

FB-3200

Polyphonic Synthesizer

Version 1.0

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Table of Contents

Introduction.....	3
History.....	3
Digital Transformation.....	4
Acknowledgments.....	4
Architecture.....	5
Polyphonic Section.....	6
Signal Generators (SG 1+2).....	6
Lowpass Filters (LP).....	7
Envelope Modifiers (EM).....	7
Monophonic/Paraphonic Section.....	8
Equalizer.....	8
Resonators.....	8
Keyboard Balance.....	8
Amplitude Modulation.....	8
The Remaining Signal Path.....	9
Modulation Generators.....	10
MG1 and MG2.....	10
Sample & Hold.....	10
The "MOD" Signal.....	10
General Envelope Generator (GEG).....	11
Voltage Processors.....	11
Adder.....	11
External Trigger and Modulation Sources.....	12
Programmer.....	12
Tweaks.....	13
Options Menu.....	13
The <i>fb3200.ini</i> Configuration File.....	14
MIDI Control Change Messages.....	14
MIDI Learn.....	14
Modulation and Trigger Sources.....	15
Parameters.....	16
Global.....	16
Signal Generators.....	16
Lowpass Filter.....	17
Envelope Modifier.....	17
Equalizer.....	18
Total Signal Modifiers.....	18
Modulation Generators 1/2 and Sample & Hold.....	18
General Envelope Generator.....	19
Voltage Processors 1 and 2.....	19
Adder.....	19
Temperament (Micro-Tuning).....	20
External Modulation and Trigger Sources.....	20
Tweaks.....	20
Resonators.....	20
Frequently Asked Questions.....	21

Introduction

The *FB-3200* is a software synthesizer plug-in for Microsoft Windows (VST) and Apple macOS (VST/AU) simulating the classic KORG PS-3200 polyphonic analog synthesizer from 1978. It is written in native C++ code for high performance even on “lighter” systems. The main features are:

- Close emulation of behavior and all controls of the original hardware
- Band-limited oscillators, classic lowpass filters
- Equalizer section
- Two Modulation Generators, Sample & Hold
- Paraphonic Envelope Generator
- Semi-modular
- Micro-tuning options
- Additional tweaks
- Plug-in supports Windows and macOS (32 bit and 64 bit)

History

In 1977, KORG released two new synthesizer, the *PS-3100* and the *PS-3300*, where “PS” is short for *Polyphonic Synthesizer*. By that time not many polyphonic synthesizers were around, and being even *fully* polyphonic the PS brothers (in close approximation the PS-3300 consists of three PS-3100) were propelled into the noble company of a Polymoog.

While the PS-3100 is a rather modest instrument, the PS-3300 features no less than 3 independent synthesizer blocks (comparable to almost a full PS-3100): Each block has 48 voices with 48 filters and 48 envelopes but only 12 oscillators generating the top octave frequencies for the twelve keys C to B. The remaining 36 signals are derived by frequency division.

One year later came the *PS-3200*, KORG's first *programmable* polyphonic synthesizer. Compared to the huge PS-3300, the PS-3200 was reduced to a single synthesizer block again (like the PS-3100). But the “2” in the name can be taken literally since there are now two Signal Generators (2 x 12 oscillators plus frequency dividers). Unfortunately the charismatic Resonator section had been dropped and replaced with a static 7-band equalizer.

However, 40 years ago the most impressive feature was the PS-3200's program memory: The position of 32 knobs could be stored into 16 different programs! While it was not possible to memorize the patched cable settings nor the remaining controls, programmability still can be regarded as a major step forward. Note though that it was not possible to *edit* a recalled program of the PS-3200 (as we know it from almost any other programmable synthesizer); once stored, a program behaved like a read-only preset and could only be *completely* overridden with the current settings on the panel. Those were the days.

Digital Transformation

After creating the FB-3100 and FB-3300 it was reasonable to finish the 3000 series with a simulation of the PS-3200: The *FB-3200*.

Aim of the project again was to provide a close simulation of the original hardware. But this time I added some additional features that I think are quite useful and/or that folks have repeatedly asked for:

- The FB-3200 reacts to Velocity.
- Channel Aftertouch is available as a new modulation source.
- The filter can be switched from the two-pole *Korg 35* to a classic four-pole lowpass ladder type.
- The *Resonators* section is back.

But as usual, there are still some decisions left that folks maybe do not like:

- The FB-3200 is not stereophonic (although you can pan the *Final* and *Direct* outputs in the stereo field).
- The monophonic/paraphonic modulation options of the PS-3200 remain monophonic/paraphonic in the FB-3200.
- The UI is too small and at the same time too big. This is *always* true. ☺
- The plugs of the FB-3200 do not use virtual patch cords but “patch menus”.

