K7 Prodigy Logic Module

Don't Let Cost of FPGA-Based Prototyping be your SoC Design Bottleneck

Delivering Rapid SoC Prototyping
Solutions Since 2003

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S2C K7 Prodigy Logic Module Series

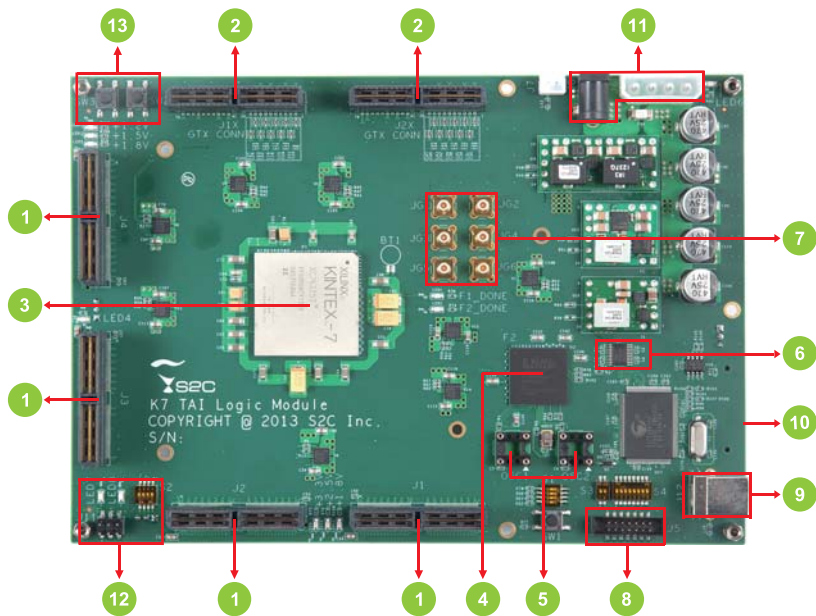## Low-Cost Fifth Generation Rapid FPGA-based Prototyping Hardware

The S2C K7 Prodigy™ Logic Module is equipped with one Xilinx Kintex-7 XC7K410T or XC7K325T FPGA device and can prototype a design with a capacity up to 4.1M gates. The K7 Prodigy Logic Module features the largest number of user I/Os in its class with 432 I/Os on four Dedicated I/O connectors and 16 channels of GTX transceivers on two Differential I/O connectors. The GTX transceivers are capable of running up to 10Gbps with -2 grade FPGA devices. Users can easily download to FPGAs, generate programmable clocks, adjust I/O voltages and run self-tests on hardware from S2C's Prodigy Player Pro Runtime Software via a straightforward USB2.0 interface.

With the S2C K7 Prodigy Logic Module's affordable pricing, project managers can deploy a large number of FPGA-based prototypes to accelerate hardware verification and software development in parallel.

K7 Prodigy Logic Module Configuration Table		
	XC7K410T	**XC7K325T**
ASIC Logic Gates (Max)	4.1M	3.2M
FPGA Memory	28Mbits	16Mbits
DDR3 Memory	Optional 1GB*	Optional 1GB*
DDR2 Memory	Optional 1GB*	Optional 1GB*
Global Clocks	4	4
External I/O	432	432
Gigabit Transceivers	16	16
GPIO	12	12

Extended through optional 1GB DDR3 or DDR2 memory module on J4 Dedicated I/O connector

In addition, the S2C K7 Prodigy Logic Module series has a similar footprint to S2C's high design capacity series, V7 Prodigy Logic Modules, and therefore K7 Prodigy Logic Modules can also be used to prototype a subset of SoC designs targeted on V7 Prodigy Logic Modules in parallel to shorten time-to-market of larger SoC designs.

