File Number	Piece Number

File Number	TYS-PST3S-K4L-IDS
Stage Mark	FM
Page	14

PST3S-K4L Star Tracker IDS

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Standardization Checked by:	Dong Pengfei
Approved by:	Wang Haijun

Signature

TY-Space Technology (Beijing) Ltd.

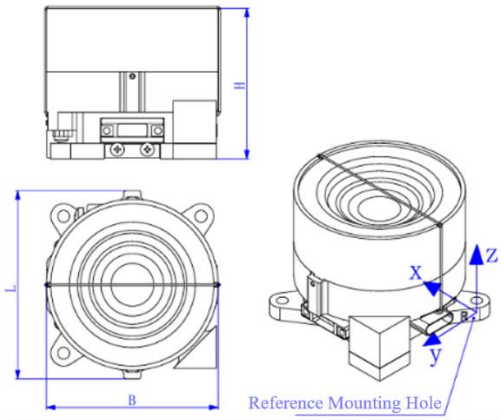
IDS 1: Performance Index

	File Number	TYS-PST3S-K4L-IDS	Page 1 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	

Parameters	**Specifications**
Attitude Accuracy	Pointing: 5″ (3σ) Roll: 50″ (3σ)
Dynamic Performance	@0.1°/s: 5″ (Pointing, 3σ); 50″ (Roll, 3σ); @0.5°/s: 8″ (Pointing, 3σ); 80″ (Roll, 3σ); @1.0°/s: 10″ (Pointing, 3σ); 100″ (Roll, 3σ); @2°/s: Trackable
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
Exclusion Angle	Sun: better than 35°; Earth: better than 30°
Time Scale Accuracy	Better than 0.5ms @ synchronization pulse (SYNC pulse)
Communication	RS422
Quaternions Continuity	The scalar of quaternion: non-negative
Life Time	5 years @500km Orbit
Reliability	≥0.98 @ the end of 5-year running

