File number	Piece number

File Number	TYS-P3SH5-IDS
Stage mark	FM
Page	19

PST3S V2.3(166)
PST3S-H5 Star Tracker IDS

Signature

Edit ： FUSHUXIN

Proofreading ： FANWEI

Check ： WANG HONGQIANG

Standard check： LI YANAN

Approval ： WANGHAIJUN

IDS 1：Performance Index

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	

Name of Index	Indicator requirements
Attitude Accuracy	Pointing：3″ (3 σ) Rolling：30″ (3 σ)
Dynamic Range	@ 0.1°/s：5″ (Pointing, 3 σ);50″ (Rolling, 3 σ)； @0.5°/s: 8″ (Pointing, 3 σ); 60″ (Rolling, 3 σ)； @1.0°/s: 15″ (Pointing, 3 σ); 120″ (Rolling, 3 σ)； @ 3° /s: follow up
Data Validity Rate	>98%@ 0.5°/s; >96%@0.5°/s ~1.5°/s;
Update Rate	≥10Hz
Acquisition Rate	Max. ≤2s
Start-up Time	Better than 5s
Exclusive Angle	Sun:better than 35°； Earth: better than 25°
Timing Accuracy	0.5ms @ synchronization pulse（SYNC pulse）
Communication	422/CAN
Quaternion Continuity	the scalar of quaternion: non-negative
Life Time	5years @500Km Orbit
Reliability	≥0.98 @ the end of 5years running

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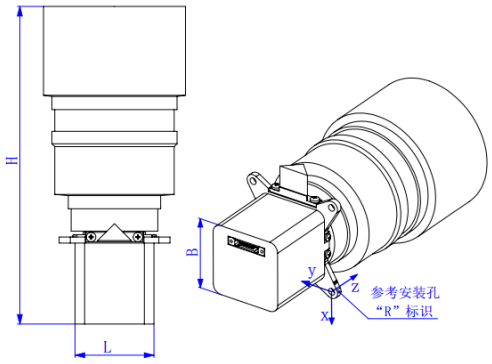
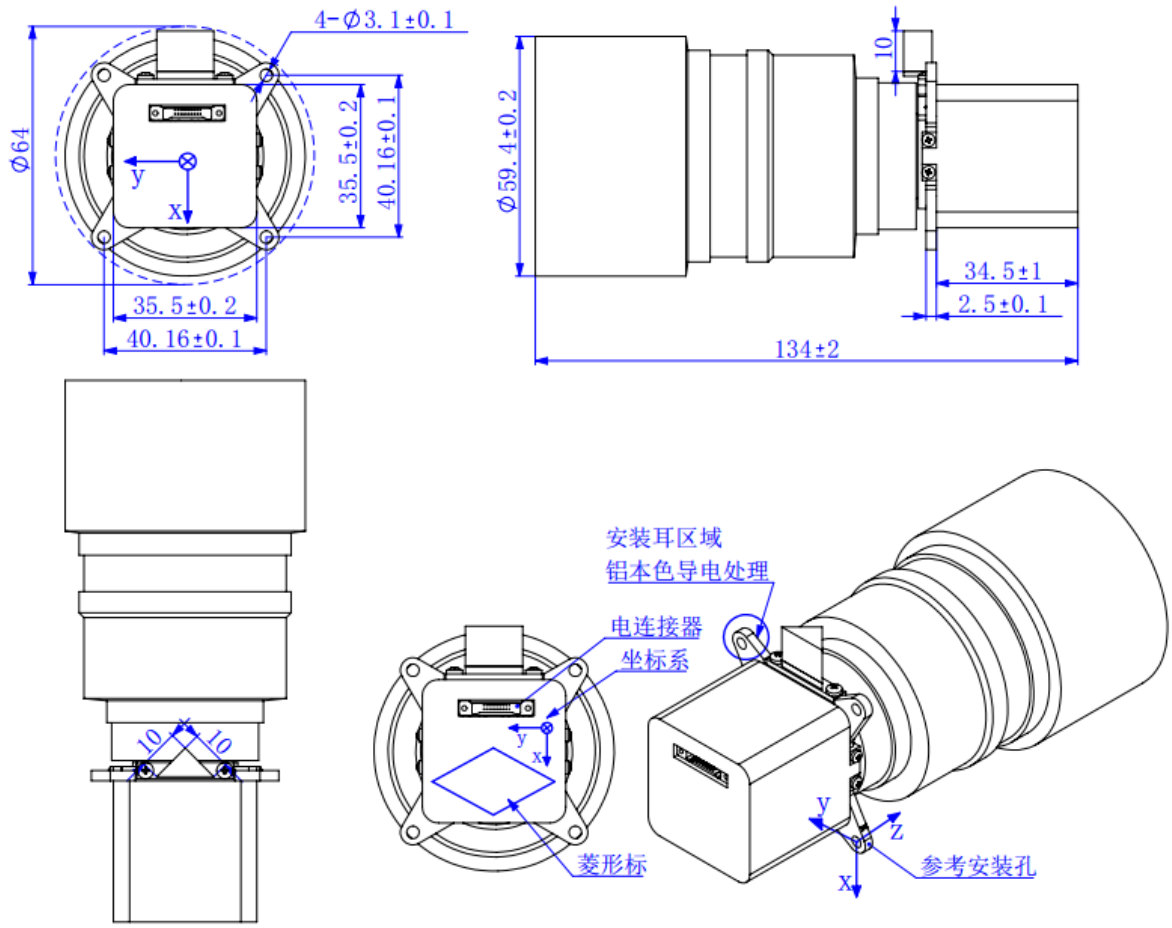
IDS 2：Mechanical Characteristics-Body

