

# 321

SCALE + FLIP + SHIFT + COMBINE

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# 1. SAFETY & WARRANTY

This product is covered by the Frap Tools srls (hereinafter "Frap Tools") warranty, for two (2) years following the date of purchase. This warranty covers any defect in the manufacturing of this product. This warranty does not cover any damage or malfunction caused by incorrect use as described in the following instructions.

The warranty covers replacement or repair, as decided by Frap Tools. Please contact customer service at [hello@frap.tools](mailto:hello@frap.tools) for a return authorization.

Frap Tools warrants that your new Frap Tools product, when purchased at an authorized Frap Tools dealer, shall be free of defects in materials and workmanship for a period of two (2) years from the original date of purchase. Please contact Frap Tools for warranty and service outside of Europe. During the warranty period, Frap Tools shall, at its sole option, either repair or replace any product that proves to be defective upon inspection by Frap Tools. Frap Tools reserves the right to update any unit returned for repair and to change or improve the design of the product at any time without notice. This warranty can be transferred to anyone who may subsequently purchase the product provided that such transfer is made within the applicable warranty period and Frap Tools is provided with all of the following items:

- all warranty registration information for the new owner;
- proof of the transfer within thirty (30) days of the transfer purchase, and a photocopy of the original sales receipt.

Warranty coverage shall be determined by Frap Tools in its sole discretion. This is your sole warranty. Service and repair of Frap Tools products are to be performed only by Frap Tools or an authorized service company. Unauthorized service, repair or modification will void this warranty.

Please follow the given instructions for use of the device because this will guarantee correct device operation. Due to the fact that these instructions also include indications concerning Product Liability, it is absolutely imperative that they be read carefully. Any claim for defect will be rejected if one or more of the following points is not observed. Disregard of the instructions can void the warranty.

The device may only be used for the purpose described in this operating manual. Due to safety reasons, the device must never be used for purposes not described in this manual. If you are not sure about the intended purpose of the device please contact an expert or Frap Tools at the email address above.

Do not use or store the device in humid places. Avoid contact with any kind of liquid.

Do not touch any component of the device when it is power or connected to any power source.

Do not place the device on unstable carts, stands, tripods, tables, or other surfaces, or on surfaces which are not perfectly plane. This may cause the device to fall which could result in human injury, property damage and/or improper functioning of the device itself.

The device is designed for use only when safely and tightly mounted in a proper eurorack case, made of non flammable materials. If you are not sure about the intended purpose of the device please contact an expert or Frap Tools at the email address above.

Do not ever leave the device switched on when not in use.

To prevent fire, never place any type of candle, or fire, or other source of heat on or near the device.

Transport the device only in the original box with original packaging or when safely and tightly mounted in a proper eurorack case, and handled with care. Never let the device fall or topple. Make sure that during transport and while in use the device and its case, have a proper stand and does not fall, slip or turn over because of potential human injury to persons and/or property damage. Any damage from physical abuse such as dropping the unit, impact from hard objects or damage to external components as a result of negligence will void this warranty.

Never subject the device to temperatures above +40°C or below 0°C. Before operation, also verify operating temperature ranges of all the modules and the power boards in use. Do not keep or leave the case that hosts the device, or the device itself near heat sources.

Any modification must be carried out only by Frap Tools or an authorized service company. The device may not be modified in any way by any parties not expressly authorized by Frap Tools. Any repair, modification, tampering, or attempted repair made by unauthorized personnel will void this warranty.

Frap Tools can not be held responsible in any way for problems to persons or property or to the device itself, if the device is installed improperly, or if it is improperly used, maintained, or stored.

Any device shipped to Frap Tools for return, exchange, warranty repair, update, or examination must be sent in its original packaging! Any other deliveries will be rejected. Therefore, you should keep the original packaging, and any technical documentation or manual provided. The device must be shipped only with the original packaging. As specified on the product box, this box is not intended for shipment: if you bought the device directly at a physical reseller's shop, you should put the device in the original packaging and put the packaging in a proper larger box with proper packaging destined for shipping. If you received the device via carrier or any post service, it should have come with a proper double box packaging.

