LEIPZIG

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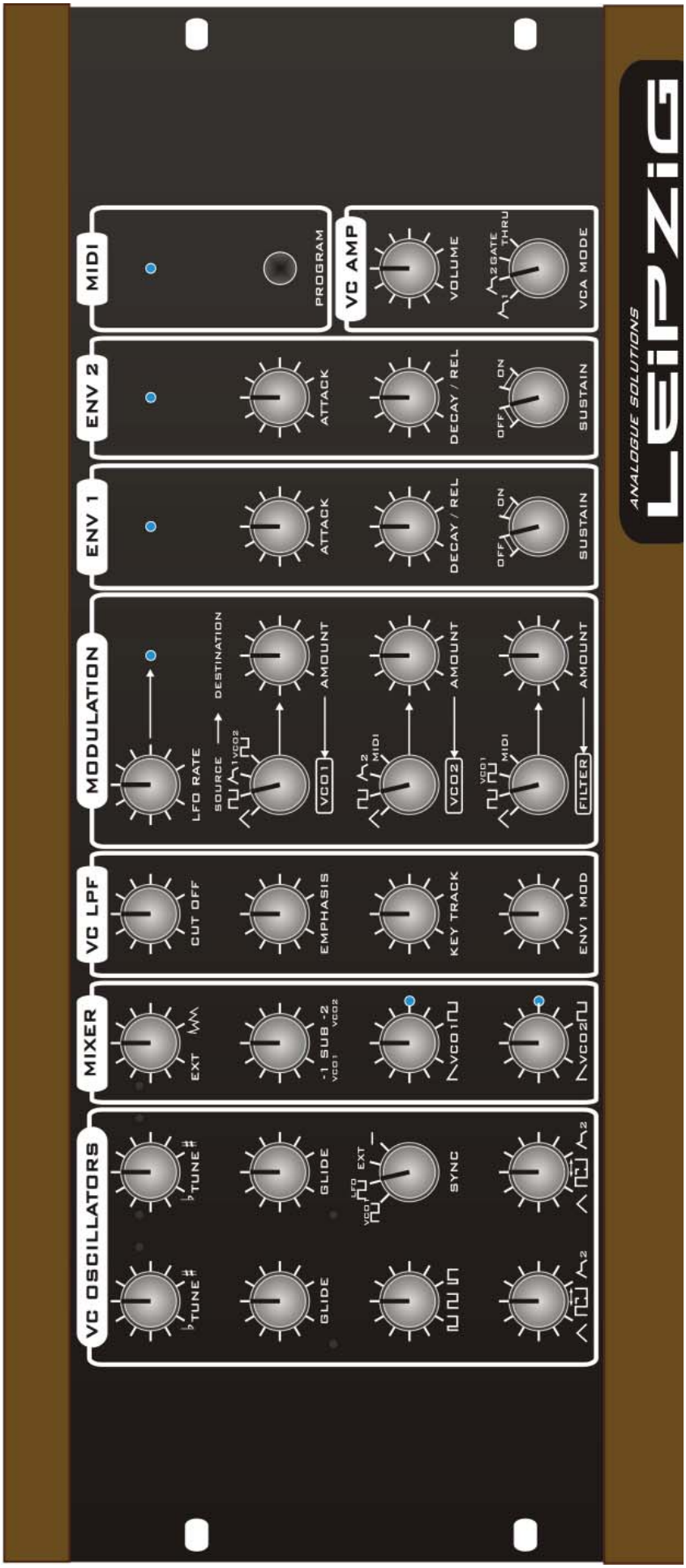
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SPECIFICATION

Brief Overview:

Leipzig is a self contained TRUE analogue synthesiser. The voice circuitry is entirely analogue, using all discrete and op-amp components. There is no voice DSP.

Leipzig has a similar sound and specification to the classic Moog Prodigy / Rogue synthesisers, but with many improvements such as MIDI and more modulation paths.

VCO1
Tune, Glide, PW , PWM, Mod Source & Amount controls, Saw out, Pulse out

VCO2
Tune, Glide , Sync, PWM, Mod Source & Amount controls, Saw out, Pulse out

VCF
Low pass filter: Cut-off, Emphasis, Key Track, ENV1 Mod, Mod Source & Amount controls

Mixer
Audio source mixer, including external audio inputs

VCA
Mode switch, Output volume

ENV1
ASR envelope with trigger LED

ENV2
ASR envelope with trigger LED

LFO
Square & Triangle waves

Noise Generator
White noise

SUB oscillators
-1 from VCO1
-2 from VCO2

MIDI to CV Converter
16 bit high resolution with auxiliary controller CV2 output (modulation CV)

Many modulation possibilities.

