

Amps

Dual, Chainable VCA

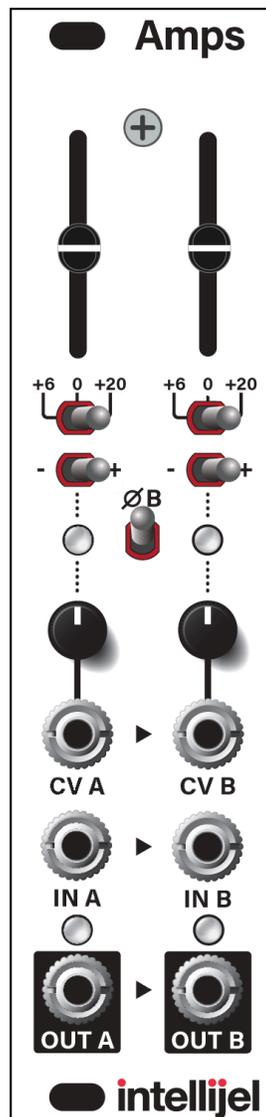


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COMPLIANCE



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by Intellijel Designs, Inc. could void the user's authority to operate the equipment.

Any digital equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.



This device meets the requirements of the following standards and directives:

EMC: 2014/30/EU

EN55032:2015 ; EN55103-2:2009 (EN55024) ; EN61000-3-2 ; EN61000-3-3

Low Voltage: 2014/35/EU

EN 60065:2002+A1:2006+A11:2008+A2:2010+A12:2011

RoHS2: 2011/65/EU

WEEE: 2012/19/EU

INSTALLATION

Intellijel Eurorack modules are designed to be used with a Eurorack-compatible case and power supply. We recommend you use Intellijel cases and power supplies.

Before installing a new module in your case, make sure your power supply has a free power header and sufficient available capacity to power the module:

- Sum up the specified +12V current draw for all modules, including the new one. Do the same for the -12 V and +5V current draw. The current draw will be specified in the manufacturer's technical specifications for each module.
- Compare each of the sums to specifications for your case's power supply.
- Only proceed with installation if none of the values exceeds the power supply's specifications. Otherwise you must remove modules to free up capacity or upgrade your power supply.

You will also need to ensure your case has enough free space (hp) to fit the new module. To prevent screws or other debris from falling into the case and shorting any electrical contacts, do not leave gaps between adjacent modules, and cover all unused areas with blank panels. Similarly, do not use open frames or any other enclosure that exposes the backside of any module or the power distribution board.

You can use a tool like [ModularGrid](#) to assist in your planning. Failure to adequately power your modules may result in damage to your modules or power supply. If you are unsure, please [contact us](#) before proceeding.

Installing Your Module

When installing or removing a module, always turn off the power to the case and disconnect the power cable. Failure to do so may result in serious injury or equipment damage.

Ensure the 10-pin connector on the power cable is connected correctly to the module before proceeding. The red stripe on the cable must line up with the -12V pins on the module's power connector. The pins are indicated with the label -12V, a white stripe next to the connector, the words "red stripe", or some combination of those indicators. Some modules have shrouded headers to prevent accidental reversal.

