BAM USER MANUAL

Safety warnings and recommendations

Do not eat BAM. Before using BAM, make sure to read all the instructions below, and this User Manual. BAM has some openings on its enclosure and 4 adhesive feet for cooling purpose. To ensure sufficient cooling, do not obstruct the openings and/or remove the adhesive feet. BAM should be connected to the included AC adapter or a power supply of the type described in this manual. Do not place things on the top of the AC adapter which could prevent normal cooling. If your BAM is unused for a long period of time, disconnect the AC adapter from the outlet. BAM, in combination with an external amplification system or headphones, may generate a high sound level, which could potentially damage your ears. Do not operate BAM for a long period of time at a high volume level. It's safer to keep reasonable levels and start with low volume. Do not expose BAM and its AC adapter to rain, moisture, dust, sand or dirt. Do not pour liquids into BAM. Never use or store BAM near water, for example sea, swimming pool, bathtub, kitchen or bathroom sink. BAM should be located away from high temperatures (> 35 degrees C), for example direct sunlight in an enclosed vehicle, radiators, heat registers, stoves or other heat sources. Only clean BAM with a soft, dry cloth. Do not apply any liquids or alcohol. Do not apply excessive vibration forces to BAM, do not drop it and always transport it in its original packaging or in shock absorbing material. Never climb on top of, nor place heavy objects on BAM. Some parts of BAM are fragile (such as the housing and some electronic components), so dropping it might damage your BAM. Repair work resulting from dropped BAM is not covered by the normal warranty of the product. Do not leave small children alone with BAM, and do not let them use BAM unless they are capable of following all the rules for the safe operation of BAM. Do not open (or modify in any way) BAM or its AC adapter. There are no user-serviceable parts inside. Refer all servicing to qualified personnel only. If you think your BAM needs repair, you can send us an e-mail at : support@otomachines.com.

Warranty

BAM is sold with one year full warranty. This warranty covers all malfunctions that may occur from normal use, and does not cover damage due to abuse, faulty connections or operation under other than specified conditions. Warranty is void when serial number is unreadable, when the device is repaired by unauthorized persons, opened, or tampered with in any way, or if the product was not sold to the end-user through an authorized dealer or the OTO Machines website. This warranty is limited to replacement or repair of the product. The unit can only be returned for repair after agreement from OTO Machines. Customer covers shipping costs of faulty BAM to OTO Machines and OTO Machines covers shipping costs back to customer.

Disposal

The trash can symbol indicates that your product must be disposed of properly according to local laws and regulations.

Warning on epilepsy

A very small percentage of individuals may experience epileptic seizures or blackouts when exposed to certain light patterns or flashing lights. If you have an epileptic condition or have had seizures of any kind, consult your physician before using BAM.
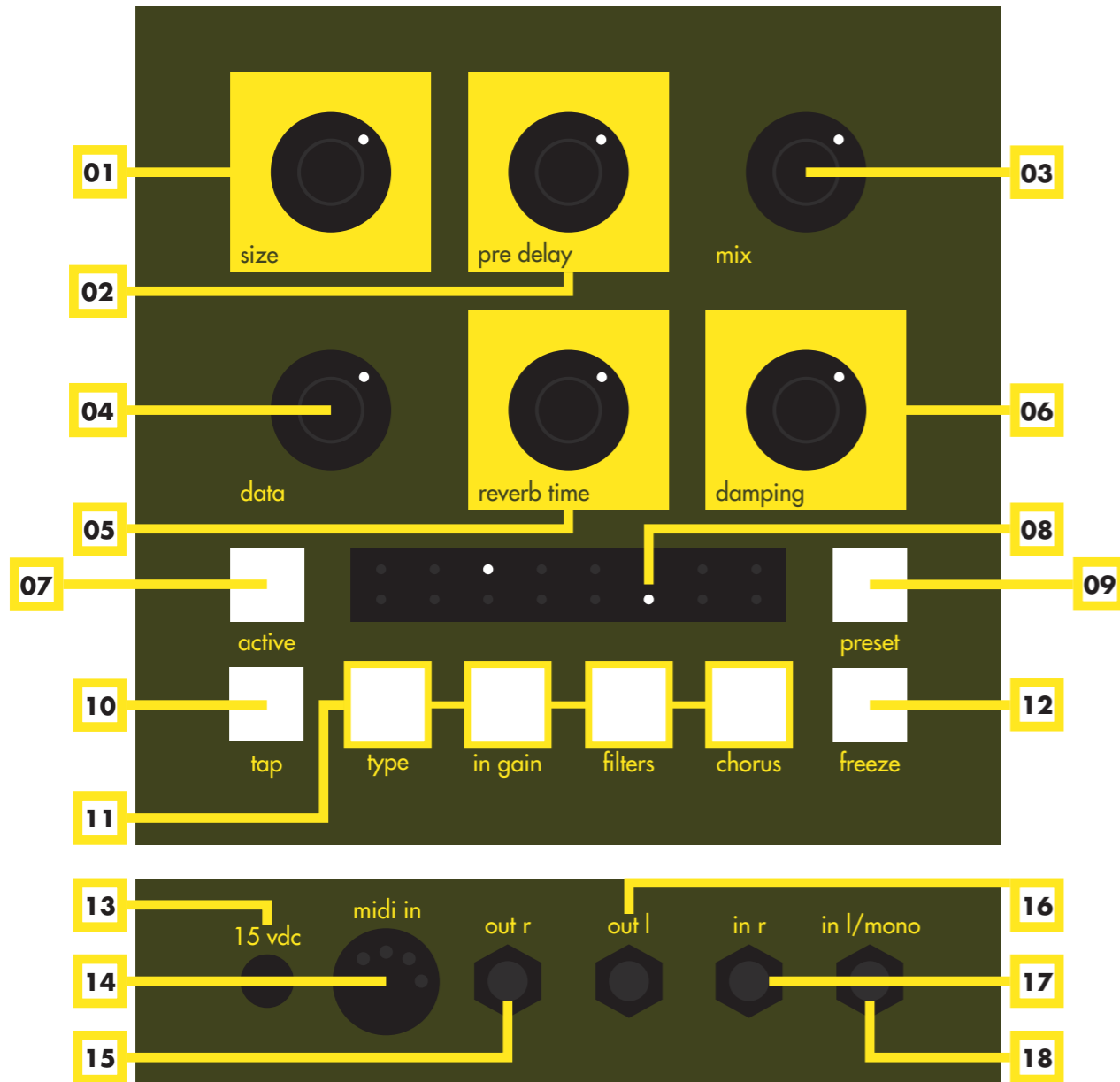
TABLE OF CONTENTS

PRESENTATION

Congratulations and thank you for purchasing BAM !

