Zynq®-7000 and Zynq® UltraScale+™ SoC Systems Guide
FROM CONCEPT TO PRODUCTION
Design it or Buy it?

Avnet’s ready-made SoC modules can shorten your development cycle

Today’s quick time-to-market demands are forcing you to rethink how you design, build and deploy your products. Sometimes it’s faster, less costly, and lower risk to incorporate an off-the-shelf solution instead of designing from the beginning. Avnet’s System-On-Module (SOM) and Single-Board Computer (SBC) solutions for the Xilinx Zynq®-7000 and Zynq UltraScale+ All Programmable SoC can reduce development times by more than four months, allowing you to focus your efforts on adding differentiating features and unique capabilities.

Avnet’s SoC Modules Offer the Following Benefits:
- Reduce risk by building your application upon a known working system
- Get running quickly with example designs, tutorials, and board support packages
- Start software development immediately
- Customize the module with Avnet Engineering Services (e-mail us at customize@avnet.com to explore the options)

With now over twelve years of experience building SOM products, we’ve helped many companies attain a jump start on their products and get to market faster. Contact us today to get started!

Avnet’s Zynq-7000 and Zynq UltraScale+ All Programmable SoC SOM Solutions

<table>
<thead>
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<td>Zynq Device</td>
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<td>7Z015-1</td>
<td>7Z020-1</td>
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<td>Pmod™</td>
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<td>4&quot; x 2.25&quot; x 0.57&quot;</td>
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<td>Resale¹</td>
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1. Resale based on 1k units (commercial grade)
2. Zynq: PL IO / PS MIO
3. PicoZed uses low-power DDR3L memory

Pmod is a registered trademark of Digilent
PicoZed™

PicoZed™ is a highly flexible, rugged SOM that is based on the Xilinx Zynq-7000 All Programmable SoC. It offers designers the flexibility to migrate between the 7010, 7015, 7020, and 7030 Zynq-7000 All Programmable SoC devices in a pin-compatible footprint. The PicoZed module contains the common functions required to support the core of most SoC designs, including memory, configuration, Ethernet, USB, clocks, and power. It provides easy access to over 100 user I/O pins through three I/O connectors on the backside of the module. These connectors also support access to dedicated interfaces for Ethernet, USB, JTAG, power and other control signals, as well as the GTP/GTX transceivers on the 7015/7030 models. The transceiver based 7015 and 7030 versions of PicoZed are a superset of the 7010/7020 version, adding four high-speed serial transceiver ports to the I/O connectors. Designers can simply design their own carrier card, plug-in PicoZed, and start their application development with a proven Zynq-7000 All Programmable SoC sub-system.

Industrial Temperature PicoZed SOMs are built with components supporting extended temperatures of -40 to +85°C. Due to the configurability of the Zynq device, the user must perform final temperature testing validation.

**FEATURES**

**SoC options**
- XC7Z010-1CLG400
- XC7Z015-1CLG485
- XC7Z020-1CLG400
- XC7Z030-1SBG485

**Memory**
- 1 GB of DDR3L SDRAM
- 8 GB eMMC
- 128 Mb of QSPI Flash

**Communications**
- 10/100/1000 Ethernet PHY
- USB 2.0 OTG PHY

**User I/O (via three board-to-board connectors)**
- 7Z010 Version
  - 113 User I/O (100 PL, 13 PS MIO)
  - PL I/O configurable as up to 48 LVDS pairs or 100 single-ended I/O
- 7Z015 Version
  - 148 User I/O (135 PL, 13 PS MIO)
  - PL I/O configurable as up to 65 LVDS pairs or 135 single-ended I/O
  - 4 GTP Transceivers
- 7Z020 Version
  - 138 User I/O (125 PL, 13 PS MIO)
  - PL I/O configurable as up to 60 LVDS pairs or 125 single-ended I/O
- 7Z030 Version
  - 148 User I/O (135 PL, 13 PS MIO)
  - PL I/O configurable as up to 65 LVDS pairs or 135 single-ended I/O
  - 4 GTX Transceivers

**Other**
- JTAG configuration port accessible via I/O connectors
- PS JTAG pins accessible via I/O connectors
- 33.33 MHz oscillator

