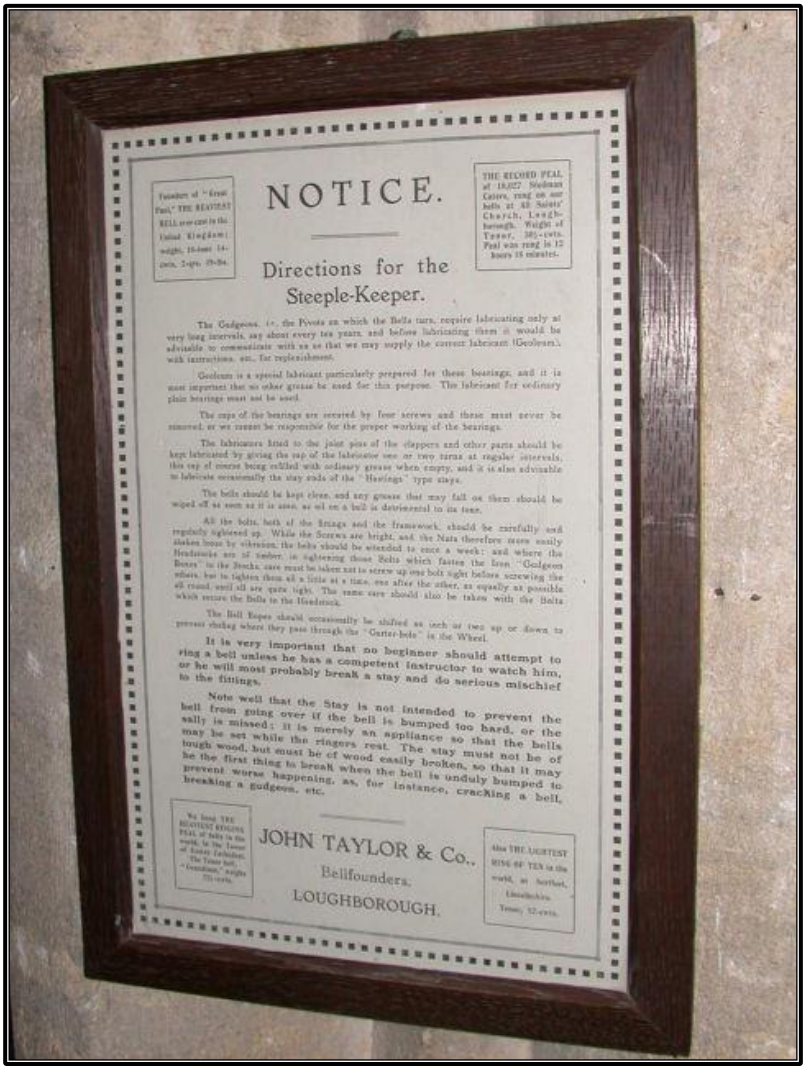
Type 2 Liverpool Ringing Simulator

05 – Configuring Virtual Belfry Guide



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Document History

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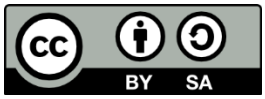

