

RiderWest

Tip-Over Wing Embedded LED Kit for the BMW K1200LT

This kit includes everything you need to add super-bright LEDs to the black tip-over wing covers of your K1200LT. When wired as per these instructions, the LEDs act as both running lights and turn signals, giving you greater conspicuity, especially when turning or changing lanes.

This kit contains enough parts so you can install 16 LEDs per tip-over wing. However, if you have J-Pegs installed (or you are planning to install them) you'll use only 15 LEDs per side (with Mick-O-Pegs, you can use 16 per side). If you have anything else installed on your tip-over wings, adjust the drilling template accordingly before you start drilling.



Warning You must know how to solder (and be fairly good at it) to assemble this kit. Under no circumstances should you use plumbing solder or any soldering product not specifically intended for electronics work. **Use a low wattage soldering iron and good quality, rosin-core solder. Though tolerant of normal soldering technique, excessive heat will destroy an LED. Do not, under any circumstances, use a soldering gun.**

If you're unsure of your solder skills and need a little extra guidance, see this link: <http://www.aaroncake.net/electronics/solder.htm>

Installation of the assembled tip-over wings is straightforward—most steps take longer to explain than to actually perform. This document is 17 pages long because the steps are highly detailed and there are a lot of photos.



TIP It's a good idea to read a section all the way through and study the photos before you start drilling or cutting so you know what to expect.

If you have any questions about this kit, contact support@riderwest.com. You can download a full-color version of this document from our Web site: www.riderwest.com.

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What you get

Check the parts that came with your kit before you begin. Your kit should contain:

- (32) Amber LEDs, 3mm
- (32) resistors, 470Ω (yellow-violet-black-black-red) $\frac{1}{4}$ watt, 1%
- (2) 4' pieces of red and black zip cord (wire)
- (2) 12" pieces of red and black zip cord (wire)
- Connectors-Bag 1
 - (4) Male connectors, fully insulated, red, crimp-type
 - (4) Female connectors, fully insulated, red, crimp-type
 - (4) Piggy-back adaptors, crimp-type
 - (2) Female connectors, crimp-type
- Connectors-Bag 2
 - (1) T-Tap IDC (Insulation Displacement Connector)
 - (1) Male connector
- (5) Cable ties, 4"
- (2) Cable ties, 7", black
- Detailed instructions (what you're reading now)

What you need

To install this kit, you need the following tools:

- Low wattage soldering iron and electronics-grade rosin core solder
- "Helping Hands" (Harbor Freight part number 319-9) or similar—i.e., some type of base with alligator clips to hold small objects.
- Small needle-nose pliers
- T-25 Torx wrench (from the LT's toolkit—for removing the tip-over wing covers)
- Philips head screwdriver (for removing the turn signal assemblies)
- Crimping tool (for standard, automotive-type crimp connectors)
- Pliers (for squeezing the T-Tap, if used)
- Wire cutter/stripper
- Drill with 7/64" bit
- Scotch tape
- Silicon caulk

Preparing the LEDs and Resistors

The most tedious part of this kit is attaching the resistors to the LEDs. Make sure all solder joints are smooth and shiny.

1. Use the needle nose pliers to make a small loop in one lead of every resistor (see Figure 1). It'll be easier to trim the lead if it sticks out like in the photo. If you bend the lead against your thumb, you can make the loop and position the lead all in one motion. Don't make the loop right up against the resistor—leave a little slack to allow the resistor room to flex.



Figure 1: Forming the loop on the resistors

2. "Helping Hands" (see Figure 2) is very convenient for holding the LEDs as you work. If you don't have such an item, you can devise something by attaching an alligator clip to a stiff wire that you hold in a vise. Either way, you need something to hold the LEDs as you solder.



Figure 2: Helping Hands for holding LEDs while soldering

3. Put an LED in your holder and attach a resistor to the negative lead of the LED (the negative lead is the shorter one, and the flange at the base of the LED has a flat spot on the negative side). Squeeze the bent lead tight onto the LED's lead. See Figure 3.

