



OSCILLOSCOPE

QUICK REFERENCE GUIDE FOR THE SIA-3000 / A45 / VISI 7.4 AND LATER

Applications of Oscilloscope tool

- Display a waveform as voltage vs. time
- Measure voltage parameters of signals
- Measure Rise and Fall time
- Eye mask measurements

Introduction

The focus of this note is to familiarize the user with the basic Oscilloscope tool allowing quick and easy measurements and interpretation of results. Refer to the Online Help or the SIA-3000 User's Manual for more information.

Theory of Operation

There are two different measurement engines in the SIA-3000, which perform specific measurements using the most appropriate hardware techniques. The Sampling Oscilloscope uses circuitry optimized for voltage measurements (Amplitude Engine). Timing and Jitter measurements use different internal circuitry optimized for time measurements (Timing Engine). For amplitude measurements and rise or fall time measurements (which are amplitude dependent) the Oscilloscope uses a standard Repetitive Sampling methodology. This allows eye-masks to be created. The time measurements made for the other tools, such as histogram, *are not* derived from the measurements that this oscilloscope makes.

Oscilloscope panel

Refer to the "Navigating VISI 7" Quick Reference Guide for details on using the VISI™ Interface.

Results Area

When particular parameters are selected for measurement, this area displays the results.

View Area

Displays waveform and/or eye mask.

Status Bar

Cursor coordinates - Displayed in the box at lower right portion of the Panel. Units are same as those in plot.

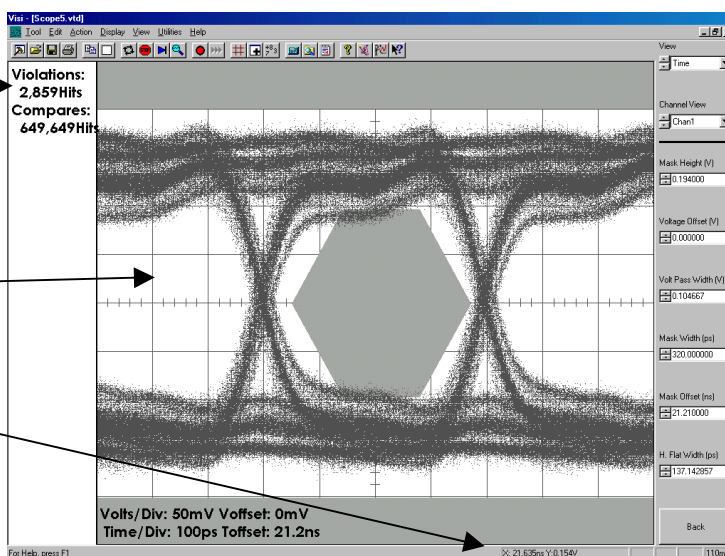


Figure 1. Oscilloscope

Making a measurement—Initial Setup

The Oscilloscope has many different capabilities. It can display the waveform, measure voltage parameters, and create eye masks. This section describes how to setup and make these measurements.

Display of the Waveform

- Connect the Device Under Test to a measurement channel. The SIA-3000 defaults to CH1, so if you wish to just see a signal on Channel 1, no additional configuration is necessary.
- Press **AUTOSCALE** and the waveform will be displayed.
- Use the “Scale” and “Position” knobs on the front panel to place the waveform vertically and horizontally (see Figure 2). These values can be manually selected in the **Channel Setup** menu.
- To “Run” a measurement, use the buttons on the front panel or the menu bar. A Single Acquire can be made in the same way (see Figure 3).

