

**Love, Peace & Sharing:
HapsTrak enables open connectivity
in the Rapid Prototyping world!**

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Open Connectivity in Rapid Prototyping

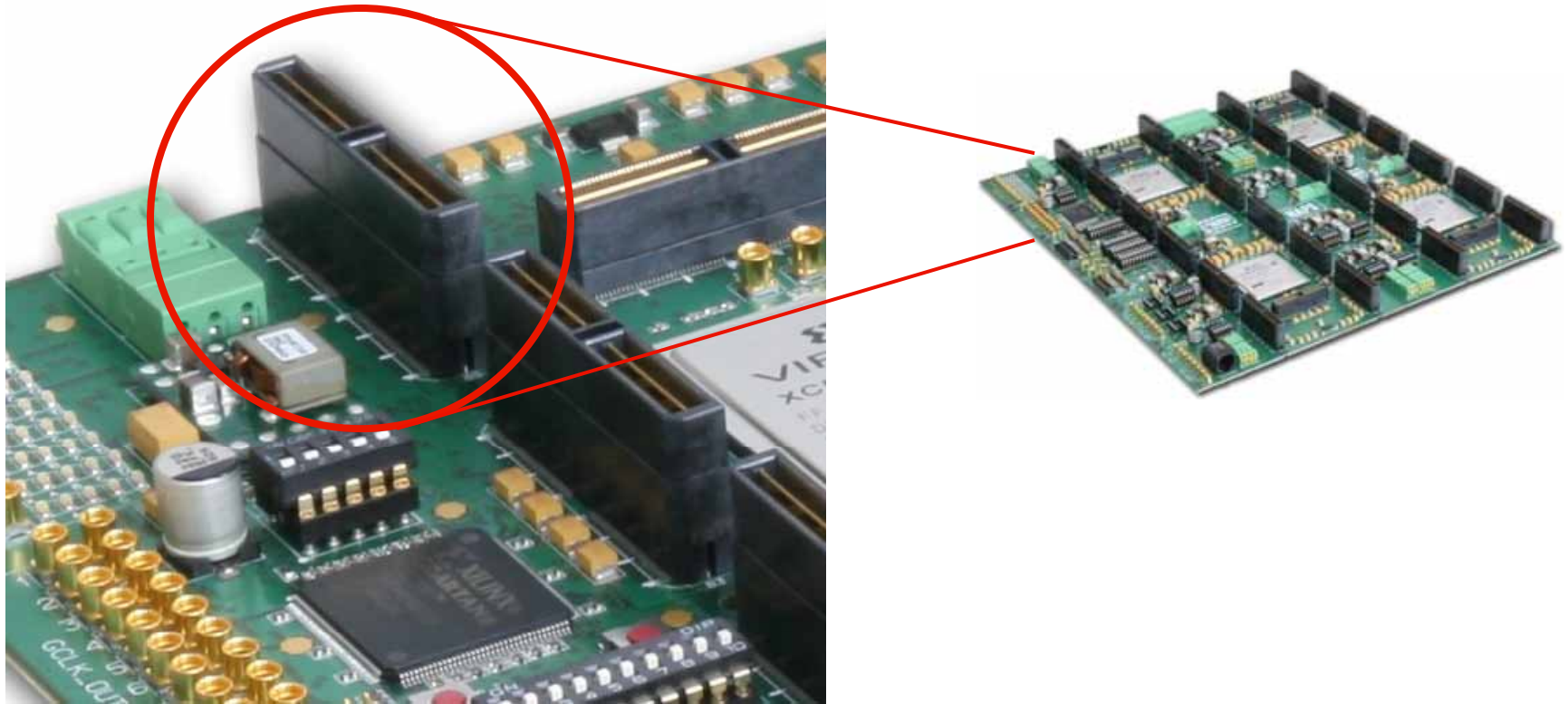
- Easily deployable and allowing integration into existing flows and environments
- Reusable for many years and for a wide variety of projects and designs
 - High ROI
- Minimize risk
 - Why build your board based on custom connectors that may change for a specific project
 - Increase time to focus on core competency
- Daughter boards are immediately available based on design requirements

