Application Note

How to use the TOMBAK
As a signal synchronisation module

Multiboard Series
TOMBAK : Synchronization electronic board
How to use the TOMBAK in Pick Mode

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

1. Presentation

Synchronization signals is available on this module. A signal (internally generated or external) can be synchronized with an external reference signal connected to Pulse_In connector. The output delay from input and the pulse width are software adjustable.

2. Timing Diagram

![Timing Diagram](image)

**Figure 1**: External or internal signal synchronized with Pulse-In signal.

3. Synoptic

![Synoptic Diagram](image)

**Figure 2**: Main firmware features used in synchronization mode.
4. Cabling

1. Plug the USB-Jack cable in the “USB In” connector
2. Plug the signal to synchronize in the “Sync Ext in” SMA connector. (only for external signal synchronization). If signal to synchronize is internally generated, no signal needed on “Sync Ext in”.
3. Plug the reference signal (i.e. the signal on which “Sync Ext In” signal or “internal signal” will be synchronized with) in the “Pulse In” SMA connector
4. The synchronized signal will output on the “Pulse Out” SMA connector
5. 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** to **On**
  - Set the **Shaper** button to **Off**
  - Set the **Inverse** button to **Off** unless you need to invert the output signal
  - Set **Advanced Mode** to **Pick**
• **Input pulse window:**
  - Configure the **Threshold** voltage so that the input **pulse frequency** is detected and the same as your pulse generator system
  - Set the **Division** factor to 1
  - Set the input pulse **Source** to Direct

![Input Pulse](image)

• **Output Pulse window:**
  - Choose the output **delay value**
  - Choose the output **pulse width**
  - **Auto Fine Delay** may be left in auto mode

![Output Pulse](image)

• **Synchro input windows:**
  - **Source:**
    - Set **Int** to synchronize an internal generated signal with Pulse-In signal.
    - Set **Ext** to synchronize an external signal (connected to Ext-In connector) with Pulse-In signal.
  - **Mode**: None
  - **Frequency**:
    - If internal source is selected, set the output signal **Frequency** you need to synchronize.
    - If external source is selected, **Frequency** shows the input Ext-In signal frequency
  - **Burst size**: not used in this mode

![Synchro Input](image)

• **Synchro output window (default settings):**
  - **Source**: Pulse

![Synchro Output](image)
Don’t forget to save the settings by clicking on the “Save” button in the bar menu.

6. Main features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustable pulse width</td>
<td>-resolution (for pulse width [5ns – 510ns])</td>
</tr>
<tr>
<td></td>
<td>-resolution (for pulse width [511ns – 2^62ns])</td>
</tr>
<tr>
<td></td>
<td>[5ns – &gt;&gt;1000s]</td>
</tr>
<tr>
<td></td>
<td>2ns</td>
</tr>
<tr>
<td></td>
<td>5ns</td>
</tr>
<tr>
<td>Adjustable pulse delay</td>
<td>[70ns – &gt;&gt;1000s]</td>
</tr>
<tr>
<td></td>
<td>10ps</td>
</tr>
<tr>
<td>Input Ext-In Voltage</td>
<td>Logic Low</td>
</tr>
<tr>
<td></td>
<td>Logic High</td>
</tr>
<tr>
<td></td>
<td>[0-0.8V]</td>
</tr>
<tr>
<td></td>
<td>[1.7-3.3V]</td>
</tr>
<tr>
<td>Input PulseIn voltage</td>
<td>30 mV – 3.3V</td>
</tr>
<tr>
<td>Input maximum frequency</td>
<td>200 MHz</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>1 / 3.3 / 5 Volts</td>
</tr>
<tr>
<td></td>
<td>(hardware setup)</td>
</tr>
<tr>
<td>Output maximum frequency</td>
<td>20 MHz</td>
</tr>
</tbody>
</table>