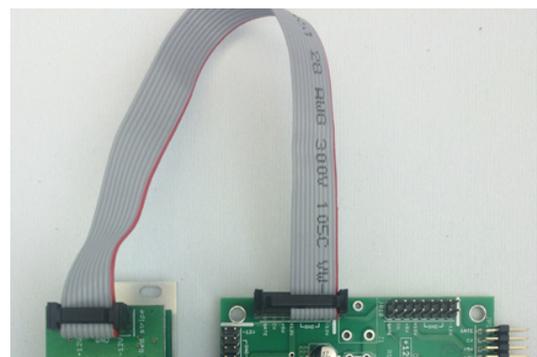
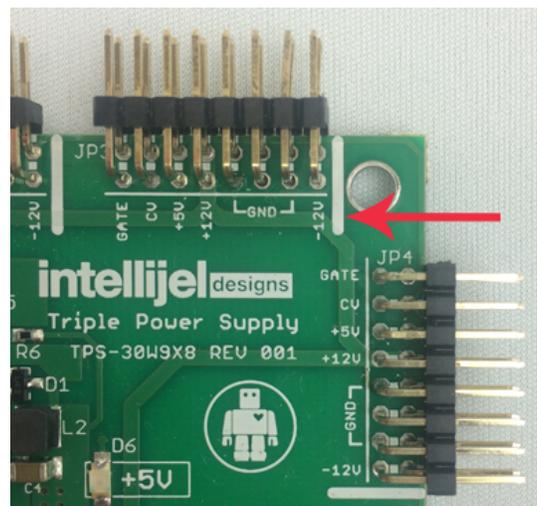
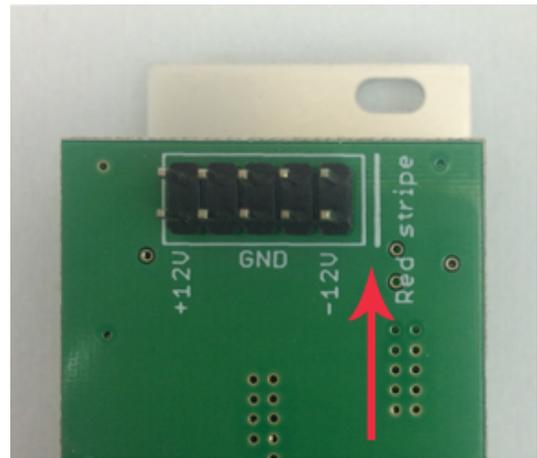
Most modules will come with the cable already connected, but it's good to double check the orientation. Be aware that some modules may have headers that serve other purposes, so ensure the cable is connected to the correct one.

The other end of the cable, with a 16-pin connector, connects to the power bus board of your Eurorack case. Ensure the red stripe on the cable lines up with the -12V pins on the bus board. On Intellijel power supplies the pins are labeled with "-12V" and/or a thick white stripe, while others have shrouded headers to prevent accidental reversal.

If you're using another manufacturer's power supply, check their documentation for instructions.

Before reconnecting power and turning on your modular system, double check that the ribbon cable is fully seated on both ends and that all the pins are correctly aligned. If the pins are misaligned in any direction or the ribbon is backwards you can cause damage to your module, power supply, or other modules.

After you have confirmed all the connections, you can reconnect the power cable and turn on your modular system. You should immediately check that all your modules have powered on and are functioning correctly. If you notice any anomalies, turn your system off right away and check your cabling again for mistakes.



OVERVIEW

The Intellijel Amps is a versatile dual channel linear VCA. It features cascaded CV inputs and cascaded mix outputs allowing it to be used in a number of versatile configurations. A boost switch enables you to amplify each VCA's input by either +6dB or +20dB — ideal for boosting low level signals or pleasingly overdriving audio. The addition of a phase inversion switch for the second channel allows Amps to function as a ring modulator. The CV normalization, with ability to invert and offset, also allows for VC-Crossfader functionality.

Features

- Manual LEVEL slider per VCA — convenient when using the module as a mixer, or for biasing the signal for CV (such as when modulating the VCA with a bipolar LFO).
- Dedicated CV attenuators with dual color LEDs for monitoring bipolar CV signals.
- Linear response curve.
- Input and CV normalling of VCA A to VCA B to allow a single source to feed and/or control both VCAs.
- Output normalling of VCA A to VCA B to allow both VCAs to feed a single output.
- Each VCA has a boost switch that can increase the output level by either +6dB or +20dB.
- Phase Invert switch on VCA B allows for ring modulation capabilities.
- CV Invert switch on both VCAs allows for crossfading one signal into another.
- 4-pin link connectors on the rear panel allow for multiple AMPS modules to be chained together to create a 4-channel mixer; 6-channel mixer; etc.

FRONT PANEL

Controls

[A] VCA A LEVEL slider - Sets the base level (or bias) of the A channel's VCA. When fully up, this is approximately equivalent to applying a +5 V voltage at the CV input, which results in unity (1:1) gain. The slider level is summed with the channel's CV input.

