

# MIDI Command Controller Interface

Heyan Huang

December 9, 2014

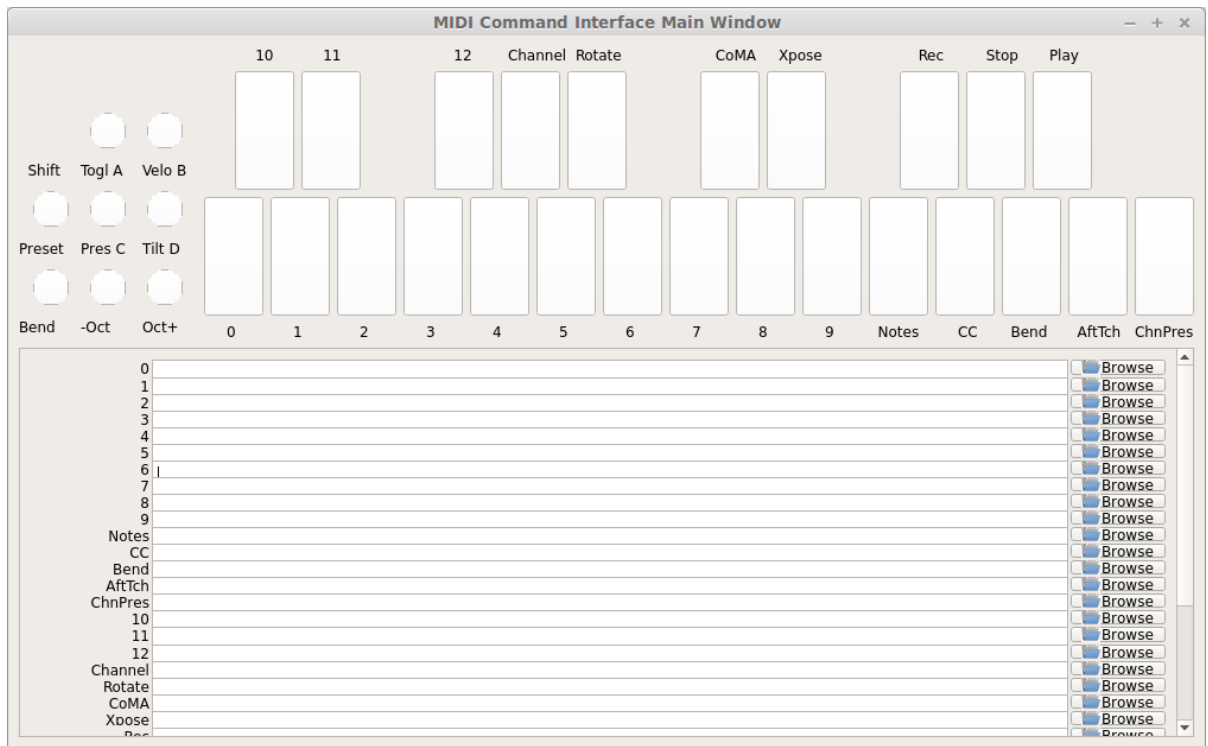
## Contents

<b>1</b>	<b>Update 12/09/2014, updates include</b>	<b>1</b>
<b>2</b>	<b>Update 11/23/2014, updates include</b>	<b>1</b>
<b>3</b>	<b>Review 11/21/2014, updates include</b>	<b>2</b>
3.1	Review Contents . . . . .	2
3.2	Detailed Requirements . . . . .	3
<b>4</b>	<b>Project Requirements</b>	<b>3</b>
<b>5</b>	<b>main functionality</b>	<b>3</b>
5.1	Read data from MIDI . . . . .	3
5.2	Write data back to MIDI . . . . .	3
<b>6</b>	<b>Programming Language</b>	<b>3</b>
6.1	Qt . . . . .	3
6.2	c++ . . . . .	3
<b>7</b>	<b>Interface Design</b>	<b>4</b>
<b>8</b>	<b>Midi keys and corresponded operations</b>	<b>4</b>
<b>9</b>	<b>Interface Guide</b>	<b>4</b>
<b>10</b>	<b>References</b>	<b>4</b>

- 1 Update 12/09/2014, updates include**
- worked in it a little bit to set the connections between Midi controller and Qt Creator;
  - tried to implement pthread for reading user input, but got slightly frustrated today, and applied easier methods instead;
  - the project basically satisfied the instructor’s requirements for connecting one key to work for playing his sequence, for example, Surfinusa.wav file;
  - Will demo to his to see if he has better suggestions.

