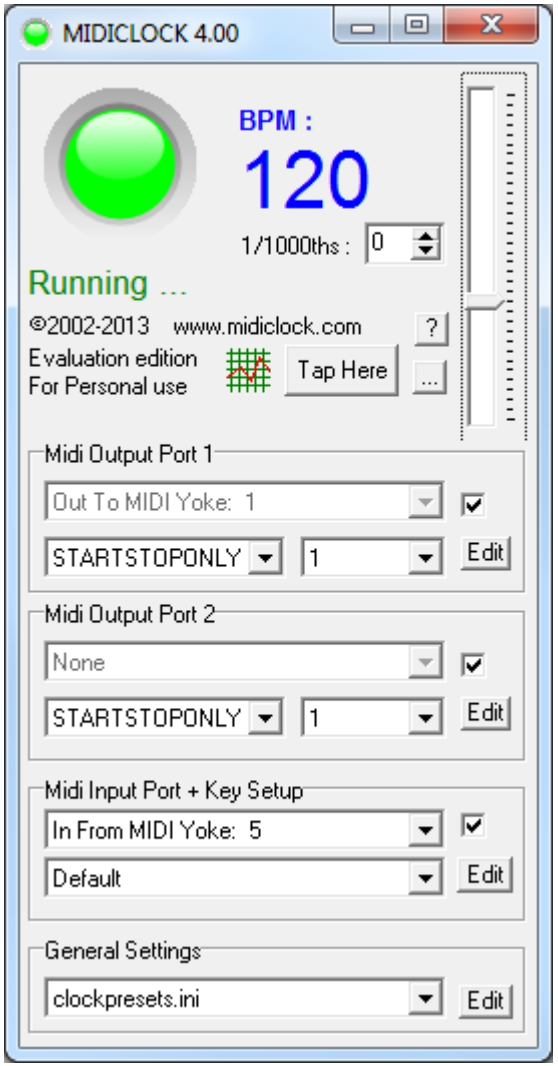
MIDIClock 4.00



Quick Quide by Serge

Rev 3

26 May 2013

www.midiclock.com

Introduction

- What is MIDIClock ?

  - A program that can be used to synchronize synths, effects, sequencers, arpeggiators, ...
  - Its main function is generating a midi beat clock signal on a midi output device at a selectable bpm rate. Other output signals are also possible through custom output drivers
  - The software has no installer, simply unzip to where you need it. It is portable : it can be run from a removable disk/stick without installing anything.
  - The latest trial version of MIDIClock can be downloaded from midiclock.com.

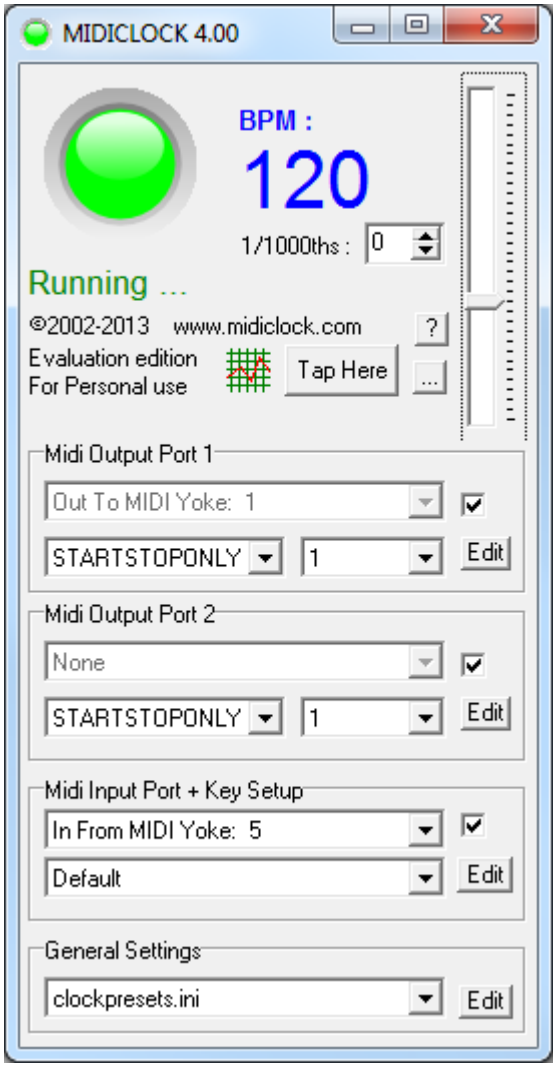
What is the midi clock protocol?

From wikipedia :

