

# MIDI Toolkit 0.0.1

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MIDI functionality for GNU Octave.

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# 1 Installing and loading

The MIDI toolkit must be installed and then loaded to be used.

It can be installed in GNU Octave directly from octave-forge, or can be installed in an off-line mode via a downloaded tarball.

The toolkit has a dependency on the RTMIDI library (<https://github.com/thestk/rtmidi>), so it must be installed in order to successfully install the toolkit.

For fedora: `yum install rtmidi-devel`

For ubuntu: `apt install librtmidi-dev`

The toolkit must be then be loaded once per each GNU Octave session in order to use its functionality.

## 1.1 Windows install

If running in Windows, the package may already be installed, to check run:

```
pkg list midi
```

Otherwise it can be installed by installing the requirements and then using the online or offline install method.

## 1.2 Online Direct install

With an internet connection available, the MIDI package can be installed from octave-forge using the following command within GNU Octave:

```
pkg install -forge midi
```

The latest released version of the toolkit will be downloaded and installed.

## 1.3 Off-line install

With the MIDI toolkit package already downloaded, and in the current directory when running GNU Octave, the package can be installed using the following command within GNU Octave:

```
pkg install midi-0.0.1.tar.gz
```

## 1.4 Loading

Regardless of the method of installing the MIDI toolkit, in order to use its functions, the toolkit must be loaded using the `pkg load` command:

```
pkg load midi
```

The toolkit must be loaded on each GNU Octave session.

## 2 Basic Usage Overview

The MIDI package must be loaded each time a GNU Octave session is started:

```
pkg load midi
```

The MIDI toolkit provides 3 main types of functionality:

device functions

These are functions that directly allow opening, sending and receiving midi messages

controller functions

Funtions that provide a layer on top of the device functions for using midi controls.

file functions

Basic functions that allow read and write of MIDI files

To read and write to a MIDI device, a midi device object must be created, using the name or id of a known midi device as provided by the `mididevlist` function.

MIDI devices can then be read using the `midisend` and `midirecieve` functions that use `midimsg` type to encapsulate the midi data.

```
%% list the midi devices
devs = mididevinfo

%% open a midi device, specifying the first input and output midi device
dev = mididevice("input", devs.Input1.ID, "output", devs.Output1.ID)

%% recieve data and echo it through the output port
while True
    msg = midirecieve(dev, 1);
    if !empty(msg)
        midisend(msg);
    endif
endwhile
```

An overview of the package can be displayed by running `help midi`

Help for each function can be displayed by `help thefunctionname`  
ie:

```
help mididevice
```

## 3 Function Reference

The functions currently available in the MIDI toolkit are described below;

### 3.1 MIDI Device Interface

#### 3.1.1 mididevice

```
dev = mididevice (mididev)
dev = mididevice (mididir, mididev)
dev = mididevice ("input", midiindev, "output", midioutdev)
```

Create a midi device using the input parameters.

When a single device name or id is provided, attempt to create the midi device using the same name of other input and output.

Otherwise, use the name or device id for the given input of output direction.

*mididev* - name or id of device to load.

*mididir* - midi direction of "input" or "output"

*midiindev* - midi input name or id

*midioutdev* - midi output name or id

*dev* - octave\_midi class for opened device

**See also:** mididevlist.

#### 3.1.2 mididevinfo

```
devlist = mididevinfo ()
mididevinfo ()
```

Retrieve the midi devices detected within the system.

The list will be stored with variable *devlist* as either a input or output device. If no output variable is provided, the devices will be displayed.

**See also:** mididevice.

#### 3.1.3 midimsg

```
msg = midimsg (0)
msg = midimsg (type ....)
msg = midimsg ("note", channel, note, velocity, duration, timestamp)
msg = midimsg ("noteon", channel, note, velocity, timestamp)
msg = midimsg ("noteoff", channel, note, velocity, timestamp)
msg = midimsg ("programchange", channel, prog, timestamp)
msg = midimsg ("controlchange", channel, ccnum, ccval, timestamp)
msg = midimsg ("polykeypressure", channel, note, keypressure, timestamp)
msg = midimsg ("channelpressure", channel, chanpressure, timestamp)
msg = midimsg ("pitchbend", channel, pitchchange, timestamp)
msg = midimsg ("polyon", channel, timestamp)
msg = midimsg ("monoon", channel, monochannels, timestamp)
msg = midimsg ("omnion", channel, timestamp)
msg = midimsg ("omnioff", channel, timestamp)
msg = midimsg ("allsoundoff", channel, timestamp)
msg = midimsg ("allnotesoff", channel, timestamp)
msg = midimsg ("resetallcontrollers", channel, timestamp)
msg = midimsg ("start", timestamp)
```

```

msg = midimsg ("stop", timestamp)
msg = midimsg ("continue", timestamp)
msg = midimsg ("systemreset", timestamp)
msg = midimsg ("activesensing", timestamp)
msg = midimsg ("timingclock", timestamp)
msg = midimsg ("systemexclusive", timestamp)
msg = midimsg ("systemexclusive", bytes, timestamp)
msg = midimsg ("eox", timestamp)
msg = midimsg ("data", bytes, timestamp)

