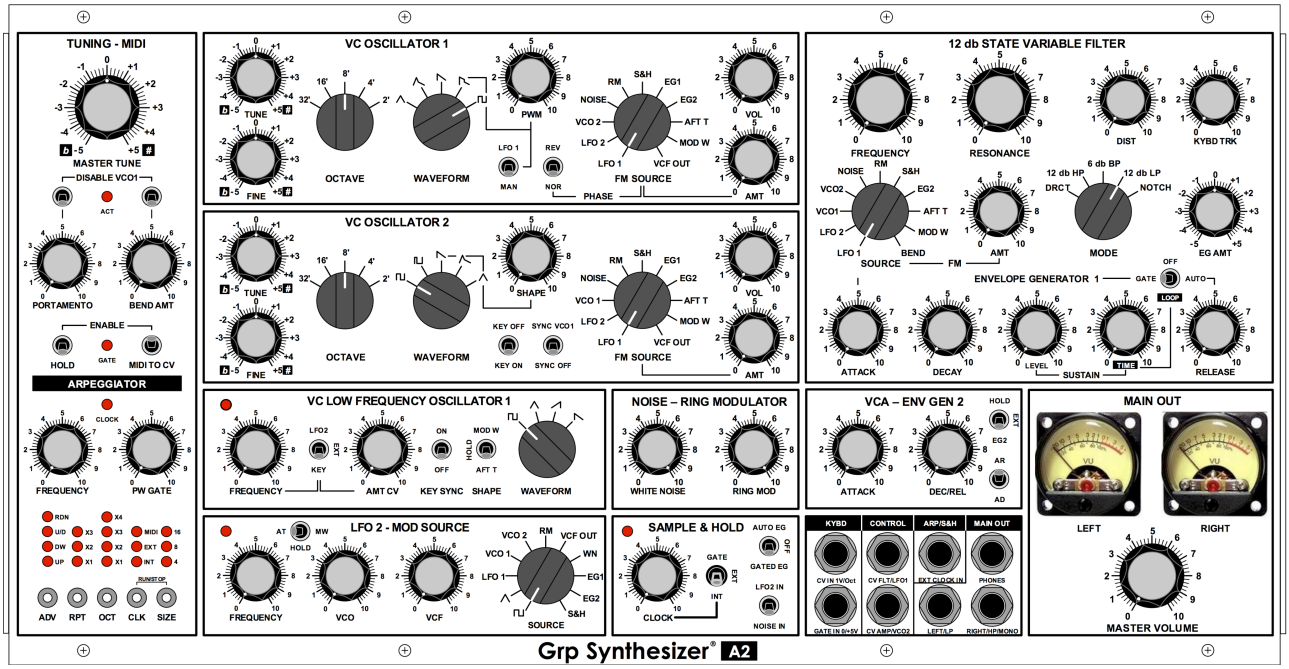
Grp Synthesizer ® A2
Owner's Manual
Version 1.4



www.grpsynthesizer.it info@grpsynthesizer.it

CONTENTS

PREFACE

Thanks for purchasing Grp A2 Synthesizer; this machine will reward with years of sonic pleasure. Please, for obtain always the correct functioning, read this manual.

Straight from the box, with the instrument, you'll find:

- The external power unit 24V 40W
- AC cable
- Two rack ears

Owner's Manual is available in pdf format at www.grpsynthesizer.it

SOME WARNING

Read with attention the following suggestions. You should always follow the safety rules when you are working with electronic devices, for your own safety and for keep alive your precious machines.

OPERATING CONDITIONS

- Avoid using the synthesizer in environments potentially dangerous and near water (pools, bathrooms, sink, places with a lot of humidity).
- Never use the synthesizers in places with a lot of dust and dirt.
- Never place the synthesizer near heat sources, e.g., radiators.
- Do not expose to direct sunlight; wooden panels are painted and ultraviolet rays can modify the color.
- Do not expose the instrument to strong vibrations.
- Do not throw away the original box: it can be useful for shipping the instrument safely.

POWERING

- Your Grp A2 Synthesizer comes complete with the correct external power supply, use it.
- Detach powering if not in use for long times.
- Avoid touching plugs with wet hands.
- When detaching power, grab the always the plug, never the cable.

OPERATIONS

- Either if you are a rockstar, NEVER place glasses or bottles with liquids near the synthesizer..
- Synthesizer should be placed on a solid straight surface.
- Synthesizers can play very LOUDY: avoid your ear's destruction.

MAINTENING

- Never open the instrument; inside, there's nothing you can/should touch.

CORRECT USE

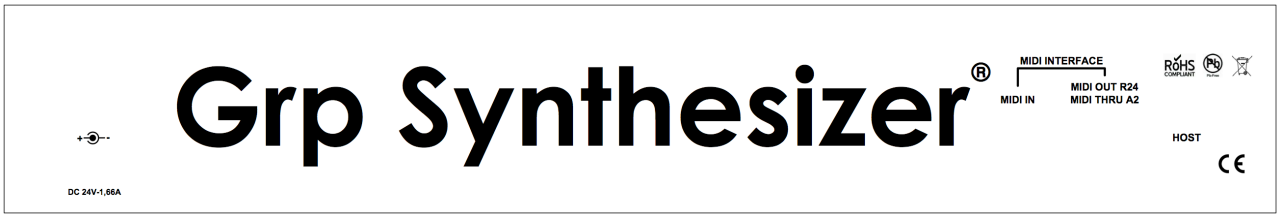
- This Synthesizer is designed esclusively for production of audio range signals. Every other use is forbidden and will void the warranty from Grp Synthesizer. Grp Synthesizer is not liable for damages from improper use.

