

## Installing Your New LVB Tracker Box

Thank you for selecting the LVB Tracker Box. We feel sure you will be happy with it.

### Setting up your LVB Tracker Box

- Test it (First test)
- Calibrate it
- Install USB drivers
- Test it (Second test)
- Interface it to your tracking program

#### First test

After unpacking your box the first thing you probably want to do is see it work.

- Turn your Yaesu 5400/5500 control box power off,
- Plug the LVB Tracker DIN cable into the Yaesu control box,
- Turn on the control box power switch.

Your LVB Tracker should come to life. It will display a quick message on the LCD screen telling you the firmware version, then switch to the main operating screen.

Pressing the UP, DOWN, CCW and CW buttons will cause your rotor to turn in that direction. The numbers on the display will NOT agree with your control box meter because you haven't calibrated your LVB Tracker to the rotor. This test will just show you that the box will control the rotor.

#### Calibrate it

This step will align the rotor position with the LVB Tracker display. The simplest method we have found is to use the pushbuttons to calibrate the rotor/LVB Tracker. Complete calibration and rotor interface information is available on Howard Long, G6LVB's web site, <http://www.g6lvb.com/Articles/LVBTracker/index.htm>, LVB Tracker Documentation. While the serial calibration is more straight forward, installing the USB drivers may be a challenge. Using the push buttons will get you operating faster.

#### Pushbutton Calibration

Turn off the LVB Tracker.

**To place the LCB Tracker into Calibration mode**, Hold down one of the four buttons when you turn on the Yaesu rotor control box, hold the button until the calibration message appears on the LCD.

**Set Az=min &  
press D (U=esc)**

**During the calibration process do not press any buttons other than those specified!**

#### Calibration to your rotor system:

- 1) **Set Az minimum** – use the CCW (left) button to move the rotor to its CCW stop. Once there press the DOWN button to accept. [UP will abort the calibration process].

**2) Set El minimum** – use the DOWN button to move the rotor to its DOWN stop. Once there press the CCW (Left) button to accept. [CW will abort the calibration process].

**Set El=min &  
press L (R=esc)**

**3) Set Az maximum** – use the CW (right) button to move the rotor to its CW stop. Once there press the DOWN button to accept. [UP will abort the calibration process]. Even if your rotor goes to 450° degrees (360°+ 90°), I recommend stopping at 360°. This will give you a little tighter control.

**Set Az=max &  
press D (U=esc)**

**4) Set El maximum** – use the UP button to move the rotor to its UP stop. Once there press the CCW (Left) button to accept. [CW will abort the calibration process]. Even if your rotor is capable of flipping vertically to -90° (00° to 90° to -90° [00° on the opposite side]), I recommend stopping at +90. This will give you a little tighter control.

**Set El=max &  
press L (R=esc)**

**5) Set Az Range** – this selects the horizontal travel range of your rotor. I recommend using the shorter range at first (360 degrees). Even if your rotor goes to 450° (360° + 90° more) and you stopped at 360° during max Az setup, choose D. If you want to use the 450° degrees choose U. [CW will abort the calibration process]

**Az range: 450 U  
360 D (R=esc)**

**6) Set El Range** – this selects the vertical range of your rotor. I recommend using the shorter range at first (90°). If your rotor goes to -90° and you stopped at +90° during max choose U, else for 360° degrees choose D. [CW will abort the calibration process]

**El range: 0-90 U  
0-180 D (R=esc)**

**7) CCW stop North=U, South=D** – this selects which direction your rotor stops. The 5400B generally stops S, the 5500 generally stops N. Choose U for North stop and D for South stop. [CW will abort the calibration process]

**CCW stop North=U  
South=D (R=esc)**

**8) EE Write** – Saves these settings to EEPROM, press the Up button. [CW will abort the calibration process]

**EE Write: U  
(R=esc)**

9) **EEPROM write OK message** – press any button to end the calibration routine and Return to normal operation.