1. Dedicated I/O
2. Differential I/O
3. Kintex-7 325T/410T
4. LM Controller
5. OSC Sockets
6. Programmable Clocks
7. SMB Clocks
8. JTAG
9. USB Interface to PC
10. SD Card for Download (Backside)
11. Power Inputs
12. GPIO
13. Resets

Large Capacity

• Up to 4.1M ASIC gates
• Up to 28Mbits of FPGA internal memory
• Up to 1540 embedded 18X18 multipliers

High Speed Transceivers

• 16 GTX Gigabit Transceivers can run up to 10Gbps through 2 high-speed Differential I/O connectors
• Each Differential I/O connector has 8 channels of GTX transceivers and 12 single-ended I/O for control signals

Flexible & Powerful I/O

• Each FPGA can access up to 432 I/O through 4 Dedicated I/O connectors
• The HP (high performance) Dedicated I/O connector is fully populated with 120 I/O and I/O voltage can be adjusted to 1.2V, 1.5V or 1.8V
• Two HR (high range) Dedicated I/O connector is fully populated with 120 I/O and I/O voltage can be adjusted to 1.8V, 2.5V or 3.3V
• One HR I/O connector has 72 I/O and I/O voltage can be adjusted to 2.5V
• Dedicated I/O voltages are adjusted through runtime software in GUI

High Performance

• Up to 60W power for FPGA
• Equal trace length for I/Os from same I/O connector
• Optional 1GB 32-bit DDR3 memory module at up to 667Mbps or 1GB 32-bit DDR2 memory module at up to 400Mbps data rate

Advanced Global Clock & Reset Management

• 2 single-ended global clocks can be selected from:
   - 2 programmable clock source (1-195MHz)
   - 2 oscillator sockets
· 2 pairs of differential global clocks from SMB connectors
· Clocks are programmed conveniently in S2C TAI Player runtime software
· 1 design clock can be output through SMB connector
· 2 global resets can be triggered from push-buttons

Ease-of-Use

• Multiple FPGA configuration options through USB2.0 Port, JTAG and SD Card
• Less than 1 second FPGA configuration through SD card
• Runtime features include self-test, clock generation, setting I/O voltage, read hardware status through software
• User Test Area – LEDs, Push Buttons, Switches and GPIO Headers for testing and debugging
• Use many off-the shelf pre-tested daughter boards
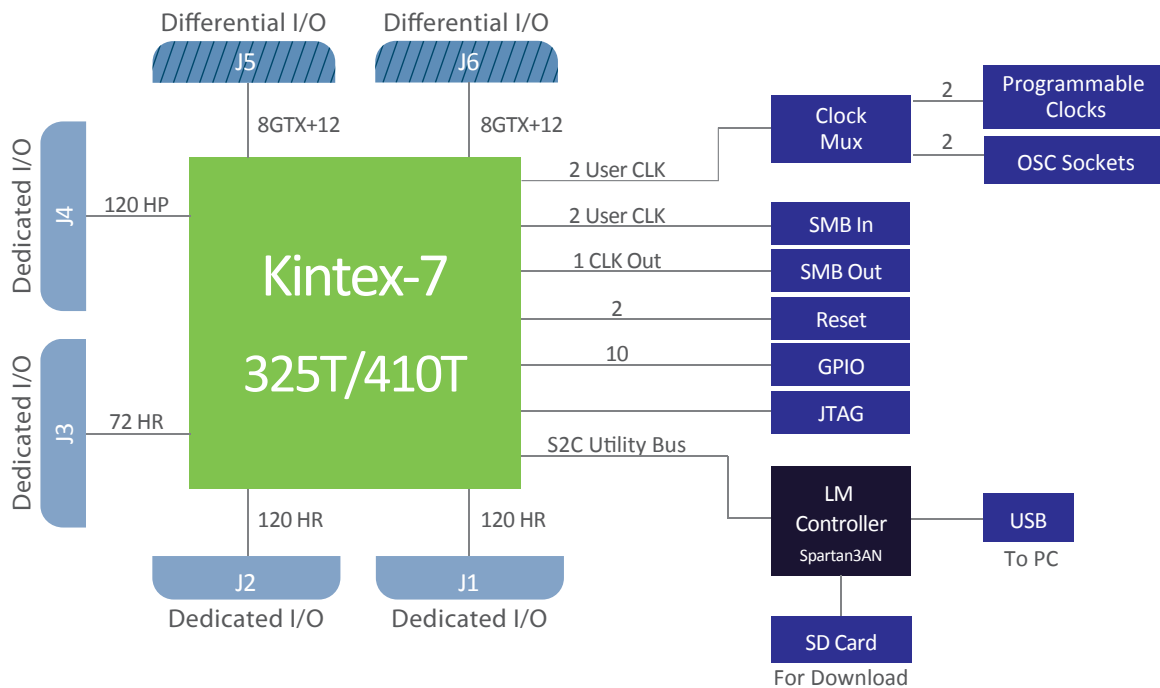
Prodigy™ Player Pro™ Software

