINT REQUESTED          80400000 50420000 80400000 00000000  80400000 80400000 00000000 F64500C0
       +00033                          37440000 B8420000 68430000 814200E0  35C6C5DB 3BC9638D E347CF8D 35C6C5DB
       +00065                          3DC900A2 9D4650DC 3849F9D2 9047DC56

     4 25500   PRINT REQUESTED          80400000 70420000 80400000 00000000  80400000 80400000 00000000 F64500C0
       +00033                          38440000 00000000 40410000 2441C049  22C60972 3BC911B4 E1475D97 22C60972
       +00065                          3DC941BE A046F4D1 384921EA 93479D96

     5 25500   PRINT REQUESTED          00000000 60420000 00000000 00000000  80400000 80400000 00000000 F64500C0
       +00033                          38440000 00000000 00420000 00420000  00000000 00000000 00000000 00000000
       +00065                          00000000 00000000 00000000 00000000

     6 25500   PRINT REQUESTED          80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                          38440000 00000000 50420000 81428016  F1C5A9B1 3CC93F06 DD47CA61 F1C5A9B1
       +00065                          3DC904FA A84676DE 3949FA1A 9A475D8C

     7 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                          38440000 00000000 90420000 B742405C  C8C5E518 3CC9FA2E DB479346 C8C5E518
       +00065                          3EC97A17 AD4686B4 39490E33 9E47F206

     8 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                          38440000 00000000 B8420000 ED42C0A3  9EC56780 3CC97A57 D947102B 9EC56780
       +00065                          3EC9A234 B3469F18 3949E44A A1475181

     9 25500   PRINT REQUESTED          80400000 50420000 80400000 00000000  80400000 80400000 00000000 F64500C0
       +00033                          38440000 00000000 E0420000 1143C0F4  69C5A1D0 3CC9BD7F D747480F 69C5A1D0
       +00065                          3EC98551 B9468100 39497B62 A4477EFB
```

D82347

D82347

FATAR DETAIL REPORT

```
BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
NUMBER DISPL   BLOCK TYPE                        (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

  5314 25500  PRINT REQUESTED          00000000 00410000 00000000 00000000  00000000 00000000 00000000 F64500C0
       +00033                          4A440000 98420000 24430000 5C430000  00000000 00000000 00000000 00000000
       +00065                          00000000 00000000 00000000 00000000

  5315 25500  PRINT REQUESTED          00000000 00410000 00000000 40420000  00000000 00000000 00000000 F64500C0
       +00033                          4A440000 98420000 38430000 5C430000  00000000 00000000 00000000 00000000
       +00065                          00000000 00000000 00000000 00000000

  5316 25500  PRINT REQUESTED          00000000 00000000 00000000 00000000  00000000 00000000 00000000 F64500C0
       +00033                          4A440000 98420000 4C430000 5C430000  00000000 00000000 00000000 00000000
       +00065                          00000000 00000000 00000000 00000000

 * * * * * *  END OF FILE      1  -- FILE CONTAINED    5316 BLOCKS

* * * * * * *  START FILE       2

* * * * * * *  END OF FILE      2  -- FILE CONTAINED       0 BLOCKS

FATS020 ANALYSIS TERMINATED AT TAPEMARK SEQUENCE
```

FINAL TOTALS

FILES READ	BLOCKS READ	BYTES READ	FEET READ	TEMP ERRS	PERM ERRS	FILES WRITTEN	BLOCKS WRITTEN
2	5316	135558000	332	0	0	0	0

```
FAST ANALYSIS OF TAPE AND RECOVERY -- FATAR   VER 4.2.0P  -- INNOVATION DATA PROCESSING  AUTHORIZED   9/11/91   PAGE   1
FATS070 CONTROL CARD TABLE SIZE IS   4096 BYTES
FATAR CONTROL CARDS
   1--  ANALYZE BLP                                                                    00000130
   2--    PRINT LF=1,B=ALL,HEX                                                         00000131
FATS071 TAPE BUFFER SIZE IS 65535 BYTES
FATS040 TAPEIN IS NOT LABELED - LABELS=NO ASSUMED
                                   CHARACTERISTICS OF THE TAPE TO BE ANALYZED
                                            UNIT  SERIAL  DEN  TRTCH
                                             5BD  NC1064  38000
                                              FATAR DETAIL REPORT
 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                   (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  START FILE        1
                                                  202 ← 7/21                                                   1974
     1 25500   PRINT REQUESTED          80400000 50420000 80400000 00000000  80400000 80400000 00000000 F64500C0
       +00033                           4A440000 B8420000 5C430000 60430080  37492963 0D49F592 F8C858F3 37492963
       +00065                           0D496F45 F9C842A3 54C9DE6C 06494F5A