Your Instrument

Grp A2 Synthesizer is a monophonic analog synthesizer, with two oscillator capable of generating fairly complex waveform difficult to find in several other machines (Super Saw and Super Triangle), with a State Variable Filter 12 dB straigh from previous models A8 and A4 Synthesizer, with loopable envelopes and a fun on-board Arpeggiator.

Cabinet and rear panel

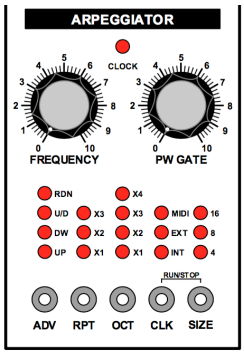
This synthesizer comes in a cabinet with wooden panels (it could be rack mounted using the two enclosed rack ears); the same cabinet is used either for A2 Synthesizer and R24 Step Sequencer. Stille, the cabinet can be used with eigth modules in 5U format, with powering in Synthesizers.com standards.



Due to double possible housing (A2 or R24), rear panel reports *the possible* meaning of MIDI Port:

- If the cabinet hosts R24 Sequencer, you have MIDI In and MIDI Out.
- If the cabinet hosts A2 Synthesizer, you have MIDI In and MIDI Thru.

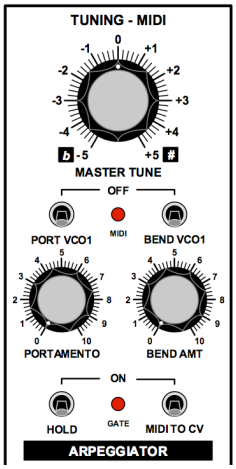
Due its analog nature, A2 Synthesier doesn't trasmit any MIDI data and doesn't need MIDI Out connector.



Setting MIDI Channel for Grp A2

On powering, both LEDs ADV and RPT in ARPEGGIATOR module will start to blink. This means: Grp A2 is waiting for first MIDI Channel Message and for tune itself on this MIDI Channel. This Setting will be retained either after power off.

If you need to change the MIDI Channel for Grp A2, press together buttons ADV and RPT; their LEDs will start to blink and the machine will be back in *waiting for MIDI Channel condition*.



Section TUNING – MIDI

This section contains command for general tuning of the instrument, settings for Bend, Hold, Portamento and portamento disable on VCO 1. A LED will blink on every MIDI command received *and* on every analog Gate received.

Control MASTER TUNE
Sets general tuning for the instruments. Range covers more or less 24 semitones.

LED MIDI
Blinks when MIDI interface receives activiti from MIDI Input.

Switch PORT VCO 1 DISABLE
Enable or disable Portamento on **VC OSCILLATOR 1** only. For obtaining interesting effects when *the second* oscillator is hard synched to first.

Switch BEND VCO 1 DISABLE
Enable or disable Pitch Bend reception on **VC OSCILLATORE 1** only. Still, you can obtain interesting results when the second oscillator is hard synched to the first.

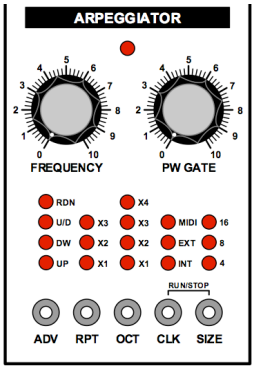
Control PORTAMENTO
Sets Portamento Time.

Control BEND AMT
Sets the amount of Pitch Bend.

LED GATE
Lights when there is a Gate On and/or its freezing in Hold condition.

Switch HOLD ON
Freezes in Hold both envelope generators, for prolonging notes or arpeggio.

Switch MIDI TO CV ON
Detach MIDI reception from both VCOs pitch. With this, you can control oscillators only from the analog ports and front panel controls.



Section ARPEGGIATOR

Hosts all Arpeggiator controls. Arpeggio can play with Internal Clock, with External TTL Clock or with MIDI Clock.

*Arpeggio starts when you'll press both switches **CLK** e **STEP** (lowest right in ARPEGGIATOR section); Arpeggio can play either after all notes are released if you'll use the **HOLD** switch*

LED
It blinks at Arpeggio speed.

Control FREQUENCY
Sets Arpeggio rate; this control works only if you select Clock **INT**.

Control PW GATE
For obtain variation in legato/scaccato behavior for arpeggiated notes this control works with Clock sources **INT** e **MIDI**; obviousy, with **EXT** Clock, you'll have the following conditions:

- With division 4: PW works and has four quandized positions.
- With division 8: PW works and has two quantized positions.
- With division 16: PW doesn't works.