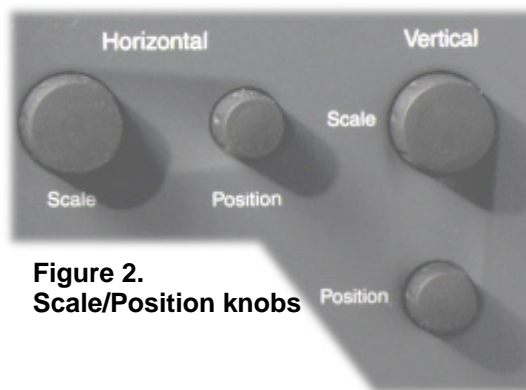


Figure 2.
Scale/Position knobs



Figure 3. Acquiring a Measurement

Adding/Changing Channels

To change a channel or make measurements on an additional channel, press **Add/Del Channel**. You will be prompted with a dialog box (Figure 4). Use the front panel to toggle channel selections and press enter when complete.

You may need to change the trigger channel. From the Main Menu press **Trigger** to open the trigger setup menu, then press **Trigger** to open a dialog box similar to Figure 4. Choose a channel for the trigger.

Note that while more than one channel may be chosen for measurements, only one channel can be used as a trigger.

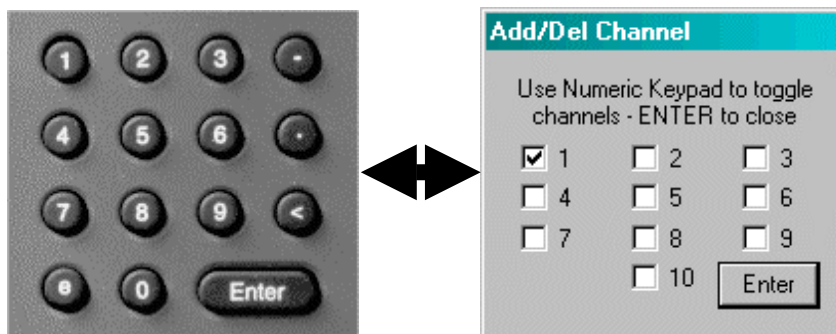


Figure 4. Channel Selection

Making a Measurement—Voltages

From the Main Oscilloscope menu, press **Signal Analysis** and then **Voltage Measures**.

This will open a menu allowing you to toggle on or off specific groups of voltage measurements. The measurements are shown to the left of the display area as shown in Figure 5.

These buttons act as toggles. Press a button to enable a group of measurements, and then press it again to turn off a group of measurements.

