

Using miditext

The MIDI-to-textmidi translator

Thomas E. Janzen

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1 Overview

The `miditext` program translates a binary standard MIDI file into a text file in textmidi language. A file in textmidi language can be edited and processed with text tools and macro processors such as `m4`. Textmidi files can then be re-translated into MIDI using `textmidi`. The goal of `miditext` and `textmidi` together is to permit the specification of any musical events that are permitted by the MIDI 1.1 spec's chapter on Standard MIDI Files. SysEx (system exclusive) is also supported, as are all three filetypes (single track, multitrack and multi-sequence).

The textmidi language is described in the info page for `textmidi`.

The programs `textmidi` and `miditext` are not written to interpret poorly-formed standard MIDI files, that is, files that do not follow the MIDI 1.1 Spec. Nevertheless, although at least one popular multimedia program from decades ago wrote illegal key signature events, with only a byte for the number of sharps or flats, but no mode (major/minor) byte, `miditext` will accept this idiosyncrasy.

No attempt is made in textmidi to support either MIDI show control or machine control.

1.1 What is miditext?

The program `miditext` reads a standard MIDI file and converts it to a text file, which is in the textmidi language. Each item in the text file corresponds to an item in the binary MIDI file, more or less.

`miditext` does not record or play over a MIDI interface.

1.2 History

`miditext` was developed in 2003 and improved in 2020 and 2021 in order to add support for more of the MIDI specification.

2 Invoking miditext

2.1 Options

```
miditext [-i|--midi] midi_input_file [-o|--textmidi] textmidi_output_file
[-a|--answer] [-q|--quantize musical_ratio in quotes] [-l|--lazy] [-h|--help]
[-y|--dynamics_configuration dynamics_configuration_file]
[-V|--version] [-v|--verbose]
[-w|--dotted_rhythms true|false]
[-e|--rhythmexpression rational|simplecontinuedfraction]
```

-h, --help

Print the options summary.

```
Usage: miditext [OPTION]... [MIDIFILE]
miditext Version 1.0.86
Allowed options:
  -h [ --help ]                help
  -v [ --verbose ]             write more trace information
  -V [ --version ]             Write version information
  -i [ --midi ] arg            binary MIDI file
  -a [ --answer ]              Ask before overwriting a file
  -o [ --textmidi ] arg        textmidi file
  -q [ --quantize ] arg        quantization ratio in quotes: "1/32"
  -l [ --lazy ]                Attempt writing in lazy mode
  -y [ --dynamics_configuration ] arg dynamics_configuration file
  -w [ --dotted_rhythms ] arg  true or false
  -e [ --rhythmexpression ] arg rational or simplecontinuedfraction

Report bugs to: janzentome@gmail.com
miditext home page: https://github.com/tomejanzen/textmiditools
```

-v, --verbose

Write some informative messages to the screen. Errors are printed regardless. The items written are:

- The name of the output file.
- The contents of the MIDI file header.
- The format of the MIDI file.
- The number of events per track.
- The percentage of quantized events.

“Quantized events” are events that have a delay preceding them that has a simple relationship to the length of a whole note. If `--verbose` is specified, then the delay preceding each event is converted into a fraction of a whole note, much the that musical rhythm is expressed. If the resulting fraction has a denominator of 1, 2, 4, 6, 8, 12, or 16, then it is counted as a quantized rhythm. For example, $3/4$ is a dotted half note, and a $1/12$ note is a triplet eighth. Delays of zero are not counted in the computation of the percentage. Files with 90% and higher of quantized rhythms are easy for `miditext` to convert into LAZY format tracks, even if the `--quantize` option is not specified. MIDI files that were developed in a scoring program by mousing note by note tend to

have a quantized rhythm. A more fluid performance might still be achieved by frequently adjusting the tempo and dynamics, both of which `textmidi` makes possible.

- `-V, --version`
Print the version of `miditext`.
- `-i, --midi midi_input_file`
The input file: a MIDI file.
- `-o, --textmidi textmidi_output_file`
The output file, in `textmidi` text language.
- `-q, --quantize num`
A musical rhythm ratio (in quotes to satisfy most command shells) to use as the common divisor of all rhythmic durations. For example “1/16” would force all durations to be divisible by a sixteenth-note.
- `-l, --lazy`
Will attempt to output track data in `textmidi`’s LAZY mode, an abbreviated text representation. `miditext --lazy` does well with simpler files and overlapping rhythms within a track. However, a known failure is on MIDI file inputs that have non-note events **during** a live note. This problem is put aside for now because there is no philosophy for what to do with events that happen during the life of a note because LAZY mode does not define “inside” of a note. LAZY mode defines notes as events with a beginning and an end, as SMUS files do. This is contrast to MIDI, which separates the note’s start (NOTE_ON) and stop (NOTE_OFF or NOTE_ON with velocity zero).
- `-y, --dynamics_configuration {dynamics_configuration_file}`
To set the MIDI velocity values for lazy dynamics expressed with “forte”, “mf”, etc., edit a dynamics configuration file. It is in the same format as `boost::program_options` requires. You can see various settings for MIDI dynamics on wikipedia at the **Dynamics_(music)#Interpretation_by_notation_programs** page. It is not necessary to specify values for all of the dynamic symbols. An example file:

```
ppppp=5
pppp=10
ppp=25
pp=40
p=50
mp=62
mf=75
forte=90
ff=110
fff=120
ffff=127
fffff=127
```

`-w, --dotted_rhythms true|false`

Used with `-lazy`, selects dotted rhythms or only rational numbers (including an integer with an implied “1/”). The default is to use dotted rhythms. If true, any rhythm with a numerator that is a power of 2 minus 1 (n^2-1), e.g.: 3, 7, 15, 31, 63, will be written as a dotted rhythm, to large numbers of dots (periods). If “true”, then “3/8” will appear as “4.”, else as “3/8”.