BAM is a stereo reverb processor inspired by the late 70s / early 80s digital reverberator units. These units are sought after by sound engineers, producers and musicians for their grainy, warm and musical reverberations. Here at OTO, we are passionate by the technology of the digital reverberators, especially the old models ! We have carefully listened to all digital reverberators built from 1976 to 1986, studied their architecture and read all the available papers (from 1961 to nowadays) on digital reverb design. It seemed obvious to us that the musicality of the early digital reverb processors was partly due to the algorithms (the way the processor synthesized a natural reverberation), but also to their hardware limitations. The audio signal was severely high-cut filtered (10 kHz was standard at that time) because of the limited sample clock. Some units used 12 bit gain stepping converters to achieve a 15 bit resolution and others used the first 16 bit converters. Then the samples were digitally processed through a 16 to 20 bit fixed-point CPU with limited memory. The algorithms had to be simple but efficient to create the most musical and versatile reverberation from these limitations. And the hardware itself added grain and warmness to the sound. The technology used in BAM is very close to the one used in these early digital reverberator units : 16 bit converters, 20 bit fixed-point processing, analog filtering and even an input transformer transient simulator. Some of the 7 reverb algorithms are influenced by the early structures, and some are brand new. BAM is a very musical and unique reverb processor. It combines the sound quality of a vintage reverb processor with the playability of a desktop effect in a compact format with MIDI control and 36 user presets.

FEATURES

- 7 algorithms : Room, Hall, Plate, Ambient, Chorus, Non-Linear and Primitive
- Input Gain up to +15 dB with analog clipping
- Pre Delay up to 500 ms (with the PRE DELAY pot) or 1500 ms (with the TAP switch)
- Continuous control of the reverb Size parameter for fine tuning
- Low-cut filter : 20 Hz, 80 Hz, 150 Hz, 250 Hz, 450 Hz
- High-cut filter : 1.8 kHz, 4.5 kHz, 7 kHz, 9 kHz, 15 kHz
- Chorus parameter can add modulation to the reverberator signal
- Tap Tempo assignable to Pre Delay or Reverb Time
- Freeze switch
- 36 user presets
- MIDI input : BAM responds to CCs and Pgm Change
- 3 bypass modes : Relay, Spillover and Aux
- Nice and simple user interface via 16 white LEDs
- Rugged steel enclosure
- Neutrik® jack connectors
- Power supply included
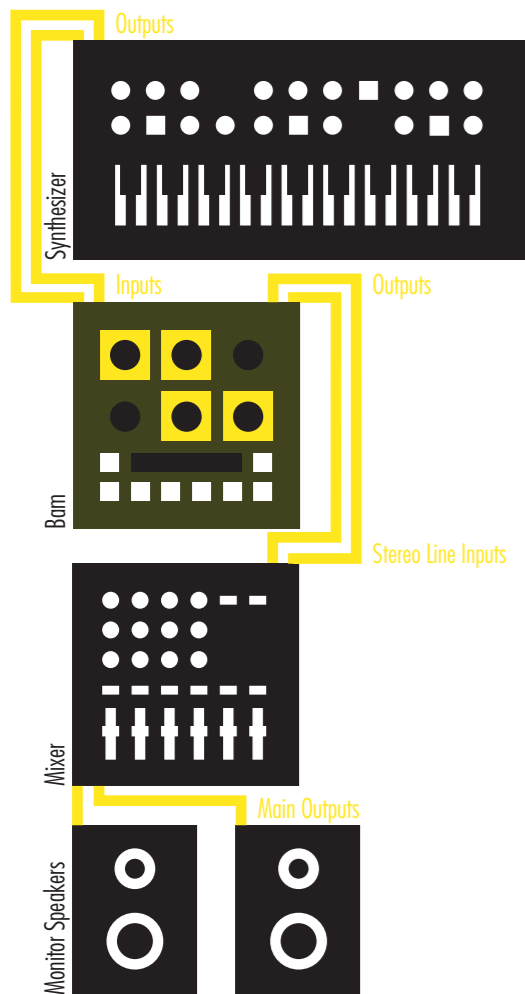
FRONT PANEL & REAR PANEL

01 - **SIZE.** Sets the size of the space. Allows you to tune the reverb to your sound
02 - **PRE DELAY.** Sets a delay time (from 0 to 500ms) before the reverb occurs
03 - **MIX.** Mix between the dry and wet sound
04 - **DATA.** Sets the selected parameter (cf p.7)
05 - **REVERB TIME.** Sets the decay of the reverb
06 - **DAMPING.** Sets the amount of high frequency loss in the reverb tail
07 - **ACTIVE.** Turns the effect on or off (when it's off, the reverb is bypassed)
08 - **LEDS.** Display the parameters, presets, midi settings and other infos
09 - **PRESET.** Save and Recall presets
10 - **TAP.** Tap tempo
11 - **FUNCTION KEYS.** Give access to the parameters (cf p.8 to 11)
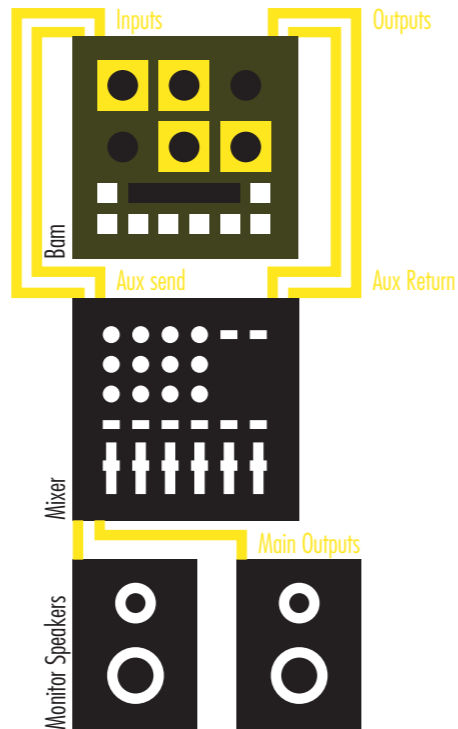12 - **FREEZE.** Reads the current reverb memory in loop

13 - **POWER SUPPLY INPUT.** 15 Volts DC 0,5 Amps, center positive
14 - **MIDI IN.** Midi input
15 - **OUT R.** Right output. Unbalanced 1/4" jack
16 - **OUT L.** Left output. Unbalanced 1/4" jack
17 - **IN R.** Right input. Unbalanced 1/4" jack
18 - **IN L/MONO.** Left or mono input. Unbalanced 1/4" jack

SETUP EXAMPLES

1. Instrument

Synthesizer
Outputs
Inputs
Outputs
Bam
Stereo Line Inputs
Mixer
Main Outputs
Monitor Speakers

2. Auxiliary

Inputs
Outputs
Bam
Aux send
Aux Return
Mixer
Main Outputs
Monitor Speakers

NOTE : turn the MIX pot to its maximum
position (right) or set BAM in «Aux mode»(cf. page 12)

PARAMETERS

BAM has 4 function keys :
Type, In Gain, Filters and Chorus
These function keys give you access to parameters.

