PangoBeats Documentation

PangoBeats 1.1 for BEYOND 5.8 Release

For the BEYOND 5.8 Release, PangoBeats received a large update that improved detection, UI, and integrates the tool directly into the BEYOND installer and Directly in the BEYOND System BPM Dropdown. Document written for PangoBeats 1.1 September 16 2026

Note: **Open-Source Software and Source Availability**

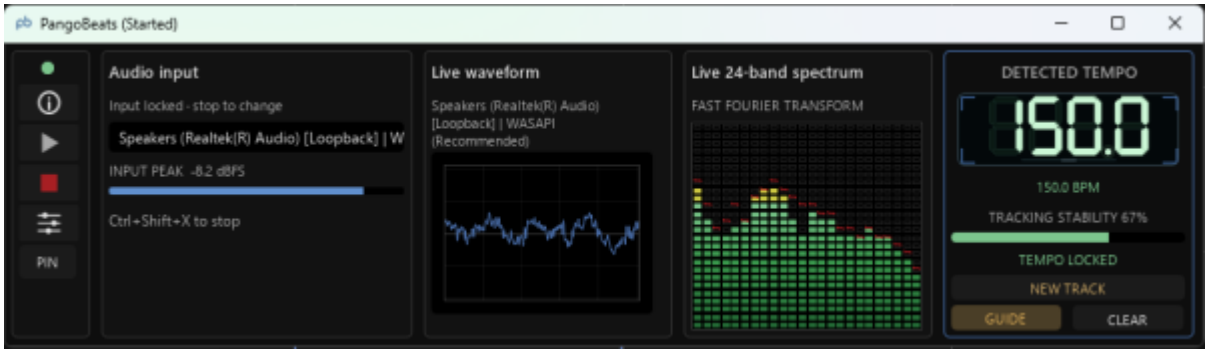
PangoBeats 1.0.0.27 includes open-source components under their respective licenses. Every recipient of PangoBeats 1.0 may obtain the applicable PangoBeats application source, third-party source materials, build information, and license notices at no charge by emailing Pangolin Support.

Upon request, Support will provide a download link to the preserved source-material archive.

See Third-Party Component Information below.

What is PangoBeats?

PangoBeats is a companion app for our BEYOND software designed to automatically detect the BPM of incoming audio and direct the system BPM of BEYOND to that bpm. It can be used as a BPM input option in BEYOND and is installed as part of the full release installer starting with the BEYOND 5.8 Release.



You can use either internal audio with a built-in loopback, external microphones, or line inputs to detect the BPM from. The cleaner the audio input the better PangoBeats will be able to detect the input.

Using many detection methods, PangoBeats will analyze the incoming audio to determine BPM. Once a BPM is confidently detected, PangoBeats will lock onto that BPM and give the user a confidence level and broadcast that tempo to BEYOND.

PangoBeats will maintain the BPM as long as confidence is high and automatically update downbeat timing to BEYOND. As confidence is lowered, PangoBeats will “Coast” along until confidence is restored. BEYOND will hold the last known value even if PangoBeats loses confidence in its detection.



Users can help PangoBeats along by letting it know if the track has changed or giving it a guiding tap to give it more confidence in its detection. It can even be minimized and then left on top, allowing the user to keep the main window visible over their BEYOND software and integrate it into their live shows.



Getting Started with PangoBeats

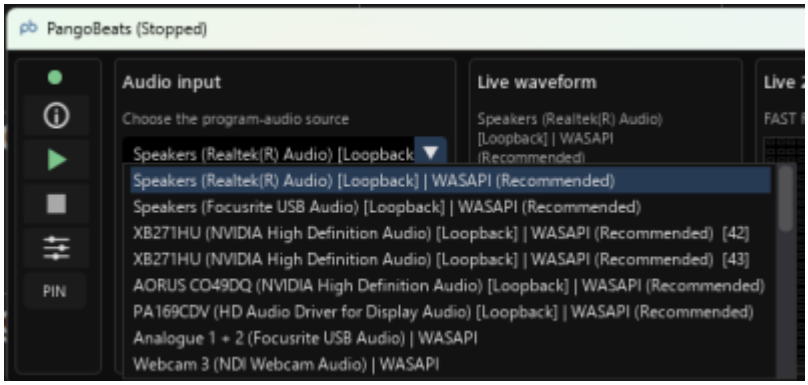


PangoBeats was first fully integrated into BEYOND during the 5.8 release. For the following guide to be accurate be sure you have downloaded the full 5.8 release or higher. As PangoBeats is now delivered inside the BEYOND installer, that will be the only thing you need to install.

