



# Fox Delta

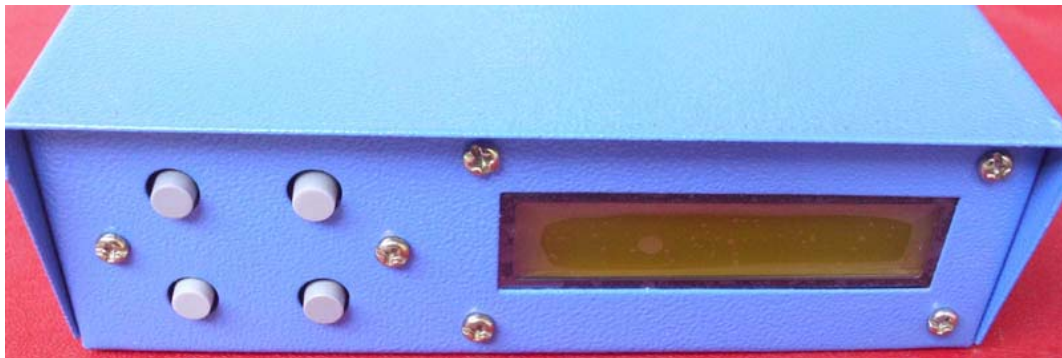
Amateur Radio Projects & Kits

FD- ST2-USB

Technical Info Doc: PIC16F876A LCD Satellite Tracker & Rotor Controller

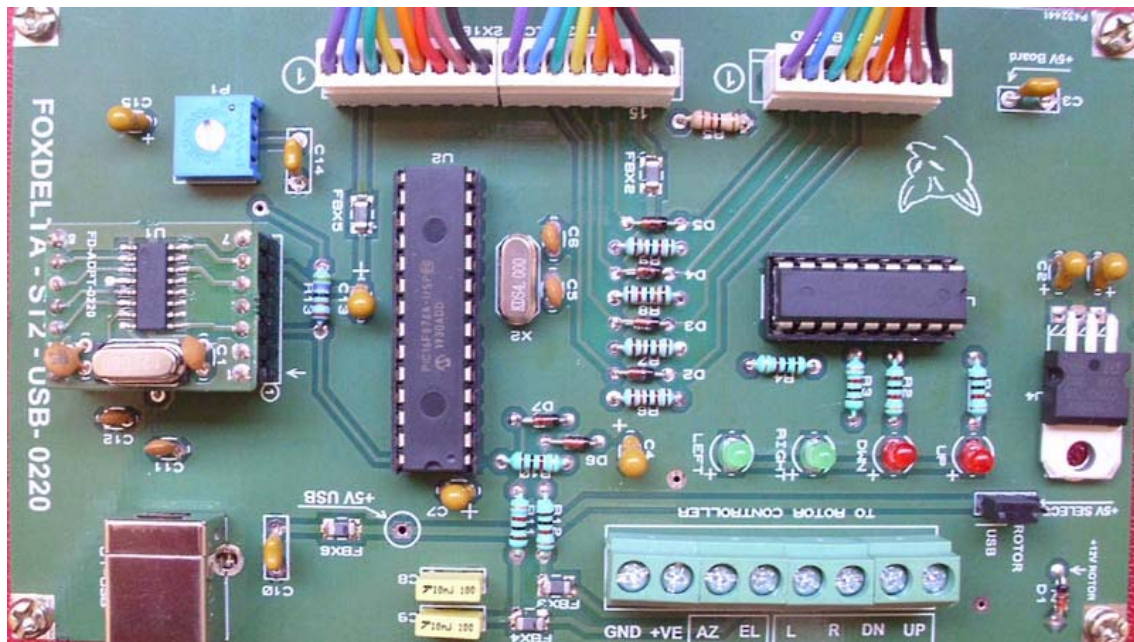
ST2 – 0417 USB: PCB Rev 0220: **Minor Design Change**

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.

ST2-0220 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.



