

## What's this?

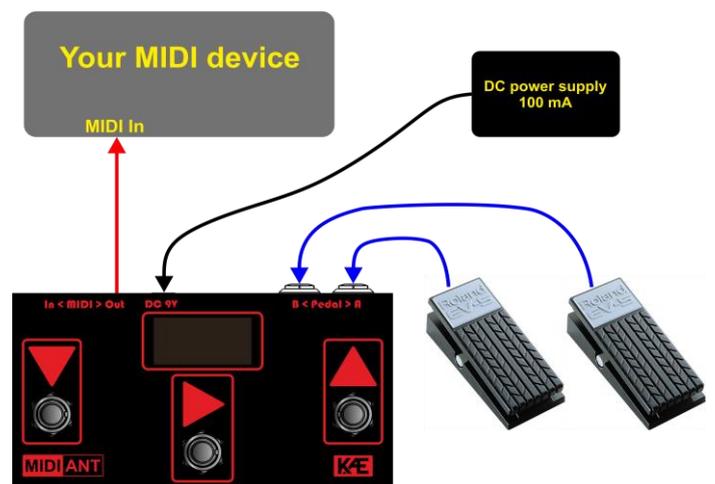
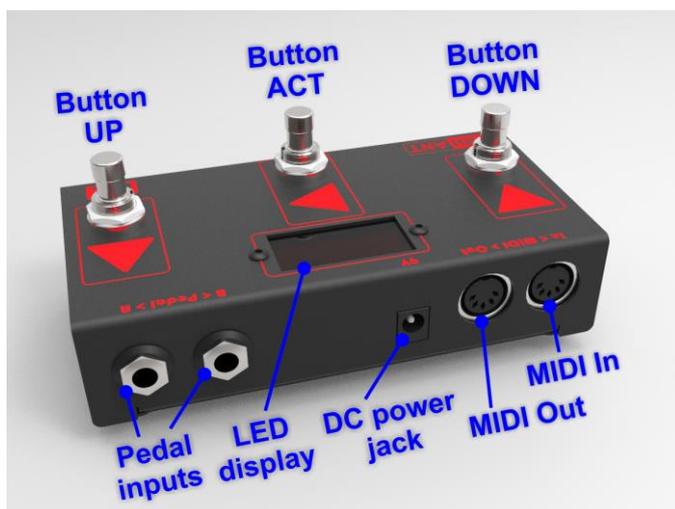
**MIDI Ant** is a powerful small-sized universal programmable MIDI controller. It can:

- Reach every preset in every possible bank, in every device! Plus, it helps You to rearrange Your favorite presets in a list of up to 256 items!
- Show the program number in various formats
- Send up to 9 messages *at once* on each button actuation phase – on press, hold or release
- Make sophisticated MIDI message filtering, transformation and routing
- Generate a highly precise MIDI Clock for your favorite delay pedal, with period between 20 and 300 BPM and 1 BPM increments
- Handle up to 2 external expression pedals and apply sophisticated value transformation and routing

Plus, it has these amazing features:

- It comes with a free Microsoft Windows® application for easy configuration
- An 'auto-calibration' for both expression pedals: eliminates dependency from the extreme positions of the internal potentiometers
- Software swappable left and right buttons
- 3 types of tempo control: 'hard-coded', manual or by expression pedal
- Ultra-bright 3-digit red LED display
- 2 high-quality Neutrik® ¼" jacks for external expression pedals
- Phantom-powered from spare pins on the **MIDI Out** socket
- Intelligent switching 2.5mm DC power jack with center negative pin, permitting either power supply or phantom power at a time.
- Reverse polarity protection
- Sturdy metal case
- Soft-action (click-less) momentary footswitches for maximum comfort