**Software**
- Linux BSP and reference design

**Mechanical**
- 4 inches x 2.25 inches (102 mm x 57 mm)

Additional information and downloadable documentation for PicoZed can be obtained at [www.picozed.org](http://www.picozed.org).
MicroZed™

MicroZed is a low-cost SOM that is based on the Xilinx Zynq®-7000 All Programmable SoC. In addition to the Zynq-7000 All Programmable SoC, the module contains the common functions and interfaces required to support the core of most SoC designs, including memory, configuration, Ethernet, USB, and clocks. On the bottom side of the module, MicroZed contains two 100-pin I/O headers that provide connection to two I/O banks on the programmable logic (PL) side of the Zynq-7000 All Programmable SoC device. When plugged onto a user designed baseboard or carrier card, these 100-pin connectors provide connectivity between the Zynq-7000 All Programmable SoC PL I/Os and the user circuits on the carrier card. MicroZed also includes on-board power regulation that supports 5 V input with an option to support 12 V input.

Industrial Temperature MicroZed SOMs are built with components supporting extended temperatures of -40 to +85°C, with the exception of the use of the uSD card connector. Due to the configurability of the Zynq device, the user must perform final temperature testing validation.

PARTS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Resale 1-99</th>
<th>Resale* 100-499</th>
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<td>AES-Z7MB-7Z010-SOM-G</td>
<td>7Z010 MicroZed SOM</td>
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<td>AES-Z7MB-7Z020-SOM-G</td>
<td>7Z020 MicroZed SOM</td>
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<td>7Z010 Ind. Temp MicroZed SOM</td>
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<td>AES-Z7MB-7Z020-SOM-I-G</td>
<td>7Z010 Ind. Temp MicroZed SOM</td>
<td>$265 USD</td>
<td>$245 USD</td>
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*Contact your local Avnet sales office for pricing on higher quantities

Additional information and downloadable documentation for MicroZed can be obtained at www.microzed.org.

FEATURES

SoC
- XC7Z010-1CLG400 or
- XC7Z020-1CLG400

Memory
- 1 GB of DDR3 SDRAM
- 128 Mb of QSPI Flash
- Micro SD card interface

Communications
- 10/100/1000 Ethernet
- USB 2.0 OTG
- USB-UART

User I/O (via dual board-to-board connectors)
- 7Z010 Version
  - 108 User I/O (100 PL, 8 PS MIO)
  - PL I/O configurable as up to 48 LVDS pairs or 100 single-ended I/O
- 7Z020 Version
  - 123 User I/O (115 PL, 8 PS MIO)
  - PL I/O configurable as up to 55 LVDS pairs or 115 single-ended I/O

Other
- 2x6 Digilent Pmod® compatible interface providing 8 PS MIO connections for user I/O
- Xilinx PC4 JTAG configuration port
- PS JTAG pins accessible via Pmod or I/O headers
- 33.33 MHz oscillator
- User LED and push switch

Software
- Linux BSP and reference design

Mechanical
- 4 inches x 2.25 inches (102 mm x 57 mm)
UltraZed™

UltraZed-EG™ SOM is a highly flexible, rugged, System-On-Module (SOM) based on the Xilinx Zynq® UltraScale+™ MPSoC. Designed in a small form factor, the UltraZed-EG SOM packages all the necessary functions such as system memory, Ethernet, USB, and configuration memory needed for an embedded processing system. The UltraZed-EG provides easy access to 180 user I/O pins, 26 PS MIO pins, and 4 high-speed PS GTR transceivers along with 4 GTR reference clock inputs through three I/O connectors on the backside of the module.

Designers can simply design their own carrier card, plug-in UltraZed-EG SOM, and start their application development with a proven Zynq UltraScale+ MPSoC sub-system. Available with the Zynq UltraScale+ MPSoC XCZU3EG-SFVA625 device, the UltraZed-EG SOM enables designers to build high-performance systems with confidence and ease. By simply plugging the off-the-shelf UltraZed-EG SOM into an application specific carrier card, system bring-up and debug time can be cut in half, while overall system cost can be reduced by 20% or more versus a standard chip-down design.

