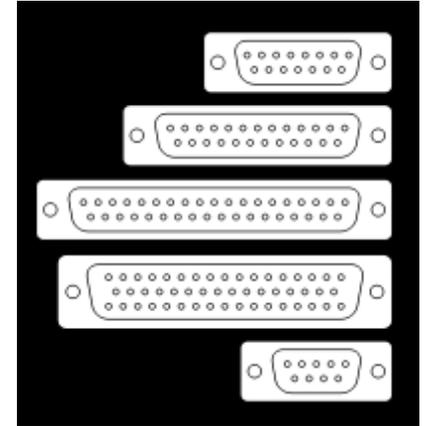


Common Types Light Aircraft Connectors

- We will cover an overview of:
 - The most common connectors we use in homebuilt and light general aviation aircraft
 - Common connector and pin configurations
 - Crimping and pin removal/insertion tools
 - Connector families we will cover
 - D-Subminiature (D-Sub)
 - Molex Pin and Socket Power Connectors
 - Molex radio tray pins
 - Tyco/AMP Mate-N-Lok
 - Tyco/AMP **Circular Plastic Connectors (CPC)**
 - ITT Cannon
 - Web Link sources for more information

D-Subminiature or D-Sub

- Parallel rows of pins or sockets surrounded by a “D” shaped metal shield
 - 5 connector shell sizes
 - 9, 15, 25, 37 and 50 pin standard configuration
 - 15, 26, 44, 62 and 78 pin high density configuration (not typically used in homebuilt or general aviation applications)
- Pins (male) and sockets (female) come in stamped and machined crimp and solder cup configuration depending on application
- Avionics applications typically use machined type pins and sockets for vibration resistance
- Pins are sized for a specific maximum wire gauge
- A very common mistake is trying to put 20AWG wire into a 22AWG pin. It will not fit! Don't do it!



D-Subminiature Pins

- Machined socket



- Machined pin



D-Subminiature Pins

- Stamped socket

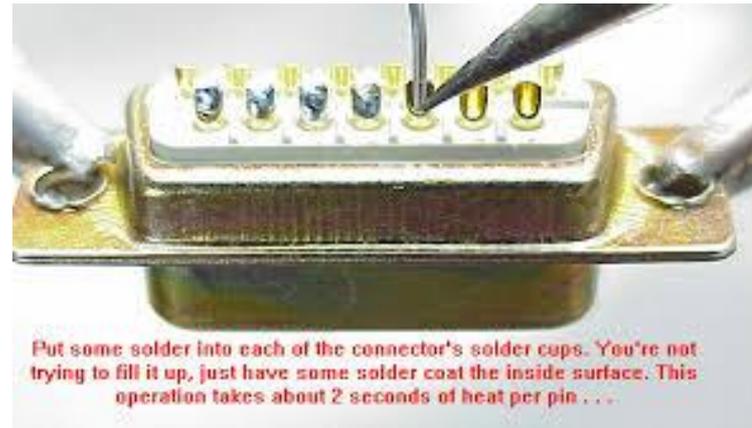


- Stamped pin



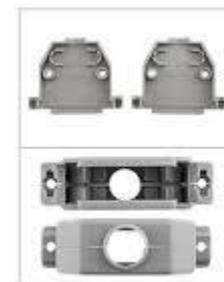
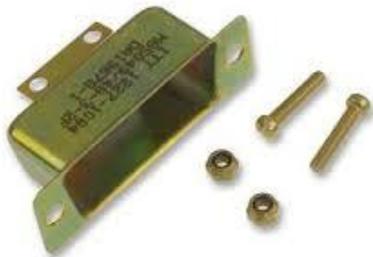
D-Subminiature Pins

- Solder cup type



Put some solder into each of the connector's solder cups. You're not trying to fill it up, just have some solder coat the inside surface. This operation takes about 2 seconds of heat per pin . . .

