

File number	Piece number



Label TYS-NST4SA2--IDS

Stage mark Z

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NST4S-A2 Star Tracker IDS

Signature

Edit : FSX

Proofreading : XMG

Check : WHQ

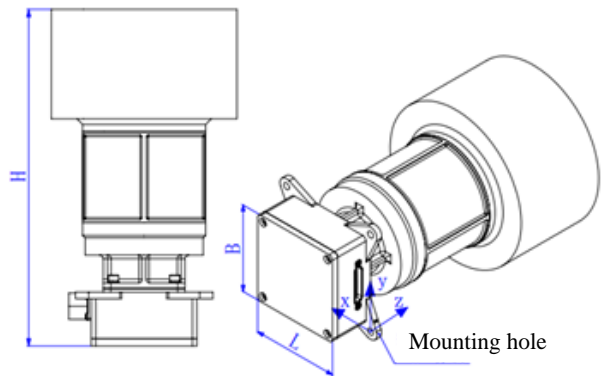
Standard check: CY

Approval : WHJ

IDS1: DATA SHEET

	File number	TYS-NST4SA2-IDS			
	Sub-system name				
	Device name	NST4S-A2 Star Tracker		Stage mark	
	Device code				Z
Attitude Accuracy	Pointing: 3" (3 σ) Rolling: 30" (3 σ)				
Dynamic Range	@ 0.1°/s: 3" (Pointing, 3 σ); 30" (Rolling, 3 σ); @0.5°/s: 5" (Pointing, 3 σ); 50" (Rolling, 3 σ); @1.0°/s: 10" (Pointing, 3 σ); 100" (Rolling, 3 σ); @ 3°/s: follow up				
Data Validity	>98%@ 0.5°/s; >96%@0.5°/s ~1.5°/s; >90%@1.5°/s ~2°/s.				
Update Rate	$\geq 10\text{Hz}$				
Acquisition Rate	Max. $\leq 2\text{s}$				
Start-up Time	Better than 5s				
Exclusive Angle	Sun $\leq 25^\circ$; Earth or other stray light $\leq 20^\circ$				
Timing Accuracy	0.1ms @ synchronization pulse (SYNC pulse)				
Communitation	422				
Quaternion Continuity	the scalar of the quaternion: non-negative				
Life Time	7years @1200Km Orbit.				
Reliability	≥ 0.98 @ the end of a 7years running				
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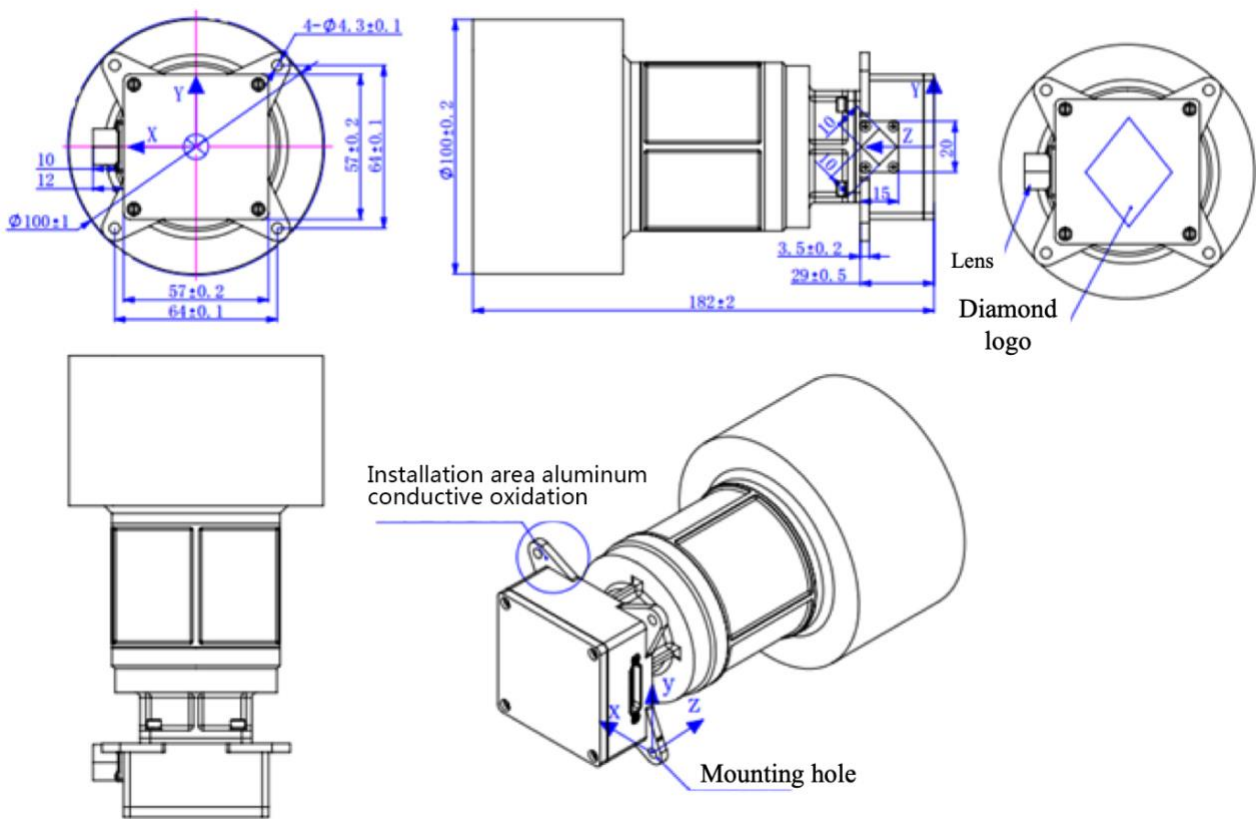
IDS2: Mechanical Characteristics

