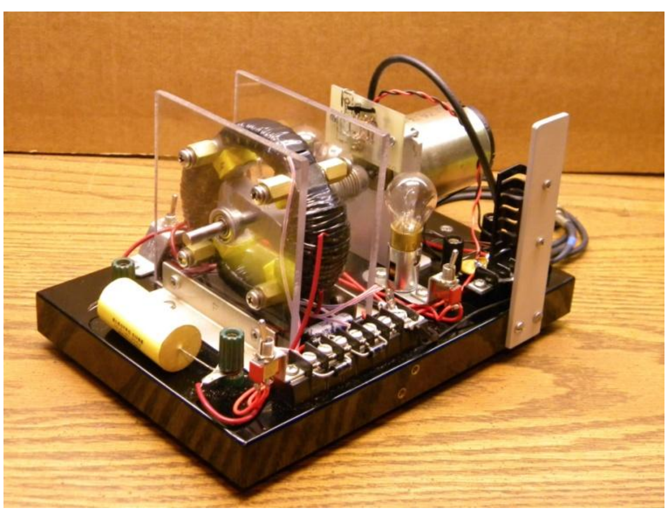
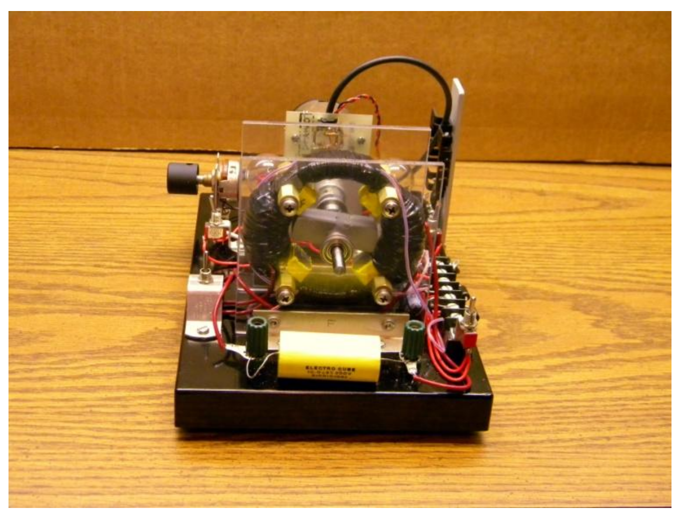
Building and Investigating the Mini-QEG

A source for a small four pole laminated core was found when an old Wollensak tape recorder drive motor was located and disassembled. This is a shaded pole design with a 1.75" rotor. The shading parts of the poles were removed using an abrasive disc cutting wheel. The rotor was scrapped. The resulting core closely matched the QEG in shape and function. A machined-to-fit rotor was constructed from scrap transformer laminations, tig welded, and machined with a matching .25" shaft and ball bearings.

Winding the resonance coils was performed by hand and resulted in two 265 turn coils of #22 magnet wire. Two output coils of 36 turns each were also wound. It was not obvious how the coils would be interconnected. A decision was made to wind all coils in the same direction and take care of the phasing during testing. This proved to be a good plan since it provided clues to the real operation of the QEG. It was originally assumed that the oscillating coils' fields oscillated clockwise and counter-clockwise in the main toroid with parallel paths formed by the rotor aligning with the poles. This is only partially correct. With the rotor not aligned with the poles, inductive measurements were made with the additive connection (50mh) and bucking connection (16mh) ; with the rotor aligned, the additive connection showed 51mh. The bucking connection showed 22mh, a respectable 27% variation. This connection was chosen. Discussion as to why little variation was measured with the additive connection brought to light that the QEG core operated as two separate cores with a common rotor path when aligned. If the coils were additively connected their fields would buck each other in the common rotor (bridge) and thus prevent any field crossing this bridge whether the rotor was aligned or not, thus preventing any inductance modulation. The output coils must be similarly phased.