<table>
<tr><td colspan="3" rowspan="4"></td><td>File number</td><td></td><td colspan="4"></td></tr>
<tr><td>Sub-system name</td><td></td><td colspan="4"></td></tr>
<tr><td>Device name</td><td>Star Tracker</td><td colspan="4">Stage mark</td></tr>
<tr><td>Device code</td><td>PST3S-H5</td><td></td><td></td><td>FM</td><td></td></tr>
<tr><td colspan="3">Device weight[note] 130±10g</td><td colspan="2">Device number：1</td><td></td><td>√</td><td></td></tr>
<tr><td rowspan="3">Weight characteristics</td><td>Envelope size mm</td><td colspan="2">Envelope：＜Φ64</td><td>Height：134±2</td><td></td><td>√</td><td></td></tr>
<tr><td>Centroid position mm</td><td>X：-21±1</td><td>Y：20±1</td><td>Z：16±1</td><td></td><td>√</td><td></td></tr>
<tr><td>Inertia of centroid kg.mm²</td><td>P_X = 220±2</td><td>P_Y =221±2</td><td>P_Z =55±2</td><td></td><td>√</td><td></td></tr>
<tr><td rowspan="5">Installation characteristics</td><td>Installed holes number：4</td><td colspan="2">Size of installed holes（tolerance）mm：Φ3.1±0.1</td><td>Material: 2A12-T4</td><td colspan="3">Determination method（√）</td></tr>
<tr><td colspan="3">Installation contacting area mm² ：200</td><td colspan="4" rowspan="4">Note：</td></tr>
<tr><td colspan="3">Installation surface flatness：0.1mm/100mm ×100mm</td></tr>
<tr><td colspan="3">Installation surface roughness Ra μm:3.2</td></tr>
<tr><td colspan="3">Installation surface state：
Conductive treatment of the mounting ear area</td></tr>
<tr><td colspan="8">Parameter relationship diagram:
Note: the determination method refers to the way to determine the mass of device.
 

Note：The origin of the coordinates lies in the geometric center of the outer surface of the lower shell (see "Instrument diagram");</td></tr>
<tr><td colspan="3">Edited（Date）：</td><td></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="3">Signed（Date）：</td><td>Mark</td><td colspan="2"></td><td colspan="2">Signature, date</td></tr>
</table>

IDS 3：Instrument Diagram

	File number						
	Sub-system name						
	Device name	Star Tracker	Stage mark				
	Device code	PST3S-H5			FM		



Note: This sketch should include body size, mounting size, mounting plane, mounting point (aperture and its tolerances, center distance and its tolerances), position tolerances for guide pins and holes, direction, location, type and number of electrical connectors , the operating hole, the lap (position and length), the registration measurement reference for calibration and testing.

