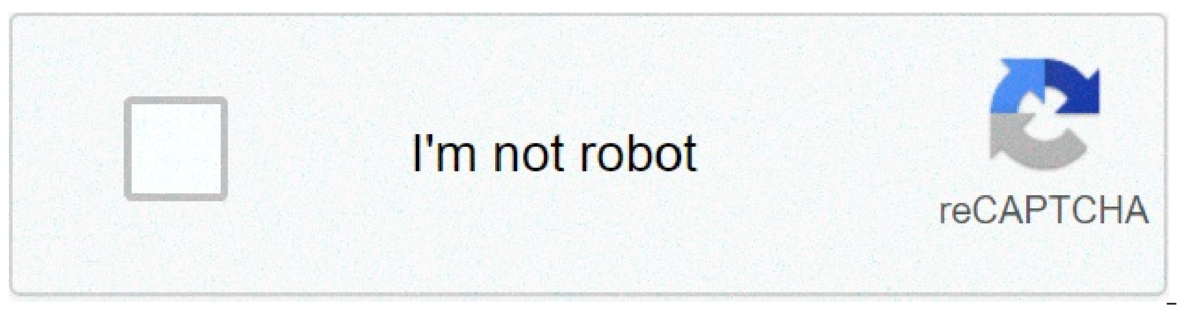

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97 civic radio wiring diagram

Dan has been a licensed journey-level electrician for some 17 years. He has extensive experience in most areas of the electrical trade.A "3-way switch" is really two switches that both control one light. This illustration makes it look simple, but this article explains the intricacies of wiring a 3-way switch.Wiring a 3-Way SwitchWiring a 3-way light switch is not a difficult task... there are only three connections to be made, after all. Making them at the proper place is a little more difficult, but still within the capabilities of most homeowners, if someone shows them how. That's where understanding a wiring diagram can help.First, what is a three-way switch?When you want to be able to control a light from two different locations (for example, you want to be able to turn the stair lights on from both upstairs and downstairs), this is what electricians call a "three-way switch."Is it hard to wire a 3-way switch?To replace a switch is not difficult at all: Simply watch how you disconnect the old one and then put the wires back on the new light switch in the same position. Problems can arise when an extra switch is being added or if you forget which wire went where. That's when it becomes necessary to understand a little more about how a 3-way switch works and how to read a wiring diagram.What do I need to know before I begin?If you know what the purpose of each wire is, the task will become much simpler. This article will explain everything you'll need to know in order to wire a 3-way switch, with wiring diagrams and common wiring methods explained.What about 4-way switches?Read How to Wire a 4-Way Switch for instructions and wiring diagrams for wiring four-way switches.How to Wire a Three-Way SwitchNot all 3-way switches are the same. Choose which configuration you want to follow by looking at the diagrams provided below. If you're starting from scratch, Diagram #3 might be the best place to start, but these methods can be used interchangeably in old work. They merely indicate different ways to run the necessary cables. Diagram #1 works when several light fixtures share one common breaker, and the switches are both on the same wall. Diagram #2 works best when power is available in the ceiling but the switch boxes are on opposite walls—it is often easier to run the cable up into the ceiling light box instead of between switches. Diagram #3 works best for cases with multiple switches in the same box, as other switches then have power available and can operate other lights without having to have a separate power in line run to them. Diagram #4 can be useful when the light is near the first switch box. It results in lots of wires, so installing a larger box may be necessary. Turn off the power at your electrical panel before you begin working. Make sure you understand which screw terminals and which wires serve which purpose. Below, you'll find full descriptions to guide you. Have plenty of 14-3 type NM cable on hand, which has three insulated wires—white, black, and red—plus a bare copper ground wire. If you're connecting to 12-gauge wire, or the breaker is 20 amp, you'll use 12-3, instead. Most home lighting circuits are 15 amp, which only requires 14 gauge wire. Follow the diagram to connect the wires (see instructions below) to the new three-way switch. All white wires used as travelers between the 3-way switches should have their ends wrapped with black electrical tape or in a plastic wire nut. How a 3-Way Switch Works: Identifying the Terminal ScrewsThere are three screw terminals on the sides of the switch and one on the end. Every switch has these same three terminals, but older switches might be missing the fourth ground terminal. The small, green screw terminal on the end is the ground terminal. It is usually painted green, although the picture does not show that color well. It can often be recognized as the screw that is part of the metal framework of the switch and is not insulated from other metal parts. The green or uninsulated ground wire always goes to this ground terminal. Older switches often did not have this ground terminal screw, but are no longer legal to use. Now, all light switches must have a ground terminal screw to attach the ground wire to. One of the three other terminals is a different color, usually darker, and is called the common terminal. Mechanically and electrically, this common terminal is connected internally to one of the other two brass screws called the traveler terminals. When the switch is flipped the other way, that connection is broken, and the common terminal is then connected, internally, to the other traveler terminal. The common terminal is always connected internally to one (but only one) of the traveler terminals. Which one is dependent on whether the switch is up or down. It should perhaps be noted that the traveler terminals are essentially interchangeable. Given that each one is to have a traveler wire attached to it, and there are two traveler wires and terminals, it doesn't matter which traveler wire goes to which traveler terminal. Identifying the Ground, Common, and Traveler Terminals in a 3-Way SwitchThe common terminal is on the top in this view, with a traveler on the lower end. The ground terminal screw is showing up as silver-colored at the very bottom.WildernessAn old switch. This switch has no ground terminal/screw and is no longer legal to use. Make sure your switch has a ground terminal.Wilderness Which wire is "hot"? Which screw is the "ground"? Identifying the Screw Terminals by ColorWhat is the green terminal screw?The small, green screw terminal on the bottom is the ground terminal. All new switches must have a ground, but some older ones don't.What is the darker screw terminal?One of the three screw terminals will be a different color, usually darker. This is the common terminal.What are the brass screws?The two brass screw terminals are the traveler terminals.Identifying the Wires by ColorWhat is the green wire?The green or uninsulated (copper) ground wire always goes to the ground terminal.What is the white wire?The white wire is the neutral. You'll bundle all the neutrals together with a "wire nut" or a twist-on plastic wire connector.What is the black wire?The black wire is "hot" at all times unless the entire circuit is turned off at the circuit breaker panel.A note about wire colors: The National Electric Code requires that every neutral wire be colored white, and that ground wires be colored green. Only neutral wires may be white in color, but the code makes an exception for white wires in a cable that are not being used for a neutral. These wires should be colored black using a magic marker or some other method. Many electricians will do this, but many will not, and it can make troubleshooting in the future difficult and can be a safety hazard to anyone else working on the system. I encourage you to take the few seconds necessary to color these non-neutral wires.The colors shown in these wiring diagrams are common color usages only. Not all electricians use the same color code (except for neutrals and grounds), so the wires could be different colors.Identifying All the Parts of a 3-Way Light SwitchThe terms "traveler" and "common" have already been explained, but there are other terms that will be used in this article that also need some explanation.Cable. The term "cable" refers to an combination of two or more wires, bundled together, usually in a sheath of insulating material. Each wire is insulated separately, with the possible exception of the ground wire. The ground wire may be insulated with a green color or left bare (copper), without insulation. Power in. The power-in cable is that cable that eventually ends in the circuit breaker panel or fuse box. It is the cable that provides the power to the lighting system. Neutral. This is the white wire contained in the power-in cable. It does not terminate at or connect to any switch, although it may be present in a switch box and ended with a wire nut that connects it to another neutral wire. Ground. The grounded wire in each switch or light fixture box. It is either colored green or left bare of insulation (copper). Hot wire. This is the second, black wire, contained in the power-in cable. It is "hot" at all times unless the entire circuit