**ST2-0417 Kit Parts List: (PCB REV 0220)**

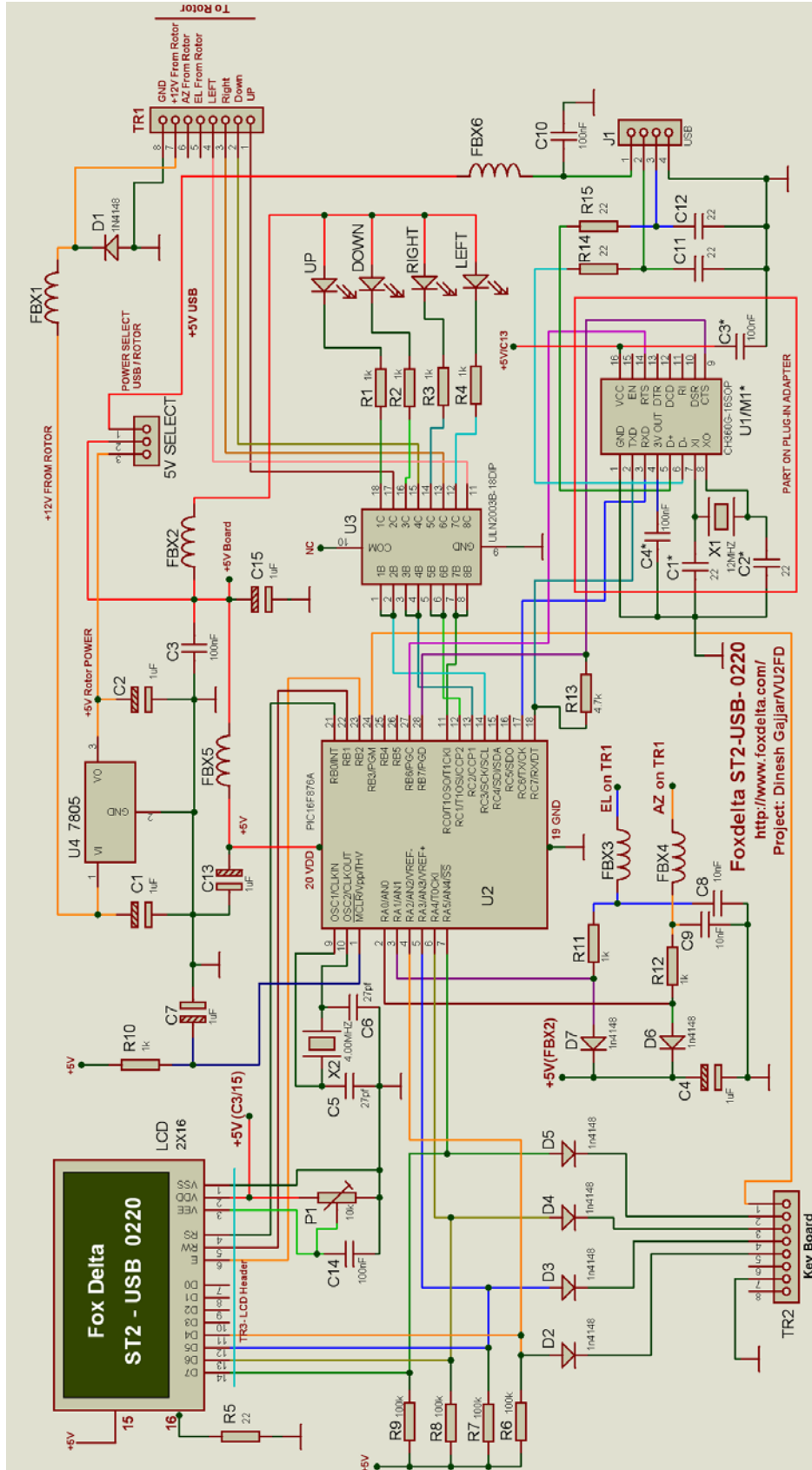
Quantity	Part ID	Details
1	U1* / M1	CH360G SO16* (Plug-in Adapter)
1	U2	PIC16F876A Pre-programmed
1	U3	ULN2803A DIP18
1	U4	7805 5V Regulator
7	D1, 2, 3, 4, 5, 6, 7,	1N4148
4	TR1	2pin Screw terminals X 4
1	P1	10K Preset
1*	X1*	12MHZ HC49U Crystal (On Adapter)
1	X2	4MHZ HC49U Crystal
5	FBX1 – 6*	FB SMT 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)