Rotary controls:
25

Rotary switches:
6

Push button:
1

LEDs:
6

Jack sockets (6.35mm, mono);
3

MIDI Sockets;
2

Rugged steel contruction

Dimensions:
Height: x 5U

Weight:
xKg

Power:
x

Accessories:
Manual
Mains adaptor (230v)

INTRODUCTION

Congratulations on buying the Leipzig synthesiser. Leipzig is part of the Analogue Solutions range of analogue music equipment. Leipzig is a precision electronic musical instrument. It combines all the often needed music electronic circuitry to make a music synthesiser in one compact module.

No compromise has been made with the construction of Leipzig. Cheaper options in parts have not been used;

Full rugged steel case - no plastic mouldings
Good quality smooth potentiometers, fully sealed against dust
Good quality knobs with spun aluminium caps
High grade double sided lead free circuit board
All power and signal input/outputs have EM filters to remove external noise and improve immunity
High Quality DAC for MIDI to CV conversion - 16bit!
Very stable MIDI to CV conversion
Very stable analogue oscillators
Expensive blue LEDs
Hand built by humans
Lasting quality and appeal with a life far longer than any software plug-in or DSP synth

APPLICATIONS

MONOSYNTHESISER

Leipzig is for use any time you need analogue sound effects, fat basses, screaming leads, beeps, tones, zaps, and all the other crazy sounds associated with analogue synthesis. Use in place of your boring digital synths and DSP soft synths.

EFFECTS PROCESSOR

Leipzig has an audio input socket, so you can feed external sounds into the onboard analogue filters for analogue processing.

SAFETY INSTRUCTIONS

Please read carefully before using:

- Only use the correct power adaptor - 230V (or 115V whatever your country needs)
- Never handle the adaptor with wet hands
- Never excessivly bend the adaptor cable or get it trapped or place heavy objects on it. If the adaptor cable becomes damaged, replace the adaptor.
- Ensure the unit is disconnected from the mains before moving or cleaning.
- Always disconnect the unit from the mains if there is lightning in your area.
- Ensure the unit is on a stable surface, and never place heavy objects on top of it.
- Never allow young children or animals to operate the unit or adaptor.
- Do not use excessive force when using the controls or inserting cables to the connectors.
- The unit should not be operated in the rain or near water and should not be exposed to moisture. If the unit is brought from a cold environment to a warm one, the unit should be left to reach the ambient temperature.
- Keep unit away from heat sources, such as radiators, ovens, heaters etc.
- Never allow the unit to get wet. Do not operate it near water, like pools, sinks, bathrooms etc. Do not place beverages on or near it.
- Never open the case or attempt to make repairs. Refer any servicing to a qualified service personnel.

Preventing damage to other connected devices;

Leipzig has a very high dynamic range. It is capable of produce loud signals of very high and sub-sonic frequencies that could blow inadequate speakers if played too loud. It is recommended that input levels to external equipement (mixers, amp's etc.) is kept low when first connected, and then sowly increased to a userable level.

Maintenance Instructions

Any cleaning of the the case should be done with a clean lint-free cloth. DO NOT USE SOLVENTS OR CLEANERS, as this will deteriorate the exterior appearance of the equipment.

Mounting

Mounting does not mean 'place on the wall' or 'to make love to' in this instance. Place the unit soundly on any stable surface so he cannot fall off or over, causing it or yourself injury.

CIRCUITS IN DETAILS

Here follows details on all the sockets and controls, with brief simplified explanations of what the circuits do. We have not gone into technical details on how and exactly what each circuit does but tried to explain each control's function and effect.

Anyone who has used synthesisers before should be familiar with the terms used and therefore be able to predict their behaviour and how they affect the sound. The best way to learn how to use Leipzig is to go straight ahead and play with it. Reading of this manual may only be neccessary for finer operational detail.

VCO & 2

The voltage controlled oscillators (VCOs 1 and 2) produce the raw audio waveform usually used as the initial source for sound creation. They provide cyclic audio waveforms that can be pitched. VCOs usually receive treatment from the VCF to turn their basic tones into pleasant sounds.

