

BOOMSTAR

OPERATION MANUAL

S T U D I O E L E C T R O N I C S

LIMITED WARRANTY TERMS AND CONDITIONS

This Limited Warranty applies only to ANALOGIA INC./STUDIO ELECTRONICS purchased in the United States of America. Outside the USA, warranty policy and service is determined by the laws of the country of purchase and followed by our local authorized distributor. A listing of our authorized distributors is available at <http://www.studioelectronics.com/shop/distributors/>

ANALOGIA INC./STUDIO ELECTRONICS warrants to the first owner of a covered product purchased directly from ANALOGIA INC./STUDIO ELECTRONICS, or an authorized ANALOGIA INC./STUDIO ELECTRONICS dealer in the U.S., that this product will be free from defects in materials and or workmanship for a period of one year from the date of purchase. Please register this product online at <http://studioelectronics.com/support/registration/> to establish the date of purchase (NOT A REQUIREMENT FOR WARRANTY SERVICE BUT A GOOD IDEA).

To exercise your rights under this Warranty as the first owner/purchaser, **YOU MUST SHIP THIS PRODUCT IN ITS ORIGINAL PACKAGING** (which we can replace and send to you for \$10) at your expense, with proof of purchase documentation and the ANALOGIA INC./STUDIO ELECTRONICS supplied power adapter, to ANALOGIA INC. An RMA (Return Material Authorization) number from ANALOGIA INC./STUDIO ELECTRONICS must be obtained first before returning any product. Email RMA requests to rma@studioelectronics.com, or call us at (310) 640-3546 to secure an RMA #. Products shipped to ANALOGIA INC. without an RMA will be refused and returned. Shipping insurance is optional, but highly recommended.

ANALOGIA INC./STUDIO ELECTRONICS will repair or replace this product at its sole option and at no charge to you for parts and labor—when deemed necessary and within the warranty period—provided that ANALOGIA INC./STUDIO ELECTRONICS reserves the right to determine whether the product is “defective” for purposes of this Limited Warranty. This Warranty does not apply if damage to this product occurs as a result of abuse or misuse, abnormal use or handling, improper packaging, another product’s interaction, exposure to temperature extremes, or if the product has been altered or modified/customized in any way, or the damage was caused by unauthorized repair or service. The original product must return to ANALOGIA INC. unaltered.

IN NO EVENT SHALL ANALOGIA INC./STUDIO ELECTRONICS BE LIABLE FOR ANY INDIRECT, INCIDENTAL, COLLATERAL, EXEMPLARY, PUNITIVE, CONSEQUENTIAL OR SPECIAL DAMAGES OR LOSSES ARISING OUT OF YOUR PURCHASE OF PRODUCTS AND/OR OUT OF THIS WARRANTY, INCLUDING WITHOUT LIMITATION, LOSS OF USE, PROFITS, GOODWILL OR SAVINGS OR LOSS OF DATA, MUSIC, ELECTRONIC FILES, OR PREFERENCES THAT MAY HAVE BEEN STORED BY A USER OF THE PRODUCT, EVEN IF ANALOGIA INC./STUDIO ELECTRONICS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR CLAIMS. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

This Limited Warranty and the right of replacement is in lieu of any and all other warranties—which you hereby waive—and it gives U.S. purchasers specific legal rights. You may also have other rights which vary from State to State.

ANALOGIA INC., 530 West Palm Ave. El Segundo, CA 90245

CIRCUIT AND SOFTWARE DESIGN

Tim **Caswell**

USER INTERFACE AND FEATURE SPECIALIST

Greg **St. Regis**

SOUND PROGRAMMING AND DEMOS

Drew **Neumann** Greg **St. Regis** Marc **St. Regis**

GRAPHIC DESIGN

John **Greczula**

PRIMARY ANALOG CONSULTANT

Drew **Neumann**

LEAD VENDOR LIAISON

Daniel **Wendell**

QUICK START GUIDE MANUAL

Marc **St. Regis** Greg **St. Regis** Camille **St. Regis** Daniel **Wendell**

VERY SPECIAL THANKS

Mary **St. Regis** Geoff **Farr** Rachael **Herbison** Lucy **Bauer**

Rev. 2.0, 5.3.2014

Information contained in this Boomstar Manual is subject to change without notice and does not represent a commitment on behalf of ANALOGIA INC. No portion of this manual may be produced or transmitted in any form, or by any means—whether electronic or mechanical, or for any purpose other than purchaser's personal use—without the explicit written permission of ANALOGIA INC. All other products, logos or company names mentioned herein are trademarks or registered trademarks of their respective owners.

© ANALOGIA INC. 2014. All Rights Reserved.

ANALOGIA INC.

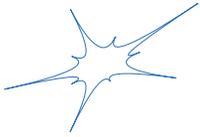
530 West Palm Ave., El Segundo California 90245

Tel: (310) 640-3546 Web: studioelectronics.com Email: @sbcglobal.net

facebook.com/StudioElectronics • twitter.com/SE_BoomStar • youtube.com/user/StudioElectronics
soundcloud.com/studio-electronics

BOOMSTAR OPERATION MANUAL

1) The Design Behind the 'Stars	1
2) Setup Essentials	2-6
2.1 Warnings, Precautions and Advice	2-4
2.2 Product Registration	4
2.3 Smart and Safe Connections	5
2.4 Boomstar Warming and Output Warning	6
3) Signal Flow Chart	7
3.1 A Tim Caswell Original	7
4) Patch Reset	8
4.1 Sawtooth Bass Patch - Factory Reset	8
5) Panels	9-21
5.1 Front Panel	9-10
5.1.1 Adjustment Holes	9-10
5.1.1.1 CV input tracking adjust.	9
5.1.1.2 Oscillator 1 high tune adjust.	9
5.1.1.3 Oscillator 1 octave adjust	9
5.1.1.4 Oscillator 1 initial tune adjust	9
5.1.1.5 Oscillator 1 scale adjust	9
5.1.1.6 Oscillator 2 scale adjust	9
5.1.1.7 Oscillator 2 initial tune adjust	9
5.1.1.8 Oscillator 2 high tune adjust	10
5.1.1.9 Oscillator 2 octave adjust	10
5.1.1.10 Envelope Drive	10
5.1.1.11 VCA Offset	10
5.1.1.12 VCA DC Balance	10
5.2 Top Panel	11-19
5.2.1 SEM Controls	11
5.2.2 SE80 and 700 Controls	11
5.2.3 Patch Points	11-12
5.2.3.1 CV IN - Control Voltage In	11
5.2.3.2 GATE IN - Gate Input	11
5.2.3.3 VCF FM - VCF Frequency Mod In	11
5.2.3.4 VCA AM - VCA Amplitude Mod In	11
5.2.3.5 OSC Out - Oscillator Output	11
5.2.3.6 EXT IN - External Input	12
5.2.4 VCO 1 - Voltage Controlled OSC 1	13
5.2.5 VCO 2 - Voltage Controlled OSC 2	14
5.2.6 VCF - Voltage Controlled Filter	14-15
5.2.7 ENV 1 - Envelope 1	15-16
5.2.8 ENV 2 - Envelope 2	16
5.2.9 X MOD - Cross Modulation	17
5.2.10 LFO - Low Frequency Oscillator	17-18
5.2.11 VCA - Voltage Controlled Amplifier	18
5.2.12 Master Tune	18
5.2.13 Bend	18
5.2.14 Glide	18
5.2.15 Dynamics	19
5.2.16 ENV 1 • PW 1 - Envelope 1 to Pulse Wdth	19
5.2.17 MIXER	19
5.2.17.1 VCO 1 - Voltage Cont. OSC	19
5.2.17.2 VCO 2 - Voltage Cont. OSC 2	19
5.2.17.3 Ring Mod - Ring Modulation	19
5.2.17.4 Noise	19
5.2.17.5 Feedback	19
5.3 Back Panel	20-21
5.3.1 Connections, Switches, Warnings	20-21
5.3.1.1 Audio Out	20
5.3.1.2 MIDI	20
5.3.1.3 Power Adapter Connection	20
5.4 Side Panel	21
5.4.1 Rack Mounting Holes	21
6) Legal	22-23
6.1 Liability	22
6.2 FCC	22-23
6.2 Canada	23
6.4 Europe	23
7) Glossary	24
8) Filter Talkers	25
8.1 Bace	25
8.2 Drew Neumann	25
9) The Ancient Chinese	26
10) Back Panel Art	27
11) Troubleshooting	28
12) Blank Patch Sheet 1	29
13) Blank Patch Sheet 2	30



1

THE DESIGN BEHIND THE 'STARS

As **SE** fans know, we've been doing the multiple filter thing for some time, and while our approach has never been one of exact emulation of the original synthesizers—that could only be accomplished if the entire signal path were cloned as well—the focus and purpose was, and remains, to bring the main essence—the “spirit” of the classic originals into our own unique, performance-based platforms, and in the case of the **Boomstar** accomplish that with as many hardware features, i.e., crossmod, ringmod, overdrive, feedback, that would fit! Judging from the many flattering remarks (from owners, well-wishers, followers), and downright effusive praise, satisfaction has been achieved—and thanks to all!

