



**Fox Delta**

Amateur Radio Projects & Kits

FD- ST2-USB

Technical Info Doc: PIC16F876A LCD Satellite Tracker & Rotor Controller

## **ST2 – 0426 USB:**

### **USB Satellite Antenna Tracking Interface for Yaesu rotor Controllers:**



ST2 is an advanced Satellite Antenna Tracking Interface for Yaesu (Or similar) Rotor Controllers. Project uses PIC16F876A, 28PIN DIP. Firmware uses full A/D and EPROM capability of 876A and makes setup a smooth process.

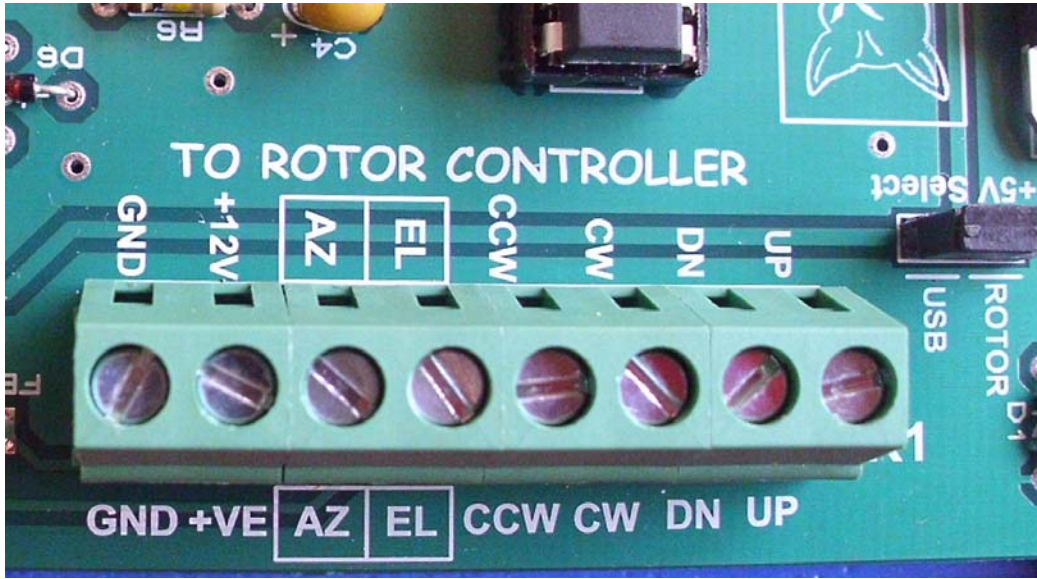
ST2-0426 is an USB device using SO type SMT packaged CH360G to create a virtual COM port for your PC. Kits are supplied with pre-soldered SMT parts.

