Is ARM® Cortex™-A8 the new entry point in real-time embedded computing?

Presenters:
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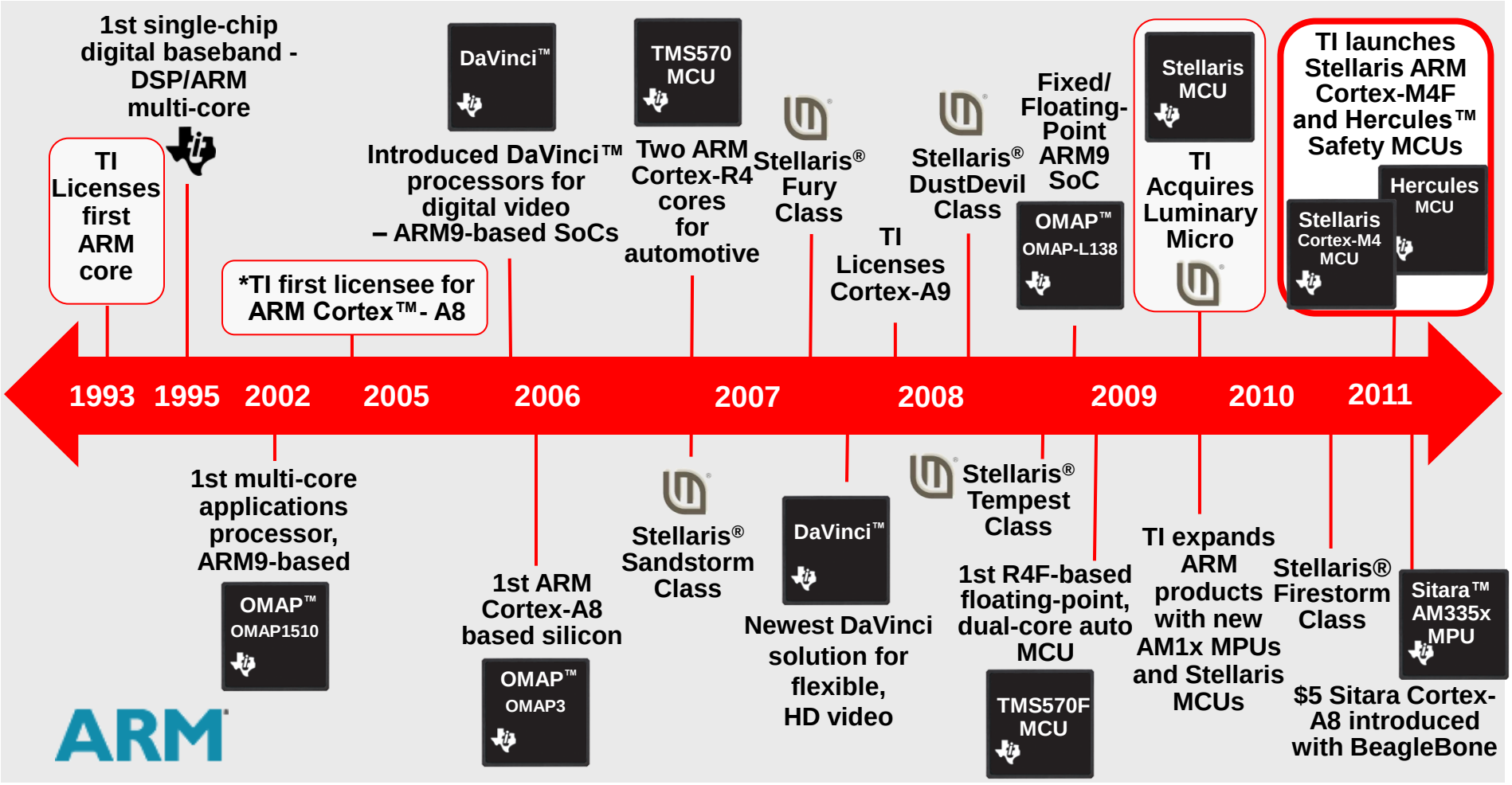
Leo Forget, Product Manager, QNX Software Systems

