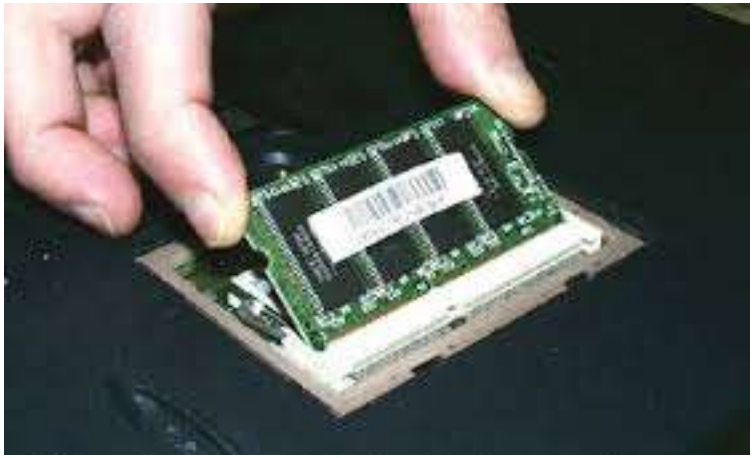
PRESENTED BY

Zynq®-7000 All Programmable SoC Modules

Achieving Faster Time to Market

Accelerating Your Success™

Which do you prefer?



OR

Memory Module Advantages

- Higher density
- Ease of use (Replace, upgrade, or configure)
- Proven and validated designs
  - Layout
  - Timing
- Integrated features
  - Serial Presence Detect (SPD)
  - Temperature sensors
  - Termination

8GB DDR3 SODIMM

Objective

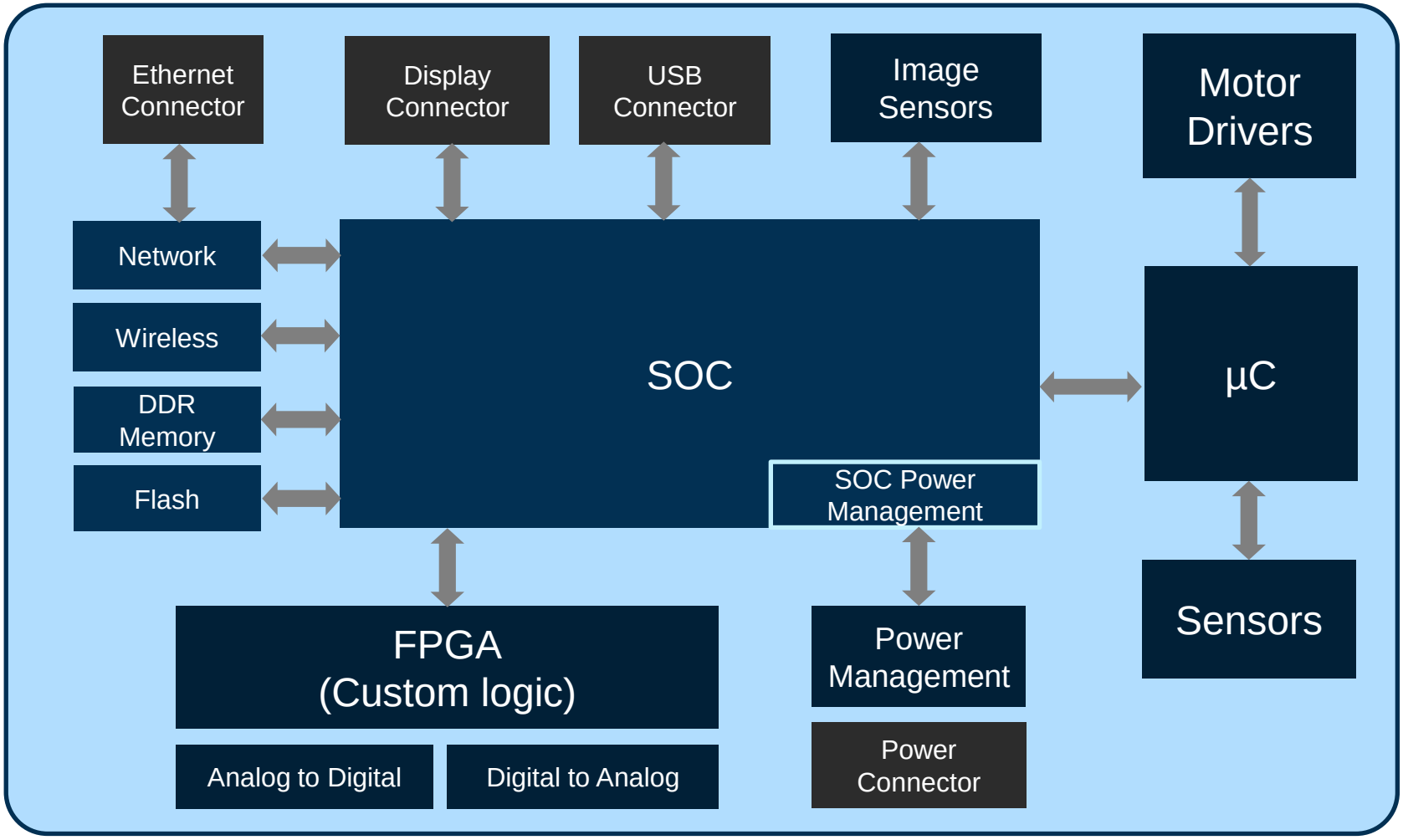
- Illustrate the advantages of using SoMs
- Demonstrate Avnet's experience in developing and supporting Zynq SoMs
- Review case studies showing effectiveness and customer acceptance of Zynq SoMs

Agenda

- Introduction (~5 minutes)
- Modular vs. chip-down approach to design (~20 min)
- Overview of Avnet's SoM portfolio roadmap (~ 25 minutes)
- Zynq SoM Case Studies (~20 minutes)
- Next steps (~5 minutes)

Modular vs. Chip-down Approach to Design

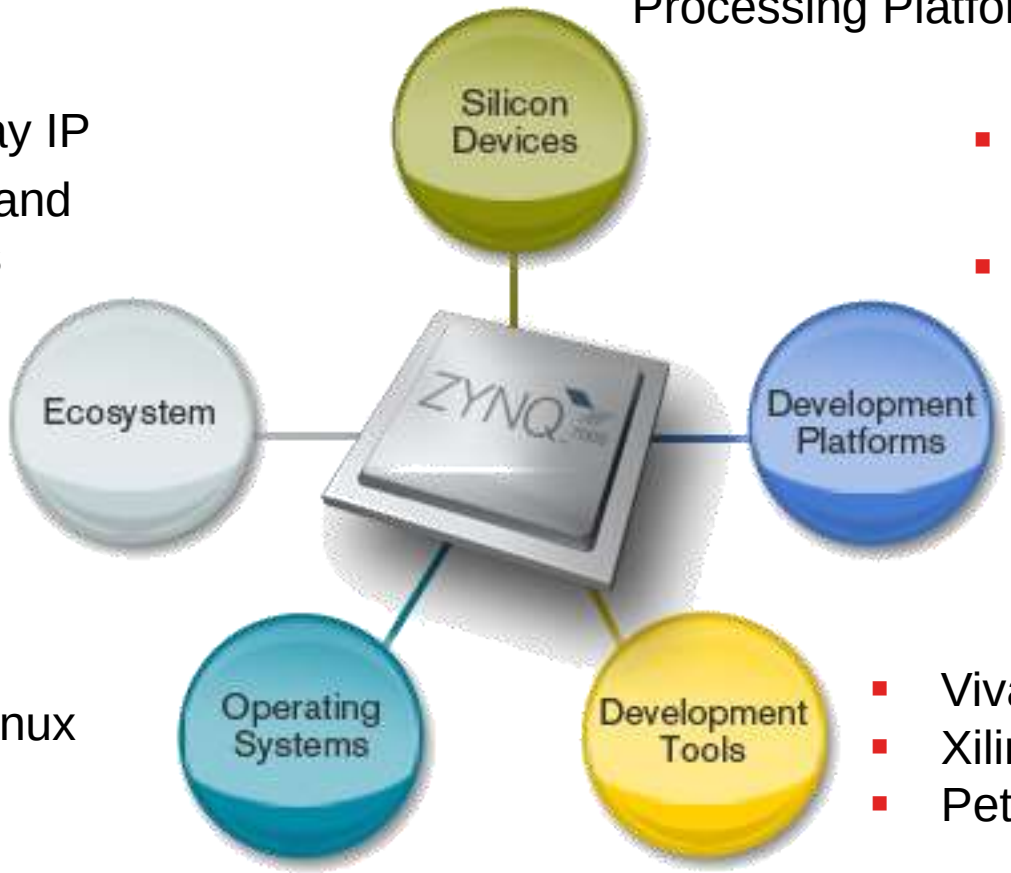
Example Embedded System



A Comprehensive Platform Offering

- Zynq-7000 Full-Featured Processing Platform

- Plug and Play IP
- Peripherals and Accelerators

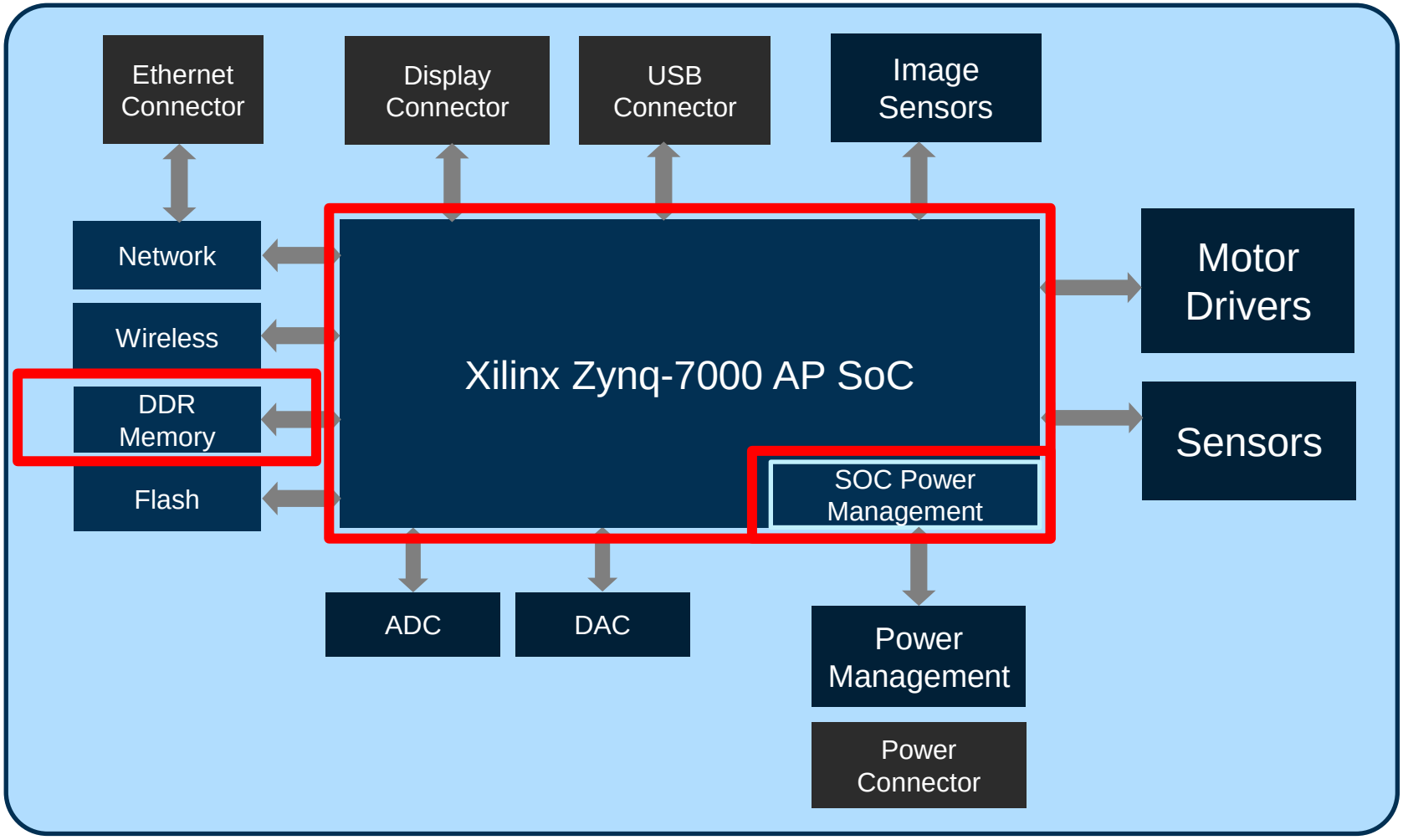


- Traditional HW development
- Virtual development platforms

- Open Source Linux
- FreeRTOS

- Vivado® Design Suite
- Xilinx SDK
- PetaLinux SDK

Simplified Example Embedded System



What is the solution?