TUNE

Two independent TUNE controls for the oscillators. Controls the course pitch of the VCO. Range is about +/- 2 octaves.

GLIDE

Two independent GLIDE controls (portamento) for the oscillators. Each time you play a new note, the pitch will glide from the last note to the new note. The GLIDE control alters the speed. At minimum there is no glide.

Pulse Width

(Just below VCO1 GLIDE control). For VCO1 only. This alters the pulse width for VCO1's square wave (alters the 'duty cycle'). If you do not understand this, don't worry about it! Just turn it and hear how the tone changes.

SYNC

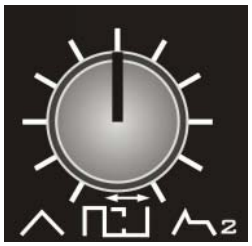
VCO2 only. This switch routes a sync signal to VCO2. Oscillator sync is where a master signal (selected by the switch) will reset the waveform of a slave signal (VCO2 in this case) each time the master waveform starts a new cycle.

Try the different settings and listen to the effect. You may have to modulate the pitch of either VCO1 or VCO2 to enhance the effect. There is a balancing act between the pitch

of the two sound sources (usually the 2 VCOs) to get a good effect.

Sync source choices are;

VCO1 square wave
LFO square wave
EXTernal signal
Off (flat line symbol)



PWM

Two independent pulse width modulation controls (PWM), one for each VCO. This allows modulation of the square wave 'duty cycle'. Once again, don't worry about this technically, just enjoy the effect!.

Turn to the left for LFO triangle wave modulation.
Turn to the right for Envelope 2 modulation.
Centre is zero (no modulation).

For VCO1, it is best to first put the Pulse Width control to the centre before using PWM, otherwise the sound might cut (unless that is the effect you want!)

NOISE GENERATOR

The noise generator produces white noise. This is like the hiss you hear between radio stations. The signal is available for filtering via the EXT/NOISE mixer control.

Noise would be used for sound effects such as breath, wind, percussion, etc.

MIXER

The mixer is used to bring various audio source signals together for filtering. There are four mixer controls. In all cases, centre is zero volume, or turn to the left or right to select either of two sound sources.

NOISE/EXT1 level

Turning the control anti-clockwise in increasing amounts sends the signal (if any) coming in off the rear panel EXT1 socket to the mixer.

Turning the control clockwise in increasing amounts sends white Noise to the mixer.

In a central position no signal is sent to the mixer.

-1/-2 SUB level

SUB is a duplication of the VCO square wave output, but at a lower octave. Use to beef up the sound.

Turning the control clockwise in increasing amounts sends a -2 octave VCO2 square wave signal to the mixer.

Turning the control anti-clockwise in increasing amounts sends a -1 octave VCO2 square wave signal to the mixer.

In a central position no signal is sent to the mixer.

Saw/Pulse VCO1 level

Turning the control clockwise in increasing amounts sends VCO1s pulse signal to the mixer.

Turning the control anti-clockwise in increasing amounts sends VCO1s sawtooth wave signal to the mixer.

In a central position no signal is sent to the mixer.

Saw/Pulse VCO2 level

Turning the control clockwise in increasing amounts sends VCO2s pulse wave signal to the mixer.

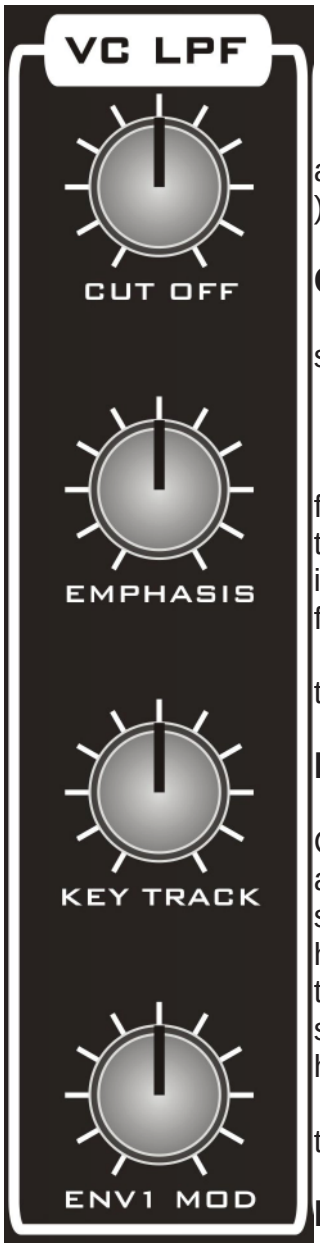
Turning the control anti-clockwise in increasing amounts sends VCO2s sawtooth wave signal to the mixer.

