RePlay *for Kids*

Toy Adaptation Tutorial

or

"How to modify a battery-operated toy so that it can be used by a child with a disability"

Why Playing With Toys Is Important

- To help children develop play skills.
- To teach cause and effect relationships.
- To prepare children to use technology such as a computer.
- To help children learn how to interact and control their environment, and to interact with others.
- To help children develop communication skills.
- And, of course, just for fun.

Why Adapt A Toy?

- On-off switches or toy activation switches are often small and hard to reach, making it difficult for a child with a physical disability to operate the toy.
- An adapted switch can be used to encourage a child to make a certain motion.

First Steps

- **Safety Rule #1:** You are doing these modifications at your own risk. **RePlay *for Kids*** will not be held responsible for injuries that occur during the workshop. Soldering irons and glue guns are **HOT!** Many of the tools are **SHARP! BE CAREFUL!**
- **Safety Rule #2:** Remember that these toys will be used by young children. Do not leave sharp edges or small pieces on the toys (choking hazard). **BE CAREFUL!**
- If you have any questions, PLEASE ASK! There are no stupid questions.

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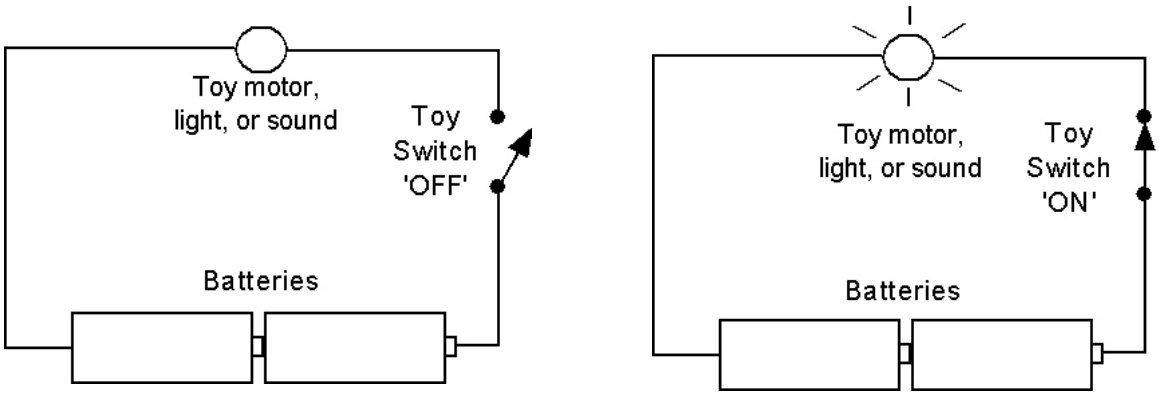
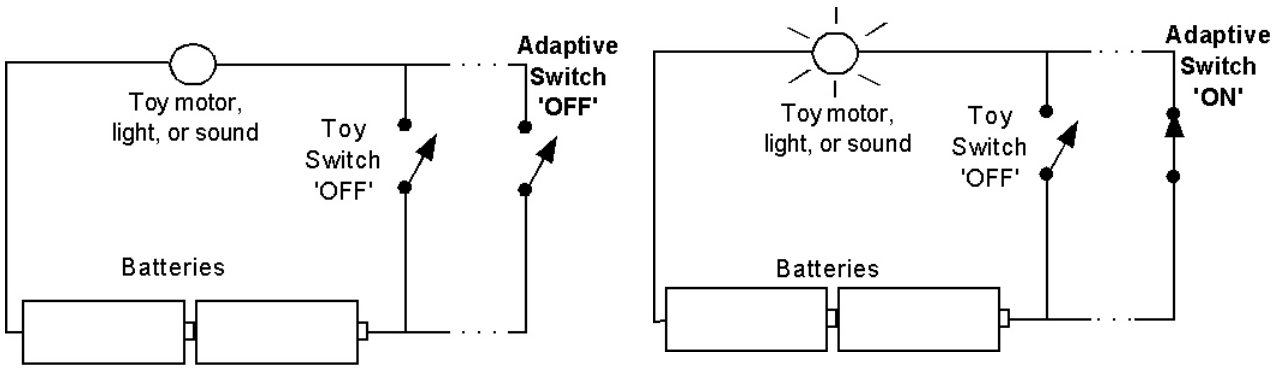
How A Toy With Switches Works

Regular Unadapted Toy



- When switch is open, loop is broken and no current flows, so toy doesn't operate.
- When switch is closed, loop is completed and current flows, so toy is activated.

Adapted Toy – Parallel Switch



- If both switches are open, loop is broken and no current flows, so toy doesn't operate.
- If *either* switch is closed, a loop is completed, current flows and the toy is activated.
- Toy can still be operated by original switch.

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Tips For Adapting A Toy

1. Test the toy to make sure it works. Be sure you understand what it's supposed to do BEFORE you take it apart.

2. Locate the on/off switch, determine if it can be accessed. If there is more than one switch, pick one switch that has a stimulating function (lights, noises). If you are uncertain which one to choose, ask for help.

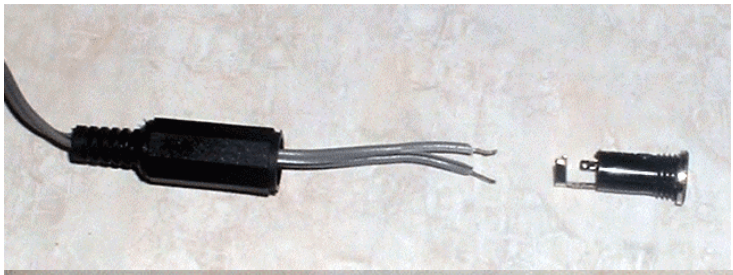
3. Take apart the toy, making sure you keep track of the screws that are taken out.
   - watch out for hidden screws beneath decals
   - some toys are glued together; so they will have to be carefully pried apart, then glued back together afterwards.

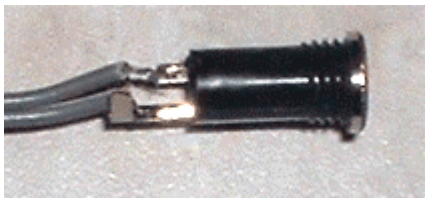
4. Try to find the wires that connect to the on/off switch and solder a wire to each of the contacts (see soldering tips below). If the switch is part of a circuit board, try using the voltmeter to find a site for placing the new wires (ask for help).

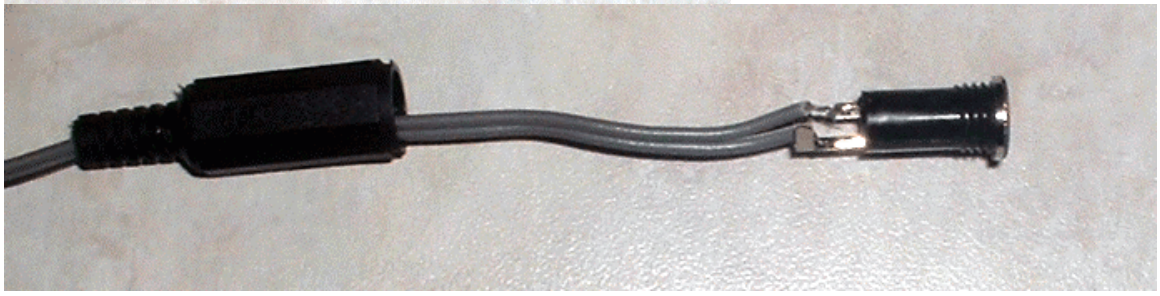
5. Figure out where to have the new wires exit the toy.
   - avoid pinching and strain on the wires
   - use file or drill to create room in wall of toy

6. Put the toy back together.

7. Attach the phone jack (female part).
   - press the wires together first to test if the wires are connected properly
   - put the sleeve over the wires ***before*** soldering (see picture below)
   - solder the wires to the jack (one wire in each hole in the jack – see photo)







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Soldering Tips

1. Allow soldering gun time to warm up.

2. Wipe the tip of the soldering gun on a wet sponge to clean it prior to soldering.

3. Unravel a 3 inch section of solder and hold it against the soldering gun tip until it starts to melt onto the tip. Only allow a small amount of solder to wick onto the tip.

4. If possible, wrap the stripped end of the wire around a post of the part that is being soldered to the wire, or to an existing wire to provide some mechanical protection for the connection.

5. Place the tip of the hot soldering iron against the wire and part, allowing them both to get hot enough (if the wire gets too hot, you can try holding it with a pliers). Place the solder against the soldering iron/wire/part junction, allowing it to melt into the wire and part. It helps to either have a helper hold the solder, or to hold the solder and wire with one hand. As soon as the solder starts to melt into the junction, remove the soldering iron to avoid getting the junction to hot.

6. Watch out for other wires becoming unsoldered when you solder the new wires on. The faster you solder, the less likely the existing connections will melt and become unsoldered.

7. Try to use a small amount of solder to avoid shorting out other wires. If you use too much solder, you can remove it by heating up and using the desoldering bulb to suck the excess solder away.

Toy Adaptation Supply List

Tools

Soldering iron
Solder
Desoldering bulb
Thin long-nose pliers
Wire stripper
Wire cutter / diagonal cutting pliers
Small needle files
Electrical tape
Digital multimeter
Screwdrivers

Parts

1/8” 2-conductor phone jacks
24 gauge, 2-conductor stranded speaker wire