     2 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           4B440000 00000000 00000000 2943F8D3  37494640 0D49F5C8 F8C81EA0 37494640
       +00065                           0D494444 F9C88CCD 54C9AE8C 06491213

     3 25500   PRINT REQUESTED          80400000 70420000 80400000 00000000  80400000 80400000 00000000 F64500C0
       +00033                           4B440000 00000000 A0410000 4443C8F6  3749D51A 0E49C102 F8C8D246 3749D51A
       +00065                           0D494C40 FAC80301 54C9ABAE 0549AEC6

     4 25500   PRINT REQUESTED          80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           4B440000 00000000 20420000 6043A01A  364945F5 0E497D3C F7C869ED 364945F5
       +00065                           0D497539 FAC8FA3A 54C990D0 05493E7A

     5 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           4B440000 00000000 80420000 334100D7  3649ACCF 0E492F76 F7C8DE93 3649ACCF
       +00065                           0D49B02F FAC8927B 54C95BF2 0549B92D

     6 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           4B440000 00000000 A8420000 19420081  3649FAA9 0E49C9AF F7C8323A 3649FAA9
       +00065                           0D49F922 FAC8D7C2 55C90614 044923E1

     7 25500   PRINT REQUESTED          80400000 50420000 80400000 00000000  80400000 80400000 00000000 F64500C0
       +00033                           4B440000 00000000 D0420000 83424006  36493484 0E4952E9 F6C863E0 36493484
       +00065                           0D498313 FBC83010 55C99B35 04498194

     8 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           4B440000 00000000 F8420000 B942C04B  3649555E 0F49CE22 F6C87886 3649555E
       +00065                           0D493901 FBC8D963 55C91057 0449C747

     9 25500   PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           4B440000 00000000 10430000 EF428093  36496838 0F49375C F6C86C2C 36496838
       +00065                           0C4945EC FBC864BD 55C97178 034901FB
```

D82348

D82348

FATAR DETAIL REPORT

```
 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                        (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

   4170 25500   PRINT REQUESTED         80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                          59440000 B0420000 24430000 87420080  3C48814B 4149FF95 3E486551 3C48814B
        +00065                          4449DB8A 0548E34A 2DC99483 D9C8AA7E

   4171 25500   PRINT REQUESTED         80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                          59440000 B0420000 38430000 BD4200C0  3A486CF3 4149CC82 3F484244 3A486CF3
        +00065                          44492C7F 05480CFB 2DC94D39 DAC8000F

   4172 25500   PRINT REQUESTED         80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                          59440000 B0420000 4C430000 F4420010  3948269B 41496A6F 4048EF36 3948269B
        +00065                          44493774 06483B97 2CC9D6EE DAC81D9F

 * * * * * *  END OF FILE      1  -- FILE CONTAINED    4172 BLOCKS

* * * * * * *  START FILE       2

* * * * * * *  END OF FILE      2  -- FILE CONTAINED       0 BLOCKS

FATS020 ANALYSIS TERMINATED AT TAPEMARK SEQUENCE
```

FINAL TOTALS

FILES READ	BLOCKS READ	BYTES READ	FEET READ	TEMP ERRS	PERM ERRS	FILES WRITTEN	BLOCKS WRITTEN
2	4172	106386000	261	0	0	0	0

```
FAST ANALYSIS OF TAPE AND RECOVERY -- FATAR   VER 4.2.0P  -- INNOVATION DATA PROCESSING  AUTHORIZED   9/11/91   PAGE   1
FATS070 CONTROL CARD TABLE SIZE IS   4096 BYTES
FATAR CONTROL CARDS
   1--  ANALYZE BLP                                                          00000130
   2--    PRINT LF=1,B=ALL,HEX                                               00000131
FATS071 TAPE BUFFER SIZE IS 65535 BYTES
FATS040 TAPEIN IS NOT LABELED - LABELS=NO ASSUMED
                                   CHARACTERISTICS OF THE TAPE TO BE ANALYZED
                                            UNIT  SERIAL  DEN  TRTCH
                                             5B2  NC1065  38000
                                              FATAR DETAIL REPORT
 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                   (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  START FILE       1