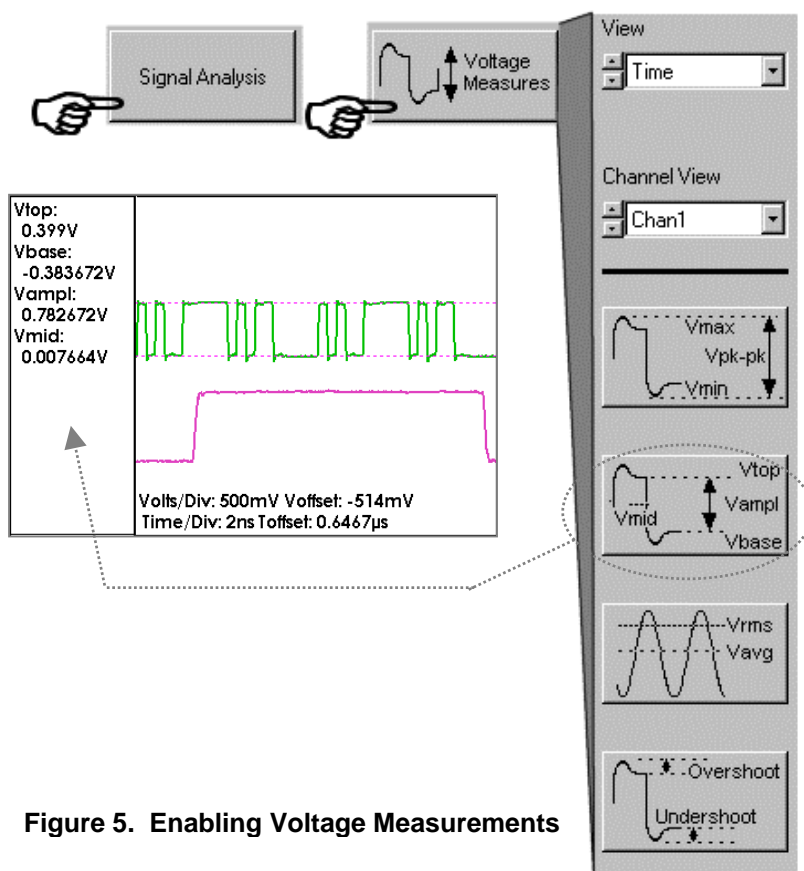


Figure 5. Enabling Voltage Measurements

Viewing Results from a Different Channel

“Channel View” is a global control. It allows you to choose which channel is currently active. When you select a channel from this list, you can then view voltage measurements and change scale or position.

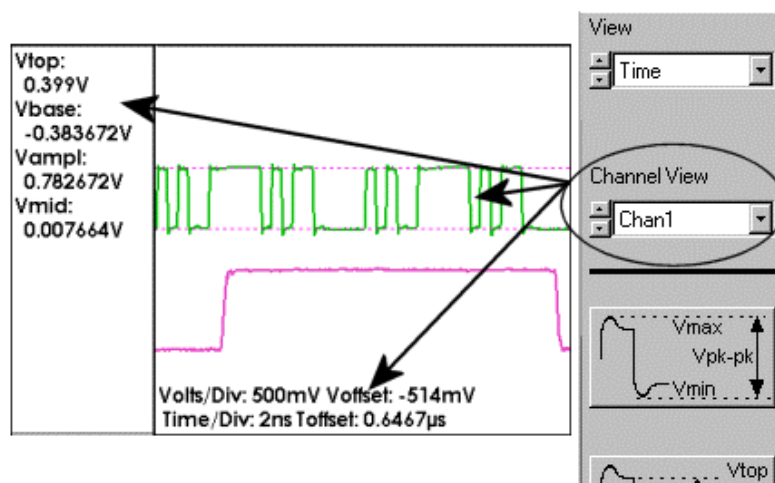


Figure 6. Viewing results from different channels

Measuring Rise and Fall time

From the main menu, press **Signal Analysis** and **Rise Time, Fall Time**. See Figure 7. The Rise Time, Fall Time button is a toggle which will enable or disable the measurement. To change from 20%-80% to 10%-90%, go to the Edit|Configuration menu on the top tool bar.



Figure 7. Enabling/Disabling Rise and Fall Time measurements.

Eye Mask Measurements

To make an Eye Mask measurement, connect a data signal to one channel and a bit clock to another channel. Set the trigger to be the channel with the bit-clock.

Press **Signal Analysis**, **Eye Mask**, then select ON in Enable Eye Mask. See Figure 8.

Pressing **Show Measures** will display the number of samples on the display (Compares) and the number of Violations of the mask regions. This is a toggle, and pressing it again will turn off those values.

Press **Zoom to Eye** to automatically place the mask in the display. To change the mask position or size, press **Mask Setup**. This will allow you to configure the mask.

For other configuration and tool settings, refer to the context sensitive help. The help describes the use of each setting.

