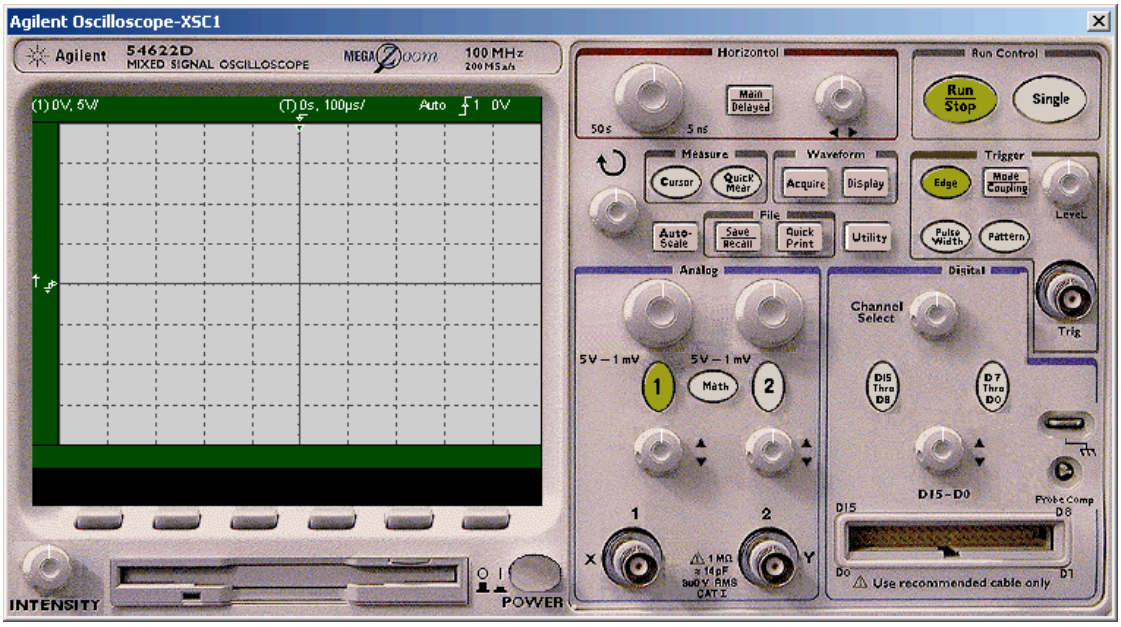
10.19.3 Agilent Simulated Oscilloscope

The simulated Agilent Technologies 54622D Oscilloscope is a 2-channel +16 logic channels, 100-MHz bandwidth oscilloscope. A link to the PDF version of this instrument's user guide can be found at www.electronicsworkbench.com.



10.19.3.1 Supported Features

Most of the features that are documented in the Agilent 54622D User's Guide are available on its simulated version. These include:

Running Mode:	Auto, Single, Stop
Trigger Mode:	Auto, normal, auto-level
Trigger Type:	Edge trigger, pulse trigger, pattern trigger
Trigger Source:	Analog signals, digital signals, external trigger signal
Display Mode:	Main, delay, roll, XY
Signal Channels:	2 analog channels, 1 math channel, 16 digital channels, 1 probe signal for testing purposes
Cursors:	4 cursors

Math Channel:	FFT, multiply, subtract, differentiate, integrate
Measurements:	Cursor information, sampling information, frequency, period, peak-peak, maximum, minimum, rise time, fall time, duty cycle, RMS, width, average, X at max
Display Controls:	Vector/point on traces, trace width, background color, board color, grid color, cursor color
Auto-scale/Undo:	Yes
Print Traces:	Yes
File:	Save data into a DAT format file; can be converted and displayed on the system graph window
Soft-button Menu Operation:	The menu structure is:

Main Display MENU

1:Main, 2: Delayed, 3:Roll, 4:XY, 5:Vernier, 6:Time Ref

Cursor MENU

1:Source, 2:X Y, 3:X1, 4:X2, 5:X1 X2, 6:Cursor

Quick Measure MENU

1:Source, 2:Clear Measure, 3:Frequency, 4:Period, 5:Peak_Peak, 6:Maximum, 7:Minimum, 8:Rise Time, 9:Fall Time, 10:Duty Cycle, 11:RMS, 12:+Width, 13:-Width, 14:Average, 15:X at Maximum

Acquire MENU

1:Normal, 2:Average, 3:Args

Display MENU

1:Clear, 2:Grid, 3:Background, 4:Boarder, 5:Vector

Auto-Scale MENU

1:Undo Auto-scale

Save MENU

1:Save

Quick Print MENU

1:Print

Utility MENU

1:Sampling Information, 2:Default Settings

Edge MENU

1:Source, 2:Shape

Pulse MENU

1:Source, 2:Shape, 3:Operation, 4:Less Value, 5:Great Value

Pattern MENU

1:Source, 2:L, 3:H, 4:X, 5:Up Edge, 6:Down Edge

Mode Coupling MENU

1:Mode, 2:Hold-off Value

Analog Channel MENU

1:Coupling, 2:Vernier, 3:Invert

Math Channel MENU

1:Setting, 2:FFT, 3:Multiply, 4:Subtract, 5:Differentiate, 6:Integrate

Math FFT MENU

1:Source, 2:Span, 3:Center, 4:Scale, 5:Offset

Math 1*2/1-2 MENU

1:Scale, 2:Offset

Math Diff/Inte MENU

1:Source, 2:Scale, 3:Offset

Digital Channel MENU

1:Select Channel/Enable/Disable, 2:Shape,
3:Threshold, 4:User Value

10.19.3.2Features Not Supported

The following features are not supported in the simulated version of the oscilloscope included in Multisim.