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Documentation Map

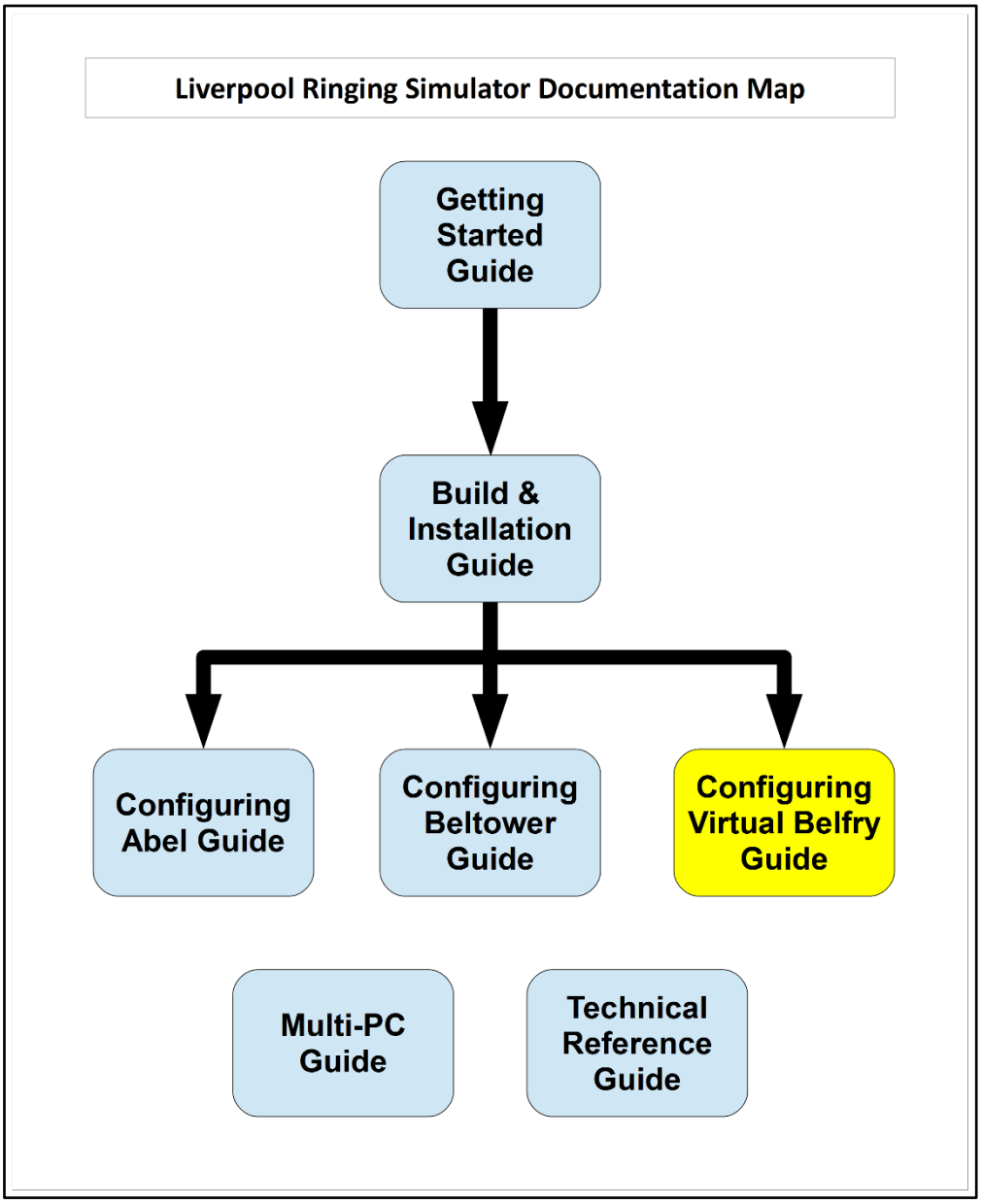

Figure 1 – Documentation Map

About This Guide

The Type 2 Liverpool Ringing Simulator allows sensors, attached to one or more real tower bells or teaching dumb bells, to be connected to a computer Simulator Software Package such as Abel[2], Beltower[3] or Virtual Belfry[4]. This allows you to extend and augment the teaching and practice opportunities in your tower.

This brief ***Configuring Virtual Belfry Guide*** shows you how to configure the Virtual Belfry Simulator Software Package to work with the Type 2 Liverpool Ringing Simulator.

Other project guides are available for the Abel and Beltower packages.

First Steps

This guide begins from the point that you have completed building and installing your Type 2 Liverpool Simulator hardware, and are now ready to configure Virtual Belfry to work with the simulator.

For guidance on building and installing the Type 2 Liverpool Simulator, please refer to the ***Build & Installation Guide***. For detailed technical information, see also the ***Technical Reference Guide***.

If you want to use multiple PCs concurrently, please refer the ***Multi-PC Guide*** for information on building either the Second PC module or the Basic Serial Splitter module. The Second PC module allows two PCs to be used concurrently, the Basic Serial Splitter up to a maximum of 16.

Next Steps

This is not a detailed guide to using Virtual Belfry. Please refer to the Virtual Belfry documentation and help for more information on the usage and configuration of the application.

This is also not a guide to using a simulator in teaching and practice. For guidance in this area the ART[5] publication ***Teaching with Simulators*** is recommended, available from the ART shop[6].

[2] https://www.abelsim.co.uk/
[3] https://www.beltower.co.uk/
[4] https://www.belfryware.com/
[5] Association of Ringing Teachers
[6] https://shop.bellringing.org

Virtual Belfry

Copyrights & Licensing

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Please ensure your copy of Virtual Belfry is properly licensed.

Virtual Belfry can be ordered and downloaded from https://www.belfryware.com/, and requires a Licence Key for full functionality.

Sensors Configuration

Configuration of the Virtual Belfry Simulator Software Package to use the Simulator Interface should also only need to be done once. All settings are saved by Virtual Belfry in the Windows Registry. This example is based on Virtual Belfry 3.10 on Windows 10, screens and options may differ slightly in other versions.

To configure Virtual Belfry to use the Simulator Interface, carry out the following steps. This manual described the minimum necessary to configure Virtual Belfry to use the Simulator Interface, for full details on the overall configuration and features of Virtual Belfry please refer to the product documentation.

- Start Virtual Belfry on the Simulator PC, click on the *Sensors* vertical tab, then click the *Configure…* button.

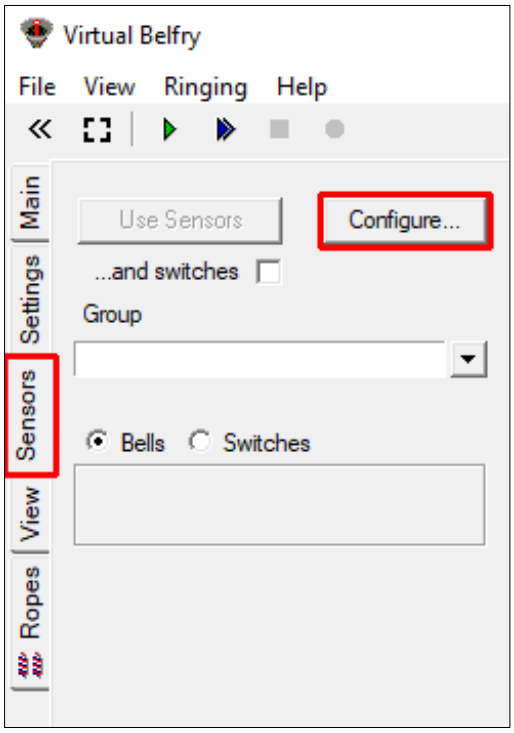

Figure 2 – Virtual Belfry – Main Window

- In the *Configure Sensors* window, click the *New…* button to create a new sensor group.

