

Circuit4 For iPhone User's Manual

Revision A
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Circuit4 Version 1.0

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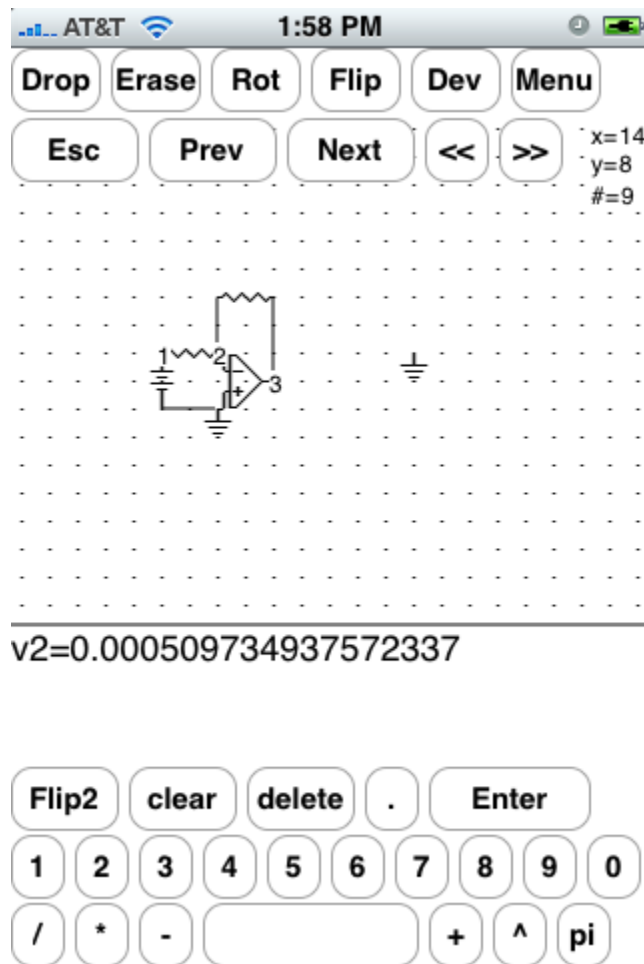
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i. INTRODUCTION

What is Circuit4?

- Circuit4 is a circuit analysis application.
- It allows Electrical Engineering students to create circuits in an iPhone and iPod Touch. It is also available for the TI89, Voyage 200 and TI92+.
- It is able to solve direct current circuits (DC).

The picture below is a circuit created with Circuit4. The circuit contains an OP-AMP, resistor and voltage source. V2 is the voltage at node 2.



1. GETTING STARTED

1.1 Requirements

In order to install Circuit4 you need to have an iPhone 1st or 2nd generation or an iPod Touch 1st or 2nd generation with operating system 2.0.

1.2 [Installing Circuit4](#)

To install Circuit4 on your iPhone or iPod touch simply click on the AppStore icon on your device, search for Circuit4 and purchase it. Once you've purchase Circuit4 it will download and install automatically on your device. You could also purchase Circuit4 from iTunes. If you purchase it from iTunes you must sync your device with iTunes so that it installs Circuit4 on your device.

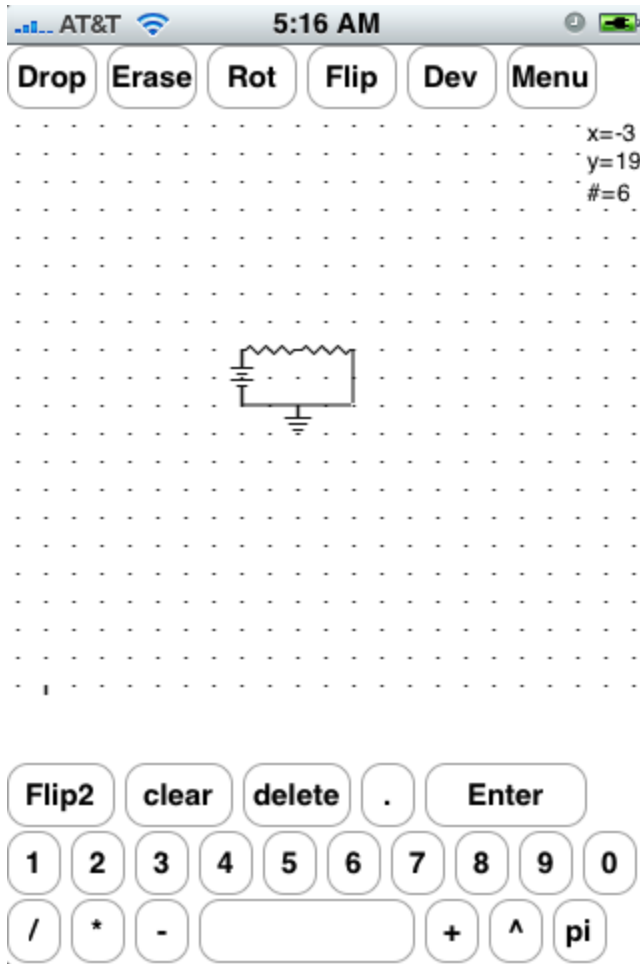
1.3 [Obtaining Help](#)

