



# Product Selection Guide

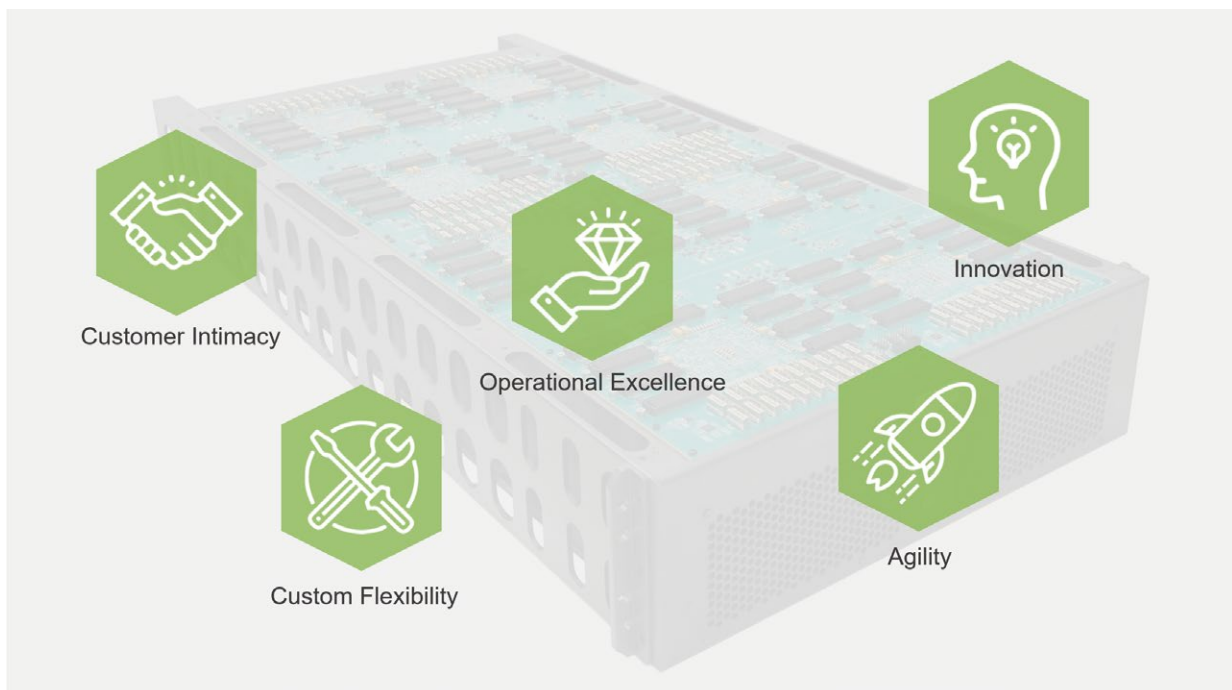
Paving the Way to Digital Innovation

## Company

S2C is a leading global supplier of FPGA prototyping solutions for today's innovative SoC and ASIC designs, now with the second largest share of the global prototyping market. S2C has been successfully delivering rapid SoC prototyping solutions since 2003. With over 600 customers, including 6 of the world's top 10 semiconductor companies, our world-class engineering team and customer-centric sales team are experts at addressing our customer's SoC and ASIC verification needs. S2C has offices and sales representatives in the US, Europe, mainland China, Hong Kong, Korea and Japan.



## Core Competencies



# Product

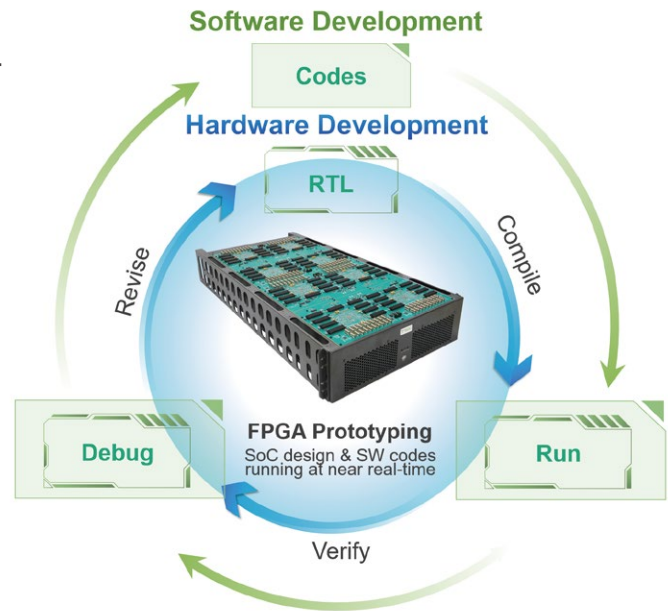
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## Prodigy™ Complete Prototyping

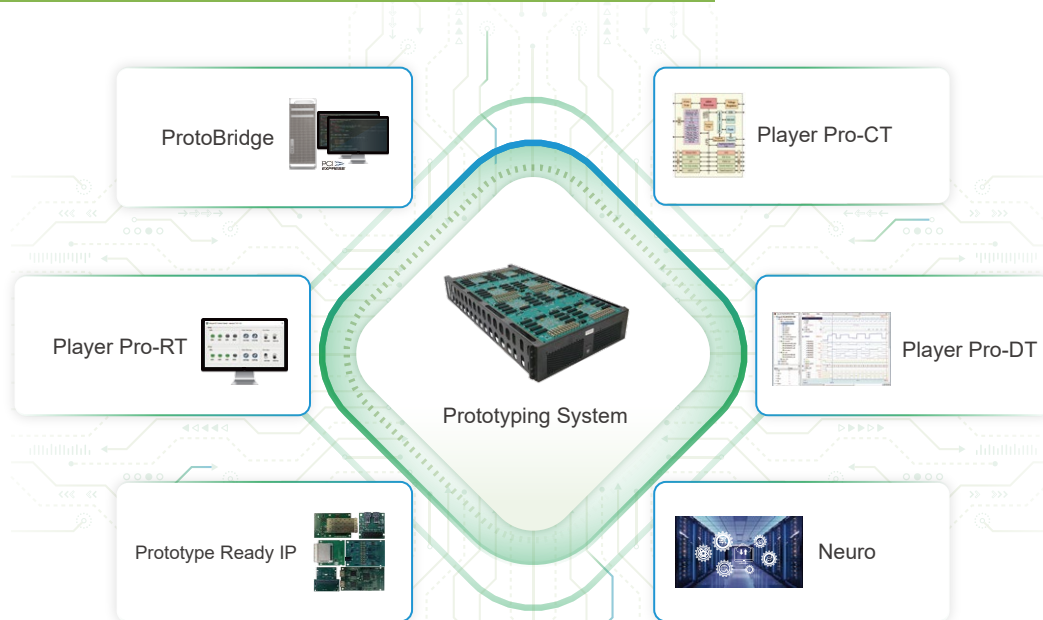
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## Why FPGA Prototyping

- ▶ **High-performance**  
10 - 100 times faster than emulation 1000 - 10000 times faster than simulation
- ▶ **Functional Verification**  
Verify hardware, firmware, and application software design functionality before code freeze
- ▶ **Early Software Development**  
Start software development and validation before first silicon
- ▶ **Accelerate Time-to-market (TTM)**  
Shorten the design cycle by six to nine months



## Prodigy™ Complete Prototyping



The S2C Prodigy line is a complete prototyping solution capable of addressing a wide spectrum of applications and handle a broad range of design sizes through various development phases. Prodigy provides the convenience, flexibility, and productivity that are essential to FPGA prototyping.

Key features of the Prodigy Prototyping Platform:

- ▶ Scalable/flexible architecture to target designs of various sizes, applications, and development stages
- ▶ High productivity tools to shorten the design-to-test time
- ▶ A vast library of 90+ daughter cards to meet a variety of interface needs

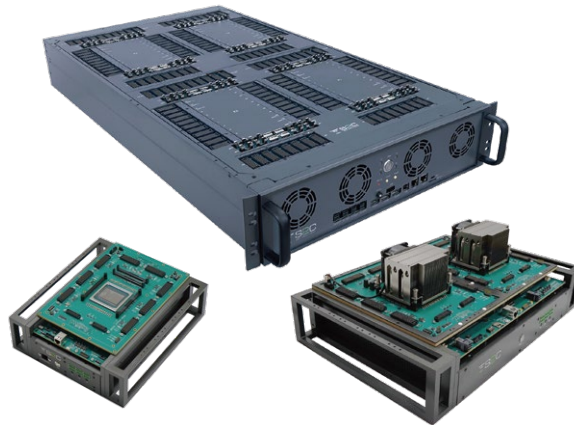
## Prototyping Capacity

Model Configuration	Logic Matrix		Logic System								Logic Module
	LX2	LX1	S8-100	S8-40	10M	2800	S7-19P	S7-13P	S7-9P	VU440	VU440P
8 FPGAs	392M	240M	–	–	–	–	–	–	–	–	–
4 FPGAs	196M	–	400M	–	224M	–	196M	–	–	120M	–
2 FPGAs	98M	–	200M	–	–	–	98M	–	–	60M	–
1 FPGA	–	–	100M	40M	56M	22M	49M	21M	14M	30M	44M

## Prodigy Prototyping Platform



Logic Matrix | High performance and high capacity



Logic System | All-in-one design for maximum flexibility



Logic Module | Compact & Low profile

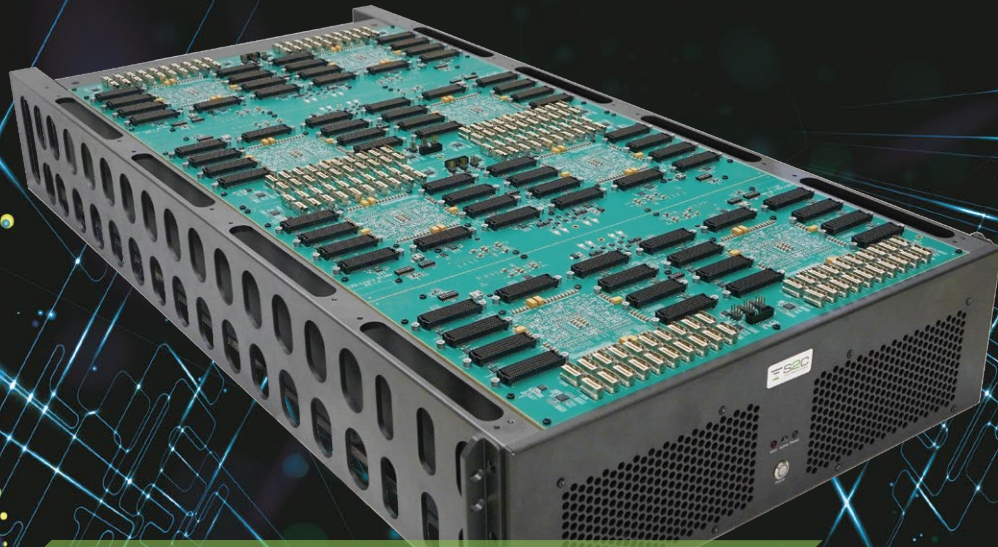
## Prototyping Configuration

	Logic Matrix		Logic System													Logic Module			
Model	LX2	LX1	S8-100S <sup>3</sup>	S8-40	10MQ	10MS	2800S	S7-19PQ	S7-19PD	S7-19PS	S7-13P	S7-9P	VU440Q	VU440D	VU440S	VU440P			
Estimated ASIC Gates (M)	392	240	100	40	224	56	22	196	98	49	21	14	120	60	30	44			
System LC & LE(K)	71,504	44,328	18,507	7,352	40,800	10,200	2,753	35,752	17,876	8,938	3,780	2,586	22,164	11,082	5,541	5,541			
FPGA Memory (Mb)	1,328	709	858	891	1,012	253	229	664	332	166	455	346	354	178	89	89			
DSP Resources	30,720	23,040	6,864	14,352	27,648	6,912	5,760	15,360	7,680	3,840	12,288	6,840	11,520	5,760	2,880	2,880			
User I/Os	11,648	9,984	2,212	486	4,376	1,184	896	5,900	2,950	1,475	676	676	4,736	2,368	1,184	432			
SerDes Transceivers	640	384	Contact S2C for more info			160	40	20	176	88	44	48	48	176	88	44	12		
Max SerDes Rates (Gbps)	28	12				16	16	16	16	16	16	16	25	25	12.5	12.5	12.5	10	
PCIe Support	Gen3 <sup>1</sup>	Gen3				Gen3	Gen3	Gen3	Gen3 <sup>1</sup>	Gen3 <sup>1</sup>	Gen3 <sup>1</sup>	Gen3	Gen3	Gen3	Gen3	Gen3	Gen3	Gen3	Gen3
DDR4 SO-DIMM	–	–				8	2	1	8	4	2	–	–	4	2	1	2		
Prodigy Connectors	72	64				32	8	6	32	16	8	4	4	32	16	8	3		
Prodigy+ Connectors	–	–				–	–	–	–	–	–	–	–	–	–	–	–		
High Speed SerDes Connectors <sup>2</sup>	160 MCIO	8 PGT 80 MSAS				8 PGT	2 PGT	2 PGT	8 PGT	4 PGT	2 PGT	2 PGT	2 PGT	8 PGT	4 PGT	2 PGT	Gen3 x 8		
Dimensions (L*W*H mm)	450*900 *150					394*280 *130	400*280 *143	620*460 *150	310*275 *150		620*460 *170	310*460 *170	310*275 *170	310*275 *150		620*460 *150	310*465 *150	310*275 *150	111*281 *55

<sup>1</sup> VU19P supports gen4 in compatible mode

<sup>2</sup> MCIO provides 4 SerDes + 8 GPIO, MSAS provides 4 SerDes + 8 GPIO, PGT+ provides 4 SerDes + 6 XPIO, PGT provides 8 SerDes + 16 GPIO

<sup>3</sup> Contact S2C for more info about S8-100D/Q



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 Logic Matrix™

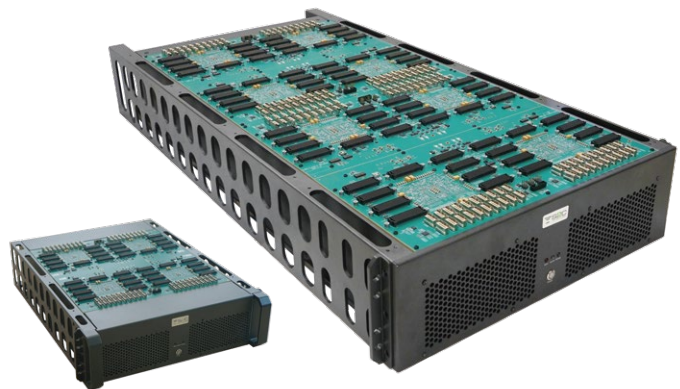
## Prodigy LX2 Enterprise Prototyping System

### 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 runtime 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 Compile Time, an automatic prototyping compile tool; Player Pro Debug Time, a deep trace debugging tool; Proto-Bridge 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 can meet the most demanding prototyping requirements in a wide variety of applications including 5G, AI, ML and GPU.

#### Large Capacity & 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



### PPro-CT

- Automatic and guided partition
- Enhanced partition engine and TDM macros
- Full-system timing analyse report
- Optional LSF configuration support

### PPro-DT

- Integrated in-circuit debug setup
- Larger probes without re-compile
- Faster sampling clock
- Larger external sample storage  
(MDM Pro hardware required and sold separately)

### PPro-RT

- Remote system management
- Integrated hardware self-test
- Virtual "I/Os" for debug
- Support direct access to user's design resources

## PPro-CT - Automatic Prototyping Compile Tool

Player Pro CompileTime 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

## PPro-DT - Deep Trace Debugging Tool

The capability of system debugging and troubleshooting directly affects the project progress. Player Pro DebugTime 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

## PPro-RT - Remote Management Tool

Player Pro RunTime 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

### 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

### 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

## 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	1,327.2
<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

# Prodigy Logic System™

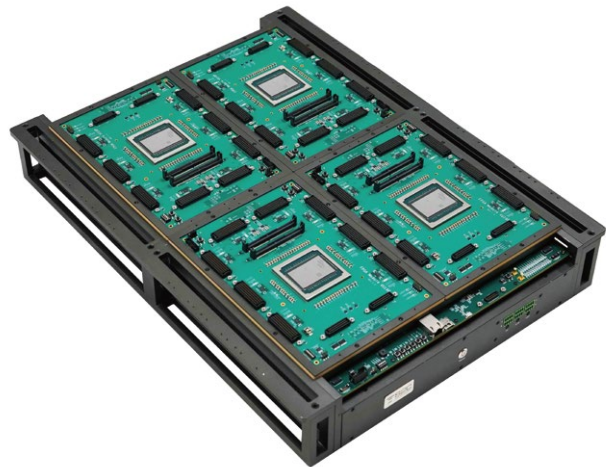
## ◀ Prodigy S7-19PQ Logic System

The S7-19PQ Prodigy Logic System delivers an efficient and high-performance solution for early firmware/software development and system validation. The S7-19PQ is a compact and all-in-one system that includes all components - FPGA modules, power control module, and power supply - for maximum flexibility, durability and portability. The S7-19PQ is based on Xilinx's Virtex UltraScale + VU19P FPGA and provides 4,736 general purpose I/Os and 176 high-speed transceivers on 40 high performance connectors.

The S7-19PQ Prodigy Logic System is part of the S2C Prodigy Complete Prototyping Solutions, which consists of industry-leading design partition, debug solutions and remote capabilities that ensures users FPGA-based prototype comes up quickly. Users also have access to a rich portfolio of Prototype Ready IP in the form of plug-play daughter cards to quickly build prototyping targets.