All non-warranty services are subject to a minimum fee of €50.00+VAT (within the European Union). The customer must pay for shipping to Frap Tools, Frap Tools will cover return shipping costs.

It is important to note that the front panel of the 321 module may get warm, and may warm up the case where it is mounted. Please do not be alarmed, as this is normal and is part of its standard operation.

Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise. Continued use may lead to fire. Immediately unplug the equipment and contact your dealer or Frap Tools at the address above for advice.

Never attempt to repair this product yourself. Improper repair work can be dangerous. Never disassemble or modify this product. Tampering with this product may result in injury or fire and will void your warranty.

Do not allow foreign matter to fall into the equipment. Penetration by foreign objects may lead to fire.

If water or other liquid spills into this equipment, do not continue to use it. Continued use may lead to fire. Unplug the power cord immediately and contact your dealer or Frap Tools at the address above for advice.

**WARNING:** The internal components of the 321 module can get very hot. Do not touch the internal components while it is connected and/or powered and after they completely cool down after use for at least 30 minutes.

## 2. WHAT IS 321

The 321 includes the most useful functions we always need in every patch, to edit and combine dynamically the signals in use.

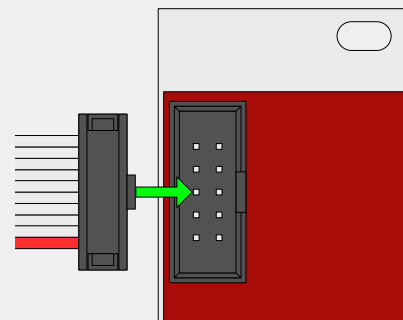
It is capable of scaling any incoming signal, invert its phase, offset it, and combine with other signals. It is completely DC coupled, so work well for both audio and CV. It can also be used as a CV source.

## 3. CONNECT THE POWER

Before to connect the power cable, pay attention to:

- the power connector on the module is the keyed one in the top;
- the red line on the cable should be placed matching the -12V side on your power board: please double check with your power board supplier that the marked side is the -12V.

**WARNING:** Frap Tools can not be held responsible in any way for problems or damage to persons or property or to the device itself, if the device is not connected as indicated above.



### 3.1. Warm-up and working temperature

For best performances, we suggest to let the 321 warm up around 15 minutes prior to use it [tested at 25°C]. It is absolutely normal that it feels warm when using it!

## 4. MOUNTING THE MODULE

After connecting the power as explained in the previous section, install the 18HP modules in your case using the 4 screws provided you prefer, being sure the module is safely and tightly connected to your eurorack case.

The 321 module use the standard eurorack orientation, red line is -12V. Please double check with the power system you want to use that both uses the same powering system.

**WARNING:** Frap Tools can not be held responsible in any way for problems or damage to persons or property or to the device itself, if the device is not connected as indicated above.