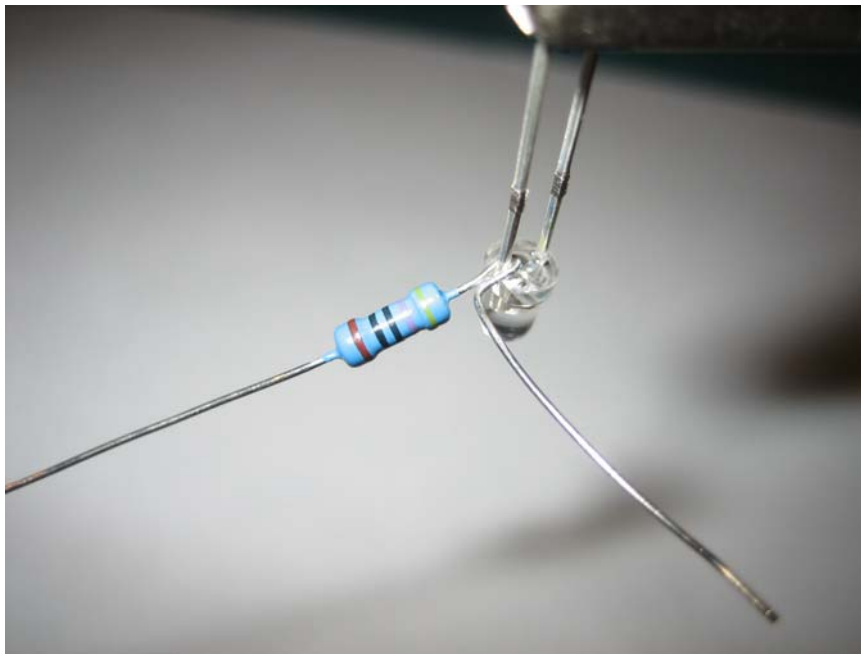


Figure 3: Resistor attached (but not soldered) to LED

4. Carefully solder the resistor to the LED and trim the resistor's and LED's leads (cut the LED's lead right up against the solder joint (see Figure 4). Repeat this for all the LEDs and resistors.

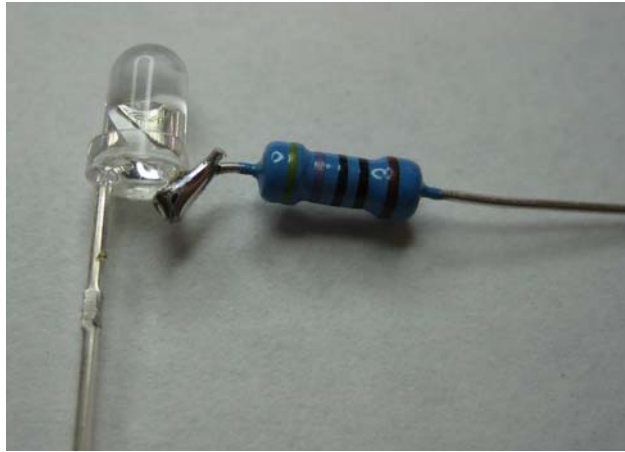


Figure 4: Resistor soldered to LED and leads trimmed

Preparing the Drilling Template

1. The drilling template consists of four identical strips—two for each side. Because the tip-over wing is longer than the standard $8\frac{1}{2}$ " x 11" paper, you need to tape two pieces together to make the full template.

Cut out two of the strips. Note where the template says to not cut—on one strip, leave that end as shown in the Figure 5. Cut the second strip so only 6 holes are left.



NOTE If you're adjusting for J-Pegs, trim the second strip so only 5 holes are left. If you have something else installed, leave all six holes on the second piece—you can trim it after you tape it to the tip-over wing, at which time you can tell how many LEDs you can use.

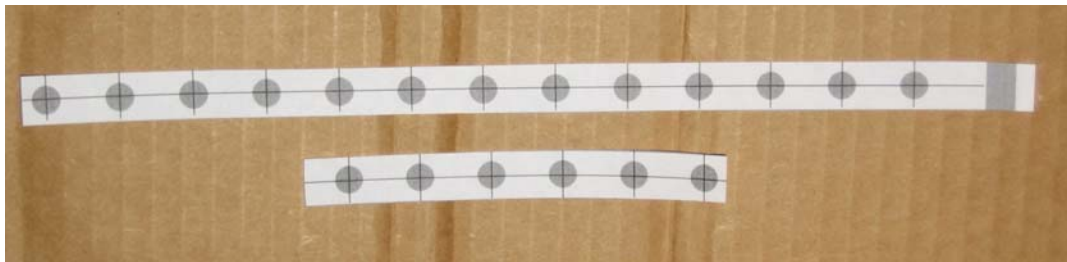


Figure 5: Drilling template cut out

2. Overlap the two pieces by three holes, hold it up to a bright light to make sure the lines and circles align, and tape together. You now have one long piece with 16 holes (or 15 holes if you're allowing for J-Pegs). See Figure 6.



