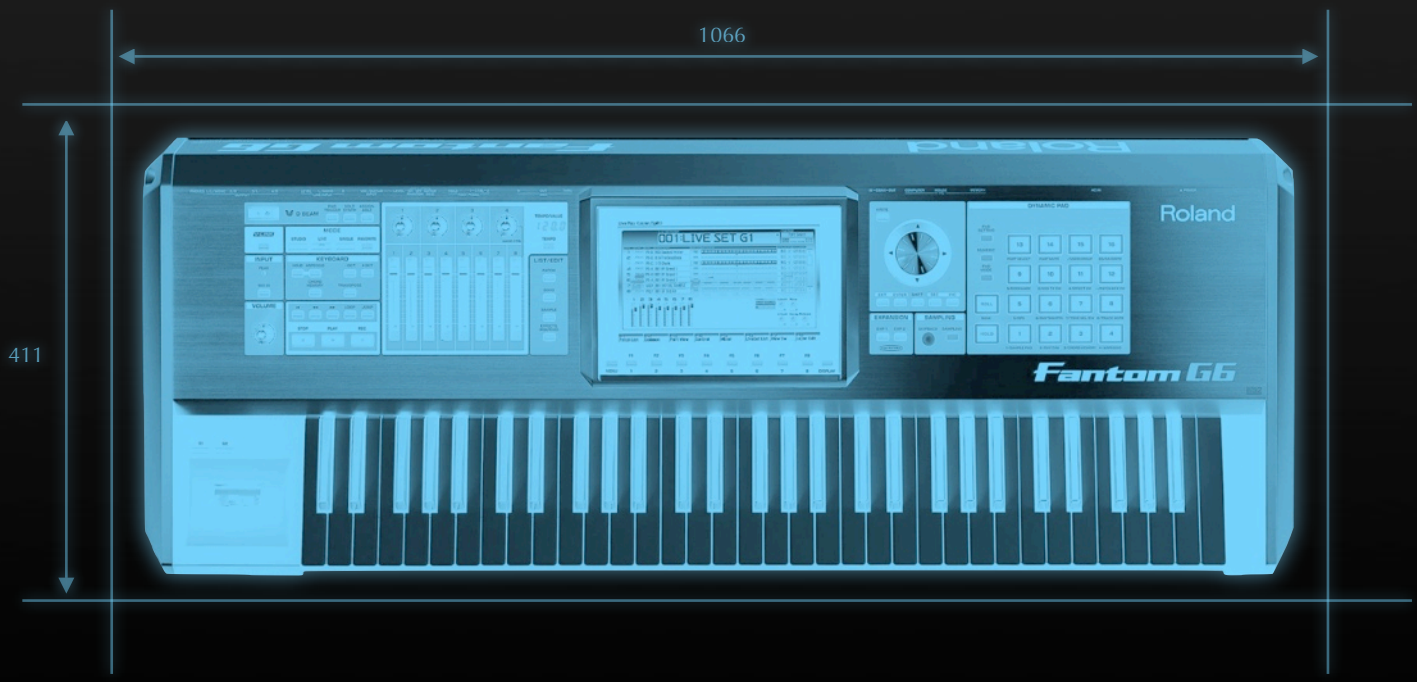
Fantom-G Tweakbook

Artemiy Pavlov

Explore the greatest depths of the Roland Fantom-G

1st edition



Fantom-G Tweakbook

The Fantom-G Tweakbook is intended for people who want to explore the greatest depths of their Fantom-G synthesizers from Roland. It is a truly immense knowledge resource of many different techniques and secrets on sound design and music production, with lots of illustrations and example sounds provided in each tutorial article.

The book covers an overwhelming amount of topics, including subtractive, additive and vector synthesis, ring modulation, analog sound replication, envelope, LFO and matrix modulation, using effect processors as synthesis blocks, sampling, re-sampling and audio post-production, advanced processing of internal and external sounds, using in conjunction with other gear and much beyond. And yet, with it's helpful introductory tutorials, dictionary and patch parameter map, the Fantom-G Tweakbook is as easy to understand to newbies as it is to experienced Roland users.

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About The Author

Artemiy Pavlov was born in 1981 in Kharkov, Ukraine, in a family of an electronics engineer and a math teacher, both of which were also musicians. He naturally paid a lot of interest in sound both as an art and as a physical phenomenon, and nowadays it's both his passion and profession.

In the field of sound design and development, Artemiy worked with companies like Roland, Native Instruments and Spectrasonics, and created a number of successful products for his own Sinevibes, such as books, sound libraries and software plug-ins. He also is a PhD student at the Kharkov National University of Radioelectronics, doing research in the field of electromagnetism and artificial structures.

Artemiy is married since 2001, with two daughters born 2004 and 2007.

