```
0    H_TYPE              Header type  (D=DISR, I=IMP)
1    H_DIRECTORY         First part of filename
2    H_FILENAME          Last part of filename
3    H_FILETIME          Time file was last written by D_WRITE
4    H_LENGTH            Length of header string array
5    H_DIMENSION         Number of dimensions in data
6    H_XSIZE             Number of columns
7    H_YSIZE             Number of rows
8    H_ZSIZE             Number of images
9    H_DATATYPE          Type of data
                    1=byte
                    2=16 bit integer
                    3=32 bit integer
                    4=floating point
                    5=double precision
                    6=complex
                    7=string
                    8=structure
10   H_EXTENSION         Position in header where extension area starts
11   H_EXTRA             Position in header where extra area starts
12   H_PROCESS           Position in header where processing area
starts
13   H_PURPOSE           Purpose of observation
                    In Process, Verification, or Calibration
14   H_SUBJECT           Discipline taking data:
                    Optics, Electronics, SW, System, Environments
15   H_DATE              Date observation made
                    Format: Wed Nov 24 10:04:11 1997
16   H_ENGINEER          Engineer responsible
17   H_SITE              Site of observation
                    Martin Marietta
                    University of Arizona
                    MPAE
                    ESOC
                    MBB
18   H_SET_NAME          Text description of data set (see 86)
19
20
21
22   H_CCDTEMP           On chip CCD temperature in [K]
23   H_REF_TEMP          CCD electronics reference temperature (MPAE)
24
25
26
27
28
29
30   H_DETECTOR          detector type (CCD, IR, PHOTOMETER, Aux)
31   H_SENSOR_ID         sensor id number
32
33
34
35
36   H_EXPTIME           integration time [ms] for CCD measurement
37   H_IMAGE_TIME        start time of exposure
38   H_ABSCAL            absolute calibration factor used
39
```

```
40
41
42   H_COORD_XL_2 SA2, Dark col 2, and Vis Ext 2 lower left pixel
43   H_COORD_YL_2 SA2, Dark col 2, and Vis Ext 2 lower left pixel
44   H_COORD_XL_3 SA3 lower left pixel
45   H_COORD_YL_3 SA3 lower left pixel
46   H_COORD_XL_4 SA4 lower left pixel
47   H_COORD_YL_4 SA4 lower left pixel
48   H_AXIS_EL           elevation of DISR spin axis
49   H_AXIS_AZ           azimuth of DISR spin axis
50   H_COORD_XL          CCD coordinates (lower left pixel)
                  Images, SA1, Dark col 1, Vis Ext 1
51   H_COORD_YL          CCD coordinates (lower left pixel)
                  Images, SA1, Dark col 1, Vis Ext 1
52   H_COORD_XU          not used
53   H_COORD_YU          not used
54   H_FILTER            filter or wavelength in use
55   H_GAIN              gain factor (MPAE)
56   H_DC_OFFSET         DC offset (MPAE)
57
58
59
60   H_TIMING_GEN        timing generator code (MPAE)
61   H_CAMERA            BB/EM/FM model
62   H_VACUUM            Ambient or Vacuum
63   H_OPTICS            optical setup for data set
                  Collimated light
                  Int. Sphere
                  f/#
64   H_TESTLAMP          which external source used
                  Monochromator
                  High Intensity
                  Broadband
                  Laser
                  Dark
                  Other
65   H_SHUT_TIME         opening time of CCD test shutter (MPAE)
66   H_LED_TIME          LED on time (MPAE)
67
68
69
70
71
72
73
74
75
76
77
78
79
80   H_GSE_REV           GSE revision creating data set
81   H_CONFIG_FILE       configuration file associated with data set
82   H_TEST_LOG          test log filename generating data
83   H_REC_BEG           first record of this data set in test log
84   H_REC_END           last record of this data set in test log
85   H_PIXEL_UNITS       units of pixels (digital numbers)
```

```
                    All data will be stored from light in raw ADC units
86   H_SET_ID            data set id
                    1=Message