Each press on the corresponding function key will
cycle through each available parameter. The selected
parameter will flash and can then be modified with the
DATA pot.

To exit parameter selection press the function key until
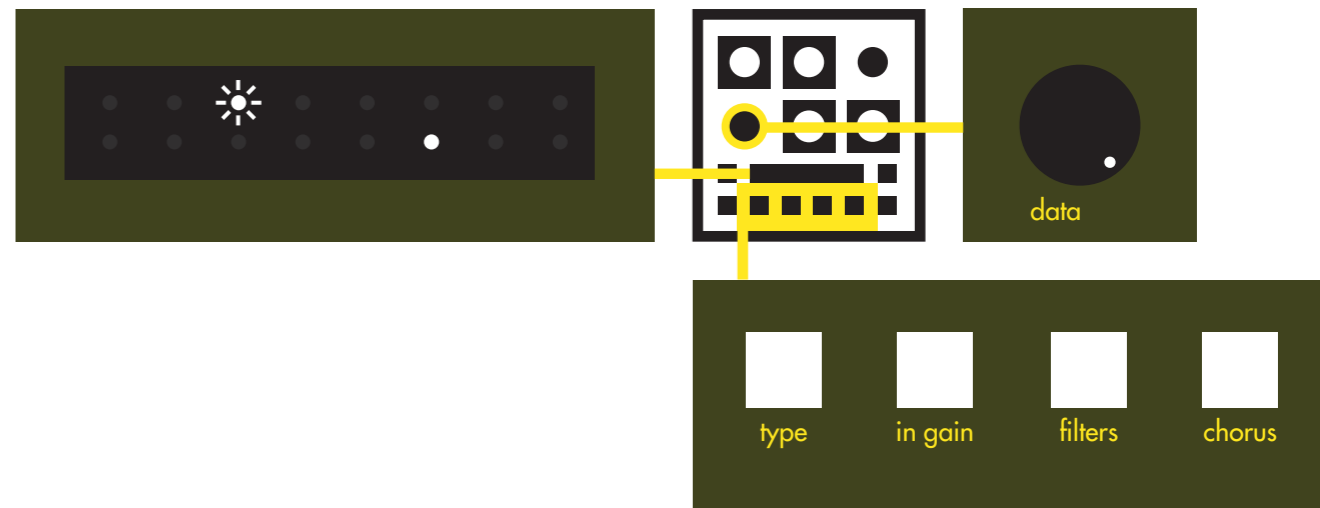the LEDs go off.

Function Key Overview

1. Type. Type gives you access to 7 different
reverb algorithms.

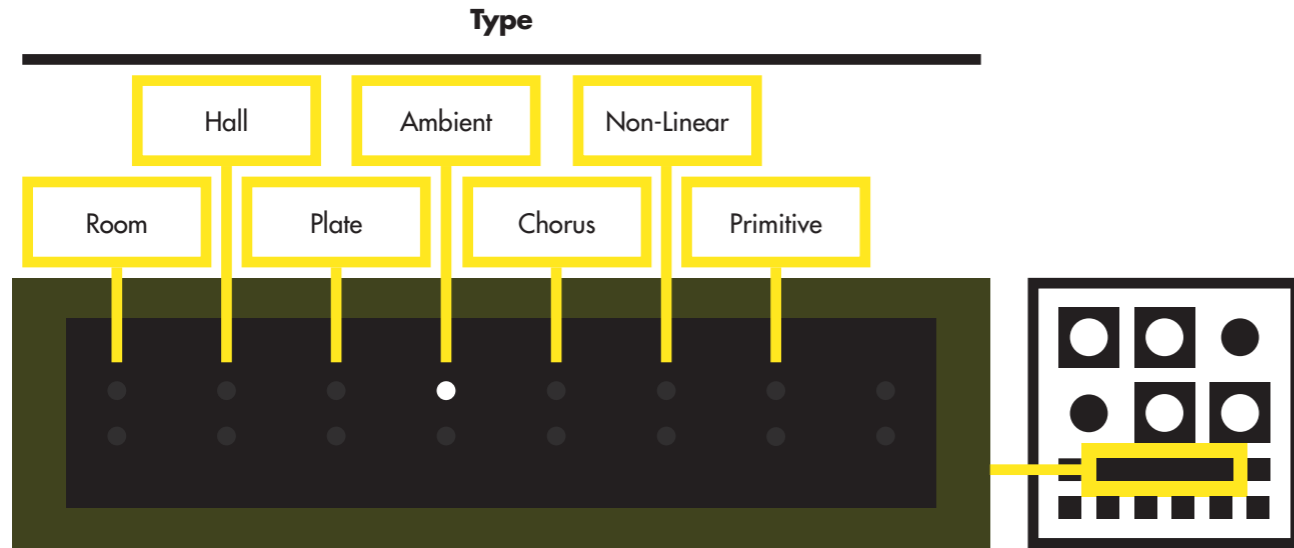**2.** In Gain. In Gain sets the input gain of the reverb.

3. Filters. This function key has 2 parameters :
Low-cut filter and High-cut filter. Low-cut filter is
displayed on the upper line, High-cut on the lower line.