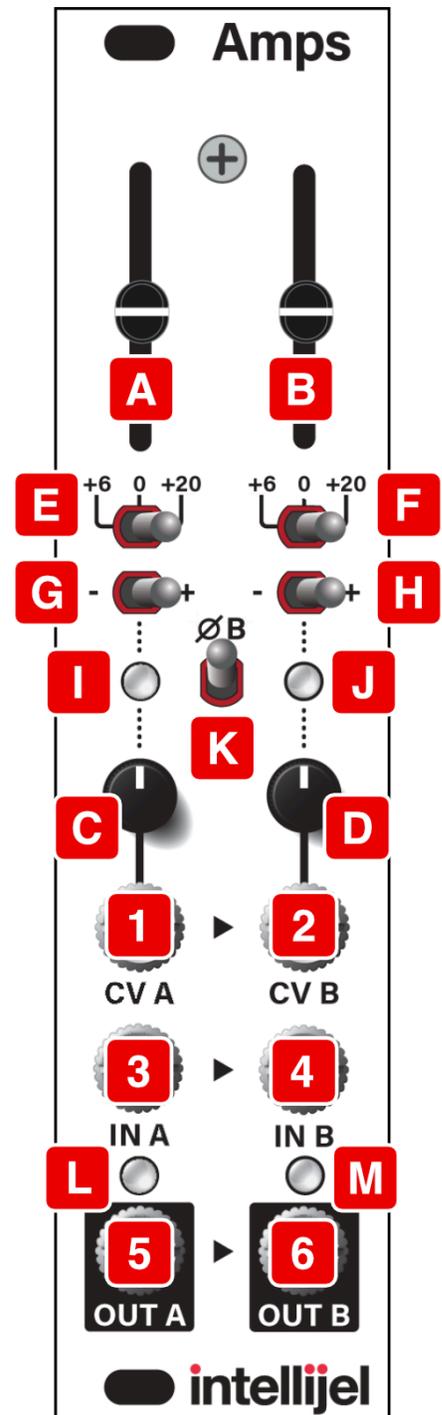
[B] VCA B LEVEL slider - Sets the base level of the B channel's VCA.

[C] CV A Attenuator - Controls the amount by which the **CV A [1]** input governs VCA A's amplification amount. The corresponding **CV A LED [I]** shows the post-attenuator level of the incoming CV signal. It lights green for positive voltages and red for negative, with the brightness indicating relative overall amplitude.

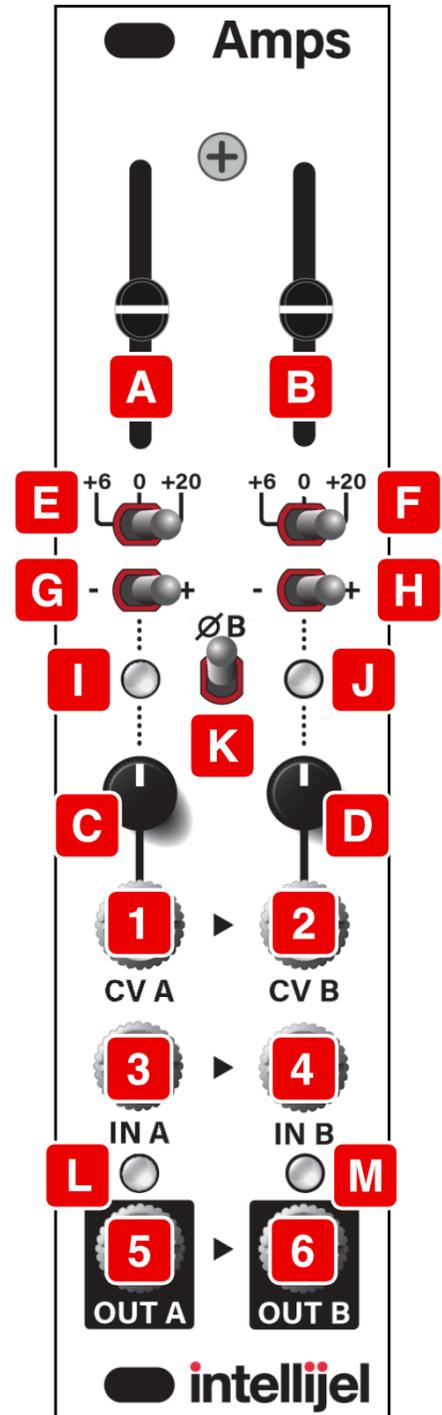
[D] CV B Attenuator - Controls the amount by which the **CV B [2]** will governs VCA B's amplification amount. Because the CV inputs cascade, if there is nothing plugged into **CV B [2]**, then it will use the input present at the **CV A [1]** jack to modulate VCA B. As with CVA A, the led above the attenuator indicates both amplitude and polarity of the post-attenuated CV signal.

