

Tertiary Mirror Assembly TIP-TILT MIRROR POSITION Command Interface

Interface Scope:	External (from SOAR)
Source:	From Guider
Interface Type:	Command input
Command Name:	Tip-Tilt Mirror Position
Function:	Two-axis (Tip, Tilt) position command to TM controller
Format:	Serial Data Clock (SDClk), Synchronous 32-bit Serial Data In word (SDI), Synchronous Write Enable (WE) strobe pulse.
	Serial Data Clock will consist of a burst of 33 pulses. SDI and WE will change state at fall of SDClk , Tip-Tilt may sample SDI and WE on rise of SDClk ..
	"Tip" and "Tilt" command words are concatenated to form 32-bit SDI word, See Figure 1
SDI Coding:	Offset binary, Positive true
Scale Factor:	$3.05 \cdot 10^{-9}$ radians / LSB (Tip position command)
(Nominal)	$3.05 \cdot 10^{-9}$ radians / LSB (Tilt position command)
Characteristics:	All signals to be compatible with EIA RS-422
Termination:	120 ohm parallel terminated at load, (Tip-Tilt controller)
Connector Type:	25-pin, male, "D"-type connector, AMP type TBD or equiv. (TBR)
Connector Location:	Rear panel of TMA Controller card cage
Connector Number:	J-2
Connector Pin-out:	Per Table 1 (TBR)
Mating cable number:	TBD
Comments:	Maximum command rate = 500 commands / sec

Pin	Signal Name	Signal type
1	Serial Data In (SDI) - True	Input
2	Serial Data In (SDI) - Complement	Input
3	Serial Data Clock (SDCik)- True	Input
4	Serial Data Clock (SDCik) - Complement	Input
5	Write Enbl strobe (WE) - True	Input
6	Write Enbl strobe (WE)- Complement	Input
7	Signal ground	
8	Signal Ground	
9	Chassis Ground	
10	Chassis Ground	

Table 1 - Tip-Tilt Controller Connector J-2 Pin Assignment (TBR)

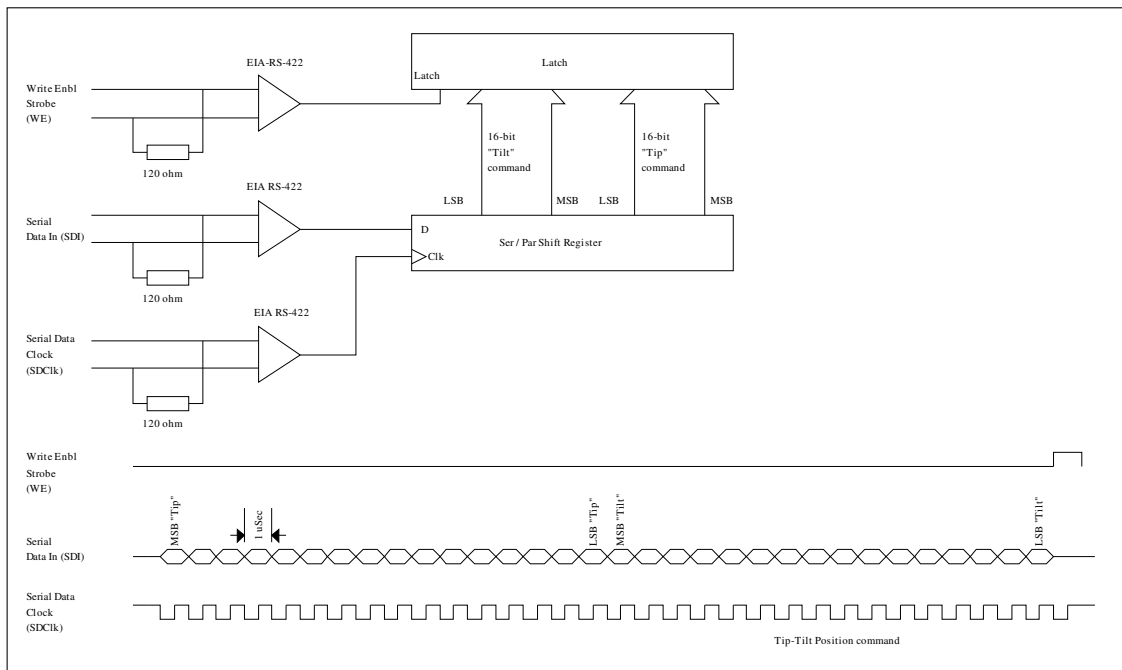


Figure 1 - Tip Tilt Command Interface

Tertiary Mirror Assembly TIP-TILT MIRROR MODE Command Interface**Interface Scope:** Internal**Source:** From AOCS computer (PCI-6503) via TEIA**Interface Type:** Command input**Command Name:** Tip-Tilt Mirror Mode**Function:** Operating Mode Select command to TM controller
Mode Selection per Table 2.

Operating Mode	Mode₂	Mode₁	Mode₁	Selected Tip-Tilt Operation
0	0	0	0	Both axes of Tip-Tilt go to "Null" position; ignore position command from Guider
1	0	0	1	Normal Operation; Tip-Tilt follows position command from Guider
2	0	1	0	Both axes of Tip-Tilt go to positive full-scale position; ignore position command from Guider
3	0	1	1	Both axes of Tip-Tilt go to negative full-scale position; ignore position command from Guider
Halt	1	x	x	Emergency Stop. Both axes hold present position. New position commands are ignored.