If you encounter problems installing the application or if you have any other type of questions please feel free to e-mail us circuit4@noatechnologies.com

2. BUILDING YOUR FIRST CIRCUIT

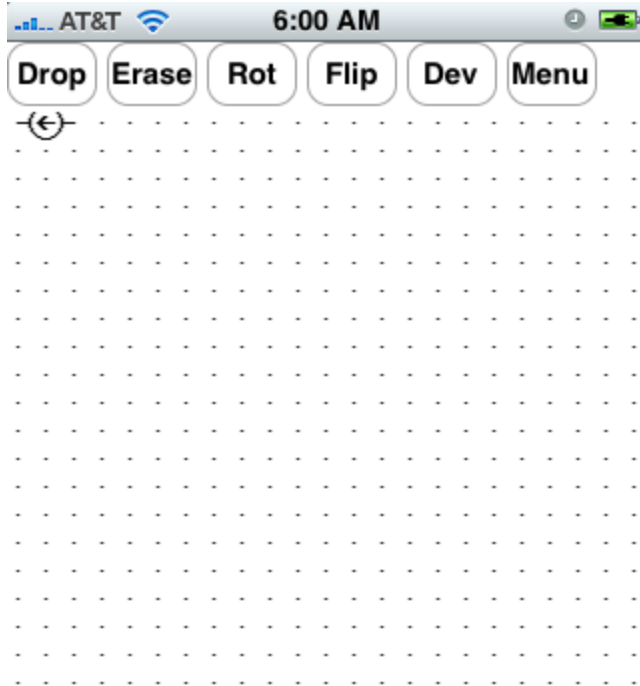
The best way to get familiar with Circuit4 is by building a circuit step by step. Here you will learn how to draw a circuit and how to solve for its node voltages and node equations.

A picture of the circuit we will build is shown below. For the purpose of this example this is a simple circuit of two resistors and a battery (also called a voltage source).