      1 25500  PRINT REQUESTED      218  80400000 30420000 80400000 00000000  00000000 80400000 00000000 F64500C0
        +00033                          5A440000 40410000 00410000 BB42000A  ED47547B 3C4961C9 6D48A2A9 ED47547B
        +00065                          444906E0 A2479B25 1DC984CD F5C82C12

      2 25500  PRINT REQUESTED          80400000 40410000 80400000 00000000  00000000 00000000 00000000 F64500C0
        +00033                          5A440000 40410000 E0410000 F1420052  EA4761B9 3C492DAC 6E48A390 EA4761B9
        +00065                          4449CDE4 9D47936E 1DC91E7A F5C8A895

      3 25500  PRINT REQUESTED          80400000 30420000 80400000 00000000  00000000 80400000 00000000 F64500C0
        +00033                          5A440000 40410000 40420000 134300CB  E7472BF7 3C49C78E 6F486177 E7472BF7
        +00065                          44492CE9 984759A9 1DC98F26 F6C8E518

      4 25500  PRINT REQUESTED          80400000 40410000 80400000 00000000  00000000 00000000 00000000 F64500C0
        +00033                          5A440000 40410000 88420000 2E4300EE  E547AC34 3C492F71 7048DA5D E547AC34
        +00065                          44491DED 934712D6 1CC9D2D2 F6C8D89B

      5 25500  PRINT REQUESTED          80400000 40410000 80400000 00000000  00000000 00000000 00000000 F64500C0
        +00033                          5A440000 40410000 B0420000 4A430010  E247E371 3C496553 71480D44 E247E371
        +00065                          44499FF0 8E47C1F5 1CC9E97E F7C8871E

      6 25500  PRINT REQUESTED          80400000 40410000 80400000 00000000  00000000 00000000 00000000 F64500C0
        +00033                          5A440000 40410000 D8420000 65430034  DF47D5AE 3C496435 7248FC29 DF47D5AE
        +00065                          4449A2F3 8A47FC08 1CC9D12A F7C8EBA0

      7 25500  PRINT REQUESTED          80400000 30420000 80400000 00000000  00000000 80400000 00000000 F64500C0
        +00033                          5A440000 40410000 04430000 824100B8  DC4787EB 3C493117 7348A80F DC4787EB
        +00065                          444928F6 85472E11 1BC98CD6 F8C81C23

      8 25500  PRINT REQUESTED          80400000 30420000 80400000 00000000  00000000 80400000 00000000 F64500C0
        +00033                          5A440000 40410000 18430000 2D4200E8  DA47EA27 3B49CCF8 73480AF5 DA47EA27
        +00065                          444929F8 8047410E 1BC91D82 F8C8F2A4

      9 25500  PRINT REQUESTED          80400000 40410000 80400000 00000000  00000000 00000000 00000000 F64500C0
        +00033                          5A440000 40410000 2C430000 8D42003A  D7470464 3B4930DA 744824DA D7470464
        +00065                          444997F9 76470B02 1BC9842D F9C87326
```

D823 49

D82349

FATAR DETAIL REPORT

```
BLOCK  LNGTH/  MESSAGE/                 1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
NUMBER DISPL   BLOCK TYPE                     (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

  5262 25500  PRINT REQUESTED      236  80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500C0
       +00033                           6C440000 98420000 80400000 3E430080  B5488B16 32C901D9 2CC9CA76 B5488B16
       +00065                           56C9B913 FCC86A33 D846C7AE 7C49086C

  5263 25500  PRINT REQUESTED           80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500C0
       +00033                           6C440000 98420000 C0410000 594300A0  B548A7A1 32C91EB7 2CC9C488 B548A7A1
       +00065                           55C9EA7B FEC8A305 CE46A9A3 7C49C276

  5264 25500  PRINT REQUESTED           80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500C0
       +00033                           6C440000 98420000 40420000 99400000  B648B32C 32C92895 2CC9A89A B648B32C
       +00065                           54C983E5 FFC8EACD C4465798 7C495F81

  5265 25500  PRINT REQUESTED           80400000 70420000 80400000 40420000  80400000 80400000 00000000 F64500C0
       +00033                           6C440000 98420000 88420000 FF410040  B648ACB7 32C91D73 2CC977AC B648ACB7
       +00065                           54C99350 00C958C6 BA46048D 7C49DA8B