### Highlights

- Delivers up to 196M equivalent ASIC gates
- 5,900 high-performance I/Os for peripheral expansions & multi-system connectivity
- 176 high-speed transceivers at 16Gbps
- 8 on-board DDR4 SODIMMs at up to 2,400Mbps totaling 128GB
- Compatible with over 90 Prototype Ready IPs
- Feature-rich remote management and runtime controls



### Features

#### Large Capacity & Scalability

- 35.76M System Logic Cells and 663.6Mb of internal memory
- 15,360 DSP Slice
- Four on-board DDR4 SO-DIMM sockets can hold up to 72-bit 16GB DDR4 in each socket
- Multiple Logic Systems can be conveniently connected together to expand capacity

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current, and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage, or over-temperatures

#### High Performance

- 176 high-speed transceivers can run up to 16Gbps
- On-board support of DDR4 memory can run up to 2,400 Mbps
- Demanding length matched and impedance controlled
- Up to 200W of power for each FPGA

#### Flexible & Powerful I/Os

- 4,608 I/O pins and 112 high-speed transceivers through 32 Prodigy connectors
- 64 high-speed transceivers and 128 GPIOs through 8 PGT I/O connectors
- I/O voltage can be adjusted between 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI
- 138 fixed inter-FPGA connections between F1 and F2, between F2 and F3, between F3 and F4, and between F4 and F1

# Features

## Advanced Clock Management

### Standalone Mode

- 8 global clocks to be selected from
  - 8 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- 3 global resets to be selected from
  - 3 from on-board push buttons
  - 2 from Clock Module Type D
  - 2 from runtime software in GUI

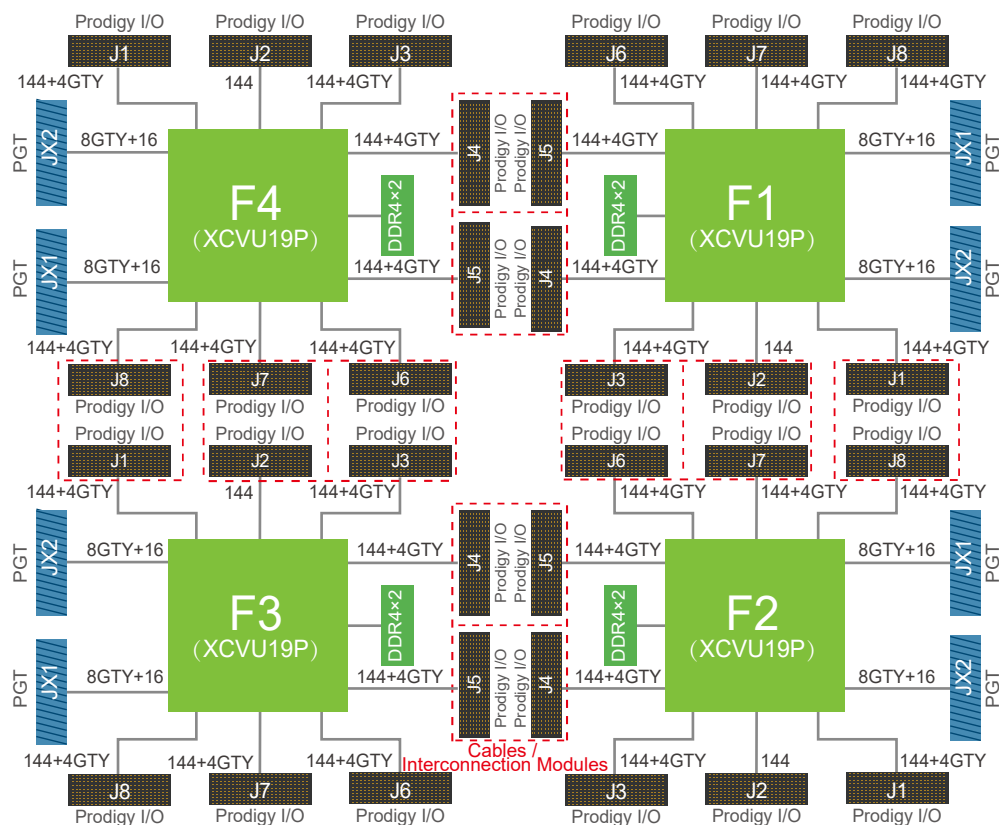
### Multi-System Mode

- 8 global clocks to be selected from
  - 8 local programmable clock sources (0.16 ~ 350MHz)
  - 8 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources

## Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG, and micro SD card
- Remote power on/off/recycle through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- Virtual UART for firmware debugging
- User Test Area - LEDs, Push Buttons, Switches, and Pin Headers for testing and debugging
- On-board battery charging circuit makes FPGA bin file encryption easy (battery not included)
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at transaction-level
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent deep trace debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter cards

## I/O Architecture



## ◀ Prodigy S7-19PD Logic System

The Prodigy™ S7-19PD Logic System is a high-performance, modular and scalable prototyping solution, which is creatively designed to build the components of FPGA modules, power control module, and power supply into a compact and all-in-one system, for achieving maximum flexibility, durability and portability. The S7-19PD is based on Xilinx's Virtex UltraScale+ XCVU19P FPGA and provides abundant high speed I/Os and gigabit transceivers for peripheral and interconnection use. The S7-19PD provides an ideal FPGA design prototyping platform in artificial intelligence, machine learning, 5G and GPU.

The Prodigy™ S7-19PD Logic System is part of the Prodigy Complete Prototyping Solutions, which consists of industry-leading design partition, debug solutions and remote capabilities that ensures users FPGA-based prototype comes up quickly. Users also have access to a rich portfolio of Prototype Ready IP in the form of plug-play daughter cards to quickly build prototyping targets.

### Highlights

- Delivers up to 98M equivalent ASIC gates
- 2,950 high-performance I/Os for peripheral expansions & multi-system connectivity
- 88 high-speed transceivers at 16Gbps
- 4 on-board DDR4 SODIMMs at up to 2,400Mbps totaling 64 GB
- Compatible with over 90 Prototype Ready IPs



### Features

#### Large Capacity & Scalability

- 17.88M System Logic Cells and 331.8Mb of internal memory
- 7,680 DSP Slice
- Four on-board DDR4 SO-DIMM sockets can hold up to 72-bit 16GB DDR4 in each socket
- Multiple Logic Systems can be conveniently connected together to expand capacity

#### High Performance

- 88 high-speed transceivers can run up to 16Gbps
- On-board support of DDR4 memory can run up to 2,400Mb/s
- Demanding length matched and impedance controlled
- Up to 200W of power for each FPGA

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current and temperature with a software GUI; Automatic shut-down upon detection of over-current, over-voltage or over-temperatures

#### Flexible & Powerful I/Os

- 2,304 I/O pins and 56 high-speed transceivers through 16 Prodigy connectors
- 32 high-speed transceivers and 64 GPIOs through 4 PGT I/O connectors
- I/O voltage can be adjusted between 1.2V/1.35V/1.5V/1.8V through runtime software in GUI
- 274 fixed inter-FPGA connections between F1 and F2

## Features

### Advanced Clock Management

#### Single-System Mode

- 8 global clocks to be selected from
  - 8 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- 3 global resets to be selected from
  - 3 from on-board push buttons
  - 3 from Clock Module Type D
  - 3 from runtime software in GUI

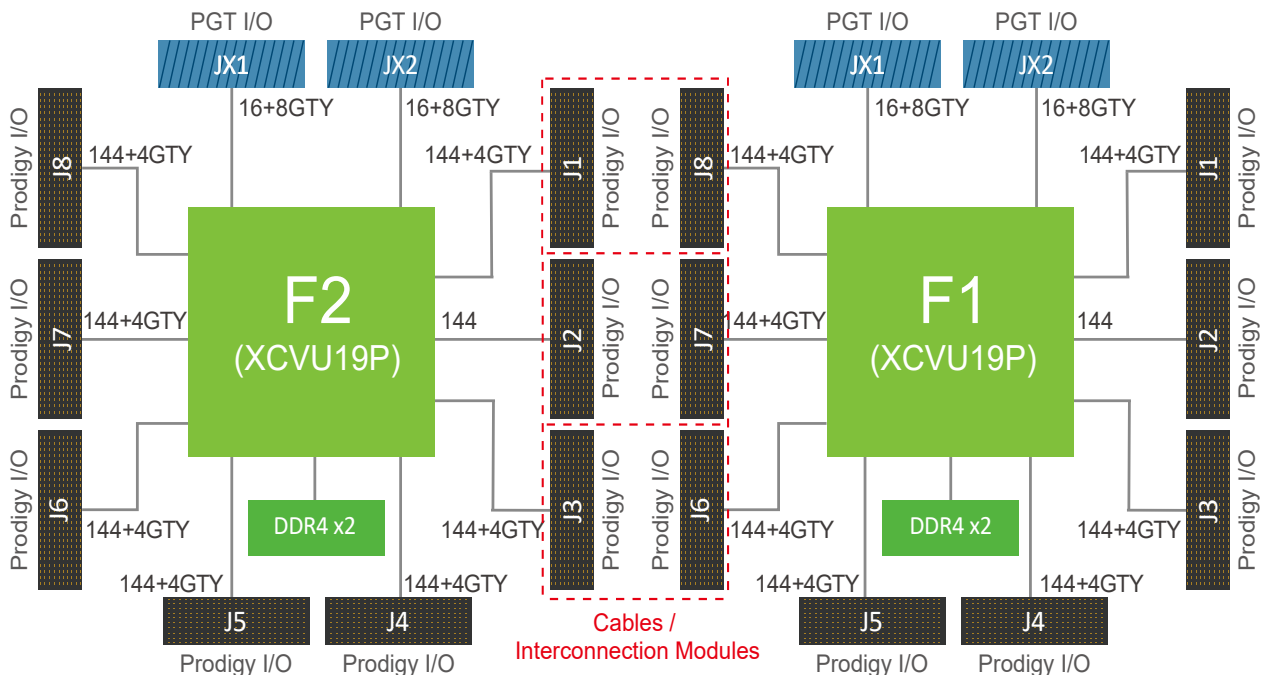
#### Multi-System Mode

- 8 global clocks to be selected from
  - 8 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources

### Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG, and micro SD card
- Remote power on/off/refresh through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- Virtual UART for firmware debugging
- User Test Area - LEDs, Push Buttons, Switches, and Pin Headers for testing and debugging
- On-board battery charging circuit makes FPGA bin file encryption easy (battery not included)
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at transaction-level
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent deep trace debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter cards

## I/O Architecture



## ◀ Prodigy S7-19PS Logic System

The Prodigy™ S7-19PS Logic System is a compact, sleek, all-in-one system that includes all components - FPGA module, extendable power control module, and power supply for maximum flexibility, durability and portability. The system is based on Xilinx's Virtex UltraScale+ VU19P FPGA and provides 1,184 general purpose I/Os and 44 GTY transceivers on 10 high-speed connectors. Utilizing the 7th generation Prodigy Player Pro™ technology, user can perform an array of runtime features remotely through both Ethernet and USB. User also have access to S2C's vast library of over 90 daughter cards to quickly build prototyping targets.

### Highlights

- Delivers up to 49M equivalent ASIC gates
- 1,475 high-performance I/Os for peripheral expansions & multi-system connectivity
- 44 high-speed transceivers at 16Gbps
- 2 on-board DDR4 SODIMMs at up to 2,400Mbps totaling 32GB
- Compatible with over 90 Prototype Ready IPs
- Feature-rich remote management and runtime controls



### Features

#### Large Capacity & Scalability

- 8.94M System Logic Cells and 165.9Mb of internal memory
- Two on-board DDR4 SO-DIMM sockets can hold up to 72-bit 16GB DDR4 in each socket
- Multiple Logic Systems can be conveniently connected together to expand capacity

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current, and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage, or over-temperatures

#### High Performance

- Equal trace length for all the Prodigy I/O connectors
- Up to 200W of power for an FPGA
- On-board support of DDR4 memory can run up to 2,400 Mbps
- High-speed transceivers can run up to 16Gbps

#### Flexible & Powerful I/Os

- 1,152 I/Os and 28 high-speed transceivers through 8 Prodigy connectors
- 16 high-speed transceivers and 32 GPIOs through 2 PGT I/O connectors
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage

## Features

### Advanced Clock Management Standalone Mode

- 8 global clocks to be selected from
  - 8 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- 3 global resets to be selected from
  - 3 from on-board push buttons
  - 2 from Clock Module Type D
  - 2 from runtime software in GUI

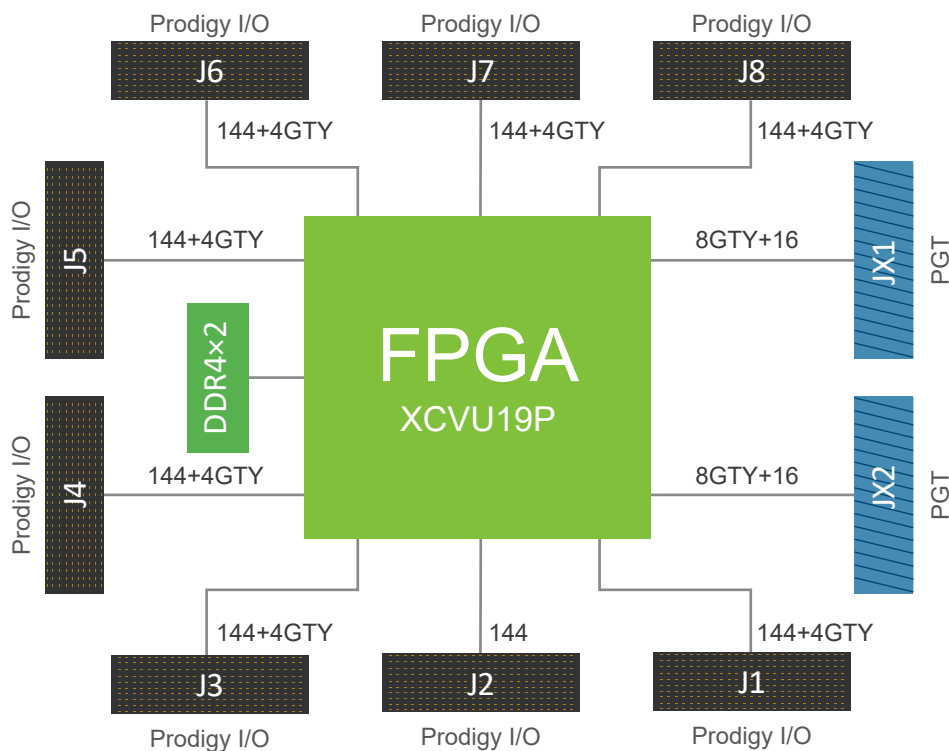
### Multi-System Mode

- 8 global clocks to be selected from
  - 8 local programmable clock sources (0.16 ~ 350MHz)
  - 8 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources

### Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG, and micro SD card
- Remote power on/off/recycle through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- Virtual UART for firmware debugging
- User Test Area - LEDs, Push Buttons, Switches, and Pin Headers for testing and debugging
- On-board battery charging circuit makes FPGA bin file encryption easy (battery not included)
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at transaction-level
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent deep trace debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter cards

## I/O Architecture





## ◀ Prodigy S7-13P Logic System

The Prodigy S7-13P Logic System is a high-performance, compact, all-in-one prototyping system that includes all components - FPGA module, power control module, and power supply - for maximum flexibility, durability, and portability. The system is based on Xilinx's Virtex UltraScale+ VU13P FPGA and provides 676 general purpose I/Os and 48 GTY transceivers on 11 high-speed connectors. Utilizing the 7th generation Prodigy Player Pro™ technology, user can perform an array of runtime features remotely through both Ethernet and USB. User also has access to S2C's vast library of over 90 daughter cards to quickly build prototyping targets.