Edited (Date):			
Signed (Date):	Mark		Signature, Date

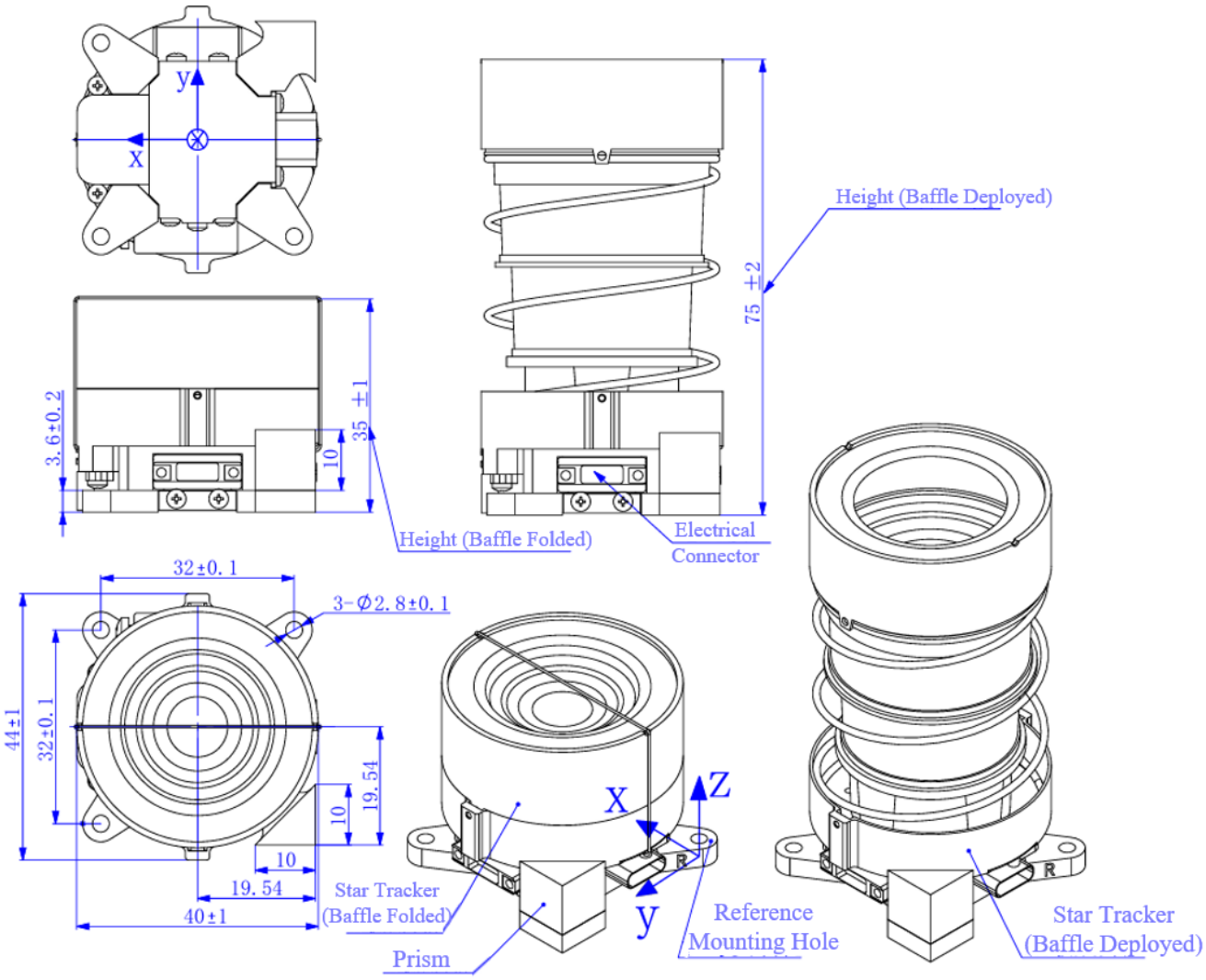
IDS 2: Mechanical Characteristics

<table>
<tr><td colspan="2" rowspan="4"></td><td colspan="2">File Number</td><td colspan="2">TYS-PST3S-K4L-IDS</td><td colspan="4">Page 2 of 14</td></tr>
<tr><td colspan="2">Sub-System Name</td><td colspan="2"></td><td colspan="4"></td></tr>
<tr><td colspan="2">Device Name</td><td colspan="2">PST3S-K4L Star Tracker</td><td colspan="4">Stage Mark</td></tr>
<tr><td colspan="2">Device Code</td><td colspan="2"></td><td></td><td></td><td>FM</td><td></td></tr>
<tr><td colspan="3">Device Weight: 60±10g</td><td colspan="3">Device Count: 1</td><td></td><td>√</td><td></td></tr>
<tr><td rowspan="4">Mechanical Characteristics</td><td>Envelope Size (mm)</td><td>44±1×40±1</td><td>Expand Height: 35±1</td><td>Height When Unfolded: 75±2</td><td></td><td>√</td><td></td></tr>
<tr><td>CM Position (mm)</td><td>X: 16±1</td><td>Y: 16±1</td><td>Z: 18±1</td><td></td><td>√</td><td></td></tr>
<tr><td rowspan="2">Inertia at CM (kg.mm^2)</td><td rowspan="2">P_X = 16±2</td><td rowspan="2">P_Y =16±2</td><td rowspan="2">P_Z =14±2</td><td></td><td>√</td><td></td></tr>
<tr><td>MEAS</td><td>CALC</td><td>EST</td></tr>
<tr><td rowspan="5">Mounting Characteristics</td><td>Mounting Hole Count: 3</td><td colspan="2">Mounting Hole Dimensions (Tolerance) (mm): Φ2.8±0.1</td><td>Material: 2A12-T4</td><td colspan="3">Determination Method (√)</td></tr>
<tr><td colspan="3">Mounting Contact Area (mm^2): 380</td><td colspan="4" rowspan="4">Note: The determination method refers to the way to determine the mechanical characteristics of the device.
MEAS: Measurement
CALC: Calculation
EST: Estimation</td></tr>
<tr><td colspan="3">Mounting Surface Flatness: 0.1mm/(100mm×100mm)</td></tr>
<tr><td colspan="3">Mounting Surface Roughness Ra (μm): 3.2</td></tr>
<tr><td colspan="3">Mounting Surface Treatment: Conductive Treatment</td></tr>
<tr><td colspan="8">Parameter relationship diagram (should indicate coordinate system relative orientation, CM position, device body dimensions, mounting surface location, etc.):
 

