

ANIQHV5KV High Voltage Module

ANIQ R&D Inc.

Introduction

This is a quickstart operation manual describing how to use the ANIQHV5KV VME module, with preamplifier power supply and high voltage bias supply.

ANIQHV5KV Specifications

- Connects to a VME backplane.
- Designed for Ge detectors (HPGe or Li-drifted).
- Enable control switch
(**Warning: do not enable until the 2 minutes waiting time after power up**).
- Ramp up/down control switch with a progressive rise/fall in bias voltage.
- Preset voltage output, V_{out} , according to the the user's needs.
- Up to 5kV of output voltage.
- Provides up to 0.2 mA of current.
- 5 and 12 volts power input provided by the VME backplane.
- Auto ramp down by detecting the temperature signal. This option is selected using a jumper (See Fig. 1 for the jumper positions) to protect HPGe detectors.

Initial setup

This ANIQHV5KV module comes with a preset output bias voltage of 2.5kV. This output voltage can be adjusted with the gain trimpot (CCW to increase V_{out}) by measuring the Test Point (TP) voltage, V_{TP} . The gain and the TP contact

are shown in Fig. 2, labeled as numbers 2 and 3 respectively. The variation of the output voltage is linear and can be written as:

$$V_{\text{out}} = 989.5V_{\text{TP}} \quad (1)$$

For example, to get 2.4kV output voltage, the user needs to measure 2.526V at the TP with a common voltmeter by adjusting the gain trimpot with a small flat screwdriver, turning .CCW to *increase* the bias.

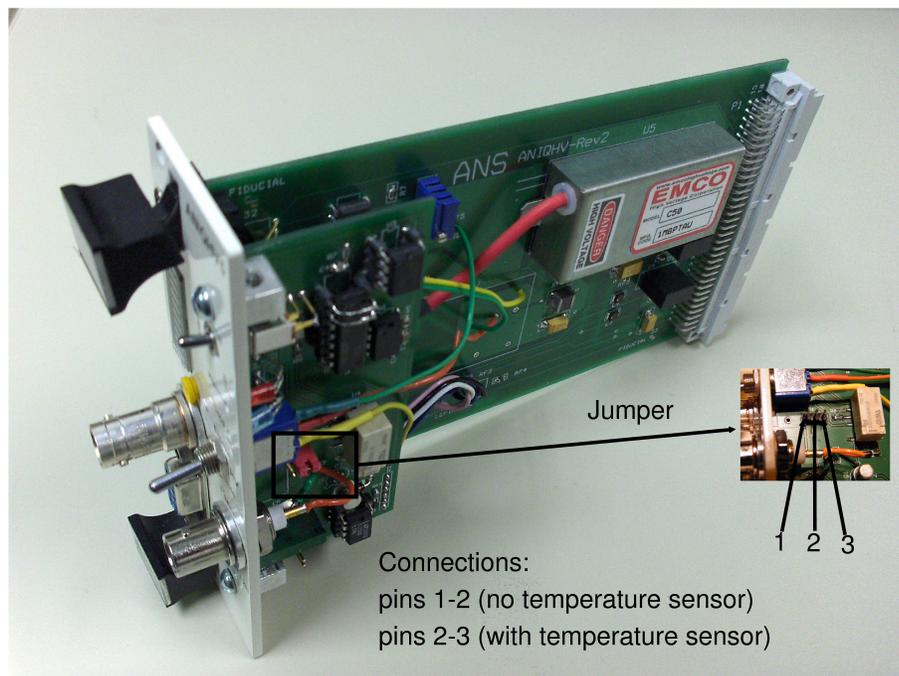


Figure 1: Side view of the ANIQHV5KV module.

Front panel

The front panel allows adjustments to be made; it is shown in Fig. 2. The front panel contains connectors, switches and indicators represented by the numbers listed below:

1. The SHV output connector.
2. Gain adjustment.
3. Test point for external low voltage voltmeter.
4. Output voltage LED bar indicator.

5. High Voltage Ramp switch.
6. LED indicating "Warm" state of the detector.
7. LED indicating "Cold" state of the detector.
8. High Voltage output Enable/Disable switch.
9. BNC connector for the detector temperature state readout.
10. DB9 power connector for the detector preamplifier.