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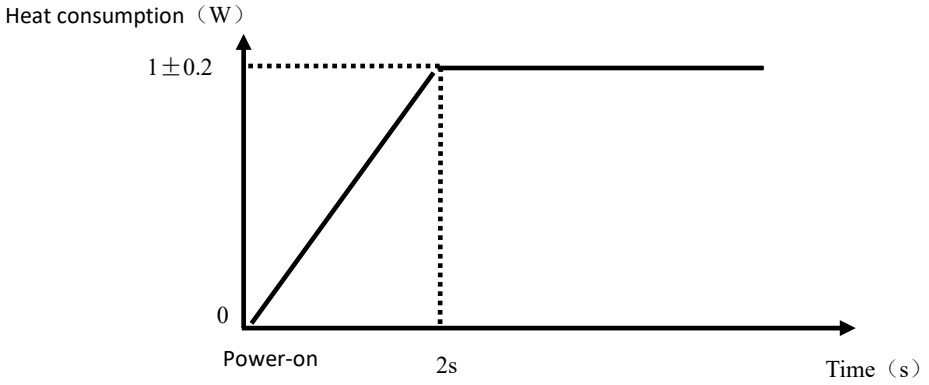
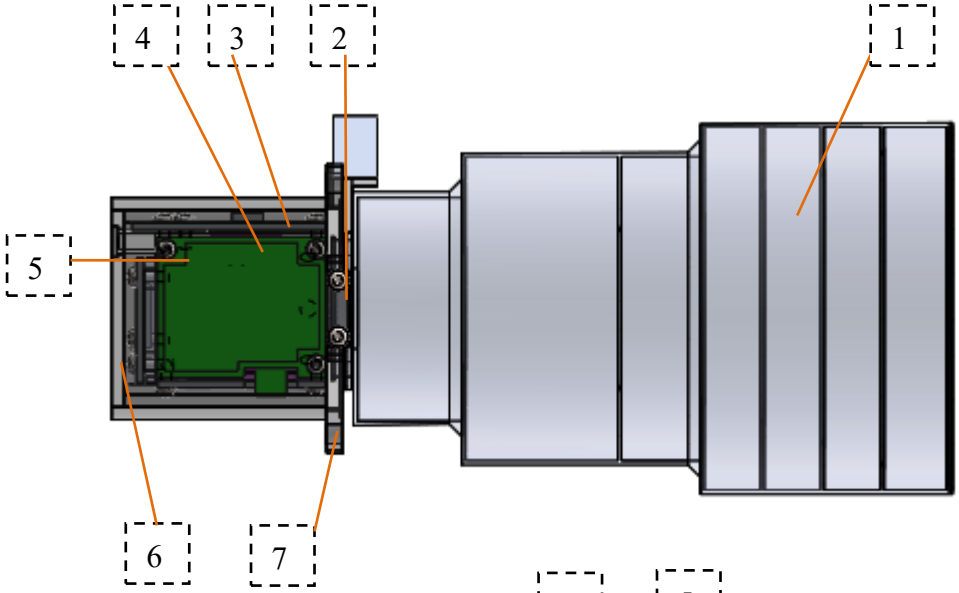
IDS 4：Thermal characteristics

<table>
<tr><td colspan="2" rowspan="4"></td><td>File number</td><td></td><td colspan="4"></td></tr>
<tr><td>Sub-system name</td><td></td><td colspan="4"></td></tr>
<tr><td>Device name</td><td>Star Tracker</td><td colspan="4">Stage mark</td></tr>
<tr><td>Device code</td><td>PST3S-H5</td><td></td><td></td><td>FM</td><td></td></tr>
<tr><td rowspan="3">Surface (except for mounting surface)</td><td>Aluminum alloy（2A12-T4）</td><td colspan="6" rowspan="3">Note: The inner surface of the baffle is treated with ultra black coating，ε_H：≥0.85，α_S：≥0.96</td></tr>
<tr><td>Outside surface treatment: Aluminium colour</td></tr>
<tr><td>Outer surface ε_H：≥0.6</td></tr>
<tr><td colspan="2">Start temperature ℃：-30~+40</td><td colspan="6">Heat capacity J/K：100</td></tr>
<tr><td colspan="2">Operating temperature range℃：-30~+40</td><td colspan="6">Operating relative humidity range：≤60 %</td></tr>
<tr><td colspan="2">The best operating temperature range ℃：20±5</td><td colspan="6">Storage relative humidity range：≤70 %</td></tr>
<tr><td colspan="2">Storage temperature range℃：-30~+40</td><td colspan="6">Operating state heat consumption W：1±0.2（单台）</td></tr>
<tr><td colspan="8">Description：
 