April 18, 2012

Webinar agenda

- Introduction to ARM® technology at TI
- Sitara™ ARM product portfolio
- Sitara's newest processor: the AM335x ARM Cortex™-A8 processor
- QNX company overview
- Why QNX Neutrino RTOS
- QNX / TI Collaboration
- Introduction to TI Wifi support on QNX
- Conclusion

TI ARM® investment and innovation



TI has shipped more than 7 billion ARM-based products and continues to invest in a large portfolio of scalable platforms from $1 to >1.5 GHz

* TI licensed in July 2003, but publicly announced Oct 2005.

Sitara™ ARM® processors offer

Performance

- Up to 450MHz ARM9™ to 1.5GHz Cortex™-A8 devices
- Industry's first widely available Cortex-A8 devices - 2 DMIPS per MHz
- Graphics acceleration up to 27M polygons/s performance for advanced user interface
- High speed DDR2 and DDR3 memory performance

Scalability

- Largest software compatible ARM MCU & Embedded MPU portfolio
- ARM only to ARM + accelerator functionality while reusing both SW and HW designs
- Leverage TI's extensive portfolio of embedded ARM devices to maximize your product's changing needs
- Fully pin-for-pin and software compatible options to scale from ARM only to ARM + DSP

Connectivity

- 10/100/1000 Ethernet
- CAN 2.0 and High speed USB interface
- Multiple serial port options per device
- Lowest cost processor with SATA interface
- Flexible LCD controller for up 720p displays moving to 1080p in future devices
- Industrial peripheral support

Strength of Software

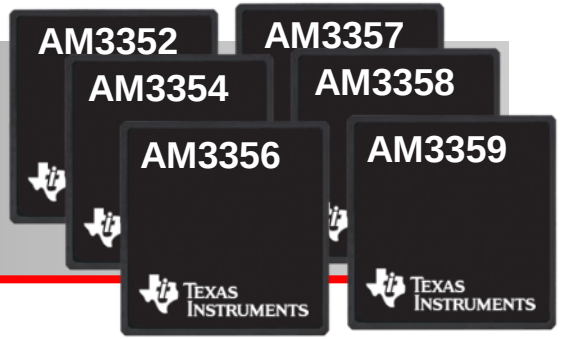
- Free and easy access to software
- Low cost development tools with reference code
- Application specific and advanced development kits
- Driver software available for most high-level operating systems
- QNX support for numerous Sitara devices

Sitara™ ARM® processors available today

	AM18x	AM335x	AM35x	AM37x
Core	ARM9 up to 456MHz	Cortex™-A8 up to 720MHz	Cortex-A8 up to 600MHz	Cortex-A8 up to 1GHz
DMIPs	Up to 410	Up to 1440	Up to 1200	Up to 2000
Graphics	N/A	SGX530	SGX530	SGX530
Memory	LPDDR1/DDR2	LPDDR1/DDR2/DDR3	LPDDR1/DDR2	LPDDR1
RTOS	QNX Neutrino	QNX Neutrino	QNX Neutrino	QNX Neutrino
Key Features	LCD Controller, SATA, Video In/Out, 10/100 EMAC, USB w/PHY	LCD Controller, CAN, 10/100/1000 EMAC	Display Subsystem, Video In/out, 10/100 EMAC, CAN USB w/PHY	Display Subsystem, Video In/out, PoP packaging, USB, Lowest power
Apps	Smart Meter, Wi-Fi Router	PND, Connected Home, Industrial Automation	IA, PLC, Infotainment	PND, Ed. Tablet, PDT
Pricing	Starting at $4.55 (10K)	Starting at $7.50 (10K)	Starting at $12.25 (10K)	Starting at $12.25 (10K)

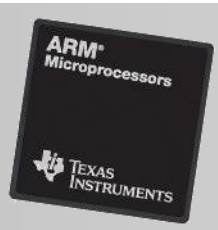
Highly integrated, power-efficient ARM® Cortex™-A8 at ARM9™ prices

Highest ARM DMIPs per dollar today!