[E] BOOST A switch - allows for VCA A amplification in excess of unity gain. Specifically:

- Middle Position: Boost is disabled and the maximum linear gain of the channel's VCA is unity (1:1) — which is achieved when the **VCA LEVEL [A]** slider is fully up, or +5V is applied to the **CV A IN [1]** jack.
- Left Position: The signal is boosted by approximately +6 dB (double the voltage). This setting is useful for boosting the gain of lower input signals, or for providing a bit of overdrive to optimal signals.
- Right position. The signal is boosted by approximately +20 dB (10x the voltage). This setting is useful for converting line level inputs to modular levels, or for clipping (distorting) eurorack signal levels.

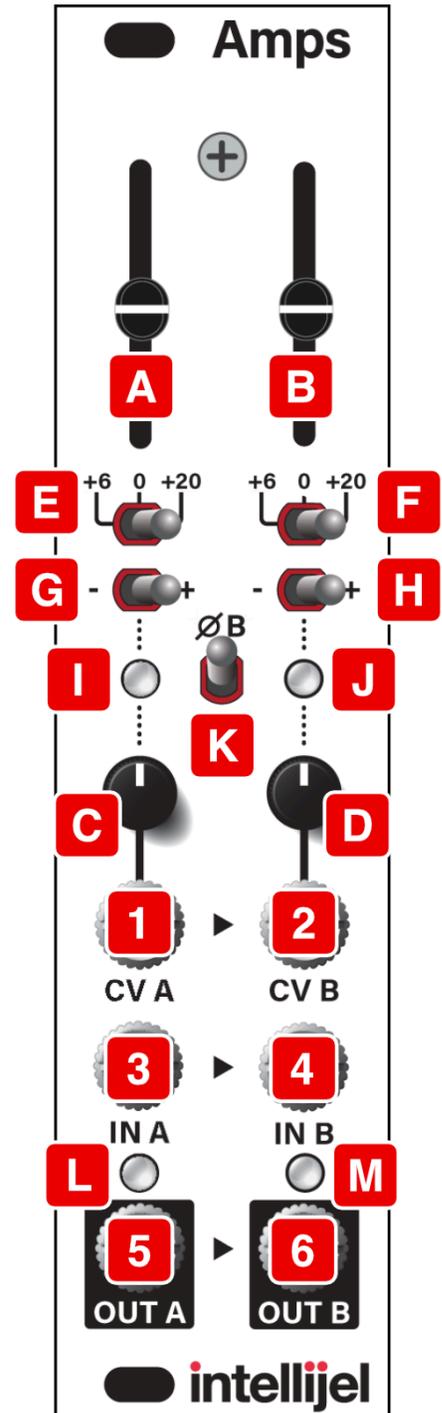


- [F] **BOOST B** switch - Same as **BOOST A [E]** switch, but allows for VCA B amplification in excess of unity gain.
- [G] **CV A POLARITY** switch - inverts the voltage arriving at the **CV A [1]** input, so that positive voltages affect the VCA negatively, and vice versa.
- [H] **CV B POLARITY** switch - inverts the voltage arriving at the **CV B [2]** input.
- [I] **CV A LED** - Displays a visual representation of the voltage currently modulating the **VCA A** level. This is the voltage arriving at **CV A IN [1]** *after* passing through both the **CV A Attenuator [C]** and the **CV A Polarity [G]** switch. Positive voltages light the LED **green**; negative voltages light it **red**. The brighter the LED, the higher the absolute voltage.
- [J] **CV B LED** - Displays a visual representation of the voltage currently modulating the **VCA B** level. This is the voltage arriving at **CV B IN [2]** *after* passing through both the **CV B Attenuator [D]** and the **CV B Polarity [H]** switch. Positive voltages light the LED **green**; negative voltages light it **red**. The brighter the LED, the higher the absolute voltage.
- [K] **VCA B PHASE INVERT** switch - In the UP position, this inverts the phase of the **IN B [4]** signal, which (among other things) allows for ring modulation (see [Ring Modulator](#), later in this manual).
