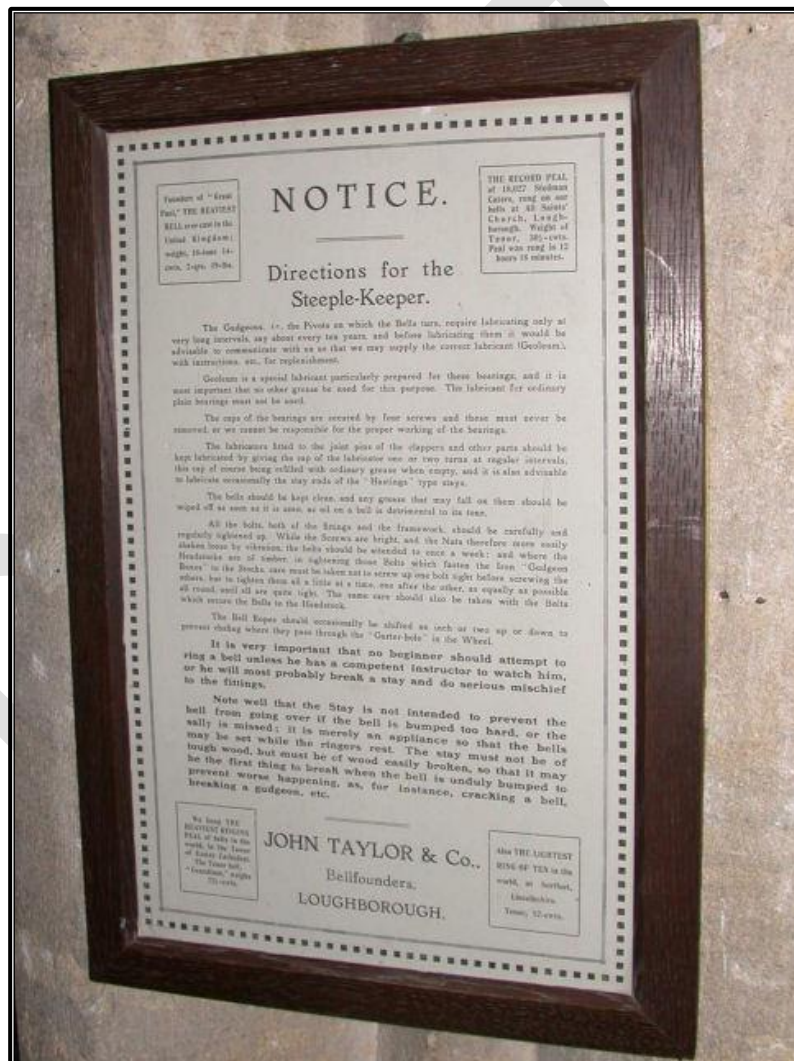


# Type 2 Liverpool Ringing Simulator

## 03 – Configuring Abel Guide



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## Document History

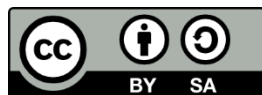
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## Documentation Map

