

**Tina-TI**  
**An Introduction**

Section 6

# Precision Analog Applications Seminar

## Tina-TI

An introduction

Tina-TI is a powerful analog circuit simulation tool

**DesignSoft**  
Excellence in Computer Aided Design and Educational Software

ANALOG SIMULATION

Amplifiers and Linear : Tina - Analog Circuit Simulation From Texas Instruments

TINA™

TINA is an easy-to-use, but powerful, circuit simulation program based on a SPICE engine. TINA-TI™ is a fully functional version of TINA, loaded with a library of TI macromodels plus passive and active models. TINA-TI is limited to circuits with two ICs and up to 20 additional nodes.

**Screenshot of TINA™ output graphics**

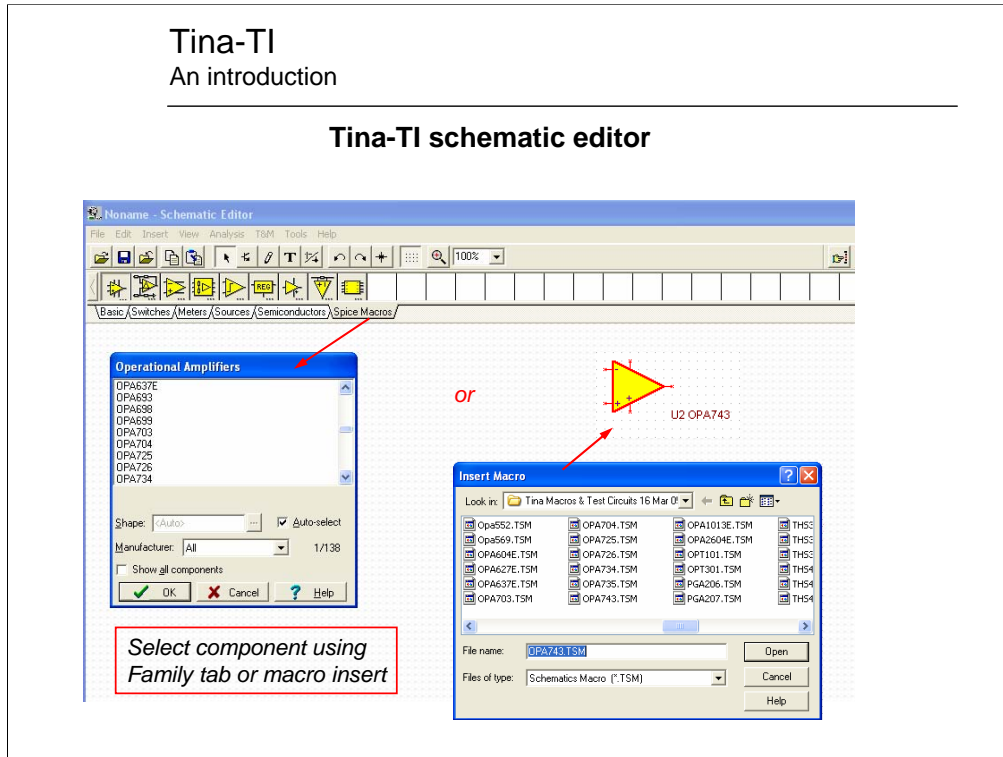
AC Analysis with parameter stepping

Tina-TI is a free, yet powerful, circuit simulator from DesignSoft and TI. This simulator accommodates up to 2 TI analog IC's and a wide pallet of passive and active devices. There is a maximum node count of 20. Note however, this count does not include the TI analog IC connections.

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### Tina-TI schematic editor



Select the circuit components including the TI analog IC's using the tabs located just below the component outlines. The tab names describe the family of components contained within the tab. Once a component has been selected it's just a matter of positioning it on the grid with the mouse.

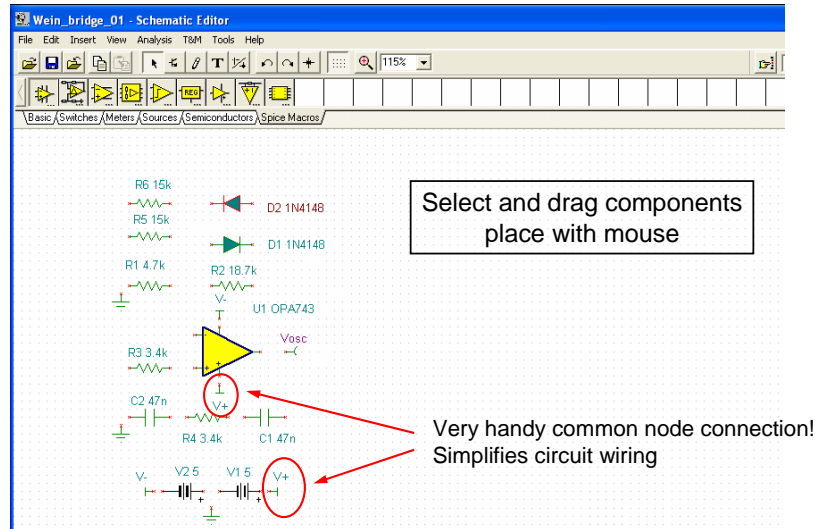
The "Spice Macro" tab accesses the library of TI analog devices: op-amps, difference amps, differential amplifiers, regulators, shunt current monitors, etc. Additional Pspice models can also be inserted in the circuit using the "macro insert" function found by clicking on the "Insert." In this example, the OPA743 op-amp was inserted using this macro function.