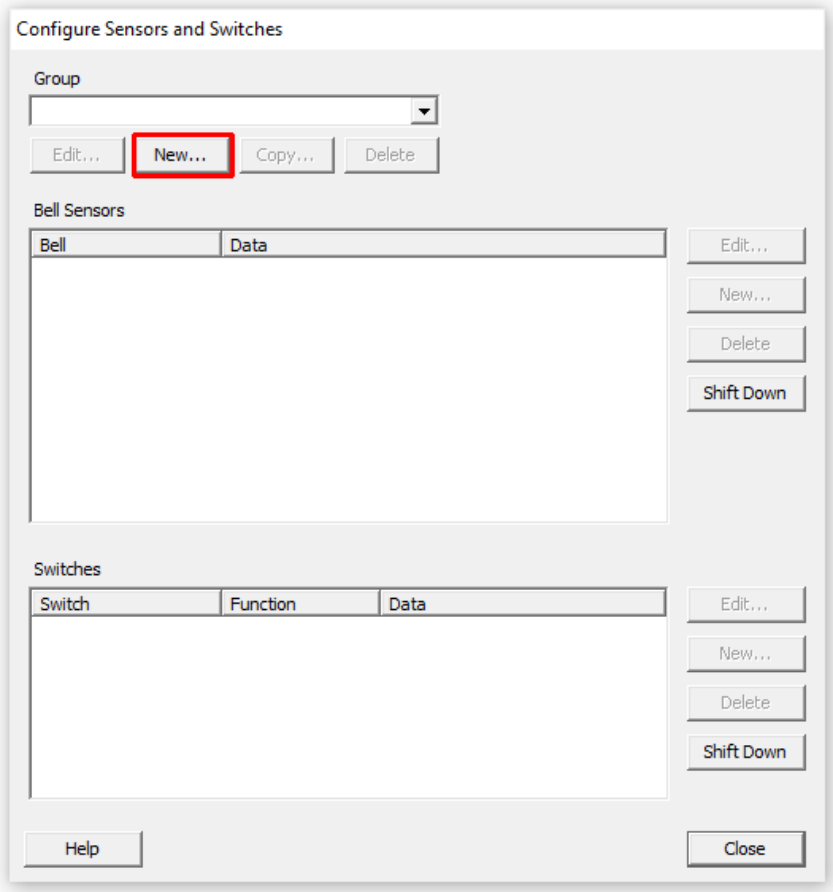

Figure 3 – Virtual Belfry – Add New Sensor Group

- Give the sensor group a name, and then click *OK*.

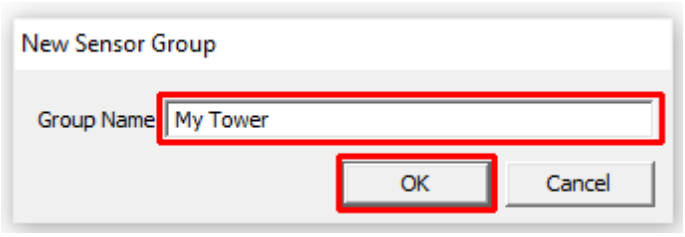

Figure 4 – Virtual Belfry – New Sensor Group

- In the *Configure Sensors* window, select the new sensor group in the *Group* dropdown, and then click *New…* to create a new sensor.