## Layout and connection diagram

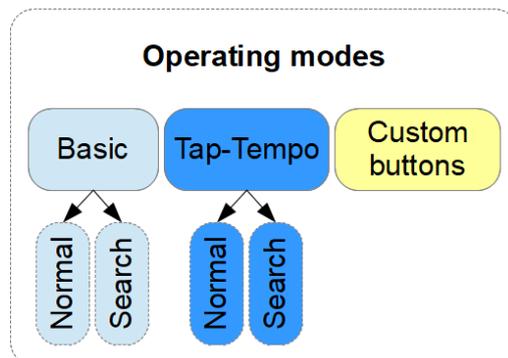


*Note: DC power supply and expression pedals are not part of MIDI Ant's shipping package.*

There are 3 operating modes You can use, but only one at a time. In parallel with the currently active mode, there are always working expression pedal ports and the 'Message reactor' feature (see details on page 3).

## Operating mode > Basic

Its purpose is to change the program/patch in Your controlled device. The buttons behave as follows:



### - Buttons "UP" and "DOWN":

- When in 'normal' sub-mode: change the displayed program. On each change, the currently selected program is sent by MIDI.
- When in 'search' sub-mode: change the displayed program. Hold buttons for fast increment/decrement.

### - Button „ACT“:

- in 'normal' sub-mode: enter 'search' sub-mode. Display starts to blink.
- in 'search' sub-mode: exit 'search' sub-mode and transmit currently selected program by MIDI. Display stops blinking.

## Operating mode > Tap-tempo

Like 'Basic' mode, plus You may use the "ACT" button to control the tempo in the controlled device.

### - Buttons "UP" and "DOWN":

- When pressed - enter 'search' mode (display starts to blink) and change the displayed program. Hold buttons for fast increment/decrement.

### - Button „ACT“ when pressed:

- if in 'search' sub-mode: exit 'search' sub-mode and transmit currently selected program by MIDI.

- If in 'normal' sub-mode:

- **If tap method is "CC message"**: a CC message is emitted. BPM value is not shown by **MIDI Ant** (it's calculated by the controlled MIDI device).

or

- **If tap method is "MIDI Clock"**:

- 2 taps start transmission of MIDI clock stream with 'hard-coded' BPM (only if configured) or with currently selected BPM by external expression pedal (only if plugged).

- 3 or more taps will start transmission of MIDI clock stream with tapped BPM (only if the stream is stopped), otherwise taps will adjust the tempo to the interval between the last 2 taps.

Maximum tap interval = 3 seconds (20 BPM)

Minimum tap interval = 0.2 seconds (300 BPM)

After first 24 MIDI Clocks (that is one quarter note), a **MIDI Start** command is sent.

- **Button „ACT“ when hold for 2.3 seconds**: only if MIDI clock stream is running, stops it and transmits **MIDI Stop** command.

**NOTE:** The operating modes are active one at a time; only sub-modes can be changed dynamically. See chapter 'Settings' to learn how to change operating modes.

**NOTE:** The tap method can be changed only by the configurator utility program for Windows®.

## Operating mode > Custom buttons

With this mode, You can send a pre-defined message group on each of the button actuation phases: on press, hold or release. Each message group may consist of up to 9 MIDI messages with independent channels. Almost every short message type is supported (except MIDI clock; see the MIDI implementation chart at the end).

Additionally, the 'virtual' action type of each button can be configured as momentary or latching (retentive). The momentary action completely follows the behavior of the **Ant's** physical footswitches (1 stable 'off' state). The latching action gives You 1 more stable state ('on'). By configuring a button as 'latching', You can send up to 4 message groups just by applying 'short' and 'long' presses.

**NOTE:** All settings in 'Custom buttons' mode can be changed **only** by the configurator utility for Windows®. For detailed explanation, see its manual. See chapter 'Settings'.

## Expression pedal ports

Up to 2 external expression pedals can be connected to **MIDI Ant**. Pedals should be *passive* (no battery powered) and should provide 6.3 mm ( ¼" ) TRS male jacks. Maximum allowed resistance of their internal *linear* potentiometer should be 30 kΩ (kilo ohms). Virtually all commercially available pedals meet this requirement.