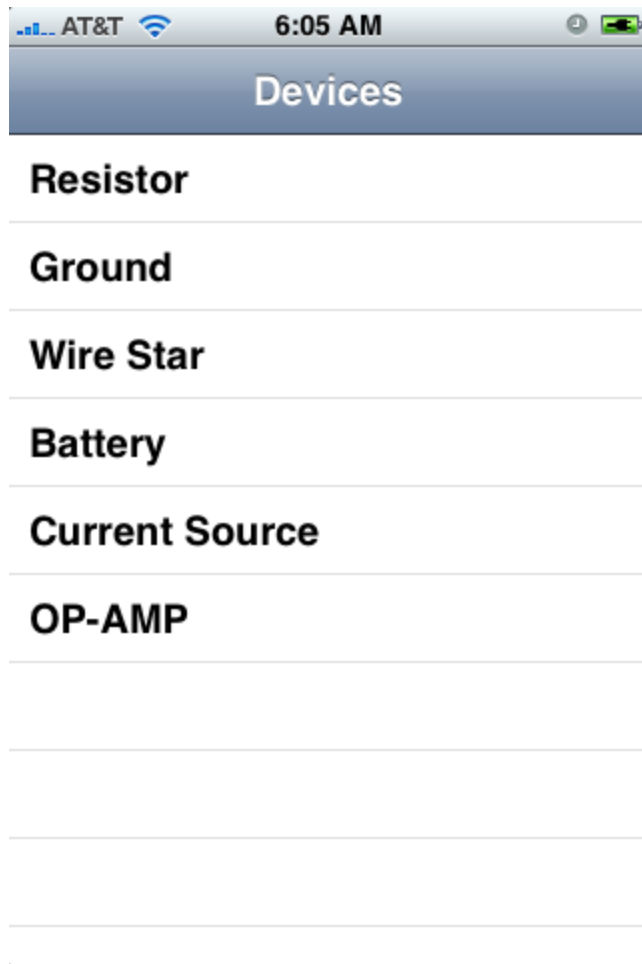


Drawing the Circuit

Below is a picture of Circuit4 when you first open it.



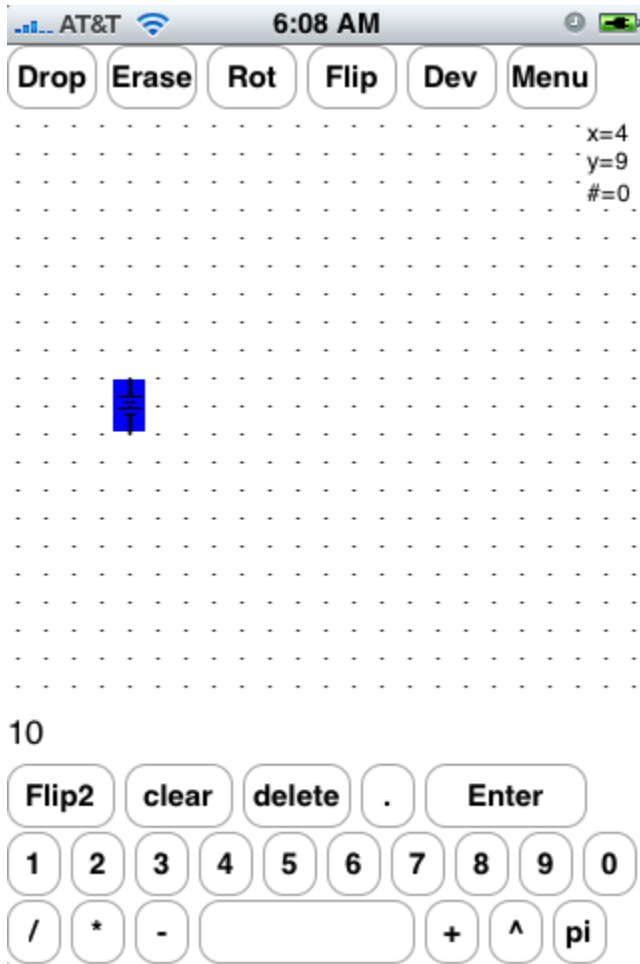
Touch the Dev button. You will see the Device popup window as shown below.



Now choose the Battery device (this is the same as a voltage source). The Battery will be displayed on the screen. To move the Battery to a different location simply touch the new location and it will move there.

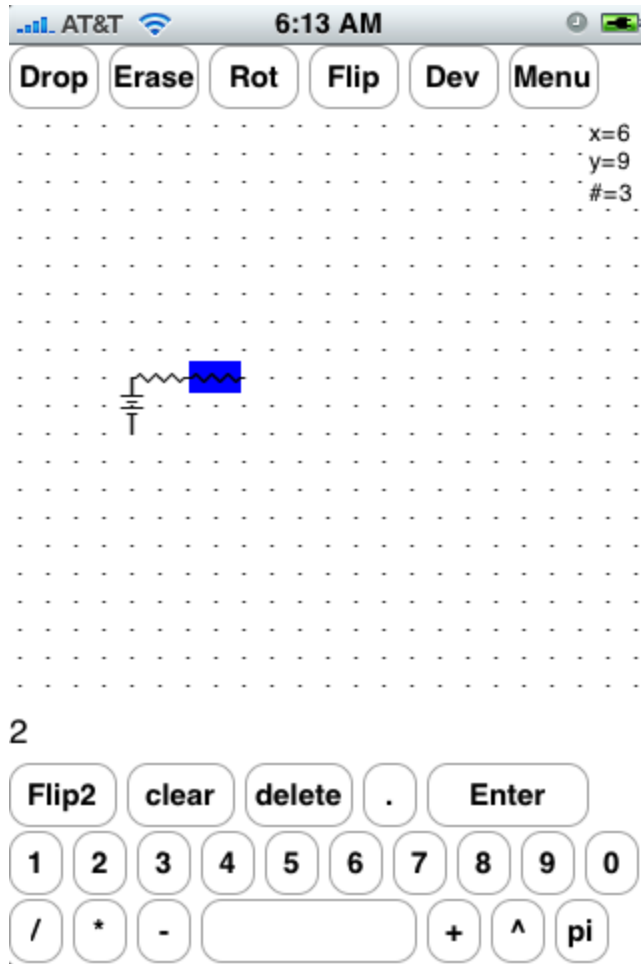
To rotate the Battery touch the Rot button. To flip the Battery touch the Flip button.