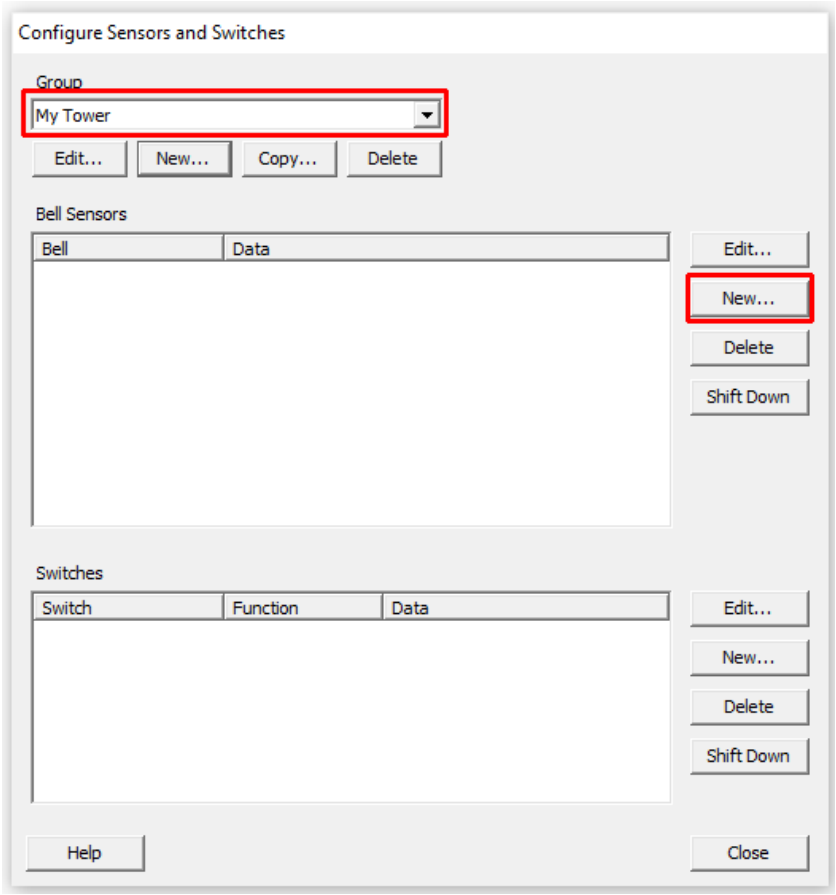

Figure 5 – Virtual Belfry – Add New Sensor

- In the *New Sensor* window, configure the first sensor as follows:
  - In the *Bell* field, enter a unique name for the sensor, in this example *Sensor #1*.
  - In the *Type* dropdown, select *Generic Data Interface*.
  - In the *Port* field, enter the full name of the COM port to be used, in this example *COM1*. Virtual Belfry displays a dynamically updated list of available COM ports in the large box at the top right of the window, and you can populate the *Port* field by double-clicking a port from this list.
  - In the *Signal* field, select the Simulator Interface signal that corresponds to this sensor, in this case channel *1*.
  - In the *Wait for* field, enter the delay for this bell to an appropriate value, so that the simulated bell sounds as closely as possible to the same time as the real bell (this is best done with the real bell un-silenced). Note that in Virtual Belfry the delay values are specified in 1/1000ths of a second (milliseconds).
  - Set the *Ignore* field to *20ms*, and the signal number fields to *1 of 1*.
  - Leave the *Correction to signal time…* fields blank for now. Refer to the Virtual Belfry documentation for information on configuring these fields and analysing real ringing.
  - Click *OK* to close the *New Sensor* window.

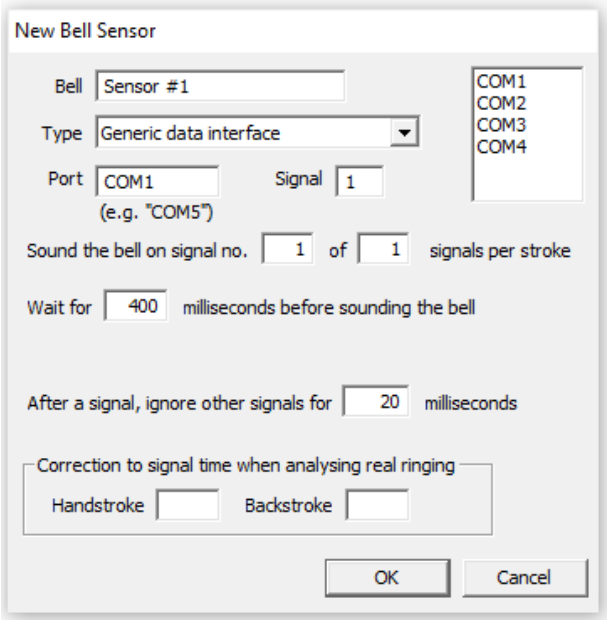

Figure 6 – Virtual Belfry – First New Sensor

- Repeat steps 4 and 5 for the second and each successive sensor. Assuming that you are configuring Sensors connected to just one interface, the only values which should be different are the *Bell*, *Signal* and *Wait for* fields.

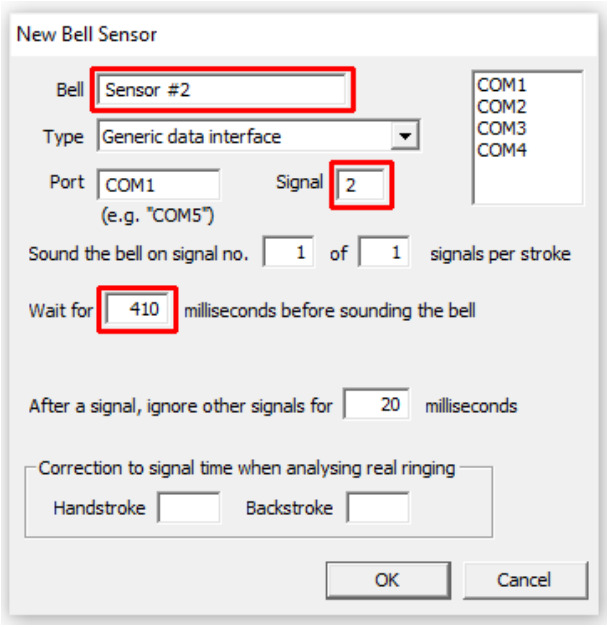

Figure 7 – Virtual Belfry – Subsequent Sensors

- Click *Close* in the *Configure Sensors* window to save the sensor settings and close the window. The following example shows a completed sensor group with example delay timers for a mythical ring of six.