Benefits of Standard IO Connectivity

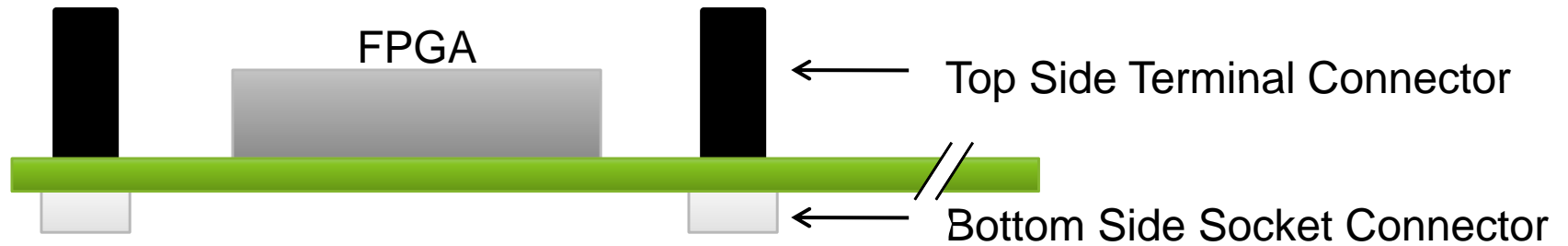
- Easily migrate to next project
- Enables users to quickly integrate special functions and system connections offered by vendors or services
- Enables users to develop their own compatible daughter boards
 - Allows prototyping system more versatile
 - Helps to protect a company's unique design and verification IP
- Expandability
 - Interface with multiple motherboards
 - Mechanical specification rules allows for stacking and efficient use of prototyping board

HapsTrak Enables Open Connectivity

- HapsTrak is an IO connector and module standard mounted on HAPS rapid prototyping motherboards and daughter boards