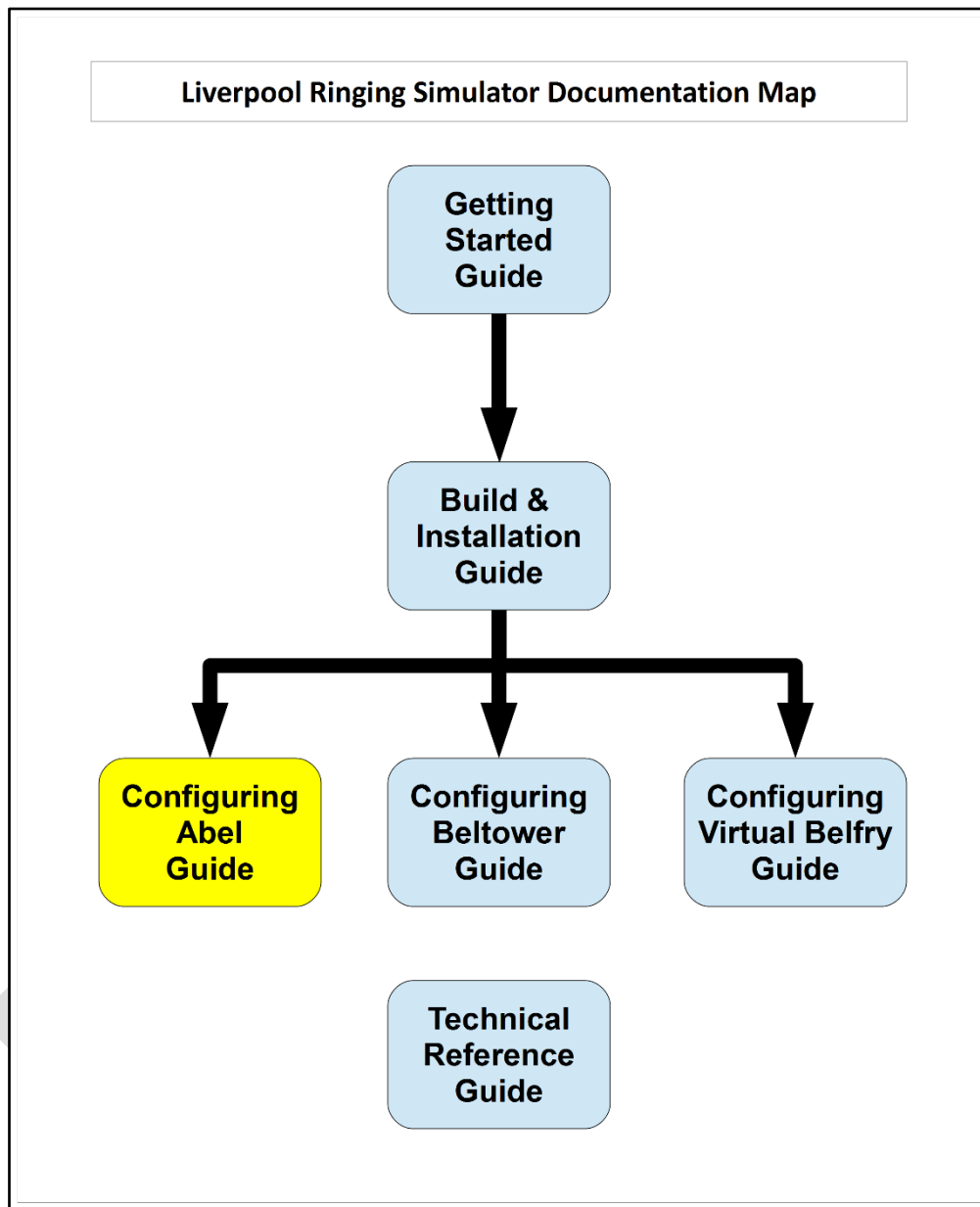


Figure 1 – Documentation Map

## 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<sup>2</sup>, Beltower<sup>3</sup> or Virtual Belfry<sup>4</sup>. This allows you to extend and augment the teaching and practice opportunities in your tower.

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

Other project guides are available for the Beltower and Virtual Belfry 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 Abel 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**.

## Next Steps

This is not a detailed guide to using Abel. Please refer to the Abel 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<sup>5</sup> publication **Teaching with Simulators** is recommended, available from the ART shop<sup>6</sup>.

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<sup>2</sup> <http://www.abelsim.co.uk/>

<sup>3</sup> <http://www.beltower.co.uk/>

<sup>4</sup> <http://www.belfryware.com/>

<sup>5</sup> Association of Ringing Teachers

<sup>6</sup> <http://ringingteachers.org/resource-centre/shop>

## Abel Copyright & Licensing

Abel is a copyright software product ©AbelSim Ltd, made available under the Abel End User Licence<sup>7</sup>.

All AbelSim profits go to charities, including ringing-related charities. Please ensure your copy of Abel is properly licensed.

Abel can be ordered and downloaded from <http://www.abelsim.co.uk/>.

## External Bells Configuration

Configuration of the Abel Simulator Software Package to use the Simulator Interface should only need to be done once. All settings are saved in the Abel options file. This example is based on Abel 3.10.0.

To configure Abel to use the simulator hardware, carry out the following steps. This guide described the minimum necessary to configure Abel to use the simulator hardware, for full details on the overall configuration and features of Abel please refer to the product documentation.

