# Device Box Wiring Lab

**Program:** Electrician Technician

**Course:** EL140 Residential Applications

**Objectives:** Under the supervision of your instructor, you should be able to do the following:

- Make-up all the 4S boxes by pig-tailing and tying off the proper wires.

**Lab Equipment:**

- Project Boards (use #14 NM wire)

**Required Tools:**

- 1 – Phillips screwdriver
- 1 – Flat head screwdriver
- 1 – Pair of strippers

**Materials:**

- 1– ½" raised 4/0 ring cover
- 5– ½" raised single gang ring cover
- 1 – Keyless light fixtures
- 1 – Duplex receptacles
- 2– 3-way switches
- 1 – 4-way switch
- 1 – Single pole switches
- 1 – GFCI receptacle
- 36 – Red wire nuts
- 15' – 14/2 Romex
- 10' – 14/3 Romex

**Safety (PPE):**

- Safety glasses/goggles
- Hard Hat

**Resources:** N/A

**Required Time:** One Day

**Shop Maintenance:**

- All work will cease 20 minutes prior to the end of class.
- All work areas must be cleaned.
- Tools and equipment must be cleaned and returned to the designated areas (cage, tool room, cabinets etc.)
- Any broken or missing tools must be reported immediately.
- Tools and equipment are students' responsibility

**Procedures:** *(Eye protection must always be worn)*

- When connecting wires to the screws on the devices, strip about a ¾" off the end of the wire, using the wire strippers put a "U" or "hook" shape on the exposed end, then connect the wire to the device with the hook going towards the right, and the wire is under at least ¾" of the screw without overlapping. The GFCI is the only exception, you only strip about ½" off the end of the wire and slide it under the screw and then tighten.
- **Pigtail** – When you take two or more wires, cut them 6" from the box, take another wire of the same color (8" long) and put all the wires together under one wire nut.
- **Tie-off** – When you take two or more wires, cut them 6" from the box, and put them all together under one wire nut.

**1 – Light fixtures**

- Tie off all the green wires if more than one.
- Pigtail all the white wires if more than one.
- Pigtail all the red wires if more than one.
- Connect the white wire to the silver screw on the keyless light fixture.
- Connect the red wire to the gold screw on the keyless fixture.

**2 – ½ Hot Duplex Receptacles**

- Pigtail all the green wires if more than one.
- Pigtail all the white wires if more than one.
- Pigtail all the black wires if more than one.
- Pigtail all the red wires if more than one.
- Cut the tab between the two gold screws on the line side of the receptacle.
- Connect the green wire to the green ground screw of the device.
- Connect the white wire to the silver screw of the device.
- Connect the black wire to the bottom gold screw on the device.
- Connect the red wire to the top gold screw on the device.

**3 – GFCI Receptacle**

- Pigtail all the green wires if more than one.
- Connect the green wire to the green ground screw of the device.
- Take the black wire from the power cord and connect it to the "LINE" gold screw on the back of the GFCI. (All wires for the GFCI will be stripped ½" and inserted through the designated hole and not around the screw).

- Take the white wire from the power cord and connect it to the “LINE” silver screw on the back of the GFCI.
- Take the black wire from the 14/2 and connect it to the “LOAD” gold screw on the back of the GFCI.
- Take the white wire from the 14/2 and connect it to the “LOAD” silver screw on the back of the GFCI.

**4 – Single Pole Switch**

- Pigtail the grounds and connect the pigtail to the green ground screw.
- Tie off all the white wires if more than one.
- Pigtail all the black wires if more than one.
- Connect the red and black wires to the two screws on the switch.

**5 – 3-Way Switches**

- Pigtail the grounds and connect the pigtail to the green ground screw.
- Tie off the two white wires.
- Connect the red wire to the black screw on the 3-way switch.
- Connect the two blue wires to the remaining screws on the 3-way switch.

**6 – 4-Way Switches**

- Pigtail the grounds and connect the pigtail to the green ground screw.
- Connect the two blue wires coming from one 3-way switch to one set of gold screws.
- Connect the remaining two blue wires from the second 3-way switch to the remaining bronze-colored screws.