MidiGurdy Manual

Version 1.3.0

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Contents

1 Introducing the MidiGurdy

The MidiGurdy is a fully electronic hurdy-gurdy that is designed to have a playing-feel as close to an acoustic hurdy-gurdy as possible.

1.1 Intended use

The main purpose of the MidiGurdy is to be tool for rehearsal, learning and teaching hurdy-gurdy playing techniques.

Hold and play it as you would do with an acoustic hurdy-gurdy. To hear the produced sounds, attach headphones or connect the instrument to an external amplifier or mixing desk. If you have an acoustic hurdy-gurdy, use the the mechanical features and software settings to change the playing feel and sound to match them to your acoustic instrument.

Attach the instrument to a computer to see a visual representation of your trompette technique. See where you place your coups and check the speed of your crank. Or use the visualisation to teach your trompette technique to others.

The MidiGurdy is also a new electronic musical instrument in it's own right. You can use it as a MIDI-controller to control external synthesizers or use the built-in software synthesizer with non-hurdy-gurdy sounds.

1.2 Features

1.2.1 No maintenance

No acoustic sound production means (nearly) maintenance-free playing: no strings to tune, no cotton to replace, no rosin to be applied to the wheel. Simply pick up the instrument, switch it on and start playing right away.

1.2.2 Realistic control

The crank reacts with high precision to your right-hand technique. A physically adjustable brake allows you to change the required force to turn the wheel. A non-vibrating string inside the tangent box with adjustable tension and the movable sensor tangents on the keys allow you to change the playing feel of the keyboard. And the keys are pressure sensitive, offering many of the sound-shaping possibilities of acoustic instruments.

1.2.3 Extensible hurdy-gurdy sounds

The MidiGurdy comes pre-loaded with a selection of hurdy-gurdy sounds sampled from real instruments. And you can change them or add new sounds to your liking.

1.2.4 Nine strings – in any key or tuning

There are three melody, three drone and three trompette strings you can configure and control individually.

1.2.5 Practice anywhere - in silence

Playing with headphones means you can play even late at night without disturbing anyone. And the smaller form factor compared to most acoustic instruments make it more portable.

1.2.6 Two interfaces

Many of the MidiGurdy features can be controlled via the buttons and display on the instrument itself, but also more comfortably via a Web-Browser when you connect the MidiGurdy to your computer.

1.2.7 Open to all

The MidiGurdy software and sounds are all released under an Open-Source license and new versions will always be free of charge.

2 Important notes

2.1 Handling and maintenance

Warning: Always grab the instrument by the body or the rear tangent box support. Never carry or lift the instrument by the keyboard or individual keys!

- Use a soft, dry cloth to clean the instrument, which may be slightly moistened if necessary.
- Never use petrol, thinner, alcohol or similar cleaning agents to avoid damaging or discolouring the surface of the instrument.
- All user-adjustable screws and controls should only ever be hand-tightened. Never tighten the screws or tuning knobs with great force.

2.2 Precautions for batteries

- The required ambient temperature depends on the batteries used. Refer to the battery documentation. Never use or store the batteries in extremely hot places, e.g. in direct sunlight, in a closed vehicle or near a radiator. This could lead to leakage of battery fluid and shorten the battery life.
- Keep the batteries dry and ensure that the connections are never exposed to moisture. This could lead to overheating or rusting on the battery and on the connections.
- Make sure that batteries are never within the reach of small children.
- Never hit the batteries or drop them. Strong shocks can lead to leakage of battery fluid, excessive heat generation, explosion or fire.

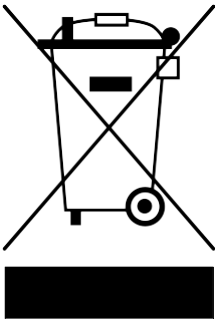
2.3 Further Precautions

- Handle the controls and connectors of the instrument with due care. Excessive handling can lead to damage.
- Never press or hit the display or place heavy objects on it.
- When making or removing the connections, pull only on the plugs - never on the cables. This will prevent any damage to the cables and the instrument.

Warning: The instrument should only be serviced by an expert. Before opening the base plate, the instrument must be disconnected from all power sources (power supply, USB connection, battery).

Danger: Only use the original 5V power supply to power the instrument via the power connector. And only connect the 5V power supply to a suitable power outlet. Never plug it into an outlet of another voltage.

2.4 Notice regarding disposal (EU only)



When this “crossed-out wheeled bin” symbol is displayed on the product, owner’s manual, battery, or battery package, it signifies that when you wish to dispose of this product, manual, package or battery you must do so in an approved manner.

Do not discard this product, manual, package or battery along with ordinary household waste. Disposing in the correct manner will prevent harm to human health and potential damage to the environment.

Since the correct method of disposal will depend on the applicable laws and regulations in your locality, please contact your local administrative body for details. If the battery contains heavy metals in excess of the regulated amount, a chemical symbol is displayed below the “crossed-out wheeled bin” symbol on the battery or battery package.

3 Getting to know the MidiGurdy

In many ways the MidiGurdy works very similar to other hurdy-gurdies, but there are a few differences that you should be aware of. The MidiGurdy also offers many functions that you won‘t find on an acoustic instrument, which this manual will explain in detail.

In this section we will explore the mechanical features of the instrument and learn about the user controls and the connectors available on the MidiGurdy.

3.1 Mechanical Features

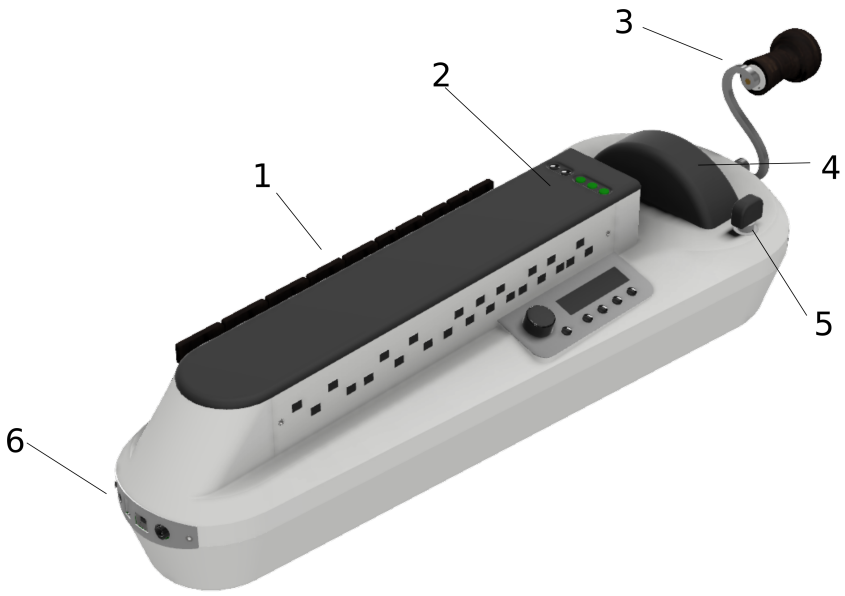


Fig. 1: The mechanical features of the MidiGurdy

3.1.1 (1) Keyboard

The keyboard of the MidiGurdy works like most hurdy-gurdies and uses gravity for the keys to fall back into their original position. This requires you to tilt the instrument forward while playing.