Remote mode

Terminals on rear panel

Self-test

Hardware error detect

Calibration

Language selection

Infinite Persistence Operation mode

Label button for editing on digital channel's label

Delay and phase measurement

Overshoot and preshoot measurement

Clock setting

Cursor has normal mode only

Peak detection and real time data acquirement

Noise reject and high frequency reject modes in data coupling

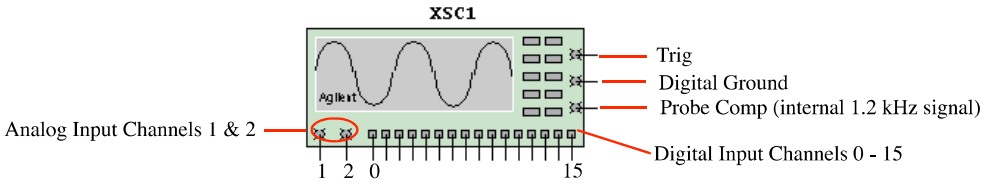
Duration trigger, IC trigger, Sequence trigger

Bandwidth limit feature

10.19.3.3Using the Agilent Oscilloscope

➢ To connect the simulated Agilent 54622D Oscilloscope to a circuit:

1. Click on the **Agilent Oscilloscope** tool button, place its icon on the workspace and double-click on the icon to open the instrument. Click on the Power button to switch on the instrument
2. Wire the icon to the circuit following the pin key below.



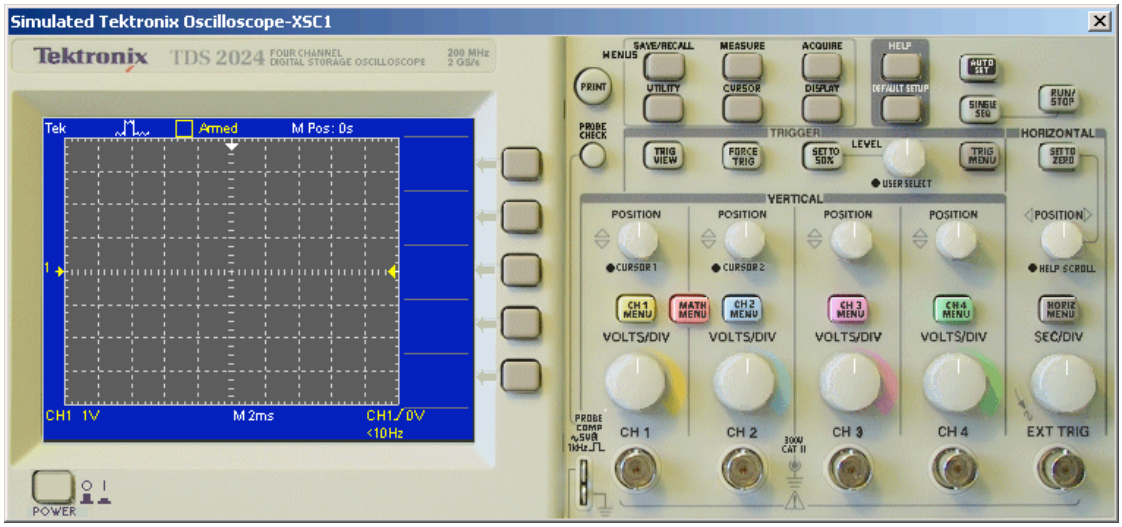
3. Refer to the PDF copy of the instrument's user guide for complete instructions on the use of this device.

Tip For optimum simulation speed, set the time scale on the scope near to the value you would like to display during simulation.

Note A link to the PDF version of this instrument's user guide can be found at www.electronicsworkbench.com.

10.20 Tektronix Simulated Oscilloscope

The simulated Tektronix TDS 2024 is a 4-channel, 200-MHz oscilloscope. A link to the PDF version of this instrument's user guide can be found at www.electronicsworkbench.com.



10.20.1 Supported Features

Most of the features that are documented in the Tektronix TDS 2024's User Guide are available in its simulated version. These include:

Running Mode:	Auto; Single; Stop.
Trigger Mode:	Auto; Normal.
Trigger Type:	Edge Trigger; Pulse Trigger.
Trigger Source:	Analog signals; Extent trigger signal.
Display Mode:	Main; Window; XY, FFT, Trig View.
Signal Channels:	4 analog channels; 1 math channel; one probe signal in 1kHz for testing purposes.
Cursors:	4 cursors.
Math channel:	FFT; +; -.
Measurements:	Cursor information; Frequency; Period; Peak-Peak; Maximum; Minimum; Rise time; Fall time; RMS; Mean.
Display controls:	Vector/Point on traces; Contrast color control.