### Highlights

- Supports 25Gbps transceivers
- 3.78M System Logic Cells, 455 Mb of internal memory, and 12,288 DSP Slices
- 676 high-performance I/Os
- 4x QSFP28 optical interfaces, each supporting 100G applications
- Supports MIPI and x8 PCIe Gen3
- Abundant remote management capability



### Features

#### Large Capacity & Scalability

- 3.78M System Logic Cells
- 455Mb internal memory
- 12,288 DSP slices
- Multiple Logic Systems can be conveniently connected to expand capacity

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current, and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage, or over-temperatures

#### High Performance

- Equal trace length for all the Prodigy I/O connectors
- Up to 100W of power for an FPGA

#### Flexible & Powerful I/Os

- 576 I/Os and 15 GTY transceivers through 4 Prodigy I/O connectors
- 16 GTY transceivers and 32 GPIOs through 2 PGT I/O connectors
- 16 GTY transceivers through 4 QSFP28 connectors
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage

## Features

### Advanced Clock Management Standalone Mode

- 6 global clocks to be selected from
  - 6 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- 1 dedicated clock, reference clock, and reset for pin-multiplexing
- 2 global resets sourced from push button or MMCX
- 1 global reset sourced from runtime software in GUI

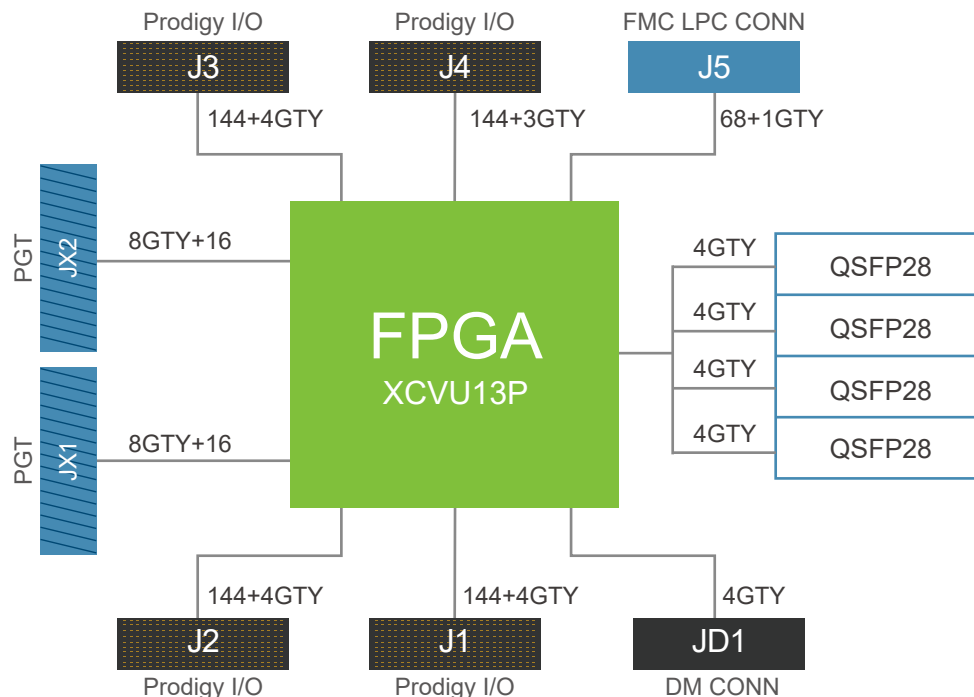
### Multi-System Mode

- 6 global clocks to be selected from
  - 6 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources
- 1 dedicated clock, reference clock, and reset for pin-multiplexing

### Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG, and micro SD card
- Remote power on/off/recycle through Ethernet
- Auto-detection of daughter cards and cables
- Virtual Switches & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- Virtual UART for firmware debugging
- User Test Area - LEDs, Push Buttons, Switches, and Pin Headers for testing and debugging
- Optional on-board battery charging circuit makes FPGA bin file encryption easy
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at transaction-level
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent deep trace debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter cards

## I/O Architecture



## ◀ Prodigy S7-9P Logic System

The Prodigy S7-9P Logic System is a high-performance, compact, all-in-one prototyping system that includes all components - FPGA module, power control module, and power supply - for maximum flexibility, durability, and portability. The system is based on Xilinx's Virtex UltraScale+ VU9P FPGA and provides 676 general purpose I/Os and 48 GTY transceivers on 11 high-speed connectors. Utilizing the 7th generation Prodigy Player Pro™ technology, user can perform an array of runtime features remotely through both Ethernet and USB. User also has access to S2C's vast library of over 90 daughter cards to quickly build prototyping targets.

### Highlights

- Supports 25Gbps transceivers
- 2.59M System Logic Cells, 345.9Mb of internal memory, and 6,840 DSP Slices
- 676 high-performance I/Os
- 4x QSFP28 optical interfaces, each supporting 100G applications
- Supports MIPI and x8 PCIe Gen3
- Abundant remote management capability



### Features

#### Large Capacity & Scalability

- 2.59M System Logic Cells
- 345.9Mb internal memory
- 6,840 DSP slices
- Multiple Logic Systems can be conveniently connected to expand capacity

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current, and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage, or over-temperatures

#### High Performance

- Equal trace length for all the Prodigy I/O connectors
- Up to 100W of power for an FPGA

#### Flexible & Powerful I/Os

- 576 I/Os and 15 GTY transceivers through 4 Prodigy I/O connectors
- 16 GTY transceivers and 32 GPIOs through 2 PGT I/O connectors
- 16 GTY transceivers through 4 QSFP28 connectors
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage

## Features

### Advanced Clock Management Standalone Mode

- 6 global clocks to be selected from
  - 6 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- 1 dedicated clock, reference clock, and reset for pin-multiplexing
- 2 global resets sourced from push button or MMCX
- 1 global reset sourced from runtime software in GUI

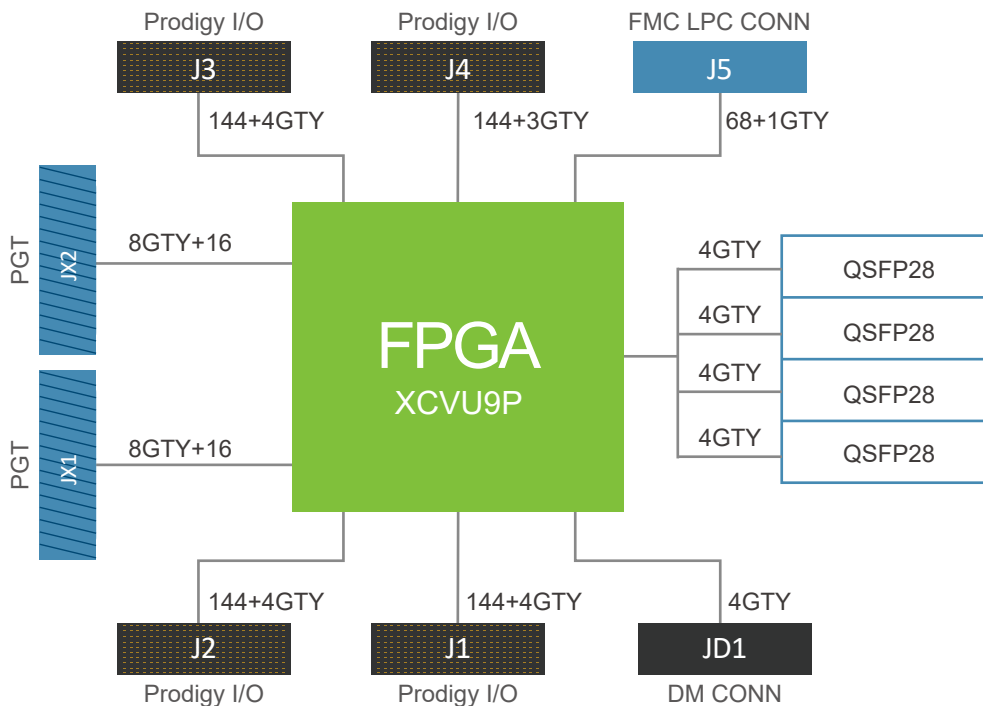
### Multi-System Mode

- 6 global clocks to be selected from
  - 6 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources
- 1 dedicated clock, reference clock, and reset for pin-multiplexing

### Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG, and micro SD card
- Remote power on/off/recycle through Ethernet
- Auto-detection of daughter cards and cables
- Virtual Switches & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- Virtual UART for firmware debugging
- User Test Area - LEDs, Push Buttons, Switches, and Pin Headers for testing and debugging
- Optional on-board battery charging circuit makes FPGA bin file encryption easy
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at transaction-level
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent deep trace debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter cards

## I/O Architecture



## ◀ Quad VU440 Prodigy™ Logic System

The Quad VU Prodigy Logic System is a sleek, all-in-one system that includes all components - FPGA boards, extendable power control module, and power supply - for maximum flexibility, durability, and portability. The system is based on Xilinx's Virtex UltraScale XCVU440 FPGA and provides 4,736 general purpose I/Os and 176 GTH transceivers on 40 high-speed connectors, and users have access to the cast library of over 80 daughter cards to quickly build prototype targets. In addition, users can perform an array of runtime features remotely through both Ethernet and USB. The modular system can be re-configured to Single or Dual system.

### Highlights

- Large capacity and scalability with 22.16M System Logic Cell and 354.4Mb of internal memory
- 4,608 high-performance I/Os for inter FPGA connections and daughter cards
- 176 GTH transceivers for high-bandwidth data transmission
- On-board support for two 72-bit 8GB ECC DDR4 SO-DIMM sockets
- Compatible with 80+ Prodigy Daughter Card Library
- Stackable design for easy capacity expansion
- Compact, sleek, all-in-one chassis for clean, portable, and well-organized work environment



### Features

#### Large Capacity & Scalability

- 22.16M System Logic Cells and 354.4Mb of internal memory
- Four On-board DDR4 SO-DIMM socket can hold at least 72-bit 8GB DDR4 in each socket
- Multiple Quad VU Prodigy Systems can be conveniently stacked to expand capacity

#### High Reliability

- Screw-lock design to I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current, and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage, or over-temperatures

#### High Performance

- Up to 100W of power for each FPGA
- Equal trace length for I/Os from same I/O connector
- On-board support of DDR4 memory can run up to 2,400 Mbps
- 176 high-speed GTH transceivers can run up to 12.5Gbps

#### Flexible & Powerful I/Os

- 4,608 high-performance I/O pins and 112 GTH transceivers on 32 Prodigy I/O connectors for inter FPGA connections and daughter cards
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage
- 64 high-speed GTH transceivers and 128 GPIOs through 8 PGT I/O connectors

## Features

### Advanced Clock Management Standalone Mode

- 6 global clocks to be selected from
  - 6 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- 2 global resets sourced from push button or MMCX
- 1 global reset sourced from runtime software in GUI

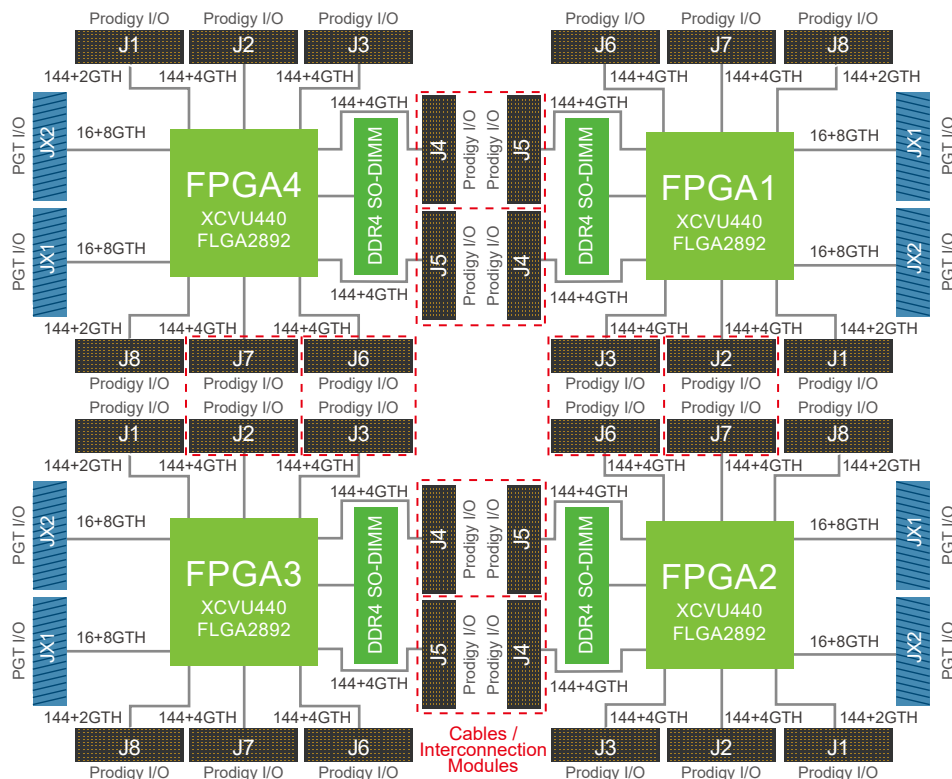
### Multi-System Mode

- 6 global clocks to be selected from
  - 6 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources

### Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG, and micro SD card
- Remote power on/off/recycle through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- Virtual UART for firmware debugging
- User Test Area - LEDs, Push Buttons, Switches, and Pin Headers for testing and debugging
- On-board battery charging circuit makes FPGA bin file encryption easy
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at transaction-level
- Optional Prodigy Player Pro Compile for design partition & implementation
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent deep trace debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter cards

## I/O Architecture



## ◀ Dual VU440 Prodigy Logic System

The Dual VU440 Prodigy Logic System is a compact, sleek, all-in-one system that includes all components - FPGA module, extendable power control module, and power supply for maximum flexibility, durability, and portability. The system is based on Xilinx's Virtex UltraScale XCVU440 FPGA and provides 2,368 general purpose I/Os and 88 GTH transceivers on 20 high-speed connectors. Utilizing the 6th generation Prodigy Player Pro™ technology, user can perform an array of runtime features remotely through both Ethernet and USB. User also have access to S2C's vast library of over 80 daughter cards to quickly build prototyping targets. The modular system can be re-configured to a Single or Quad system.

### Highlights

- Large capacity and scalability with 11.08M System Logic Cell and 177.2Mb of internal memory
- 2,304 high-performance I/Os for inter FPGA connections and daughter cards
- 88 GTH transceivers for high-bandwidth data transmission
- On-board support for two 72-bit 8GB ECC DDR4 SO-DIMM sockets
- Compatible with 80+ Prodigy Daughter Card Library
- Stackable design for easy capacity expansion
- Compact, sleek, all-in-one chassis for clean, portable, and well-organized work environment



### Features

#### Large Capacity & Scalability

- 11.08M System Logic Cells and 177.2Mb of internal memory
- Two On-board DDR4 SO-DIMM socket can hold at least 72-bit 8GB DDR4 in each socket
- Multiple Logic Systems can be conveniently connected together to expand capacity

#### High Reliability

- Screw-lock design to I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current, and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage, or over-temperatures

#### High Performance

- Up to 100W of power for each FPGA
- Equal trace length for I/Os from same I/O connector
- On-board support of DDR4 memory can run up to 2,400 Mbps
- 88 high-speed GTH transceivers can run up to 12.5Gbps

#### Flexible & Powerful I/Os

- 2,304 high-performance I/O pins and 56 GTH transceivers on 16 Prodigy I/O connectors for inter FPGA connections and daughter cards
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage
- 32 high-speed GTH transceivers and 64 GPIOs through 4 PGT I/O connectors

## Features

### Advanced Clock Management Standalone Mode

- 6 global clocks to be selected from
  - 6 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- 2 global resets sourced from push button or MMCX
- 1 global reset sourced from runtime software in GUI

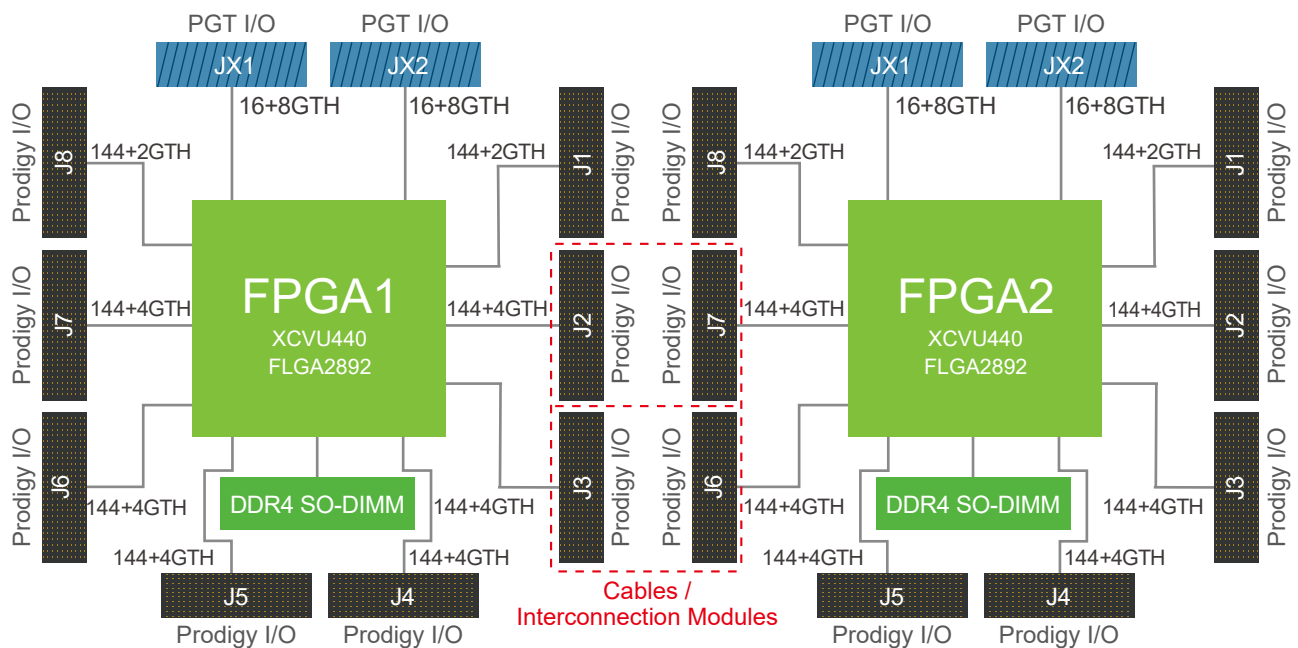
### Multi-System Mode

- 6 global clocks to be selected from
  - 6 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources

### Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG, and micro SD card
- Remote power on/off/recycle through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- Virtual UART for firmware debugging
- User Test Area - LEDs, Push Buttons, Switches, and Pin Headers for testing and debugging
- On-board battery charging circuit makes FPGA bin file encryption easy
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at transaction-level
- Optional Prodigy Player Pro Compile for design partition & implementation
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent deep trace debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter cards

## I/O Architecture





## Single VU440 Prodigy Logic System

The Single VU440 Prodigy Logic System is a compact, sleek, all-in-one system that includes all components - FPGA module, extendable power control module, and power supply for maximum flexibility, durability, and portability. The system is based on Xilinx's Virtex UltraScale XCVU440 FPGA and provides 1,184 general purpose I/Os and 44 GTH transceivers on 10 high-speed connectors. Utilizing the 6th generation Prodigy Player Pro™ technology, user can perform an array of runtime features remotely through both Ethernet and USB. User also have access to S2C's vast library of over 80 daughter cards to quickly build prototyping targets. The modular system can be extended and upgraded into a Dual or Quad system.