is turned off at the circuit breaker panel. Circuit breaker panel. Commonly called a "fuse box," it may contain either circuit breakers or fuses. This panel controls all the power in the building and it is where that power may be shut off. Two rope. "Two rope" is the designation given to a cable that has two individual wires, plus a ground wire. These wires will be colored white and black, with a green or bare (copper) ground. Three rope. Three rope is a cable with three wires, plus a ground. Normally the colors are white, black, and red with an additional green or bare (copper) ground. Understanding a Wiring DiagramEach diagram will show the two 3-way switches (but not the wall box they are contained in), the various cables and wires used in the configuration being discussed, and the light box and light fixture.How does the electricity flow through the switch?To understand the wiring diagram, you must know that the electrical current enters the system on the black wire in the power-in cable, passes through the switches, through the light fixture, and returns to the white wire in the power in cable. If the circuit is broken anywhere (a switch turned the wrong way, a broken wire, or a bad light bulb), the current will not flow and the bulb will not light. For discussion purposes, each 3-way switch will be considered to have the common terminal connected to the right-hand traveler terminal when in the "up" position and connected to the left-hand terminal when in the "down" position. This is not necessarily true, however, it's simply helpful for discussion purposes.Read the descriptions carefully and compare them to the diagrams to understand the diagrams. Each diagram will have a description of how the current travels in order to light the lamp.Voltage TestersA non-contact voltage tester is an invaluable tool here for working on electrical circuits. Both Fluke and Klein make professional-quality testers, and cheaper ones are commonly available as well. As a professional electrician for some 20 years, there is always one in my pocket, and anyone working around electricity should carry one as well. Turn off the power before starting to work! Installing the Light SwitchOnce the correct location of each wire is determined using the wiring diagrams below, the light switch is connected to proper wires and installed in the light switch box. Make sure the power is off before making any connections!Older switches vs. newer ones:Many residential light switches have a small hole in the back of the switch that wires can be pushed into, and all switches have the screws on the side. The picture of the older switch above has both the push-in holes and screws; the other is an expensive switch that has holes to insert wire but the screws must be tightened as well. Many switches have only the screws, with no holes. There is a "strip gage" on the back of the switch; it shows how much insulation is to be stripped off if the push-in method of connection is to be used. If the screws are to be used, a little more insulation needs to be removed.How to attach the wires to the screw terminals:If the screws are to be used for connection, bend the end of the stripped wire into a half circle using needle-nose pliers, and wrap the wire around the screw in the clockwise direction. Tighten each screw firmly. Fold the wires neatly back into the wall box and push the switch into the box. Normally the ground screw goes down, toward the floor, but it can be inserted in the up position with 3-way and 4-way switches. 3 Way Wiring Diagram #13-way switch wiring diagram with the power-in cable entering the light box.Wiring Diagram #1, Power In the Light BoxIn this example, the power-in cable enters the light box. This method of running the wire is common when several light fixtures share one common breaker, and the switches are both on the same wall. Cables need to be run into the light box, between the two switches, and from the light box to just one of the switches.Lets follow the current as it lights the lamp in the light fixture:The current enters the light box on a black wire, as it always does. That wire is spliced to a white wire in a two-rope cable that goes to the first switch box (not the switch), where it is spliced to the white wire in a three rope cable and continues on to the second switch, at the common terminal. If the switch is up, it will exit the switch on the right-hand traveler terminal and continue on the red wire back to the traveler terminal on the first switch. If that switch is also up, it will exit that switch from the common terminal on the black wire in the two rope cable from the light switch. Continuing down that black wire, the electricity enters the light box where it goes to the light fixture. The current will pass through the light, exiting on the white, neutral wire and returning to the power-in cable. A note about the color of the wires: In this example, the only neutral wires are the white wire in the "power-in" cable (which is always a white wire) and one of the two wires attached to the light (also always white). All other white wires should be colored.3-Way Wiring Diagram #23-way switch wiring: Power in the light box with 3 rope cables to each switch box.Wiring Diagram #2, Power in Light BoxIn this 3-way switch wiring diagram, the power-in line enters the light box, but 3 rope cables are then installed between the light box and each switch box. This method might be used when power is available in the ceiling but switch boxes are on opposite walls—it is often easier to run the cable up into the ceiling light box instead of between switches.If the current is followed...it comes into the light box on the black wire then flows to the common terminal on one switch using a (colored) white wire it exits the switch from a traveler terminal then returns to the light box, where it is merely spliced to another wire that goes to a traveler terminal on the second switch it goes through that switch, again exiting from the common terminal, and once more enters the light box, where it goes to the light itself. The neutral goes from the power-in cable directly to the light fixture. 3-Way Wiring Diagram #33-way wiring diagram with power entering switch #1.Wiring Diagram #3This time the electrician has brought power into the first switch, through the second switch, and on to the light fixture. This is a reasonable method for cases with multiple switches in the same box, as other switches then have power available and can operate other lights without having to have a separate power in line run to them.The major difference here is that the neutral from the power-in line has to be taken to the light fixture via the 3 rope. The white wire must be used here, as code requires that all neutral wires be white.Following the current...it enters the first switch box on the black wire and is connected to the common terminal. If the switch is in the "down" position, it exits the switch on the red wire, entering the second switch at a traveler terminal. If that switch is also down, it exits that switch on the black, common, wire and continues to the light. After passing through the light fixture, the current returns to the second switch box on the white wire, is spliced to another white wire in the 3 rope used between switch boxes, and continues to the first switch box, where it is spliced to the white power in wire and back to the fuse box. The circuit is complete and the lamp will light. 