### **ST2 OUTPUT/INPUT CONNECTORS:**

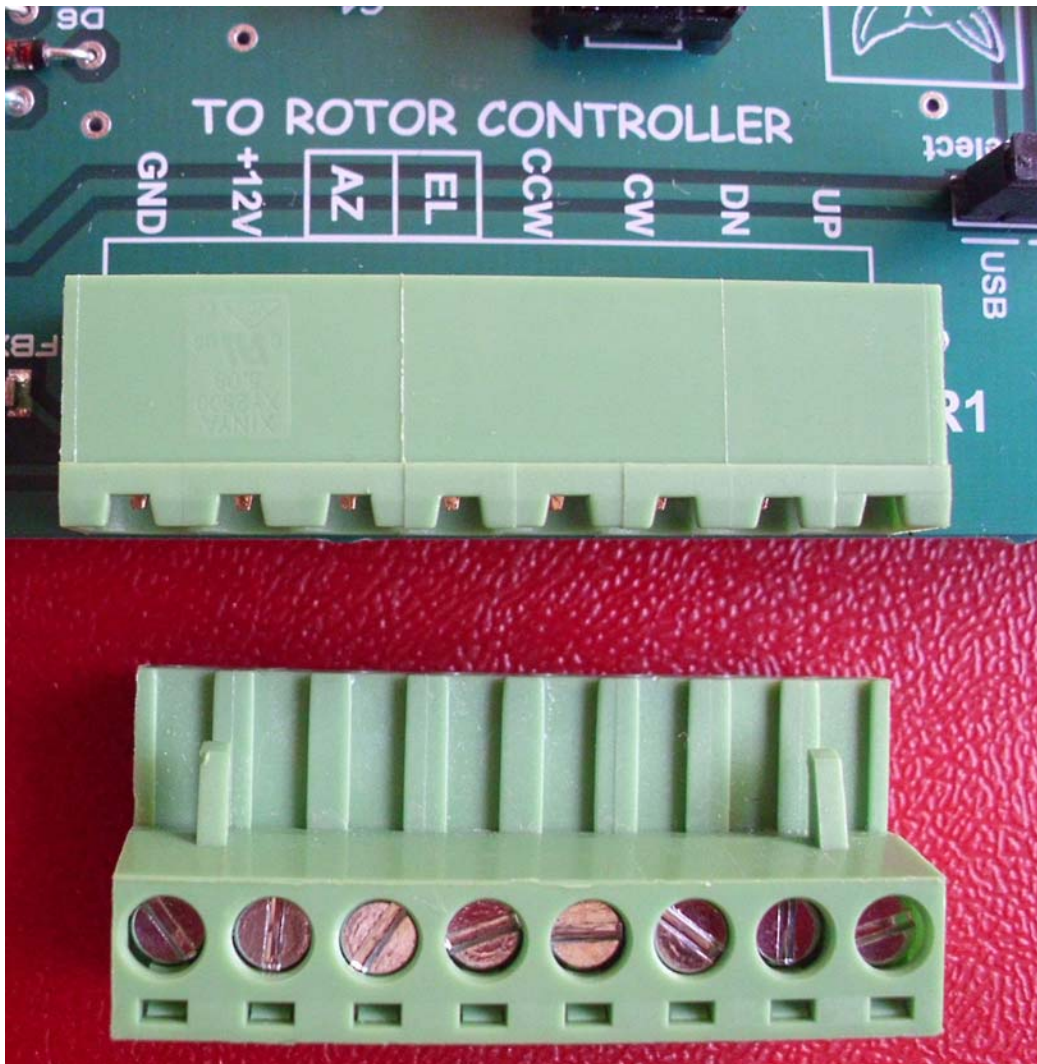
2 types of output connectors are available (select at check-out)