		File number		TYS-NST4SA2-IDS			
		Sub-system name					
		Device name		NST4S-A2 Star Tracker		Stage mark	
		Device code				Z	
Device weight ^(note) 370±20 g			Device number:			√	
Weight characteristics	Envelope size mm	Envelope diameter: $\Phi 100 \pm 1$		Height: 182±2		√	
	Centroid position mm	X: 32±2	Y: 32±2	Z: 39±2		√	
	Inertia of centroid kg.mm ²	$P_X = 1351 \pm 3$	$P_Y = 1357 \pm 3$	$P_Z = 383 \pm 3$		√	
Installation characteristics	Installed holes number: 4	Size of installed holes (tolerance) mm: $4 \times \Phi 3.4 \pm 0.1$		Material: 2A12-T4		Determination method (√)	
	Installation contacting area mm ² : 500			Note:			
	Installation surface flatness: 0.1						
	Installation surface roughness Ra μm : 3.2						
	Installation surface state: the installation area is oxidized by conduction, and the remaining area is oxidized black.						
<p>Parameter relationship diagram (it should show the relative relationship between the coordinate frames, position of centroid, size of device body, location of installation surface, etc.):</p> <p>Note: the determination method refers to the way to determine the quality of device.</p>							
							
<p>Note: The origin of the coordinates lies in the geometric center of the outer surface of the lower shell (see "Instrument diagram");</p>							
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IDS3: Instrument Diagram

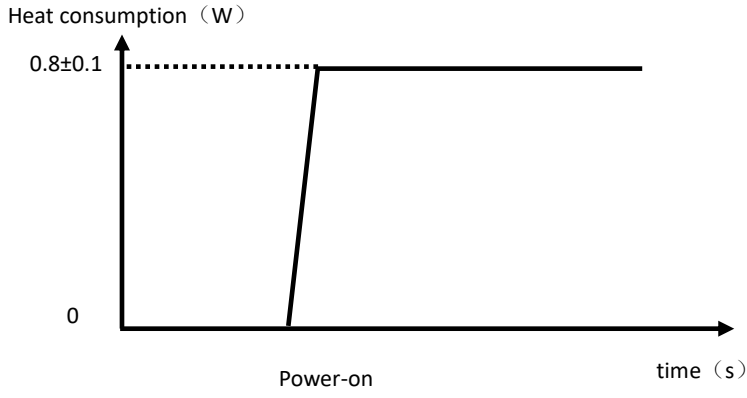
	File number	TYS-NST4SA2-IDS		
	Sub-system name			
	Device name	NST4S-A2 Star Tracker	Stage mark	
	Device code			Z

