

### Disclaimer:

**WARNING !!** - This device uses extremely strong NEODYMIUM magnets. These magnets can cause injury or damage if misused. **KEEP AWAY FROM CHILDREN!!**. **DO NOT OPEN or USE** if you have a pacemaker or other medical condition that may be affected by magnetic fields. The strong magnetic fields can erase computer hard drives, magnetic access and credit cards, Use at your own RISK.

MAG-ic Tech or its owners neither assumes nor accepts any liability for damages resulting from the handling or use of this equipment. With your purchase, the buyer agrees that he/she is responsible for all damages and injuries caused by the use of this product, which include personal injuries, property damages and any other damage whatsoever. The buyer must agree with the terms before using the product.

Pay special attention when using this device to measure finished instruments. The probe tip is fabricated from Delrin and may scratch or leave marks on finished surfaces.

**DO NOT DRAG THE PROBE TIP OVER FINISHED SURFACES!!** To avoid scratches and marks, you should slightly lift the probe before moving it. A good method is to lift the tip and place a piece of soft cloth under before moving and removing the cloth at the new measuring location.

Some users prefer to use a rice paper or other thin protective paper. You can also calibrate MAG-ic probe with the rice paper inserted between the magnet and the probe. In this way the zero (0.00) value would include the paper thickness and all measurements must be performed with the paper included.

You can also use the OFFSET function in the MAG-ic Probe Software to compensate for a thicker protective cloth if required

## MAG-ic Probe Device Overview

MAG-ic Probe BLE is the newest variation of the MAG-ic Probe product line. All electronics are housed inside the handheld probe.

The device features -

- All-in-one construction - less wear & tear
- a USB connection for connection to a computer for use with the MAG-ic Probe Software or to USB Battery for mobile use.
- MAG-ic Probe BLE features Bluetooth Low Energy (Bluetooth LE) to display measurements on iPhones, Android Phones or Apple and Android Tablets. **Note:** BLE is not the same as Classic Bluetooth. Your device must support Bluetooth 4.0, also known as Bluetooth Smart or BLE. Only IOS or Android is supported.

MAG-ic Probe BLE is supplied with -

- USB Cable
- USB Battery Pack
- 1/2" Sphere Magnet
- 1/4" Cylinder Magnet

MAG-ic Probe can measure 0-600mil (0-15mm) using the 1/2" Sphere and 0-420mil (0-10mm) using the 1/4" Cylinder. The cylinder is used when access is restricted for example in violins and violas. Where possible, use the 1/2" Sphere.



# Operating Instructions



- **IMPORTANT!** - MAG-ic Probe BLE is used with a computer running MAG-ic Probe software. - Previously, MAG-ic Probe was also able to connect via Bluetooth to a 3rd party App called Simplee for mobile.. This App is no longer available.
- MAG-ic Probe BLE starts initially by waiting 10 Seconds for stabilization.
- After the initial stabilization phase, MAG-ic Probe starts a calibration routine. This is very important for the accurate operation of the device. Please follow the directions carefully.

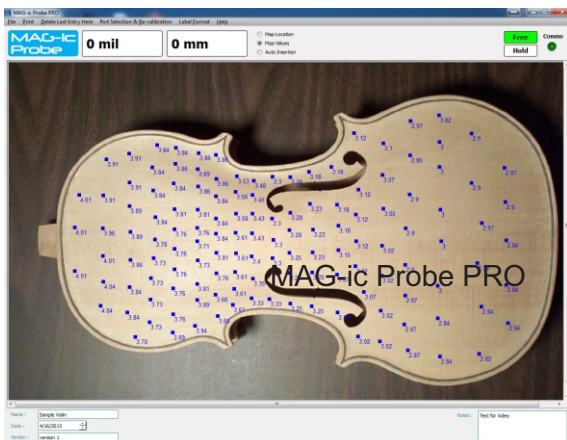
## MAG-ic Probe Software

MAG-ic Probe BLE uses a sophisticated companion software that provide many useful features that allow you to measure, document and visualize the object you are measuring.