In a central position no signal is sent to the mixer.

LED indicators

Each oscillator has it's own 'frequency' LED. This is taken from the VCO's pitch, but of course divided down enough octaves so you can see it flash!

VCF



The voltage controlled filter low pass filter (VC LPF) is used to alter the tone of the signal coming from the mixer output (VCOs/Noise) and is the heart of what gives an analogue synth its character.

CUT OFF

This sets the cut-off frequency, the point at which the LPF will start to filter-out harmonics.

EMPHASIS

Emphasis (Resonance, Q or Feedback) is a feature of adding feedback to the filter circuit. The output of the filter is fed back into the filter input. Emphasis sets the level of feedback. As the control is increased to higher levels the filter will self-oscillate. The oscillation frequency is set by the cut-off control.

Use Emphasis to alter the tone of the filter effect. It can be used to create 'squiggy' sounds and 'pulse hits'.

KEY TRACK

The pitch CV (CV1) also controls the filter-cut off. The KEYTRACL control alters how much this happens. Key Track is sometimes also known as Key Follow. This is used when you want a brighter sound as you play a higher pitch, since an increasing pitch means higher CV1, which in turn increases the cut-off frequency (assuming the KEY TRACK control is up). This brightening of sound is how real sound behaves. 'Real' instruments usually sound brighter in their higher registers.

KEY TRACK can also be used to 'play' the resonance, but setting EMPHASIS to self-oscillate.

ENV1 MOD

This control alters how much the cut-off is modulated by envelope generator 1. Balance this control with the CUT OFF control.

Filtering External Sound Sources

External sound sources, such as vocals, guitars, mixer sends, samplers, etc. can be sent through the filter for extra treatment. Note, mic's and guitars may need pre-amp'ing; use if the signal is too quiet.

Simply plug the sound source into the rear panel EXT1 socket.

Turn the mixer control EXT/NOISE to EXT, and up to a suitable level.

You may wish to return the VCO1 and VCO2 mixer controls to their centre positions so the VCOs cannot be heard.

Turn the VCA mode switch to THRU (ON). This will leave the VCA open so a constant signal can be heard.

Finally, play around with the filter and modulation settings as neccessary.

The VCO signals can also be introduced, and use the various VCA modes and envelopes if you wish to contour the sound level and add additional effects.

ENVELOPE GENERATORS

LED indicators

These will turn on each time the EGs are triggered.

EG1/2 ASR

EG1 and EG2 are identical. They are ASR (attack / sustain / release) envelope generators. Use to modulate various parameters of the synthesiser.

ATTACK

Controls the Attack time. This is the rate at which the envelope signal will take to reach full level when the MIDI note/key pressed.

DECAY / REL

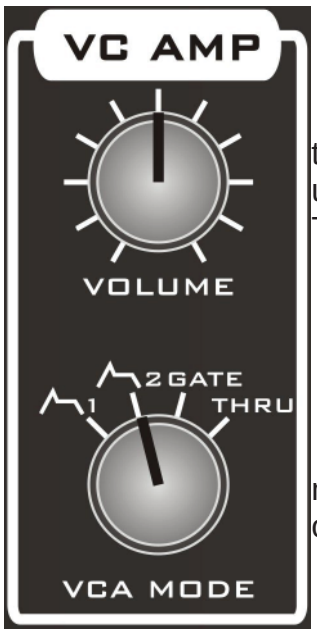
Controls the Decay or the Release time - the time it take the envelope signal to return to zero when the key is released.

SUSTAIN

If this switch is on, then the DECAY / REL control becomes Release. If a key is held down, the EG is sustained at full level.

If this switch is off, then the DECAY / REL control becomes Decay. There will be no sustain.

Note: this switch has 4 positions. The left 2 positions turn SUSTAIN off, and the right 2 on. We are unable to get 2 way switches for the series of potentiometers/switches that we use.



VCA

The Voltage Controlled Amplifier (VCA) is the circuit that is used to change the output volume. Normally an envelope signal would be used to do this, so the sound starts loud then gradually fades away. The filter audio output is hard-wired to the VCA signal input.

