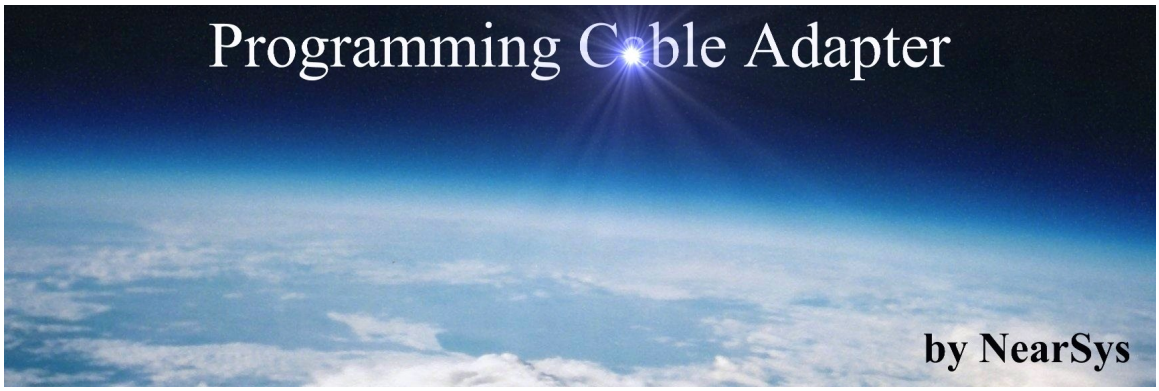


Most CheapBots are programmed through a three pin header soldered to the PCB. Although in some cases, a female DB-9 replaces the three pin header. Therefore, to program most CheapBots, you'll need to make a serial to three pin adapter. Some people modify a serial mouse into the adapter, but these directions illustrate how to make one from scratch (you'll gain additional soldering experience making one that comes in handy when you make sensors).

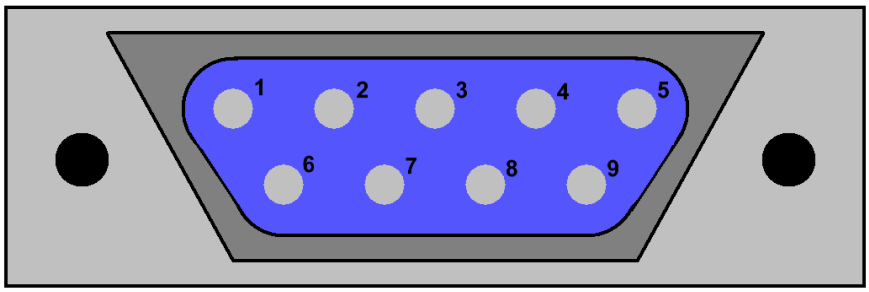
Materials
Female DB-9 connector with solder cups
Three pin receptacle
Thin gauge stranded wire (AWG 24 or 22, around 18 inches long)
DB-9 housing or shell
Heat shrink tubing recommended (1/8 inch and slightly larger)
Green marker or paint (plastic model enamels work well)

Note: A two by three pin receptacle just as well as a one by three pin receptacle

Tools
Wire cutters
Wire strippers
Hot glue gun
Soldering iron
Hot air gun

Procedure
This is easy; you're going to solder three wires between the DB-9 connector and the three pin receptacle. The three important DB-9 pins are labeled number 2, 3, and 5. Five is ground, three is serial-in to the PICAXE, and pin two is serial-out to the PC.

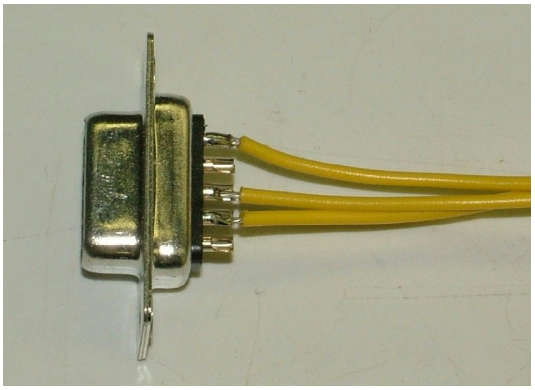
The back of a female DB-9 connector looks something like this. Be sure you can identify the numbers printed next to the solder cups on the back of the female DB-9 before proceeding.