But . . .

What does this GIVE you?

microZed™
FLEXIBILITY REDEFINED
MICROZED.ORG

Zynq DDR Interface

- Understand transmission line theory
- Match trace lengths
- Control impedances
- Use proper termination
- Utilize best practice power supply design
  - Bypass properly
  - Avoid crossing splits in the power plane
- Filter and reduce noise on VREF
- Engineer the layout to minimize crosstalk

DDR3 Memory Layout
32 bits
4 lanes
Very strict layout requirements

Done for you!!

Zynq Power Supply Design

- Multiple rails at multiple voltages
- Tight tolerances that differ per rail
- Start-up and sequencing

PL V_{CCINT} ⇨ V_{CCBRAM} ⇨ V_{CCAUX} ⇨ V_{CCAUX_IO} ⇨ V_{CCO}

PS V_{CCPINT} ⇨ $V_{CCPAUX/VCCPLL}$ ⇨ $V_{CCO\_MIO/DDR}$

MGT V_{CCINT} / $V_{MGTAVCC}$ ⇨ $V_{MGTAVTT}$

- Varying loads and transients
- Decoupling capacitor networks
- Powering XADC and MGTs

Done for you!!

Zynq External I/O Design

- Ethernet
  - 10/100/1000 LVCMOS PHY with RGMII
  - RJ-45 plus transformer
  - RJ-45 with integrated magnetics

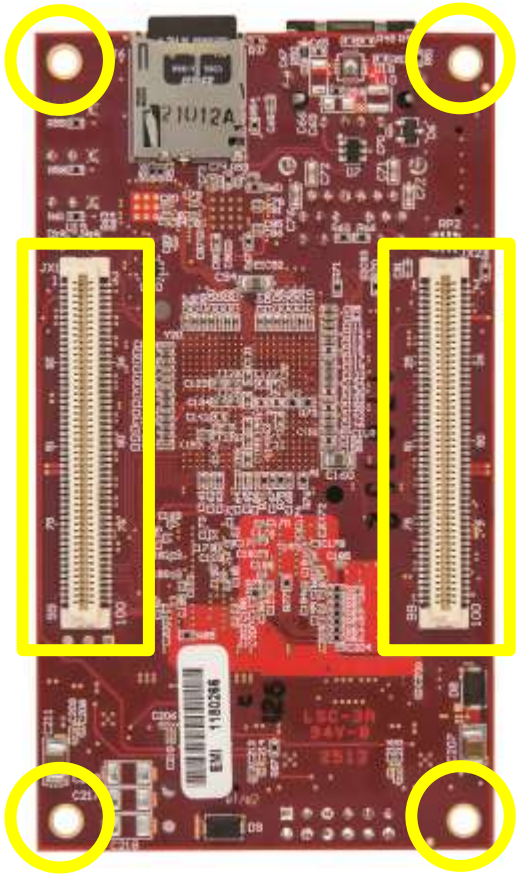
- USB
  - USB 2.0 (480Mbps) PHY with ULPI
  - Standard USB connector

- JTAG

Done for you!!

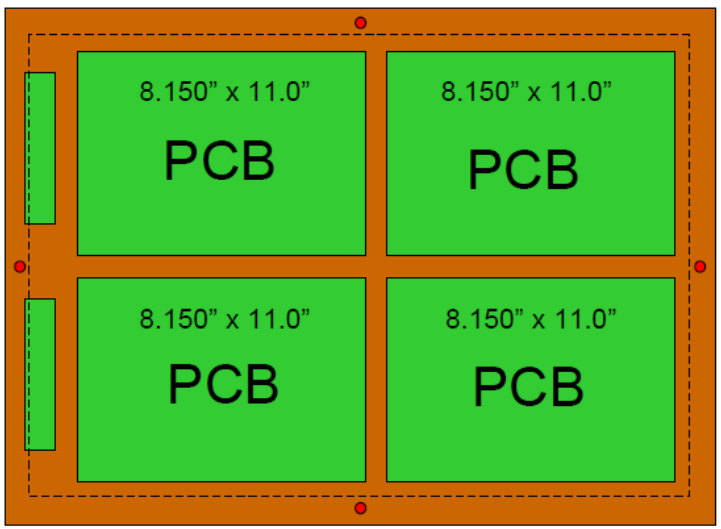
I/O Expansion Connectors and Mechanicals

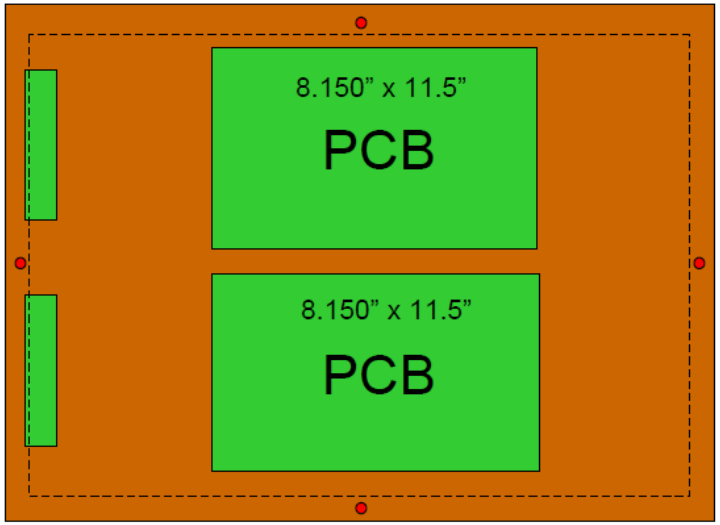
- Zynq SoMs use standard connectors
- Layout, pinout and P/Ns provided
- Mating connectors P/Ns provided
- Mounting hardware specified
  - Spacers
  - Standoffs
  - Screws
  - Nuts
  - Bolts



Done for you!!

PCB Costs





- PCB cost drivers → Panel utilization
- PCB cost drivers → Layer count
  - Large 10-layer PCBs expensive and challenging
  - Small 10-layer PCB less expensive, but challenging

Done for you!!

Sanmina PCB Fabrication – Cost Ratio Calculator*

Carrier vs. SOM

Print

New Cost Ratio 1.90

Attribute	Initial	New	Ratio
Layers	6	10	1.56
Material	FR-4 Std Tg	FR-4 Lead Free	1.06
Thickness	50-70 mils	50-70 mils	1.00
Drilled Hole Size	13.5 mils	12 mils	1.02
Impedance	10%	10%	1.00
Copper Thickness	0.5-1 oz	0.5-1 oz	1.00
Blind Via	None	None	1.00
Buried Via	None	None	1.00
BC™ Cores (2mil)	None	None	1.00
Inner Layer Line Width/Space	5/5 mil	4/4 mil	1.06
Outer Layer Line Width/Space	5/5 mil	4/4 mil	1.06

Revision v5.6

Reset

The model values are based on average data.
Model values may vary from an actual formal quotation.

- Carrier card less complex than chip-down design
- Can be 6-layer
- How do you save?

Done for you!!

* http://www.sanmina-sci.com/components/printed-circuit-boards/cost-ratio-calculator/index.php

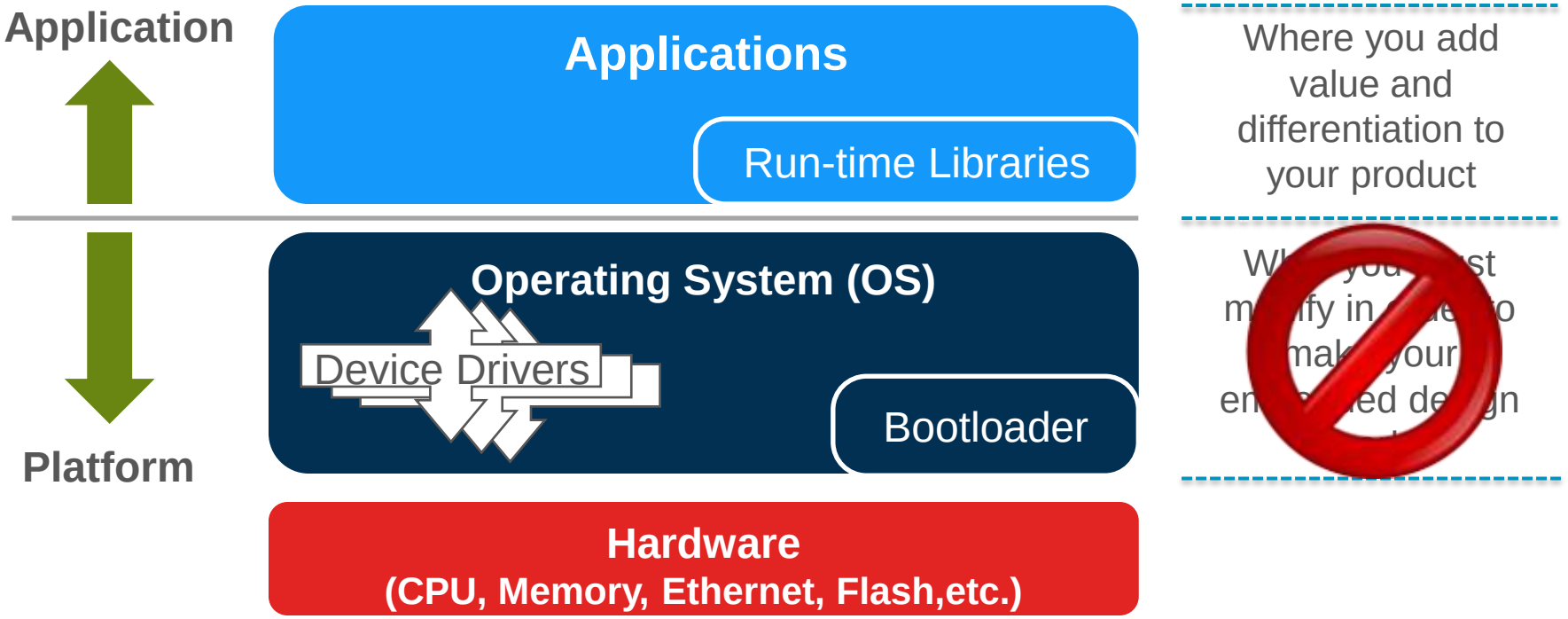
Debug, Validation and Certification testing

- Chip-down designs requires debugging and validation
- Requires development time
- Requires test equipment for complex designs
  - CAD/CAE tools
  - Digital Oscilloscopes
  - Signal Generators
  - Logic Analyzer
- Basic certification testing*
  - ROHS
  - CISPR (EN55022:2010 & 55024:2010)
  - FCC Class A

Done for you!!

*Customers responsible for end product certification testing.