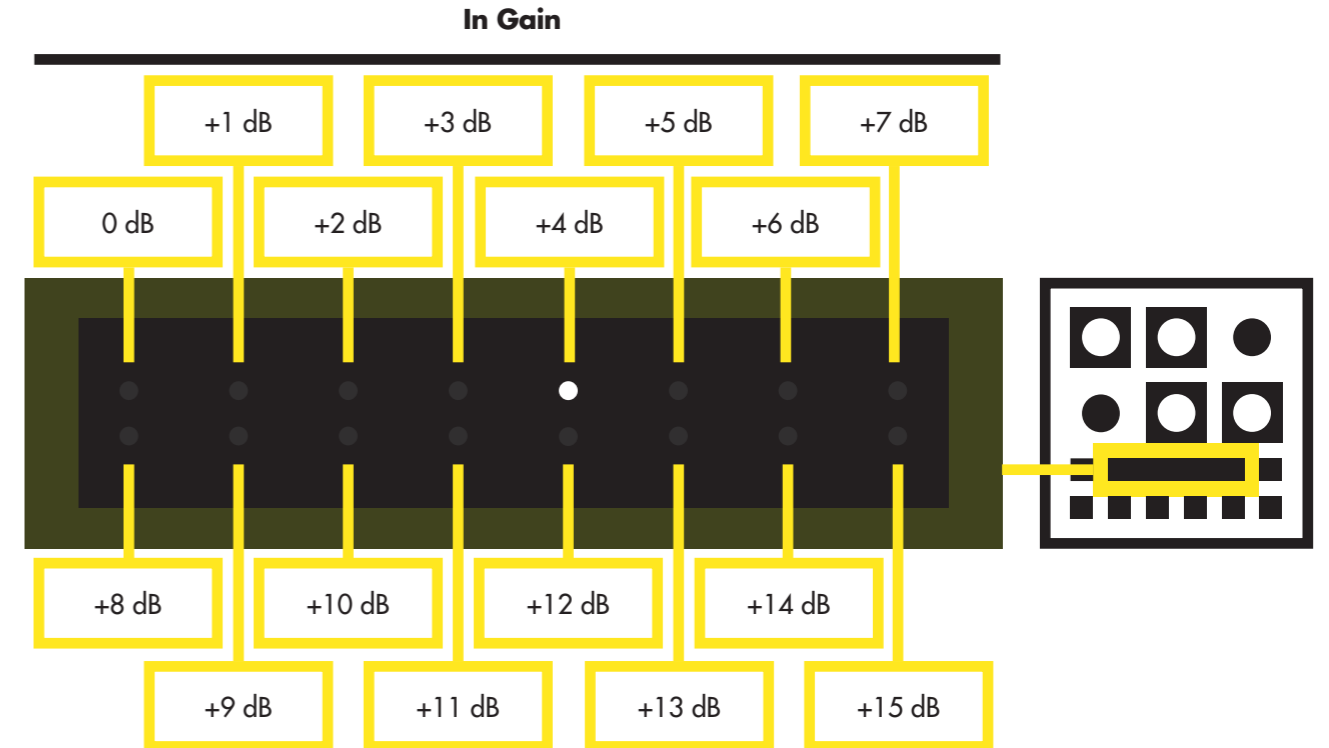**4.** Chorus. Chorus adds modulation to the reverberator
signal.

data

type   in gain   filters   chorus

TYPE

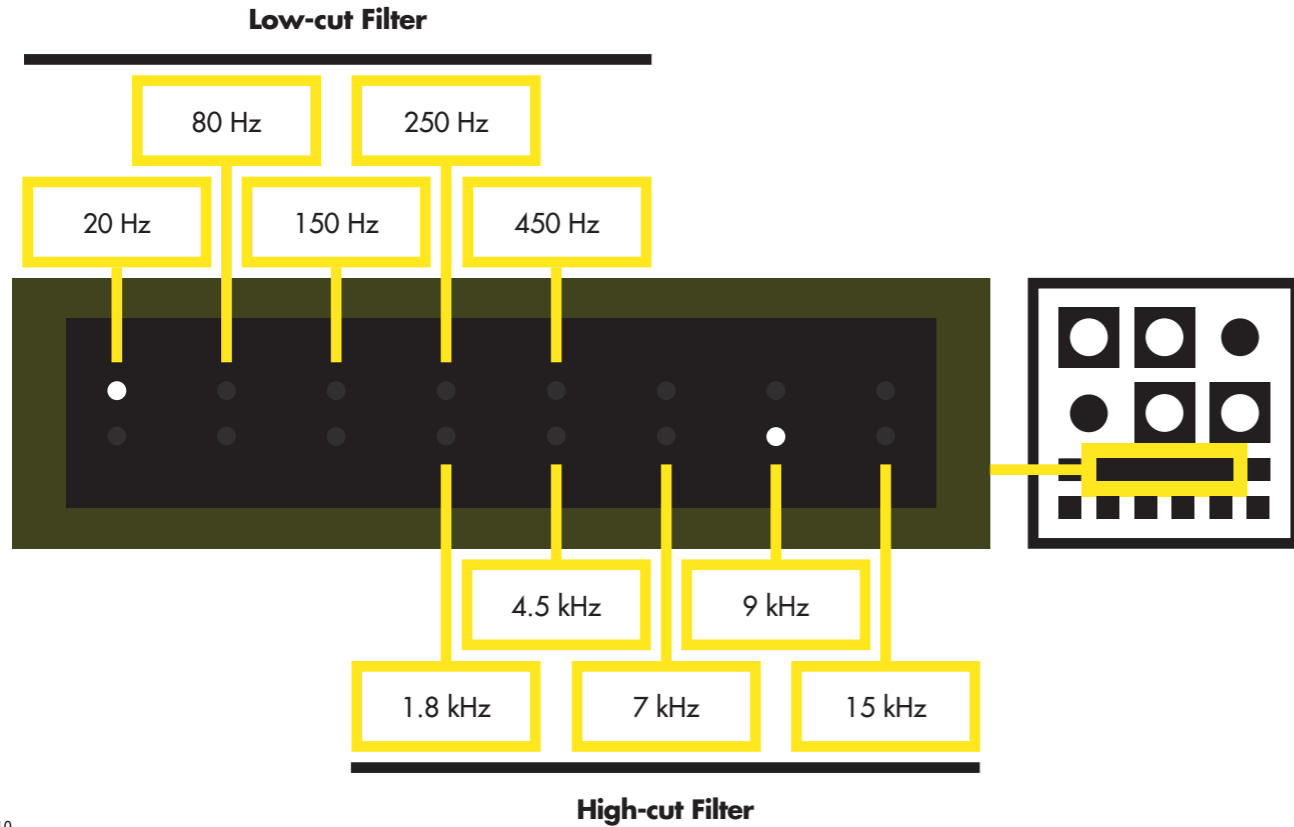**Type.** Sets the algorithm of the reverb.

IN GAIN

In Gain. Sets the analog input gain of the reverb from 0 dB to +15 dB. Due to the built-in diode clipper, increasing gain can add a nice character to the reverb signal.