3-Way Wiring Diagram #43-way wiring: Power-in enters switch #1 along with a cable to the light box.Wiring Diagram #4This example shows the power-in cable entering the first switch box along with the cable to the light fixture. This can result in a lot of wires in this box, but can be helpful when the light is near the first switch box. A larger box may be necessary to contain all the wires.Following the current...it enters the switch box on the black wire at the common terminal. If the switch is up, it will exit the box on the red traveler wire and continue to the traveler terminal at the second switch. If that switch is also up, it will exit the switch at the common terminal on the white (colored) wire and return to the first switch box where it is spliced to the black wire in the 2 rope going to the light. Passing through the lamp, it returns on the white (neutral) wire to the first switch box, where it is spliced to the white (neutral) wire returning to the fuse box. The circuit is complete and the lamp lights up. Commonality In All Wiring DiagramsCommon to all of these wiring diagrams is that the neutral, white wire from the lamp connects directly to the white, neutral wire from the power-in cable without ever terminating on a switch. It may or may not be spliced to another white wire in a box, but never terminates on a switch—only on the light fixture. The black power-in wire always goes to the common on a switch, often "changing colors" through the necessity of splicing to different cables. No matter what color, one switch will have a common terminal connected directly to the power-in black wire. The other common terminal on the other switch always goes directly (although perhaps again spliced) to the light fixture. It does not terminate on the other switch. There are two traveler wires; they always go directly from one switch to the other. Neither traveler wire ever terminates at the light fixture, the power in cable, or on anything but a traveler terminal, although it may splice to a different cable somewhere. Neutral wires are always white, and white wires not connected to the white power in wire should be colored some other color. Ground wires are always green or bare of insulation (copper). Each switch, as well as the light fixture, must have a ground wire terminated to it. The only exception is older homes that do not have ground wires in the boxes; if there is a ground wire in the box it must be terminated on the switch and light. A final note about building codes:Recent code changes require that each switch box have a neutral wire in it. This means not only a white wire, but a white wire that is connected to the white wire on the power in cable. This rule is intended to provide future capability for the use of a dimmer or other device that may need a neutral wire and stop homeowners from disconnecting or using the ground wire for other purposes. New work (such as adding a new three-way switch) will need to comply with this code.Which method or diagram is the best to follow?The only wiring diagram shown here that is legal to use is #3, although #1 could be modified by adding a 2-wire cable from the lower box to the light. Any neutrals in the switch box that are unused are either spliced together or, in the case of a single neutral, simply capped off with a wire nut and tucked back into the box.Am I required to replace all the wiring that doesn't meet the current code?Simply replacing a switch does not mean that the room needs to be re-wired, as the existing wiring is "grandfathered in" and is acceptable. Old work does not need to be re-done to comply with the code and is this why the unacceptable (by current code) wiring diagrams are discussed here in this article.Other Articles and Links That Might Help YouIn general, switches are not difficult to replace or install, and most homeowners are quite capable of doing it. For more help and guidance, read Installing or Replacing a Light Switch.If you are adding a new light fixture to work with your new 3-way switches and want some help, read Installing and Wiring a Light Fixture.Regardless of whether you are replacing a switch or installing new switches in a major remodel, probably the most useful tool to own is a non contact AC voltage detector. Make sure that whenever you do any kind of electrical work that you first test with a good voltage detector.This article is accurate and true to the best of the author's knowledge. Content is for informational or entertainment purposes only and does not substitute for personal counsel or professional advice in business, financial, legal, or technical matters.Questions & AnswersQuestion: Can a dimmer switch be installed in a three-way switch set up?Answer: Yes, but a 3-way dimmer switch must be used. Most dimmer switches will not work.Question: Is there a 3 way switch diagram with three lights in the circuit?Answer: To add more light fixtures simply use the same wires that to the existing fixture and extend them further to however many additional fixtures you want. Simply splice new wire into the wire going to the existing light. They will all come on and off at the same time.Question: On a three-way switch, can it just be grounded in the box, or does it need to go to the box and then to the switch? Can it just go to the box? My house is wired just to the box, but I have been told it should also go to the switch.Answer: Current electrical code requires that all switches be grounded. It is easy enough to add a short "pigtail" from the box to the switch, if the box is metal and already grounded.Question: My three-way switch is over fifty-years-old. There is a white wire on one side of the box (on the bottom), and a red wire on the same side(top). On the other side, there is a black wire (top). The new three-way switch box has a green screw at the bottom on one side, and a black screw on the other side at the bottom, with two gold-colored screws at the top. Can I attach the wires to the new box in the same place as the old, regardless of colors?Answer: Yes, but you didn't mention a ground wire (on the green screw) for the old switch. It's very doubtful it has one. If not, the new switch should get a ground wire to that green screw, which will mean finding a source for a ground wire and running it to that switch. Electrical code requires every switch have a ground wire now even though grounds were not used for many years. Other than that, hook up the wires the same way. The worst case scenario is that the switch will not work properly, after that you will swap a couple of wires and try again until it DOES work correctly. It's always fun trying to decipher what an electrician or homeowner did fifty years ago!Question: I have a setup that looks like "3 Way Diagram #1," based on the configuration of the two switches (I haven't located the lightbox yet), but when I separated both switches from the wires, all of the traveler lines went hot. The white wire "power-in" cable remained hot, as well. How can this happen? Is it possible that this is actually a 4 way, and I've just failed to identify an additional switch?Answer: As traveler wires go from one traveler terminal on one switch to a traveler terminal on the other switch, it is not possible to remove both ends from the switches and have the wire be hot. It is not connected to anything at all, and cannot be hot.What kind of tester are you using to determine if a wire is hot? The non-contact testers mentioned in the article can be sensitive enough to pick up static electricity transferred from one wire to another even though they are not touching. They are intended to ensure a wire is dead, and I've never had one give a false negative (showing a dead wire), but the price is that occasionally they can show hot when a wire is not.If the wires are hot when disconnected, then there is another source of power that you have not identified yet, and the wires are going somewhere you are unaware of. It is doubtful that it is a 4-way switch - those have four terminals on them (plus ground), and they are all travelers. No power line should ever terminate on a 4-way switch.Question: Can you direct me to a diagram of a 3-way switches configuration?Answer: There is a link near the beginning of the article on 3-way switches. Here it is again: If I understand correctly, one - and only one - of the traveler wires is always hot. If that's true, could one put an outlet in the middle of each traveler wire with the result of one outlet or the other - but not both - being 'ON'?Answer: You could do that, but only one switch - the one with the power from the fuse box - will operate them. You could even set it up so the top or the bottom of a single outlet, but not both, is on, depending on how the switch is flipped. You will have to ensure that there is a neutral wire run with the others and available at each outlet.Question: I have the scenario pictured in diagram 1 of this article and I've gone through my wiring countless times and it still doesn't work. I'd be positive I have it correct but it doesn't work. How can I further diagnose my wiring problem?Answer: Is the breaker on and the light bulb good? Is the makeup in the lightbox correct? If you put the incoming black wire to the light bulb, does it light up? If all those are good, the best guess is that either the black or the white from the lightbox