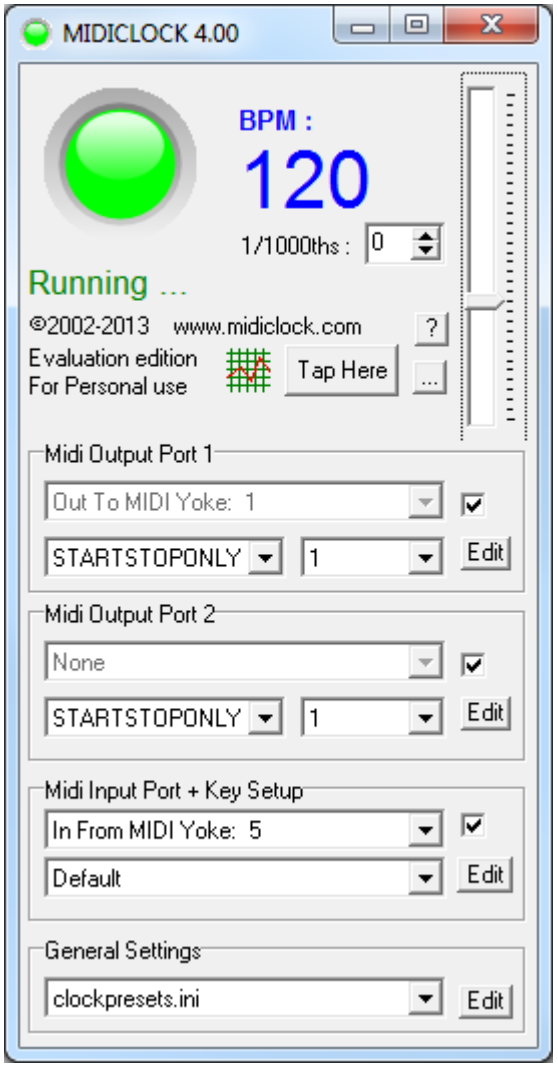
- MIDI beat clock is a clock signal that is broadcast via MIDI to ensure that several synthesizers stay in synchronization. It is not MIDI timecode.
- Unlike MIDI timecode, MIDI beat clock is sent at a rate that represents the current tempo, at 24 ppqn (pulses per quarter note). It is used to maintain a synchronized tempo for synthesizers that have BPM-dependent voices and also for arpeggiator synchronization. It does not transmit any location information (bar number or time code) and so must be used in conjunction with a positional reference (such as timecode) for complete sync.
- MIDI beat clock defines the following real time messages:
- * clock (decimal 248, hex 0xF8)
- * start (decimal 250, hex 0xFA)
- * continue (decimal 251, hex 0xFB)
- * stop (decimal 252, hex 0xFC)
- All the above real-time messages are supported by MIDIClock

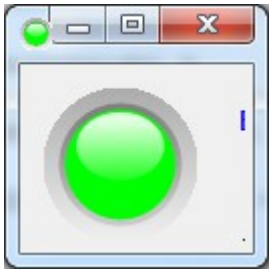
MIDIClock Features :

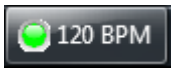
- 2 MIDI output drivers supported
- Up to 32 midi simultaneous MIDI input action mappings with MIDI learn function
- Fractional BPM rates from 0.001 BPM to 1000 BPM
- Highly customizable through INI files.
- Stable, usable for gigs, studio, live shows,...
- Registration & Support : midiclock.com/upgrade



