

File Number	Piece Number



File Number	TYS-PST3S-H5-IDS
Stage Mark	FM
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PST3S-H5 Star Tracker IDS

Signature

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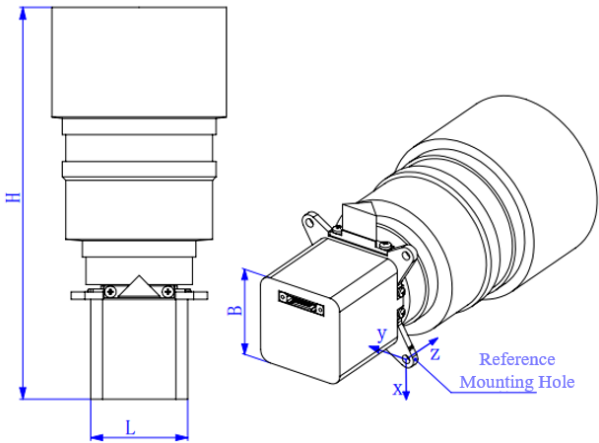
Standardization
Checked by: Chai Yin

Approved by: Wang Haijun

IDS 1: Performance Index

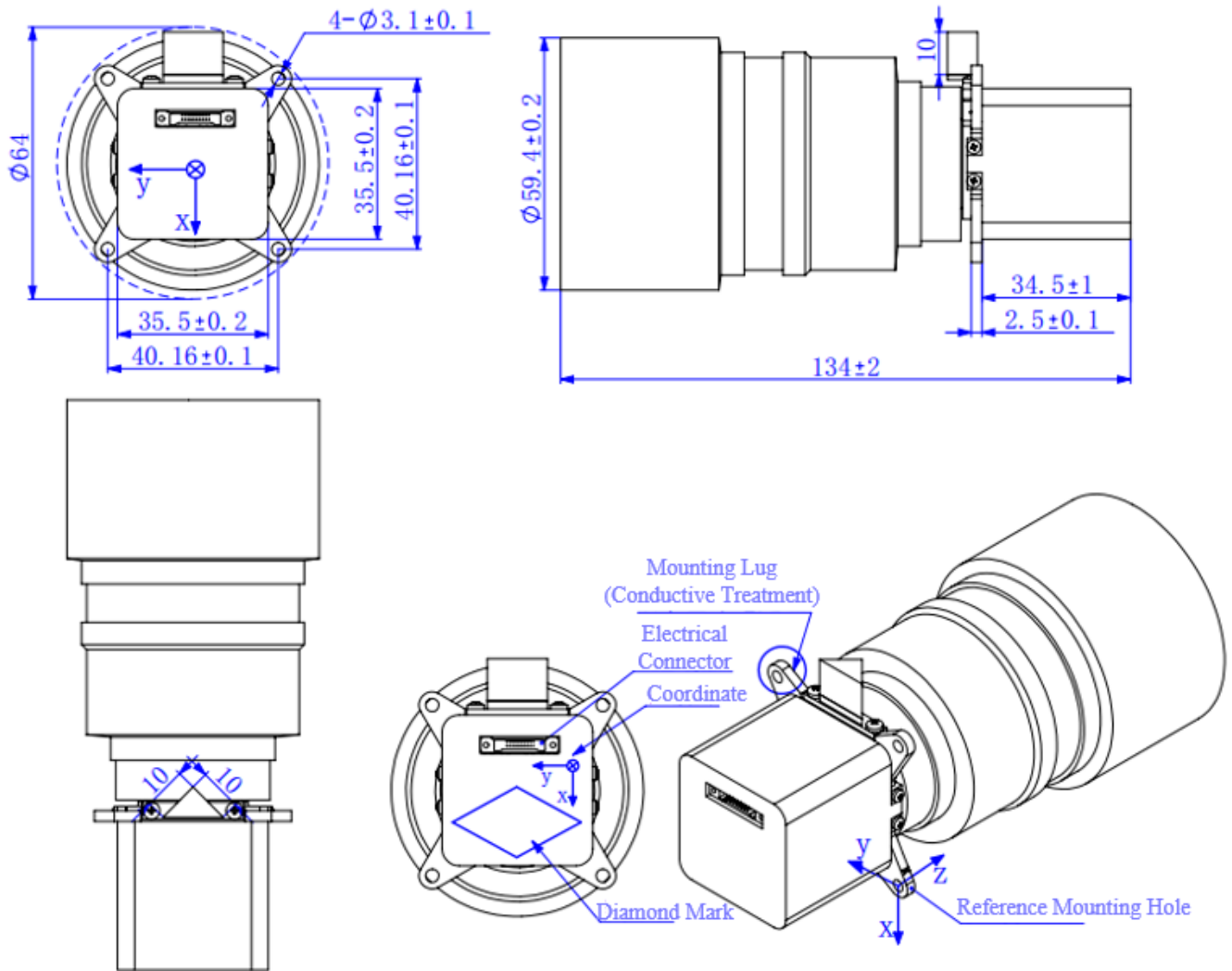
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		Sub-System Name				
		Device Name	PST3S-H5 Star Tracker		Stage Mark	
		Device Code				
Parameters	Specifications					
Attitude Accuracy	Pointing: 3" (3σ) Roll: 30" (3σ)					
Dynamic Performance	@0.1°/s: 5" (Pointing, 3σ); 50" (Roll, 3σ); @0.5°/s: 8" (Pointing, 3σ); 60" (Roll, 3σ); @1.0°/s: 15" (Pointing, 3σ); 120" (Roll, 3σ); @3°/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 25°					
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					
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IDS 2: Mechanical Characteristics