### Highlights

- Large capacity and scalability with 5.54M System Logic Cells and 88.6Mb of internal memory with ability to connect multipleboards together for even greater capacity
- 1,152 high-performance I/Os through 8 Prodigy connectors that support a variety of daughter cards
- 44 high-speed transceivers that can run up to 12.5Gbps
- Compact, sleek, all-in-one chassis for clean, portable, and well-organized work environment
- Abundant add-on remote management capability



### Features

#### Large Capacity & Scalability

- 5.54M System Logic Cells and 331.8Mb of internal memory
- On-board DDR4 SO-DIMM socket supports up to 8GB memory
- Modular design can be extended and upgraded into a Dual or Quad system
- Multiple Logic Systems can be conveniently connected together to expand capacity

#### High Performance

- Up to 100W of power for each FPGA
- Equal trace length for I/Os from same I/O connector
- On-board support of DDR4 memory can run up to 2,400 Mbps

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current, and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage, or over-temperatures

#### Flexible & Powerful I/Os

- 1,152 I/O pins through 8 Prodigy connectors
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage
- 16 gigabit transceivers and 32 GPIOs through 2 PGT I/O connectors

## Features

### Advanced Clock Management Standalone Mode

- 6 global clocks to be selected from
  - 6 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- Two dedicated fast clocks when using pin-multiplexing through Prodigy Player Pro
  - One is fixed to 200MHz
  - The other one is adjustable (0.16 ~ 350MHz)
- 2 global resets sourced from push button or MMCX
- 1 global reset sourced from runtime software in GUI

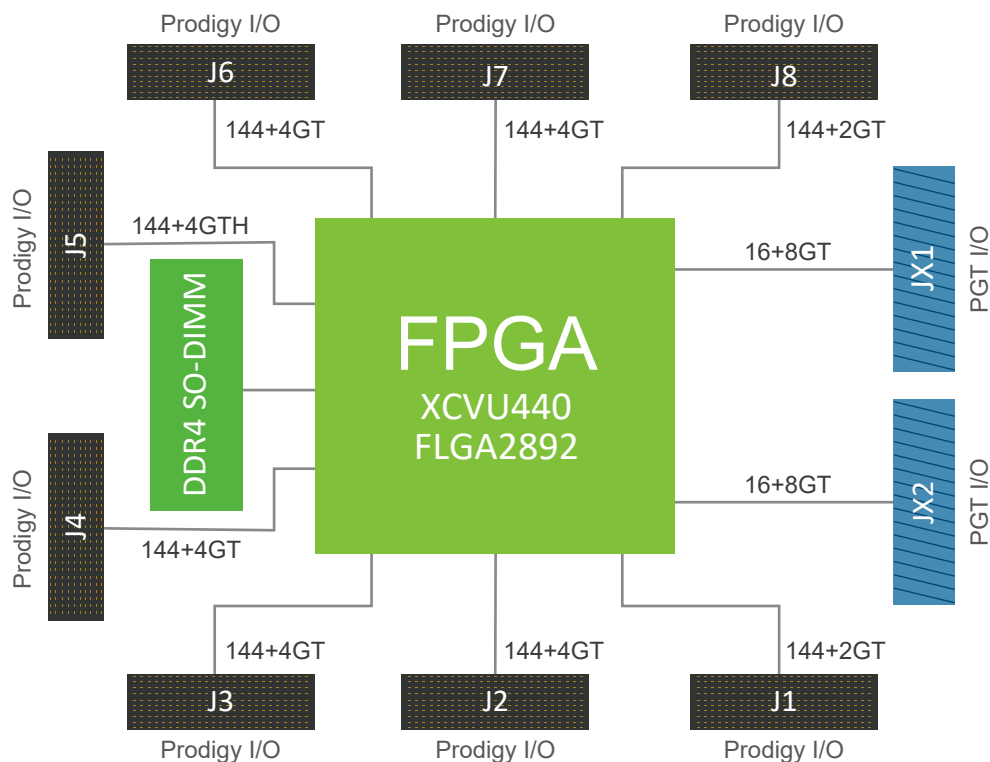
### Multi-System Mode

- 6 global clocks to be selected from
  - 6 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources

### Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG, and micro SD card
- Remote power on/off/recycle through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- Virtual UART for firmware debugging
- User Test Area - LEDs, Push Buttons, Switches, and Pin Headers for testing and debugging
- On-board battery charging circuit makes FPGA bin file encryption easy
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at transaction-level
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent deep trace debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter cards

## I/O Architecture



## ◀ Quad 10M Prodigy™ Logic System

The Quad 10M Prodigy Logic System is a complete and modular multi-FPGA prototyping platform based on Intel's Stratix 10 GX 10M FPGA. The system has 4,736 general purpose I/Os and 160 high-speed transceivers on 40 high performance connectors. The Quad S10 10M Prodigy Logic System is well suited for next generation 5G, AI, Networking and system validation of complex SoC designs.

S2C's Prodigy Player Pro™ Software technology streamlines the design compilation and enables users to perform an array of runtime features remotely through both USB and Ethernet port. Users also have access to a rich portfolio of Prototype Ready IP in the form of plug-play daughter cards to quickly build prototyping targets.

### Highlights

- Large capacity and scalability with 40.8M Logic Elements, 1,012Mb memory and 13,824 DSP blocks
- 4,608 high-performance I/Os for inter FPGA connections and daughter cards
- 160 high-speed transceivers that can run up to 16Gbps
- Compatible with 90+ Prodigy Daughter Card Library
- Compact, sleek, all-in-one chassis for clean, portable, and well-organized work environment



### Features

#### Large Capacity & Scalability

- 40.8M Logic Elements
- 1,012Mb M20K memory
- 13,824 DSP blocks (27,648 18x19 multipliers)
- 8 on-board DDR4 SO-DIMM sockets, each supports up to 72-bit 16GB DDR4
- Multiple systems can be conveniently connected to prototype even larger designs

#### High Performance

- Up to 180W of power for each FPGA
- Equal trace length for I/Os from same I/O connector
- 160 high-speed transceivers can run up to 16Gbps

#### Flexible & Powerful I/Os

- 4,608 high-performance I/O pins and 96 high-speed transceivers through 32 Prodigy Connectors
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage
- 64 high-speed transceivers and 128 GPIOs through 8 PGT Connectors

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current, and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage, or over-temperatures

# Features

## Advanced Clock Management

### Single-System Mode

- 8 global clocks to be selected from
  - 8 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- 1 dedicated clock, reference clock and reset for pin-multiplexing
- 2 dedicated programmable clocks for the on-board DDR4 memories
- 3 global resets to be selected from
  - 3 global resets sources from Clock Module Type D
  - 2 global resets sources from on-board push buttons
  - 2 global resets sources from runtime software in GUI

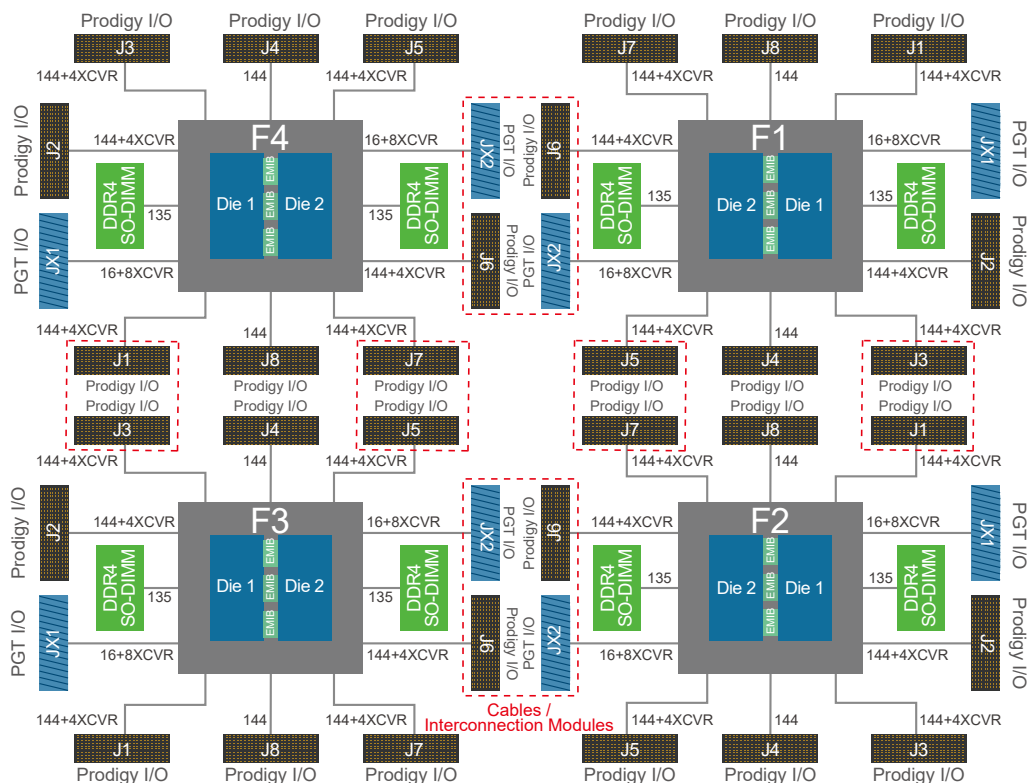
### Multi-System Mode

- 8 global clocks to be selected from
  - 8 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources
- 1 dedicated clock, reference clock and reset for pin-multiplexing

## Ease-of-Use

- Auto partitioning the design to multiple dies and multiple FPGAs with Prodigy Player Pro Compile
- Multiple FPGA configuration options through Ethernet port, USB port, JTAG and micro SD card
- Remote power on / off / recycle through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- User Test Area - LEDs, Push Buttons, Switches and Pin Headers for testing and debugging
- Compatible with S2C's off-the-shelf pre-tested daughter boards
- Optional ProtoBridge™ AXI software providing a high-throughput data channel of up to 4GB/s
- Optional Prodigy Multi-Debug Module (MDM) for deep trace debugging of multiple FPGAs

## I/O Architecture



## Single 10M Prodigy™ Logic System

The Single S10 10M Prodigy Logic System is a complete and modular prototyping platform based on Intel's Stratix 10 GX 10M FPGA. The system has 1,184 general purpose I/Os and 40 high-speed transceivers on 10 high performance connectors. The Single S10 10M Prodigy Logic System is well suited for next generation 5G, AI, Networking and system validation of complex SoC designs.

S2C's 6th generation Prodigy Player Pro™ Software technology streamlines the design compilation and enables users to perform an array of runtime features remotely through both USB and Ethernet port. Users also have access to a rich portfolio of Prototype Ready IP in the form of plug-play daughter cards to quickly build prototyping targets.

### Highlights

- Highest Logic Density with up to 10.2 million Logic Elements
- 40 high-speed transceivers that can run up to 16Gbps
- Abundant high-performance I/Os ease the application extension
- Compatible with over 80 Prodigy DaughterCard Library
- Complete software-stack eases the design compilation, runtime control and system debug effort



### Features

#### Large Capacity & Scalability

- 10.2M Logic Elements
- 253Mb M20K memory
- 3,456 DSP blocks (6,912 18x19 multipliers)
- Two on-board DDR4 SO-DIMM sockets, each supports up to 72-bit 16GB DDR4
- Multiple systems can be conveniently connected to prototype even larger designs

#### High Performance

- Up to 180W of power for an FPGA
- Equal trace length for I/Os from same I/O connector
- 40 high-speed transceivers can run up to 16Gbps

#### Flexible & Powerful I/Os

- 1,152 high-performance I/O pins and 24 high-speed transceivers through 8 Prodigy Connectors
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage
- 16 high-speed transceivers and 32 GPIOs through 2 PGT Connectors

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage or over-temperatures

## Features

### Advanced Clock Management

#### Single-System Mode

- 6 global clocks can be selected from
  - 6 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- Two dedicated programmable clocks for the on-board DDR4 memories
- 3 design clock outputs through 3 pairs of MMCX connectors
- 2 global resets sourced from push button or MMCX or runtime
- 1 global reset sourced from push button

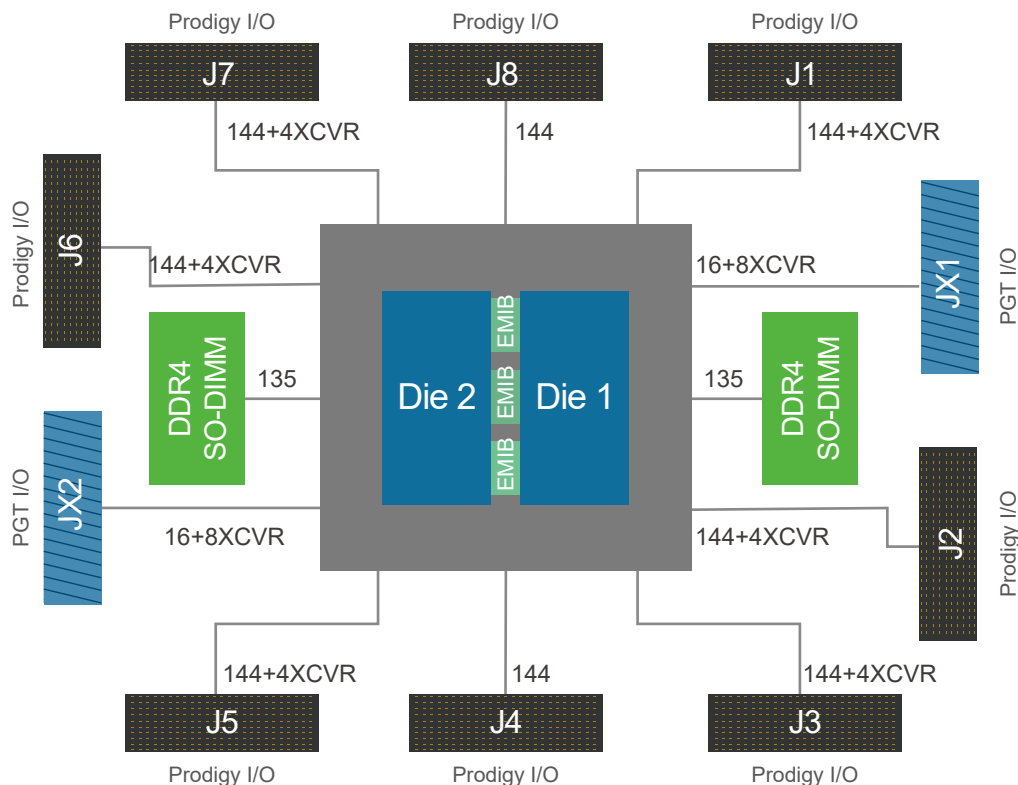
#### Multi-System Mode

- 6 global clocks to be selected from
  - 6 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- 2 global resets sourced from global reset sources

### Ease-of-Use

- Auto partitioning the design to multiple dies and multiple FPGAs with Prodigy Player Pro Compile
- Multiple FPGA configuration options through Ethernet port, USB port, JTAG and micro SD card
- Remote power on / off / recycle through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- User Test Area - LEDs, Push Buttons, Switches and Pin Headers for testing and debugging
- Optional on-board battery charging circuit makes FPGA bin file encryption easy
- Compatible with S2C's off-the-shelf pre-tested daughter boards
- Optional ProtoBridge™ AXI software providing a high-throughput data channel of up to 4,000MB/s
- Optional Prodigy Multi-Debug Module (MDM) for deep trace debugging of multiple FPGAs

## I/O Architecture



## Single S10 2800 Prodigy™ Logic System

The Single S10 2800 Prodigy Logic System is based on Intel's Stratix 10 GX2800 FPGA. The system has 896 general purpose I/Os and 20 high-speed transceivers on 8 high-speed connectors. The Single S10 2800 Prodigy Logic System is well suited for medium to large SoC designs. S2C's 6th generation Player Pro™ software technology enables users to perform an array of runtime features remotely through both Ethernet and USB. Users also have access to S2C's vast library of over 80 daughter cards to quickly build prototyping targets.

### Highlights

- Large Capacity and Scalability with 2,753K Logic Elements, 229Mb memory and 5,760 DSP blocks with ability to connect multiple boards together for even greater capacity
- 20 high-speed transceivers that can run up to 16Gbps
- 864 high-performance I/Os through 6
- Prodigy Connectors that support a variety of daughter cards
- Compact, sleek, all-in-one chassis for clean, portable, and well-organized work environment
- All-in-one form factor: 310mm × 275mm × 94mm (L × W × H)



### Features

#### Large Capacity & Scalability

- 2,753K Logic Elements
- 229Mb M20K memory
- 5,760 DSP blocks
- Multiple Logic Systems can be conveniently connected together to expand capacity through the use of interconnection modules or cables
- Footprint is compatible with the S10 5500 FPGA to offer an easy path to upgrade (S10 5500 FPGA must be purchased separately)

#### High Performance

- Up to 100W of power for an FPGA
- Equal trace length for I/Os from same I/O connector
- 20 high-speed transceivers can run up to 16Gbps

#### Flexible & Powerful I/Os

- 864 high-performance I/O pins and 4 high-speed transceivers through 6 Prodigy Connectors
- I/O voltage can be adjusted to 1.2V, 1.35V, 1.5V or 1.8V through runtime software in GUI with 4 status LEDs on-board to indicate I/O voltage
- 16 high-speed transceivers and 32 GPIOs through 2 PGT I/O connectors

#### High Reliability

- Screw-lock design to high-speed I/O connectors
- Self-Tests - Isolate design issues from board issues conveniently with a software GUI
- Monitoring of on-board voltage, current and temperature with a software GUI
- Automatic shut-down upon detection of over-current, over-voltage or over-temperatures

## Features

### Advanced Clock Management Standalone Mode

#### Standalone Mode

- 6 global clocks can be selected from
  - 6 programmable clock sources (0.16 ~ 350MHz)
  - 5 pairs of external clocks through MMCX connectors
  - 1 OSC socket
- 3 design clock outputs through 3 pairs of MMCX connectors
- Two dedicated fast clocks when using pin-multiplexing, one clock is fixed to 200MHz and the other clock is programmable (0.16 ~ 350MHz)
- 2 global resets sourced from push button or MMCX
- 1 global reset sourced from runtime software in GUI

#### Multi-System Mode

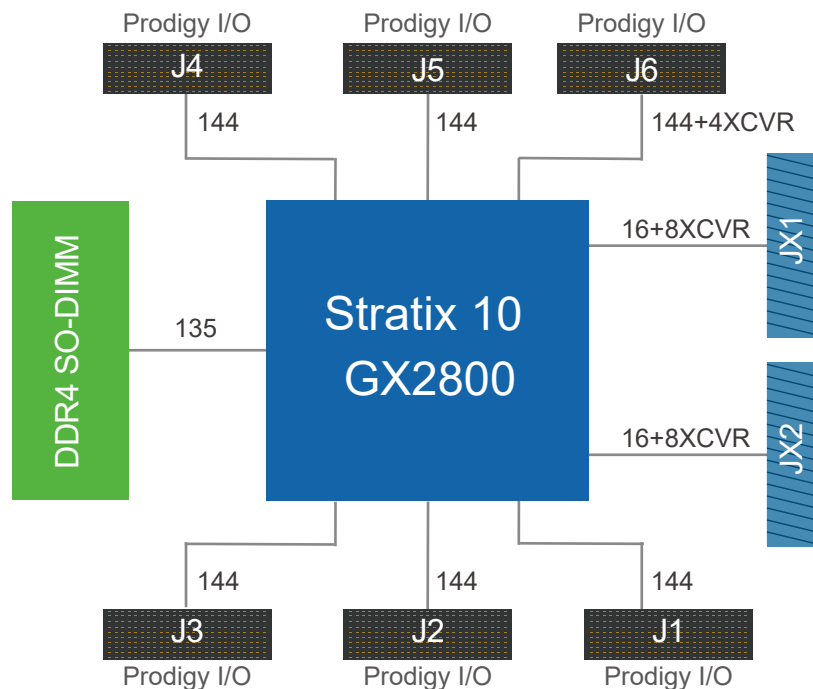
- 6 global clocks to be selected from
  - 6 local programmable clock sources (0.16 ~ 350MHz)
  - 6 global clock sources
- 3 feedback clocks can be output to global clock sources
- Dedicated fast clock(s) for pin-multiplexing
- 2 global resets sourced from global reset sources

### Ease-of-Use

- Multiple FPGA configuration options through Ethernet port, USB port, JTAG and micro SD card
- Remote power on / off / recycle through Ethernet
- Auto detection of daughter cards and cables
- Virtual SWs & LEDs for simple tasks such as changing a setting or indicating a condition remotely
- User Test Area - LEDs, Push Buttons, Switches and Pin Headers for testing and debugging
- Optional on-board battery charging circuit makes FPGA bin file encryption easy
- Optional ProtoBridge™ AXI software to co-model with software/simulation models at the transaction-level
- Optional S2C design implementation & debug software
- Optional Prodigy Multi-Debug Module (MDM) for the concurrent debugging of multiple FPGAs
- Compatible with S2C's off-the-shelf pre-tested daughter boards

## Modular and Portable Architecture

The Single S10 2800 Prodigy Logic System is a compact, sleek, all-in-one system that includes all components - FPGA board, extendable power control module, and power supply - for maximum flexibility, durability, and portability. The modular system can be extended and upgraded into a Dual or Quad system.





# Prodigy Logic Module™

## ◀ S2C K7 Prodigy Logic Module - 7K410/7K325

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

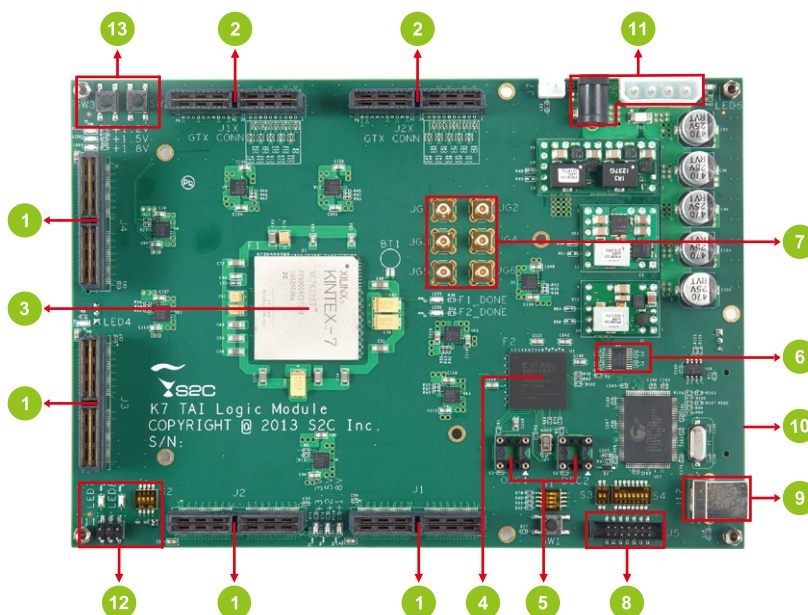
The S2C K7 Prodigy™ Logic Module is equipped with one Xilinx Kintex-7 XC7K410T or XC7K325T FPGA device and can prototype a design with a capacity up to 4.1M gates. The K7 Prodigy Logic Module features the largest number of user I/Os in its class with 432 I/Os on four Dedicated I/O connectors and 16 channels 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.

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

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.

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

## Features

### 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

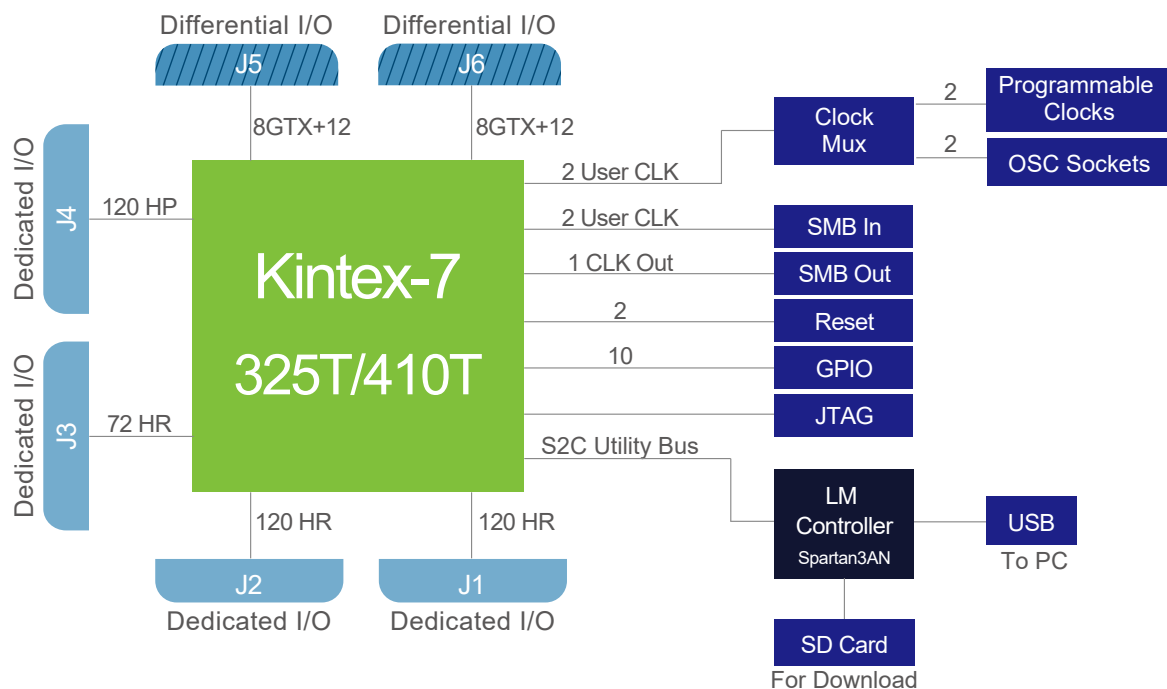
- Up to 60W power for FPGA
- Equal trace length for I/Os from same I/O connector
- Optional 1GB 32-bit DDR3 memory module at up to 667Mbps or
- 1GB 32-bit DDR2 memory module at up to 400Mbps data rate

### 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

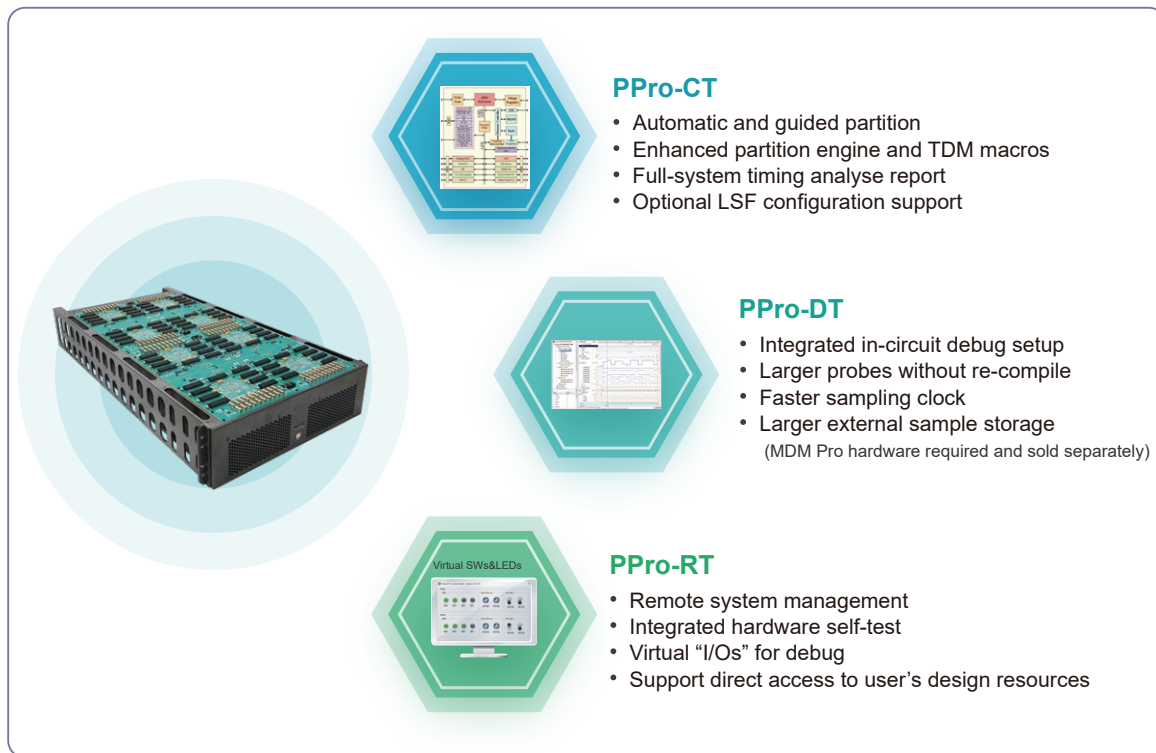


# Prodigy Player Pro™

## Prodigy™ Player Pro

### Cockpit for Prototype Design and Multi-Debug Set Up

Prodigy Player Pro is a tool that works with the FPGA-based prototyping platforms from S2C. Prodigy Player Pro plays three roles in speeding your development process - it configures the prototype, runs remote system management and provides set up for multi-FPGA debugging.



## CompileTime (PPro-CT)

An integrated GUI environment and Tcl interface makes it easy to take an existing design, compile it, partition it into multi-FPGAs, and generate the individual bit files.

### Automated Compile Flow

Prodigy Player Pro has an intuitive GUI environment to guide all compile steps. After a design is compiled once, you can perform an ECO flow automatically in Tcl mode:

- Import design
- Set up probes
- Run synthesis
- Partition design
- Assign & I/Os
- Run FPGA place and route
- Generate bit file(s)

### I/O Assignment

Prodigy Player Pro provides a library of S2C daughter board pin-map files, and automatically matches them to I/O connectors. GUI-based clock and I/O properties assignment minimizes chance of error.

### Partition

- Automatic and guided partitioning to multiple boards
  - User-guided performance optimization
  - User configurable cable connection setup
- Black-box approach to save partitioning time
- Enhanced system performance by TDM optimization
- Pre-qualification of signals before automatic pin-multiplexing insertion
- Timing estimation to quickly understand the performance before place and route
- System timing report to guide the optimization

## RunTime (PPro-RT)

For compiled designs, Prodigy Player Pro enables you to control the target Prodigy Logic Module or Prodigy Logic System directly from the same software console, through either Ethernet or USB connections.

### Multiple FPGA Configurations

Prodigy Player Pro can download the design to the FPGA(s) through USB or Ethernet. It can also write the design to an SD card on the Prodigy Logic Module/System and download the design from an SD card.

### Virtual I/Os

Prodigy Player Pro provides virtual switches and indicators that you can use just like real hardware.

- Virtual LEDs for quick monitoring of design status
- Virtual push buttons and switches to set design input conditions quickly
- Virtual UART for convenient firmware debugging

## DebugTime (PPro-DT)

Prodigy Player Pro allows users to pre-select the signals to be observed before compilation and define the trigger conditions to start a data capture. During runtime, the selected signals are captured and stored in an external DDR4 memory for analysis.

### Integrated In-Circuit Debug Setup

- Preserve internal FPGA probes
- Probes are distributed to multiple FPGAs automatically based on the partition results
- Set up trigger and trace signals in multiple FPGAs from a single console

### Multi-FPGA Debug

Prodigy Multi-Debug Module Pro (MDM Pro) is an optional tool with multiple FPGAs debug setup ready. MDM Pro includes Player Pro for Debug Time and external MDM Pro hardware. It features:

### Trigger Condition Specification

Users can easily set the trigger events and combinational events through the Prodigy Player Pro Debug panel.

- Trigger Events support: ==, !=, >=, <=, >, < and counting
- Combinational Events support: !, &, |, ^, -> and counting
- Supports up to 8 event trigger blocks
- Supports trigger state machine language

## Specifications

### Hardware Support

- Compile Time: VU+, VU, KU, S10 and A10 •
- Runtime: VU+, VU, KU, S10 and A10
- Debug Set Up: VU+ and VU

### Language Support

- Synthesizable RTL (Verilog, VHDL, System Verilog)
- Synthesizable gate-level netlist
- Mixed languages

### Hardware Self-Test

A step-by-step wizard enables users to check for potential broken I/O pins, interconnection nets and clock lines.

Users can also verify the global clock frequencies and I/O voltage settings.

### Remote System Control

All system features can be controlled remotely through USB or Ethernet.

- Automatic detection of daughter cards when plugged in
- Easy monitoring I/O voltages, currents and temperatures
- Support direct access to the internal registers and BRAM
- Controlling multiple Prodigy Logic Modules/Systems conveniently from one console

### Large Number of Probes Without Re-Compile

- Mark an unlimited number of internal FPGA probes
- Trace up to 16K probes per FPGA in 8 groups of 2K probes each without FPGA re-compilation

### Concurrent Multiple FPGAs Debug

MDM Pro hardware is required.

- IP mode and Compile mode simplify the process and usage
- Transmit trigger and trace data from multiple FPGAs to MDM through high-speed transceivers
- Write the sample data in VCD/FSDDB format for analysis
- Store large external 8GB of waveform

### OS Support

CompileTime

- 64-bit Red Hat 7.8+
- CentOS 7.4+

Runtime & DebugTime

- 64-bit Windows 10
- Red Hat 7.8+
- CentOS 7.4+
- Ubuntu 16.04+

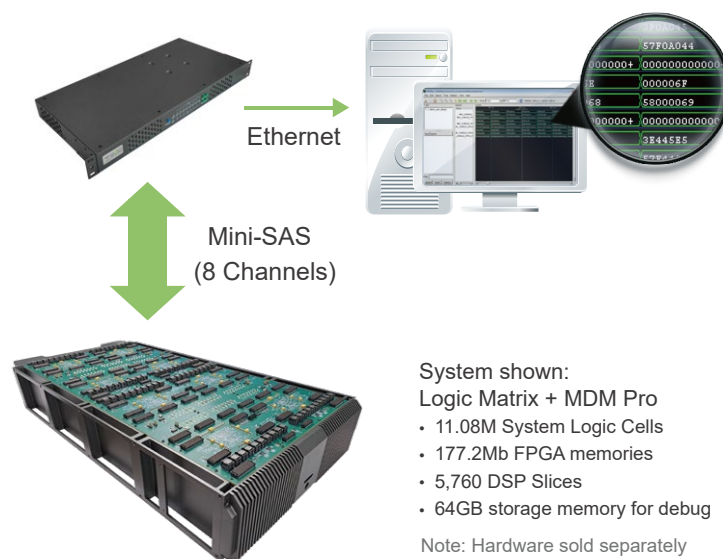
# Prodigy Multi-Debug Module™ Pro

## Prodigy Multi-Debug Module Pro

Prodigy Multi-Debug Module Pro (MDM Pro™) is an innovative deep trace debugging solution for FPGA prototyping and allows for the concurrent debugging of multiple FPGAs. Prodigy MDM Pro works within the Prodigy Player Pro™ cockpit to go beyond debug set up to specify trigger conditions then debug multiple FPGAs with the help of the dedicated hardware. The MDM Pro hardware enables massive data acquisition and transferring through high speed giga transceivers, and deep tracing of the cause of bugs with the ability to store up to 64GB of waveforms. The MDM Pro captures and stores waveforms continuously removing the need to consume design FPGA memory for debug.