**EEPROM write OK**  
**Push btn to exit**

**Normal display screen**

**Az +360° (+000°)**  
**E1 +090° (+000°)**

### USB or Serial

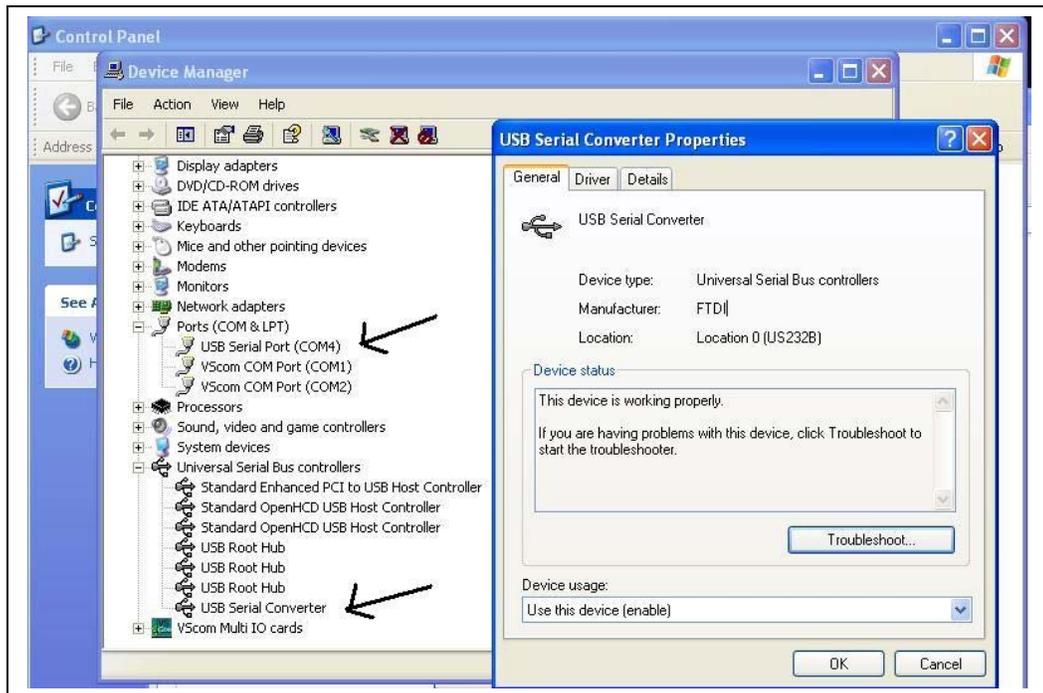
The unit comes with the USB module installed. This is expected to be the most common operational mode. You can run the unit using a serial port, but you must remove the USB module and install the MAX232 chip. The USB module and the MAX232 chip CAN NOT both be in the unit at the same time.

### USB

To use a USB port on your computer to talk to the LVB Tracker you must install an FTDI (maker of the USB module) driver. These are available from the FTDI web site for various operating systems. <http://www.ftdichip.com/FTDrivers.htm>

You want to download the VCP(Virtual Com Port) driver. Install these using the instructions included with drivers.

What you want to end up with is a USB driver that emulates a serial com port. Looking at the Windows operating system, go into Control Panel, Device Manager. Expand on the Ports and USB devices. Windows will assign a Comx port. You can edit this.



Once you have the USB driver installed and operating. Let's connect a USB cable between the LVB Tracker and your computer and talk to the LVB Tracker via USB.

First let's just talk to the LVB Tracker using a terminal program like Hyperterminal. Setup Hyperterminal (or another terminal program) to the COM port selected for the FTDI USB device, 9600, N, 8, 1. Turn on the rotor control box and the Tracker.

Pressing the Enter key a couple of times should get you a couple of CMD> displays on the computer screen.

Now send the Tracker Box a manual command to move the rotor. Since the LVB Tracker box is calibrated to your rotor/rotor control box these commands should cause the rotor to move to the correct azimuth and elevation.

In the terminal program type **C2 <enter>**  
The rotor box should respond with the current Az and El.  
Something like +169+068 which is +Azimuth+Elevation

In the terminal program type **M330 <enter>**  
The rotor should move to 330° Northwest.

In the terminal program type **W180 030 <enter>**  
The rotors should move to South and 30° up in elevation.

In the terminal program type **AZ270.0 <enter>**  
The rotor should turn to the West.

In the terminal program Type **El010.0 <enter>**  
This should cause the rotor to move to 10° elevation.

You have now tested both the GS-232 and EasyComm protocols.

