

# **CET246 Electronic Design Automation**

## Connectors

---

David J. Broderick, Ph.D.

September 17, 2018

Central Connecticut State University

# Introduction

A 75 cent connector can ruin your day



# Electrical Requirements

Questions to ask regarding each connector:

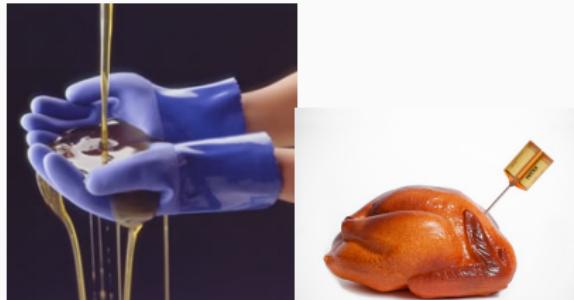
1. How many Signals?
2. High frequency?
3. Low-level analog?
4. High voltage?
5. High current?



## Size, Space, and Weight Requirements



# Environmental Requirements



# International Protection Marking

## First Digit:

Solid particle protection

- 0. No protection
- 1. ( $>50$  mm) Large Objects
- 2. ( $>12.5$  mm) Finger width
- 3. ( $>2.5$  mm) Small tools
- 4. ( $>1$  mm) Wires, screws
- 5. Dust protected
- 6. Dust tight

## Second Digit:

Liquid ingress protection

- 0. No protection
- 1. Dripping Water, Upright
- 2. Dripping Water,  $15^\circ$  Tilt
- 3. Spraying Water,  $60^\circ$  Tilt
- 4. Splashing Water
- 5. Water Jets, 6.3 mm nozzle
- 6. Powerful water jets, 12.5 mm nozzle
- 7. Immersed, up to 1 meter
- 8. Immersed, over 1 meter

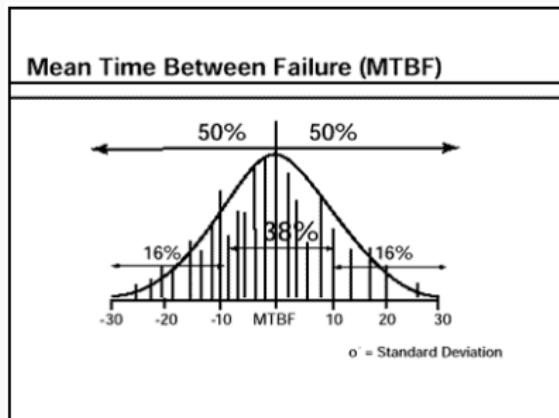
# Industry Standards

- OEM - by agreement or Regulatory
- FDA - medical
- SAE - automotive
- MIL defense
- FAA- aerospace
- IEEE- interoperability



# Reliability

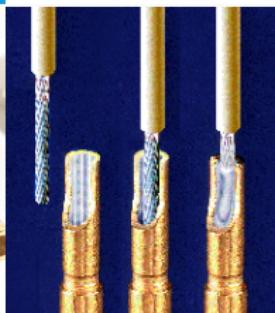
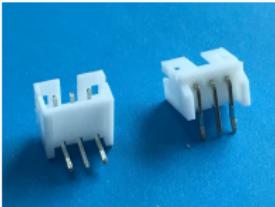
- Mating/Unmating Cycles
- Mean Time Before/To Failure (MTBF/MTTF)



# Termination

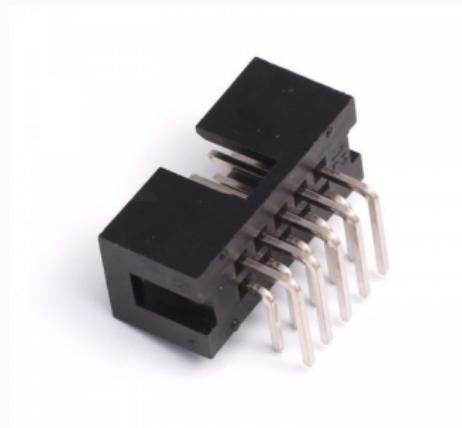
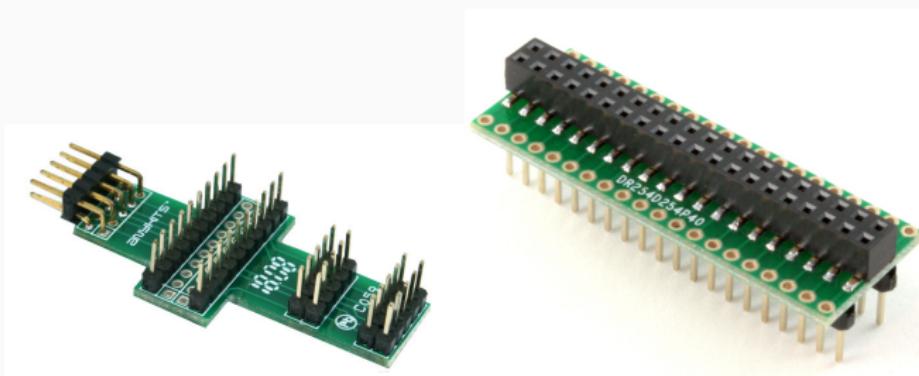
What does it connect to?