And here are the usual tweaks also not to be found on the original PS series:

- Modulation Generators and Sample & Hold can be synchronized to the host.
- MIDI controllers can be used as sources for virtual voltages and triggers.
- The FB-3200 features a few more modulation sources than the PS-3200.

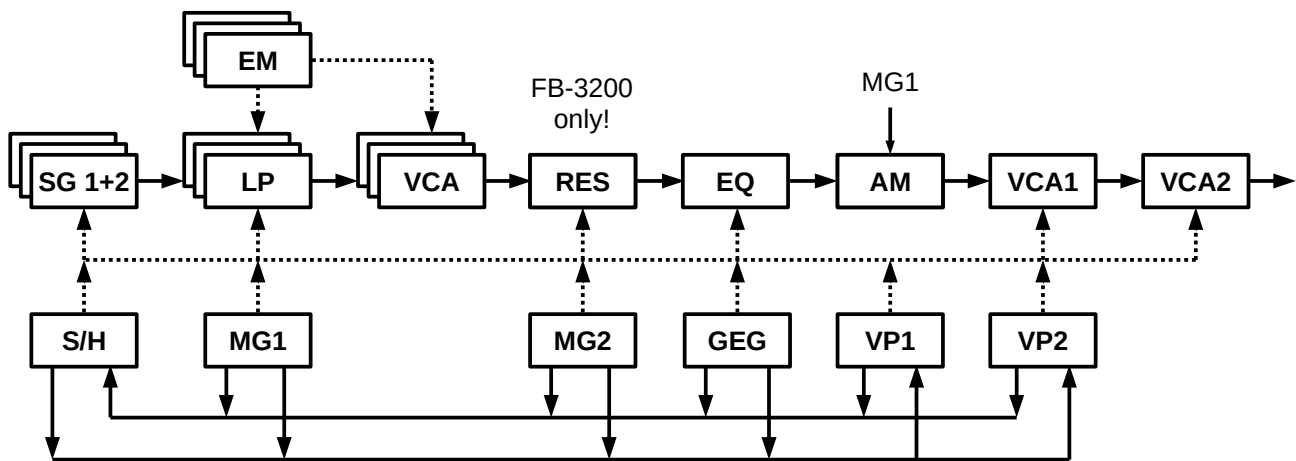
Acknowledgments

- First I wanted to thank Cockos and **Oli Larkin** for developing and maintaining the WDL(-OL)/IPlug framework, and **Laurent Bergman** for his French manuals.
- A big **Thank you!** goes to all the people who share their information about the PS synthesizers via the Internet.
- Some of the micro-tuning templates are derived from the **Microtonal Synthesis** website at <http://www.microtonal-synthesis.com/>.
- Furthermore a **BIG THANKS** to **Tim Stinchcombe** and **Will Pirkle** for their in-depth analysis of the K35 filter chip.
- Last not least another THANK YOU! to the KVR Audio community and to the KORG engineers.

No, I am not affiliated with KORG in what relation ever except that I always find myself entangled with their instruments. ☺

Architecture

Each of the 64 voices of the FB-3200 features two band-limited *Signal Generators* (SG 1+2), a *Lowpass filter* (LP), and an *Envelope Modulator* (EM). The mix of all voices is then sent into a single (!) *Resonators*¹ and *Equalizer* section, followed by an *Amplitude Modulation* section and two *Voltage Controlled Amplifiers* (VCAs). For modulation purposes the FB-3200 has two *Modulation Generators* (MG 1+2), a *Sample & Hold* unit, an additional *General Envelope Generator* (GEG), two *Voltage Processors* (VP 1+2), and an *Adder* module (ADD).



As you can see from the block diagram, there are many signal (solid) and modulation (dashed) paths between the various modules. The configuration is pretty flexible and can be reconfigured *by using the plugs*. You can see, too, that further processing of the polyphonic signals after the LP section is *monophonic* (better: *paraphonic*). For example the modulation of VCA1 does affect the volume of *all* voices and not that of an *individual* voice. In the same sense the GEG acts as a paraphonic envelope and not *per voice*.

1 As stated above, the Resonators have been dropped from the original PS-3200. It doesn't hurt to add this great feature back to the FB-3200 though.

Polyphonic Section

Signal Generators (SG 1+2)

The two Signal Generators offer four selectable waveforms (*Triangle*, *Sawtooth*, *Pulse Width Modulation*, *Variable Pulse*) and four octave ranges (16' to 2') called *Scales*. SG2 can be fine tuned with respect to SG1 or even turned off completely.

Note that per key (C to B) only one *top-octave* oscillator exists – the lower octaves are generated by frequency division. Thus, the signals of one SG for the same key at different octaves are always *in phase*; you can verify this by analyzing the output of the FB-3200 with an oscilloscope.