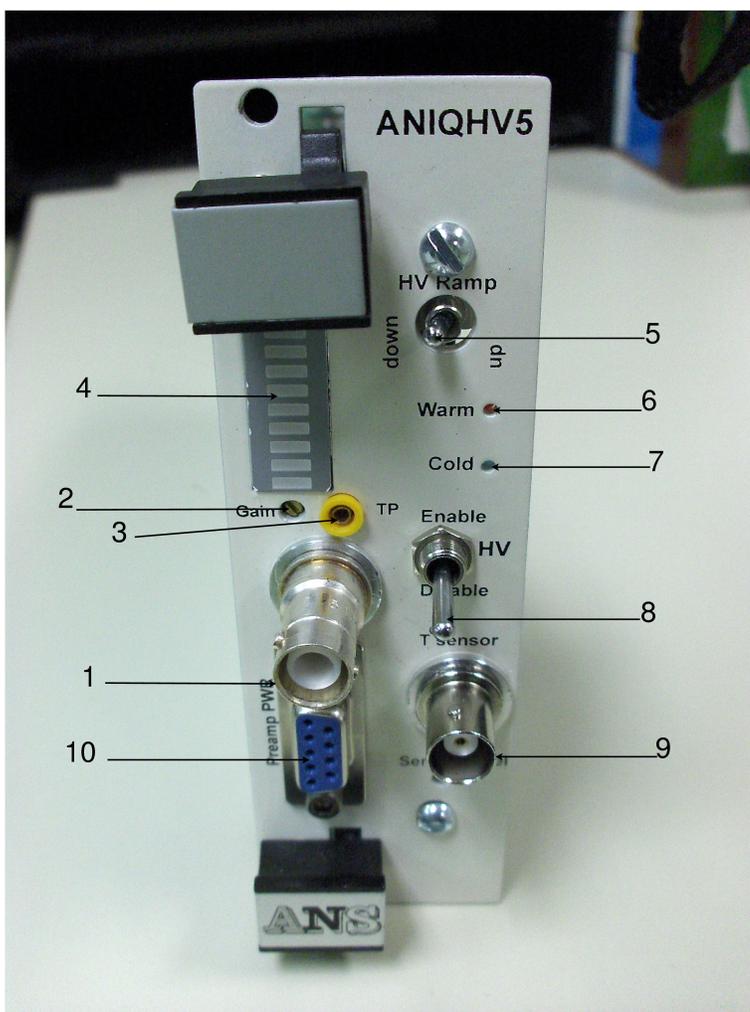


Figure 2: Front view of the ANIQHV5KV module

Power-on

There are two ways to begin using HV-power supply. In the first case, which we call a “cold-start”, the VME crate has just been powered up. The second mode is when the HV bias has been ramped down but the power was left on the VME crate; we call this a “warm-start”. There is a difference between the two modes because when the board is first powered up, its electronics will make an initial cycle that lasts two to three minutes.

“Cold-start”

This section describes how to use the HV module right after the VME crate is turned on. Due to the specific behavior of the voltage ramping circuitry, at this moment the HV value will be set at $V_{\text{out,ini}} = \frac{1}{2}V_{\text{set}}$, where $V_{\text{out,ini}}$ is the initial output voltage of the HV bias unit and V_{set} is the desired value set by the gain adjustment. To prevent the rapid appearance of the excessive voltage on the SHV connector, the output of the module has to be disabled by the Enable/Disable switch on the front panel. This allows time for internal ramping circuitry to ramp its voltage down to zero while the detector remains unbiased. This waiting period is about 2..3 minutes depending on the particular module. After the waiting period is over enable the module’s HV bias output by switching it in “Enable” position. Now the module is ready to start ramping the HV output to the preset value. In order to do this, toggle the HV Ramp switch to the right, “Up”, position.

“Warm-start”

This mode of operation refers to the state when the HV power supply was ramped down before, but the VME crate was left powered on. The powered ramping circuitry holds the output voltage at zero value. To start the operation, simply toggle the HV Ramp switch to the right “Up” position.

Power outage

If a power outage is expected to occur, special precautions have to be taken to prevent sudden HV appearance at the output of the power supply.

1. The use of reliable UPS for the VME crate is highly recommended.
2. Always leave the HV Enable/Disable switch in the “Disable” position after using the module.
3. Always check the initial position of the HV Enable/Disable switch before powering up the VME crate. The switch has to be in “Disable” position and the Ramp should be “Down”.