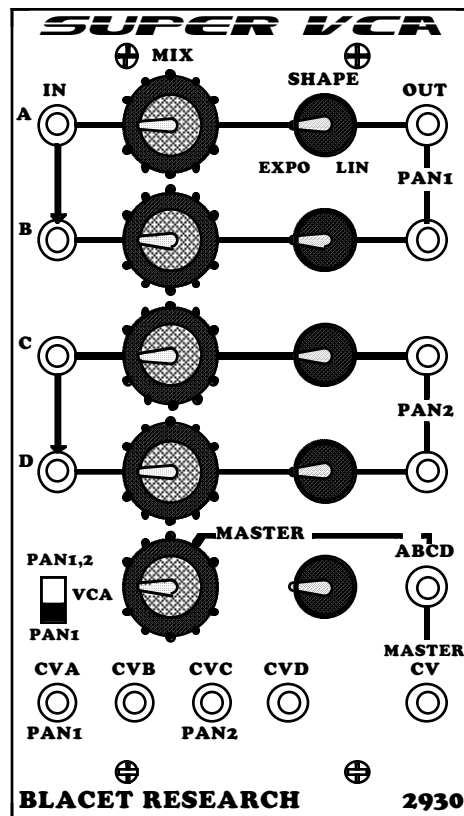


# ***SUPER VCA***

## Quad Mixer/VCA with Master Channel

### **BLACET RESEARCH MODEL VCA2930**

#### User & Assembly Manual



Blacet Research 94502 Stock Drive Lane, Lakeview, OR 97630  
 blacet@blacet.com <http://www.blacet.com> 541-947-5330

Contents Copyright.

Reproduction by any means including the Internet prohibited without permission.  
 This document contains proprietary and trade secret information of Blacet Research and is provided as a service to the module owner. Any unauthorized duplication or transferral may violate trade secret laws.

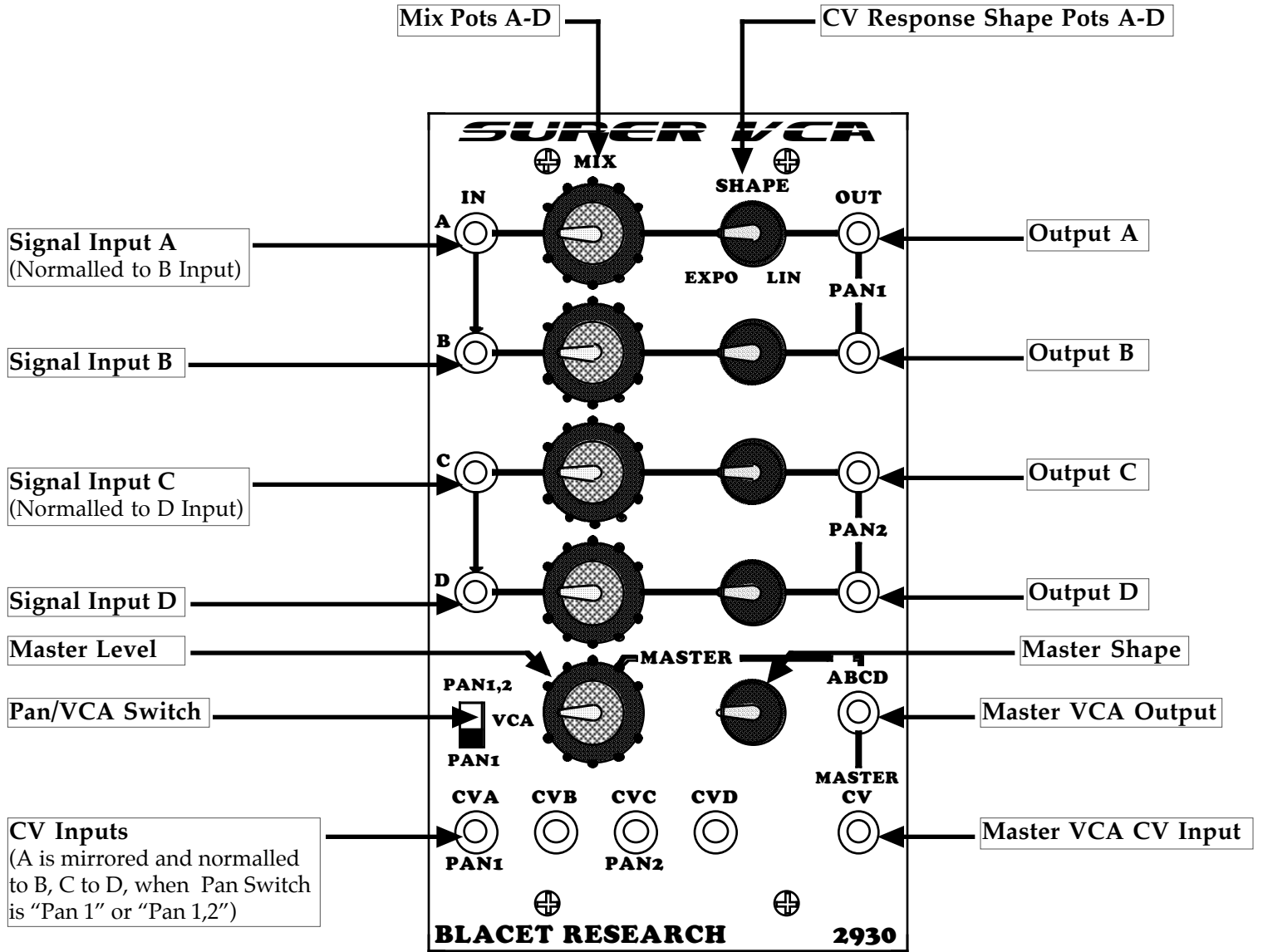
Contents subject to change without notice.

