Type 2 Liverpool Ringing Simulator

05 – Configuring Virtual Belfry Guide



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Contents

Index of Figures	2
Document History	4
Licence	4
Documentation Map	5
About This Guide	6
First Steps	6
Next Steps	6
Virtual Belfry	7
Copyrights & Licensing	7
Sensors Configuration	7
Copying Sensor Groups	15
Moving Ringers	18
Delay Timer Calibration	19
Using Multiple PCs	20
Second PC Module & Basic Serial Splitter Module	20
Configuring the Interface	20

Index of Figures

Figure 1 – Documentation Map	5
Figure 2 – Virtual Belfry – Main Window	7
Figure 3 – Virtual Belfry – Add New Sensor Group	8
Figure 4 – Virtual Belfry – New Sensor Group	8
Figure 5 – Virtual Belfry – Add New Sensor	9
Figure 6 – Virtual Belfry – First New Sensor	10
Figure 7 – Virtual Belfry – Subsequent Sensors	11
Figure 8 – Virtual Belfry – Completed Sensor Configuration Example	12
Figure 9 – Virtual Belfry – Using Sensors	13
Figure 10 – Virtual Belfry – Monitor Function	14
Figure 11 – Virtual Belfry – Copy Sensor Group	15
Figure 12 – Virtual Belfry – Confirm Copy	16
Figure 13 – Virtual Belfry – Rename Sensor Group	17

Figure 14 – Virtual Belfry – Select Sensor Group	17
Figure 11 – Virtual Belfry – Turning Off "Own Rope" Option	18
Figure 11 – Virtual Belfry – "Own Rope" Turned Off	19
Figure 15 – Virtual Belfry – Disable Sensors	20

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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 Abel², Beltower³ or Virtual Belfry⁴. 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 ART⁵ publication *Teaching with Simulators* is recommended, available from the ART shop⁶.

² <u>https://www.abelsim.co.uk/</u>

³ <u>https://www.beltower.co.uk/</u>

⁴ <u>https://www.belfryware.com/</u>

⁵ Association of Ringing Teachers

⁶ <u>https://shop.bellringing.org</u>

Virtual Belfry

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Virtual Belfry can be ordered and downloaded from <u>https://www.belfryware.com/</u>, 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.

Configure Sensors and S	witches		
configure sensors and s	witches		
Group		•	
Edit New	Copy, D	elete	
Bell Sensors			
Bell	Data		Edit
			New
			Delete
			Shift Down
]			
Switches			
Switch	Function	Data	Edit
			New
			Delete
			Shift Down
1			
Help			Close

Figure 3 – Virtual Belfry – Add New Sensor Group

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

New Sensor Group			
Group Name My Tower			
	ОК	Cancel	

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.

Configure Sensors and Switches	
Group My Tower Edit New Copy Delete	
Bell Data	Edit
	New
	Delete
	Shift Down
Switches	
Switch Function Data	Edit
	New
	Delete
	Shift Down
Help	Close

Figure 5 – Virtual Belfry – Add New Sensor

Type 2 Simulator – Configuring Virtual Belfry Guide 1.3

- 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.

New Bell Sensor
Bell Sensor #1 COM1
Type Generic data interface COM3 COM4
Port COM1 Signal 1
Sound the bell on signal no. 1 of 1 signals per stroke
Wait for 400 milliseconds before sounding the bell
After a signal, ignore other signals for 20 milliseconds
Correction to signal time when analysing real ringing
Handstroke Backstroke
OK Cancel

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.

New Bell Sensor
Bell Sensor #2 COM1 COM2
Type Generic data interface COM3 COM4
Port COM1 Signal 2 (e.g. "COM5")
Sound the bell on signal no. 1 of 1 signals per stroke
Wait for 410 milliseconds before sounding the bell
After a signal, ignore other signals for 20 milliseconds
Correction to signal time when analysing real ringing
Handstroke Backstroke
OK Cancel

Figure 7 – Virtual Belfry – Subsequent Sensors

Type 2 Simulator – Configuring Virtual Belfry Guide 1.3

• 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.