</td></tr>
<tr><td colspan="2">Edited（Date）：</td><td></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="2">Signed（Date）：</td><td>Mark</td><td colspan="2"></td><td colspan="2">Signature, date</td></tr>
</table>

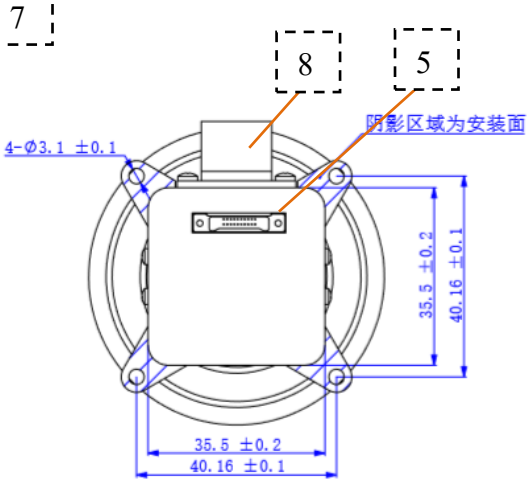
IDS 5：Thermal Diagram

	File number						
	Sub-system name						
	Device name	Star Tracker	Stage mark				
	Device code	PST3S-H5			FM		

Diagram：



Footprint：



1－Baffle　　2－Lens

3－Circuit box　　4－Circuit board of power and image processing

5－Connector　　6－Circuit board of image sensor

7－Installing lugs（Contact surfaces）　8－optical prism

Note: Hood and star tracker circuit box heat conduction installation

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IDS 6：Power

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			F M	

Working mode (long term/short term/others）	Long term	Single non-long-term power-up working hours S		Device number	1

Voltage V	Voltage stability %	Ripple voltage mV （P-P）	Device starting current characteristics （peak/duration）	Power W
5	/	100	2A/5ms	1±0.2

working voltage for equipment safety：4.8V-5.4V。

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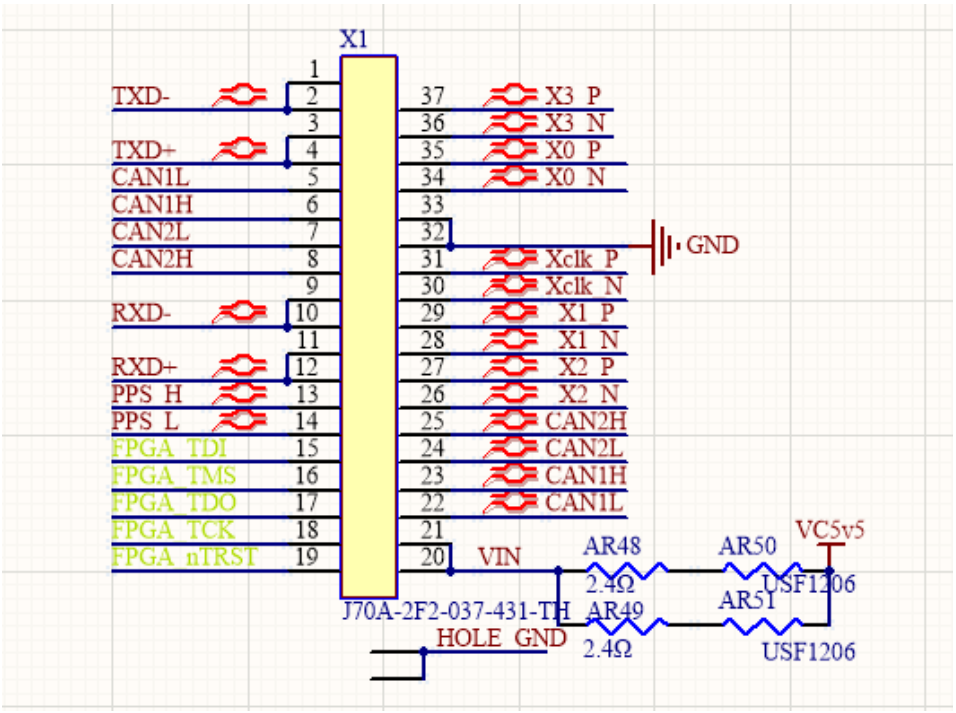
IDS 7: Electrical Connector Contact Assignment-Different PPS