MIDIClock Shapes

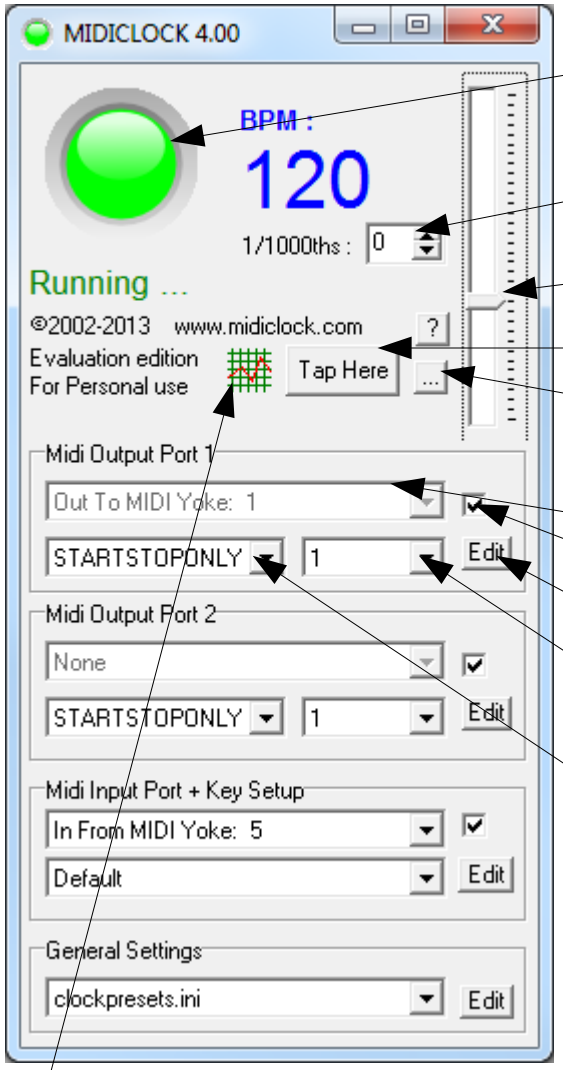






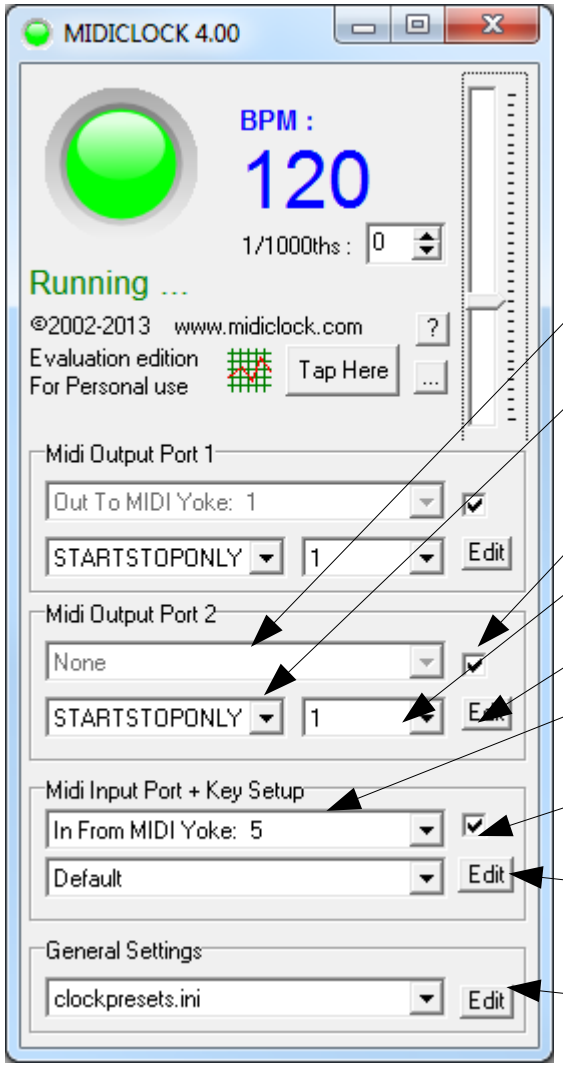
The form size of your midiclock can be resized to reduce the claimed screen real estate.

Main Screen functionality (1/2)



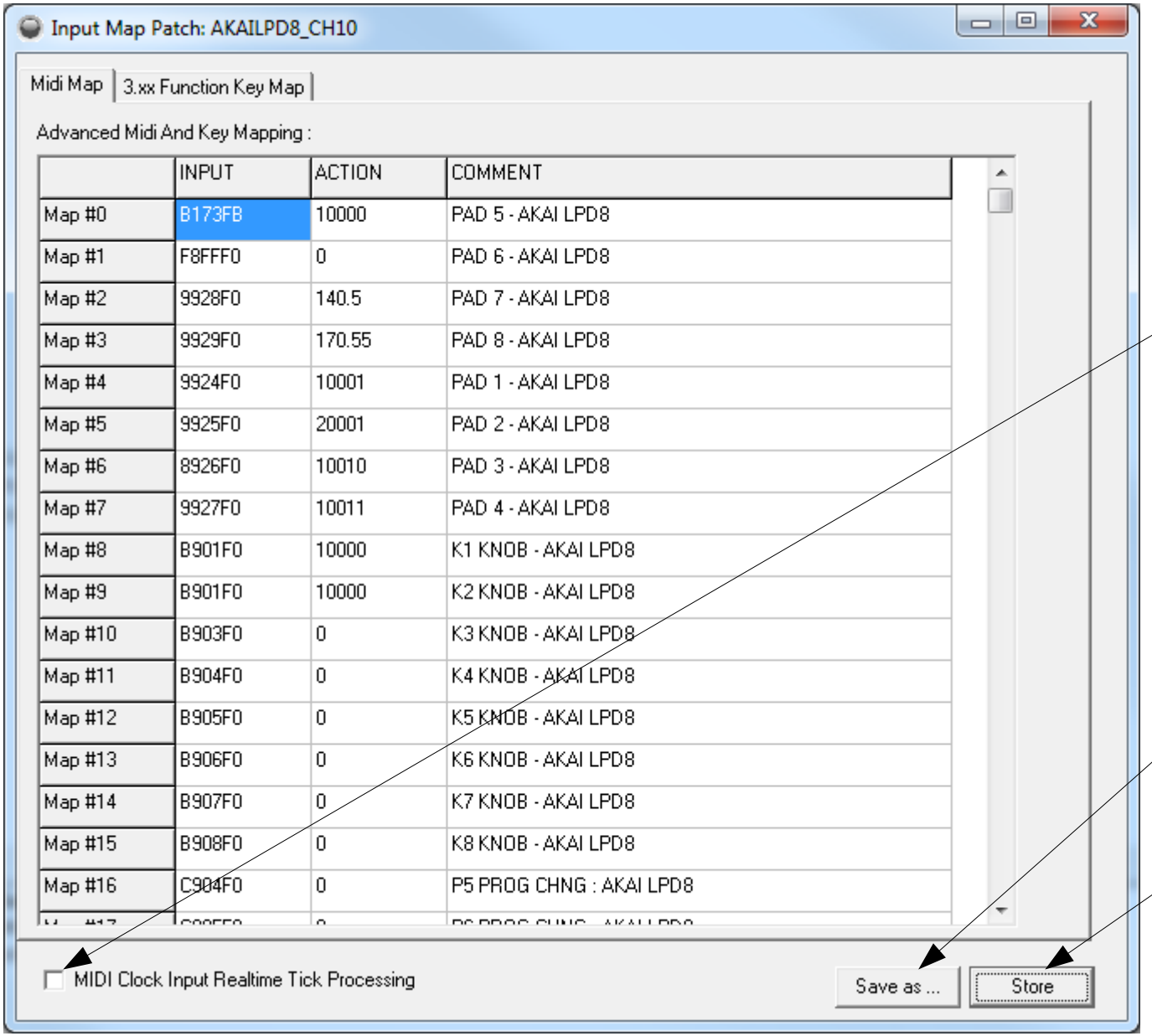
- Start /stop the timer
- Fractional part of the BPM
- Main BPM rate slider
- Tap tempo input button
- Small form factor
- Device #1 Selection
- Device #1 Enable/Disable
- Device #1 Config editing
- Device #1 Tempo divider
- Device #1 Output driver
- Tempo Chart Visualisation