An interesting feature is the *micro-tuning* option. Each of the 12 keys can be tuned individually per SG, allowing for other (not necessarily well-tempered) tunings like *Pythagorean* or *Wendy Carlos' Super Just* tuning etc. The small button at the bottom of the tuning knobs opens a menu with 14 predefined micro-tuning templates. Here it is also possible to load and/or save the tuning settings from/to a Scala (*.scl) file.

Both generators share a common Triangle wave generator with intensity control dedicated for Pulse Width Modulation alone. Alternatively, the pulse width can be controlled per SG by patching a modulation source into the respective plugs.

Frequency modulation (FM) is enabled by the orange switch at the bottom right of the SG section; the other orange switch ("REV.") to the left flips the polarity of the modulation. While a fixed source for FM is always given by the mix of MG1 and the Sample & Hold unit, a second modulation source can be patched to control the frequency of both SGs, and a third one for SG2 only.

A rather unique feature is the *Scale Modulation* which can be patched for both SGs individually. It allows for switching the *Scale* (i.e. octave) of a SG by any one of the available modulation sources.



Lowpass Filters (LP)

The outputs of the Signal Generators are fed into a lowpass filter section with adjustable resonance (*Peak*). As opposed to the original hardware, the mode can be switched from an emulation of the famous KORG K-35 two-pole to a classic four-pole ladder filter.

Cutoff frequency modulation comes in various ways: First of all the cutoff frequency can be controlled by the note played (*KBD Balance*) both in positive and negative direction (here *negative* means that the cutoff frequency will be *lower* for *higher* notes).

The next knob, *Expand*, controls the influence of the Envelope Modifier (see next section) on the cutoff frequency while the remaining options for frequency modulation resemble those of the Signal Generators: Activated by the orange switch, the filter can be modulated by the (fixed) MG or Sample & Hold signal and a second source patched into the plug at the bottom.

Envelope Modifiers (EM)

The envelopes are of the standard *ADSR* type – nothing special here. The attack time can be externally controlled by a modulation source plugged into *ATK* while a trigger signal from a source plugged into *REL* will put the EM into the release phase (i.e. stop the envelope)..



Monophonic/Paraphonic Section

Equalizer

The individual voice signals are mixed into a single monophonic signal (the *Direct* signal) and sent into the *Equalizer* section. This is basically a parallel arrangement of seven peak filters with fixed Q and individually adjustable gain.

Resonators

The original *Resonators* section of the PS-3100/3300 brothers has become pretty famous and is one of the key features giving them their “signature sound”. While it was replaced in the PS-3200 by the static Equalizer, the FB-3200 brings it back to life – you just have to click the small switch at the bottom right of the Equalizer section.

The resonators are a parallel arrangement of three bandpass filters with high Q and individually adjustable center frequencies. The “INTENSITY” control determines the mix between original and effect signal. The resonator frequencies can be modulated by a modulation source that has to be selected via the plug at the bottom. The intensity of the modulation can be adjusted continuously using the “EXT MOD” knob.



Keyboard Balance

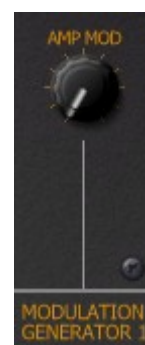
Following the Equalizer/Resonators, the signal is treated by a pretty unique feature: The *Keyboard Balance* which adjusts the volume of notes as played on the keyboard. With this control you can attenuate notes on the lower end or vice versa.



Amplitude Modulation

The signal now runs through an *Amplitude Modulator* which multiplies it with the signal of MG1. Here, the “AMP MOD” knob sets the intensity and character of the effect as follows:

- The range from 0% to 50% (i.e. from the very left to the center of the knob range) will result in a *Cross Modulation* effect. This means that the amplitude of the signal is modulated from $-\infty$ dB to a maximum of 0dB.
- The range from 50% to 100% (i.e. from the center to the very right of the knob range) will result in a *Ring Modulation* effect meaning that negative values of the MG1 signal will (apart from attenuation) cause the modulated signal to be *inverted*. This makes perfect sense if you think of Ring modulation as a *multiplication*.