- [L] **OUT A LED** - Indicates the level and polarity of the signal present at **OUT A [5]**. Positive voltages light the LED **green**; negative voltages light it **red**. The brighter the LED, the higher the absolute voltage. At audio rates, the LED appears solid, since the polarity changes too frequently for the eye to perceive.
- [M] **OUT B LED** - Indicates the level and polarity of the signal present at **OUT B [6]**.



Inputs & Outputs

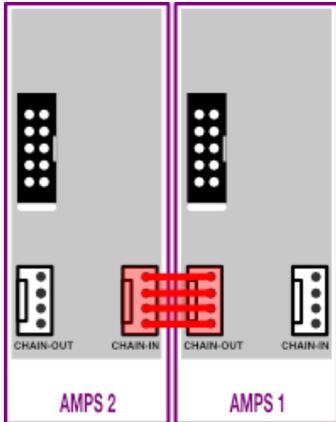
- [1] **CV A IN** - The voltage patched in here controls the level of VCA A. Patching a +5 V input into this jack (with the **CV A Attenuator [C]** fully clockwise, the **VCA A LEVEL [A]** slider all the way down, and the **BOOST A [E]** switch in the center “0” position) results in approximately unity (1:1) gain, which is sent to **OUT A [5]**.
- [2] **CV B IN** - The CV input for controlling the level of VCA B. If nothing is connected to this jack, the CV is taken from **CV A [1]**.
- [3] **IN A** - The input to VCA A.
- [4] **IN B** - The input to VCA B. If nothing is connected to this jack, the input is taken from **IN A [3]**.
- [5] **OUT A** - The output of VCA A. If nothing is connected to this jack, the output is mixed into **OUT B [6]**.
- [6] **OUT B** - The output of VCA B. If nothing is connected to **OUT A [5]**, this jack contains the sum of VCA OUT A and VCA OUT B.



CHAINING AMPS

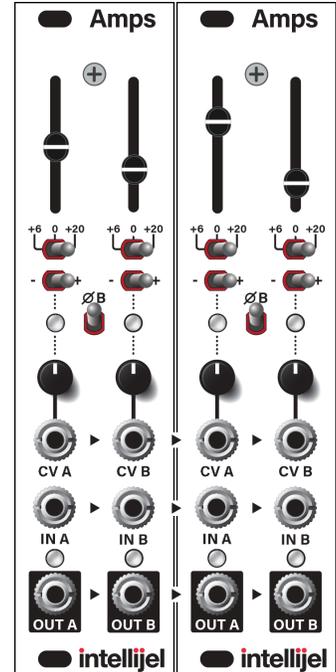
Multiple AMPS modules can be chained together to create a larger, multichannel ‘automatable’ VCA/mixer. To do so:

1. As shown in the illustration below, connect the CHAIN OUT connector on the back of the first AMPS to the CHAIN IN connector on the back of the second AMPS (using the supplied 4-wire cable).



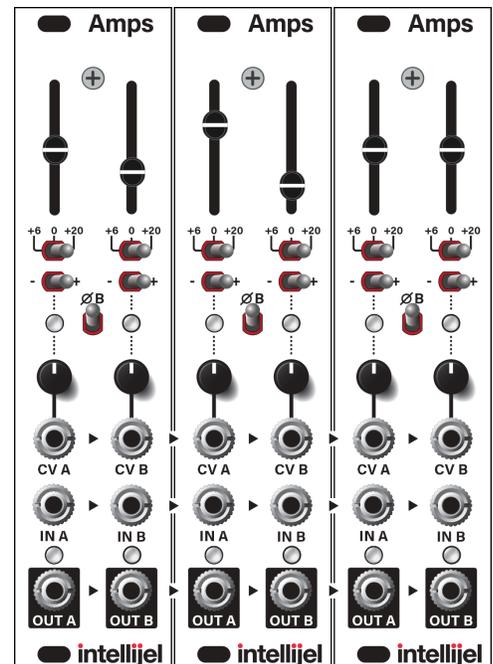
When you chain two AMPS modules, it functions exactly as if you owned a 4-channel, 12 hp version of AMPS (as illustrated to the right).