Main Screen functionality (2/2)



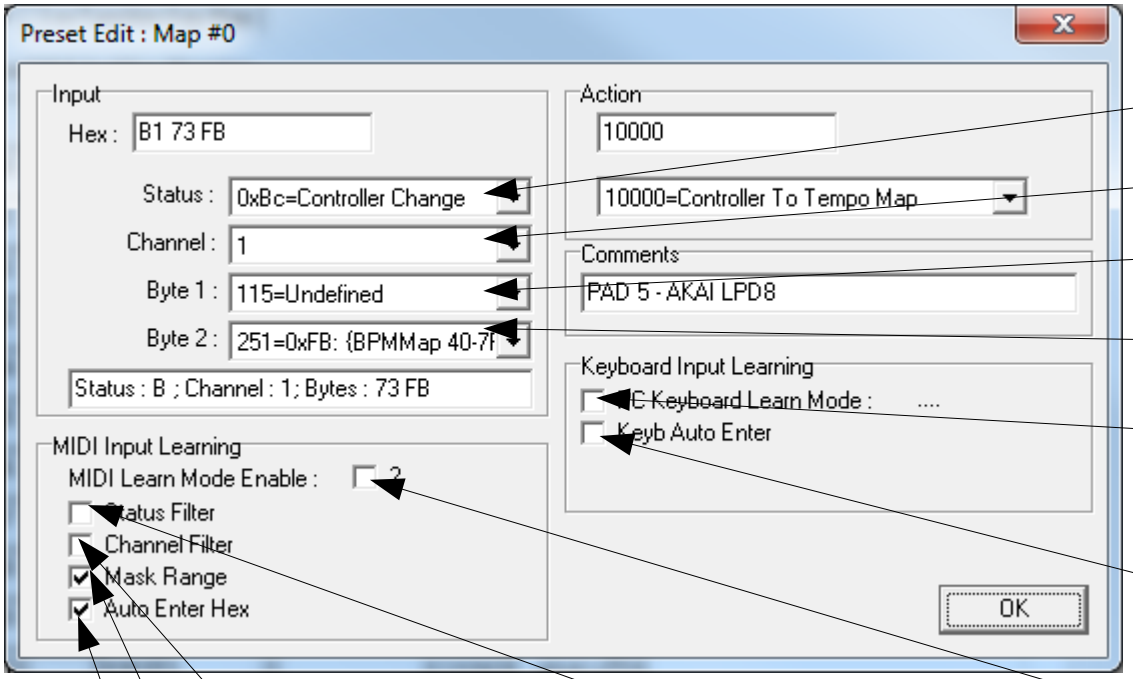
- Device #2 Selection
- Device #2 Output driver
- Device #2 Enable/Disable
- Device #2 Tempo divider
- Device #2 Config editing
- Input MIDI Device Selection
- Input MIDI Device Enable/Disable
- Input Map Editing
- Preset patch selection/edit

Input Patch Editor



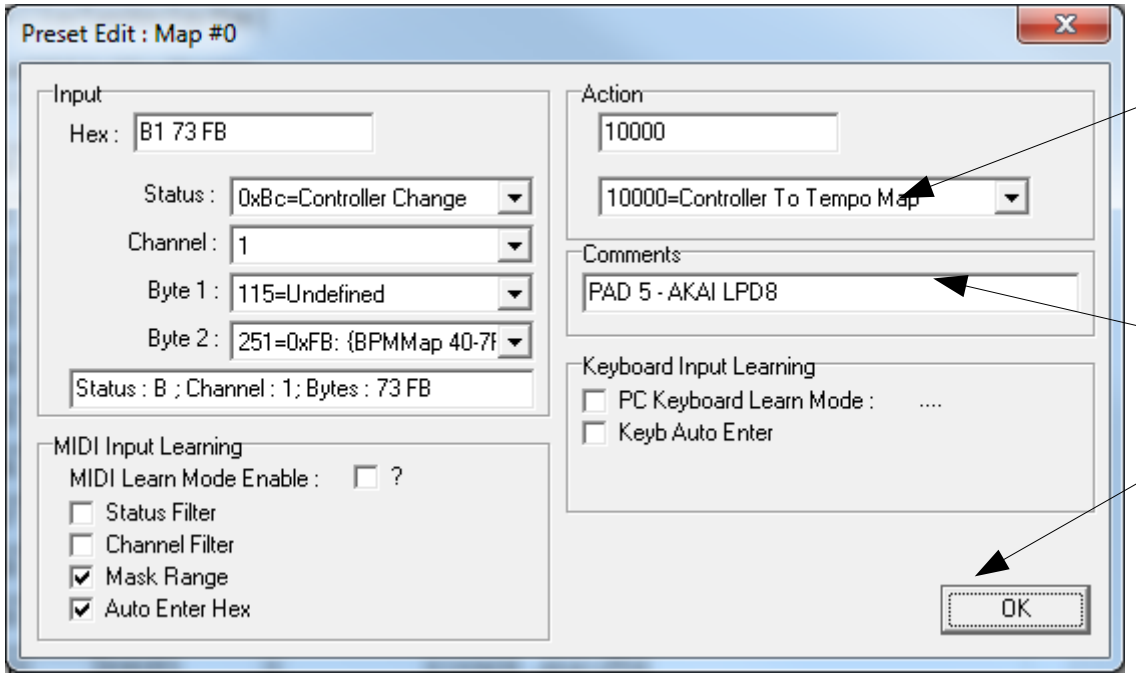
- MIDI command to action mapping
- Click on any line to edit the mapping
- Enable Realtime MIDI Clock Input processing : this makes midiclock respond to an incoming midi clock signal
- Save as a new input driver
- Store as current input driver