- These always use a “backshell” to protect and support soldered connections from vibration



D-Subminiature Tools

- The crimpers are different for stamped and machined pins
- Stamped pins are not typically used in aircraft applications
- D-Sub crimpers for machined pins have 4 dies that make 4 indentations into the pin and the depth stop on the crimper is critical
- These tools can be purchased from many different sources but you will have to make sure you have the right one for the pins and connector you have and adjust the depth stop yourself

D-Subminiature Tools

- B & C Specialty RCT-3 D-SUB Machined Pin Crimp Tool is a very good tool and comes set up with the depth stop at the right depth for the pins we use

– B&C Specialty RCT-3



- Web Link: www.bandc.biz/d-submachinedpincrimptool.aspx

D-Subminiature Tools

- There are different size tools for pin insertion and removal on standard and high density connectors and it is difficult to tell one from the other
- There is a very good article on the Aeroelectric Connection website that goes into detail about these tools
- Web Link: www.aeroelectric.com/articles/D-Sub_Pin/Pin-Extraction.html

D-Subminiature Tools

- Typical Pin Insertion/Extraction tool



- White end is for removal of pin from connector
 - There is a little bit of “technique” required to remove the pin
- Red end is for insertion of pin into connector
 - Unless you are using very fine wire (24AWG) this is almost never used
 - You just crimp the pin on the wire and push it into the connector
- Web Link: <http://www.digikey.com/product-detail/en/40-9865/367-1097-ND/3830306>

D-Subminiature Tools

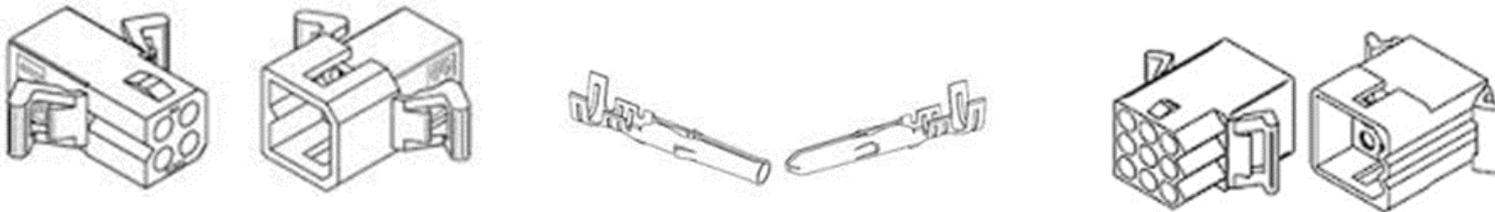
- Tyco AMP 91285-1 Insertion/Extraction tool



- Super useful tool for any type of D-Sub connector
- Has replaceable and interchangeable tips
- Can be acquired from Digikey for about \$27
- Web Link: www.digikey.com/product-search/en/tools/insertion-extraction/1245293?k=AMP%2091285-1

Molex Pin and Socket Power Connectors

- Two pin sizes 0.062" and 0.093"
- 1 to 4 rows of pins
 - Web Link: www.molex.com search on:
 - **Standard .062" Pin and Socket Connectors**
 - **Standard .093" Pin and Socket Connectors**



Molex Pin and Socket Power Connector Tools

- Molex Pin Crimpers
- Can be purchased for \$25-65 at various online sources.
- Are “Single Die non ratcheting” type requiring extra care and technique when crimping on pins

