Pedal Box / Pedal Board Usage Manual

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Introduction

PbX and PbD are almost identical, except that PbD uses it's own footswitches. Where as PbX uses MIDI Input. PbX should be used when you already have external floorboard. PbD IS an external floorboard.

PB is extremely powerful. Offering dynamic expression pedal setting changes (including the device it's targeting) and Rig control which allows up to 32 MIDI events to sent, as well set change the state of up to 8 relays.

PB is very flexible, it can be used as simple display tool, to powerful hub of your setup.

About the creator

Hi, I'm Durisian, I live in Melbourne Australia and spend most of my time as a theatre production manager. I spent my youth dreaming of becoming of a sound engineer with maybe a hint of rock star :)

I fell in love with creating music a young age when my dad (who ran a computer store) showed me how to connect a keyboard up through a midi interface. I've always been fascinated by technology and now I could combine it with music.

Before I started this project I had very little programming experience, certainly none on a PIC chip. So if you looking from my code shaking your head, that's ok – I look back at it now and shake my head too!! (There was lot's I didn't understand when I started this project).

In my late teens while studying music and sound engineering I learnt guitar – and began the never ending quest for the perfect sounds.

It wasn't until after my studies and I had established myself as a live sound engineer and theatre technician that I had enough money to buy my dream guitar (Ibanez SZ-320). By this stage I had a Behringer FCB1010 and V-Amp pro. The V-Amp still provides some of the fantastic sounds I've ever heard (I don't care what you think – this thing rocks, you just have to know how to use it). As I got more creative (read bizarre) I realised that 2 expression pedals wasn't enough.

My search for a reasonably priced analogue to MIDI converter began in 2006-7. It took almost 6 months before I finally stumbled across SmashTV's website. I became very excited as I found my way to ucapps.de and realised that it would not be difficult to create my application to drive more expression pedals. After many months of learning I started my first app – Pedal Box, which in it's first incarnation simply took the AIN and output MIDI. Then I went a little further with LCD display, getting it to show me labels about what I was controlling.

It then dawned on me that I don't need my FCB1010, I can just use digital inputs. Pedal Board was born.

From there things got really out of control – Especially when it came to rig control! I realised a PC editor would be required to assist with config files, and spent almost a year creating the first version in Java (which I had no idea about - I'd never done object oriented programming before). I've since discovered how much easier VB is. So PBE2 will only run under windows and requires .Net 3.5... sorry.

Today, almost 3 years after it's first conception - I can enjoy an enormously powerful floorboard – With a PC editor to make configuration a breeze.

A very big thank you to all those that helped with my ridiculous questions through the forums. And of course TK who makes this sort of thing possible for so many people.

Understanding how it works, and what it does

PB needs to know what it is controlling, and the messages that it has to send. This is done via device config files which are uploaded to a bankstick. Each device file requires a 24LC256 bankstick.
A maximum of 7 device config files can loaded (due to the MBHP limit of 8 banksticks, the first is used for master settings).

When setting up pedals, footswitches and patches. You do not enter CC or program change numbers, instead you select names from the list located in the device config file.

Pedals and footswitches are mapped to an event by the given bankstick number and event type and event number.
MIDI IN events are matched up to a bankstick channel

Devices Files (or Device banksticks)

Device files hold vital information about your midi equipment.

1. The Event Map
A list of CC numbers and Program Change numbers.
Each entry contains:

- The name of the event
- And how the event is handled - On/Off, Tap Tempo, Link to value map, etc There are 9 types to choose from.

2. 10x Value Maps
These maps contain named values (parameter 2 byte of a midi message).
These allow for CC's that are linked to an amp type, effect type, or anything that has a name associated with it's value.

When using a CC linked to a value map, instead of seeing meaningless numbers, it will show the name of the selection

Value Maps are linked to events list in the handler column of the event map.

Master Settings (or Master bankstick)

There are 2 main sections. The Patches and The Settings.

