Application Note

How to use the TOMBAK as a standalone 20MHz generator

Multiboard Series

TOMBAK : Synchronization electronic board

How to use the TOMBAK as a standalone 20MHz generator

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

1. Presentation

An internal 200MHz generator is available and does not need any external signal. The board can output an external signal up to 20Mhz with adjustable pulse width.

2. Timing Diagram

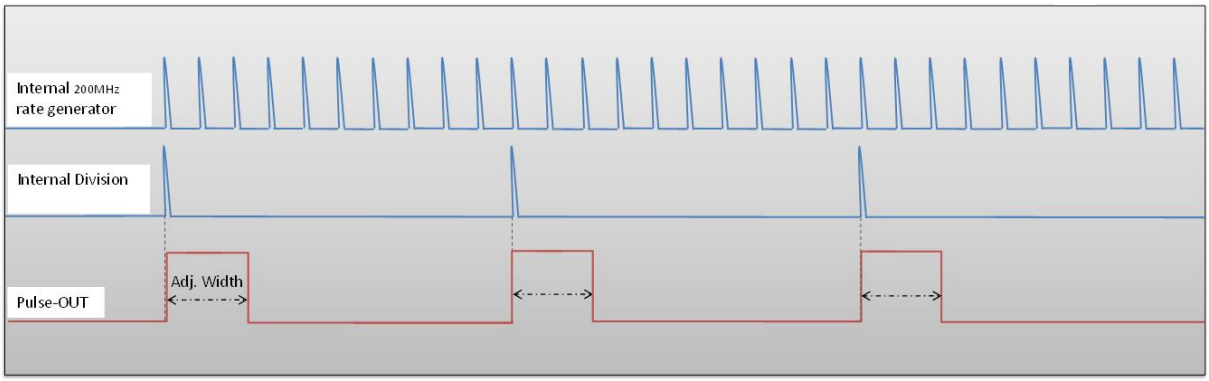


Figure 1 : internal 200MHz clock divided by 10 to get a duty cycle software adjustable 20MHz output signal

3. Synoptic

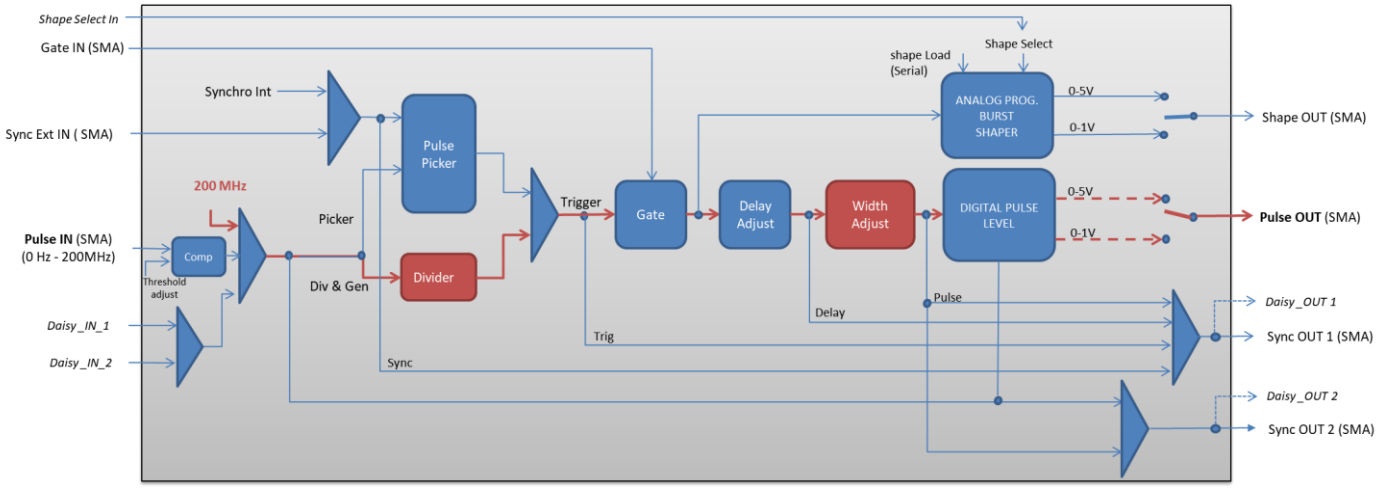
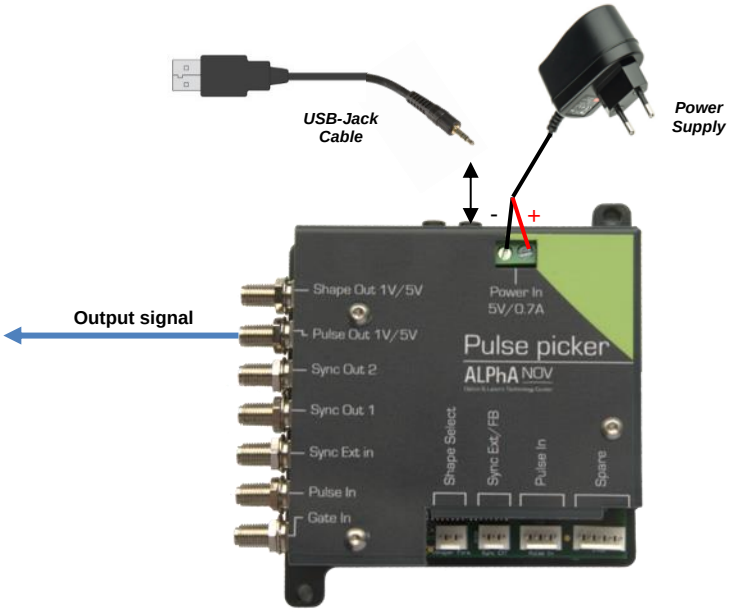