Critical Circuit Details: For oscillators we've essentially been using the same Moog-based design since our reissue of the **MiniMoog**® stabilized oscillator board. In the Boomstar synths we replaced the Fairchild cans with 3046s, which are stabilized with temperature compensating resistors placed on top—something very similar to what is in an **S.E.M.**: it gives us just the right amount of warmth and tuning stability. The **Moog**® filter employed in all our own synths is a clone, except that in the **Boomstar 5089**, a 3046 replaces the original hand-matched transistors in the top and bottom of the ladder. The resonance produced is lovely; it sits perfectly along with the signal, singing out, but never dominates. The **4075**, **3003**, and **S.E.M.** are faithful to the original circuit designs, with some license taken by Tim Caswell in case of the **SE80** filter, due to 1970s custom filter ICs employed in Yamaha's design. The VCA in the BoomStar is the **MiniM—g**® VCA, which we used in the **SE-1(X)** as well, while the **Omega** and **ATC** series synths use a VCA incorporating an LM13700, in case you were wondering.

These are “through-hole” (to be contrasted with “surface-mount”) and decidedly discrete analog synthesizers: the Holy Grail of PCB assembly procedures, built to last and remain completely serviceable—bound to be necessary if they stick around making people happy as long as we expect them to!

Greg St. Regis 5.3.14
El Segundo, CA USA





2

SETUP ESSENTIALS

2.1 Warnings, Precautions, and Advice

WARNING - When using electric products basic precautions should always be followed to avoid the possibility of serious injury or even death to you or others, as well as damage to the device or other property from electrical shock, fire, or other risks. These precautions include, but are not limited to, the following “to do” list

- Read, save, and understand all of the instructions before using product.
- Do not use product near any water source—such as a bathtub, wash basin, kitchen sink, wet floor, or swimming pool.
- Clean with a soft, dry cloth with unit unplugged from AC outlet.
- This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an Audiologist.
- Do not place anything heavy on the instrument.
- The product should be situated so that its location or position does not interfere with its proper ventilation.
- The product should be located away from heat sources such as radiators, heat registers, or other items that produce heat.
- Avoid using the product where it may be affected by dust or hot sunlight.
- Make sure the line voltage in your location matches the input voltage specifications on the DC power adapter.
- All Boomstar synth models use an external power adapter. No other power supply or adapter other than the one provided by Analogia Inc./Studio Electronics is to be used under any circumstances. Analogia Inc./ Studio Electronics accepts no responsibility for damage caused by use of an unauthorized power supply or adapter.
- Mute channel volume before making audio connections to prevent malfunction and speaker damage.
- Unplug power supply cord from outlet when not in use for an extended period.
- Do not trample the power supply cord, trip over it, or pull at it; grasp the plug portion when unplugging.
- Care should be taken so that objects do not fall and liquid is not spilled into the enclosure through openings.
- Protect the unit from strong jolts and vibration and never apply strong pressure to the front, back or side panels, or strike them in any manner.

The product should be serviced by qualified service personnel when:

- a) The power supply cord or the plug has been damaged.
- b) Solid objects or liquid either have fallen or spilled into the product.
- c) The product has been exposed to rain.
- d) The product does not appear to operate normally or exhibits a marked change in performance.
- e) The product has been dropped, or the enclosure damaged.

• Do not attempt to service the product beyond that described in the user maintenance instructions. All other servicing should be referred to qualified technicians.

DANGER – INSTRUCTIONS RELEVANT TO RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS: Do not open the chassis. There are no user serviceable parts inside. Refer all servicing to qualified personnel only. All Boomstar synth models use an external power adapter. No other power supply or adapter other than the one provided by Analogia Inc./Studio Electronics is to be used under any circumstances. Analogia Inc./Studio Electronics accepts no responsibility for damage caused by use of an unauthorized power supply or adapter.

- Mute channel volume before making audio connections to prevent malfunction and speaker damage.
- Unplug power supply cord from outlet when not in use for an extended period.
- Do not trample on the power-supply cord, trip over it, nor pull at it, but grasp the plug portion when unplugging.
- Care should be taken so that objects do not fall and liquid is not spilled into the enclosure through openings.
- Protect the unit from strong jolts and vibration and never apply strong pressure to the front, back or side panels, or strike them in any manner.

GROUNDING INSTRUCTIONS: This product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord with equipment grounding conductor and a grounding plug, which must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER - Improper connection of the equipment grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product. If it does not fit the outlet, have a proper outlet installed by a qualified electrician.

SAVE THESE INSTRUCTIONS!





The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltages” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and servicing (maintenance) instructions found in the literature accompanying the product.



TRADEMARKS: The STUDIO ELECTRONICS logo is a trademark of Analogia Inc./Studio Electronics. All other trademarks included in the publication remain the property of their respective holders.

Specifications and appearances are subject to change without notice.

COPYRIGHT © 2014 ANALOGIA INC. / STUDIO ELECTRONICS

2.2 Registration

Registering your BOOMSTAR synth establishes your ownership (should there be a legal ownership dispute in the future), which then secures access to Analogia Inc. Tech. Support and Warranty Service, and, if you so desire, to product updates, related information, and promotional offers. As always, our RSS feed, News page, Facebook and Twitter outlets are current and generally useful.

Please register this product online at <http://studioelectronics.com/support/registration/>



2.3 Smart and Safe Connections

Always power-off all audio gear before making any connections. Failing to do so may damage your speakers, or other audio equipment and possibly your Boomstar Synth.

After completing all connections, set all levels to 0. Power on the various devices with audio amplifier or monitoring system last, then raise the volumes to an appropriate listening level.

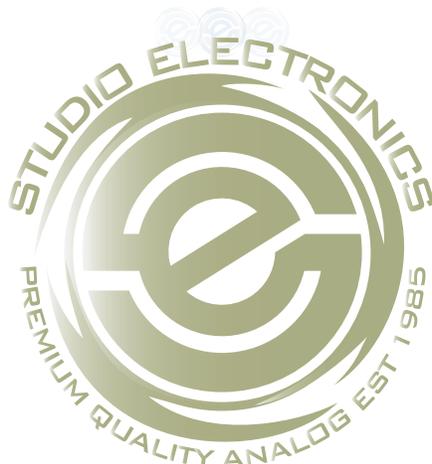
- a) Plug Boomstar +/-15 VDC power supply male 5 pin din plug into female 5 pin din connector mounted on the right side of back panel, near bottom of synth (marked Pin 1/: Com...).
- b) Plug female 3 prong IEC cable plug into +/-15 VDC power supply male 3 prong IEC socket.
- c) Plug male 3 prong IEC cable plug into AC outlet.

Note: A switchable power strip is recommended and highly useful for power recycling.

BOOMSTAR POWER ADAPTER REMOVAL PROCEDURE:

- a) Unplug female 3 prong IEC cable plug from +/-15 VDC power supply.
- b) Unplug female 3 prong IEC cable plug from AC outlet.
- c) Unplug Boomstar male +/-15 VDC power supply plug from female connector on the right side of back panel, near bottom of synth (marked Pin 1/: Com...).

IMPORTANT WARNING: DO NOT POWER ON OR OFF THE BOOMSTAR BY ANY OTHER METHOD THAN THAT SPECIFIED ABOVE TO PREVENT DAMAGE TO UNIT. BE CERTAIN TO STRICTLY FOLLOW THE AFOREMENTIONED CONNECTION PROCEDURE CAREFULLY AND ACCURATELY. THE IMPROPER CONNECTION AND DISCONNECTION OF THIS POWER SUPPLY MAY RESULT IN DAMAGE TO SYNTHESIZER AND SUPPLY. THE OPERATOR OF THIS SYNTHESIZER ASSUMES ALL RESPONSIBILITY AND LIABILITY. ANALOGIA INC./STUDIO ELECTRONICS—OWNERS, OFFICERS, AND EMPLOYEES, ASSUME NO RESPONSIBILITY OR LIABILITY FOR PERSONAL AND PROPERTY DAMAGE INCURRED DUE TO ACCIDENT, CARELESS HANDLING, ABUSE OR MISUSE, IMPROPER CONNECTION AND OR INSTALLATION, OR IMPROPER ELECTRICAL CONTACT OR GROUNDING. OWNERSHIP AND OR USE OF BOOMSTAR SYNTHESIZER CONSTITUTES AN AGREEMENT WITH THESE TERMS.



