Tubbutec TRS Bridge

User Guide

Features

- 4x TRS MIDI inputs, 4x TRS MIDI outputs
- Can route, split and merge MIDI streams
- Independent MIDI flow settings for notes/CC (red), clock (blue) and sysex (yellow)
- Easy to use user interface, quickly change routes, color coded routes and events.
- MIDI event monitor with color coding for various message types
- Save and recall up to 8 routing settings
- Automatically accepts both TRS A and TRS B at the inputs
- Outputs individually selectable between TRS A and TRS B
- Convert between TRS A and TRS B
- Save detach: Will send note off messages if a connection is detached
- Auto-restarter Will send re-sync new clock connections automatically
- Sysex Buffer: Buffers Sysex messages if necessary in order to merge them
- Adjustable LED brightness
- Full galvanic separation of inputs - no ground loops.

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Introduction

TRS Bridge is a midi router, merger and splitter with four TRS-style inputs and four TRS outputs.

MIDI messages received at the inputs can be forwarded to one or multiple MIDI outputs. Similarly each of the outputs can receive MIDI messages from one or multiple inputs.

TRS Bridge can set these routes in a simple modes for all types of MIDI messages, but it is also possible to route different kinds of messages differently:

Note and controller data

These are all the midi messages that can be merged without any issues. If two devices send midi at the same time, data will be interleaved and sent to the receiving device.

Clock Data

Clock data can not be merged, only one midi clock stream can be used at a time. When changing the routing, TRS Bridge makes sure that each output only receives clock from a single input.

Sysex data

Sysex data is even trickier to handle than clock data, because sysex messages can have an arbitrary length. if multiple sysex streams are received simultaneously, USB bridge A buffers the data and will forward it to the receiver as soon as possible. This way sysex messages are merged as well.

User interface

TRS-Bridge features four MIDI inputs at the top, and four MIDI outputs at the bottom. Each of the channels has a multicolor LED and a button associated with them. In this manual we will use terminology such as "input 4 LED" or "output 2 button".

Color coding

TRS-Bridge uses color coding to show different kinds of MIDI messages, being able to see colors is however not nessesary to use TRS-Bridge.

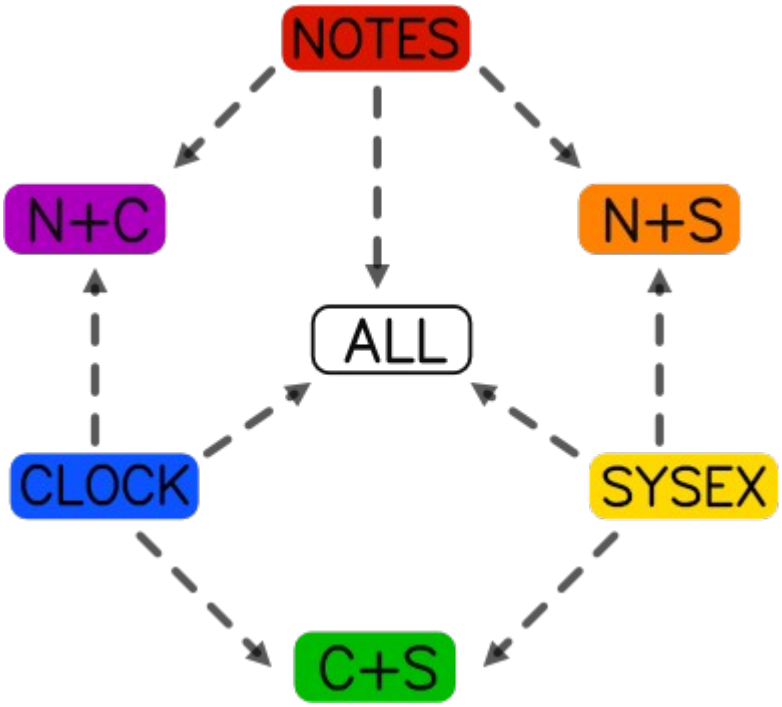
Note/CC: Notes, MIDI CC, Pitch Bend, as well as other kinds of MIDI messages that do not fall in the following categories are shown in RED.