Selector ADV
The advance mode for arpeggiated note: **UP** (from lowest to highest note), **DW** (from highest to lowest), **U/D** (from lowest to highest and from highest to lowest), **RND** (random).

Selector RPT
Sets the number of repeats on every step: **X1** (normal behavior, no repeats); **X2** (step plays twice before advance to next step), **X3** (step plays three times before advance to next step).

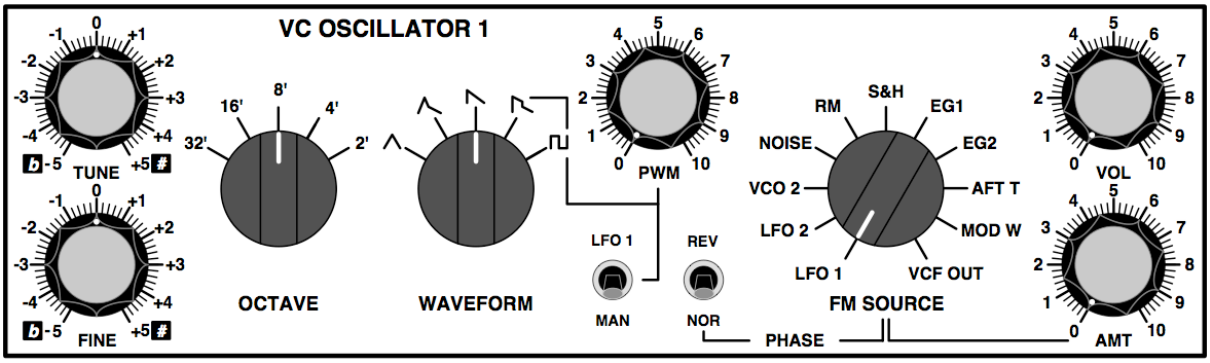
Selector OCT
Sets octave number for arpeggio. Arpeggio runs for **X1**, **X2**, **X3**, **X4** octaves from original played notes.

Selector CLK
Sets clock source for arpeggio. You can choose between: **INT** (Internal Clock Generator); **EXT** (pulses received at **ARP / S&H EXT CLOCK IN** port); **MIDI** (MIDI Clock).

Selector SIZE
Sets step length against clock. You can choose between: **4** (arpeggio plays quarter notes); **8** (arpeggio plays eighth notes); **16** (arpeggio plays sixteenth). With **EXT** Clock (0/+5V), you'll obtain:

- With division 4: Arpeggiator advances one note every 4 pulses.
- With division 8: Arpeggiator advances one note every 2 pulses.
- With diision 16: Arpeggiator advances one note every pulse.

Is not possible to obtain different note values; if necessary, you can clock Arpeggio from EXT TTL pulses with the desired note density.



Sezione VC OSCILLATOR 1

Is the first oscillator available in Grp A2 Synthesizer. It offers shape modulation / PWM on pulse wave.

VC OSCILLATOR 1
Control TUNE
Sets VCO tuning in a 24 semitones range.

Control FINE
Sets VCO tuning with an higher degree of accuracy; range spans +/- 3 semitones**.**

Selector OCTAVE
Sets tuning per octaves Range spans between 32’ and 2’.

Selector WAVEFORM
For choosing desired waveform. There are: **TRIANGLE**, **TRIANGLE & RAMP**, **RAMP**, **PULSE & RAMP**, **PULSE**. In penultimate position, you’ll find the sum of variable pulse and ramp..

Switch MAN/LFO1
Sets behavior for **PWM** knob. In **MAN** position, knob sets the pulse width value. In **LFO 1** position, knob sets the PWM amount from **VC LOW FREQUENCY OSCILLATOR 1**.

Control PWM
Sets width for PULSE & RAMP e PULSE. Still, works as modulation amount from **VC LOW FREQUENCY OSCILLATOR 1**. See above.

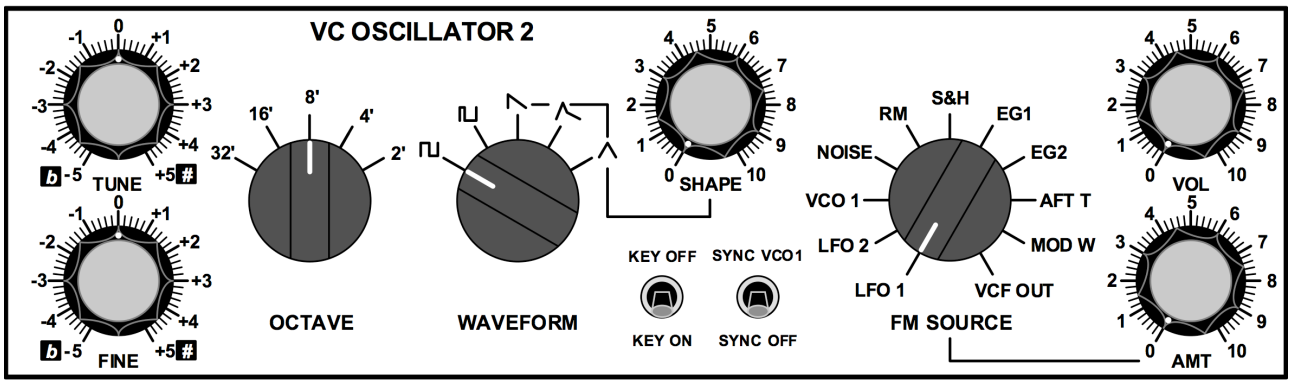
Switch PHASE
Reverts polarity for control signal selected with **FM SOURCE**. See below.