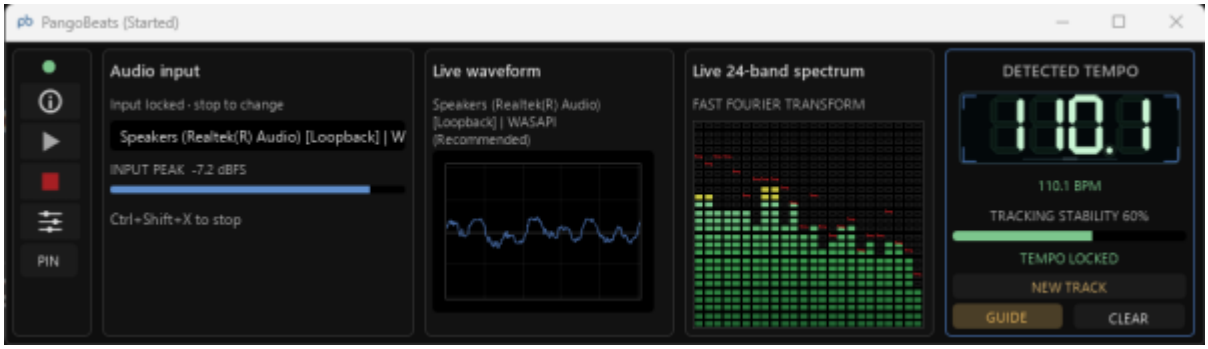
Once in BEYOND, right click on the System BPM button. There you will have all of your system BPM options. There you will be able to select which kind of BPM input you would like. By default, Manual Tempo will be selected, change this to PangoBeats.

After PangoBeats is selected in the System BPM Dropdown, it will automatically open the PangoBeats application from your installed BEYOND folder.

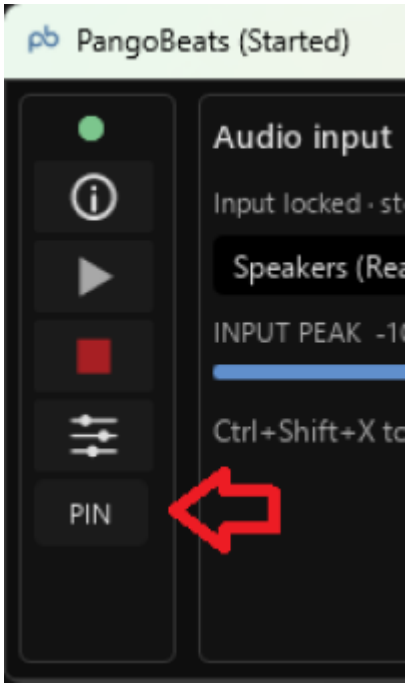
Once it has loaded, you will select your input device, if you want to detect audio from the same PC, look for one that says “Loopback” in the name. If you are trying to sense audio from the room, look for your devices microphone, and if you are using a live input from a venue mix, you can use a line input.



Once your input has been selected, press the Play button to begin detection. You will know it is sensing the right audio if the live waveform and 24 band spectrum play back accurately to what you are also hearing.



You can click the Pin button, or double click anywhere on the tool that isn't a button and it will turn the PangoBeats window into a smaller always on top preview you can leave on top of your BEYOND window to monitor its detection over time.





Understanding PangoBeats Detection Status

The main window once PangoBeats has audio you will be interested in is the BPM Detection window. This is where the status of detection is presented to the user. It also is the only window shown when you pin the app on top of other windows.

Here you will see the current status of the detected BPM, What the app is currently doing, Information about the last detected values, as well as the user input options to assist the tool.

Some of the states you might see are the following:

Status Signifier	**What PangoBeats is Doing**	**Operation Action**
Verifying Beat Level	A bpm is detected, but confidence is not high enough to trigger an Update.	Wait for more structure in the music, or use the temp guide to tap and add your own evidence to the tool.
Tempo Locked	PangoBeats has high confidence in detection and is actively locked and updating BEYOND to that BPM.	BPM updated in BEYOND, no action required. Monitor status to validate tempo is correct, guide if off.
Holding Last Tempo/ Coasting	Evidence for the locked in tempo is lowering, Last BPM no longer updating BEYOND but holding that value.	Let PangoBeats coast, BPM is likely still accurate, but a verse or bridge in the song lowers confidence. Unless a new track has started, click new track and guide.
Guided Tempo	Low confidence by the algorithm backed up by user input resulting in a Locked State.	Your tapped value was in line with the detection leading to overall high confidence. No action needed.
Input Stalled	PangoBeats is no longer detecting an audio input.	Check input device, ensure waveform and spectrum analyzer are reading input.



Three Simple User Inputs

While PangoBeats normally can run happily on its own without any user input, some tracks including acoustic, tracks over 200bpm or unusual time signatures can be harder to get a high confidence value in the algorithm.



In the case of these kinds of tracks, PangoBeats offers 3 user inputs.

- New Track: Click this to throw out previous BPM detection data and start detection from scratch. This can be useful if the music rapidly changed BPM and Style, but is unlikely to be needed when a DJ is playing similar tracks at similar BPM. Use this mainly for large differences in track style, and tempo. This button can be pressed with the hot key Ctrl + Shift + R
- Guide: This acts as a tap function like you might in BEYOND's manual mode. However, instead of setting the value, it adds evidence to the confidence level of detection. Don't expect exact tapped value to be set the moment you finish tapping. It uses your tap to build evidence and confidence in its detected BPM. This button must be clicked 5 times to close standard 4 beat bar of music. This can also be tapped with F9 on your keyboard.
- Clear: This clears your tapped value in case you tapped incorrectly, this does not clear all evidence gathered just your user inputted evidence. Use New Track if you want the detection to begin from scratch.