Clock: MIDI Clock, Start, Stop, Continue and 'transport' messages are shown in BLUE.

Sysex: Sysex Messages are shown in YELLOW.

If multiple kinds of messages are displayed, the colors are mixed in a mostly additive manner:

Notes + Clock (RED + BLUE) = PURPLE
Notes + Sysex (RED + YELLOW) = ORANGE
Clock + Sysex (BLUE + YELLOW) = GREEN
Notes + Clock + Sysex = WHITE



Status page

After turning on TRS-Bridge, it starts up with the status page. The status page shows the activity of the MIDI inputs and outputs. If there is no activity, the LEDs glow dimmly.

Activity on the inputs and outputs is indicated according to the color coding mentioned above.

An example:

If a note or MIDI CC message is received, the respective input will light up in red. Outputs that send this message will light up simultaneously. The same is true for clock and sysex messages.

A special case are clock signals. Additionally to the activity, the clock LEDs are also pulsing with the clock tempo and indicating a quarter-note downbeat.

An example of a status page:

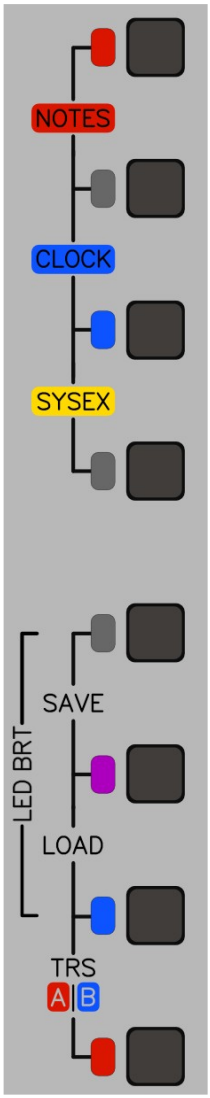
Input 1 receives note or CC messages

Input 3 receives clock messages

Output 2 sends clock and note messages

Output 3 sends clock messages

Output 4 sends note messages



Simple routing

There are two ways to connect inputs and outputs.

- Input side of view: Connect an input to one or multiple outputs
- Output side of view: Connect an output to one or multiple inputs

Both methods can result in the same routing and both methods are supported by TRS-Bridge

The Simple routing method can be used to quickly connect inputs and outputs without having to think about the various kinds of MIDI messages.

Connect an input to outputs

From the status page press one of the input buttons.

The input will blink in white.

The output LEDs show the connections between this input and the outputs.

Press the output buttons to turn connections between the selected input and this output on or off.

You can also select a different input by pressing another input button.

To exit the simple routing page and go back to the status page, press the selected (blinking) input again.

Connect an output to inputs

From the status page press one of the output buttons.

The selected output will blink in white.

The input LEDs show the connections between this output and the inputs.

Press the input buttons to turn connections between the selected input and this output on or off. *Note: Since only only one clock can be received by an output, TRS-bridge will automatically remove previous clock routings when a new connection is made. You will see previously white connections (All message types routed) turn orange (Only Note and Sysex messages routed).*

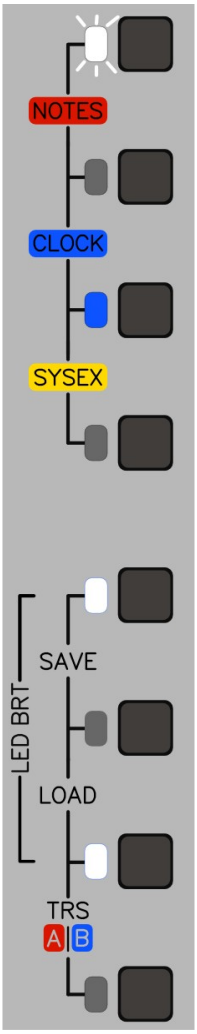
You can also select a different output by pressing another output button.

To exit the simple routing page and go back to the status page, press the active (blinking) output again.

Simple routing,
input side of view.

