Hornet OSD
The Introduction of Recording Files Data Format

The below information in asterisk is reference data

Example:

****

#DATA2,44,242,1,0,149,0,50,0,180,0,0,0,0,0,0,0,0,5,236,31,242,25,218,17,61,0,0,0,8,1,27,10,1,9,39,0,0,0,0,10,183,50,47,170

#DATA1,29,241,72,145,254,5,236,36,79,25,218,12,230,105,113,0,120,4,226,0,0,0,0,1,22,10,9,144,170

#DATA3,18,243,128,1,129,222,8,240,11,248,7,208,11,222,0,0,160,170

****

download——telemetry data1：
#DATA1,29,241,72,145,254,5,236,36,79,25,218,12,230,105,113,0,120,4,226,0,0,0,0,1,22,10,9,144,170

The detailed explanation is in chart 1

Chart 1 DATA1 analysis

<table>
<tr><th>Command number</th><th>command</th><th>Function description</th><th colspan="9">data analysis</th></tr>
<tr><td></td><td>#DATA1</td><td>Header</td><td colspan="9">The first instruction</td></tr>
<tr><td>data0</td><td>29</td><td>data length</td><td colspan="9">data length：29，from this byte to the end, total 29 bytes.</td></tr>
<tr><td>data1</td><td>241</td><td>Instruction identify</td><td colspan="9">241（decimal system）=0xF1(hexadecimal)，also means the first instruction</td></tr>
<tr><td rowspan="3">data2</td><td rowspan="3">72</td><td rowspan="3">Flying control information</td><td colspan="9">72（decimal system）=0x48(hexadecimal))=01001000（binary system） it means :
Timing Photography, Effective lock, not automatic return to home，GPS signal 8 satellites.</td></tr>
<tr><td>No.</td><td>bit7</td><td>bit6</td><td>bit5</td><td>bit4</td><td>bit3</td><td>bit2</td><td>bit1</td><td>bit0</td></tr>
<tr><td>Function</td><td>Camera mode
0:Timing taking photo
1: Equidistance taking photo</td><td>GPS lock information Mark
0:No lock
1:Effective lock</td><td>Whether signal lose automatically
0:Non Automated Return to Home
1:Automated Return to Home</td><td>null</td><td colspan="4">Satellites quality</td></tr>
</table>

<table>
<tr><td>data3</td><td>145</td><td>Flying status indication</td><td colspan="8">145（decimal system）=0x91 (hexadecimal)=10010001（binary system）,
It means ： canceling automatic landing, disable automatic photography function, receiver on , RC Receiver off, automatic stabilization mode</td></tr>
<tr><td></td><td></td><td></td><td>NO.</td><td>bit7</td><td>bit6</td><td>bit5</td><td>bit4</td><td>bit3</td><td>bit2</td><td>bit1</td><td>bit0</td></tr>
<tr><td></td><td></td><td></td><td>function</td><td>Loop path mark</td><td>0:canceling automatic landing
1:starting automatic landing</td><td>1:Enable automatic photography function
0 ： disable automatic photography function</td><td>1： receiver on
0： receiver off</td><td>1：data radio on
0： RC Receiver off</td><td colspan="3">0：manual RC mode
1：automatic stabilization mode
2：UAV navigation model</td></tr>
<tr><td>data4</td><td>254</td><td>Navigation introduction</td><td colspan="8">254（decimal system）=0xFE (hexadecimal)=11111110（binary system）, it means ： air line navigation</td></tr>
<tr><td></td><td></td><td></td><td>No.</td><td>bit7</td><td>bit6</td><td>bit5</td><td>bit4</td><td>bit3</td><td>bit2</td><td>bit1</td><td>bit0</td></tr>
<tr><td></td><td></td><td></td><td>function</td><td colspan="3">NULL</td><td colspan="3">0： Return to Home
1： Circling
2： Automatic take off
3： Automatic deployment
Others undefined</td><td colspan="2">0：orientation flight
1：waypoint flying mode
2：navigation mode</td></tr>
<tr><td>data5, data6</td><td>5,236</td><td>The integral digits of current latitude(unit:minutes)</td><td colspan="8">contain 2 fields ： 5,236 means ： 5*256+236=1516 minutes = N25° 16′
(if the number in data5 >128,current latitude is south latitude
For example 137,236 means ：（137*256+236）-32768=2540 minutes = S42° 20’)</td><td rowspan="2">Total as ： current latitude is N25°16’.9295’’</td></tr>
<tr><td>data7, data8</td><td>36,79</td><td>The decimal place of current latitude</td><td colspan="8">contain 2 fields：36,79 means：36 *256+79=9295 minutes（minutes of decimal place）</td></tr>
</table>