Note: The coordinate origin is located at the center of the reference mounting hole on the mounting surface (see IDS 3: Instrument Diagram).</td></tr>
<tr><td colspan="2">Edited (Date):</td><td></td><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td colspan="2">Signed (Date):</td><td>Mark</td><td colspan="2"></td><td colspan="3">Signature, Date</td></tr>
</table>

IDS 3: Instrument Diagram

	File Number	TYS-PST3S-K4L-IDS	Page 3 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	



Note: This schematic diagram should include overall dimensions, mounting dimensions, mounting surface, mounting points (hole diameters and their tolerances, center-to-center distance and their tolerances), positional tolerances of guide pins and holes, orientation, position, type and designation of electrical connectors, operation holes required for calibration and testing, bonding jumpers/straps (position and length), and registration measurement datum.

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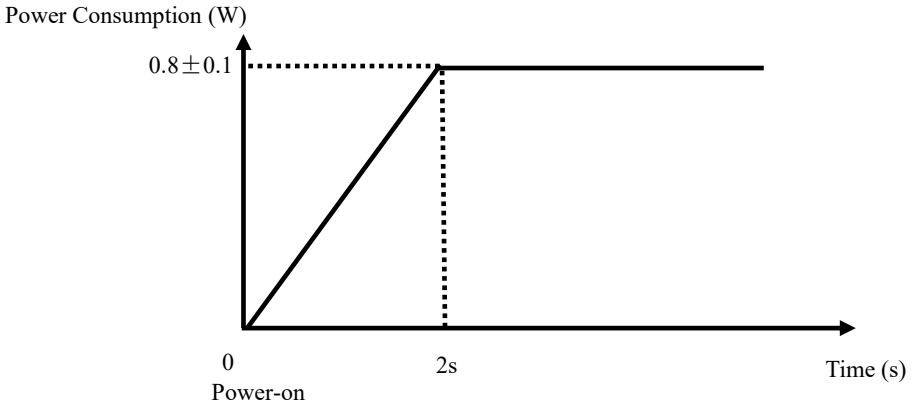
IDS 4: Thermal Characteristics

	File Number	TYS-PST3S-K4L-IDS	Page 4 of 14				
	Sub-System Name						
	Device Name	PST3S-K4L Star Tracker	Stage Mark				
	Device Code				FM		

Surface (Excluding Mounting Surface)	Aluminum Alloy (2A12-T4) Outer Surface Treatment: Aluminum Color Outer Surface Emissivity: ε_H ≥0.6	Note: The inner surface of the baffle is ultra black coating. ε_H≥0.85, α_S ≥0.95
Start Temperature ℃: -30～+40		Heat Capacity J/K: 54
Operating Temperature Range ℃: -30～+40		Operating Relative Humidity Range: ≤60%
Best Operating Temperature Range ℃: 20±5		Storage Relative Humidity Range: ≤70%
Storage Temperature Range ℃: -30～+40		Power Consumption @Operating State W: 0.8±0.1(Per Device) Power Consumption @Preparing State W: 0 (Per Device)

Description:



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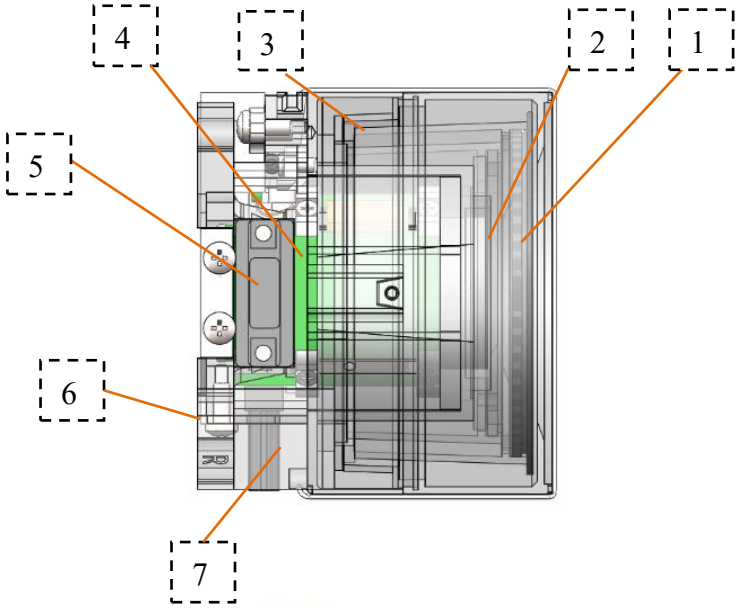
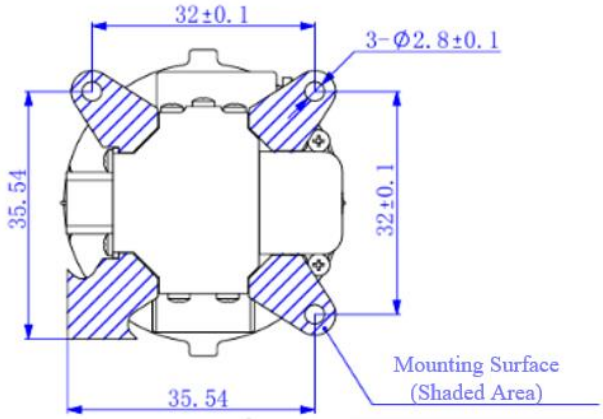
IDS 5: Thermal Diagram

	File Number	TYS-PST3S-K4L-IDS	Page 5 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	

Diagram:





1—Baffle 2—Lens

3—Circuit Box 4—Circuit Board

5—Connector 6—Optical Prism

7—Mounting Lug

Note: Thermal conductive mounting of Star Tracker Circuit Box and Baffle.

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IDS 6: Power

		File Number	TYS-PST3S-K4L-IDS	Page 6 of 14			
		Sub-System Name					
		Device Name	PST3S-K4L Star Tracker	Stage Mark			
		Device Code				FM	
Operating Mode (Long Term/Short Term / Other)		Long Term		Device Count			1
Voltage	Voltage Stability	Ripple Voltage	Inrush Current (Peak / Duration)	Power Consumption			
5V	5%	100mV (p-p)	2A/5ms	0.8±0.1W			

Notes:

1). The internal grounding of the star tracker is designed to be isolated, and the external structure makes contact with ground.

2). Upon deployment of the baffle, a current of 1.5A is sustained for 10s.

* 10s refers to the total time from sending the deployment command to sending the shutdown command.

3). The environmental temperature for baffle deployment must be greater than 0°C.

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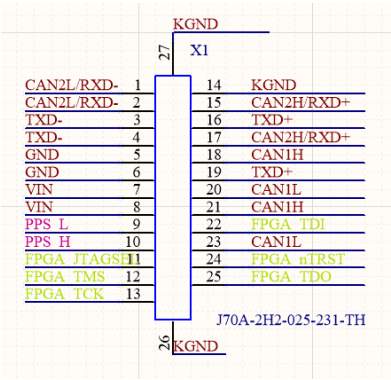
IDS 7: Electrical Connector Contact Assignment – Differential PPS

