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Title: Modular High Voltage Power Supply

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Modular High Voltage Power Supply



INTERNATIONAL NUCLEAR SAFEGUARDS

Very stable and low noise computer controlled bias power supply in a rack mountable modular platform

Background/State of the Art Approach, Metrics and Outcomes

Impact



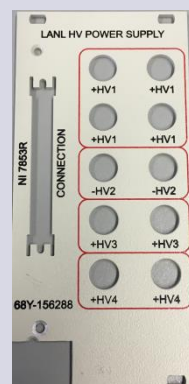
- Modern high voltage power supplies used in safeguards applications are:
 - Built into stand-alone instruments
 - Based on old NIM bin technology
 - Do not meet the stringent <20mV low noise specifications needed. (COTS HV boards have 10V ripple)

Innovation

- Develop a modular High Voltage power supply that can be used with other safeguards data acquisition boards in a shared rack
- A modular supply based on modern crate and controller standards will allow for longevity of the technique.
- Fully computer controlled
- Very low noise, <10mV ripple

MAIN GOAL

- Develop a Modular High Voltage Power Supply that will meet the needs of safeguards applications and provide a modular plug and play supply for use with standard electronic racks, e.g. PXI.



HOW IT WORKS

- The development will produce a HV power supply that will interface with a crate controller, e.g. PXI controller.
- The power supply will provide three different positive bias voltages and a single negative bias.
- Computer controlled voltage levels as well as feedback voltages can be accessed over Ethernet via the crate controller.

- Safeguards relevance
 - Existing safeguards instruments are becoming obsolete and a modular approach to replacing them is being considered.
 - HV power supplies are one of the functions needed to replace the aging technology
- Long-Term R&D STR-375
 - Need #5: Deploy equipment
- IAEA STR-382 Objective
 - SGTS-11: UMS
- Start of FY TRL = 6
- End of FY TRL (Planned) = 7

Goals/Action Plan

Current FY

- Modify the LANL manually controlled PXI based HV power supply for computer control via an IAEA preferred modular crate.

Future FY

- Demonstrate the final product either at LANL or at a facility preferred by the IAEA.

Team

LANL NEN-1 electronics team

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