Selector FM SOURCE
For choosing modulation source at exponential frequency modulation port. You can choose between: **LFO 1**, **LFO 2**, **VCO 2** (audio signal from **VC OSCILLATOR 2**), **NOISE**, **RM** (audio signal from **R**ing **M**odulator), **S&H**, **EG1** (EG curve from **ENVELOPE GENERATOR 1**), **EG 2** EG curve from **ENV GEN 2**), **AFT T** (MIDI Channel Aftertouch), **MOD W** (MIDI Modulation Wheel), **VCF OUT** (audio signal from **12 dB STATE VARIABLE FILTER**).

Modulations from audio rate sources (Oscillator, Filter, Ring Mod) brings a lot of harmonic content in modulated oscillator.

Control FM AMOUNT
Amount of frequency modulation for **VC OSCILLATOR 1**.

Control VOL
Output level for **VC OSCILLATOR 1**.



Section VC OSCILLATOR 2

The second soud source in Grp A2. While the first oscillator offers PWM, this one offers Super Saw and Super Triangle made with *nine* sawtooth and/or triangle waves properly detuned.

Control TUNE
Sets VCO tuning in a 24 semitones range.

Control FINE
Sets VCO tuning with an higher degree of accuracy; range spans +/- 3 semitones.

Selector OCTAVE
Sets tuning per octaves Range spans between 32’ and 2’.

Selector WAVEFORM
You can choose between: **SQUARE**, **PULSE** (pulse at 10%), **SAW/SuperSAW**, **SAW & TRIANGLE/Super SAW & TRIANGLE**, **TRIANGLE/Super TRIANGLE**.

Both Super Saw and Super Triangle works perfectly as sound sources; yu can obtain interesting resutls under Hard Sync control, or in Ring Modulation with first oscillator. Still, try to use them as audio-rate modulation source for Cutoff Frequency Modulation (with and without Resonance in self oscillation).

Control SHAPE
Sets the weigtht of the eight analog voices added on for generating SuperSAW, SuperTRIANGLE and Super SAW & TRIANGLE. At minimum, you’ll listen only the original component, turning pot CW, you’ll rise the additional voices level.

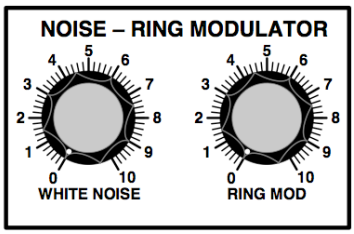
Switch KEY ON/OFF
For unlocking keyboard control on **VC OSCILLATOR 2**.

Switch SYNC
In position **VCO 1**, enables Hard Sync on **VC OSCILLATOR 2** under **VC OSCILLATOR 1** control as master.

Selector FM SOURCE
For choosing modulation source at exponential frequency modulation port. You can choose between: **LFO 1**, **LFO 2**, **VCO 1** (audio signal from **VC OSCILLATOR 1**), **NOISE**, **RM** (audio signal from **R**ing **M**odulator), **S&H**, **EG1** (EG curve from **ENVELOPE GENERATOR 1**), **EG 2** (EG curve from **ENV GEN 2**), **AFT T** (MIDI Channel Aftertouch), **MOD W** (MIDI Modulation Wheel), **VCF OUT** (audio signal from **12 dB STATE VARIABLE FILTER**).

Control FM AMOUNT
Amount of frequency modulation for **VC OSCILLATOR 2**.

Control VOL
Output level for **VC OSCILLATOR 2**.