  5266 25500  PRINT REQUESTED           80400000 70420000 80400000 40420000  80400000 80400000 00000000 F64500C0
       +00033                           6C440000 98420000 B0420000 6C420020  B7488E42 32C9FF50 2CC931BE B7488E42
       +00065                           53C948BD 01C9A1A0 B0469C81 7C493796

  5267 25500  PRINT REQUESTED           80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500C0
       +00033                           6C440000 98420000 D8420000 AC420060  B74856CD 32C9D12E 2CC9D9CF B74856CD
       +00065                           53C9972B 02C94276 A6460B76 7C4978A0

  5268 25500  PRINT REQUESTED           80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500C0
       +00033                           6C440000 98420000 00430000 E24200A0  B8481758 32C98A0C 2CC967E1 B8481758
       +00065                           52C9EB9B 03C93746 9C46726A 7C4997AA

  5269 25500  PRINT REQUESTED           80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500C0
       +00033                           6C440000 98420000 14430000 0C430070  B848BFE2 31C932EA 2CC9DEF2 B848BFE2
       +00065                           52C9280E 04C93911 9246C75E 7C4992B4

* * * * * * *  END OF FILE      1  -- FILE CONTAINED    5269 BLOCKS

* * * * * * *  START FILE       2

* * * * * * *  END OF FILE      2  -- FILE CONTAINED       0 BLOCKS

FATS020 ANALYSIS TERMINATED AT TAPEMARK SEQUENCE
```

FINAL TOTALS

FILES READ	BLOCKS READ	BYTES READ	FEET READ	TEMP ERRS	PERM ERRS	FILES WRITTEN	BLOCKS WRITTEN
2	5269	134359500	330	0	0	0	0

```
FAST ANALYSIS OF TAPE AND RECOVERY -- FATAR   VER 4.2.0P  -- INNOVATION DATA PROCESSING  AUTHORIZED   9/11/91   PAGE   1

FATS070 CONTROL CARD TABLE SIZE IS   4096 BYTES

FATAR CONTROL CARDS

   1--  ANALYZE BLP                                                    00000130
   2--    PRINT LF=1,B=ALL,HEX                                         00000131

FATS071 TAPE BUFFER SIZE IS 65535 BYTES

FATS040 TAPEIN IS NOT LABELED - LABELS=NO ASSUMED

                                   CHARACTERISTICS OF THE TAPE TO BE ANALYZED
                                            UNIT  SERIAL  DEN  TRTCH
                                             5B4  NC1066  38000

                                              FATAR DETAIL REPORT

 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                   (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  START FILE       1

      1 25500  PRINT REQUESTED        80400000 70420000 80400000 00000000  80400000 80400000 00000000 F64500C0
        +00033                        6C440000 B8420000 14430000 504200E0  D14832E7 2BC9DB4B 2FC95BC8 D14832E7
        +00065                        45C94086 11C918B1 22C7C535 7E49BF01

      2 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                        6C440000 B8420000 28430000 9E4200C0  D248CC6D 2BC9F025 2FC9D9D5 D248CC6D
        +00065                        45C96496 11C9DD7E 27C79F3A 7E49F905

      3 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                        6C440000 B8420000 3C430000 D5420000  D2484DF4 2AC9F3FF 2FC942E3 D2484DF4
        +00065                        45C9CEA9 11C90248 2CC7603F 7E49170A

      4 25500  PRINT REQUESTED        80400000 70420000 80400000 00000000  80400000 80400000 00000000 F64500C0
        +00033                        6C440000 B8420000 50430000 054300A0  D348B27A 2AC9E3D9 2FC996F0 D348B27A
        +00065                        45C99CC0 11C9460C 31C70A44 7E49160E

      5 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                        6C440000 B8420000 64430000 204300C8  D4480601 2AC9C3B3 2FC9D2FD D4480601
        +00065                        45C996DA 10C9F8CB 36C7A848 7E49FA11

      6 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                        6D440000 00000000 00410000 D4422831  D448497E 2AC91A90 30C91B0A D448497E
        +00065                        45C9C7F5 10C9AB8B 3AC786F7 7E497A15

      7 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                        6D440000 00000000 E0410000 0543683B  D5486E04 2AC9D869 30C93417 D5486E04
        +00065                        46C90A16 10C93242 3FC7F4FB 7E492019

      8 25500  PRINT REQUESTED        80400000 70420000 80400000 00000000  80400000 80400000 00000000 F64500C0
        +00033                        6D440000 00000000 40420000 2043305E  D5487E8A 2AC97E43 30C93024 D5487E8A
        +00065                        46C98139 0FC9FAF3 45C74900 7E49AA1C