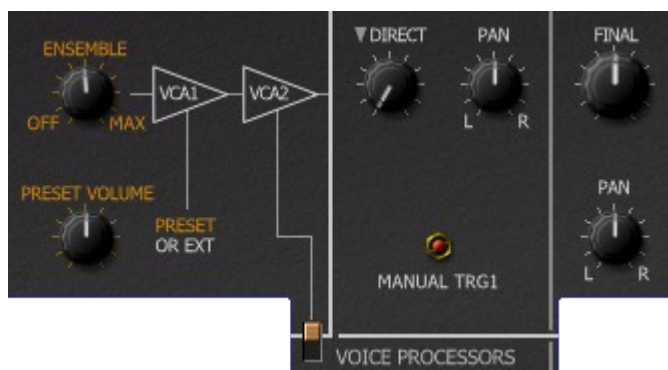
The interesting thing is that MG1 is able to generate signals in the kilohertz range which allows for drastic sound effects. But even in the low range a Ring Modulation with a sawtooth wave can result in unusual gate effects.

The Remaining Signal Path

After Amplitude Modulation the signal passes through an *Ensemble* effect as known from classic string synthesizers of the 70's. The intensity of the effect can be controlled from "Off" to "Max". Compared to the PS-3200, the FB-3200 Ensemble effect does produce much less noise!

Next to follow are two individual VCAs (Voltage Controlled Amplifiers) for further amplitude modulation. The purpose of these amplifiers is the dynamic control of the loudness contour by a variable modulation source and Voltage Processor 1 (can be enabled using the orange switch).

Finally, the *Final* knob controls the output volume of the full signal path while the *Direct* knob controls the volume of an additional outlet of the polyphonic signal i.e. a mix of all voices after the lowpass filters but before the Equalizer/Resonators section. This is because the original PS-3200 offers two mono outputs, namely the *Final* and the *Direct* signals. On the FB-3200 you can pan both signals individually (see *Tweaks* section) which gives a bit more flexibility.



Modulation Generators

MG1 and MG2

The FB-3200 has two *Modulation Generators* (LFOs). The second one, *MG2*, only offers a triangle wave while the first one, *MG1*, is much more flexible and can produce a triangle, a falling or rising sawtooth, and a square wave as well as (pretty uncommon!) *Pink Noise* and *White Noise*. Except for the noise waves (which have a continuous frequency range) the frequency of MG1 can be set up to about 1.6kHz – again a very uncommon but nice feature!

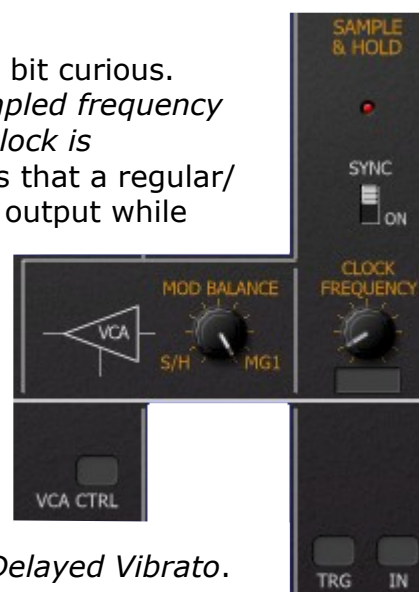
Both MGs can be synchronized to the host tempo. Furthermore, by patching an appropriate source one can *modulate* the frequency of MG1.



Sample & Hold

The *Sample & Hold (S&H)* unit samples whatever signal is sent into the input plug *IN*. The sample rate can be synchronized to the host tempo. Alternatively, it will sample the input on any trigger impulse at the plug *TRG*.

The "SYNC" switch (called "SYNCHRO" on the PS-3200) is bit curious. KORG's original documentation states that "*when the sampled frequency is near the clock frequency multiplied by an integer, the clock is synchronized*". Well, better check it out by yourself. Fact is that a regular/periodic input signal can produce some regular, repetitive output while noise will create random patterns. In any case the SYNC function is disabled when the S&H clock is synchronized to the host tempo.



The "MOD" Signal

The *MOD* signal is simply a balanced mix between the Sample & Hold and the MG1 signal. Its amplitude can be controlled by a modulation source patched to the plug *VCA CTRL*. This makes it easy to create effects like *Delayed Vibrato*.

General Envelope Generator (GEG)

The GEG is a simple *AR* envelope with an additional *Delay* parameter. It can be turned into an *AD*-like envelope by enabling the "AUTO" switch: In this case the GEG – once triggered – will ignore the Sustain phase and go immediately into the Release phase.



The GEG can be triggered by any trigger signal patched into one of the two plugs *TRG1* and *TRG2*. Of special interest is the "KBD TRIGGER" source: Here you can select how many keys (1 to 5) have to be pressed before this trigger source is triggered (in the "Off" position the keyboard by default does not trigger at all).

not trigger at all).

What's not on the PS-3200 is the status LED that shows the current on/off state of the GEG – I think this is a very convenient yet non-obstructive addition.