3.1.2 (2) Tangent box lid

The tangent is covered by a wooden lid that is held in place using four magnets.

3.1.3 (3) Crank

The crank also works like you would expect from a hurdy-gurdy. You can turn it forwards, backwards, shake it and use it to sound the trompette by giving shorter or longer impulses while turning. The turning speed also affects the volume of the instrument.

3.1.4 (4) Wheel Cover

The wheel cover can be lifted by grabbing it on both sides and simply lifting it upwards with a little force. Once the cover is removed, you can grab the wheel to attach or remove the crank. To close the cover again, carefully insert it into the cut-out around the wheel and push down with a little force until you hear it snap into place.

3.1.5 (5) Wheel Brake Control

The black knob right next to the wheel cover controls the wheel brake. It is used to adjust the amount of resistance that you feel while turning the crank, simulating strings pressing down onto the wheel. Turn right to pull it tighter and increase the required force, turn left to loosen the brake and reduce the required force. Always turn the crank while adjusting the brake to avoid overloading the wheel and axle! Excessive force on the brake might damage the parts of the braking system.

3.1.6 (6) Front panel connectors

The front panel contains all connectors used to interface the MidiGurdy with external components. We will have a closer look at the individual input and output ports in the next section. Instrument strap pins There are three instrument strap pins: one at the front and two pins at the back.

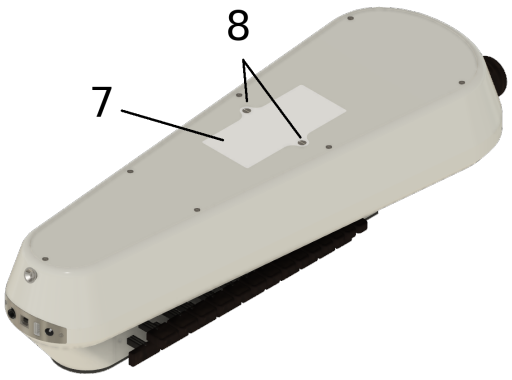


Fig. 2: Location of the battery compartment

3.1.7 (7) Battery Compartment

The battery compartment can be used to power the MidiGurdy via eight AA/R6/Mignon batteries. Please ensure correct polarity of the batteries when inserting them into the instrument.

3.1.8 (8) Battery Compartment Screws

The lid of the battery compartment is secured in place with two slotted screws. Use a suitable screwdriver to remove or tighten both screws. Please do not use excessive force then tightening the screws.

3.2 Tangent box lid buttons

There are two distinct sections that are used to control the many different functions of the MidiGurdy: the five buttons in the tangent box lid and the main user interface.

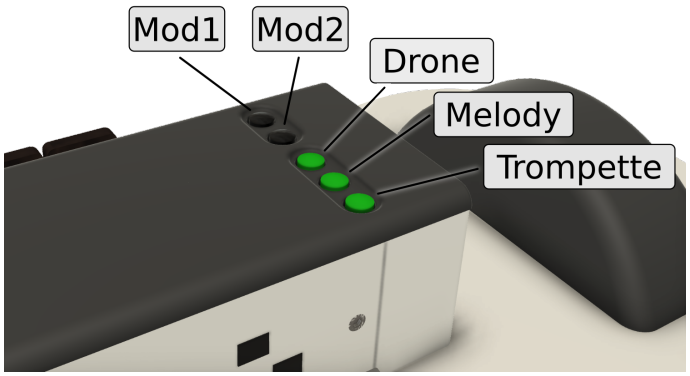


Fig. 3: Buttons in the tangent box lid

The lid of the tangent box contains five buttons, arranged in two groups. Let's look at the group of three buttons closest to the player first, also called the "String Buttons".

3.2.1 The String Buttons (Drone, Melody, Trompette)

These buttons are used to switch individual strings on and off (lift them on and off the wheel). The order of the buttons follows the string positions on an acoustic hurdy-gurdy:

- **Drone string**, closest to the keyboard
- **Melody string**, in the middle
- **Trompette string**, closest to the player

Press any of these buttons, turn the crank and notice how the string sound gets switched on or off. An illuminated button means the string is currently switched on.

3.2.2 The Modifier Buttons (Mod1 and Mod2)

The two black buttons on the tangent box lid are called the “Modifier Buttons“. By default, those two buttons can be used to:

- load the **previous preset** (Mod1), or
- load the **next preset** (Mod2).

The action of the Modifier Buttons can also be changed in the Web-Interface. For example, once you are more familiar with the MidiGurdy and you want to use more than three strings, you can use there buttons to select a second or third set of strings.

3.3 User Interface

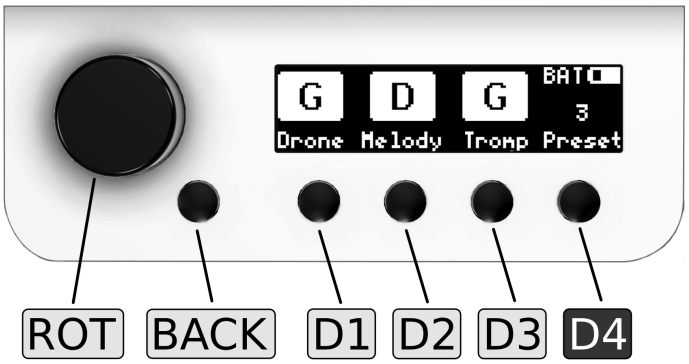


Fig. 4: The main user interface of the MidiGurdy

The main user interface of the MidiGurdy consists of the display, a rotary knob and five buttons. First a short overview explaining the most important functions of the interface. For a detailed description of the settings and the menu system, please see the section *The Menu System* (page 13).

3.3.1 Display

The display of the MidiGurdy is used to show you the current setup of the instrument and is used to display all settings and menu items. By default it shows the so called “Home Screen“ which informs you about the current tuning and on/off state of all strings, the currently selected preset, how the instrument is powered and the estimated battery charge in case you are running on batteries (see *The Menu System* (page 13) for more details).

3.3.2 Rotary knob (ROT)

You can turn this knob left and right and also press it like a button. Turning the knob is used to navigate the menu system or to increase or decrease values. Pressing the knob usually selects a menu item or confirms a changed value.

3.3.3 Back button (BACK)

The back button is right next to the rotary knob. Regardless on where you are in the menu system, pressing this button will always cancel the current selection or operation, bring you back to the previous screen and eventually back to the Home screen.

3.3.4 Display Buttons (D1 D2 D3 D4)

The four buttons under the display are called the "Display Buttons" and activate different functions depending on the currently active menu. By default, the first three buttons activate the configuration menus for

- the drone strings **D1**
- the melody strings **D2**
- the trompette string **D3**

as indicated by their labels in the display on the Home Screen.