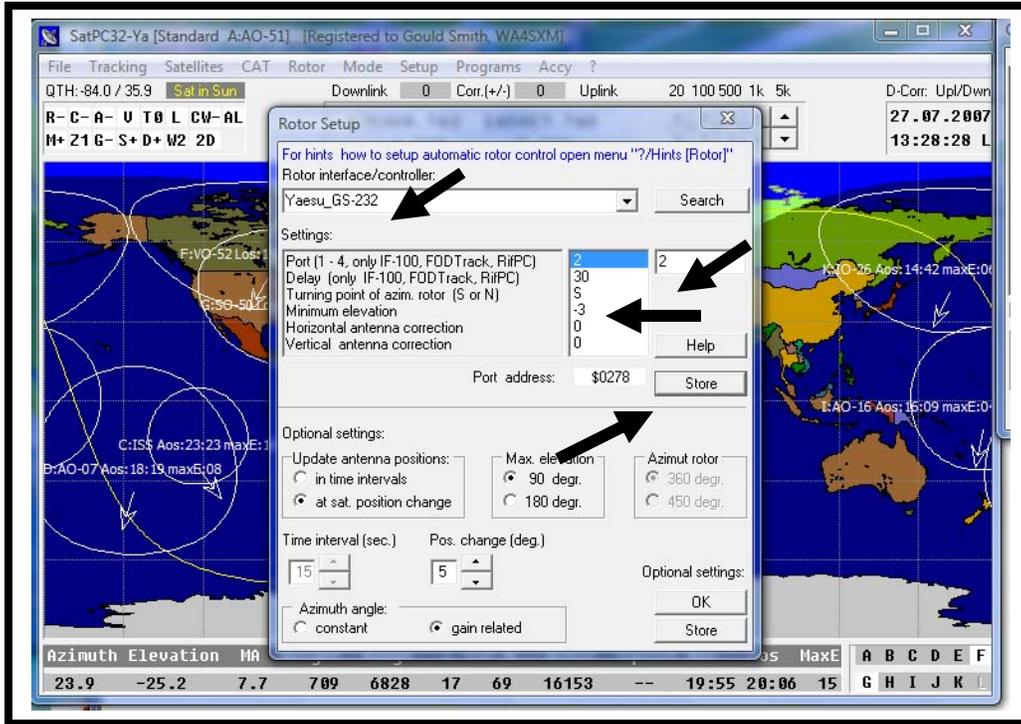
### **Interfacing the LVB Tracker to your tracking program**

This should be pretty straight forward. Each tracking program has a different method of interfacing, but they all use the same essential information.

Protocol - choose GS-232 or EasyComm  
Com Port – whatever COM port you setup when you installed the FTDI driver, 9600 bps  
Whether your rotor stops at N or S

All the tracking programs (SatPC32, Nova for Windows, MacDopplerPro and Predict) that we have setup the LVB Tracker with have good instructions for setting up a rotor controller. Please read them and follow them.

## Sample SatPC32 Rotor setup screen



For SatPC32 you will also be running ServerSDX. So you will also need to set the COM port in this program.

When you run SatPC32 the next and subsequent times, ServerSDX will load first

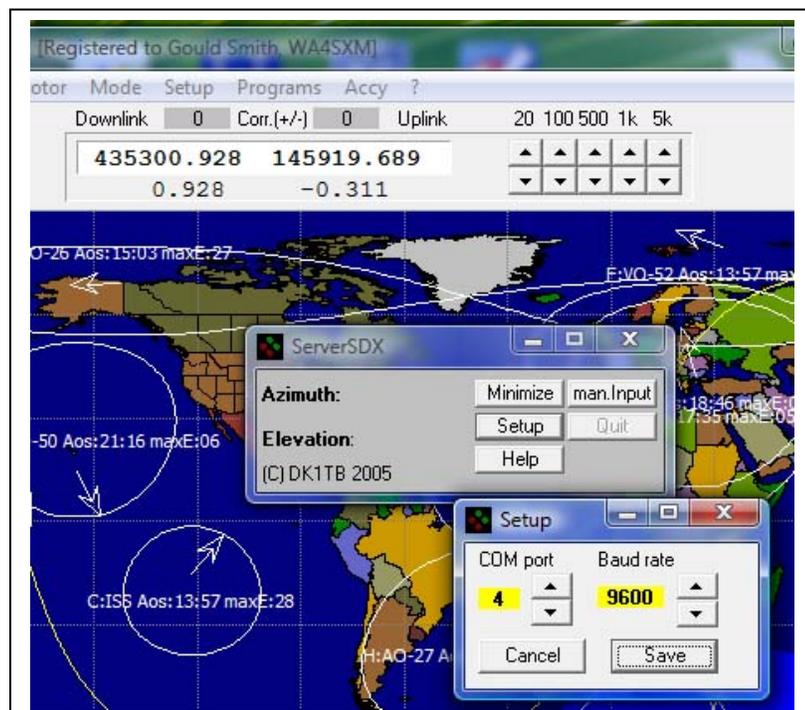
To complete the setup:

Click on ServerSDX,

Click on Setup,

Then select the same COM port as above and 9600 bps and **SAVE.**

Now test that ServerSDX is talking to the rotor.



## Final check out - LVB Tracker and SatPC32

After you have setup SatPC32 and ServerSDX you are ready to test the system

1. Open ServerSDX and click on *man Input* (manual input)
2. Enter m225 and click OK, you should see the AZ rotor control meter and LCD values moving toward 225° Azimuth  
The M command only works for Azimuth
3. Enter w190 20 and click OK or hit the return key,  
you should see the rotor control meters and LCD values moving toward 190 ° Azimuth and 20 ° elevation
4. Enter w350 40 and after about 3 seconds enter S and OK,  
the rotors should Stop where they are.
5. Now the final test, in SatPC32, Click on R in the Command bar in the upper left until it says R+, click on M in the command bar until it says M+ (multiple satellites) and see what satellite is over you or about to be over you. You can click on A+ in the command bar to automatically select a satellite that is over you. When the pass happens you should see the rotors tracking the satellite, and the AZ/EL values changing on the LCD display. You now have automated tracking of the satellites.