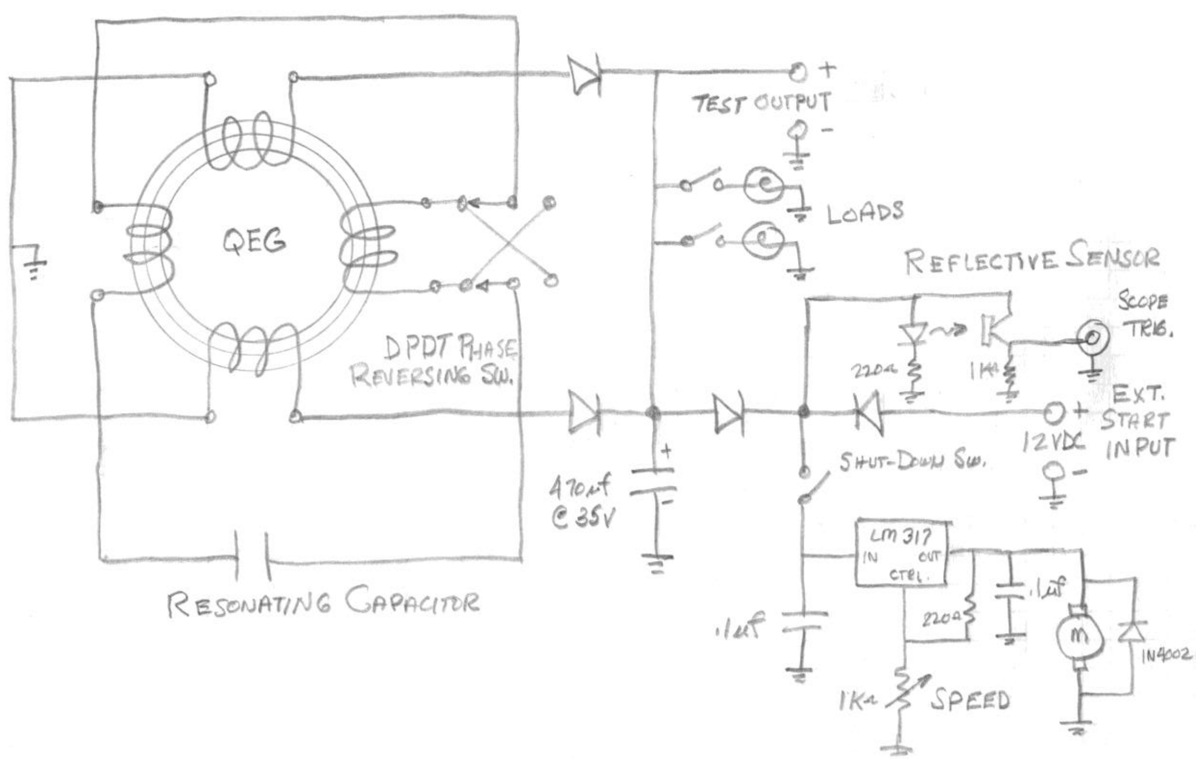


In the large QEG we would suggest that the oscillating coils midpoint connection be the windings start and therefore the lowest voltage (1/2 of the total) nearest to the core metal. It also might be advisable to intentionally ground this point to the core as is common practice on high voltage transformers such as microwave oven and neon sign transformers to give these lowest layers a ground reference.

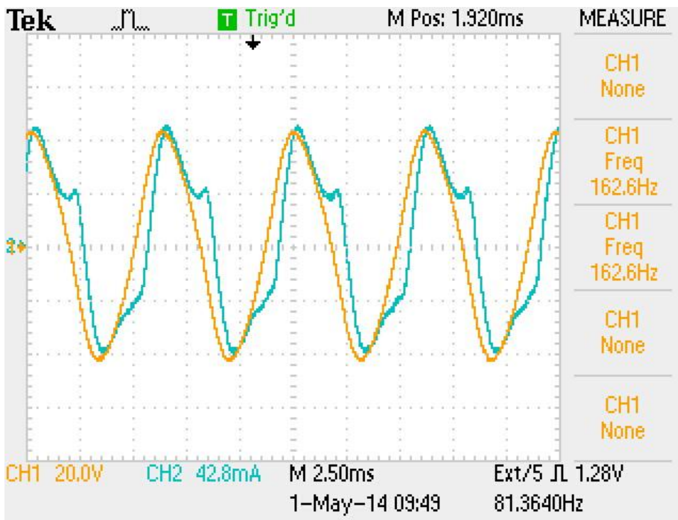
The turns ratio of the output cores was chosen as a guess to provide 12VDC rectified output to facilitate possible closed looping and self-powering of the generator. To date, the output is not sufficient to provide for this operation. A new primary coil is now being wound with about 500 turns. This should provide more power and higher voltage output.

The generator is mechanically powered by a 6VDC @2A max motor. An in-line flexible shaft coupling directly drives the mini-QEG. An adjustable linear voltage regulator provides variable speed control to 7K RPM. A more efficient switching regulator will be substituted later. To enable stable oscilloscope operation an optical reflective sensor provides a once per revolution shaft index pulse to the oscilloscope external trigger input by viewing a flat on the motor shaft. Two 12V automotive bulbs provide a switchable load on the rectified DC. A 12 VDC power supply or battery provides input power (12VDC @2A). A diode oring arrangement enables non-interruptible changeover from external power to looping power by just removing the external power. A wiring schematic is provided.

1/4 Scale Mini-QEG Test-Demo Unit



First analysis of oscilloscope waveforms shows the expected oscillator coil voltage and current waveforms indicating their harmonic distortion caused by the variable inductance. Current waveform delay relative to voltage is as expected. Further analysis of these waveform shapes and timing relative to the index pulse will be used to suggest possible efficiency improvements by reducing back MMF and therefore motor current. This device is currently being operated at its fundamental electrical frequency of twice the shaft rotational frequency or 1/2 the parametric pumping rate. Non-phase lock resonance has been observed to the 6th harmonic. Phase lock resonance has been verified by the motor not increasing in speed as its power (voltage) is increased beyond the point of phase lock and only the amplitude of oscillations and output increase. This is a very hopeful sign that the QEG can be made to operate as described even in different configurations.



Updates will be made as progress on the project continues to be made.