1. Fix Straight connector
2. R/A 9PIN Connector

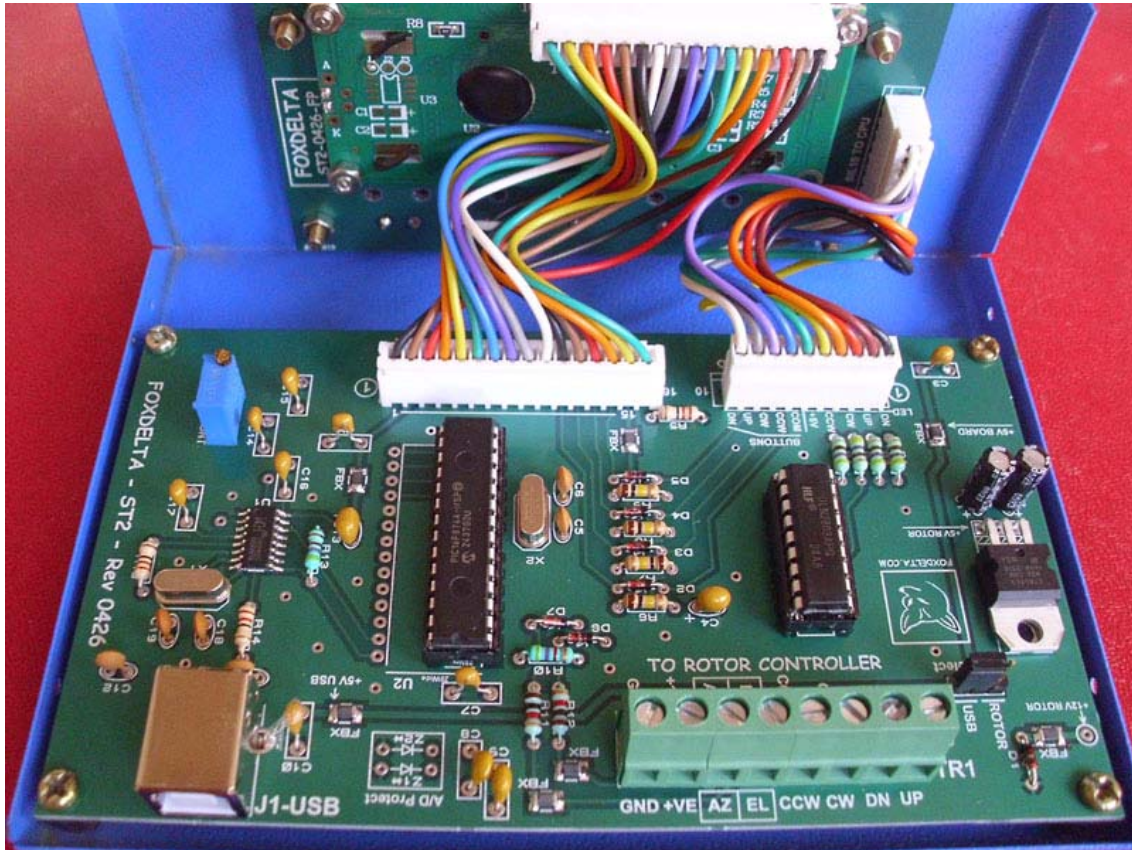
**ST2 Fix Connector:**



**ST2 Removable 8PIN Connector:**



## ST2 0426 Main Board: (With Straight Connector)



### ST2-0426 Kit Parts List:

Quantity	Part ID	Details
1	U1* / M1	CH360G SO16* (Plug-in Adapter)
1	U2	PIC16F876A Pre-programmed
1	U3	ULN2803A DIP18
1	U4	7805 5V Regulator
7	D1, 2, 3, 4, 5, 6, 7,	1N4148
4	TR1	2pin Screw terminals X 4
1	P1	10K Preset
1*	X1*	12MHZ HC49U Crystal (On Adapter)
1	X2	4MHZ HC49U Crystal
5	FBX1 – 6*	FB SMT 1206 Pre-Soldered on PCB
1	LCD	2x16 with backlight
4	LED	3MM LED
1	J1	USB Socket R/A PCB
2	TR2	SIL8 Male + Ribbon
4	TR3	SIL8 Male (8+8) + 2 x 8Ribbon
1	Case	Powder Coated Metal case
1	Set	Hardware Keyboard
1	Set	Hardware Case