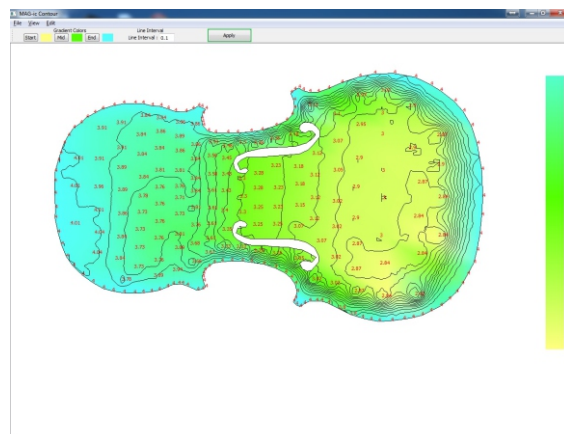
There are 2 versions of the software available for download on the [www.magicprobe.net](http://www.magicprobe.net) website.

**MAG-ic Probe Lite** allows you to upload a photo or drawing of the object to the computer and plot all your measurements directly to the picture. This can then be printed or saved for future reference and comparison.

**MAG-ic Probe PRO** software will allow you to take this a step further and actually produce a color contour map of the surface you measured. This is a unique way to visualize the surface contour and ideal to compare different instruments. Many use this feature to document the progress of an instrument as the surface goes through stages of fabrication.



MAG-ic Probe Lite



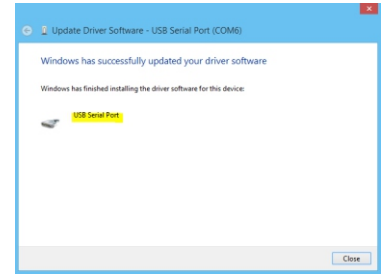
MAG-ic Probe Pro

## USB Serial Connection

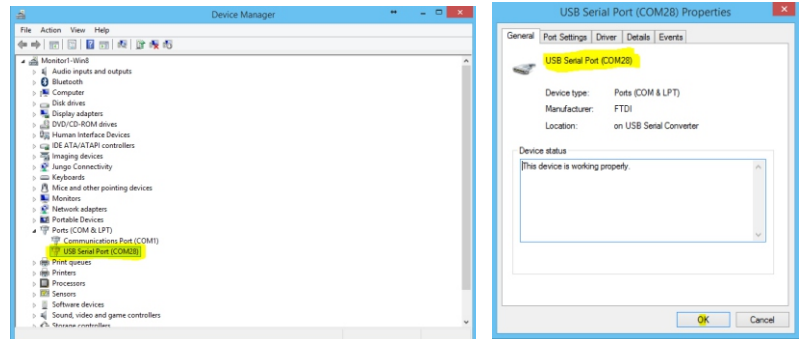
MAG-ic Probe BLE uses a common USB driver to communicate with your computer. This driver should be automatically installed by most Operating Systems.

When first connecting MAG-ic Probe BLE to your computer, pay close attention to the monitor. You may hear a Windows Sound and possibly a window similar to the one on the right. If it says the driver is successfully installed, record the ComPort # as this is the number you will need in the MAG-ic Probe Software.

Other wise Open the **Control Panel** and click on **Device Manager**. In the Device Manager, click on the small triangle next to PORTS (COM & LPT).



This will list the Serial Ports currently installed on your PC. Look for the **USB Serial Port (COM #)** and note the port number. If you double-click this line, you should see a similar properties window to the far-right window.



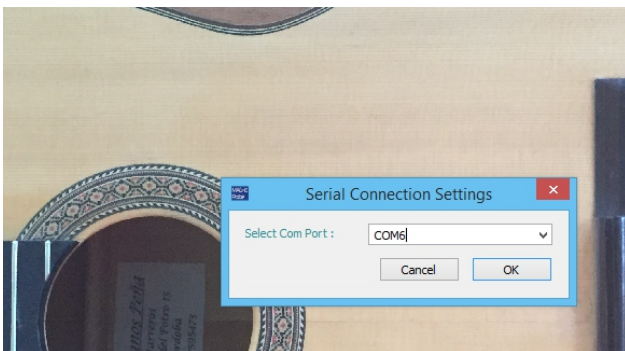
If your computer does not automatically install the driver, you will need to install the driver manually. In that case, please disconnect the MAG-ic Probe from your computer. Navigate to <http://www.ftdichip.com/Drivers/VCP.htm> and download the VCP Drivers for your operating system. It is best to use the Setup Executable from that page. There are also installation guides available from that page to assist you with proper installation and diagnosing problems.