## Introduction

The Blacet VCA2930 is a Quad Mixer/VCA with a Master VCA. Audio or control voltage signals may be processed. Each of the four VCA channels may be used independently, as a mixing element into the Master VCA or as part of one of two panning circuits.

A unique feature is that the control voltage response for each channel is continuously variable between exponential and linear, allowing precise control over a complex mix.

Normalling and a built in control voltage mirror allows panning type use with no external mixer and only one external CV. Other applications of the module include: splitter (one signal to two outputs), fader (two signals fade between two outputs) and swapper (two signals alternately appear at one output).



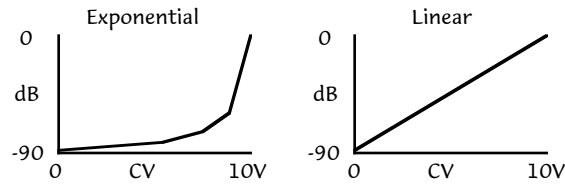
## Controls and Operation

Operation of the VCA2930 is fairly straight forward. There are four separate VCAs and a Master VCA. Any channel that does not have a plug in the OUT jack is automatically connected to the Master Channel and any signal will appear at the Master VCA Output (ABCD).

Connect a signal to any IN jack and connect the OUT jack to a mixer, amp or other module as required. Set the level with the MIX pot. Each VCA has it's CV input normalled to a bias source that keeps the VCA fully on. Make sure the Pan/VCA Switch is in the center position (VCA).

the Pan/VCA Switch is in the center position (VCA).

You can use the CV input to dynamically control the VCA. Use the EG1, DAD, or LFO, for example. Use the SHAPE pot to control the VCA response from an exponential to a linear curve.



Exponential CVs usually sound “punchier” and linear CVs have more of a “sustain” quality. It is important to avoid using CVs in excess of 10V. This will send the VCA into a gain situation which will result in possible distortion and increased bleed thru. This precaution is especially true in the exponential mode as the gain will increase very rapidly due to the accelerating curve shown above. As little as 0.5V will cause 15 dB of gain (each 6 dB **doubles** the signal level).