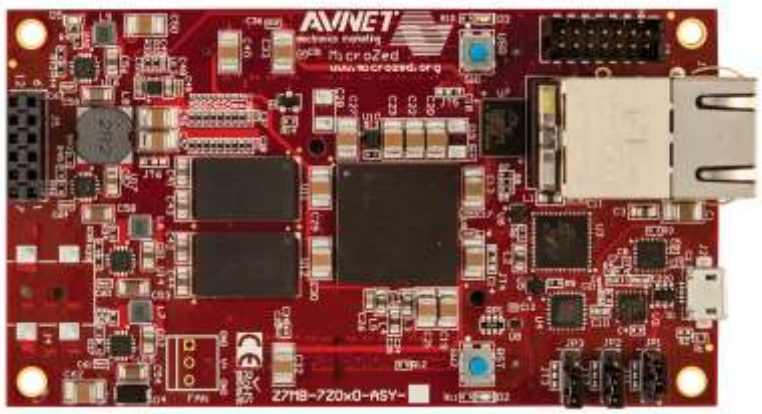
Embedded Software Stack



BOM Cost: Chip-down vs SOM Comparison

- Zynq Z7010 Subsystem
  - XC7Z010-1CLG400C: $53
  - 1GB DDR3: $14
  - 128Mb QSPI Flash $2
  - SOC Power: $8
  - Ethernet Phy: $6
  - USB-UART $2
  - USB Phy $2
  - RJ-45/USB Combo $7
  - MicroHeaders $5
  - Switches $5
  - Misc other: $16
  - Total (1K web): $120

- MicroZed Z7010 SOM
  - Total (1K web): $169

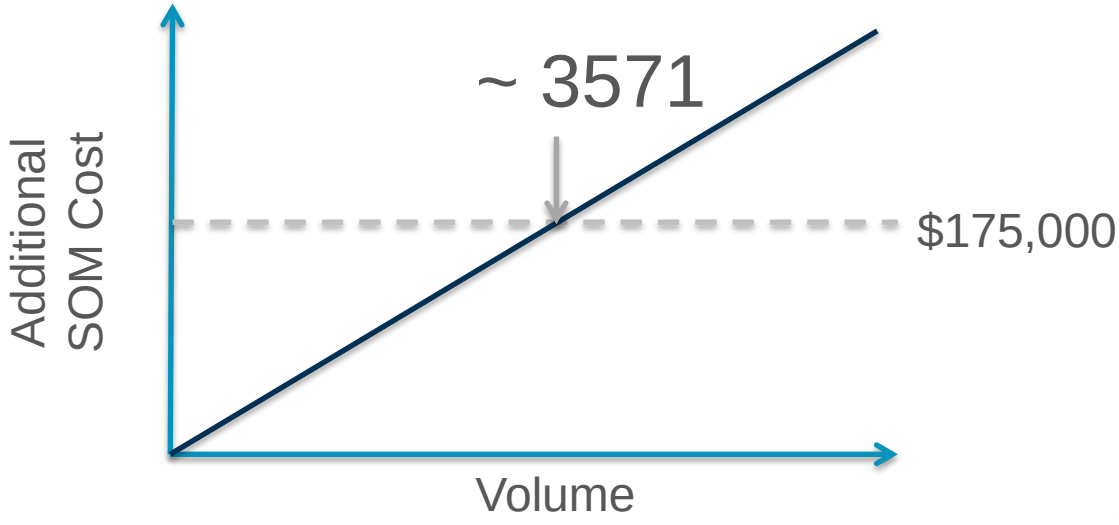


Is it worth $49?

Reviewing the cost!

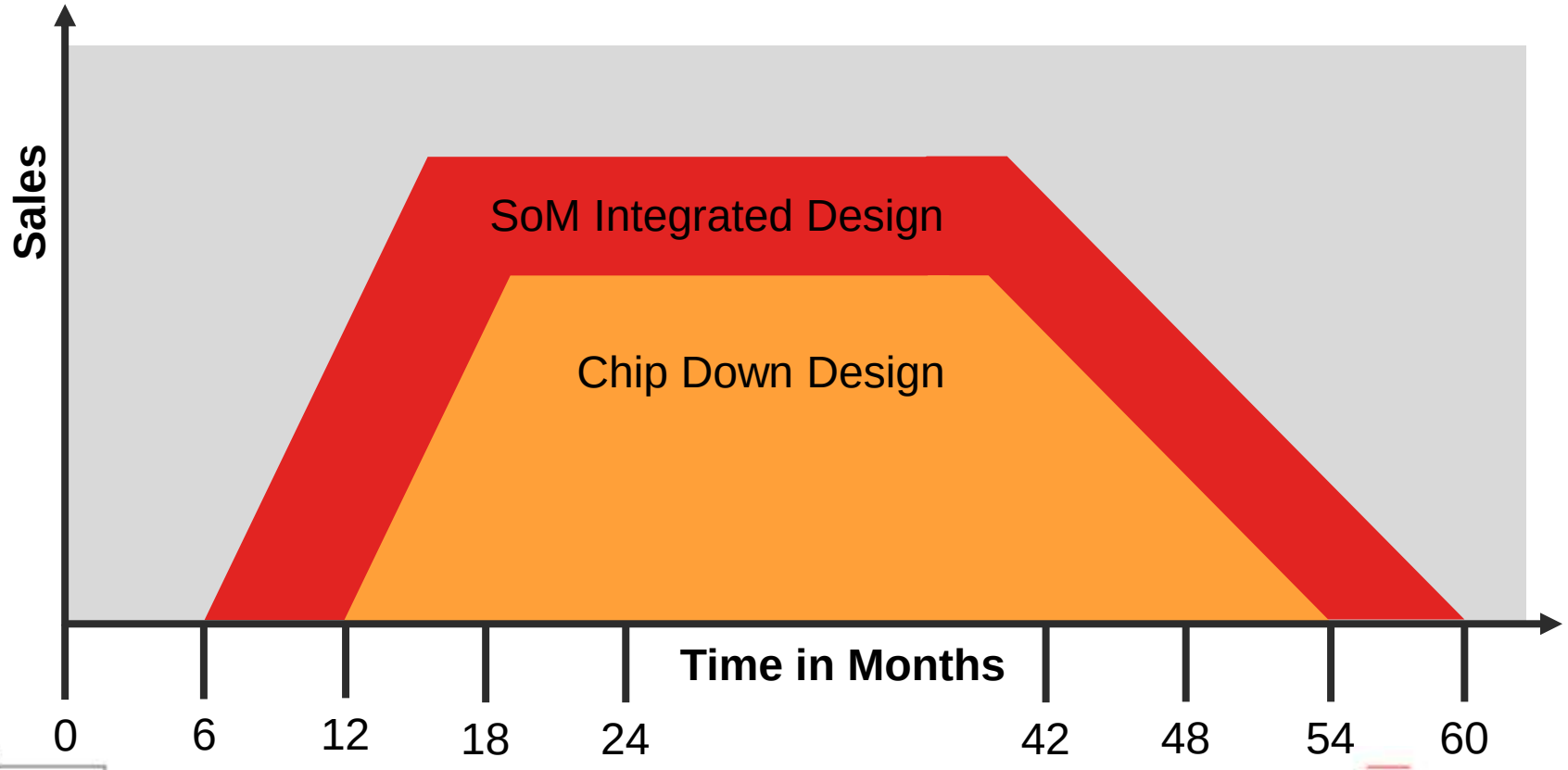
- Engineering time estimated (1 man yr.): $150,000
- SoM Protoype PCB Board Spin: $25,000

Production	Engineering cost per unit	SOM savings per unit
100 units	$1750	$1701
1000 units	$175	$126
10000 units	$17.50	**$-31.5**

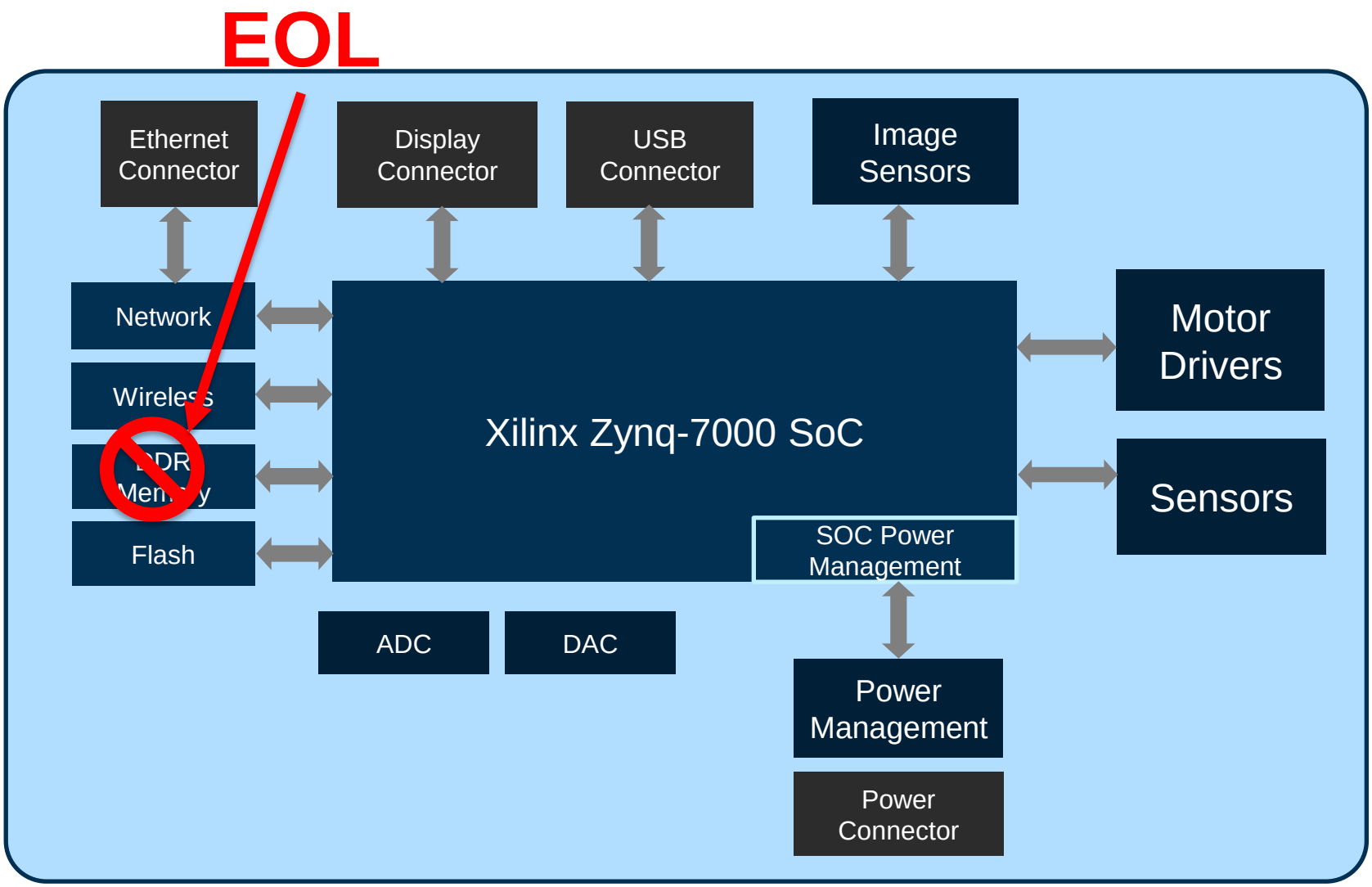


Need for Competitive Time to Market

- Development time and risk of chip down design can be reduced by leveraging a SOM



Other considerations . . .



SOM Adoption Advantages

- Saves PCB design time
- Saves application design time
- Saves money
- Minimize boards spins
- Focus on core competency
- BSP/Software infrastructure done
- Regulatory and environmental testing (CE)
- Reduces risk
- Long product life times (up to 10 years)

Avnet's Zynq SOM Portfolio

Avnet's Zynq System-on-Module Roadmap

7030 7045 7100

7045
Mini-Module Plus

7045 / 7100
Zynq Mini-ITX

7100
Mini-Module Plus

picoZed

7030
SoM

2013

2014

7010 7015 7020

7010
Eval Kit

7010/7020
SoM

MicroZed
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MICROZED.ORG

7010/7020
SBC

7010/7020
I-Temp & CO

MicroZed
FLEXIBILITY REDEFINED
MICROZED.ORG

7010//7015/7020
SoM

picoZed

Zynq®-7000 AP SoC Mini-Module Plus

- Processor
  - XC7Z045-1FFG900 or XC7Z100-2FFG900
- Memory
  - 1GB DDR3 SDRAM
  - 128MB NOR
  - 32MB QSPI Flash
  - 8KB I2C EEPROM
  - microSD Card
- Timing
  - Real-time clock
  - Programmable LVDS clock source (GTX reference clock)
  - 200 MHz LVDS oscillator (system clock)
- I/O
  - 10/100/1000 Ethernet interface
  - USB 2.0 interface
  - USB-UART interface
  - 8 GTX ports
  - 132 user I/O pins
- Programming
  - JTAG programming/configuration port
  - Processor PJTAG header

AES-MMP-7Z045-G	(1-24)	$1295
(Module only)	(25+)	$895
AES-MMP-7Z100-G	(1-24)	$1495
(Module only)	(25+)	$995