Type

Hall	Ambient	Non-Linear
Room	Plate	Chorus	Primitive

In Gain

+1 dB	+3 dB	+5 dB	+7 dB
0 dB	+2 dB	+4 dB	+6 dB

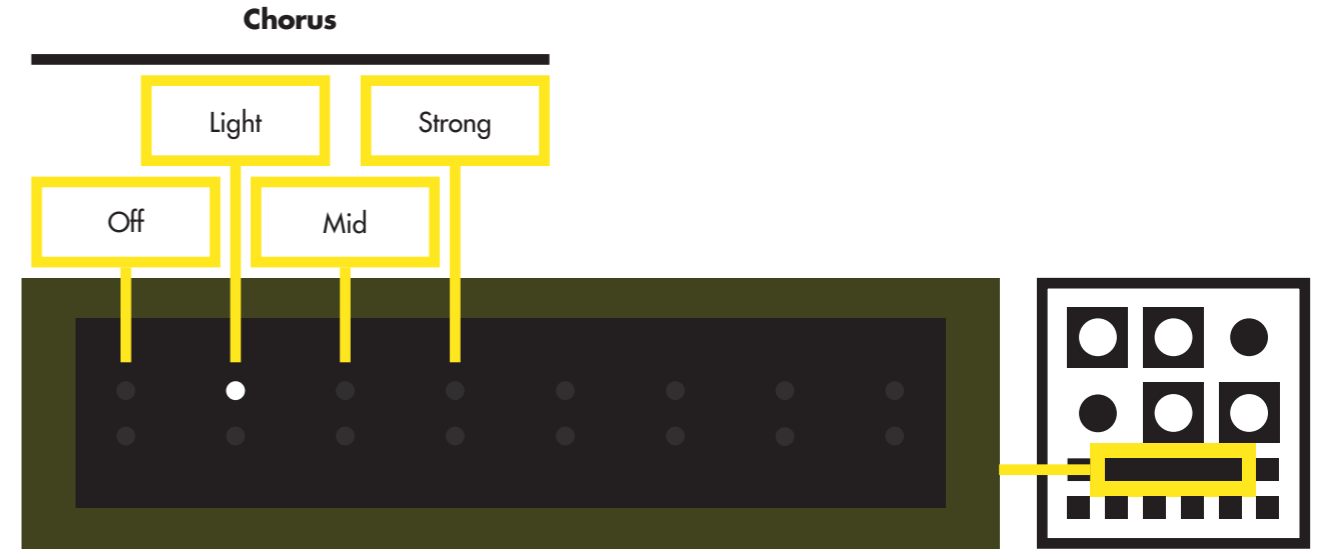| +8 dB	+10 dB	+12 dB	+14 dB
+9 dB	+11 dB	+13 dB	+15 dB

FILTERS

Filters. Low-cut & High-cut filters are located at the reverb input. It can change the character of your sound from airy to darker.

CHORUS

Chorus. Adds modulation to the reverb signal. The 'Off' position won't introduce any pitch shifting but it can lead to more metallic character. The 'Light' position is the standard setting for natural reverb.

Low-cut Filter

80 Hz	250 Hz

20 Hz	150 Hz	450 Hz

4.5 kHz	9 kHz

1.8 kHz	7 kHz	15 kHz

High-cut Filter

Chorus

Light	Strong

Off	Mid

ACTIVE MODE

The ACTIVE switch has three Bypass modes :
Relay, Spillover and Aux.

To change the Bypass mode, press and hold the ACTIVE switch for at least 2 seconds. The ACTIVE switch and one of the following LEDs will flash to indicate the current Bypass mode :
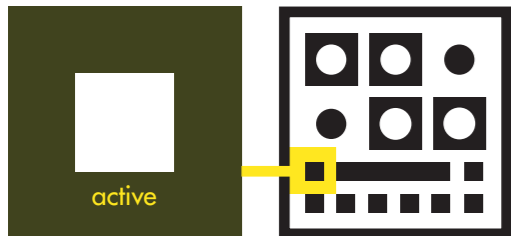
Led 1. Relay. When the ACTIVE switch is off, inputs are directly connected to the outputs via a relay, and the electronics are completely bypassed. The tail of the reverb is muted when the ACTIVE switch is off.
Led 2. Spillover. This is an electronic bypass, the tail of the reverb is not muted when the ACTIVE switch is off.
Led 3. Aux. The MIX pot sets the level of reverb and the ACTIVE switch mutes the reverb input when it's off.

You can change the bypass mode with the DATA pot. To exit the ACTIVE settings, wait for 10 seconds or press the ACTIVE switch.

NOTE : When BAM is switched off, inputs are directly connected to the outputs via the relay.

TAP TEMPO DESTINATION

The TAP tempo switch can be assigned to the Pre-Delay time or the Reverb time.

To change the TAP Tempo mode, press and hold the TAP switch for at least 2 seconds. The TAP switch and one of the following LEDs will flash to indicate the current TAP Tempo destination :

Led 1. Tap tempo is assigned to the Pre-Delay time.
Led 2. Tap tempo is assigned to the Reverb time.

You can change this destination with the DATA pot. To exit the TAP Tempo settings, wait for 10 seconds or press the TAP switch.

DISPLAY MODE

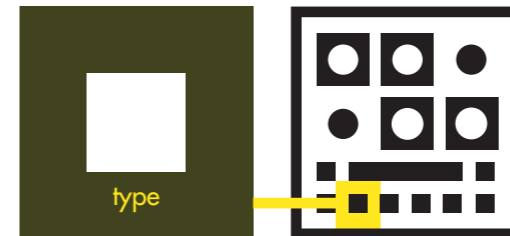When no parameter is selected, you can choose what the screen will display.

To change the DISPLAY mode, press and hold the TYPE function key for at least 2 seconds. The TYPE function key and one of the following LEDs will flash to indicate the current Display mode :

Led 1. Off mode. The screen will display nothing.
Led 2. VU-meter mode. The 16 LEDs act as a VU meter and display the reverb input level (the upper line for the left input, the lower line for the right input).
Led 3. Preset mode.The 16 LEDs show the current preset and bank number (cf. page 15).

You can change the Display mode with the DATA pot. To exit the Display mode settings, wait for 10 seconds or press the TYPE function key.

LOCAL MODE (MIX)

Each Preset contains its own Mix value. Sometimes it can be useful to load a preset while keeping the current Mix settings.
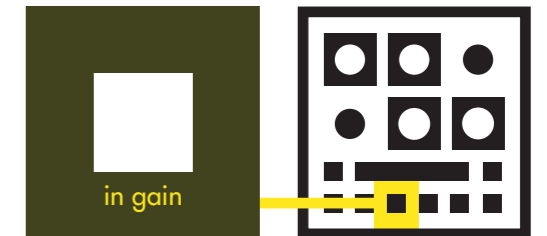
To change the Local mode, press and hold the IN GAIN function key for at least 2 seconds.

The IN GAIN function key and one of the following LED will flash to indicate the current Local mode :

Led 1. Preset mode. The Mix value is loaded from the preset.
Led 2. Local mode. The Mix value from the loaded preset is ignored and the current Mix value is used.