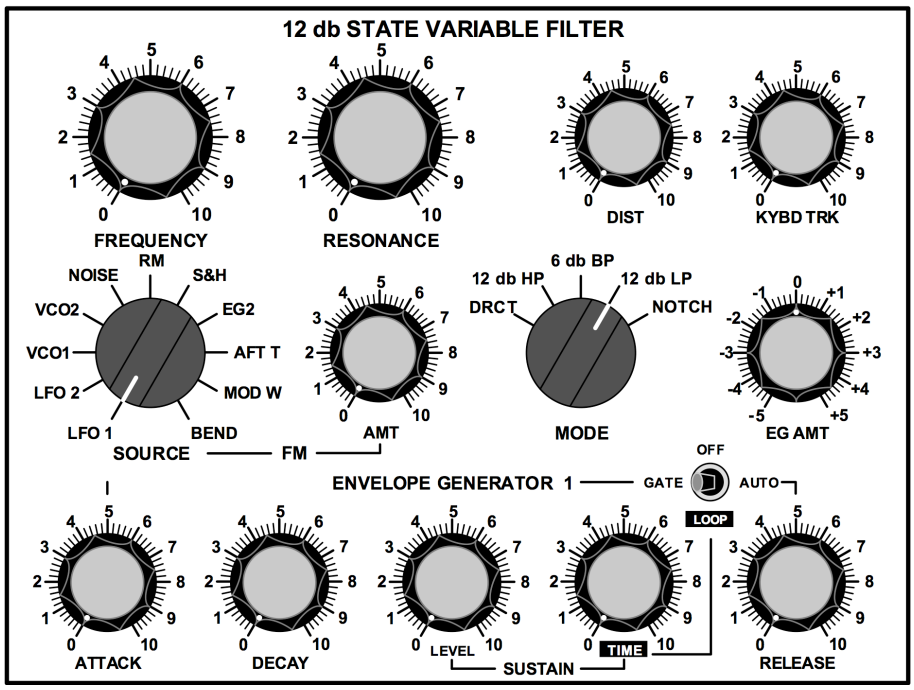
Section NOISE – RING MODULATOR

This section offers White Noise generation and Ring Modulation.

Control WHITE NOISE
Sets White Noise level.

Control RING MODULATION
Sets Ring Modulation out level. RM circuit receives pre mix level signals from **VC OSCILLATOR 1** and **VC OSCILLATOR 2**.

You can easily obtain "clangorous sounds" ring modulating two complex signals from oscillators and frequency modulating one of oscillators.



Section 12dB STATE VARIABLE FILTER

Hosts State Variable Filter with frequency modulation section, Distortion and dedicated Envelope Generator.

Control FREQUENCY
Sets Filter Cutoff Frequency.

Control RESONANCE
Sets Resonance level for filter; with high amount of Resonance, filters will go into self oscillation, generating a pure sine wave.

State Variable Filter can be wilder than a Transistor Ladder design. Be careful with energy at higher levels of Resonance.

Control DIST
Distortion amount on filter output.

Control KYBD TRACK
The amount of control from MIDI/CV conversion, plus signal at **KYBD CV IN 1V/Oct** is used for controlling Filter Cutoff Frequency. Properly set, it allows to “play the filter” in set oscillation.

Selector SOURCE FM
Modulation source for Filter Cutoff Frequency. You can choose between: **LFO 1**, **LFO 2**, **VCO 1**, **VCO 2**, **NOISE**, **R(ing)M(od)**, **S(ample)&H(old)**, **EG2**, **AFT(er)T(ouch), MOD W(heel)**.

Control AMOUNT FM
Modulaton amount for **SOURCE FM** toward Filter Cutoff Frequency.

Selector MODE
Mode selection for **12 dB STATE VARIABLE FILTER**. You can choose between: **12 dB HP** (High Pass), **6 dB BP** (Band Pass), **12 dB LP** (Low Pass), **NOTCH** (Band Reject). In **D(i)R(e)CT**, at outputs **LEFT** and **RIGHT** of synthesizer you’ll obtain LP/Low Pass (out **LEFT**) e HP/High Pass (out **Right**).

With DRCT position, and with properly settings of Cutoff and Envelope Amount, you can obtain a strong signal widening in full panned stereo output.

Control EG AMT
Bipolar amount -5/+5 for **ENVELOPE GENERATOR 1** signal toward Filter Cutoff Frequency.

Section ENVELOPE GENERATOR 1

The filter dedicated envelope generator. You can use its signal for modulate other destinations too.

Control ATTACK
Sets EG Attack Time.

Control DECAY
Sets Envelope Decay Time.

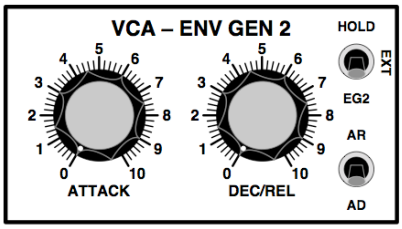
Control SUSTAIN LEVEL
Sets Envelope Sustain Level.

Control SUSTAIN TIME
Sets **TIME** duration for Sustain when l'**ENVELOPE GENERATOR 1** is in Loop condition (positions **GATE** and **AUTO** in selector **LOOP**).

Control RELEASE
Sets Envelope Release Time .

Selectro LOOP
Enables repetition for time stages programmed into the Envelope Generator. In **OFF** position, Loop is disabled. In **GATE** position, Loop is ANDed (is subordinated) to Keyboard Gate and/ord S&H Gate; so, you'll have Loop only if you play a note on the keyboard or the S&H is running. In **AUTO** position, Loop is always working.

While it is not possibile to synchronize Loop speed with BMP (its length depends on summing several durations programmed into the envelope), you can obtain several interesting results with repetitions and rhythms; e.g., for modulating Filter Cutoff simultaneously with Looped Envelope and the LFOs.



Section VCA – ENV GEN 2

Hosts Voltage Controlled Amplifier **VCA** and dedicated Envelope Generator **ENV GEN 2**.