Mode rotary switch control

The VCA can be controlled in 4 modes;

EG1

When EG1 is selected, the envelope signal of EG1 is used to modulate the VCA level. Use it if you require the VCA level to change over time.

EG2

When EG2 is selected, the envelope signal of EG2 is used to modulate the VCA level. Use it if you require the VCA level to change over time.

GATE

When GATE is selected, the MIDI converter's Gate signal is used to modulate the VCA. With this, the VCA level is either off or full on. The audio envelope would be like an organ's, with no attack or decay time.

THRU

When THRU (on or bypass) is selected, the VCA is left permanently on at full level. Use this setting if you wish to use the Filter as an effects processor, to process external audio fed into Semblance.

VOLUME

This sets the output volume of synth, i.e. the output level from the VCA that is output from the SIGNAL output socket.

LFO

This is in the MODULATION panel (see later). The Low Frequency Oscillator (LFO) is basically identical to a VCO; it is another oscillator, except that it produces periodic wave forms of low frequency, typically sub-audio. These slow cyclic waveforms are used for modulating other circuit parameters, for example, for sweeping the filter cut-off up and down, either slowly for a nice sweep, or faster for a 'wah-wah' type effect. It could be used to modulate the VCO pitch for vibrato.

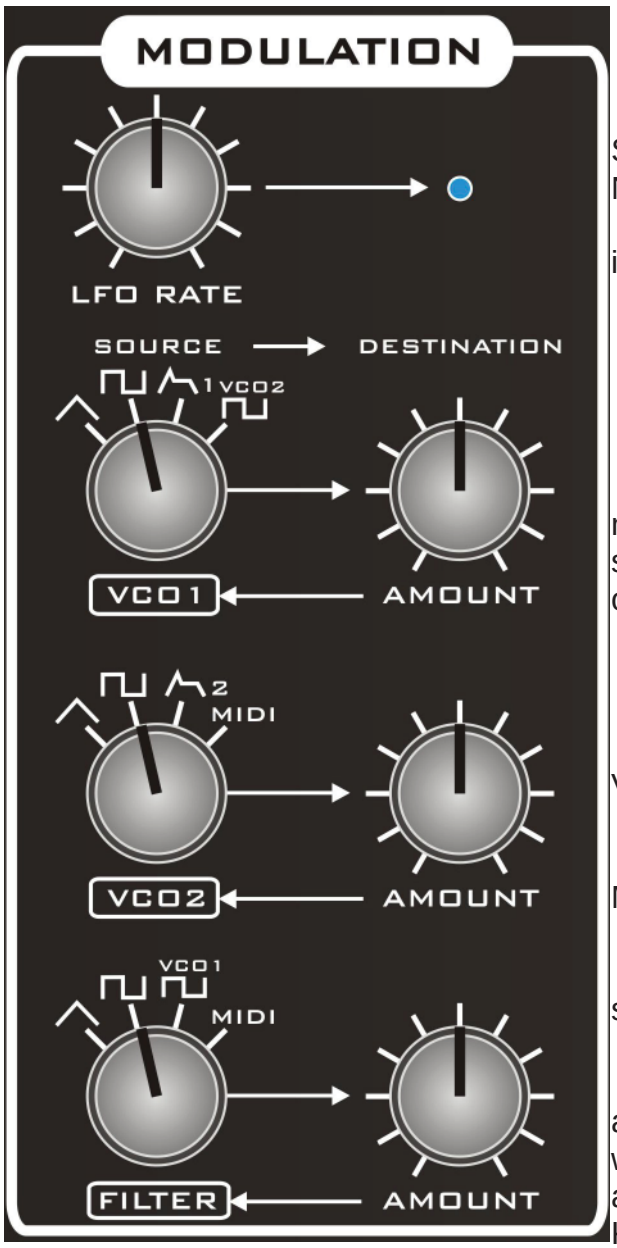
The LFO is found in the MODULATION panel (see diagram).

LFO RATE

This sets the frequency (speed) of the LFO.

LFO SPEED LED indicator

This wil turn on each time the LFO signal is at a positive voltage, indicating the speed of the LFO waveform.



MODULATION

The modulation panel is where you route SOURCE modulation signals to their DESTINATIONS. Think of it as a modulation matrix.

There are three modulation destinations in this panel;

VCO1 (pitch)
VCO2 (pitch)
FILTER (cut-off)

These can be modulated by the signals selected by their respective SOURCE switched. The AMOUNT control alters the level of modulation.