You can read more about Artemiy Pavlov at these sites:

- www.artemiypavlov.com
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Contents

Introduction

Understanding spectrum and time

Is it very easy to understand what sound is and how it is produced on a synthesizer simply if you separate it's two main properties: *spectrum* and *time*. The *spectrum* of every sound is comprised of multiple primitive oscillations of different frequencies, and they define whether it's a piano, a bass, a cymbal or a human voice, and what character this sound has - dark or bright, mellow or harsh. These frequencies may also change in *time*, turning the sound from static into live.

In a synthesizer like the Roland Fantom-G, the sound starts with a *generator* which plays back a certain waveform or an audio sample. Then, it goes through a *filter*, which can alter the spectrum of the initial sound. After that, the sound goes through the *amplifier* which defines the loudness of the final sound.

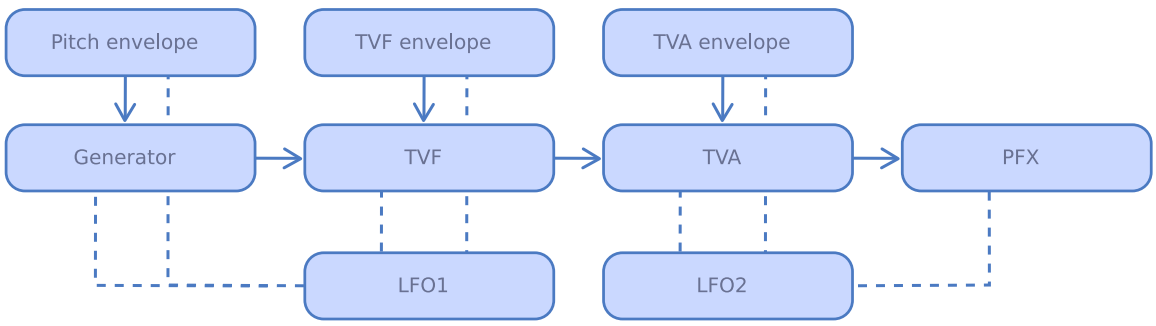
There is another type of building blocks which allow to make the parameters of the generator, filter and amplifier change in time, thus making the sound dynamic: these blocks are envelopes (which are simple parameter timelines) and LFO generators (for repeating or even rhythmic changes).

Fantom-G patch structure

Making a new sound with the Fantom-G comes down to working with these types of *spectrum*- and *time*-oriented building blocks described above.

On the Fantom-G, the combination of the elements that form a certain sound is called a "patch". Every patch has four partials called "tones", each of them being a complete synthesizer on it's own. A patch tone in the Fantom-G consists of the following elements:

- **Generator** with an envelope.
- **Filter** with an envelope.
- **Amplifier** with an envelope.
- Two **LFO** generators.
- **PFX** multi-effect processor.
- **Modulation matrix** which allows to route the MIDI controllers, envelopes and LFOs to a multitude of non-standard destinations.



Simplified view of the Fantom-G tone structure

In addition, there are 10 tone structures which allow to connect a pair of tones (1 and 2, 3 and 4) in several different ways, including chaining the tone filters and insertion of other special synthesis elements like the ring modulator and booster.

Making a new patch

Each article in this book follows the same basic idea: to explain a certain method for obtaining this or that type of new sound or sound effect. Below are the steps you will need to take to complete studying an article.

- First and foremost, unless stated in the article, you need to be in *SINGLE* mode, and clear the current patch. To do this, press the *PATCH* button in the *LIST/EDIT* group, then *F4 Util Menu*, and perform the *Patch Initialize* procedure.
- Now you need to enter the full patch edit mode so that all the available building elements and parameters are accessible to you. Do it by pressing the *PATCH* button in the *LIST/EDIT* group again, or *F6 Pro Edit*.
- To begin making a sound, you will usually start with selecting a certain waveform for the wave generator. The Waveforms list will help you locate the right one inside the Fantom-G.
- When following the instructions, you can use the short Dictionary to look up the terms that are unfamiliar to you, and examine the Parameter Map to locate the parameters you need to adjust within the patch editor. Note that the patch editor gives you hundreds of sound parameters to adjust, but you will only need to adjust a few of them.
- The sound structure drawing will help you understand how different building blocks work together: what blocks the sound goes through, which blocks provide control data. However, only those blocks that play a vital role in the given sound are displayed.
- If you want to save the sound you have created for a given article, press the *WRITE* button

Each article in the Fantom-G Tweakbook also features one or more example patches that already recreate the sounds described. In order to load them, copy the *Tweakbook.prj* folder onto your USB drive. Then, load this project by pressing *MENU*, then *F1 Project* and *F1 Load Project*.