		File number					
		Sub-system name					
		Device name	Star Tracker	Stage mark			
		Device code	PST3S-H5			FM	
Name (by function)	XK-01	Electrical connector P/N	J70A-2F2-037-431-TH		Needle / Hole	Hole	

Contact number	Signal (function) description	Voltage/V	Current/A	Polar	Remarks (shielded / twisted)
13	PPS_H	RS422 standard	RS422 standard	PPS Receive+	13、14 twisted
14	PPS_L			PPS Receive-	13、14 twisted
20，21	VCC5	5V		Power	two-point two-wire
32，33	GND	0V		power Ground	two-point two-wire
3，4	TXD+	RS422 standard	RS422 standard	422 Transmit+	1、3 twisted
1，2	TXD-			422 Transmit-	2、4 twisted
11，12	RXD+	RS422 standard	RS422 standard	422 Receive+	9、11 twisted
9，10	RXD-			422 Receive-	10、12 twisted
5，22	CAN1L	CAN2.0B standard	CAN2.0B standard	CAN1L	5、6 twisted
6，23	CAN1H			CAN1H	22、23 twisted
7，24	CAN2L	CAN2.0B standard	CAN2.0B standard	CAN2L	7、8 twisted
8，25	CAN2H			CAN2H	24、25 twisted
26	X2_N	LVDS standard	LVDS standard	Cameralink X2-	26、27 shielded twisted
27	X2_P			Cameralink X2+	26、27 shielded twisted
28	X1_N	LVDS standard	LVDS standard	Cameralink X1-	28、29 shielded twisted
29	X1_P			Cameralink X1+	28、29 shielded twisted
30	Xclk_N	LVDS standard	LVDS standard	Cameralink Xclk -	30、31 shielded twisted
31	Xclk_P			Cameralink Xclk +	30、31 shielded twisted
34	X0_N	LVDS standard	LVDS standard	Cameralink X0-	34、35 shielded twisted
35	X0_P			Cameralink X0+	34、35 shielded twisted
36	X3_N	LVDS standard	LVDS standard	Cameralink X3-	36、37 shielded twisted
37	X3_P			Cameralink X3+	36、37 shielded twisted
15	FPGA_TDI				Internal use, prohibit external use
16	FPGA_TMS				

17	FPGA_TDO				
18	FPGA_TCK				
19	FPGA_nTRST				



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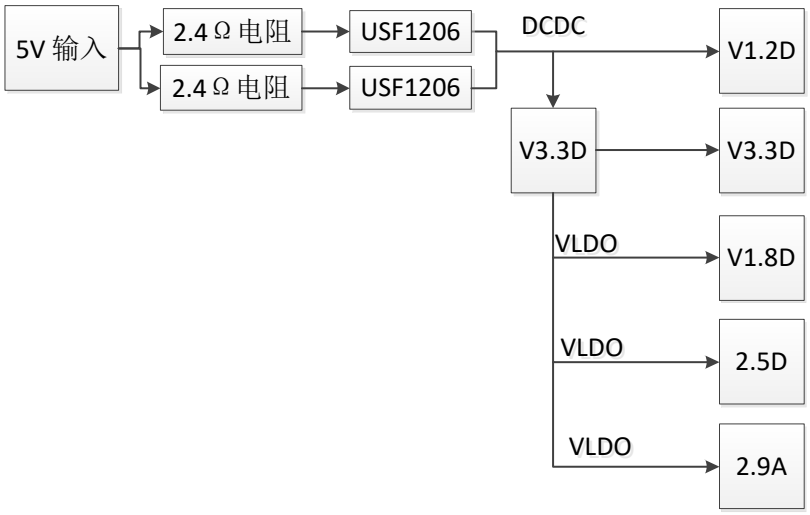
IDS 8: Electrical Interface Features-Power

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	

Interface signa	Power supply
Signal characteristics	5V power and the ground are two-point two-wire.
Interface Circuit	
Explanation	

