Application Note

How to use the TOMBAK as a frequency divider

Multiboard Series

TOMBAK : Synchronization electronic board

How to use the TOMBAK as a frequency divider

> *Pre-requirement:* Before using the TOMBAK board, make sure you followed all the instructions mentioned in the Operating Manual

1. Presentation

The board provides a software configurable frequency divider with specific delay and pulse width signal from a reference pulse signal.
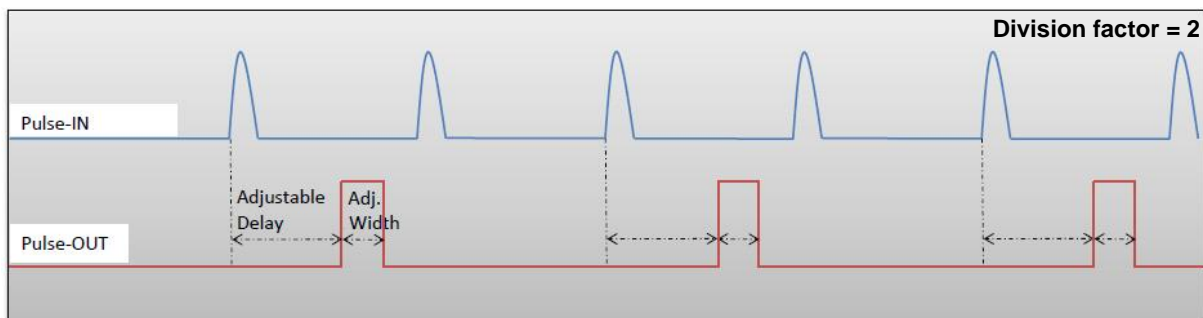
2. Timing Diagram

Figure 1 : Frequency divided, delayed and pulse width adjusted signal from input to output
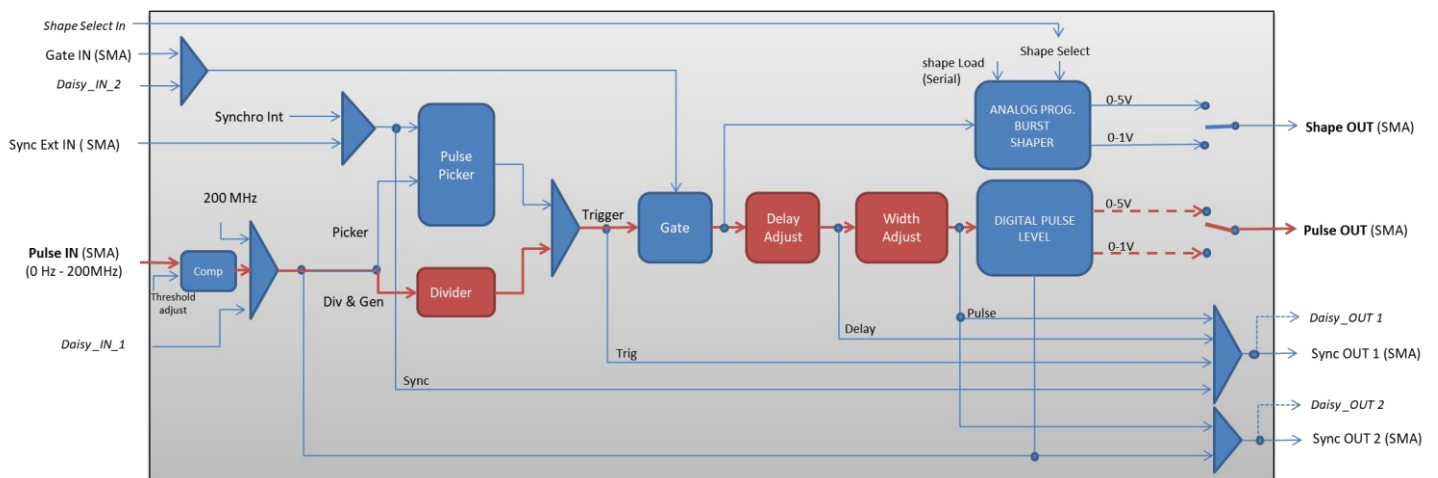
3. Synoptic