In most cases, PangoBeats won't need user input, especially if most of what you are detecting is what most music is played at clubs and events in the modern era. But if you need to give it a little help for more unpredictable music then these tools are provided.

Setting the Detection Up For The Best Result

The best results will always come with the cleanest audio. And while internal audio loopback will be the

cleanest, it isn't realistic outside of DJ's who are also running their own lasers.

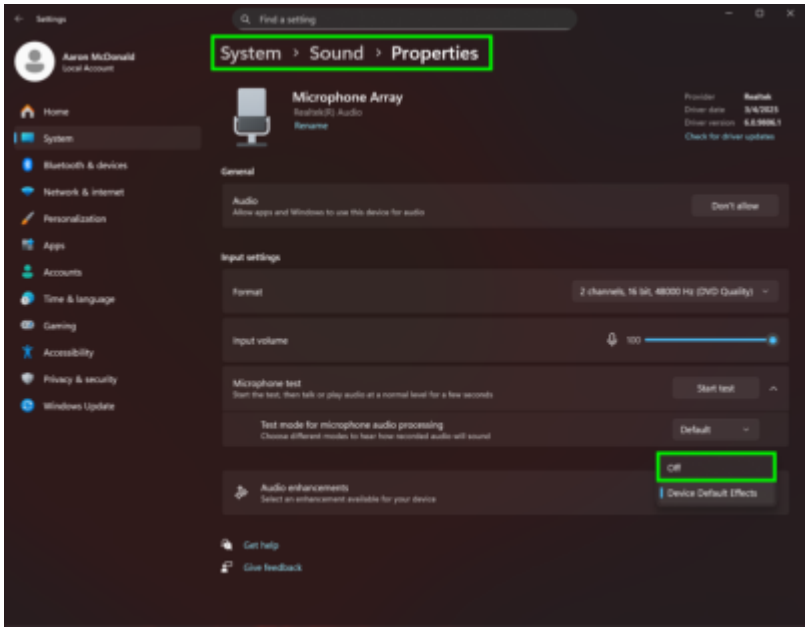
The second-best way is to bring an XLR based audio device like a Scarlett solo, or similar. When you use a device like this, you will need to request a "Venue mix" or "Live feed" from the audio engineer. On a separate AUX output and deliver that to your audio device. Bring an XLR cable, be kind and they will probably give it to you.



If you already have a Scarlett style device but you are unable to get a live feed from the audio engineer, you can also use your own microphone like a shotgun or pencil microphone, plug it into your audio device, and aim that mic at the venue's speakers. Its best to avoid dynamic and handheld microphones for this purpose like a Sure sm57/58 and condenser microphones.



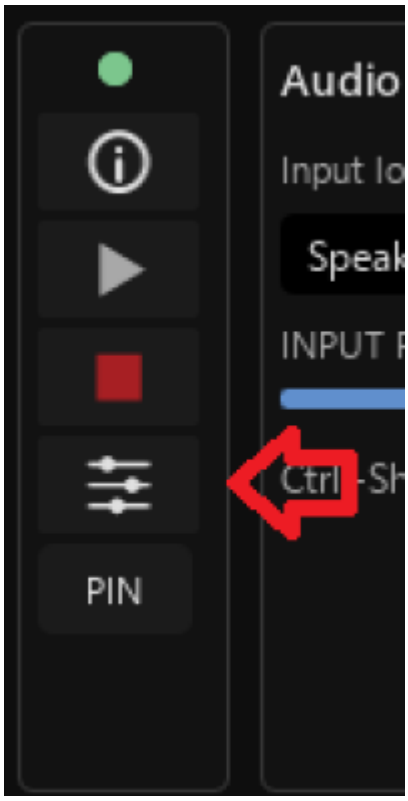
And finally, you can use the built-in microphone on your computer, but results will vary. One important aspect of those microphones is they are often designed to remove background noise and find voices. These are often called "Audio Enhancements" and can usually be disabled. But its important to know that microphones are designed for filtering everything but your voice for meetings won't be the best at collecting the full spectrum of audio for music. Check windows settings suggested in the picture to disable windows version of this, but other PC manufacturers may have their own tools that will be specific to each model of device.



For all these devices, its important that the microphone level is at the proper volume, you want to keep the input peak between -25 and 0 dBFS during chorus sections of the music as detected by PangoBeats.

PangoBeats Settings

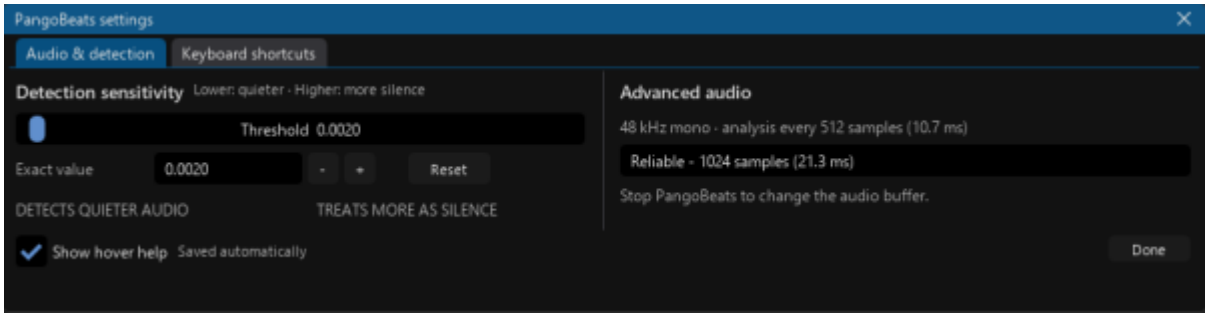
PangoBeats have a few user options in the settings window. To access the settings, click on the three horizontal fader icon.



Audio & Detection

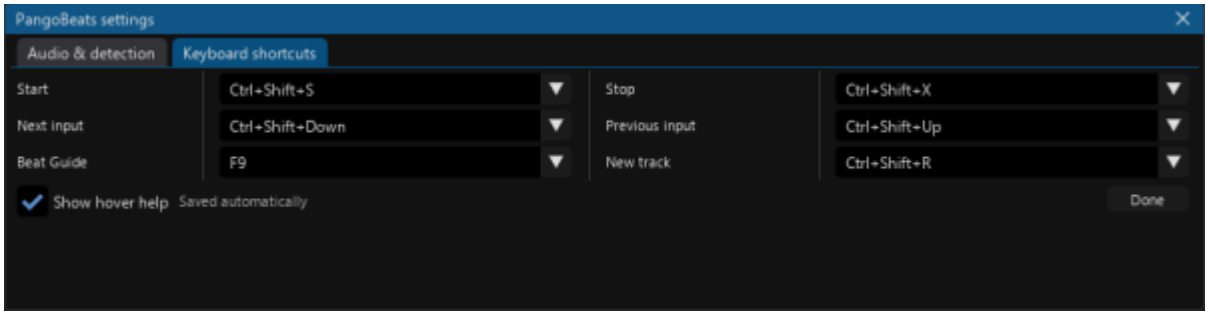
The audio and detection panel in the settings window is where you have some controls over the audio input.

- Detection sensitivity: Here you can change the threshold for background noise, if the audio is more clean then this value should be lower, if you are using a laptop built in mic in a loud club, this should be higher. What exact value is best depends dramatically on what your microphone setup is and the rooms noise and loudness.
- Show Hover Help: Here you can enable and disable the hover tips which show you what a button or feature does when you hover your mouse over it. Disable it once you learn all the functions to reduce clutter.
- Advanced Audio: Here you can determine what level of detection is used, Higher detection samples are more accurate, but slower and lower detection samples are less accurate but very fast. If you feel PangoBeats is always a little late on what beat its locking to, you can reduce samples. If you feel PangoBeats struggles to get your beat accurately often, you can increase the sample value.



Keyboard Shortcuts

PangoBeats have a number of buttons and options, and all are mapped to keyboard shortcuts by default. Here you can change which button is assigned to what keyboard shortcut. It is saved to this specific install of PangoBeats within this specific BEYOND folder. Click Done to save your changes.



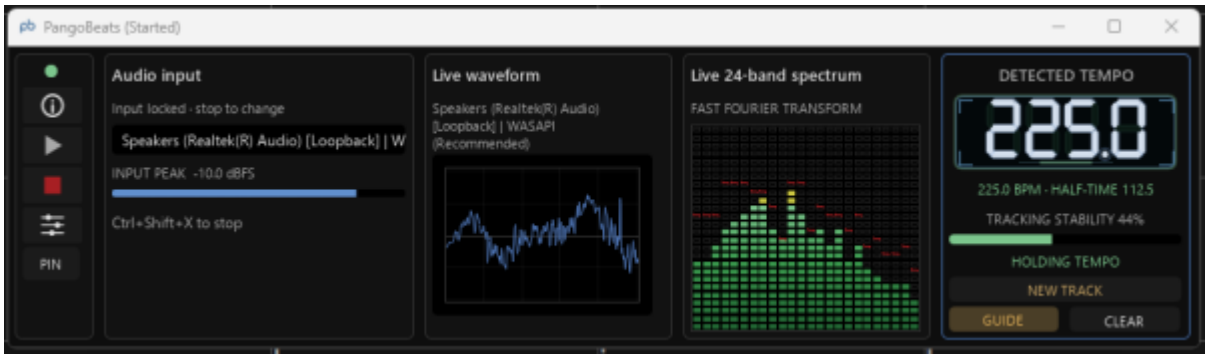
How Does PangoBeats Detect BPM

It’s important to note that PangoBeats does a lot more interesting things when detecting BPM then just sensing a kick drum or doing a shazam style lookup.