Available at http://www.picozed.org

Zynq®-7000 AP SoC Mini-ITX Development Kit

- Processor
  - Xilinx XC7Z045/XC7Z100-2FFG900
- Memory
  - 1GB PS and 1GB PL DDR3 SDRAM
  - 32MB QSPI Flash
  - 8KB I2C EEPROM
  - microSD
- Communication
  - 10/100/1000 Ethernet
  - USB-UART and USB 2.0 4-Port HUB
  - PCIe Gen2 x4 Root Complex
  - SATA-III Interface
  - SFP Socket
  - LVDS Touch Panel Interface
  - HDMI Interface
  - Audio Codec

Zynq®-7000 AP SoC Mini-ITX Development Kit

- Expansion connectors
  - FMC HPC Slot
- Clocking
  - Programmable LVDS Clock Source
  - 200 MHz LVDS Oscillator
  - RTC
- Configuration and Debug
  - JTAG Header
  - Processor PJTAG Header
  - Digilent USB-JTAG Module
- General Purpose I/O
  - User LEDs and Switches

Zynq Mini-ITX Development Kit Offerings

- **Mini-ITX Board Kit**
  - Mini-ITX Board

AES-Mini-ITX-7Z045-G
$1,950 (1–24)
$1,750 (25–99)

AES-Mini-ITX-7Z100-G
$2,150 (1–24)
$1,900 (24–99)

- **Mini-ITX Base Kit**
  - Mini-ITX Board
  - 200W ATX Power Supply
  - Vivado License
  - Accessories

AES-Mini-ITX-7Z045-BAS-G
$1,995

AES-Mini-ITX-7Z100-BAS-G
$2,195

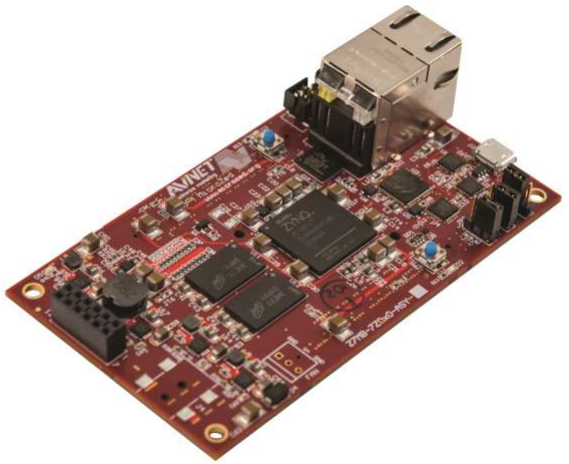
- **Mini-ITX System Kit**
  - Mini-ITX Chassis
  - Mini-ITX Board
  - 200W ATX Power Supply
  - 500GB SATA-III Hard Drive
  - Vivado License
  - Accessories

AES-Mini-ITX-7Z045-SYS-G
$2,295

AES-Mini-ITX-7Z100-SYS-G
$2,495

MicroZed

- Processor
  - Zynq™-7000 AP SoC XC7Z010 or XC7Z020
- Memory
  - 1 GB DDR3
  - 128 Mb Quad-SPI Flash
  - 4 GB microSD card
- Communication
  - 10/100/1000 Ethernet
  - USB Host 2.0 and USB-UART
- Expansion connectors
  - 2 MicroHeader connectors
  - Digilent Pmod™ Compatible header (8 MIO)
- Clocking
  - 33.33333 MHz clock source for PS
- Configuration and Debug
  - Xilinx Platform Cable JTAG connector
- General Purpose I/O
  - 1 user LED & 1 push button



MicroZed System on Module

- Now supports industrial temp (-40 to +85 C)

- Now available in cost-optimized version
  - $169 for XC7Z010 (1K units)
  - $245 for XC7Z020 (1K units)

Ordering

Part Number	Hardware Description	Resale
AES-Z7MB-7Z010-G	MicroZed Evaluation Kit	$199 USD
SYSTEM-ON-MODULE PARTS	(For production purposes, does not include cables, microSD card or software license)	
AES-Z7MB-7Z010-SOM-G	MicroZed 7010 SOM - Standard Version	$192 USD (qty = 1-99)*
AES-Z7MB-7Z020-SOM-G	MicroZed 7020 SOM - Standard Version	$289 USD (qty = 1-99)*
AES-Z7MB-7Z010-SOM-I-G	7Z010 Industrial Temp MicroZed SOM	$232 USD (qty = 1-99)*
AES-Z7MB-7Z020-SOM- I -G	7Z020 Industrial Temp MicroZed SOM	$329 USD (qty = 1-99)*
AES-Z7MB-7Z010-C01-G	MicroZed Cost Optimized 7010 SOM - For SOM use only	$169 USD (qty = 1000)
AES-Z7MB-7Z020-C01-G	MicroZed Cost Optimized 7020 SOM - For SOM use only	$245 USD (qty = 1000)

*Contact customize@avnet.com for other quantity pricing or special requirements

Enabling Development with Carrier Cards

- **I/O Carrier**
  - 12 Pmods

AES-MBCC-IO-G
$149

- **FMC Carrier**
  - LPC FMC
  - 5 Pmods

AES-MBCC-FMC-G
$149

- **Breakout Carrier**
  - Simplest
  - Lowest cost

AES-MBCC-BRK-G
$49

Introducing PicoZed

Ruggedized, Scalable Zynq System-On-Module

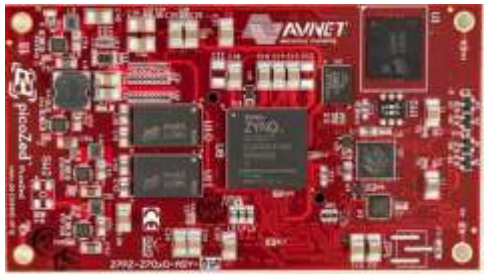
- First scalable Zynq SOM
  - Footprint compatible module supports 7010 – 7015 – 7020 – 7030
  - 7015 and 7030 are a footprint superset providing 4 GTP/GTX serial transceivers
- Module provides core Zynq functionality
  - Memory, Configuration, Ethernet, USB, Power
- Over 100 PL user I/O available through 3 MicroHeaders on backside
- Production ready
  - Rugged form-factor
  - Commercial and Industrial temperatures
- Target applications
  - Embedded system-on-module (SOM)
  - Embedded vision
  - Test & measurement
  - Motor control
  - Software-defined radio
  - Industrial automation

picoZed™

- Leverage MicroZed ecosystem
  - 7010 and 7020 are functionally equivalent from software perspective
  - Identical Linux BSP

PicoZed Feature Overview

- Zynq SoC options
  - 7010, 7015, 7020, 7030
- Memory
  - 1 GB DDR3 Memory
  - 4 GB eMMC storage
  - 128 Mb QSPI Flash
- Communications
  - 10/100/1000 Ethernet PHY
  - USB 2.0 PHY
- User I/O
  - 100-135 PL User I/O
  - 13 PS User I/O
  - 4 GTP/GTX serial XCVRS*
- Power
  - 5-12V main voltage input
  - Separate PL I/O bank voltage inputs
  - Separate GTP/GTX voltage input



7010 / 7020 PicoZed

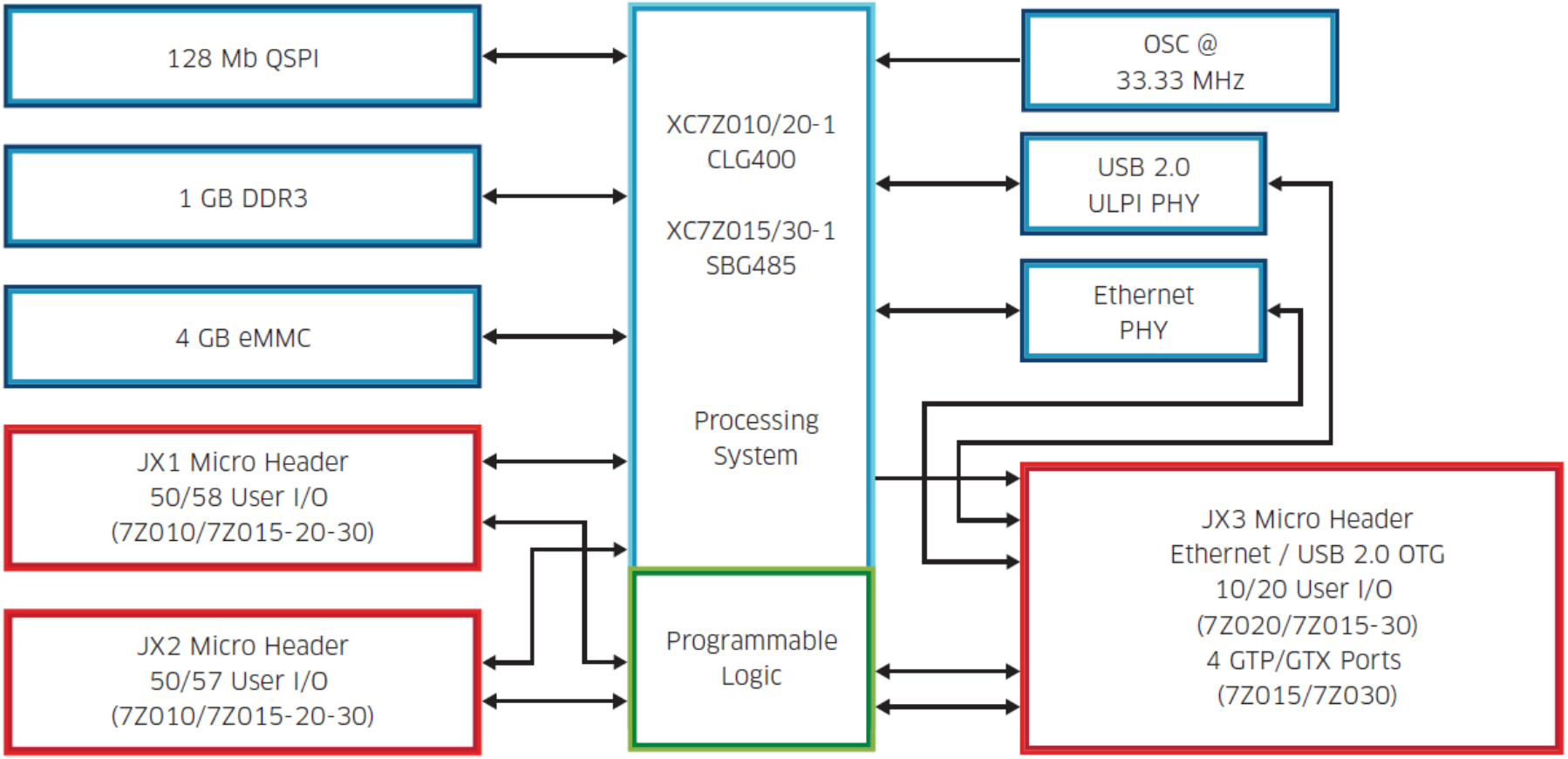
7015 / 7030 PicoZed

	1-99	100-499	1K+
7010	$249	$179	$149
7015	$339	$299	$259
7020	$289	$229	$199
7030	$459	$399	$369

Available at http://www.picozed.org

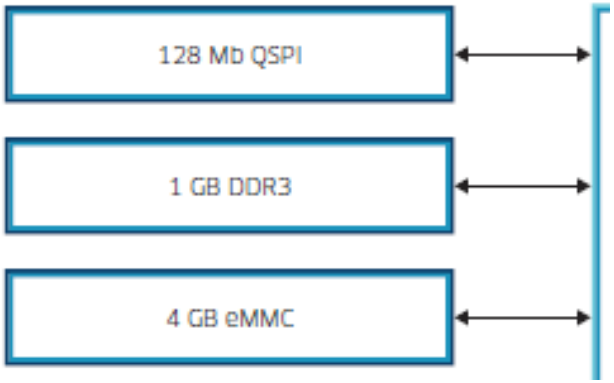
* PicoZed 7015 / 7030 only

PicoZed Block Diagram



PicoZed Memory Overview

- 1GB DDR3
  - Two Micron (256Mb x 16) devices
  - 1066 Mbps data rate
- Spansion S25FL128S Quad SPI
- 4GB e·MMC™ (supports up to 8GB)
- SD/microSD available via PS and JX3



- PicoZed Boot Options
  - Quad SPI
  - SD/microSD
  - JTAG (Cascaded or Independent)
  - e·MMC (Secondary)

Spansion S25FL128S Quad SPI

- PicoZed function
  - PS initialization
  - PL bitstream
  - Spansion Flash File System (FFS)