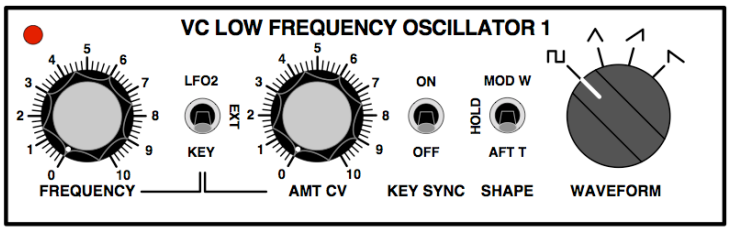
Switch AR/AD

You can choose between Attack/Release mode (**AR** position) with Attack Time, maximum Sustain Level and, at Gate Off, Release Time, or (**AD** position) Attack/Decay mode with Attack Time and Decay Time.

In AD mode, if you enable the HOLD switch in TUNING-MIDI Section, envelope can reach an end and, while HOLD is still acting, VCA stays close with no sound passing. If you are planning to use HOLD condition, don't forget to switch ENV2 in AR condition.

Switch HOLD/EXT/EG2

You can choose control source for **VCA**. In **HOLD** position, amplifier stays always open at maximum level (perfect for Drone Music); in **EXT** position, amplifier receives CV at **CONTROL CV AMP/VCO 2** port. In **EG2** position, amplifier is under dedicated EG control.



Section VC LOW FREQUENCY OSCILLATOR 1

Contains Low Frequency Oscillator for cyclic modulation with sync and external control capabilities.

LED
Blinks at LFO rate.

Control FREQUENCY
Sets LFO rate.

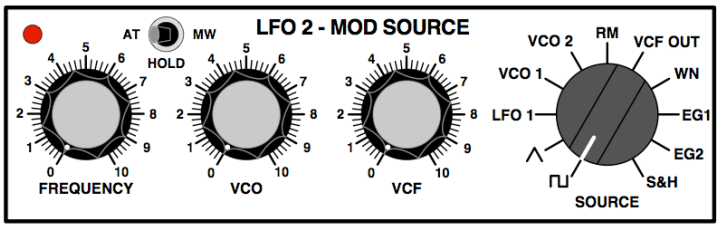
Selector LFO2/EXT/KEY
You can choose modulation source for LFO Frequency. In **LFO2** position, signal from the second Low Frequency Oscillator controls the LFO 1 Frequency. In **EXT** position, LFO 2 receives external controls from **CONTROL CV FLT/LFO1** port. In **KEY** position, keyboard control voltage drives LFO 1 Frequency (every octave, frequency doubles).

Control AMT CV
Modulation amount for source choosen with **LFO2/EXT/KEY**. See above.

Switch KEY SYNC
In **ON** position, enables cycle restart at Gate on.

Selector SHAPE
You can choose control source for modulating signal amplitude from LFO1. In **MOD W** position, modulaton is scaled with modulation wheel. In **HOLD** position, modulation is always on. In **AFT T** position, modulation is scaled with channel aftertouch.

Selector WAVEFORM
You can choose between: **SQUARE**, **TRIANGLE**, **RAMP** positive, **SAW** negative.



Sezione LFO 2 MOD SOURCE

It contains the Low Frequency Oscillator. You can choose several different modulation sources gathered in SOURCE selector.

LED
Blinks at **LFO 2** frequency.

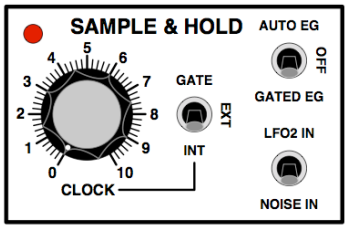
Control FREQUENCY
Sets velocity for **LFO 2**.

Selettore AT/HOLD/MW
In **AT** position, **LFO 2** out level is scaled with Channel Aftertouch. In **HOLD** position, **LFO 2** signal is always available without attenuation. In **MW** position, **LFO 2** modulation is scaled with Modulation Wheel position.

Control VCO
Modulation amount to both Oscillator Frequencies.

Controllo VCF
Modulation amount to Filter Cutoff Frequency.

Selector SOURCE
You can choose the waveform from **LFO 2** or the other modulation sources available. Are available signals from: **SQUARE WAVE** (generated into **LFO 2**), **TRIANGLE WAVE** (generated into **LFO 2**), **LFO 1** (modulation signal from **VC LOW FREQENCY OSCILLATOR 1**), **VCO 1** (audio signal from **VC OSCILLATOR 1**), **VCO2** (audio signal from **VC OSCILLATOR 2**), **RM (**audio signal from **RING MODULATOR**), **VCF OUT** (audio signal from **12 dB STATE VARIABLE FILTER**), **WN** (audio signal from **NOISE**), **EG1** (control signal from **ENVELOPE GENERATOR 1**), **EG2** (control signal from **ENVELOPE GENERATOR 2**), **S&H** (control signal from **SAMPLE & HOLD**).