Connector Types



Bottom Side
* ASP-125516-03



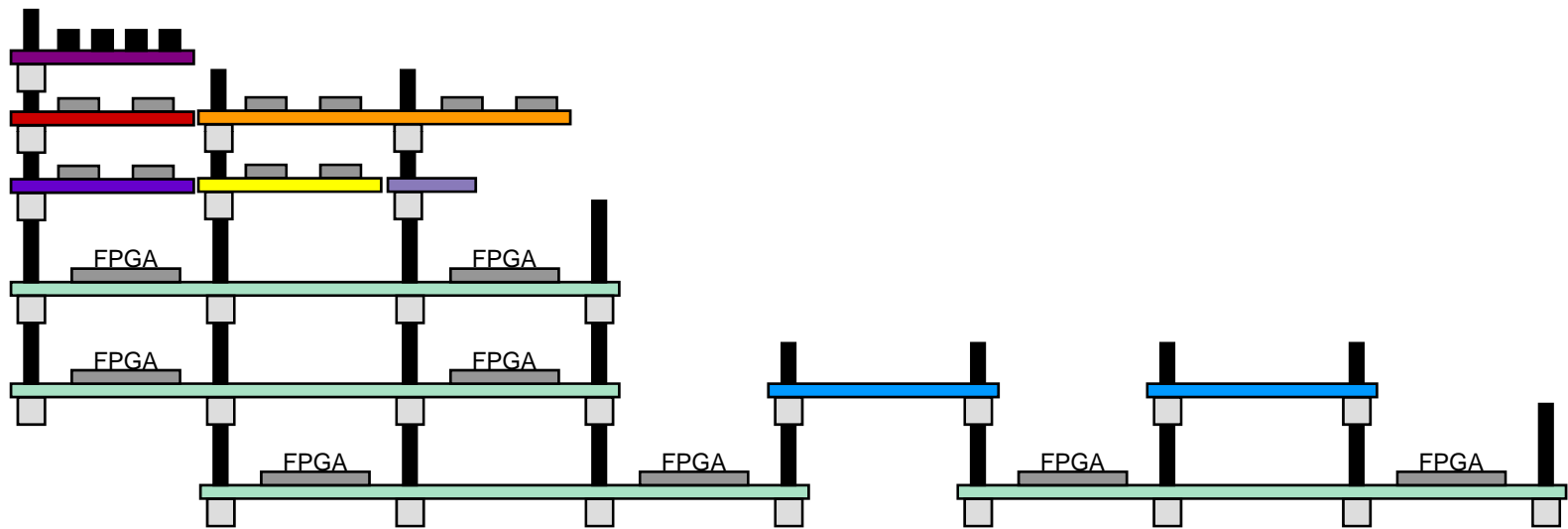
Top Side (5mm)
* ASP-132422-01



Top Side (19mm)
* ASP-125521-03

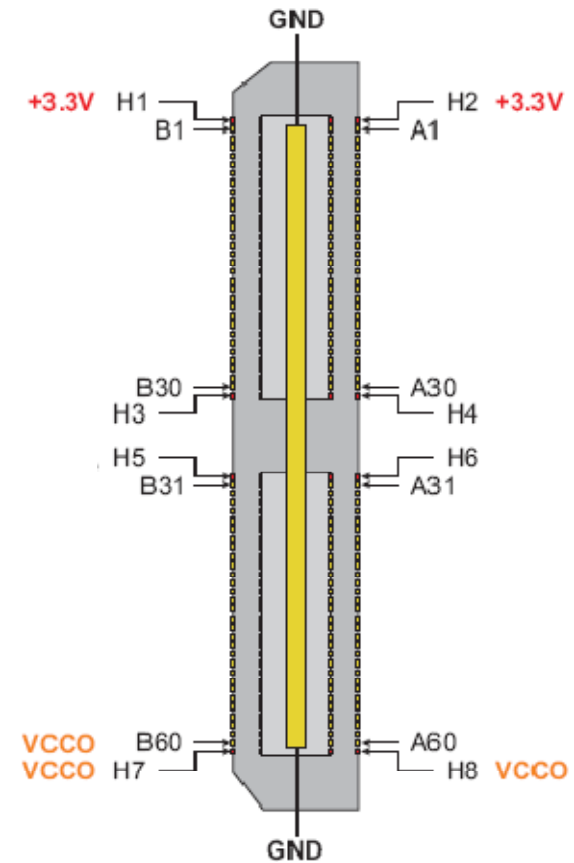
* Samtec part numbers

Expandability



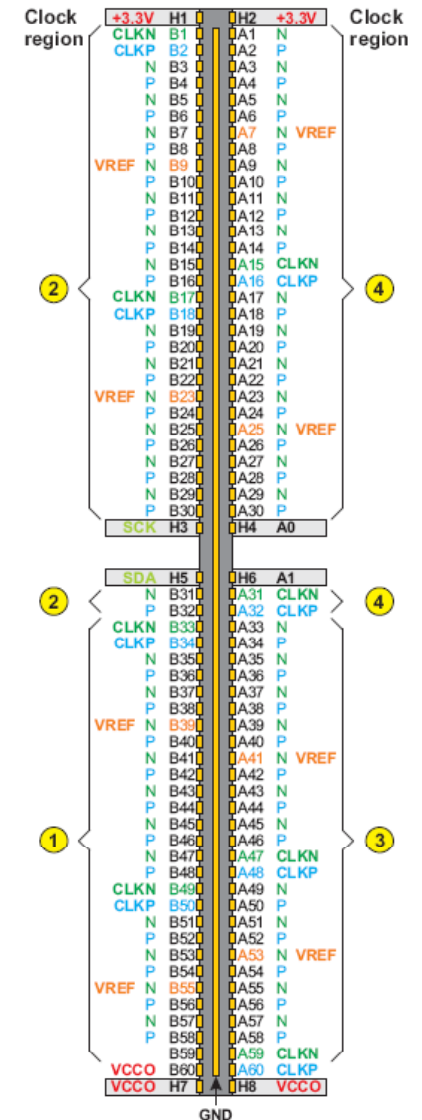
Connector Footprint

- HapsTrak I (120 pins)
 - 119 user IOs
 - 1 VCCO
- HapsTrak II (128 pins)
 - 119 user IOs
 - 3 VCCO
 - 2 +3.3V
 - 4 (H3-6) dedicated pins for board identification
- HapsTrak II is backwards compatible with HapsTrak I
- HapsTrak I daughter boards will not lose any functionality when mounted on HapsTrak II connectors