Figure 2 : Main firmware features used in Standalone Generator

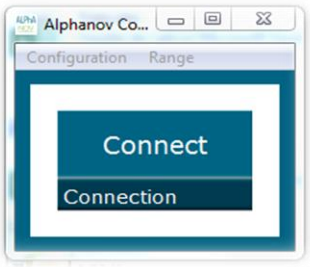
4. Cabling

1. Plug the USB-Jack cable in the "*USB In"* connector
2. The software adjustable signal will output on the "*Pulse Out*" SMA connector
3. Finally, plug the power supply to the "*Power In*" connector to power on the board



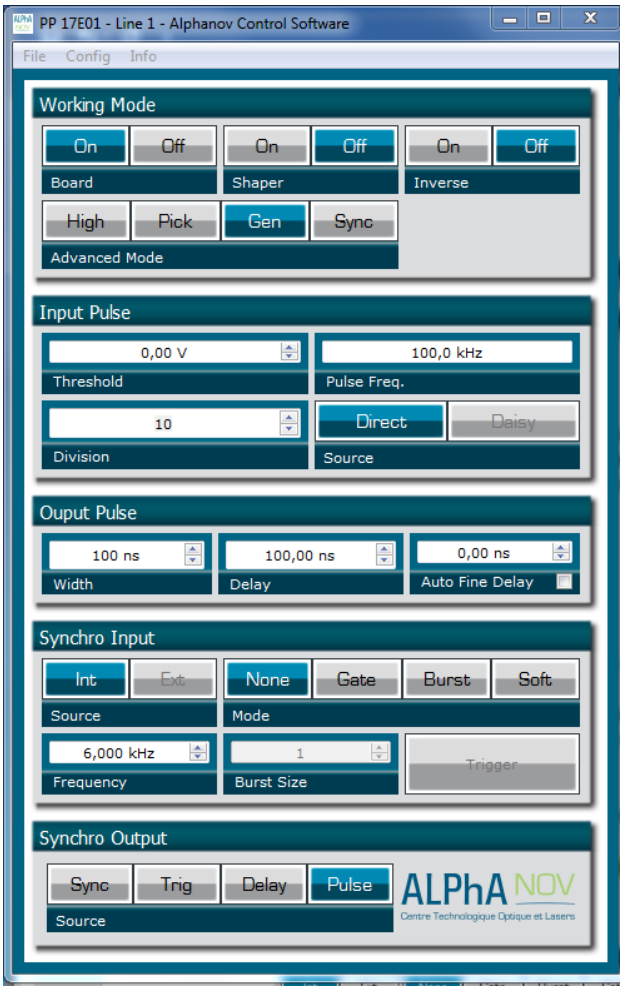
5. Software configuration

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

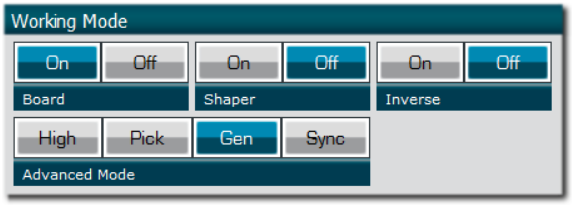


A window will appear for each TOMBAK connected to the computer.

The main configuration windows must be configured as follow :



- Working Mode window :
  - Set the B**oard On**
  - Set the **Shaper** button to **Off**
  - Set the **Inverse** button to **Off** unless you need to invert the output signal
  - Select **Gen** mode in **Advanced Mode**

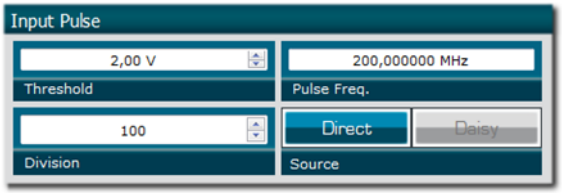


- Input pulse window :
  - **Threshold** input voltage is not used in this configuration, set value to 0V (default settings)
  - **Delay** value is not used in this configuration, set value to 0V (default settings)
  - Set **Source** to **Direct** (default settings)

- **Pulse Freq.** indicator give the internal rate generator. The output frequency is related to this primary value.