– MOLEX 63811-1000



– Waldom HT-1921



Molex Pin and Socket Power Connector Tools

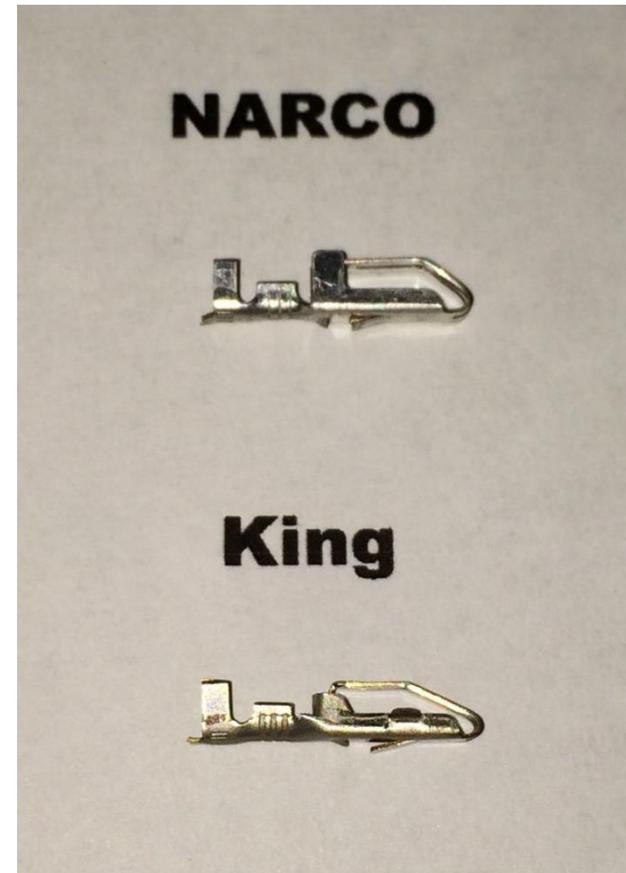
- Molex Pin Removers
- Different diameter tools for 0.062" and 0.093" pins
- Has spring loaded "pusher" to push pin out after tube releases "wings"



- Web Link: www.digikey.com search on:
 - Molex part number 11-03-0006 (for .093")
 - Molex part number 11-03-0002 (for .062")

Molex Radio Tray Connectors

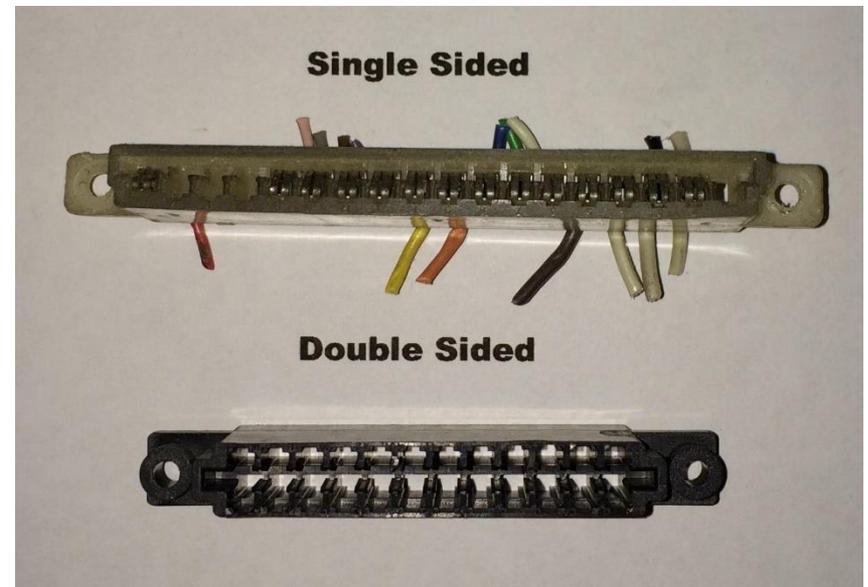
- Two pin configurations
 - VERY SUBTLE
 - One used on Narco
 - One used on Bendix King
- BE CAREFUL Not interchangeable!