The rightmost button **D4** is also called the "Power / Settings" button. As the name suggests, this button is used for multiple purposes:

1. Switching the MidiGurdy on and off:
    - Hold this button for about 1 second to switch the instrument on
    - Hold this button for about 4 seconds to switch the instrument off again
    - Hold this button for about 8 seconds and release it again to do a forced restart of the instrument. Use this if the MidiGurdy has locked up and doesn't react to any user input any more (which hopefully will never happen!)
2. Opening the Presets and Settings menus with a short press of the button

4 Connections

The connectors at the front of the MidiGurdy connect the instrument with all external components and devices.

4.1 Power Supply

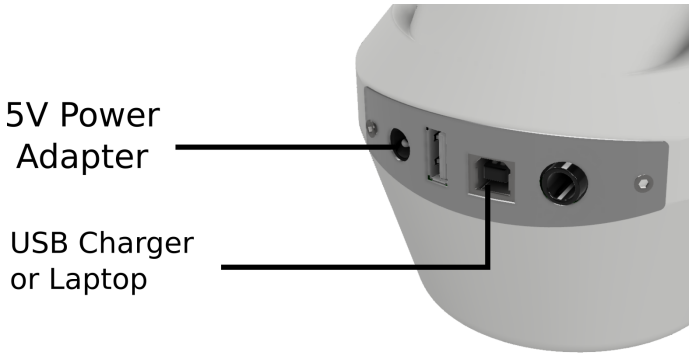


Fig. 1: The MidiGurdy power connections

The MidiGurdy can be powered from three different sources:

1. By inserting eight AA / R6 / Mignon batteries or rechargeable batteries
2. By attaching the included 5V power supply
3. By attaching the USB-B port to another USB device like a computer, laptop or phone charger via a suitable USB cable

All three power sources can also be connected at the same time. The MidiGurdy will always choose the best source available and show the currently selected source in the top right corner of the display.

When the 5V power supply is connected, the instrument will always be powered via this source and will draw no power from the batteries or the USB port. When powered via USB and batteries, the instrument will mainly draw power from the USB connection and only fall back to the batteries if the USB connection cannot supply enough current.

Concerning Batteries

The MidiGurdy is designed to be used with eight AA batteries (also called R6 or Mignon cells). Either primary (disposable) or secondary (rechargeable) cells can be used. We recommend high-capacity 2500mAh NiMH rechargeable batteries, which will give you an estimated 10 – 12 hours of solid playing time.

The MidiGurdy does not contain a battery charger. If you use rechargeable batteries (which we highly recommend), you will need an external charger to bring them back to charge.

Warning: Always replace all batteries when inserting fresh batteries into the instrument, never replace only individual cells.

Please check the polarity of the batteries carefully before inserting them into the instrument!

4.2 Headphones

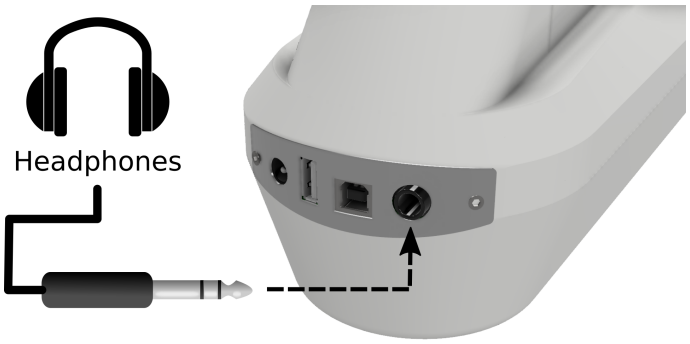


Fig. 2: Connecting headphones to the MidiGurdy

The MidiGurdy outputs all sound via the 6,3mm (¼ inch) stereo jack connector. Simply insert the headphones and adjust the volume of the instrument to comfortable levels. See *Volume Menus* (page 14) on how to change the volume.

4.3 Other Sound Equipment

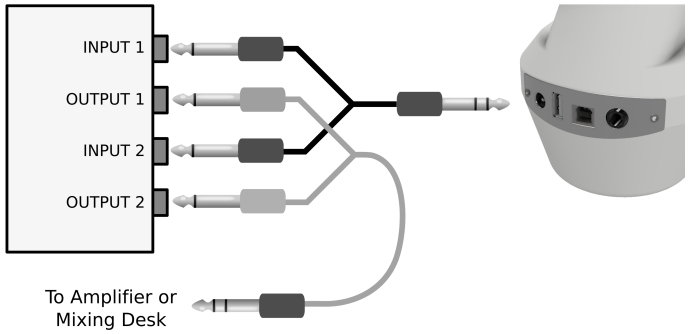


Fig. 3: Connecting other sound equipment

To connect the MidiGurdy to an amplifier, a mixing console, recording device or other sound equipment, please use the supplied Y-cable and breakout box ("DI-box"). Connect the single stereo plug of the Y-cable to the headphone jack of the MidiGurdy and the two mono plugs to the ports on the breakout box marked "Input 1" and "Input 2". Then connect one or both "Output" ports of the breakout box to the amplifier or other sound equipment.

4.4 USB Data Connection to Computer or Tablet

To connect the MidiGurdy with a desktop computer or tablet please use a USB-A to USB-B cable, as used for most USB printers. (This cable is not shipped with the instrument and needs to be purchased separately.)

Once connected, the MidiGurdy will act as two separate USB devices via this connection:

1. as a USB network card
2. as a USB-MIDI controller

Both functions use a standard implementation and should therefore work on any modern computer or tablet without installing additional drivers.

Note: If your device provides enough power via the USB port, the MidiGurdy will use this connection to power itself, unless the 5V power supply (see above) is plugged in.

For more information on how to use the MidiGurdy via the USB connection, please refer to section *The Web Interface* (page 28).

For more information on how to use the instrument as a MIDI device with your computer or tablet, please see section *MIDI with the MidiGurdy* (page 19).

4.5 External Synthesizer via USB-MIDI Connection

The MidiGurdy provides a standard USB-MIDI connection via the USB-B port and can therefore be used to control external synthesizers or other MIDI capable devices that have a USB-MIDI interface.

Simply attach the MidiGurdy with a suitable USB-A to USB-B cable as shown in the picture above.

The USB-MIDI connection setup can be configured via the web interface of the MidiGurdy. Please see the section *The Web Interface* (page 28) for more details.

5 The Menu System

This section describes all menus and configuration items that are available on the MidiGurdy.

Please note that there are extended features and advanced settings that are only available via the Web Interface. Please see the *The Web Interface* (page 28) on how to access and use it.

5.1 Home screen

Fig. 1: The home screen of the instrument menu

The home screen shows the most important information about the current setup of the instrument. The MidiGurdy will always return to the home screen after a configurable period of inactivity (see *Configuration Menu* (page 17)).

The largest part of the display is taken up by the visualisation of the **current string state and tuning**. From left to right you see the state for the drone, melody and trompette strings.

Please note that the display does not show the octave of the current tuning. To see which octave a string is tuned to, you would have to open the respective String Setup Menu (see below) by pressing the buttons under the string label.

In the top right corner of the home screen you can see the estimated charge of the batteries as a small battery icon, as well as the currently active power source:

- BAT – powered via batteries
- EXT – powered via 5V power supply
- USB – powered via USB connection

The bottom right corner shows the number of the last loaded preset. See below for an explanation of the preset system.