Install the driver package as per the instructions on the FTDI Website. Once the drivers are successfully installed, Connect the MAG-ic Probe BLE to your computer USB port and you should hear the computer beep and proceed as above.

Once you have the correct COM Port # you can proceed to open the **MAG-ic Probe Software** you downloaded from the previous section.

In the software, select **Port Selection & Re-Calibration** from the Top Bar and select **Serial Port**.

Select or Type in the **Com Port #** from above and click **OK**. If successful, the green "Comms" light in the top-right should light up and the calibration messages should start appearing in the



## MAC Serial Connection

**Please Note** - The MAC software is provided for use but is no longer supported as Apple have made changes to the way Serial Port drivers are used which has given rise to many issues especially with later model Macbooks using Mavericks and later OS. The USB Drivers required can be found at <http://www.ftdichip.com/Drivers/VCP.htm> and a troubleshooting document can be found at [http://www.ftdichip.com/Support/Documents/AppNotes/AN\\_134\\_FTDI\\_Drivers\\_Installation\\_Guide\\_for\\_MAC\\_OSX.pdf](http://www.ftdichip.com/Support/Documents/AppNotes/AN_134_FTDI_Drivers_Installation_Guide_for_MAC_OSX.pdf)

Previous to the Mavericks release, USB drivers worked well. If you have difficulty installing the drivers, Please consult the above document or use a Windows Platform.

The below is provided for some basic assistance

MAC OSX does not easily list the available serial ports to the user or applications in the way that Windows does. One method to find the Serial Port number is to use the **TERMINAL** application.

If the device is installed properly, you will see entries in the /dev directory:

```
/dev/cu.usbserial-xxxxxxx
```

```
/dev/tty.usbserial-xxxxxxx
```

where xxxxxxxx is a serial number of some kind. /dev can be accessed through the Terminal application. The Terminal application can be launched

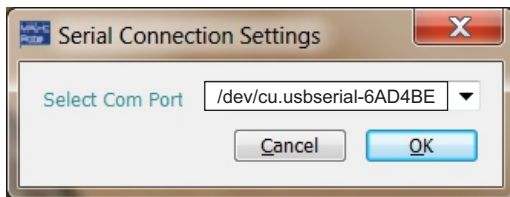
by selecting Go > Applications > Utilities > Terminal. Type the following lines in the Terminal window to produce the file list:

```
cd /dev
```

```
ls-l
```

If in the list, you find usbSerial ports similar to the format above, please note or copy the entire string for example ***/dev/cu.usbserial-6AD4BE***

In the MAG-ic Probe Software, click on ***Port Selection and Recalibration*** and select ***Serial Port***. Select or type the entire line from above. If successful, the green light in the top right should light up and the calibration messages will appear in the center of the screen.



## **Calibration - a Word about understanding magnetics**

MAG-ic Probe uses magnets and magnetic sensors to measure the thickness of any non-ferrous materials. This technique is very effective because magnetic fields can penetrate these materials with no attenuation or deformation.

However, as with most technologies, some tolerance and knowledge is required for achieving the best results.

- Magnetic fields generated by permanent magnets are very strong at the magnet surface, but deteriorate very rapidly in a non-linear manner as the distance increases.
- Magnetic fields vary with temperature, even fractions of a degree will have an effect.
- Magnetic sensors also vary their output with temperature and suffer from internal fluctuations.
- Friction of the magnet on the material surface may cause it to not be centered on the probe tip when moving the probe across the measured object.
- Dust and surface anomalies may cause the probe to be off perpendicular with regards to the external magnet.
- Magnetic fields are affected by metallic objects and even the Earth's magnetic field can influence your measurements.

Considering the above, and following the usage recommendations will enable you to get the most out of your MAG-ic Probe. MAG-ic Probe is supplied with 2 magnets. The ½" ball provides the strongest magnetic field and thus the highest resolution, and should always be your first choice. The smaller magnet should only be used when access to the inside of a finished instrument is limited due to small f-holes etc, for example violins and mandolins.