Double clicking on the other components opens a card listing the device characteristics. There are pull-downs on these cards that lets you select a specific device and alter certain characteristics.

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### Tina-TI schematic editor

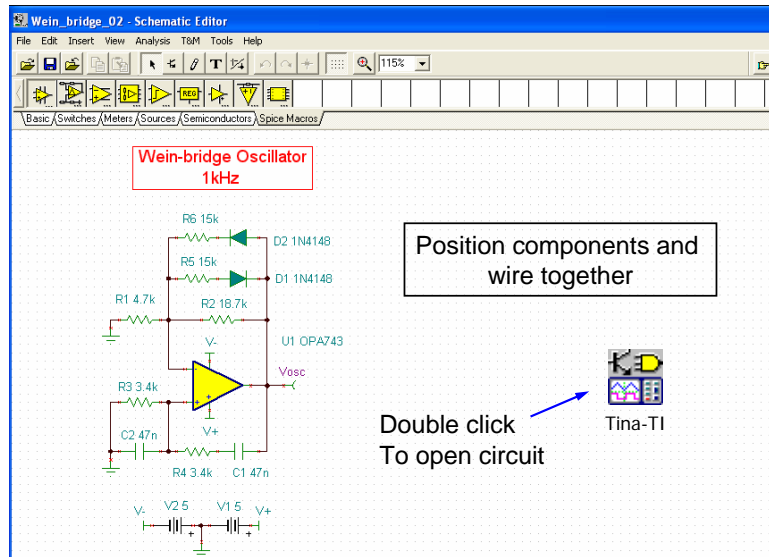


A wide variety of transistors, diodes, passive components, meters and sources can be selected from the various component tabs. Once selected they can be dragged and positioned as desired. Note the handy common node connection circuit element which can be used to simplify circuit wiring.

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### Tina-TI schematic editor



Once the components are placed they can be wired together. This is accomplished by positioning the hand symbol at one end of a component. Pressing the left mouse button starts the wire. Follow the grid with the wire to the next appropriate connection point. Once there, release the mouse button. The completed circuit is that of a 1kHz Wein-bridge oscillator.

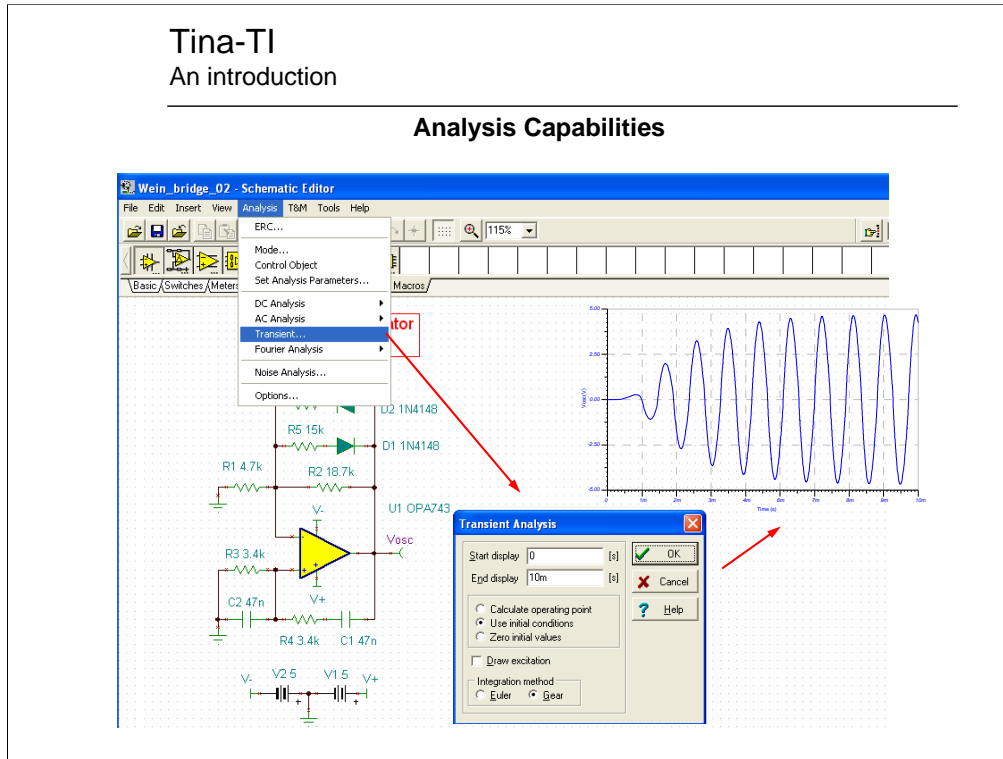
A connection check can be performed on the circuit using the ERC function. It is selected by clicking on "Analysis" pull-down. This may be skipped as an ERC will be first performed once any of the analysis options are selected.