2.4 Boomstar Warming & Output Warning

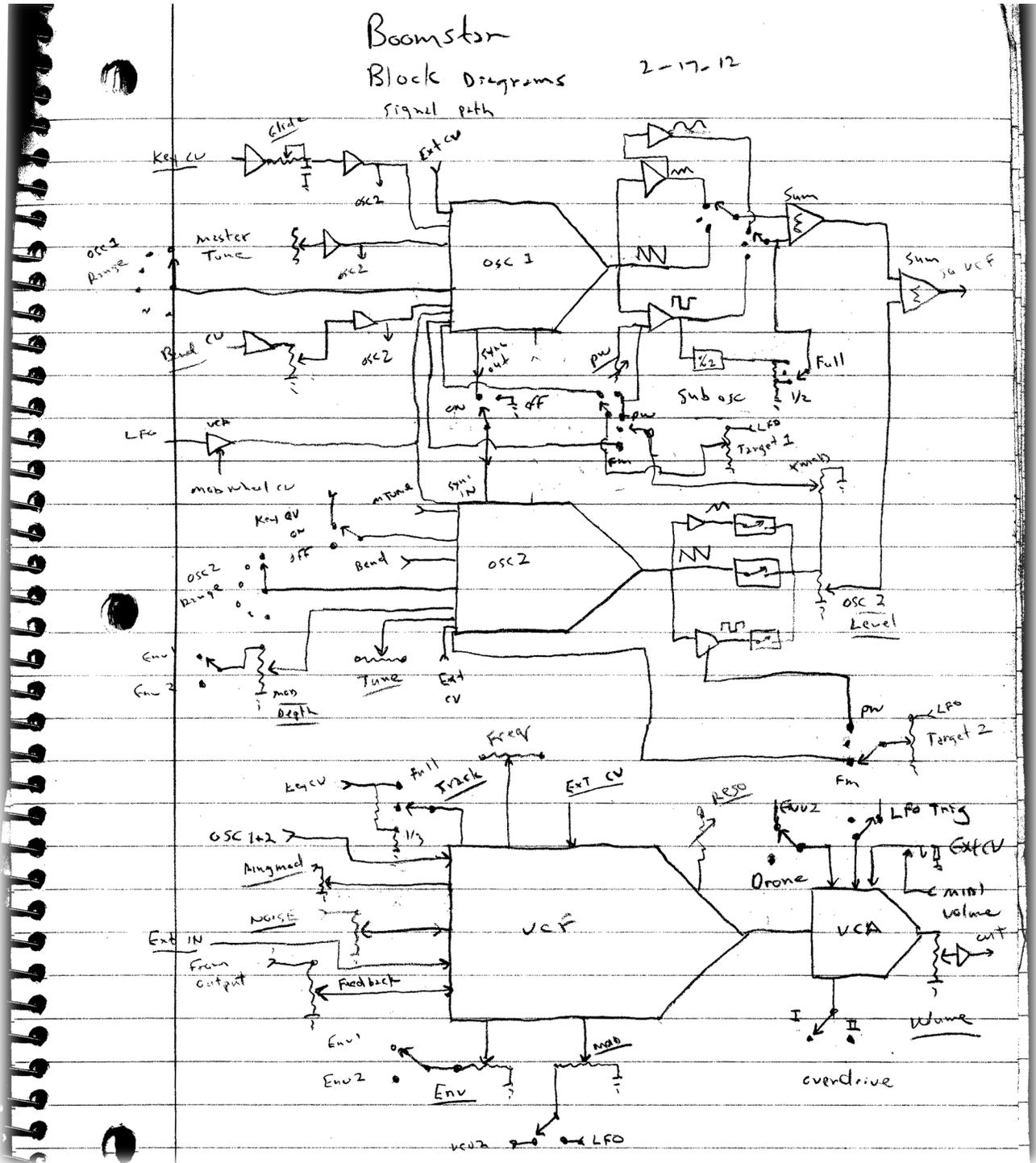
Once the Boomstar is powered up, its temperature-regulated Oscillators will attain optimal temperature stabilization in 5 minutes at which point it is ready for tuning and accurate control of all parameters.

IMPORTANT WARNING: DO NOT PATCH OUTPUTS TO OUTPUTS! THE “AUDIO OUT” ON THE BACK PANEL MUST NOT BE PATCHED TO THE “OSC OUT” PATCH POINT ON THE FRONT PANEL.



3

SIGNAL FLOW CHART





4 PATCH RESET

3.1 Sawtooth Bass Patch - Factory Reset

"We have talked to engineers," and they advise starting (and returning to this "home base" when puzzled or lost) with this very basic patch to begin one's exploration of the Boomstar sound and structure.



VCO 1

RANGE: 32', 16', 8', 4', 2', LO

SYNC: ON, OFF

SUB LEVEL: FULL, HALF

WAVE MIX: \triangleleft, \square, \sim, \triangleright

PULSE WIDTH

VCO 2

TRACK: ON, OFF

RANGE: 32', 16', 8', 4', 2', LO

WAVE: \triangleleft, \square, \sim, \triangleright

TUNE: - , +

MOD DEPTH: ENV 1, ENV 2

VCF

FREQUENCY

TRACK

RESONANCE

ENV 1

VCF

ATTACK

INVERT

LOOP

DECAY

SUSTAIN

RELEASE

ENV 2

VCA

ATTACK

INVERT

LFO TRIG

DECAY

SINGLE TRIG

MULTI TRIG

SUSTAIN

DRONE

MASTER

RELEASE

XMOD

VCO 2 DEPTH

VCO 1 PW

VCO 1 FREQ

LFO

RATE

MIDI SYNC: ON, OFF

WAVE: \triangleleft, \square, \sim, \triangleright

VCO 1 PW

VCO 1 FREQ

MOD DEPTH

VCO 2 PW

VCO 2 FREQ

MOD DEPTH

OVERDRIVE: I, II

VOLUME

MIXER

MASTER TUNE: - , +

BEND

GLIDE

DYNAMICS

ENV1-PW1

VCO 1

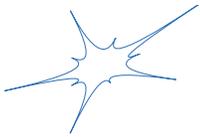
VCO 2

RING MOD

NOISE

FEEDBACK

EXT IN



5 PANELS

5.1 Front Panel

5.1.1 Adjustment Holes

These unmarked holes on the front panel are motherboard access points for calibration potentiometers, set by none other than Greg St. Regis, or a trained factory tech, and tweaking them without a knowledge and familiarity of their function could result in your Boomstar sounding and playing quite poorly; that being said, some interesting drive and VCA offset settings can be tailored to one's own preferences—proceed at own risk.

Xcelite model R3322 screwdriver, or exact equivalent is recommended.

IMPORTANT WARNING: ONLY AN ANALOGIA INC./STUDIO ELECTRONICS RECOMMENDED SCREWDRIVER OR EXACT EQUIVALENT CAN BE USED TO CHANGE THE BOOMSTAR'S FRONT PANEL ADJUSTMENT HOLE SETTINGS TO INSURE UNIT IS NOT DAMAGED. BE CERTAIN TO STRICTLY FOLLOW THIS REQUIREMENT. AN IMPROPER TOOL, AND OR IMPROPER USE OF SAID TOOL MAY RESULT IN SERIOUS DAMAGE TO SYNTHESIZER AND OR SERIOUS INJURY TO OPERATOR. THE OPERATOR OF THIS SYNTHESIZER ASSUMES ALL RESPONSIBILITY AND LIABILITY. ANALOGIA INC./STUDIO ELECTRONICS OWNERS, OFFICERS, AND EMPLOYEES ASSUME NO RESPONSIBILITY OR LIABILITY FOR PERSONAL AND PROPERTY DAMAGE INCURRED DUE TO ACCIDENT, CARELESS HANDLING, ABUSE OR MISUSE, IMPROPER CONTACT OR GROUNDING, OR IMPROPER TOOLS OR THEIR IMPLEMENTATION. OWNERSHIP AND OR USE OF BOOMSTAR SYNTHESIZER CONSTITUTES AN AGREEMENT WITH THESE TERMS.

Holes from left to right:

5.1.1.1

#1 CV input tracking adjust.

5.1.1.2

#2 Oscillator 1 high tune adjust.

5.1.1.3

#3 Oscillator 1 octave adjust.

5.1.1.4

#4 Oscillator 1 initial tune adjust.

5.1.1.5

#5 Oscillator 1 scale adjust.

5.1.1.6

#6 Oscillator 2 scale adjust.

5.1.1.7

#7 Oscillator 2 initial tune adjust.

5.1.1.8

#8 Oscillator 2 high tune adjust.

5.1.1.9

#9 Oscillator 2 octave adjust.

5.1.1.10

#10 Envelope Drive: Set to full for Minim—g; back off for more Oberh—m-like sound.

5.1.1.11

#11 VCA Offset: Uniform waveform adjust.