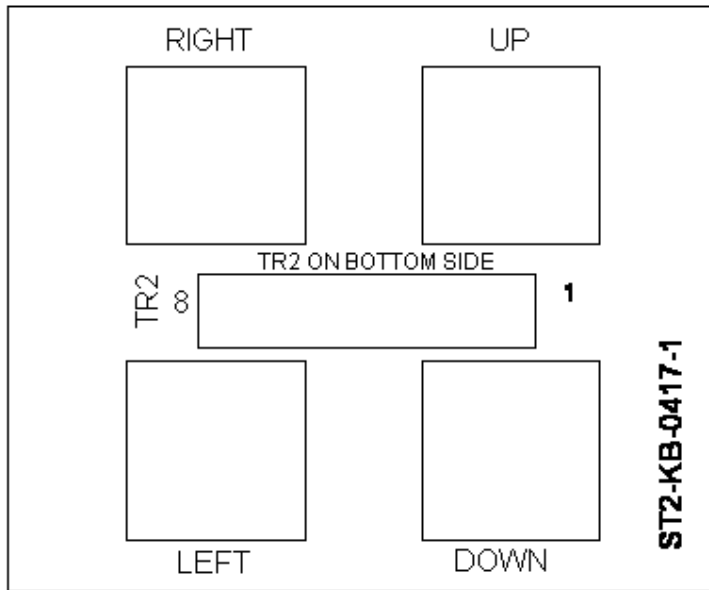
**Notes:**

1. U1 is SMT part and is provided on a plug-in module
2. P1 is LCD Contrast Preset.
3. U2 is supplied pre-programmed
4. TR3 is for connections to your Yaesu Rotor Controller. User is required to make a suitable cable.
5. 3PIN Header is Power selection for selecting power from USB (5V) or Rotor (12V)
6. ST2-0417 PCB is revised to 0220, with some design change: Headers for power selection instead of a Relay, CH340 on a plug-in adapter and all Ferrite beads are SMT.

**Schematic ST2-0417: PCB Revised to 0220**



**Silk View of Key Board: PCB REV 0220**



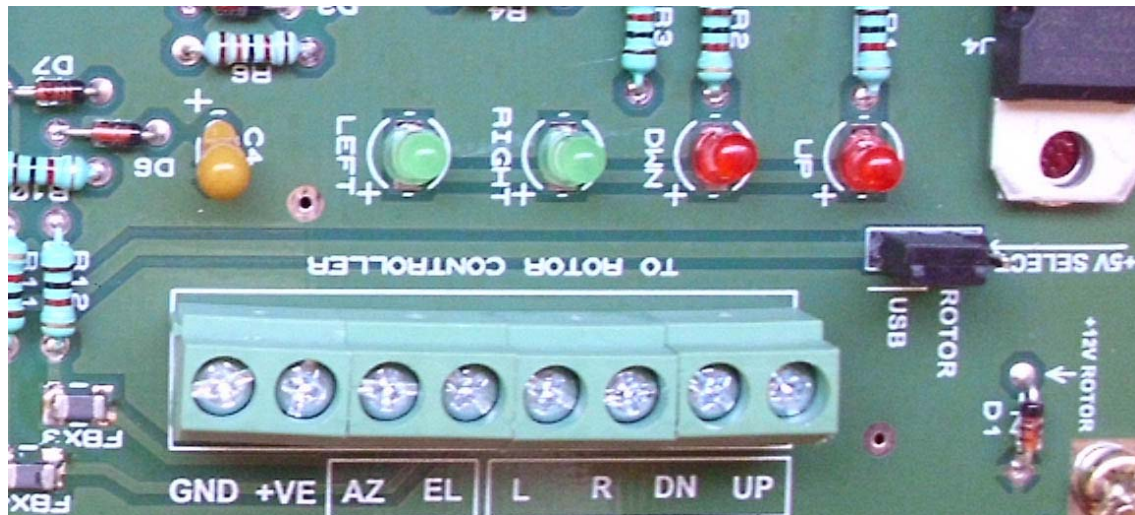
TR2 is a matching 8SIL socket (with Main Board TR2) and is installed on **Solder side** of this PCB. Push Buttons are installed on **Component side**.

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

**ST2 POWER SELECTION:**

ST2-0417/0220 may be powered from USB or from +12V from Rotor.

