

The purpose of this application note is to describe the implementation of the Mackie control emulation in the Bitstream 3X

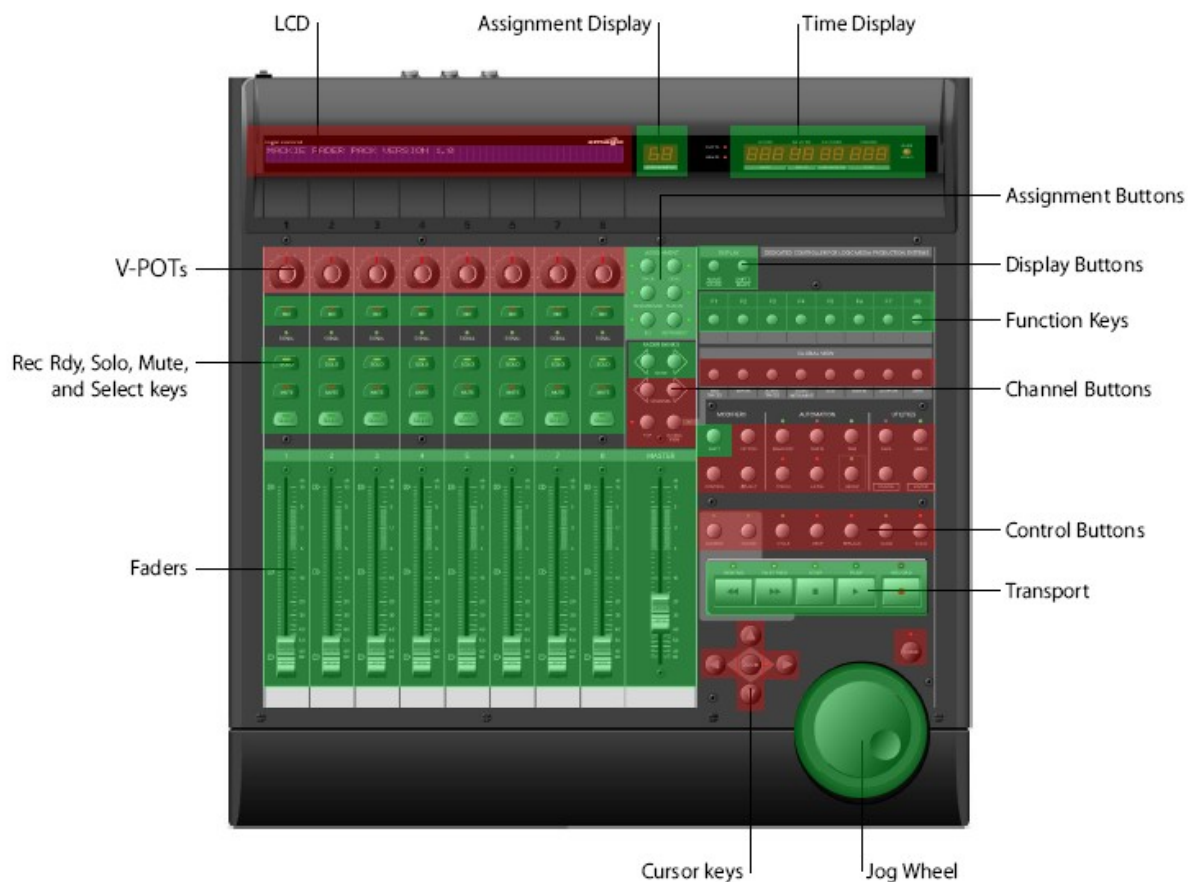
## Requirements

This document only concerns owners of Bitstream 3X featuring built-in **ROM V1.5 or higher**, for older versions, please contact Wave Idea in order to know how to get an up to date firmware version.

To check Bitstream 3X ROM version, please refer to the user's manual.

It is also necessary to download the *Mackie\_control.bs3* library file to the Bitstream 3X (download is done using the Bitstream 3X configuration software).

## Overview of the Mackie control available controls



The red areas are currently not emulated by the Bitstream 3X (some of them should be emulated in future firmware versions).

The green areas are emulated by the Bitstream 3X.