Available controls on the home screen:

- Turn the rotary knob **ROT** left or right to open the Chien Sensitivity menu
- Press the rotary knob **ROT** to cycle through the volume menus for Main Volume, Reverb Volume and Key Volume.

5.2 Chien Sensitivity

Probably one of the most important settings you will want to change on the MidiGurdy is the sensitivity of the chien. On an acoustic hurdy-gurdy, you would tighten or loosen the *tirant* for that. On the MidiGurdy, you simply turn **ROT** left or right when you are on the Home Screen.

Turn right to make the chien more sensitive (to start buzzing at lower cranking speeds), turn left to make it less sensitive.

5.3 Volume Menus

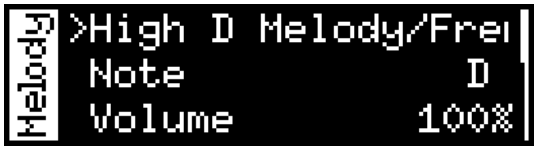
When you press the rotary knob ROT on the home screen, you reach the Main Volume menu. Turn ROT left and right to decrease or increase the main volume of the instrument.

Press **ROT** again to reach the Reverb Volume menu, turn it left and right to decrease or increase the sympathetic string reverberation volume. d

Press **ROT** again to reach the Key Volume menu, turn it left or right to decrease or increase the volume of the simulated mechanical key noise.

The **BACK** button will bring you back to the Home Screen.

5.4 String Menus



The String Menus are used to change the setup of all melody, drone and trompette strings of the MidiGurdy. You can access the String Menus by pressing the first three buttons under the display, D1 for "Drone", D2 for "Melody" and D3 for "Tromp" (Trompette).

These buttons always open up the String Menu, even when those labels are not shown above the buttons. Only if you see other labels above the buttons will their function be different.

5.4.1 String Menu Items

All three string types – melody, drone and trompette – start with the same configuration items

- **Sound** – The first item in each String Menu shows the currently selected sound for the string, or "No sound…" if no sound has been selected. Press the rotary knob on this item to choose a sound from the list of installed Soundfonts.
- **Note** – Select this entry to choose the tuning of the string. The chosen note will either be the single continuous note you hear when turning the crank (for drone and trompette), or the fundamental note that you hear on the melody strings if you don't press a key on the keyboard (the "open string" note).
- **Volume** – The volume of this string in percentage of the main volume. Use this setting to adjust the volume balance of the strings, for example to reduce the volume of drone and trompette to make the melody stand out more.
- **Balance** – This setting controls where you hear this string in the stereo panorama (left / right).
- **Fine Tune** – With this setting you change the fine tuning of the individual string in cent. 100 cent equal one semitone.

5.4.2 Menu Items only for Melody Strings

In addition to the items common to all string types, the Melody String Menu contains a few additional items that are only relevant for melody strings:

- **Capo** – Some acoustic hurdy-gurdies allow the player to lock one of the lower keys in a pressed state, effectively acting as a capo for all melody strings. This setting allows you to simulate that setup on the MidiGurdy, separately for each melody string.
- **Polyphonic** – Contrary to most acoustic hurdy-gurdies, you can choose to play the melody strings polyphonically. This means that when you press two or more keys at the same time, you will hear all notes simultaneously instead of just the note of the highest key.
- **Keyboard Mode** – If enabled, the keyboard works as if the MidiGurdy were a piano. Sound is only controlled via the keyboard and you don't need to turn the crank to hear a sound. The keyboard is velocity-sensitive, which means that the volume of the sound is dependent on how fast you press the keys. **Please note that this mode is not available if the string is set to a hurdy-gurdy sound**.

5.5 Preset Menu

Presets allow you to save and load the setup of the instrument very quickly. The MidiGurdy comes with a few pre-configured presets, but you can create your own presets or edit existing presets to your liking. To open the Preset Menu, press D4 and the list of presets will appear.

5.5.1 Loading a preset

To load a preset, select any numbered preset from the list with the rotary knob, then do a short press on the rotary knob.

5.5.2 Saving a preset

To save the current instrument setup to a new preset, go to the last entry in the preset list called "New preset..." and press the rotary knob.

A new screen will appear in which you can enter a name for the new preset. The first character of the name is highlighted and can be edited by turning ROT left or right to move though the available characters. Pressing the rotary knob after choosing a character moves to the next character position.

At the bottom of the screen you see new labels for the four buttons under the display:

DEL	<	>	SAVE
D1	D2	D3	D4

Press the buttons under the arrows **<** and **>** to change which character you are currently editing (moving the cursor).

Press the button under DEL to delete the currently selected character and shift all following characters to the left by one place.

Press the button under SAVE to accept the current name and save the preset.

You don't have to enter a name to save a preset. In that case, the preset is called "Unnamed" in the list of presets and can only be identified by it's number.

5.5.3 Editing a preset

To edit an existing preset, select the preset you want to move with the rotary knob and then do a **long press** on ROT to open the Edit Preset Menu. The chosen preset name will be displayed, along with four options: “Move”, “Rename”, “ Replace” and “Delete”. Select one of the options with the rotary knob or press BACK to cancel the operation.

5.5.4 Moving a preset

When you choose “Move” in the Preset Edit Menu, the preset list will appear with the chosen preset highlighted. Use the rotary knob to move it to the desired position, then do a short press on the rotary knob to save the new position. Or press the BACK button to cancel the operation.

5.5.5 Renaming a preset

When you choose “Rename” in the Preset Edit Menu, you will be presented with a screen where you can modify the preset name. This screen works just in the same way as if you would save a new preset (see “ Saving a preset” above).

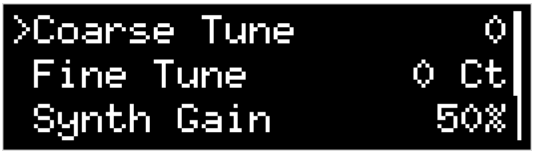
5.5.6 Replacing a preset

When you choose “Replace” in the Preset Edit Menu, the current instrument setup will be stored over the preset you are currently editing, replacing everything with the new setup.

5.5.7 Deleting a preset

When you choose “Delete” in the Preset Edit Menu, the currently selected preset is deleted immediately and the following presets are shifted up automatically.

5.6 Configuration Menu



The configuration menu can be reached by **pressing D4 twice** (once to see the Presets Menu, then again to open the Configuration Menu). It contains many settings that affect the instrument as a whole:

- **Coarse Tune** – shifts the tuning of all strings of the MidiGurdy up or down the given number of semitones.
- **Fine Tune** – shifts the tuning of all strings of the MidiGurdy up or down the given number of cents. The default tuning (Fine Tune = 0, Coarse Tune = 0) of the instrument with the supplied Soundfonts is A=440Hz.
- **Pitch Bend** – controls the amount of pitch bend in cent that you will hear when pressing a key harder or softer. Increase this value for more pitch bend, decrease it for less. 100 cent equal one semitone.

