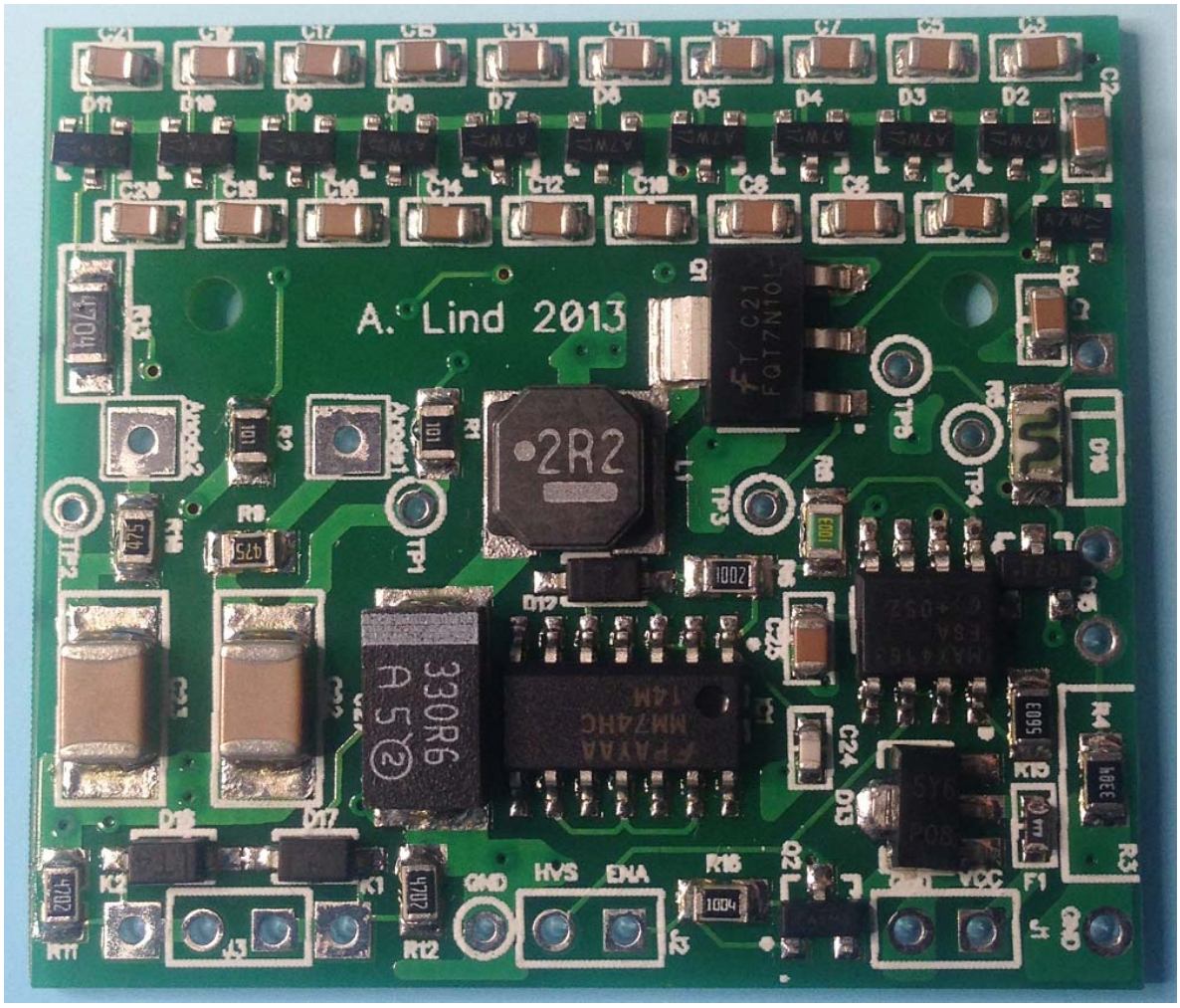
High Voltage Geiger Muller Power Supply

Ver 4.1

Allan R. Lind, March 2013



Overview

A small lightweight High Voltage DC Power Supply designed specifically for Radiation detectors employing Geiger Muller tubes.

The board is designed to run for long periods off a single 3.7V Lithium Ion or Lithium Polymer battery.

There are 2 independent HV outputs each of which can be configured for +391V, +548V, or +860V which should serve most commonly available GM tubes.