Figure 6: Drilling template taped together

Removing the Tip-Over Wing Covers

1. Use the T-25 Torx wrench to remove the two screws on the bottom of the black Tip-Over Wing cover (see Figure 7). Note that, very early model LTs use Allen screws instead of Torx. Remove the cover.


 **NOTE** If you have a 2005 or newer bike, you must remove the courtesy light (landing light) before removing the cover. Remove the two screws, lower the light from its mounting position, and remove the two wires. Now you can remove the cover.




Figure 7: Screw locations on bottom of 2003 Tip-Over Wing cover. For 2005 and later models, you must also remove the courtesy light from the bottom of the cover.

2. Repeat for the other side of the bike.
3. Thoroughly clean the inside of both covers (so the silicon will stick).

Attaching the Template and Drilling Holes

1. Start with the end of the template with the gray rectangle. Align the edge of this end with the tab on the wide end of the cover and tape in place (see Figure 8).

 **Tip** You'll most likely need to adjust the template after you tape it in place. To make this easier, for each piece of tape you use, fold one end of the tape over on itself so you have a little "handle" for lifting the tape. Use the end with the "handle" on the plastic cover.

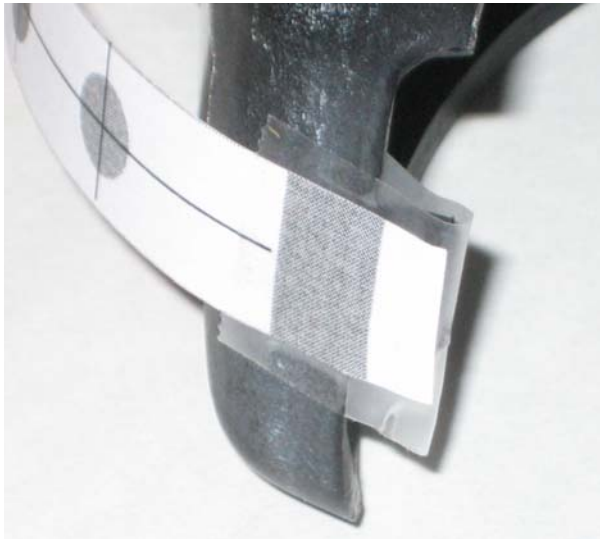


Figure 8: Template taped to tab on cover

2. Line the template along the center of the cover, taping it in place as you go. Because of the funny angles, it will not lay completely flat. The idea is to get the holes placed, more or less, in the center of the cover. After the template is taped in place, you can make minor adjustments to get the holes where you want.



Figure 9: Template taped to tab on cover

3. With the 7/64" drill bit, drill the holes for the LEDs. You may find it more accurate to first drill a very small hole (1/16") in each location, remove the paper template, and then drill the 7/64" hole.



Tip If you're worried that you may damage some of the LEDs if you drop your bike, you may want to skip LEDs 6 through 9 (and you wondered why I numbered the holes?)—these are located in area of the cover mostly likely to get damaged if you drop your bike.

4. Repeat for the other cover.

Inserting the LEDs

1. Insert an LED/resistor assembly in each hole so that all of the resistors are on the opposite side from the rubber spacer (this makes wiring it easier). The holes for the LEDs are slightly undersized for a tight fit. Using a needle-nose pliers, grab the LED/resistor assembly by the base and press it into a hole just so it starts to stick (see Figure 10). Then, position a flat-blade screwdriver in the center of the LED, between the two leads, and *gently* press the LED the rest of the way in. It's helpful to position the cover on the edge of a firm table while you push. If you use something with a rough surface to push against, protect your cover with a rag or towel.

To understand where you're going with this, see Figure 11.



Figure 10: Pressing the LED into the hole

2. Repeat for the other cover.

Test the LEDs before Wiring

We highly recommend that you test each LED before wiring them together because it's possible to damage them while pushing them into the holes. If any are damaged, replace with the extras provided. (It's much easier to replace a bad one now than after they're all wired together.)