To draw the Battery touch the Drop button. When the Battery is dropped it is automatically highlighted as shown below. Its default value is one. At this moment you can type a new value. Enter the number ten using the virtual keyboard. Touch the Enter button to save the value.



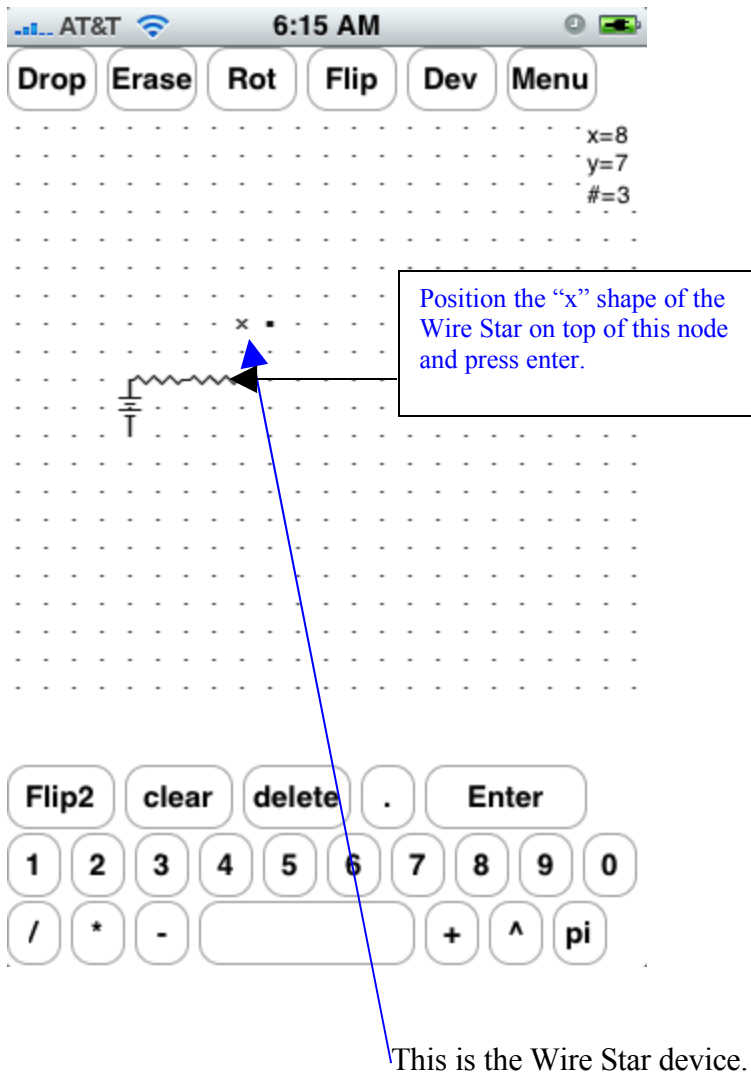
Drop Two Resistors

Follow the same steps of above to drop two resistors. For each resistor enter a value of two. Drop the resistors as shown below.