□ Cut the wire into three equal pieces

Note: If you have two or more colors of wire, use a black or green wire for pin 5 and a different color for pins 2 and 3 (they can be the same, but not black or green). This way the black or green wire indicates the ground pin of the programmer.

□ Strip ¼ inch of insulation from one end of each wire
□ Twist the bare ends of the wires tightly and tin them
□ Cut six short lengths of heat shrink tubing
□ Prop the DB-9 under a weight, in a helping hands, or have someone hold it steady
□ Insert one tinned wire into solder cup 5, hold it steady, and solder it
□ Continue holding the wire steady until the solder cools
□ Repeat with the other two wires in cups 2 and 3
□ Review the soldering to make sure no cups were shorted out



□ Slide heat shrink over the wired solder cups and shrink the tubing
□ If necessary, cut the receptacle three pins wide

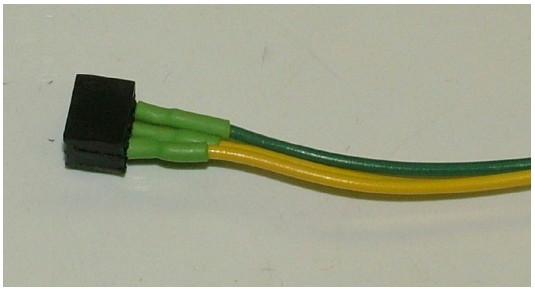
Note: If the receptacle is two rows wide, then cut the second row of pins short, bent them over into contact with the first row, and lightly solder them together. This way it won't matter which row of the receptacle you plug into the programming header.

□ If necessary, cut the pins on the receptacle to less than ½ inch long
□ Lightly tin the pins of the receptacle
□ Slide heat shrink over the wires and push them away from the tinned end for now

□ Prop the receptacle under a weight, in a helping hands, or have someone hold it steady
□ Place the wire from DB-9 pin 5 against the tinned pin on one end of the receptacle

Note: At this point, it doesn't matter which end pin is used, just as long as the center pin is not soldered to.

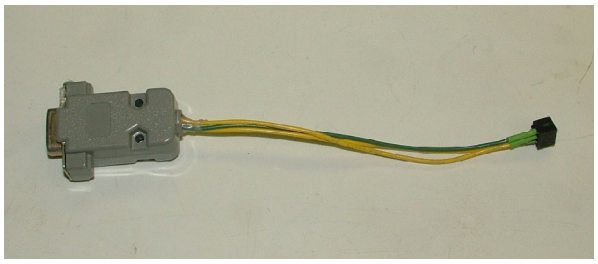
□ Heat the pin and the wire with a soldering iron until the solder melts
□ Hold the wire steady until the solder cools
□ Repeat and solder the wire from DB-9 pin 3 to the middle receptacle pin
□ Repeat for the wire from DB-9 pin 2 to the other end receptacle pin
□ Review the soldering to make sure no pins were shorted out
□ Slide the heat shrink over the wired receptacle pins and shrink the tubing



□ Check continuity between the DB-9 and receptacle

Note: If the programming cable does not use a black or green colored wire to signify the ground side of the receptacle, the paint a green dot on the side of the receptacle to signify its ground side

□ Squirt some hot glue around the solder cups of the DB-9
□ Place the DB-9 into and opened DB-9 shell
□ Squirt some more glue into the open shell and around the DB-9
□ Squirt some glue into the other half of the DB-9 shell
□ Close the shells before the glue cools
□ Bolt the shell halves together
□ Squirt some hot glue into the opening in the back of the DB-9 shell
□ Let the glue cool



26 April 2009