Voltage Processors

There are two *Voltage Processors*, VP1 and VP2, on board the FB-3200. They are used to process the signal of a modulation source (e.g. a MG or the GEG) and to produce a modified signal. Here is how that works:

Typically, a signal source can vary from something like -5 to +5 (virtual) Volts. A Voltage Processor will change the range these input values will be mapped to, for example from -2.5 to +1.8 Volts. The input range even can be inverted, for example from +3.4 to -4.2 Volts. The limits of the output ranges are set by the "LIMITER A" and "LIMITER B" knobs where "LIMITER B" defines the low end of the range (in the examples above -2.5 and +3.4 Volts) and "LIMITER A" the high end (in the examples above +1.8 and -4.2 Volts).

Adder

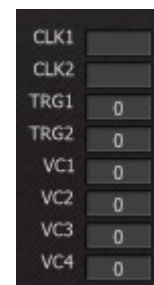
The *Adder*, a simple module to add the signals of two modulation sources and control their level.



External Trigger and Modulation Sources

Strictly speaking there are two types of sources and targets: *modulations* and *triggers*. For example the *ATK* target plug of the EM continuously modulates the Attack time while the *REL* target plug waits for a trigger signal to release the envelopes.

There are some additional modulation ("VC1" to "VC4") and trigger sources ("Clk1" to "Clk2", "Trg1", "Trg2") available. The "Clk" sources provide variable clock triggers synchronized to the host tempo, the "Trg" sources create trigger signals from assignable MIDI Control Change messages (the trigger occurs when the controller value passes from a value above 63 to a value below 63, emulating a "falling-edge ground trigger"), and the "VC" modulation sources create modulation signals from assignable MIDI Control Change messages. In the Patch Bay you can choose these sources like any other source.



When hovering with the mouse over a modulation/trigger target, the properties of both the target and the assigned source (if any) will be displayed in the info block at the bottom right of the FB-3200's panel.

Programmer

To give you a little idea of how to select presets on the original PS-3200 (and to make the visual appearance of the FB-3200 a little more appealing) is the intent of the *Programmer* section.

The 64 presets are organized in four *Banks* ("A" to "D") and 16 *Programs*. To select for example preset "32" (or preset "31" if your DAW's first preset has the number "0" instead of "1") you have to press the Bank "B" and Program "16" switches.

Of course you can still use the *Browse* button to open the preset menu as known from almost all Full Bucket plug-ins.



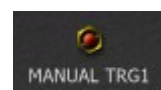
Tweaks

In the section *Digital Transformation* above it has already been mentioned that the FB-3200 contains some additional features (*tweaks*) that the original PS-3200 hardware synthesizer does not have.

- Additional modulation sources and S&H input sources
- Additional trigger sources "Clk1", "Clk2", "Trg1", "Trg2"
- Panorama control for *Final* and *Direct* output
- Resonators section
- Controls for Velocity sensitivity of lowpass filters and VCA



Not really a tweak (since the PS-3200 does feature a momentary switch) but nonetheless helpful is the "MANUAL TRG1" push button that – when clicked – raises a trigger impulse for the "Trg1" trigger source.



Options Menu

When clicking on the *Menu* button, a context menu opens with the following options:

Copy Program	Copy current program to internal clipboard
Paste Program	Paste internal clipboard to current program
Load Program	Load a program file containing a patch to the FB-3200's current program
Save Program	Save the FB-3200's current program to a program file
Load Bank	Load a bank file containing 64 FB-3200 patches
Save Bank	Save the FB-3200's 64 patches to a bank file
Init Program	Initialize the current program
Reload Configuration	Reload the FB-3200's configuration file (see section <i>The fb3200.ini Configuration File</i>)
Save Configuration	Save the FB-3200's configuration file (see section <i>The fb3200.ini Configuration File</i>)
Select Startup Bank	Select the bank file that should always be loaded when the FB-3200 is started
Load Startup Bank	Load the Startup bank file; can also be used to check what the current Startup bank is
Unselect Startup Bank	Unselect the current Startup bank
Check Online for Update	When connected to the Internet, this function will check if a newer version of the FB-3200 is available at fullbucket.de
Visit fullbucket.de	Open fullbucket.de in your standard browser

The *fb3200.ini* Configuration File

The FB-3200 is able to read some settings from a configuration file (*fb3200.ini*) located in the same directory as the FB-3200 VST DLL (*fb3200.dll* or *fb320064.dll*) or Mac VST/AU (*FB3200.component* or *FB3200.vst*) itself. After you have edited this INI file in a text editor, you have to reload it using the *Reload Configuration* command from the *File* menu (see section *The fb3200.ini Configuration File*).