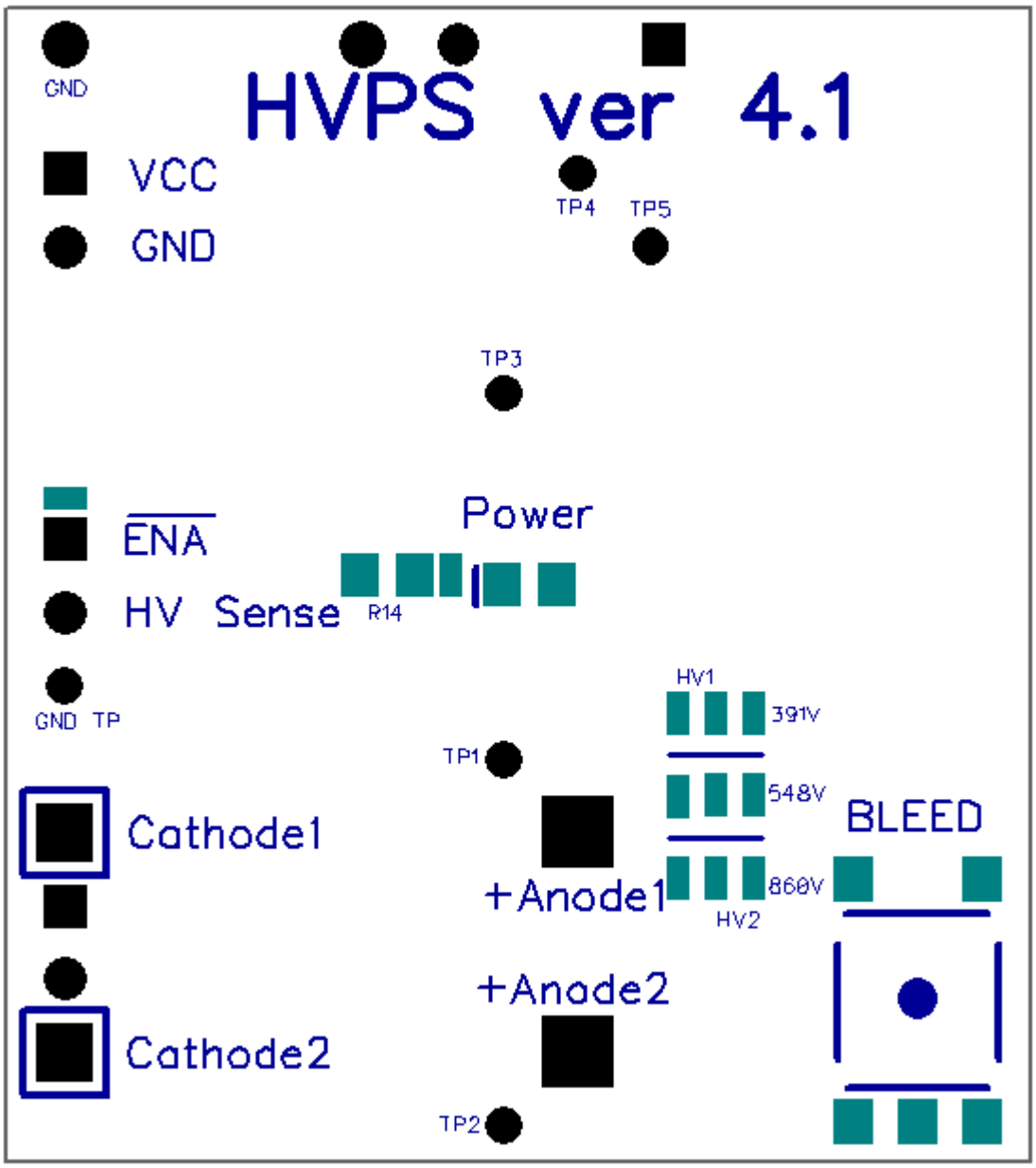
There are 2 independent pulse outputs derived from the Geiger Muller tube's Cathodes. These outputs are diode protected from voltage pulses extending beyond the battery rail voltage. A detected event creates a positive going pulse.

The power supply is fuse protected from overvoltage and reverse polarity.
There is an enable input (take to ground to enable the supply). If not using Enable input, place a solder bridge as indicated.