My Tower	-	
Edit Ne	ew Copy Delete	
Bell Sensors		
Bell	Data	Edit
Sensor #1 Sensor #2 Sensor #3	COM1,1,1,1,400,20,0,0 COM1,2,1,1,410,20,0,0 COM1,3,1,1,420,20,0,0	New
Sensor #4	COM1,4,1,1,430,20,0,0	Delete
Sensor #5	COM1,5,1,1,440,20,0,0	
Sensor #6	COM1,6,1,1,450,20,0,0	chift Dame
		Shift Down
Switches		Shift Down
Switches Switch	Function Data	Edit
Switches Switch	Function Data	Edit
Switches Switch	Function Data	Edit New Delete

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.

•	/irtual Belfry
File	View Ringing Help
~	[] • • • = •
W Ropes View Sensors Settings Main	Using Sensors Configure and switches Group My Tower Bells O Switches Sensor #1 Sensor #2 Sensor #2 Sensor #3 Sensor #4 Sensor #5 Sensor #6

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.

\$\$	Sensor #5	5
	00975 Sensor #4 OK 02430 Sensor #3 OK 03050 Sensor #2 OK 06697 Sensor #1 OK	^
	<	>
	Monitor	Help
	F#	

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.

Group		
My Tower	•	
Edit Nev	v Copy Delete	
Bell Sensors		
Bell	Data	Edit
Sensor #1	COM1,1,1,1,400,20,0,0	
Sensor #2	COM1,2,1,1,410,20,0,0	New
Sensor #3	COM1,3,1,1,420,20,0,0	
Sensor #5	COM1,5,1,1,440,20,0,0	Delete
Sensor #6	COM1,6,1,1,450,20,0,0	Shift Down
Switcher		
Switches Switch	Function Data	Edit
Switches Switch	Function Data	Edit New
Switches Switch	Function Data	Edit New Delete
Switches Switch	Function Data	Edit New Delete Shift Down
Switches Switch	Function Data	Edit New Delete Shift Down

Figure 11 – Virtual Belfry – Copy Sensor Group

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

My Tower	•	
Edit Ne	w Copy Delete	
3ell Sensors Bell	Data	Edit
Sensor #1	COM1.1.1.1.400.20.0.0	
Sensor #2	COM1,2,1,1,410,20,0,0	New
Sensor #3	COM1.3.1.1.420.20.0.0	
-	m to proceed	V
Sensor # Confin	n to proceed	× lete
Sensor #• Confin Sensor #! Sensor #! This o switc	pperation will create a copy of the group and all i hes	its sensors and
Sensor # Confin Sensor # Sensor # This c switc	operation will create a copy of the group and all i	its sensors and Cancel
Sensor #• Confin Sensor #! Sensor #t This o switches	operation will create a copy of the group and all i hes	Cancel
Sensor # Confin Sensor # Sensor # This of switch	operation will create a copy of the group and all i hes OK Function Data	Cancel
Sensor # Confin Sensor # Sensor # This of switch	operation will create a copy of the group and all i hes OK Function Data	Cancel
Sensor # Confin Sensor # Sensor # Switches	operation will create a copy of the group and all i hes OK Function Data	Cancel

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*.

Configure Sensor	s and Switches	
Group My Tower (copy) Edit	Vew Copy Delete	
Bell	Data	Edit
Sensor #1	COM1,1,1,1,400,20,0,0	
Sensor #2	COM1,2,1,1,410,20,0,0	New
Sensor #3 Sensor #4 Sensor #5	Edit Sensor Group	Delete
Switches	Group Name Another Tower	Shift Down
Switch	Function Data	Edit
		New
		Delete
		Shift Down
Help		Close

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.

File View Ringing Help	elfry
≪ [] ▶ ● \$\$ Ropes \$ Blue Lin Using Sensors Configure	Ringing Help
Using Sensors Configure	▶ ▶ ■ ● 🗎 💱 Ropes 👌 Blue Line
10	g Sensors Configure
ច្ច័and switches	switches
Group	
another Tower	Tower My Tower
Bells C Switches	s C Switches Another Tower

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.

😻 Virtual Belfry		
File	View Ringing Help	
«	[] • • • •	
ettings Main	Show C Sallies only Ringers Place Band	
ors S	Own rope(s) when ringing	
ens	Other ropes when ringing	
<u>~</u>	All ropes when stood	
View	Ropesight	
es	Flashes (F4)	
Rog	Directional colours	
\$\$	When following the treble	
	☐ When out of place by (% of blow):	

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*.