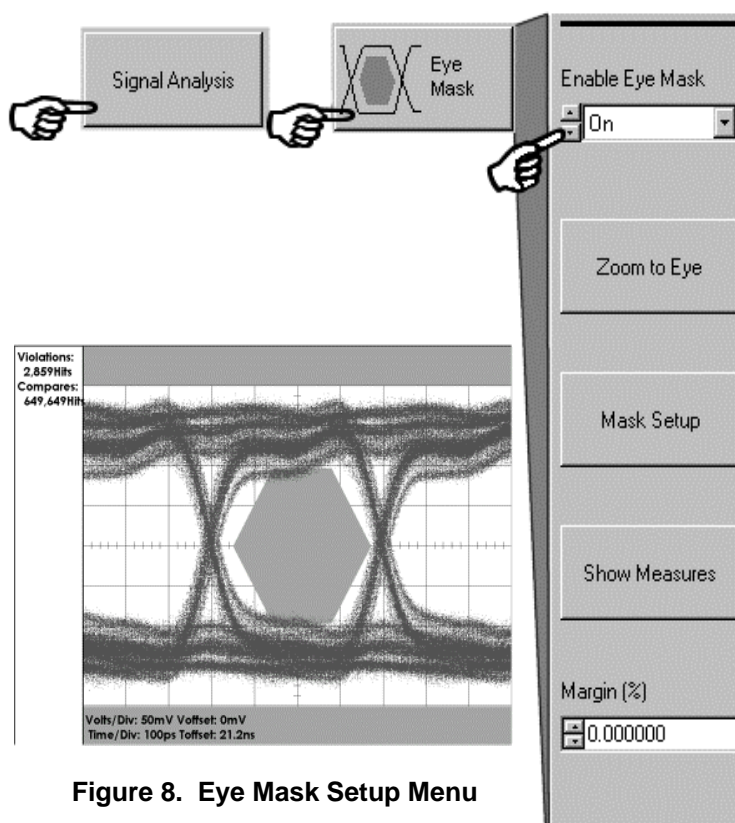
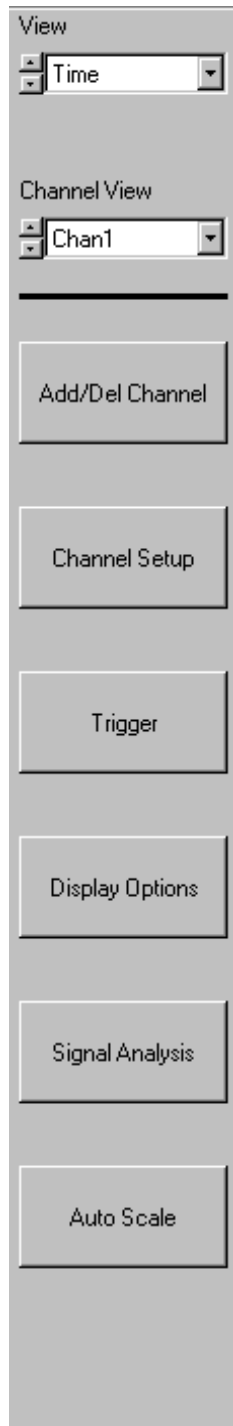


Figure 8. Eye Mask Setup Menu

Dialog Bar Descriptions



Oscilloscope Main Menu

View

Time or summary. Changes current active view to show a graphical representation of the measurement or text of the results.

Channel View

This is a global control within the Oscilloscope. Use it to change a particular channel's settings. For instance, you would go to the CHANNEL SETUP menu and change a channel's settings. Channel View allows you to select which channel's settings you are changing.

Add/Del Channel

Opens a choice box. Use the mouse or keypad on the front panel to select or deselect a channel to measure.

Channel Setup

Configure a particular channel (as chosen by "Channel View"). You can set Delay (time), Offset (voltage), and Volts/division

Trigger

Select and configure a trigger channel.

Display options

Choose persistence time, show IN or /IN channel--both or either, enable averaging, change zoom reference.

Signal analysis

Eye Mask, Voltage measurements, Rise/Fall times and Voltage Histograms.

Auto Scale

Automatically sets the delay, time/division, and volts/division to view the signal on Channel 1. If a different channel is configured, Auto Scale will automatically position the waveform for that channel.

Channel Setup

Volts Per Division
200mV

Offset (mV)
0

Time Per Division
10ns

Delay (ns)
24.000000

Volts Per Division

Set the Vertical Scale or use the “Vertical Scale” knob on front panel.

