HOURLY AVERAGE

Voyager hourly average tapes contain averages of all the currently available interplanetary data for an individual spacecraft. They are FORTRAN readable; the reading procedure is described in Appendix A. The tape contains data from L, M, E1, and E2 modes and also trajectory information.

The tape begins with a header section which is followed by data arranged in triplets. If q is the quantity measured, the triplet is q_{ave}, σ_q, and N_q,

$q_{ave} = (\Sigma\ q_i)/N_q$

$\sigma = [\Sigma\ (q_i - q_{ave})^2/(N_q - 1)]^{1/2}$

N_q = the number of data points contributing to $q_{ave.}$.

Note carefully that any parameter may be filled (there is no unique fill value); if so, the value of N_q is set to 0. Be sure to check N_q before using an average. (The fill value is not predictable.)

The supplementary trajectory information on the G-tapes (word number 211 and greater) is not arranged in such triplets. A detailed description of the tape follows. The source of most of the parameters is the "ANSWER" array from the Voyager analysis program VGRANL. The position of any variable in the hourly average array is controled by the :hdref refid=CDOCP., and can be changed using the namlist &RUNNT, see :hdref refid=FT02. Changes should be made :hp3.only with extreme care.:ehp3. as mixing such files can result in an unreadable data set. The default values follow.

---------- HEADER ----------

WORD	MEANING		TYPE
0	The number of words following in record		I4
1,2	Source of data (tape label)		A8
3	Type of source: (’EDR ’ or ’SUM ’)		A4
4	Date the average was made		
5	Spare		
6	S/C ID: (’VOY1’ or ’VOY2’)	A8	
7	Time of data:	Year (e.g. 1977=77)	I4
8		Day (Jan 1 =1)	I4
9		Hour (0 - 23)	I4

Unless otherwise specified, the data triplet variables have the following types: q_{ave} and σ_q are R*4; N_q is I4.

Referances to ANS under SOURCE refer to the answer array, see :hdref refid=ANSWER..
The TRIPLET # also refers to the index of the proto HA array produced by DOCP, see :hdref refid=DO

WORD	MEANING	SOURCE	[TRIPLET #]
---------- M MODE VARIABLES moment protons -			
10-12	ρ #/cc	ANS(38)	[1]
13-15	|V| km/s	ANS(102)	[2]
16-18	W Thermal width km/s	ANS(40)	[3]
19-21	Anisotropy wpar/wperp	ANS(41)	[4]
22-24	V_r km/s	ANS(99)	[5]
25-27	V_t km/s	ANS(100)	[6]
28-30	V_n km/s	ANS(101)	[7]
	estimates		
31-33	ρ #/cc	ANS(38)	[8]
34-36	|V| km/s	ANS(102)	[9]
37-39	W Thermal width km/s	ANS(40)	[10]
---------- M MODE VARIABLES moment alphas --			
40-42	ρ #/cc	ANS(117)	[11]
43-45	|V| km/s	ANS( )	[12]
46-48	W Thermal width km/s	ANS(118)	[13]
49-51	Anisotropy wpar/wperp	ANS( )	[14]
52-54	V_r km/s	ANS( )	[15]
55-57	V_t km/s	ANS( )	[16]
58-60	V_n km/s	ANS( )	[17]
	estimates		
61-63	ρ #/cc	ANS( )	[18]
64-66	|V| km/s	ANS( )	[19]
67-69	W Thermal width km/s	ANS( )	[20]
---------- M MODE VARIABLES fit protons -			
70-72	ρ #/cc	ANS(52)	[21]
73-75	|V| km/s	ANS(108)	[22]
76-78	W Thermal width km/s	ANS(53)	[23]
79-81	Anisotropy wpar/wperp	ANS(54)	[24]
82-84	V_r km/s	ANS(105)	[25]
85-87	V_t km/s	ANS(106)	[26]
88-90	V_n km/s	ANS(107)	[27]
	estimates		
91-93	ρ #/cc	ANS( )	[28]
94-96	|V| km/s	ANS( )	[29]
97-99	W Thermal width km/s	ANS( )	[30]

