



Tower Design Engineering  
[frankd@towerde.com](mailto:frankd@towerde.com)  
 801.636.8935  
[www.towerde.com](http://www.towerde.com)

# MODULAR HARDWARE DESIGN CONCEPTS

The purpose of implementing hardware design modules is to reduce cost of developing unique hardware for an array of products and to reduce production cost, testing cost, replacement cost, and sustaining engineering costs. This approach does demand serious up front architecture considerations and product planning.

The two approaches discussed here are fundamental and are only used to illustrate the concepts; they are not meant to be comprehensive.

These three modules are unique in that the functions they perform are localized to that hardware module and can be plugged into any other “motherboard” that accepts these modules.

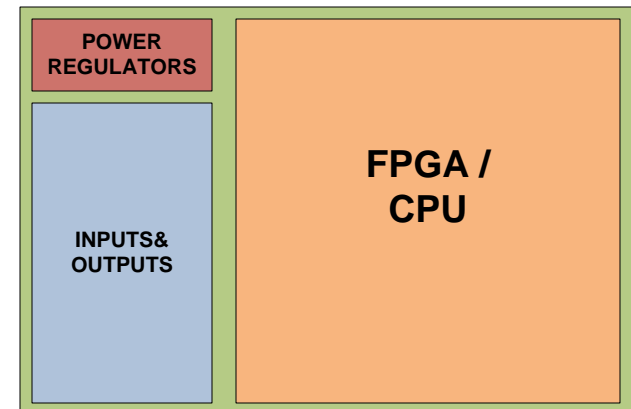
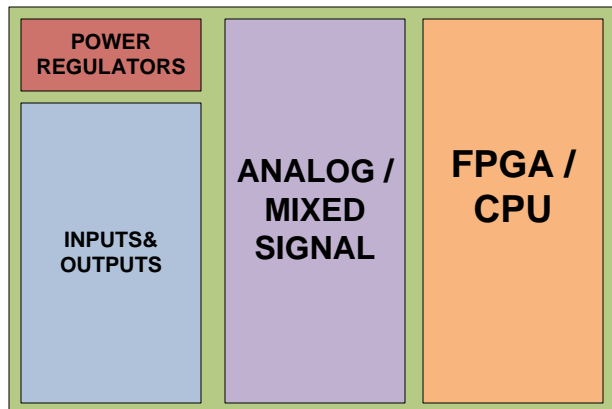
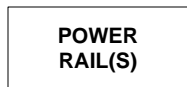
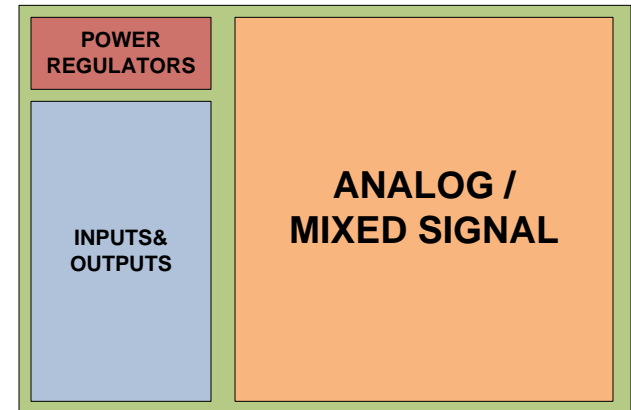
Boards must be identified to determine functionality. This can be achieved via pinout, EEPROM, logic, hardware, or handshaking.

Power becomes a consideration because of the various power a board may require, which is usually unique for each modular hardware design. In the figures on this page, the general power rail approach has been used and all the unique power regulation is done on the hardware module itself.

NOT on the module



Module **with** on board power regulation





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These modules are unique in that the functions they perform are localized to the hardware module and can be plugged into any other “motherboard” that accepts this type of module.

Boards must be identified to determine functionality. This can be achieved via pinout, EEPROM, logic, hardware, or handshaking.

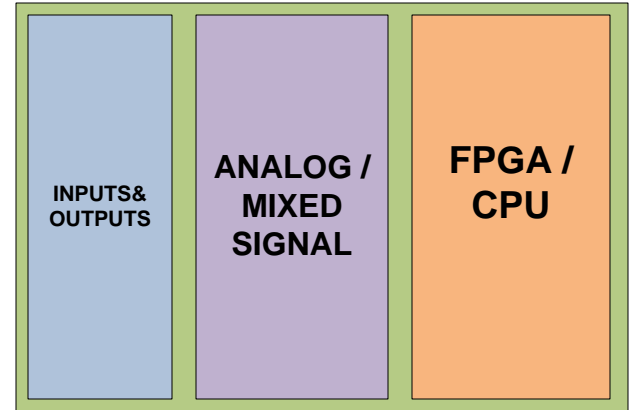
Power in this module configuration is less desirable due to lead inductance, possible rail sag on the module itself, or worse ground loops.

In the figures on this page, the direct power rail approach has been used and all the unique power regulation is done outside the hardware module itself.

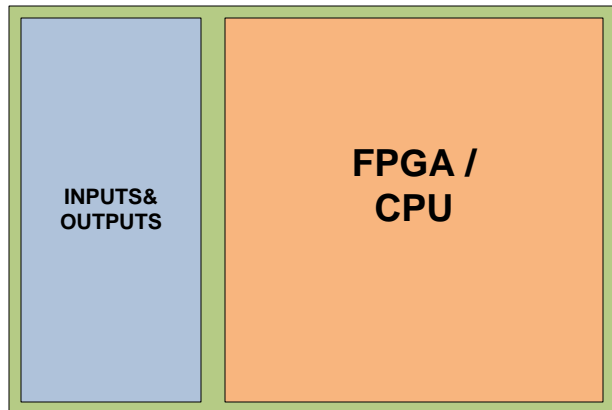
NOT on the module

POWER REGULATORS

Module **without** on board power regulation



POWER REGULATORS



POWER REGULATORS

