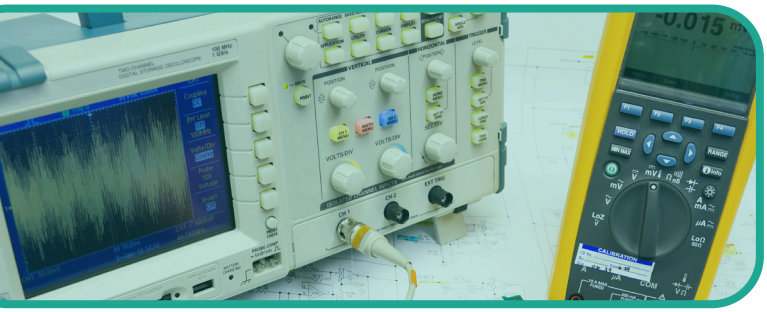
VIEWING AN ELECTRIC FIELD ON OSCILLOSCOPE



BACKGROUND

The history of viewing an electric field on an oscilloscope dates back to the early 1900s when cathode ray tubes were first invented. These tubes were used to display electrical signals graphically, allowing scientists and engineers to visualize and measure electric fields. In the 1930s, oscilloscopes were developed to provide a more precise and accurate method of measuring electrical signals.

REAL WORLD CONNECTIONS

Electronic devices generate electromagnetic fields, which can interfere with other devices in their vicinity. To measure this interference, an oscilloscope can be used to display the voltage waveforms produced by the electromagnetic interference (EMI). The oscilloscope displays the electrical signal over time, allowing the user to see the frequency and intensity of the interference.

When some of the first internet service providers started mounting wireless antennas onto water towers and other structures, the broadcast signal was around 900 Mhz. Ironically, that was the same signal band used by most cordless landline telephones and baby monitors. These signals would cause interference and prevent the technology from working correctly. These competing signals would be viewable on an oscilloscope for evaluation.

FORMULAS

VOLTAGE: The voltage measured by an oscilloscope can be calculated using the formula V = IR, where V is the voltage, I is the current, and R is the resistance.

FREQUENCY: The frequency of an electrical signal can be calculated using the formula f = 1/T, where f is the frequency and T is the period of the signal.

PERIOD: The period of an electrical signal can be calculated using the formula T = 1/f, where T is the period and f is the frequency of the signal.

CAPACITANCE: The capacitance of a capacitor can be calculated using the formula C = Q/V, where C is the capacitance, Q is the charge stored in the capacitor, and V is the voltage across the capacitor.

INDUCTANCE: The inductance of an inductor can be calculated using the formula L = Vt/I, where L is the inductance, Vt is the voltage across the inductor, and I is the current flowing through the inductor.