**List of controls emulated by the Bitstream 3X**

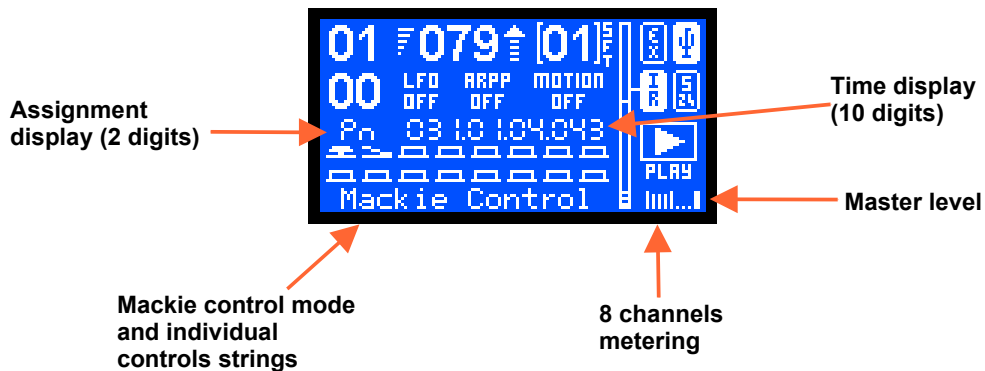
Mackie control	Bitstream 3X control	Emulation
LCD	-	-
Assignment display	Display	√
Time display	Display	√
V-pots	-	-
V-select buttons	Programmable buttons (group 4)	√
Assignment buttons	Programmable buttons (group 5)	√
Display buttons	Programmable buttons (group 6)	√
Function keys	Programmable buttons (group 7)	√
Fader banks L/R	Group buttons	√
Channel buttons	-	-
Control buttons	-	-
Transport buttons	Transport buttons	√
Jog wheel	Endless encoder (while encoder button pressed)	√
Cursor keys	-	-
Faders 1-8	Faders	√
Rec/Rdy buttons	Programmable buttons (group 0)	√
Solo buttons	Programmable buttons (group 1)	√
Mute buttons	Programmable buttons (group 2)	√
Select buttons	Programmable buttons (group 3)	√
Master fader	Cross-fader	√

In addition to the above controls, the Bitstream 3X emulates the different SYSEXs received and transmitted by the Mackie Control to perform connection with the Host computer.

**Entering the Mackie control mode**

To Enter into the Mackie control emulation operating mode, simply press the Bitstream 3X “mode” button until the LCD displays “Mackie Control”.

The following screen copy indicates the new displayed parameters while the Bitstream 3X is in Mackie control mode



All the other information displayed on the above screen are common to the other Bitstream 3X operating modes, these other displayed parameters are described in the Bitstream 3X user manual.

Please note the Bitstream 3X must contain the Mackie\_control.bs3 library file to properly emulate the Mackie control.

### Leaving the Mackie control mode

To exit from the Mackie control emulation operating mode, simply press the Bitstream 3X “mode” button until the LCD displays another operating mode of the Bitstream 3X.

### Emulation in details

Here is a list and explanation of the Mackie control emulation by the Bitstream 3X:

#### ***MIDI exclusive systems***

The Bitstream 3X emulates the Mackie control Sysex used to communicate with the host computer. Among these Sysexs, the following Ids have been implemented:

Received      Host Connection Reply  
                    Go Offline  
                    Firmware Version request

Transmitted    Host Connection Query  
                    Host Connection Confirmation  
                    Firmware Version reply

#### ***Display information***

The Bitstream 3X emulates the Mackie control displays as follow:

##### Time display

Fully implemented, the Bitstream 3X displays the timing information sent by the host. The format displayed is similar to the Mackie control :

**000.00.00.000**

##### Assignment display

Fully implemented, the Bitstream 3X displays the assignment display of the Mackie control. The format is similar to the Mackie control, 2 digits 7 segments are displayed on the Bitstream 3X LCD

**Pn**

##### LCD display

Not implemented in the current firmware version

##### Channels metering

The Bitstream 3X displays all 8 channels metering information. These information represent the peak level information sent by the host.  
The Bitstream 3X decrease these peak levels information with a decay time of 300ms, as mentioned in the Mackie control specification.

