Setting up auto-tracking with SDR-Console and the FoxDelta ST2-USB Interface

This note describes how I successfully setup Az/El auto-tracking at my satellite ground station.

Rotator in use: G-5400B from Yaesu Tracking software: Satellite tracking with SDR-Console Rotator interface: Fox Delta ST2-USB

Please ensure that your G-5400B has been setup and operates normally with manual tracking before you attempt to add tracking automation to your setup. It is assumed that you have successfully installed SDR-Console and have configured it with the SDR that you use and have configured satellite tracking successfully.

Step 1: Connecting the ST2-USB to the G-5400B controller unit

• The G-5400B has a DIN-8 socket on the rear panel. The signals on each pin are as follows:



*** IMPORTANT ***

<u>Please check your connections. Incorrect connections can damage your Controller and/or</u> <u>Interface unit</u>

Step 2: Connecting the ST2-USB to your shack PC/Laptop

- Please follow the instructions on Dinesh's foxdelta.com website to install the driver <u>https://www.foxdelta.com/products/ST2-0417/CH341SER.zip</u>
- Once the drivers are successfully installed, connect the USB cable from the ST2-USB to your PC/Laptop. (Your "Devices" menu on Windows will show you the COM port assigned to this USB connection)
- Power on the G-5400B controller and follow the instructions in the tutorials on Dinesh's website (<u>https://www.foxdelta.com/products/st2-0417.htm</u>) to calibrate and setup the ST2-USB for the first time
- You can power down the G-5400B controller after the calibration is complete

Step 3: SDR-Console configuration

- Start SDR-Console
- In the "View" tab, click on "Satellites" to open the satellite tracking window

		tome	View	Receiv	e Transmit	t Rec/F	layback	Favo	urites	Memorie	s Tools	Help					Ę
Ext Bar	ra Fre nds Da	equency	کن Options	Scale	ہے۔ Smoothing	<u>↑↑</u> Peaks - Shaded Maximum	Signal History	Colour	+ Resoluti	on Speed		Timestamp	Clock Cl	RDS	Auto centerMouse-over buttons	••• Select	Satellites
	0	General			Spect	rum			V	Vaterfall			Waterfall Extras		Low, High, Zoom		More Opti

• Click the little gear icon on the top-right of the satellite tracking window to open the "Satellite Tracking Options" window



• In the left pane, select "Rotator"

Satellite Tracking Options		×
isplay Recording	Configure the rotator support using DDE	
Satellites Announcements Doppler Rotator Serial Ports	Format: None Satellite not visible: Continue tracking Nova Set to start of next pass Orbitron Park antennas 	
	✓ Min elevation 0° Power off: park Park posn Az / El: 0° ✓ 0° ✓ This software supports Microsoft's Dynamic Data Exchange (DDE) which enables other programs on the same computer (DDE clients) to receive the current satellite information (name, azimuth,	^
	elevation, range rate) from this program (DDE server). DDE support is used by 3rd-party rotator programs amongst others. The two common formats used by the amateur radio community' rotators are supported - Orbitron <u>http://www.stoff.pl/</u> and Nova <u>http://www.nlsa.com/nfw.html</u> .	l
□ 0	Note: at present the frequency in Orbitron format is set to 0. This OK Cano	¥ cel

- In the "Configure the rotator support using DDE" section, select the following:
 - Format: Orbitron (optionally, Nova works too, but the corresponding change should be made in WispDDE settings in the next section)
 - Satellite not visible: Set to start of next pass (This seems to be the best option for me)
 - \circ Tick the box for "Min elevation 0 deg
 - I don't use "Power off park, so it was left unticked
- Click "Ok" to confirm your selections

Step 4: WispDDE setup

SDR-Console cannot communicate directly with the ST2-USB interface. This is why we need an intermediate software like WispDDE. You will need WispDDE version 4.3.2. I downloaded the WispDDE executable from http://ok1dx.cz/constructions/avrot/wispdde/wispdde.zip

- Extract the files into a temporary folder and run setup.exe and follow onscreen instructions
- Run wispdde.exe and you will see the following screen

WiSP DDE Client V.4.3	-		×
Close Settings Help			
Satellite:			
Rotor Azimuth: Update rotor Elevation:			
Auto update 🔽 Update radio			
Radio(s)			
Uplink: Do <u>w</u> nlink:			
Bev. Dir.			
Mode: Mode:			
Selected Radio: Selected Radio:			
RSSI:	Raw A	\z:	
	Uplink	DDE Fre	q:
	Dnlink	DDE Fre	q:
Raw DDE String:			

• Select "Settings->Rotor" and you will see the following screen

🔀 Rotor Settings	_		\times
Interface Type: GS-232	Port: COM3	•]
Baud Rate: 9600 🗨	Inte ■ Auto	rectional rface o flip dete	et
Step (deg.):	🔽 Sou	ith stop	
	🗌 Az.	450deg.	
Pace Delay (Secs.):	Time O	lut (Secs.):
	🔲 Log	Events	
Offset Azimuth:	Park Azir	muth:	
Elevation:	Ele	vation:	
Save	0	llose	

- Set the following parameters:
 - Interface type: GS232
 - Port: (select the COM port associated with the USB connection from the ST2-USB)

- Baud rate: 9600
- Tick "Bidirectional interface"
- Tick "South stop" (if relevant to you)
- $\circ~$ You may tick "Auto flip detect" if you want WispDDE to manage rotator direction flip on high elevation passes
- $\circ~$ You may tick "Az. 450deg" if your rotator supports 450 degree azimuth rotation

I have left all other options blank on this screen.

- "Save" and "Close" this screen
- On the main WispDDE screen, select Settings->DDE Link. You will see a screen as shown below:

🔀 DDE Settings	– 🗆 ×
Receive DDE from: Orbitron	Satellite Data
Source Application:	Link Topic:
Orbitron	Tracking
Link Item: TrackingData	Query Interval (sec.): 30
Link Item: TrackingData Decimal	Query Interval (sec.): 30 Log Events

- Set the following parameters:
 - Receive DDE from: Orbitron (If you have chosen Nova in the setup of SDR-Console, you need to replace Orbitron with Nova
 - You will see that the parameters for "Source Application", "Link Topic" and "Link Item" will be auto-filled
 - Query Interval (sec): 30 (the default is 1 sec, but this is too small and makes my G-5400B "hunt" back and forth. I have found a refresh interval of 30 seconds is sufficient for me track LEO satellites fairly well. You may experiment with a setting that suits your equipment)
- "Save" and "Close"
- I have not enabled any features on the Settings->Radio screen
- Shutdown WispDDE (for now)

That's it! All you need to do is test the setup!

Getting it all to work

- Run SDR-Console (if not already open)
- On the Satellite Tracking screen, select the satellite that you would like to track and have your rotator align the antennas to
- Power on the G-5400B controller. You should see Azimuth and Elevation information on the ST2-USB display indicating the where the antennas are pointed

• Run WispDDE. After the "Query Interval" you have set, you will see the WispDDE screen refresh itself with the current azimuth and elevation information from SDR-Console and you will also see your rotator controller being activated and antennas aligned to the data from SDR-Console

That's all there is to it! Have fun!

If you have any queries on this note, I'll do my best to answer them. Please mail your queries to vu2lbw@gmail.com