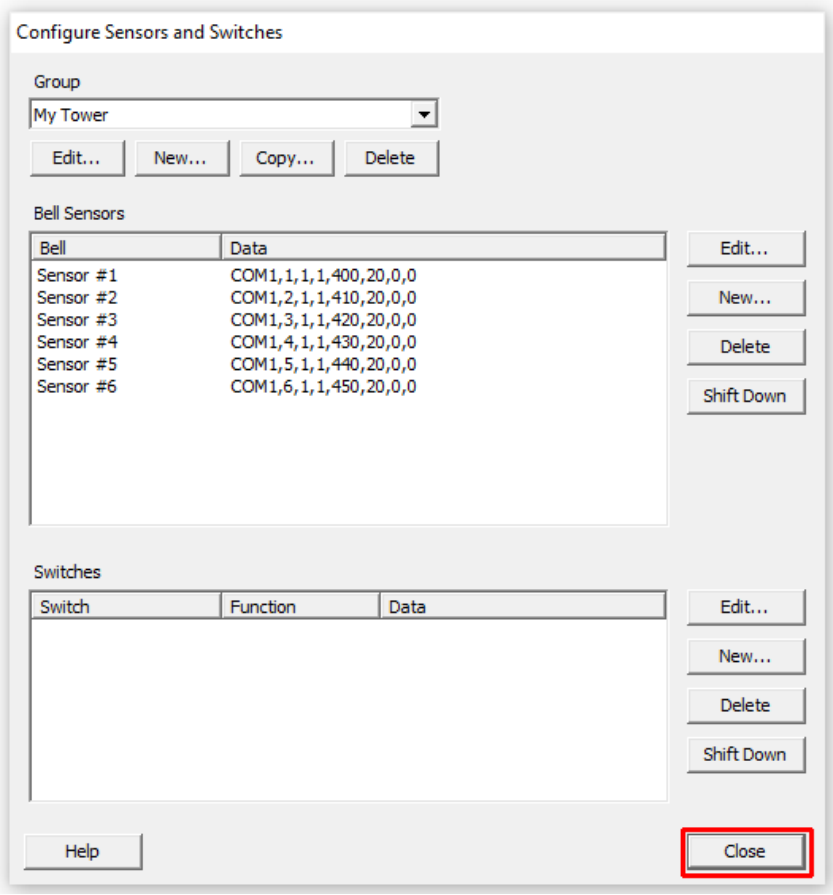

Figure 8 – Virtual Belfry – Completed Sensor Configuration Example

- To activate the sensor group for silent practice, click on the *Using Sensors* button on the *Sensors* vertical tab, and tick the checkboxes for the bells in use.

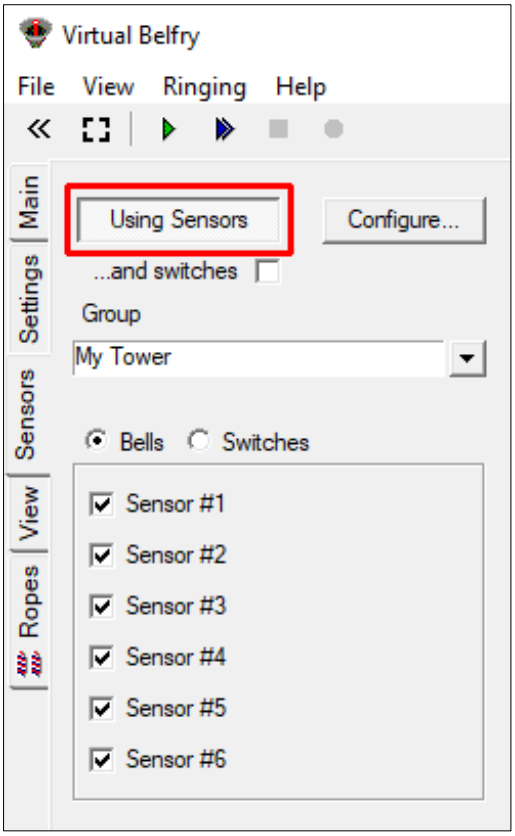

Figure 9 – Virtual Belfry – Using Sensors

- Virtual Belfry should now be configured to use the Simulator Interface. Test each bell in turn and check that the simulated bells are correctly mapped to the real bells.
- Note that the method mapping sensors to simulated bells changed considerably in Virtual Belfry 3.5. Select *Index…* from the *Help* menu (or press F1 and click on the *Index* tab) and look at the *Silent Practice* and *Sensors Control Panel* help pages for a detailed description.

- The *Monitor* button on the *Sensors* vertical tab opens a monitor pane in which sensor inputs can be observed in real time. New data is added at the top of the pane.

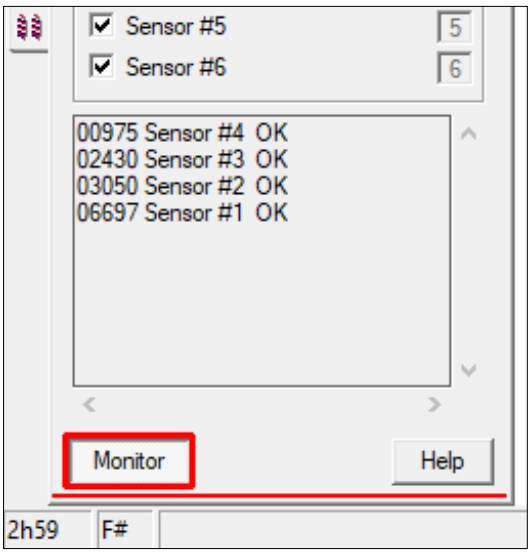

Figure 10 – Virtual Belfry – Monitor Function

Copying Sensor Groups

- Sensor groups may be copied and edited, facilitating switching between multiple different sensor configurations. Click the *Copy…* button on the Configuring Sensors and Switches window.