Your Prototype Design and Debug Cockpit

All S2C K7 Prodigy Logic Modules are shipped with our state-of-art Prodigy Player Pro Runtime software for FREE. You can exercise full control over the S2C Prodigy Logic Modules from Linux or Windows machines through the USB port without being a hardware expert.
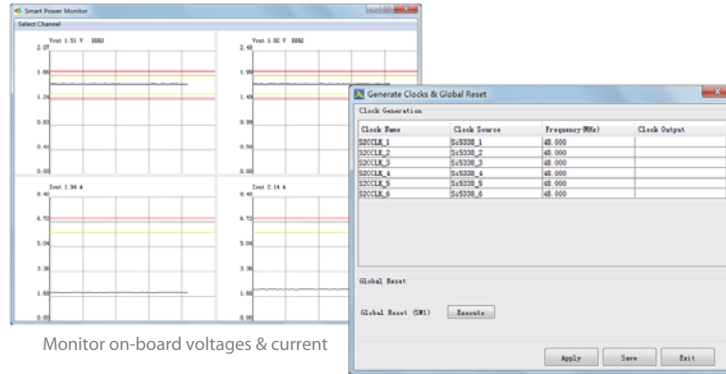

Monitor on-board voltages & current

Program on-board clock frequencies

- Control hardware through USB2.0
- Download designs to FPGA conveniently from Prodigy Player Pro software
- Make SD card for standalone FPGA download
- Run self-test for all I/Os and clocks
- Select global clock sources and assign on-board programmable clock frequencies
- Monitor on-board voltage, current and temperature
- Read back on-board global clock frequencies
- Adjust I/O voltages through software

K7 Prodigy Logic Modules are available with our popular FPGA I/O assignment tool for FREE. Instead of going through datasheets and manually creating I/O assignment files for FPGAs, users can now make I/O assignments in a graphical user interface to save time and avoid errors.
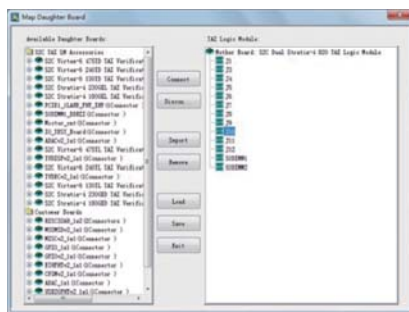

Map Daughter Boards
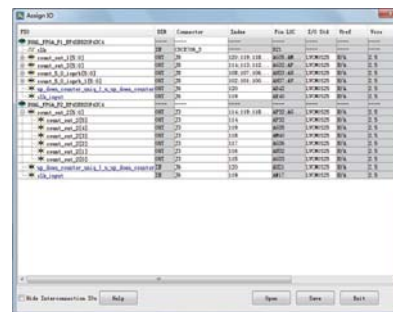
Assign I/O

ProtoBridge™ C-API and DPI

Links to Simulators and C/C++ Models

S2C's ProtoBridge facilitates a high-speed bridge between the users' verification and FPGA-based prototyping environments. ProtoBridge C-API software enables designers to read and write data from computers to designs mapped to K7 TAI Logic Modules through the AXI Bus protocol. ProtoBridge DPI software enables designers to link designs mapped to K7 TAI Logic Modules from test benches written in System Verilog. Users can read and write data at speeds of up to 100MB/s in DMA mode. Data is transferred between the computer and the FPGAs through the x4 PCIe Gen2 interface.