Draw a Wire

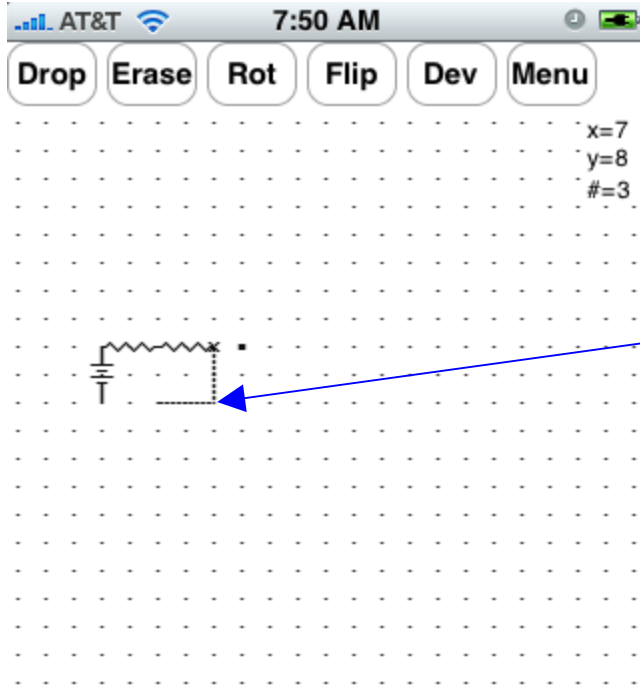
To draw a wire you must use the Wire Star device. Touch the Devices button and then touch the Wire Star button.



This is the Wire Star device.

To draw a wire position the "x" shape of the Wire Star on top of the resistor node and touch the Drop button.

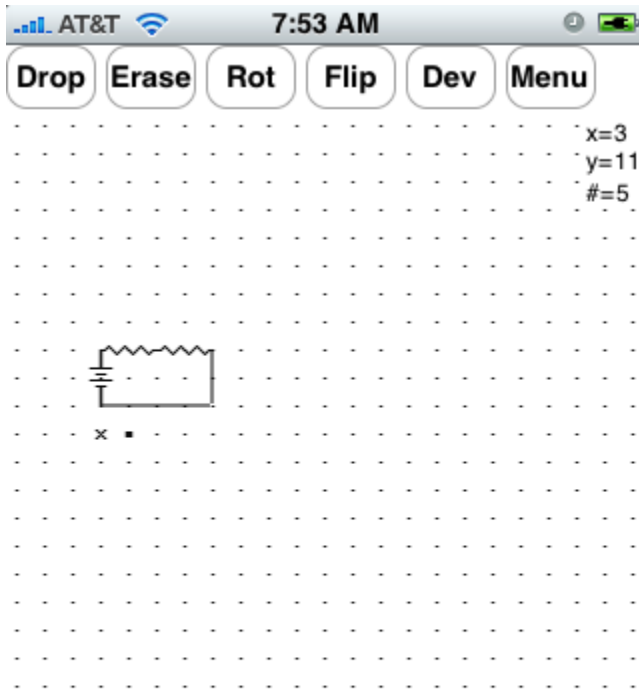
Now extend the wire by touching a different place on the screen. The wire will draw itself to the place you touched. Every time you want to make a corner you must touch the Drop button. To cancel this operation touch the Esc button.



You must touch the Drop button every time you want to make a corner like this one.