- **Synth Gain** – Controls the amount of gain (amplification) used in the internal synthesizer. Depending on the sounds you have chosen for the strings and the volume of the samples in the Soundfont, you might have to increase the gain to reach the desired volume or decrease the gain to avoid digital distortion and clipping in the synthesizer.
- **Keynoise...** - opens a menu similar to the String Menu where you can choose the sound of the key noise channel and change the volume and stereo balance of the key noise.
- **MIDI...** - opens the MIDI configuration menu. Please see *MIDI with the MidiGurdy* (page 19) on how to configure the MIDI input and output.
- **Instrument Mode...** - With this setting you can choose how many strings the MidiGurdy should have and change the function of the lid buttons Mod1, Mod2. Please see the *Instrument Modes* (page 23) section for more information.
- **Brightness** – Controls the brightness of the display.
- **Disp. Timeout** – Controls the number of seconds of inactivity after which the menu system will return to the Home Screen automatically.
- **Preload Presets** - This function loads all sounds of all your presets into memory, enabling much faster preset switching.

6 MIDI with the MidiGurdy

With the USB MIDI output feature, you are able to use the MidiGurdy as a MIDI controller, for example to control external synthesizers or use the instrument to input notes in a music notation editor.

6.1 Connecting to MIDI devices

To use this feature, you first need to connect the MidiGurdy to another device. There are a number of different ways on how you can make this connection.

6.1.1 USB MIDI to Computer or Tablet

If you want to use the MidiGurdy as an input device to write musical notation, if you want it to control a software synthesizer or other musical software running on your computer, you can simply connect your instrument to your computer as if you wanted to access the web-interface. So use a USB-A to USB-B cable, attach the USB-A plug into your computer and the (square) USB-B plug into the MidiGurdy.

Depending on your operating system, you might need to open up the Sound or MIDI device preferences.

Android MIDI

Unlike the web-interface, the MIDI function should work on Android as well!

The MidiGurdy registers as a MIDI device to your computer as soon as you plug it in, but it does not send any MIDI messages until you enable the connection on the instrument as follows:

- Press D4 twice to go to the Configuration menu
- Turn the rotary knob to scroll down to the “MIDI…” entry
- Press the rotary knob to open the list of MIDI devices
- You will see only one entry: “Main Midi…”. Select it by pressing the rotary knob
- Turn the rotary knob to scroll down to “Output” and press the rotary knob to active the option
- Turn the rotary knob to switch between the options “Off”, “On” and “Auto-On”

Off means the MidiGurdy does not send any MIDI messages (the default and best option if you don’t use this feature, to conserve processing power and battery consumption).

On means that the MidiGurdy will send MIDI messages via this connection. If you disconnect the USB cable and plug it back in, you will need to manually enable it again to send MIDI messages.

Auto-On means that the connection is On (MIDI messages are sent) and if you disconnect the USB cable and plug it back in, the connection will automatically be enabled again.

So as soon as the "Output" value is **On** or **Auto-On**, the MidiGurdy will start sending MIDI messages to your computer.

6.1.2 USB MIDI to another USB MIDI device

If you want to use the MidiGurdy to control another MIDI device that has a USB MIDI port (like a more modern synthesizer, a MIDI expander or similar), you can use the same USB-A to USB-B cable that you use for the connection to a computer.

But the way you use the cable is different: attach the square USB-B plug to your external MIDI device and plug in the USB-A plug into the vertical USB-A port on the MidiGurdy.

Open the MIDI configuration on the MidiGurdy (press D4 twice, scroll down to "MIDI…") and you should see a new entry in the list. The name of this entry depends on how your external MIDI device registers itself. As with the previous connection method, select the MIDI connection by pressing the rotary knob, scroll down to "Output" and set it to "On" or "Auto-On".

6.1.3 Connecting to an old-style (5-pin) MIDI device

If you want to control a device with the old-style 5-pin MIDI connector, you will need a USB to 5-pin MIDI adapter cable. These adapter cables can be bought in many places, many at very affordable prices (a few Euro). Any cable that requires no additional drivers for Windows will work fine with the MidiGurdy.

If you have a USB to 5-pin MIDI adapter available, connect its USB-A plug to the vertical USB-A port on the MidiGurdy.

Open the MIDI configuration on the MidiGurdy (press D4 twice, scroll down to "MIDI…") and you should see a new entry in the list. The name of this entry depends on how your adapter cable calls itself. Often it is something like "MIDI cable #1" or similar. As with the previous connection methods, select the MIDI connection by pressing the rotary knob, scroll down to "Output" and set it to **On** or **Auto-On**.

6.2 MIDI messages sent by the MidiGurdy

The MidiGurdy outputs MIDI messages on three separate MIDI channels, one for each string type. By default, the following MIDI channels are used:

- Melody: MIDI channel 1
- Trompette: MIDI channel 2
- Drone: MIDI channel 3

Which strings output via MIDI

Important: only strings that are configured (have a sound assigned to them) and enabled (green LED button is on) actually send MIDI messages. And only the first string of each type actually outputs via MIDI, so only Melody 1, Drone 1 and Trompette 1

6.2.1 Melody String MIDI Messages

- Note On/Off, with a range of fixed velocities - sent in reaction to key presses and wheel start / stop
- Expression Control (CC 11) - used for volume instead of Note-on velocity, controlled by the speed of the wheel
- Channel pitch bend - depends on the key pressure of the highest pressed key

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Keyboard Mode

Note: If you choose **Keyboard mode** for the melody string, no expression messages get sent and the velocity (volume) of the Note On messages is determined by the speed / force with which you press the keys. In this mode the MidiGurdy melody string behaves similar to a keyboard / piano.

6.2.2 Drone String MIDI Messages

- Note on/off, with fixed velocity
- Expression Control (CC 11) - used for volume instead of Note-on velocity, controlled by the speed of the wheel

6.2.3 Trompette String MIDI Messages

Which MIDI messages are sent by the trompette string depends on the internal mode of the string. The mode is determined automatically by the type of sound selected for this string. If you choose a "normale" MidiGurdy trompette sound, then it's in the "MidiGurdy" mode. If you choose a different sound, it is automatically switched to the "Percussion" mode.

In "MidiGurdy" mode:*

- Note on/off, with fixed velocity - Note On as soon as you move the wheel
- Expression (CC 11) - used for volume, controlled by the speed of the wheel
- Channel Pressure - controlled by the speed of the wheel above the chien sensitivity threshold

In "Percussion" mode:

- Note on/off - Note On only for a coup impulse, velocity is the speed of the initial impulse)

6.3 MIDI Output Configuration

There are a few settings you can change on a MIDI output. These settings will be automatically saved and recalled when you reconnect a MIDI device with the same name as before.

- **Melody channel**: Determines the MIDI channel for the melody string.
- **Drone channel**: Determines the MIDI channel for the drone string.
- **Trompette channel**: Determines the MIDI channel for the drone string.
- **Program Change**: Controls if program and bank change messages should be sent to the external MIDI device. If this setting is enabled, every time you change a sound of a string sends a program and bank change message with the bank and program number of the selected sound. The default of this setting is off, so no program change messages are being sent.
- **Speed**: Use this setting to control the maximum number of MIDI messages per second that the MidiGurdy sends over this connection. The default value of "Standard" limits the total number of messages sent across all channels to below 1000 per second, which is the maximum that most standard MIDI devices can cope

with. The downside is that the resolution of the messages gets reduced and the latency of the messages is higher.