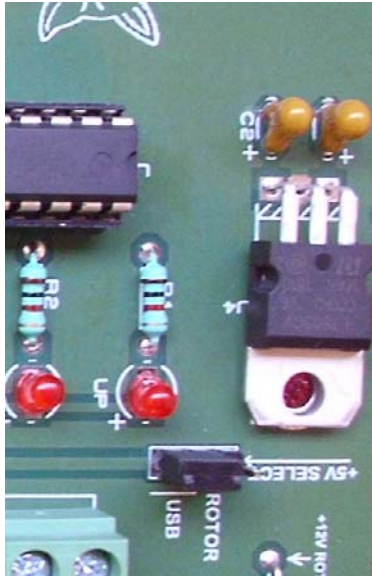
A 3PIN header is used to select either USB or Rotor Controller's 12V DC:



### 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



#### +5V Selection:

This header selects +5V for main board.

If you wish to power ST2 from Rotor Controller, Install shorting pin on "ROTOR"

ST2 is supplied with "USB" as power source so that, when received by user, it can be tested for operation and communication by connecting PC's USB PORT.

### Rotor Controller Connections:

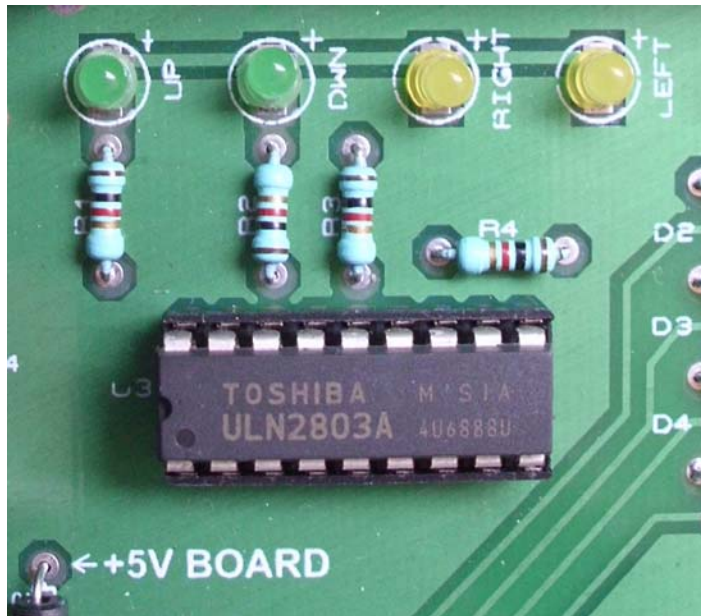
Connect your rotor controller to these Terminals:



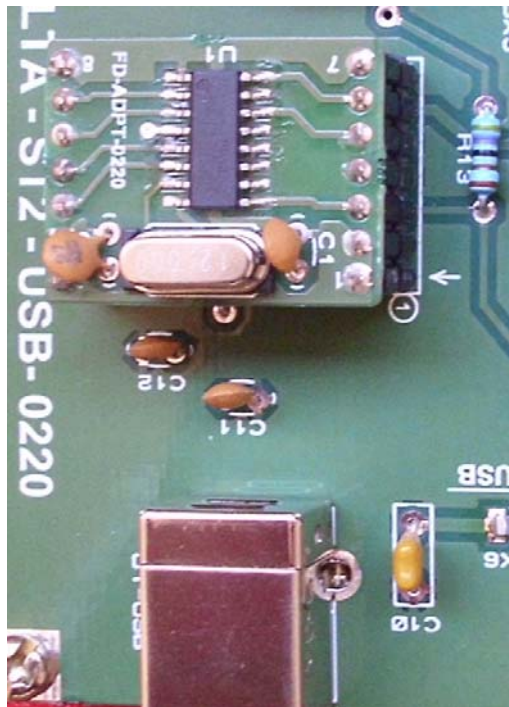
Terminal Name	Purpose
GND	Ground
+VE	12V from Rotor Controller
AZ	Azimuth A/D from Rotor
EL	Elevation A/D from Rotor
L	LEFT (AZ)
R	Right (AZ)
DN	DOWN (EL)
UP	UP (EL)