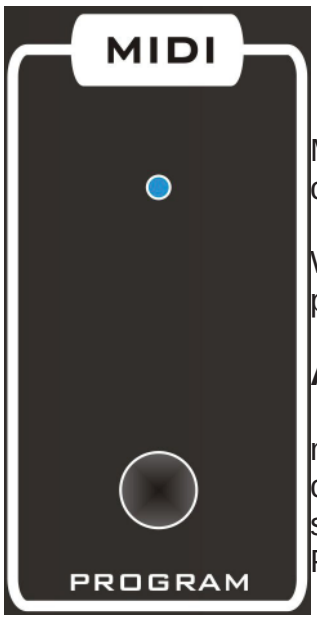
The modulation sources available are;

VCO1: LFO triangle, LFO Square, EG1, VCO2 square

VCO2: LFO triangle, LFO Square, EG2, MIDI (modulation CV / CV2)

FILTER: LFO triangle, LFO Square, VCO2 square, MIDI (modulation CV / CV2)

These are not the only modulation types available. Other modulations are available within each feature's own panel (e.g. VCO1 and 2 can have PWM, the LPF has EG1 and KEY TRACK modulation).



MIDI to CV CONVERTER

The MIDI to CV converter (MCV) is a device that converts some MIDI signals into analogue voltages. It allows analogue synthesiser circuits to be integrated and used with your MIDI set-up.

MIDI messages responded to are Note on/off, Velocity, Mod Wheel, All notes off. Note messages provide analogue outputs for pitch CV, auxiliary CVand Gate.

Activity LED

The Activity LED will briefly light whenever it receives a MIDI message that itself will respond to, i.e. a message on the correct channel, and of correct type, note on/off and mod wheel (if CC/VEL source is set to mod wheel). It remains on when Red Square is in Program mode.

The MIDI to CV converter produces three kinds of signal;

CV1	This is a pitch CV and is hard wired to control both VCO pitches.
CV2	This is a modulation CV that is wired into the modulation panel
Gate	This is a note on/off signal wired into the VCA and EG triggers.

To Set MIDI Receive Channel

Press and hold the Program button. Then do either;

Press a MIDI key. This will set and store the receive channel to the channel received in the note data.
CV2 will set itself to Velocity.
Release the Program button.

Or

Move a Continuous Controller. This will set and store the receive channel to the channel received in the CC data.
CV2 will set itself to the CC number received.
Release the Program button.

Note; The Program button must be held in whilst pressing a key or moving a controller. CC number 7Fh is reserved. Avoid using this controller.

REAR PANEL


ANALOGUE SOLUTIONS
Leipzig
SIGNAL
ext 2 in
ext 1 in
vca out
MIDI
in
thru
POWER
2x T500mA FUSES
230V/50Hz
115V/60Hz
S/N
CE
Select correct mains voltage using the switch underneath. Disconnect mains before changing.
No user serviceable parts inside. Please refer servicing to qualified engineer.
To prevent risk of fire or shock, do not expose this unit to rain or moisture.
To prevent risk of electric shock do not open cover.
MADE IN GREAT BRITAIN

REAR PANEL DETAILS

The rear panel is shown above and detailed below;

POWER IN

This unit features a standard IEC power socket. Check the correct mains voltage is selected on the switch on the bottom panel - 115V or 230V AC. Disconnect the unit from the mains supply before switching to the correct voltage for your mains supply.

MIDI IN

Plug your MIDI cable in here. Connect this to the MIDI out or thru of your MIDI controller.

MIDI THRU

The MIDI data coming into the In socket is copied to the Thru socket. This is so you can control additional devices from your MIDI controller without the need of a MIDI thru box. The Thru socket will not function when in Poly mode.

EXT1 signal input socket

This is the input socket to feed audio signals into the synth. The signal is routed to the EXT audio input of the mixer.

EXT2 signal input socket

This a second input socket to feed audio signals into the synth. The signal is routed to the EXT audio input of the mixer.

SIGNAL output socket

This is the main audio output Leipzig It is the signal output from the VCA, post-Volume control.