If you connect to a MIDI device that has more processing power and can cope with more messages per second, you can try the "Fast" setting. This will limit the maximum number of messages per second to 2000. There will be much less latency and resolution loss.

"Unlimited" does not limit the number of messages in any way, so they are sent out via MIDI as they get generated by the internal sensors and modelling. Depending on your playing style, string modes and enabled strings, it can be as much as 5000 messages per second.

7 Instrument Modes

Once you are familiar with the way the MidiGurdy works, you can customise it's behaviour and extend the capabilities of the instrument.

The different instrument modes allow you to configure the **number of strings** in your MidiGurdy and the behaviour of the **lid buttons** S1 S2 S3 and Mod1 Mod2.

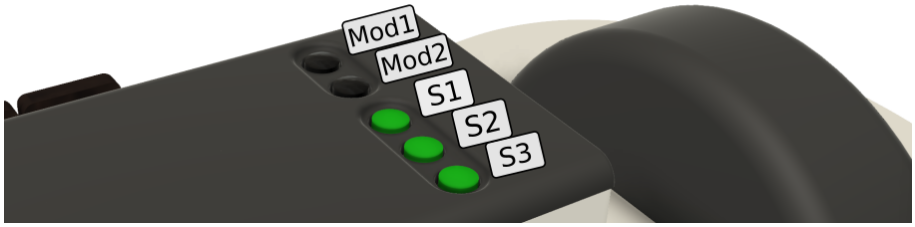

Fig. 1: The lid buttons affected by the instrument mode

The following modes are available:

7.1 3 Strings (the default mode)

This is the default mode of the MidiGurdy. It provides one melody, one drone and one trompette string.

Lid Buttons with 3 Strings

- S1, S2, S3 are used to switch the drone, melody and trompette strings on / off.
- Mod1 and Mod2 can be used to load the previous and next preset.

Fig. 2: The home screen in "3 Strings" mode

7.2 6 Strings

This mode gives you an additional set of melody, drone and trompette strings, bringing the MidiGurdy to a toal of 6 strings.

Lid Buttons with 6 Strings

- S1, S2, S3 are used to switch the drone, melody and trompette of the **current set** on / off.
- Mod1 loads the previous preset with a **long press**, the next preset with a **short press**.
- Mod2 switches which **string set** the S1, S2 and S3 buttons control.

Home Screen with 6 Strings

The home screen uses a different layout in two strings mode. It shows two rows of strings, each row represents one **string set**. Which string set is active is shown by the vertical lines next to the string indicators.

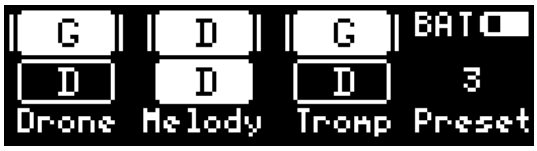

Fig. 3: The home screen in 6 String mode with the first string set active

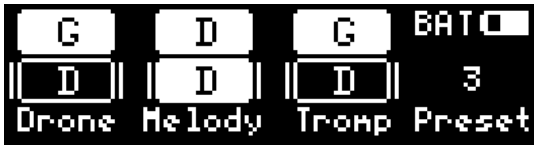

Fig. 4: The home screen in 6 String mode with the second string set active

String Menus with 6 Strings

As you now have two strings of each type, you also have two string menus each. For example, pressing D2 will open the first melody string menu, pressing D2 again will switch to the second melody string menu. Which string you are currently editing is shown in on the left.

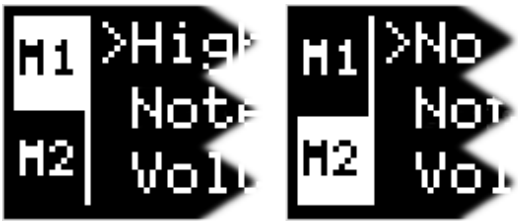

Fig. 5: The two string menu indicators after pressing D2 repeatedly.

7.3 9 Strings, grouped by number

The 9 Strings mode gives you yet another additional set of melody, drone and trompette strings, bringing the MidiGurdy to a toal of 9 strings.

The first variant of the 9 Strings modes groupes the strings by number, just like the 6 strings mode but with one additional set. The lid buttons work slightly different though:

Lid Buttons with 9 Strings, grouped by number

- S1, S2, S3 are used to switch the drone, melody and trompette of the **current set** on / off.
- Switch between sets with **short presses** on Mod1 and Mod2.
- Switch between presets with **long presses** on Mod1 and Mod2.

Home Screen with 9 Strings, grouped by number

The home screen uses a similar layout to the 6 strings mode. It shows three rows of strings, each row represents one **string set**. Which string set is active is shown by the vertical lines next to the string indicators.

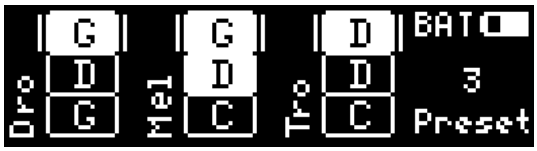

Fig. 6: The home screen in 9 Strings, grouped by number mode with the first string set active

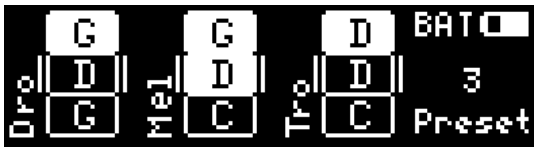

Fig. 7: The home screen in 9 Strings, grouped by number mode with the second string set active

Fig. 8: The home screen in 9 Strings, grouped by number mode with the third string set active

String Menus with 9 Strings

The string menus gain an additional entry, just as with the 6 String mode. So for example, pressing D2 will open the first melody string menu, pressing D2 again will switch to the second melody string menu. and pressing D2 a third time switches to the third melody string menu. Which string you are currently editing is shown in on the left.

Fig. 9: The three string menu indicators after pressing D2 repeatedly.

7.4 9 Strings, grouped by type

This mode gives you nine strings, just like the previous mode. But it groupes the strings in a different way. This only affects how you switch strings on and off using the S1 S2 S3 buttons.

Grouping by string type means that S1 S2 S3 switch the first, second and third string of the currently active type. If the currently active set is “melody”, then S1 switches melody 1, S2 melody 2 and S3 melody 3.

Lid Buttons with 9 Strings, grouped by type

- S1, S2, S3 are used to switch strings 1 - 3 or the **currrently active type**.
- Switch between presets **short or long presses** on Mod1
- Switch the active string type with **short or long presses** on Mod2.

