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*GDS-3000 Series*  
*350/250/150MHz Digital Storage Oscilloscope*  
**VPO Technology Introduction**



**GWINSTEK**

Made to Measure Since 1975

# VPO

## Visual Persistence Oscilloscope

The GW Instek GDS-3000 Series digital storage oscilloscopes are equipped with a built-in self-developed waveform image processing system which significantly enhances the waveform capture rate. We call this VPO (Visual Persistence Oscilloscope) Technology. The first generation of analog oscilloscopes (Analog oscilloscope CRT display as shown in Figure Fig. 1a) utilized fluorescent materials to capture fast electronic signals to generate a dot on a screen. By controlling the intensity and bias of an electron beam, the brightness and tracking of a signal could be generated. This was used to reconstruct a waveform image that would be displayed on a screen for a short time. For this reason, one can observe the details of a signal while the signal is changing with the naked eye.

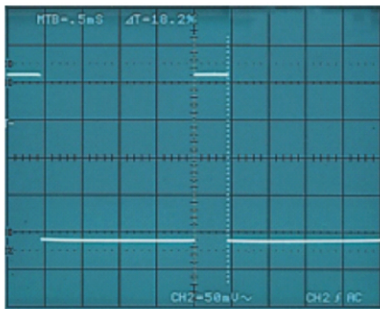


Fig.1a Analog Oscilloscope

Digital storage oscilloscopes, usually viewed as 2nd generation oscilloscope (DSO, as shown in Figure Fig. 1b), mainly convert analog signals into digital signals through high-speed analog to digital converters (ADC). These signals are then stored in its memory for the CPU to process and draw the waveform. The design of a DSO puts some of its functions far beyond the reach of analog oscilloscopes. For example: waveform storage, math operations (Example: - \* / FFT), automatic measurements and pre-triggers. The only reason why analog oscilloscopes still fascinate so many people is because of their ability to display a signal in real-time. Conversely, this is also the greatest disadvantage of digital storage oscilloscopes. As the CPU in a DSO does not have the processing power to process a waveform as fast as the signal is changing, only part of the signal is captured and processed. The section of time for when a signal is not captured is called Dead Time (Fig. 1c). The longer the dead time is, the greater the chance of not detecting a rapid change in the signal. If a DSO cannot detect such signals then it is unable to meet the demands of a modern measurement instrument.

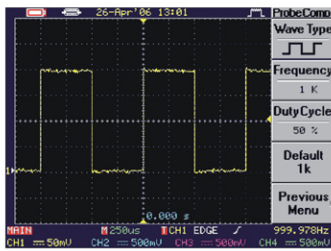


Fig.1b DSO



Fig.1c Dead Time

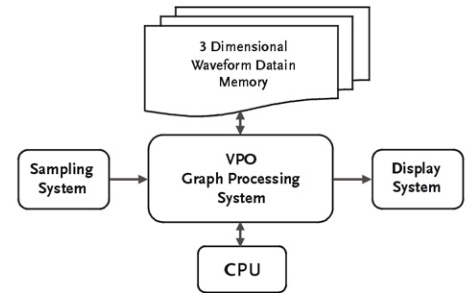
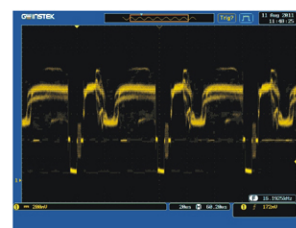
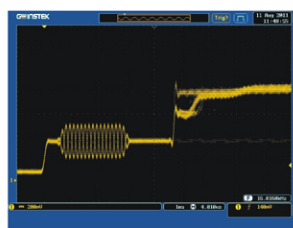
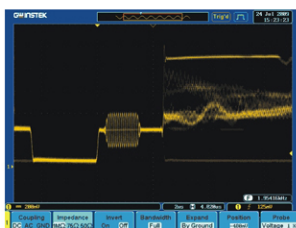


Fig 2 VPO Illustration

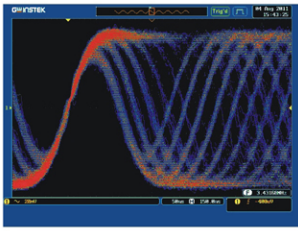
The waveform image processing system designed and developed by GW Instek is mainly used to share the data processing with the CPU, shortening the time needed to draw a waveform and consequently increasing the waveform capture rate. Furthermore, in order to create a display performance similar to that of analog oscilloscopes, the waveform data for all channels is displayed as a three dimensional image (amplitude, time and intensity). When a strong signal is generated, the waveform will be brighter and the waveform will persist for a longer time, allowing users to easily grasp any instantaneous changes in the waveform. By using an image processing chip, waveform data can be quickly acquired by the DSO, processed and displayed on the screen with multiple levels of intensity almost as quickly as an analog oscilloscope.