5.1.1.12

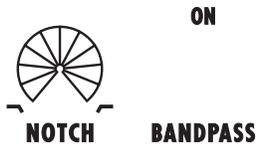
#12 VCA DC Balance: De-pops amplifier.

A detailed calibration video will be posted at <http://studioelectronics.com/support/tutorials/#boomstar>



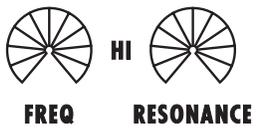
5.2 Top Panel

5.2.1 SEM Controls



ON
NOTCH Sweeps the 12dB filter setting from low-pass to high-pass. The **ON** position enables the **BANDPASS** filter mode, passing frequencies within a certain range and rejecting, or attenuating frequencies outside that range.

5.2.2 SE80 and 700 Controls



The **FREQ** knob sets the hi-pass filter (cutoff) frequency: the greater the value, the fewer low frequencies pass through.

The **RESONANCE** knob sets the filter resonance. The resonance, or “Q” emphasizes, or boosts the cutoff frequency region, and makes the presence of harmonics more apparent.

5.2.3 Patch Points - Modular Synthesis Control—Anti-MIDI

5.2.3.1

CV IN Control Voltage Input: External sources for control would include Modular synthesizers, and step sequencers; one volt per octave is the voltage specification.

5.2.3.2

GATE IN Gate Input: External Gate Input; a +5 voltage source is required to open the voltage controlled amplifier—the alternative to MIDI note on and off.

5.2.3.3

VCF FM Voltage Controlled Filter Frequency Modulation Input: Use an external control voltage to modulate the filter frequency; modulation in the audio range results in a more complex waveform.

5.2.3.4

VCA AM Voltage Controlled Amplifier Amplitude Modulation: Use a control voltage to externally modulate Amplifier amplitude for level adjustments and tremelo effects.

5.2.3.5

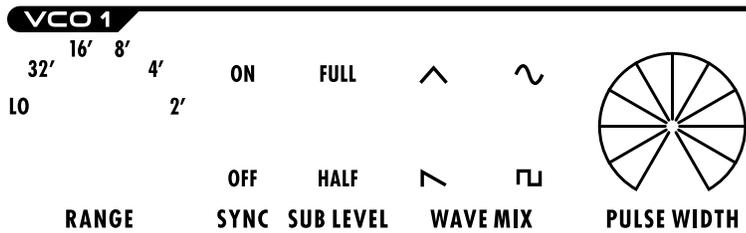
OSC OUT Oscillator Output: Combined pre-filter audio output of oscillator 1 and oscillator. Tone is pre-amplifier and therefore constant. Send this signal to your DAW or mixer and use liberally or sparingly. The purity, clarity and transparency of all frequencies concerned are quite apparent and lovely.

5.2.3.6

EXT IN External Input: Takes an external audio source and processes it through the Boomstar's filter and amplifier. In order to hear the sound you will need to open the amplifier, with either a gate or a MIDI note. Patching the **OSC OUT** to the **EXT IN** (pictured below) will add additional depth, harmonics, and distortion.



5.2.4 VCO 2 - Voltage Controlled Oscillator 1



*A word about the
Oscillators as a whole:*

Oscillators are the Adam (and Eve) of Analog synthesis. An oscillator produces periodic or regularly repeating waveforms, e.g., pitched sounds. The Oscillator's tuning controls alter the frequency or pitch of the oscillators, whereas its wave shape selectors determine the harmonic spectrum of the signal, its basic timbre, or tone coloration. We here at Studio Electronics think Voltage Controlled Oscillators still sound best.

What do these tone colors sound like, you wonder?

Triangle: Fluty, with odd harmonics like the square wave, but its amplitude is quite weak in comparison to its fundamental. The Triangle possesses more brilliance than the similarly shaped sine wave.

Sine: The most elemental waveform with its smooth fundamental and limited harmonics—perfect for sub waveforms, simple “worm” leads, and enriching and thickening the sound.

Sawtooth: Bright, buzzy, brassy—the richest harmonically—features a very smooth tone when a low-pass filter is engaged; it contains both even and odd harmonics of the fundamental frequency.

Square: In its even state, it is a full bouncy sound—a bass beast for many. Near the edges of its duty cycle, or width, it becomes a “clavi,” reedy, nasal sound, with odd harmonics only.

The **RANGE** switch selects the octave: **LO** (low frequency—clicks and ticks below the audible range for humans; clicks can make for very interesting rhythmic pulses and sequences), **32'**, **16'**, **8'**, **4'**, **2'**. The **LO** setting of Oscillator 2 can be employed as a very flexible modulator. These foot pitch numbers come from the lengths of organ pipes in the great cathedrals and churches of old—half the length equals double the pitch.

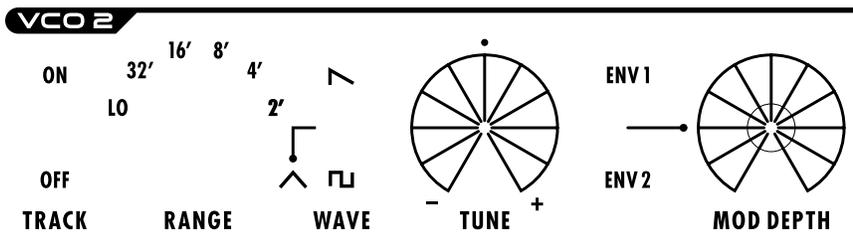
The **SYNC** switch locks the pitch of Oscillator 2 to follow the pitch of Oscillator 1 in hard synchronization, so that OSC 2 will tune only to the harmonic frequencies of Oscillator 1. Intermediate frequencies of Oscillator 2 will produce unusual, “metallic” wave shapes and timbres; both Oscillators sharing the same base frequency makes all of this possible.

The **SUB LEVEL** switch selects a half or full volume octave down Square wave with a center off position—a common feature of the Boomstar enabling quick escapes from more complex programming settings.

The **WAVE MIX** switch selects single waveform settings or blending combinations of Triangle or Saw with Sine or Square waveforms. The center position is null, or off.

The **PULSE WIDTH** knob sets the width of the Square waveform, ranging from wide, square rectangular forms to narrow, nasally tall skyscraper-like shapes. A classic Square wave dials in a little left of the 12 o'clock knob setting—for that wonderfully warm and yet hollowed-out rubbery tone.

5.2.5 VCO 2 - Voltage Controlled Oscillator 2



The **TRACK** switch selects Oscillator 2's pitch tracking response. The **ON** position is the "business as usual," 1 volt per octave default setting. The **OFF** position disconnects the pitch control of the keyboard so a fixed or static pitch can be achieved, which is useful and expressive in a variety of ways, i.e., as a fixed value low frequency modulator when the **LO** setting is employed, a "flanged," "phasey" synced Oscillator timbre effect, or a non-tracking, static drone. Come up with some of your own!

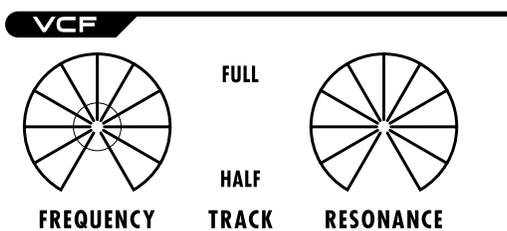
OSC 2's **RANGE** switch functions identically to OSC 1's **RANGE** switch for selecting the octave: **LO** (low frequency inaudible clicks), **32'**, **16'**, **8'**, **4'**, **2'**.

The **WAVE** switch selects the Sawtooth, Triangle, or fixed Square wave.

The coarse/fine **TUNE** knob sets the pitch, or synced harmonic value when the **SYNC** switch of Oscillator 1 is in the **ON** position—a very potent tweaking hot spot! The range of the tune pot is increased when **TRACK** is off.

The **MOD DEPTH** knob sets the depth at which **ENV 1**, or **ENV 2** modulates the frequency or pitch of 2.

5.2.6 VCF 2 - Voltage Controlled Filter



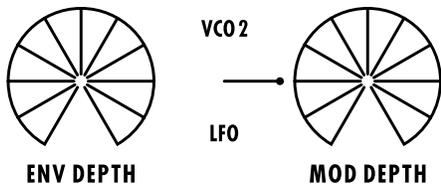
A word about the Filter:

The Boomstar's unique, classic filter designs feature wide range lowpass filters, and in the case of the **5089**, **4075**, and **3003** self-oscillating filters. The **SEM** features a notch that sweeps from low-pass to high-pass, as well as a band-pass mode. The **SE80** is a multimode filter, with dual frequency and resonance controls, for the low-pass and high-pass response. The Filter attenuates, or cuts off the higher frequency components—those which lie above the adjustable cutoff frequency—and passes the lower frequency components of the audio signal. [see Filter Talk, p. 25]

The **FREQUENCY** knob sets this cutoff frequency: the lower the cutoff frequency, the less harmonic content the waveform will retain after passing through the filter. A wave shape rounding and smoothing occurs as this cutoff frequency is reduced.