We hope you will enjoy your LVB Tracker Box.

Thanks to:

Howard Long, G6LVB for designing the device, writing the software and laying out the circuit board.

Mike Young, WB8CXO has hand built, tested and packed each LVB Tracker box. Mike also worked on numerous prototype boxes.

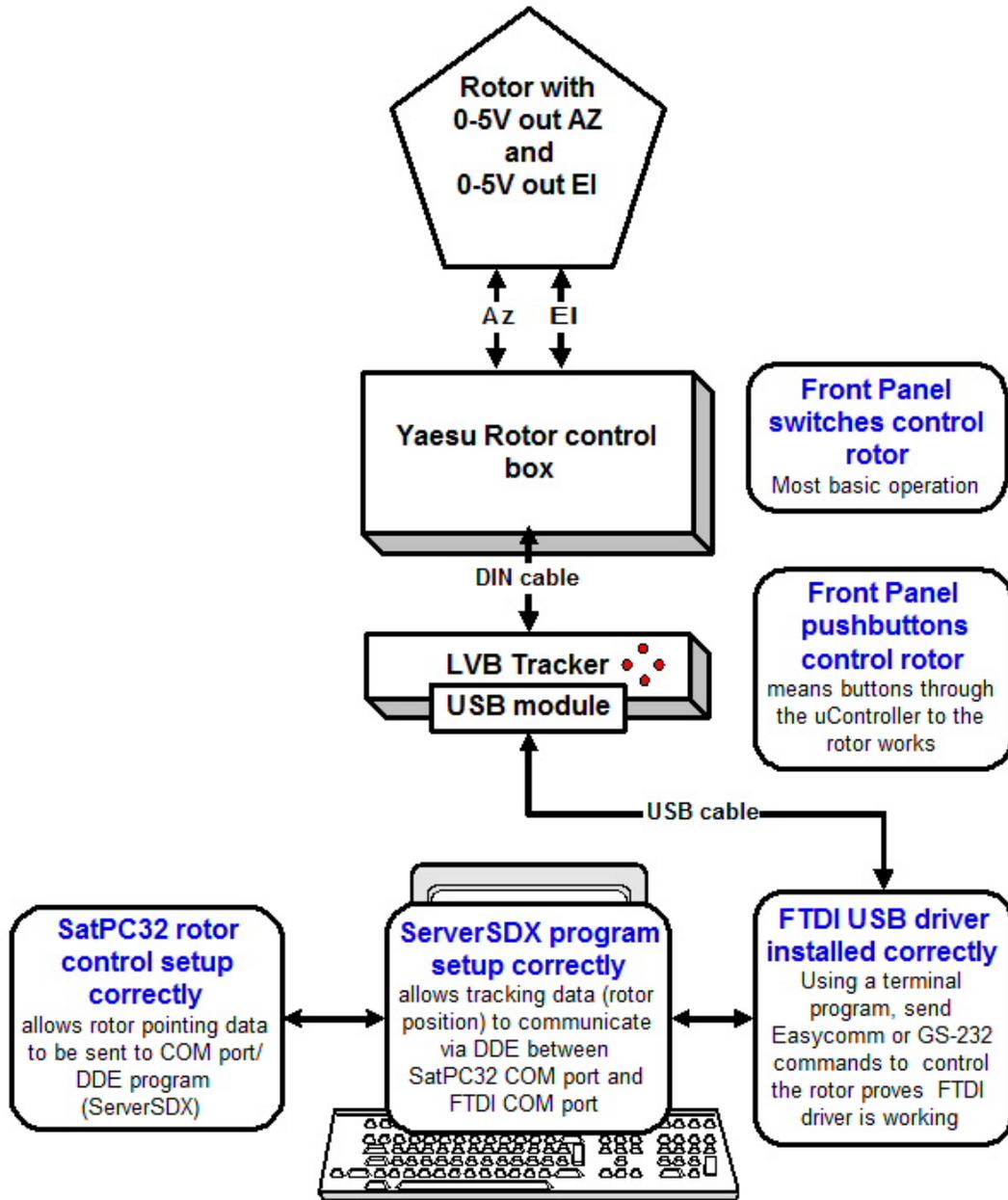
Dick Jansson, KD1K for doing the CAD work for the enclosures.

All of this time and work was a volunteer effort for AMSAT.

73,  
Gould, WA4SXM  
Project Leader

**Problems:** The information in this document should allow you to isolate any problem area. Direct control of the rotor via pushbutton, serial commands via terminal program over USB, and direct commands via the tracking program or interface program like ServerSDX.

# LVB Tracker Communication Chain



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July 2008 v2