is not connected to a "common" terminal, but one of the traveler terminals. It is always possible that one of the switches is bad as well - even brand new switches can be defective.If you have a voltmeter, preferably a non-contact tester, you can troubleshoot it as well. Using the wire colors in the diagram, the white wire at the switch should be hot all the time. One traveler or the other at that same switch should be hot, changing as the switch is flipped. If all that works, and the travelers at the other switch go hot or cold as the first switch is flipped, the black wire at the other switch should be hot or not, as that switch is flipped. Checking these should tell you where the problem is.Question: Can I use a 3-way switch with just two wires?Answer: No. There must be three wires between the two switches. You CAN use the switch with only two wires, but it will act as a regular switch, not a three-way switch.Question: I'm wanting to switch from a regular light switch to the rocking light switch. I have 2 black wires and one red wire - where should they go?Answer: If you are merely replacing a regular light switch with one of the "decora" style (a square switch that just rocks up and down) then the wires go to the same place they did on the wall switch.Question: How do I strip some insulation off the wire?Answer: Preferably with a wire stripping tool. If one is not available a knife can be used even a sharp cooking knife. Cut around the insulation, being very careful not to touch the copper wire, and then strip a line down one side. Wire cutters can also be used by twisting them around the top end of the cut and then using them to push off the insulation you wish removed. Again considerable care must be taken not to damage the wire inside. Either way, if the wire is nicked it must be cut off and the process started over.© 2010 Dan HarmonCommentsDan Harmon (author) from Boise, Idaho on August 30, 2019:You're welcome, Marius. And thanks for the comment - it's always nice to hear I have been of help to someone.Marius Tudor on August 30, 2019:Mr Dan thank you for making the time to be on this blog and for the thorough answers and schematics you present. It helped me out think deeper into what was happening on one of the job sites. The answers are always in front of us....we just need the guidance sometimes.This is the place where I will definitely check periodically in the future.Dan Harmon (author) from Boise, Idaho on May 12, 2019:@Pierre:Use any of the diagrams above, and simply hook the wires to each other. Black to black, white to white and ground to ground for as many lights as you would like.Dan Harmon (author) from Boise, Idaho on January 21, 2019:@George:You have one 4 way switch, the one with four wires. It should have two more, three way, switches with three wires each on the circuit. When more than 2 switches are required, it requires 2 three way switches and all the rest are 4 way switches. Instructions on how to wire 4 way switches can be found at: on January 21, 2019:I have 3 way light switches one switch has 4 wires attached to four screws on the switch,,,the other has 3 wires attach. WhyDan Harmon (author) from Boise, Idaho on December 05, 2018:@Bill:You cannot do it using only 2 conductor cable (12-2), unless you run two of the rather than a single cable. As shown in the diagrams and as described, you must have 3 wires between switches, and that means 12-3.Bill on December 05, 2018:I am wanting to put 2 3way switch es in my garage using 12 2 wire do I just run a wire between the two switchesSimon on September 14, 2017:I like this page,it was very informativeMarshall on August 04, 2017:Thank you Dan for your reply again.This is a cheap metal ceiling mounted single bulb type fixture that is enclosed with a round globe. It now has an LED light in it and I am not using the light until it's fixed. The switch is disconnected.Today I left a message for an electrician to call me that A friend recommended. I expect that he will call back on Monday.The reason I quit all my DIY work is I am hoping that the electrician will alert our homeowners board if he agrees that the building was illegally miswired (with no grounds on switches and fixtures) when constructed. In 1977, all new construction should have had all electrical fixtures, outlets, and switches grounded. I believe therefore that this whole apartment complex was built "on the cheap" (for other reasons as well).What I want is for the homeowners association to send letters out to the other condo owners that they should have all of their units electrically inspected and grounded (if necessary). I do not believe that the homeowners association will act unless they receive a letter from the electrician with the company letterhead on it. Frankly, I doubt if they will act anyway even if they did receive such a letter. This makes me wonder if I should go to the city about this if necessary.Am I making a big to do about nothing? The way I see it, there are almost 400 condos and apartment units in our complex that have ungrounded light fixtures and light switches. One could get electrocuted when he or she changes a lightbulb or touches the metal screws on a light switch cover, if the fixture or the switch had a short in it.Dan Harmon (author) from Boise, Idaho on August 04, 2017:Probably not. I don't know what kind of fixture this is, but light fixtures are designed with getting rid of the heat from a light bulb in mind. You've just closed off any possibility of getting air to it and it could overheat. If you really want to do this, I suggest an LED bulb as it doesn't put out anywhere near the heat of an incandescent bulb.Of course, if you mean you've removed the fixture and left an open box behind it, then yes it is fine to cover it with plastic.Marshall on August 03, 2017:Hi Dan, today I opened up my 8 foot high ceiling light fixture with the three-way problem. I found out that it is not grounded. After having found so many light switches in my condo that we're not grounded, I have come to the probable conclusion that the original contractor never connected the grounds! I believe this ceiling light fixture had never been opened up beforeLong story short, Therefore I have ceased my own DIY work and will be calling an electrician tomorrow.My question is this: because this light fixture is so close to the bathroom and because it would be difficult for me to close it back up, I have put a plastic cover over it to prevent bathroom humidity from shorting out this ungrounded fixture, until the electrician comes to fix it. IS THIS A PROPER THING TO DO?Dan Harmon (author) from Boise, Idaho on July 30, 2017:Okay. It sounds to me like your "switch two" contains the hot wire from the panel and "switch one" contains the switch leg to the light. This does not agree with your designation of a hot wire, or with statement 2 however - I'm not quite understanding what you're seeing for some reason.At this point, I would disconnect all the wires (non-ground wires) from the switches (labeling them somehow as to where they went, just in case) and recheck just what is hot with the breaker on. At the point the switch with the hot in it can be wired with the hot going to the common and both travelers hooked up. Then check at the other switch; depending on whether the installed switch is up or down you should find two wires that become hot, one at a time. Those are the travelers and the only one left is the switch leg that goes to the common on that switch. I'm fairly confident that the "hot spur" is the hot wire from the panel, which would mean that your "switch two" contains the hot and "switch one" has the switch leg to the light, but I may be missing something.Marshall on July 28, 2017:Thank you for your reply once again Dan. I did some sorting out. Here are my observations.1...The light is only on when both switch one (hallway by front door) and switch two (bedroom) are in the "up" position.2...But when switch one is up, and switch two is "down", the light is off.3...Also when switch one is down, and switch two is EITHER up or down, the light is off. This is why I identified the hallway switch as "switch one", and the bedroom switch as "switch two". BUT THE ODD THING IS THAT SWITCH TWO (Bedroom)IS PRACTICALLY RIGHT NEXT TO THE PANEL BOX. Switch one (hallway) is further away from the panel box. Is the switch that is closest to the panel box on a three-way