	File Number		TYS-PST3S-K4L-IDS	Page 7 of 14	
	Sub-System Name				
	Device Name		PST3S-K4L Star Tracker	Stage Mark	
	Device Code				FM
Name (by Function): X01	Electrical Connector P/N: J70A-2H2-025-231-TH			Pin / Hole: Hole	
Contact Number	Signal (Function) Description	Voltage/V	Current/A	Polarity	Remarks (Shielded / Twisted)
16,19	TXD+	RS422 Standard	RS422 Standard	Asynchronously Transmit+	3,16 Twisted, 4,19 Twisted
3,4	TXD-			Asynchronously Transmit-	
15,17	RXD+	RS422 Standard	RS422 Standard	Asynchronously Receive+	1,15 Twisted, 2,17 Twisted
1,2	RXD-			Asynchronously Receive-	
7,8	VIN	5V	0.2A	Power	Two-Point Two-Wire
5,6	GND	0V	0.2A	Power Ground	
14	KGND				Case Ground
10	PPS_H	RS422 Standard	RS422 Standard	PPS Receive+	9,10 Twisted
9	PPS_L			PPS Receive-	
11,12,13, 18,20,21 22,23,24, 25					Internal Use
					
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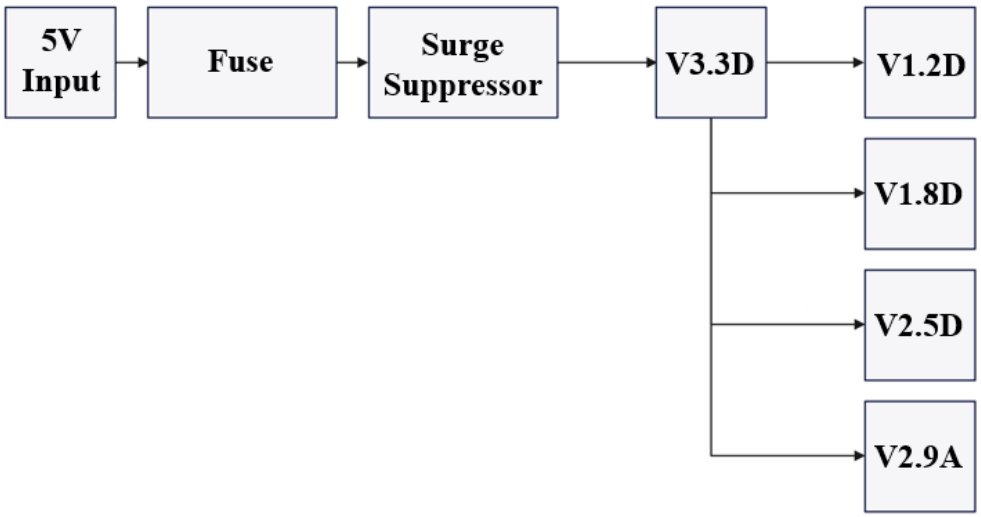
IDS 8: Electrical Interface Features - Power

	File Number	TYS-PST3S-K4L-IDS	Page 8 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	

Interface Signal	Power Supply
Signal Characteristics	5V power and the ground are two-point two-wire.
Interface Circuit	
Notes	

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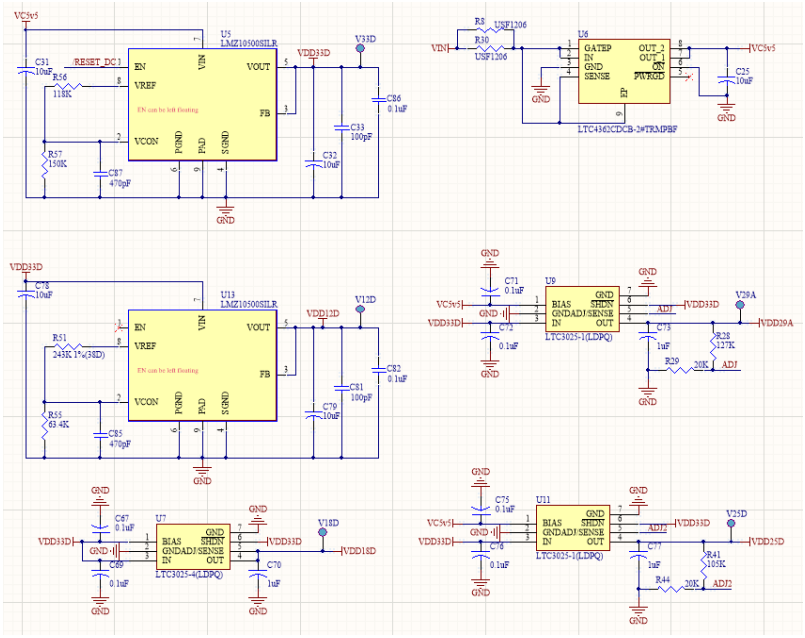
IDS 9: Electrical Interface Features - Power