MIDI Control Change Messages

All parameters of the FB-3200 can be controlled by MIDI controllers, or more precise: Each MIDI controller (except *Modulation Wheel* and *Sustain Pedal*) can control one of FB-3200's parameters. The mapping is defined in the *fb3200.ini* for example like this:

```
[MIDI Control]
CC7  = 0  # Final Volume
CC70 = 17 # LP Cutoff
CC71 = 18 # LP Peak
...
```

The syntax is straight forward:

```
CC<controller number> = <parameter ID>
```

Given the above example, controller 7 directly controls the overall *Volume* parameter, controller 74 the *VCF Cutoff* etc. As you can see, comments are introduced by the Pound sign (#); they are here just for description purposes and completely optional.

MIDI Learn

The easiest way to assign MIDI controllers to FB-3200 parameters is to use the MIDI Learn function. To activate *MIDI Learn*, click on the respective button and wiggle both the MIDI controller and the FB-3200's parameter that you want to link. If you want to unlearn the assignment, right-click the *MIDI Learn* button (the label now reads "UNLEARN") and activate it. Now wiggle the MIDI controller or the parameter that you want to unlearn.

Modulation and Trigger Sources

Modulation Sources			
Name	Voltage	Group	Description
off	0	–	off / default
+5V	+5	–	maximum value
-5V	-5	–	minimum value
GE1	0 to 5	Intern	GEG inverted output
GE2	-5 to 0	Intern	GEG normal output
GE3	0 to 5	Intern	GEG normal output
Mod	-5 to 5	Intern	Mixed S&H / MG1 output
MG1 or MG2	-5 to 5	Intern	MG1 or MG2 output
S&H²	-5 to 5	Intern	S&H output
VP1 or VP2	-5 to 5	Intern	VP1 or VP2 output
Add	-5 to 5	Intern	Adder output
Key	-5 to 5	Extern	last pressed key
Aft	0 to 5	Extern	Channel Aftertouch/Pressure
PB	-5 to 5	Extern	Pitch Bend
PB+	0 to 5	Extern	Pitch Bend positive
MW	-5 to 5	Extern	Mod Wheel
MW+	0 to 5	Extern	Mod Wheel positive
VC1 to VC4	-5 to 5	MIDI	assignable MIDI CC

Trigger Sources		
Name	Group	Description
off	–	off / default
Kbd	Intern	Keyboard Trigger
Sng	Intern	Keyboard Single Trigger
Mlt	Intern	Keyboard Multiple Trigger
MG1 or MG2	Intern	MG1 or MG2 clock
S&H	Intern	S&H clock
Clk1 or Clk2	Extern	external clock
Trg1 or Trg2	Extern	MIDI CC trigger

2 For the S&H input, this source is replaced by **RND**, a random signal (white noise).

Parameters

Global

parameter	ID	description
<i>Final Volume</i>	0	the overall volume of the <i>Final</i> signal
<i>Direct Volume</i>	1	the volume of the <i>Direct</i> (polyphonic section) signal
<i>Final Panorama</i>	2	the stereo position of the <i>Final</i> signal
<i>Direct Panorama</i>	3	the stereo position of the <i>Direct</i> signal
<i>Total Tune</i>	4	master tune
<i>Keyboard Balance</i>	5	volume balance of low versus high notes
<i>Pitch Bend Range</i>	6	range of the Pitch Bend modulation

Signal Generators

parameter	ID	description
<i>SG1 Waveform</i>	7	SG1 waveform (<i>Triangle, Sawtooth, Pulse Width Modulation, Variable Pulse</i>)
<i>SG1 Scale</i>	8	SG1 octave (<i>Scale</i>)
<i>SG1 Scale Mod Source</i>	9	external/patched modulation source for SG1 Scale
<i>SG1 Pulse Width Mod Source</i>	10	external/patched modulation source for SG1 Pulse Width Modulation
<i>SG2 Waveform</i>	11	SG2 waveform (<i>Triangle, Sawtooth, Pulse Width Modulation, Variable Pulse</i>)
<i>SG2 Fine Tune</i>	12	SG2 frequency fine tuning
<i>SG2 Scale</i>	13	SG2 octave (<i>Scale</i>)
<i>SG2 Frequency Mod</i>	14	SG2 frequency modulation amount of external/patched source
<i>SG2 Frequency Mod Source</i>	15	external/patched modulation source for SG2 frequency modulation
<i>SG2 Scale Mod Source</i>	16	external/patched modulation source for SG2 Scale
<i>SG2 Pulse Width Mod Source</i>	17	external/patched modulation source for SG2 Pulse Width Modulation
<i>SG PWM Speed</i>	18	Pulse Width Modulation speed
<i>SG PWM Intensity</i>	19	intensity of the Pulse Width Modulation
<i>SG Frequency Mod Enable</i>	20	activates the frequency modulation
<i>SG Frequency Mod Reverse</i>	21	polarity of the frequency modulation

parameter	ID	description
<i>SG Frequency Mod by MOD Signal</i>	22	frequency modulation amount of mixed S&H / MG1 signal
<i>SG Total Frequency Mod</i>	23	total frequency modulation amount of external/patched source
<i>SG Total Freq. Mod Source</i>	24	external/patched modulation source for total frequency modulation