### Status LEDs:

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



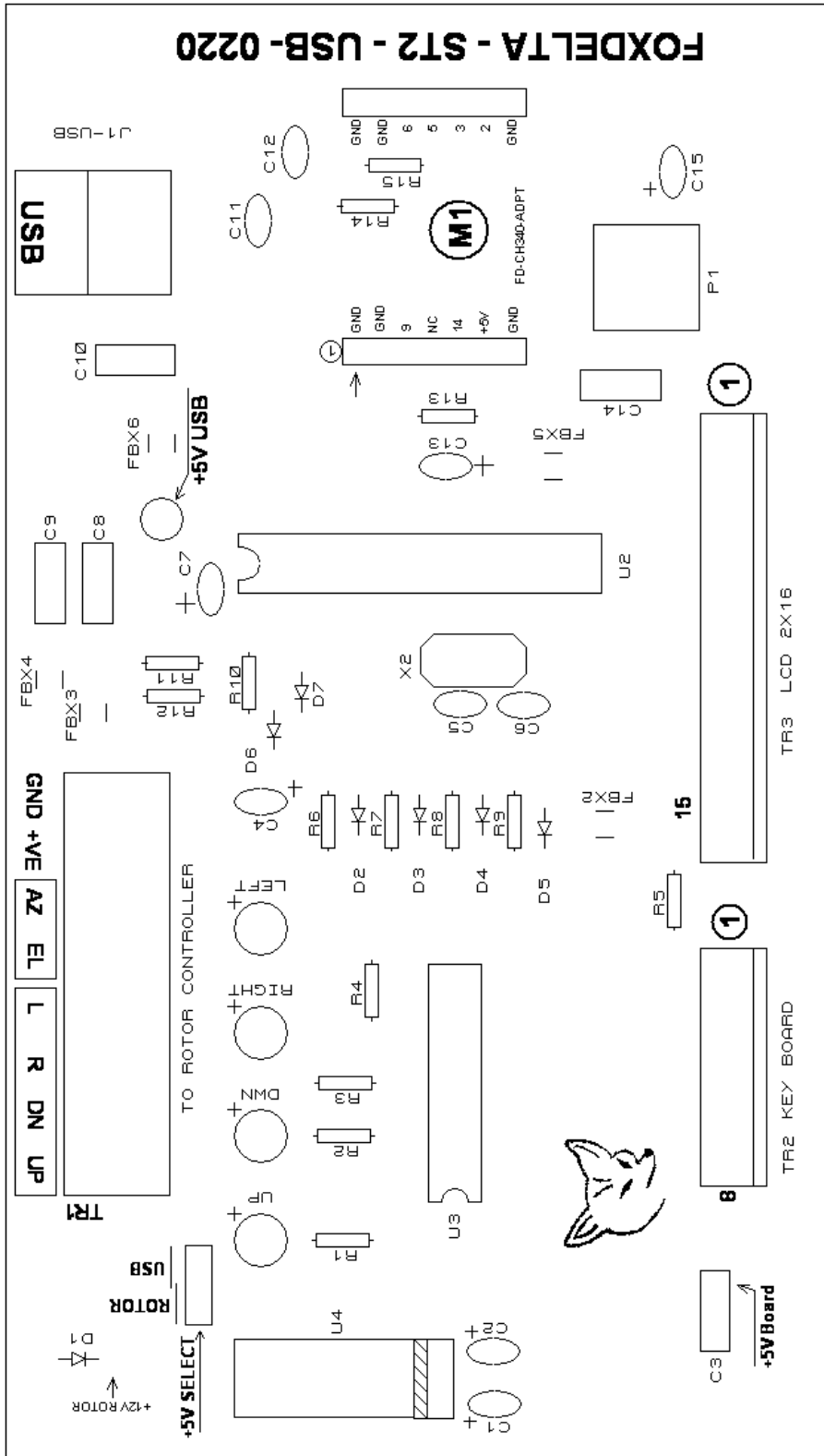
### USB to TTL DRIVER CHIP:



### ST2-USB-0220:

New revised ST2 USB PCBs are supplied with CH340G chip on an adapter for easy replacement (If needed)

There is not design change except above, from ST2-0417 Boards/Kits



73s / Dinesh Gajjar / 18<sup>th</sup> March 2020

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