connection always identified as " switch one"?Here are some AC tester observations on the switch two wire connections. (Switch one was closed up while only switch two was opened up). But first, a couple of notes:NOTE: switch one is a three way switch with the hot connected to the common terminal, and the non-missing traveler connected to one of the travelers.NOTE 2: Switch two is an old one pole switch (that I will replace with a three pole switch) with a piece of black electrical tape on the hot wire, and no tape on the non-missing traveler.1...When both switch one and switch two are up (light on), Then both the hot wire and the NON-missing traveler on switch two are "hot".2... when both switch one and switch two are down (light off), Then only the hotwire is hot, and the NON-missing traveler is "cold" = dead.3... when switch one is up, and switch two is down (light off), again, only the hot is hot, and the NON-missing traveler is cold/dead.4...but when switch one is down, and switch two is up (light off) THEN BOTH THE HOT WIRE AND THE NON-MISSING TRAVER ARE HOT.5... The nonmissing traveler (on switch two) goes up the same romex (2-rope)cable as the same white neutral wire that I found disconnected from the other three neutral wires in this double gang (both switches are on double gangs) switch (which I suspect is the missing traveler)6...but the hot wire (on switch two) is a "hot spur" that is pigtailed with four other black hot wires. (But that you say is supposed to be DIRECTLY connected to the light, And NEVER spliced with multiple/plural other wires).Therefore, I have a MISCONNECTION! Could I have possibly misidentified switch one and switch two?MarshallDan Harmon (author) from Boise, Idaho on July 28, 2017:You're right - in a properly wired set up both wires cannot be hot. One will be, but the other is going to the light and thus cannot be hot all the time or the light would be on all the time. Sounds like it is seriously mixed up, maybe with one of the travelers going to the light instead of the other switch. You have some work ahead of you, to sort out just what wires are going where.Marshall on July 23, 2017:I have another question about my 3 way switches. Re: the black wires that connect to the "common" terminal on both switches, should only one, or should BOTH wires be "hot" WHEN DISCONNECTED from the "common" screw? A "hot" wire as I understand it, is a wire that is engergized EVEN WHEN DISCONNECTED, unless the breaker to that circuit is turned off.What I'm getting at is if BOTH black wires that connect to the "common" screw on BOTH 3 way switches are "hot"(even when disconnected, that would mean energy is coming from both the "power in" cable and from the light fixture, that is, POWER COMING FROM BOTH DIRECTIONS AT ONCE.(Note: I have not yet installed both switches in part for this reason). Am I missing something here? Or is this a dangerous bad connection?Remember, I said that BOTH the original 3 way switches were replaced with 1 way switches for some mysterious reason years ago. (And I do KNOW that it is supposed to be a 3 way connection) And I wonder if this might be the reason why. Could some handyman not familiar with 3 way wiring have installed 1 way switches after experiencing problems?Dan Harmon (author) from Boise, Idaho on July 21, 2017:Hope it all helps.No, I didn't disable any printing. But the hosting company, HubPages dot com may have decided that that isn't something they want to see. Not sure - I've never tried to print comments and haven't heard any other complaints about it. Could be something about the avatar pictures?Marshall on July 21, 2017:Thank-you Dan for your second reply! I believe it will prove very helpful. I was able to print your article re: 3-way switches, but I cannot print any of the comments (either all of them, or just my own as well as your answers "selected"). Did you disable the printing of the comments?Dan Harmon (author) from Boise, Idaho on July 21, 2017:It is fine to splice 4 hots together with a pigtail (your "spur") to a switch. But that pigtail should go to the "common" screw on the switch, not a traveler. Traveler wires ONLY go to the other switch. I think you have the idea: use one black traveler (already in place) and the white wire that is not included in with the other whites as neutrals as the other traveler after making sure the other end is where you think it is and that it is not doing something else in between the boxes. I'm assuming that the second switch has the switch leg going to the light, along with a neutral - if so using the extra white as a traveler (after taping it black on both ends) is fine. Just don't splice any additional wires to that traveler (or any other traveler). No wire nut on a traveler should ever have more than 2 wires in it, simply continuing the same wire without adding any more to it.All grounds should always be nutted together, along with pigtails to any switch, outlet or other device.(A matter of terminology only, but a 3-WAY switch is not a 2 or 3 POLE switch. Technically it is a double THROW switch, connecting one wire to one or two other wires, not only one at a time. It has two "on" positions, which a double POLE switch does not.)Marshall on July 21, 2017:Thank-you for your reply Dan, you asked:" But are you sure that someone in the past hasn't used what used to be a traveler to power something else? An outlet or something?"I don't believe so. Here is what I AM sure of...1...I have WOODEN studs and PLASTIC boxes.2...In the bedroom 2 gang switch box, one of the romex neutrals was disconnected from the other three romex neutrals, with a piece of electrical tape covering the bare end.3...In the hallway 2 gang switch box, two of the neutrals had white masking tape on them to mark them (I since replaced with white electrical tape). The other two neutrals did not have any marker tape.4...I KNOW that these two switches are a three pole connection, but BOTH switches as I found them were ONE pole switches for some reason. WHY WOULD SOMEBODY REPLACE 3 POLE SWITCHES WITH ONE POLE SWITCHES? I since replaced the hallway one pole with a new 3 pole, and intend to do likewise in the bedroom.5...An inherited renter who said he was an electrician lived in the unit in 2000(I acquired the condo in 2000, and rented it out until 2014, when I moved in). He said he installed the track lighting in the living room (different circuit) which was different from the lighting fixture that was installed when I lived in that unit before from 1985 to 1987. I believe he may have fiddled around with the 3 pole connection for some reason. Anyway, that track lighting "blew up" in 2013 when my sister was renting the unit from me, according to my sister (I now live in the unit as owner-occupier).6...Two outlets in the living room are part of the same circuit as all the bedroom outlets. Is that unusual?7...One of the bedroom 2 gang box romexes is a 14-3, but it is used to power a switch controlled outlet in the bedroom, which is original construction.8...When I lived there before, I had no electrical problems of any kind. Since I moved in the unit in 2014, not only does the 3 pole connection not work right, but the 2 gang box in the living room has a bad on/off switch and/or bad dimmer switch that used to control the track lighting that "blew up" (since replaced with a pull chain ceiling fan two years ago that has always worked fine), I replaced ALL the outlets (some were loose), and I had the defectively designed" PFE stab-lok"(which I still have and would like to get tested, but where? Certainly not UL!) panel box replaced in 2015. I also connected the grounds in the 2 gang boxes in the bathroom and the hallway (the bedroom is next).9...All four black hot wires are pigtailed together in the bedroom 2 gang box, with black wire spurs connected to the switches. Is that kosher?10...All four ground wires in the hallway 2 gang box are now connected together. But I originally found them with one connected to only one other (times 2). All four ground wires in the bedroom 2 gang box are properly connected together, but the swit;ches are not grounded (which I intend to correct shortly)11...The one traveler that IS hooked up in the bedroom 2 gang box is a black spur that is hooked up to all four romex black wires (see #9). Therefore, if I hook up one of the 4 romex neutrals to it, I will have to relabel it with black electrical tape