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		Sub-System Name					
		Device Name		PST3S-H5 Star Tracker		Stage Mark	
		Device Code					FM
Device Weight: 130±10g		Device Count: 1					√
Mechanical Characteristics	Envelope Size (mm)	<Φ64		Height: 134±2			√
	CM Position (mm)	X: -21±1		Y: 20±1	Z: 16±1		√
	Inertia at CM (kg.mm ²)	P _X = 220±2		P _Y = 221±2	P _Z = 55±2		√
						MEAS	CALC
Mounting Characteristics	Mounting Hole Count: 4	Mounting Hole Dimensions (Tolerance) (mm): Φ3.1±0.1			Material: 2A12-T4	Determination Method (√)	
	Mounting Contact Area (mm ²): 200				Note: The determination method refers to the way to determine the mechanical characteristics of the device. MEAS: Measurement CALC: Calculation EST: Estimation		
	Mounting Surface Flatness: 0.1mm/(100mm×100mm)						
	Mounting Surface Roughness Ra (μm): 3.2						
	Mounting Surface Treatment: Conductive Treatment						
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 <i>IDS 3: Instrument Diagram</i>).							
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IDS 3: Instrument Diagram

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	Device Name	PST3S-H5 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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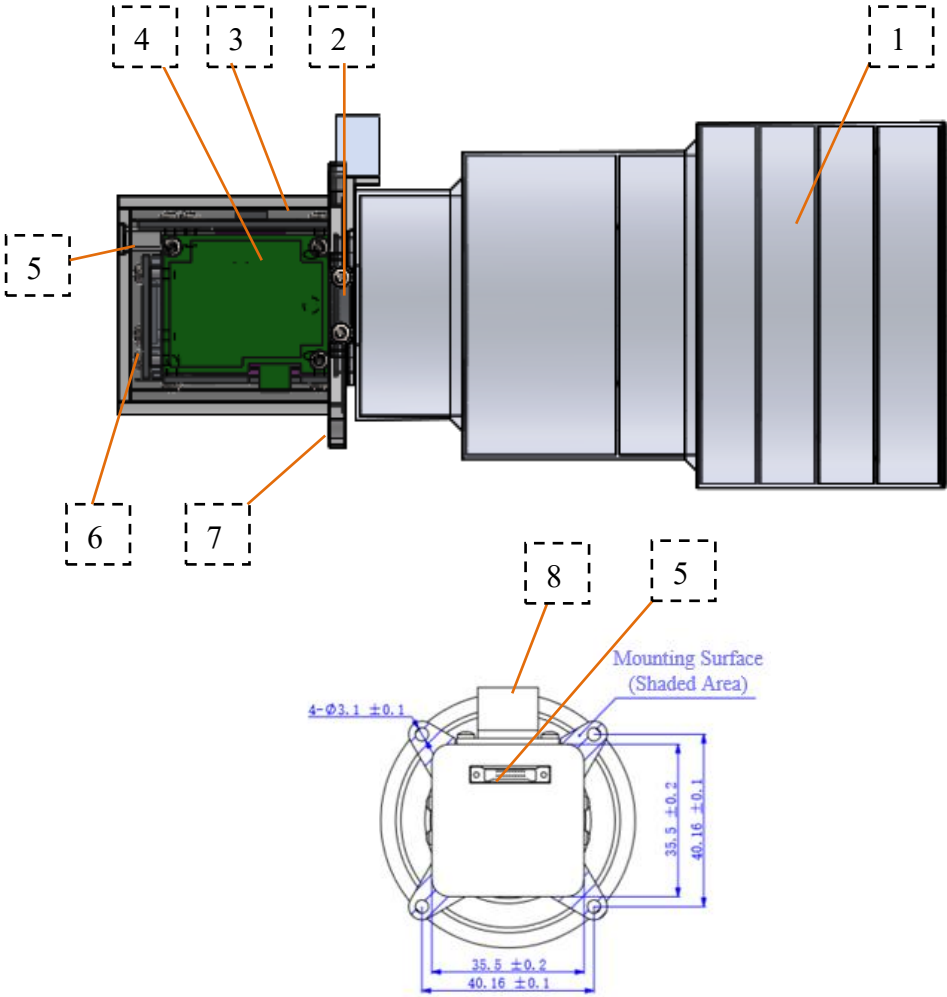
IDS 4: Thermal Characteristics