### Highlights

- Debug across up to 8 FPGAs simultaneously using a single logic analyzer
- Sampling frequency at speeds up to 125MHz
- Trace up to 2K probes per FPGA and support 8 sample groups
- Easy get the value of any internal DFF/BRAM
- Supports trigger state machine languages to ease the debugging
- Store up to 64GB of waveform data externally



## Features

The MDM Pro supports two usage modes: Compiler mode and IP mode. In IP mode, users can instantiate the debug IP in the DUT directly, no need to run the Player Pro compile time flow. When running the compiler mode, it is embedded in Prodigy Player Pro, the advanced multiple FPGA debug capabilities include:

### RTL-level Probing

The GUI allows you to mark and upload internal signals to the external MDM Pro hardware for easy setting of trigger conditions and signal tracing.

### Large Number of Probes Without Re-Compile

- Mark an unlimited number of internal FPGA probes before synthesis
- Trace up to 16K probes per FPGA in 8 groups of 2K probes each without FPGA re-compilation

### Integrated In-Circuit Debug Setup

- Set up trigger and trace signals in multiple FPGAs from a single console
- Preserve internal FPGA probes before synthesis
- Probes are distributed to multiple FPGAs automatically based on partition results
- Support compile mode and IP mode

# Features

## Trigger Condition Specification

### General Trigger

Users can easily set trigger events and combinational events

- Trigger events support: ==, !=, >=, <=, >, < and counting
- Combinational events support: !, &, |, ^, -> and counting
- Supports up to 8 event trigger blocks. Each block can run comparison, sequencing, occurrence and combination operations

### Advanced Trigger

- Up to 8 trigger comparators
- State machines - support up to 16 states
- One, two- and three-way conditional branching
- Four built-in 16-bits counters used to events, implement timers, etc.
- Four built-in flags used for monitoring trigger state machine execution status

## 64GB Deep Trace

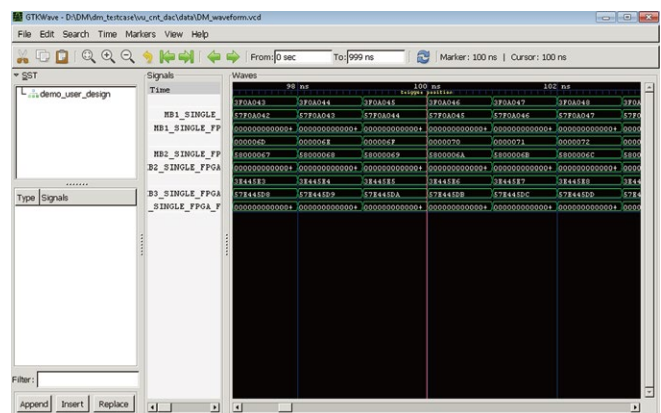
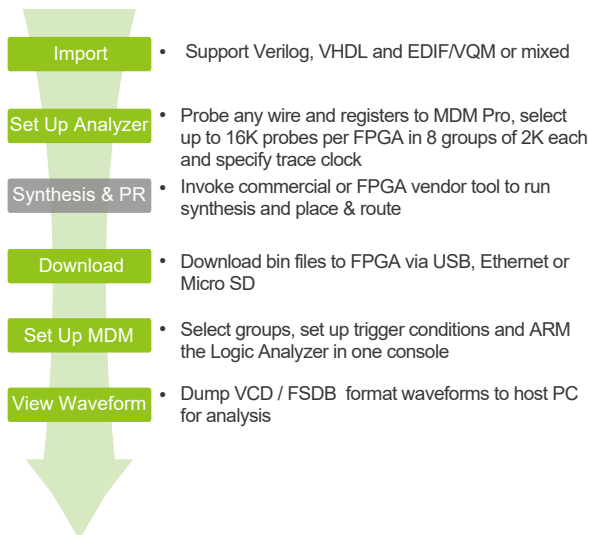
- Store 64GB of waveforms on external DDR4 memory, minimize the consumption of user FPGA resources
- Transfer captured waveforms to host computer through Gigabit Ethernet
- Capture and store waveforms continuously

## Concurrent Debug of Multiple FPGAs

- Debug across multiple FPGAs simultaneously using a single Logic Analyzer
- Easy get the value of any internal DFF / BRAM
- Transmit trigger and trace data from multiple FPGAs to the MDM Pro hardware through high-speed transceivers
- Write the sample data in VCD / FSDB format for analysis

## Integrated with Prototyping Setup Flow

Prodigy MDM Pro works within the Prodigy Player Pro cockpit to go beyond debug set up to specify trigger conditions then debug.



Concurrent Debugging of Multiple FPGAs in one console

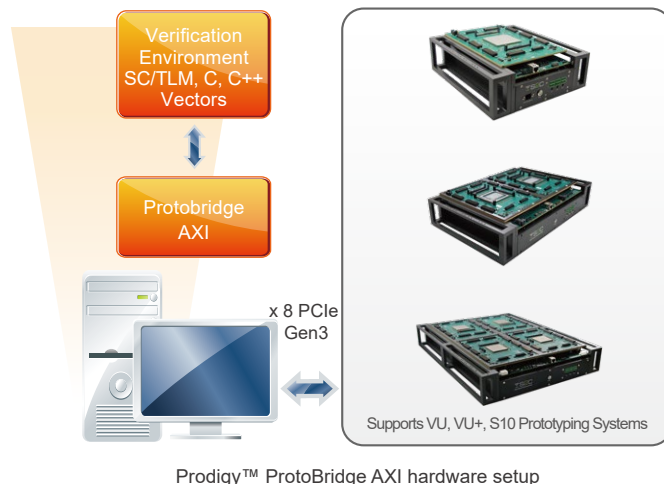
# Prodigy ProtoBridge™

## Prodigy ProtoBridge AXI An FPGA-Assisted Verification Tool

### Overview

FPGA-based prototypes closely resemble final silicon chips in speed and accuracy, providing significant value in full-chip validation and early software development. Realizing these benefits has historically been met with the need to build additional hardware with significant resources and specialized expertise having to be employed to obtain the necessary FPGA connectivity.

The unique Prodigy ProtoBridge AXI FPGA-Assisted Verification Tool uses the widely adopted AXI-4 bus protocol to link software running on host PC to the FPGA-based prototyping environment.



Prodigy™ ProtoBridge AXI hardware setup

### Benefits

#### Technology

##### Early IP Verification without the complete SoC design

- IP blocks connected to the AXI bus can be verified without processor cores or peripheral blocks
- Early algorithm/architectural exploration can be performed on the FPGA while taking advantage of the FPGA environment's speed performance

##### Shorten Design Verification Time with a high-throughput channel

- Transaction-level verification is utilized to ensure system-level result accuracy
- C-code is used as a stimulus to reduce the time and effort in creating RTL test benches

#### Business

- Eliminate Resource & Expertise Constraints by removing the need for the creation of additional specialized hardware and software
- Reuse Across Multiple Projects as the flexibility of Prodigy ProtoBridge makes it ideal for any design
- Get World-Class Support to help design teams with any issues that arise – something not available with in-house solutions leaving design teams to fend for themselves

##### Achieve High Product Reliability with improved test coverage

- Create corner test cases in software and run exercises on an FPGA-based prototype
- Run high-performance regression tests on an FPGA-based prototype with vectors stored in host PC

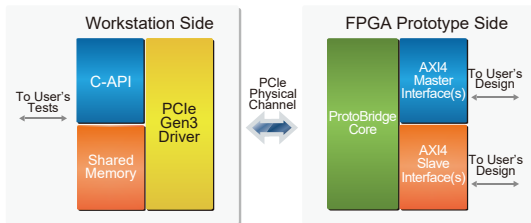
## Features

### Exercise of Large Amounts of Verification Data at High Speed

- Transmission through 8-lane PCIe Gen3 between Host PC and FPGA
- Massive data transfer from Host PC to FPGA up to 4,000 MB/s
- Support for direct and DMA access modes

### AXI-4 Bus Protocol Between Host PC and FPGA

- Instantiation of AXI-4, AXI4-Lite, AXI-3 and AHB bus connections on FPGA ports
- Configurable data width from 32-bit to 1024-bit
- Support for an independent clock for each Master/Slave instance



Architecture diagram of ProtoBridge AXI

### Rich Coverage of C Function Calls Between Host PC and FPGA

- System initialization function calls to manage the tool environment
- Interrupt control function calls to identify the source of an interrupt signal for C-API's follow-up actions
- Data read/write function calls to communicate with and operate the FPGA circuit
- DMA transfer function calls to perform DMA operations for large amounts of data

### Unique Shared Memory Operation Increases FPGA Prototyping Memory Capacity

- Uses PC memory to store data alleviating the need to store data on the design under test's (DUT's) memory
- Allows DUT to exchange data with host PC's memory
- Simplifies DUT operations of moving the generated data for further design and debug
- Provides easy access to memory content by other tasks running on the host PC at the same time

## Specifications

### FPGA Platforms Supported

- Single/Dual/Quad VU440 Prodigy Logic System
- Single/Dual/Quad VU19P Prodigy Logic System
- Single/Quad S10 10M Prodigy Logic System
- User's design can reside on one prototyping system or expanded to multiple systems

### OS Support

- Centos 7.4
- RHEL 7.6
- Ubuntu16.04

## Product Inclusions

- AXI-4 transaction-level interconnection module and Master/Slave interfaces for FPGA integration
- A set of C-API function calls to perform AXI bus transactions in the host computer
- PCIe driver for Linux or Windows operating systems to control Logic Module operations
- C-API reference operations with sample access to FPGA internal memory
- System integration guide to connect user RTL code with the ProtoBridge AXI-4 bus module



# Prodigy Prototype Ready IP™

## Prototype Ready IP

S2C provides a large library of off-the-shelf interfaces and accessories for FPGA-prototyping. All interfaces and accessories work with the Prodigy Logic Modules to further speed up and simplify your system prototyping process. Accessory modules are supplied as daughter boards that plug into the Prodigy Logic Module, providing pre-tested interfaces and reference design flows for easy bring-up. S2C also provides professional services to customize interface and accessory modules to meet the needs of your application.



Prototype Ready IP is available for S8 series, S7 series and earlier.

## S8 Series

Product Number	Product Name	Product Description
<b>H-PMP-DDR4V40</b>	Prodigy+ DDR4 Memory Module for S8-40	<ul style="list-style-type: none"> <li>• Provide 1 DDR4 So-DIMM Socket</li> <li>• Provide 1 16GB ECC DDR4 memory</li> <li>• Provide 1 on-board 200MHz LVDS oscillator as reference clock</li> <li>• Provide 1 pushbutton</li> <li>• Provide 5 LEDs</li> <li>• Occupy 3 Prodigy+ I/O connectors</li> </ul>
<b>H-PMP-DDR4V100</b>	Prodigy+ DDR4 Memory Module for S8-100	<ul style="list-style-type: none"> <li>• Provide 1 DDR4 So-DIMM Socket</li> <li>• Provide 1 16GB ECC DDR4 memory</li> <li>• Provide 1 on-board 200MHz LVDS oscillator as reference clock</li> <li>• Provide 1 pushbutton</li> <li>• Provide 5 LEDs</li> <li>• Occupy 3 Prodigy+ I/O connectors</li> </ul>
<b>H-PMP-GPIOE</b>	Prodigy+ GPIO Extension Module	<ul style="list-style-type: none"> <li>• Provide 1 GPIO header (14-pin 3.3v-level)</li> <li>• Provide 1 high-speed 14-pin VCCO-level GPIO header</li> <li>• Provide 1 ARM Cortex Debug+ETM connector (20-pin)</li> <li>• Provide 1 micro-USB port</li> <li>• Provide 4 single-ended MMCX clock connectors for user FPGA</li> <li>• Provide 2 pairs of differential MMCX clock connectors (for global clocks)</li> <li>• Provide 1 Pmod GPIO header (12-pin 3.3V-level): 4 pushbuttons and 4 LEDs</li> <li>• Provide 2 I2C headers (3.3V-level)</li> <li>• Occupy 1 Prodigy+ I/O connector</li> </ul>

<b>H-PMP-ACMV40</b>	Prodigy ARM Connectivity Module for S8-40	<ul style="list-style-type: none"> <li>• Provide 2 QSPI</li> <li>• Provide 1 Micro SD 3.0</li> <li>• Provide 1 RGMII Ethernet</li> <li>• Provide 1 UART header (3.3V-level)</li> <li>• Provide 2 I2C headers (3.3V-level)</li> <li>• Occupy 2 Prodigy+ I/O connectors</li> </ul>
<b>H-PMP-ACMV100</b>	Prodigy ARM Connectivity Module for S8-100	<ul style="list-style-type: none"> <li>• Provide 2 QSPI</li> <li>• Provide 1 Micro SD 3.0</li> <li>• Provide 1 RGMII Ethernet</li> <li>• Provide 1 Uart header (3.3V-level)</li> <li>• Provide 1 PMOD header (3.3V-level)</li> <li>• Occupy 2 Prodigy+ I/O connectors</li> </ul>
<b>H-PMP-x2SGMII</b>	Prodigy+ 2 Channel SGMII PHY Module	<ul style="list-style-type: none"> <li>• Provide 2 SGMII Ethernet interfaces</li> <li>• Provide 1 on-board 125Mhz LVDS OSC providing system reference clock</li> <li>• Provide 2 pushbuttons</li> <li>• Provide 11 LEDs</li> <li>• Occupy 1 Prodigy+ I/O connector</li> </ul>
<b>H-PMP-MIPIDADPT</b>	Prodigy+ MIPI D-PHY Adaptor Module	<ul style="list-style-type: none"> <li>• Provide 40 MMCX connectors to support 4x4-lane or 2x8-lane MIPI interfaces</li> <li>• Provide 1 constant clock (200 MHz)</li> <li>• Provide 8 GPIOs via one 2 x 5 pin headers</li> <li>• Provide 2 LEDs</li> <li>• Provide 1 pushbutton</li> <li>• Occupy 1 Prodigy+ I/O connector</li> </ul>
<b>H-PGTP-x8PCIERC</b>	8-Lane PCIe Root Complex PGT+ Module	<ul style="list-style-type: none"> <li>• Provide 1 x8 PCIe Slot</li> <li>• Provide 3 LEDs</li> <li>• Provide 1 pushbutton</li> <li>• Occupy 2 PGT+ I/O connector</li> </ul>
<b>H-PMP-MCIOHPC</b>	Prodigy+ to MCIO-HPC Converter Module	<ul style="list-style-type: none"> <li>• Convert Prodigy+ to MCIO-HPC connector</li> <li>• Occupy 1 Prodigy+ I/O connector</li> </ul>
<b>H-PMP-LPDDR4V40</b>	Prodigy+ LPDDR4 Memory Module for S8-40	<ul style="list-style-type: none"> <li>• Provide 2 LPDDR4 memory</li> <li>• Provide 1 on-board 200MHz LVDS oscillator as reference clock</li> <li>• Provide 2 pushbutton</li> <li>• Provide 6 LEDs</li> <li>• Occupy 3 Prodigy+ I/O connectors</li> </ul>
<b>H-PMP-LPDDR4V100</b>	Prodigy+ LPDDR4 Memory Module for S8-100	<ul style="list-style-type: none"> <li>• Provide 2 LPDDR4 memory</li> <li>• Provide 1 on-board 200MHz LVDS oscillator as reference clock</li> <li>• Provide 2 pushbutton</li> <li>• Provide 6 LEDs</li> <li>• Occupy 3 Prodigy+ I/O connectors</li> </ul>
<b>H-PMP-USB2</b>	Prodigy+ USB2.0 Interface Module	<ul style="list-style-type: none"> <li>• Support USB2.0 host, device and OTG mode</li> <li>• Support ULPI and UTMI interface</li> <li>• Provide 2 pushbutton</li> <li>• Provide 2 LEDs</li> <li>• Occupy 3 Prodigy+ I/O connectors</li> </ul>