The Patches

1. **Rig Control Patch Maps** (There are 128 patch maps)

   - Firstly a name is given to the patch as a whole
     - MIDI send Entries (there are 32 of these entries in each patch map)
     - Enabled or Disabled for that entry. If disabled, the event will not be triggered.
     - The bankstick number of the device you wish to trigger
     - The event type
     - The event number
     - The value you wish to set the event to
   - Relay Triggers
     - Relays 1 - 8 each have an enabled or disabled setting. If disabled nothing will happen
     - Relays 1 - 8 each have an on or off setting

   2. Relay Settings
   - The Name of the relay
   - It's On label
   - It's Off label
   - Whether to invert the relay or not

2. **Gig Control Cue Lists** (There are 20 to choose from)

   - The Song List can be given a name
     - Entries contain the Rig Control patch # to be triggered

The Settings

1. **DIN map** (only required for PbD)

   - Bankstick of device to control
   - The MIDI event type
   - The event #
   - A Low value
   - A High Value
   - **Button type - either momentary, or switching**

2. **AIN Map** (8 maps, 1 for each pedal. 128 entries in map (1 for each patch change)

   - Bankstick of device to control
   - The MIDI event type
   - The Event #
   - Low Value
   - High Value

   - **Locked** aka 'FIX PED'
     Each pedal can be set to 1 (locked) or 0 (dynamic)
     Dynamic pedals will change the bankstick/device and values they are set to by following Rig Control patch change events.

Expression Pedals

Overview

- Scales between the low and high value
- Displays either:
    - a meter of approx position, some events will display 'off' when 0 and/or 'on' when 127.
    - A pan meter
    - the data 2 value
    - or a named value (eg. 'Ping/Pong Delay' for an effect select control).
- Pedals can not be mapped to program change, on/off or tap events.
- Pedals can have different settings for each rig control patch change, or can be locked to the same event.

Dynamic and Locked Modes

Dynamic Expression Pedals can have up 128 different settings applied. The current setting is chosen by triggering a rig control patch. This allows you to have a different pedal setup for each of your rig control patches.

Locked Expression Pedals will always keep the same setting regardless of any patch change (the setting associated with patch 0).

To change the locked mode:

Enter the global setup menu (CC 127 at 125, or hold bank down and press the global setup footswitch)

Move an Expression Pedal to alter the value Locked status of that pedal

Exit Setup to save (CC 127 at 127 or press the event setup footswitch)

Setup Expression Pedal MIDI Output

Setup mode is activated by pressing holding bank down and pressing the event setup button (pin defined in main.h) or CC 127 at 127. The last pedal moved (or footswitch pressed) will selected for editing. If the pedal is dynamic – you will be editing the setting for the current rig control patch.

There are 4 input programming screens. You can move to the next screen with the bank up footswitch or CC 127 at 126.

In the first screen, you select the device that should be used. Up to 7 devices can stored on 7 banksticks.

Moving any pedal will select the device. If a bankstick is not present 'BS Not Available' will be displayed.

The second screen allows you to select the desired event type. Move any pedal to scroll through available types.

3rd screen; Moving any pedal connected will scroll the event selection, select the desired event.

Multiple pedals/footswitches can be set to the same event.

Finally
For each pedal a minimum and maximum value can be specified.
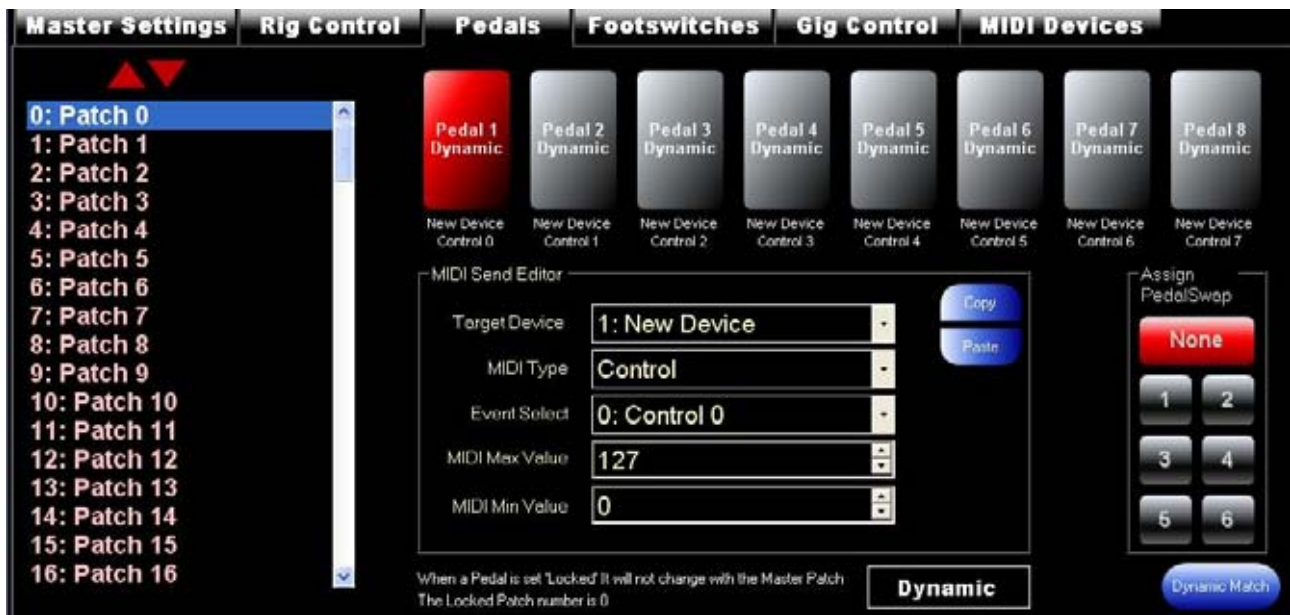The value is scaled between the low and high.