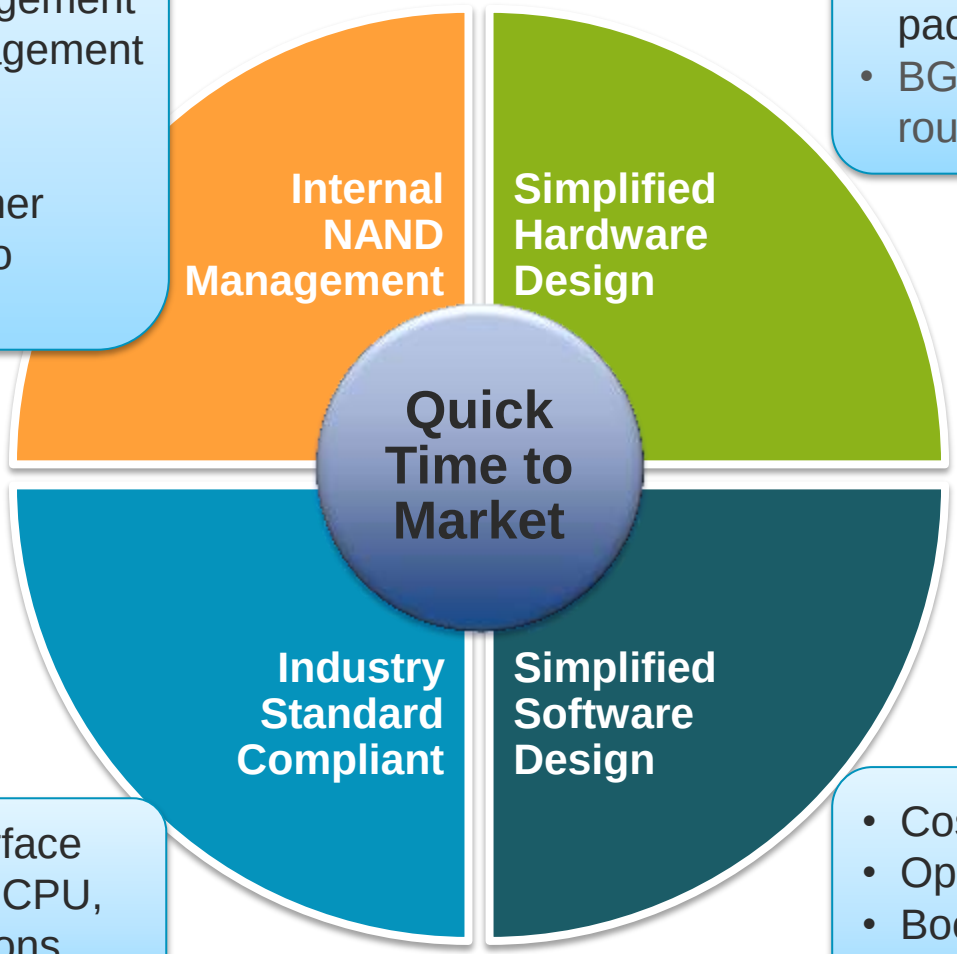
- Zynq connection on PicoZed
  - PS QSPI peripheral, Bank 0, 3.3V
  - x4 SPI – requires 7 pins

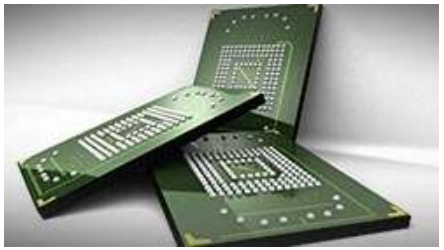
- Advantages
  - Support 400 Mb/s
  - 128 Mb storage (4Mb – 1Gb devices in family)
    - 24-bit Zynq addressing plus internal bank switching
  - Possible to Execute in Place

Why *e*·MMC?

- Optimized memory controller for Nand Flash Management
  - ✓Bad Block Management
  - ✓Wear Leveling
  - ✓ECC
- Best value/bit for higher densities compared to NOR

- Industry standard packages
- BGA100 for ease of routing



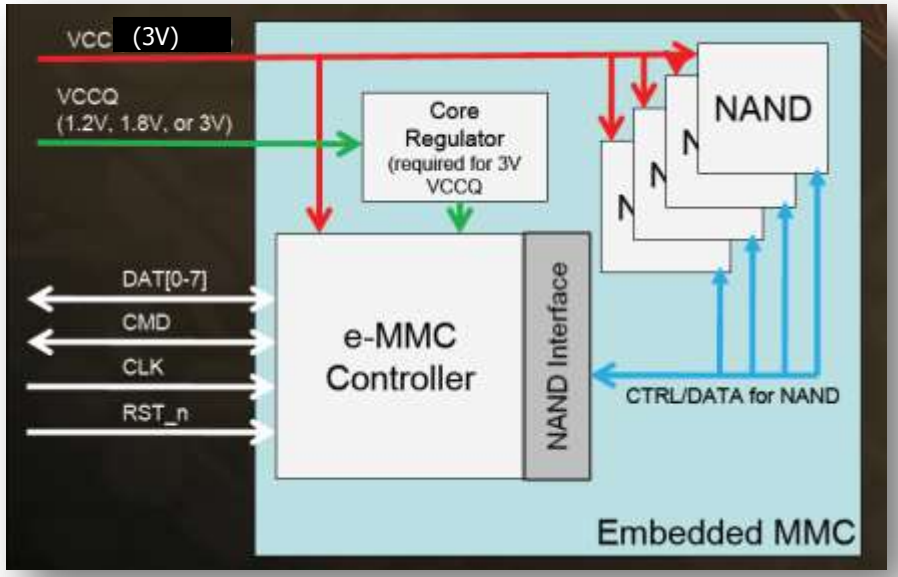


- Common MMC Interface
- Supported on many CPU, MCU & FPGA solutions

- Cost Reduced SW Design
- Open source Linux
- Boot functionality managed within *e*.MMC

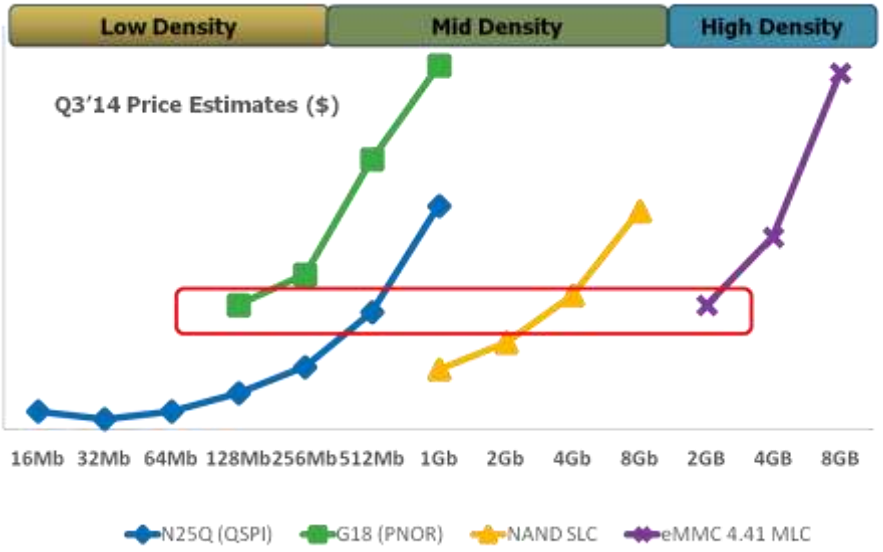
e·MMC™ Architectural Interface

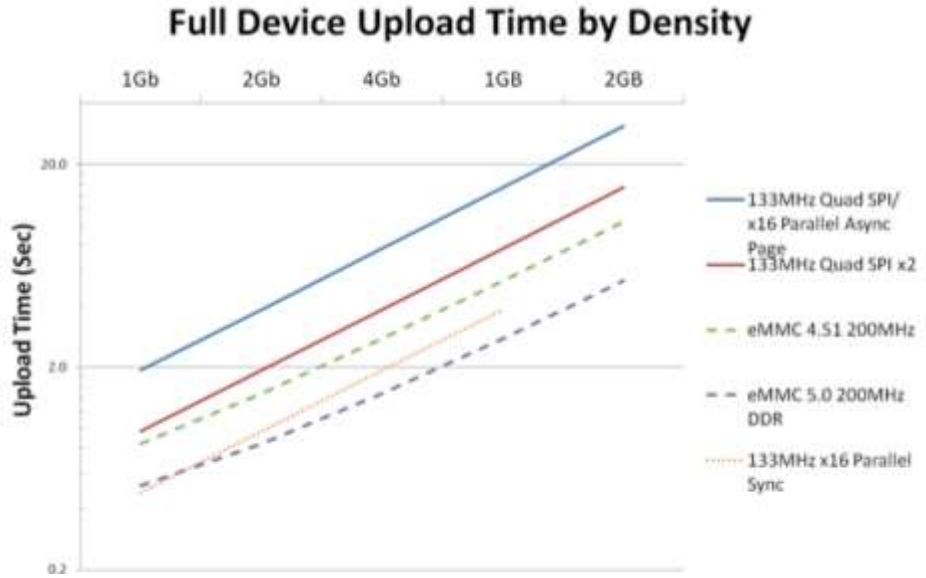
- HS-MMC protocol
- CMD: bidirectional channel for device initialization and command transfers
- DAT [7:0]: bidirectional data signals
  - 1-bit mode: DAT [0]
  - 4-bit mode: DAT [3:0]
  - 8-bit mode: DAT [7:0]
- CLK:
  - 0 to 52MHz DDR (JEDEC 4.41)
  - 0 to 200MHz SDR (JEDEC 4.51)
  - 0 to 200MHz DDR (JEDEC 5.0)*



* JEDEC 5.0 requires an additional DQ signal

Why Micron *e*·MMC™?

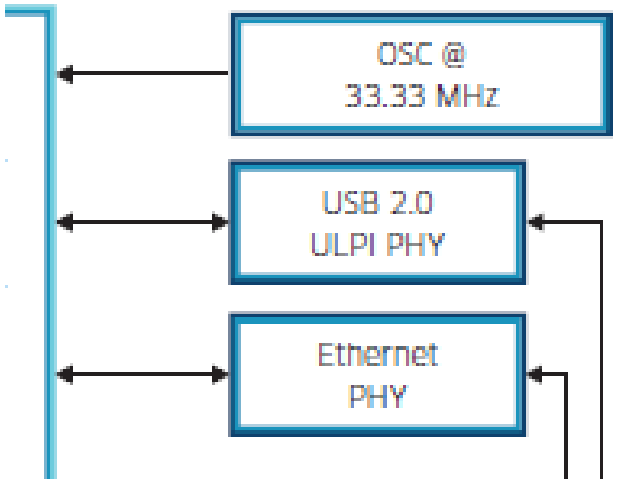




- Competitive performance
  - NAND and therefore e·MMC provide best value for mid to high densities
- Committed to embedded and automotive markets with legacy eMMC support
- Broad portfolio:
  - Density: 2-64GB
  - Version: v4.41, v4.51, v5.0
  - Package: BGA 153/169-ball & BGA 100-ball 1mm pitch options → easy routing

PicoZed I/O Overview

- 33.33 MHz OSC PS System Clock
  - Abracon ASDMB-33.333MHZ-LC-T
  - 1.8V, 50ppm, 2.5x2.0mm
- USB 2.0 ULPI PHY
  - Microchip USB3320
  - Signals pass through JX3
- 10/100/1000 Ethernet PHY
  - Marvell Alaska 88E1512
  - Signals pass through JX3



MicroHeader Expansion Connectors

JX1 Microheader

- Bank 34 PL I/O
- Bank 13 PL I/O
- JTAG
- Analog
- Bank 34 VCCIO
- VIN
- VBATT

Note: JX1 and JX2 Microheaders are pin compatible with MicroZed

* PS MIO can support microSD and UART interfaces to PS if needed

PicoZed MicroHeader Part Numbers	
PicoZed (Plug)	FCI 61082-101400LF
CC (Receptacle)	FCI 61083-101400LF