to signify that it is now hot. But first, I have to do a continuity test to determine the other end of that SAME wire at the other (hallway) 2 gang switch. For you have said that a traveler wire MUST connect DIRECTLY from one 3 pole switch to the other 3 pole switch (but splicing broken connections in between OK). But I believe you said that UNDER NO CIRCUMSTANCES, to connect traveler spurs INDIRECTLY to all four white neutrals, or black hots that are pigtailed together inside the box, if I understand you correctly.Anyway, I hope this helps you to help me with my situation. I thank you very much for what you have told me thus far.Dan Harmon (author) from Boise, Idaho on July 20, 2017:I'm sorry, but I can't answer the question on 1977 code - it was before my time.If you have 2 14-2 wires running between the switches, and have wooden studs (almost certainly) and plastic boxes (probably) then you can make it work with what you have. You will have to figure out which cable is which in each switch box and then color both ends of one of the white wires. Make it any color but white or green. At this point you have all the wires you need to make the 3 way switches and the light work. But are you sure that someone in the past hasn't used what used to be a traveler to power something else? An outlet or something?Marshall on July 20, 2017:I live in a 1977 vintage apartment building in the US. My bedroom entry light is controlled by two three way switches that are housed inside two separate double gang light switch boxes. The way it is now, one switch must be left in the up position all the time, in order for the other switch to turn the light on or off. But the two switches should be able to work fully independently if each other. There is no 14-3 cable used for the three-way connection. There are only 14-2 cables available for this connection. Black wires are used for the common and one of the travelers on the three pole switches, but the other traveler is missing. But I suspect that it originally had a white neutral spur connect from the other traveler terminal on each switch up to the four neutral wires all spliced together in both double gang boxes. I know this does not meet present code, but did it meet the latest code back in 1977? My real question is do I absolutely have to have a new 14-3 wire added into the circuit to have a safe 3 pole switch connection?Dan Harmon (author) from Boise, Idaho on March 22, 2017:Hi Angela:It sounds like you have a very old home and that can be a problem. If the wires are Romex (two or three insulated wires encased in an outer sheath) you could replace the box with an "old work" or "cut in" plastic box - that isn't a difficult thing to do and it's very inexpensive. If the wires aren't Romex, but old knob and tube, it isn't something you really want to deal with, so if you can't see that those wires are all enclosed together in an outer sheath, or each wire enters the box separately, don't try it.Outside of that, the only thing left is to protect those screws on the side - I'm not aware of any switches available to day with screws on the back. One possibility would be to use electrical tape and wrap the entire switch, going up the side, across the top and completely around, completing the circle several times, covering those screws with several layers of tape. Many electricians will do this as a matter of course.But if the screws are already touching, that's probably not a real good solution, as movement over the years could wear a hole in the tape. Better would be to cut a piece of rigid plastic (not a piece of plastic bag), as thick as possible, and slide it alongside the switch, keeping the screws away from the wall of the box. Do both sides of the switch. There is also insulating material available, similar to what a circuit board is made out of, that will work as well and is quite thin.Angela Schmitt on March 21, 2017:We have a 3-way switch in our bathroom for the light, fan, and night light. We decided to put in a new one as we re-did our bathroom and wanted the colors to match. The old switch had the screws on the back of it, but the new one has metal screws on the side and they touch the metal box. This causes it to spark when he turns on the power. What can we do? (Hopefully this made sense--I know nothing about wiring.) Thanks!Dan Harmon (author) from Boise, Idaho on January 11, 2017:You cannot do that with three way switches. Consider that if they are both down, and the light off, you would have to flip both of them to the up position to turn it on, defeating the purpose of three way switches.What you CAN do, though, is set them so that they have to be either both up or both down to be on - when they are opposite each other the light is off. Wire them, try it and see what happens. If it isn't what you wish, either turn one over or reverse the traveler wires on just one of them.ddevol47@gmail.com on January 01, 2017:This isnt really a comment more of a question . I think I got had a few years back a coworker showed me a way to wire three way switched so that you would always have the two three way switches in the down position when off and the two in the up position when on. If he did do this which at the time seemed like he did , I would like to know how think it is not possible.Am I right I just never had anybody even try it. Your article was and thank for all your insight and knowledge.Dan Harmon (author) from Boise, Idaho on November 10, 2016:The best you will be able to do is to wire the outlet to the common terminal of the switch rather than the traveler terminals. If it is the power coming in the outlet will be on all the time, if it is the light the outlet will go on and off.But there is another problem as well. Unless you can absolutely guarantee that the white wire is a neutral (and it might not be) you may be wiring the outlet in series with the light and it will not work properly. If I am understanding it properly, that white wire is terminated on the switch: if that is the case it is NOT a neutral and what you are trying to do will not work as you are wiring the outlet and light in series. It is a hazard this way and must not be done.Unless there are additional wires than the three you mentioned, all in one cable, you cannot make the outlet work. There must be an additional cable, with a white and a black wire in it, in the box to make the outlet work at all.Rick on November 10, 2016:Hi Dan,I have light switch on the wall of my stairs at the top (2nd level of house) and at the bottom (1st level of house). It operates as a two way switch. Turn on going up, turn off once up or turn on upstairs going down and off once down. Anyways... I put a duplex outlet on the opposite side of the wall from the light switch at the bottom of the stairs and intended to power off of the light switch. The light switch has 3 wires and a ground connection. One red, one hot black, one white neutral (all wired from the back of switch) and ground wire to the box screw. I wired the duplex expecting it to work but have some issues. When I turn the light switch on, the power on the duplex goes off. When I turn the light switch off the power to the duplex is on. I Have switched wires around but still have not had success. I did notice however that if I touch the light switch neutral to the ground screw it all works like as I expect. Can you help shed some light on this?Dan Harmon (author) from Boise, Idaho on March 27, 2016:Piet, you will have to have a power line in that box, plus at least 3 wires going out; one to each light. It would be possible to put two of them on one 3 wire romex, though, using the black and red as switch legs (one for each light) and the neutral.Does that answer your question?piet on March 27, 2016:I have a 3 light switch in 2x4 box and I want every light have a switchmoses on October 11, 2015:good jobDan Harmon (author) from Boise, Idaho on March 29, 2014:Article 404.2(C) is what you're looking for. "For switches control lighting loads supplied by a grounded general purpose branch circuit, the grounded circuit conductor for the controlled lighting circuit shall be provided at the switch location"And thanks for the pat; 3 way switches really aren't that difficult, just a little different than most people are used to thinking of for switches.donald on March 29, 2014:I was just looking to see if the Code called for color specific wires for the