The **TRACK** switch selects the filter tracking (sometimes called keyboard follow or keyboard scaling) to **FULL**, **OFF**, or **HALF**. Filter tracking applies keyboard control voltage to the filter: more tracking, more brightness as you ascend the keyboard. A **FULL**, tracking selection makes the low end and bassy and round, and the high end cut better with its increased brightness, clarity, and edge.

The **RESONANCE** knob sets the filter resonance. The resonance, or "Q," emphasizes, or boosts, the cutoff frequency region making the presence of harmonics more apparent. The **5089** and **4075** filters will begin to self-oscillate as the knob passes the 3 o'clock position. Resonance is a pure sine wave and can be used as a separate tone source. Resonance is in fact negative feedback—a signature sound of subtractive synthesis.



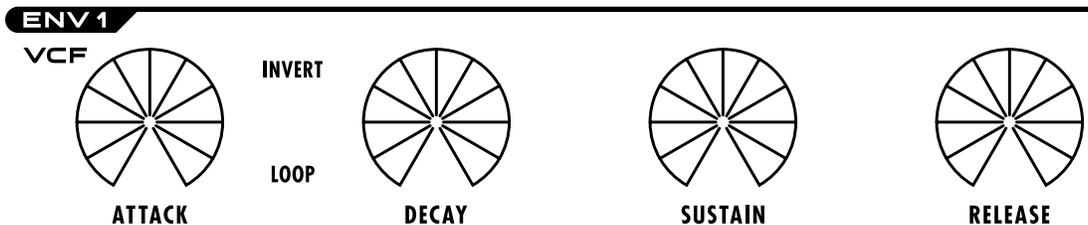
The **ENV DEPTH** (Envelope) knob sets the depth of the modulation amount as it is applied to the filter cutoff frequency. The shape of the filter envelope is determined by the contouring controls attack, decay, sustain, and release; the amount or depth of the envelope contouring is determined by this parameter. Note: If the **MASTER/DRONE** switch is set to the Master position, then the filter frequency is modulated by **ENV 2**, not **ENV 1**.

The **MOD DEPTH** knob sets the modulation amount of the filter by either **VCO 2** (Voltage Controlled Oscillator 2), or **LFO** (Low Frequency Oscillator), via the switch to its left. Oscillator 2 becomes an LFO when its range switch is set to its **LO** position; in the higher range settings (8, 4, 2) audio frequency modulation (think vocal and metallic timbres/x-mod) are achieved. The software-based **LFO** with its versatile, multiple waveforms can be synced to MIDI. [See pp. 17-18, 5.2.10]

5.2.7 ENV 1 - Envelope 1

A word about the Filter Envelope:

The filter envelope shapes the timbre and overtone content of the audio signal as it flows from the circuitry of the mixer. This envelope or contour generator is used to dynamically move the cutoff frequency. It works as such: each time a key is depressed an envelope or contour generator attached to the filter's cutoff frequency is actuated, and sends a control signal to the filter. The control signal rises at one rate, falls at a second rate, levels off at a certain point, and then finally falls off at a third rate. These four parameters and their effect upon the cutoff frequency are explained below.



The **ATTACK** knob sets the attack time. The attack time determines the initial segment of the envelope. The frequency at which the contour begins is determined by the filter frequency setting, while the peak, which it reaches, is determined by the filter frequency and Envelope 1 amount settings combined. Incrementing the **ATTACK** knob value from "0 - 10" will result in the brightness of the sound increasing sharply at first, and then more gradually as the attack time lengthens. Switching **INVERT** on reverses the behaviour of the normal ADSR envelope. During the attack phase (beginning when the key is pressed), the sound fades from the maximum amplitude to zero; during the decay phase, it rises to the value determined by the sustain setting; after the key has been released, the sound parameter rises from sustain amplitude back to maximum amplitude: tricky and nice. Switching **LOOP** on causes the attack and decay values to repeat or loop, transforming Envelope 1 into a quasi LFO. The sustain parameter is in effect as well.

The **DECAY** knob sets the decay time. The decay time determines the duration of the second segment of the envelope, i.e., the fall from the attack peak to the sustain level. When repeatedly depressing a key and incrementing the value from "0 - 10," you will at first hear the brightness drop sharply after the initial attack. This drop will become more gradual as the decay time lengthens.

The **SUSTAIN** knob sets the sustain level. The sustain level determines the filter frequency at which the envelope "levels off" after the initial rise and fall. The frequency of the sustain level can be as high as the initial peak, in which case there is no decay after the initial rise, or it can be as low as the frequency at which the envelope contour began.

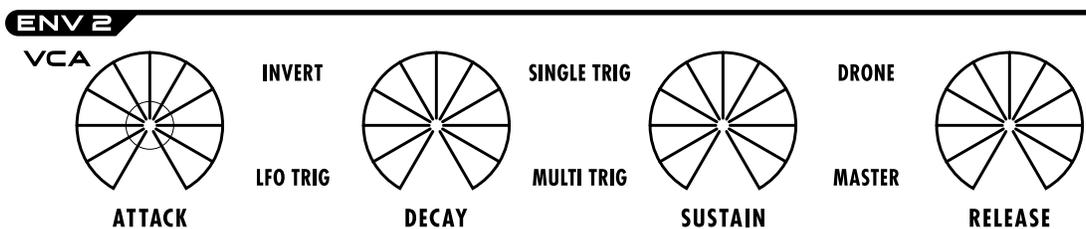
The **RELEASE** knob sets the release time and is the fourth and final stage of the envelope contour. Finally, after the

initial rise and fall of the attack and decay times to the sustain level, the release time takes effect after the sustain level segment, when the played key or note is lifted. The frequency at which the sustain level is set, falls to the initial filter cutoff frequency level at the rate set by the release time.

5.2.8 ENV 2 - Envelope 2

A word about the Amplifier Envelope:

The volume of the audio signal, which passes through the VCA envelope, is contoured by the **ENV 2** controls. Each time a key is pressed, the envelope or contour generator attached to the amplifier is actuated, and sends a control signal to the amplifier. Like the filter envelope control signal, the VCA envelope control signal is composed of the same four segments: initial rise, decay, sustain level, and release time. The volume of the note is shaped according to the settings of the envelope controls. These four parameters are shown below.



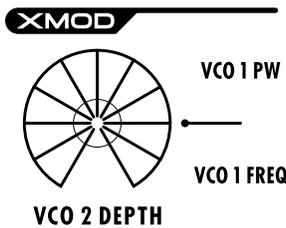
The **ATTACK** knob sets the attack time. The attack time determines the duration of the initial rise in volume to a peak. Notice the sound take on different qualities as you increase from a short sharp attack to a long slow crescendo. Switching **INVERT** on reverses the behaviour of the normal ADSR envelope... Wait this sound familiar: ENV 2's invert functions is an exact clone (what used to be called a carbon copy) of ENV 1's. The **LFO TRIG** (Low Frequency Oscillator Trigger) switch selection, triggers the "gate" of ENV 2: the amplifier envelope.

The **DECAY** knob sets the decay time. The decay time determines the duration of the drop in volume from the initial peak to the sustain level. Shorter decay times will produce more percussive/snappy sounds, longer times open up and stretch out the sound. Switching **SINGLE TRIG** (single trigger) on allows for the continuation of the decay cycle through a legato, or multi-note phrase. Switching **MULTI TRIG** (multiple trigger) on forces the attack and decay cycle of both **ENV 1** and **ENV 2** to restart with every key press, or note on command.

The **SUSTAIN** knob sets the sustain level. The sustain level determines the volume level at which the envelope contour levels off after the attack and decay. Set at "0," no sustain level is heard. Set at "5," the contour diminishes to a low volume. Set at "10," no drop in volume is heard after the initial peak is reached. With **DRONE** on, the last note received by the Boomstar—MIDI or CV—is indefinitely sustained. The **MASTER** switch setting makes **ENV 2** modulate both the filter and the amplifier. **ENV 1**'s controls are still active in that they can still modulate the frequency of Oscillator 2 and the pulse width of Oscillator 1. To restate for clarity's sake: **ENV 2**'s knobs assume the Boomstar's Attack, Decay, Sustain, and Release values for both filter and amplifier: a tidy and retro sound styling that brings to mind certain beloved analog keyboards from the '80s.

The **RELEASE** knob sets the release time. The release allows the sound to fade out at the time set, rather than immediately upon release of a note or key. This "final decay" takes effect after the sustain level segment of the envelope and "does work" after the playing, triggering, or sequencing is done.