### **IMPORTANT - MAGNETS**

MAG-ic Probe uses extremely strong Neodymium magnets. These magnets are brittle and can chip if mishandled. Each MAG-ic Probe is carefully calibrated to the magnets supplied with it. A large chip may affect the accuracy of the device. The biggest cause of magnets chipping is when the 2 supplied magnets are allowed to SNAP together or to steel objects. Please handle carefully. Best practice is to leave the magnets in the storage case and when a magnet is required, hold the other magnet in place with 1 hand and use the tip of the MAG-ic Probe to extract the required magnet from the storage case. Use the same method to replace the magnet.



On startup, MAG-ic Probe provides a calibration sequence to detect the magnet size and to compensate for small variations in field measurement tolerances like temperature and location. This initial calibration is suitable for most quick measurements, for example when you are making a few measurements during shaping or sanding and then re-measuring periodically. This basic calibration can and should be repeated often if conditions change, by repeating the Initial Calibration sequence below, OR when using USB and the MAG-ic Probe Software, by selecting the CALIBRATE option.

For more prolonged measuring and contour mapping sessions, see the ***Advanced Calibration*** section.

## Initial Calibration Sequence

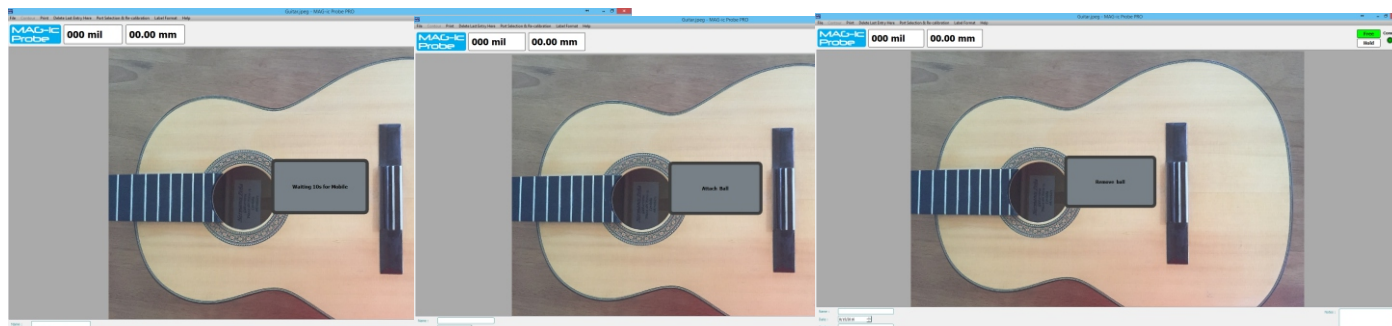
### OPTION 1 - Connecting to Computer and using MAG-ic Probe Software

When initially connecting the MAG-ic Probe BLE to the computer USB port, the device will wait 10 seconds for stabilization

- Connect one end of the USB Cable to the MAG-ic Probe BLE and the other end to the computer as shown.

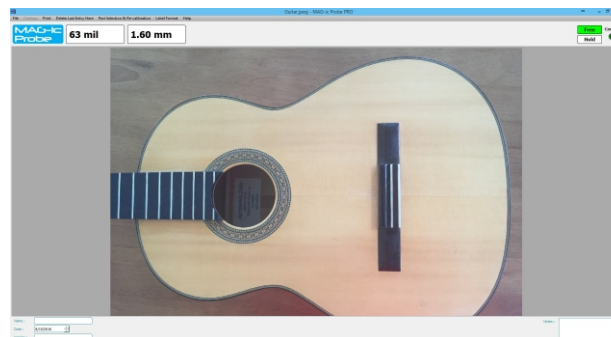
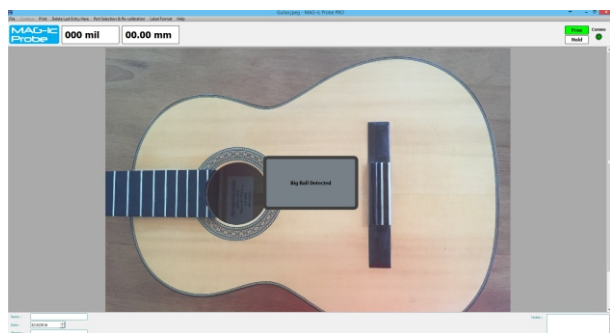


- In the MAG-ic Probe software, Click on the **Port Selection and Re-calibration** Menu and select **Serial Port**
- Select or type the correct **COM Port #** and click **OK**. The Green light on the top-right of the monitor should light and the calibration messages will appear in the middle of the screen.