---------- M MODE VARIABLES fit alphas --			
100-102	ρ #/cc	ANS(59)	[31]
103-105	|V| km/s	ANS(114)	[32]
106-108	W Thermal width km/s	ANS(60)	[33]
109-111	Anisotropy wpar/wperp	ANS(61)	[34]
112-114	V_r km/s	ANS(111)	[35]
115-117	V_t km/s	ANS(112)	[36]
118-120	V_n km/s	ANS(113)	[37]
	estimates		
121-123	ρ #/cc	ANS( )	[38]
124-126	|V| km/s	ANS( )	[39]
127-129	W Thermal width km/s	ANS( )	[40]
---------- MAGNETIC FIELD ----------			
130-132	F1 = $\|\Sigma B_i\|/N$	ANS(8)	[41]
133-135	F2 = $\Sigma \|B_i\|/N$	ANS(9)	[42]
136-138	B_r γ	ANS(96)	[43]
139-141	B_t γ	ANS(97)	[44]
142-144	B_n γ	ANS(98)	[45]
145-147	Number of rejected spectra		[46]
---------- E1 & E2 VARIABLES long integration time ----------			
148-150	E1 Temperature °K	ANS(17)	[47]
151-153	E1 Flux one dimensional	ANS(16)	[48]
154-156	E2 Temperature °K	ANS(17)	[49]
157-159	E2 Flux one dimensional	ANS(16)	[50]

---------- L-MODE VARIABLES moment, long integration ------			
160-162	ρ #/cc	ANS(38)	[51]
163-165	|V| km/s	ANS(102)	[52]
166-168	W Thermal width km/s	ANS(40)	[53]
169-171	Anisotropy wpar/wperp	ANS(41)	[54]
172-174	V_r km/s	ANS(99)	[55]
175-177	V_t km/s	ANS(100)	[56]
178-180	V_n km/s	ANS(101)	[57]
	estimates		
181-183	ρ #/cc	ANS(38)	[58]
184-186	|V| km/s	ANS(102)	[59]
187-189	W Thermal width km/s	ANS(40)	[60]
	D cup		
190-192	Density #/cc	ANS(23)	[61]
193-195	Velocity km/s	ANS(27)	[62]
196-198	Thermal width km/s	ANS(37)	[63]
---------- TRAJECTORY ----------			
199-201	Range from Sun AU (using 1AU=1.495979x10^8 km)	ASEDR(11)	[64]
202-204	Longitude, Sun true Equinox and Equator, radians	ASEDR(12)	[65]
205-207	Latitude, Sun True Equinox and Equator, radians	ASEDR(13)	[66]
---------- E1 & E2 VARIABLES short integration time ----------			
208-210	E1 Temperature °K	ANS(17)	[67]
211-213	E1 Flux one dimensional	ANS(16)	[68]
214-216	E2 Temperature °K	ANS(17)	[69]
217-219	E2 Flux one dimensional	ANS(16)	[60]

---------- L-MODE VARIABLES moment. short integration ------

220-222	ρ #/cc	ANS(38)	[61]
223-225	|V| km/s	ANS(102)	[62]
226-228	W Thermal width km/s	ANS(40)	[63]
229-231	Anisotropy wpar/wperp	ANS(41)	[64]
232-234	V_r km/s	ANS(99)	[65]
235-237	V_t km/s	ANS(100)	[66]
238-124	V_n km/s	ANS(101)	[67]
	estimates		
241-243	ρ #/cc	ANS(38)	[68]
244-246	|V| km/s	ANS(102)	[69]
247-249	W Thermal width km/s	ANS(40)	[70]
	D cup		
250-252	Density #/cc	ANS(23)	[71]
253-255	Velocity km/s	ANS(27)	[72]
256-258	Thermal width km/s	ANS(37)	[73]

The first word of each record (Header word O) indicates the number of words which follow. A FORTRAN READ statement might be of the form:

```
READ (XX) N, (A(I), I = 1,N)
```

with an EQUIVALENCE statement

```
EQUIVALENCE (A(1), IA(1))
```

With the DD card,

```
//FTXXF001 DD UNIT=T6250,LABEL=(,BLP),
// DCB=(RECFM=VBS,LRECL=17596,BLKSIZE=17600,
// VOL=SER=ABCD
```