Editing Input Map #0 (1/2)



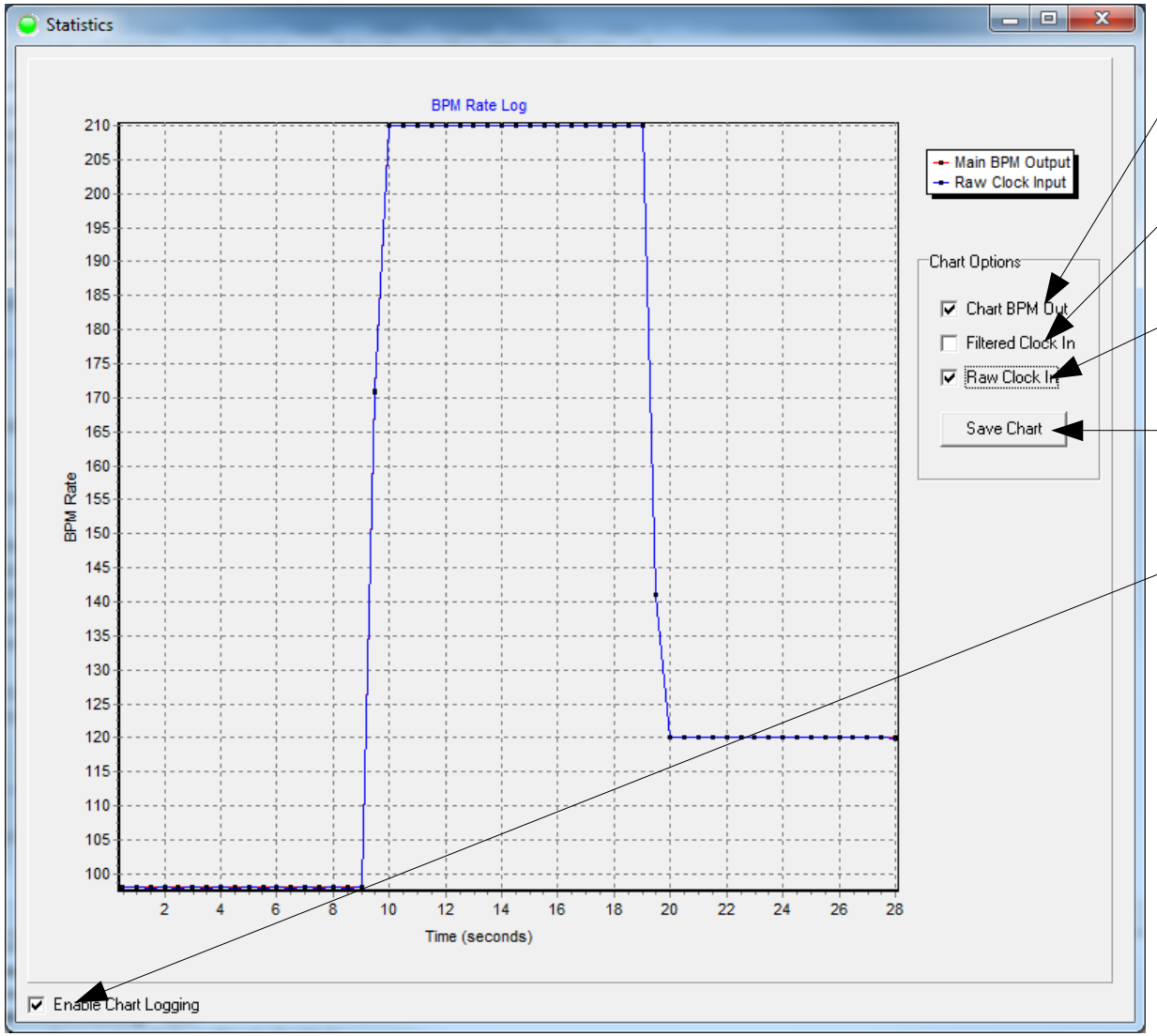
- Status byte
- Midi channel
- Parameter 1 of midi message
- Parameter 2 of midi message
- **PC Keyboard Learning function :** → shows hex code for the key pressed
- Keyb Auto Enter : enters key code in fields automatically
- **MIDI Learning function** --> updates map to incoming midi date. Use this for quick mapping.
- Filter on status byte in learning mode
- Filter on selected channel for incoming data in learning mode
- Apply the mask range when data comes in, in learning mode
- Automatically update the hex code in the editor on input

Editing Input Map #0 (2/2)



- Action mapped to the defined input midi code
(for a list of actions see the special commands decription at the end of this document)
- Descriptive comment for this map
- Press ok to apply the settings

Tempo Chart Visualisation



- Enable Output BPM rate display
- Enable display of Filtered Clock Input Values
- Enable display of Raw Clock Input Values
- Save chart as BMP
- Enable/Disable chart logging

Keyboard Shortcuts

- CTRL+ALT+S : save current settings to clockpresets.ini. It creates the file if it does not yet exist.
- F1/RETURN : Start/Stop timer toggle
- F2 : Pause timer
- F3 : Continue/Resume timer
- F5 : set BPM to Preset #5
- CTRL+F5 : Store current BPM rate at preset #5
- F6/F7/F8 : Change BPM to Preset #6/7/8
- CTRL+F6/F7/F8 : Store BPM at preset #6/7/8
- SPACE : tap tempo trigger
- Any custom key can be mapped through the input map !!