First select the low value with any pedal or pot, and then trigger the screen change. Now you can adjust the high value.

From here you can screen change to go back to screen 1.

Pressing bank down or CC 127 at 127 at any time saves settings and exits setup mode.

Expression Pedal Setup using PBE2 Software

Select the desired Rig Control Patch from the list and select the desired pedal.

Use the MIDI Send Editor section to assign the desired settings.

The red arrows above the list allow you to move the settings for ALL 8 PEDALS to a different patch.

You can copy and paste individual settings

You can also swap ALL of an single pedals settings with another by dragging one pedal on top of another.

Dynamic Match will set all of a pedals setting the current settings

MIDI Input as Expression Pedals (New in 2.6)

By default CC's 20 – 27 will act as though they are directly connected analogue pedals. Including dynamic changes and setup functions.

PedalSwap (New in 2.6)

PedalSwap allows you to swap in a different set of dynamic pedal settings without triggering a rig control patch change. The effect will last until PedalSwap is deactivated or a rig control patch is triggered.

There are 6 slots available. These can only be assigned with Pedal Board Editor 2 software.

Select the desired patch from the list and click any of the 6 slots. These Pedal settings will now be applied when that PedalSwap slot is activated. Only 1 patch can be assigned to slot.

PedalSwap can be activated (and deactivated) by pressing dedicated footswitches or by CC's 92-97 respectively (note: the data 2 byte is ignored).

Footswitches

Overview

Static footswitches always output the same MIDI event regardless of bank.

Banked footswitches gives you up to a total of 128 midi commands (regardless of how many physical banked footswitches you have)

Footswitches will display and behave in different ways depending on the handler chosen in the device config file:

Normal (meter handlers)

- Toggles between the low and high value
- Can be toggle or momentary action
- LED indicator is on when at high value
- Displays either:
    - a meter of approx position, some handlers will display 'off' when 0 and/or 'on' when 127.
    - A pan meter
    - the data 2 value
    - a named value (eg. 'Ping/Pong Delay' for an effect select control).

On/Off only

- Toggles between 0 and 127, regardless of low/high value
- Can be toggle or momentary action
- LED indicator on when at 127
- Displays 'On' or 'Off'

Program Change

- Only sends the Status byte, and Parameter 1 byte
- Is momentary only (regardless of setting)
- LED indicator lights up on the footswitches assigned to the current program change
- Displays the program change name.

Tap Tempo

- Sends the reset tap tempo midi event, with a value of 127 on down press.
- Momentary only (regardless of setting)
- LED indicator is on when button down, off when button is up.
- Displays approximate BPM

Special

- Relay triggering
- Gig Control cue triggering

Footswitches can be setup to act with a toggle (press = high - press = low) or momentary action (press = high, release = low)

Static and Banked Footswitches

Footswitch Setup

Setup mode is activated by pressing holding bank down and pressing the event setup button (pin defined in main.h) or CC 127 at 127. The last footswitch pressed (or pedal moved) will be selected for editing.

There are 4 input programming screens. You can move to the next screen with the bank up footswitch or CC 127 at 126.

In the first screen, you select the device that should be used. Up to 7 devices can stored on 7 banksticks.

Moving any pedal will select the device. If a bankstick is not present 'BS Not Available' will be displayed.

The second screen allows you to select the desired event type. Move any pedal to scroll through available types.