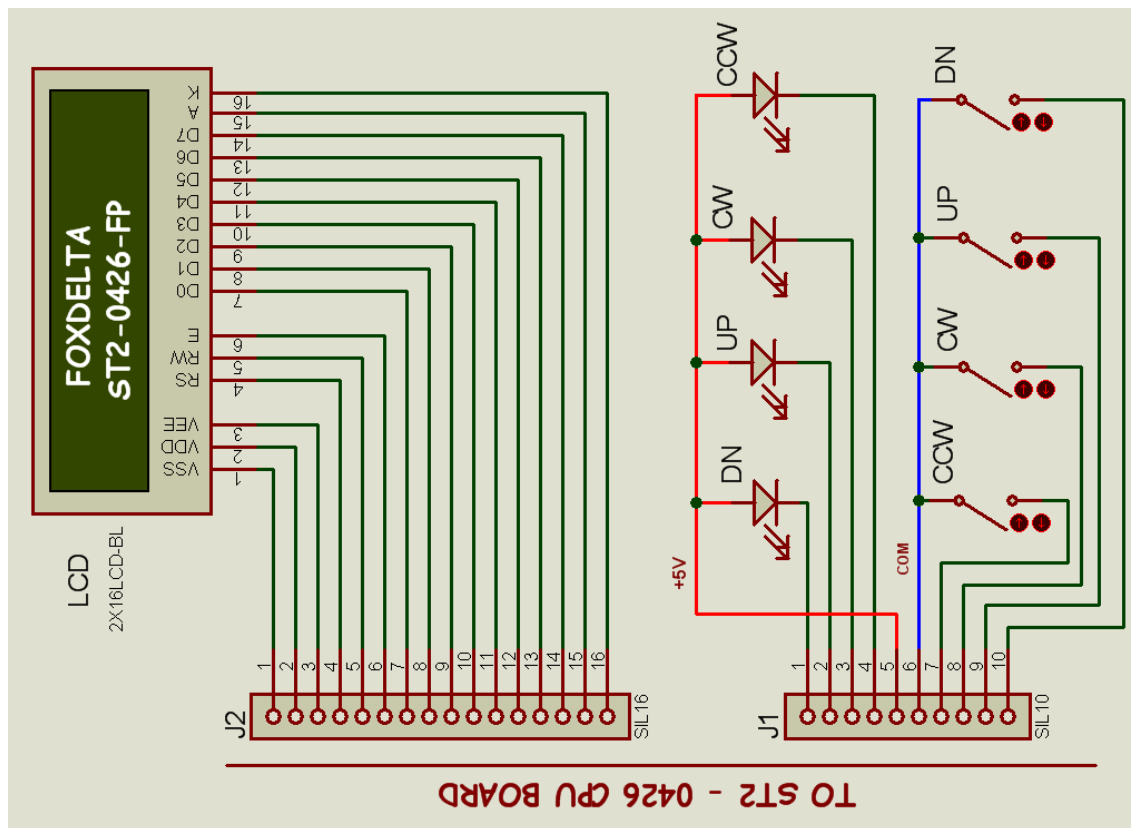
1	Set	Hardware LCD
4	KB Push Buttons	KB buttons 12MM
1+1	PCB	ST2-0220 DSPTH PCB & KB PCB+CH340 Adapter
1	IC Socket	18PIN DIP
1	IC Socket	28PIN DIP Narrow
1	Headers	3pin with shorting pin: Power Selection

Quantity	Part ID	Details
7	R1, 2, 3, 4, 10, 11, 12	1K
3	R5, 14, 15	22 ohms
4	R6, 7, 8, 9,	100K
1	R13	4.7K
2	C8, 9	0.01uF Poly
3	C3, 14, 10	0.1uF Poly
6	C1, 2, 4, 7, 13, 15,	1uF Tantalum
2	C14, 15	10 or 22pf Ceramic
2	C5, 6	27pf Ceramic (On adapter)