travelers and happened upon your site. I am happy to see that there are individuals out there that take the time to describe the functioning of a 3-way circuit in understandable detail as you have. Pat on the back. I have a question. What article calls for there to be a neutral in every switch box? Haven't been in "The Book" for sometime and it makes sense to me. However it would be beneficial to be able to show a customer they have to pay more for a job! Thank you.Dan Harmon (author) from Boise, Idaho on March 05, 2014:You will need to install the new 4 way switch in between the two 3 way switch. In between meaning electrically, not necessarily physically. You will need a 12-3 from a 3 way, to the 4 way and on to the other 3 way.Instructions and diagrams are available here: on March 05, 2014:I have a 3 way switch that is working correctly In my basement. I want to add another switch, to make it a 4 way, in between the existing two switches. I have 12-3 run from switch to switch. The power to the lights comes out of switch one with 12-2. Is that possible without taking drywall off?Dan Harmon (author) from Boise, Idaho on March 02, 2014:Doesn't sound as if your motion sensors are 3 way. Are you absolutely positive that they are? In addition, the old switches, if 3 way, had three terminals on them, plus a ground, that all had to have a wire. Two black wires is not enough - what other wires/colors are in the boxes?Jacob on March 02, 2014:I have a 3 way in my hall way my 2 new motion sensors have the 3 red black and ground but the old switches have 2 black wires I know witch one is the common but with only 3 wires how do I hook up the 4th wireDan Harmon (author) from Boise, Idaho on December 27, 2013:It is almost certain that at one or the other of the switches the common wire has been switched with a traveler. Check at the switch where the power originates and verify that first one and then other other traveler is powered when the switch is flipped. If not, one of the travelers is interchanged with the power here.Then verify at the other switch that the switch can transfer power, or not, regardless of which traveler is hot, to the common wire. If not, one of the wires is interchanged with the common going to the light fixture.From your description, the problem lies with the power switch. That switch should always produce power at one of the two travelers.Jerry Leviner on December 27, 2013:My problem after wiring for a new light with two 3 way swithes is that if both switches are down then the light will not come on at either switch. It loses power at the non power switch! What did I do wrong?Dan Harmon (author) from Boise, Idaho on June 26, 2013:If you put both black fixture and ground wires to the black wire from the circuit breaker the best thing that will happen is that it will blow the breaker. More likely, in residential construction, it will cause all the metal of the fixture to become "hot" whenever the light is turned on. Touch both the light and a ground source such as the sink faucet and you will be shocked.So, it is absolutely NOT OK to put the ground wire to the black wire. If the house does not have ground wires, simply tuck the fixture ground back into the box. The primary purpose of the ground wire there is to blow the breaker if the fixture is defective somehow and the black wire is touching the metal parts of the fixture somewhere inside the fixture. As long as the fixture is in good condition (presumably a new fixture is) there will be no problem.phillip on June 26, 2013:I have a friend doing work in my bathroom which has old wiring coming from the circuit breaker. The new light fixture we're adding has a ground wire. He stated that it would be OK to twist the ground wire into the black wire. Is this correct;Dan Harmon (author) from Boise, Idaho on April 20, 2013:Yes, that will work fine. See the article on four way switches for wiring diagrams. Just keep adding more 4 way switches to the diagram, always between the two 3 way switches. There will be 2 three way switches, one at each end of the row of switches. One 3 way will have the incoming power and the other will have the cable feeding the light itself.14 guage wire is fine, as long as it is being fed from a 15 amp fuse. DO NOT use 14 gauge wire on a circuit with a 20 amp breaker. ... is the article on 4 way switches.bob on April 20, 2013:i need to power one light from seven or eight different locations using 3 way and 4 way switches using 14/3 wire can i do that manyDan Harmon (author) from Boise, Idaho on November 29, 2012:Amshas, I'm not sure what you refer to. If you can be more specific in your needs and what you are trying to accomplish, perhaps I can help you out.amshad on November 27, 2012:this is useful but i need 3 way 3 swicthDan Harmon (author) from Boise, Idaho on September 13, 2012:What you are missing is that there is no "on" or "off" with a three way switch. When the toggle is up, the common terminal is connected to one of the travelers, when the toggle is down the common terminal is connected to the other traveler. There is no "off" position. One or the other of the traveler terminals is always connected to the common terminal.The wiring diagrams basically just show different methods of physically running the cables; in each and every case one common is connected to the incoming power and the other is connected to the light. Traveler terminals are always connected to a traveler terminal on the other switch - never to either the light or the incoming power.Robert on September 13, 2012:I'm sorry, but these all four wiring digram looks to me the same. Those are not independent connection. If first switch is on second switch work corectly, if the first switch is off the second switch does not work. I'm not looking solution like this.Dan Harmon (author) from Boise, Idaho on July 11, 2012:Thank you for the compliment. These switch may at first seem complex, but at the heart are actually quite simple. The best thing about them is that they are always hooked up electrically the same regardless of the physical realities of running wire.Dan Harmon (author) from Boise, Idaho on February 23, 2012:If you have three white wires to one side then they are all either neutral wires or grounds. Any hot put to the same side as either a neutral or ground will immediately blow the fuse or breaker.With more information I might be able to offer more concrete advice. Is this old (pre 1950s) knob and tube wiring? Are there cables in the box that contain (or more) wires in each cable? Are there any wires in the box that are spliced together? Should this be a switched outlet, with one half hot all the time and one half switched? Are the wires old enough to have suffered a color change, at least to the point that black has become gray or dirty white?So far I'm seeing a box with three neutrals and only one hot wire. I can't conceive of any application where this would be advantageous except perhaps knob and tube wiring, where there was no cabling. All normal house wiring has at least a black and a white in each cable. Or is this other than a house with the wires entering the box via a conduit (pipe)?fee on February 23, 2012:rewiring an old outlet-found 3 white wires to 1 side of the outlet 1 black to hot side-i can only assume that 1 of the white wires should be a hot as well,?since the outlet wont work?thanksDan Harmon (author) from Boise, Idaho on January 03, 2012:@ stefan - if you spliced the white wire to the hot, it is then a hot, not a neutral, and should be colored at both ends so that no one will mistake it for an actual neutral. Black tape is fine for this purpose.Understand that it is not the color that makes a neutral; it is where it eventually ends up in the breaker panel. Those wires or the electrons flowing in them don't know what color the insulation is. People do, though, and that is why the NEC has decreed that every neutral be white - when you spliced that white wire to the black hot it is no longer a neutral and should not be white.Interestingly, that rule is so important that the NEC will not allow you to color a wire white. You may change the color from white to anything else (except green), but never from say, black, to white. The only exception is for #4 and larger wire, which is so large that the only use in most homes is from the street into your home.Stefan on January 03, 2012:Thanks for diagram 4. No other book