                    2=Time
                    3=Sun Sensor
                    6=Housekeeping
                    7=Lamp
                    8=Descent Cycle
                    9=Calibration Cycle
                    10=Visible
                    11=Image
                    12=Strip
                    13=Solar Aureole
                    14=Dark Current
                    15=Full CCD
                    16=IR
                    17=Violet
                    19=Visible Extra
                    20=Shutter Test
                    21=DCS Test
                    22=Heater Test
                    23=Calibration Lamp Test
                    24=Surface Lamp Test
                    25=Sun Lamp Test
                    26=Bad RAM
                    27=Bad EEPROM
                    28=Memory Dump
                    29=Image Graph (WGSE)
                    30=Raw
87   H_SET_NUMBER        sequential number of this data set
88   H_MISSION_TIME      mission time in seconds
89   H_CYCLE_NUMBER      sequential numbering of cycles
90   H_CYCLE_TYPE        cycle type
                    1=Standard non-image
                    2=Standard image
                    3=Flat Field
                    4=Cal Cycle A
                    5=Cal Cycle B
                    6=Cal Cycle C
                    8=Dark current only
                    9=Spectrophotometric
                    10=Drain cycle
                    11=High near surface
                    12=Medium near surface
                    13=Low near surface
                    14=Very low near surface
                    15=Surface A
                    16=Surface B
                    17=Surface C
                    18=Surface D
91   H_SCEN_STEP         cycle criteria table entry number
                    1=First cal cycle A
                    2=First cal cycle B
                    3=First cal cycle C
                    4=Second cal cycle A
                    5=Second cal cycle B
                    6=Second cal cycle C
```

```
                    7=Third cal cycle A
                    8=Third cal cycle B
                    9=Third cal cycle C
                    10=Fourth cal cycle A
                    11=Fourth cal cycle B
                    12=Fourth cal cycle C
                    13=Medium near surface when <0.3rpm and >3km
                    14=Standard image for first cycle
                    15=Flat field
                    16=Drain cycle
                    17=Dark current only when >1rpm and <10km
                    18=Spectrophotometric when >1rpm and <10km
                    19=Dark current only when >1rpm and <5km
                    20=Spectrophotometric only when >1rpm and <5km
                    21=High near surface when 3km < altitude < 20km
                    22=Medium near surface when 400m < altitude < 3km
                    23=Low near surface when 200m < altitude < 400m
                    24=Very low near surface when 0m < altitude < 200m
                    25=Surface cycle A for first cycle on the surface
                    26=Surface cycle B for second cycle on the surface
                    27=Surface cycle C for third cycle on the surface
                    28=Surface cycle D for fourth cycle on the surface
                    29=Standard image for cycles with < 4 min of
telemetry
                       data left in the buffer
                    30=Standard non-image cycle (default)
92   H_SPM_FLAG          spectrophotometric flag (1=SPM)
93   H_CCD_MEAS          number of CCD set performed during cycle
94   H_IR_MEAS           number of IR set performed during cycle
95   H_VIOLET_MEAS       number of violet set performed during cycle
96   H_MEAS_TYPE         measurement type
                    0=Upper half DLI1
                    1=Upper half DLI2
                    2=Upper half SLI
                    3=Lower half DLI1
                    4=Lower half DLI2
                    5=Lower half SLI
                    6=DLV
                    7=ULV
                    8=DLIS
