

# INTRODUCTION TO TESLA COIL

## Definition

A Tesla coil is a type of resonant transformer circuit invented by Nikola Tesla around 1891. It is used to produce high voltage, relatively high current, and high frequency alternating current electricity.

## Introduction

Tesla experimented with a number of different configurations and they consist of two, or sometimes three, coupled resonant electric circuits. Tesla used these coils to conduct innovative experiments in electrical lighting, phosphorescence, x-ray generation, high frequency alternating current phenomena, electrotherapy, and the transmission of electrical energy without wires.

The early Tesla coil transformer design employs a medium- to high-voltage power source, one or more high voltage capacitor(s), and a spark gap to excite a multiple-layer primary inductor with periodic bursts of high frequency current.

The multiple-layer Tesla coil transformer secondary is excited by resonant inductive coupling, the primary and secondary circuits both being tuned so they resonate at the same frequency (typically, between 25 kHz and 2 MHz). The later and higher-power coil design has a single-layer primary and secondary. These Tesla coils are often used by hobbyists and at venues such as science museums to produce long sparks.

Tesla coil circuits were used commercially in sparkgap radio transmitters for wireless telegraphy until the 1920s, and in electrotherapy and pseudomedical devices such as violet ray (although Tesla circuits were not the first or the only ones used in spark transmitters). Today their main use is entertainment and educational displays. Tesla coils are built by many high-voltage enthusiasts, research institutions, science museums and independent experimenters. Although electronic circuit controllers have been developed, Tesla's original spark gap design is less expensive and has proven extremely reliable.

## Uses of Tesla Coils

Tesla coils are very popular devices among certain electrical engineers and electronics enthusiasts. Builders of Tesla coils as a hobby are called "coilers". A very large tesla coil, designed and built by Syd Klinge, is shown every year at the Coachella Valley Music and Arts Festival, in Coachella, Indio, California, USA. There are "coiling" conventions where people attend with their home-made Tesla coils and other electrical devices of interest.

Low power Tesla coils are also sometimes used as a high voltage source for Kirlian photography.

Tesla coils can also be used to create music by modulating the system's effective "break rate" (i.e., the rate and duration of high power RF bursts) via MIDI data and a control unit. The actual MIDI data is interpreted by a microcontroller which converts the MIDI data into a PWM output which can be sent to the Tesla coil via a fiber optic interface.

Source: [http://www.juliantrubin.com/encyclopedia/electronics/tesla\\_coil.html](http://www.juliantrubin.com/encyclopedia/electronics/tesla_coil.html)