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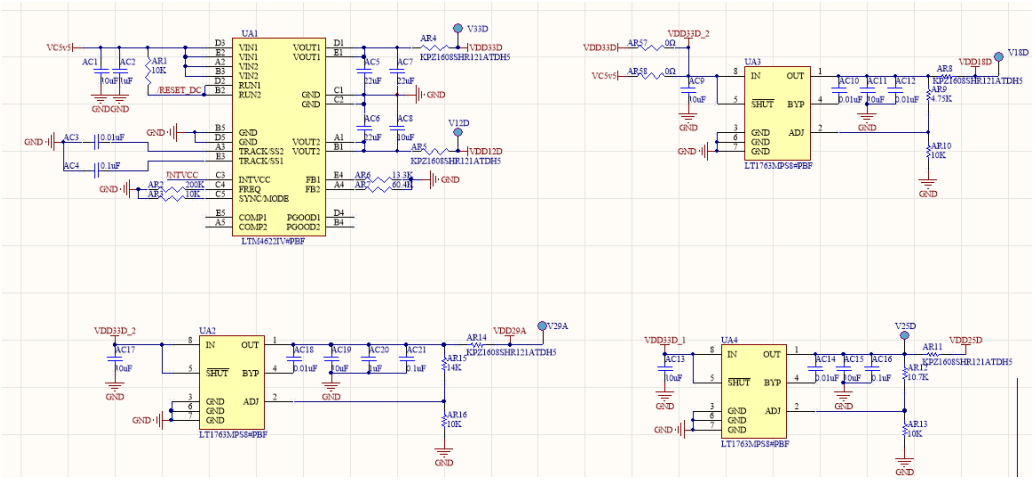
IDS9: Electrical Interface Features-Power

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	

Interface signal	Power supply
Signal characteristics	5Vpower and the ground are two-point two-wire
Interface Circuit	
Explanation	The AR58 is not welded

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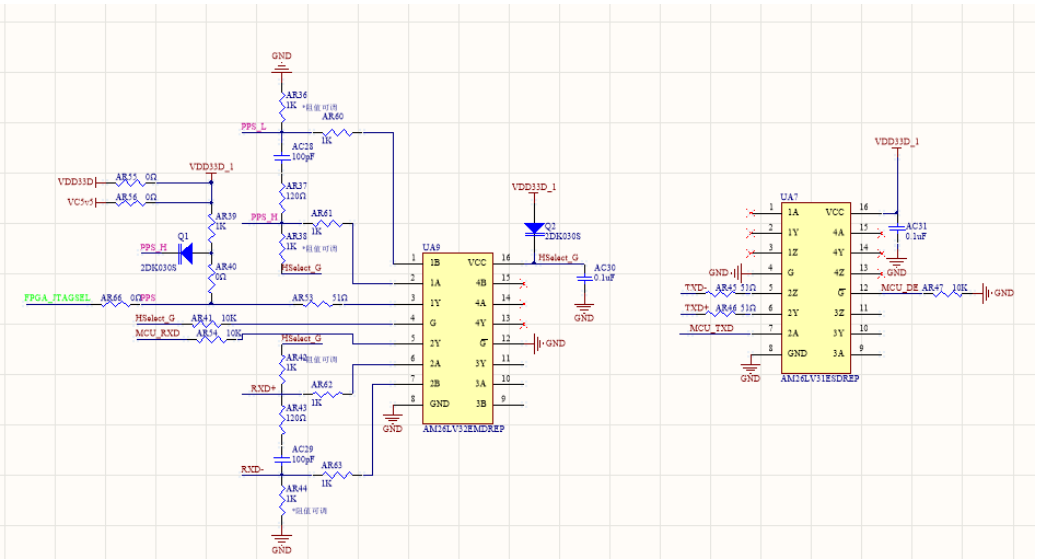
IDS 10：Electrical Interface Features-RS422

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	

Interface signal	Digital signal, RS422.
Signal characteristics	422 communication baud rate: 115200bps; two-point two-wire
Interface Circuit	
Explanation	no welding：AR56.