Lowpass Filter

parameter	ID	description
<i>LP Cutoff Frequency</i>	25	cutoff frequency
<i>LP Peak</i>	26	peak (resonance)
<i>LP Balance</i>	27	keyboard balance (tracking)
<i>LP Expand</i>	28	intensity of modulation by Envelope Modifier
<i>LP Frequency Mod Enable</i>	29	activates the cutoff frequency modulation
<i>LP Frequency Mod by MOD Signal</i>	30	cutoff frequency modulation amount of mixed S&H / MG1 signal
<i>LP Frequency Mod</i>	31	cutoff frequency modulation amount of external/patched source
<i>LP Frequency Mod Source</i>	32	external/patched modulation source for cutoff frequency modulation

Envelope Modifier

parameter	ID	description
<i>EM Attack</i>	33	Attack time
<i>EM Decay</i>	34	Decay time
<i>EM Sustain</i>	35	Sustain level
<i>EM Release</i>	36	Release time
<i>EM Attack Time Mod Source</i>	37	external/patched modulation source for Attack time
<i>EM Release Trigger Source</i>	38	external/patched trigger source for Release phase

Equalizer

parameter	ID	description
<i>8 kHz Gain</i>	39	gain of the 8 kHz band
<i>4 kHz Gain</i>	40	gain of the 4 kHz band
<i>2 kHz Gain</i>	41	gain of the 2 kHz band
<i>1 kHz Gain</i>	42	gain of the 1 kHz band
<i>500 Hz Gain</i>	43	gain of the 500 Hz band
<i>250 Hz Gain</i>	44	gain of the 250 Hz band
<i>125 Hz Gain</i>	45	gain of the 125 Hz band

Total Signal Modifiers

parameter	ID	description
<i>Amplitude Mod Intensity</i>	46	intensity of the Amplitude Modulation
<i>Ensemble</i>	47	intensity of the Ensemble effect
<i>Preset Volume</i>	48	initial volume of VCA1
<i>VCA1 Amplitude Mod Source</i>	49	external/patched modulation source for VCA1
<i>VCA2 Mod by VP1</i>	50	activates the modulation of VCA2 by VP1

Modulation Generators 1/2 and Sample & Hold

parameter	ID	description
<i>S&H / MG1 Balance</i>	51	mix between S&H and MG1 for MOD signal
<i>MOD Signal VCA Control</i>	52	external/patched source for amplitude modulation of the MOD signal
<i>S&H Clock Frequency</i>	53	sample clock rate
<i>S&H Synchro</i>	54	Activates the Synchro function
<i>S&H Sync to Host</i>	55	sync to host tempo rate
<i>S&H Trigger Source</i>	56	external/patched trigger source
<i>S&H Input Source</i>	57	external/patched sample input source
<i>MG1 Waveform</i>	58	Waveform (<i>Triangle, Falling Sawtooth, Rising Sawtooth, Square, Pink Noise, White Noise</i>)
<i>MG1 Frequency</i>	59	frequency of MG1
<i>MG1 Sync to Host</i>	60	sync to host tempo rate

parameter	ID	description
<i>MG1 Frequency Mod Source</i>	61	external/patched source for frequency modulation
<i>MG2 Frequency</i>	62	frequency of MG2
<i>MG2 Sync to Host</i>	63	sync to host tempo rate

General Envelope Generator

parameter	ID	description
<i>GEG Delay</i>	64	Delay time
<i>GEG Attack</i>	65	Attack time
<i>GEG Release</i>	66	Release time
<i>GEG Auto</i>	67	activates the Auto function
<i>GEG Trigger 1 Source</i>	68	external/patched trigger 1 source
<i>GEG Trigger 2 Source</i>	69	external/patched trigger 2 source

Voltage Processors 1 and 2

parameter	ID	description
<i>VP1 Limiter A</i>	70	Limiter A of VP1
<i>VP1 Limiter B</i>	71	Limiter B of VP1
<i>VP1 Input Source</i>	72	input source of VP1
<i>VP2 Limiter A</i>	73	Limiter A of VP2
<i>VP2 Limiter B</i>	74	Limiter B of VP2
<i>VP2 Source Select</i>	75	sets the input source of VP2 (<i>VP1</i> or <i>VP2</i>)
<i>VP2 Input Source</i>	76	input source of VP2

