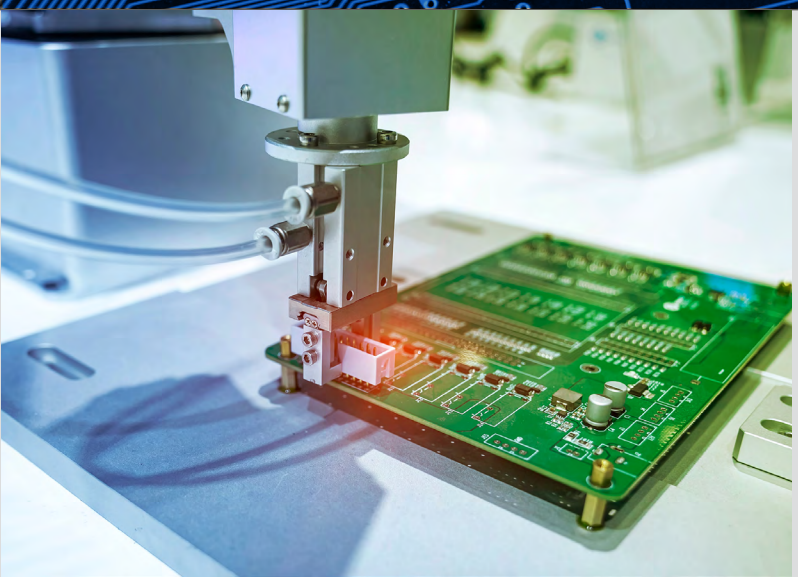
Machine Design

FAQ

Selecting PCB Connectors for Your Applications

Eliminating design challenges before they arise.



Printed circuit board (PCB) connectors are a critical component for a wide variety of applications from desktop electronics to industrial equipment and machines. Selecting the right connector for your application takes forethought and a deep understanding of needs.

Q1: Why is connector selection so important?

Like a swinging door that is broken, a connector that has exceeded its insertion or flex range can disrupt power and data from flowing into and out of the PCB properly. It also matters how your connector is attached to the board and the outside world—whether soldered directly to the board or a pluggable solution is preferred. The proper PCB connector can save time and costs for installation, maintenance, and replacement. In today's market, there are also concerns about purchasing knock-offs of popular connectors that provide substandard quality to the user. Paying attention to your connector choice early in your design can save time, money, and your reputation.

Q2: What is the most important point to consider when selecting a PCB connector?

One of the first things to take into consideration is the environment the connector will be used in when selecting the connection technology of the PCB Terminal Block–screw or spring connection. An automobile application would need to handle shock and vibration where spring type connections are preferred. Remote systems may have wider temperature concerns, while a factory floor application may need to be dust and moisture resistant. Although enclosures are often used to protect electronic components, PCB connectors can be in direct contact with the outside world, or the closest component to the outside world. Keeping the environment a priority early in your selection process will provide critical information when considering how long your connector will last in the field.