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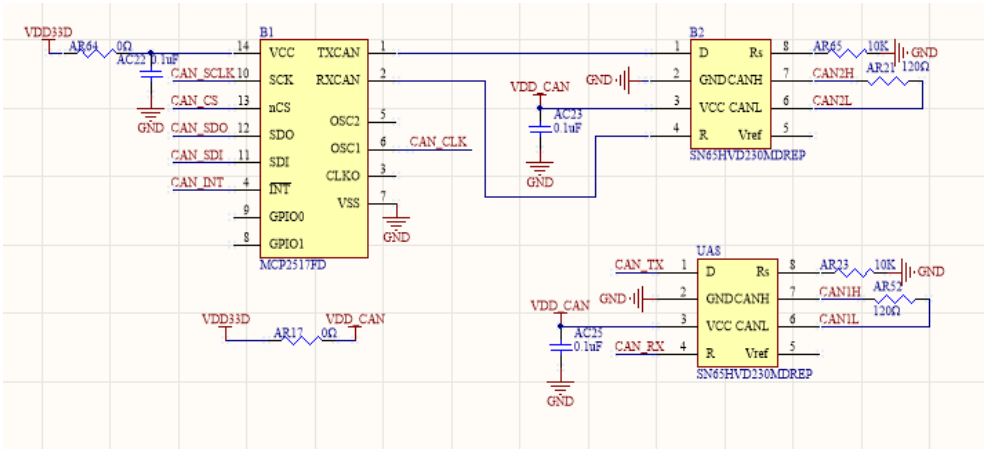
IDS 10：Electrical Interface Features-CAN

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	

Interface signal	Digital signal, CAN.
Signal characteristics	The CAN bus operates at 500kbps, with all signal lines configured in a dual-point dual-line cascading configuration.
Interface Circuit	
Explanation	Weld AR21 and AR52 based on the overall requirement. Welding is not performed by default.

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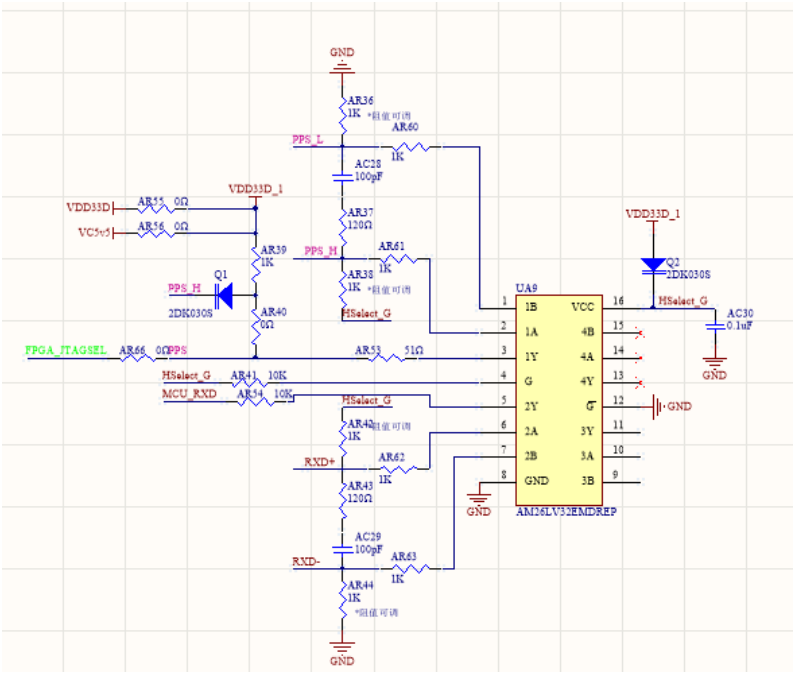
IDS 11：Electrical Interface Features-Second pulse (different)

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	

Interface signal	pulse per second (PPS)
Signal characteristics	The second pulse signal is input as a differential pair, with the falling edge aligned to the second integer, and the negative pulse width is 1ms.
Interface Circuit	second pulse circuit 
Explanation	AR40、AR39、AR56 and Q1.are not weld @Differential PPS