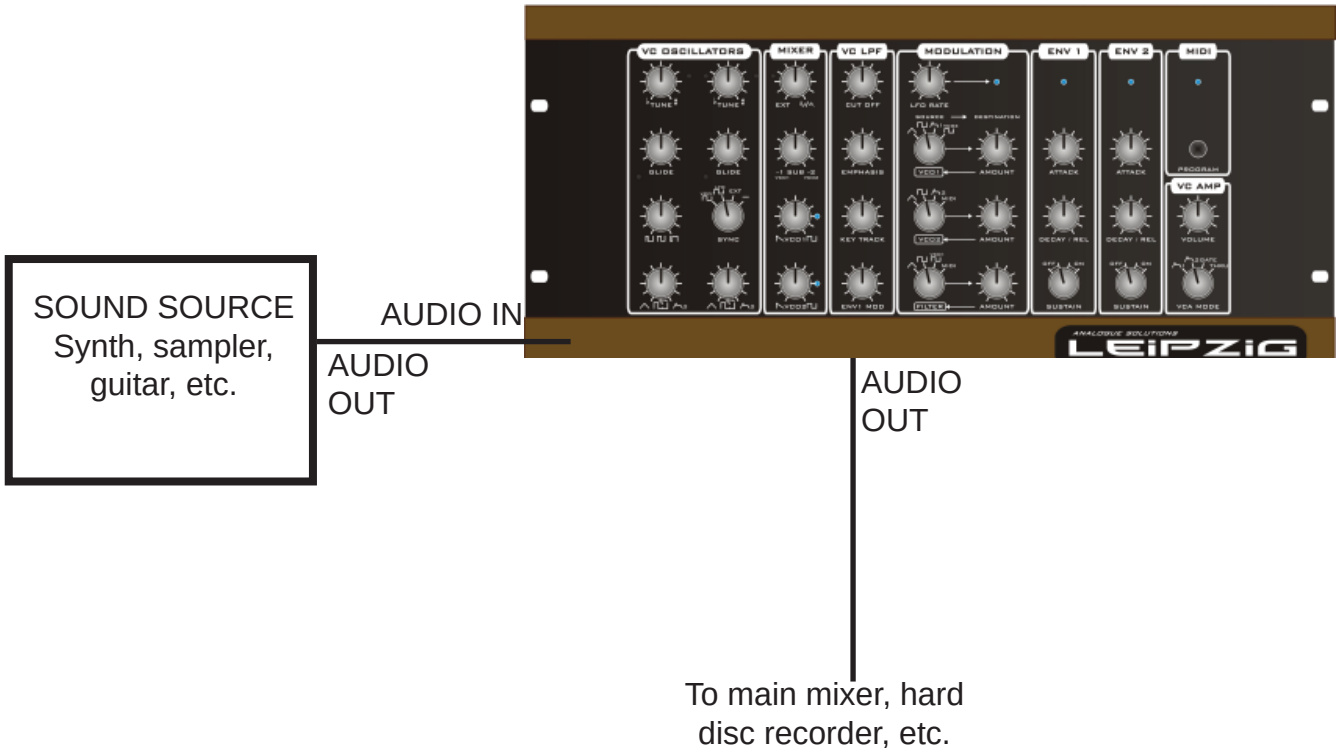
All jack sockets are 6.35mm mono.

Try to keep your leads under 3M to keep the signal quality as clean as possible.

REAR PANEL AUDIO CONNECTIONS

The main signal output is on the rear panel. Connect this socket to a spare mixing desk input channel. If you want to feed external signals into Leipzig, use the rear panel EXT1 socket. Maybe hardwire if from your desk's effect send.

It is recommended to keep your MIDI and CV/audio cables as short as possible to keep the signal quality as high as possible. We recommend no more than 3 metre cable lengths.



Specification subject to change without notice.

Warranty

This unit comes with a 1 year (from purchase date) back to base warranty, (i.e. customer must arrange and pay for carriage to and from Analogue Solutions or the dealer from which purchased).

This warranty shall not apply where the product has been subject to alteration, misuse, accident, neglect (such as extremes of temperature and/or moistur) or to wear resulting from normal use.

We will normally carry out most the labour or repairs free of charge for an extended period of an additional 4 years from purchase date, but this may not included cost of any damaged parts which will be charged for.

At the sole discretion of Analogue Solutions, the warranty is deemed to be void should the unit be or considered to have been opened or any other modifications or tampering be carried out by unauthorised parties.

CE Compliance

This unit complies with Complies with EU Directives 73/23/EEC and 89/336/EEC. Standards: EN55103-1, EN55103-2, EN60065

Leipzig 'user manual'
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