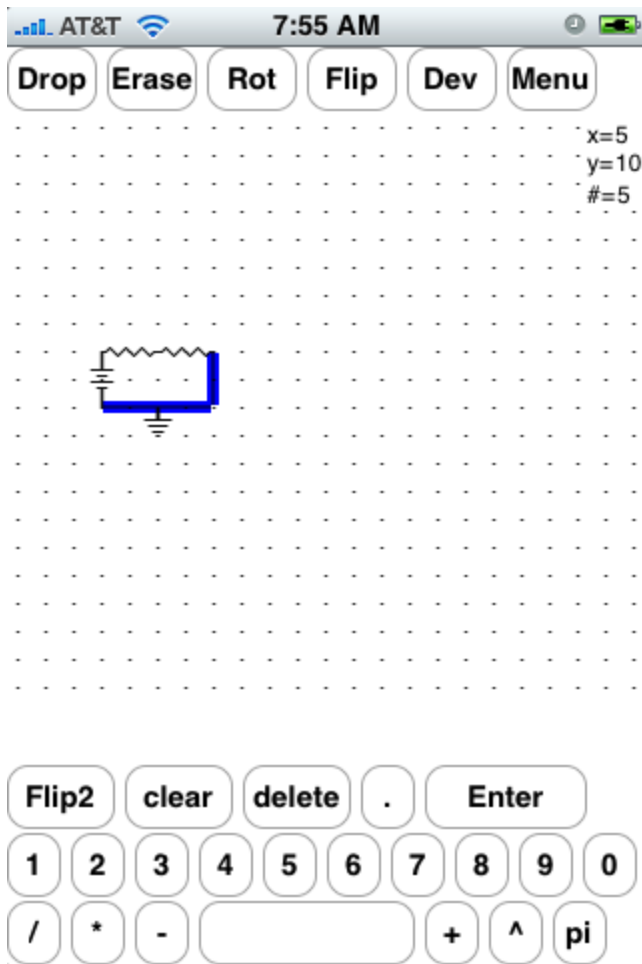


Touch the Battery's terminal to draw the wire to that position. Now touch the Drop button. Once the wire is connected between the Resistor and Battery it will become solid black as shown below.



Drop a Ground

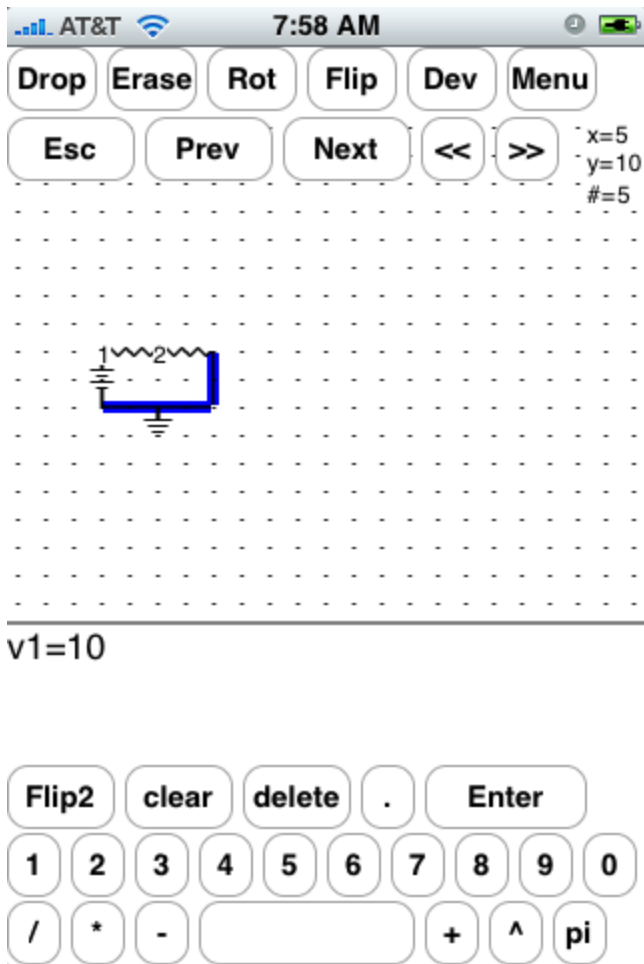
Every circuit must have a ground. Chose the Ground device from the Devices menu and drop it as shown.



Solve For The Node Voltages of the Circuit

To solve for the node voltages click on the Menu button and then select Solve>Node Voltages-V(t). It may take 10 to 20 seconds for the circuit to be solved.

The answers are displayed in a small window on the bottom of the screen. Each of the nodes of the circuit become enumerated. To view the voltage of the next node touch the Next button. To go back touch the Prev button. If the answer is too long touch the << or >> buttons to scroll left or right, respectively.



At this point you are done. To exit touch the Esc button.

3. BASIC FUNCTIONS TO BUILD A CIRCUIT

3.1. Choosing a device

Touch the Devices button. This will open up the Devices menu. Now touch the device you want and the device will be displayed on the screen.

3.2. Rotating a device

To rotate a device (note that you cannot rotate a device that has already been dropped) touch the Rot button. The device will be rotated in a 90 degrees angle.

3.3. Flipping a device

To flip a device touch the Flip button. This is the same as rotating the device in a 180 degrees angle.

3.4. Dropping a device

To drop a device on the screen touch the Drop button. Immediately the symbol will become highlighted and a default value will be displayed.