Relay and Gig Control cue functions can be found by selecting 'Special' as the event type when the master bankstick is selected.

3rd screen; Moving any pedal connected will scroll the event selection, select the desired event.

Multiple pedals/footswitches can be set to the same event.

Finally
For each footswitch a low and high value can be specified. This can be the same value if you not require any toggling
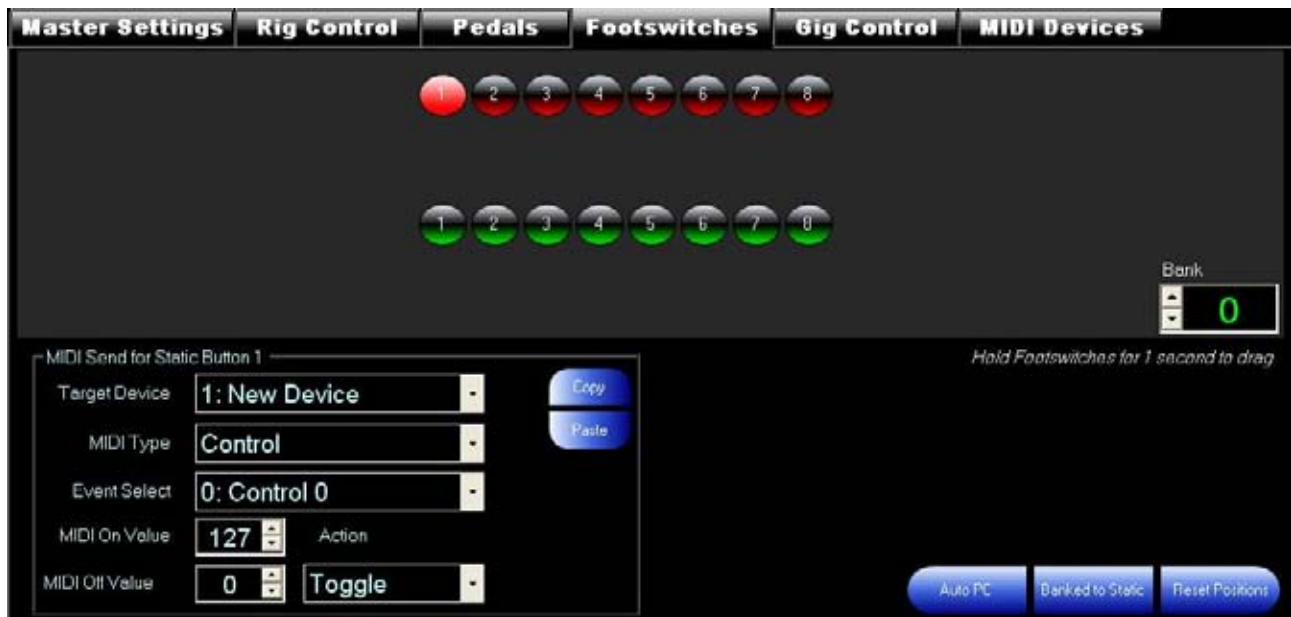

First select the low value with any pedal or pot, and then trigger the screen change. Now you can adjust the high value.

To switch between Momentary and Toggle action – press the global setup footswitch or CC 127 at 125.

From here you can screen change to go back to screen 1.

Pressing bank down or CC 127 at 127 at any time saves settings and exits setup mode.

Footswitch Setup using PBE2 Software

Firstly you need to set how many physical footswitches your hardware has. Click the logo at the top to access the setting dialog.

Footswitches can be moved around on the screen, just click and hold for 1 second and drag to the desired location.

Static footswitches are red, and banked are green.

To edit a setting, select the relevant footswitch and choose the relevant bank (if a banked footswitch). You then use the MIDI send editor to adjust the settings.

You can copy and paste individual settings

The quick buttons:

Auto PC will assign program changes between desired physical banked footswitches. A dialog will appear asking which footswitches to go between. The device it assigns program changes for is whatever is currently selected in the MIDI send editor. This allows you have 8 banked footswitches, but quickly assign as many program changes as possible between say footswitches 5 to 8.

Banked to Static will take the current setting of a selected banked footswitch and apply it all banks

Rig Control

Overview

New in Version 2 - 'Rig Control'. This allows up to 32 midi events to sent at the same time, and also to change up to 8 relays.

Changing the Rig Control patch can also effect the settings of any expression pedals set as 'dynamic'

Configuring MIDI Messages to send

Firstly, trigger the patch you want to edit, either by footswitch or program change command.