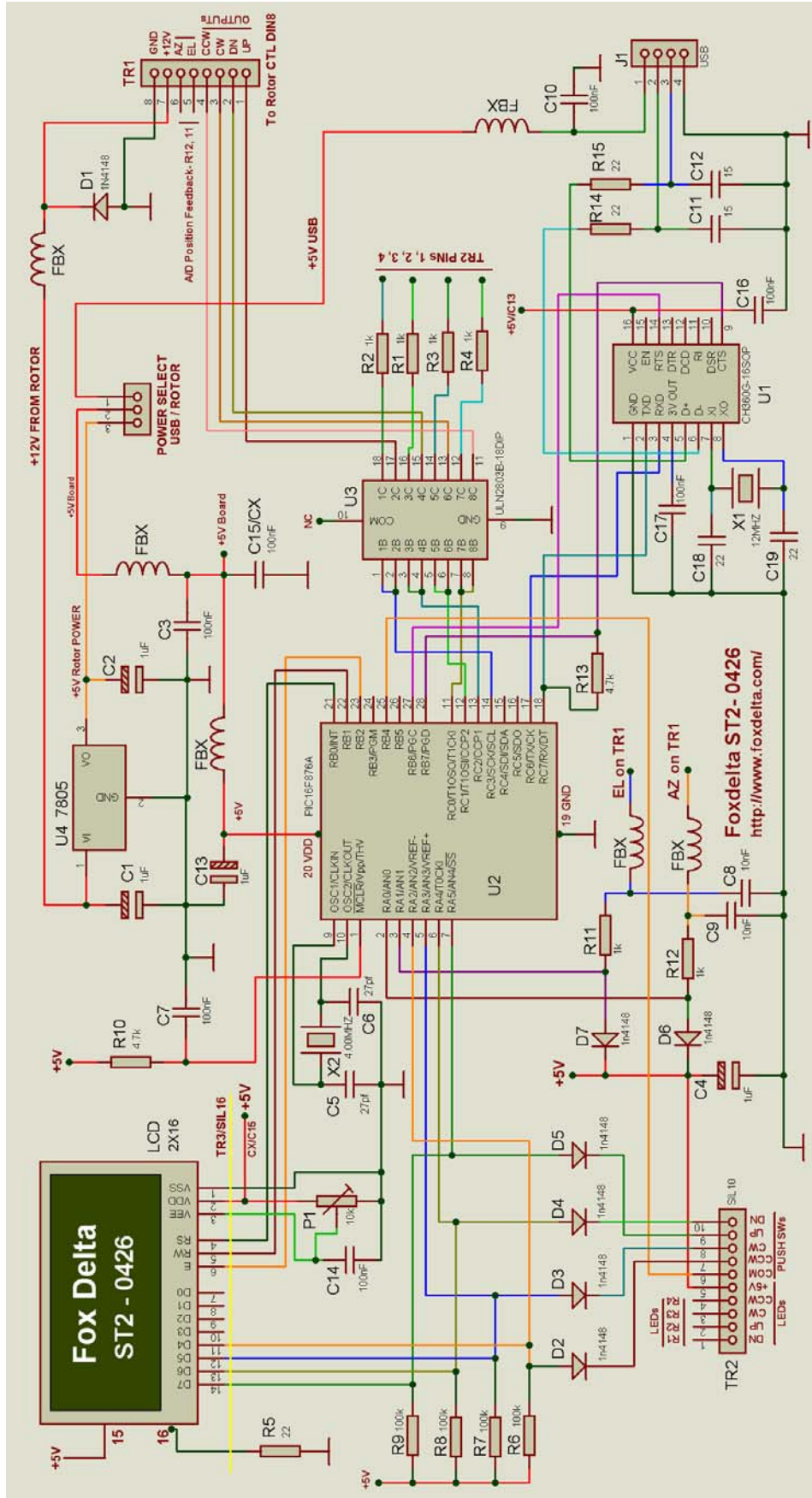
**Notes:**

1. U1 is SMT part and is supplied pre-soldered for kits
2. P1 is LCD Contrast Preset.
3. U2 is supplied pre-programmed

**Schematic ST2-0426 Front Panel PCB:**

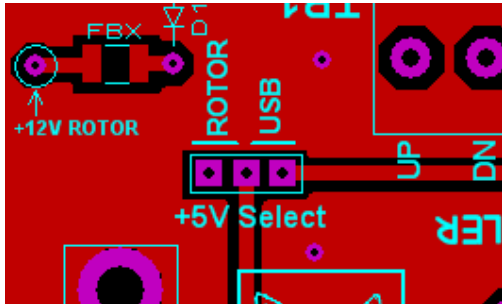


# Schematic: ST2 0426 Main Board:



## ST2 POWER SELECTION:

ST2-0426 may be powered from USB or from +12V from Rotor. A 3PIN header is used to select either USB or Rotor Controller's 12V DC:



## 5V Regulator:

U4 is a 1A 5V regulator. This regulator is in use when power selector header is selected for +12V from Yaesu Rotor Controller.