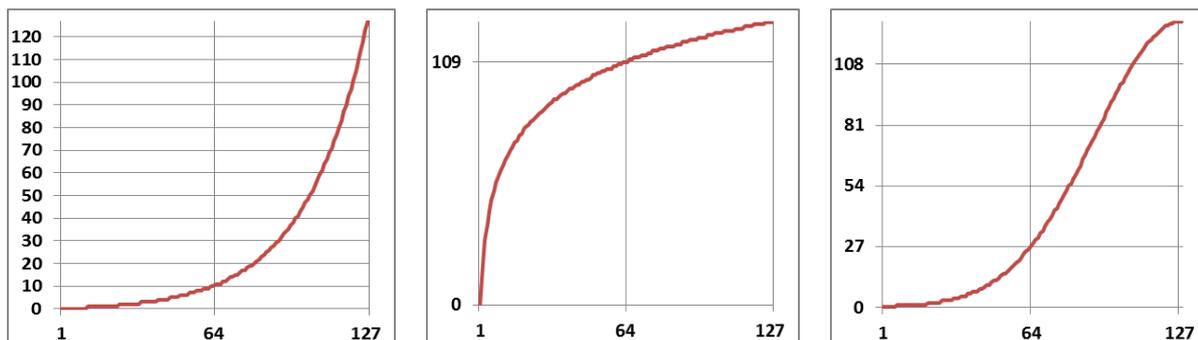
The pedals can be assigned to a 'Control change' or 'Pitch bend' MIDI message or one of them can be assigned to tempo controller. On each change of a pedal position, a MIDI message will be sent, or BPM value will be changed.

Both pedal inputs have an auto-calibration, allowing You to have full-range values even if the internal potentiometer in your pedal doesn't swing end-to-end. If your pedal has an 'offset' knob, set it to minimum. The auto-calibration is always on, regardless of the pedal assignment. To reset the calibration of particular expression pedal, just unplug it while the MIDI Ant is powered.

When a pedal is assigned to a MIDI message, it's possible its value to be limited in a specific range. After this, it's possible to apply a transformation of the value before to be output to the message.

Transformation will not be applied to a pedal, when it is assigned to tempo.

Following charts illustrate the available transformation types:



*\*Range of values for both axes: [0..127] \*Input values are on horizontal axes \*The charts represent actual values.*

This behavior applies to all operating modes.

## Message reactor

This is a very powerful feature, allowing You to make sophisticated transformations of the MIDI messages, appearing on the **MIDI In** socket. For instance, You may:

- Pass or block messages of specific type
- Pass or block messages matching a specific channel and/or data

- Change the type of the message (for example 'Control change' to 'Pitch bend')
- Change the channel of a message
- Route different channel messages to a specific channel
- Distribute 'Note on' messages to different channels, depending on note number
- Apply offset or other transformation to the note number in a 'Note on' messages
- Duplicate a message  
and many more...

The message reactor works in all operating modes. The feature can be configured **only** by the configurator utility for Windows® (see below). See its manual for details.

## Settings

All parameters can be edited by a special free Windows® application, the **MIDI Ant Configurator**. It offers very intuitive and self-explanatory interface, but yet it has its own manual. The application and the manual can be downloaded freely from the [MIDI Ant's webpage](#).

### Settings > 'On-site' edit mode

You can edit some of most important parameters in any place and without PC. To get into 'on-site' edit mode, power **MIDI Ant** off. Press and hold simultaneously „**UP**” and „**DOWN**” buttons and holding them that way, reconnect the power to **MIDI Ant**. Now release the buttons to continue.

Here are the available parameters and their possible values in exact order. Change each parameter's value by pressing buttons “UP” or “DOWN”, then move to next parameter by pressing button “ACT”. After adjusting the last parameter, you'll enter the last operating mode you've selected.