- Start Abel on the Simulator PC, and from the *Options* menu select *External Bells...*
- In the *External Bells* configuration window, click the *Discover Ports* button.

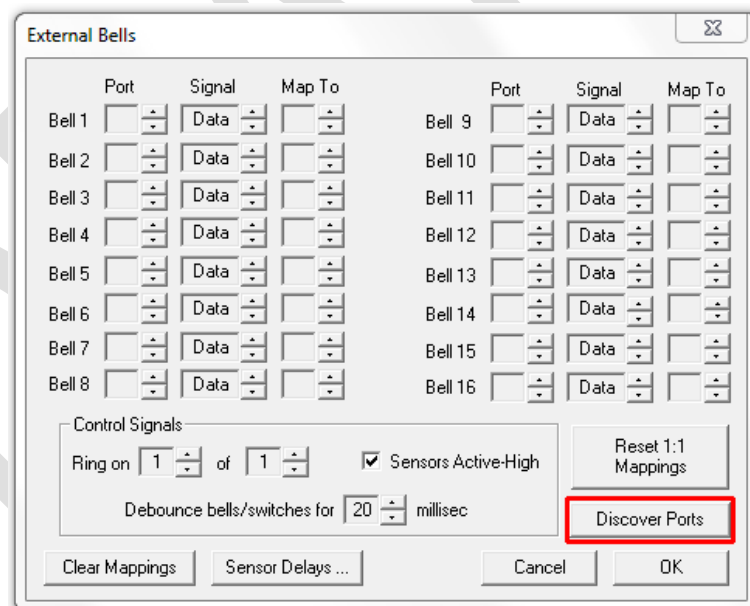


Figure 2 – Abel – Discover Ports

<sup>7</sup> <http://www.abelsim.co.uk/doc/welcome1.htm>

- Verify that the serial port used by the Simulator Interface is recognised by Abel, and then click **OK**. Note that Abel requires the serial COM port number to be between 1 and 8. Refer to the **Technical Reference Guide** for instructions on reconfiguring port numbers.

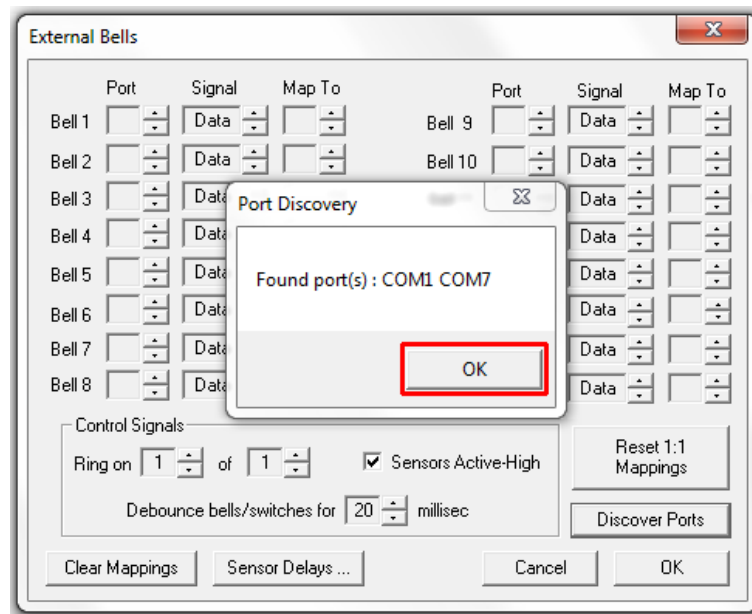


Figure 3 – Abel – Port Discovery

- Set the *Port* field to the COM port number of the serial interface to be used. In this example the port *COM1* is used. This field should be set to the same value for all sensors connected to the same Simulator Interface.