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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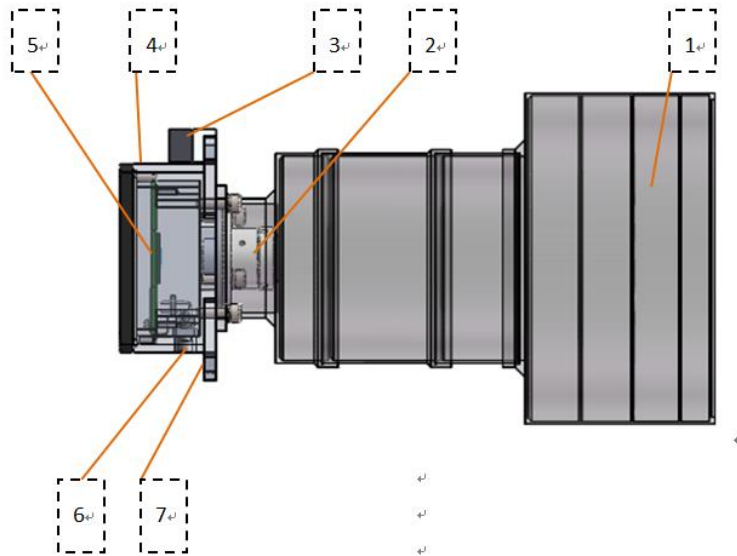
IDS4: Thermal characteristics

		File number	TYS-NST4SA2-IDS			
		Sub-system name				
		Device name	NST4S-A2 Star Tracker		Stage mark	
		Device code				Z
Surface (except for mounting surface)	Aluminum alloy (2A12-T4)	Note:				
	Outside surface treatment: Black anodized					
	$\epsilon_H: \geq 0.85$					
Start temperature $^{\circ}\text{C}$: -30~+40		Better Operating @ $^{\circ}\text{C}$: 0~+10		Heat capacity J/K: 350		
Operating temperature range $^{\circ}\text{C}$: -40~+40		Operating relative humidity range: $\leq 60\%$				
Storage temperature range $^{\circ}\text{C}$: -40~+40		Storage relative humidity range: $\leq 70\%$				
Operating state heat consumption W: 0.8 ± 0.1 (per device)						
 <p style="text-align: center;">Heat consumption (W)</p> <p style="text-align: center;">0.8±0.1</p> <p style="text-align: center;">0</p> <p style="text-align: center;">Power-on</p> <p style="text-align: center;">time (s)</p>						
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IDS 5: Thermal Diagram

	File number	TYS-NST4SA2-IDS		
	Sub-system name			
	Device name	NST4S-A2 Star Tracker	Stage mark	
	Device code			Z

Diagram:



- 1—Baffle 2—Lens
- 3—Prism 4—Circuit box
- 5—Image sensor & Circuit board 6—Connector
- 7—Installing lugs (Contact surfaces)