PangoBeats searches not only for kicks, but also claps, kick snare patterns, looks in higher sounds like high hats, and is counting bars. PangoBeats even considers half time and double time in its detection.

PangoBeats also requires quite high confidence in its detection before it locks on and sends a new BPM to BEYOND, since that takes a very visual effect on your show, it utilizes all of these factors to build evidence for its guessed BPM, and then locks in and sends that BPM and Resync to BEYOND.

PangoBeats utilizes a fully in-house detection model without the need for third party tools or large training data set, allowing it to be a lightweight companion app to BEYOND, without internet connection, and without utilizing much CPU performance at all.



PangoBeats 1.0 Legacy Documentation

PangoBeats Latest Version: 1.0.0 (Build 27) - Updated on 01/30/2025

Introduction

PangoBeats is a stand-alone cutting-edge Windows application designed to enhance the audio experience by providing real-time Beats Per Minute (BPM) detection. It seamlessly integrates with BEYOND/QuickShow software, offering users the capability to synchronize their audio with visual performances. PangoBeats stands out with its user-friendly interface and powerful audio processing features, making it an indispensable tool for DJs, musicians, and live performers.

PangoBeats requires at least Windows 10 64-bit to function.

Features

PangoBeats comes packed with an array of features tailored to enrich your audio-visual projects:

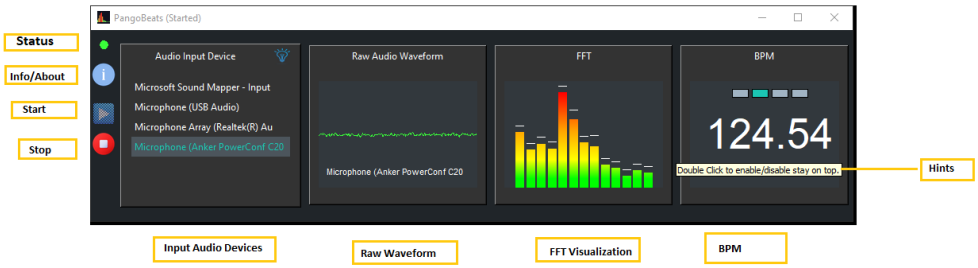
- **Real-Time BPM Detection**: The core functionality of PangoBeats is its ability to detect the BPM from any selected audio source in real time.
- **Integration with BEYOND/QuickShow**: After detecting the BPM, the application communicates directly with BEYOND/QuickShow, running on the same computer to synchronize your shows.
- **FFT Visualizer**: For an additional layer of visualization, the app includes a Fast Fourier Transform

(FFT) visualizer that displays the spectrum of audio being processed.
- **Raw Audio Waveform Display**: Users can view the raw audio waveform in real time, providing immediate visual feedback of the audio track being analyzed.

Interactive Elements

PangoBeats is designed with interactivity in mind, offering hints and actions to enhance user engagement:

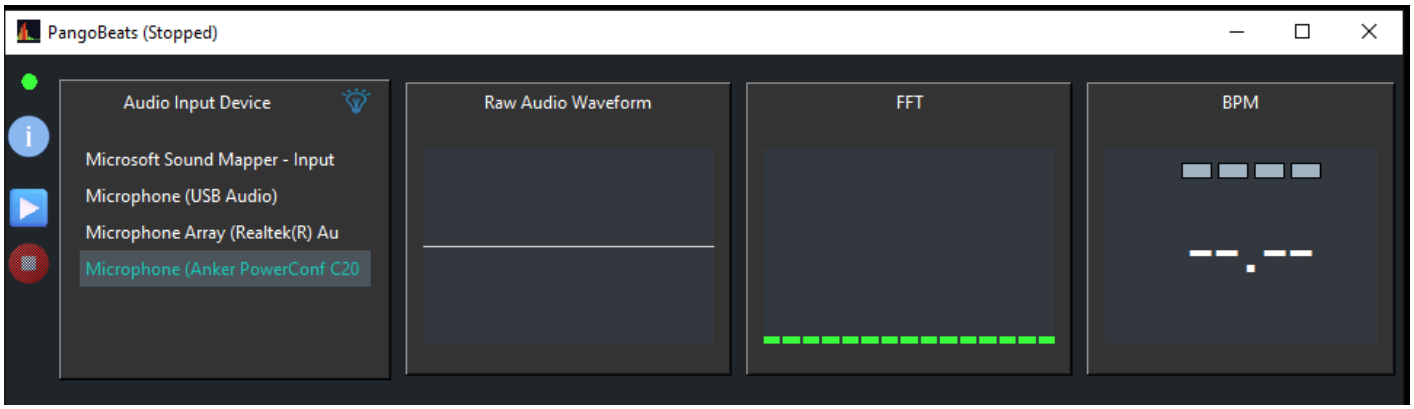
- **Tooltips**: When hovering over different windows and elements, helpful tooltips appear, like “Double click to enable/disable stay on top”.
- **Start/Stop Processing**: Users can click on the Start/Stop button after selecting their audio source to begin the BPM detection and processing.
- **Information and Help**: The Info button opens an About window, which contains links to support, checks for updates, and accesses the PangoBeats Wiki for additional help.



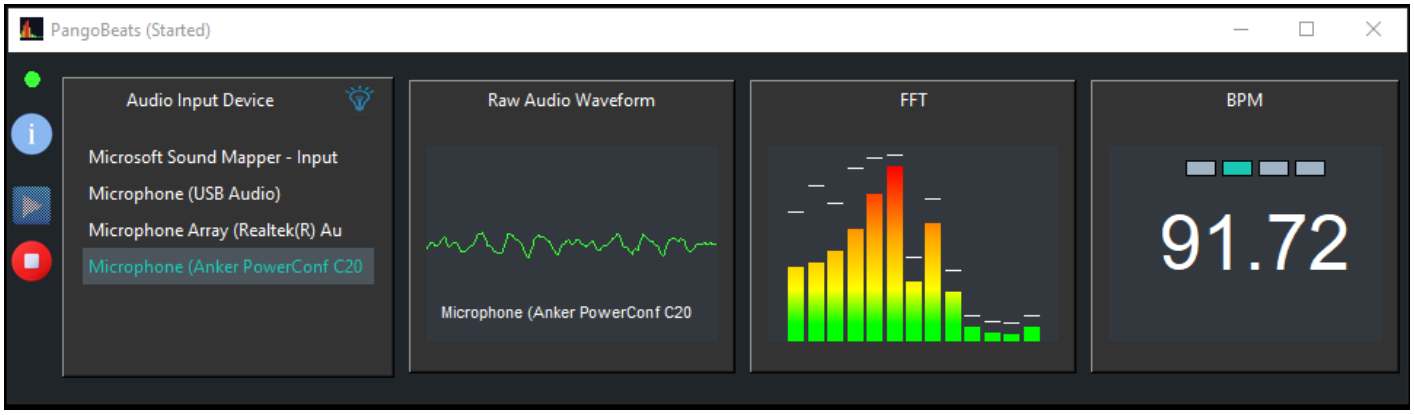
Quick Demo

Here's a quick start guide to using PangoBeats with the help of screenshots:

- Select your audio input device from the scrollable list.
- Click on **Start** to begin BPM detection and see the application in action.



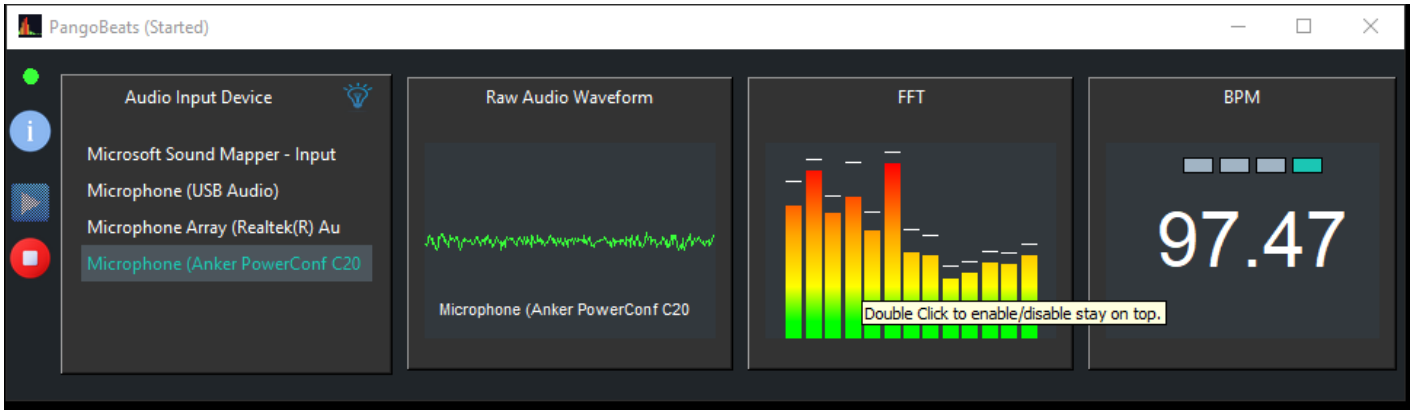
- Observe the real-time raw audio waveform, FFT visualizations, and BPM adjustments as the music plays.

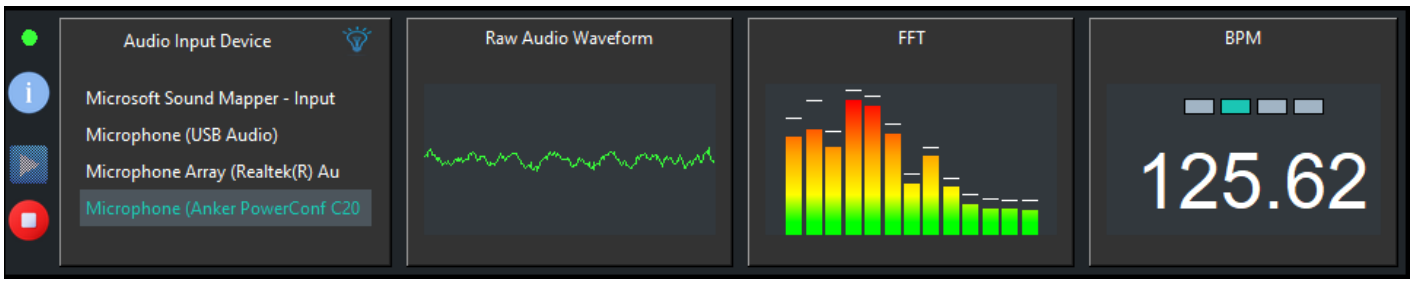


- The BPM will be displayed in the top bar of BEYOND/QuickShow, updating as the music changes.

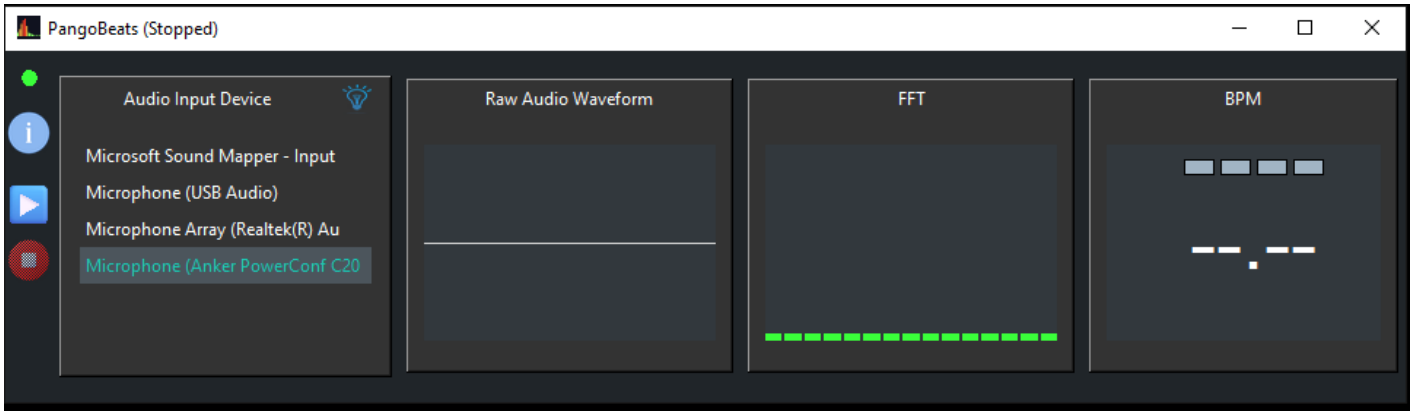


- To keep PangoBeats on top of other windows, double-click anywhere on the window where you see the hints.





- When you wish to stop the processing, click on Stop.