You know need to enter the Patch Setup mode. Hold bank down and press the event setup footswitch (or CC 127 at 127), once your in event setup mode, press the event setup footswitch again (or send the patch setup midi event - CC 127 at 124) The last patch change will be the one that is edited.

In this first screen we set the bankstick to be used of the first message.
Use any pedal to scroll through the list

Press Bank Up or (CC 127 at 126) to move to the event type screen.
Again by moving any pedal, you can select any of the available types.

Press Bank Up or (CC 127 at 126) to move to the event select screen.

Again by moving any pedal, you can scroll though the list of events.

Press Bank Up or (CC 127 at 126) to move to the value select screen.

Moving any pedal will change the value.
Also at this screen, you set whether or not the event should be enabled or disabled. If enabled, the midi event, with the value will be sent, if disabled it will not. This can be toggled by pressing the Event Setup footswitch or CC 127 at 125.

Press Bank Up or (CC 127 at 126) to go back to the bankstick select screen, but for the next message. Up to 32 messages can be sent.
At this time, the message you have just been editing will be saved.

You can press Bank Down (or CC 127 at 127) at any time to exit Rig Control Patch Setup Mode. However the current message being edited will not be saved.

Relay Setup

Up to 8 relays can connected to PB. Each Rig Control patch can turn the relay on or off.

Note: Relays can be inverted by PB, this setting can only be modified in the Pedal Board Editor 2 software

We start in the Rig Control patch setup screen (see Configuring MIDI Messages to send).
This time press the event setup button again, or send the patch setup midi command (CC 127 at 124) again.

The top line indicates whether the relay will be triggered or not. The bottom line indicates whether it will be triggered on or off.
To toggle the enabled line - Press the Global Setup footswitch (or CC 127 at 125).
To adjust the on/off line - Move any pedal.

Bank up (or CC 127 at 126) will move to the next column.

When finished, press the Event Setup Button (or CC 127 at 124) to save and return to the Patch Setup Screen.

Configuring using PBE2 Software

In the software we have a much more complete overview of what's happening.

To edit a patch, firstly choose it from the list. You can name it using the Patch name textbox

To edit midi events, choose the desired event from the second list – it can now be modified in the midi send editor.

You can copy and paste individual settings

The arrows on top of the lists allow to change the order of patches and midi events. Note the 'Footswitch; checkbox. With is checked if a footswitch is assigned to a patch that is being moved, the footswitch will update so it points to the moved patch.

Relays can be set to trigger on or off (or no change). Green is ON, Red is Off, Black is No Change.

Relay names and inversion settings can access by holding down shift and clicking the logo at the top of the window.

Match Name: Will copy the program change names of the currently selected device and apply them to the rig control patch names

Auto PC: Will take program changes settings for the currently selected device in the MIDI send editor and add them sequentially to each patch to the currently selected MIDI send slot in the list.

Triggering a Patch Change

Patch changes can be made by sending a program change midi event on the master bankstick channel.

Or

By assigning a master bankstick program change to a footswitch.(see Footswitch Setup).

Gig Control

Overview

Gig control is a cue based system of rig control patch selection.

There are 20 cuelists available. Each cuelist has up to 128 cues.

By triggering Next/Previous Cue you are able to trigger Rig Control Patch changes in a given order.

Configuring

If you wish to use footswitches for next/previous cue, it must be assigned (see Footswitch Setup). Be sure to select the master bankstick, and choose the 'Special' event type, next and previous cue are the first 2 in the list

You can change the current cue list by holding the footswitch you have assigned as Next Cue and pressing bank down or by sending CC 122 at127 to the master bankstick.

You can scroll the song list using any pedal connected.
Pressing Bank Down (or CC 127 at 127) will exit song list selection mode

To edit the cuelist – Press Bank Up (or CC 127 at 126) from the cuelist select screen.

Again using any pedal, you can select the patch number you want for the first cue.
Pressing the next cue footswitch (CC 122 at 2) or previous cue footswitch (CC 122 at 1) will take you through the cue list to set each cue step.
Pressing Bank Down (or CC 127 at 127) will exit cue setup mode.
Cues are automatically saved.

Setting the cue to EOCL (End Of Cue List – Last in the cue select screen) tells PB to loop back to the start if next cue is pressed, and also gives a a high cue number if previous is triggered from the first cue.