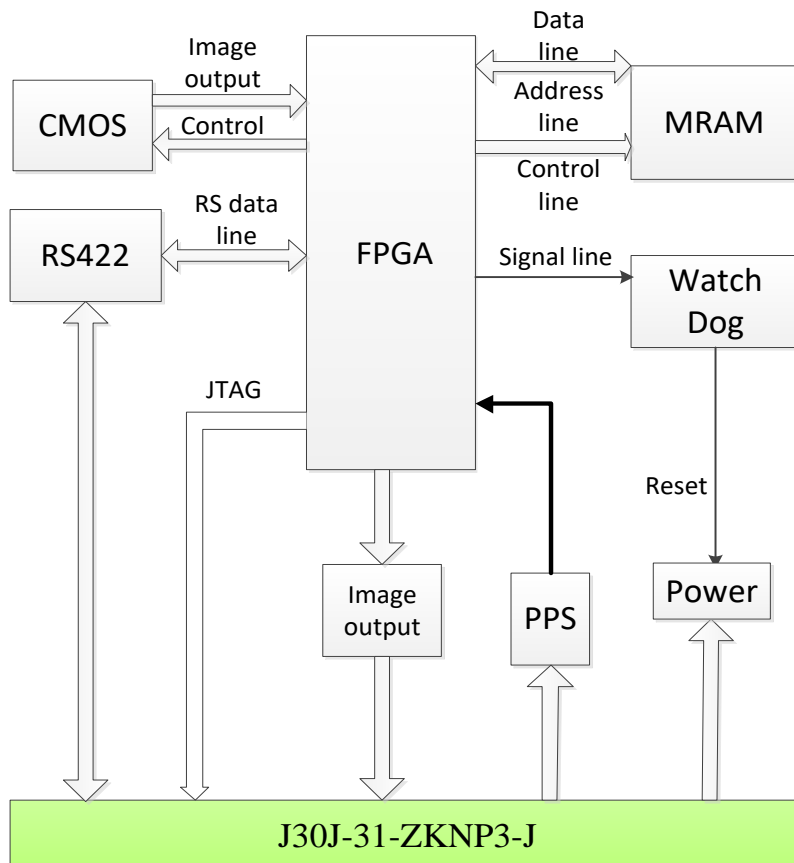
The structure of NST4S-A2 Star Tracker is shown as above,
 The power distribution is:1,circuit board: about 0.8W;

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IDS 6: Circuit and Interface Schematics

	File number	TYS-NST4SA2-IDS		
	Sub-system name			
	Device name	NST4S-A2 Star Tracker	Stage mark	
	Device code			Z

Simplified diagram:



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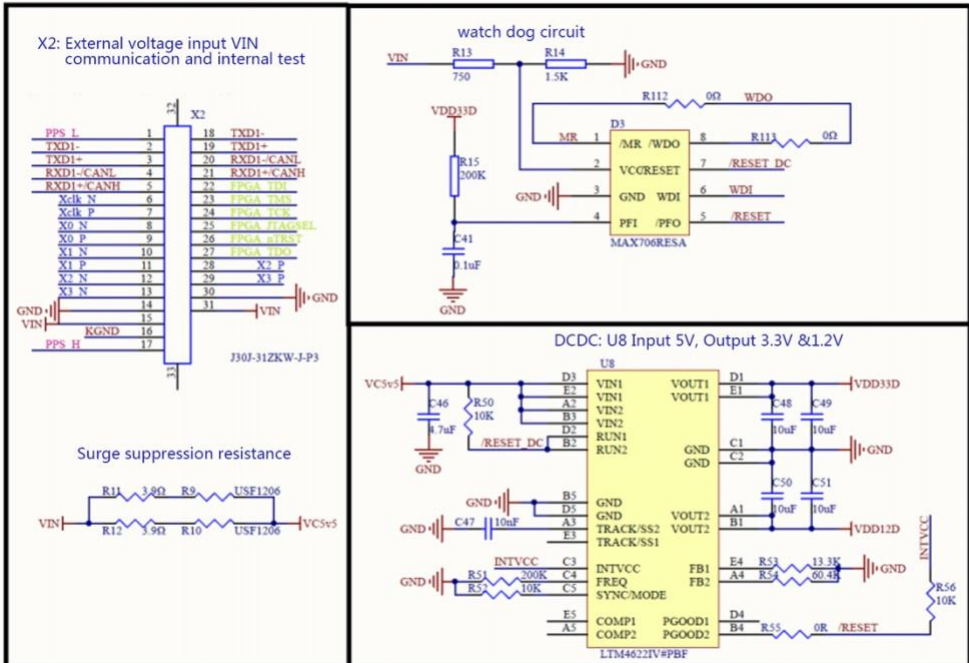
IDS 7: Power

