AG1.0

"The PURR"

When electric guitars and basses do not have an internal electronic, the pickup is electrically connected straight to the cable to the amplifier.
The pickup itself represents a relatively large inductance (coil), the cable a capacitance (capacitor), with its value dependent from its length. Both together form a low-pass filter with a resonance peak.
The location of this resonance peak varies with the capacitance of the cable, so the cable influences the sound of the guitar. Depending on the type of pickup and the quality and length of the cable it's more or less obvious.
The AG1.0 can prevent this influence, length and quality of the connected cable do not matter anymore.

Function / Usage

The AG1.0 is a buffer / amplifier / cable driver that electrically decouples the possibly very long cable to the amplifier from the pickup of the guitar / bass. The cable has no longer influence on the resonance peak of the pickup.

The input of AG1.0 should be connected with a possibly short, and thus low capacitance cable to the guitar / bass. Preferably the AG1.0 is attached to the lower end of the guitar strap, near the output jack of the guitar, e.g. using the supplied hook-and-loop tapes and / or duct tape. Now a patch cable of app. 30cm length should be sufficient to connect the input of the AG1.0 with the output of the guitar / bass.

The AG1.0 itself has a very high input impedance and thus this first connection has only a very small effect on the "natural" resonance of the pickup. It may possibly be, depending on the pickup, at a too high frequency, the instrument sounds unusual "sharp".

Therefore, the AG1.0 offers the possibility to add various capacitances to the input and thus to adjust the resonance to one's personal taste.

As a further feature the AG1.0 can amplify the signal as it passes by up to 4x (+12dB).

The cable from the output of the AG1.0 to the amplifier may now have virtually any length or quality (capacitance). It no longer has any influence on the sound of the instrument.

The AG1.0 is powered by a 9V battery whose run time is app. 500 hours.

The AG1.0 offers a true bypass function in the off state (relay), without influencing the signal from the instrument to the amplifier in any way.

Connections / Controls

- **Guitar**
  Instrument input of the AG1.0
  Connect the guitar / bass here with a preferably short cable.
  The input can handle voltages of up to 5Vpp (1.8Vrms) without distortion (with limited gain setting, max. input voltage (Vpp) times gain has to be lower than the battery voltage) .
  The input is protected against electrostatic overvoltages (ESD).

- **Amp / Power**
  Output of the AG1.0
  Connect a random cable to the amplifier or the effect chain here.
  The AG1.0 only consumes current, when this cable is plugged in.
  The output is protected against short circuit and electrostatic overvoltages (ESD).

- **Resonance**
  Selection of the input capacitance
  The capacitance added to the input can be selcted with this rotary switch.
  In position "0" no capacitance, in position "9" the maximum of app. 800pF is added, comparable with a guitar cable of app. 6m length and medium quality

- **Gain**
  Selection of the gain between input and output
  The gain between input and output of the AG1.0 can be set with this rotary switch.
  In position "0" there is no gain (1x / 0dB), in position "9" a gain of 4x / +12dB is

activated. Please keep in mind, that the gain setting may be limited by the level of the input voltage to prevent distortion at the output (input voltage x gain < battery voltage)

- **Power (On/Off, Bat)**
  On / off switch, operation mode / battery condition
  The AG1.0 is switched on or off with this toggle switch.
  Switched on (cable has to be connected to the "Amp / Power" jack as well...) the "Bat" LED flashes app. every 2 seconds and indicates the battery condition with its color (red / yellow / green).

- **Battery**
  To replace the battery the back cover has to be removed (2 screws). The AG1.0 uses a 9V battery (PP3), the run time is app. 500 hours (with alkaline).

Activation / Current consumption

To activate the AG1.0 the "Power" switch at the back has to be in position "On".
When also a cable is connected to the output jack "Amp / Power", the AG1.0 works as intended, observable by the flashing "Bat" LED.
The run time of a fresh battery in this operation mode is app. 500 hours.
To switch the AG1.0 off again, either the cable to the amplifer has to be removed from "Amp / Power" jack or the "Power" switch has to be put in the "Off" position or both.