Configuring using the PBE2 Software

Choose a cuelist from the list (Name it if desired). Then choose cues from the second list. Use the patch selection drop down list to choose the desired patch.

Red arrows above each list allow to move settings around.

Triggering

Gig control can be done MIDI events on the master bankstick channel -

CC 122 at 1 for Previous Cue

CC 122 at 2 for Next Cue

Or

By the assigning Next Cue and Previous Cue to footswitch.

Storing Configurations (PC Software)

Make sure you have the appropriate MIDI channel selected (1-16). Ensure the channel does not match any device.

Save and Load

File types:

.pbx: This is main save file type. It stores all master and device configuration.

You can save and load pbx files from the red buttons at the top.

.rbs: Stores individual master or device settings

Accessed by the Yellow Load and Save Config buttons

.syx: For upload via a separate program, such MIOS Studio 2 or MIDI-OX

Accessed by the Yellow Load and Save Config buttons

Uploading to PB

Choose you MIDI in and out and appropriate device ID. It is highly recommend to use feedback from core. This allows the software to detect errors and halt the upload (which can prevent MIOS from becoming corrupt and required the firmware to be re-uploaded).

When your ready hit upload. This uploads all of the Master bankstick settings

Special MIDI Implementation

As PbX does not have any buttons for executing special commands, such as with setup modes, triggering relays, etc. Special MIDI events are used for this functionality.

MIDI Implementation can be modified in pbx_midi_config.h)

The channel is set by the Master bankstick (the first bankstick)

General Setup Commands

Control Changes	CC#	Value
Event Setup	127	127
Screen Change	127	126
Global Setup	127	125

event setup is also used to save and exit most setup screens

Rig Control

Control Changes	CC#	Value
Patch Setup	127	124
PedalSwap 1	92	N/A
PedalSwap 2	93	N/A
PedalSwap 3	94	N/A
PedalSwap 4	95	N/A
PedalSwap 5	96	N/A
PedalSwap 6	97	N/A
Relay 1	112	0 = off 127 = on
Relay 2	113	0 = off 127 = on
Relay 3	114	0 = off 127 = on
Relay 4	115	0 = off 127 = on
Relay 5	116	0 = off 127 = on
Relay 6	117	0 = off 127 = on
Relay 7	118	0 = off 127 = on
Relay 8	119	0 = off 127 = on

Program Change 0 - 127

Special

Control Changes	CC#	Value
MIDI In as AIN 0	20	0 - 127
MIDI In as AIN 1	21	0 - 127
MIDI In as AIN 2	22	0 - 127
MIDI In as AIN 3	23	0 - 127
MIDI In as AIN 4	24	0 - 127
MIDI In as AIN 5	25	0 - 127
MIDI In as AIN 6	26	0 - 127
MIDI In as AIN 7	27	0 - 127

Gig Control

Control Changes	CC#	Value
Cue Select	122	127
Next Cue	122	2
Previous Cue	122	1

Device Configuration

Overview

In order to provide detailed information. PB requires device config files to tell it about your equipment. Device config files can only be created and edited in the Pedal Board Editor 2 software.

