

**Close to 400M ASIC gates**

# Prodigy Logic Matrix LX2

## A New Benchmark in High-performance & High-density Prototyping



### **Robust**

Space saving & lower cost  
of ownership



### **Hierarchical**

Multi-system & multi-rack  
expansion



### **High Density**

Up to 64 FPGAs in standard  
server rack

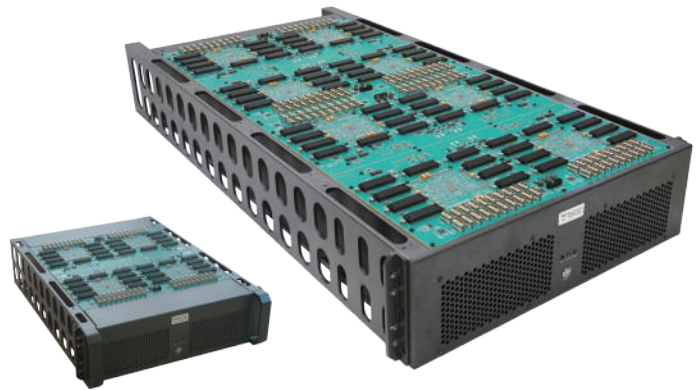
# Prodigy LX2 Enterprise Prototyping System

## High-performance full system validation and software development solution

The Prodigy LX2 Enterprise Prototyping System provides industry-leading performance and capacity. It integrates the scalable prototyping hardware, with Player Pro - RunTime, a real time control software, to meet the verification requirements for a wide range of applications. Prodigy LX2 is part of S2C's Prodigy Complete Prototyping Solution which consist of Player Pro - CompileTime, an automatic prototyping compile tool; Player Pro - DebugTime, a deep trace debugging tool; ProtoBridge AXI, an FPGA-assisted verification tool; and Neuro, a cloud-based management tool, plus a rich portfolio of Prototype Ready IP – all designed to accelerate the prototyping process.

### Highlights

- Industry leading capacity, supports nearly 400M ASIC gates per LX2
- Flexible topology structure and multi-level interconnection capability, increases prototype performance
- Modular design to ease deployment, expansion and maintenance
- Rich validation tool supports to shorten prototype setup time
- Enterprise-based management & control tool to manage prototyping systems, users and projects
- Application Scenarios: Early Software Development, Full system validation and Regression Test



### Features

The LX2, S2C's new generation of Logic Matrix uses an advanced structure of "Logic Matrix → Rack → Cluster" which can expand to billions of ASIC gates. The LX2 is currently fulfilling the most demanding prototyping requirements in a wide variety of applications including 5G, AI, ML and GPU.

#### Large Capacity and Scalability

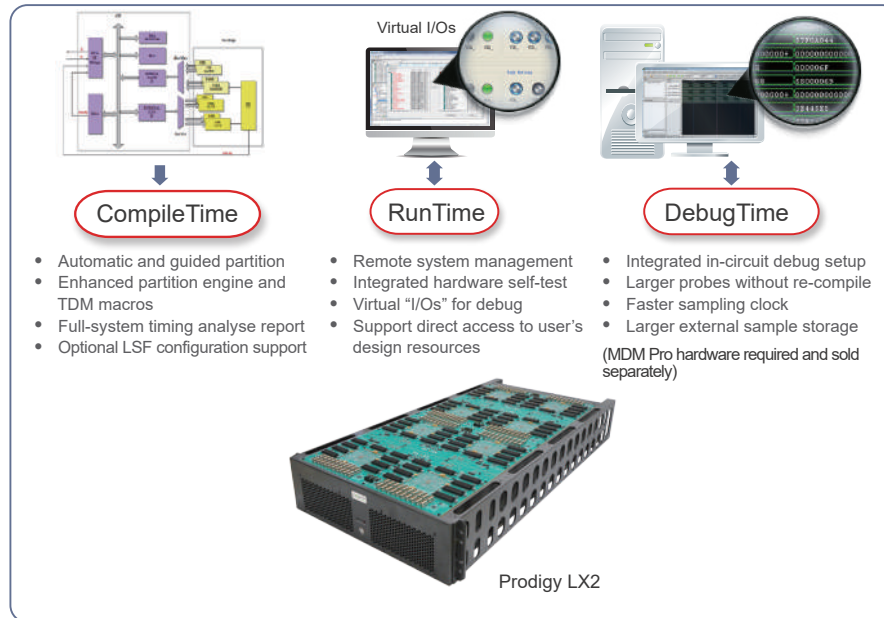
- The LX2 is equipped with 8 Xilinx Virtex UltraScale+ VU19P FPGA, and supports up to:
  - 71.5M System Logic Cells
  - 1,327.2Mb Internal Memory
  - 30,720 DSP Slice
- Scales to large setups, 8 LX2 in a standard 42U rack, up to 64 VU19P FPGAs
- Multi-racks can be cascaded to achieve even larger capacities