Home Screen with 9 Strings, grouped by number

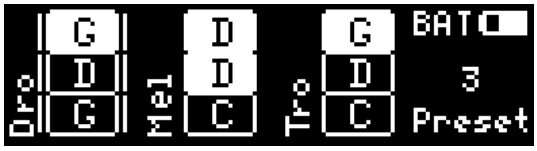

Fig. 10: The home screen in 9 Strings, grouped by type mode with the drone set active

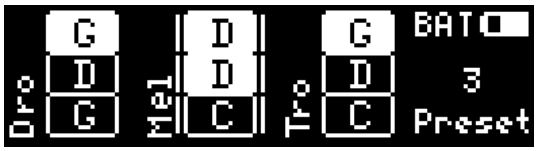

Fig. 11: The home screen in 9 Strings, grouped by number mode with the melody set active

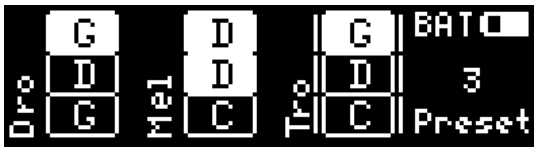

Fig. 12: The home screen in 9 Strings, grouped by number mode with the trompette set active

7.5 Old MidiGurdy Mode

This is the way the MidiGurdy worked before configurable instrument modes were added: 9 strings, grouped by number.

Lid Buttons

- S1, S2, S3 are used to switch the drone, melody and trompette of the **current set** on /off.
- **Hold** Mod1 to select the second set
- **Hold** Mod2 to select the third set

(If you don’t hold Mod1 or Mod2, the first set is active.)

7.6 Custom Mode

If you would like a different instrument setup that is not offered by these predefined modes, you can also open the *The Web Interface* (page 28) and choose a custom setup of strings and how the lid buttons react in the "Settings" area.

8 The Web Interface

When you connect the MidiGurdy to a desktop computer, laptop or tablet via the USB connection, you will be able to access the Web Interface to configure the instrument, upload new sounds and to use the visualisation of your trompette technique.

In the following description we always call the computing device you are using to access the MidiGurdy "computer".

8.1 Making the connection

As explained in *USB Data Connection to Computer or Tablet* (page 12), please use a USB-A to USB-B cable to connect the MidiGurdy to your computer.

Once the connection has been established, the MidiGurdy will present itself as a USB network card to your computer. It acts as a a *class-compliant USB* device, which means that you should not have to install special drivers to use it.

The connection has been tested to work on Windows 7, Windows 8, Windows 10, OS X, Linux and iOS.

Android Support

Sadly, the network connection is currently only supported on rooted Android devices. If you don't know what a *rooted Android device* is, then you probably don't have one.

The MidiGurdy and your computer will automatically set up a private network, so only your computer and the MidiGurdy can talk to each other. At no point will the MidiGurdy be accessible to the Internet or someone on the Internet be able to reach the MidiGurdy. Even computers on your local Wi-Fi network will not be able to access the MidiGurdy.

By default, the IP address of the MidiGurdy is **10.10.10.10**. So once the connection has been established, open the Web Browser of your choice and type the following into the address bar:

http://10.10.10.10

Alternatively, if your computer supports *ZeroConf* (Linux, Android) or *Bonjour* (OS X, Windows), you should be able to access the MidiGurdy via the following URL:

http://midigurdy.local

Windows does not support ZeroConf or Bonjour by default, but you can can install the "Bonjour Print Services for Windows" from the Apple Website to enable support for Bonjour.

If you see a web page saying "Welcome to the MidiGurdy!" in your browser, the connection has been established successfully and you are all ready to go.

8.2 Features of the Web Interface

The Web Interface gives you access to all settings that are also available via the Menu System on the instrument itself. In addition, there are some functions that are only available via the Web-Interface, namely:

- Adding and removing sounds
- Visualisation of the trompette technique
- Advanced configuration to change the response to keyboard and crank
- Keyboard calibration

Note: The features of the web-interface have not been documented properly yet. Please watch this space for updated documentation.

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9 Software Upgrades

From time to time it might be necessary to upgrade the Software running on the MidiGurdy to a new version. Either to fix existing problems or to take advantage of new features.

MidiGurdy Software Download

The newest versions of the MidiGurdy software can always be found in the download section of the MidiGurdy website: http://www.midigurdy.com/downloads/

9.1 Software Version and Compatibility

The versioning of the software follows a simple scheme: <Major Version>.<Minor Version>.<Patch level>. For example, the Version number "1.11.5" is major version 1, minor version 11 and patch level 5.

The patch level is increased for small changes or bugfixes that don't change the behaviour of the instrument in a noticeable way (apart from fixing the bug, of course).

The minor version is increased for new features or changed behaviour that are noticeable for the user, but still work with your existing configuration and presets.

A new major version indicates that there are changes that are incompatible with the previous version and therefore require you to backup your configuration before the upgrade and restore (or recreate) it again afterwards.

Always read the release notes!

When upgrading to a new version, please read the release notes carefully before upgrading!

9.2 Upgrading via USB stick

In order to upgrade the MidiGurdy software, you will need a FAT/FAT32 formatted USB stick with sufficient space for the upgrade file. Download the new software release from the MidiGurdy website to your computer and store it on the USB stick. Make sure you store it with the exact filename, i.e. the version 1.2.3 will be called "midigurdy-1.2.3.swu"

Eject the USB stick from your computer and attach it to the MidiGurdy via the USB-A host port. After a few seconds the MidiGurdy will inform you that it has found an upgrade file on the USB stick and ask if you want to go ahead with the upgrade. Follow the instructions on the display to complete the upgrade process.

Important: Do not interrupt the upgrade!

Do not switch off the MidiGurdy while the upgrade is in progress and ensure that the instrument is supplied with sufficient power before starting the upgrade!

During the upgrade, the String Buttons in the tangent box lid will flash to indicate that the upgrade is in progress. Once the upgrade has finished, remove the USB stick from the MidiGurdy and press any button to restart the instrument. After a successful upgrade, the version number shown during start-up should match the version you wanted to upgrade to.

9.3 Troubleshooting

If the MidiGurdy does not start the upgrade process a few seconds after you have inserted the USB stick, please double-check if the upgrade file has actually been written to the USB stick and that the file is called "midigurdy-X.Y.Z.swu", where X, Y and Z indicate the version you are upgrading to.

If your USB stick does not work

There are some USB sticks that draw a lot of power from the USB port in order to function properly (especially sticks with very high capacity or USB 3.0 transfer speeds). If your stick is not recognized, please try a different USB stick with a lower power consumption.

MacOS Users: Please format your USB stick with FAT / FAT32

When you format a USB stick with MacOS, you can choose between "MacOS Extended", "AFPS" and "FAT" filesystems. Please make sure to format your stick with **FAT** to make it work in the MidiGurdy.

In case the upgrade process was interrupted by a power failure or has failed due to a different reason, the previous software version will still be intact and working. Simply restarting the MidiGurdy should bring it back into a working state.

In case the instrument does not start again after all, please contact us for support. As the MidiGurdy uses a replaceable SD-Card for data storage, you will always be able to revive your instrument if an upgrade went horribly wrong.

9.4 Additional Notes

You can always upgrade or downgrade to any version of the MidiGurdy software. But please take special care when upgrading or downgrading between different major versions!