### Master fader level

The Bitstream 3X displays the master fader level. It is not a part of the Mackie control specification but very useful. This information is displayed on the bottom right of the Bitstream 3X LCD.

### Leds information

Not implemented in the current firmware version

### V-pots led rings

Not implemented in the current firmware version

## ***Emulated controls***

The Bitstream 3X emulates the Mackie control controls as follow:

### V-pots

Not implemented in the current firmware version

### Channel faders 1-8

The Bitstream 3X faders 1-8 emulate these controls. This emulation is available on the 21 groups of the Bitstream 3X.

### Master fader 9

The Bitstream 3X crossfader emulates this control. This emulation is available on the 21 groups of the Bitstream 3X.

Please note the crossfader generates a single MIDI event while the Bitstream 3X is in Mackie mode.

### Rec-Rdy buttons 1-8

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 0 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### Solo buttons 1-8

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 1 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### Mute buttons 1-8

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 2 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### Select buttons 1-8

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 3 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### Cursor keys

Not implemented in the current firmware version

### Jog wheel

The Bitstream 3X endless encoder emulates this control while the Bitstream 3X encoder button is pressed. This emulation is available on the 21 groups of the Bitstream 3X.

Please note the endless encoder generates a MIDI event while the Bitstream 3X is in Mackie mode and while the Bitstream 3X encoder button is pressed (as opposed to all other modes)

*Bitstream 3X encoder button pressed and encoder turned* : The Bitstream 3X will emulate the Mackie control jogwheel.

*Bitstream 3X encoder button NOT pressed and encoder turned* : The Bitstream 3X will NOT emulate the Mackie control jogwheel, the Bitstream 3X encoder will be used as a selector function, as all other Bitstream 3X operating modes.

### Transport buttons

The Bitstream 3X transport buttons emulate these controls. This emulation is available on the group 0 of the Bitstream 3X.

### Display buttons

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 6 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### Function keys

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 7 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### V-select buttons

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 4 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### Assignment buttons

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 5 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### Fader Left-Right bank buttons

The Bitstream 3X Up and Down buttons emulate these controls while the Bitstream 3X current function is 'Group'.

When changing group on the Bitstream 3X, Fader Left right bank change MIDI events are sent by the Bitstream 3X (Left = Down / Right = Up)

### Channel bank buttons

The Bitstream 3X programmable buttons emulate these controls. This emulation is available on the group 6 of the Bitstream 3X.

The behavior of the Bitstream 3X programmable buttons has been set to “push” mode as the Mackie control buttons (as opposed to the “toggle” button behavior)

### Control buttons

Not implemented in the current firmware version

### Shift button

The Bitstream 3X SHIFT button emulates this control

## Example using Ableton Live 5.2

Ableton Live is compatible with the Mackie Control mode. You can use the Bitstream 3X Mackie emulation mode to control Ableton Live.

Please note the V-pots of the Mackie control are not emulated by the Bitstream 3X because of the different nature of the controls (Bitstream pots are analog potentiometers, on the other hand, Mackie pots are endless encoders). The Bitstream cannot emulate these V-Pots.

When using the Bitstream 3X in Mackie mode and connected to Ableton Live, the parameters mentioned in this document are already programmed, while the other parameters need to be assigned directly from Ableton Live (Edit MIDI map).

In this way, the Bitstream 3X will emulate several controls of the Mackie, it will also generate standard Ccs to control the other non-assigned parameters in Ableton Live.

Another advantage of using the Mackie mode to control Live is the audio channels metering and time information that are displayed on the Bitstream 3X LCD.

