# 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, <u>http://www.g6lvb.com/Articles/LVBTracker/index.htm</u>, 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 tigher 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.

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]

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]

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El range: 0-90 U
0-180 D (R=esc)
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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°) El +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. <u>http://www.ftdichip.com/FTDrivers.htm</u>

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.

Device Manager	
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E Spiplay adapters	General Driver Details
Controllers     Keyboards	USB Serial Converter
Mice and other pointing devices     Modems     Monitors	Device type: Universal Serial Bus controllers
■ ■ Network adapters     □    ♥ Ports (COM & LPT)	Manufacturer: FTDI
USB Serial Port (COM4)	Location: Location 0 (US232B)
VScom COM Port (COM2)	This device is working properly.
Sound, video and game controllers     System devices     Get Controllers	If you are having problems with this device, click Troubleshoot to start the troubleshooter.
Standard Enhanced PCI to USB Host Controlle	r'
Standard OpenInCD USB Host Controller	Troubleshoot
USB Root Hub	Device usage:
USB Serial Converter	Use this device (enable)

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

R+ C- A- U T0 L CW-AL H+ Z1G-S+D+W2 2D For hints how to setup automatic rotor control open menu "?/Hints [Rotor]" Rotor interface/controller: Yaesu_GS-232 Setings: Pot [1 -4, only IF-100, F0DTrack, RifFC] Delay (only IF-100, F0DTrack, RifFC) Delay (only IF-100, F0DTrack, RifFC) Delay (only IF-100, F0DTrack, RifFC) Delay (only IF-100, F0DTrack, RifFC) Delay (only IF-100, F0DTrack, RifFC) Pot address: \$0278 Store Delay (only IF-100, F0DTrack, RifFC) Delay (only IF-100, F0DTrack, RifFC) Pot address: \$0278 Store Delay (only IF-100, F0DTrack, RifFC) Delay (only IF-100, F0DTrack, RifFC) Riff(IF) Riff(I	27.07.2007 13:28:28 L
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Rotor interface/controller:         Yaesu_GS-232         Settings:         Port (1 - 4, only IF-100, F0DTrack, Ri/PC)         Delay (only IF-100, F0DTrack, Ri/PC)         Delay (only IF-100, F0DTrack, Ri/PC)         Winimum elevation         Horizontal antenna correction         Port address:       \$0278         Store         Optional settings:	5:14:42 maxE:0
Yaesu_GS:232       Search         Settings:       Port (1 - 4, only IF-100, F0DTrack, Ri/FC)         Delay (only IF-100, F0DTrack, Ri/FC)       2         Juning point of azim. rotor (S or N)       3         Minimum elevation       -3         Vertical antenna correction       0         Port address:       \$0278         Store       TAO-16 A	6:14:42 maxE:0
Frvo 52Los       Settings:         Port (1 - 4, only IF-100, F0DTrack, RifPC)         Delay (only IF-100, F0DTrack, RifPC)         Delay (only IF-100, F0DTrack, RifPC)         Turning point of azim. rotor (S or N)         Horizontal antenna correction         Port address:       \$0278         Store         Optional settings:	5:14:42 maxE:0
F:VO 52L0st       Port (1 - 4, only IF-100, F0DTrack, RifPC)         Delay (only IF-100, F0DTrack, RifPC)       30         1       30         3       3         0       Help         Port address:       \$0278         Store       NAO-16 A	5:14:42 maxE:0
Delay (only IF-100, FDDTrack, RifPC) Turning point of azim. rotor (S or N) Horizontal antenna correction Vertical antenna correction Port address: \$0278 Store Optional settings:	5:14:42 maxe:0
Turning point of azim. foot (5 of N)     -3       Infinite point of azim. foot (5 of N)     -3       Horizontal antenna correction     0       Port address:     \$0278       Store     NAO-16 A	
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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

Registered to Gould Smith, WA45XM] To complete the otor Mode Setup Programs Accy ? Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1k 5k . • + 435300.928 145919.689 ٠ \* Click on ServerSDX, • 0.928 -0.311 Click on Setup, -26 Ads: 15:03 max -27 Then select the same ServerSDX COM port as above and 9600 bps and Azimuth: Minimize man.Input Setup Qui Elevation: 50 Aos: 21: 16 ma Œ:06 Help (C) DK1TB 2005 Now test that Setup ServerSDX is talking COM port Baud rate to the rotor. 9600 C:ISS Aos: 13:57 maxE:28 --Save Cancel

setup:

SAVE.

# 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)
- 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



Gould Smith, WA4SXM July 2008 v2