MIDI Command Controller Interface

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December 11, 2014
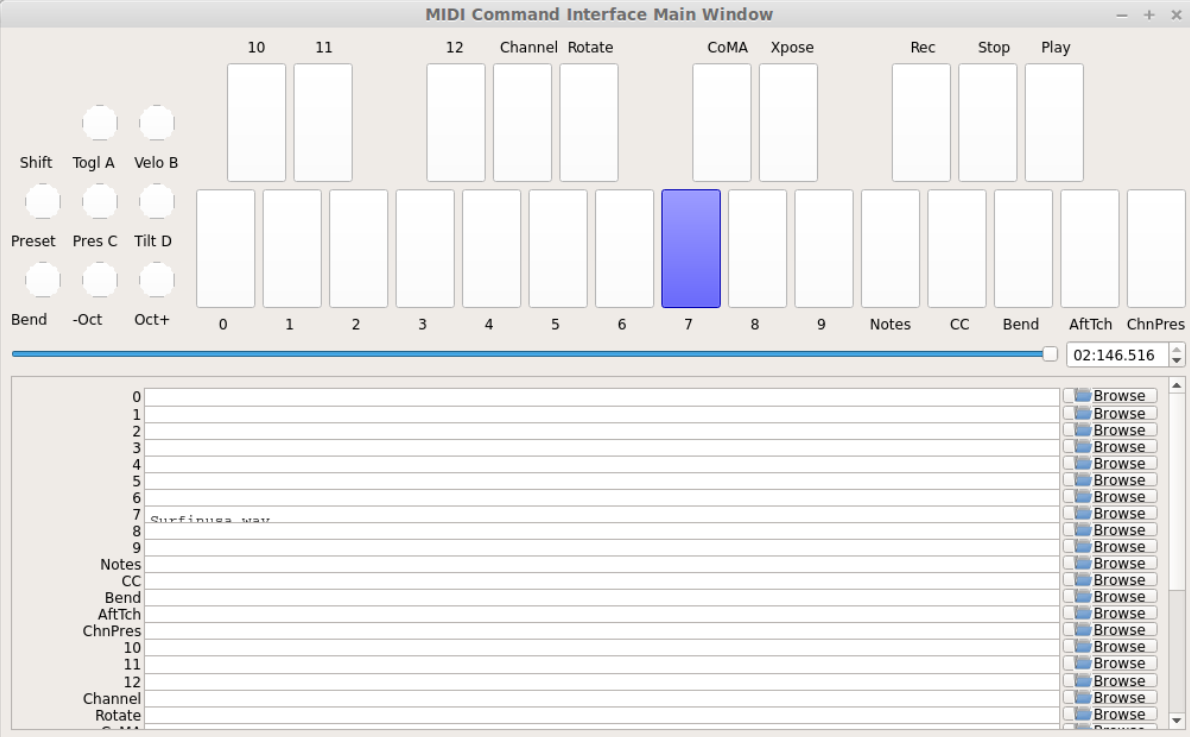
Contents

1 Update 12/11/2014, updates include

1.1 updates

- Temporatorily mimic phonon seekslider, but have not connected the signals and slots fully functioning yet;

- This seekslider may still eventually came back to use Phonon library using Qt4.8 version;

- So far consider this as a bonus feature;

1.2 review

- Because of lack Xbee modules (needs devices from intstructor), so far playing only .wav file is ok;

- It is basic, setting one buttone to work only, without any threads yet, but will expend it to be better during spring semester.