      9 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
        +00033                        6D440000 00000000 88420000 3B430081  D6487610 2AC9151D 30C91B31 D6487610
        +00065                        46C9F05F 0FC957A1 4AC78704 7E491320
```

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FATAR DETAIL REPORT

082350

```
BLOCK  LNGTH/  MESSAGE/                  1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
NUMBER DISPL   BLOCK TYPE                      (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

  4872 25500  PRINT REQUESTED      254  80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           7E440000 80410000 80400000 37410050  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

  4873 25500  PRINT REQUESTED           80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           7E440000 80410000 C0410000 1A420060  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

  4874 25500  PRINT REQUESTED           80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           7E440000 80410000 30420000 83420074  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

  4875 25500  PRINT REQUESTED           80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           7E440000 80410000 80420000 B94200BA  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

  4876 25500  PRINT REQUESTED           80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           7E440000 80410000 A8420000 F0420000  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

  4877 25500  PRINT REQUESTED           80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           7E440000 80410000 D0420000 13430022  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

  4878 25500  PRINT REQUESTED           80400000 50420000 80400000 00000000  80400000 80400000 00000000 F64500C0
       +00033                           7E440000 80410000 F8420000 2E430045  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

  4879 25500  PRINT REQUESTED           80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           7E440000 80410000 10430000 49430068  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

  4880 25500  PRINT REQUESTED           80400000 A0410000 80400000 00000000  80400000 00000000 00000000 F64500C0
       +00033                           7E440000 80410000 24430000 6443008C  00000000 00000000 7F0CF389 63CE30FE
       +00065                           00000000 78A60052 1AC620AC 00000000

* * * * * * *  END OF FILE      1  -- FILE CONTAINED    4880 BLOCKS

* * * * * * *  START FILE        2

* * * * * * *  END OF FILE      2  -- FILE CONTAINED       0 BLOCKS

FATS020 ANALYSIS TERMINATED AT TAPEMARK SEQUENCE
```

FINAL TOTALS

FILES READ	BLOCKS READ	BYTES READ	FEET READ	TEMP ERRS	PERM ERRS	FILES WRITTEN	BLOCKS WRITTEN
2	4880	124440000	306	0	0	0	0

```
FAST ANALYSIS OF TAPE AND RECOVERY -- FATAR   VER 4.2.0P  -- INNOVATION DATA PROCESSING  AUTHORIZED   9/11/91   PAGE   1
FATS070 CONTROL CARD TABLE SIZE IS   4096 BYTES
FATAR CONTROL CARDS
   1--  ANALYZE BLP                                                                    00000130
   2--    PRINT LF=1,B=ALL,HEX                                                         00000131
FATS071 TAPE BUFFER SIZE IS 65535 BYTES
FATS040 TAPEIN IS NOT LABELED - LABELS=NO ASSUMED
                                   CHARACTERISTICS OF THE TAPE TO BE ANALYZED
                                            UNIT  SERIAL  DEN  TRTCH
                                             5B3  NC1060  38000

                                              FATAR DETAIL REPORT

 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                   (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  START FILE       1

     1 25500  PRINT REQUESTED        80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                        90420000 98420000 30430000 F94200D0  54C979EE FDC77EEC 1DC93D0C 54C979EE
       +00065                        BE473577 1EC9CA71 00C9304C 5D498716

     2 25500  PRINT REQUESTED        80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                        90420000 98420000 44430000 18430008  54C916F1 00C84D18 1CC9D2EF 54C916F1
       +00065                        C047FB66 1EC9DB5A 00C92C90 5C4915EC

     3 25500  PRINT REQUESTED        80400000 E0410000 80400000 30420000  80400000 00000000 00000000 F64500E0
       +00033                        90420000 98420000 58430000 33430028  54C99DF3 01C8493A 1CC956D3 54C99DF3
       +00065                        C2473B40 1EC95444 00C91DD4 5C498CC1

     4 25500  PRINT REQUESTED        00000000 00410000 00000000 40420000  00000000 00000000 00000000 F64500E0
       +00033                        90420000 98420000 6C430000 44430000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     5 25500  PRINT REQUESTED        00000000 C0410000 00000000 00000000  80400000 00000000 00000000 F64500E0
       +00033                        90420000 A0420000 80410000 44430000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     6 25500  PRINT REQUESTED        00000000 00410000 00000000 40420000  00000000 00000000 00000000 F64500E0
       +00033                        90420000 A0420000 10420000 44430000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     7 25500  PRINT REQUESTED        00000000 00410000 00000000 00000000  00000000 00000000 00000000 F64500E0
       +00033                        90420000 A0420000 60420000 44430000  00000000 00000000 00000000 00000000
       +00065                        00000000 00000000 00000000 00000000