5.2.9 X MOD - Cross Modulation



A word about Cross Modulation:

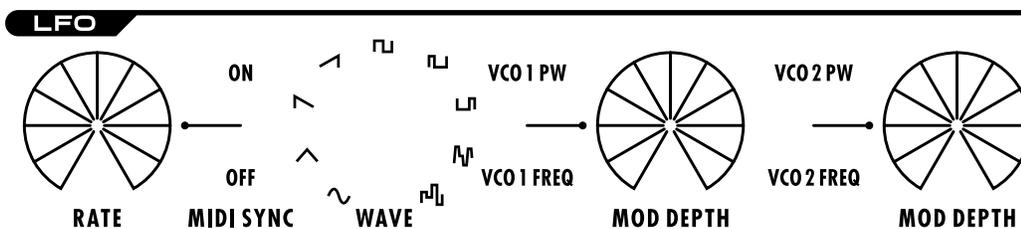
Is it just another term for frequency modulation, as some say, or is it a magical plane where seemingly bizarre, almost entirely unpredictable results bring chaotic freshness to any electronic vision or experimentation? Yes. It can also be coaxed into creating vocal textures à la the ATC-1.

The **VCO 2 DEPTH** (Voltage Controlled Oscillator 2 Depth) sets the amount of Oscillator 2 frequency modulation to Oscillator 1's frequency (**VCO 1 FREQ**) or pulse width (**VCO 1 PW**). Oscillator 2 also becomes an LFO when its range switch is set to its **LO** position; in the higher range settings (8, 4, 2) audio frequency modulation can create metallic, clangorous, planetary, searing effects, vibrant "colors," and "waves." Pulse width modulation was a feature found on the legendary Prophet 5 synth, an expressive modulator capable of subtle or dramatic movements in the width of the square wave—a feature rarely found on non-modular analog synths to this day. Use the switch to the right of the pot to select either.

5.2.10 LFO - Low Frequency Oscillator

A tardy word about Modulation as a whole:

Modulation is the use of a control signal to create an often repetitive pattern of pitch, level, or harmonic and rhythmic content changes; it infuses sound with movement and color.



The shape of the Boomstar's LFO is determined by the waveform that the software LFO outputs—selected by the non-graduated **WAVE** knob, with the waveshapes being **sine, triangle, reverse sawtooth, sawtooth, square, 10% square, 90% square, slew random, and random**. The amount of modulation is determined by either the **MOD DEPTH** control, or modwheel—its speed, or rate, by the **RATE** knob.

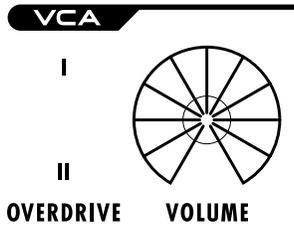
The Boomstar's LFO is assignable to **VCO 1 PW, VCO 1 FREQ, VCO 2 PW, VCO 2 FREQ**, and can be synchronized to MIDI via the **MIDI SYNC** switch. Note: In the Filter section the LFO is assignable to filter frequency as well. [see p. 14, 5.2.6]

LFO Features and Functions in Review:

RATE: Sets the speed, which reaches audio frequency spectrum; **MIDI SYNC ON** locks the LFO rate to clock: **RATE** sets the 12 MIDI sync beat divisions, i.e., 4 measures, 2 measures, whole note, 1/2 note, whole note triplet, 1/4 note, 1/2 note triplet,

1/8 note, 1/4 note triplet, 1/16 note, 1/8 note triplet, 1/16 note triplet; **MIDI SYNC OFF** honors panel settings; **WAVE**: Selects the waveforms: **sine, triangle, reverse sawtooth, sawtooth, square, 10% square, 90% square, random 1, random 2**; **MOD DEPTH (x2)**: Sets the modulation depths—the destinations being **VCO 1 PW** (Oscillator 1 Pulse Width), **VCO 1 FREQ** (Oscillator 1 Frequency), **VCO 2 PW** (Oscillator 2 Pulse Width), and **VCO 2 FREQ** (Oscillator 2 Frequency).

5.2.11 VCA - Voltage Controlled Amplifier



A word about Voltage Controlled Amplification:

The authentic two-stage MiniM—g voltage controlled amplifier is what increases the strength of the audio signal, e.g., an amplifier is used to control the loudness of the sound over a period of time so as to emulate the natural amplitude, shape, and scope of a real instrument—wait a minute, an analog synthesizer is a real instrument!

The **OVERDRIVE** switch engages the overdrive circuit: in the top position it is on.

The **VOLUME** knob sets the master volume of the synthesizer.

5.2.12 Master Tune



Sets the master tuning for the unit: roughly + and - 7 semitones.

5.2.13 Bend



Sets the pitch bend range for the pitch bend controller. The full position allows one octave up and down.

5.2.14 Glide



Sets the exponential hardware glide value—a classic “less is more” in all cases unless sweeping slowly through octaves. The Boomstar’s glide is hardware, so it accessible via CC.

5.2.15 Dynamics



Play hard. Hear hard. Routes the MIDI velocity expression of your playing or sequencing to the **ENV DEPTH** parameter.

5.2.16 ENV 1 • PW 1 - Envelope 1 to Pulse Width



ENV 1 • PW 1

Sets the amount of **ENV 1** (Envelope 1) modulation and the pulse width of Oscillator 1. To set modulation to the full range of the pulse width, set the pulse width to “0,” meaning all the way counter-clockwise, and then set the parameter to “10,” or all the way clockwise.

5.2.17 Mixer

5.2.17.1



VCO 1

Sets the mix level of Oscillator 1: default setting should be 75% of full, after which point a bit of “browning out” occurs if both Oscillators are in use at that level—not a bad thing at all. Our MIDIMINI distorts in just the same gleeful way. The SEM filter will get brown a tad earlier near 65% of full, due to its lower input threshold.

5.2.17.2



VCO 2

Sets the mix level of Oscillator 2. Default setting should be 75% of full if a clean sound is in order [see previous]. Otherwise, employ at full strength.

5.2.17.3



RING MOD

Sets the mix, or “heterodyne” of OSC 1 and OSC 2, and outputs the sum and difference of the frequencies present in each waveform—tech-y. Expect to hear tones thick in harmonics and suitable for producing bell-like/warm, metallic sounds, and “startpage” heterodyne right away, along with that other thing you just remembered.

5.2.17.4



NOISE

Sets the mix level of the Noise circuit. Default setting should be 0, unless you like hash with your bash.

5.2.17.5



FEEDBACK

Sets the level of positive feedback (a Drew Neumann NAMM 2013 term/spontaneous tutorial). A feature similar to this was the best trick of the old Minim—g: running the unit back into itself. We repackaged that as a pre-patched sweetening, screaming, and fully addictive tweak and twist necessity.

5.3 Back Panel

5.3.1.1

AUDIO OUT Standard high impedance instrument level output.

5.3.1.2



The MIDI **OUT** connection functions as a thru as well. The MIDI **IN** is self-explanatory. The **OVERFLOW** switch sets the MIDI overflow parameters for chaining multiple Boomstar synths together. To do this, activate the first unit's **OVERFLOW** switch, and the last unit in the "chain" **OVERFLOW** switch disengaged. Note: For proper

usage of a single Boomstar, make certain the **OVERFLOW** switch is deactivated, or the note buffer will be reduced to 0, and note dropouts will occur with legato playing; however, **OVERFLOW** function can be useful when the Boomstar is used in conjunction with a hardware step sequencer, which may or may not send the appropriate note-off commands. The MIDI **LEARN** switch sets the MIDI channel: play on the channel desired, press the **LEARN** switch momentarily, release, and the Boomstar "learns" the channel. Note: Boomstar OS software prior to Version 2 does not remember the channel after powering down. Upon powering up those Boomstars, the channel received defaults to MIDI channel one. All Boomstars with serial numbers 100,343 are equipped with Version 2 OS.

5.3.1.3

— Excludes Boomstars manufactured to run only on 100 VAC for the Japanese market—

POWER

Pin 1 / 2: Com * Pin 3: +5
Pin 4: -15 * Pin 5: +15
* Shell / Shield: AC FG *

FOLLOWING THE BOOMSTAR POWER ADAPTER CONNECTION PROCEDURE IS ESSENTIAL TO THE PROPER FUNCTIONING OF YOUR UNIT—DON'T DAMAGE YOUR BOOMSTAR AND VOID YOUR WARRANTY BY "HOT-SWAPPING" THE POWER TO THIS SYNTHESIZER!