File Overview

- **MIDIClock.exe** : The application binary. Clicking this application starts up midiclock.
- **clockpresets.ini** : Startup application presets. These are saved by pressing CTRL+ALT+S.
- **MidiclockRegistration.ini** (optional) : contains the key for registered users.
- ***.mcp** files : alternative application preset patches. Same file format as clockpresets.ini.
- **outdrv subdirectory** : contains output drivers, such as :
  - GMBASSDRUM.ini : a GM bass metronome
  - GMCLICHEROCK1.ini : a typical GM pop-rock drum rhythm
  - G71UT.ini : interfacing to a Zoom G7.1ut effect pedal
- **indrv subdirectory** : contains input drivers

Clockpresets.ini layout (1/3)

- **[APPLICATION_PRESETS] ; Section indicating general application presets**
  - MAINSCREENPOSITIONTOP=155 ; Main screen top pixel position at program startup
  - MAINSCREENPOSITIONLEFT=565 ; Main screen left pixel position at program startup
  - DEFAULTSPEED=120 ; BPM Rate used at program startup
  - SHOWFLASHING=1 ; 0 = disable window color flashing ; 1=enable window flashing at ¼ beat
  - FULLFLASHING=0 ; 1 = enable full window flashing ; 0 = disable
  - FLASHINGDURATION=1000 ; Color duration (unit = 1/24th of a beat). Set to 1000 for normal use.
  - FLASHINGPERIOD=24 ; Cycle period for the flashing, define in 1/24th of a beat units
  - IGNOREMOUSEWHEEL=0 ; 1=Disable mouse wheel influence on bpm rate
  - IGNOREKEYBOARDTAP=1 ; 1=Ignore keyboard 'SPACE' for tapping and 'RETURN' for start/stop
  - ALWAYSONTOP=0 ; 1= keep application window always in front of other applications
  - AUTOSTARTONTAP=0 ; 1= automatically start the midi clock signal at beat 1 after tapping beat 4
  - TAPTEMPOTIMEOUT = 5000 ; Tap tempo input state reset timeout (in milliseconds)
  - TAPTEMPOCOUNT=2 ; number of taps needed to trigger a tempo change (2, 3 or 4)
  - BPMROUNDING=0.001 ; rounding step taken into account when determining the BPM rate
  - BPMMINIMUM=0.001 ; the minimal BPM rate selectable in the midi clock GUI
  - BPMMAXIMUM=330 ; the maximal BPM rate selectable in the midi clock GUI
  - DONTASKSAVESETTINGS=0 ; 1= Shows “do you want to save settings”
  - CLOSEMINIMIZESWHENRUNNING=0 ; 1 = Closing the application minimizes it when the clock is running

Clockpresets.ini layout (2/3)

- **[MIDIOUTPORT1] ; section containing the midi port #1 application settings**
  - MIDIPORTINDEX=1 ; Selection Order number of the midi port #1
  - MIDIPORTNAME=Out To MIDI Yoke: 1 ; Device name of the midi port #1
  - DEVICETYPE=MidiClock ; Output driver selected for this midi port #1
  - CLOCKDIVIDER=1 ; Divider used on the clock signal on port #1
- **[MIDIOUTPORT2] ; section containing the midi port #2 application settings (same structure)**
  - MIDIPORTINDEX=9 ; Selection Order number of the midi port #2
  - MIDIPORTNAME=E-MU Xmidi1X1 ; Device name of the midi port #2
  - DEVICETYPE=MidiClock ; Output driver selected for this midi port #2
  - CLOCKDIVIDER=1 ; Divider used on the clock signal on port #2
- **[MIDIINPORT1] ; section containing the midi input port application settings**
  - MIDIPORTINDEX=2 ; Selection Order number of the midi input port
  - MIDIPORTNAME=In From MIDI Yoke: 3 ; Device name of the midi input port
  - DEVICETYPE=AKAILPD8_CH10 ; Input driver selected for this midi port

Clockpresets.ini layout (3/3)

- **[BPM_PRESETS] ; section containing BPM rate preset values.**
  - F5BPM=100 ; pressing F5 will set the BPM rate to 100
  - F6BPM=120 ; pressing F6 will set the BPM rate to 120
  - F7BPM=140 ; pressing F7 will set the BPM rate to 140
  - F8BPM=160 ; pressing F8 will set the BPM rate to 160

Note : since 4.00, custom keymaps can be set up in the input map editor. The F5/F6/F7/F8 presets are supported for backwards compatibility

Input drivers : General Layout

- **[SPECIAL_COMMANDS] ; Powerful decription of remote controlling midi clock by MIDI messages**
  - INPUT0=933C40 ; MIDI Message to be parsed. (replace 933C40 with your midi message in hex)
  - ACTION0=150 ; Action to be taken when receiving that MIDI message.
  - ...up to INPUT31 : 32 INPUT/ACTION pairs can be defined.
- INPUT specifier :
  - Speficies the 3 midi bytes in hex (status byte + 2 data bytes) on which midiclock reacts
  - When the status byte is 0x60, the input is a PC keyboard keypress. The 2nd data byte determines the key code.
  - For example the midi message 933C40
    - The keyboard plays middle C (note number 60, hexadecimal 3C) on channel 4 (the zero nibble of 94), at half the full velocity (velocity 64, hexadecimal 40).
    - INPUT0=933C40 ; this would define the above midi message as input signal
    - ACTION0= 150 ; the action would be to set the bpm rate to 140 bpm
  - What about velocity sensitive keyboards ?
    - Use masking : using F0 as data byte 2 will make midiclock trigger on all non zero velocities
    - Example : INPUT0=933CF0 : for every middle C played (note on event), the ACTION0 will be run
  - ACTION0=130 ; example : set BPM RATE to 130 when the INPUT0 MIDI Message is received
  - More advanced options and usage for INPUT/ACTION will be described on the next pages.