Voltage Sense output for monitoring High Voltage Output. This output will show 2.5V under normal operation. If it is any lower this could be due to output overload condition or a fault in the HV generator or multiplier stage.

Provisions are made for the following optional components.
Power Indicator LED
Optional output HV smoothing capacitors
Voltage adjustment Resistor (R3 to give user required output voltages)
High Voltage Bleed push switch
Output stack protection Zener diode

Addition of some or all of the components will increase cost and power consumption.

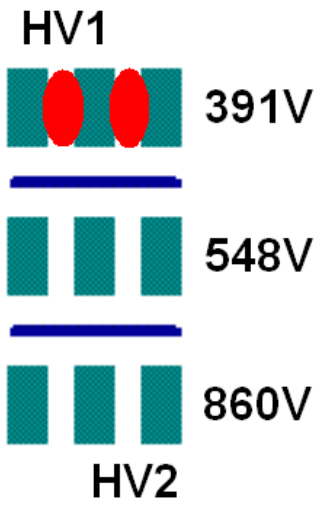

GND
HVPS ver 4.1
VCC
GND
TP4
TP5
TP3
Power
ENA
HV Sense
R14
GND TP
HV1
391V
TP1
548V
BLEED
Cathode1
+Anode1
860V
HV2
+Anode2
Cathode2
TP2

Specifications

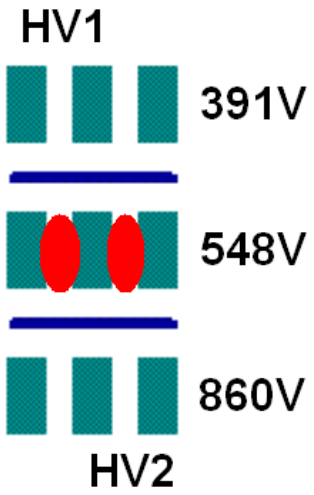
H 40mm W 36mm
Supply Voltage: +3.3 ~ +5.0V
Operating Current: ~130uA
(under no load)
Output Voltage: 391V, 548V, 860V
(jumper selectable)
Outputs: 2
Anode Output ballast resistors: 4.7M Ohms
Over voltage and reverse polarity Protection: Resettable fuse
HV Sense output: 0-2.5V represents 0-860V , 0-548V or 0-391V depending on which output you have chosen.
TP 1 and 2 are direct Outputs before the 4.7M Anode Resistors

Output voltage configurations

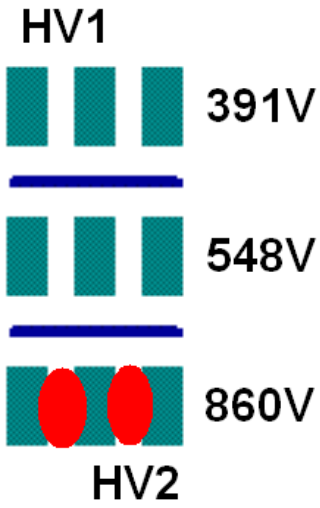
Place a solder bridge over the pads as indicated in red.
Output 1 = 391V
Output 2 = 391V



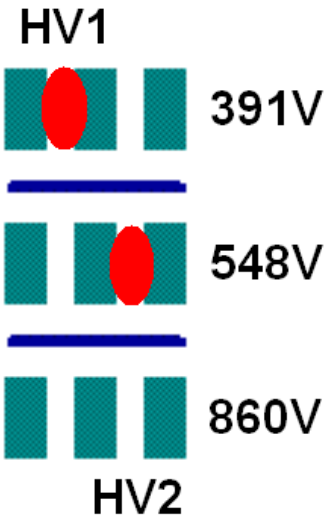
Output 1 = 548V
Output 2 = 548V



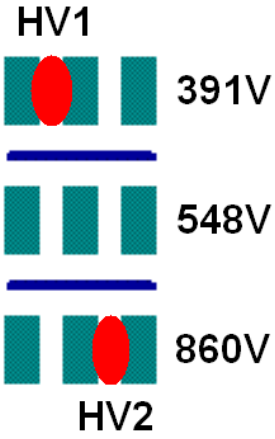
Output 1 = 860V
Output 2 = 860V



Output 1 = 391V
Output 2 = 548V



Output 1 = 391V
Output 2 = 860V



V

Output 1 = 548V
Output 2 = 860V