                    9=ULIS
                    10=IR Combined (normal operation)
                    11=IR Long (long integration for dark reading)
                    12=SLI strip
                    14=Solar Aureole
                    15=Near Surface DLVS
                    16=DLVS
                    17=ULVS
                    18=CCD Dark Current
                    19=Full CCD
                    21=Whole DLI2
                    22=Whole SLI
                    23=Whole DLI1
                    30=DLVS Extra
                    31=ULVS Extra
97   H_AZIMUTH           azimuth at start of cycle in degrees
98   H_ALTITUDE          altitude at start of cycle in meters
```

```
99   H_SPIN              spin rate at start of cycle in rpm
100  H_TARGET_AZ         target azimuth for measurement in degrees
101  H_ACTUAL_AZ         actual azimuth for measurement (Flight SW's
idea)
102  H_LAMP_STATE        cal and surf lamp status, 1=on, four character
string
                   Char 0 = Cal lamp 1
                   Char 1 = Cal lamp 2
                   Char 2 = Cal lamp 3
                   Char 3 = Surface Science Lamp
103  H_IR_STATUS         IR hardware status word
104  H_IR_FLAGS          IR processing, two character string
                   Char 0 = optimum sampling, 1=used
                   Char 1 = compression, 1=compressed
105  H_IR_CHP_TMPB       IR chip temperature (start) in Kelvin
106  H_IR_CHP_TMPE       IR chip temperature (end) in Kelvin
107  H_PRECHARGE         Average of ULIS and DLIS precharge voltage
                   at beginning of collection in ADU
108  H_IR_COL_TIME       IR collection time [in sec (multiple of 8.064
ms)]
109  H_NUM_ROT           number of region/rotations (IR)
110  H_NUM_REGIONS       number of regions (IR)
111  H_DC_OFFSET_U       DC Offset voltage for ULIS in ADU
112  H_DC_OFFSET_D       DC Offset voltage for DLIS in ADU
113  H_UIR_TGT_PRC       target %age for ULIS
114  H_DIR_TGT_PRC       target %age for DLIS
115  H_UIR_PRCTILE       %ile point used for ULIS
116  H_DIR_PRCTILE       %ile point used for DLIS
117  H_CCD_STATUS        CCD hardware status
118  H_DCS_STATUS        DCS hardware status
119  H_CCD_FLAGS         Four character string; 1=all ok, 0=error
                   Char 0 = Pixel error
                   Char 1 = New frame error
                   Char 2 = New line error
                   Char 3 = Not used; set to 0
120  H_PROC_FLAGS        Six character string for CCD processing;
0=off,1=on
                   Char 0 = Bad pixel replacement
                   Char 1 = Summing
                   Char 2 = Noiseless compression
                   Char 3 = Square root compression
                   Char 4 = Hardware compression
                   Char 5 = Optimum exposure
121  H_NUM_COL           number of columns transmitted
122  H_NULL_PIXEL2       sum of null pixels (col 2)
123  H_NULL_PIXEL3       sum of null pixels (col 3)
124  H_CCD_TGT_PRC       target %age for CCD
125  H_CCD_PRCTILE       %ile point for CCD
126  H_STP_CNT_COL       strip center column
127  H_STP_FST_COL       1st column of strip from readout side of CCD
128  H_CAL_TMP_SORS      Current through temperature sensors
129  H_CCDLUG_TEMP       CCD thermal lug temperature [K]
130  H_STRAP_TEMP        thermal strap temperature [K]
131  H_OPTICS_TEMP       conduit housing temperature [K]
132  H_VIOLET_TEMP       violet detector temperature [K]
133  H_SH_AUX_TEMP       sensor header aux board temperature [K]
134  H_SH_BOX_TEMP       sensor header box temperature [K]
```

```
135  H_EA_BOX_TEMP       EA box temperature [K]
136  H_AUX_BRD_VOLT      divided 12V in volts
137  H_CPU_BRD_VOLT      divided 5V in volts
138  H_ADC_OFFSET        Not used
139  H_ADC_GAIN          Not used
140  H_DISPQ_SIZE        max. dispatcher queue size since last HK data
set
141  H_ALRMQ_SIZE        max. alarm queue size since last HK data set
142  H_TLMQ_SIZE         max. TM queue size since last HK data set
143  H_SCIPRQ_SIZE       max science processing size since last HK data
set
