

Step 1: Get a Cordless Telephone

Go to the dumpster and find a cordless phone. Since we will not actually be "calling" the telephone, we need one with the "page or locate" function. The locate function makes the handset ring when you press the locate button on the charging station. So basically, when the phone rings on the locate function, the ringing signals a relay to switch position (from off to on).

The phone I found is a SONY model crapo something. It doesn't really matter. It has an old school answering machine in it, making it potentially fun to listen to all the messages on the tape. But all the messages on this machine seemed to be about this lady that couldn't find the light switch in her basement.

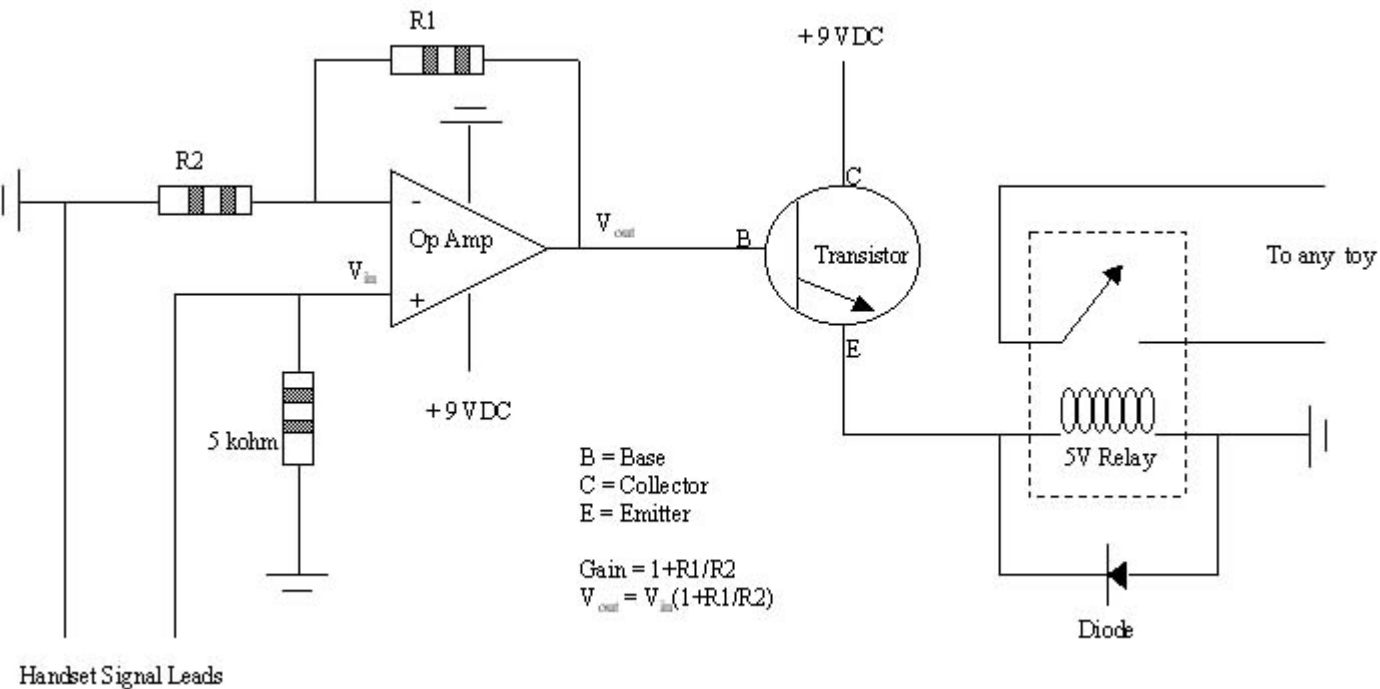
Step 2: Convert the Charging Unit to DC Power

This step can be omitted, but if you need remote control type stuff you probably aren't going to be anywhere near an AC outlet. So you need to get your charging station (the part you don't talk into with a cordless phone) to run off of DC power. Actually this is pretty easy to do. Most of them already use DC power, but utilize a "wall wart" to take the AC from the wall and convert to DC. My phone runs off of 9 volts DC (says this on the phone) so it was easy to just take off the back and solder in some leads to connect to a 9 volt battery.

Step 3: Getting the Signal From the Handset

Upon pressing the "locate" button on the charging station, the handset rings through a small speaker in the mouthpiece. So you just pop the back off the handset, and solder two leads to the speaker connections. I left the speaker in there too because I like trying to trick Gillian into believing that our phone is ringing. The voltage across these leads will give us a signal (we'll need to amplify it later) that we can use to trigger a relay or switch.

Step 4: Signal Amplification



The signal from the handset speaker now needs to be amplified to switch our relay. This is because at most you will get like a volt maybe off the speaker for signal. We're gonna need at least 5 volts to switch a small standard relay. So the first step in amplification is to run the speaker signal through an operational amplifier (op amp). This brings the low voltage speaker signal up to a usable level, say around 5 or six volts depending on the gain we select for the op amp.

Essentially any op amp will work for this application. You can steal them from radioshack or your favorite electronics store. You can also get them for free as samples from a semiconductor manufacturer. Major semiconductor companies will send you loads of free stuff because they want you to use their products for prototypes. And if you use their products for the prototype, chances are you'll use the same product for the main production line and make them lots of big dollars. I was able to get like 50 op amps as free samples online (they even paid shipping). Using the amp is pretty straight forward. You select the gain (gain=output voltage/input voltage) by changing the values of two resistors. For the circuit diagram to the right, the gain equals $(1 + R1/R2)$. A gain of say 10-100 would be fine for this project. For power, I used a 9 V battery for all the circuitry. You could use the NiCd battery in the phone, but 3.6 V is hardly enough to switch a regular relay.

The op amp boosts the voltage up to around 5-6 Volts, but can only sink a current of like 10 mA. So now we need to use a transistor to beef up the current in order to drive the relay. The output of the op amp is fed directly into the base of your favorite bipolar transistor. I'm using a BU407 because it was a free sample, but you could use almost any medium current transistor like the 2N3055 or TIP31. The transistor now provides ample current to switch the relay. The diode is there to protect the transistor against emf spikes from the relay coil as it is switched off.

Step 5: Hook up Your Favorite Device

This project is nearly over. Now you just need to hook up the relay to control the power to your favorite toy. For example, this would be a nice addition to a spud gun ignition system.

Here's what mine looks like:

