

# midiBeam

## Wireless MIDI Interface

### User Guide Version 2.0

Oct 3, 2018



Panda-Audio Ltd.  
[www.panda-audio.com](http://www.panda-audio.com)  
Product web site: [www.pandamidi.com](http://www.pandamidi.com)

## EU Directives on the Protection of the Environment

**RoHS** This product is compliant with the EU Directive 2002/95/EG for the Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment. No lead (Pb) cadmium (Cd), mercury (Hg), hexavalent chromium (Cr + 6), PBB or PBDE is intentionally added to this device. Any traces of impurities of these substances contained in the parts are below the RoHS specified threshold levels.

**REACH** This product is compliant with the European Union Directive EC1907/2006 and contains none or less than 0.1% of the chemicals listed as hazardous chemicals in the REACH regulation.

**WEEE** As with the disposal of all old electrical and electronic equipment, this product is not to be treated as regular household waste. Instead it shall be handed over to the applicable collection point for recycling of electrical and electronic equipment.

**CE** This product complies with the European Union Council Directives and Standards relating to electromagnetic compatibility EMC Directive (2006/95/EC) and the Low Voltage Directive (2004/108/EC). EMC compliance test report: EMC – 130930/1

### Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and;
- (2) This device must accept any interference received, including interference that may cause undesired operation.

### Observe proper precaution when handling batteries

Batteries may leak or explode if improperly handled. Observe the following precautions when handling batteries for this product:

- Be sure the product is off before replacing the batteries.
- Use only good quality alkaline batteries.
- When inserting the batteries, do not attempt to insert them backwards.
- Do not short or disassemble the batteries.
- If the device is not used over longer time, then remove the batteries.

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### Parts of the package:

1. A TX02 transmitter box.
2. An RX02 receiver box.
3. Quick Start Guide.
4. A pair of Velcro tape that can be used to attach TX02 to your instrument.

### Part that you will need, but not contained in this delivery:

1. For TX02: you need a pair of alkaline AAA batteries.
2. For RX02:
  - a.) If you use it with a computer: you need a USB cable to connect it to the computer. The cable must have a USB TYPE A connector on the computer side, and a USB MINI B connector on the RX02 side.
  - b.) If you use it without computer, with hardware synthesizer: you need a wall-wart adaptor with USB output. The adaptor must have a USB MINI B connector. You will also need a 5 pin DIN MIDI cable.

### Warranty

If your midiBeam system defects or malfunctions any time as a result of any defected electronic parts or our design fault we provide you a limited lifetime warranty of repairing or replacing it.

# Introduction

The midiBeam wireless MIDI interface connects your MIDI instrument (or any MIDI source) to your synthesizer or computer through radio waves, without any cable connection. There are at least two typical applications where it has obvious advantages:

1. If you have a battery powered mobile MIDI instrument you will be free to move around the stage without any cable if you use midiBeam. You can use a mobile keyboard hanging in your neck from Roland, Casio, etc., or a wind controller, like the AKAI EWI 4000s or the Yamaha WX5.
2. If you are fed up with the many cables hanging around in your studio, you can reduce the number of cables if you use midiBeam. Unlike other wireless MIDI solutions midiBeam is a very cost efficient replacement for a MIDI cable, while the delay latency is perfectly negligible, just about 10% of other wireless solutions.

The midiBeam system consists of two boxes, midiBeam TX02 and midiBeam RX02.

TX02 is the transmitter, powered by two AAA batteries. It is a small plastic box, with an LED and one pushbutton on the top ("PAIRING"). The MIDI plug is hanging out on one end on a short cable. The TX02 can be attached to the instrument by Velcro tape.

RX02 is the receiver, it must be powered through the mini USB socket either from a computer or from a USB power supply. It has an LED and a pushbutton as well. The MIDI output is provided either through USB or the DIN MIDI output socket. There is a DIN MIDI input socket too. If the radio connection is active between the two devices then the DIN MIDI socket on the RX02 can be used as an additional input. The two MIDI streams are merged together, and appear at both the MIDI DIN output on the RX02, and on the computer through USB. If the device has no radio connection (TX02 is off or not paired) then RX02 functions as a standard MIDI Interface to a computer. No special driver installation is necessary.

## Setting up TX02

Use a small screwdriver to remove the screw from the plastic box. Push down the top of the box with one thumb at the marked point, and slide the top firmly towards the side where the screw is with your other thumb. Take two premium quality AAA alkaline batteries. Make sure that the switch is in OFF position. When the top is removed, you can place the batteries in the box. Be very careful to place them in the box with correct polarity. When closing the box, slide the top back to its place. Beware to push down the top at the marked place by thumb while pushing it in. Connect the DIN plug of TX02 to the MIDI output of your instrument. Attach TX02 to your instrument with the Velcro tape. The best way is if you cut the 2cm wide tape into two 1cm wide pieces, and stick them to TX02 on the side of the screw.



## Setting up RX02

- A) **Using it as a wireless MIDI interface with a hardware synthesizer.** Connect the wall-wart USB adaptor to the mains voltage, and push the USB MINI B plug into RX02. Connect the MIDI OUT of RX02 to the MIDI IN of your synthesizer with a DIN-DIN MIDI cable. The MIDI IN on RX02 can be used as an optional additional input for another MIDI source. MIDI data coming from the TX02 and from the DIN MIDI input on the RX02 will be merged together in this mode and both data appears on the MIDI OUT socket on the RX02.
- B) **Using it as a wireless MIDI interface with a computer.** Connect RX02 to your computer with a USB cable. It will appear as “Panda-Audio midiBeam” on either Windows or Mac platforms without any driver installation. You have to select this as the input for your soft synthesizer. Additionally, the DIN MIDI OUT of RX02 is also available, so you can use a soft synthesizer and a hardware synthesizer at the same time. The MIDI IN on RX02 can be used as an optional additional input for another MIDI source.
- C) **Using it as a computer MIDI interface.** RX02 alone can be used as a conventional MIDI interface to your computer. In this case TX02 must not be turned on. Connect RX02 to your computer with a USB cable. It will appear as “Panda-Audio midiBeam” on either Windows or Mac platforms without any driver installation. Typically, connect the MIDI OUT of your keyboard to MIDI IN on RX02, and connect MIDI OUT of RX02 to the MIDI IN on your hardware synthesizer or MIDI expander box. You can use in this setup RX02 to record into a sequencing program from your MIDI keyboard, and to replay from the sequencing program into your hardware synthesizer.

## Operating midiBeam

If TX02 and RX02 have been setup as described before in A) or B), turn them on both. TX02 has a battery switch for that, RX02 has no switch, it is powered through the USB cable either from the supply or from the computer. If the two devices are not paired (“Pairing” means tuning them to a common radio channel), then both of them will blink slowly, with a short blink. If you press the button on either of them, it will change to fast blinking, which shows that it is searching for a pair. Press the button on the other one as well, and they will blink both together for a few seconds, then at once both of them change to continuous light. This means that they are paired now, they allocated one of 76 radio channels for themselves in the 2.4 GHz range where midiBeam operates.

You can start to play your keyboard, and whatever you send into the MIDI IN of TX02 (the DIN plug hanging on a short cable), will appear on the DIN and USB outputs of RX02. Both devices will store their channel settings in permanent memory, so when you turn them on next time they will remember on each other. The range of safe functionality is very much depending on the environment. In open air, LOS (“Line Of Sight”, no objects between TX02 and RX02) more than 350 meters range can be measured, but reflections in rooms, objects in between the devices and the momentary direction of the antennas can influence it. Anyway, the range is more than enough under any conditions on a huge stage in a hall or open air, or in a studio even between neighbouring rooms; you will not have to drill holes in the wall for an ad hoc connection.

During the pairing process midiBeam will automatically avoid radio channels with activity from other devices, also from other pairs of midiBeam. So, if you want to use several pairs of them on the same location, then this is all what you have to do:

1. Make sure that only one pair is turned on (also RX02 devices must be turned off). Pair them.
2. Leave the previous pair running, and turn on the next pair. Pair them.
3. Continue from 2., until all pairs are tuned.

Remember, you have to do this only once. Once you set them up all, they will all remember their settings.

As said before, during pairing midiBeam avoids any radio channels with disturbances. If you find unusual difficulty with the transmission quality, then it is worth to initiate a new pairing. Maybe a disturbing source has been turned on close to the room (e.g. a Wi-Fi). Then midiBeam will adopt itself to a new channel that is free.

## Parameter adjustments

Although midiBeam has no user interface except the two buttons and two LEDs, there are some parameters that can be adjusted by the user. These are adjusted through small System Exclusive files. You can download from the Panda-Audio web page the following files:

midiBeamTool.exe	Time10min.mid
midiBeamMonitor.exe	Time30min.mid
Power_0dBm.mid	Time60min.mid
Power_m06dBm.mid	TimeForever.mid
Power_m12dBm.mid	RunningStatusOn.mid
Power_m18dBm.mid	RunningStatusOff.mid

If you use a Windows computer, then you can use either midiBeamTool.exe or the \*.mid files; if you use any other platform, then you can use the \*.mid files with a media player that can replay standard MIDI files. You must have a MIDI interface connected to your computer. When you want to adjust any parameters, then connect TX02 to the MIDI output of the computer, and run both devices; they must be on and they must be paired, even if you want to adjust a parameter that is targeted to TX02 only. Parameter adjustment happens only this way, through TX02, you cannot use the MIDI input of RX02 for this purpose.

### ***Radio Power adjustment***

The radio power of midiBeam can be adjusted in four steps. As a default, the lowest power should be used (-18dBm of the radio chips in midiBeam). In some countries higher power steps may exceed the allowed limits. The Radio Power setting must be applied to both TX02 and RX02. So, if you activate the appropriate setting with replaying one of the \*.mid files, or clicking the option in midiBeamTool.exe, then both TX02 and RX02 will blink very quickly for about three seconds to confirm the reception of the parameter change.

### ***Power Off Time adjustment***

If you stop playing, but you forget to turn off TX02 then it can turn off automatically after a programmable time, sparing battery power. The programmable steps are Forever (never turning off), 10 minutes, 30 minutes and 60 minutes. If you activate any of these, then TX02 will blink quickly (RX02 will not, it is not affected by this option). If TX02 has timed out, and turned off automatically, then you have to turn off the power switch for about a second, and then turn it on again.

## ***Running Status adjustment***

The MIDI standard offers a way to reduce the amount of data in the MIDI stream slightly. This can speed up communication if e.g. many pitch bend data is transmitted. Although it is mandatory for a receiver to handle this in MIDI, some implementations do not handle this correctly. Therefore, midiBeam can optionally turn Running Status on or off. As a default it is ON, but if you notice something unusual (e.g. your MIDI devices work correctly when they are connected by cable, but not if you connect them through midiBeam) then try to turn Running Status OFF.

## **Parameter Status Display**

When pressing their appropriate buttons both TX02 and RX02 send out a short System Exclusive dump that contains the values of their parameters, and some more information like the version number of their software. While the content of these dumps can be decoded with help of the midiBeam System Exclusive Format Description Document that can be found on the web page of Panda-Audio too, it is more convenient to use the Windows application `midibeamMonitor.exe`, that lists these parameters to the screen and to a text file with the name "midibeam.txt" at the same time in a decoded, explained format. The file will be written into the default directory where the program is running.

## **Battery power of TX02**

TX02 can operate for 65 hours on good quality alkaline batteries. When the battery voltage gets low, TX02 will start to blink very quickly to warn that batteries must be changed. In this case there are still 6-10 hours left for operation. When the LED started to blink, you can press the button and for the next 6 seconds the LED returns to normal functionality, it can show ON, OFF or PAIRING state. After 6 seconds it will return to blinking.

While it does not damage the device to use lower quality batteries, with poor batteries the lifetime can be as small as a third of this, and you cannot rely on a warning that is long enough to get new batteries.



# Software Update

Should it ever be necessary to update the software of midiBeam, e.g. to fulfil wishes of users with new features, and make it available for earlier users too, the software of both midiBeam devices can be updated through their appropriate MIDI IN. Any software update file can be found on the web page of Panda-Audio, either as a \*.bin file for midiBeamTool.exe, or as a \*.mid file, embedded in a System Exclusive package. Just like in case of the parameter update, you need a computer with a MIDI interface, but in opposite to that, it is only the appropriate device to be updated that has to be connected to it, the other one is disregarded.

If you want to update TX02 then do the following:

1. Connect the MIDI OUT of the computer interface to the DIN plug of TX02.
2. Keep the pushbutton on TX02 pressed while you turn on the power switch. The LED will stay dark.
3. Start the update dump.
4. At the end of the dump the LED will start to blink quickly. Turn it off and turn it on again.

If you want to update RX02 then do the following:

1. Connect the MIDI OUT of the computer interface to the MIDI IN socket of RX02.
2. Keep the pushbutton on RX02 pressed while you apply power through USB. The LED will stay dark.
3. Start the update dump.
4. At the end of the dump the LED will start to blink quickly. Turn it off and turn it on again.

## Technical specifications:

**Size:**

TX02: 63 x 48 x 15 mm, 2.5 x 1.9 x 0.6 inch.

RX02: 83 x 54 x 31 mm, 3.2 x 2.1 x 1.2 inch.

**Weight:**

TX02: 36g (without batteries), 59g (with batteries)

RX02: 58g

**Power:**

TX02: 2 x AAA batteries

RX02: through USB socket

**Transmitter battery lifetime:**

66 hours <sup>(1)</sup>

**Visible warning of low battery voltage:**

At about 10% battery capacity.

**Auto power off:**

Programmable to 10, 30, 60 minutes or no power off.

**Radio range:**

Typically 250 meters open air, line of sight<sup>(1)</sup>

**Radio band:**

2.4 GHz, 76 channels

**Radio power:**

Programmable in 4 steps.

**Latency:**

0.38 milliseconds <sup>(2)</sup>

**Error correction:**

No hanging notes even at the limit of range.

**Running Status:**

Can be turned on or off.

**Device pairing:**

Automatic on one of 76 radio channels.

**Software:**

Upgradable on both devices.

<sup>(1)</sup> At the highest radio power setting. There are 4 programmable radio power settings. Premium quality alkaline batteries used.

<sup>(2)</sup> From end of NoteOn at the input of TX-02 until the start of NoteOn at the output of RX-02.

## **Warranty and Return Policy**

The customer must never send back a device without consulting the manufacturer by e-mail first. A device should be sent back to the manufacturer only after consultation, if the manufacturer explicitly orders to do so. The customer must pay for the cost of sending back the device to the manufacturer. It is up to the customer what post service will be used to send the device to the manufacturer, but it is the customer's responsibility to ensure that the manufacturer receives the device. The cost of repairing the device and sending back the repaired device to the customer will be covered by the manufacturer. It is the manufacturer's responsibility to ensure that it is received by the customer.