Backside

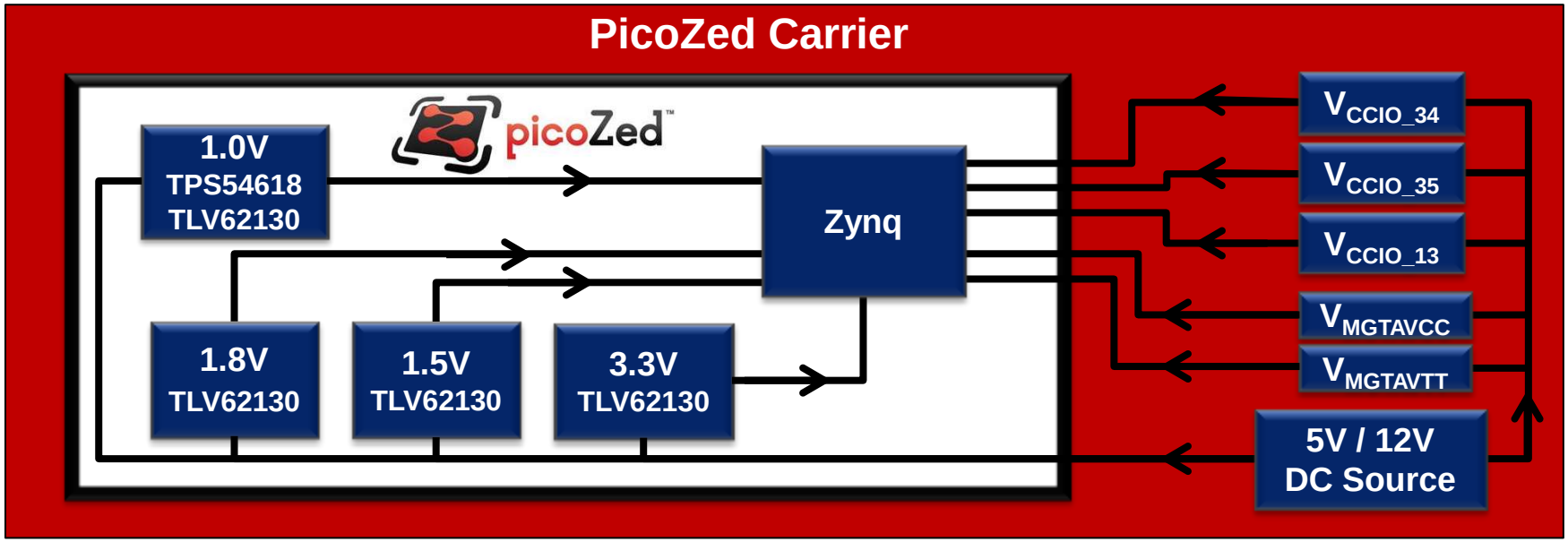
JX3 Microheader

- Bank 13 PL I/O
- PS MIO*
- MGT TX/RX
- Ethernet PHY
- USB PHY
- Bank 13 VCCIO
- MGTAVCC
- MGTAVTT

JX2 Microheader

- Bank 35 PL I/O
- Bank 13 PL I/O
- PS MIO
- Bank 35 VCCIO
- Bank 13 VCCIO
- VIN

PicoZed Power Architecture



- PicoZed based on MicroZed
- TI power architecture supports Vin 5-12V
- 3 independent banks powered by carrier
- 2 transceiver rails powered by carrier

picoZed™

PicoZed Power Analysis

PicoZed needs 5V at 1A when:

- **PL fabric 85% utilized**
- **Pmod using 100mA**

Out-of-box, it only uses 300-400mA

Feature	Est. Current (A)			
	1.0V	1.5V	1.8V	3.3V
7010-400*	0.90	0.33	0.30	0.15[1]
1G DDR3		0.60[2]		
DDR3 Term			0.40	
USB OTG			0.03	0.03
GIGE	0.07		0.09	0.05
QSPI FLASH				0.10
USB UART				0.03
PMOD				0.10
TOTAL	0.97A	0.93A	0.82A	0.31A

* Based on XPE 14.4, ~85% Utilization, PL and PS combined

[1] Current supplied by baseboard, not by on-board supply

[2] Based on doubling Micron Power Estimator for 4Gb part

PicoZed 7020 Power Analysis

Power Supply

Source	Voltage	Total (A)
V_{CCINT}	1.000	1.631
V_{CCBRAM}	1.000	0.076
V_{CCAUX}	1.800	0.337
V_{CCAUX_IO}		
V_{CCO} 3.3V	3.300	
V_{CCO} 2.5V	2.500	
V_{CCO} 1.8V	1.800	
V_{CCO} 1.5V	1.500	
V_{CCO} 1.35V	1.350	
V_{CCO} 1.2V	1.200	
-	1.800	
-	1.000	
-	1.200	
V_{CCPINT}	1.000	0.915
V_{CCPAUX}	1.800	0.126
V_{CCO_DDR}	1.500	0.334

Core current draw more than doubles for 7020 device, slight increase in Vccaux

Feature	Est. Current (A)			
	1.0V	1.5V	1.8V	3.3V
7020-400*	2.50	0.33	0.46	0.15[1]
1G DDR3		0.60[2]		
DDR3 Term			0.40	
USB OTG			0.03	0.03
GIGE	0.07		0.09	0.05
QSPI FLASH				0.10
USB UART				0.03
PMOD				0.10
TOTAL	2.57A	0.93A	0.98A	0.31A

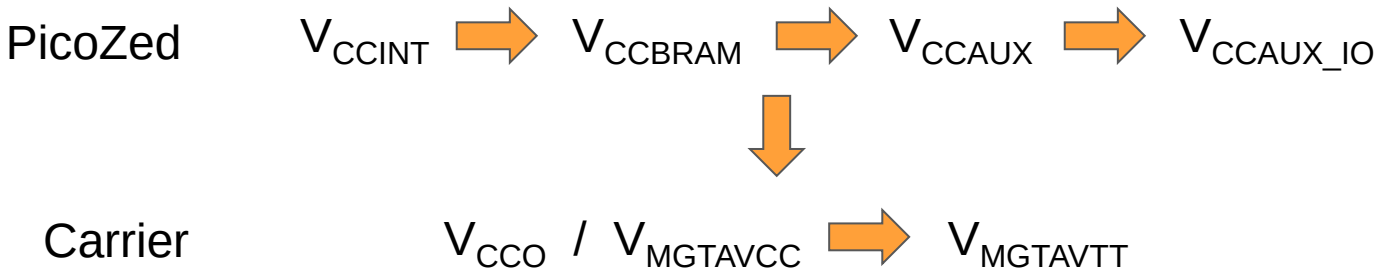
* Based on XPE 14.4, ~85% Utilization, PL and PS combined

[1] Current supplied by baseboard, not by on-board supply

[2] Based on doubling Micron Power Estimator for 4Gb part

PicoZed Power Analysis

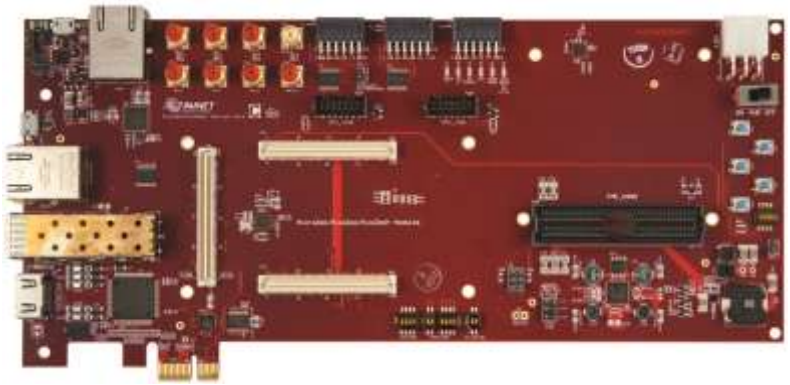
- Need 2.4W in addition to XPE estimate
  - Additional input power needed for board peripherals
- 7015/7030 PicoZeds also need transceiver power
  - Use XPE to estimate requirements
- PicoZed provides V_{CCIO_EN}
  - Enable signal should be used to sequence carrier supplies



PicoZed Carrier Card

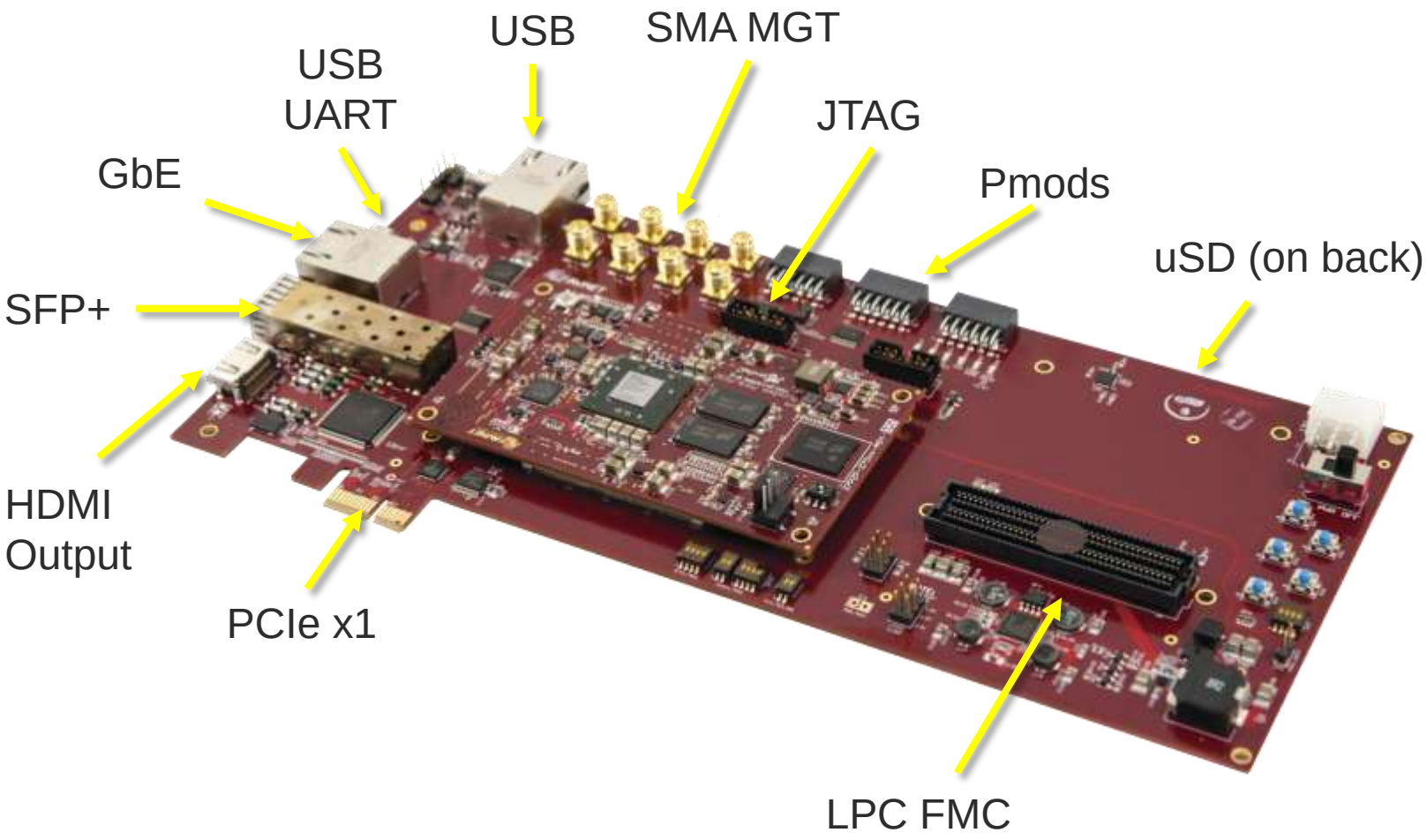
- Provides off-the-shelf development platform for PicoZed SOMs
- Connector interfaces for PicoZed's on-board Ethernet and USB PHYs
- Four GTP/GTX supported through
  - FMC
  - PCIe Gen 2 (x1)
  - SFP+
  - SMA
- Additional features
  - FMC expansion slot
  - 2nd 10/100/1000 Ethernet port
  - USB-UART
  - HDMI Output
  - Adjustable PL VCCIO Bank settings