**FEATURES**

**MPSoC**
- Xilinx XCZU3EG-1SFVA625 device

**Memory**
- DDR4 SDRAM (2GB, in x32 configuration)
- Dual QSPI Flash (64MB)
- I2C EEPROM (2KB)
- eMMC Flash (8GB, in x8 configuration)

**Communications**
- USB 2.0 ULPI PHY
- Gigabit Ethernet PHY
- I2C 8-bit I/O expander

**Other**
- 2-channel I2C switch/mux
- PS reference clock input
- On-board voltage regulators
- Power-On Reset (POR) circuit
- 4-position boot mode DIP switch
- Linux BSP and reference designs

**User I/O (via three board-to-board connectors)**
- 3 JX micro-header connectors (2 x 140-pin, 1 x 100-pin) providing the following connections to the Carrier Cards
  - 180 user PL I/O pins
  - 26 user PS MIO pins (one full MIO bank)
  - 4 PS GTR transceivers
  - 4 PS GTR reference clock inputs
  - PS JTAG interface
  - PL SYMON interface
  - USB 2.0 connector interface
- Gigabit Ethernet RJ45 connector interface
  - PMBus interface
- SOM PS VBATT battery input
- Carrier Card I2C interface
- Carrier Card reset input
- Carrier Card interrupt input
- Carrier Card reset output
- Power Good output
- SOM to Carrier Card ground pins
- SOM input voltages and output sense pins

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**PARTS**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Resale 1-99</th>
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<td>UltraZed-EG SOM</td>
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<td>$479 USD</td>
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*Contact your local Avnet sales office for pricing on higher quantities

Additional information and downloadable documentation for UltraZed can be obtained at [www.ultrazed.org](http://www.ultrazed.org).
The Mini-Module Plus (MMP) is a SOM based on the higher density Xilinx Zynq®-7000 All Programmable SoCs. The module contains all the necessary functions and interfaces for a high-performance SoC system. The MMP features the two highest density 7045 or 7100 Zynq devices in a pin-compatible SOM, with support for eight GTX serial transceiver interfaces running up to 8.0 Gbps each. In addition to the serial transceivers, there are 132 PL based user I/O made available on the two high density board-to-board connectors located on the underside of the module.

PARTS

<table>
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<tr>
<th>Part Number</th>
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<th>Resale 1–99</th>
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<tr>
<td>AES-MMP-7Z045-G</td>
<td>Zynq Mini-Module Plus 7Z045 Kit</td>
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<tr>
<td>AES-MMP-7Z045-SOM-G</td>
<td>Zynq Mini-Module Plus 7Z045 SOM</td>
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<td>AES-MMP-7Z100-G</td>
<td>Zynq Mini-Module Plus 7Z100 Kit</td>
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<tr>
<td>AES-MMP-7Z100-SOM-G</td>
<td>Zynq Mini-Module Plus 7Z100 SOM</td>
<td>$995 USD</td>
<td>$945 USD</td>
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</table>

*Contact your local Avnet sales office for pricing on higher quantities
*SOM versions do not include license voucher for Vivado software or cables to connect to the Mini-Module Baseboard.

FEATURES

SoC
- XC7Z045-1FFG900C or
- XC7Z100-2FFG900I

Memory
- 1 GB of DDR3 SDRAM
- 128 MB of parallel Flash
- 256 Mb of QSPI Flash
- 8 KB of I2C EEPROM
- Micro SD card interface

Communications
- 10/100/1000 Ethernet
- USB 2.0 OTG
- USB-UART

User I/O (via dual board-to-board connectors)
- 132 User I/O (66 per connector)
- Configurable as up to 66 LVDS pairs or 132 single-ended I/O
- 8 GTX ports (4 per connector)

Other
- Real-time clock
- Programmable GTX reference clock
- 200 MHz LVDS oscillator
- 33.33 MHz processor clock
- Xilinx PC4 JTAG configuration port
- Processor PJTAG header

Software
- Linux BSP and reference design

Mechanical
- 4 inches x 2.25 inches (102 mm x 57 mm)

Additional information and downloadable documentation for the Zynq Mini-Module Plus can be obtained at [www.zedboard.org/product/zynq-mmp](http://www.zedboard.org/product/zynq-mmp).
Zynq® Mini-ITX

The Zynq®-7000 All Programmable SoC Mini-ITX platform provides an industry standard, motherboard form-factor for designers seeking a high performance platform based on the Xilinx Zynq-7000 All Programmable SoC. Available with either the 7Z045 or 7Z100 SoC, the Mini-ITX offers the unique mix of user configurability, expandability, and standard interfaces that designers are looking for.