When board is powered from USB, this regulator is inactive/OFF

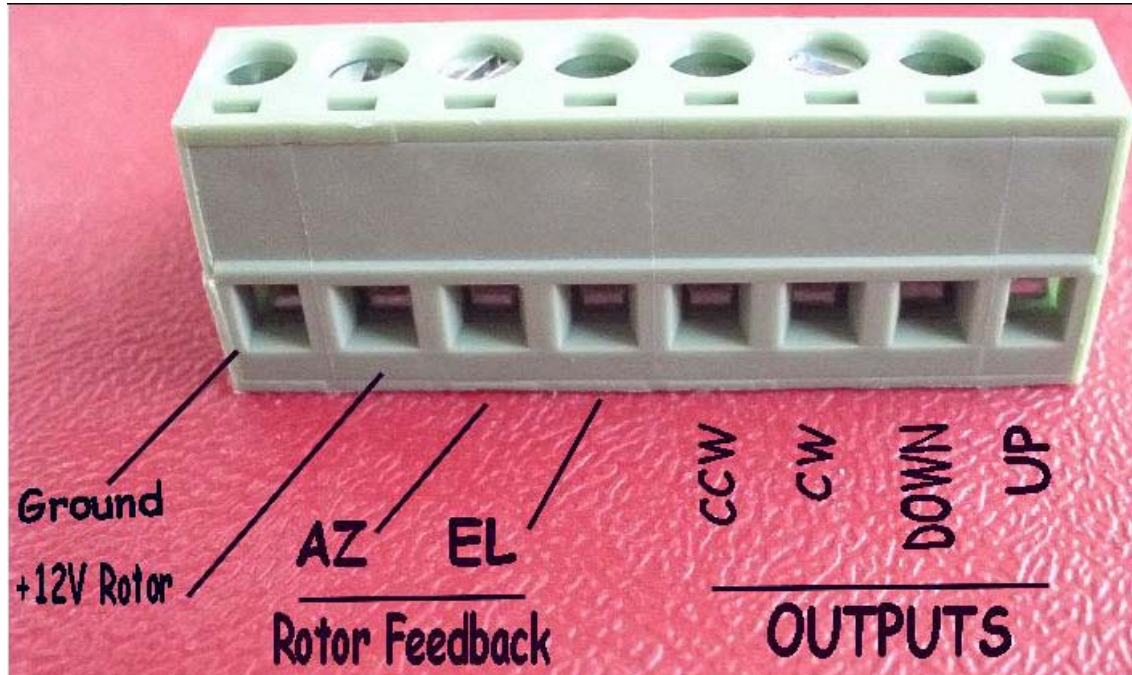
## Rotor Controller Connections: Fix Connector



## Terminal Name Purpose

GND	Ground
+VE	12V from Rotor Controller
AZ	Azimuth A/D from Rotor
EL	Elevation A/D from Rotor
L	LEFT (AZ)
R	Right (AZ)
DN	DOWN (EL)
UP	UP (EL)

## Rotor Controller Connections: Removable Connector



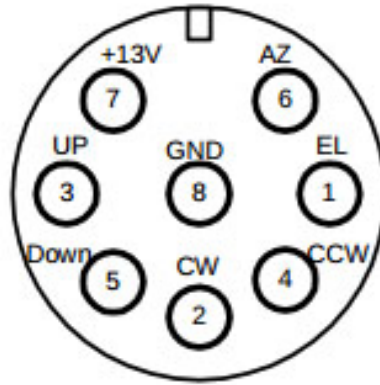
### DIN8 SOCKET ON BACK OF CONTROLLER: AS SEEN FROM BACKSIDE

DIN8 Connector #	ST2 Screw Terminal	Remarks
1	EL (Elevation)	INPUT FROM ROTOR CONTROLLER (Feedback) 0 to 5V
2	RIGHT (CW)	OUTPUT TO CONTROLLER
3	UP	OUTPUT TO CONTROLLER
4	LEFT (CCW)	OUTPUT TO CONTROLLER
5	DN (DOWN)	OUTPUT TO CONTROLLER
6	AZ (Azimuth)	INPUT FROM ROTOR CONTROLLER (Feedback) 0 to 5V
7	+VE	+12V From Controller to ST2
8	GND	GROUND

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# Yaesu 5400/5500 Rotor cable

External control socket on the rear of 540/5500 rotor



## Rotor Status LEDs:

Status of AZ/EL output to rotor controller can be observed on LEDs on Front Panel Board:



CW = AZ RIGHT

Status LEDs

UP = EL UP

CCW = AZ LEFT

DWN = EL DOWN

73s / Dinesh Gajjar / 26<sup>th</sup> June 2026

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For more details, please visit Project Page: <http://www.foxdelta.com>