#### High Reliability

- High-speed I/O connectors with secure screw-lock design; hardware self-test, and real-time monitoring system
- Redundant power supply design allows switching supplies without interruption
- High-efficiency heatsink and cooling fan with PWM functions

#### Flexible topology structure and multi-level interconnection capability

- Advanced Clock Management
  - Each Logic Matrix supports 12 global clock inputs, 3 global clock outputs and 4 global resets
  - Dedicated global clocks and resets control module, synchronizes the clocks and resets in the server rack or across the server racks
- Rich interconnection resources in LX2
  - 11,648 GPIO and 640 GTY transceivers
  - Each GTY transceiver can run up to 28Gbps
- Fast system deployment capabilities
  - Prodigy cables and MCIO cables
  - High performance interconnection boards
  - Simplify the deployment in the server rack or across the server racks



### Player Pro-CT - Automatic Prototyping Compile Tool

Player Pro Compile Time provides an easy-to-use integrated GUI environment and Tcl interface which makes it easy to take an existing design, compile it, partition it into multiple-FPGAs, place & route and generate the individual bin files.

- Full-automatic or user-guided design partition into FPGA logic matrix
- Multiple TDM mode support including SSTL, LVDS and SerDes
- Automatic signal pre-qualification and TDM logic insertion to achieve better performance
- System timing report facilitates quickly analyzing and optimizing system performance
- Supports bus identification partition to achieve optimal high-speed prototyping

### Player Pro-DT - Deep Trace Debugging Tool

The capability of system debugging and troubleshooting directly affects the project progress. Player Pro-DT supports concurrent debugging of multiple FPGAs with no need to consume FPGA internal memory.

- Supports two modes including compile and IP modes
- Trace up to 128K probes in 8 groups of 16K probes each
- Sampling frequency at speeds up to 125MHz
- Store up to 64GB of waveform data externally
- Sampling data supports various standard formats for debug and analysis

### Player Pro-RT - Remote Management Tool

Player Pro-RT provides an integrated GUI environment and Tcl interface that helps users remotely monitor and control their prototyping systems through Ethernet or USB port.

#### Remote Control through USB or Ethernet

- Automatic detection of cables and daughter cards when plugged in
- Easy setting or monitoring I/O voltage and fan speed
- Remotely open, shut down or reboot the prototyping system

#### Concise GUI makes the configuration easier

- Download the design to FPGAs through USB or Ethernet
- Supports reading or writing the design to an SD card, and download it from an SD card
- Supports multiple programmable clocks and I/O voltage settings

#### Powerful Debugging features, easy interacting with DUT

- Virtual I/Os to configure or detect the design status
- Virtual UARTs for firmware debugging
- NT bus for direct access to user design resources

## ProtoBridge AXI - High-bandwidth PC-to-DUT Connectivity

ProtoBridge AXI provides a high throughput channel between the host PC and DUT through PCIe interface. It delivers:

- AXI-4 bus protocol between host PC and FPGA
- 8-lane PCIe Gen3 as the physical transmission channel
- Rich coverage of C-API function calls
- Massive data transfer from host PC to FPGA up to 4,000MB/s

The ProtoBridge AXI package includes hardware logic IP, plus drivers and APIs. It supports data transfer through the LX2 system, and offers an easy solution for software and hardware co-verification applications.

## Prototype Ready IP

S2C offers a rich portfolio of daughter boards to help quickly implement your prototyping targets including MIPI, PCIe, HDMI, USB, DDR4/DDR3, QSFP+, and more. These have been used to address a broad range of applications including artificial intelligence, high-performance computing, digital signal processing, graph processing, data storage, IoT, data communications, medical devices, automotive electronics, and other market segments. S2C also provides a series of reference designs to accelerate integration and validation of complex systems, saving both prototyping costs and resources.

## Configuration Table



	LX2-M1	LX2-M2	LX2-P3	LX2-P4
<b>FPGA Count</b>	2	4	6	8
<b>System Logic Cell (K)</b>	17,876	35,752	53,628	71,504
<b>Estimated ASIC Gates (M)</b>	98	196	294	392
<b>FPGA Memory (Mb)</b>	331.8	663.6	995.4	1327.2
<b>DSP Slices</b>	7,680	15,360	23,040	30,720
<b>User I/Os</b>	2,912	5,824	8,736	11,648
<b>Prodigy Connectors<sup>1</sup></b>	18	36	54	72
<b>MCIO Connectors<sup>2</sup></b>	40	80	120	160

<sup>1</sup> Each Prodigy Connector provides 144 single-ended/72 LVDS pairs

<sup>2</sup> Each MCIO Connector provides 4 GTY transceivers and 8 GPIOs