Should an ERC error be detected, clicking on the listed error text will highlight the error on the schematic. This makes it much easier to locate and then correct the error.

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### Analysis Capabilities



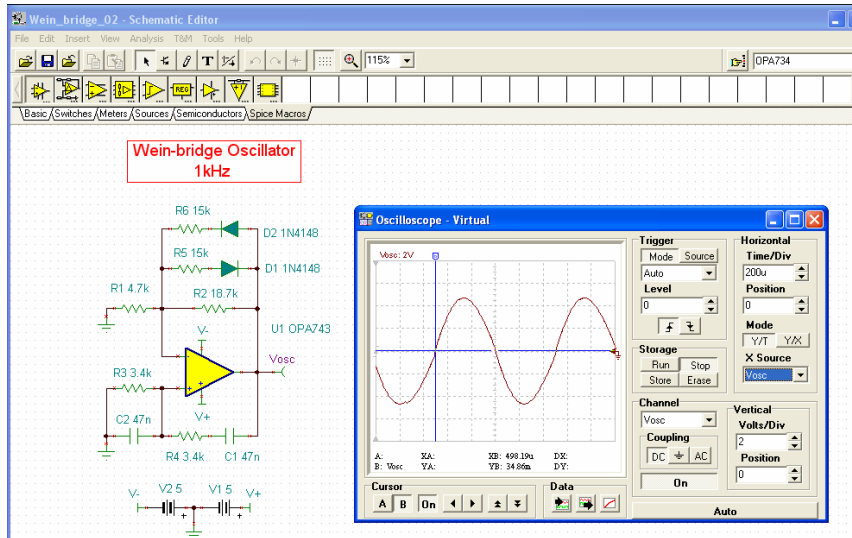
A number of analysis can be performed on the circuit; DC, AC, transient, Fourier and noise. There are more specific analysis available within these categories.

Shown here is a transient analysis made on the Wein-bridge oscillator circuit. The time scale has been selected to show the start-up and a few cycles of the oscillation.

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### Test and measurement capabilities



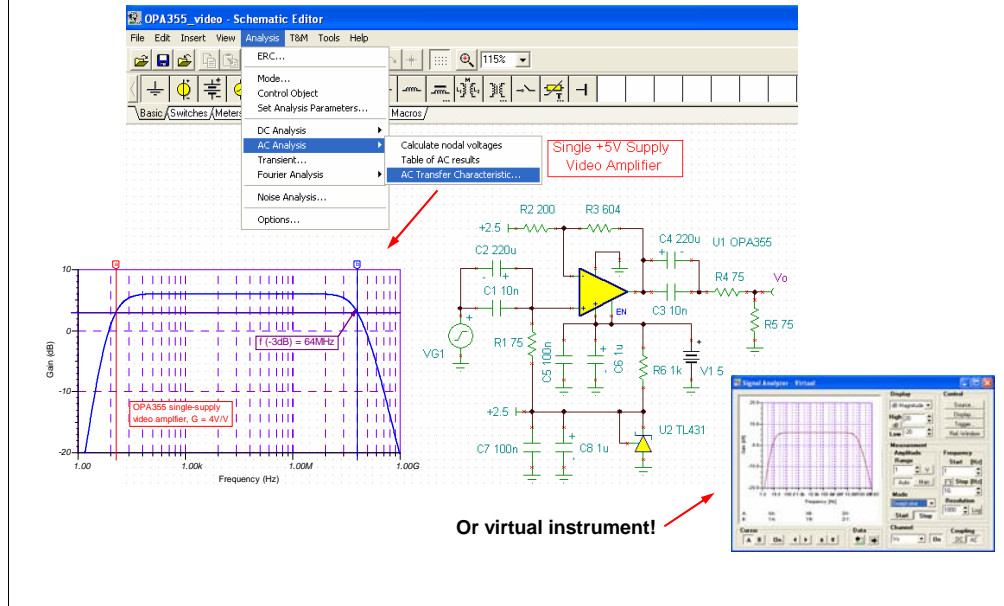
Tina-TI also provides virtual instruments. Here is an example of the virtual oscilloscope. Other instruments include; multimeters, signal generators, signal analyzers and x-y recorders.

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### Test and measurement capabilities



Here's another example of Tina-TI's capability. A video amplifier application is shown using an OPA355 video op-amp and a TL431 shunt regulator IC. The TL431 provides a low impedance 2.5V voltage source. This is an example of a "2 TI device" circuit which is the limit for Tina-TI.

An amplitude vs. frequency plot can be acquired using the "Analysis" pull-down category "AC transfer characteristics." However, a virtual instrument can also be selected and displayed. Doing so allows the component values to be tweaked real time and the results immediately seen.



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Where to get Tina-TI:

<http://focus.ti.com/docs/toolsw/folders/print/tina-ti.html>

Or simply go to [www.ti.com](http://www.ti.com)

and enter **Tina-TI** in the **keyword search** box

Tina-TI is available on the web and can be easily obtained via the TI website.

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