The proper power connection, disconnection procedure and IMPORTANT WARNINGS (as previously detailed on pp. 11 - 12 of this manual):

BOOMSTAR POWER ADAPTER CONNECTION PROCEDURE

- a) Plug Boomstar +/-15 VDC power supply male 5 pin din plug into female 5 pin din connector mounted on the right side of back panel, near bottom of synth (marked Pin 1/: Com...).
- b) Plug female 3 prong IEC cable plug into +/-15 VDC power supply male 3 prong IEC socket.
- c) Plug male 3 prong IEC cable plug into AC outlet.
- a) Unplug female 3 prong IEC cable plug from +/-15 VDC power supply.
- b) Unplug female 3 prong IEC cable plug from AC outlet.
- c) Unplug Boomstar male +/-15 VDC power supply plug from female connector on the right side of back panel, near bottom of synth (marked Pin 1/: Com...).

IMPORTANT WARNING: DO NOT POWER ON OR OFF THE BOOMSTAR BY ANY OTHER METHOD THAN THAT SPECIFIED ABOVE TO PREVENT DAMAGE TO UNIT. BE CERTAIN TO STRICTLY FOLLOW THE AFOREMENTIONED CONNECTION PROCEDURE CAREFULLY AND ACCURATELY. THE IMPROPER CONNECTION AND DISCONNECTION

OF THIS POWER SUPPLY MAY RESULT IN DAMAGE TO SYNTHESIZER AND SUPPLY. THE OPERATOR OF THIS SYNTHESIZER ASSUMES ALL RESPONSIBILITY AND LIABILITY. ANALOGIA INC./STUDIO ELECTRONICS—OWNERS, OFFICERS AND EMPLOYEES—ASSUME NO RESPONSIBILITY OR LIABILITY FOR PERSONAL AND PROPERTY DAMAGE INCURRED DUE TO ACCIDENT, CARELESS HANDLING, ABUSE OR MISUSE, IMPROPER CONNECTION, INSTALLATION, OR IMPROPER ELECTRICAL CONTACT OR GROUNDING. OWNERSHIP AND OR USE OF BOOMSTAR SYNTHESIZER CONSTITUTES AN AGREEMENT WITH THESE TERMS.

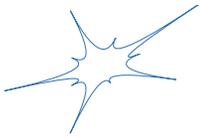


5.4 Side Panel

5.4.1

Holes allow for rackmount bracket kit to be attached. Contact us at studioelectronics@sbcglobal.net for further info.





6 LEGAL

6.1 Liability

Neither Analogia Inc./Studio Electronics nor anyone else involved in the creation, production, or delivery of this product shall be liable for any direct, indirect, incidental, special, consequential or punitive damages whatsoever arising out of the use of this product, or inability to use this product; including without limitation: damages for loss of business, profits, goodwill, business interruption, loss of business information, data or any other pecuniary loss, even if Analogia Inc./Studio Electronics were previously advised of the possibility of such damages. Some states do not allow limitations on the length of an implied warranty, or the exclusion or limitation of incidental or consequential damages, so the above limitation and/or exclusions may not apply to you.



6.2 FCC

DO NOT MODIFY THE UNIT! This product, when installed as indicated in the instructions contained in this manual, meets FCC requirement. Modifications not expressly approved by Analogia Inc./Studio Electronics may void your authority granted by the FCC, to use this product.

IMPORTANT: When connecting this product to accessories and/or another product, use only high quality shielded cables. Cable(s) supplied with this product must be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies, and if not installed and used according to the instructions specified in this product's operation manual, may cause interference harmful to the operation of aforementioned other electronic devices.

Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference (which can be determined by turning the unit "OFF" and "ON"), please try to eliminate the problem by using one of the following measures:

- Relocate either this product or the device that is being affected by the interference.
- Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter(s).
- In the case of radio or TV interferences, relocate/ reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to coaxial cable.
- If these corrective measures do not bring any satisfied results, please consult the local retailer authorized to

distribute this type of product. If you cannot locate the appropriate retailer, please contact Analogia inc.
These **FCC** statements apply only to those products distributed in the USA.



6.3 Canada

NOTICE: This class B digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

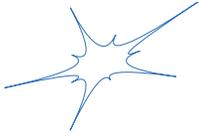


6.4 Europe

AVIS: Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

This product complies with the requirements for European Directive 89/336/EEC.





7

GLOSSARY OF ABBREVIATIONS

CV: Control Voltage

ENV: Envelope

EXT: External

FREQ: Frequency

IN: Input

LFO: Low Frequency Oscillator

LO: Low

MOD: Modulation

MULTI: Multiple

OSC: Oscillator

OUT: Output

PW: Pulse Width

SYNC: Synchronisation

TRIG: Trigger

VCA: Voltage Controlled Amplifier

VCF: Voltage Controlled Filter

VCO: Voltage Controlled Oscillator

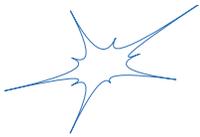
WAVE: Waveform

Other Non-Screened Terminology:

“0”= all the way counter clockwise

“10”= all the way clockwise





8

FILTER TALKERS

8.1 Bace (vstace@gearslutz.com)

MOOG: Creamy with great definition in the lower registers.

303: Mid range pronounced with clean clear resonance—squelchy.

ARP: Similar to Moog but less creamy and more grit—woolly.

SEM: Powerful mids. Not as deep as Moog but round and punchy, sinuous—searing.



8.2 Drew Neumann (droo@gearslutz.com)

The biggest differences between these filters are noticeable at higher resonance settings—that's where most filters reveal their character, but there's more:

The **Moog** ladder has wonderful overdrive into the filter, wide-ranging resonance, (which does reduce gain a little bit as resonance is increased) and a sharp -24db slope. Warm and fat.

The **303** is similar to the ladder, but one of the stages uses a different capacitor, and the resonance is chirpy and mainly available in higher frequencies. It's a bit buzzy than the Moog, and the cutoff slope isn't quite as sharp. Acidic is right.

The **ARP** filter is an integrator cascade—resonance is available over the entire range, and is quite pure sounding (sine going to nearly triangle waves as it overdrives) which is why I like using the 4075 for deep drum and percussion sounds. It's dry sounding and organic, also great for very ethereal and rubbery sounds. It's -24db, but not quite as crisp in the high end as the ladder based designs. That's normal...

The **SEM** filter is OTA based, and is -12db/octave. It is also a multi mode filter (highpass, lowpass, bandpass, notch, and various mixes in between). It's ballsy, crisp and clear, and gain actually increases with resonance, but the filter will not go all the way to oscillation at high settings (due to parts tolerances, some might—but not all).

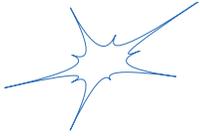
The **CS80** filter pair is bright and buzzy, with a gently rolling cutoff slope, and really comes to life at higher resonance settings. They are a resonant lowpass and a resonant highpass filter cascaded in series, which allows you to create interesting vocal formant-type sounds. The sound is almost like a voltage-controlled sweepable parametric EQ.

Resonance on the CS80 never reaches self-oscillation, which is probably good because it would harm speakers, neighbors, children and pets if it did.

In the **SE80**, add to this the overdrive, feedback and distortion capabilities, and you'll be on a wild ride. Don't forget to take breaks from it to eat, drink, or sleep.



If you're into Olympic skating, you really can't go wrong with the SE80 Boomstar from Studio Electronics. It has all the quirky squirrely vocal charm of the original without the kind of weight problems that have ended many a skater's careers. Sure, you can go spend \$10,000 on a used, broken or poorly serviced example of the original, load it up on your sled and try to haul its 220 lbs over that ice pond you've been using for triple Lutz practice. You'd fall through the ice, dam-it. YOU'D DIE!! DON'T DO IT!!! Get a Boomstar instead!