- 2 Update 11/23/2014, updates include**
- Cleaned repository so that it looks clean and nice;
  - Remove menubar as suggested by advisor;
  - Removed topright four line texts cause it’s not necessary;
  - Shifted top line keys so that they look like original midi controller layout;
  - Changed PlainTextEdit so that they satisfies the requirements;

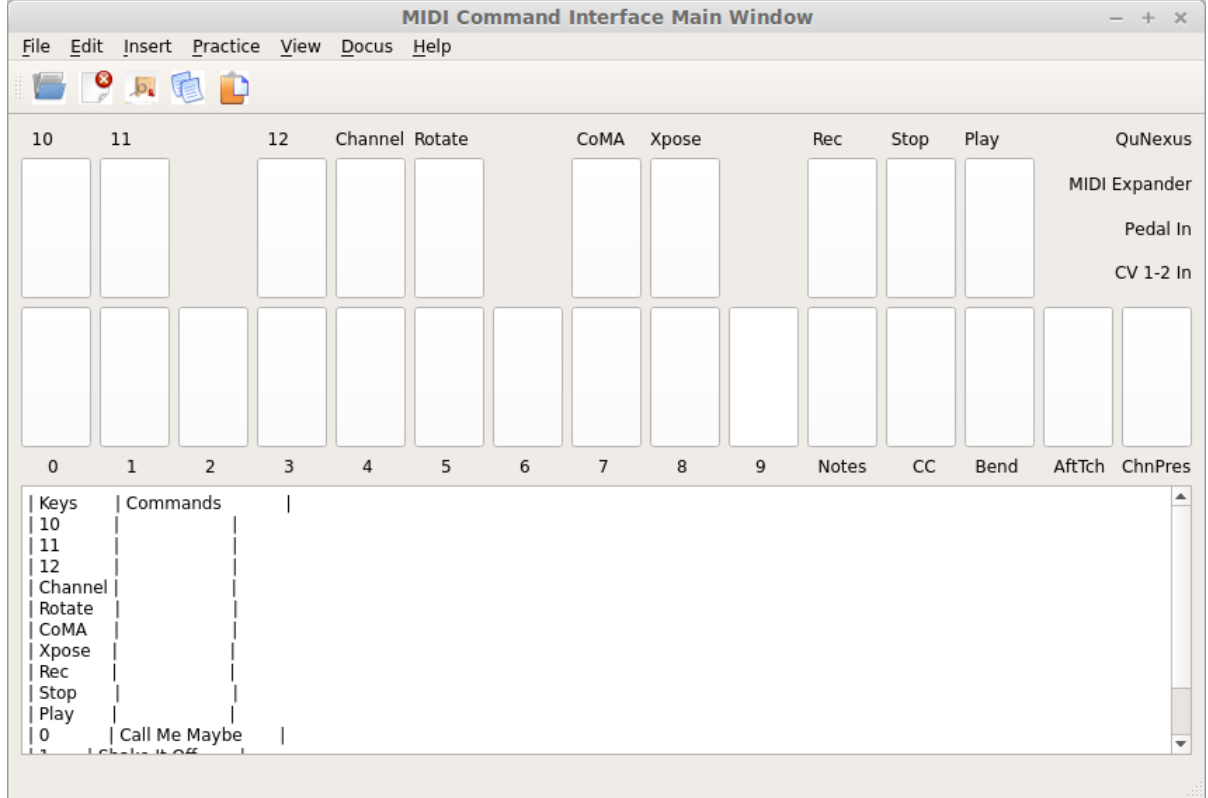
- Added left side 8 keys, just that three keys **Bend**, **-Oct**, **Oct+** are **NOT** like the original shapes yet, need work on them later on;
- Will link possible functionalities to make it a functional softwares first, and then updates minus issues.
- Current layout looks as below snapshotted:



### 3 Review 11/21/2014, updates include

#### 3.1 Review Contents

- Created most basic interface for the client, and reviewed with course instructor.
- Demo the most basic interface to him, and get corresponding specific requirements as listed followed.



### 3.2 Detailed Requirements

- menubar is NOT necessary, and could be removed away;
- Interface topright four line texts are not necessary, could be removed away;
- Interface top line keys should shift to the right by half key width so that the interface looks similar to the original midi controller keyboard;
- PlainTextEdit should be changed to be array of 25/33 lines of (text label, file name editor, browse QPush-Button keys) layout;
- Left handside 8 keys should be included in the midi interface even functionalities are not required at this moment;
- When finished the above basic ones, if I have extra time, could explore the left side 8 keys to test if it is possible to use them to set a bunch of sequence so that save time when needed compared with set sequence one by one from the basic 25 keys.