### Ableton Live configuration

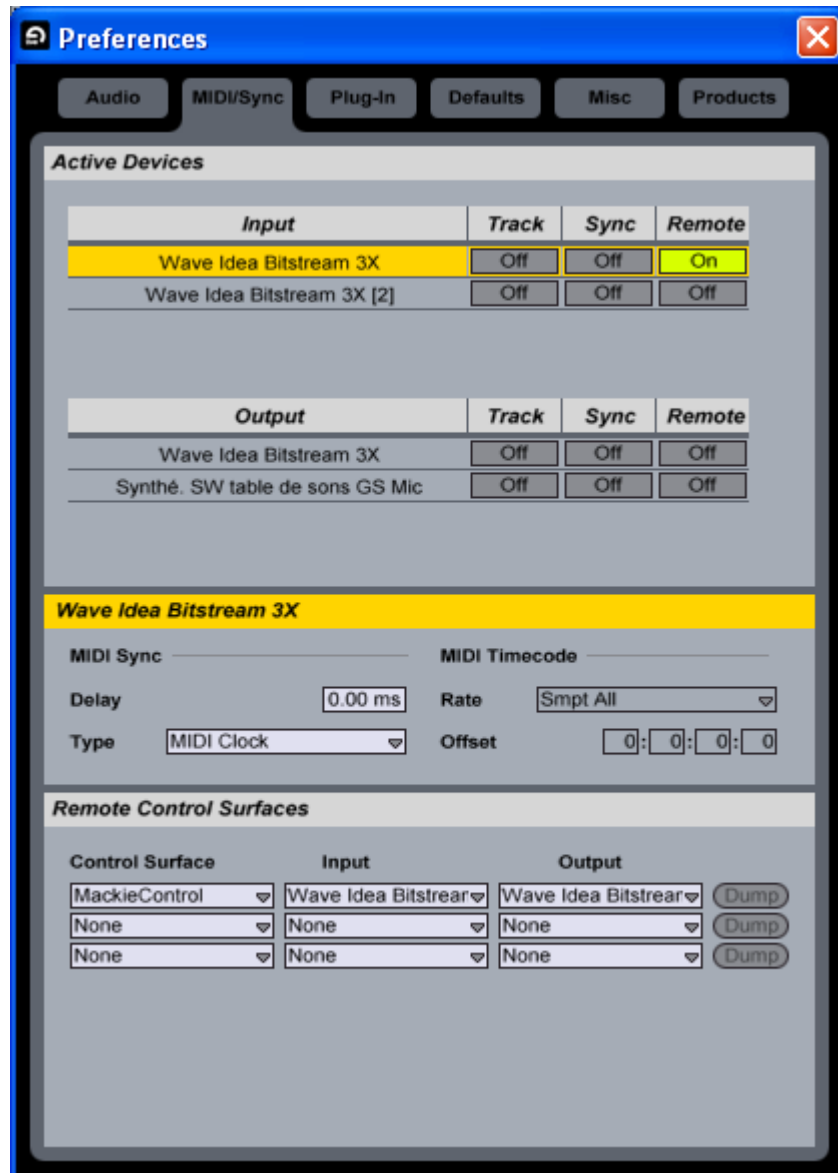
Open the preference menu in Ableton Live and select the MIDI configuration tab.

On the screen shot below, we can see the Bitstream 3X USB port 1 has been selected as the active MIDI input for remote controls (this allows to mix the Mackie control mode with the User defined mode of the Bitstream 3X)

No MIDI sync has been selected since it is already implicit to the Mackie control mode.

## AN003 : Bitstream 3X – Mackie control emulation

In the menu at the bottom of the windows, the Mackie control mode has been selected, and MIDI In and MIDI Out selected are the USB port 1 In and Out of the Bitstream 3X.



In order to avoid any MIDI loopback (resulting in MIDI overflow), the Bitstream 3X MIDI merger output connected to Ableton Live must be disabled.

From the Bitstream 3X menus : MIDI Config -> MIDI Merge -> Merger Outputs -> USB Out 1 -> Off

Please note if you are using the MIDI Output instead of the USB output, the merger configuration described above must be changed accordingly.

Once this configuration has been done, it is not finished yet. At this phase, the controller should be able to control the sequencer of Ableton Live (from the transport functions of the Bitstream 3X), also the time information should be displayed as well as the audio channels metering.

## AN003 : Bitstream 3X – Mackie control emulation

To complete the configuration, standard MIDI assignments can be performed from Live using the Learn mode (Edit MIDI map), as follow :

Click on MIDI Map from Ableton Live, then select the control to map, then move the control you want to assign on the Bitstream 3X. Ableton Live should display the controller received and it becomes automatically assigned.

Repeat the above for all additional controls to assign.