The calibration sequence will pause for 10 seconds to allow for the pairing of a mobile device via Bluetooth LE.

- The ATTACH BALL message requires that one of the target magnets is attached to the end of the probe. Select which magnet you wish to use and attach it to the end of the probe.
- The probe will gather some data from the sensor and then display REMOVE BALL. Remove the magnet from the end of the probe and keep the magnet **at least 12 inches** from the probe.
- After 5 seconds, the calibration is complete and the display will advise that either the BIG or SMALL magnet was detected. Confirm this is the size you selected.
- The display will prompt you to replace the magnet on the probe and the display should read 0.00mm.
- Test the operation by lifting the magnet slightly off the probe and the software should start to display some measurement values.



- If you should exceed the measurement range of the selected magnet, the device will display an "Out of Range" message.
- Your MAG-ic Probe is now calibrated and ready for measurement.

- NOTE - It is **not** critical that the display should read absolute zero (0.00). However, in this case, repeat the above procedure by removing and restoring power to start the calibration again. If after the second calibration the device still does not display 0.00 but is close (1 - 3mil), continue with your normal measurements.

### **Advanced Calibration**

a More advanced calibration sequence is advised for prolonged measurement sessions. Temperature variation is the biggest enemy of electronic measurement. Even the heat generated by a human hand will heat the probe enough to affect your measurements. However, the maximum effect this would probably have on measurements is in the order of 0.1mm - 0.2mm (4mil - 8mil). If this is important to you, please read on..... When preparing for a more serious prolonged measuring session, such as mapping a complete top or plate with many measurements, a two-step calibration sequence is advised. The goal of this 2-step process is to only perform a calibration sequence, when the probe has reached peak operating temperature.

- Power the device ON either with Computer USB power or USB Battery power.
- Hold the probe in your hand just as you would when doing measurements on your object. Your fingers will transfer heat to the probe and after 3 - 5 minutes the probe internal temperature should be equal to your finger temperature.
- Now perform the calibration sequence as before. This calibration should be performed with the probe located above your instrument to be measured in order to closely approximate the final working condition.
- Your MAG-ic Probe is ready for use.
- If temperature conditions change during the session or if you have to interrupt the session for a prolonged period, repeat the above procedure.

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## Usage Tips

MAG-ic Probe BLE is capable of measuring very small distances to 1/1000th inch. It should make sense then that the probe should be absolutely square to the surface being measured and the opposing magnet. If the probe is slightly tilted, the distance from the center of the probe to the target magnet will be slightly increased giving rise to incorrect measurements.

In the MAG-ic Probe software, there is a HOLD function which can assist in ensuring that the current measurement is the lowest measurement at the location. It is a good idea to use the HOLD function while making small rocking motions at each measuring location to ensure the lowest measurement.

Please refer to the software tutorial video's at <http://www.magicprobe.net/mag-ic-probe-software-1/> for more information.

Take care of the magnets, they are fragile and will shatter or splinter if allowed to SNAP together or to steel objects.

Avoid major temperature changes after calibration. If for some reason there is a significant environmental temperature change, re-calibrate the MAG-ic probe.

Depending on the thickness of the material being measured, it is possible the target magnet could "jump" over reasonable obstacles like internal braces in guitars. This is not guaranteed and really depends on the size and shape of the brace. You should know the internal pattern of braces and follow the easiest path for the magnet to remain attached to the probe.

### Specifications

Measuring range (Large Magnet)	1 - 600mil (0-15mm) (0-10mm High Resolution)
(Small Magnet)	0 - 420 mil (10.6mm)
Resolution	1mil (decreasing after 10mm)
Accuracy	3 mil - 0.1mm
Battery Voltage	USB 5VDC
Power Consumption	10mA - 50mA

### Contact Info

We welcome any feedback and suggestions. If you have any problems with your device please contact us.

email - [info@magicprobe.net](mailto:info@magicprobe.net)  
Phone (901) 212-6979