Adder

parameter	ID	description
<i>Level 1</i>	77	level of input 1
<i>Level 2</i>	78	level of input 2
<i>Input 1 Source</i>	79	external/patched input 1 source
<i>VP2 Limiter A</i>	80	external/patched input 2 source

Temperament (Micro-Tuning)

parameter	ID	description
<i>SG1 Tune C to B</i>	81 – 92	individual tuning for SG1, keys C to B
<i>SG2 Tune C to B</i>	93 – 104	individual tuning for SG2, keys C to B

External Modulation and Trigger Sources

parameter	ID	description
<i>Clock1 Source</i>	105	sync to host rate for Clk1
<i>Clock2 Source</i>	106	sync to host rate for Clk2
<i>Trigger1 Source</i>	107	MIDI CC assignment for Trg1
<i>Trigger2 Source</i>	108	MIDI CC assignment for Trg2
<i>VC1 Source</i>	109	MIDI CC assignment for VC1
<i>VC2 Source</i>	110	MIDI CC assignment for VC2
<i>VC3 Source</i>	111	MIDI CC assignment for VC3
<i>VC4 Source</i>	112	MIDI CC assignment for VC4

Tweaks

parameter	ID	description
<i>KBD Trigger</i>	113	number of keys to be pressed for KBD triggering
<i>Velocity to LP</i>	114	intensity of Velocity to filter cutoff
<i>Velocity to VCA</i>	115	intensity of Velocity to volume
<i>Filter Mode</i>	116	2-pole Korg 35 or 4-pole ladder filter

Resonators

parameter	ID	description
<i>EQ or Resonator</i>	117	show Equalizer or Resonator section
<i>Resonators Intensity</i>	118	mix between original and Resonators effect signal
<i>Resonator 1 Freq.</i>	119	peak frequency of first resonator
<i>Resonator 2 Freq.</i>	120	peak frequency of second resonator
<i>Resonator 3 Freq.</i>	121	peak frequency of third resonator
<i>Resonators Freq. Mod Intensity</i>	122	amount of Peak frequency modulation by external/patched modulation source
<i>Resonator Freq. Mod Source</i>	123	external/patched modulation source for Peak frequency modulation

Frequently Asked Questions

Before you read on here, please make sure that you also have read my statements regarding the FB-3200's capabilities and limitations at the beginning of this manual (see section *Digital Transformation*).

How do I install the FB-3200 (Windows 32 bit version)?

Just copy the files `fb3200.dll` and `fb3200.ini` from the ZIP archive you have downloaded to your system's or favorite DAW's VST plug-in folder. Your DAW should automatically register the FB-3200 VST plug-in the next time you start it.

How do I install the FB-3200 (Windows 64 bit version)?

Just copy the file `fb320064.dll` and `fb3200.ini` from the ZIP archive you have downloaded to your system's or favorite DAW's VST plug-in folder. Your DAW should automatically register the FB-3200 VST plug-in the next time you start it.

Note: You may have to remove any existing (32 bit) `fb3200.dll` from your VST plug-in folder or else your DAW may screw the versions up...

How do I install the FB-3200 (Mac VST/AU universal 32/64 bit)?

Locate the downloaded PKG package file `fb3200_1_0_3_mac.pkg` in Finder (!) and do a right- or control-click on it. In the context menu, click on "Open". You will be asked if you really want to install the package because it comes from an "unidentified developer" (me ☺). Click "OK" and follow the installation instructions.

What is the plug-in ID of the FB-3200?

The ID is FB32.

Will you support the FB-3200?

Yes. If you have problems, found a bug, or have some suggestions about the FB-3200 please send me a mail: full.bucket@gmx.net.

How do I know if a new version of the FB-3200 is available?

When connected to the Internet, open the Options menu (see section *Options Menu*) by clicking the disk icon and select the entry "Check Online for Updates". If a new version of the FB-3200 is available on fullbucket.de the respective information will be shown in a message box.

Does the PS-3200 have a status LED for the GEG?

Nope, I added that to the FB-3200 for convenience.

Why do some controls have orange and others white labels?

Only 32 controls of the original PS-3200 could be memorize – these were color-coded with orange labels. I transferred this funny scheme to the FB-3200 but it has no deeper meaning there.

Why are the SG Waveform and Scale values set by knobs and not by switches?

Again this has to do with the original hardware. All programmable parameters of the PS-3200 were sampled and stored as "continuous" values. When recalled, a parameter value was transformed to a control voltage – the Korg engineers just did not make a distinction between continuous parameters (knobs) and discrete parameters (switches)!

Nice side effects of this concept is that the Signal Generators' pulse width can be set continuously and the Scales controlled by modulation sources.