> When only the cable to the amplifier is removed from the output jack, the "Bat" LED stops flashing and the AG1.0 is practically switched off. Indeed, the battery is burdened with a very low current, which is near the self-discharge and effectively has no effect on the run time of the battery. To prevent this situation anway, the "Power" switch should to be put in the "Off" position. Thus any current consumption is prevented, the battery is not burdened in any way.

Battery condition

The charge condition of the battery is monitored constantly during operation by a small microprocessor. The flashing "Bat" LED indicates the actual condition by its color.

- **Green** ... Battery fresh (voltage higher than 8V)
- **Yellow** ... Battery not that fresh anymore but in usable condition (6.5V - 8V)
- **Red** ... Battery is weak and should be replaced (voltage below 6.5V)

> The first flash of the "Bat" LED after start does not yet indicate the battery condition, but is always in YELLOW (RED and GREEN both on, LED check).

Battery replacement

The run time of the battery is app. 500 hours. At the latest when the "Bat" LED is flashing RED, it should be replaced. To do so, the two screws at the back cover have to be

untightened and the cover itself and the subjacent plastic frame have to be removed. Now the batterie can be replaced. The type of the battery: 9V (PP3).

Gain adjustment

The AG1.0 can amplify the signal on the "Guitar" input between 1x (0dB) and 4x (+12dB) to the "Amp / Power" output. By means of the rotary switch "Gain", the amplification can be adjusted in 10 steps.
In position "0" the is no addional gain selected (1x / 0dB), in position "9" the gain reaches its maximum of app. 4x / +12dB.

> The maximum level of the output signal of the AG1.0 can almost be equal to the level of the battery voltage. When the battery is fresh, it reaches nearly 9Vpp (peak-to-peak) resp. 3Vrms.
> If the connected guitar produces a very high output voltage (e.g. a humbucker, more than 2Vpp) and the gain of the AG1.0 is adjusted to a very large factor (4x), the theoretically resulting output voltage could exceed the battery voltage. Actually this is not possible, so the output signal will be distorted resp. clipped near the level of the battery voltage.
> The product of input voltage (peak-to-peak) and the selected gain may not exceed the battery voltage. Respectively one has to be careful adjusting the gain when using guitars / basses with high output voltages. Practically this problem arises only with humbuckers and single coils with a very high number of windings.

Resonance adjustment

The actual function of the AG1.0 is to decouple the relatively large capacitance of the guitar cable from the pickup of the connected guitar / bass. Quite without almost any capacitance in parallel with the pickup it may sound possibly too "pointy". Therefore, it may be useful, to add at least a small capacitance to the pickup. This can be done with the rotary switch "Resonance".
In 10 stages different sized capacitances can be added to the input. In position "0" almost no capacitance lies in parallel with the pickup, only the unavoidable, very small capacitance of the input circuit of the AG1.0 itself and the capacitance of the hopefully short patch cable to the guitar.
From position "1" to position "9 the value of the added capacitance is continuously increased. The resonance of the guitar pickup is accordingly shifted to lower frequencies. Practically the adding of different capacitances is comparable with the simulation of guitar cables with different lengths or qualities.

True bypass

The AG1.0 has a true bypass function when switched off, connecting the "Guitar" input directly to the "Amp / Power" output.
So, if the AG1.0 should no longer control the signal path between guitar / bass and amplifier, it is sufficient to switch it off by means of the "Power" switch.
The direct routing of the signal between the two jacks is done by relay contacts and the AG1.0 does not influence the signal in any way when in this state.

> The true bypass function of the AG1.0 uses a bistable relay to save energy. As a matter of principle it may happen that the relay gets into a wrong switching state (battery extremely weak / very strong mechanicle shocks). One "On / Off" cycle (with a sufficient fresh battery) should restore the right relay state.

Technical data / specifications:

Battery / current consumption:	9V (PP3) / 0.5mA (app. 500h run time)
"Guitar" input impedance:	1MOhm / 10pF
"Amp / Power" ouput resistance:	100 Ohm

Resonance: input capacitances from 0 to app. 800pF, switchable in 10 steps
Gain: amplification between 1x (0dB) and 4x (+12dB) switchable in 10 steps