Offset (mV)

Sets the voltage offset of the waveform. Or use the “Vertical Position” knob on the front Panel.

Time Per Division

Set the horizontal time scale, or use the “Horizontal Scale” knob on the front panel.

Delay (ns)

Set the time delay of the waveforms, or use the “Horizontal Position” knob on the front panel.



Trigger

Trigger

Trigger Method

Auto

Trigger Voltage

0.000000

Trigger Edge

Rising

Patn Mkr Mode

Edge Count

Open PM Utility

Trigger

Clicking on button will display the selection box for adding or deleting channels. Use the mouse or keypad on the front panel to select one channel. Press Enter when done.

Trigger Method

“Auto” uses threshold values calculated from pulsefind.

“User Volts” allows the threshold to be manually set.

Trigger Voltage

This panel is grayed out when Trigger Method is in “Auto” and will display the threshold value. When Trigger Method “User Volts” is selected, the desired threshold voltage can be manually entered in this place.

Trigger Edge

Select Rising or Falling edge to be used as the trigger.

Patn Mkr Mode

**Only available in SIA-3000 with PM-50 (pattern marker) option.

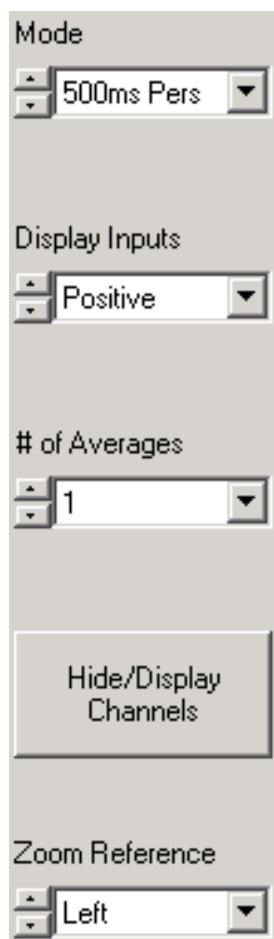
The PM-50 can be selected to generate the marker. This field allows configuration of the PM-50 as either “Edge Count” or “Pattern Marker”. See PM-50 help.

Open PM Utility

**Only available in SIA-3000 with PM-50 (pattern marker) option.

With PM-50 enabled, this button will open the PM-50 configuration Utility.

Display Options



Mode

This mode selects the amount of persistence. Infinite persistence holds all measured samples on the screen until “clear” is pressed or the configuration is changed. The other persistence values hold the measured samples on the screen for the amount of persistence time selected. Dot Connect connects samples by a line.

Display Inputs

Choose which traces to display. Positive shows only the IN trace. Negative shows only the $\overline{\text{IN}}$ trace. Differential shows the differential trace. Both shows each IN and $\overline{\text{IN}}$ trace separately.

of Averages

Selects the number of averages for each sampled point displayed on the screen

Hide/Display Channels

Open a selection box to turn on or off a view of a specific channel.

Zoom Reference

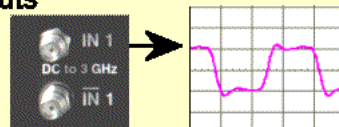
“Left” will zoom holding the left position.

“Center” will zoom holding the center position. This setting will affect how the “Horizontal Scale” knobs zoom on the waveform.

Display Inputs

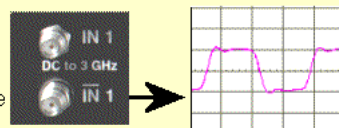
Positive

Shows only the positive (IN) trace



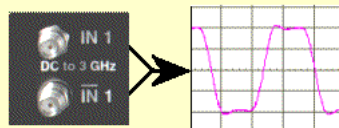
Negative

Shows only the negative ($\overline{\text{IN}}$) trace



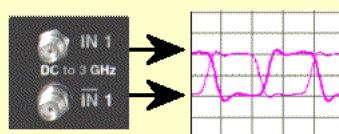
Differential

Shows the differential signal



Both

Shows each IN and $\overline{\text{IN}}$ signal independently



Signal Analysis



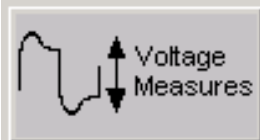
Histogram

This button will open a menu for configuring a histogram window. The histogram shows statistics from the samples that fall inside this window.