144  H_STACK_SIZE        max stack size since last HK data set
145  H_CAL_SCENARIO      cal. scenario number, 1=health check,
2=inflight cal
146  H_CCD_REP           number of repetitions for CCD cal measurement
147  H_IR_REP            number of repetitions for IR cal measurement
148  H_VIOLET_REP        number of repetitions for violet cal
measurement
149  H_SHUTTER_REP       number of repetitions for shutter test
150  H_SHUTTER_CYC       number of shutter cycles per shutter test
151  H_DCS_REP           number of repetitions for DCS test
152  H_COMP_RATIO        compression ratio for DCS
153  H_HEATER_REP        number of repetitions for heater test
154  H_HEATERS           which heaters tested, 1=strap heater, 2=Aux bd
heater
155  H_CAL_LAMP_REP      number of repetitions for cal. lamp test
156  H_NUM_BINS          number of IR bins for data collection
157  H_SURF_LAMP_REP     number of repetitions for surface lamp test
158  H_SUN_LAMP_REP      number of repetitions for sun sensor LED test
159  H_CAL1_VOLT1        voltage on cal. lamp 1
160  H_CAL1_CURR         current on cal. lamp 1
161  H_CAL2_VOLT1        voltage on cal. lamp 2
162  H_CAL2_CURR         current on cal. lamp 2
163  H_CAL3_VOLT1        voltage on cal. lamp 3
164  H_CAL3_CURR         current on cal. lamp 3
165  H_SURF_VOLT1        voltage on surface lamp
166  H_SURF_CURR         current on surface lamp
167  H_DCS_TST_STAT      overall DCS test status
168  H_DCS_SLF_STAT      DCS self test status
169  H_DCS_SW_STAT       DCS s/w test status
170  H_SUN_LED_VLT1      voltage on Sun sensor LED
171  H_SUN_LED_CURR      current on Sun sensor LED
172  H_SUN_RESP          Sun sensor reading with LED on
173  H_NUM_HEAT          number of heaters tested 1 or 2
174  H_NUM_TRIPLET       number of sun triplets in data set, max is 25
175  H_NUM_TIME_PAIRS    number of time data pairs, set to 20
176  H_DUMP_START        address of first word in memory dump data set
177  H_DUMP_LEN          number of words in dump set
178  H_DUMP_FLAG         indicates if addresses containing only byte
info
                    were packed together; 1=packed
179  H_MESSAGE           message type code, Appendix C in User's Manual
180  H_MESSAGE_ID        additional information code for 179
181  H_NUM_BAD           number of ranges or indices of bad RAM areas
or
                    EEPROM patches
182  H_LOTS_BAD          flag - lots bad RAM or EEPROM areas=1
```

```
183  H_CCDTEMP_R         Raw CCD chip temperature
184  H_EXPTIME_R         Raw exposure time reading for CCD (0.5ms
increments)
185  H_MISSION_TIME_R    Raw mission time reading (0.1ms increments)
186  H_AZIMUTH_R         Raw azimuth rdng at cycle start in 0.1 deg
increments
187  H_ALTITUDE_R        Raw altitude reading at cycle start in 10m
increments
188  H_SPIN_R            Raw spin rate at cycle start in 0.1 deg/sec
increments
189  H_TARGET_AZ_R       Raw target azimuth in 0.1 deg increments
190  H_ACTUAL_AZ_R       Raw actual azimuth in 0.1 deg increments
191  H_IR_CHP_TMPB_R     Raw IR chip temperature start
192  H_IR_CHP_TMPE_R     Raw IR chip temperature  end
193  H_PRECHARGE_R       Raw average ULIS and DLIS precharge voltage
194  H_IR_COL_TIME_R     Raw IR collection time used (number of 8.064ms
incrts)
195  H_CAL_TMP_SORS_R    Raw cal. source voltage
196  H_CCDLUG_TEMP_R     Raw CCD thermal lug temperature
197  H_STRAP_TEMP_R      Raw strap temperature
198  H_OPTICS_TEMP_R     Raw conduit temperature
199  H_VIOLET_TEMP_R     Raw violet temperature
200  H_SH_AUX_TEMP_R     Raw SH aux board temp
201  H_SH_BOX_TEMP_R     Raw SH box temperature
202  H_EA_BOX_TEMP_R     Raw EA box temperature
203  H_AUX_BRD_VOLT_R    Raw divided 12V
204  H_CPU_BRD_VOLT_R    Raw divided 5V
205  H_ADC_OFFSET_R      Not Used
206  H_ADC_GAIN_R        Not Used
207  H_CAL1_VOLT1_R      Raw cal. lamp 1 voltage
208  H_CAL1_VOLT2_R      Raw cal. lamp 1 voltage
209  H_CAL2_VOLT1_R      Raw cal. lamp 2 voltage
210  H_CAL2_VOLT2_R      Raw cal. lamp 2 voltage
211  H_CAL3_VOLT1_R      Raw cal. lamp 3 voltage