# 5. FEATURES

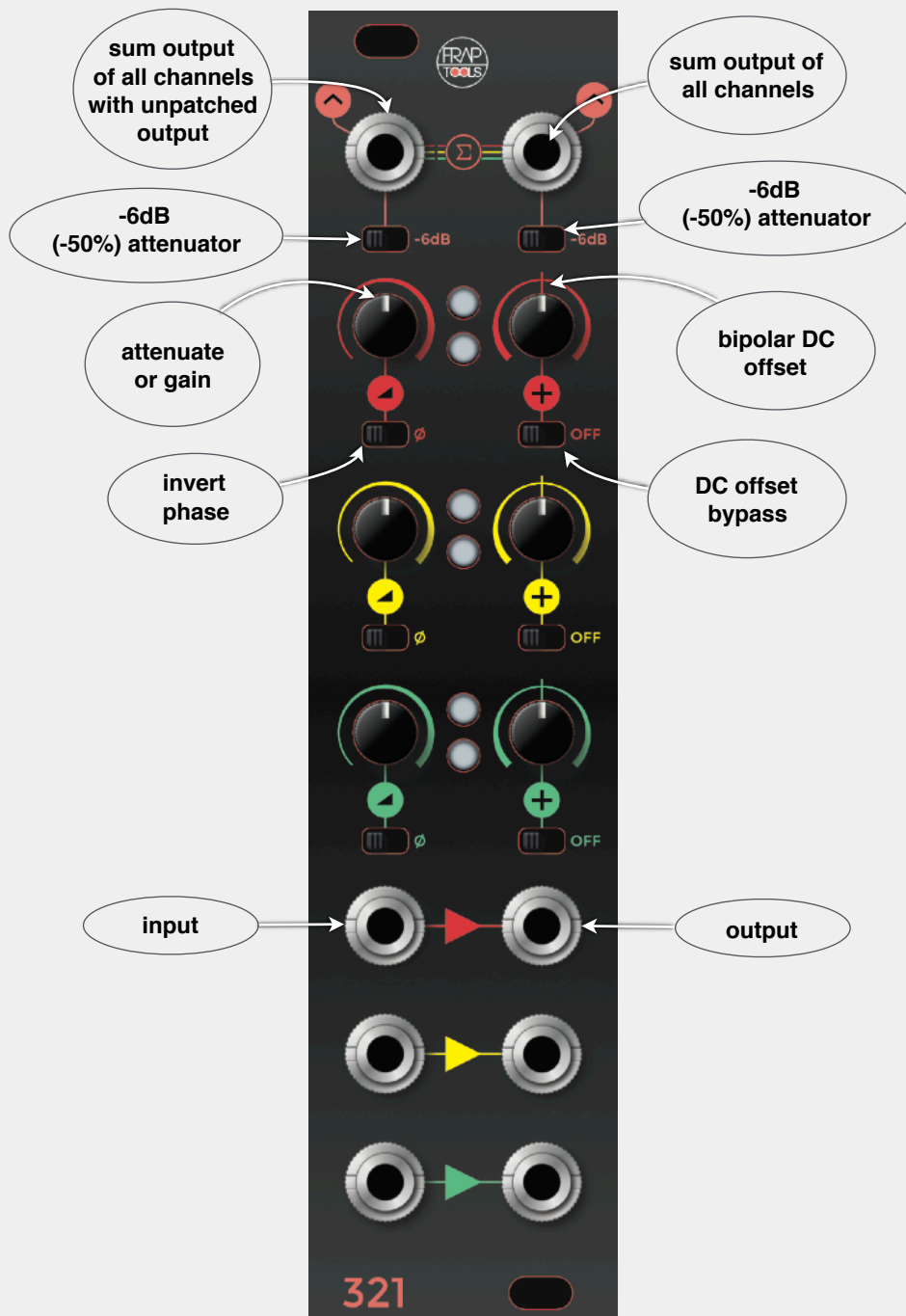
The 321 is composed of three identical sections, the red, yellow and green, where each of those is capable of scaling any signal, from 0 up to 2 times (+6dB), flip its phase, and apply a DC offset, allowing to shift your audio or CV up or down.

In case no signals are connected to the section input, the offset may act as a CV source too.