Eye Mask

This button opens a menu for measuring and configuring an eye mask.



Voltage Measures

This button opens a menu allowing the choices of various voltage measurements such as Vmax, Vmin, Vavg, Vovershoot, Vundershoot, Vmid, Vtop, Vbase.



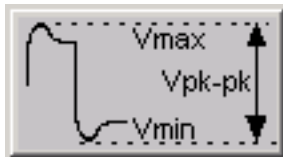
Rise time / Fall time

Toggles on or off rise and fall time measurements

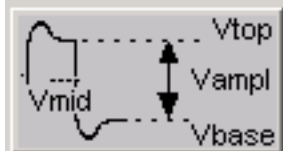
Set 10%-90% or 20%-80% in the Edit|Configuration menu on the top menu.

The default is 20%-80%

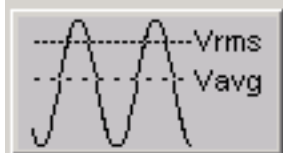
Voltage Measurements



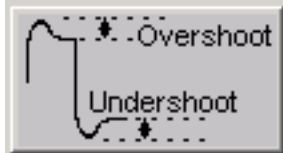
Toggle on or off the display/measurement of Vmax, Vmin and Vpk-pk



Toggle on or off the display/measurement of top (Vtop) and base (Vbase) voltage levels, the amplitude (Vampl) between these two values and the midpoint (Vmid) of these points.



Toggle on or off the display/measurement of Average and RMS values.



Toggle on or off the display/measurement of Overshoot and Undershoot measurement. This value calculates the difference between the Vmax and Vtop as the Overshoot. The Undershoot is the difference between the Vmin and Vbase values.

Histogram Setup

Enable Histogram

Vertical

Dimensions

Display Scale

1 Division

Show Measures

Enable Histogram

“Disabled” turns off any histograms. “Vertical” turns on a sample box used to create vertical, or voltage, histograms of the samples that fall inside the box. “Horizontal” turns on a sample box used to create horizontal, or time, histograms of the samples that fall inside the box. It is important to note that these samples are derived from the Oscilloscope or Voltage Measurement Engine. To get the best time-measurement histograms, use the HISTOGRAM Tool which allows calculation of RJ, DJ, and TJ.

Dimensions

Opens menu for the sizing and positioning of the box used for histograms.

Display Scale

Choose the number of divisions for the histogram display.

Show Measures

Toggle on or off the statistics of the histogram samples.

Histogram Dimensions Submenu

Voffset (mV)
0.000000

Height (mV)
1600.000000

Tdelay (ns)
120.000000

Width (ns)
160.000000

Default

Voffset (mV)

Position the histogram box vertically

Height (mV)

Scale the height of the histogram box.

Tdelay (ns)

Position the histogram box horizontally

Width (ns)

Scale the width of the histogram box.

Default

Sets the histogram box to a center default position and size.

Eye Mask Menu

Enable Eye Mask

On

Zoom to Eye

Mask Setup

Show Measures

Margin (%)

0.000000

Enable Eye Mask

Turns on or off the Eye Mask.

Zoom to Eye

Automatically positions Eye on the display.

Mask Setup

Opens a menu for the sizing and positioning of the Mask.