**Figure 2 : Main firmware features used in frequency divider mode**

4. Cabling

1. Plug the USB-Jack cable in the "*USB In"* connector
2. Plug the signal generator (i.e. the signal you want to delay) in the "*Pulse In"* SMA connector
3. The software adjustable delay and pulse width signal will output on the "*Pulse Out*" SMA connector
4. Finally, plug the power supply to the "*Power In*" connector to power on the board
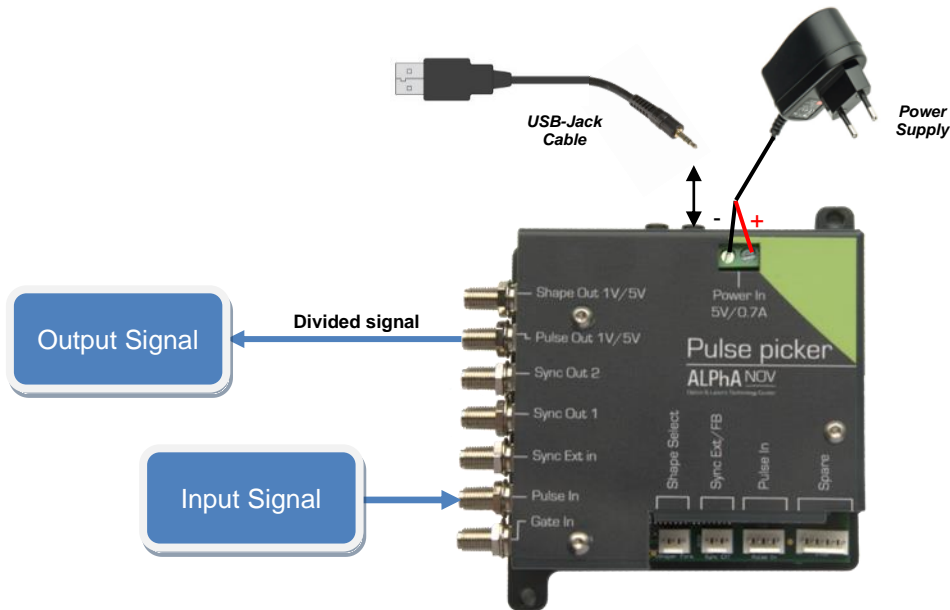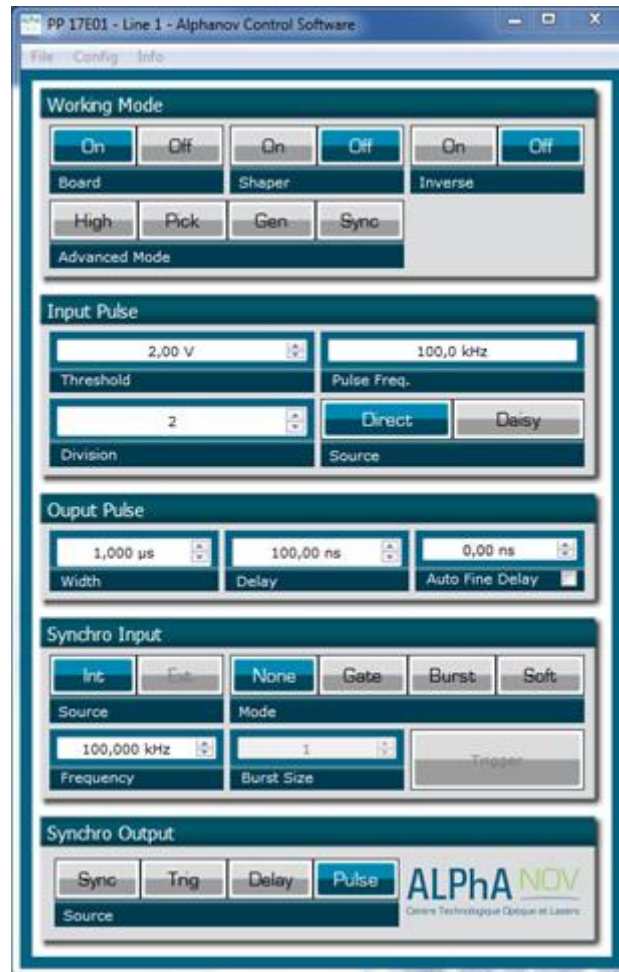