     8 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                        90420000 A0420000 98420000 E8420000  54C9BDFE 06C802D0 1CC9AA45 54C9BDFE
       +00065                        CA47800E 1DC97DDB 02C94E22 5B492FEE

     9 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                        90420000 A0420000 C8420000 A1410000  55C9B400 07C8A0F1 1CC9BF28 55C9B400
       +00065                        CB47865D 1DC9A5C7 02C9E465 5B4903C3
```

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D82354

D82354

FATAR DETAIL REPORT

```
BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
NUMBER DISPL   BLOCK TYPE                     (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

  5210 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 50420000 DF420000  1C494F97 DC4854CB CA47370C 1C494F97
       +00065                          D548E9CF 15483F7A 3D491FDA 06C869CA

  5211 25500  PRINT REQUESTED          80400000 E0410000 80400000 10420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 90420000 0A4300A4  1C494681 DD481C75 C74702D8 1C494681
       +00065                          D648DA63 1548F359 3E493304 05C8B033

  5212 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 B8420000 254300C8  1C49096B DE48A81E C5478DA3 1C49096B
       +00065                          D64802F6 1548CD44 3E490A2E 03C8CD9C

  5213 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 E0420000 404300E4  1C49A154 DE48F1C7 C347DF6E 1C49A154
       +00065                          D7489986 15481F3A 3E49A857 02C8C305

  5214 25500  PRINT REQUESTED          80400000 E0410000 80400000 30420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 04430000 5C430008  1C490B3E DF48F070 C147ED39 1C490B3E
       +00065                          D8487815 1548803A 3E490681 00C88D6E

  5215 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 1C430000 E5400080  1C494627 E048B419 BF47C004 1C494627
       +00065                          D848C2A2 15484545 3E492DAA FDC75FAE

  5216 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 30430000 09420020  1C495310 E04824C2 BC4759CF 1C495310
       +00065                          D9485F2E 1548FF5A 3E4913D3 FAC7587F

  5217 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 44430000 754200B0  1B492FF9 E1485A6A BA47BA99 1B492FF9
       +00065                          D9487DB8 1548B57A 3E49C0FB F7C70450

  5218 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 58430000 B1420020  1B49E1E1 E2484512 B847D663 1B49E1E1
       +00065                          DA48E240 154806A6 3F493224 F4C75720

  5219 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 40420000 6C430000 E7420068  1B495FCA E248F6B9 B647BC2D 1B495FCA
       +00065                          DA48C4C7 154881DB 3F496A4C F0C763F0

  5220 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 50420000 80410000 0E4300D0  1B49B2B2 E3485061 B3476AF7 1B49B2B2
       +00065                          DB48064D 1648AC1B 3F495C74 EDC725C0

  5221 25500  PRINT REQUESTED          80400000 E0410000 80400000 30420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 50420000 10420000 294300F4  1B49D69A E4487008 B147DFC0 1B49D69A
       +00065                          DB48CDD0 1648DA65 3F49199C EAC79C8F

  5222 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          14430000 50420000 60420000 45430018  1B49CE82 E44844AF AF471A8A 1B49CE82
       +00065                          DC480253 16488FBA 3F499AC3 E7C7C75E
```

```
FAST ANALYSIS OF TAPE AND RECOVERY -- FATAR   VER 4.2.0P  -- INNOVATION DATA PROCESSING  AUTHORIZED   9/11/91   PAGE   1

FATS070 CONTROL CARD TABLE SIZE IS   4096 BYTES

FATAR CONTROL CARDS

   1--  ANALYZE BLP                                                    00000130
   2--    PRINT LF=1,B=ALL,HEX                                         00000131

FATS071 TAPE BUFFER SIZE IS 65535 BYTES

FATS040 TAPEIN IS NOT LABELED - LABELS=NO ASSUMED

                                   CHARACTERISTICS OF THE TAPE TO BE ANALYZED
                                            UNIT  SERIAL  DEN  TRTCH
                                             5B5  NC1061  38000

                                              FATAR DETAIL REPORT

 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                     (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  START FILE       1