PARTS

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*Contact your local Avnet sales office for pricing on higher quantities

FEATURES

SoC
- XC7Z045-2FFG900 or XC7Z100-2FFG900

Memory
- 1 GB of DDR3 SDRAM (PS side)
- 1 GB of DDR3 SDRAM (PL side)
- 256 Mb of QSPI Flash
- 8 KB of I2C EEPROM
- Micro SD card interface

Communications
- 10/100/1000 Ethernet
- SFP+ socket
- 4-Port USB 2.0 hub
- USB-UART
- SATA-III interface
  - (requires PL core)

Expansion
- PCIe Gen2 x4 electrical, x16
- mechanical slot (Root Complex)
- FMC slot (HPC)

Other
- HDMI output port
- LVDS LCD panel interface
- Audio input and output
- Real-time clock
- Programmable GTX
- reference clock
- 200 MHz LVDS oscillator
- 33.33 MHz processor clock
- Xilinx PC4 JTAG
- configuration port
- Processor PJTAG header
- 8 User LEDs
- Push and DIP switches
- Standard ATX power
- connector input

Software
- Linux BSP and reference design

Mechanical
- 6.7 inches x 6.7 inches (170 mm x 170 mm)

Additional information and downloadable documentation for the Zynq Mini-ITX can be obtained at www.zedboard.org/product/mini-itx-board.
**PICOZED™**

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<td>AES-PZCC-FMC-V2-G</td>
<td>PicoZed Carrier Card V2</td>
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<td>AES-Z7PZ-SVDK-G</td>
<td>PicoZed Smart Vision Kit</td>
<td>$895 USD</td>
<td><a href="http://www.picozed.org">www.picozed.org</a></td>
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<tr>
<td>AES-PZ-EMBV-KIT-G</td>
<td>PicoZed Embedded Vision Development Kit</td>
<td>$1,500 USD</td>
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<td>AES-PZCC-AZTEK-G</td>
<td>PicoZed Transceiver Evaluation Kit (AZTEK)</td>
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**MICROZED™**

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<td>AES-Z7MB-7Z010-G</td>
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<td>AES-MBCC-IO-G</td>
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<td>AES-ARDUINO-CC-G</td>
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<td><a href="http://www.microzed.org">www.microzed.org</a></td>
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<td>AES-MBCC-BRK-G</td>
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<td>AES-Z7MB-IIOT-SK-G</td>
<td>MicroZed Industrial IoT Starter Kit</td>
<td>$299 USD</td>
<td><a href="http://www.microzed.org">www.microzed.org</a></td>
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<tr>
<td>AES-Z7MB-IIOT-UP-G</td>
<td>MicroZed Industrial IoT Upgrade Kit</td>
<td>$129 USD</td>
<td><a href="http://www.microzed.org">www.microzed.org</a></td>
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<tr>
<td>AES-Z7MB-I4EK-G</td>
<td>MicroZed Industry 4.0 Ethernet Evaluation Kit</td>
<td>$699 USD</td>
<td><a href="http://www.microzed.org">www.microzed.org</a></td>
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**ULTRAZED™**

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<td>AES-ZU3EG-1-SK-G</td>
<td>UltraZed Starter Kit</td>
<td>$895 USD</td>
<td><a href="http://www.ultrazed.org">www.ultrazed.org</a></td>
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**ZYNQ® MINI-MODULE PLUS™**

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<td>AES-MMP-BB2-G</td>
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<td>AES-POM-LTM1-G</td>
<td>GE Energy Power Module</td>
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<td>AES-POM-RHM1-G</td>
<td>Rohm Power Module</td>
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<td><a href="http://www.zedboard.org">www.zedboard.org</a></td>
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*Contact your local Avnet sales office for pricing on higher quantities*
## ZYNQ® MINI-ITX™

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<td>AES-MINI-ITX-7Z100-BAS-G</td>
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<td><a href="http://www.zedboard.org">www.zedboard.org</a></td>
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## OTHER KITS AND ACCESSORIES