## 4 Project Requirements

- Use QuNexus Midi controller as a command controller to manipulate play sequence for tower lights show;
- Besides the main functionalities, create a Qt Creator Interface to help facilitate the tower light playing process for clients convenience.

## 5 main functionality

### 5.1 Read data from MIDI

- Use the MIDI Controller as a speical Controller that can be operated to play specific songs sequence, or do some specific work.
- play specific sequence may be the work for keys 0-9, and 10-12, how about other 20 keys? Do they require specific work to be done?

## 5.2 Write data back to MIDI

- When a key was pushed, the specific Controller key's LED is supposed to be on to indicate the operation.
- Trick about the LED to be continuously on is that when a key is pressed, that is 1 byte that indicates the "Duration" of the key press, I may need to
  - try to set this byte to be a large value, (1 byte,  $2^8 = 256$ , it has limits!)
  - or continuously reset is to be that large value;
  - or continuously write this key to be pressed data back to MIDI with time intervals

## 6 Programming Language

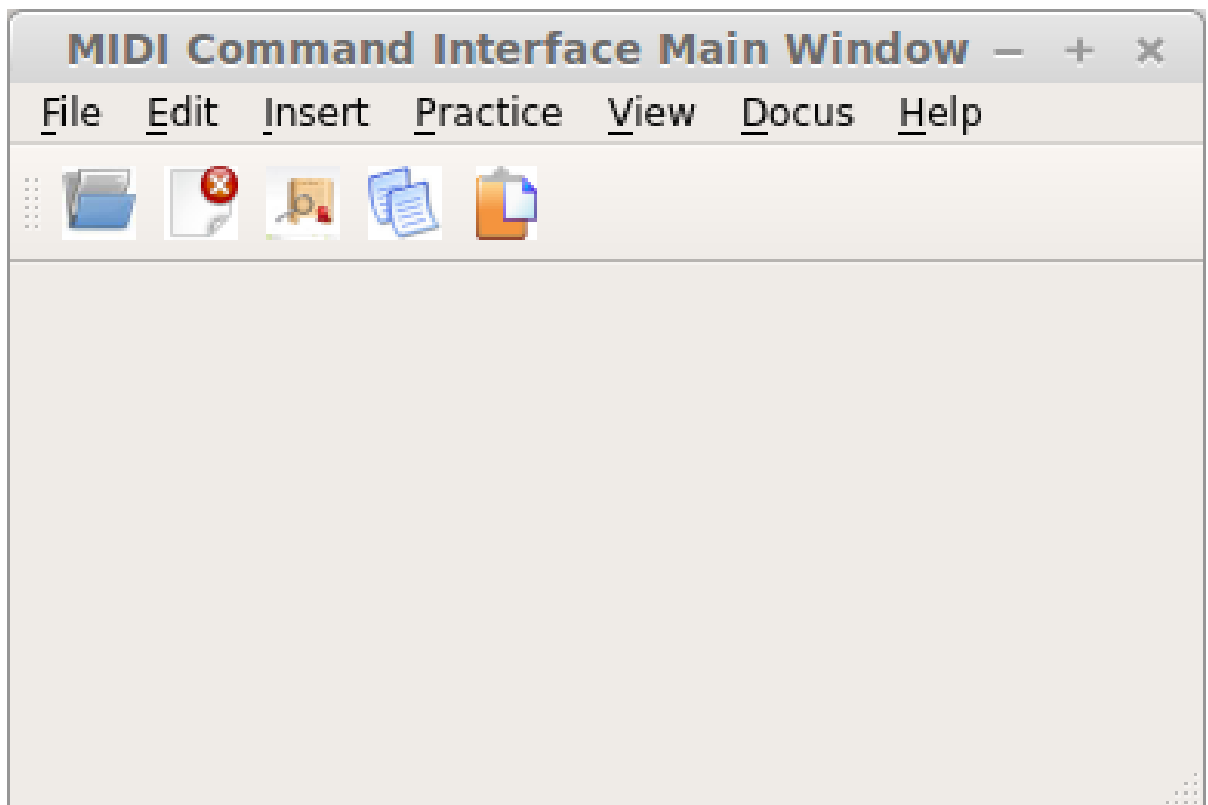
### 6.1 Qt

- the worries that I have by using Qt is that if Qt has the capability to handle the MIDI-Linux connection problems.
- And also Qt-to-Audio (linux) connection things as well. Should it be Qt, or as far as I can set it to work in Linux, just let it be that way then?

### 6.2 c++

- I believe C++ is the most widely used Language used by those midi sequencer softwares, so I have no better choice than c++ right now.