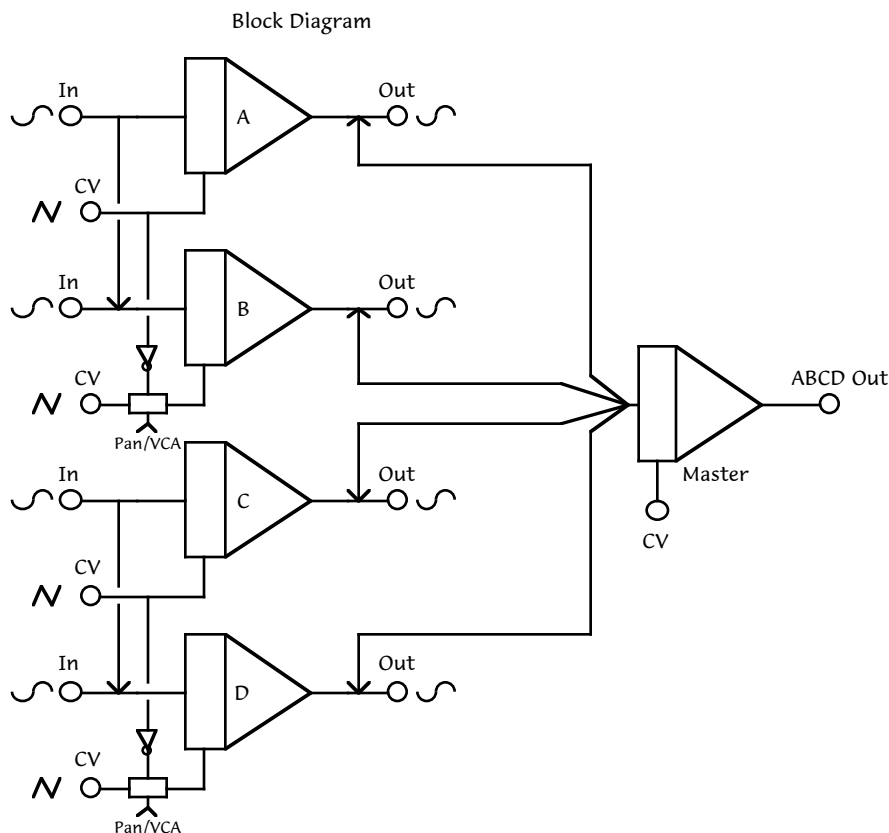
For special effects such as Panning, you can set the Pan/VCA Switch to Pan 1, which enables VCAs A and B or set the switch to Pan 1, 2 which sets up two panners, A,B and C,D. See the diagrams on the next page.

**Stereo Panning:** Input a signal into A and connect the A and B outputs to a stereo mixer. Typically, use a 0-10V triangle wave from an LFO into the A CV input. The input signal will pan between the stereo outputs. You can experiment with the A and B Shape pots to get different effects.

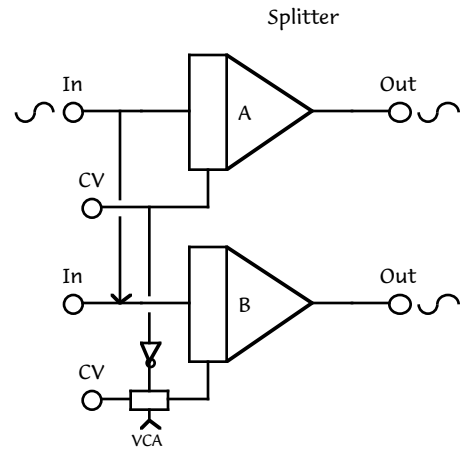
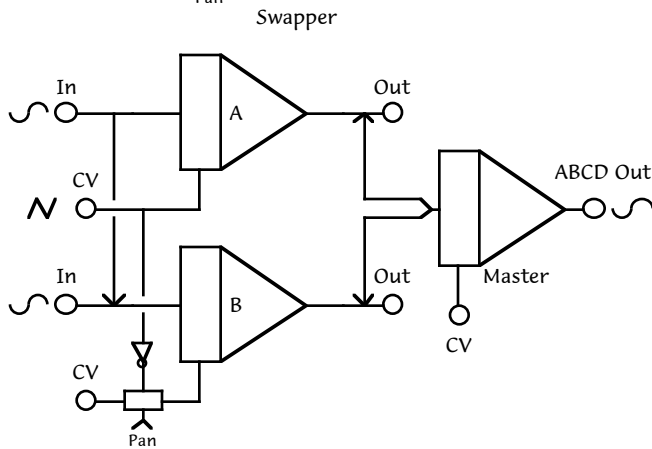
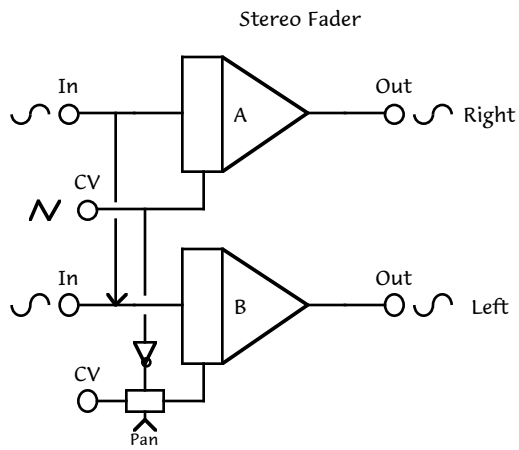
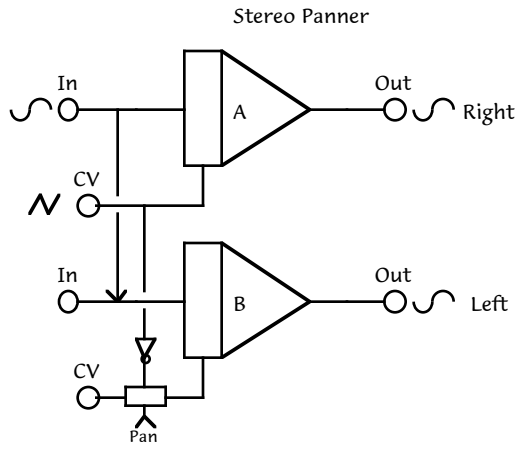
**Stereo Fader:** Input two different signals into A and B and connect the A and B outputs to a stereo mixer. Typically, use a 0-10V triangle wave from an LFO into the A CV input. The input signals will appear alternately at the stereo outputs. You can experiment with the A and B Shape pots to get different effects.

