

"A Superior alternative for
Conventional embedded Microcontroller/ Digital Signal Processor
for Power Electronics Systems leading to faster concept to system"

HSRPEC

High Speed Reconfigurable Power Electronics Controller

A reconfigurable controller architecture (on FPGA) that can replace the conventional embedded microcontroller/ Digital Signal Processor based controller design for real time control and monitoring of Power Electronic (PE) system. Technology developed by CDAC(T), Sponsored under NaMPET.

ADVANTAGES

- ✘ Reconfigurable hardware for various PE applications.
- ✘ Reduced processor obsolescence risk.
- ✘ FPGA independent design.
- ✘ Faster performance.
- ✘ Faster concept to system design.
- ✘ Generic board design handles a variety of PE applications.

FEATURES

- ✘ Soft processor integrated reconfigurable PE Controller.
- ✘ Application dependent processor design.
- ✘ An exclusive Power Electronics specific IPs Library (PWM generator, PI, ADC, DAC Controller, SPI, UART etc).
- ✘ Custom made instructions/functions for PE IP Library.
- ✘ Explores the idea of Hardware parallel processing than software pipelining.
- ✘ Reduced software/coding overhead.

KNOWHOW

- ✘ How to integrate a processor IP in FPGA.
- ✘ How to develop custom IP peripheral for processor.
- ✘ How to develop POSIX compatible APIs for processor.
- ✘ How to develop real time control application in HSRPEC.

CONTROLLER CARD: Fixed design hardware for variety of PE control applications

INTERFACE CARD: Interface Card interfaces the controller to the Power Electronic systems

FPGA : Cyclone III EP3C25E144C8N (24,624 LEs)
On chip Memory: 64 kBytes (inside FPGA)
Flash memory : 2 MB
Digital I/Os : 55 No.s (3.3-V LVTTTL)
Host Interface : JTAG
Supply voltage : 3.3 V

Analog Input: +10V (ADC 13 bit 8 Channel, SPI interface)
Analog Output: +3.3V (DAC 12 bit 8 channel, SPI interface)
Digital Input : +5 V 2 no.s
Digital Output : +5 V 12 no.s
Supply voltage: 12 V
"Custom design for interface card is also possible depending on the Application."



Technology Transfer Centre (TTC), Power Electronics Group

Centre for Development of Advanced Computing

Vellayambalam, Thiruvananthapuram, Kerala - 695 033

Tel: +91-471-2723333, 2723226 Fax: +91-471-2722230, 2723456,

email: peg@cdac.in Website: www.nampet.in



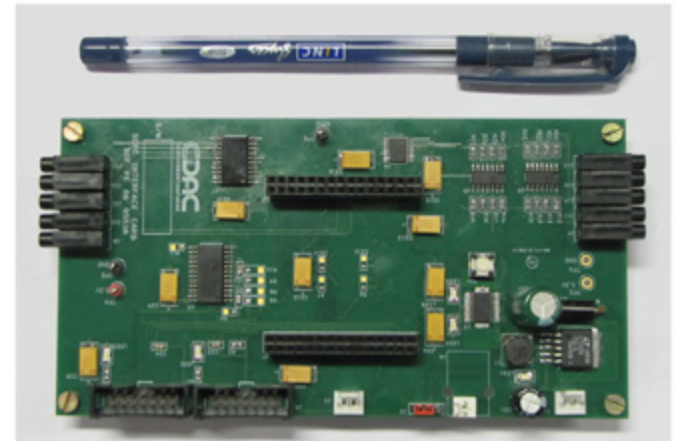


← Controller Card

Interface Card



← AC Drive with HSRPE Controller



Potential Application Areas

As a Digital Controller for

1. Solar MPPT Applications
2. High Frequency Inverter
3. High Performance AC Drive
4. DC Drive
5. UPS
6. DC-DC Converters
7. Multi level Inverters
8. Interleaved DC-DC Converters
9. Cyclo Converters
10. Matrix Converters
11. Smart metering
12. Power Factor Correction (PFC)
13. Power Quality Applications
14. Controller with Custom/standard Communication Protocol