X4 PCIe Gen2

User Design in
K7 TAI Logic Module
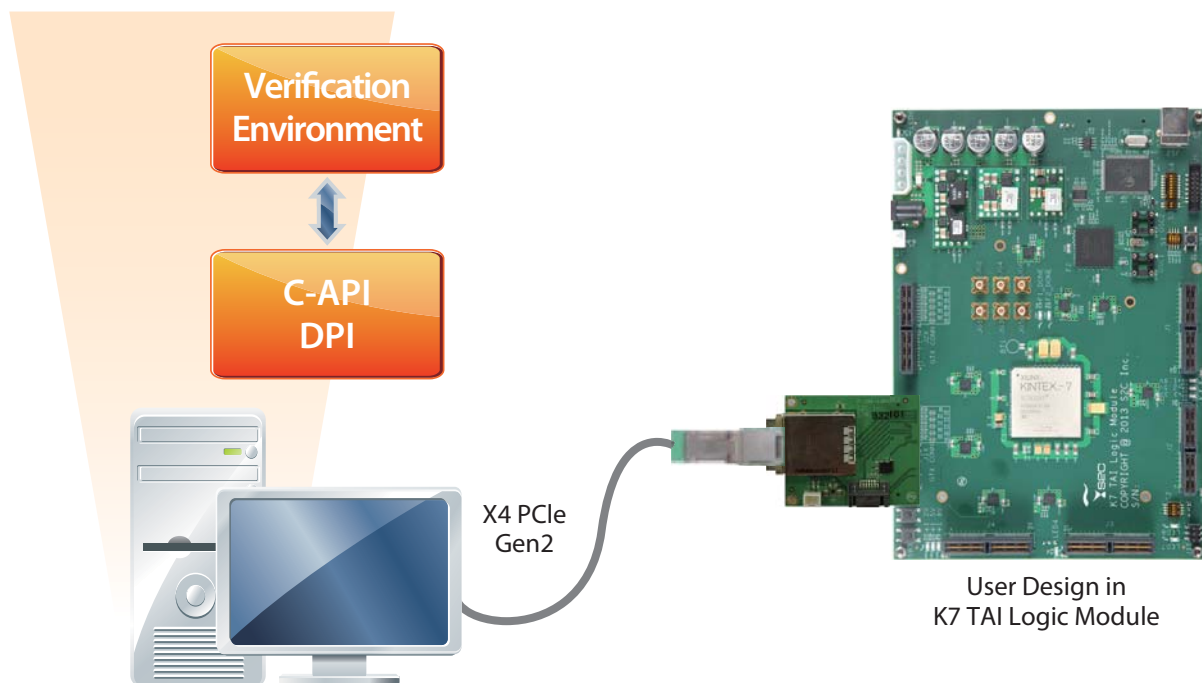
ProtoBridge C-API

• Access AXI-based IP in FPGA from host computer
• Provide a set of C-API calls to perform AXI bus functions
• Instantiate AXI master device in user's design
• Read and write at up to 100MB/s
• Set up easily with an example design

ProtoBridge DPI

• Link to System Verilog simulations
• Supports both cycle-based and transaction-based modes
• Facilitate early block-level verification
• Orders of magnitude faster than software simulations

Prodigy™ Prototype Ready™ IP and Acessories

S2C provides a large library of off-the-shelf interfaces and accessories for K7 Prodigy Logic Modules to further speed up and simplify your system prototyping process. The accessory modules can be either plugged on top of Prodigy Logic Module as daughter boards or can be mounted to Prodigy Logic Modules as Mother boards. S2C also provides services to customize interface and accessory modules for your applications.

General Peripherals

- Mictor Interface Module
- D-Max Interface Module
- Processor Peripheral Module
- USB 2.0 PHY Interface Module
- PCIe x1 PHY Interface Module
- 2 Channel PCIe x8 Gen2 Root Complex Module
- PCI Interface Module
- 2 Channel PCI Master Interface Module
- Gigabit Ethernet PHY Interface Module
- 2 Channel Gigabit Ethernet PHY Interface Module
- FTDI Interface Module
- 2 Channel High Speed A/D and D/A Module

High Speed GTX Peripherals

- 4-Lane PCIe Gen2 and SATA GTX Module
- 2 Channel CX4 Module
- 4 Channel SFP+ 10GbE Module
- QSFP+ 40GbE Module
- 4 Channel Transceivers on SMA GTX Module
- SMA2SATA Module

