

HV Distribution Box



Description

The HV Distribution box, formerly known as the "Biasing Box", offers a comprehensive range of functionalities designed to control and monitor high-voltage (HV) channels as well as manage biasing options.

One of the core capabilities of the box is its **multiplexer functionality**, which allows a single HV input channel to be routed via the switch to any of the 8 output channels. The voltage can be switched individually, in groups, or to all channels simultaneously. In addition to this, a second HV input is available, offering flexibility in the configuration. This enables users to switch between a **1x8 multiplexer** setup or a **2x1x4 multiplexer**, ideal for applications where two HV power supplies are used, such as during an IV scan. For switching multiplex modes, use the switch in the front of the box.

The system also incorporates an **interlock circuit** designed for enhanced safety. If the test box is not connected to the coldbox interlock control system, the interlock function can be bypassed by inserting two jumpers into the 4-pin connector. The interlock mechanism ensures that when the system is powered off, no electrical connection exists between the input and the output channels. Once power is applied, the system

defaults to the **1-to-8 multiplexer mode**, where all 8 channels receive voltage from the first input channel. By pressing the **Interlock Reset Button**, you can Reset the Box to the 1-to-8 multiplexer mode with forward bias disabled (As long the channel Switch is correctly set).

Additionally, the box features the ability to apply **forward bias voltage** on each individual channel. This means that instead of the default negative HV output, a positive forward bias voltage can be applied to the channels. In this configuration, it also enables **current measurement** for each channel, providing added monitoring capabilities.

The test box also includes **high-voltage current measurement**, which allows precise tracking of current within high-voltage circuits.

Finally, the box is equipped with a **USB-C** interface for seamless connection to a PC. Through the **virtual COM port (VCOM)**, the test box can be fully controlled via software, enabling users to manage it through **Python scripts** or any other custom control software. This flexibility in control makes the test box highly adaptable to various testing environments. There is also a **second USB-C Port** for an **external USB Power Supply** because if all channels are switched to the Bias circuit, the box slightly exceeds the USB current limit of a normal USB Port from the PC.

Feel free to ask if you need more details or have further questions.

Specifications

Physical Specs

160 x 191 x 66 mm

2x Lemo Inputs

8x Lemo Outputs + 8x LED Output

USB-C Connector for Power and VCom Port

Interlock Connector for Coldbox + LED Indicator and Reset Button

Forward Bias

Measuring Resolution: min. 2 μ A

Measuring Range: 0 - 900 μ A

Forward Bias Range: 0 – 1V

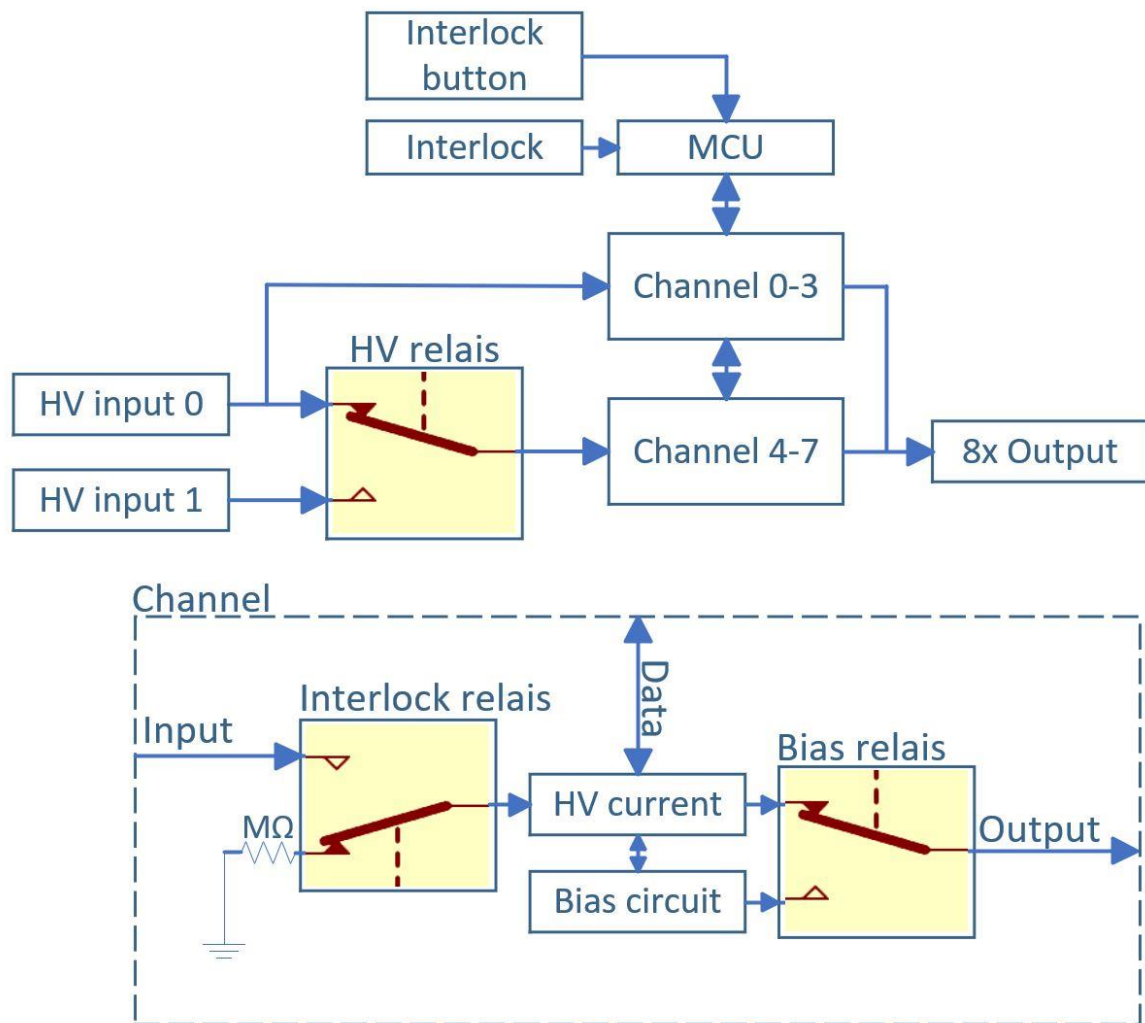
Forward Bias Resolution: 3 mV

High Voltage Current Measuring (ADE9112)

Current Range: 1nA - 10uA

Current Resolution: 1 nA

Block Diagram



Note: the HV relays is now the switch in the front and not an uC-controlled relays