To test them, apply a 12 volts DC source—negative to the resistor, and positive directly to the LED's + lead. If you don't have a convenient 12 volt source, use one of the enclosed 4' zip cords to connect the LEDs to your car/bike battery. **Do not connect 12 volts to the LED without the resistor in the circuit—this will instantly destroy the LED.**

When you are convinced that all the LEDs work properly, continue to the next section and wire them together.

Wiring the LEDs

The LEDs are wired in parallel, meaning that all the positive leads are connected together, and all the negative leads are connected together. Refer to Figure 11 and Figure 12. Keep in mind that, if you are skipping some of the LEDs in the sequence, you may need to bridge the gap with a separate piece of wire.

1. Start with the positive leads (the ones without the resistors attached). At the narrow end of the cover, bend the first LED's positive lead toward the LED next to it. For the second, and all the rest, bend the leads toward the first LED (whether this is left or right depends on which cover you're doing, and how you're holding the cover). Form the bends so that the leads touch. You may need a small tool to help position the leads. When you have them touching (or close), solder them in place (you can use the "Helping Hands" to hold the cover up while you solder). If two leads don't quite touch, add some solder, and then reheat the joint as you push the leads together with a small screwdriver or dental pick.
2. Now work on the negative leads. This time, start on the wide end. Push the first resistor against the cover and bend the lead toward the next resistor. Push the next resistor against the cover and bend its lead over the previous one, and toward the next LED in the row. The idea here is to bend each resistor's lead over the previous resistor's lead to help hold it down. When you get to the narrow end, the last resistor's lead is bent in the opposite direction—towards all the other resistors. Make sure all the leads are touching and solder them in place.



Figure 11: LEDs wired together in cover

3. Attach a 12" piece of zip cord to the LEDs (see Figure 12). The red wire goes to the positive side (no resistor) and the black goes to the resistor side. Separate the black and red wires for about an inch. Strip off about $\frac{1}{4}$ " of insulation and twist the strands tightly

together. Loop the wire around the LED's or resistor's leads and crimp by pressing down with a screwdriver. The wire should lay flat against the cover, as shown. Solder both wires.



Figure 12: Close-up of zip cord attached to LEDs

4. Repeat for the other cover.
5. Test your assemblies by connecting the black wire to -12 volts and the red wire to +12 volts. If any LEDs don't light, check for bad solder connections. Fix. Test again.
6. When you're satisfied that all the LEDs work and that all the LEDs are fully seated in their holes, coat the inside of the cover with silicon, using the color of your choice (see Figure 13). The silicon electrically insulates the connections, "glues" the LEDs and resistors in place, and seals everything against the elements.



Figure 13: Inside of cover—LEDs and resistors are covered with silicon caulk

Running the Wires

1. Remove the chrome tip-over wing cover by removing three screws (two on the bottom and one near the rider's foot position) and disengaging the tab facing upward near the narrow end of the cover (note the lengths of the screws as you remove them—sometimes the screw near the rider's foot is longer than the other two).

2. Run one of the pieces of black/red zip cord from the nose of the bike to one of the tip-over wings. There is a space to the outside of the radiator where you can run the wire. See Figure 14.