- Spring semester (1 credit) will pack all my instructor's Tower Play modules into a well-designed fully-functional softwares for user's convenience.
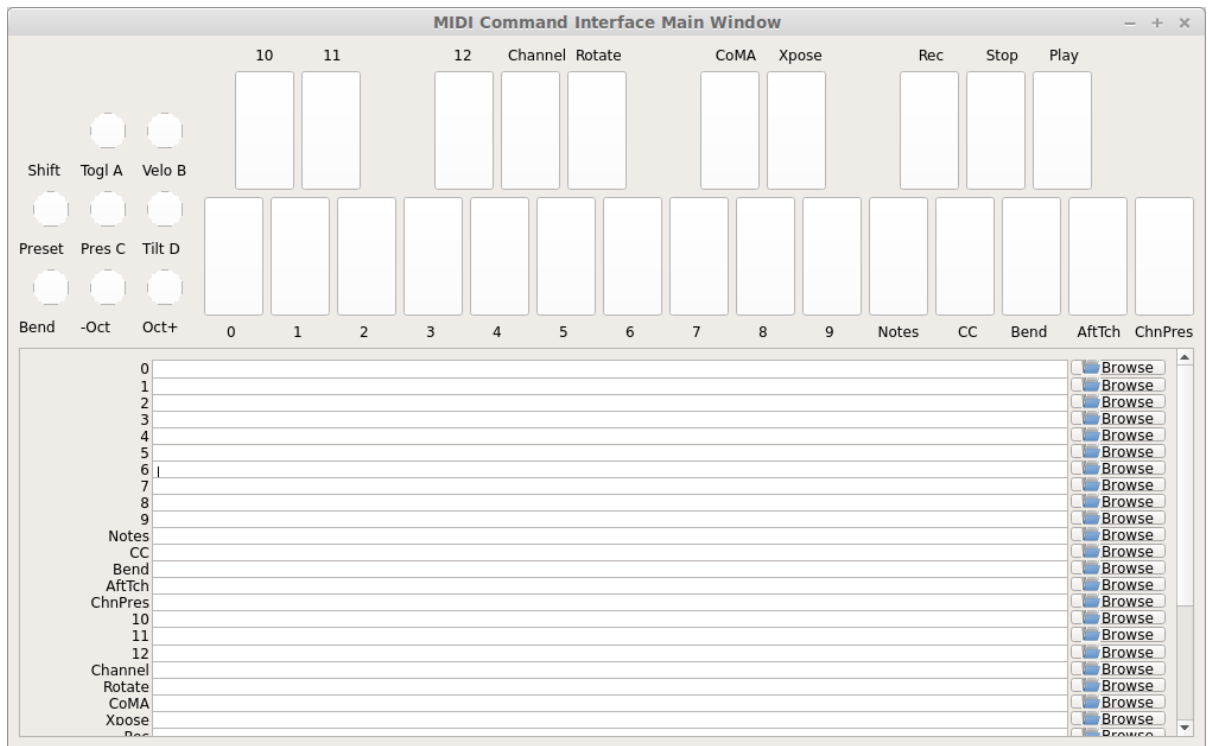
2 Update 12/09/2014, updates include

- worked in it a little bit to set the connections between Midi controller and Qt Creator;

- tried to implement pthead 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.

3 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 satifies 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.
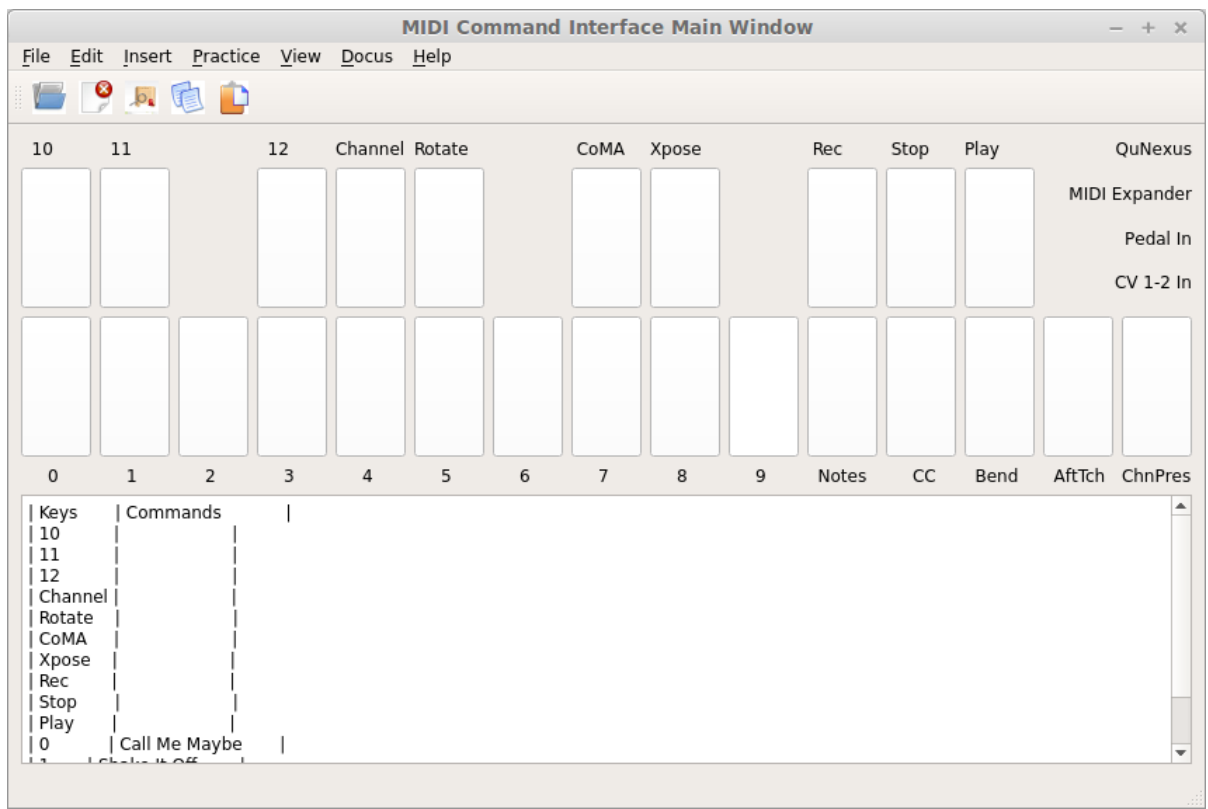
- Current layout looks as below snapshotted:

4 Review 11/21/2014, updates include

4.1 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.

4.2 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.

5 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 facilate the tower light playing process for clients convenience.

6 main functionality

6.1 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?

6.2 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
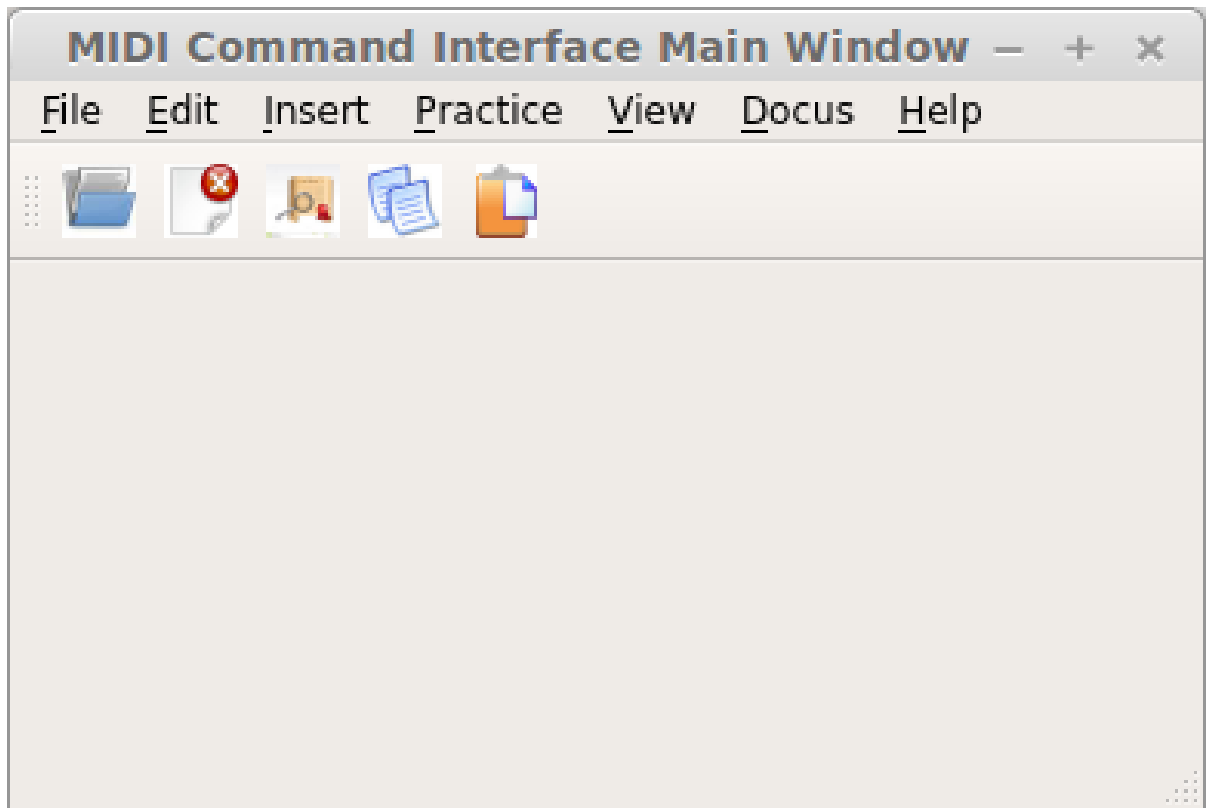
7 Programming Language

7.1 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?

7.2 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.

8 Interface Design

9 Midi keys and corresponded operations

10 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.

11 References

- For circle QPushButton

  - http://stackoverflow.com/questions/12734319/change-rectangular-qt-button-to-round

- Draw circle separate

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+	

- – 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

- QGraphicsSene 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/

- 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/qq/qq12-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

- 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