



**Fox Delta**

Amateur Radio Projects & Kits

FD- ST2-USB

Technical Info Doc: PIC16F876A LCD Satellite Tracker & Rotor Controller

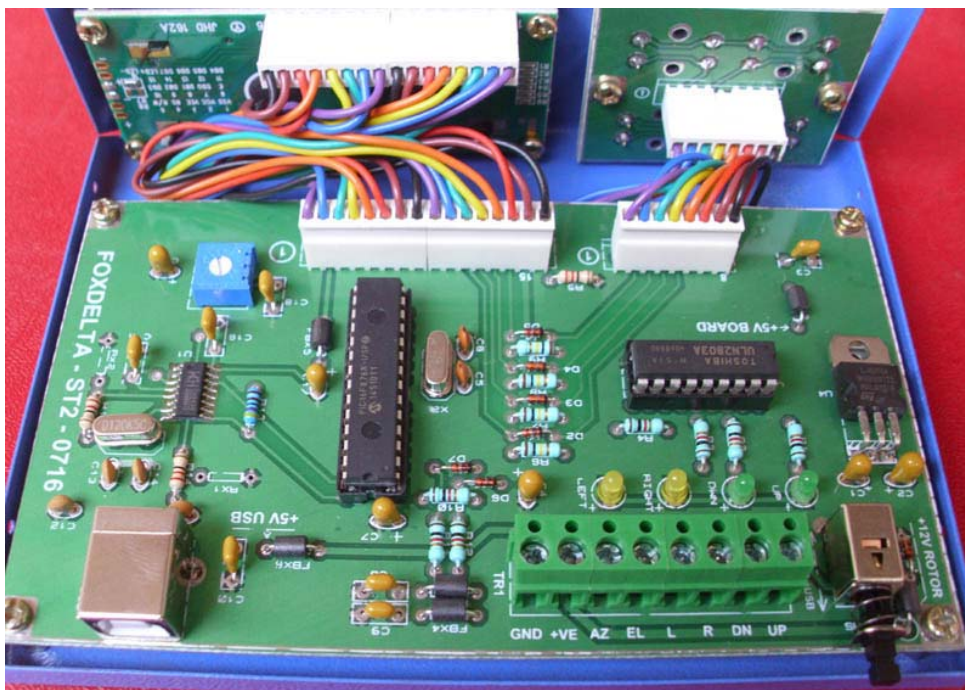
ST2 - 0816:

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.

ST2-0816 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 part.



Above picture is of ST2-0716, final proto.

Kits and assembled ST2-USB are supplied with ST2-0816 PCBs

## ST2-0816 Kit Parts List:

Quantity	Part ID	Details
1	U1	CH360G SO16*
1	U2	PIC16F876A Pre-programmed
1	U3	ULN2803A DIP16
1	U4	7805 5V Regulator
1	SW1	DPDT Push Switch
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
1	X2	4MHZ HC49U Crystal
6	FBX1-6	Ferrite Bead Inductors
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	ST2-0816 DSPTH PCB & KB PCB
1	IC Socket	16PIN DIP
1	IC Socket	28PIN DIP Narrow

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	0.001uF Poly
5	C3, 15, 16, 18, 10	0.1uF Poly
6	C1, 2, 4, 7, 17, 19,	1uF Tantalum
4	C14, 13, 11, 12	22pf Ceramic
2	C5, 6,	27pf Ceramic