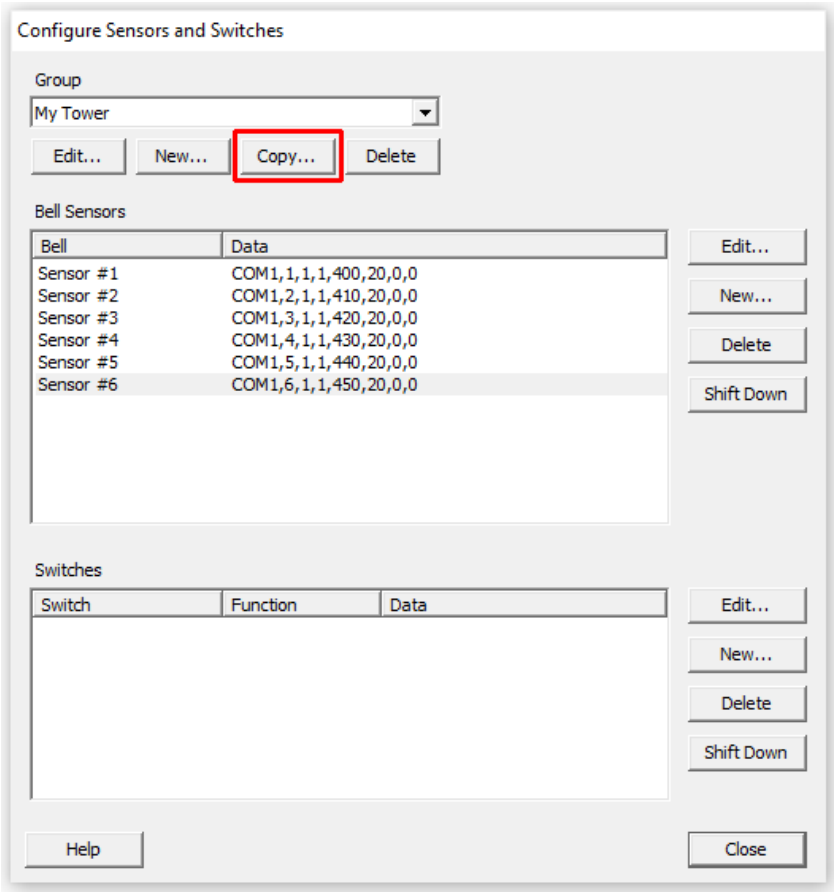

Figure 11 – Virtual Belfry – Copy Sensor Group

- Then click *OK* to create a copy of the current group.

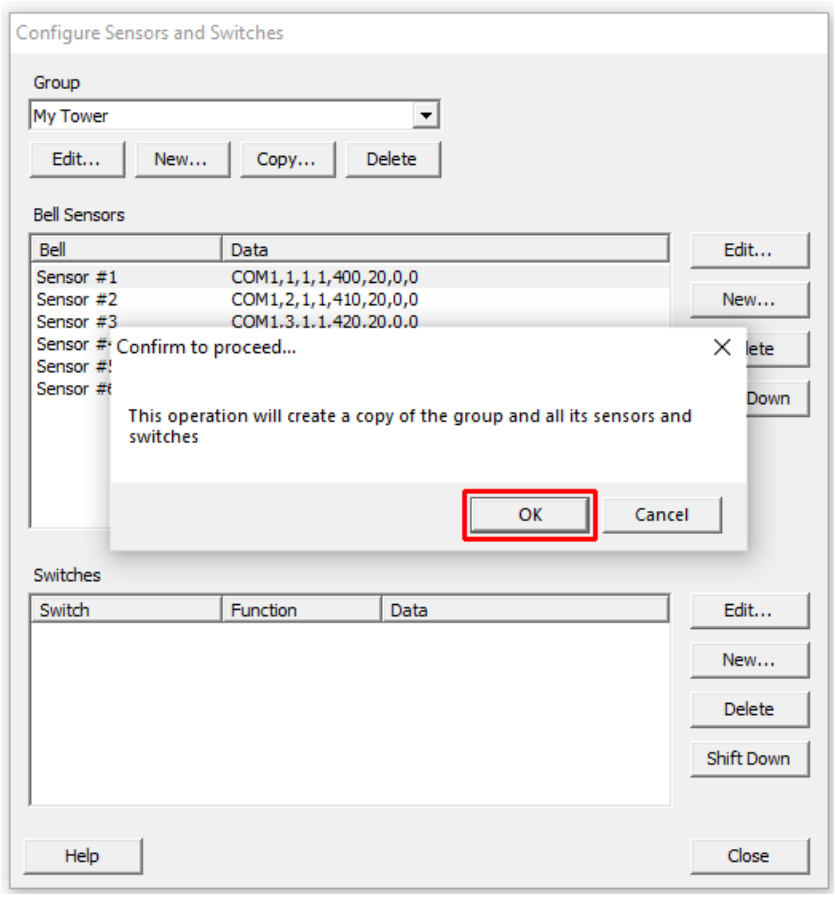

Figure 12 – Virtual Belfry – Confirm Copy

- The new sensor group will have the same name as the original, with the word *(copy)* appended.

- To rename the new group, click the *Edit…* button, enter a new name for the group, and click *OK*.