I looked at in Home Depot or online showed diagram 4. Once I hooked everything up, I color coded the neutral that was spliced to "hot" with black tape. I hope this was the correct action, since the neutral spliced to hot acts like hot when the appropriate switching combo is performed. Did I do right by labeling the neutral "hot" in the second switch box? Thanks.Dan Harmon (author) from Boise, Idaho on January 02, 2012:First, grounds should NOT be separated. Any and all grounds in the same box are always to be tied together (exceptions can be made for special computer circuit grounds).Let me see if I understand what you are trying to do. You have 4 three way switches and two lights. Two switches are to run light(A) and two switches are to run light(B). Power is coming from the fuse panel into the box with the first switch, (call it 1A). The same power will then go to switch (1B). From that point, the wiring is the same for each control circuit.I am assuming here that one light is to be wired as in diagram #3. The other light, with its own two switches is also wired as in diagram #3. If this is the case, then the power in wire (black), the power in neutral (white) and the ground (bare or green) must go to both of the first two switches, one for each light. Simply run a two rope between those two switches, splice onto the power in cable, and treat each set of switches as independent.Please let me know if this answers your question. If not, let me know either with another comment here or with an email (contact information near the top right, under my profile information). These things are difficult to answer with limited information and with just the written word, but we can get it solved.BradG on January 02, 2012:Do you have any suggestions for wiring 2 separate 3 way switch setups (switch-switch-light) from the same power source? I have wired it and even separated the neutrals at the second switch but still cannot get the power to switch off. Do I need to separate the grounds also?Dan Harmon (author) from Boise, Idaho on December 07, 2011:It's really hard to diagnose from a distance, but the power coming into the second switch will always come in (when the first switch has the first power cable) on a traveler.You should have two wires marked as travelers and one as common (which will never go "hot" without that second switch wired in). If the one marked "T" never goes hot, I would suspect that it is the common, not a traveler.You can use a volt meter, or the non contact voltage detector to trace the wires. Make sure the wires are capped and safe in the second box and turn power on. Flipping the first switch should give you two wires that go hot, then cold when the switch is flipped - these are travelers at the second switch. From your description, that leaves two wires; hook one of them to either traveler and turn that traveler hot; if the light works that wire is then it is the common and the fourth wire should be simply capped with a wire nut.However, it is possible that earlier owners wired in a second switch that never worked properly. If you use wiring diagram #3 above, and only use two rope wire, the switches may work, but not properly. Is that possibly what has happened?dr on December 06, 2011:We have an older home and had a 3 way switch between to connected fan/lights. Power comes into Switch #1 and if we use only Switch #1 to the fan/lights they work. . . .but we are trying to add the Switch #2 back in. We had a wire marked as the "T - traveler" but we cannot get the switch #2 to work again--we cannot seem to get power to it. There is not the modern 3 wire used, it was two separate double wires originally used. Can you go from the power Switch #1 to Switch #2? Would we be better off running new 3 wire to the Switch #2 or can we try to get it to work again as it is?Dan Harmon (author) from Boise, Idaho on November 14, 2011:It's actually pretty simple, isn't it? All those wires and often colors on a 3 way light switch look confusing but once you understand what is actually going on it isn't so bad.Glad you found it useful, and thanks for the comment. It's always good to hear that I have been able to help out.rocco on November 14, 2011:thank you so much,for the multiple ways,i now have better understanding of the terminology and the wiring methodDan Harmon (author) from Boise, Idaho on September 11, 2011:Good. It is certainly tempting to save some time and effort by cutting corners, but this is not the place. It's just too dangerous, now and in the future.wade on September 11, 2011:Thanks for the response, I would not have felt good about doing it that way. But, he had run the wire and had his walls up for his room addition. I thought I might be able to save him time from the setback. Again, Thanks, I see it's not worth the risk.Dan Harmon (author) from Boise, Idaho on September 09, 2011:Yes, in more ways than one. Without a ground there is a potential shock hazard. You will be unable to utilize the legally required ground screw on the switch. It is not legal to do what you are proposing and any future problems (house burns down perhaps) that can traced to that wiring will result in liability to whoever did it. In many states it is illegal to sell a house with known deficiencies like this without notifying the buyer, whereupon the sale probably won't go through.In short, don't do it. As an electrician I wouldn't do it, and if ordered to by the boss would refuse. It just isn't worth it. These codes are in place for a very good reason and need to be followed.Good luck with your project.wade on September 07, 2011:Im helping a friend with wiring 3 ways, he has already run 2 wire/with ground to the switches, am i asking for trouble if we skip the ground? (use the ground for a traveler)Dan Harmon (author) from Boise, Idaho on September 07, 2011:Thanks to the both of you for the comment; it helps to know that you find the information useful.imamsaheb on September 07, 2011:when i look the connectipons to learn simplify,so thanks uManna in the wild from Australia on March 06, 2011:This is useful. Thanks.Dan Harmon (author) from Boise, Idaho on January 25, 2011:Thanks for the comment - I hope you will find a use for the information.whitton on January 25, 2011:Thank you for this very informative Hub.Dan Harmon (author) from Boise, Idaho on November 29, 2010:Thank you, both for the ping and the compliment.tamron on November 29, 2010:I pinged ya! well done and well written electrical article!Dan Harmon (author) from Boise, Idaho on November 17, 2010:That's good to hear. Thanks for the comment - I appreciate it when someone lets me know I helped them out.Dan Harmon (author) from Boise, Idaho on October 27, 2010:Thank you. I can only hope that someone will find it useful in wiring a 3 way switch.stars439 from Louisiana, The Magnolia and Pelican State. on October 27, 2010:Great information. GBYDan Harmon (author) from Boise, Idaho on October 18, 2010:You are absolutely right in that it can be very frustrating. I once tried to trouble shoot a friend's work and he had installed a 4 way instead of a 3 way (which is possible and will work) but had it wired wrong. It looked right if you didn't notice the 4th screw, but wouldn't work properly. Almost 2 hours of tearing all the switches and 4 little can lights apart before I noticed his error! Extremely frustrating!dgicre from USA on October 18, 2010:This is great! Very common problem and hooking 3/way switches up the wrong way leads to some interesting and often frustrating experiences.Dan Harmon (author) from Boise, Idaho on October 18, 2010:Thank you for the compliment. Wiring a 3 way switch is just enough different that many people have trouble with it. My hope is that the diagrams and explanations will make it understandable for those that have even a modicum of experience there.At least you found your problem; many end up hiring an electrician to to a 5 minute job!Dallas W Thompson from Bakersfield, CA on October 18, 2010:As a licensed California Contractor, I thought I knew basic wiring. I purchased what I thought was a three-way switch. Imagine my frustration after checking my wiring three times, I checked the three-way switch to determine it was a normal single pole, on-off two-way switch... Great information for those who understand the concept of wiring... 97 honda civic lx radio wiring diagram

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