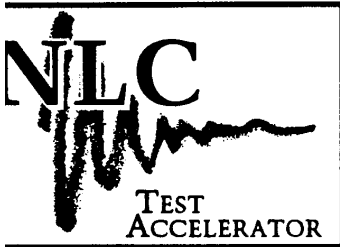


January 12, 2009



**Subject:** Modifications for Toshiba Ion Pump Control  
Unit VT-69060U-E

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This document describes the changes of the Toshiba Ion Pump Control Unit VT-69060U-E power supply required to meet SLAC electrical safety requirements and to support the testing of the E3736KS Toshiba Multi-beam (L-band) Klystron at NLCTA.

Attached is a schematic of the stand-alone power supply.

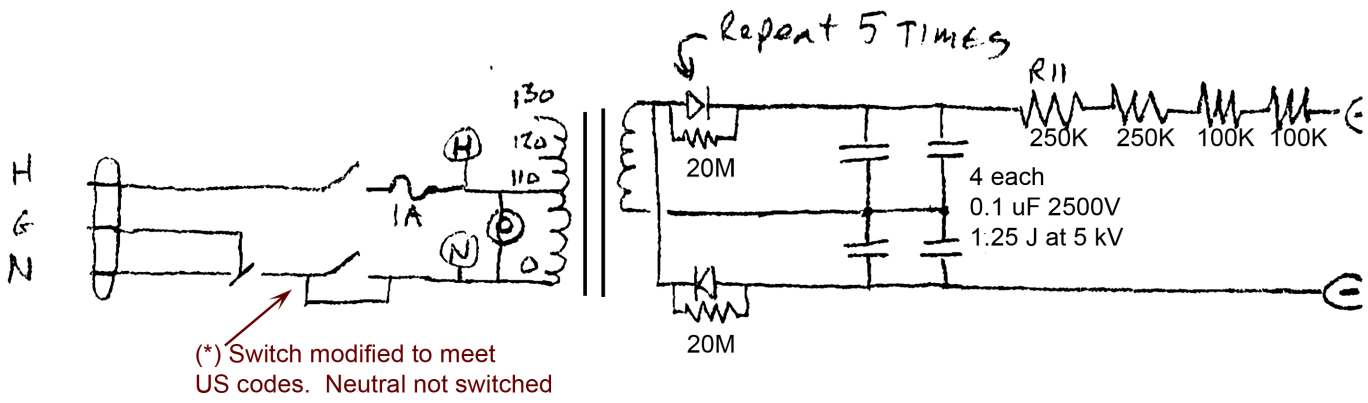
Specifications (inferred)

Input:	120 VAC, front panel switched
Voltage:	3.6 kV
Polarity:	Positive
Maximum current:	50 mA (maximum meter reading, not verified)
HV Connector:	SHV
Ground connection:	Black 2-way banana-plug binding post
Current monitor:	See note below.
Current Monitor output:	2-way banana-plug binding posts, Black (-) and Red (positive). Red is at ground potential.
Meter:	Internally amplified analog meter with adjustable setpoint.
Modes:	5 uA to 50 mA by decades, 5 kV
Relay output:	Three white 2-way banana-plug binding posts, form C (Common, NO, NC). Note: Relay output depends on front-panel meter range setting.

The power supply was modified as follows:

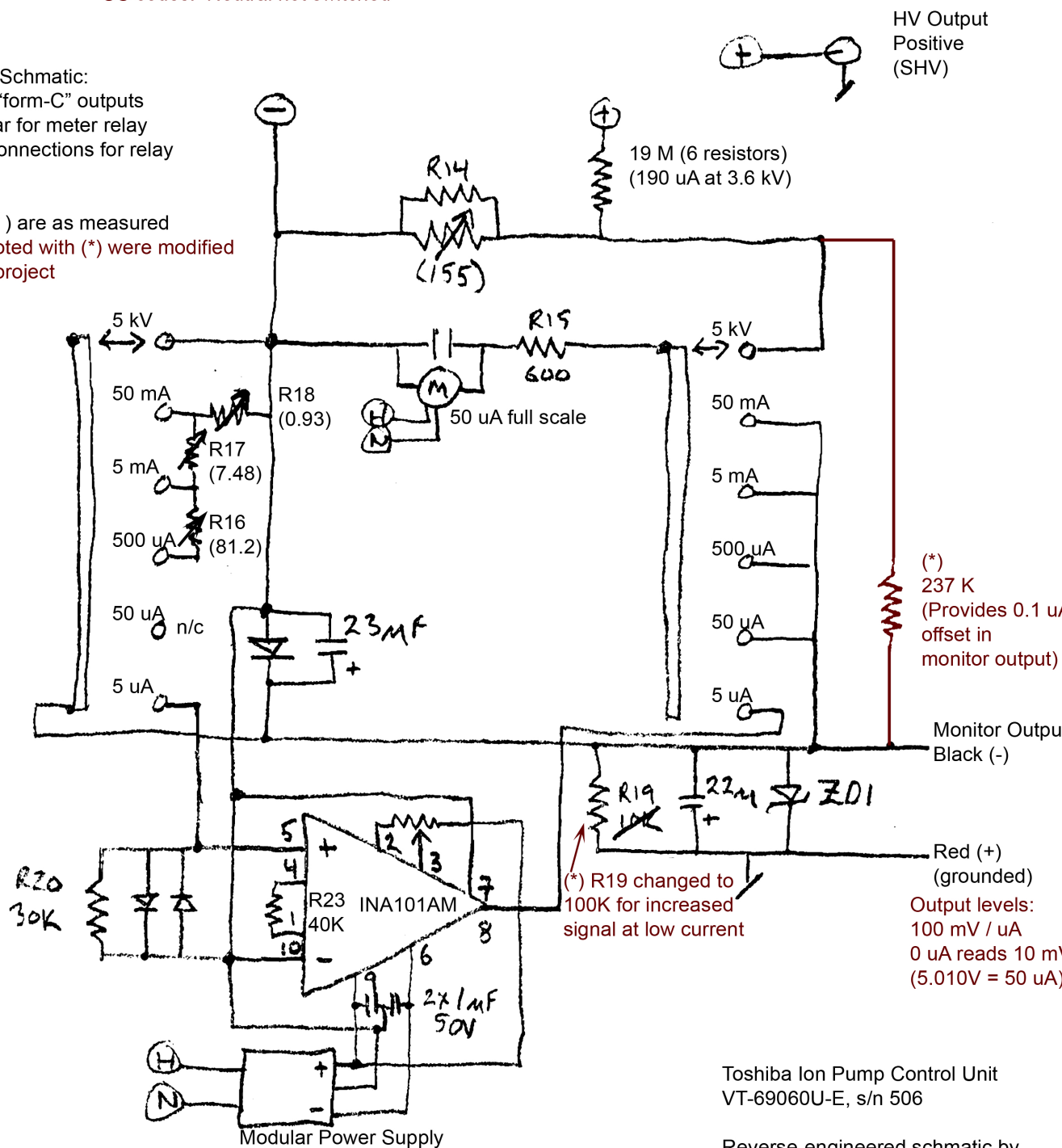
- 1) Front panel power switch modified to only switch hot leg of input power lead.
- 2) Current sense resistor (R19) increased from 10k to 100k. This results in an output signal of 100 mV/uA (increased from 10 mV/uA). Note: Minimum resistance of monitoring equipment for 1% loading of signal is 10 Mohm.
- 3) Keep-alive resistor of 237 Kohm added to provide an offset in monitored current. While power supply is turned on, a minimum current monitor reading of 10 mV (0.1 uA equivalent) is expected.

The schematic is attached. Modifications are shown in red.



Not shown in Schematic:  
 - Meter relay "form-C" outputs  
 - repeater relar for meter relay  
 - rear panel connections for relay

Note:  
 1. Values in ( ) are as measured  
 2. Items annotated with (\*) were modified for use in project



Toshiba Ion Pump Control Unit  
 VT-69060U-E, s/n 506

Reverse-engineered schmatic by  
 Keith Jobe 12/10/2008