

There are two types of cable installation- internal and external. The difference between these two kinds of cable installation is that external refers to the cables being out in the open, where internal refers to the cables being mostly hidden within walls or running underneath floor boards or within the ceiling. Both types of installation are useful with a purpose, and the methods for installing each differs.

External cable installation involves the following:

1. Planning- Decide how one wants things set up. How many and where will each computer, network device, and hub be located is where it all begins. From there one can begin to plan where the cables will run by taking into consideration the topology of the network and the layout of the room, including obstacles such as doors and walls.
2. Measuring- After one has planned out the cable pathway, the amount of cable needed to run along that path needs to be measured out. It is important to take in to account any of the obstacles as well as allowing enough slack to compensate for mistakes or unforeseen circumstance. One can always cut or tie up a cable that is too long; it is much more difficult to get a cable that is not long enough, to grow.
3. Acquiring- Since external cable jobs are usually smaller and do not require as much cable as an internal installation, one usually works with prefabricated cables. These are cables that can be purchased at desired lengths that are ready to go because they already have the jack or connector attached. Make sure to get the correct lengths of cable as well as the right kind of cable as there are many different types.
4. Laying cable- Cables should all be laid out completely to make sure the layout works and cables can reach where they should.
5. Securing cable- Cables should all be secure to ensure that don't get moved, tripped over, or damaged. Cables can be secured with a variety of means: cable ties bundle loose cables together, staples can be used to hold cables close to the wall, raceways can be used to both hide cables from site and protect them. When securing cables it is important to make sure they are not secured too tightly. When securing the cables, take into consideration the obstacles. Cables the run by a door way are likely to get stomped on by people walking by so it is important to either protect the cable on the ground or run the cable up and over the doorway. Cable behind furniture should be protected from getting smashed as well. Running cable to a second room may entail running cable through the wall to the next room to ensure that the cable doesn't get smashed by the door, or even running it through a hole in the floor to the next room below. Holes should be drilled carefully to avoid hitting electrical or water lines. Securing cables begin at one end and work along the line to the next end.

6. Connecting the network- With the cables laid out and secured, it is now time to plug the cables in. Once the cable has connected to both the hub and the computer or network device, they can be powered up and the connection can be checked.

Internal Installation is a bit more involved.

1. Planning- Decide how one wants things set up. How many and where will each computer, network device, and hub be located is where it all begins. From there one can begin to plan where the cables will run by taking into consideration the topology of the network and the layout of the room, including obstacles such as walls, electrical equipment and other floors. Creating a diagram is very useful.
2. Laying cable- Internal installation usually uses a large quantity of cable that can be unrealistic to measure out before hand so cable is usually taken right off a spool of bulk cable. Every cable should be labeled at each end before moving on to the next cable. The ends of each cable will terminate at a patch panel. Beginning at the patch panel, the cable can be fed through the walls until it reaches its destination. Always leave slack to allow for anything that may come up.
3. Securing cable- Cables should all be secure to ensure that they don't get moved or damaged. Cables can be secured with variety cable ties that bundle loose cables together or staples can be used to hold cables close to the wall.
4. Cutting the cable- Make sure to label the end of the cable before cutting the end off the spool.
5. Connecting the cables- The ends of each cable must be either punched down at the wall plates and patch panels or have connectors attached to them. From there the cable itself can be connected to the hub or network device or patch cables can be used to connect computers to wall plates and hubs to patch panels.

Different cables can be used when installing cable. The most basic cables are coaxial, fiber optic, and copper twisted pair.

Coaxial is the most rigid of the cables. Coaxial can be classified as either Thick Ethernet or Thin Ethernet which indicates the thickness and composition of the core. Those cables can then be classified as PVC or plenum, (a non-toxic sheathing has been used so the cable can be used in air spaces), sheathing.

Fiber optic is great for use when an area has a lot of EMI, but it is more expensive. It comes in two types- singlemode which has a thinner diameter core and uses a laser with a single wavelength, or multimode which uses an LED with multiple wave lengths.

The most commonly used is copper twisted pair wiring, which can itself be broken into several categories. The major categories are Shielded (STP) and Unshielded Twisted Pair (UTP) which

consists of pairs of twisted copper wires. UTP is the most commonly used. It is made up of four pairs of copper wire and is categorized by the frequency it is capable of reaching, the higher the category number the higher the faster it can perform. The categories are: 1, 2, 3, 4, 5, 5e, and 6. Networks usually use category 5 or higher. These UTP cables can further be broken down into a solid, (used for longer paths), or stranded, (usually used as patch cables), category, which is based on the composition of the copper wires inside. STP is made up of 2 pairs of copper wires that have additional shielding. It is used when EMI is an issue. There are four types of STP: Type 1A, 2A, 6A, and 9A. They are defined by the gauge of wire and if the wires are wrapped in foil.

Describe the common tools used with cable and what functions they perform.

The common tools used for cable installation include the following:

Tape and coat hanger/stiff wire or string: An inexpensive way to thread cable through a wall to the other side.

Drill: For drilling holes into walls and floors/ceilings to make a passage for cable to get to another room.

Staples, cable ties-(plastic, vinyl, or Velcro ties used to hold bundles of cables together), raceways-(rigid, hollow tubing that can be secured to walls and cables can be run through): A means for securing cables to keep them from getting moved or damaged.

Ladders: To reach higher than one normally could when securing cables or running cables through a ceiling.

Cable puller-(a stick with a loop on the end) or telepole-(a telescoping pole with a hook on the end): These are used for running cable through a section to a second person on the other side of the wall or ceiling.

Fish tape-(flexible band that uses a reel and hook system): This is used for vertically dropping cables in a wall.

Wall plates: These are face plates that screw onto the wall and provide an outlet to connect network devices to the cables run through the walls rather than just leaving a hole with a protruding cable.

Patch panels-(a face plate that has a greater number of outlets): These are face plates that screw onto the wall and provide an outlet to connect the hub to the cables run through the walls rather than just leaving a hole with a protruding cable.

Punchdown block tool-(a handheld tool with an end piece that resembles a miniature fork lift): This tool strips insulation off wires, presses the wire into place, and cuts off the excess wire.

Connectors-(connectors vary depending on the type of cable being used- the most common is the RJ-45 which resembles the telephone jack): Connectors top off the end of each cable and plug into jacks and outlets to make the cables usable.

Crimper-(resembles a pair of pliers with a space for inserting the RJ-45 connectors): This squeezes the plastic connector together so it fits snugly over the wires so they don't fall out of the connector)

Epoxy-(an adhesive): This is used to hold fiber optic cables in place.