PB will not function if it detects a bankstick that has not been uploaded with a device config file.
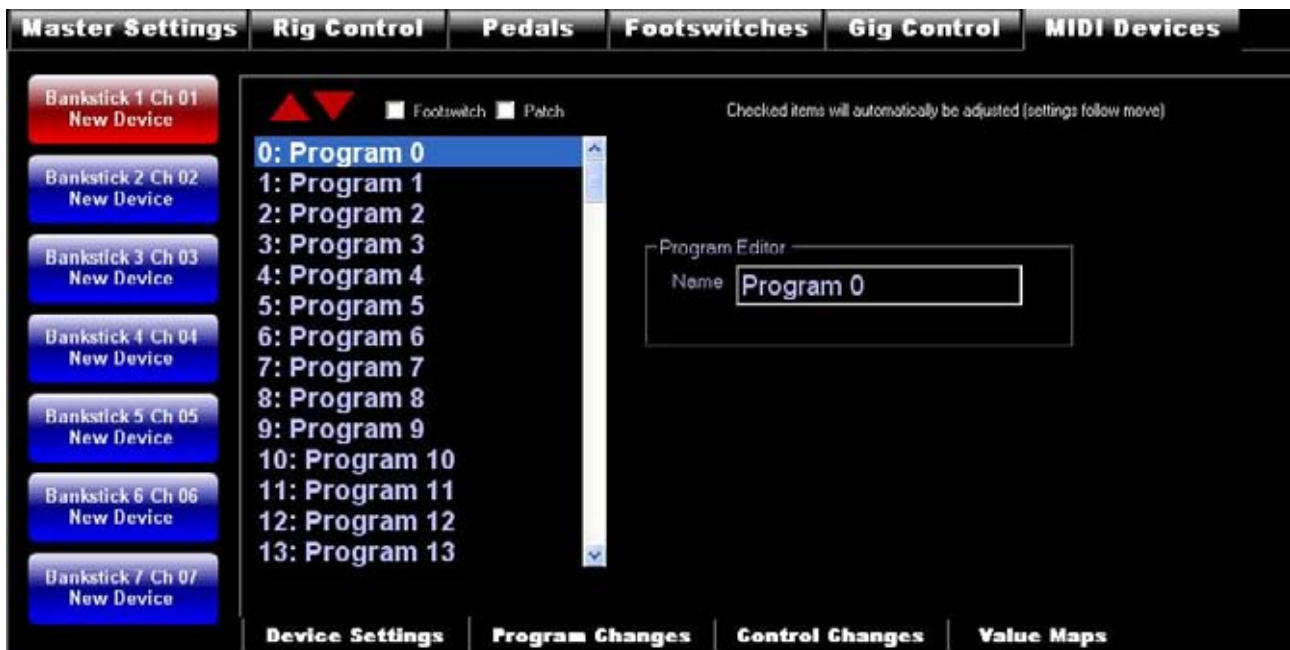

Pedal Board Editor 2 automatically generates a default device config file on startup.

To access these. Go to the MIDI Devices Tab. From here can save/load .rbs and .syx files of your devices. As well as edit them

A list of buttons down the left hand side allows you choose which device you are modifying

Note: You can change the number of device shown in the PBE2 setting by clicking the logo at the top.

Program Changes

Down the bottom are the device config tab buttons. We'll start with program changes.

There's only one thing to deal with here, the name of the program change. Select the relevant number from the list, and give it a name by entering it into the textbox.

The red arrows at the top of the list allow you to move the name around.

The 2 checkboxes, Footswitch and Patch - If checked if any footswitch/patch is configured to that program change, it will update so it's triggering the same program change name.

Control Changes

Very similar to program changes. Except there is the added handler drop down list.

This allows you to choose how PB will interpret and display data on the LCD

On/Off only: Regardless if low/high values it will only produce 0 and 127. The display will show on or off

Tap Tempo: Regardless of low/high and toggle/momentary settings. It will always be a momentary trigger and only send 127 as parameter 2. The display will show an approximate bpm reading.

Meter (inc. with off and with on/off): Displays a meter the value, with optional on when at high value and off when at 0.

Pan Meter: Displays a meter that centres in the centre of the screen

Numeric Value: Show the parameter 2 value

Use Map: Display labels based on one of the 10 Value maps (see next section)

Value Maps

Value maps allow you provide a 16 character text label to a CC parameter 2 value.

This is useful for things amp or cab selection, fx or noise gate settings, etc, etc.

Firstly choose the map you want to edit from the buttons at the top right hand side.

Now select the desired value from the list and enter a label into the textbox

If there a multiple sequential values that have the same label. You only need to enter it into the lowest value. If no label is entered, PB will scan up the list to the first label it finds of a lower value.

The label EOM is keyword stating it is the end of the map and values equal to or above EOM are not applicable. This allows PB to provide a warning if you trigger values that don't do anything. Good for thins like amp selection where only the first 30 or so values a relevant.

Maps are assigned to CC via the CC's handler in the Control Change setup tab (see previous section)

Storing Configurations

Make sure you have the appropriate MIDI channel selected (1-16). Ensure the channel does not match any other device or the master.

Save and Load

File types:

.pbx: This is main save file type. It stores all master and device configuration.

You can save and load pbx files from the red buttons at the top.

.rbs: Stores individual master or device settings

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Uploading to PB

Choose you MIDI in and out and appropriate device ID. It is highly recommend to use feedback from core. This allows the software to detect errors and halt the upload (which can prevent MIOS from becoming corrupt and required the firmware to be re-uploaded).

Select the device config you wish to upload from the buttons on the left hand side

When your ready hit upload. This uploads the chosen device config bankstick settings.