	File Number	TYS-PST3S-K4L-IDS	Page 9 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	

Interface Signal	Power Supply
Signal Characteristics	5V power and the ground are two-point two-wire.
Interface Circuit	
Notes	

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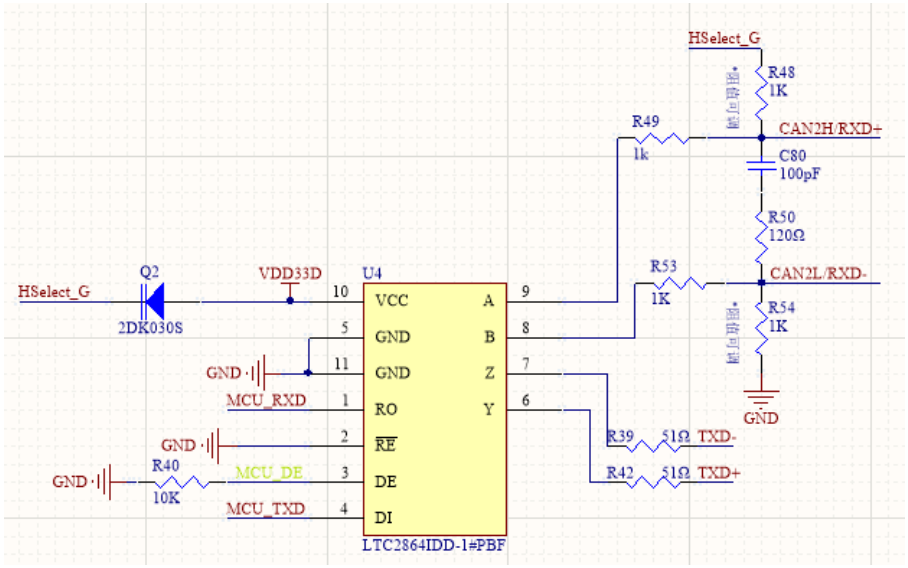
IDS 10: Electrical Interface Features - RS422

	File Number	TYS-PST3S-K4L-IDS	Page 10 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	

Interface Signal	Digital Signal: RS422
Signal Characteristics	RS422 Communication Baud Rate: 115200bps; 1 start bit, 8 data bits (LSB first), 1 stop bit, odd parity; Communication Method: Two-point Two-wire
Interface Circuit	
Notes	

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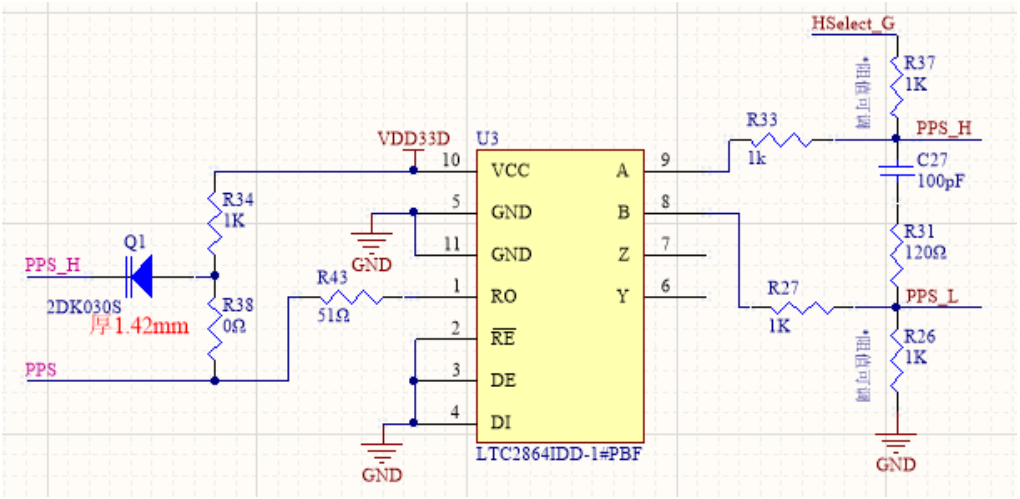
IDS 11: Electrical Interface Features - Differential PPS