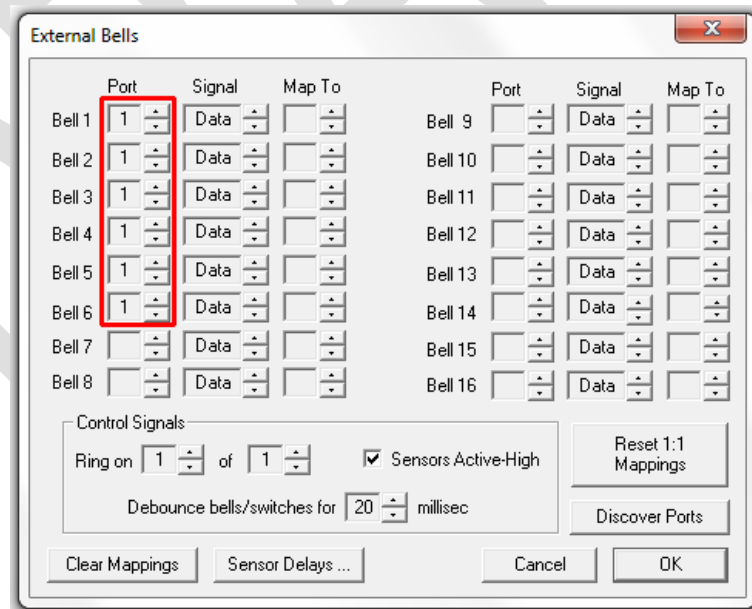


Figure 4 – Abel – Port Setting

- Set the *Signal* field to *Data*, indicating that this external bell is connected via a Simulator Interface using the MBI data protocol. Do this for all Simulator Sensors connected to a Simulator Interface<sup>8</sup>.

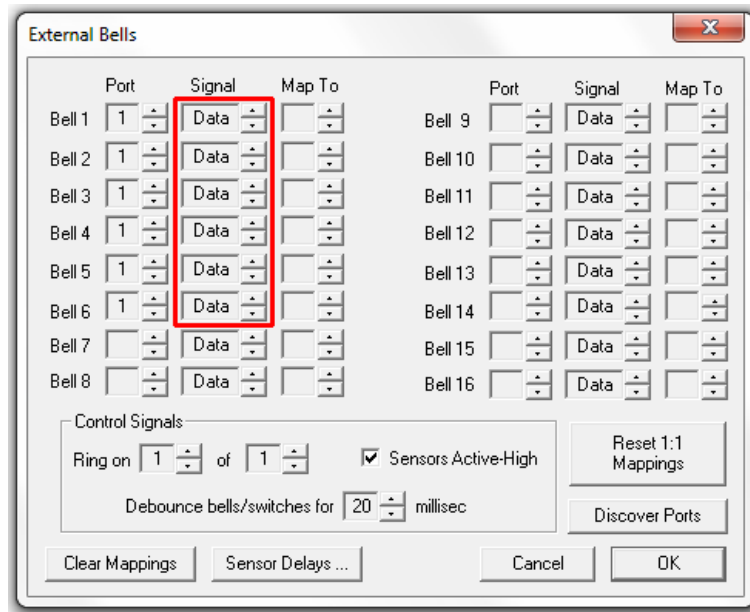


Figure 5 – Abel – Signal Setting

- Set the *Map To* fields to map Bell 1 to 1, 2 to 2 and so on, for as many Sensor Heads are connected to the Simulator Interface. This does not mean that Sensor Head number 1 will always the simulated Treble (and so on); the use of the simulated bells can be changed in the main Abel screen – refer to the Abel documentation.