- PCB
- Wire
- Crimped
- Soldered
- Press fit



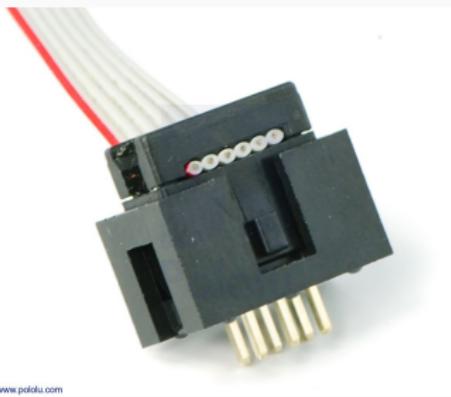
# Some Useful Connectors

Board Headers shrouded/unshrouded



# Some Useful Connectors

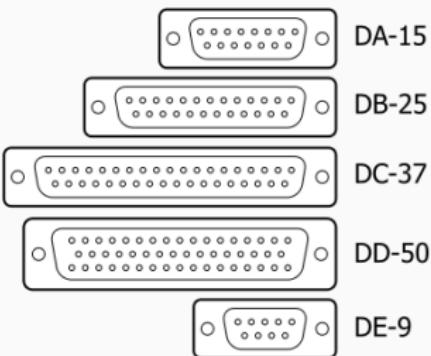
Press fit



[www.pololu.com](http://www.pololu.com)

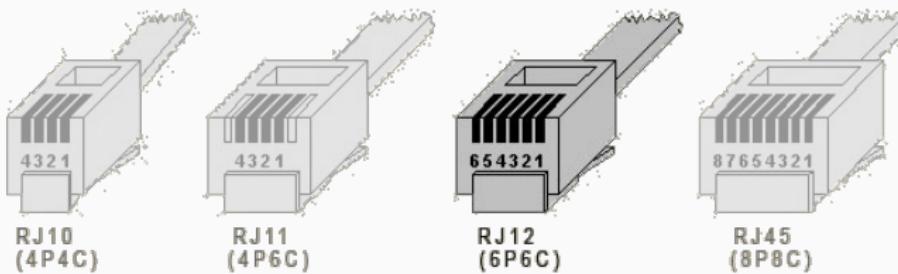
# Some Useful Connectors

## D Sub-miniature



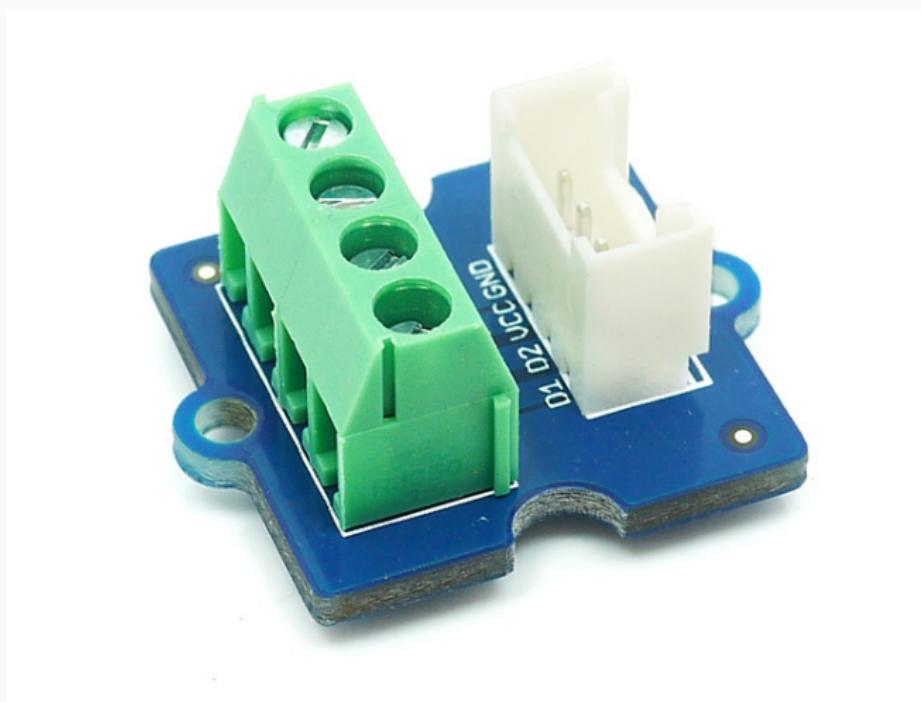
# Some Useful Connectors

RJ-XX



# Some Useful Connectors

Screw terminals



# Some Useful Connectors

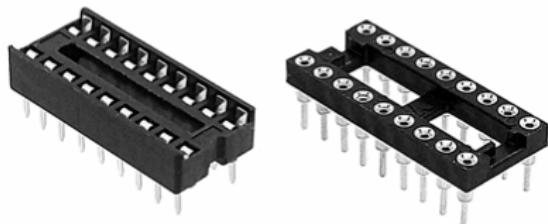
Barrel/Audio Jack



# Some Useful Connectors

## IC Sockets

Turned Pin Contact



Dual Leaf Contacts



© www.petervis.com

## Some Useful Connectors

British Naval Connector - BNC