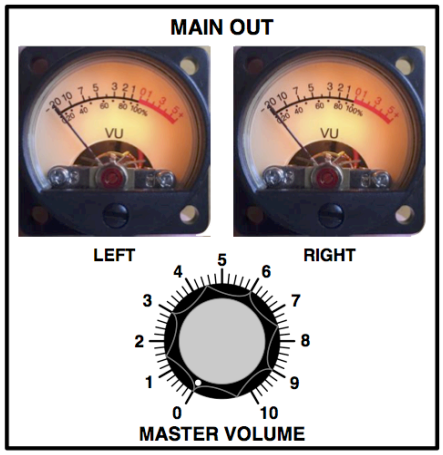
Section SAMPLE & HOLD

Selector LFO2 IN/NOISE IN
You can choose between: **LFO2 IN** – signal previously selected with control **LFO 2 – MOD SOURCE**. In position **NOISE IN**, white noise is used.

Control CLOCK
Sets internal Clock speed for **Sample & Hold** and defines event density.

Selector CLOCK GATE/EXT/INT
Several differnt sync/advance behavior for **Sample & Hold**. In **GATE** position, the circuit is sampling the source choosen with **LFO 2 IN/NOISE IN** every time musician plays a note on keyboard (or when Arpeggio plays a new note); in **EXT** position, a new sample is obtained when at **EXT CLOCK IN** a new clock pulse is received; in **INT** position, the circuit samples at internal **CLOCK** speed.

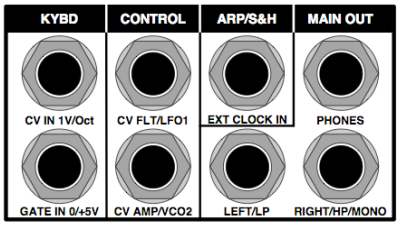
Selector AUTO EG/OFF/GATED EG
For choosing subordination of S&H circuit to Keyboard Gate. In **AUTO EG** position, both **ENVELOPE GENERATOR 1** and **ENV GEN 2** are fired at **CLOCK** frequency in **SAMPLE & HOLD** (at high Clock speed, better use percussive envelopes). In **OFF** position, envelopes are *not* fired from internal Clock. In **GATED EG** position, envelopes are fired from internal Clock *only* if musician is playing a note on keyboard. E.G. Internal Clock from S&H and Keyboard Gate are ANDed before firing the envelopes.



Section MAIN OUT

Vu-Meter LEFT and RIGTH
Show ouyt levels on **LEFT** and **RiGTH** connectors. If **MODE** selector available in Filter section is on **DRCT**, Vu-Meter **LEFT** shows LowPass level and Vu-Meter Right shows High Pass level.

Control MASTER VOLUME
This is the final volume for the synthesizer.



CONNECTIONS

CONNECTIONS MAIN OUT

Output LEFT/LP
Outputs synthesizer's Left signal; if **MODE** is in **DRCT** position, outputs 12dB Low Pass.

Output RIGTH/HP/MONO
Outputs synthesizer's Rigth (if there's a cable patched on output **LEFT**), or 12 dB High pass (if **MODE** selector is in **DRCT** position). This port outputs **NOTCH** (LP+BP) signal if the output **LEFT** is free – no cable patched – and **MODE** selector is in position different than **DRCT**.

Output PHONES
Stereo signal for phone listening.

CONNECTIONS KYBD

Input CV IN 1V/Oct
CVs received at this port, in 1V/Oct standard, are routed at frequency control for both Oscillators and, thru attenuator **KYBD TRK**, a Cutoff Frequency of **12 dB STATE VARIABLE FILTER.**

Input GATE IN 0/+5V
Gates from external equipment, in standard 0/+5V, are routed to both Envelopes. Gate received is used too for synchronize the **VC LOW FREQUENCY OSCILLATOR 1** with **KEY SYNC** in **ON** position. Still, Gate can be used for drive Loop in **ENVELOPE GENEATOR 1** (if selector **LOOP** is in **GATE** position).

CONNECTIONS CONTROL

Input CV FLT/LFO1
A TRS connector is used for drive two indipendent control signals. Signal on Tip is routed at Cutoff Frequency (**CV FLT**); signal on Ring is routed at Frequency of **VC LOW FREQUENCY OSCILLATOR 1** (**LFO1**).

Input CV AMP/VCO2
A TRS connector is used for drive two indipendent control signals. Signal at Tip is routed at Amplitude control on VCA (**CV AMP**); it works *only if* selector **HOLD/EXT/EG2** is on **EXT** position. Signal at Ring is routed at frequency control of **VC OSCILLATOR 2** (**VCO2**).