		File number		TYS-NST4SA2-IDS			
		Sub-system name					
		Device name		NST4S-A2 Star Tracker		Stage mark	
		Device code				Z	
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	4%	150	2A/5ms			0.8±0.1	
CAUTION: Safe Running Voltage Range: 4.8V ~ 5.2V							
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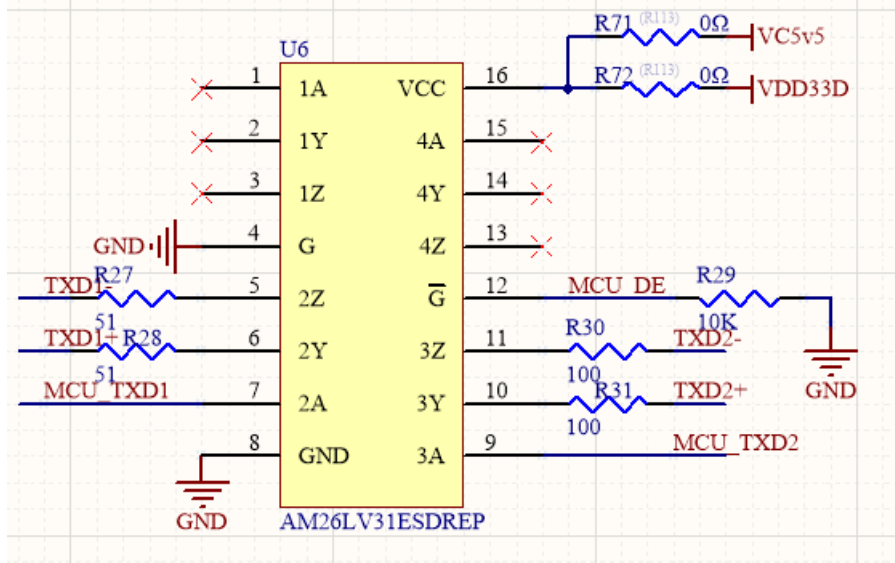
IDS 8: Electrical Connector Contact Assignment

		File number		TYS-NST4SA2-IDS			
		Sub-system name					
		Device name		NST4S-A2 Star Tracker		Stage mark	
		Device code				Z	
Name (by function)		XK-01	Electrical connector code		J30J-31ZKWP3-J	Needle / Hole	Hole
Contact number	Signal (function) description	Voltage/V	Current/A	Polar		Remarks (shielded / twisted)	
2, 18	TXD1-	0/+3.3(±1)	≤0.075	422 Transmit-		2,3 twisted, 18,19 twisted	
3, 19	TXD1+	0/+3.3(±1)	≤0.075	422 Transmit+			
4, 20	RXD1-	0/+3.3(±1)	≤0.075	422 Receive -		4,5 twisted, 20,21 twisted	
5, 21	RXD1+	0/+3.3(±1)	≤0.075	422 Receive +			
17	PPS H	0/+3.3(±1)	≤0.075	PPS Receive +			
1	PPS L	0/+3.3(±1)	≤0.075	PPS Receive -			
15, 31	VIN	/	/	power			
14, 30	GND	/	/	power Ground			
16	KGND	/	/	Structure Ground		Structure Ground	
others						Internal use, prohibit external use	
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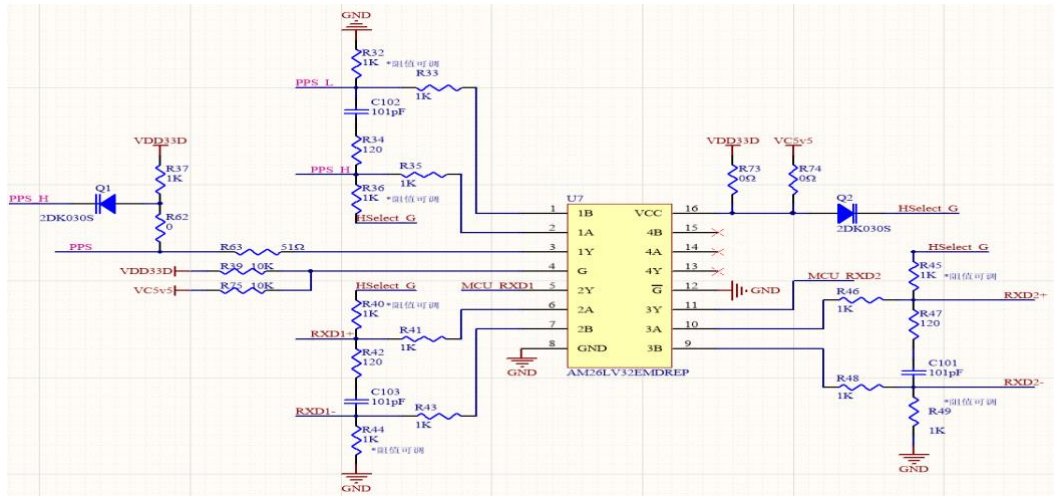
IDS 9: Electrical Interface Features-Power