You can change the Local mode with the DATA pot. To exit the Local mode settings, wait for 10 seconds or press the IN GAIN function key.
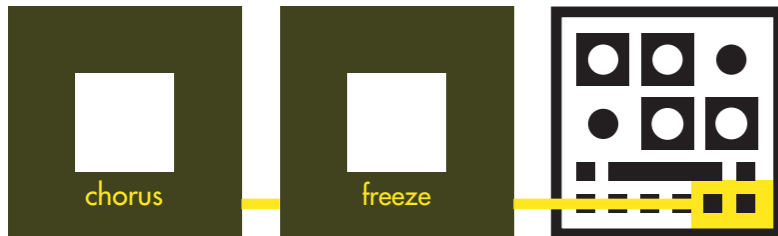
FREEZE MODE

The FREEZE switch can be set to operate in either Latch or Momentary mode. To change the Freeze mode, press and hold the FREEZE and the CHORUS switches simultaneously for at least 2 seconds.

The FREEZE switch and one of the following LEDs will flash to indicate the current Freeze mode :

Led 1. Latch. Freeze is on when you press the FREEZE switch. Freeze turns off when you press the FREEZE switch again.
Led 2. Momentary. Freeze is only on when you depress the FREEZE switch.

You can now change the Freeze mode with the DATA pot. To exit the Freeze mode settings, wait for 10 seconds or press the FREEZE switch.

chorus   freeze

PRESETS

BAM has 36 presets; 6 banks of 6 presets each. The upper line of LEDs (1 to 6) indicates the bank. The lower line of LEDs (9 to 14) indicates the preset.
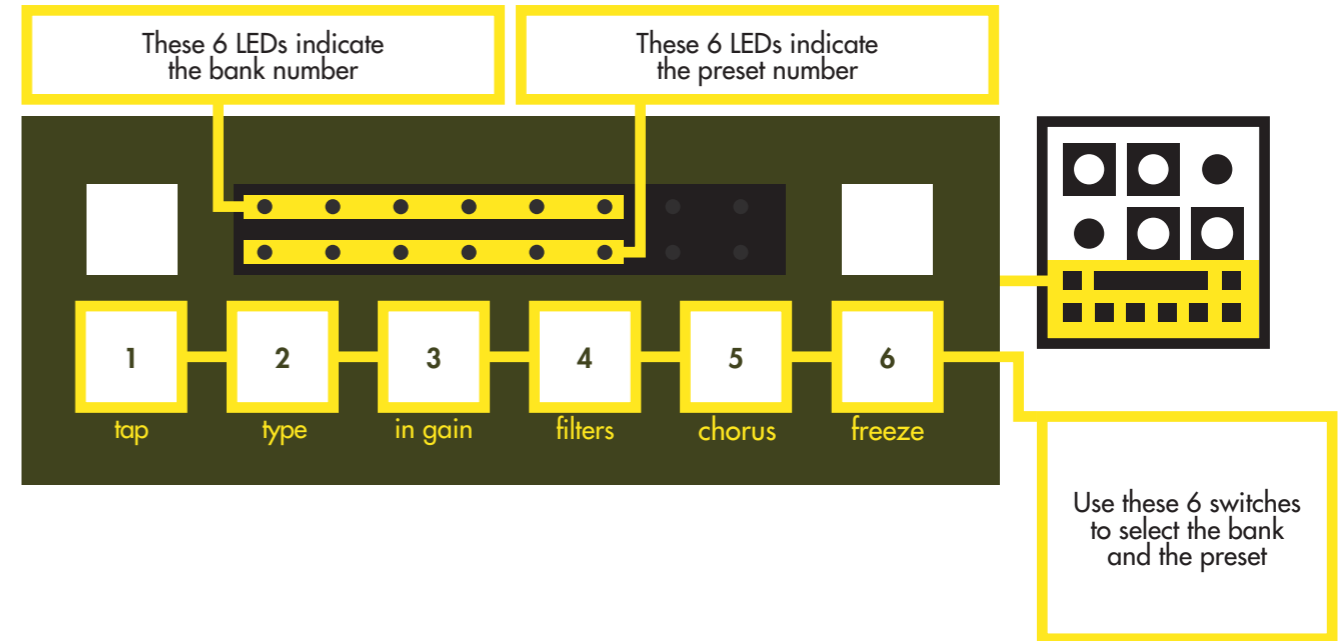
Recall a Preset
Press the PRESET switch. The PRESET switch lights up and one of the upper line LEDs blinks. Press one of the 6 switches (from TAP to FREEZE) to select a bank. Then one of the lower line LEDs blinks. Press one of the 6 switches (from TAP to FREEZE) to select a preset. Your preset is loaded.

Save a preset
Press the PRESET switch for 2 seconds. The PRESET switch flashes to indicate you are in Save mode. One of the upper line LEDs blinks. Press one of the 6 switches (from TAP to FREEZE) to select a bank. Then one of the lower line LEDs blinks. Press one of the 6 switches (from TAP to FREEZE) to select a preset.

All the parameters and pot positions are now saved in the selected preset.

These 6 LEDs indicate the bank number

These 6 LEDs indicate the preset number

1	2	3	4	5	6
tap	type	in gain	filters	chorus	freeze

Use these 6 switches to select the bank and the preset

EXIT WITHOUT LOADING OR SAVING A PRESET

If you press the PRESET switch before selecting the bank or the preset, the preset won't be loaded or saved. You can also wait 10 seconds.

POTENTIOMETERS POSITION

Once you recall a preset, the physical position of a pot may not be the same as in the preset. To prevent a sudden jump of volume when you turn a pot, the preset value will reach the pot value with a smooth fade.

Table 1 : Factory Presets list

1.1 Le Salon de Musique	1.2 Tired Room	1.3 Cold Wave	1.4 SmHall	1.5 Hall Right	1.6 The Rite of Plate
2.1 Daily Spacial	2.2 Solaris	2.3 Stoned Reflections	2.4 Kssshhh	2.5 The Intruder	2.6 Endangered Spaces