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		Sub-System Name				
		Device Name	PST3S-H5 Star Tracker		Stage Mark	
		Device Code				
Surface (Excluding Mounting Surface)	Aluminum alloy (2A12-T4)		Note: The inner surface of the baffle is ultra black coating. $\varepsilon_H \geq 0.85, \alpha_S \geq 0.96$			
	Outer Surface Treatment: Aluminum Anodization					
	Outer Surface Emissivity: $\varepsilon_H \geq 0.6$					
Start Temperature °C: -30~+40			Heat Capacity J/K: 100			
Operating Temperature Range °C: -30~+40			Operating Relative Humidity Range: $\leq 60\%$			
Best Operating Temperature Range °C: -0~+10			Storage Relative Humidity Range: $\leq 70\%$			
Storage Temperature Range °C: -30~+40			Power Consumption @Preparing State W: 0 (Per Device) Power Consumption @Operating State W: 1 ± 0.2 (Per Device)			
Description:						
Edited (Date):						
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IDS 5: Thermal Diagram

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	Device Name	PST3S-H5 Star Tracker	Stage Mark			
	Device Code				FM	

Diagram:



- 1—Baffle
- 2—Lens
- 3—Circuit Box
- 4—Power Supply & Image Processing Circuit Board
- 5—Connector
- 6—Image Sensor Circuit Board
- 7—Mounting Lug
- 8—Optical Prism

Note: Conductive mounting of Star Tracker Circuit Box and Baffle.

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IDS 6: Power

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		Sub-System Name						
		Device Name		PST3S-H5 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	/	100mV (p-p)		2A/5ms		1±0.2W		
Notes: Safe Operating Voltage: 4.8V~5.4V.								
Edited (Date):								
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IDS 7: Electrical Connector Contact Assignment – Differential PPS

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		Sub-System Name							
		Device Name		PST3S-H5 Star Tracker		Stage Mark			
		Device Code						FM	
Name (by Function): X1		Electrical Connector P/N: J70A-2F2-037-431-TH				Pin / Hole: Hole			
Contact Number	Signal (Function) Description	Voltage/V	Current/A	Polarity		Remarks (Shielded / Twisted)			
13	PPS_H	RS422 Standard	RS422 Standard	PPS Receive+		13,14 Twisted			
14	PPS_L			PPS Receive-					
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, 2,4 Twisted			
1,2	TXD-			422 Transmit-					
11,12	RXD+	RS422 Standard	RS422 Standard	422 Receive+		9,11 Twisted, 10,12 Twisted			
9,10	RXD-			422 Receive-					
5,6,7,8,15, 16,17,18,19, 22,23,24,25, 26,27,28,29, 30,31,34,35, 36,37						Internal Use			