Memory Modules

- 9Mbyte SRAM Module
- 9MB No Bus Latency SRAM Module
- 1GB DDR2 Pre-tested Memory Module
- 1GB DDR3 Pre-tested Memory Module
- SPI Flash Memory Module
- 2 Channel 128MB NOR Flash Memory Module
- Multi-Function Flash Memory Module

ARM Processors

- ARM926 Test Chip Module
- ARM1176 Test Chip Module
- Xilinx Zynq ZC702 Interface Module

Embedded & Multimedia

- TV Decoder Module
- TV Encoder Module
- Audio Interface Module
- DVI Input Interface Module
- DVI Output Interface Module
- VGA interface module
- HDMI Transmitter Interface Module
- Embedded Peripheral Interface Module Type A
- Embedded Peripheral Interface Module Type B

Expansions & Accessories

- Global Clocks Management Module
- Interconnection Module Type A
- Interconnection Module Type B
- Third Party Interface Module (Dual)
- Third Party Interface Module (Single)
- Connector Spacer-1 Module
- Connector Spacer-5 Module
- I/O Level Shifting Module Type C
- I/O Level Shifting Module Type D
- I/O Testing Module
- GTX I/O Testing Module
- Power Expansion Module
- Prodigy Logic Module I/O Connector
- Prodigy Logic Module I/O Cable
- Xilinx Download Cable
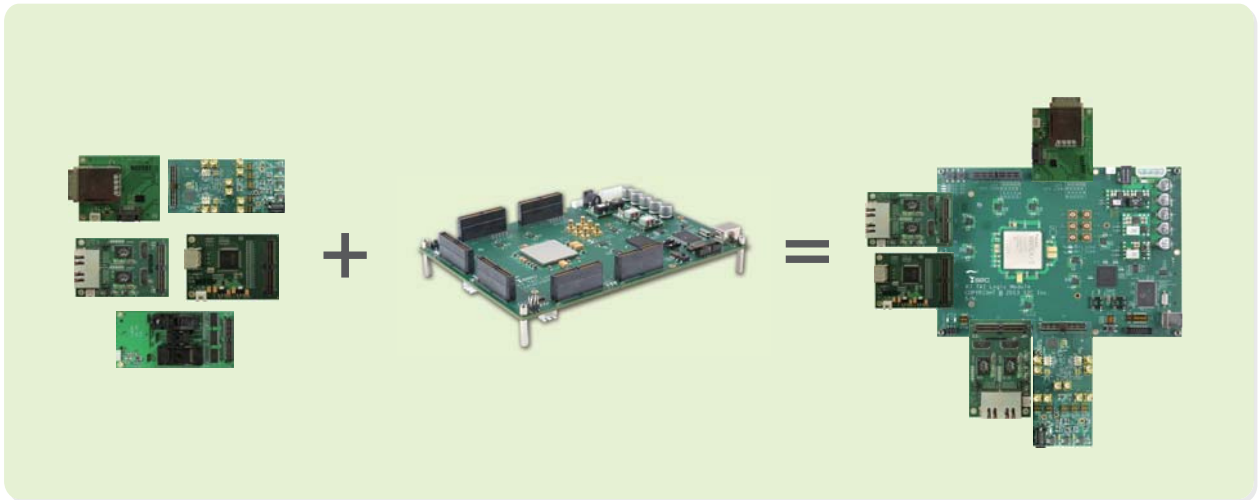
Popular Interface Modules

4-Lane PCIe Gen2 GTX Module

Enables user designs in TAI Logic Modules with GTX I/O connectors to interface to 4-lane PCI Express Gen 2 devices

2 Channel Gigabit Ethernet PHY Interface Module

Enables user to interface to 2 external 10/100/1000 Ethernet PHY through Marvell's 88E1111 chips

Xilinx Zynq ZC702 Interface Module

Enables user designs in TAI Logic Modules to interface to Xilinx ZC702 Evaluation kit

Multi-Function Flash Memory Module

Supports one NAND Flash socket, one SPI Flash socket, one I2C EEPROM socket and one SD card socket.

2 Channel High Speed A/D and D/A Module

Provides two 14-bit Analog to Digital (A/D) converter channels and two 14-bit Digital to Analog (D/A) converter channels.

HDMI Transmitter Interface Module

Supports 12-bit Deep Color operation to all video formats up to 1080p

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