Input drivers : Actions

- The following target action codes can be executed on incoming midi commands :
  - 0 = do nothing
  - 1 --> 200 = set this specific BPM value
  - 10000 = perform midi byte 2 to tempo transformation (see further on for the input masking options)
  - 10000.1 = perform midi byte 1 to tempo transformation (see further on for the input masking options)
  - 10001 = start-stop
  - 10002 = pause
  - 10003 = continue
  - 10004 = start
  - 10005 = stop
  - 10006 = decrease tempo
  - 10007 = increase tempo
  - 10008 = tempo - 2
  - 10009 = tempo + 2
  - 10010 = double tempo
  - 10011 = halve tempo
  - 10016 = tempo – rounding step
  - 10017 = tempo + rounding step
  - 10101 = beat reset
  - 20001 = tap tempo trigger

Input drivers : Tempo Transformation Input Masks (1/3)

- In case of an action = 10000 --> several midi value to tempo transformation can be selected by input midi data byte 2
- In case of an action = 10000.1 --> several midi value to tempo transformation can be selected by input midi data byte 1
- This is useful for mapping a specific controller range or patch onto a tempo range of choice.
- For byte E0 – EF, a custom transformation can be defined in the input driver. For example, for E0 :
  - [CUSTOMRANGE_TRANSFORMS]
  - RANGEMIN_E0=00
  - RANGEMAX_E0=7F
  - RANGEMULTIPLIER_E0=1.5
  - RANGEOFFSET_E0=30
- Speficic values can also be overwritten by an explicit map, for example E1 :
  - [CUSTOMRANGE_TRANSFORMS]
  - RANGEMIN_E1=00
  - RANGEMAX_E1=7F
  - RANGEMULTIPLIER_E1=1
  - RANGEOFFSET_E1=0
  - RANGEMAP_E1=CUSTOMRANGE_MAP2

Input drivers : Tempo Transformation Input Masks (2/3)

- This custom map can then be defined in a separate section. You can design your own mapping curve from a spreadsheet this way.
- For example :
  - [CUSTOMRANGE_MAP2]
  - 0=60
  - 1=60.72
  - 2=61.45
  - 3=62.19
  - 4=62.93
  - 5=63.69
  - 6=64.45
  - 7=65.23
  - 8=66.01
  - 9=66.8
  - 10=67.6
  - 11=68.41
  - 12=69.23

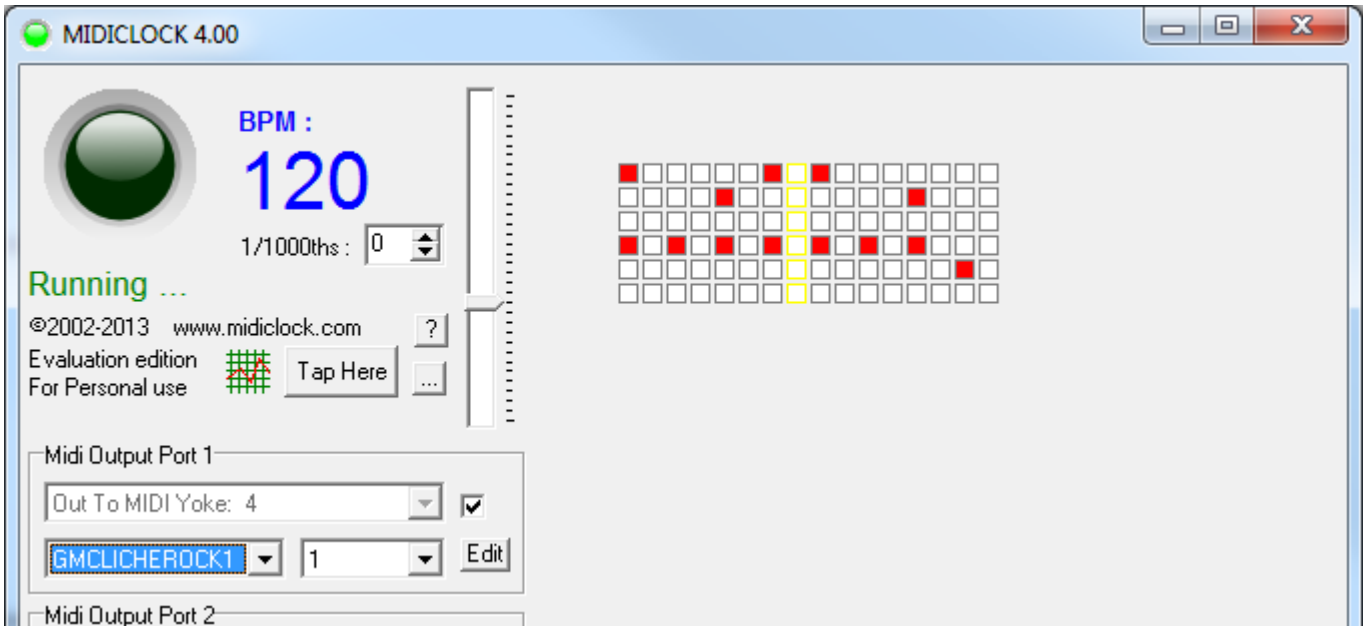
Input drivers : Tempo Transformation Input Masks (3/3)