That is, **OUT B** of AMPS 1 is normalled to **OUT A** of AMPS 2; **IN B** of AMPS 1 is normalled to **IN A** of AMPS 2; and **CV B IN** of AMPS 1 is normalled to **CV A IN** of AMPS 2.



2. You can add a third AMPS module to the end of the 2-module chain to create a 6-channel mono mixer, etc.

With three AMPS modules chained together, it works exactly as if it were a 6-channel, 18 hp version of the module.



ADVANCED PATCHING IDEAS

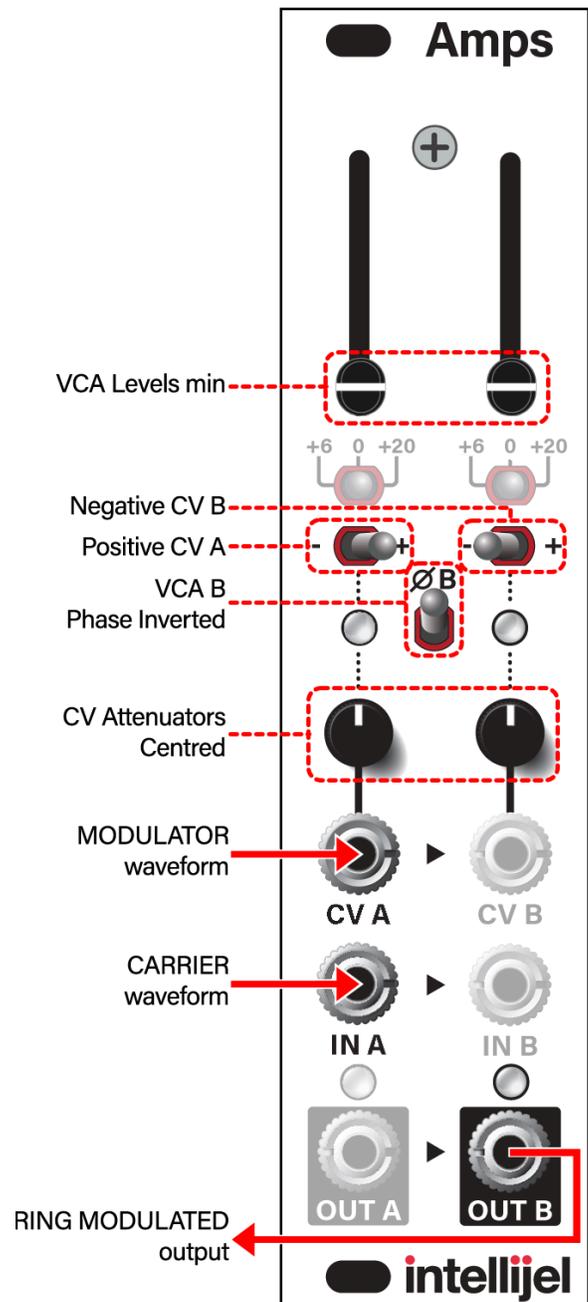
Aside from the obvious uses as a dual VCA, the polarity and phase switches provide AMPS with a couple of additional capabilities, which are often not part of standard VCAs.

Ring Modulator

To use AMPS as a ring modulator:

1. Set the **CV A POLARITY [G]** switch to +, and the **CV A attenuator [C]** to center.
2. Set the **CV B POLARITY [H]** switch to -, and the **CV B attenuator [D]** to center.
3. Set the **VCA B PHASE INVERT [K]** switch to the UP (invert) position.
4. Patch external waveform 1 into **IN A [3]** – this will be the CARRIER.
5. Patch **OUT B [6]** into an external VCA or mixer.
6. Set both **VCA A LEVEL [A]** and **VCA B LEVEL [B]** to minimum.
7. Patch external waveform 2 into **CV A IN [1]** – this will be the MODULATOR.