In addition to the patches, all articles are also supplied with audio demos: this is especially useful as you can browse the book by the type of sound you'd like to create. The example patches and audio demos are referenced at the end of each article, in bold text on a grey background, e.g.:

- **015 Example Patch**
- **Audio Example.mp3**

Reference

Waveforms

Waveform type	Number range
Sine	1325-1328
Low sine	2228
Triangle	1319-1324
Saw	1258-1281
Super saw	1071-1079
Square	1289-1306
Low square	2227
Pulse	1308-1318
Pink noise	1360
White noise	1359
DC	2229

Dictionary

Term	Description
Aftertouch	A special controller that starts to work after a key is pressed and is kept pushing stronger.
Attack	Envelope parameter which defines how quickly it will grow from zero to max. level after a key is pressed.
Band-pass filter	Filters out parts of the spectrum around (i.e. above and below) the cutoff frequency.
Cutoff	A parameter of a filter which specifies the frequency range it works in: which part of the spectrum it will pass through, and which it will attenuate.
Decay	Envelope parameter which defines how quickly it will fall from max. level to sustain level.
Envelope	Defines how a certain characteristic of some sound changes over time.
Filter	A device that modifies the spectrum of the sound, removing a certain range of frequencies.
Filter slope	Defines how drastic the filtering effect is, measured in dB per octave. For example, -12 dB/octave means that the signal level one octave above the cutoff frequency will be attenuated by 12 dB. With lower values (e.g. -24 dB/octave, -36 dB/octave), the filtering effects will get more and more deep.
Generator	A device that produces the initial sound (for example, plays back a built-in waveform, or an imported audio sample).
High-pass filter	Filters out part of the spectrum below the cutoff frequency.
Keyfollow	Defines how a certain sound parameter changes as you play more closer to the lower or the upper key range.
LFO	“Low frequency oscillator” that applies repetitive or rhythmic changes onto a certain characteristic of sound.
Low-pass filter	Filters out part of the spectrum above the cutoff frequency.
Modulation	A process of one device controlling a parameter of another device.
Notch filter	Also known as band-reject filter: a filter that cuts away part of the spectrum around the cutoff frequency.
Oscillator	A generator that produces a certain waveform in realtime by means of analog circuitry or computer analog modeling.
Peaking filter	Boosts part of the spectrum around the cutoff frequency.
PWM	Stands for “pulse width modulation”. In analog and virtual analog synths, this means that the width of the square/pulse waveform may be smoothly adjusted.
Release	Envelope parameter which defines how quickly it will fall from sustain level to zero after a key is released.
Resonance	An effect of high amplification of a certain frequency range, typically appearing in a device whose output signal is partially or fully fed back into the input.

Term	Description
Sample	A digital recording of some sound or music.
Slope	In a filter, a characteristic that tells how drastic the edges of the spectrum curve are. The higher the slope, the deeper the filtering effect is.
Sustain	Envelope parameter which defines the infinite “hold” level.
TVA	“Time Variable Amplifier” is an amplifier with it’s own envelope generator.
TVF	“Time Variable Filter” is a filter with it’s own envelope generator.
Unison	Refers to two or more sounds of the same type detuned and mixed together.
Velocity	Speed or strength a key is pressed with. Normally this is tied to the sound level (the harder you play, the louder the sound), but can be used with virtually any other parameter like filter cutoff or modulation depth.
Waveform	Typically refers to a sound with a static shape (i.e. that doesn’t change in time).

Parameter map

Patch edit

Screen	Description	Parameters
General	Common patch settings	Octave Shift, Analog Feel
Wave	Waveform settings	Wave Form, Wave Gain
TMT	Tone Mix Table	Structure Type, Booster Gain, Tone Key Range, Tone Velocity Range
Pitch	Pitch settings	Coarse Tune, Fine Tune, Pitch Keyfollow, Pitch Bender Range
Pitch Env	Pitch envelope	Pitch Env. Attack/Decay/Release/Sustain, Env. Depth
TVF	Filter settings	Filter Type, Cutoff, Resonance, Cutoff Keyfollow, Env. Velocity Sens.
TVF Env	Filter envelope	TVF Env. Attack/Decay/Release/Sustain, Env. Depth
TVA	Amplifier settings	TVA Level, TVA Velocity Sens., Pan
TVA Env	Amplifier envelope	TVA Env, Attack/Decay/Release/Sustain
Output	Output, effects sends	Tone Output Assignment, MFX/Chorus/Reveb send level
LFO1/2	LFO settings	Wave Form, Rate, Offset, TVA/TVF/Pitch/Pan Depth
Step LFO	Step LFO editor	Step Type, Step 1 .. 16 value
Solo/Porta	Solo/Portamento	Mono/Poly, Legato Switch, Portamento Type/Time
Misc	Miscellaneous	Tone Delay Mode, Tone Delay Time, Tone Env Mode
CTRL1/2/3/4	Matrix Control	CTRL1/2/3/4 Source, Destination, Depth, Switch

Effects edit

Screen	Description	Parameters
Routing	Effects routing	MFX/Chorus/Reverb sends, MFX chorus/reverb sends
PFX	Patch MFX settings	Settings specific to the selected MFX algorithm
PFX Control	Patch MFX control settings	CTRL1/2/3/4 Source, Destination, Sens, Control Channel