212  H_CAL3_VOLT2_R      Raw cal. lamp 3 voltage
213  H_SURF_VOLT1_R      Raw surf. lamp voltage
214  H_SURF_VOLT2_R      Raw surf. lamp voltage
215  H_SUN_LED_VLT1_R    Raw sun sensor LED volt
216  H_SUN_LED_VLT2_R    Raw sun sensor LED volt
217  H_OBJECTIVE         Objective of test, Depends on H_PURPOSE
                    PURPOSE=Optics:
                     Focus, Alignment, FOV, Performance
                    PURPOSE=Electronics:
                     Noise, Functionality, Performance
                    PURPOSE=System:
                     Noise, Crosstalk, Calibration, Alignment, FOV,
                     Optical Performance
                    PURPOSE=SW or Environments, OBJECTIVE blank
218  H_DUMMY             Flag for dummy detector
                    0000=no dummy
                    1100=dummy CCD
                    0011=dummy IR
                    1111=dummy CCD and IR
219  H_MODEL             DISR model
220  H_DCOFFSETU_R       Raw ADC value of DC offset voltage, ULIS
221  H_DCOFFSETD_R       Raw ADC value of DC offset voltage, DLIS
222  H_SQRT_MIN          Minimum value for sqrt table
```

```
223  H_SQRT_MAX          Maximum value for sqrt table
224
225  H_SUN_SOURCE        source of spin data, Probe, Sun, LED, OGSE
226  H_OGSE_ID           OGSE identifier in use
227  H_OGSE_MSG          last msg from EGSE displayed on OGSE
228  H_OGSE_LAMP         lamp current
229  H_OGSE_SW_VER       OGSE software version
230
231  H_OGSE_SAMP         sun amplitude current
232  H_OGSE_SUNTABLE     sun table
233  H_OGSE_RPM          sun pulse RPM
234  H_OGSE_SPAN         sun pulse span value
235  H_OGSE_SIDEC        Si detector reference
236  H_OGSE_INDEC        InGaAs detector reference
237  H_OGSE_FLSIDEC      filtered silicon detector reference
238  H_OGSE_5V           5V reference
239  H_OGSE_DETEMP       OGSE detector temperature
240  H_OGSE_SSS_TEMP     sun sensor stimulator temp.
241  H_OGSE_FILT         OGSE filter
242
243
244
245
246
247
248
249
250
251
252
253
254
255  H_MONO_WAVL         Monochromator wavelength [nm]
256  H_MONO_SI           Monochromator Si detector reading
257  H_MONO_GE           Monochromator Ge detector reading
258  H_MONO_FLTR         Monochromator filter
259  H_MONO_G            Monochromator gain
260  H_MONO_RT           Monochromator response time [s]
261  H_MONO_GRAT         Monochromator grating
262  H_MONO_TUR          Monochromator turret number
263  H_SPSI              Sphere Si detector reading
264  H_SPFLSI            Sphere filtered Si reading
265  H_SPINGAS           Sphere InGaAs detector reading
266  H_SP_DETTMP         Sphere detector temperature
267  H_COSI              Collimator silicon detector reading
268  H_COFLSI            Collimator filtered Si reading
269  H_COINGAS           Collimator InGaAs detector reading
270  H_COTMP             Collimator detector temperature
271  H_PLMINGAS          Palmer InGaAs detector reading
272  H_PLMTMP            Palmer detector temperature
273  H_CAL_D1            Spare calibration detector 1
274  H_CAL_D2            Spare calibration detector 2
275  H_CAL_D3            Spare calibration detector 3
276  H_CAL_D4            Spare calibration detector 4
277  H_CAL_D5            Spare calibration detector 5
278  H_CPGASTEMP         Temperature of SH internal purge gas
279  H_AMBTEMP           Ambient temperature of clean room
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280  H_SPTEMP            Temperature of gas in sphere
281  H_BOXTEMP           Temperature of gas in dry box
282  H_CHMBTEMP          Temperature in environment chamber
283  H_CAL_T1            Spare calibration temp 1
284  H_CAL_T2            Spare calibration temp 2
285  H_CAL_T3            Spare calibration temp 3
286  H_CAL_EL            Sensor head elevation
287  H_CAL_AZ            Sensor head azimuth
288  H_CAL_POL           Collimated beam polarizing angle
289  H_CAL_SHUT          Calibrator high intensity shutter state
                    0=closed, 1=open
290  H_LAST_CALTIME      Time of last cal. log entry
```