Table 2 - Tip-Tilt Operating Modes**Format:** Parallel, static, 2-bit digital command word, see Figure 2**Characteristics:** All signals to be compatible with EIA RS-422**Termination:** None**Connector Type:** 15-pin, male, "D"-type connector, AMP type **TBD** or equiv. (**TBR**)**Connector Location:** Rear panel of TMA Controller card cage**Connector Number:** J-3 (**TBR**)**Connector Pin-out:** Per Table 3 (**TBR**)**Mating cable number:** **TBD**

Comments: Maximum command rate = 1 command change / sec

Pin	Signal Name	Signal type
1	Mode Command, Bit 2 (MSB) - True	Input
2	Mode Command, Bit 2 (MSB) - Complement	Input
3	Mode Command, Bit 1 - True	Input
4	Mode Command, Bit 1 - Complement	Input
5	Mode Command, Bit 0 (LSB) - True	Input
6	Mode Command, Bit 0 (LSB) - Complement	Input
7	Signal ground	Input
8	Signal ground	Input
9	Chassis Ground	
108	Chassis Ground	

Table 3 - Tip-Tilt Controller Connector J-3 Pin Assignment (TBR)

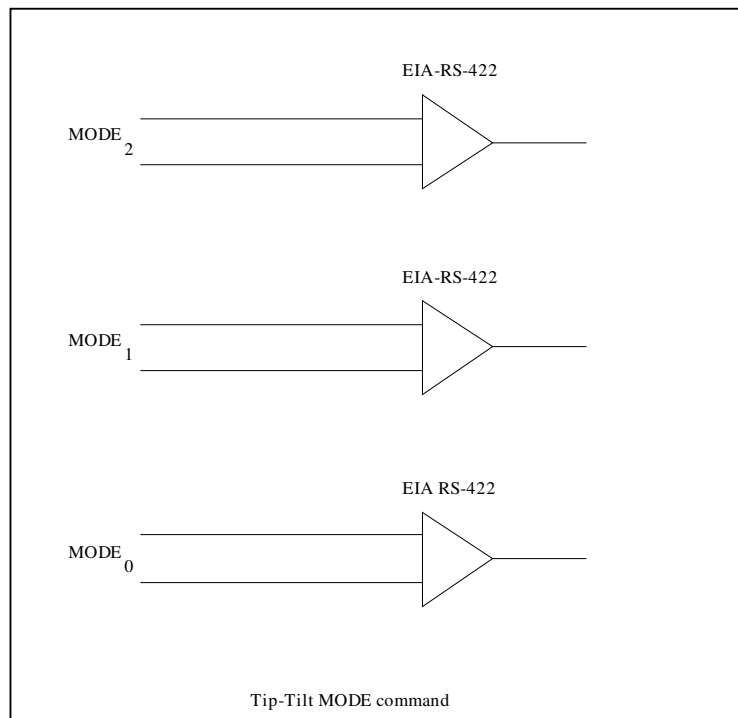


Figure 2 - Tip-Tilt MODE Command

Tertiary Mirror Assembly TIP-TILT MIRROR POSITION Diagnostic Data Interface

Interface Scope: Internal

Destination: To AOCS computer analog data acquisition card (PCI-6071)

Interface Type: Diagnostic data output

Datum Name: Tip-Tilt Mirror Position

Function: Actual position of Tip-Tilt mirror. Long-term bias terms are offloaded to telescope mount by AOCS algorithms.

Format: Two single-ended analog outputs with associated signal references, see Figure 1

Scale Factor: TBD volts / radian (Tip Position output)
TBD volts / radian (Tilt Position output)

Voltage Range: 0 to +2 volts (TBR)

Source Resistance: < 1 ohm

Load Resistance: > 10 kohm

Connector Type: 15-pin, female, "D"-type connector, AMP type TBD or equiv. (TBR)

Connector Location: Rear panel of TMA Controller card cage

Connector Number: J-4 (TBR)

Connector Pin-out: Per Table 4

Mating cable number: TBD

Comments:

Pin	Signal Name	Signal type
1	Tip position	output
2	Tip position reference	Signal ground reference
3	Tilt position	output

4	Tilt position reference	Signal ground reference
5		
6		
7	Chassis Ground	
8	Chassis Ground	

Table 4 - Tip-Tilt Position Data Connector J-4 Pin Assignment (TBR)

Tertiary Mirror Assembly Power Interface

Interface Scope:	Internal
Source:	From AOCS Azimuth Electronics power distribution panel
Interface Type:	Prime power (120 VAC, 50 Hz) input
Interface Name:	TMA Power
Function:	Single power input to Tip-Tilt mirror assembly
Characteristics:	120 VAC, +/- 10%, 50 Hz +/- 1 Hz, TBD watts
Connector Type:	Standard USA 15-amp, polarized, grounding connector, Leviton type TBD or equiv.
Connector Location:	Rear panel of TMA Controller card cage
Connector Number:	J-1 (TBR)
Connector Pin-out:	Per NEC
Mating cable number:	TBD