

Power Consumption: Designing For Client Use

Maximum power consumption is specified for many standards including PCI, PMC, cPCI etc. It would be nice if the real world design issues followed the standards of the IEEE Computer Society and PCISIG. Frequently our clients have power requirements exceeding the specification for the bus they use.

Dynamic Engineering designs makes sure the voltage rails can handle anything your mezzanine card, back-plane or host may require of them. Most Dynamic Engineering boards use 2 oz. copper on power and ground planes. Planes are treated as traces when calculating current capacity; subtracting vias, and other through holes. The current rating is determined with a 10° maximum rise above ambient.

Before a design goes to fabrication, screenshots are taken of each layer, showing the calculated amperage at each bottleneck. The bottlenecks are checked against the maximum capacity of the connector in use. For many connectors the pins are rated for 1A each. The planes are tested against the maximum set by the connector limitations instead of the specification limitations to allow for “real world” usage. For example if a connector has 10 pins, we size the voltage rail for 10 amps; the specification may be much lower.

Component placement can be critical. Whenever possible, power supplies are placed at a top edge, and out from underneath any mezzanine cards on carriers.

The oversized planes and heavy plating also help with thermal conduction when over-limit cards are introduced into a system. In addition alternate cooling methods are also provided – “zero slot” fans as an example.

Our most recent development is what we call the “zero slot fan”, which is a low-profile fan that has been cut to fit within our PCI, PCIe, VME, and cPCI boards while not requiring an additional slot. Precision cut to meet height restrictions, whether mounted on the top or bottom while still providing an impressive air flow.

We also use the fans on our cPCI and VME fan boards. These fit in one slot and can be fitted with up to 12 fans, depending on your needs. If air-flow is a problem, conduction cooling may be the answer. In fact, whatever your power and cooling needs are, we can accommodate. Dynamic Engineering specializes in custom creations, and we welcome the chance to bring your ideas to life.

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Embedded Solutions