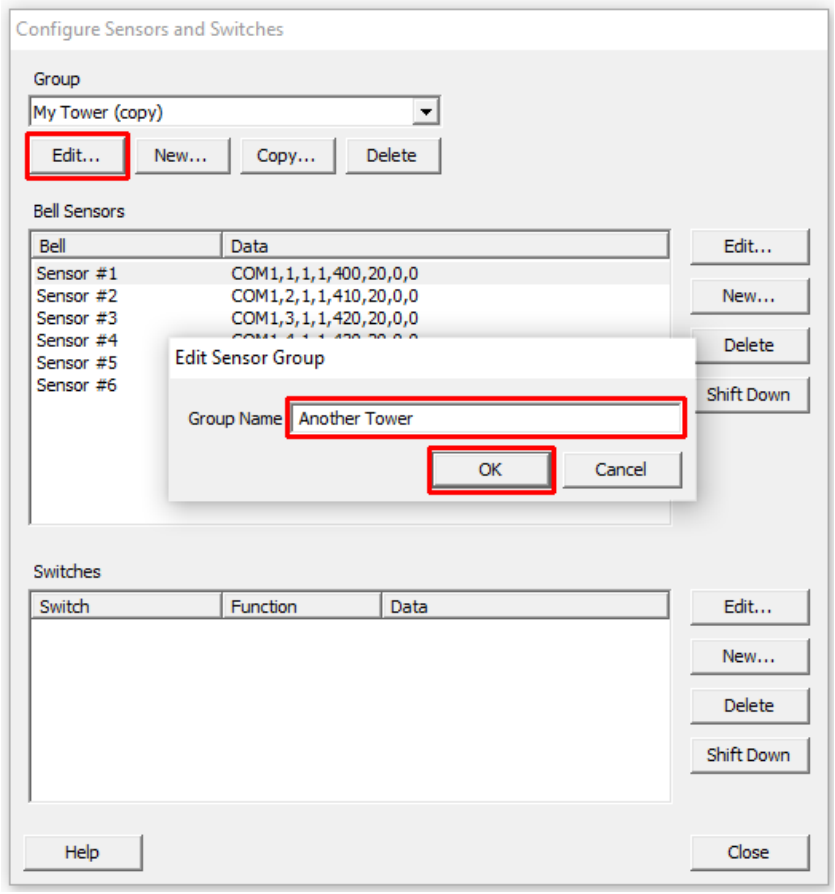

Figure 13 – Virtual Belfry – Rename Sensor Group

- Now change the configuration of the sensors in the new group as required.
- You can switch to the new sensor group by using the dropdown on the *Sensor* tab of the main window.

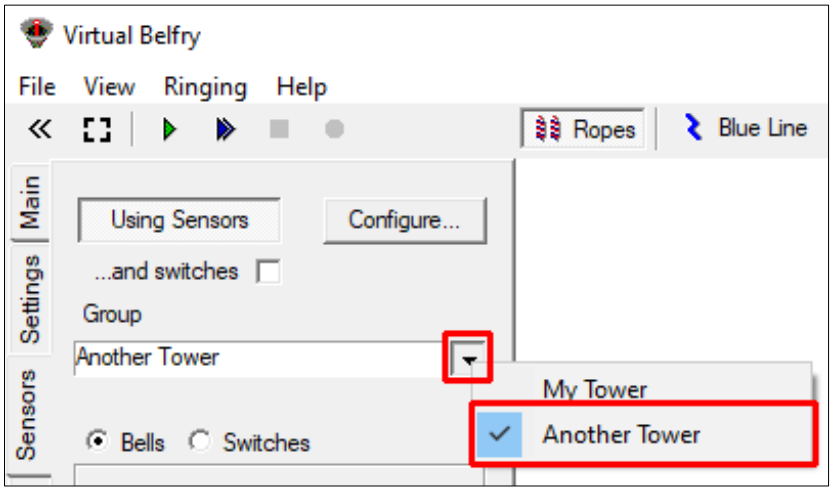

Figure 14 – Virtual Belfry – Select Sensor Group

Moving Ringers

- When using the simulator for practice with a single dumb bell and the animated ropes or ringers on screen, it can be distracting to see the image corresponding to your own rope moving on screen. You can turn off the display of your own rope by unticking the *Own rope(s) when ringing* option on the *Ropes* vertical tab.

Figure 15 – Virtual Belfry – Turning Off "Own Rope" Option

When input from the simulator sensor is detected, Virtual Belfry removes from the screen the image of the ringer or rope for the selected sensor, as shown in the following screenshot (where the dumb bell is being rung as the third).