3.5. Changing the value of a device

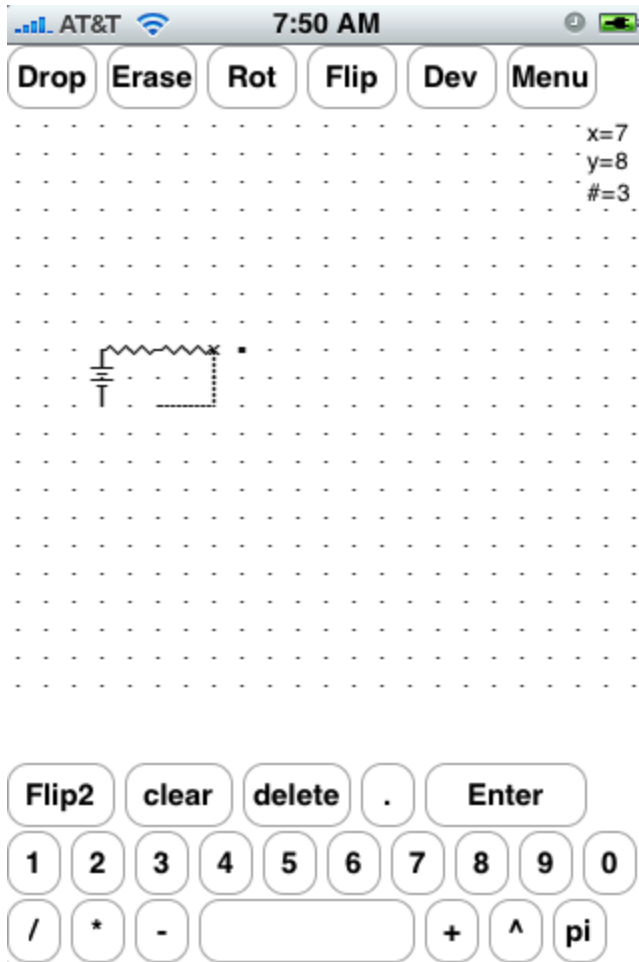
To change the value of a device first highlight the device and then enter the value. Make sure to touch the device in the middle to highlight it. You must then press the Enter button so that the new value is saved.

3.6. Deleting a device

To delete a device you must first highlight the device by touching it on its center. Once highlighted touch the Erase button.

3.7. Drawing a wire

First, choose the Wire Star device. To connect two devices first position the star on one end of the device you want to connect, now touch the Drop button. Next, touch the terminal of the second device you want to connect and touch the Drop button. This will effectively connect the two devices. The picture below shows how the Star Wire has already been connected to one end of the Battery and now is about to be connected to one end of a resistor. Do this to connect all devices of your circuit.

