

The Symmetric Research VREF-399 is a precision voltage reference suitable for general lab use and specific applications such as 24 bit A/D converter calibration. It provides excellent short and long term voltage stability, maintaining accuracy from one power on cycle to the next. It does so by using a heated buried zener voltage reference to remove any TC drift.

Six fixed output voltages are available on banana jacks. These constant voltages range from 0 to 5 volts in approximately 1 volt increments. Because no trim pots are used, drift and calibration problems are reduced and stability is increased. The reference as a whole is floating. Any one of the outputs may be used as ground, with the other outputs distributed positive or negative from the grounded output. The 6 banana jacks on the top panel allow many different types of connections and test leads.

Included with the system are a 12 VDC wall transformer power supply, anodized aluminum enclosure, banana plugs, and a PDF User Manual with circuit diagrams.

## HARDWARE FEATURES

- Ideal for applications requiring precision constant voltages
- 6 digit accuracy
- Floating design with 6 individual banana jacks outputs in 1 volt increments
- Can source 10 milliamps per output
  
- Superb short and long term stability due to heated buried zener design
- Buried zener design guarantees low noise
- All outputs op amp buffered with short circuit protection
- Low impedance outputs are suitable for driving potentiometers, etc
  
- Easy to use banana jacks allow quick connections to test leads, wires, and user cables
- Anodized aluminum enclosure
- Small footprint 2.75" x 5.00"
- 12 VDC external power supply and 6 banana plugs included
  
- Perfect for calibrating 24 bit A/D systems
- Excellent for general lab use

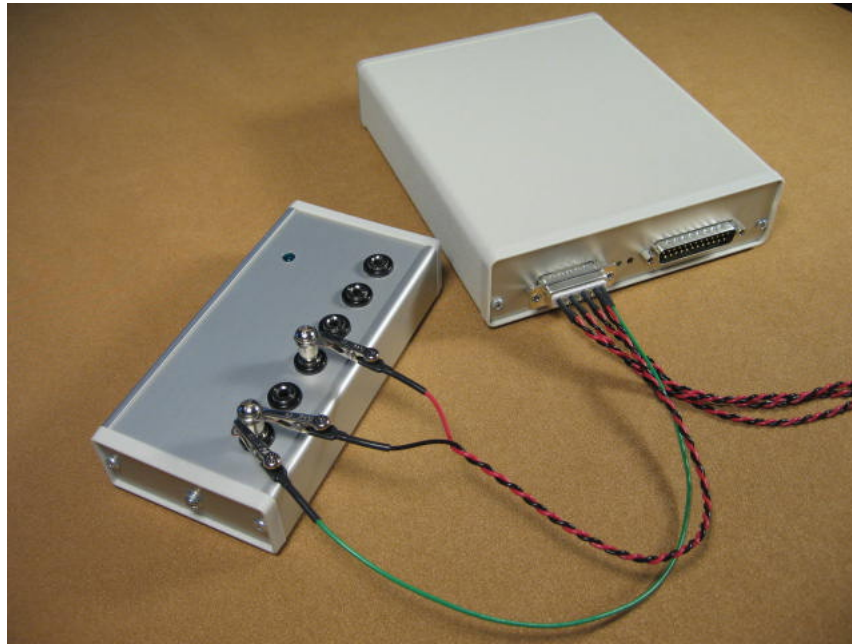
## OTHER FEATURES

- Full documentation includes PDF User Manual and circuit diagrams

## PRICES

SR Product	Description	Price
VREF-399	High precision voltage reference accessory	\$200

One popular VREF-399 application is for calibrating A/D systems. In the photo below, a VREF-399 is on the left, and a four channel SR USB4CH 24 bit A/D system is on the right. Power and computer connections are not shown.



VREF-399 being used to calibrate USB4CH A/D system

In this experiment, one channel of the USB4CH is connected to the VREF-399. The red and black twisted pair wires are the analog inputs to the A/D system. Since there is a one volt separation between banana jacks, there is a 2 volt calibration signal applied.

For this particular setup the USB4CH green AGND wire is also connected, referencing the VREF-399 to the USB4CH. However, the calibration could have just as easily been done with the green wire not connected, relying on the USB4CH weak internal AGND connection for ground referencing. The VREF-399 is completely flexible as to which banana jack is referenced to ground with the jacks distributed positive and negative from the selected point.

With the 6 output jacks you can easily test A/D converters over a wide range of input voltages. And, with its heater stabilized buried zener reference design, the VREF-399 provides exactly the same calibration voltage from one power on to the next for repeatable precision results.