- Web Link: www.molex.com search on: Molex KK Series

Molex Radio Tray Connectors

- Two connector body types
 - Pins on only one side
 - Pins on both sides



Molex Radio Tray Connector Tools

- Crimper

- Waldom HT1921 (again)



- Pin Removers

- Commercial (\$20-50) OR Reworked Bobby Pin

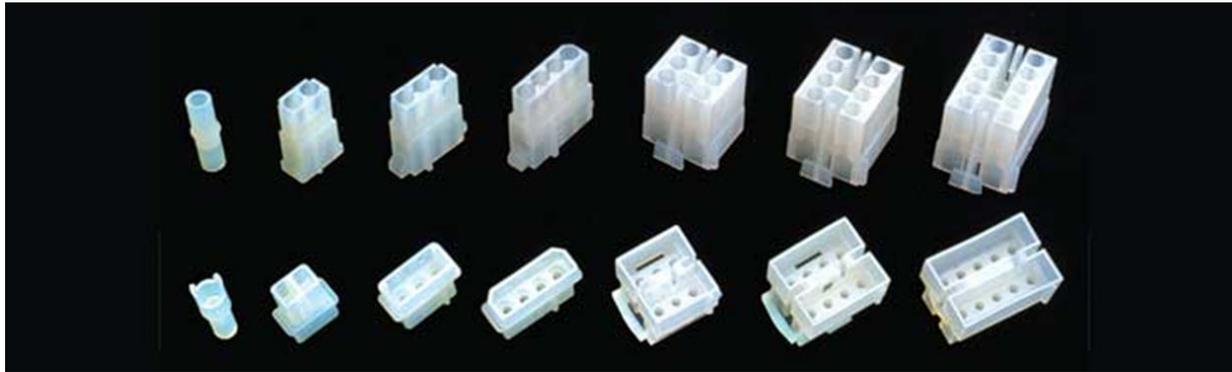


- Links:

- www.molex.com search on: Molex KK Series
- <http://www.berkut13.com/extractor.htm>

Amp/Tyco MATE-N-LOK

- Very Similar to MOLEX Pin and Socket
- Found in many certified aircraft
- Pin size 0.062" and 0.093"
- 1 to 5 rows of pins



- Web Link: www.te.com search on:
 - Commercial Pin and Socket .093
 - Commercial Pin and Socket .062

Amp/Tyco MATE-N-LOK Tools

- Crimpers

- Paladin PA-1631
- Dual Die Ratcheting



- Waldom HT-1921 (again)
- Basic single die non ratcheting



- Pin Remover

- AMP 305183



Amp/Tyco Circular Plastic Connector (CPC)

- Found in many engine monitoring systems
- Many connector configurations
- Many pin sizes
 - Web Link: www.te.com search on:
 - CPC Connectors Overview



ITT Cannon

MS A&B and E&R

- Mil Spec. connector
- Found in many certified aircraft
- Commonly used on instruments
 - Aluminum body with strain relief back shell and threaded locking ring to protect soldered pin connections from vibration
 - Pins in rubber insulator
 - Web Links:
 - www.ittcannon.com/products/ms-e-r/
 - www.ittcannon.com/products/ms-a-b/

ITT Cannon MS A&B and E&R



Conclusion

- With the right tools all of these connectors are easy to assemble and modify
- The pins and parts for these connectors are readily available from distributors on the Internet
- You must know the specific part number you are looking for
- The tools do not have to cost a fortune if you know what you are looking for
- There are many more types of Aircraft connectors than what we have covered here
- All of the information you need is available on the Internet

Links to more information

- www.aeroelectric.com
 - www.aeroelectric.com/articles/D-Sub_Pin/Pin-Extraction.html
- www.bandc.biz
 - www.bandc.biz/d-submachinedpincrimptool.aspx
- www.digikey.com
 - www.digikey.com/product-search/en/tools/insertion-extraction/1245293?k=AMP%2091285-1
 - www.digikey.com/product-detail/en/40-9865/367-1097-ND/3830306
 - Molex part number 11-03-0006
 - Molex part number 11-03-0002
- www.molex.com
 - Standard .062" Pin and Socket Power Connectors
 - Standard .093" Pin and Socket Connectors
 - Molex KK Series
 - <http://www.berkut13.com/extractor.htm>
- www.te.com
 - Commercial MATE-N-LOK
 - Commercial Pin and Socket
 - CPC Connectors Overview
- www.ittcannon.com
 - www.ittcannon.com/products/ms-e-r/
 - www.ittcannon.com/products/ms-a-b/