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<td>AES-MINIZED-7Z007-G</td>
<td>MiniZed Z7007S Starter Kit</td>
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<tr>
<td>AES-Z7EV-7Z020-G</td>
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<td>AES-PMOD-TPM12-SLB9670-G</td>
<td>Infineon TPM v1.2 Peripheral Module</td>
<td>$29.95 USD</td>
<td><a href="http://www.microzed.org/product/trusted-platform-module-security-pmod">www.microzed.org/product/trusted-platform-module-security-pmod</a></td>
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<td>AES-FMC-HDMI-CAM-G</td>
<td>HDMI I/O + Camera Module</td>
<td>$250 USD</td>
<td><a href="http://www.avnet.me/fmc-hdmi-cam">www.avnet.me/fmc-hdmi-cam</a></td>
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<tr>
<td>AES-FMC-ISMNET2-G</td>
<td>ISM Networking FMC v2</td>
<td>$250 USD</td>
<td><a href="http://www.avnet.me/fmc-ismnet2">www.avnet.me/fmc-ismnet2</a></td>
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<td>AES-CAM-ON-PI300C-G</td>
<td>PYTHON-1300C Module</td>
<td>$499 USD</td>
<td><a href="http://www.zedboard.org/product/python-1300-c-camera-module">www.zedboard.org/product/python-1300-c-camera-module</a></td>
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<tr>
<td>AES-ALI3-ZED-G</td>
<td>7-inch Touch Display Kit</td>
<td>$499 USD</td>
<td><a href="http://www.zedboard.org/product/7-inch-zed-touch-display-kit">www.zedboard.org/product/7-inch-zed-touch-display-kit</a></td>
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<tr>
<td>AES-ALI3-AMPIRE10-G</td>
<td>10-inch Touch Display Kit</td>
<td>$499 USD</td>
<td><a href="http://www.zedboard.org/product/10-inch-touch-display-kit">www.zedboard.org/product/10-inch-touch-display-kit</a></td>
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<td>210-299P-KIT</td>
<td>JTAG HS3 Programming Cable</td>
<td>$55 USD</td>
<td><a href="http://www.avnet.me/jtaghs3">www.avnet.me/jtaghs3</a></td>
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<tr>
<td>AES-PMOD-MUR-1DX-G</td>
<td>Murata 1DX Ble WiFi Bluetooth Pmod WiFi/BLE Module</td>
<td>$59 USD</td>
<td><a href="http://www.avnet.me/pmod_1dx">www.avnet.me/pmod_1dx</a></td>
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</table>
System-on-Module Carrier Cards

### PICOZED™

#### FEATURES

**Carrier Card V2**
- uSD card socket
- x1 PCIe Gen 2
- SFP+ cage
- USB-UART

- SMA port for GTX/GTP
- 10/100/1000 Ethernet connector
- USB 2.0 connector
- LPC FMC Expansion

### MICROZED™

#### FEATURES

**Breakout Carrier Card**
- Two 60-pin (2x30) 0.1” footprints

**FMC Carrier Card**
- LPC FMC expansion connector
- Up to 4 Pmod™ expansion connectors

**Arduino Carrier Card**
- Shield and Peripheral Module expansion (2x6 pin connectors)

**I/O Carrier Card**
- Up to 12 Pmod™ expansion connectors

**Embedded Vision Carrier Card**
- Camera interface
- HDMI Input/Output
- (based on ADI ADV7511/7611)
- Power-over-Ethernet via 2nd Ethernet 10/100/1000 port

### ULTRAZED™

#### FEATURES

**PCIe Carrier Card**
- LPC FMC Connector
- PCIe x1Endpoint
- 1 PS Pmod
- 2 PL Pmods
- DP, Ethernet, USB
- SATA

**I/O Carrier Card**
- Arduino Slot
- 1 PS Pmod
- 12 PL Pmods
- DP, Ethernet, USB
- SATA

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**CONTACT INFORMATION**

<table>
<thead>
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<th>North America</th>
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<th>Japan</th>
<th>Asia</th>
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</thead>
<tbody>
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<td>Im Technologiepark 2-8 85586 Poing Germany</td>
<td>Yeibusu Garden Place Tower, 23F 4-20-3 Ebisu, Shibuya-ku Tokyo 150-6023 Japan <a href="mailto:eval-kits-jp@avnet.com">eval-kits-jp@avnet.com</a> +81-(0)3-5792-8210</td>
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