data9, data10	25,218	The integral digits of current longitude(unit:minutes)	contain 2 fields：25,218 means ： 25*256+218=6618'=E 120°18'； (if the number in data5 >128, current longitude is west longitude For example 156,79 means：（156*256+79）-32768=7247''=W 120°7')	Total as：E120°18'.3302''
data11, data12	12,230	The decimal place of current longtitude	contain 2 fields: 12,230 means：12 *256+230=3302''（decimal place）	
data13, data14	105,113	GPS current courseangle（unit: centi degree）	contain 2 fields：105,113 means：current GPS courseangle is（105 *256+113）/100.0=269.93°	
data15, data16	0,120	GPS current speed（unit: one-tenth m/s）	contain 2 fields：0,120 means：GPS current speed:（0 *256+120）/10.0=12 m/s	
data17, data18	4,226	GPS current altitude, unit: m	4,226 means：GPS current altitude is 4 *256+226=1250 m; if data19*256+data20>6000，the height is negative Eg: 23,226 the method of calculation 23*256+226 –6000= －114m(after getting the calculation result, add an minus in front of it)（GPS current altitude range is-500~9999m）	
data19, data20	0,0	airspeed	NULL	
data21, data22	0,0	Current pressure altitude (unit: one-tenth m/s)	the method of calculation has the relation with the GPS current height . attention: unit is one-tenth m. GPS current height is-500~9999 m	
data23, data24	1,22	The distance to current target point, unit: m	1,22 means：The distance to current target point is 1*256+22=276 m	
data25,data26	10,9	Distance between the designated flight path and the plane's current position(unit:meter)	10,9 means：cornering distance to current route are 10*256+9=2569m	
data27	144	Add all data and mod	Add From data0+……+to data26 and then mode by 255	

data28	170	Finish identifier	This command finishes ：170（decimal system）=0xAA（hexadecimal）

download——telemetry data 2：

#DATA2,44,242,1,0,149,0,50,0,180,0,0,0,0,0,0,0,0,0,5,236,31,242,25,218,17,61,0,0,0,8,1,27,10,1,9,39,0,0,0,0,10,183,50,47,170

The detailed explanation is in chart 2

Chart 2 DATA2 analysis

Command number	command	Function description	Data analysis
	#DATA2	Data head	The second command
data0	44	Data length	Data length：44,from this byte to the end
data1	242	Instruction mark	242（decimal）= 0xF2(Hex), also means the second order
data2	1	Current flight target point number	Means current flight target point is the 1st point
data3, data4	0,149	Current target courseangle (unit: degree)	contain 2 fields: 0,149；means : 0*256+149=149°
data5,data6	0,50	Current target altitude(unit : m)	contain 2 fields:：0,50；means : 0*256+50=50m
data7, data8	0,180	Current target speed (unit : one-tenth m/s)	contain 2 fields: 0,180；means :（0*256+180）/10.0=18.0 m/s
data9, data10	0,0	The latitude integer place of Current airline starting point (unit: minute)	contain 2 fields: 0,0；the meaning can be seen in #DATA1
data11, data12	0,0	The latitude decimal place of current airline starting point (unit: minute)	contain 2 fields: 0,0；the meaning can be seen in #DATA1
data13, data14	0,0	The longitude integer of current airline starting point(unit: minute)	contain 2 fields: 0,0；the meaning can be seen in #DATA1
Data15, data16	0,0	The longitude decimal place of current airline final point(unit: minute)	contain 2 fields: 0,0；the meaning can be seen in #DATA1
data17, data18	5,236	The latitude integer place of current airline final point(unit: minute)	contain 2 fields: 5,236；means : 5*256+236=1516 minutes
data19, data20	31,242	The latitude decimal place of current airline	contain 2 fields: 31,242；means : 31*256+242=8178 minutes