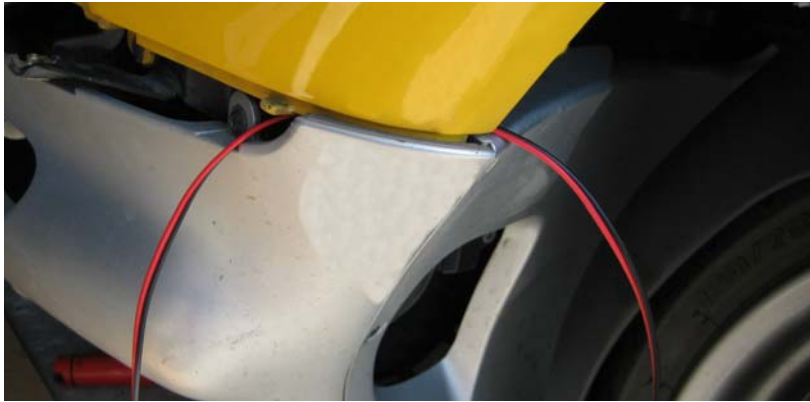


Figure 14: Running the wire from the nose of the bike to the tip-over wing

3. Thread the wire below the metal bracket and tubing and run it toward the rear of the tip-over wing. See Figure 15.



Figure 15: Running the wire in the tip-over wing

4. Replace the chrome cover on the tip-over wing (the longer screw, if there is one, goes next to the rider's foot position).
5. On the end of the zip cord in the Tip-Over wing, separate the ends and strip $\frac{1}{2}$ " of insulation off of each conductor, twist the strands together, and fold back the wire so the copper is doubled that goes into the connector (this makes the connectors crimp more securely).
 - a. Attach a FEMALE connector to the RED wire.
 - b. Attach a MALE connector to the BLACK wire (see Figure 16).

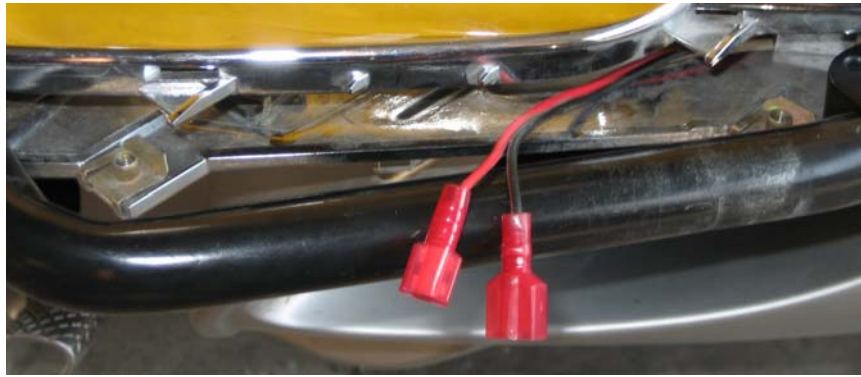



Figure 16: Connectors attached to wires in Tip-Over wing

6. Once the silicon is dry (or if you're impatient, you can do this while it's wet), on the wires coming from the Tip-Over wing cover, strip off $\frac{1}{2}$ " of insulation, twist the strands together, fold back the wire so the copper is doubled that goes into the connector, and:
 - a. Attach a MALE connector to the RED wire.
 - b. Attach a FEMALE connector to the BLACK wire.
7. Push the connectors together (red to red and black to black—red is the "hot" (positive) wire and black is the ground (negative)).
8. Re-install the Tip-Over wing cover, being careful not to pinch the wires. Don't forget the two screws.
9. Repeat for the other side of the bike.

Connecting the Wires to Power (2005 Models or Later)

If your K1200LT is a 2005 or later model, your front turn signals are also running lights. Both wires from the Marker light will go to the turn signal socket.

If you know what you're doing and don't want to follow the step-by-step instructions in this section, the short version is this: connect the RED wires to the "hot" running light wires (terminal 58) and the BLACK wires to the "hot" turn signal wires (terminal 31) on the turn signal sockets. Neither wire is connected directly to ground. For info on why this works, see the Wiring Details document in the Support section of our Web site.

 **NOTE** If you have a 2004 or earlier K1200LT and you (or someone else) modified your turn signals to also be running lights, use the instructions in this section (if your sockets are not numbered, you'll have to figure out which wire is the running light and which is the turn signal—on a 2003, the front turn signal wire is blue with a black stripe). If you have a 2004 or

earlier K1200LT and your turn signals are not modified (they are just turn signals), go to the next section.

1. Remove one of the turn signal assemblies by removing the Philips screw and gently pulling the plastic assembly away from the bike. Let it hang by the wires.
2. Pull the zip cord through the hole for the turn signal wires. Trim to about 6".
3. Prepare the wires:
 - a. Separate the end of the zip cord and strip about $\frac{1}{4}$ " of insulation off each conductor. Twist the strands together.
 - b. Attach a piggyback connector to each of the wires. See Figure 17.