Input 1 is selected and blinking

Outputs 1 and 2 are connected to input 1



Simple routing,

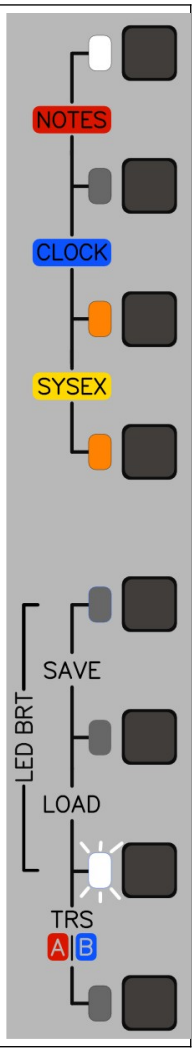
output side of view.

Output 3 is selected and blinking

inputs 1, 3 and 4 are connected to output 3

However, only the clock from intput 1 is routed to output 3.

From inputs 3 and 4 clock is not received



Advanced routing

With advanced routing you can route the various message types (Notes/CC, Clock and Sysex) independently.

Routing notes / CC

From the status page press inputs 1 & 2 simultaneously. Inputs 1 & 2 will blink in red indicating that you can now select channels for Note routing.

You can select either an input channel or an output channel and continue routing the same way as in Simple Routing.

Routing clock

From the status page press inputs 2 & 3 simultaneously. Inputs 2 & 3 will blink in blue indicating that you can now select channels for Clock routing.

You can select either an input channel or an output channel and continue routing the same way as in Simple Routing. You will notice that only one input can be selected for each output.

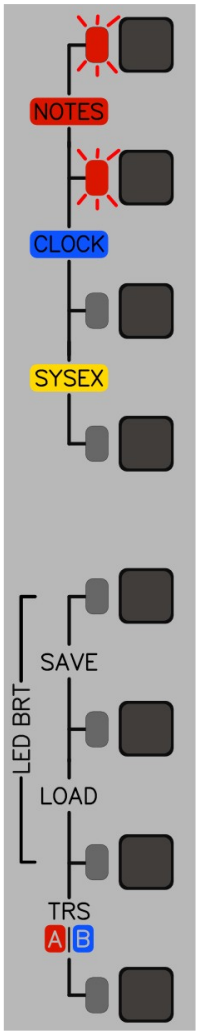
Routing sysex

From the status page press inputs 3 & 4 simultaneously. Inputs 3 & 4 will blink in yellow indicating that you can now select channels for Sysex routing.

You can select either an input channel or an output channel and continue routing the same way as in Simple Routing.

An example of Note Routing

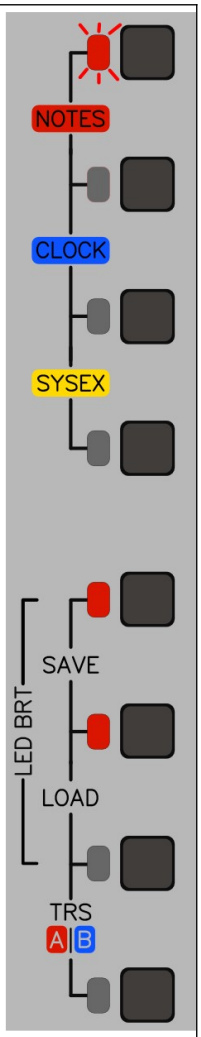
After pressing inputs 1 & 2, note routing mode is selected. This is indicated by inputs 1 & 2 blinking in red.



After selecting an input,

Note routing mode is active

input 1 is connected to outputs 1 & 2



TRS A/B select

There are two kinds of MIDI TRS pinouts: TRS A and B.

TRS Bridge automatically accepts both types at the inputs. The outputs can be individually switched between Type A and Type B. This means TRS Bridge can also be used to convert one type into another and works well to connect gear of any type.

To change the TRS type of an output, press output buttons 3 & 4 simultaneously.