X1

J70A-2F2-037-431-TH

HOLE GND

VC5v5

USF1206

AR48 2.4Ω

AR49 2.4Ω

AR50 2.4Ω

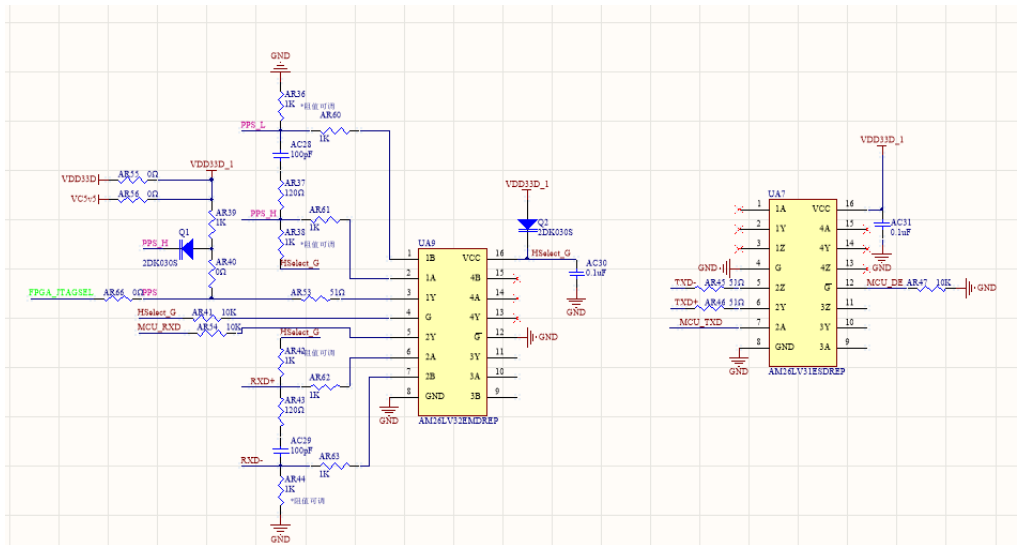
AR51 2.4Ω

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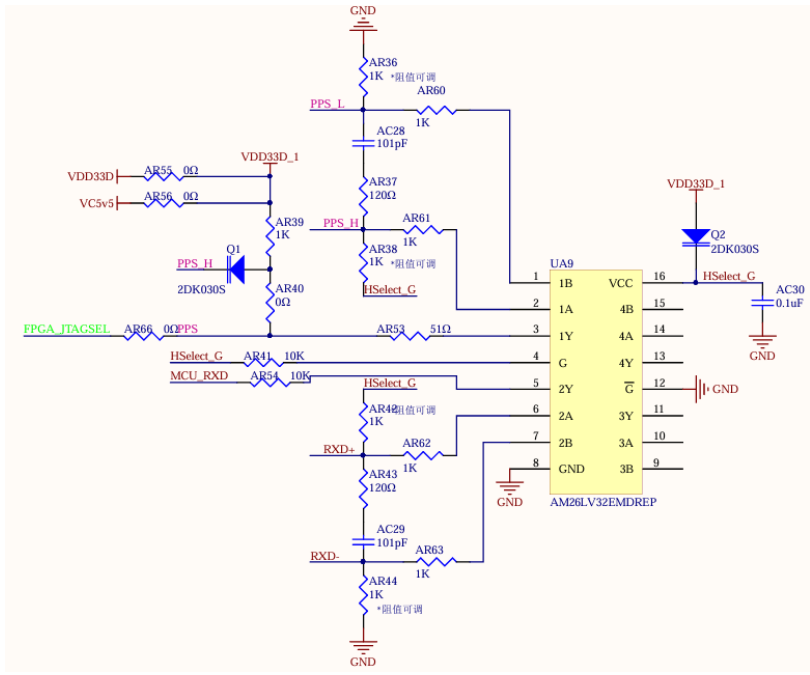
IDS 8: Electrical Interface Features - Power

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		Sub-System Name					
		Device Name	PST3S-H5 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	<pre> graph LR Input[5V Input] --> R1[2.4Ω Resistor] Input --> R2[2.4Ω Resistor] R1 --> U1[USF1206] R2 --> U2[USF1206] U1 --> DCDC[DCDC] U2 --> DCDC DCDC --> V12D[V1.2D] DCDC --> V33D[V3.3D] V33D --> V33D_out[V3.3D] V33D -- VLDO --> V18D[V1.8D] V33D -- VLDO --> V25D[V2.5D] V33D -- VLDO --> V29A[V2.9A] </pre>						
Notes							
Edited (Date):							
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IDS 9: Electrical Interface Features - RS422

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		Sub-System Name					
		Device Name	PST3S-H5 Star Tracker		Stage Mark		
		Device Code					FM
Interface Signal	Digital Signal: RS422						
Signal Characteristics	RS422 Communication Baud Rate: 115200bps; Communication Method: Two-point Two-wire.						
Interface Circuit							
Notes							
Edited (Date):							
Signed (Date):		Mark				Signature, Date	