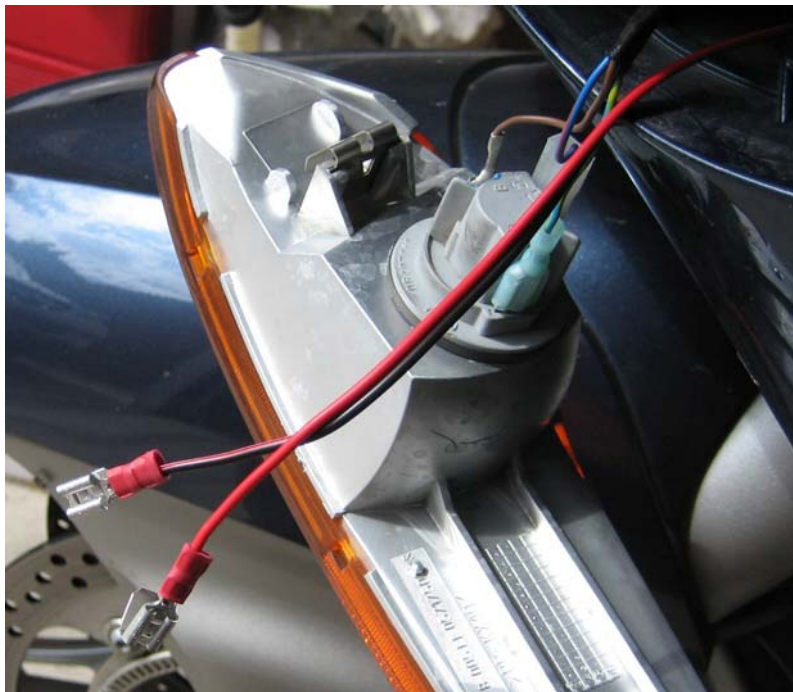



Figure 17: Wires with piggyback connectors—ready to attach to socket

4. Note that the terminals on the bulb socket are numbered. The running light wire (green with blue stripe) goes to terminal 58. The turn signal wire (blue with red stripe) goes to terminal 31. Terminal 54 (brown wire) is ground. Remove the wires from terminals 58 and 31. See Figure 18.

 **NOTE** This info is from a 2005 LT and should be the same for later model years—however, if your wire colors don't match, keep track which wire comes off which terminal and adjust what you do accordingly.

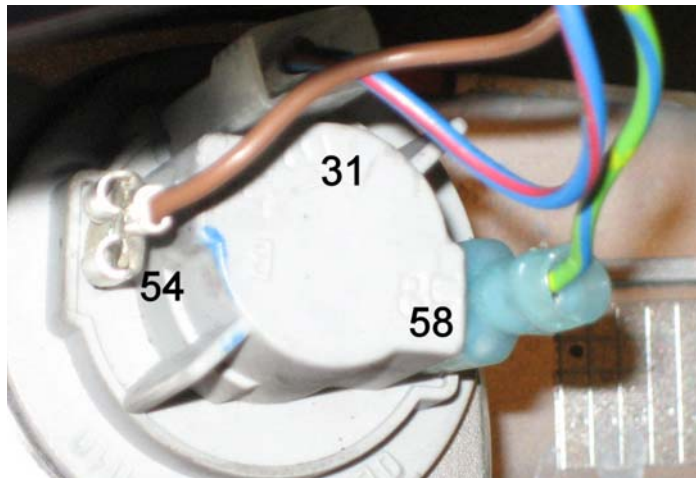


Figure 18: Terminal numbers on socket

5. The connector on the running light wire is smaller than the standard $\frac{1}{4}$ " type and needs to be replaced. Cut off the connector on the green with blue stripe wire, strip off $\frac{1}{4}$ " of insulation, twist the strands together, and attach one of the non-fully insulated female connectors to the wire.
6. Attach the piggyback connector from the RED zip cord wire to terminal 58 and the other piggyback connector to terminal 31. (Do not connect either wire to the ground terminal.)
7. Attach the original wires you removed to the tabs on the piggyback connectors (green with blue stripe to terminal 58, blue with red stripe to terminal 31). See Figure 19.