	File number	TYS-NST4SA2-IDS			
	Sub-system name				
	Device name	NST4S-A2 Star Tracker		Stage mark	
	Device code			Z	
Interface signal	Power supply				
Signal characteristics	Operating voltage: $5V \pm 0.2V$; Reflected ripple : $< 100mV(p-p)$; Electric current @the baffle depolyed(peak/duration): $2A/5s$				
Interface Circuit					
Explanation	The power ground (GND) is isolated with the structure ground (KGND).				
Edited (Date):					
Signed (Date):	Mark	Changed number	Signature, date		

IDS 10: Electrical Interface Features-422

	File number	TYS-NST4SA2-IDS			
	Sub-system name				
	Device name	NST4S-A2 Star Tracker	Stage mark		
	Device code			Z	
Interface signal	Digital signal, RS422. (Sent)				
Signal characteristics	422 communication baud rate: 115200bps; Meet the standard: EIA-422-B Interface Chip:AM26LV31ESDREP, ,3.3v				
Interface Circuit	 <p>The diagram shows the AM26LV31ESDREP chip (U6) with the following connections: - Pin 1 (1A): VCC, connected to VC5v5 via resistor R71 (0Ω). - Pin 2 (1Y): 4A, connected to VDD33D via resistor R72 (0Ω). - Pin 3 (1Z): 4Y, marked with a red 'X'. - Pin 4 (1Z): 4Z, marked with a red 'X'. - Pin 5 (G): 4Z, marked with a red 'X'. - Pin 6 (2Z): \bar{G}, connected to GND. - Pin 7 (2Y): 3Z, connected to MCU DE via resistor R29 (10K). - Pin 8 (2A): 3Y, connected to TXD2+ via resistor R31 (100Ω). - Pin 9 (GND): 3A, connected to MCU TXD2. - Pin 10 (3Z): 3Z, connected to TXD2- via resistor R30 (100Ω). - Pin 11 (2Y): 3Z, connected to TXD2- via resistor R29 (10K). - Pin 12 (MCU DE): 12, connected to TXD2- via resistor R29 (10K). - Pin 13 (3Z): 3Z, marked with a red 'X'. - Pin 14 (3Y): 3Y, marked with a red 'X'. - Pin 15 (4A): 4A, marked with a red 'X'. - Pin 16 (VCC): 16, connected to VC5v5 via resistor R71 (0Ω). - Pin 17 (4A): 4A, marked with a red 'X'. - Pin 18 (4Y): 4Y, marked with a red 'X'. - Pin 19 (4Z): 4Z, marked with a red 'X'. - Pin 20 (G): G, connected to GND. - Pin 21 (2Z): 2Z, connected to TXD1- via resistor R27 (51Ω). - Pin 22 (2Y): 2Y, connected to TXD1+ via resistor R28 (51Ω). - Pin 23 (2A): 2A, connected to MCU TXD1 via resistor R28 (51Ω). - Pin 24 (GND): GND, connected to GND.</p>				
Explanation	TXD1+ & TXD1- are for connecting OBC. TXD2+ & TXD2- are internal used.				
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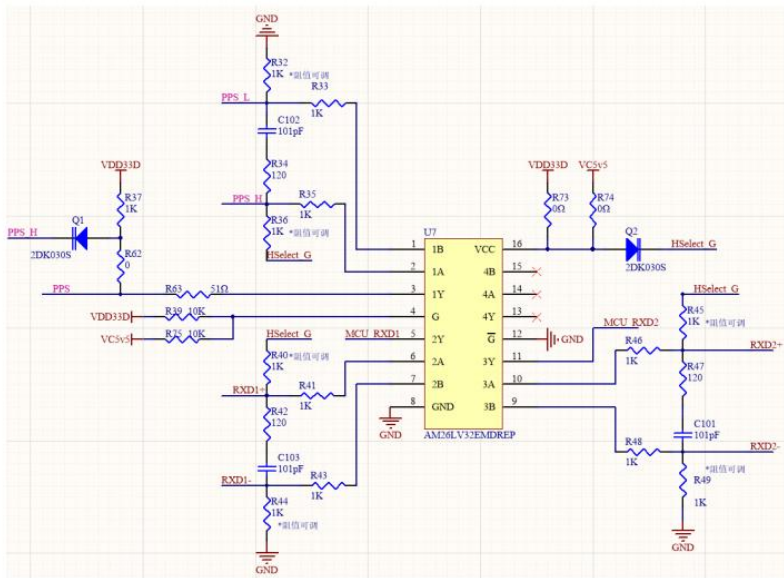
IDS 11: Electrical Interface Features-422