I/O Signal Details

- User IO P/N pairs
 - Capable of LVDS
- Vref pins
 - Voltage reference pins are multi purpose pins and are used as regular I/O unless certain I/O standards are used (i.e. SSTL)
- Clock capable pins (CLKN or CLKP)
 - Drive local clock trees and are specialized to be used as memory strobes or local clocks
- VCCO rail
 - I/O voltage supply to the FPGA on a motherboard
- 3.3V rail
 - Auxiliary supply to daughter boards



Enhanced HapsTrak II

- 20% - 30% faster data transfer rate
- Enhanced low profile connectors will be mounted on top of next generation board



Details and Purchase Information

- HapsTrak standard paper

http://www.samtec.com/Technical_Library/reference/articles/pdfs/HapsTrak_II.pdf

- Where to get HapsTrak

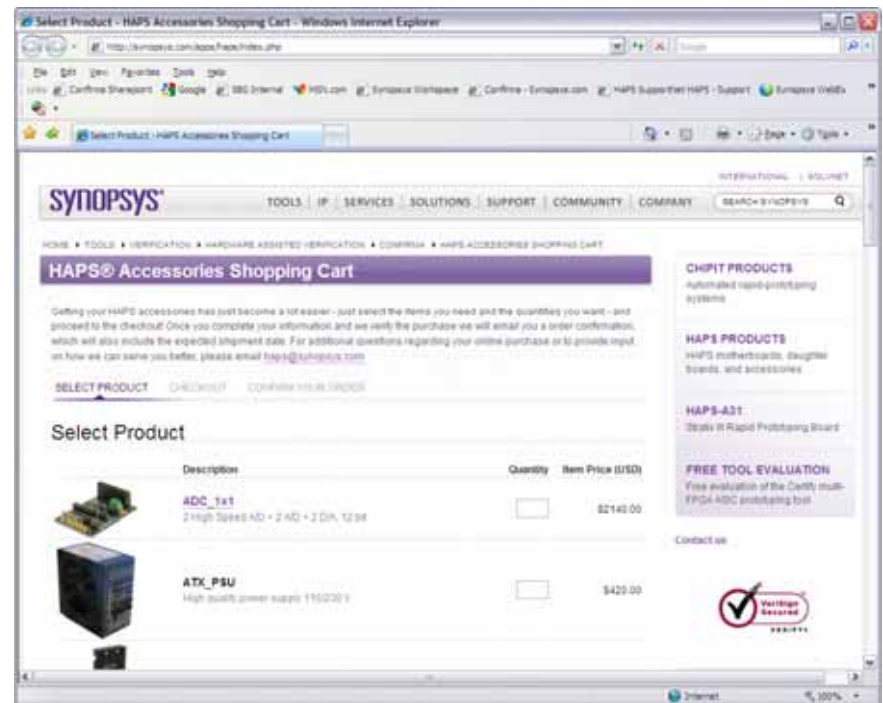
- Directly from Samtec

- ASP-125516-03
- ASP-132422-01
- ASP-125521-03

- Synopsys HAPS online shopping cart

- Synopsys contact:

- Email: Neil.Songcuan at Synopsys' email domain address



Summary

- Standard IO connector in rapid prototyping enables productivity and efficiency
- HapsTrak is a high-performance, reusable, and expandable IO connector module for rapid prototyping
- HapsTrak supports backwards and forward compatibility enabling high ROI