	File Number	TYS-PST3S-K4L-IDS	Page 11 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	

Interface Signal	Pulse Per Second (PPS)
Signal Characteristics	Second Pulse Signal: Differential Input; Falling Edge Aligned to Integer Seconds; Negative Pulse Width 1ms.
Interface Circuit	PPS circuit 
Notes	R34, R38 and Q1: not soldered @Differential PPS

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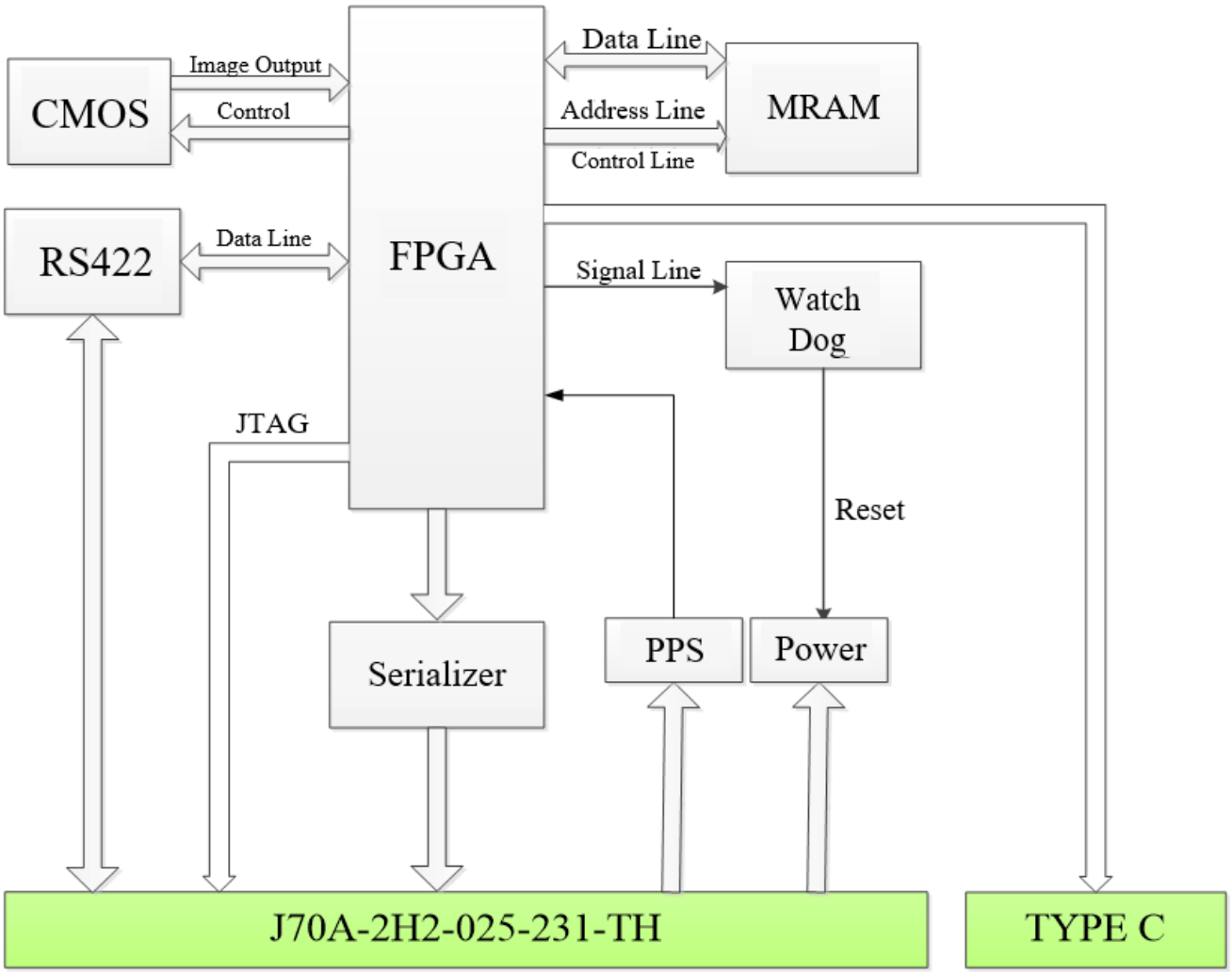
IDS 12: Circuit and Interface Schematics