- Set the **Division** factor according to the following definition :

➢ $$\textbf{Division}\ ^{(*)} = \frac{\textbf{Pulse Freq}(\mathrm{Hz})}{\mathrm{Output\ frequency}(\mathrm{Hz})}$$

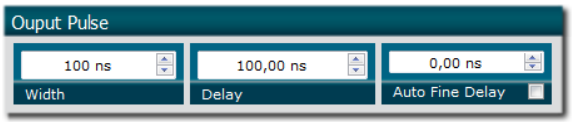
(*) Division must be at least 10 as the maximum output frequency is 20MHz.



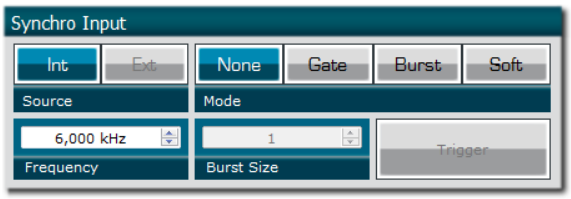
In this example, the division is set to 100 to get a 2Mhz output frequency => 200Mhz/2Mhz = 100

- Output Pulse window :
  - **Delay** value is not used in this mode
  - **Auto Fine Delay** is not used in this mode
  - Choose the output **pulse width** to get a specific duty cycle (*).

$$\textbf{pulse width}\ (\mathrm{s})\ (*) = \frac{\mathrm{DutyCycle}(\%)}{100 * OutputFrequency(Hz)}$$

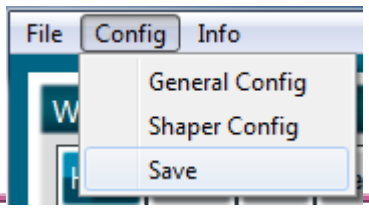


- Synchro input windows:
  - Source : Not used in this mode
  - Mode : None
  - Frequency : Not used in this mode
  - Burst size : Not used in this mode



- 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

Adjustable output frequency	[0 – 20MHz]
Frequency resolution (N is an integer in the range [10 – 10^9])	$\frac{\text{Internal 200Mhz clock}}{N}$
Adjustable pulse width ⇨ resolution (pulse width [5ns – 510ns]) ⇨ resolution (pulse width [511ns – 2^62ns])	[5ns – >>1000s] 2ns 5ns
Output Voltage	1 / 3,3 / 5 Volts (hardware setup)
Maximum output frequency	20 MHz