picoZed™ Compatible

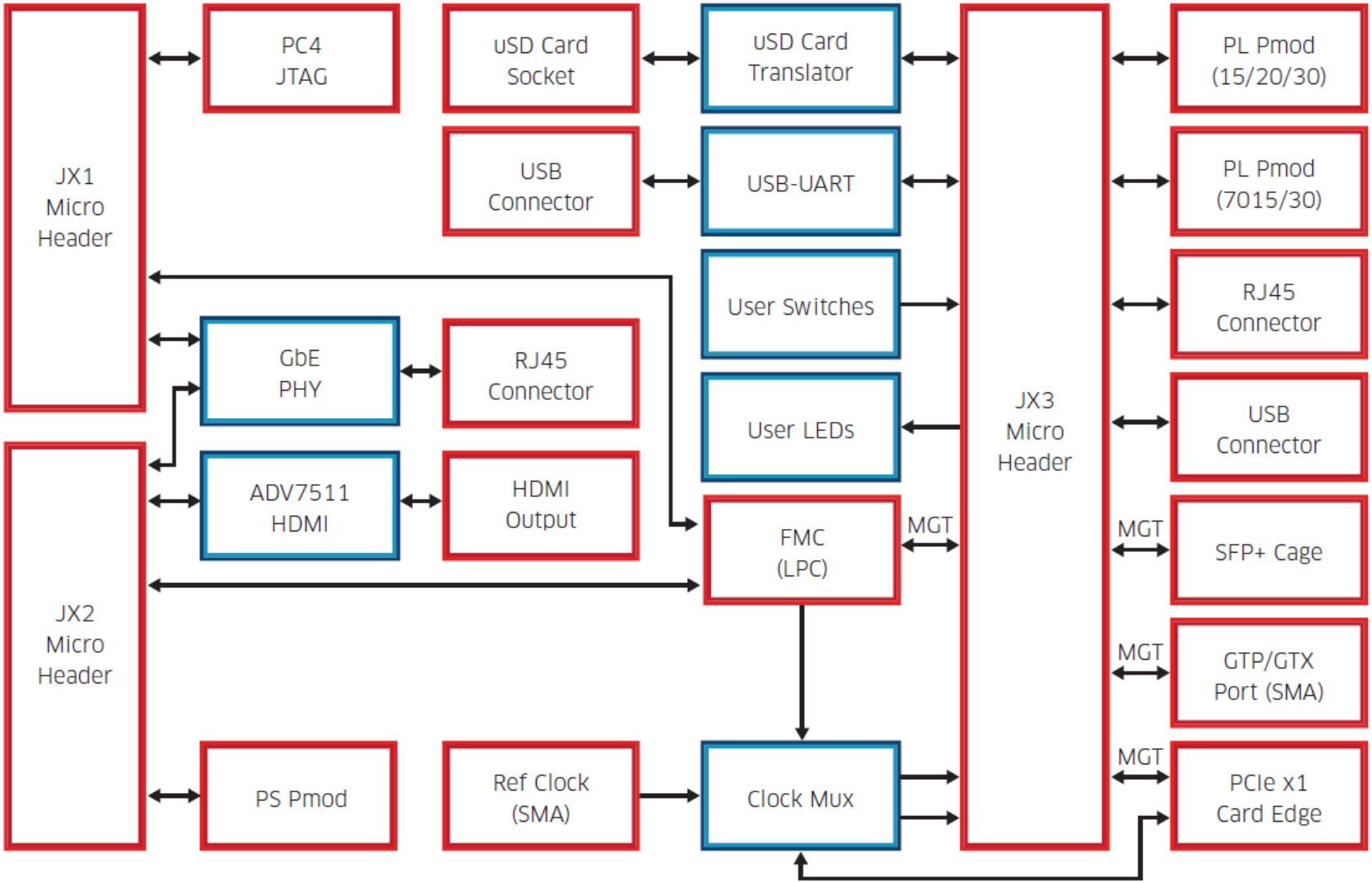


AES-PZCC-FMC-G $425
Available at http://www.picozed.org

PicoZed Carrier Card



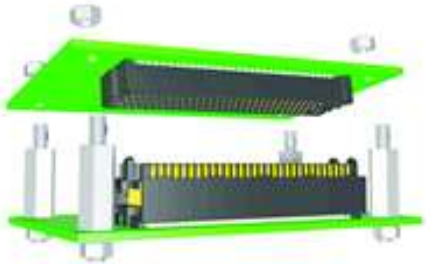
PicoZed Carrier Card Block Diagram



VITA 57 FPGA Mezzanine Card (FMC)

- PicoZed CC function
  - FMC-LPC exposes 68 single-ended and differential I/O

- Zynq connection on PicoZed
  - Two PL Banks, powered by Vadj
  - Samtec's SEARAY™ connector (ASP-134603-01)
  - Mating connectors determine stack height
    - 8.5mm (ASP-134606-01)
    - 10mm (ASP-134604-01)
  - www.em.avnet.com/samtecfmc



- Advantages
  - Use off-the-shelf FMCs
  - 100+ FMCs from 30+ companies
  - Prototype your own design
  - I/Os for PL or PS EMIO

Analog Devices
AD-FMCOMMS-EBZ
FMC Module

Avnet SoM Portfolio Summary

	picoZed				microZed		MMP		Mini-ITX	
	7010	7015	7020	7030	7010	7020	7045	7100	7045	7100
DDR3	1GB	1GB	1GB	1GB	1GB	1GB	1GB	1GB	2GB	2GB
QSPI	128Mb	128Mb	128Mb	128Mb	128Mb	128Mb	256Mb	256Mb	256Mb	256Mb
uSD	Via CC	Via CC	Via CC	Via CC	Y	Y	Y	Y	Y	Y
Max User I/O[1]	100/13	135/15	125/13	135/13	100/8	115/8	132	132	160[2]	160[2]
XCVRs	-	4	-	4	-	-	8	8	14	14
Ethernet	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
USB-UART	Via CC	Via CC	Via CC	Via CC	Y	Y	Y	Y	Y	Y
USB 2.0	Via CC	Via CC	Via CC	Via CC	Y	Y	Y	Y	4 Ports	4 Ports
Cost	$149[3]	$259[3]	$199[3]	$369[3]	$169[3]	$245[3]	$895[4]	$995[4]	$1750[4]	$1900[4]

[1] PL IO/PS IO
[2] HPC FMC
[3] 1K+ pcs [4] 25+ pcs

All are available at *http://www.picozed.org*

Avnet Zynq SOM Ecosystem: RTOS Support

	MMP	Mini-ITX	MicroZed	PicoZed
Standalone OS	X	X	X	X
FreeRTOS		X	X	
OpenSource Linux*	X	X	X	X
PetaLinux	X	X	X	In-process
Yocto Linux		In-process	X	In-process
Ubuntu Desktop Linux	X	X		
Wind River Linux		In-process	In-process	In-process
Wind River VxWorks		In-process		
Express Logic ThreadX		In-process	X	
Micrium µC/OS-III		In-process		
Mentor Nucleus		In-process		

* Xilinx Open Source Repository

Avnet Zynq SOM Ecosystem: Display Controller IP

IP	Cost	Capabilities	Challenges
Xilinx	Upto $3K	• Avnet's Video From Scratch Tutorial • Progressive resolution	• No Linux driver
ADI	Free	• Auto resolution • Ubuntu Linux • Avnet SDR	• ADI provides updates • Must use ADI device
Avnet	Free	• Avnet ALI3 Touch Display • Resolution fixed at build time	• Simple features • Preliminary Linux driver • Does not drive ADV7511
Xylon	$5K	• Auto resolution	• Cost

SOM Case Studies (Design Examples)

Global interest in Avnet SoMs

- Interest and opportunities continue to grow
- Majority are from the Americas region
- EMEA coming on strong
- Asia and Japan starting to sprout

Target Applications

- General Zynq®-7000 AP SoC evaluation and prototyping
- Embedded SOM applications
- Embedded vision
- Test & measurement
- Motor control
- Software-defined radio
- Industrial automation

Customer Applications

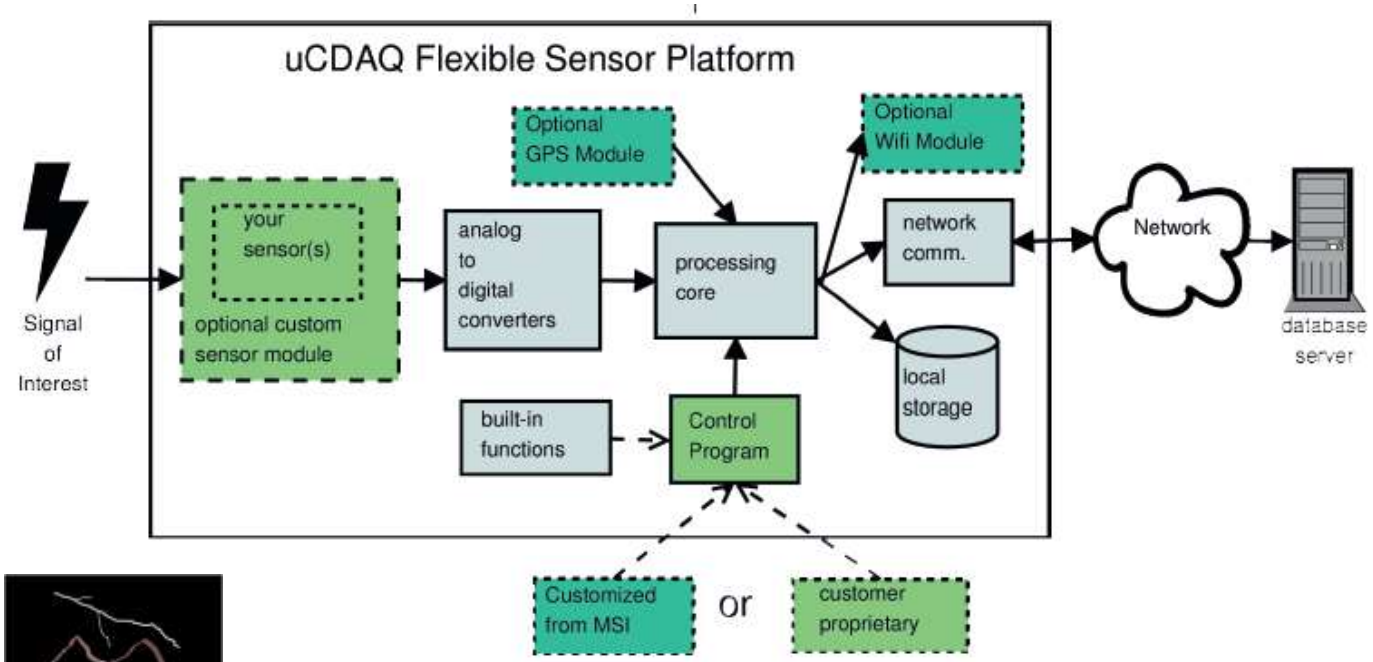
- Mil/Aero (Avionics)
- Consumer (STB)
- Medical
- Gaming
- Data acquisition
- Embedded development tools

Typical MicroZed Customer

- Average volumes are <200 units
- Short design cycles a major driver
  - ~4 months: Concept to production
  - Many customers are studying the feasibility of SOMs
- A number of customers are looking for minor modifications
  - Avnet able to quote and implement design spins quickly

Mountain Storm Instruments (MSI)

- "*Our mission is to simplify the design and operation of sophisticated sensor networks so you can focus on understanding your data.*"
- Develop Flexible Sensor Platforms (FSP) and Intelligent Sensor Platforms (ISP)



