IEEE-488 GPIB

**IEEE-488 GPIB Tutorial**

- What are GPIB cables?
  GPIB cables consist of 24 twisted pairs of copper wire and utilize a Centronics 24 style male/female connector.

- How are GPIB cables used?
  They are used in a bus or star architecture where the connectors “piggy back” each other and then connect primarily test and measurement equipment to PCs and other devices.

- Where are GPIB cables used?
  GPIB cables are typically used in test and measurement applications and are also used in DAQ (data acquisition) applications.

**IEEE-488 Cabling Terms**

**Adapter:** A device used to interconnect two different connector types.

**American Wire Gauge (AWG):** A U.S. standard set of non-ferrous wire conductor sizes. Typical data wiring is AWG number 24, 26 or 28. The higher the gauge number, the smaller the diameter and thinner the wire.

**Backshell (Hood):** A mechanical backing that is sometimes put onto a connector. The device protects the conductors and can be assembled or injection molded.

**Bus:** Also called a “Daisy Chain”. A network topology where each node is connected to one another in line. A major disadvantage is that when there is a break in the bus the entire network goes down.

**Cable:** A set of insulated wires or conductors within an extruded jacket. Many types of cable utilize shielding around the wires and under the cable jacket.

**Cable Assembly:** A piece of cable that has been terminated with one or more connectors.

**Conductor:** A metal path, usually copper, that passes electricity. When discussing data cabling, “wire” and “conductor” are synonymous.

**Connector:** Electromechanical coupling device that provides an electrical interface that can be mated and unmated.

**Contact:** The specific points of contact within a connector. Contacts can be male (pins) or female (sockets).

**Coupler:** A device used to connect two similar connector types.

**Crosstalk:** The coupling of electromagnetic fields from conductors into adjacent conductors. Crosstalk is controlled by twisting the conductors into a pair or by separating/shielding conductors.

**Electromagnetic Interference (EMI):** Unwanted electromagnetic or electrical energy that causes unwanted responses in electronic equipment.

**GPIB:** General Purpose Interface Bus. Common name for IEEE-488.

**HPIB:** Hewlett Packard Interface Bus. Common name for IEEE-488.

**IEEE-488:** Institute of Electrical and Electronics Engineers interface standard number 488.

**In-Line / Linear Configuration**

- Printer
- Plotter
- Scanner

**IEEE-488 Connector Specifications**

The IEEE-488 GPIB connector utilizes 24 contacts in a parallel configuration.

**Physical / Star Configuration**

- Plotter
- Printer
- Scanner

**IEEE-488 Cable Construction**

- 24 conductors with twisted pairs
- Braid Shield with a minimum 85% coverage
- Centronics style 24 position male to female piggy back connectors allowing for easy daisy chaining
- Metric mating hardware, M3.5 x 0.6

**Injection Molding:** The process used to inject molten polymer into a mold. Connector backshells are often injection molded.

**Insulation:** A material with very high resistivity used to protect conductors. Insulation is usually extruded over the wire or conductor after the drawing process.

**Insulation Displacement Contact:** A means of terminating wires without the need of stripping down to the bare wire.

**Plug:** Popular term for a male gender connector of varied types.

**Shielding:** A conductive foil or braid that covers insulated wires in a cable. The shield provides electrical grounding and protection from external electromagnetic interference (EMI). Shielding is also used to control internal electromagnetic radiation.

**Strain Relief:** A method of protecting the wire to contact point from flexing or pulling.

**Twisted Pair:** Two insulated conductors twisted at a fixed rate of twists per unit of length, typically used in balanced circuits where nominal impedance and crosstalk are critical characteristics.

**Wire:** Conductive material, typically copper, that has been drawn down to a specific size and coated with an insulating material. A "bare wire" utilizes no insulator coating.

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