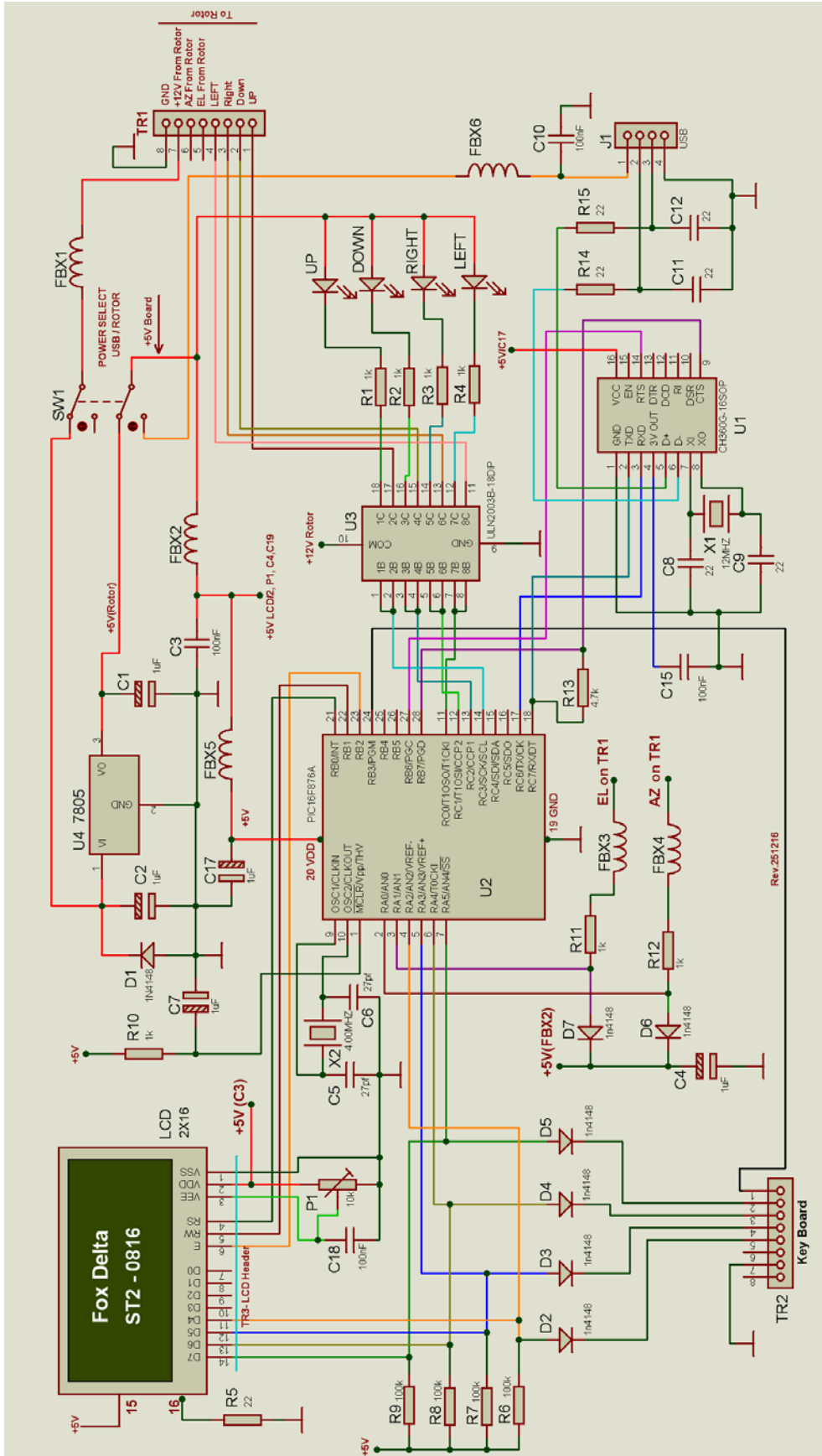
### Notes:

1. U1 is SMT part and is pre-soldered on PCB for kits
2. Special USB drivers for windows must be installed. Drivers create a Virtual COM port on your PC. Use that COM port for your Satellite program (SatPC32, Nova Etc)
3. P1 is LCD Contrast Preset.
4. U2 is supplied pre-programmed for kits
5. TR3 is for connections to your Yaesu Rotor Controller. User will require to make a suitable cable.
6. SW1 is Power switch for selecting power from USB (5V) or Rotor (12V)

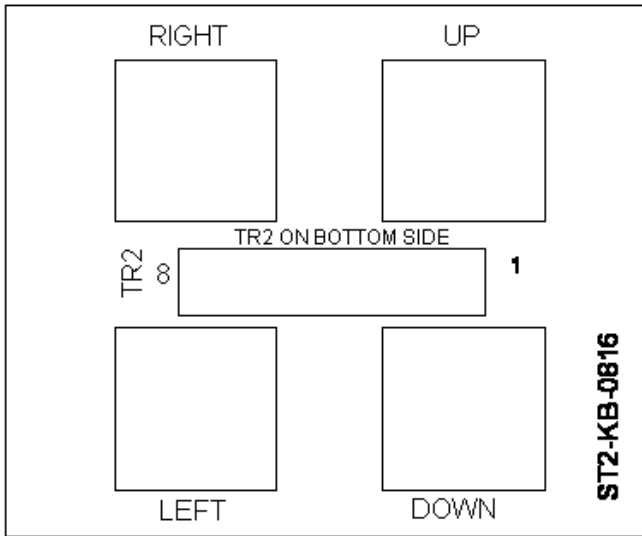
### Special note:

LCD Backlight is fix set by R5. You may change this resistor value to increase or decrease backlight brightness. Or remove it for no backlight (Power Saving)

# Schematic: ST2 - 0816: USB



### Silk View of Key Board:



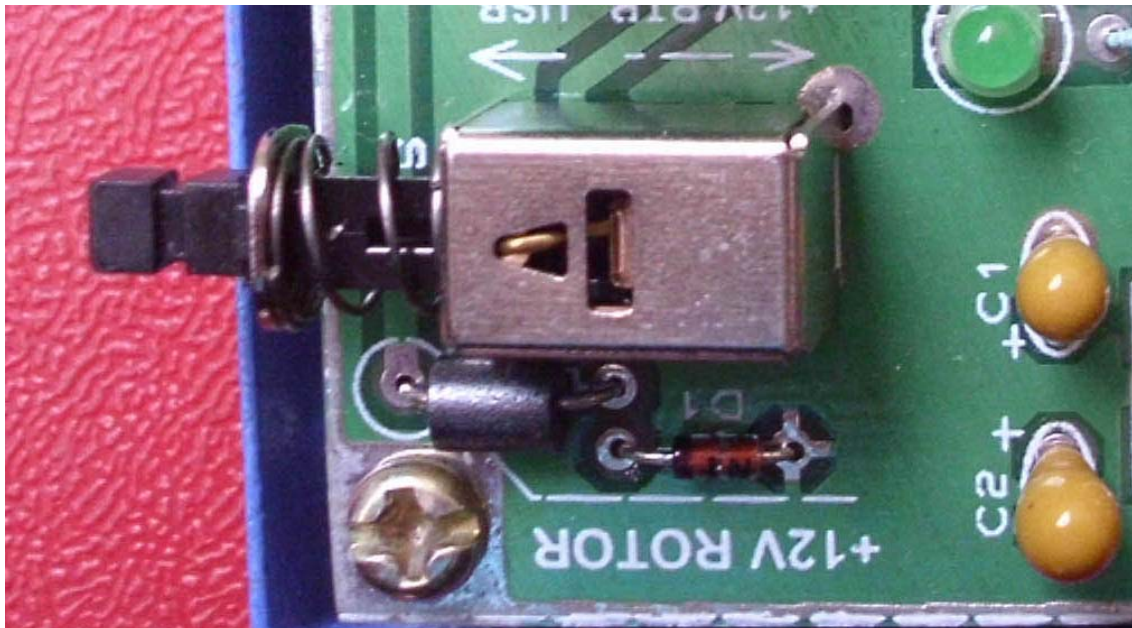
TR2 is a matching 8SIL socket (with Main Board TR2) and is installed on **Solder side** of this PCB.

Push Buttons are installed on **Component side**.

Match "1" on this board to "1" on main board for ribbon cable

### ST2 POWER SELECTION:

ST2-0816 may be powered from USB or from +12V from Rotor.  
A push switch SW1 is provided for this purpose:



## 5V Regulator:

U4 is a 1A 5V regulator. This regulator is in use when power selector switch is selected to power ST2 board from +12V coming from Yaesu Rotor Controller.

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



In ST2-0816 PCBs, U4 is to be mounted on solder side of PCB.

## Rotor Controller Connections:

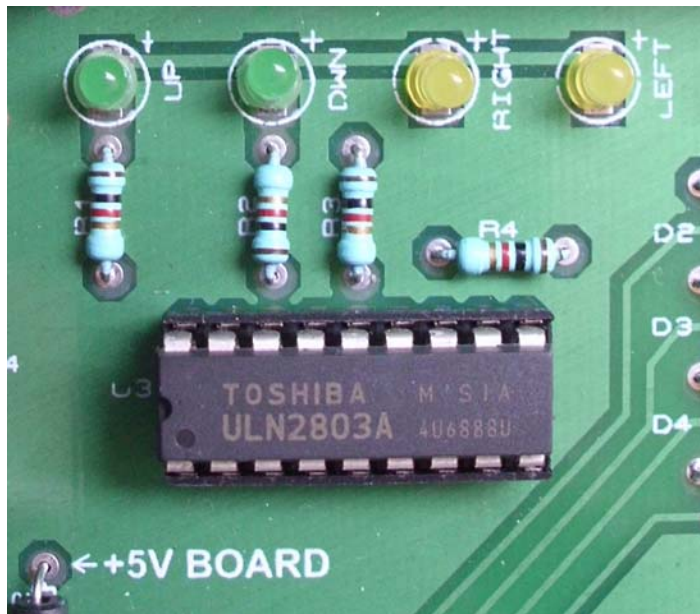
Connect your rotor controller to these Terminals:



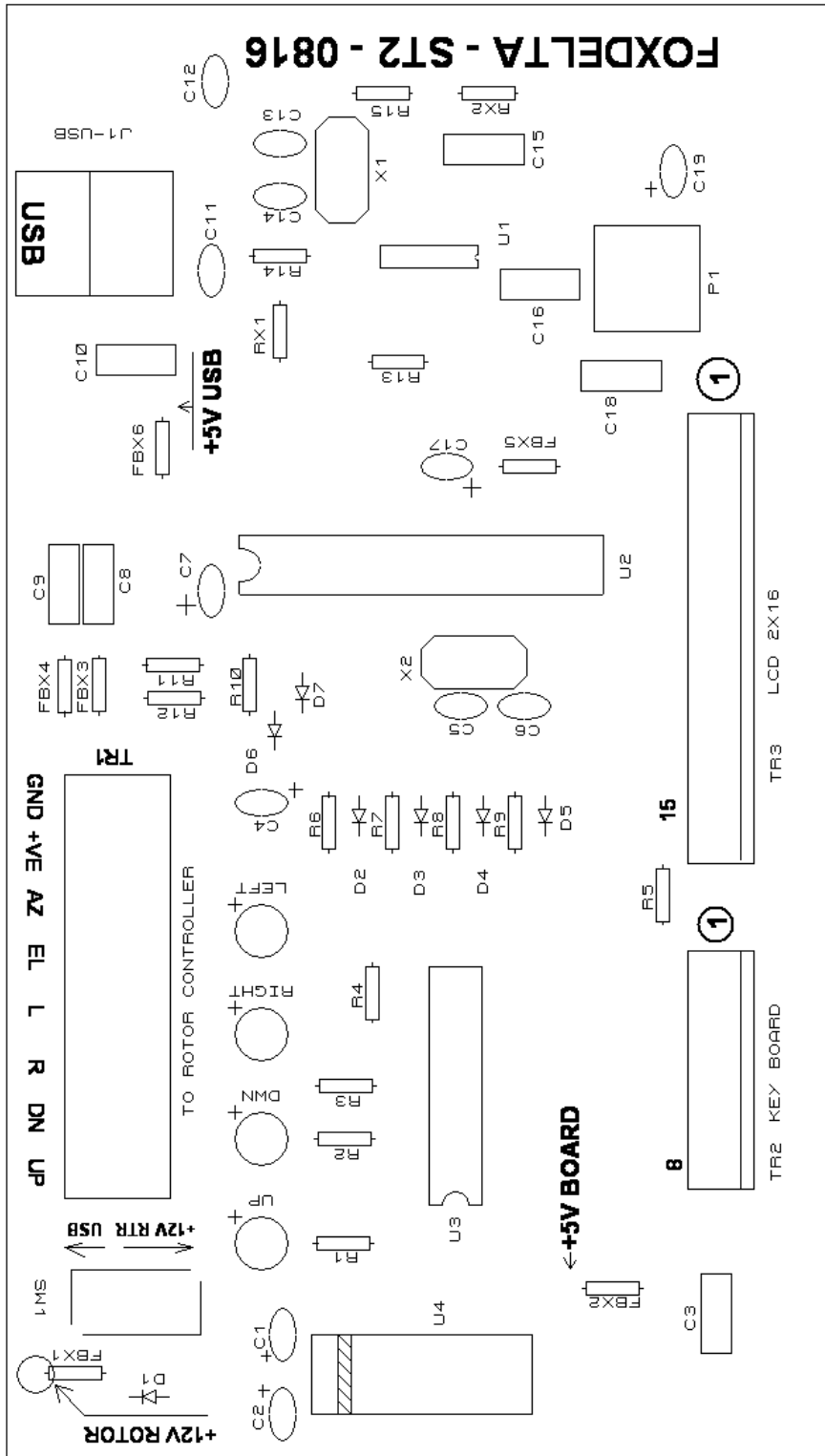
Terminal Name	Purpose
GND	Ground
+VE	12V from Rotor Controller
AZ	Azimuth A/D from Rotor
EL	Elevation A/D from Rotor
L	LEFT (AZ)
R	Right (AZ)
DN	DOWN (EL)
UP	UP (EL)

## Status LEDs:

Status of AZ/EL output to rotor controller can be observed on LEDs on main board:



**Component Side Silk of ST2-0816:**



73s / Dinesh Gajjar / 29<sup>th</sup> December 2016

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