5. Software configuration

Launch the ALPhANOV Control Software and click on *Connect* to start the TOMBAK hardware detection. The software automatically detects the TOMBAK board.
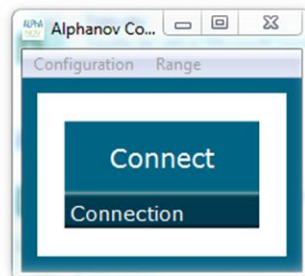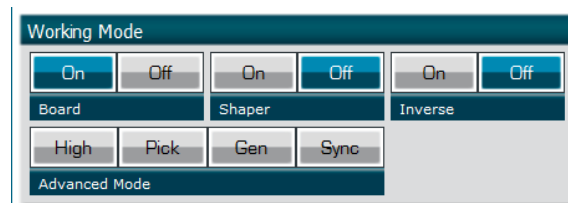

A window will appear for each TOMBAK connected to the computer.

The main configuration windows must be configured as follow :


- Working Mode window :
    - Set the **Board On**
    - Set the **Shaper** button to **Off**
    - Set the **Inverse** button to **Off** unless you need to invert the output signal
   - Unset all **Advanced Mode**

- Input pulse window :
  - Configure the **Threshold** voltage so that the input **pulse frequency** is detected and equal to your pulse generator system
  - Set the **Division** factor **according to your application**
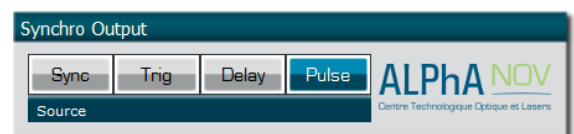 - Set the input pulse **Source** to **Direct**

- Output Pulse window :
  - Choose the output **delay** value
  - Choose the output **pulse width**
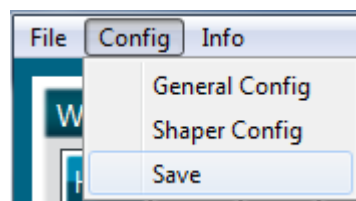 - **Auto Fine Delay** may be let in auto mode
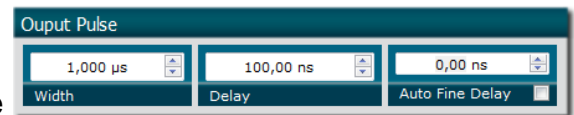
- Synchro input windows :
  - Source : not used in this mode
  - Mode : None
  - Frequency : not used in this mode
  - Burst size : not used in this mode
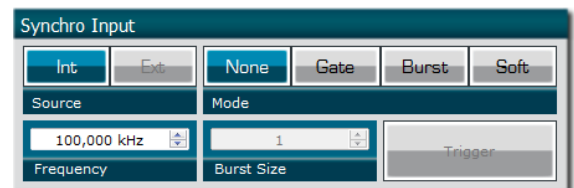
- Synchro ouput window (default settings) :
  - Source : Pulse

Don't forget to save the settings by clicking on the "Save" button in the bar menu.

6. Main features

Frequency divider factor	[1 – $10^{\wedge 9}$]
Adjustable pulse width ⇨ resolution (for pulse width [5ns – 510ns]) ⇨ resolution (for pulse width [511ns – $2^{\wedge 62}$ns])	[5ns – >>1000s] 2ns 5ns
Adjustable pulse delay ⇨ resolution	[70ns – >>1000s] 10ps
Jitter ⇨ for delay < 570ns & pulse width < 510ns ⇨ for any other delay & pulse width	 <200 ps RMS 1.5 ns RMS
Input PulseIn voltage	30 mV – 3,3V
Input maximum frequency	200 MHz
Output Voltage	1 / 3,3 / 5 Volts (hardware setup)
Output maximum frequency	20 MHz

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