      1 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 90420000 344200C0  1349F920 08497B18 054638D5 1349F920
        +00065                        F5484350 6C482F06 4849CE6B B0C4BF56

      2 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 B8420000 904200A0  1249EBFC 0849A761 E745F2BA 1249EBFC
        +00065                        F54800A1 6D48A14F 4849CE82 724318DB

      3 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 E0420000 C64200F0  1249BAD8 0849AEAA C345F8CA 1249BAD8
        +00065                        F548DFF2 6E48BF93 48499999 ED44D00E

      4 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 04430000 FD420030  12495EB4 084992F3 9F4501DB 12495EB4
        +00065                        F648FF45 6F48F6D1 484929B0 5D454FE0

      5 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 18430000 194300B8  1249DF8F 09494B3C 7745B8D5 1249DF8F
        +00065                        F648589A 7148610A 484980C6 A2457B9C

      6 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 2C430000 344300E0  1249386B 0949E784 2F45B5F4 1249386B
        +00065                        F64814F0 72489C3C 4849A2DC D645F648

      7 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 40430000 4F4300F8  12496346 094954CD D044D728 12496346
        +00065                        F7484747 73481D68 48498AF2 044642FA

      8 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 54430000 6B430018  12496E21 0A49A215 004432CE 12496E21
        +00065                        F7480DA0 7448BE8C 49493208 1E460DD0

      9 25500  PRINT REQUESTED        00000000 00410000 00000000 00000000  00000000 00000000 00000000 F64500E0
        +00033                        14430000 98420000 6C430000 40410000  00000000 00000000 00000000 00000000
        +00065                        00000000 00000000 00000000 00000000
```

D82355

D82355

FATAR DETAIL REPORT

```
 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                        (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

   3312 25500   PRINT REQUESTED         80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                          44430000 40420000 5C430000 CD410020  32495005 36487008 3C482C07 32495005
        +00065                          11482862 59481D9C 3049AF42 84C8FDA6

* * * * * * *  END OF FILE      1  -- FILE CONTAINED    3312 BLOCKS

* * * * * * *  START FILE       2

* * * * * * *  END OF FILE      2  -- FILE CONTAINED       0 BLOCKS

FATS020 ANALYSIS TERMINATED AT TAPEMARK SEQUENCE
```

FINAL TOTALS

FILES READ	BLOCKS READ	BYTES READ	FEET READ	TEMP ERRS	PERM ERRS	FILES WRITTEN	BLOCKS WRITTEN
2	3312	84456000	207	0	0	0	0

```
FAST ANALYSIS OF TAPE AND RECOVERY -- FATAR   VER 4.2.0P  -- INNOVATION DATA PROCESSING  AUTHORIZED   9/11/91   PAGE   1

FATS070 CONTROL CARD TABLE SIZE IS   4096 BYTES

FATAR CONTROL CARDS

   1--  ANALYZE BLP                                                    00000130
   2--    PRINT LF=1,B=ALL,HEX                                         00000131

FATS071 TAPE BUFFER SIZE IS 65535 BYTES

FATS040 TAPEIN IS NOT LABELED - LABELS=NO ASSUMED
```

D 82356

```
                                  CHARACTERISTICS OF THE TAPE TO BE ANALYZED
                                           UNIT  SERIAL  DEN  TRTCH
                                            5B6  NC1062  38000

                                            FATAR DETAIL REPORT

 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                   (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  START FILE       1
```

1975

```
      1 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 A8420000 68430000 D94200A0  3249B581 A448E75C 91473606 3249B581
        +00065                        6F4831BD 6C482750 4349BD8F C7C778A9
```

49

```
      2 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 B0420000 40410000 074300F0  3249D277 A5488904 8E470DCB 3249D277
        +00065                        7148F62A 6C484758 4349E2B1 C4C7D577

      3 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 B0420000 00420000 23430010  3249BF6D A548F8AB 8C47B98F 3249BF6D
        +00065                        7248A39E 6C48D35A 4349D0D3 C1C7F445

      4 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 B0420000 50420000 3E430038  32497763 A6483F53 8A473854 32497763
        +00065                        7448EC17 6C48F257 434983F5 BEC7D613

      5 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 B0420000 90420000 59430050  3249FE58 A64842FA 88479218 3249FE58
        +00065                        75481497 6C48394F 4449FA16 BAC786E1

      6 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 B0420000 C0420000 8E400000  3249524E A74822A1 8547C3DC 3249524E
        +00065                        7748CC1B 6C48E340 44493738 B7C7FAAE