FACTORY PRESETS

The first 2 banks are filled with 12 factory presets. These 12 factory presets are listed on table 1.
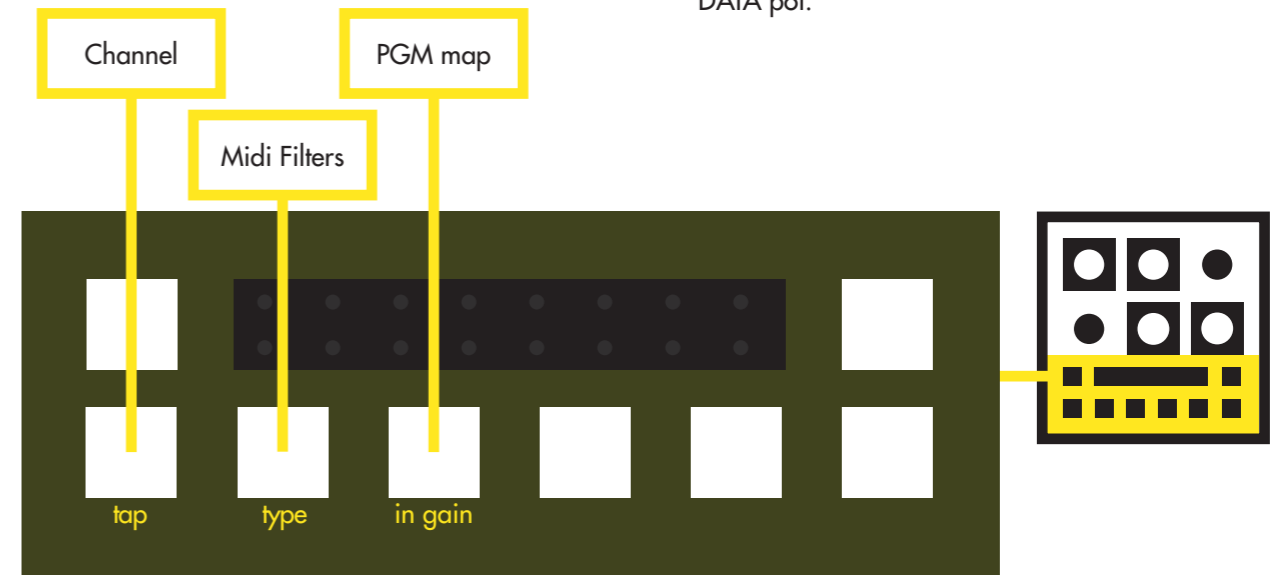
MEMORY PROTECT

You can prevent overwriting your presets with the Memory Protect function. Press the PRESET and the FREEZE switches and hold them for at least 2 seconds. The PRESET and the FREEZE switches, and one of the following LEDs will flash to indicate the current Memory Protect mode :

Led 1. OFF. The memory is not protected.
Led 2. ON. The memory is protected and you cannot save presets. If you attempt to save a preset, LEDs 1 to 6 and 9 to 14 will flash briefly to indicate that memory is protected.

You can now change the memory protect mode with the DATA pot.

To exit the Memory Protect settings, wait for 10 seconds or press the FREEZE or the PRESET switch.

MIDI

The MIDI settings menu gives you access to the following functions :

• MIDI Channel selection
• MIDI Filters
• Program Change map

To access the MIDI menu, press the ACTIVE switch while pressing the PRESET switch.

The TAP, TYPE and IN GAIN switches flash. Press any of these switches to access to the corresponding sub-menu.

1. CHANNEL

One of the 16 LEDs will flash and display which channel is selected. You can select a MIDI channel by turning the DATA pot.

2. MIDI FILTERS

One of the TAP or TYPE switch is lit (the filter is off, BAM will accept the corresponding MIDI message) or flashing (the filter is on, BAM will ignore the corresponding MIDI message).

The 2 MIDI FILTERS are :

1. Continuous Controllers (TAP switch)
2. Program Change (TYPE switch)

To activate or deactivate a filter, press the corresponding switch.

3. PGM CHANGE MAP

BAM has 36 presets and MIDI Program Change messages have 128 values. You can associate any BAM preset to any Program Change message number.

When the PGM Change Map sub-menu is selected, send a Program Change message from your computer, sequencer or any MIDI device. As soon as BAM receives a Program Change message, it will give you access to a preset selection menu (same as "Recall a Preset" cf page 15).

Reset Program Change map
If you press CHORUS and FREEZE switches simultaneously while you are in the PGM change map sub-menu, the Program Change map will be reset (cf Table 2).

To exit the MIDI menu, press the ACTIVE or the PRESET switch.

Table 2 : Default Program Change list

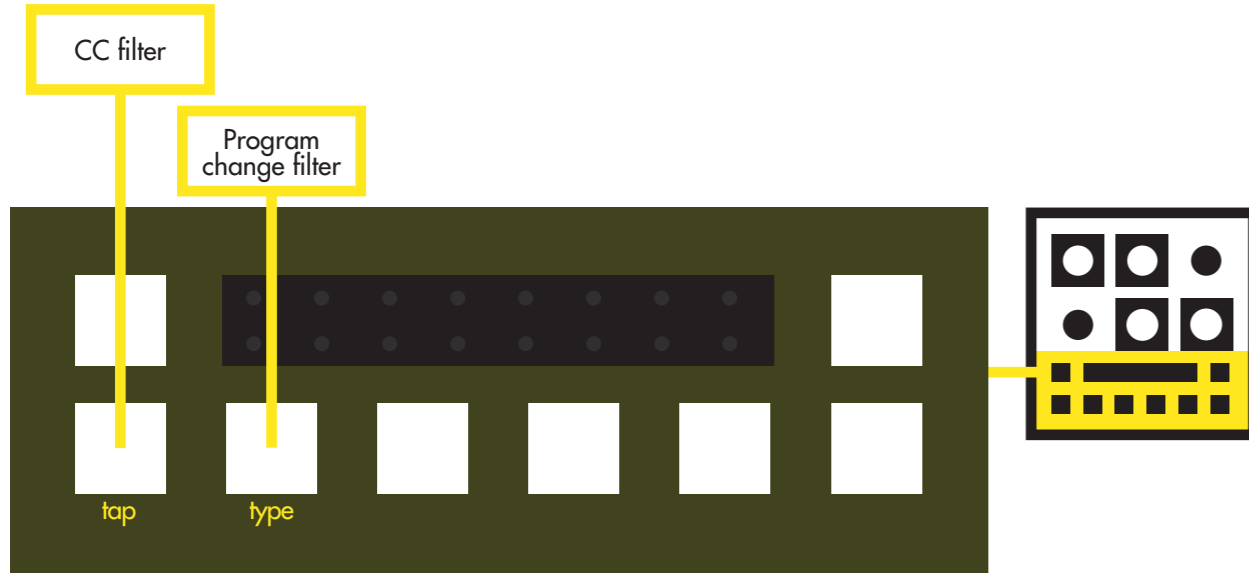| Preset	PGM Chge Nr	Preset	PGM Chge Nr	Preset	PGM Chge Nr
1.1	1 - 37 - 73 - 109	3.1	13 - 49 - 85 - 121	5.1	25 - 61 - 97
1.2	2 - 38 - 74 - 110	3.2	14 - 50 - 86 - 122	5.2	26 - 62 - 98
1.3	3 - 39 - 75 - 111	3.3	15 - 51 - 87 - 123	5.3	27 - 63 - 99
1.4	4 - 40 - 76 - 112	3.4	16 - 52 - 88 - 124	5.4	28 - 64 - 100
1.5	5 - 41 - 77 - 113	3.5	17 - 53 - 89 - 125	5.5	29 - 65 - 101
1.6	6 - 42 - 78 - 114	3.6	18 - 54 - 90 - 126	5.6	30 - 66 - 102
2.1	7 - 43 - 79 - 115	4.1	19 - 55 - 91 - 127	6.1	31 - 67 - 103
2.2	8 - 44 - 80 - 116	4.2	20 - 56 - 92 - 128	6.2	32 - 68 - 104
2.3	9 - 45 - 81 - 117	4.3	21 - 57 - 93	6.3	33 - 69 - 105
2.4	10 - 46 - 82 - 118	4.4	22 - 58 - 94	6.4	34 - 70 - 106
2.5	11 - 47 - 83 - 119	4.5	23 - 59 - 95	6.5	35 - 71 - 107
2.6	12 - 48 - 84 - 120	4.6	24 - 60 - 96	6.6	36 - 72 - 108

