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### Tesla Tunes

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# Tesla Tunes

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## Summary

Tesla Tunes is a student design project whose goal is to design and build a musical Tesla Coil. This musical Tesla Coil is controlled using a computer that is connected to an arduino uno. The arduino uno is then connected to a circuit board that will provide the voltage and frequency necessary for the electricity to arc through the air and create music.

## System Specs

System Specs:

High Voltage RLC circuit

R - Resistors:

Multiple resistors along with heat sink shield to reduce circuit heating

L - Inductor:

Coil 1: Primary - 7 turns of 3/8" copper tube

Coil 2: Secondary - 1600 turns of 30 AWG wire

C - Capacitor: 3" ducting tube wrapped around two 9" pie pans

Switching: Two IGBT's to switch the circuit on and off

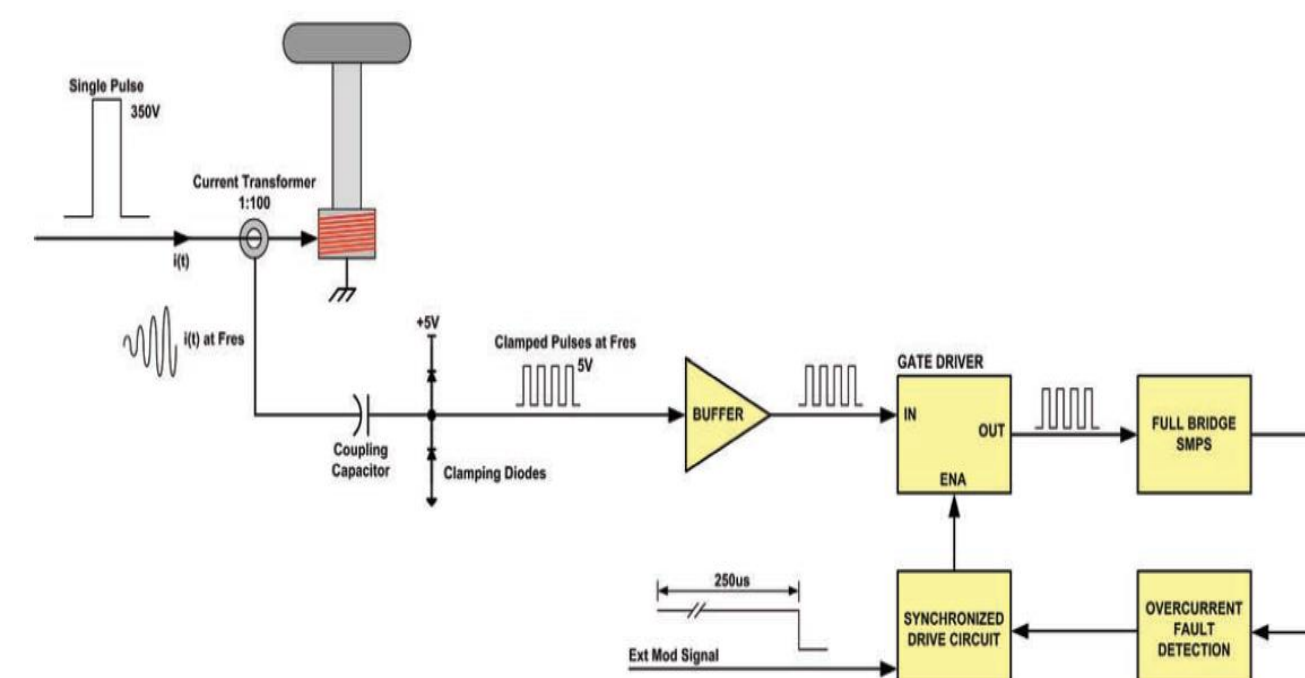
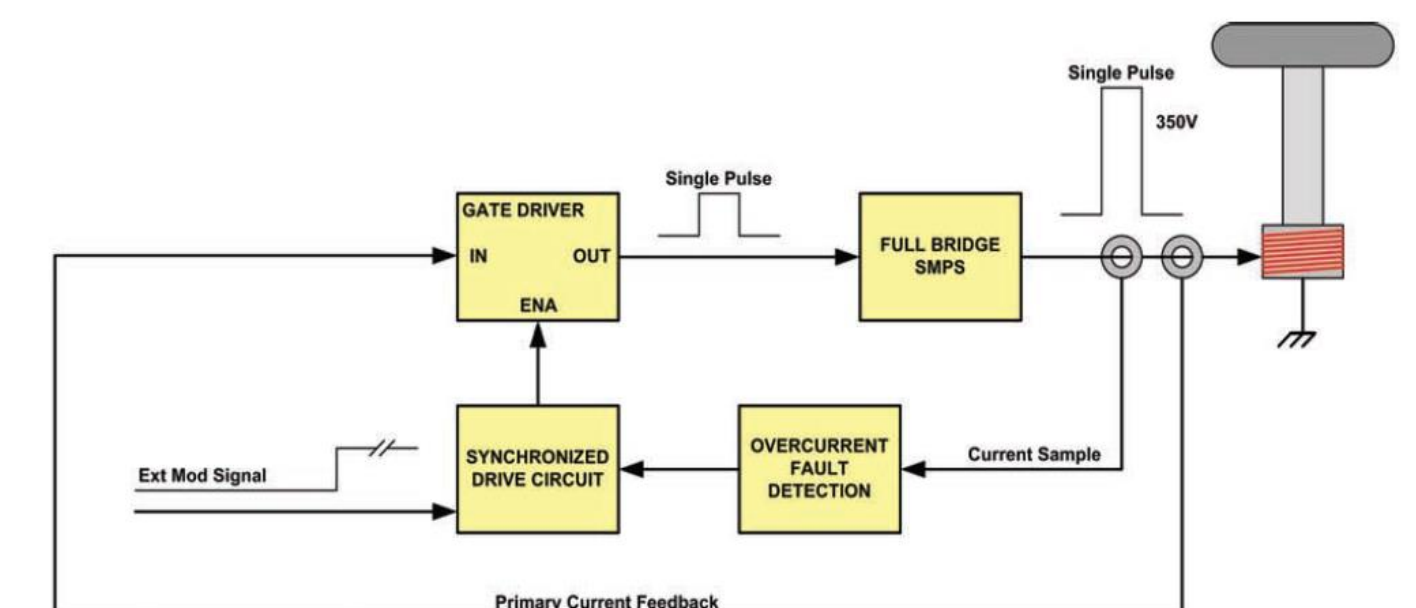
Microcontroller: Arduino Uno to control the pulses of the spark to produce different notes



## Project Concept

A Tesla Coil is a resonant transformer capable of generating extremely high voltages. The key concept of a Tesla Coil is its resonant property, where a Resistor-Inductor-Capacitor (RLC) resonant circuit is energized at its resonant frequency developing very high voltages. When the coils are driven at resonance, a large voltage develops on the toroid, eventually leading to electrical ionization and breakdown of the air, forming sparks.

## Block Diagram



Block diagrams show current flow through the system at a low rate modulation and a high rate modulation.

**NORTHROP GRUMMAN**



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