10 Adjusting the Keyboard

The MidiGurdy allows you to adjust some of the mechanical aspects of the keyboard in order to match them to your liking or to recreate some of the playing feel of your acoustic hurdy-gurdy.

There are two properties you can change:

1. the tension of the string inside the tangent box
2. the travel of the keys before hitting the string.

10.1 Opening and closing the tangent box lid

Open up the tangent box lid by grabbing the protruding end on the side towards the wheel cover. Push or pull it upwards with a little force to separate it from the magnets holding it in place. The lid is connected to the body via a small cable, so please make sure you don't pull the lid away too far without unplugging the cable.

Once you've made your adjustments, replace the lid and the magnets should make it snap into place.

10.2 Changing the string tension

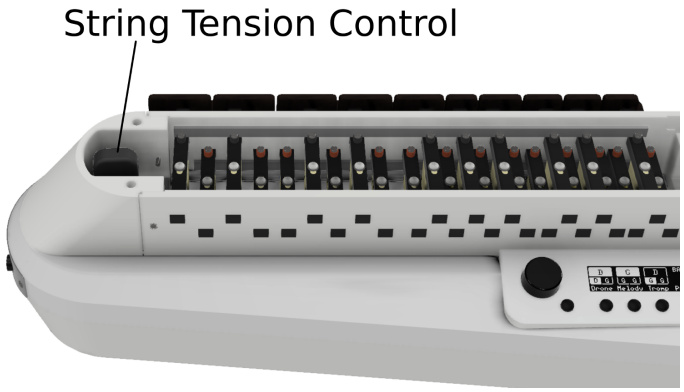

Fig. 1: Location of the string tension tuner

Inside the tangent box you see the instrument tuner near the front of the instrument. Turn the knob on the tuner clockwise to increase the string tension or anti-clockwise to decrease the tension.

Always make small adjustments

Always make only small adjustments to the string tension and check if the playing feel has changed to your liking. Increasing the tension too much might damage the instrument!

10.3 Changing the key travel

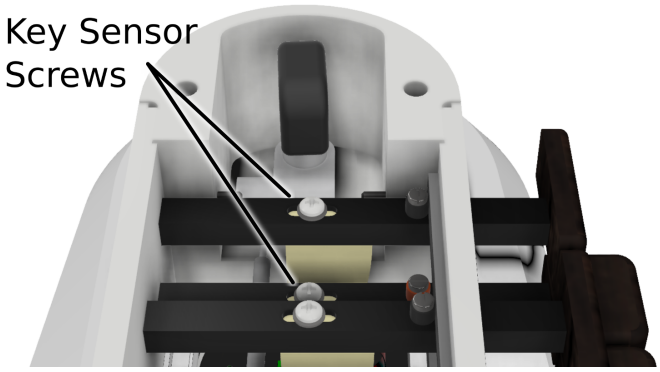

Fig. 2: Location of the key sensor screws

The key travel can be adjusted for each individual key by changing the position of the key sensor.

1. Use a small Phillips screwdriver to loosen the screw holding the sensor in place a little bit.
2. Use the screwdriver to shift the screw and attached key sensor forwards or backwards. You might need to use a little force to move it the first time. Pressing down on the screw or lifting it with a fingernail might help to get it to move more freely.
3. Once you have positioned the key sensor, tighten the screw again, but only very lightly.

Only loosen the screws

Only unscrew the key sensor a small amount until you can move it. Do not unscrew it all the way, otherwise the key sensor might drop away from the key, making it very difficult to get it back into place!

Do not tighten with a lot of force

Only tighten the screws of the key sensor with a small amount of force! Ideally you should use a screwdriver with a thin handle to turn the screw, reducing the force you can apply to the screw. The key sensor will hold in place even when the screw is not very tightly secured!

10.4 Recalibration

The key sensors are very sensitive to the amount of force with which they are pressed against the string. This means that larger changes to the string tension or a significant change in key travel might make it necessary to recalibrate the keyboard sensors.

To recalibrate the keyboard, please connect the MidiGurdy to a computer to access the Web-Interface. Then choose the recalibration function from the Advanced menu.

11 Troubleshooting

If the instrument does not work as expected, please try to identify the problem by following the instructions below. If your problem is not listed or cannot be solved with the given hints, please use the support forum at https://forum.midigurdy.com or contact us directly.

11.1 The instrument turns off for no apparent reason or sometimes doesn't start at all

- If you have a device plugged into the USB host port (maybe a USB stick or a USB-to-MIDI converter), remove the device and see if the problem persists.

If you are powering the MidiGurdy only via the USB port:

- Use a shorter USB cable and / or use a different USB port on the connected device.
- If using a phone charger as power supply via USB, use a different phone charger that can deliver more power.
- Insert charged batteries into the instrument. The batteries can compensate for the current peaks if the connected device cannot supply enough current.
- Connect the supplied power supply

If you are powering the MidiGurdy via the 5V power supply:

- Check the polarity of the batteries
- Use a different power source, like USB or batteries. Maybe the power supply is faulty.

If you are powering the MidiGurdy only via batteries:

- Replace the batteries with new or freshly charged ones

11.2 The instrument does not produce any sound when turning the crank

- Ensure that you have connected working headphones to the MidiGurdy headphone connector
- Make sure you have loaded a sound for at least one of the strings.
- Check the *main volume* (page 14) and the *string volume* (page 15)

11.3 My stereo headphones sound like they output two identical mono signals

- Turn the *balance of a sounding string* (page 15) to the far left or far right to check the stereo balance.
- Ensure that you are using a TRS-style connector (a headphone plug with only three sections on the plug). TRRS-style connectors (with four sections, as found on many headsets and headphones with microphones or volume controls) might not work as expected.
- If you are using a 3.5mm to 6.3mm adapter for your headphones, ensure that it is a stereo adapter and that it works as expected by testing it on another device.

11.4 I hear a lot of noise or humming when connecting the instrument to an external speaker or other sound device

- Make sure you are using the supplied Y-cable and the breakout box to properly separate the MidiGurdy from the external device. See *Other Sound Equipment* (page 11) on how to connect the MidiGurdy to external sound devices.
- Check if the casing of the plug inserted into the headphone socket is made of metal and touches the front cover shielding the connectors. A connection between plug and front cover might lead to ground loops and a lot of noise in the output.

12 Technical Details

12.1 Dimensions

Weight	2.7 kg (without batteries)
Physical dimensions	53 cm x 20 cm x 12,5 cm (Length x Width x Height, maximum values)
Crank thread	M6

12.2 Processor

CPU	Dual-Core Coretex-A7 ARM CPU
RAM	1 GB
Operating System	Linux

12.3 Electrical Details

Typical power consumption	1 watt
Supply voltage	5V DC with supplied power supply
Battery supply	8x AA/R6/Mignon batteries
Audio Output	Stereo headphone amplifier

12.4 Connectors

5V power supply plug	2.1 x 5.5 x 9.5mm (center positive)
Headphone jack	6.3mm stereo (TRS – Tip, Ring, Sleeve)
USB host	USB-A
USB device	USB-B