Other interior DOM components are held in place by attachment to the PMT, mostly via screws into a molded plastic collar glued around the PMT neck. The PMT Base Board is soldered directly to the PMT pins.

2.2.4 High Voltage Supply and Divider

The PMT high voltage subsystem consists of a resistive voltage divider circuit (PMT Base Board) directly solder-mounted on the PMT and a separate High Voltage Control Board. The High Voltage Control Board includes a DAC and ADC for setting and reading out the PMT high voltage, connected to the Main Board with a digital interface, as well as the high voltage generator itself.

The high voltage generator is a custom encapsulated module (#9730A) designed by EMCO High Voltage (California). The maximum high voltage is 2047 volts, specified for up to 30 μA current. The voltage setting, in steps of 0.5 V, is controlled by the DAC output, and the actual voltage is monitored via a high-impedance divider and the ADC. The output ripple is less than 1 mV, and stability is better than 1 V RMS. Power consumption of the high voltage supply is less than 300 mW at full load.

The generator output is carried to the PMT Base Board [26] via a high voltage coaxial cable. The voltage divider, designed for low power consumption, presents a total resistive load of 130 MΩ. The PMT is operated with cathode at ground potential, so the anode signal output is AC-coupled using a 1:1 bifilar-wound toroid transformer mounted on the Base Board; this toroid was modified once during DOM production in order to reduce distortion of high-amplitude signals (section 3.2). The transformer secondary is then wired to the Main Board analog input with a coaxial cable. The single photoelectron (SPE) output waveform has been described in ref. [26]. With a 100 Ω load connected to the transformer, and operating at standard PMT gain of 10^7, the SPE peak voltage before front-end amplification is approximately 8 mV with a FWHM of 7–8 ns. Several effects combine to increase the FWHM of digitized SPE waveforms to ~13 ns (peak ~5 mV).