9 THE ANCIENT CHINESE

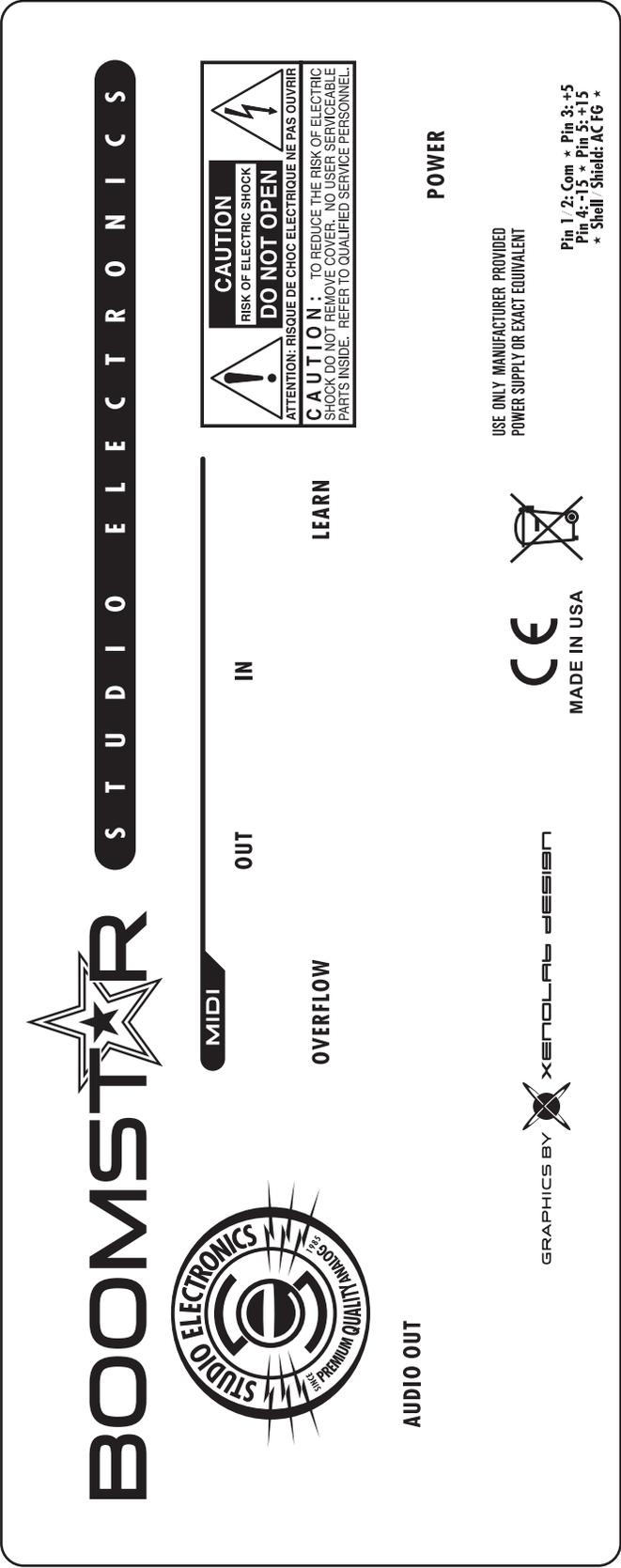
9.1 “Broom Star” (controlvoltage@gearslutz.com)

“Has anybody mentioned how “Boomstar” is a play on “broom star,” the ancient Chinese term for a comet? vvvvvaThat keeps this synth name in the realm of cosmic/celestial objects, in the grand tradition...”

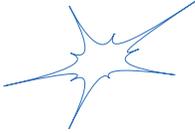
Thank you, controlvoltage—this is news to us!

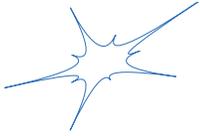
Our research shows, in “The Records of the Grand Historian, or Shiji (or Shi Chi),” written more than a century later ‘round about midnight on one fine evening/day in 100 B.C., one can discover how the “broom star” [bristly tail yo], in 240 B.C. was “seen at the north direction and then at the west direction... during the summer the Empress Dowager died.” Variant readings interpret its appearance in the east and movement north-ish. THE POINT BEING, the broom star’s albedo, or reflection coefficient, derived from Latin albedo “whiteness” (or reflected sunlight), is the diffuse reflectivity, or reflecting power, of its surface. Got it? And the STUDIO ELECTRONICS BOOMSTAR is fashionably galactic, that midnight bit notwithstanding.





BACK PANEL





11

TROUBLESHOOTING

No Sound

Check all audio and MIDI connections—make sure the Boomstar is set to receive on the correct channel.

[see p. 20, 5.3.1.2]

Reset patch. [see p. 8, 3.1]

Check all MIDI channel settings. [see p. 20, 5.3.1.2]

Turn up master VCA volume. [see p. 18, 5.2.11]

Turn up Mixer VCO 1 and VCO 2 levels. [see p. 19, 5.2.17]

Turn on Waveform 1 Sawtooth. [see p. 13, 5.2.4]

Turn off MIDI sync. [see 17, 5.2.10]

Turn off LFO trig. [see 16, 5.2.8]

Soft Sound

Check all audio connections.

Turn up master VCA volume. [see p. 18, 5.2.11]

Turn up Mixer VCO 1 and VCO 2 levels. [see p. 19, 5.2.17]

Unwanted Distorted Sound

Select “I” position for VCA Overdrive (top position). [see p. 18, 5.2.11]

Set Feedback to “0.” [see p. 19, 5.2.17.5]

Unwanted Noise

Don't be tasty with feedback—its lowest settings can add noticeable hash. [see p. 19, 5.2.17.5]

Unwanted Sustaining Sound

Turn off drone. [see pp. 16, 5.2.8]

Out of Tune

Set master tuning to 440 Hz. [see p.18, 5.2.12] Or one could experiment with 432 Hz, as was done here with our Boomstar SEM: <http://www.youtube.com/watch?v=aQza-J2kmUA&hd=1>

Of esoteric interest perhaps: The speed of light, the human light body and the math: 432 squared—186,624—is within 1 percent of the speed of light, currently measured as 186,282 miles per second. The square root of the measured speed of light is 431.6. It's also been claimed that the original Stradivarius violin was designed to be tuned to 432—true? Who knows? 'Tis amazing how much more beautiful music feels at the 432 concert pitch of Maestro Verdi. [Also google “cymatics.” It's prettyenough!]

Plain Lost

Reset patch. [see p. 8, 3.1]



12

Blank Patch Sheet 1

5089, 4075, 3003, SEM

BOOMSTAR
STUDIO ELECTRONICS

ON

NOTCH BANDPASS CV IN GATE IN VCF FM VCA AM OSC OUT

VCO 1

16' 8' 4' 2' 32' LO

RANGE SYNC OFF ON SUB LEVEL FULL HALF WAVE MIX

PULSE WIDTH

VCO 2

16' 8' 4' 2' 32' LO

RANGE WAVE

TUNE - +

ENV 1 ENV 2

MOD DEPTH

VCF

FREQUENCY TRACK FULL HALF RESONANCE

ENV 1

VCF ATTACK INVERT LOOP DECAY SUSTAIN RELEASE

ENV 2

VCA ATTACK INVERT LFO TRIG DECAY SINGLE TRIG MULTI TRIG SUSTAIN DRONE MASTER RELEASE

XMOD

VCO 2 DEPTH VCO 1 PW VCO 1 FREQ

LFO

RATE ON OFF MIDI SYNC WAVE

VCO 1 PW VCO 1 FREQ

VCO 2 PW VCO 2 FREQ

MOD DEPTH MOD DEPTH

VCA

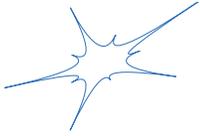
OVERDRIVE I II VOLUME

MIXER

MASTER TUNE BEND GLIDE DYNAMICS ENVI-PW1 VCO 1 VCO 2 RING MOD NOISE FEEDBACK EXT IN

Boomstar Patch Sheets - Rev. 1.2
© Analogia Inc. 2014

- 5089
- 4075
- 3003
- SEM



13

Blank Patch Sheet 2

SE80, 700

BOOMSTAR
STUDIO ELECTRONICS

FREQ RESO CV IN GATE IN VCF FM VCA AM OSC OUT

VCO 1

32' 16' 8' 4' 2' LO RANGE

ON OFF SYNC

FULL HALF SUB LEVEL

WAVE MIX

PULSE WIDTH

VCO 2

32' 16' 8' 4' 2' LO RANGE

ON OFF TRACK

WAVE

TUNE

ENV 1 ENV 2 MOD DEPTH

VCF

LOW PASS

FULL HALF TRACK

FREQUENCY RESONANCE

ENV 1

VCF

INVERT LOOP

ATTACK DECAY SUSTAIN RELEASE

ENV 2

VCA

INVERT LFO TRIG

DECAY

SINGLE TRIG MULTI TRIG

SUSTAIN

DRONE MASTER

RELEASE

XMOD

VCO 2 DEPTH

VCO 1 PW VCO 1 FREQ

LFO

RATE

ON OFF MIDI SYNC

WAVE

VCO 1 PW VCO 1 FREQ

MOD DEPTH

VCO 2 PW VCO 2 FREQ

MOD DEPTH

VCA

OVERDRIVE

VOLUME

MIXER

MASTER TUNE BEND GLIDE DYNAMICS ENVI-PW1 VCO 1 VCO 2 RING MOD NOISE FEEDBACK EXT IN

Boomstar Patch Sheets - Rev. 1.2
© Analogia Inc. 2014

□ SE80
□ 700



Boom to the Stars... and Back

DISCRETE, INNOVATIVE AND DEEP, ANALOG SYNTH EXPLORATION FOR SOUNDS GALACTIC AND EARTHY

STUDIO ELECTRONICS • 530 West Palm Ave., El Segundo California 90245
Tel: (310) 640-3546 Web: www.studioelectronics.com Email: studioelectronics@sbcglobal.net
facebook.com/StudioElectronics • twitter.com/SE_BoomStar • youtube.com/user/StudioElectronics • soundcloud.com/studio-electronics