      7 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 B0420000 E8420000 FC4100C0  32497243 A848CE47 8347C5A0 32497243
        +00065                        78486BA6 6C487C2C 44493959 B4C7327C

      8 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 B0420000 08430000 6A4200E0  32496338 A8484EEE 8147A664 32496338
        +00065                        7A489B36 6C483412 4449047A B1C73B49

      9 25500  PRINT REQUESTED        80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
        +00033                        44430000 B0420000 1C430000 AB4200B0  3249202D A9489894 7E47C350 3249202D
        +00065                        7B48BDCC 6B488CF1 4449919A AEC71016
```

D82356

FATAR DETAIL REPORT

```
BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
NUMBER DISPL   BLOCK TYPE                    (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

  5301 25500  PRINT REQUESTED      68  80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 50420000 C44200B0  64C948A7 1348BB44 84C83180 64C948A7
       +00065                          73486F94 34C8C581 58C94ABC CA48DF7F

  5302 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 90420000 FA4200F0  64C9ECB8 12488F43 84C83C09 64C9ECB8
       +00065                          7348B419 32C8C2F7 58C9ACDB C94812DD

  5303 25500  PRINT REQUESTED          80400000 70420000 80400000 40420000  80400000 80400000 00000000 F64500E0
       +00033                          88430000 88420000 B8420000 1843009C  64C96ECA 11484A42 83C83292 64C96ECA
       +00065                          7248F69B 31C88970 58C9EFFA C948233A

  5304 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 E0420000 334300C0  64C9CEDB 1048F340 83C8181B 64C9CEDB
       +00065                          7248081B 2FC85BEC 59C90D1A C8481997

  5305 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 04430000 4E4300DC  64C909ED 0F48873F 82C8E0A3 64C909ED
       +00065                          7148DE96 2EC85D6B 59C90639 C748E9F3

  5306 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 18430000 6A430000  64C923FE 0E48063E 82C8952C 64C923FE
       +00065                          71485E0F 2CC8B6ED 59C9DE57 C7489D50

  5307 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 30430000 A9410020  65C91B0F 0D48723C 81C831B5 65C91B0F
       +00065                          7048A984 2BC86173 59C99376 C6482FAD

  5308 25500  PRINT REQUESTED          80400000 E0410000 80400000 40420000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 44430000 41420010  65C9E91F 0C48C33A 81C8C53D 65C9E91F
       +00065                          6F483CF6 29C8F7FC 59C91F95 C648A109

  5309 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 58430000 964200C8  65C99930 0B480239 80C840C6 65C99930
       +00065                          6F487564 28C82F8A 59C98FB3 C548F065

  5310 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 88420000 6C430000 CD420010  65C92641 0A483037 80C8A04E 65C92641
       +00065                          6E482DCF 27C8471B 59C9D8D1 C4481DC2

  5311 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 90420000 80410000 014300A8  65C98B51 09484235 7FC8DEAD 65C98B51
       +00065                          6E483C36 25C880B0 59C9F9EF C448311E

  5312 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 90420000 10420000 1C4300CC  65C9D061 08484533 7EC84CBE 65C9D061
       +00065                          6D48BF99 24C8D049 5AC9F90D C348207A

  5313 25500  PRINT REQUESTED          80400000 E0410000 80400000 00000000  80400000 00000000 00000000 F64500E0
       +00033                          88430000 90420000 60420000 374300E8  65C9F071 07483431 7DC892CE 65C9F071
       +00065                          6C488FF9 22C87CE7 5AC9D72B C248F2D5
```

FATAR DETAIL REPORT

```
 BLOCK  LNGTH/  MESSAGE/                1...5...10...15...20...25...30...35...40...45...50...55...60...65...70...75...80
 NUMBER DISPL   BLOCK TYPE                        (COLUMN GRID IS VALID ONLY FOR CHARACTER FORMATTED DATA)

* * * * * * *  END OF FILE      1  -- FILE CONTAINED    5313 BLOCKS

* * * * * * *  START FILE       2

* * * * * * *  END OF FILE      2  -- FILE CONTAINED       0 BLOCKS

FATS020 ANALYSIS TERMINATED AT TAPEMARK SEQUENCE
```

FINAL TOTALS

FILES READ	BLOCKS READ	BYTES READ	FEET READ	TEMP ERRS	PERM ERRS	FILES WRITTEN	BLOCKS WRITTEN
2	5313	135481500	332	0	0	0	0