OUT B [6] will now carry the ring modulated output of the waveforms patched into **IN A [3]** and **CV A IN [1]**.



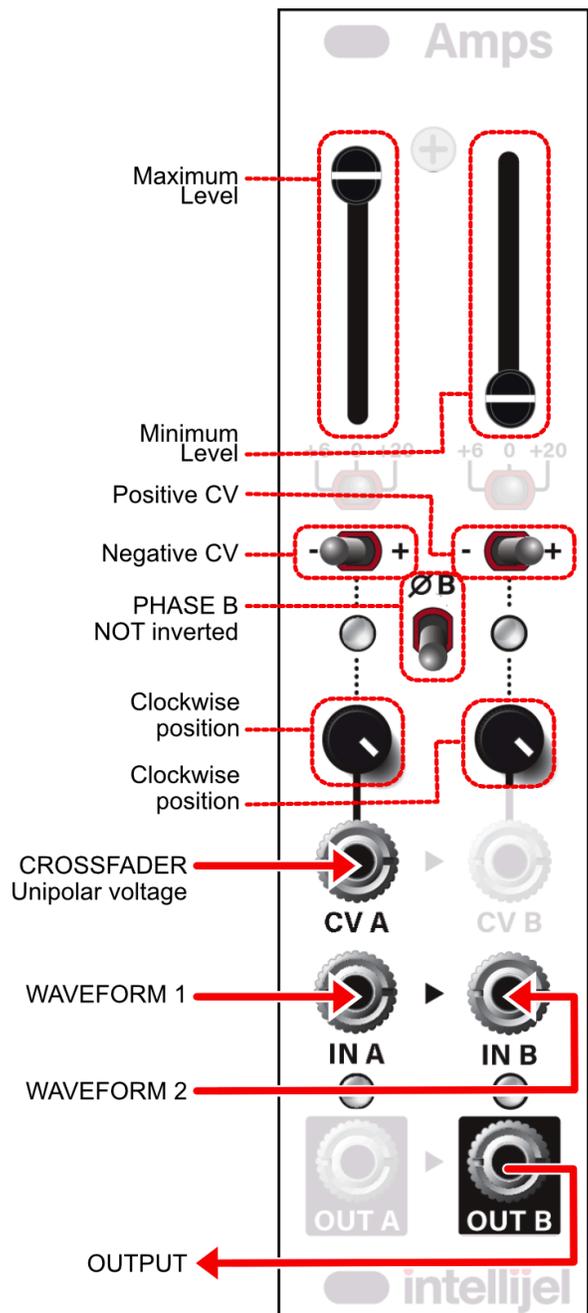
Crossfader (Unipolar CV)

To use AMPS as a crossfader with a unipolar CV input that crossfades between two incoming waveforms.

1. Set the **CV A POLARITY [G]** switch to **-**, and the **CV A attenuator [C]** fully clockwise.
2. Set the **CV B POLARITY [H]** switch to **+**, and the **CV B attenuator [D]** fully clockwise.
3. Set the **VCA B PHASE INVERT [K]** switch to the **DOWN** (in-phase) position.
4. Set the **VCA A LEVEL [A]** at the top, and set **VCA B LEVEL [B]** at the bottom.
5. Patch external waveform 1 into **IN A [3]**.
6. Patch external waveform 2 into **IN B [4]**.
7. Patch **OUT B [6]** into an external VCA or mixer.
8. Patch a unipolar control voltage into **CV A IN [1]**, and vary it.

Sweeping the control voltage from 0V to +5V will crossfade external waveform 1 with external waveform 2.

That is, positive voltages increase the amount of external waveform 2 present at **OUT B [6]** while simultaneously decreasing the amount of external waveform 1.



Crossfader (Bipolar CV)

To use AMPS as a crossfader with a bipolar CV input that crossfades between two incoming waveforms.

