

# Digital Storage Oscilloscope with Frequency Control & Real-time Visualization

**Prof. Ranjeetsingh Suryawanshi, Simran Pathan, Vaishnavi Shitole, Vaishnavi Gite, Saloni Londhe**

Vishwakarma Institute of Technology, Pune, India

ranjeetsingh.suryawanshi@vit.edu, simran.pathan23@vit.edu, vaishnavi.shitole23@vit.edu

Vaishnavi.gite23@vit.edu, saloni.londhe23@vit.edu

**Abstract:** *Project presents a digital storage oscilloscope with real-time visualization capabilities and frequency control. The system is based on the flexible ESP32 microcontroller architecture, which allows for the creation of a wide range of waveforms at tunable frequencies. Quick waveform adaptation is made possible by users' easy control over the oscillator's frequency in real-time through simple input techniques. Additionally, the system has a graphical user interface that allows users to instantly visualize created signals and easily monitor waveform properties. The oscillator is appropriate for a variety of applications in industries like audio synthesis, instrumentation, and telecommunications because it also provides sophisticated control options and signal processing capabilities. This comprehensive solution meets the needs of both enthusiasts and experts in signal production and visualization by providing a practical and versatile tool for those working in*

**Keywords:** Digital storage oscilloscope, Frequency control, Real-time visualization, ESP32 microcontroller, Signal processing.