CC filter

Program change filter

tap   type

Table 3 : MIDI CC list

Param	CC
Size	12
Pre Delay	13
Mix	14
Reverb Time	15
Damping	16
Active	17
Type	18
In Gain	19
Low-cut	20
High-cut	21
Chorus	22
Freeze	23

SPECIFICATIONS

Inputs
Connectors :   1/4" phone jacks
Input type :   single ended
Impedance :   1 MOhm
Max input level :   +20 dBu (@ 1% THD+N)

Outputs
Connectors :   1/4" phone jacks
Output type :   single ended
Impedance :   100 Ohm
Max output level :   +20 dBu

Dry signal specifications
THD+N :   0.025 %
                              (20 Hz - 20 kHz, 0 dBu)
Frequency response :   - 0.11 dBu @ 20 Hz
                               - 0.15 dBu @ 20 kHz
Dynamic range :   106 dB

Wet signal specifications
THD+N :   0.073 %
                              (@ 1 kHz, 0 dBu)
Frequency response :   - 1.50 dBu @ 25 Hz
                               - 2.90 dBu @ 15 kHz
Dynamic range :   88 dB

General
Dimensions :   145 x 145 x 65 mm
Weight :   782 g

Power supply
Input :   100V to 240V AC,
                              50 to 60 Hz, 0.6 Amp
Output :   +15V DC, 1 Amp
Dimensions :   74 x 43 x 35 mm
Weight :   165 g

**DUE TO CONTINUOUS PRODUCT IMPROVEMENT,
THESE SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.**

Reset
If you want to restore the default System settings, power up BAM while pressing the ACTIVE and TAP switches.

The ACTIVE and TAP switches are lit and the 16 LEDS will display a little animation for 3 seconds.

If you want to restore the 12 Factory Presets, power up BAM while pressing the PRESET and FREEZE switches.

The PRESET and FREEZE switches are lit and the 16 LEDS will display a little animation for 10 seconds.
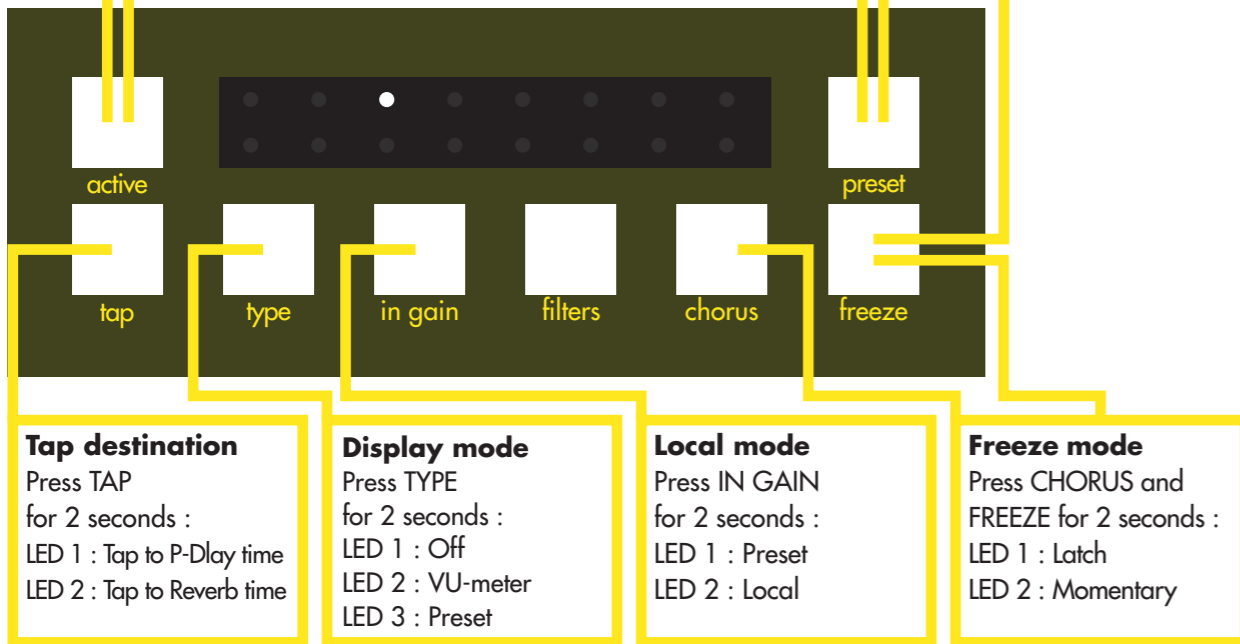
SHORTCURTS SUMMARY

Active mode
Press ACTIVE for 2 seconds :
LED 1 : Relay
LED 2 : Spillover
LED 3 : Aux

Midi
Press ACTIVE + PRESET :
TAP : Channel
TYPE : MIDI Filters
IN GAIN : Pgm Chge Map

Memory protect
Press PRESET + FREEZE
for 2 seconds :
LED 1 : Off
LED 2 : On

active

preset

tap   type   in gain   filters   chorus   freeze

Tap destination
Press TAP
for 2 seconds :
LED 1 : Tap to P-Dlay time
LED 2 : Tap to Reverb time

Display mode
Press TYPE
for 2 seconds :
LED 1 : Off
LED 2 : VU-meter
LED 3 : Preset

Local mode
Press IN GAIN
for 2 seconds :
LED 1 : Preset
LED 2 : Local

Freeze mode
Press CHORUS and
FREEZE for 2 seconds :
LED 1 : Latch
LED 2 : Momentary

FCC RoHS CE ⌧ OTO