	File Number	TYS-PST3S-K4L-IDS	Page 12 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	

Schematic Diagram:



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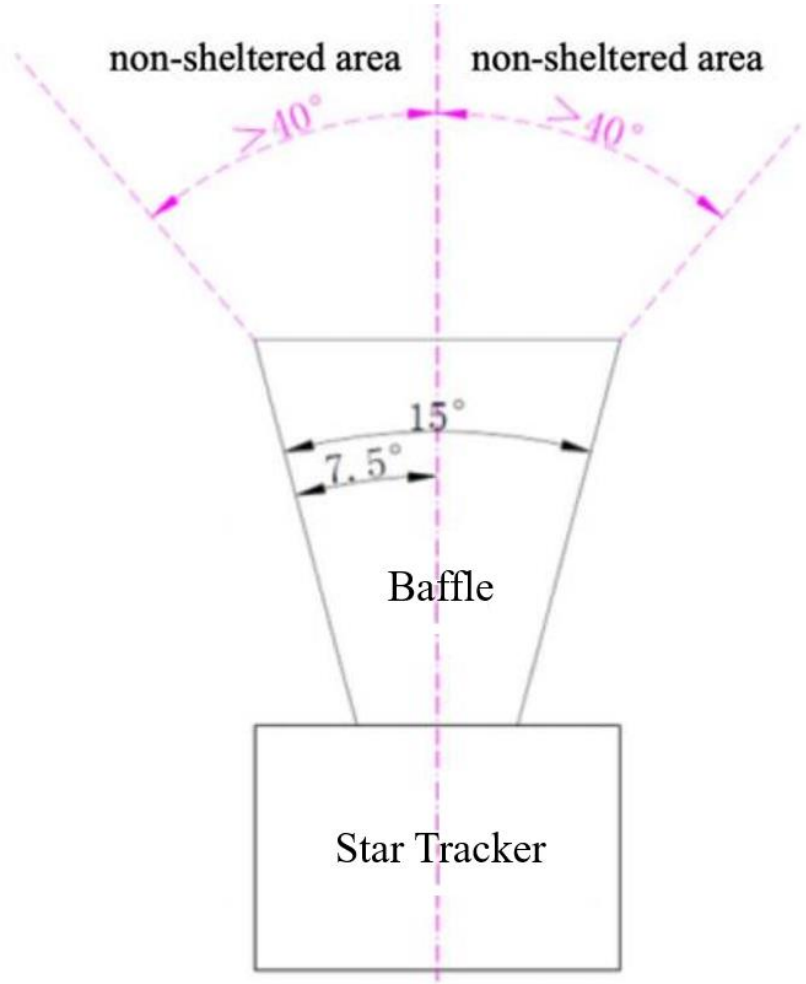
IDS 13: Mounting Requirements

	File Number	TYS-PST3S-K4L-IDS	Page 13 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	



Mounting Requirements: Ensure that nothing sheltered in the field of view (no obstructions within the 80° cone from the top of the baffle).

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IDS 14: Device Description

	File Number	TYS-PST3S-K4L-IDS	Page 14 of 14			
	Sub-System Name					
	Device Name	PST3S-K4L Star Tracker	Stage Mark			
	Device Code				FM	

None.

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