```

Create a midimsg object

If the input parameter is 0, create an empty midi message object Otherwise the first variable if the type of message to create, followed by the additional parameters for the message.

For each message type, the timestamp value if optional.

**See also:** midifileread, midisend, midireceive.

### 3.1.4 midireceive

```

midimsg = midireceive (dev)
midimsg = midireceive (dev, maxmsg)

```

Attempt to receive midi messages from a midi device.

*dev* - a octave midi device opened using mididevice.

*maxmsg* - Maximum number of messages to retrieve. If not specified, the function will attempt to get all pending.

*midimsg* - a midimsg containing the messages retrieved from the device.

If no messages are available, *midimsg* will be empty.

**See also:** mididevice, midisend.

### 3.1.5 midisend

```

midisend (dev, msg)
midisend (dev, ...)

```

Send a midimsg to a midi device

*dev* - midi device opened using mididevice

*msg* - a midi message class with messages to send to the midi device

If the msg isn't a midimsg class, the input data is expected to be in same format as the inputs to a midimsg object.

**See also:** midimsg, mididevice.

## 3.2 MIDI Controller Interface

### 3.2.1 midicontrols

```

obj = midicontrols ()
obj = midicontrols (ctrlid)
obj = midicontrols (ctrlid, initialvalues)
obj = midicontrols (--, propertyname, propertyvalue)

```

create a midi controls object

*ctrlid* - single control id or array of control ids to monitor, or [] to use any controller.

*initialvalues* - initial values to use for controls. It should be the same size as *ctrlid*

*propertyname, propertyvalue* - properties to set on the controller. If a device is not specified

the value from `getpref("midi", "DefaultDevice", 0)` will be used.

*obj* - returns a `midicontrols` object

Known properties are:

`mididevice`

name of the `mididevice` to monitor.

`outputmode`

the scaling mode for values: 'rawmidi' will return values between 0 .. 127, 'normalized' will use values between 0 .. 1.

### 3.2.2 midiid

`[ctrlid dev] = midiid ()`

Scan for control messages from midi devices to get the id of the device

Function will display a prompt fir user to move the midi control and return when a control messages is detected or ctrl-C is pressed.

*ctrlid* - control id made from the controller channel \* 1000 + controller number.

*dev* = name of the midi device the controller was detected.

**See also:** `mididevlist`.

### 3.2.3 midiread

`midiread (midicontrolsObj)`

Read current values of midi controls

*midicontrolObj* - control object created using `midicontrols`

*ret* single value or array of current values from the midi device.

**See also:** `midicontrols`, `midisync`.

### 3.2.4 midisync

`midisync (midicontrolsObj)`

`midisync (midicontrolsObj, ctrlvalues)`

Send the values of control object to the control, using *ctrlvalues* values if specified instead

*midicontrolObj* - control object created using `midicontrols`

*ctrlvalues* - values to send to the controls instead of initial values

**See also:** `midicontrols`.

## 3.3 MIDI File I/O

### 3.3.1 midifileinfo

`info = midifileinfo (filename)`

Read MIDI file and display information about the tracks and data

*filename* - filename of file to open.

*info* - structure of the midi file data with the following fields:

*filename*     the name of the file

*header*       The header block information

*track*        An array of tracks read from the file

**See also:** `midifileread`.

### 3.3.2 midifileread

`msg = midifileread (filename)`

Read MIDI file into a midimsg

*filename* - filename of file to open.

*msg* - a midimsg struct containing the messages read from the file

**See also:** midifileinfo, midimsg.

### 3.3.3 midifilewrite

`midifilewrite (filename, msgs)`

Write a midifile

*filename* - filename of file to open.

*msg* - a midimsg struct containing data to write to file

**See also:** midifileread, midimsg.

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Version 3, 29 June 2007

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