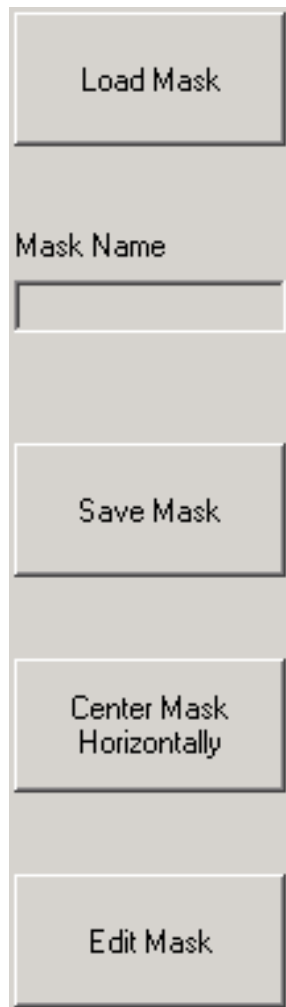
Show Measures

Toggles on or off the results of violations or compares for the mask.

Margin(%)

The amount of margin allowed in the masked regions.

Mask Setup Menu

The image shows a vertical stack of five UI elements from a software menu. From top to bottom: a button labeled 'Load Mask', a text label 'Mask Name' followed by an empty rectangular input field, another button labeled 'Save Mask', a button labeled 'Center Mask Horizontally', and a final button labeled 'Edit Mask'. All elements are rendered in a light gray, slightly 3D style with thin black borders.

Load Mask

Open a dialog box for choice of a previously saved mask.

Mask Name

Display the currently loaded mask.

Save Mask

Open a dialog box to save a mask.

Center Mask Horizontally

This button will center the mask horizontally in the view.

Edit Mask

Change the position or size of the mask

Edit Mask

Mask Height (mV)

Voltage Offset (mV)

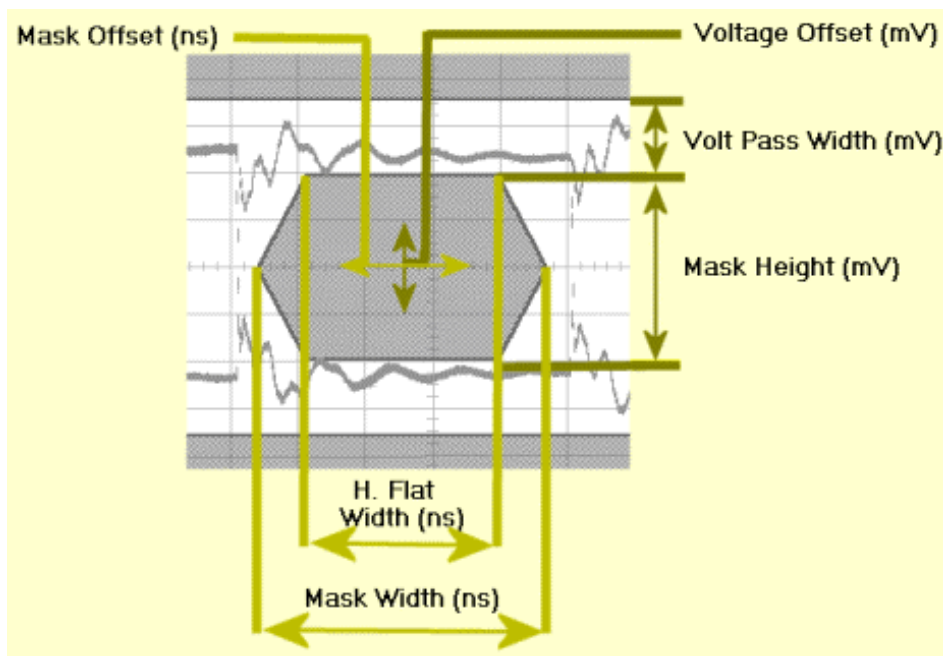
Volt Pass Width (mV)

Mask Width (ns)

Mask Offset (ns)

H. Flat Width (ns)

Refer to the diagram to see what each setting controls:



FOR MORE INFORMATION CONTACT:

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