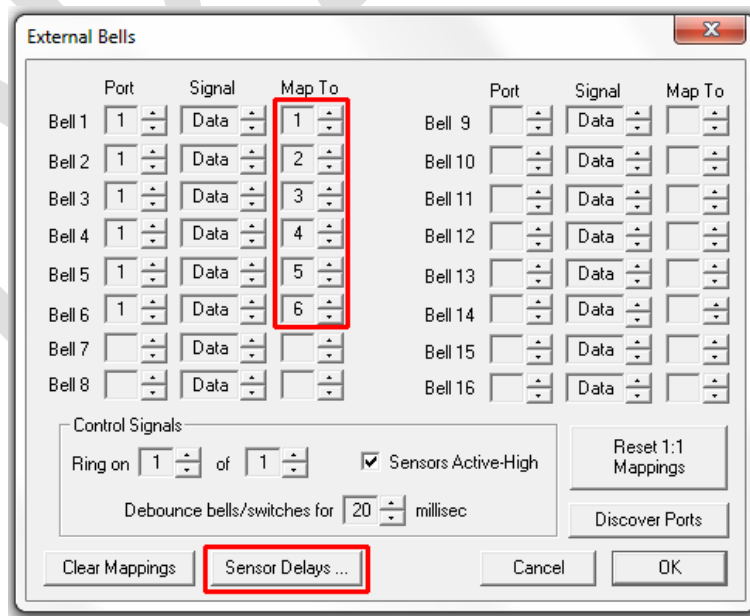


Figure 6 – Abel – Mappings

- Leave the *Control* set to *Ring on 1 of 1*, the de-bounce value at 20ms, and the *Sensors Active-High* box ticked.

<sup>8</sup> It is possible to use more than one Simulator Interface, on different COM ports, on the same Simulator PC.



- Click on the *Sensor Delays...* button to configure the delay timers.

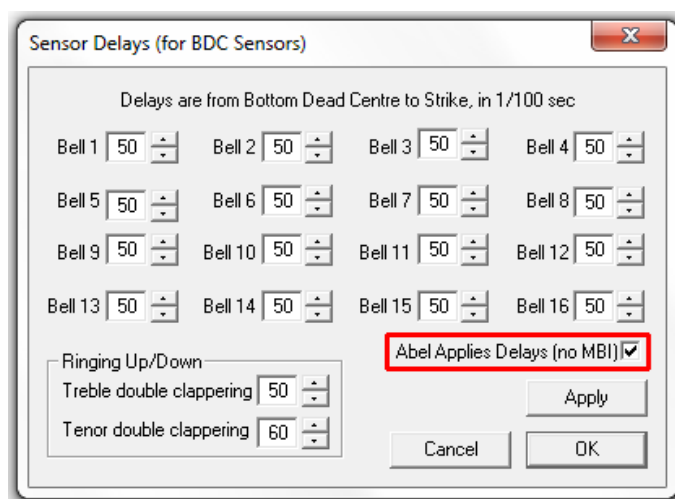


Figure 7 – Abel – Sensor Delays

- In the *Sensor Delays* window, set the delay for each 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). Refer to the notes on Delay Time Calibration later in this guide.
- Make sure the *Abel Applies Delays (no MBI)* box is ticked<sup>9</sup>. Note that in Abel the delay values are specified in 1/100ths of a second (centiseconds), not milliseconds. Click *Apply* to save the values, and then click *OK*.
- Click *OK* in the *External Bells* window to close it.
- Save the new options by selecting *Save Options* from the *Options* menu. If the options have changed, Abel will prompt for this when the program is closed.
- Abel 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.

<sup>9</sup> This is the opposite of the setting for the original Type 1 Liverpool Simulator.

## Ringling Subsets of Bells

Where simulator sensors are installed on a complete ring of bells, it may be desired to ring a subset of bells, for example the front 6 of a heavy 8, the front 8 of a ring of 12, or the back 8 or 10 of a ring of 12. The following examples show how this may be done using Abel.

### Ringling the Light Bells

Sensors Heads should be connected with the treble mapped as Bell 1 in the Simulator Interface settings, and then the other bells sequentially down to the tenor, as described in the **Build & Installation Guide**.

Abel does not require sensors installed on additional accidentals such as Sharp 2<sup>nd</sup> or Flat 6<sup>th</sup> bells. However, when Abel is configured as above to simulate, say, 12 bells, simply ringling the front 8 bells will sound out of key.

- To ring, for example, the front 8 of a 12 (with 2<sup>nd</sup> bell) and have them sound in key, it is necessary to change the configuration of Abel. Loading one of the 8-bell or 7-bell method files (*8bell.mcf/7bell.mcf*) from the *File | Open...* menu will cause Abel automatically to shift the sound options to a ring of 8 in the correct key, starting from the treble, and automatically adjusting the 2<sup>nd</sup> up a semitone<sup>10</sup>.
- Likewise, loading a 6-bell or 5-bell method file (*6bell.mcf/5bell.mcf*) from the *File | Open...* menu will cause Abel to shift the tuning to a true light 6, starting from the treble.
- Reloading one of the 12-bell or 11-bell method files (*12bell.mcf/11bell.mcf*) restores the tuning to a ring of 12 in the correct key.