Auto-setup:	Yes.
Print traces:	Yes.

Control Buttons Operation:

Run/Stop BUTTON:	Start or Stop sampling in multiple-triggers.
Single Seq. BUTTON:	Start sampling in one-trigger.
Trig View BUTTON:	See current trigger signal wave and trigger level.
Force Trig BUTTON:	Immediately to start a trigger.
Set to 50% BUTTON:	Move trigger level to the mean value of the trigger signal.
Set to Zero BUTTON:	Set time offset position to zero.
Help BUTTON:	Goes to instrument help topic.
Print BUTTON:	Print the graph to printer.
Soft Menu BUTTONs:	To support the menu controls.

Soft Button Menu Operation:

The soft button menu is a subset of the Tektronix Oscilloscope TDS 2024's:

Save/Recall MENU:	1: Setup; 2: Save; 3: Recall.
Measure MENU:	Five measure areas, each one includes second a level menu to set a source channel and measure type under: Frequency, Period, Peak_peak, Maximum, Minimum, Rise time, Fall time; RMS, Mean.
Acquire MENU:	1: Sample, 2: Average, 3: Average value.
Auto Set MENU:	Shows one of three menu lists based on the signal curve type: A) (SIN Curve) 1: Multiple; 2: Single; 3: FFT; 4: Undo, (Pulse curve) 1: Multiple; 2: Single; 3: Slope Up; 4: Slope Down; 5: Undo, (Unknow curve) 1: Mean Value; 2: Peak-Peak Value.
Utility MENU:	1: System status, it includes second level menu: 1: Horizontal status; 2: Vertical CH1-CH2 status; 3: Vertical CH3-CH4 status; 4: Trigger status; 5: Misc. status.
Cursor MENU:	1: Type; 2: Source.
Display MENU:	1: Type, 2: Format, 3: Contrast Increase, 4: Contrast Decrease.
Default Setup MENU:	1: Undo Default Setup.
Trig MENU:	It will show one of three menu lists: A) (Edge Trigger) 1: Type; 2: Source; 3: Slope; 4: Mode; 5: Coupling; B) (Pulse Trigger page 1)

	1: Type; 2: Source; 3: When; 4: Pulse Width; 5: More Page; C) (Pulse Trigger page 2) 1: Type; 2: Polarity; 3: Mode; 4: Coupling; 5) More Page.
Channel MENU:	1: Coupling, 2: Volts/Div, 3: Invert.
Math channel MENU:	It will show one of three sub menu lists: A) (+) 1: Operation; 2: CH1+CH2; 3: CH3+CH4; B) (-) 1: Operation; 2: CH1-CH2; 2: CH2-CH1; 3: CH3-CH4; 4: CH4-CH3; C) (FFT) 1: Operation; 2: Source; 3: Window.
Horizontal MENU:	1: Main; 2:Window Zone; 3: Window; 4: Trig Knob selection.

10.20.2 Features Not Supported

The following features are not supported in the simulated version of the oscilloscope:

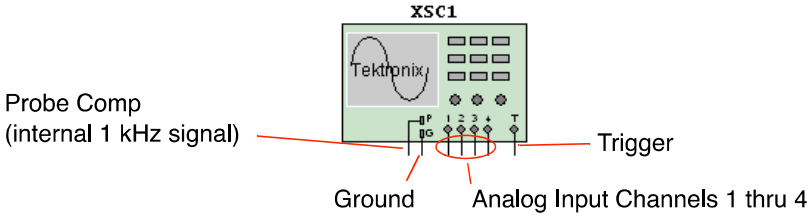
- Remote mode (without external device and RS 232 interface)
- Terminals on rear panel
- Probe check
- Scan mode display
- Language selection, Error Log and Do Self Calibration on menu item UTILITY
- Saving Wave form, Ref A – Ref D on menu item SAVE/RECALL
- Video Trigger on menu item TRIG MENU
- Trigger coupling of Noise Reject, HF Reject and LF Reject on menu item TRIG MENU
- Cursor source of Ref A --- Ref D on menu item CURSOR
- Persistence display mode on menu item DISPLAY
- Peak detect acquire on menu item ACQUIRE
- FFT Zoom on menu item MATH
- BW limit and Probe selection on menu item CHANNEL.

10.20.3 Using the Tektronix Oscilloscope

➢ To connect the simulated Tektronix TDS 2024 Oscilloscope to a circuit:

1. Click on the **Tektronix Oscilloscope** tool button, place its icon on the workspace and double-click on the icon to open the instrument. Click on the Power button to switch on the instrument

2. Wire the icon to the circuit following the pin key below.



3. Refer to the PDF copy of the instrument's user guide for complete instructions on the use of this device.

Note A link to the PDF version of this instrument's user guide can be found at www.electronicsworkbench.com.