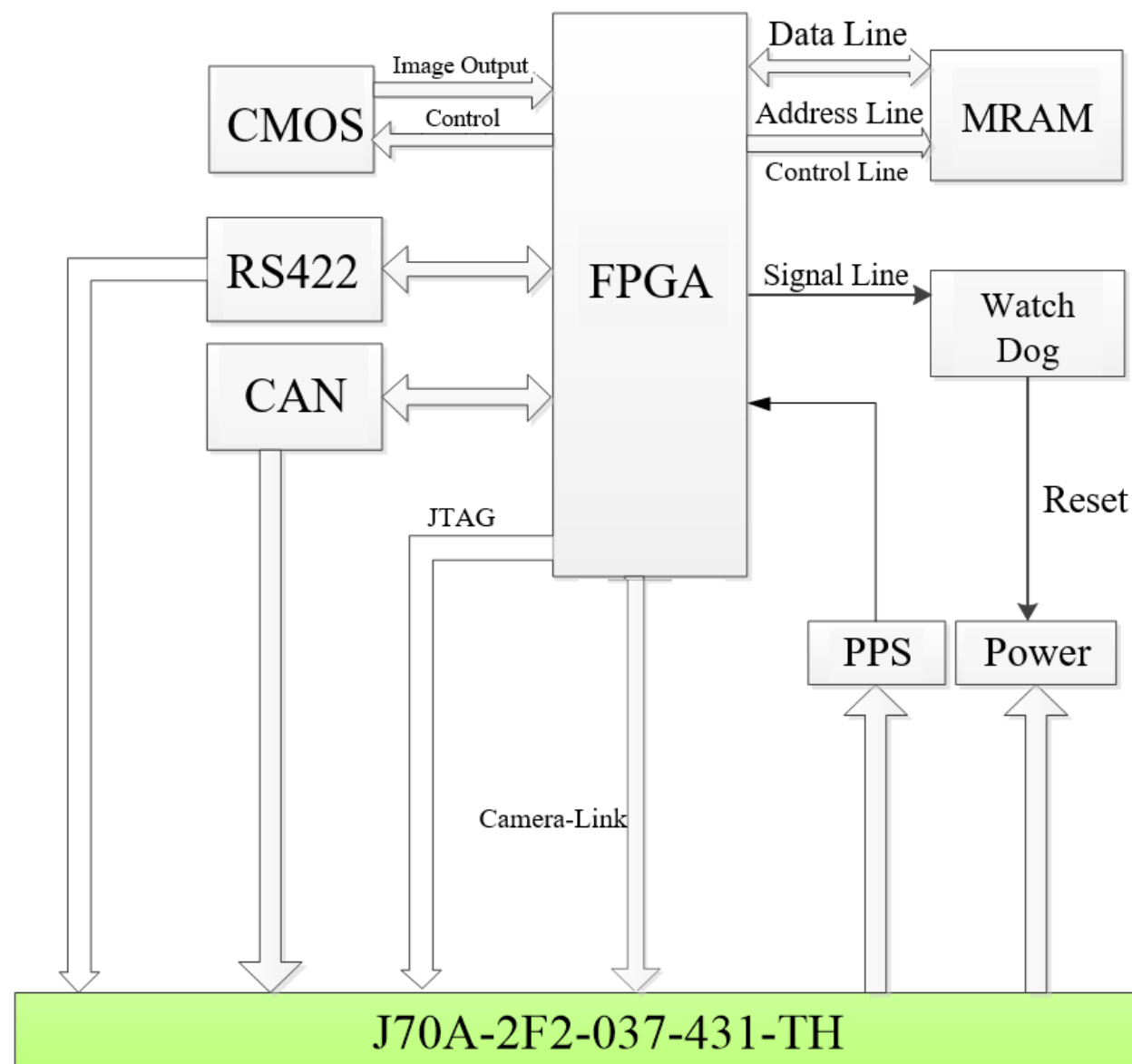
IDS 10: Electrical Interface Features - Differential PPS

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		Sub-System Name					
		Device Name	PST3S-H5 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	AR40, AR39, AR56, Q1: not soldered @Differential PPS.						
Edited (Date):							
Signed (Date):		Mark				Signature, Date	

IDS 11: Circuit and Interface Schematics

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	Sub-System Name					
	Device Name	PST3S-H5 Star Tracker	Stage Mark			
	Device Code				FM	

Schematic Diagram:



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IDS 12: Mounting Requirements

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	Device Code				FM	

non-sheltered area non-sheltered area

$>40^\circ$ $>40^\circ$

15°

7.5°

Baffle

Star Tracker

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 13: Device Description

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	Sub-System Name				
	Device Name	PST3S-H5 Star Tracker	Stage Mark		
	Device Code				FM
None.					
Edited (Date):					
Signed (Date):	Mark		Signature, Date		