Updates

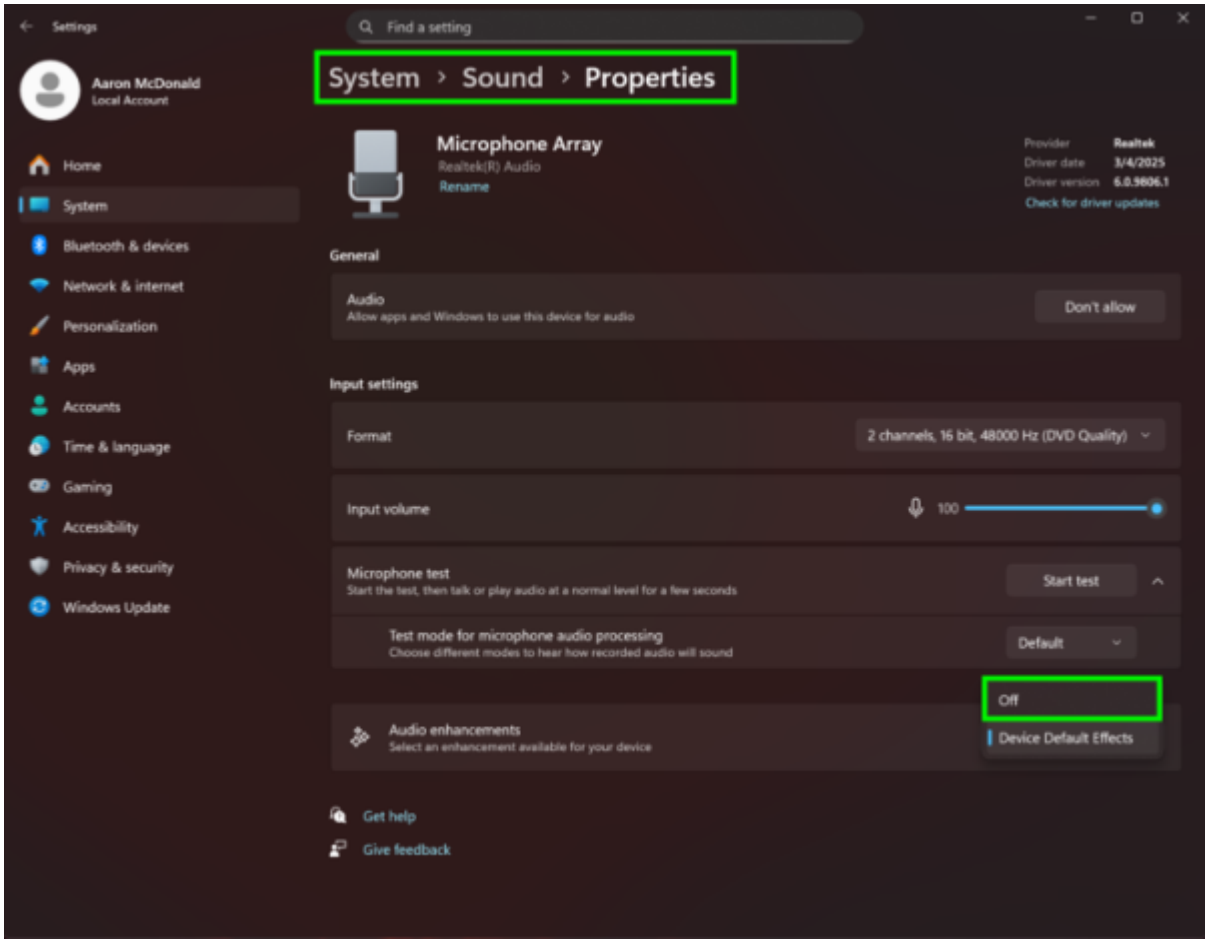
The PangoBeats documentation is a living document and will be updated regularly to reflect new features, improvements, and tips for using the application. Make sure to check back often to stay informed about the latest updates and get the most out of PangoBeats.

Known issue

PangoBeats is not responding to the beat

Windows has a microphone setting on board enhances the audio and removes any envoironment sounds. This includes the music and beat of audio.

Open up Windows settingts, System » Sound » properties and change the dropdown box after “audio enhancements” to “off”.



Intellectual Property Notice and Credits

PangoBeats is a product of Pangolin Laser Systems, Inc.

The PangoBeats software was developed by Suhas Holla Karkada Chandrashekar, and William R. Benner, Jr.

Third-Party Component Information

PangoBeats 1.0.0.27 is a free, standalone Windows companion utility distributed by Pangolin Laser Systems, LLC. It was first released in 2024 and was last updated in January 2025.

Pangolin's retained engineering records found no modifications to the identified upstream third-party components.

Component	Version	Use in PangoBeats	License
CPython	3.10.5	Embedded Python runtime	Python Software Foundation License and incorporated terms
aubio	0.4.9	Tempo and beat detection	GNU GPL v3 or later

Component	Version	Use in PangoBeats	License
ttkthemes	3.2.2	Tk user-interface themes, including Equilux	GNU GPL v3 and theme-specific terms
pystray	0.19.5	Windows notification-area integration	GNU LGPL v3 or later
chardet	4.0.0	Character-encoding detection	GNU LGPL v2.1
certifi	2022.9.24	Certificate-authority bundle	Mozilla Public License 2.0
Pillow	9.3.0	Image and icon handling	HPND/MIT-CMU-style terms and incorporated terms
PyAudio	0.2.12	Python audio-input interface	MIT License
PortAudio	19.7.0	Live audio capture used through PyAudio	PortAudio MIT-style License
NumPy	1.23.4	Arrays, FFT, and numerical audio processing	BSD 3-Clause License and incorporated terms
psutil	5.9.2	Process and system information	BSD 3-Clause License
Requests	2.28.1	Software-update networking	Apache License 2.0
Tcl/Tk	8.6.12	Graphical user-interface runtime	Tcl/Tk BSD-like terms

PangoBeats uses aubio to analyze audio and calculate beat and tempo information. Additional information is available from the https://aubio.org/.

The historical beatfinder.py - Beat Detection Module for PangoBeats remains available for reference.

Source and License Materials

Pangolin Laser Systems, LLC has preserved the PangoBeats application source, corresponding third-party source materials, license texts, copyright notices, checksums, and available build information for PangoBeats 1.0.0.27.

Every recipient or possessor of PangoBeats 1.0.0.27 may request these materials without charge by emailing Pangolin Support. Upon request, Support will provide a download link to the preserved source-material archive.

Product Boundary

PangoBeats runs as a separate Windows process and communicates with separately running BEYOND or QuickShow software through standard Windows messaging.

The preserved PangoBeats source materials include the complete PangoBeats-side messaging implementation. They do not contain BEYOND or QuickShow implementation source and do not apply an open-source license to BEYOND or QuickShow.

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