<b>H-PMP-FIM</b>	Prodigy+ Flash Interface Module	<ul style="list-style-type: none"> <li>• Provide 1 NOR Flash socket (Vcc=3.3V, VCCQ=1.8V)</li> <li>• Provide 1 QSPI Flash socket (WSON 8-6mm, 1.8V)</li> <li>• Provide 1 QSPI Flash socket (16-SOIC 300mil W, 1.8V, 3.3V)</li> <li>• Provide 1 QSPI Flash socket (8-SOIC 200mil W, 1.8V, 3.3V)</li> <li>• Provide 1 EEPROM socket (8-SOIC 200mil W, 1.8V, 3.3V)</li> <li>• Provide 1 MicroSD 3.0 Socket</li> <li>• Provide 1 3.3V I3C and 1 1.8V I3C via pin headers</li> <li>• Provide 2 pushbutton</li> <li>• Provide 2 LEDs</li> <li>• Occupy 3 Prodigy+ I/O connectors</li> </ul>
<b>H-PGTP-x8PCIECBL1000</b>	1000mm 8-Lane PCIe PGT+ Cable	<ul style="list-style-type: none"> <li>• Support up to PCIe Gen5 x4</li> <li>• Support up to PCIe Gen4 x8</li> <li>• Occupy one/two PGT+ I/O connectors</li> </ul>
<b>H-PGTP-CBL500</b>	PGT+ Cable	<ul style="list-style-type: none"> <li>• Connect two PGT+ connectors</li> <li>• Standard cable lengths: 500mm, 1000mm</li> </ul>
<b>H-PGTP-CBL1000</b>		
<b>H-PGTP-SC</b>	PGT+ Socket Connector	<ul style="list-style-type: none"> <li>• It is used on the FPGA Module of the S8 series</li> <li>• The complete model is ARF6-16-S-D-A-K-TR</li> </ul>
<b>H-PMP-SC</b>	Prodigy+ Socket Connector	<ul style="list-style-type: none"> <li>• It is used on the FPGA Module of the S8 series</li> <li>• The complete model is SEAF-20-05.0-S-08-2-A-K-TR</li> </ul>
<b>H-PMP-MC</b>	Prodigy+ Mezzanine Connector	<ul style="list-style-type: none"> <li>• It mates with the Prodigy+ Socket Connector used on the FPGA Module of the S8 series</li> <li>• The complete model is SEAM-20-02.0-S-08-2-A-K-TR</li> </ul>
<b>H-PMP-MCRA</b>	Prodigy+ Right-Angle Mezzanine Connector	<ul style="list-style-type: none"> <li>• It mates with the Prodigy+ Socket Connector used on the FPGA Module of the S8 series</li> <li>• It stands vertically on the connector</li> <li>• The complete model is SEAM-20-01-S-08-2-RA-K-TR</li> </ul>
<b>H-PMP-CBL500</b>	Prodigy+ Cable	<ul style="list-style-type: none"> <li>• Connect two Prodigy+ connectors</li> <li>• Standard cable lengths: 500mm, 1000mm</li> </ul>
<b>H-PMP-CBL1000</b>		
<b>H-PMPx3-PM</b>	3x Prodigy+ to Prodigy Converter Module	<ul style="list-style-type: none"> <li>• Convert 3 Prodigy+ to Prodigy connector</li> <li>• Occupy 3 Prodigy+ I/O connector</li> </ul>
<b>H-PMP-x2RGMII</b>	Prodigy+ 2 Channel RGMII PHY Module	<ul style="list-style-type: none"> <li>• Provide 2 RGMII Ethernet interfaces</li> <li>• Provide 2 pushbuttons</li> <li>• Provide 4 LEDs</li> <li>• Occupy 1 Prodigy+ I/O connector</li> </ul>
<b>H-MCIO-x1QSFP28</b>	QSFP28 MCIO-LPC Interface Module	<ul style="list-style-type: none"> <li>• Provide 1 QSFP28 interfaces</li> <li>• Provide 1 pushbuttons</li> <li>• Provide 2 LEDs</li> <li>• Occupy 1 MCIO-LPC I/O connector</li> </ul>

<b>H-PMP-CSM</b>	Prodigy+ Connector Space Module	<ul style="list-style-type: none"> <li>• Increase 10.1mm height when mate with Mezzanine connector</li> <li>• Occupy 1 Prodigy+ I/O connector</li> </ul>
<b>H-PMP-USB3</b>	Prodigy+ USB3.0 Interface Module	<ul style="list-style-type: none"> <li>• Support USB3.0 PIPE host and device mode</li> <li>• Support USB2.0 ULPI host and device mode</li> <li>• Provide 10 Pin Headers</li> <li>• Provide 4 pushbuttons</li> <li>• Provide 2 LEDs</li> <li>• Occupy 2 Prodigy+ I/O connectors</li> </ul>
<b>H-PMPx3-FMCP</b>	3x Prodigy+ to FMC+ Converter Module	<ul style="list-style-type: none"> <li>• Convert 3 Prodigy+ and 6 PGT+ connectors to a FMC+ connector.</li> <li>• Occupy up to 3 Prodigy+ and 6 PGT+ I/O connectors</li> </ul>
<b>H-CLK-HUB-S8</b>	Global Clock and Reset Management Hub	<ul style="list-style-type: none"> <li>• Provide 3 clock inputs via MCIO-LPC connectors, each can distribute 6 clocks and 6 resets from the CLK_IN to 8 CLK_OUT</li> <li>• Support cascading to expand more prototyping systems</li> </ul>

## S7 Series and earlier

### ► General Peripherals

Product Number	Product Name	Product Description
<b>P-PM-ETM4</b>	Prodigy ETM4 Module	<ul style="list-style-type: none"> <li>• One ARM ETM4 interface</li> <li>• One ARM JTAG interface</li> <li>• One 9-pin UART interface</li> <li>• One 3-pin UART interface</li> <li>• One SD card socket</li> <li>• One Micro SD card socket</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-GPHY1x3</b>	Prodigy 3 Channel GMII PHY Interface Module	<ul style="list-style-type: none"> <li>• Support for GMII Interface</li> <li>• 10/100/1000 BASE-T IEEE 802.3 compliant</li> <li>• Full integrated digital adaptive equalizers, echo cancellers and crosstalk cancellers</li> <li>• Two-wire Serial Interface and MDC/MDIO</li> <li>• CRC checker, packet counter</li> <li>• Auto-calibration for MAC interface outputs</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-RGPHY1x3</b>	Prodigy 3 Channel RGMII PHY Interface Module	<ul style="list-style-type: none"> <li>• Support for RGMII Interface</li> <li>• 10/100/1000 BASE-T IEEE 802.3 compliant</li> <li>• Full integrated digital adaptive equalizers, echo cancellers and crosstalk cancellers</li> <li>• Two-wire Serial Interface and MDC/MDIO</li> <li>• CRC checker, packet counter</li> <li>• Auto-calibration for MAC interface outputs</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-GPHY1x6</b>	Prodigy 6 Channel GMII PHY Interface Module	<ul style="list-style-type: none"> <li>• Support 2 channels RGMII and 4 channels GMII Interface</li> <li>• 10/100/1000 BASE-T IEEE 802.3 compliant</li> <li>• Full integrated digital adaptive equalizers, echo cancellers and crosstalk cancellers</li> <li>• Two-wire Serial Interface and MDC/MDIO</li> <li>• CRC checker, packet counter</li> <li>• Auto-calibration for MAC interface outputs</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-SGPHY1x6</b>	Prodigy 6 Channel SGMII PHY Interface Module	<ul style="list-style-type: none"> <li>• Support 6 channels SGMII Interface</li> <li>• 10/100/1000 BASE-T IEEE 802.3 compliant</li> <li>• Full integrated digital adaptive equalizers, echo cancellers and crosstalk cancellers</li> <li>• Two-wire Serial Interface and MDC/MDIO</li> <li>• CRC checker, packet counter</li> <li>• Auto-calibration for MAC interface outputs</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-PCI</b>	Prodigy PCI Interface Module	<ul style="list-style-type: none"> <li>• Provide a 32-bit 3.3V PCI Edge Connector</li> <li>• Occupies one Prodigy connector</li> </ul>

<b>P-PM-GPIOE</b>	Prodigy GPIO Extension Module	<ul style="list-style-type: none"> <li>• Two RS232s interfaces</li> <li>• Two I2C interfaces</li> <li>• One Mictor-38 connector</li> <li>• One ARM JTAG interface</li> <li>• 8 LEDs, 4 push buttons &amp; 8 Switches</li> <li>• Two 20*2 pin headers</li> <li>• 2 channels of SerDes through MMCX connectors</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-PPM</b>	Prodigy Processor Peripheral Module	<ul style="list-style-type: none"> <li>• One NAND Flash socket</li> <li>• One NOR Flash socket</li> <li>• One SPI Flash socket</li> <li>• One I2C EEPROM socket</li> <li>• One MicroSD card socket</li> <li>• One ARM JTAG connector</li> <li>• One ARM ETM debugger trace connector</li> <li>• Two I2C interfaces</li> <li>• 4 LEDs, 4 Switches and 10 Pin Headers</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-PPMS</b>	Prodigy Processor Peripheral Module Plus	<ul style="list-style-type: none"> <li>• One TSOP48 NAND Flash socket</li> <li>• One TSOP56 NOR Flash socket</li> <li>• One SOIC16 QSPI Flash (1.8V or 3.3V) socket</li> <li>• Two SOIC8 QSPI Flash (1.8V or 3.3V) socket</li> <li>• One WSON8 SPI Flash (1.8V) socket</li> <li>• One SOIC8 I2C EEPROM (1.8V or 3.3V) socket</li> <li>• One MicroSD card socket</li> <li>• One ARM JTAG connector</li> <li>• One ARM ETM debugger trace connector</li> <li>• 3 LEDs and 2 push buttons</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-USBPHY</b>	Prodigy USB Interface Module	<ul style="list-style-type: none"> <li>• Supports USB2.0 device mode only</li> <li>• Provides one 2x7 pin header, four LEDs, one 8-pole switch and two push buttons</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-USB2 V3.0</b>	Prodigy USB2.0 Interface Module V3.0	<ul style="list-style-type: none"> <li>• Support device and OTG mode</li> <li>• Provide a USB2.0 UTMI PHY (USB3250)</li> <li>• Provide a USB2.0 ULPI PHY (USB3320)</li> <li>• Provide 2 LEDs and 2 Push Buttons</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-USB3</b>	Prodigy USB3.0 Interface Module	<ul style="list-style-type: none"> <li>• Support host and device mode</li> <li>• Provide PIPE to Link Layer Controller</li> <li>• Provide ULPI to Link Layer Controller</li> <li>• Support UTMI-compliant/USB2.0 Certified for device operation</li> <li>• Provide 3 LEDs and 2 Push Buttons</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-USB3T</b>	Prodigy USB Data Transfer Module	<ul style="list-style-type: none"> <li>• Supports USB peripheral functionality compliant with USB3.1</li> <li>• Provides one 2x7 pin header, three LEDs and one push button</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>C-PM-MSAS</b>	Customized Prodigy Min-SAS Module	<ul style="list-style-type: none"> <li>• Convert 136 GPIOs between two Prodigy connectors</li> <li>• Convert 4 SerDes from Prodigy connector to Mini-SAS connector</li> <li>• Support synchronous and asynchronous reference clock</li> <li>• Provides a 160MHz reference clock.</li> <li>• Support 6 SIDEBAND signals for Mini-SAS connector</li> <li>• Occupies one Prodigy connector</li> </ul>

<b>C-PM-MSAS V2.0</b>	Customized Prodigy Min-SAS Module V2.0	<ul style="list-style-type: none"> <li>• Convert 136 GPIOs between two Prodigy connectors</li> <li>• Convert 4 SerDes from Prodigy connector to Mini-SAS connector</li> <li>• Support synchronous and asynchronous reference clock</li> <li>• Support 10 ~ 810MHz programmable clock as reference clock</li> <li>• Support 6 SIDEBAND signals for Mini-SAS connector</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>C-PM-x4SFP+</b>	Customized 4 Channel SFP+ Module	<ul style="list-style-type: none"> <li>• Provide 4 channel SFP+ connector</li> <li>• Provides 10~810MHz on-board programmable reference clock</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>C-PM-GPIM V3.0</b>	Customized Prodigy General Peripheral Interface Module V3.0	<ul style="list-style-type: none"> <li>• Provide 5 I2C connections</li> <li>• Provides a 20-pin ARM JTAG interface</li> <li>• Provides a SGPIO interface</li> <li>• Provides a PWM pin header</li> <li>• Provide 2 SPI flash sockets</li> <li>• Provides a RJ45 to 2 UART interfaces</li> <li>• Provides a 4-bit GPIO switch</li> <li>• Support level shift for UART or ARM JTAG or SPGIO or PWM between 3.3V and 1.8V</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>C-JTAG-8</b>	Customized 8-Chain JTAG Tool Kit	<ul style="list-style-type: none"> <li>• Supports to chain JTAG ports of up to 8 Xilinx FPGAs into one JTAG Chain</li> <li>• Provides an 8-position DIP switch</li> </ul>
<b>C-JTAG-16</b>	Customized 16-Chain JTAG Tool Kit	<ul style="list-style-type: none"> <li>• Supports to chain JTAG ports of up to 16 Xilinx FPGAs into one JTAG Chain</li> </ul>

## ► High Speed GT Peripherals

Product Number	Product Name	Product Description
<b>P-PGM-x8PCIEAK</b>	8-Lane PCIe Gen3 PGT Module Type A	<ul style="list-style-type: none"> <li>• PCIe Gen1/Gen2/Gen3 8-Lane cable connector to link to external host PC through OSS PCIe Kit</li> <li>• Provide 3 LEDs and 1 Push Button</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-x8PCIEAKX</b>	8-Lane PCIe Gen3 PGT Module Type A	<ul style="list-style-type: none"> <li>• PCIe Gen1/Gen2/Gen3 8-Lane cable connector to link to external host PC through OSS PCIe Kit</li> <li>• Provide 3 LEDs and 1 Push Button</li> <li>• Occupies one two MCIO connectors</li> </ul>
<b>P-PGM-x8PCIE3-AK V2</b>	8-Lane PCIe Gen3 PGT Adapter Kit V2	<ul style="list-style-type: none"> <li>• PCIe Gen1/Gen2/Gen3 8-Lane cable connector to link to external host PC through Minerva card</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-x8PCIE-AKB</b>	8-Lane PCIe Gen3 PGT Adapter Kit Type B	<ul style="list-style-type: none"> <li>• PCIe Gen1/Gen2/Gen3 8-Lane cable connector to link to external host PC through IOI Kit</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-x4PCIEA</b>	4-Lane PCIe Gen2 PGT Module Type A	<ul style="list-style-type: none"> <li>• PCIe 4-Lane cable connector to link to external host PC through OSS PCIe Kit</li> <li>• Provides one Firefly connector</li> <li>• Low-jitter precision 100MHz LVDS OSC supply the SerDes reference clock</li> <li>• Provides 3 LEDs and 1 Push Button</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-x8PCIERC</b>	8-Lane PCIe Root Complex PGT Module	<ul style="list-style-type: none"> <li>• Provides one x16 PCIe Slots, only support 8 lanes</li> <li>• Provides one 100MHz reference clock</li> <li>• Provides 3 LEDs and 1 Push Buttons</li> <li>• Occupies one PGT connectors</li> </ul>
<b>P-PGM-x8PCIERCx2</b>	2 Slot 8-Lane PCIe Root Complex PGT Module	<ul style="list-style-type: none"> <li>• Provides two x16 PCIe Slots, only support 8 lanes</li> <li>• Provides one 100MHz reference clock</li> <li>• Provides 3 LEDs and 2 Push Buttons</li> <li>• Occupies two PGT connectors</li> </ul>
<b>P-PGM-x8PCIERCx2B</b>	2 Slot 8-Lane PCIe Root Complex PGT Module Type B	<ul style="list-style-type: none"> <li>• Provides two x16 PCIe Slots, only support 8 lanes</li> <li>• Provides one 100MHz reference clock</li> <li>• Provides 3 LEDs and 2 Push Buttons</li> <li>• Occupies two PGT connectors</li> </ul>
<b>P-PGM-x2QSFP+</b>	2 Channel QSFP+ PGT Module	<ul style="list-style-type: none"> <li>• Provide x2 QSFP+ connectors with 1x2 cage</li> <li>• Provide 100MHz and 156.25MHz on-board LVDS oscillator</li> <li>• Provide x2 Push Buttons and x2 LEDs</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-x4SFP+</b>	4 Channel SFP+ PGT Module	<ul style="list-style-type: none"> <li>• Provide 100MHz and 156.25MHz reference clocks</li> <li>• Provide 4x SFP+ connectors with 2x2 cage</li> <li>• Provide 8 LEDs and 8 Switches</li> <li>• Occupies one PGT connector</li> </ul>



<b>P-PGM-SATA</b>	SATA PGT Module	<ul style="list-style-type: none"> <li>• Four SATA connectors, includes 2x host &amp; 2x device</li> <li>• On-board 150MHz LVDS oscillator supply the reference clock</li> <li>• 8 MMCX connectors for 2 channel SerDes</li> <li>• 2 MMCX connectors for reference clock input</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-SMAx8</b>	8 Channel Transceivers on SMA PGT Module	<ul style="list-style-type: none"> <li>• 8-channel transmitter of PGT to SMA</li> <li>• 8-channel receiver of PGT to SMA</li> <li>• Provide two reference clocks</li> <li>• Provide two LEDs</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-2DM</b>	PGT to DM Converter Module	<ul style="list-style-type: none"> <li>• Convert one PGT connector to two Firefly connectors</li> <li>• Provide 2 LEDs</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-2MSASB</b>	PGT to Mini-SAS Module Type B	<ul style="list-style-type: none"> <li>• Convert 8 SerDes from one PGT connector to two Mini-SAS connectors</li> <li>• Support 2 SIDEBAND signals for Mini-SAS connector</li> <li>• Provide 3 LEDs and 1 push button</li> <li>• Occupies one PGT connector</li> </ul>
<b>C-PGM-MSAS V3.0</b>	Customized PGT Mini-SAS Module V3.0	<ul style="list-style-type: none"> <li>• Convert 8 SerDes from one PGT connector to two Mini-SAS connectors</li> <li>• Supports synchronous and asynchronous reference clock</li> <li>• Supports a 10 ~ 810MHz programmable clock as reference clock</li> <li>• Support 6 SIDEBAND signals for Mini-SAS connector</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-MDMPRO</b>	PGT to Mini-SAS Converter Module	<ul style="list-style-type: none"> <li>• Convert 8 SerDes from one PGT connector to two Mini-SAS connectors</li> <li>• Supports a 200MHz clock as reference clock</li> <li>• Support 100MHz clock</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-IOT</b>	PGT I/O Testing Module	<ul style="list-style-type: none"> <li>• Provides loopback testing circuit to high-speed transceivers</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-CSM</b>	PGT Connector Spacer Module	<ul style="list-style-type: none"> <li>• Adds approximately 9.7 mm of height</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-MIOC</b>	PGT Mezzanine Connector	<ul style="list-style-type: none"> <li>• Mates with the PGT connector used on Prodigy Logic Systems</li> <li>• Occupies one PGT connector</li> </ul>
<b>P-PGM-SIOC</b>	PGT Socket Connector	<ul style="list-style-type: none"> <li>• PGT connector used on Prodigy Logic Systems</li> </ul>