`-e, --rhythmexpression rational|simplecontinuedfraction`

Used with `-lazy`, selects either a rational or simple continued fraction expression of rhythm. The default is a rational-like musical rhythm.

See `textmidi.pdf` for details.

`-a, --answer`

If the output `textmidi` file already exists, ask before overwriting it.

2.2 Invocation Examples

The following command will read the MIDI file `prelude.mid` and convert it to the text-based `textmidi` language.

```
miditext --midi prelude.mid --textmidi prelude.txt
```

The following converts `prelude.mid` into `prelude.txt`, and attempt to write using the abbreviated LAZY mode representation.

```
miditext --midi prelude.mid --textmidi prelude.txt --lazy
```

The following converts `prelude.mid` into `prelude.txt`, and coerces rhythms to be divisible by a thirty-second note. If the file `prelude.txt` exists, the user will be asked whether to overwrite it.

```
miditext --midi prelude.mid --textmidi prelude.txt --quantize "1/32" --answer
```

3 Installation

This program was prepared for builds using GNU autoconf tools. Unpack the archive. Move to the directory created for the program. Run the configure script and run make.

```
./configure  
make
```

Make yourself superuser (root), or use sudo to run install targets:

```
make install  
make install-info
```


4 Testing

Part of the testing of the conversion utilities `miditext` and `textmidi` is performed on linux with a script similar to this:

```
#!/usr/bin/env bash
function testmidi
{
    /usr/bin/env ls ${1}
    temporary_directory=$(mktemp -d)
    bn=$(basename ${1} .mid)
    miditext --verbose --midi ${1} --textmidi ${temporary_directory}/${bn}.txt
    /usr/bin/env sed -i -f starttrack.sed \
        ${temporary_directory}/${bn}.txt
    textmidi --textmidi ${temporary_directory}/${bn}.txt \
        --midi ${temporary_directory}/${bn}.mid
    miditext --midi ${temporary_directory}/${bn}.mid \
        --textmidi ${temporary_directory}/${bn}_B.txt
    /usr/bin/env sed -i -f starttrack.sed ${temporary_directory}/${bn}_B.txt
    /usr/bin/env ls -l ${temporary_directory}/${bn}.mid
    /usr/bin/env diff -s ${1} ${temporary_directory}/${bn}.mid
    /usr/bin/env diff -q -bW -s ${temporary_directory}/${bn}.txt \
        ${temporary_directory}/${bn}_B.txt
    /usr/bin/env rm ${temporary_directory}/${bn}_B.txt \
        ${temporary_directory}/${bn}.txt ${temporary_directory}/${bn}.mid
    /usr/bin/env rmdir ${temporary_directory}
}

testmidi ${BASH_ARGV[0]}
```

where `starttrack.sed` is:

```
#!/bin/sed
s/; bytes in track.*$/g
```

This script can be invoked with

```
./testmidi prelude.mid
```

The result is to create a temporary directory and create the files `prelude.txt`,

- `prelude.txt`
- `prelude.mid`
- `prelude_B.txt`

The original MIDI file and the temporary `prelude.mid` are compared. The two `textmidi` text files are compared. The test set consists of 6340 classical music files. 64 MIDI files were put aside after having prompting error messages from an independent scoring program. The remaining 6276 files all compare the text files as identical, and about a third of the pairs of MIDI files compare as identical. The differences between MIDI files are still being investigated, but causes known so far include the following:

- Some of the imported MIDI files did not use running status, in which voice-channel events can drop the command byte if the command and channel are the same in consecutive voice-channel events. `textmidi` always uses running status. Running status as used by `textmidi` is marked undefined at the beginning of each track, and set by the first voice-channel event. From then to the end of the track, running status is set only

by voice-channel events. It is not reset by non-voice-channel events, including Channel Change. In some files running-status is reset by a control event. Voice-Channel events are one of:

- Channel Pressure
 - Note On
 - Note Off
 - Polyphonic Key Pressure
 - Pitch Bend
 - Program Change
 - Control Change (including omni/poly on/off)
- In text events (including TRACK, INSTRUMENT, COPYRIGHT, etc.) `miditext` drops both prefacing and trailing spaces, as well as terminating “nul” (a character with a numeric value of zero) bytes. Therefore, TEXT events in the round-trip, recreated MIDI file may differ from those in the original MIDI file.
 - `miditext` recognizes the short key signature event, but `textmidi` always creates the standard event with five total bytes: (0xFF, 0x59, 2 [the following data length], sharps/flats, mode).
 - `miditext` always produces the full CONTROL command forms and not the abbreviated forms.

5 Known Bugs

Although the `DETAIL` mode representation is believed to be an accurate representation of the Standard MIDI file, if `--lazy` is selected with `miditext`, and if a track in the MIDI file has overlapping note events with asynchronous start and stop times, the `LAZY` mode representation may not be accurate. `miditext` can output a duration of zero for some notes if a non-note event (for example, `CONTROL`, or `SEQUENCER_SPECIFIC`) immediately follows a `NOTE_ON` with no delay, before the `NOTE_OFF` or `NOTE_ON` with velocity zero. The finite delay will follow the non-note event. If this is inconvenient, you can edit the output of `miditext -lazy` to either move the non-note event before or after the note, or create a `DETAIL` section around the note and non-note event to get the effect desired during the note's duration. `miditext` is not meant to support non-conforming MIDI files. Neither `miditext` nor `textmidi` are meant to support real-time MIDI messages that are not intended for use in MIDI files.

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