## 7 Interface Design





## 8 Midi keys and corresponded operations

Table 1: midi keys and corresponded operations

Keys	Commands
10	
11	
12	
channel	
Rotate	
CoMA	
Xpose	
Rec	
Stop	
Play	
0	Call Me Maybe
1	Shake It Off
2	All About That Bass
3	...
4	
5	
6	
7	
8	
9	
Notes:	
CC	
Bend	
AftTch	
ChnPres	
Togl A	
Velo B	
Preset	
Pres C	
Tilt D	
Bend	
Oct-	
Oct+	

# 9 Interface Guide

- Give text instructions on how to use the Interface, and what are the corresponded operations by press specific keys.
- Like list the above table in the Interface Guide text area.

## 10 References

- For circle QPushButton
  - <http://stackoverflow.com/questions/12734319/change-rectangular-qt-button-to-round>
- Draw circle separate
  - <https://coderalbert.wordpress.com/2014/03/16/creating-circle-in-linux-using-qt-creator/>
- For Rectangle Arc
  - <http://stackoverflow.com/questions/20416789/how-to-add-a-small-triangle-at-one-of-the>
- PaintEvent Triangle
  - <http://stackoverflow.com/questions/20416789/how-to-add-a-small-triangle-at-one-of-the>
  - <http://stackoverflow.com/questions/3894737/qt4-how-to-draw-inside-a-widget>
  - <http://qt-project.org/forums/viewthread/1623>
  - <http://stackoverflow.com/questions/7968269/basic-qt-gui-qpushbutton-for-drawing-a-line>
- QPushButton::drawButton(QPainter \*painter);
  - <https://www.tbi.univie.ac.at/~pmg/tutorials/QT/html/qpushbutton.html>
- QGraphicsScene QGraphicsProxy...
  - <http://qt-project.org/forums/viewthread/4020>
- QPushButton raised enabled
  - <http://www.qtcentre.org/threads/42852-QStyledItemDelegate-paint-QPushButton-with-style>
- QPushButton two icons
  - <http://www.qtcentre.org/threads/39445-How-to-add-two-icons-images-to-the-same-QPushBut>
- QPainter
  - <http://qt-project.org/forums/viewthread/23628>
- QGridLayout ScrollArea
  - <http://qt-project.org/forums/viewthread/20843>
  - <http://qt-project.org/forums/viewthread/20924/>
- Leftover five
  - <http://qt-project.org/doc/qt-4.8/qpainter.html>
  - <http://qt-project.org/doc/qt-4.8/qwidget.html>
  - <https://www.tbi.univie.ac.at/~pmg/tutorials/QT/html/qpushbutton.html>
  - <http://qt.developpez.com/doc/4.7/qpainter/#drawpolygon>
  - <http://qt.developpez.com/doc/4.7/painting-basicdrawing/>
- Linux Midi
  - <https://ccrma.stanford.edu/~craig/articles/linuxmidi/input/section1.html>

- <https://ccrma.stanford.edu/~craig/articles/linuxmidi/>
  - Open device
    - <http://pubs.opengroup.org/onlinepubs/009695399/functions/open.html>
  - Qt QIODevice
    - <http://doc.qt.digia.com/qc/qc12-iodevice.html>
    - <http://stackoverflow.com/questions/14821792/what-does-file-openqiodevicereadonly-mean>
  - Qt Debugging
    - <https://bbs.archlinux.org/viewtopic.php?id=174523>
    - [http://www.qtcentre.org/threads/53549-connect\(\)-terminates-the-program](http://www.qtcentre.org/threads/53549-connect()-terminates-the-program)
  - pulseaudio linux mint
    - <http://community.linuxmint.com/software/view/pulseaudio>
- ```

towerplayer ./towerplayer Surfinusa.wav surfinUSA.tan
Loading Surfinusa.wav
File Size=26368316
Header Size=16
Data Size=26368272 (0x1925910)
Done reading tan file!
Checking for fast nodes
unable to open ftdi (xbee) device: -3 (device not found)

```
- QSound example
    - <http://doc.qt.digia.com/3.3/sound-example.html>
  - QSound QSoundEffect(pulseaudio): Error Decoding course
    - <https://together.jolla.com/question/53394/qsoundeffectpulseaudio-error-decoding-sourc/>
  - QTimer
    - <http://qt-project.org/forums/viewthread/27190>
  - play loops
    - <http://stackoverflow.com/questions/16751778/qt-qsound-looping>
    - <http://forum.codecall.net/topic/71902-qt-c-play-sound-on-key-press-stops-working-after>
  - Phonon
    - <http://bbs.qter.org/forum.php?mod=viewthread&tid=784>
    - seek slider: <http://pencil-animation.org/forum/viewtopic.php?id=672>