### Ringling the Back Bells

To ring, for example, the back 8 or back 10 of a ring of 12 for silent practice (where all bells are being rung by ringers and not simulated by the Simulator), is straightforward, and requires only that the simulator is set up as above for 12-bell ringling. No special Abel setup is required.

Ringling the back 8 or back 10 with a mix of real and simulated ringers is more complicated, because Abel will always try to assign bell sensors from Bell 1 upwards. Hence loading the 7- or 8-bell method files causes Abel to switch to the front 8 bells, as noted above, not the back 8, and loading the a 9- or 10-bell method files causes it to attempt to switch to the front 10.

To work around this problem, set Abel up as a ring of 8 or 10, and save the configuration in a new options file by selecting *Save Options As...* from the *Options* menu. It will be necessary to change the mappings in the *External Bells* window to map the Sensor Heads for the real back bells to simulated bells 1 to 8 or 1 to 10.

A similar approach may be used to create configuration options files for the back 10 of a ring of 12, or the back 6 of a ring of 8, and so on, where a mix of real and simulated ringers is required.

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<sup>10</sup> One consequence of this behaviour is that it is quite possible to ring subsets of bells correctly in key on the simulator, which would not be possible on the real bells; for example the front 10 of a ring of 12, or the front 6 of a ring of 8.

The following screenshot illustrates an *External Bells* mapping for the back 8 of a ring of 12. These settings can be saved in a custom Abel Options file.

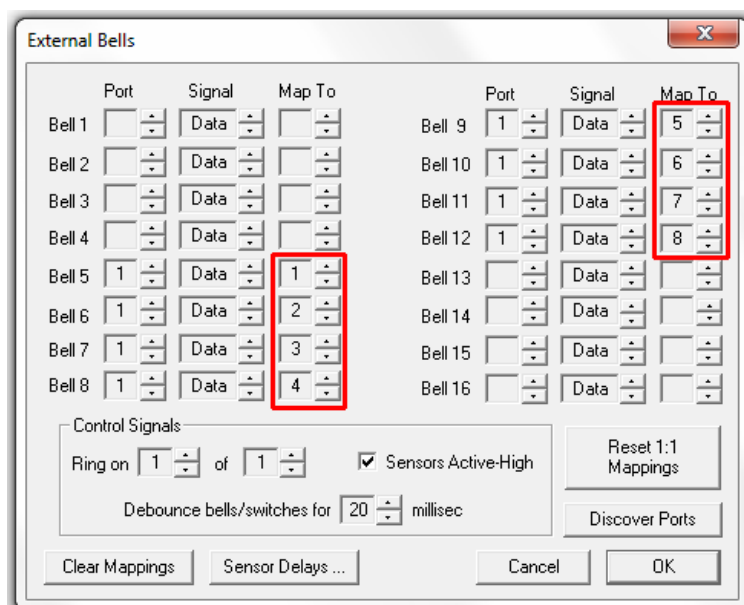


Figure 8 – Abel External Bells Dialogue (Back 8)

The custom configuration can then be loaded by selecting *Open Options File...* from the *Options* menu, or by specifying it as a command line option to a desktop shortcut.

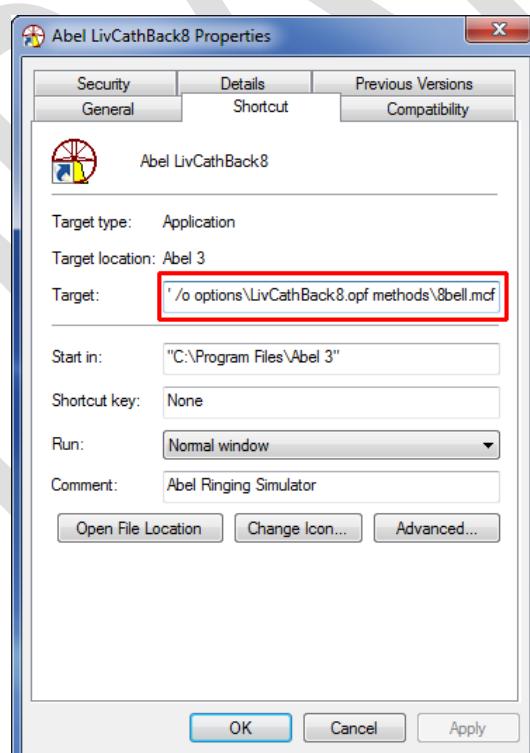


Figure 9 – Windows Shortcut Creation Dialogue

(The *Target* field in this example reads in full, `C:\Program Files\Abel 3\Abel3.exe" /o options\LivCathBack8.opf methods\8bell.mcf`)