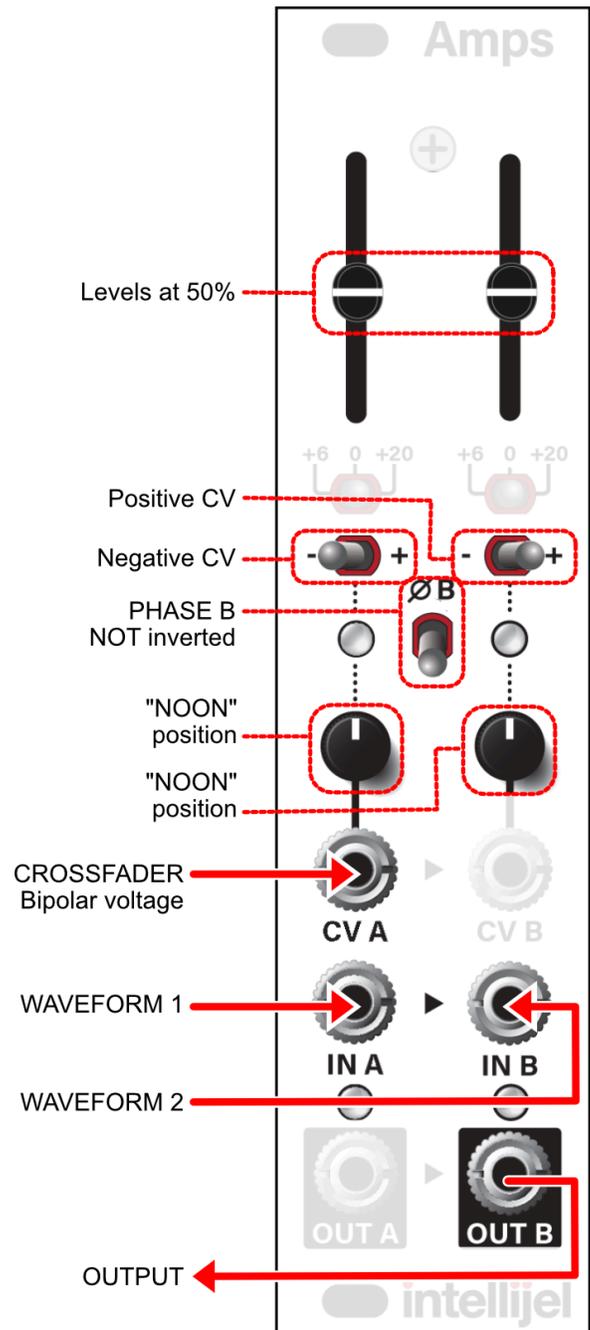
1. Set the **CV A POLARITY [G]** switch to **-**, and the **CV A attenuator [C]** to the noon position.
2. Set the **CV B POLARITY [H]** switch to **+**, and the **CV B attenuator [D]** to the noon position.
3. Set the **VCA B PHASE INVERT [K]** switch to the DOWN (in-phase) position.
4. Set the **VCA A LEVEL [A]** and **VCA B LEVEL [B]** to the same height, halfway up the sliders.
5. Patch external waveform 1 into **IN A [3]**.
6. Patch external waveform 2 into **IN B [4]**.
7. Patch **OUT B [6]** into an external VCA or mixer.
8. Patch a bipolar control voltage into **CV A IN [1]**, and vary it.

Sweeping the control voltage from negative to positive will crossfade external waveform 1 with external waveform 2.

That is, positive voltages increase the amount of external waveform 2 present at **OUT B [6]** while simultaneously decreasing the amount of external waveform 1. Similarly, negative control voltages decrease the amount of external waveform 2 present at **OUT B [6]** while simultaneously increasing the amount of external waveform 1.

CV polarity is indicated by the **CV A LED [I]** and **CV B LED [J]**.

9. Adjust the **CV A [C]** and **CV B [D]** attenuators as needed to balance the volume of the two incoming waveforms.



TECHNICAL SPECIFICATIONS

Width	6 hp
Maximum Depth	36 mm 42mm with 4-pin Link cable attached
Current Draw	40 mA @ +12V 46 mA @ -12V