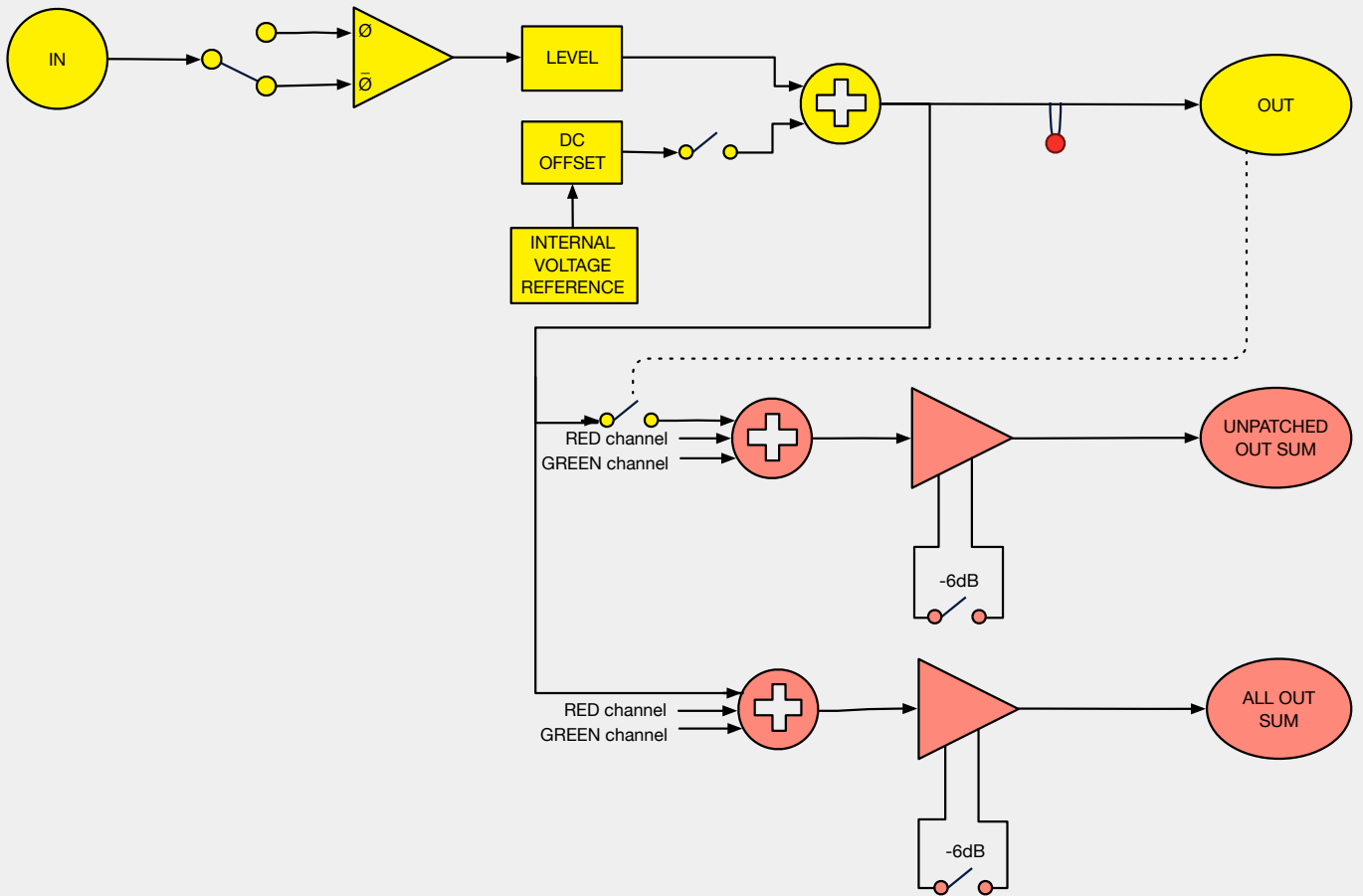
The three sections are then summed together into two independent summing stages: the top right jack outputs the sum of all three sections, while the top left outputs the sum of the unconnected sections only (semi-normalled).

The 321 is entirely DC coupled, allowing the process of control voltages as well as audio signals.

In case CVs or audio signals are particularly hot, the two 6dB attenuators, one per each summing section might be helpful to reduce exactly by 50% the incoming signals.



# 6. FLOW CHART



## 7. TECHNICAL DETAILS

321 size is 6HP.

Input impedance  $100\text{ K}\Omega \pm 10\%$ .

Output impedance  $<50\Omega$ .

Frequency response: each section is guaranteed from DC to 19KHz bandwidth within 1dB, measured at +10dBu onto a  $1\text{K}\Omega$  load.

### Current Draw

idle	+12V	48 mA
	-12V	48 mA

## 8. WHAT'S IN THE BOX

code	description	composed by	Q.ty
		321 Module	1
F-3210-TA	321 - Scale + Flip + Shift + Combine	16 to 10 poles IDC Power Cable	1
		M3x6 black and Zinc with plastic washer for mounting	2