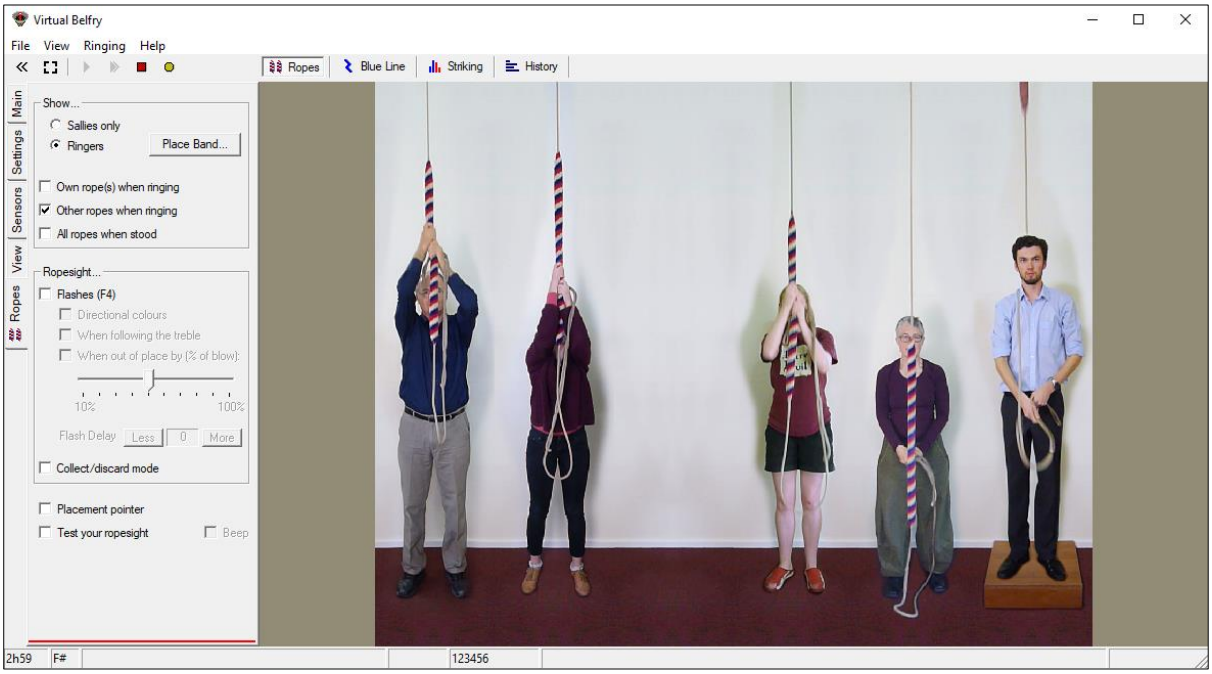

Figure 16 – Virtual Belfry – "Own Rope" Turned Off

Delay Timer Calibration

For accurate simulation of the real bells, the simulator requires that the delay timer for each bell is set so that the delay applied after Simulator Interface sends the strike signal to the Simulator (at exactly the point at which the real bell passes through bottom dead centre of its swing) results in the simulator sounding at the same time that the open bell would have struck. This delay time is specific to each bell, but for most bells is somewhere around 0.5s (or 500 milliseconds).

The simplest method of setting the timer values is to ring each bell open alongside the simulator.

- Start Virtual Belfry on the Simulator PC.
- Ring each bell in turn, open, and compare the sound of the bell and the simulated sound from the simulator.
- If the real bell sounds before the simulator, reduce that bell's delay timer value.
- If the simulator sounds before the real bell, increase that bell's delay timer value.
- Repeat this process until the sound of the real bell and the sound from the simulator are as close to coincident as possible.
- Repeat for each of the other bells in turn.

Tip: A useful starting point for delay timer values is to measure the period of oscillation of the bell for small swings and set the timer to ¼ of that value. Then fine tune the value as described above.

Using Multiple PCs

If you want to use multiple PCs concurrently, please refer the ***Multi-PC Guide*** for information on building either the Second PC module or the Basic Serial Splitter module. The Second PC module allows two PCs to be used concurrently, the Basic Serial Splitter up to a maximum of 16.

A Multi-PC configuration typically allows more than one ringer (with headphones) to use the simulator with a simulated band at the same time, each ringing a different physical bell.

Second PC Module & Basic Serial Splitter Module

From the point of view of Virtual Belfry, all PCs connected using either the Second PC module or the Basic Serial Splitter module behave in a similar manner. All PCs receive all the sensor signals from the Simulator Interface module, all the time.

Each copy of Virtual Belfry must be configured to respond to the desired bell or bells and filter out the unwanted signals. This can be done either by using a different *Sensor Group* configuration on each PC, or "on the fly" by un-checking the unwanted *Sensor #...* check boxes on the *Main* tab.

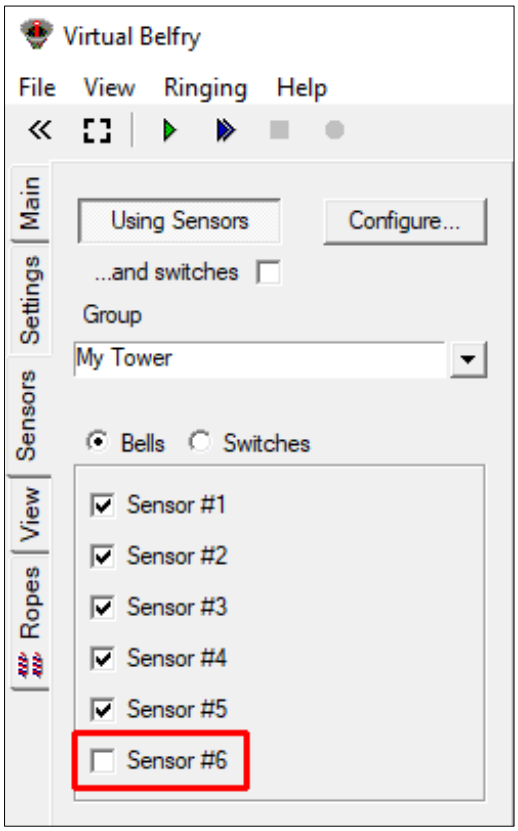

Figure 17 – Virtual Belfry – Disable Sensors

Configuring the Interface

When multiple PCs are connected, only one PC can be used to configure the Simulator Interface using a terminal emulator (as described in the ***Build & Installation Guide*** and the ***Multi-PC Guide***).

The PC used for Interface configuration depends on the hardware in use. This is covered in the ***Multi-PC Guide***.