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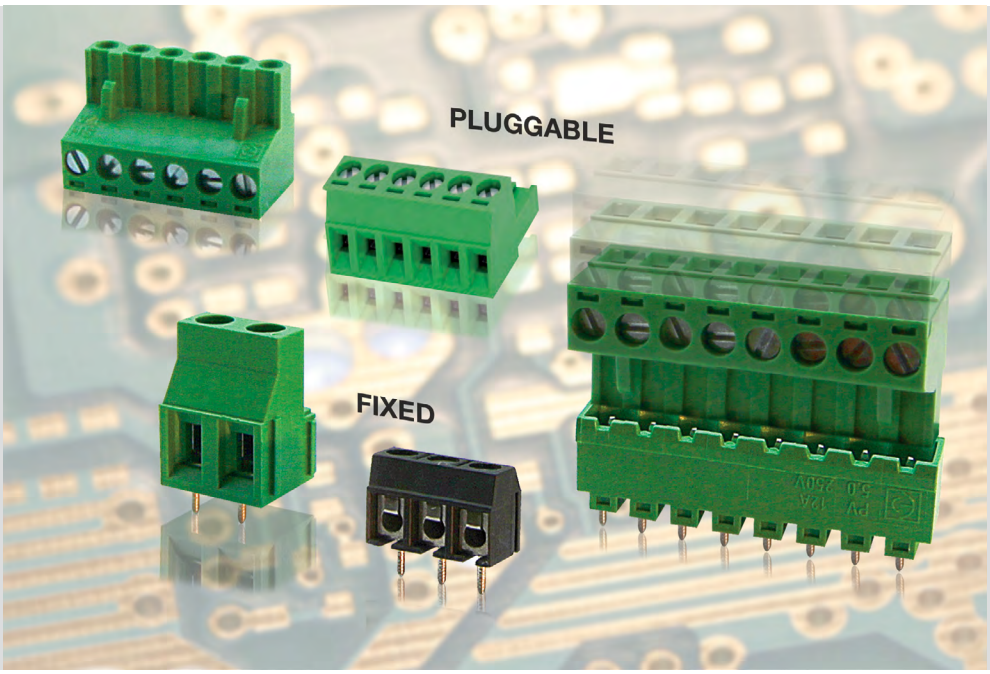
Q3: What electrical specifications should we be most concerned with?

We'll start with current ratings. This can be tricky because you'll want to know the maximum current per pin as well as a maximum current for all pins. It helps to know how many pins in a connector will be carrying current (and how much current) at any one time. If the current carried over any single pin increases, then the number of pins carrying current must decrease, and vice versa. Typically, a connector specification is provided for a defined ambient temperature, which can also affect the connector. Next, you'll want to think about the voltage rating of the connector, which depends on the spacing between contacts and insulating material used to secure the contacts in place. Balancing these two electrical specifications will help in connector selection.

Q4: Are there any other issues to consider when selecting a PCB Block?

Other valuable considerations include mechanical specifications such as the size and shape the connector needs to be. The required current and voltage ratings discussed above limit the size. Higher amperage ratings increase the size of the terminal block. Low current and voltage ratings allow for more compact board designs. Also what is the overall feel (pressure) when inserted or removed. You may have to get samples, which are often available through vendor demo kits, so you can try the connectors before purchasing hundreds of them for your application. Finally, check for existing standards that must be met. UL and IEC are the most common approvals. Knowing if your end system will be shipped out of the country may limit what connector types you can use and still be certified.



Q5: How important are the materials used to manufacture the connectors?

Very important. You'll want to be sure that all machined metal parts are electrolytically plated to increase wear, abrasion, and provide corrosion resistance. Tin-plated solder pins can satisfy the most demanding current and voltage requirements. The connector housings should provide excellent strength and temperature resistance as well and be precision-molded from some form of self-extinguishing polyamide or glass-filled polyester for safety. V0 grade plastics are very common.

Q6: What should we look for as far as labeling?

Depending on the company you decide to work with, most manufacturers incorporate some method of marking connectors to identify them. For example, Altech provides their customers the ability to order hot stamp, inkjet, or laser imprinting for permanent marking of large quantities of connectors.

Q7: Once we've decided on a connector, will there be various ways to provide them for use?

Bulk packaging in different standard packs is how they are usually supplied. Special packaging is often available for connectors to fit specific production requirements. The three basic types include tube packaging, which is used for gravity feed systems making connectors easily available for automatic placement machines; tape and reel packaging, which helps to feed components into automation machinery and eliminates orientation errors from occurring; and tray packaging, which works well with pick-and-place machines.

Q8: What other information would be helpful when selecting PCB connectors?

Consider the company you partner with. Stock levels are key when selectin a supplier. Check their standard availabilities to be sure you can get the parts you need when you need them. Be aware of how accessible company services are and that you work well with their team so you get prompt answers when you have questions. Most importantly, partner companies need to have a complete line for you to choose from so you can decrease the need for multiple vendors as your products and applications evolve.