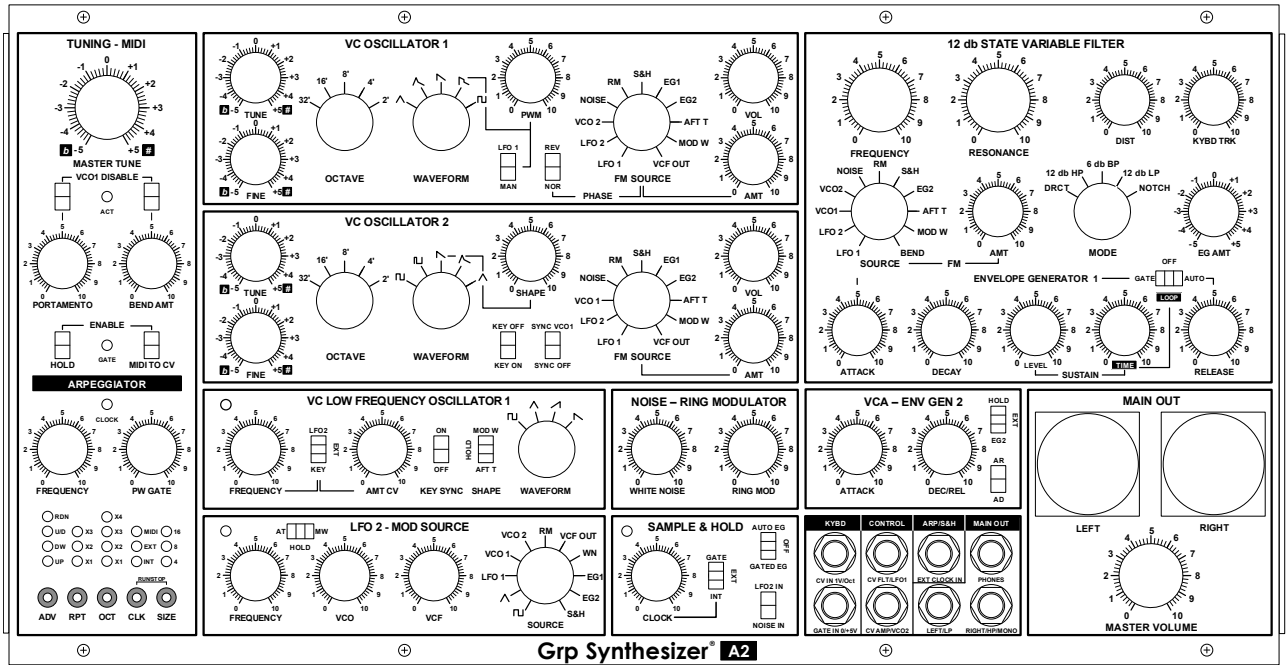
CONNECTION ARP/S&H

Input EXT CLOCK IN
Pulses recevied at this input are used as Clock source for **ARPEGGIATOR** (if option **CLK EXT** is selected) and for **SAMPLE & HOLD** (if option **EXT** is choosed in **CLOCK** selector).

Sync pulses received should have minimum amplitude of 3.5V.

Blank Patch Chart

Feel free to make copy of this page, for write down your patches.



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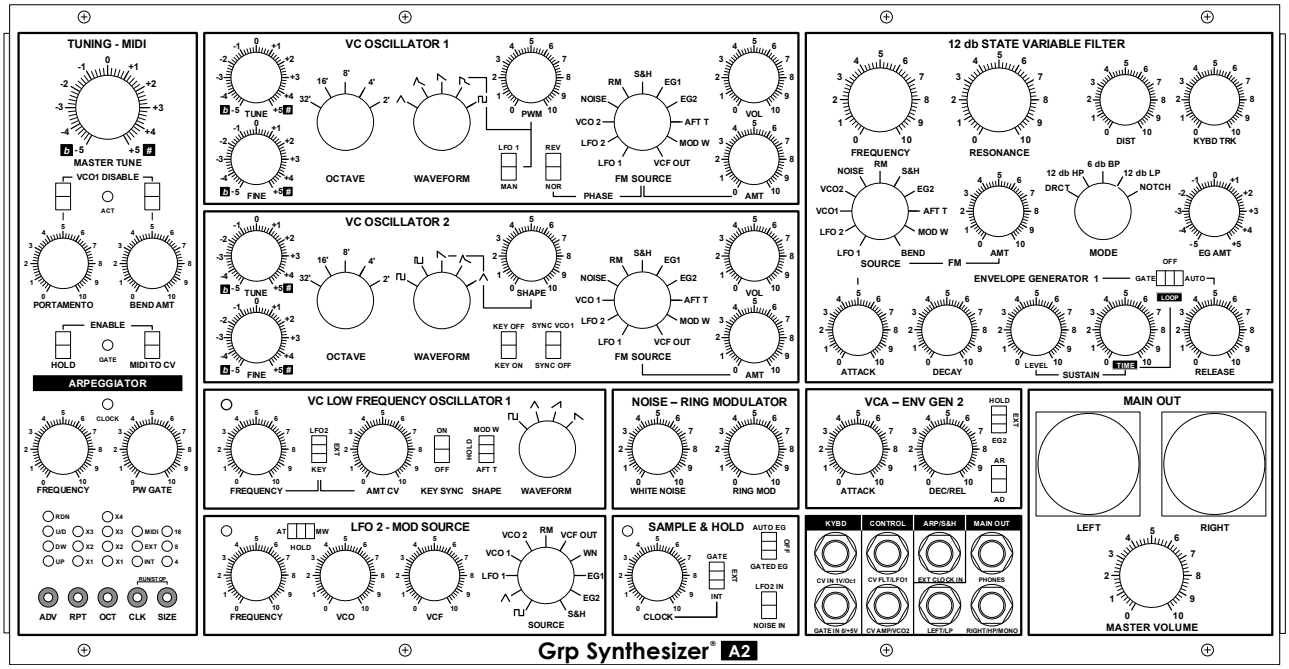

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