	File number	TYS-NST4SA2-IDS	
	Sub-system name		
	Device name	NST4S-A2 Star Tracker	Stage mark
	Device code		Z
Interface signal	Digital signal, RS422. (Received)		
Signal characteristics	422 communication baud rate: 115200bps; Meet the standard: EIA-422-B		
Interface Circuit			
Explanation	<p>Note: RXD1+, RXD1- are for connecting OBC. RXD2+, RXD2- are internal used.</p>		
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IDS 12: Electrical Interface Features-Second pulse(Single)

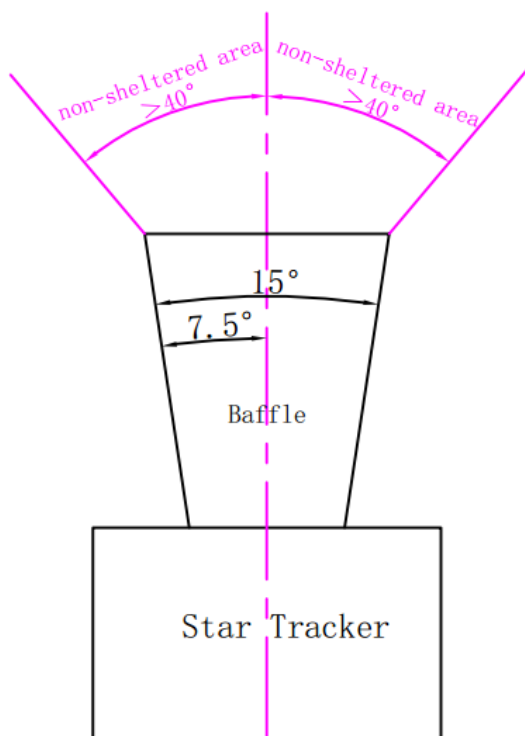
	File number	TYS-NST4SA2-IDS	
	Sub-system name		
	Device name	NST4S-A2 Star Tracker	Stage mark
	Device code		Z
Interface signal	Second pulse signal		
Signal characteristics	The second pulse signal input mode is differential and is triggered by the lower edge. the negative pulse width is 1~2ms. Meet the standard: EIA-422-B.		
Interface circuit	<p>Second pulse circuit</p>		
Explanation	R32、R33、R35、R34、R36、R63 and C102 are not weld@ single second pulse.		
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IDS 13: Electrical Interface Features-Second pulse(Different)

	File number	TYS-NST4SA2-IDS			
	Sub-system name				
	Device name	NST4S-A2 Star Tracker	Stage mark		
	Device code			Z	
Interface signal	Second pulse signal				
Signal characteristics	The second pulse signal input mode is differential and is triggered by the lower edge. the negative pulse width is 1~2ms. Meet the standard: EIA-422-B.				
Interface circuit	<p>Second pulse circuit</p> 				
Explanation	R37、R62 and Q1 are not weld@ different second pulse.				
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IDS 14: Installation requirements

	File number	TYS-NST4SA2-IDS		
	Sub-system name			
	Device name	NST4S-A2 Tracker	Star	Stage mark
	Device code		Z	



Installation Notes:

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

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