By using VPO technology and a 5 Gsa/sec sampling rate, the GDS-3000 Series significantly enhances waveform capture rate, allowing users to clearly observe video signals, DVD signals, and FM signals.

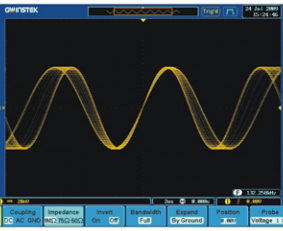
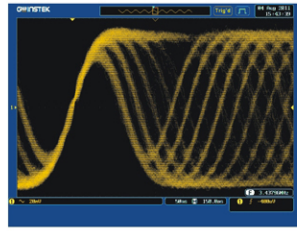
By adjusting the intensity and persistence of waveforms, the GDS-3000 Series enables users to clearly observe and analyze intermittent events.



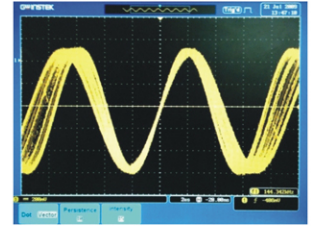
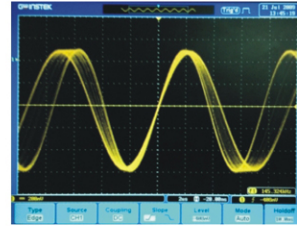
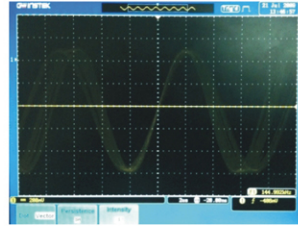
Video Signal Acquisition



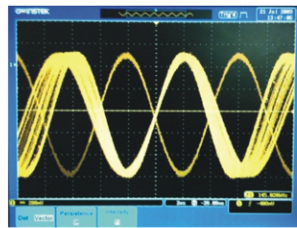
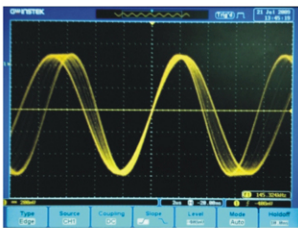
DVD Signal Acquisition



FM Signal Acquisition



Waveform Intensit



Waveform Persistence Tim

Therefore, the new generation of VPO oscilloscopes are equipped with the characteristics of analog oscilloscopes and the numerous features of second generation digital storage oscilloscopes, including: waveform storage, math operations(Example:  $\pm^*$ /FFT), automatic measurements and other accurate measurement functions. With these features, the GDS-3000 becomes the best instrument for analyzing intermittent events and video signals.

## GDS-3000 SERIES INTRODUCTION

The GDS-3000 Series is a new platform of 4-input channels, 350MHz bandwidth, 5GSa/s sampling rate, and VPO waveform display. The split screen feature has been designed to meet the requirements of multi-window & multi-signal tests in the research and the manufacturing fields. The optional power analysis software and the optional serial bus analysis software are available to facilitate the engineer's tasks in testing and manufacturing of the associated products. Three new differential probes, GDP-025, GDP-050 & GDP-100, and two new current probes, GCP-530 & GCP-1030, are coming along with the GDS-3000 Series to provide total solutions for a wide variety of applications in the industry, service and education market sectors. The GDS-3000 Series, a high-tech platform carrying thoughtful features, brings very high customer value to both general purpose market and professional market.

## FEATURES

- \* 350/250/150MHz with 2/4 Channels
- \* 5GSa/s RT or 100GSa/s ET Sampling Rate
- \* Independent Memory for Each Channel
- \* VPO Technology
- \* Large 8-inch 800 x 600 Display
- \* Split Screen Function
- \* 3 Built-in Impedances ( 50Ω/75Ω/1MΩ )
- \* Power Analysis Software (Optional)
- \* Serial Bus Analysis Software for I<sup>2</sup>C, SPI and UART (Optional)

## SELECTION GUIDE

Model	GDS-3354	GDS-3352	GDS-3254	GDS-3252	GDS-3154	GDS-3152
Bandwidth	350MHz	350MHz	250MHz	250MHz	150MHz	150MHz
Channels	4	2	4	2	4	2
Record Length	25k/Channel	25k/Channel	25k/Channel	25k/Channel	25k/Channel	25k/Channel
Real-Time Sampling	5 GSa/s	5 GSa/s	5 GSa/s	2.5 GSa/s	5 GSa/s	2.5 GSa/s
Equivalent-Time Sampling	100GSa/s	100GSa/s	100GSa/s	100GSa/s	100GSa/s	100GSa/s

\* 2 Channels on Max Sampling Rate: 2.5GSa/s (GDS-3354/3352/3254/3154); 1.25GSa/s (GDS-3252/3152)

\* 3, 4 Channels on Max Sampling Rate: 1.25GSa/s (GDS-3354/3254/3154)

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