## Moving Ringers

If you use the “moving ringers” feature of Abel with the simulator, there are two Abel settings which should be turned off.

- Select moving ringers in the *Options* menu, then in the *Ringling* menu make sure that *User Starts Bell Movement* is not ticked. Ticking this option will cause the animation and striking of bells rung by real ringers to be out of sync with the simulated moving ringers.

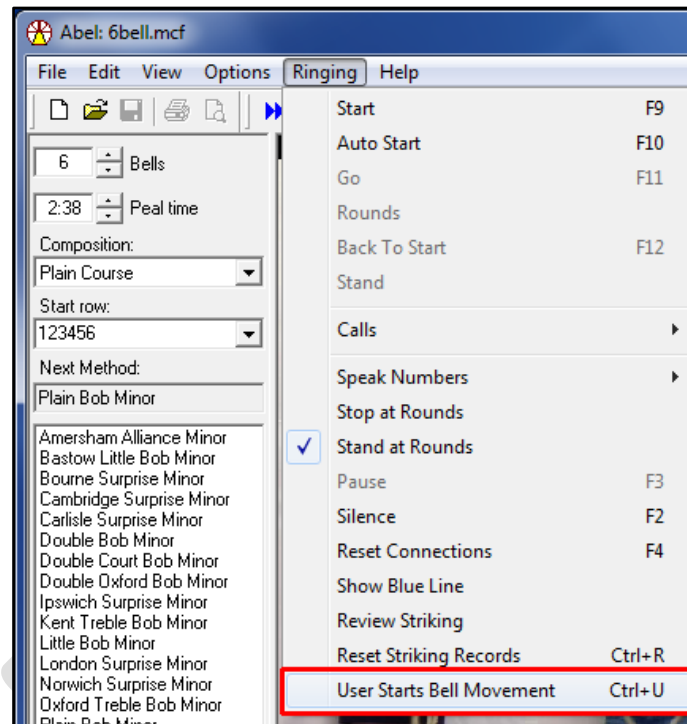


Figure 10 – User Starts Bell Movement

- The animation of moving ringer images for bells rung by real ringers can be distracting, particularly as the animation does not move smoothly for these bells. In the *View* menu make sure that *User Bell Movement* is not ticked. This stops the animation for these bells and fades the image of the ringer on the screen.

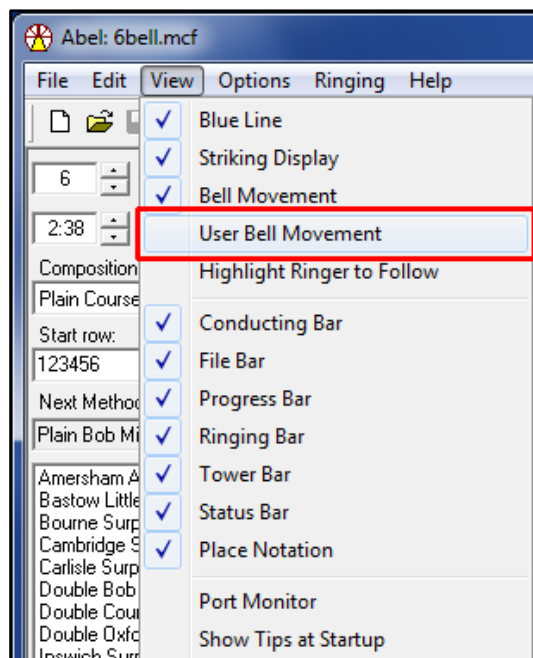


Figure 11 – User Bell Movement

## 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 50 centiseconds).

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

- Start Abel 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  $\frac{1}{4}$  of that value. Then fine tune the value as described above.