- Midiclock will also transform the incoming data byte according to these fixed fomulas :
  - Mask byte 0xF0: From 0x00 to 0x7F --> multiplier = 1.58 and offset = 0
  - Mask byte 0xF1: From 0x00 to 0x7F --> multiplier = 1 and offset = 0
  - Mask byte 0xF2: From 0x00 to 0x7F --> multiplier = 2 and offset = 0
  - Mask byte 0xF3: From 0x00 to 0x7F --> multiplier = 3 and offset = 0
  - Mask byte 0xF4: From 0x00 to 0x7F --> multiplier = 4 and offset = 0
  - Mask byte 0xF5: From 0x00 to 0x7F --> multiplier =1 and offset = 40
  - Mask byte 0xFA: From 0x00 to 0x3F --> multiplier = 2 and offset = 0
  - Mask byte 0xFB: From 0x40 to 0x7F --> multiplier = 2 and offset = 0
  - Mask byte 0xFC: From 0x00 to 0x3F --> multiplier = 2 and offset = 50
  - Mask byte 0xFD: From 0x40 to 0x7F --> multiplier = -2 and offset = 306
  - Mask byte 0xFF: From 0x01 to 0x7F --> multiplier = 2 and offset = 0

- These mappings cannot be changed, and are kept in 3.xx releases for backwards compatibility

Output drivers : General

- Midiclock contains a framework for custom MIDI output protocols. Those are located in the outdrv subdirectory.
- Midiclock includes a tiny tight sequencer for each output driver.
- Visual display of the beat position is possible
- Currently beat editing occurs through ini editing (see next page)



Output drivers : Configuration

The subdirectory outdrv contains the selectable output drivers.
I will explain how this works, by explaining some examples :

Sample Midiclock.ini explained.

```
[DEVICECONFIGURATION]
DEVICETYPE=MidiClock                    ;  Name of the device
DEVICE_CLOCKOUTPUT_ENABLE=1             ; send out midiclock commands (F8)
```

Sample GMBOINKY.ini explained

```
[DEVICECONFIGURATION]
DEVICETYPE=GM BOINKY                    ;  Name of the device
DEVICE_SYSEXINIT_STRING=                    ;  sysex data to be sent on driver initialisation
DEVICE_CLOCKOUTPUT_ENABLE=0                 ; 1 =  sends out midiclock (F8) bytes, 0 = doesn't send F8
DEVICE_SYSEX_ENABLE=0                       ; 1 = enables sysex output,  0 = no sysex output
DEVICE_SYSEXRELEASE_STRING=                 ; sysex data to be sent on driver release
DEVICE_SYSEXTEMPOSET1_STRING=               ; sysex data to be sent before the tempo code (on change)
DEVICE_SYSEXTEMPOSET2_STRING=               ; sysex data to be sent after the tempo code (on change)
DEVICE_SYSEX_VALOFFSET=40                   ; offset to be added to the sysex tempo code
DEVICE_TRACKS_ENABLE=1                      ; 1= enables track sequencing, 0 = disables track sequencing
DEVICE_TRACKS_PROGRAMCHANGE=35              ;  Default prog change nr. to be sent before starting playback
DEVICE_TRACKS_CHANNEL=0                 ;  Default channel to be used by tracks
DEVICE_CLOCKOUTPUT_NOSTARTATSTART=1 ; 1= send no start byte (FA) when the clock is started
DEVICE_CLOCKOUTPUT_NOSTOPATEND=1        ; 1= send no stop byte (FC) when the clock is stopped
```

Output Drivers : Sequences

Beat sequences can be customized.
This currently happens by creating/editing an output driver.
You can find examples in the outdrv subdirectory.

GMBOINKY.INI is an example of a sequence.

```
[DEVICECONFIGURATION]
DEVICETYPE=GM BOINKY
DEVICE_SYSEXINIT_STRING=
DEVICE_CLOCKOUTPUT_ENABLE=0
DEVICE_SYSEX_ENABLE=0
DEVICE_SYSEXRELEASE_STRING=
DEVICE_SYSEXTEMPOSET1_STRING=
DEVICE_SYSEXTEMPOSET2_STRING=
DEVICE_TRACKS_ENABLE=1
DEVICE_TRACKS_PROGRAMCHANGE=35
DEVICE_TRACKS_CHANNEL=0
DEVICE_CLOCKOUTPUT_NOSTARTATSTART=1
DEVICE_CLOCKOUTPUT_NOSTOPATEND=1
[TRACKS]
C2247400=1000100010001000
C3307400=0010001000100100
C43C7400=0000000000000010
C5487400=0000000000000001
```

You can setup some parameters that are enforced on initializing the driver :
DEVICE_TRACKS_CHANNEL : default midi channel used (when not specified)
DEVICE_TRACKS_PROGRAMCHANGE : program nr used for default midi channel

Next up you can add TRACKS

C2247400=1000100010001000

So the key is built up like this :

track name = C2
note number = 24
note volume = 74
track channel = 00

an optional X can be put behind that, to indicate no note-off should be sent.

the track events are simply
1 = occurrence
0 = no occurrence

This way you can create a complete sequence

Any Questions ??

- Visit www.midiclock.com for more information...