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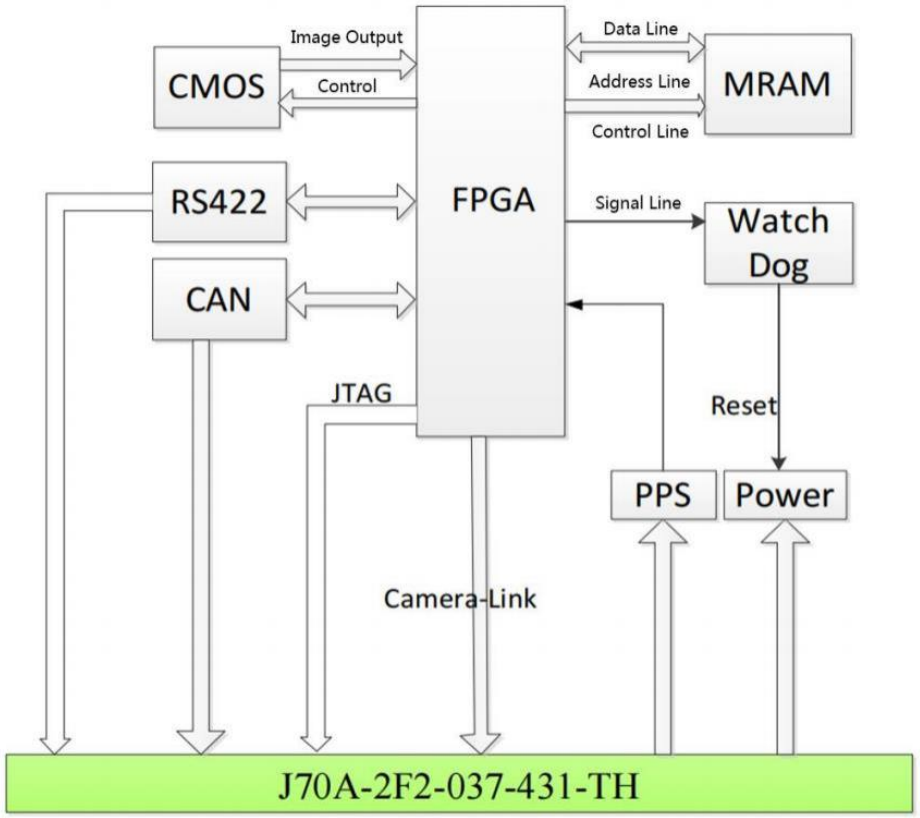
IDS 12：Circuit and Interface Schematics

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	

Simplified diagram：



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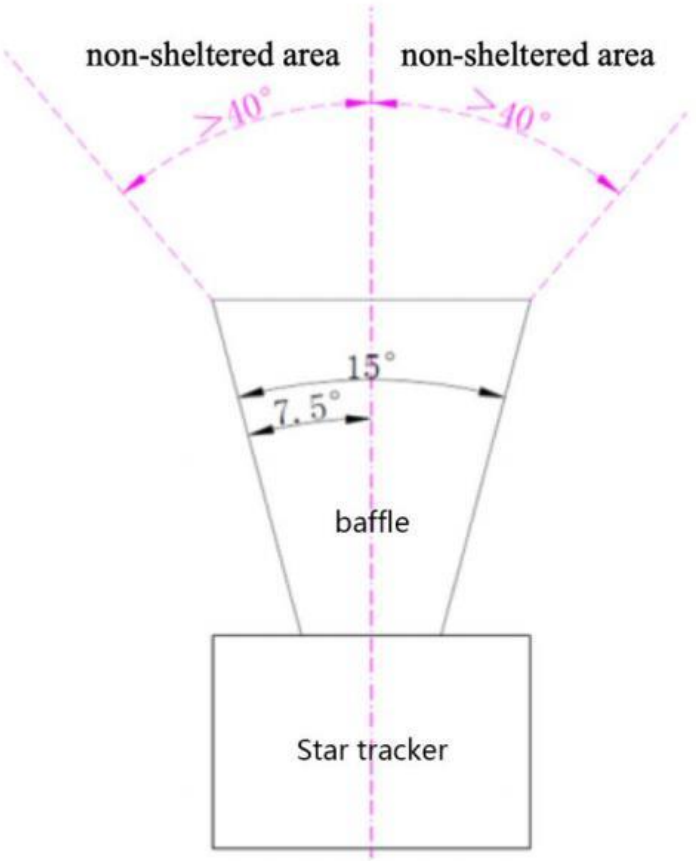
IDS 13：Installation requirements

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	



Be sure: Nothing sheltered in the field of view: the circular cone of 80° around the top of the Baffle.

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IDS 14：Device Description

	File number					
	Sub-system name					
	Device name	Star Tracker	Stage mark			
	Device code	PST3S-H5			FM	

无

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