Current Solution - uCDAQ 1000/3000 FSP

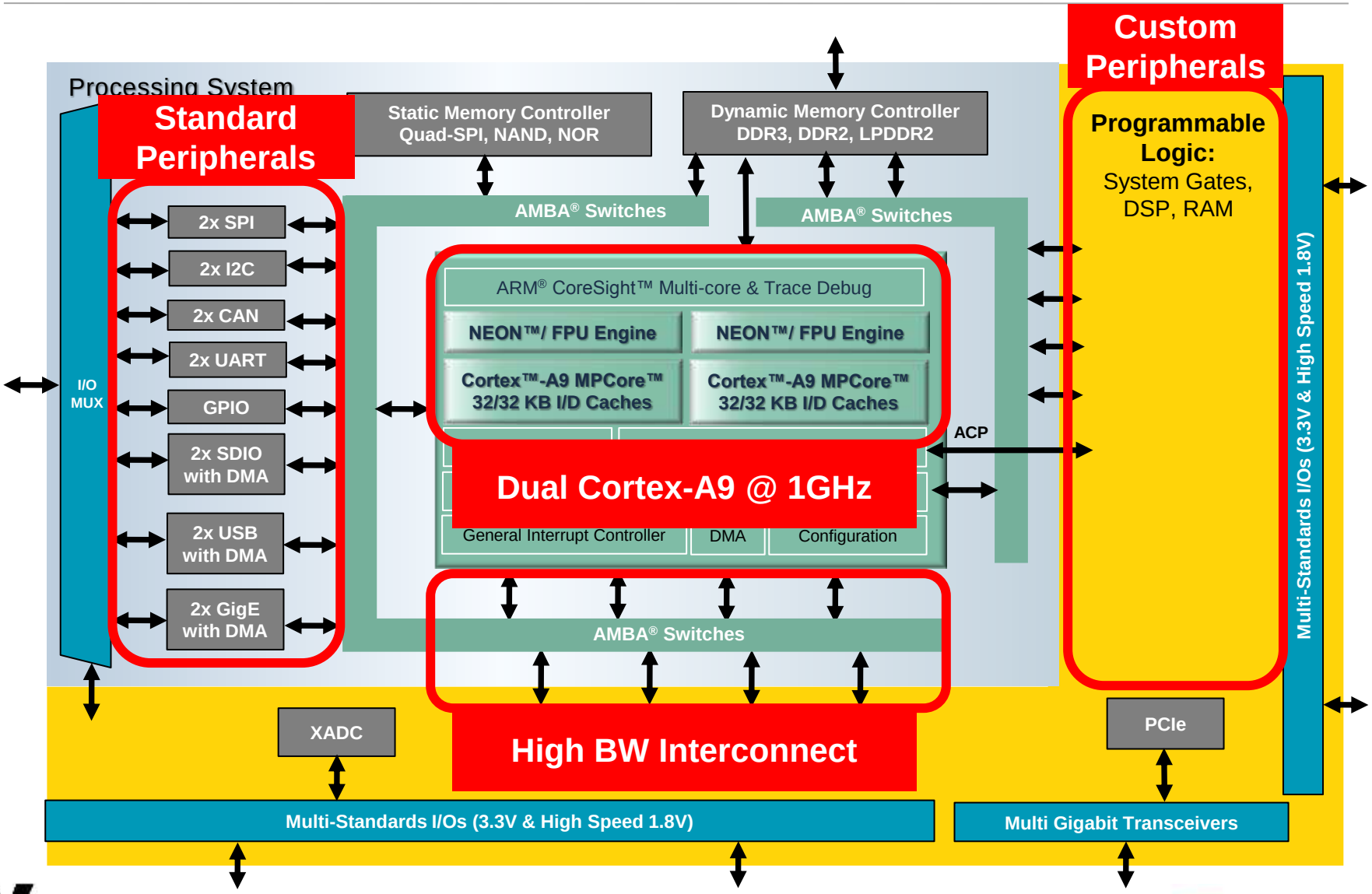
- Based on 16-bit/32-bit MCUs
- Easy to develop with, but . . .

- Limited ADC sampling rates <2 Msps
- Limited data timing capability ~1 us
- Limited system memory
- No programmable logic for high speed timing and customization
- Application SW must be developed with vendor-specific tools and in C

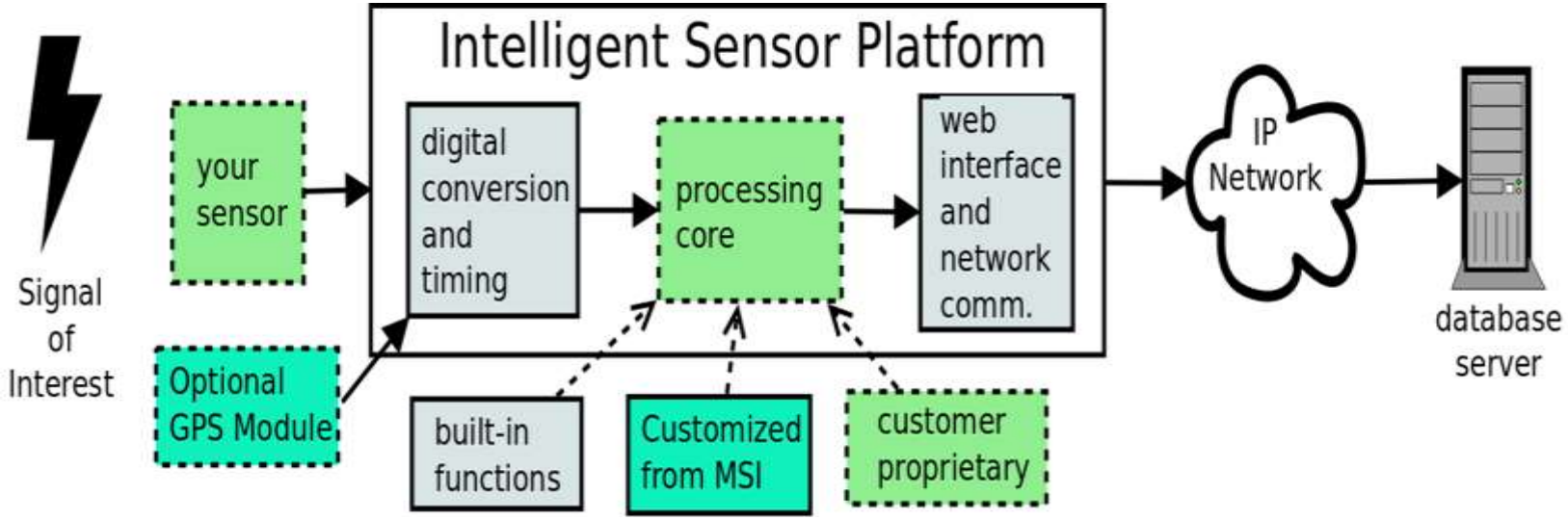
Next Gen Solution – What is needed?

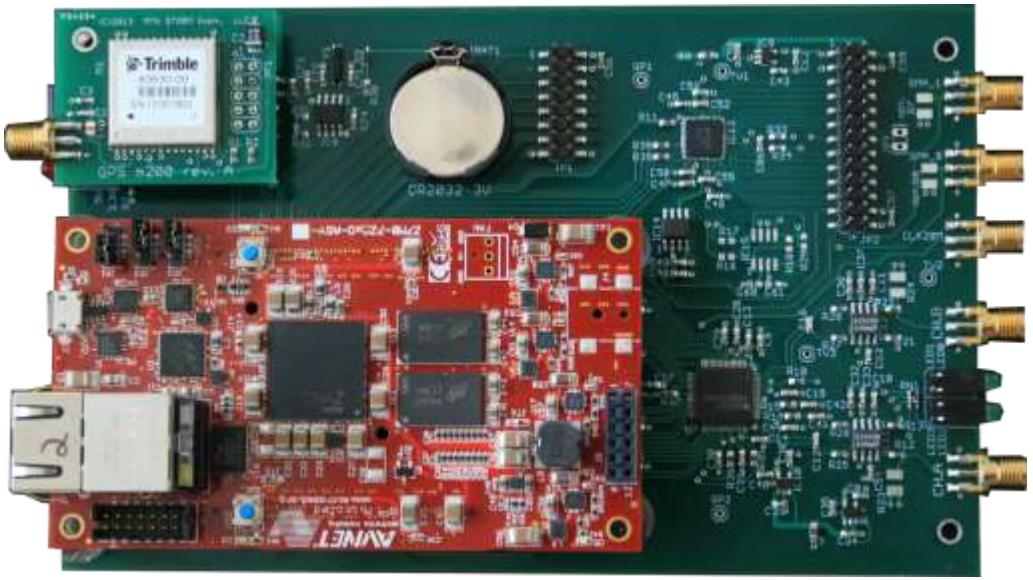
- High data sampling/processing rates (Gbps)
  - Need large data buffers (100s of MBs)
- Custom logic
  - GPS data synchronization and geo-location
  - Multiple ADC interfaces
- System configurability → Essential for MSI products
- Open source FOSS/Linux
  - Leverage existing knowledge base of open source community
  - Allows full access to source code
    - Easier debugging and customization
  - Leverage existing development tools, libraries, programming languages, and applications

Xilinx Zynq-7000 All Programmable SoCs



Next Gen Solution - SmartDAQ 1000 ISP





Xfest

Mountain Storm Instruments LLC

mtnstormdaq.com

AVNET

Why did MSI pick MicroZed?

- 12-layer PCB design “daunting” for small company
- Limited test equipment prevents complex designs
  - CAD/CAE tools
  - Digital Oscilloscopes
  - Signal Generators
  - Logic Analyzer
- ZedBoard → Large form factor with no OEM modules
- MicroZed →“Sweetspot in market” and “unique solution”
- Better ecosystem than competing solutions
- Technical support available
  - Online via www.microzed.org support forums
  - In-person via Avnet FAEs

Avnet has built a flexible Zynq platform that eases the Zynq design process. . .

The MicroZed.org community site helps lower the support burden . . .

info@mtnstormdaq.com
mtnstormdaq.com

For small start-ups, order size flexibility is essential when the market demand is unknown . . .

MicroZed has been designed for OEM use in real products

MicroZed Single Board Computer (SBC)

- Designed for a customer but offered as an orderable option
  - Small quantities available for prototypes

- Key Changes
  - Flipped Microheaders to topside
  - Changed RJ-45/USB combo connector to standalone RJ-45
  - Changed USB-UART to USB OTG
  - Added I^2C EEPROM (MAC ID)
  - Changed JTAG to HS2 format (DNP)
  - Fan voltage supports 3.3V or 5V

- E-mail: customize@avnet.com

Available at *http://www.picozed.org*

Next Steps

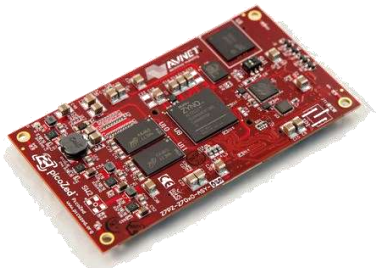
Next Steps

- Purchase a Zynq SoM Solution

MicroZed
http://www.picozed.org/product/microzed
Price: $169+

Zynq MMP
http://www.picozed.org/product/zynq-mmp
Price: $895+

PicoZed
http://www.picozed.org/product/picozed
Price: $149+
Available: October 2014



MiniITX
http://www.picozed.org/product/mini-itx
Price: $1750+

Next Steps

- See the Zynq SoM demos at the Avnet exhibit table
  - The Mini-Module Plus System-on-Module Family
  - MicroZed™ System-on-Module Family
  - PicoZed™ System-on-Module Family
  - The Zynq® Mini-ITX Platform
- Contact your local Avnet FAE
  - Application and architecture reviews and tools demo
- Signup for www.youtube.com/AvnetDesign
- Download this presentation at www.xfest2014.com
  - Available September 15
  - Q&A forums for each course

Next Steps

- Vivado Zynq SpeedWay Workshops
  - Developing Zynq®-7000 All Programmable SoC Software (Vivado 2013.3)
  - Developing Zynq®-7000 All Programmable SoC Hardware (Vivado 2013.3)
  - PetaLinux for the Zynq®-7000 All Programmable SoC
  - Designing Accelerators for the Zynq®-7000 All Programmable SoC
  - Debugging ARM Processor Systems

Available at *http://www.picozed.org/support/trainings-and-videos*

Next Steps

- Zynq Design Seminars
  - Smarter Vision Design Seminar
  - Integrated Software-Defined Radio on Zynq®-7000 All Programmable SoC
  - Motor Control: From Concept to Production with the Zynq®-7000 All Programmable SoC

Available at *http://www.picozed.org/support/trainings-and-videos*


Thank
You
Asante
Shukria
Dhanyavadagalu
Kiitos
Maake
Vinaka
köszönöm
Kam Sah Hammida
Manana
Dankon
Matondo
Terima Kasih
Taiku
Tack
Biyan
Mauruuru
Dank Je
Dankscheen
спасибо
Blagodaram
Ngiyabonga
Dziekuje
Chokrane
Diolch i Chi
Grazie
Arigato
Juspaxar
Mochchakkeram
Gracias
Paldies
Tingki
Gratias Tibi
Obrigado
Ua Tsaug Rau Koj
Bedankt
Dakujem
Grazas
cảm ơn bạn
Kia Ora
Khun Khap
Kop
Djiere Dieuf
Eskerrik Asko
Najis Tuke
Děkuji
Suksama
Nirringrazzjak
Hvala
Di Ou Mèsi
Welalin
Danke
Merci
Go Raibh Maith Agat
Salamat
Rahmat
Nuwun
Matur
Misaotra
Xвала