**Swapper:** Input two different signals into A and B and connect the Master ABCD output to a mixer. Typically, use a 0-10V triangle wave from an LFO into the A CV input. The input signals will appear alternately at the output. You can experiment with the A and B Shape pots to get different effects.

**Splitter:** For this application set the Pan/VCA Switch to VCA. Input a signal into A. This signal automatically normals to B. The input signal will appear at the A and B outputs. You can set the level of each output with the Mix pot and optionally use the A and B CV inputs to control each output.



# Applications



## Specifications

Module Width: 3"

Module Depth: 3.8"

Maximum Attenuation: 90dB

Maximum Control Voltage: 10V

CV Control Curve: variable, exponential to linear

Power Requirements: +15V @ 114 mA, -15 @110 mA

## Circuit Description

The VCA2930 contains five mostly identical VCA sections. Most of the differences involve normalizing and switching used to achieve panning type functions for channels A, B and C, D.

Taking the Channel A as an example, a signal present at the input J1, is buffered and inverted by op amp U1d. The signal is also buffered by U1a and normalised to the B Input jack for possible panning and splitting applications.

The output of U1d is attenuated by Mix pot R1 before being sent to the input of VCA U3c. The signal current at the VCA output is converted to a voltage by op amp U1c and appears at output jack J9. The signal is also normalised to the Master VCA if no plug is present at the jack.

The VCA IC is controlled by a CV present at CVA Jack J5. If no plug is inserted, then a +bias source is normalised into the circuit. This turns the VCA fully on. Op amp U7c provides the processing for the exponential control voltage of the VCA. Op amp sections U7b, U7a and U7d along with U11a provide the linear control voltage. The Shape pot, R6, selects a mix of the two control voltages which is applied to VCA U3c pin11. Op amp buffer U1b compensates for the low input impedance of pin 11.

The VCA IC is fully on with a control voltage of 0 and fully off (-90dB) with a 3V control voltage.

For panning type effects, the control voltage at J5 is buffered and sent to a control voltage mirror built around U12b. The 0 -10V signal is thus converted to 10 - 0V. This voltage can be selected by switch S1 and analog switch U13a to control VCA B. This results in VCA A being on when VCA B is off and visa versa.

When S1 is in the "VCA" position, the CV for VCA B is derived from CV jack J6 and the VCA operates in a normal, independent manner. When the switch is in either "Pan" position, then the mirrored CV from VCA A is used to control VCA B.

The three positions of S1 allow A and B to be used as a panner, with C and D independent VCAs ("Pan 1") or both A,B and C,D functioning as panners ("Pan 1,2").

Bias voltages for the module are derived from 5V reference D1 with op amp sections U6a and U6b providing the + and - bias signals.

Power input to the module is connected via JPWR and filtered by caps CA thru CD. Protection from reverse voltages or shorts is provided by polyfuses PS1 and PS2 along with diodes DA and DB.