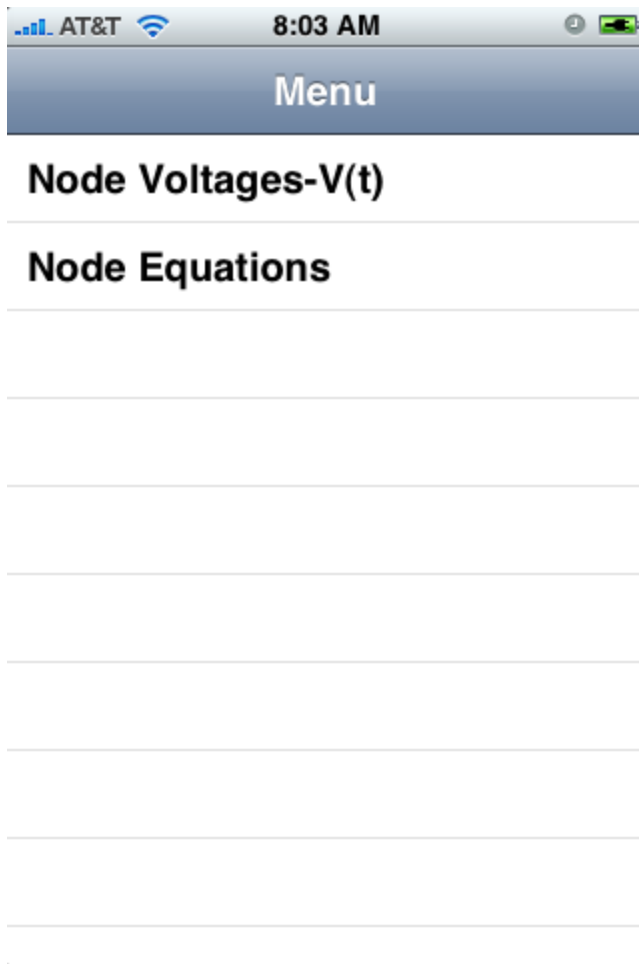


3.8. Adding a ground to the circuit

For every circuit there must be at least one ground connected to it. Drop the ground in any place of the circuit you desire. Note: The ground MUST be connected to the circuit. The node where Ground is connected will be the zero voltage reference point. All node voltages will be with respect to this reference point.

4. FUNCTIONS TO SOLVE A CIRCUIT

First, click the Menu button and then touch the Solve option to display the Solve menu as shown below.



There are two different ways to solve a circuit.

4.1. Node Voltages-V(t)

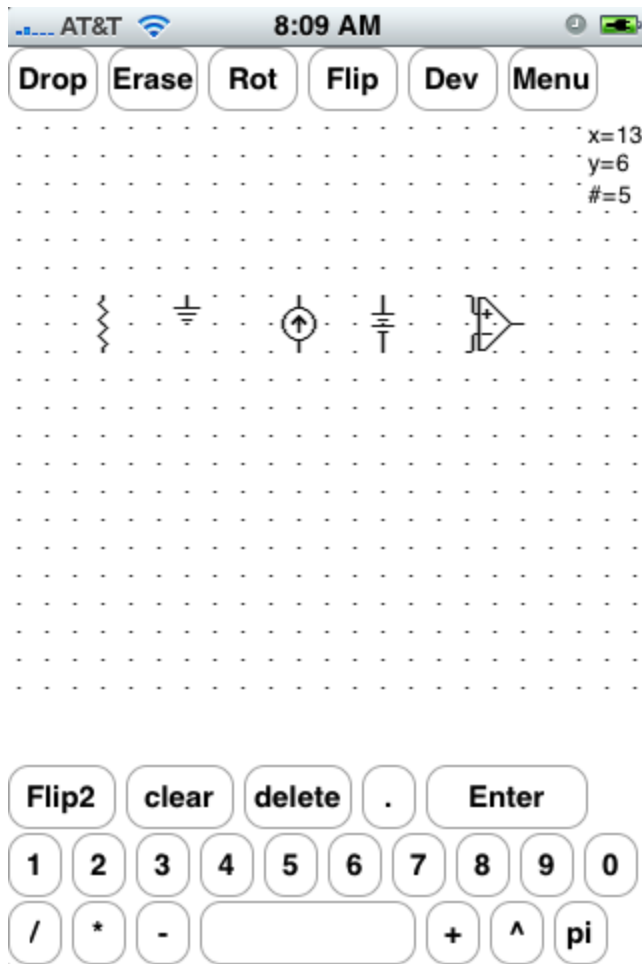
This will solve for all the node voltages in the t domain with respect to ground.

4.2. Node Equations

This will solve for all the node equations of the circuit. These are the equations needed to solve for the node voltages.

5. TYPE OF DEVICES

The picture below shows all the devices that can be used to build a circuit.



Below is a list of the names of all the devices.

- Resistor
- Ground
- Current Source
- Battery (Voltage Source)
- OP-AMP (operational amplifier)

5.1. The Op-Amp

To flip the polarity of the Op-Amp you must touch the Flip2 button.

6. MENU OPTIONS SUMMARY

6.1. Tools

6.1.1.Refresh Screen

Use this to redraw the circuit.

6.1.2.Center Ckt

The center circuit option allows you to reset the part of the circuit currently being viewed on the screen. The upper left corner of the screen will have the x,y position (0,0) after it has been reset.

6.1.3.Erase All

Warning! By choosing this option, the entire circuit will be erased.

6.1.4.About...

This will open up a window with the release version number, build number and date Circuit4 was built.

6.2. Solve

Go here to solve the circuit.

6.3. Zoom

Only two levels of zoom are available. Choose this to zoom the circuit in or out.