## ► High Speed MCIO Peripherals

Product Number	Product Name	Product Description
<b>P-MCIO-x16PCIERC</b>	16-Lane PCIe Root Complex MCIO Module	<ul style="list-style-type: none"> <li>• Converts four MCIO connector to one x16 PCIe Slot</li> <li>• Provides one 100MHz reference clock</li> <li>• Provides 3 LEDs and 1 Push Buttons</li> <li>• Occupies four MCIO connectors</li> </ul>
<b>P-MCIO-x8PCIERC</b>	8-Lane PCIe Root Complex MCIO Module	<ul style="list-style-type: none"> <li>• Provides one x16 PCIe Slot, only support 8 lanes</li> <li>• Provides one 100MHz reference clock</li> <li>• Provides 3 LEDs and 1 Push Buttons</li> <li>• Occupies two MCIO connectors</li> </ul>
<b>P-MCIO-PGM</b>	MCIO to PGT Converter Module	<ul style="list-style-type: none"> <li>• Converts two MCIO connectors to one PGT connector</li> <li>• Each MCIO has 4 transceivers, 2 LVDS signals, 4 single-ended signals and 1 differential reference clock</li> <li>• Occupies two MCIO connectors</li> </ul>
<b>P-MCIO2MSAS</b>	MCIO to Mini-SAS Converter Module	<ul style="list-style-type: none"> <li>• Converts 8 MCIO connectors to 8 Mini-SAS connectors</li> <li>• Each MCIO or Mini-SAS has 4 transceivers and 8 single-ended signals</li> <li>• Occupies 8 MCIO connectors</li> </ul>
<b>P-MCIO250</b>	Prodigy MCIO Cables	<ul style="list-style-type: none"> <li>• Connects two MCIO connectors</li> <li>• Support the differential voltage standard</li> <li>• Standard cable lengths: 250mm, 1000mm, 1500mm &amp; 3000mm</li> </ul>
<b>P-MCIO1000</b>		
<b>P-MCIO1500</b>		
<b>P-MCIO3000</b>		

## ► ARM Processor Adapters

Product Number	Product Name	Product Description
<b>P-PM-ZCINT</b>	Prodigy Zynq Interface Module	<ul style="list-style-type: none"> <li>• Provides the bridge between Xilinx ZC7(ZC702/ZC706/Z-CU102) EVB and Prodigy Logic Module/System</li> <li>• Provide two FMC-HPC and two FireFly connectors</li> <li>• Provide 8 differential clocks input, one 2x7 pin header, two I2Cs and two UARTs</li> <li>• Occupies two Prodigy connectors</li> </ul>
<b>P-PM-ARMJUNOIK</b>	Prodigy ARM Juno Interface Module Kit	<ul style="list-style-type: none"> <li>• Bridge the ARM Juno Development Platform and Prodigy LM / LS / LX</li> <li>• Provides 2 FMC-HPC connectors</li> <li>• Provide one 2x4 Pin Header, one UART and four LEDs</li> <li>• Occupies one Prodigy connector</li> </ul>

## ► Memory Modules

Product Number	Product Name	Product Description
<b>P-1GBK7DDR3M</b>	1GB DDR3 Memory Module for K7 Logic Modules	<ul style="list-style-type: none"> <li>• Two Micron MT41J256M16HA-125 or equivalent DDR3 SDRAM devices</li> <li>• On-board 200MHz system clock</li> <li>• Up to 800Mbps data rate</li> <li>• I/O voltage operating at 1.5V</li> <li>• Occupies one LM I/O connector</li> </ul>
<b>P-DDR4-8GB</b>	8GB DDR4 Pre-tested SO-DIMM Memory Module	<ul style="list-style-type: none"> <li>• Occupies one DDR4 SO-DIMM socket</li> </ul>
<b>P-PM-DDR3</b>	Prodigy DDR3 Memory Module	<ul style="list-style-type: none"> <li>• Provides one 64bit DDR3 SODIMM Socket</li> <li>• Provides one push button and three LEDs</li> <li>• Occupies one Prodigy connector</li> <li>• Requires only a single 3.3V Power Supply</li> </ul>
<b>P-PM-DDR3B</b>	Prodigy DDR3 Memory Module Type B	<ul style="list-style-type: none"> <li>• Provide one 64-bits, single rank, 4GB capacity DDR3 memory</li> <li>• Provides one push button and three LEDs</li> <li>• Occupies one Prodigy connector</li> <li>• Supports self-powered mode and external 3.3V power supply</li> </ul>
<b>P-PM-DDR4</b>	Prodigy DDR4 Memory Module	<ul style="list-style-type: none"> <li>• Provides one 72 bits DDR4 SODIMM socket</li> <li>• Provides one push button and three LEDs</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-DDR4D V2.0</b>	Prodigy DDR4 Memory Module Type D	<ul style="list-style-type: none"> <li>• Provides one 64-bits, single rank, 4GB capacity DDR4 memory</li> <li>• Provides on board 100MHz LVDS Oscillator for DDR4 system clock</li> <li>• Supports external DDR4 system clock through MMCX</li> <li>• Provides one push button and three LEDs</li> <li>• Occupies one Prodigy connector</li> <li>• Support self-powered mode</li> </ul>
<b>P-PM-DDR4E</b>	Prodigy DDR4 Memory Module Type E	<ul style="list-style-type: none"> <li>• Provides one SODIMM socket, supports dual rank, 72-bit ECC DDR4</li> <li>• Provides one on-board 200MHz LVDS oscillator</li> <li>• Provides one push button and three LEDs</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-EMMC</b>	Prodigy eMMC Memory Module	<ul style="list-style-type: none"> <li>• JEDEC/MMC standard version 5.0 compliant, MMC V4.41 compatible, and fully backward compatible with the previous Multi-Media Card system</li> <li>• Support high-priority interrupt scheme and background operation</li> <li>• Default data bus width is 1-bit, can be configured to 4-bit or 8-bit</li> <li>• Provides 4 LEDs and 2 push-buttons</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-LPDDR4</b>	Prodigy LPDDR4 Memory Module	<ul style="list-style-type: none"> <li>• Provide two low-power, double data rate 16Gb memory devices (MT53D512M32D2)</li> <li>• Provide one 200MHz OSC as system clock input</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-ECCDDR4-16GB</b>	Pre-tested 16GB ECC DDR4 SO-DIMM Memory	<ul style="list-style-type: none"> <li>• Pre-tested 16GB ECC DDR4 SO-DIMM Memory (Dual-rank) works out-of-box with the 10M &amp; 19P Prodigy Logic Systems</li> <li>• Occupies one DDR4 SO-DIMM socket</li> </ul>

<b>P-PM-18MSRAM</b>	Prodigy 18MB SRAM Module	<ul style="list-style-type: none"> <li>• Contains two 72Mbit 'NO WAIT' state bus SRAMs</li> <li>• Memory width selectable as 36bits or 72bits</li> <li>• Up to 117MHz access frequency</li> <li>• SRAM I/O Voltage is +1.8V</li> <li>• Occupies one Prodigy connector</li> </ul>
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## ► Embedded & Multimedia

Product Number	Product Name	Product Description
<b>P-PM-DP</b>	Prodigy DisplayPort Interface Module	<ul style="list-style-type: none"> <li>• Provides a DisplayPort Source (TX) connector</li> <li>• Provides a DisplayPort Sink (RX) connector</li> <li>• Provide a GMII and RGMII Ethernet PHY</li> <li>• Provide 3 LEDs, 2 Push buttons and 8 GPIOs</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-HDMI</b>	Prodigy HDMI Interface Module	<ul style="list-style-type: none"> <li>• Provides an HDMI video output</li> <li>• Provides an HDMI video input</li> <li>• Provides an I2C interface to HDMI transmitter</li> <li>• Provide 3 LEDs, 1 Push button and a 7-pin header</li> <li>• Support LVCMOS 1.8V I/O standard</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-HDMI2</b>	Prodigy HDMI2.0 Interface Module	<ul style="list-style-type: none"> <li>• Provides an HDMI 2.0 video output</li> <li>• Provides an HDMI 2.0 video input</li> <li>• Provide 3 LEDs, 2 Push buttons and a 7-pin header</li> <li>• Support LVCMOS 1.8V I/O standard</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-MIPIADK</b>	Prodigy MIPIADPT Adapter Module	<ul style="list-style-type: none"> <li>• Ready-to-use MIPI D-PHY bundle including D-PHY camera and LCD</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-MIPIADPT</b>	Prodigy MIPI Adapter Module	<ul style="list-style-type: none"> <li>• Supports 4x4-lane or 2x8-lane MIPI interfaces through MMCX connector</li> <li>• Supports 16 GPIOs, and I/O voltage can be 1.8V or 3.3V</li> <li>• Supports 200MHz Constant clock</li> <li>• Provide three LEDs and two push buttons</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-MIPIA</b>	Prodigy MIPI Adapter Module	<ul style="list-style-type: none"> <li>• Provide one MIPI DSI 15PIN-1.0MM Connector via MMCX</li> <li>• Provide one FFC 15PIN-1.0MM Connector via MMCX</li> <li>• Provide one IMX415 24PIN-0.5MM Connector via MMCX</li> <li>• Provide one IMX335 24PIN-0.5MM Connector via MMCX</li> <li>• 32 MMCX connectors</li> </ul>
<b>P-PM-MIPIPHYB</b>	Prodigy MIPI D-PHY Type B Interface Module	<ul style="list-style-type: none"> <li>• Supports up to x3 4 channels MIPI D-PHY RX/TX using ZUCG-2</li> <li>• Provide 12 user GPIOs</li> <li>• Provide 3 user LEDs</li> <li>• Provide 2 user Push Buttons</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>C-MIPI-ADPT-A</b>	Customized MIPI Adapter Module Type A	<ul style="list-style-type: none"> <li>• Provide a CSI Camera Connector</li> <li>• Provide a DSI LCD Connector</li> <li>• Provide 16 MMCX connector</li> </ul>

## ► Expansions & Accessories

Product Number	Product Name	Product Description
<b>P-PM-FMCHPC V2.0</b>	Prodigy to FMC-HPC Converter Module V2.0	
<b>P-PM-FMCLPC</b>	Prodigy to FMC-LPC Converter Module	
<b>P-GCLKMD V3.0 (for LS)</b>	Global Clocks Management Module Type D V3.0(for LS)	
<b>P-GCLKME</b>	Global Clocks Management Module Type E	
<b>P-GCLKMX V2.0</b>	Global Clocks Management Module V2.0 for LX	
<b>P-PM-2HT3 V2</b>	Prodigy to HT3 Converter Module V2.0	
<b>P-PM-2LM</b>	Prodigy to LM Converter Module	
<b>P-PM-2PH</b>	Prodigy to Pin Header Module	

<b>P-PM-IOLS</b>	Prodigy I/O Level Shifting Module	<ul style="list-style-type: none"> <li>• Converts the signal level from 1.8V to 3.3V.</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-RM</b>	Prodigy Rotation Module	<ul style="list-style-type: none"> <li>• Rotate the Prodigy connector by 180 degrees</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-SEM V2.0</b>	Prodigy Socket Extender Module V2.0	<ul style="list-style-type: none"> <li>• VCCIO output adjustable</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-ISOM</b>	Prodigy Isolation Module	<ul style="list-style-type: none"> <li>• Provides IO isolation function between the daughter card and FPGA</li> <li>• One Prodigy Mezzanine connector J1 on the bottom side mated to the FPGA module</li> <li>• One Prodigy connector J2 on the top side mated to the daughter card</li> <li>• All IOs should be fixed to 1.8V which is set by EEPROM on the daughter card</li> </ul>
<b>P-PM-IOT</b>	Prodigy I/O Testing Module	<ul style="list-style-type: none"> <li>• Provides loop back circuits with LED status lights</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-CSM V2.0</b>	Prodigy Connector Spacer Module V2.0	<ul style="list-style-type: none"> <li>• Adds approximately 19mm of height</li> </ul>
<b>P-DDR42PM</b>	Prodigy DDR42PM Module	<ul style="list-style-type: none"> <li>• Converts a DDR4 SODIMM socket to a Prodigy connector</li> </ul>
<b>P-PM-MIOC</b>	Prodigy Mezzanine Connector	<ul style="list-style-type: none"> <li>• Mates with the Prodigy connector used on Prodigy Logic Systems or Logic Modules</li> <li>• The connector has a height of 8mm</li> <li>• Samtec Part Number: SEAM-30-02.0-S-10-2-A-K-TR</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-MTIOC</b>	Prodigy Mezzanine Tall Connector	<ul style="list-style-type: none"> <li>• Mates with the Prodigy Connector used on Prodigy Logic Modules and Logic Systems</li> <li>• The connector has a height of 11mm</li> <li>• Samtec Part Number: SEAM-30-11.0-S-10-2-A-K-TR</li> <li>• Occupies one Prodigy connector</li> </ul>
<b>P-PM-SIOC</b>	Prodigy Socket Connector	<ul style="list-style-type: none"> <li>• Prodigy Connector used on Prodigy Logic Modules and Prodigy Logic Systems</li> <li>• Samtec Part Number: SEAF-30-06.5-S-10-2-A-K-TR</li> </ul>
<b>P-MINISAS200</b>	Prodigy Mini-SAS Cables	<ul style="list-style-type: none"> <li>• Connects the two Mini-SAS I/O connectors</li> <li>• Support the differential voltage standard</li> <li>• Standard cable lengths: 200mm, 600mm &amp; 1000mm</li> </ul>
<b>P-MINISAS600</b>		
<b>P-MINISAS1000</b>		
<b>USB-BLASTER-GFEC-1</b>	GFEC Altera USB Blaster	<ul style="list-style-type: none"> <li>• Supports Intel FPGA download and debug through JTAG interface when connect to PC through USB connection</li> </ul>
<b>USB-XLNX-WS</b>	WaterSpirit Xilinx USB Download Cable	<ul style="list-style-type: none"> <li>• Supports Xilinx FPGA download and debug through JTAG interface when connect to PC through USB connection</li> </ul>

## ► Connector Connectivity

Product Number	Product Name	Product Description
<b>P-PM-IMC</b>	Prodigy Interconnection Module Type C	<ul style="list-style-type: none"> <li>Connects 144 GPIO and 4 SerDes between two Prodigy connectors</li> <li>Fixed 100MHz Reference Clock</li> <li>The spacing between two connectors is 75mm</li> </ul>
<b>P-PM-IMCP</b>	Prodigy Programmable Interconnection Module Type C	<ul style="list-style-type: none"> <li>Connects 144 GPIO and 4 SerDes between two Prodigy connectors</li> <li>Programmable (10 ~ 810MHz) Reference Clock</li> <li>The spacing between two connectors is 75mm</li> </ul>
<b>P-PM-IMD</b>	Prodigy Interconnection Module Type D	<ul style="list-style-type: none"> <li>Connects 144 GPIO and 4 SerDes between two Prodigy connectors</li> <li>Fixed 100MHz Reference Clock</li> <li>The spacing between two connectors is 35mm</li> </ul>
<b>P-PM-IMD(160MHz)</b>	Prodigy Interconnection Module Type D	<ul style="list-style-type: none"> <li>Connects 144 GPIO and 4 SerDes between two Prodigy connectors</li> <li>Fixed 160MHz Reference Clock</li> <li>The spacing between two connectors is 35mm</li> </ul>
<b>P-PM-IMDP</b>	Prodigy Programmable Interconnection Module Type D	<ul style="list-style-type: none"> <li>Connects 144 GPIO and 4 SerDes between two Prodigy connectors</li> <li>Programmable (10 ~ 810MHz) Reference Clock</li> <li>The spacing between two connectors is 35mm</li> </ul>
<b>P-PM-IMHX</b>	Prodigy Interconnection Module Type H for LX	<ul style="list-style-type: none"> <li>Connects 144GPIO between two Prodigy connectors</li> </ul>
<b>P-PM-IMVX</b>	Prodigy Interconnection Module Type V for LX	<ul style="list-style-type: none"> <li>Connects 144GPIO between two Prodigy connectors</li> </ul>
<b>P-PCBLB150</b>	Prodigy Interconnection Cables Type B	<ul style="list-style-type: none"> <li>Connects the two Prodigy connectors</li> <li>Support 144-pin single-ended / 72-pairs LVDS</li> <li>Standard cable lengths: 150mm, 254mm, 635mm, 1000mm &amp; 2000mm</li> </ul>
<b>P-PCBLB254</b>		
<b>P-PCBLB635</b>		
<b>P-PCBLB1000</b>		
<b>P-PCBLB2000</b>		



## S2C

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