The four outputs will light up in either red or blue:

- Red: Output is TRS type A
- Blue: output is TRS type B

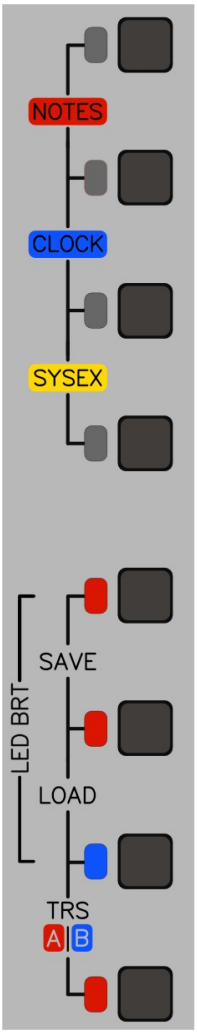
To change the TRS type of an output press its button.

To exit the TRS type menu, press output buttons 3 & 4 simultaneously again.

The TRS type setting is saved and will be available after power down.

Outputs 1,2 and 4 are configured as TRS-A,

Output 3 is configured as TRS-B



Change LED brightness

To change the LED brightness, press output buttons 1 & 3 simultaneously.

Output buttons 1 & 3 will blink in yellow indicating the LED brightness menu.

Press any of the 8 buttons to change the LED brightness in 8 steps.

When finished, press output buttons 1 & 3 again.

The LED bridghness setting is saved and will be available after power down.

Save and load routings

Up to 8 different routings can be saved and recalled.

After changing routes, you need to save manually if you want the settings to be preserved.

When powering up TRS Bridge, the last saved or loaded configuration will be loaded.

Save routings

To save the current routing setting, press output buttons 1 & 2 simultaneously.

Outputs 1 & 2 will light up in white indicating that routing settings can now be saved. Press any of the 8 buttons to save the current routing in one of 8 slots.

TRS Bridge will automatically return to the Status Page after saving.

To cancel saving, press buttons 1 & 2 simultaneously again.

Load routings

To load one of the 8 saved routings, press output buttons 2 & 3 simultaneously.

Outputs 1 & 2 will light up in white indicating that routing settings can now be loaded. Press any of the 8 buttons to load a previously saved setting from this slot.

TRS Bridge will automatically return to the Status Page after loading.

To cancel loading, press buttons 2 & 3 simultaneously again.

Save detach

Normally, deactivating a connection to an output might result in hanging notes, as no Note-Off midi signals are sent anymore.

TRS bridge memorizes which notes are sent to an output. When disconnecting an output in the router, TRS-Bridge sends Note-Off messages for all currently active notes.

As a result the problem with hanging notes is elliminated.

Auto restarter

Establishing a new clock connection while your incoming MIDI clock is already running will normally result in an out of phase clock. This is because the receiving MIDI device did not receive a Midi-Start message. Or maybe it did receive a Start message at an earlier time, but the clock is now out of sync.

To mitigate this, TRS-Bridge automatically detects such a situation and re-syncs the output clock:
When a new clock connection is made, TRS-Bridge waits until the end of the current bar, then sends a Midi-Stop and Midi-Start message to restart the MIDI device. Clock routing then continues normally.

While waiting for the current bar to finish, no clock messages are sent. This is to make sure the clock is always in sync and avoids issues with multiple clock domains.

Galvanic input separation

MIDI works with a current loop and without a ground connection between devices.
This avoids issues with ground loops for example.

MIDI devices therefore do not have ground connected on the input connectors.

This is often problematic with TRS jacks, due to their sleeve being connected to the (conducting) front panel. This would result in a ground connection between multiple MIDI devices.

TRS-Bridge uses custom insulators to make sure there is no ground connection and to achieve full galvanic separation between the inputs.

Firmware updates

Firmware can be updated via midi sysex

For the newest firmware follow the link on https://tubbutec.de/trs-bridge/

Specifications

3U Eurorack format
6HP wide
25mm total height, Depth behind panel: 21mm (including power connector)

Weight: 63g

Latency:

- End of received message to start of output message: 30µS
- Clock latency edge to edge 250µS (220µS clock message length + 30µS latency)

Electrical:

- Galvanically isolated MIDI inputs
- 5V midi outputs
- Supply: 12V
- Current draw: 50mA - 150mA (depending on LED brightness)

Tubbutec GmbH

https://tubbutec.de