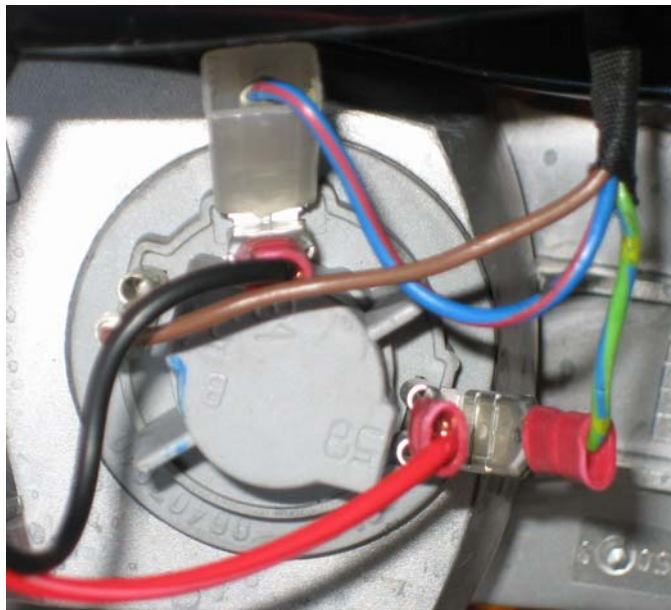


Figure 19: Socket with all wires attached

8. Replace the turn signal assembly and fasten with the screw you removed earlier.

9. Gently pull the slack out of the wire going to the tip-over wing and use a 7" black cable tie to secure the zip cord to the frame tubing running up along the side of the bike (see Figure 20).



Figure 20: Zip cord secured with 7" black cable tie

10. If necessary, use a 4" cable tie to secure the zip cord near the turn signal to make a neat job.
11. Repeat for the other side of the bike.
12. Go to the **Testing your LEDs** section.

Connecting the Wires to Power (2004 Models or Earlier)

If your K1200LT is a 2004 or earlier model, your front turn signals **do not** also act as running lights (if they've been modified and do act as running lights as well as turn signals, go to the previous section).

If you know what you're doing and don't want to follow the step-by-step instructions in this section, the short version is this: connect both RED wires to the gray with black stripe wire coming from the parking light in the headlight (use the enclosed T-Tap and male connector or solder and insulate the wires). Connect the BLACK wires to the "hot" turn signal wires. Neither wire is connected directly to ground. For info on why this works, see the Wiring Details document in the Support section of our Web site.

1. Prepare the wires:
 - a. Separate the ends on one of the zip cords and trim so that the RED wire reaches the wire going to the parking light (the parking light is the small bulb in the headlight assembly) and the BLACK

wire reaches the turn signal (leave enough slack to go through the opening for the turn signal socket).

- b. Strip about $\frac{1}{4}$ " of insulation off each conductor and twist the strands together.
2. On each BLACK wire, attach a piggyback connector.
3. Strip about $\frac{1}{4}$ " of insulation off the RED wires, twist the strands together, and, bringing them near each other, twist the copper strands from both wires together (they're both going into the same male connector).
4. Insert the twisted pair of RED wires into the MALE connector packaged with the T-Tap and crimp.
5. Attach the enclosed T-Tap to the gray with black stripe wire coming from the parking light (you may have to cut back some of the black wrapping covering the wires). To attach the T-Tap, lay the wire in the channel, close the connector and pinch the two halves together with a pliers.
6. Plug the male connector on the RED wires into the T-Tap.
7. Remove one of the turn signal assemblies by removing the Philips screw and gently pulling the plastic assembly away from the bike.
8. Remove the blue wire with the black strip from its terminal.
9. Pull the black zip cord wire through the opening for the turn signal and attach it to the terminal from which you just removed a wire.
10. Connect the original wire to the tab on the piggyback connector.
11. Replace the turn signal assembly (with the screw).
12. Repeat Steps 7 through 11 for the other side of the bike.
13. Gently pull the slack out of the wire going to the tip-over wing and use a 7" black cable tie to secure the zip cord to the frame tubing running up along the side of the bike (see Figure 20, above).
14. If necessary, use the 4" cable ties to secure the wire near the turn signals and/or T-Tap to make a neat job.

Testing your LEDs

1. Turn on your key—everything should light up. Try your turn signals. The Tip-Over wing LEDs should wig-wag with the front turn signals. If anything doesn't work, see the Troubleshooting section, below.



2. Go for a ride, enjoy, and be safe.

Troubleshooting Tips

- If both sets of Tip-Over wing LEDs don't go on and you used the T-Tap, then double-check that the connection is good and that the male connector is connected. Also, make sure the parking light works (that the wire is hot). There is a 4-amp fuse that protects the running light circuit—make sure the fuse is good.
- If one set of LEDs doesn't work, check the wiring for that side. Be sure you have a good crimp on the piggy back connectors, and make sure the fully insulated connectors in the tip-over wing are pushed together and making good contact.