#### 1. Operating mode:

- “F.bA” – mode 'Basic'
- “F.tt” – mode 'Tap-tempo'
- “F.cb” – mode 'Custom buttons'

#### 2. Channel for all messages, defined in 'Program items' table; in hexadecimal format:

- “cP.0” .. “cP.F”

#### 3. Assignment of Pedal A.

- “A.no” – not assigned
- “A.tt” – assigned to tempo control (changes the BPM)
- “A.Pb” – assigned to a MIDI 'Pitch bend' message
- “A. 0”.. “A.7F” – assigned to a MIDI 'Control change' message. The controller number is shown on rightmost 2 digits in hexadecimal format.

#### 4. Transformation type for values from Pedal A (valid only when Pedal A is assigned to a MIDI message):

- “At.-” – no transformation
- “At.L” – logarithmic transformation
- “At.E” – exponential transformation
- “At.G” – Gaussian transformation (a.k.a 'S'-curve)

#### 5. Channel for MIDI messages, emitted by pedal A. The value is shown after dot in hexadecimal format:

- “Ac.0” .. “Ac.F”

#### 6. Assignment of Pedal B.

- “b.no” – not assigned
- “b.tt” – assigned to tempo control (change BPM)
- “b.Pb” – assigned to a MIDI 'Pitch bend' message

- “b.0”.. “b.7F” – assigned to a MIDI ‘Control change’ message. The controller number is shown on rightmost 2 digits in hexadecimal format.
7. Transformation type for values from Pedal B (valid only when Pedal A is assigned to a MIDI message):
- “bt.-” – no transformation
  - “bt.L” – logarithmic transformation
  - “bt.E” – exponential transformation
  - “bt.G” – Gaussian transformation (a.k.a ‘S’-curve)
8. Channel for MIDI messages, emitted by pedal B. The value is shown after dot in hexadecimal format:
- “bc.0” .. “bc.F”.

### Settings > Default settings

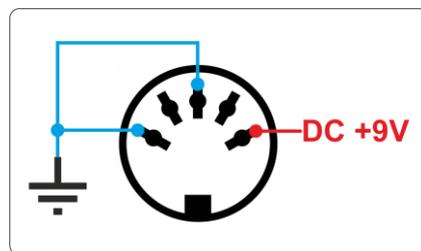
**MIDI Ant** ships with following default settings:

- Operating mode = ‘Tap-Tempo’, tap control method = MIDI clock
- 64 program items
- Linear representation of programs, starting from 1.
- Linear program mapping in the program items: N.0 -> PC#0, N.1 -> PC#1 and so on.
- No custom messages defined
- Both expression pedals not assigned.
- Both expression pedals not calibrated.
- Message reactor passes through all types of short messages.

### Technical parameters

Parameter	Value			Unit
<b>Mechanical</b>				
Overall dimensions	146 x 83 x 57			mm
Net weight	416			g
<b>Electrical</b>				
Supply voltage (DC)	<b>Min</b>	<b>Typ</b>	<b>Max</b>	V
	6	9	12	
Current consumption	<b>Min</b>	<b>Typ</b>	<b>Max</b>	mA
			40	

### Supplying phantom power via ‘MIDI Out’ socket



Front view of the **MIDI Out** socket. Ground pins (blue) are connected internally.

### MIDI implementation chart

Message type	Message code	Transmitted in mode:			Note
		Basic	Tap-Tempo	Custom buttons	
Note off	8x			Yes	
Note on	9x			Yes	
Polyphonic key pressure	Ax			Yes	
Control change	Bx	Yes	Yes	Yes	0 = Bank select LSB 32 (dec) = Bank select MSB
Program change	Cx	Yes	Yes	Yes	
Channel pressure	Dx			Yes	
Pitch bend	Ex			Yes	Expression pedal values

					routed only to MSB.
MIDI timing code	F1			Yes	
Song position pointer	F2			Yes	
Song select	F3			Yes	
Tune request	F6			Yes	
Timing clock	F8		Yes	Yes	
Start sequence	FA		Yes	Yes	
Continue sequence	FB			Yes	
Stop sequence	FC		Yes	Yes	
Active sensing	FE			Yes	
System reset	FF			Yes	

**Note:** 'x' in message code = channel info.