		final point (unit : minute)	
data21, data22	25,218	The longitude integer of current airline final point (unit: minute)	contain 2 fields: 25,218；means : 25*256+218=6618 minutes
data23, data24	17,61	The longitude decimal place of current airline final point (unit: minute)	contain 2 fields: 17,61；means : 17*256+61=4413 minutes
data25, data26	0,0	Power battery voltage (unit: one-tenth V)	contain 2 fields：0,0; means :（0*256+0）/10.0=0.0V）
data27	0	Control battery voltage (unit: one-tenth V)	contain 1 field:0 means ：0V
data28	8	Time: hour	8,1,27 means the current time is: 8(hour):1(minute):27(second)
data29	1	Time: minute	
data30	27	Time: second	
data31	10	Date: month	10,1,9 means the date is 1st october, 2009
data32	1	Date: day	
data33	9	Date: year	
data34	39	Current inner temperature(centigrade)	39 means：39℃， if the data between 0~128, then the temperature is 0~128 if the number is between 129~255, then the temperature is -1~-127
data35, data36	0,0	Power current (unit: A)	Current power is :0,0 means 0*256+0=0A
data37, data38	0,0	Power consumption(unit : milliampere per hour	Power consumption: 0,0 means 0*256+0=0mAh
data39	10	GPS refresh rate	GPS refresh rate is :10Hz
data40	183	Attitude data refresh rate	Attitude data refresh rate：183Hz
data41	50	Data link refresh rate	Data link refresh rate：50Hz
data42	47	Add all data and mod	Add From data0+……+to data41 and then mode by 255
data43	170	End identifier	This order finishes, 170 decimal system =0xAA hexadecimal

download——telemetry data 3

#DATA3,18,243,128,1,129,222,8,240,11,248,7,208,11,222,0,0,160,170

The detailed explanation is in chart 3

Chart 3 DATA3 Data analysis chart

Command number	command	Function description	Data analysis
	#DATA3	Data head	The third command
data0	18	Data length	Data length ： 18, from this byte to the end
data1	243	Command identification	243 (decimal）=0xF3(hexadecimal), also means the third command
data2,data3	128,1	pitch attitude angle (unit: one-tenth degree)	contain 2 fields: 128,1 means: angle of pitch is （128 *256+1－32768）/10.0=－0.1degree (if the value of data2 >128, then current angle of pitch is negative) If the number is 1,128 then it means : angle of pitch（1*256+128）/10.0=38.4 degrees The range of pitch angle -900~+900）
data4,data5	129,222	Roll attitude angle (unit: one-tenth degree)	contain 2 fields: 129,222 means: angle of pitch is （129 *256+222－32768）/10.0=－47.8degree (if value of data4>128, then current angle of pitch is negative. if the number is 1,128, it means ： angle of pitch is（1*256+128）/10.0=38.4° (The range of pitch angle is 900~+900）
data6,data7	8,240	Aileron measure. Range:1000~2000	The PWM signal of controlling aileron export: (8*256+240)/2.0=1144
data8,data9	11,248	Elevator measure. Range: 1000~2000	The PWM signal of controlling elevator measure export: (11 *256+248)/2.0=1532
data10,data11	7,208	Throttle measure. Range: 1000~2000	The PWM signal of controlling throttle measure export: (7*256+208)/2.0=1000

data12,data13	11,222	Rudder measure. Range: 1000~2000	The PWM signal of controlling rudder measure export: (11*256+222)/2.0=1519
data14,data15	0,0	attitude error. Range:0~1000	attitude error: 0*256+0=0
data16	160	Add all data and mod	Add from data0+……+to data16 and then divided by 255
data17	170	Finish identifier	This order finishes ,170(decimal system) =0xAA(hexadecimal)