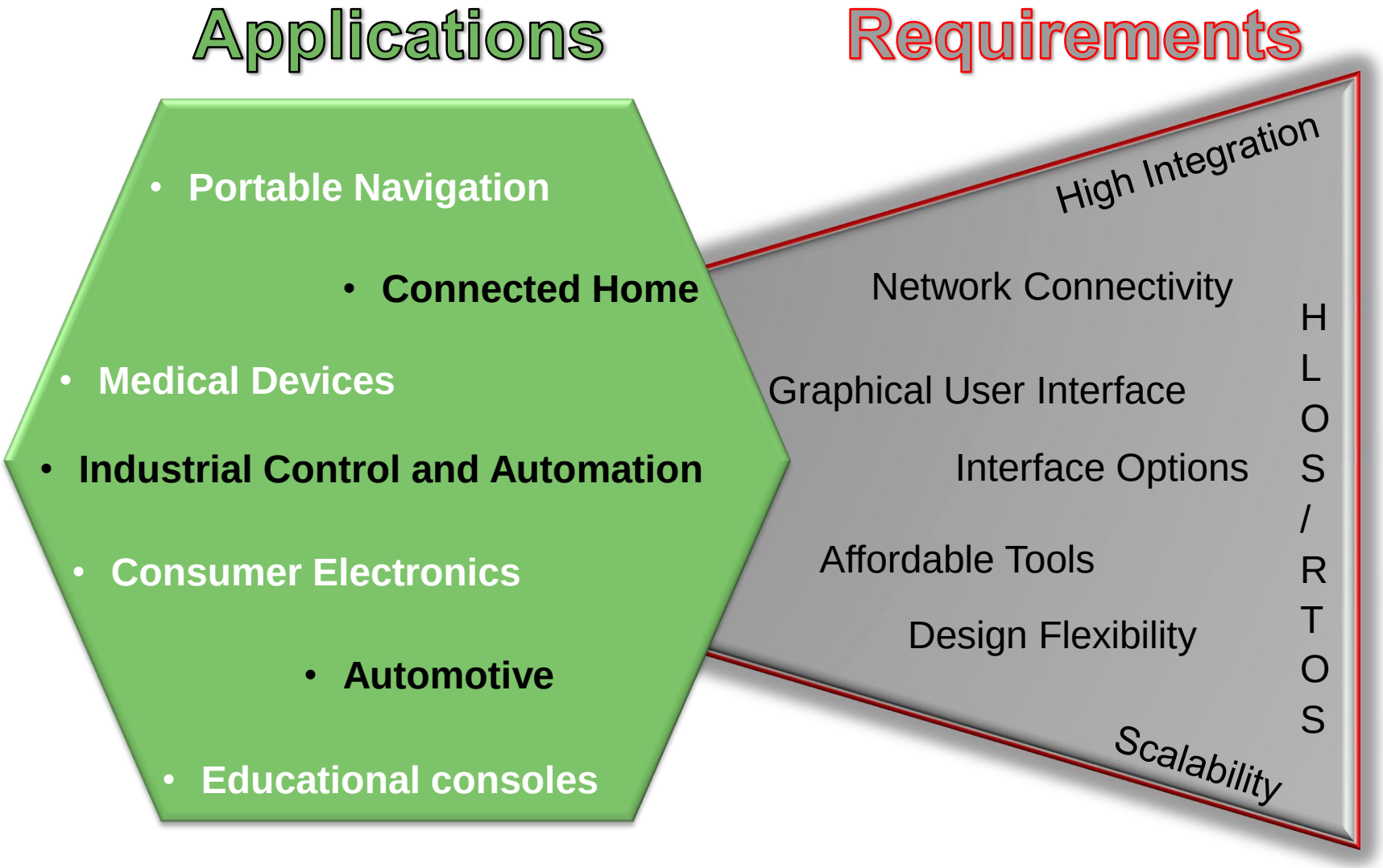


Lower system cost with support for DDR2/DDR3 memory, integrated Gigabit Ethernet, CAN, and PRU-ICSS

Full function and low cost development platforms fit your evaluation and cost requirements

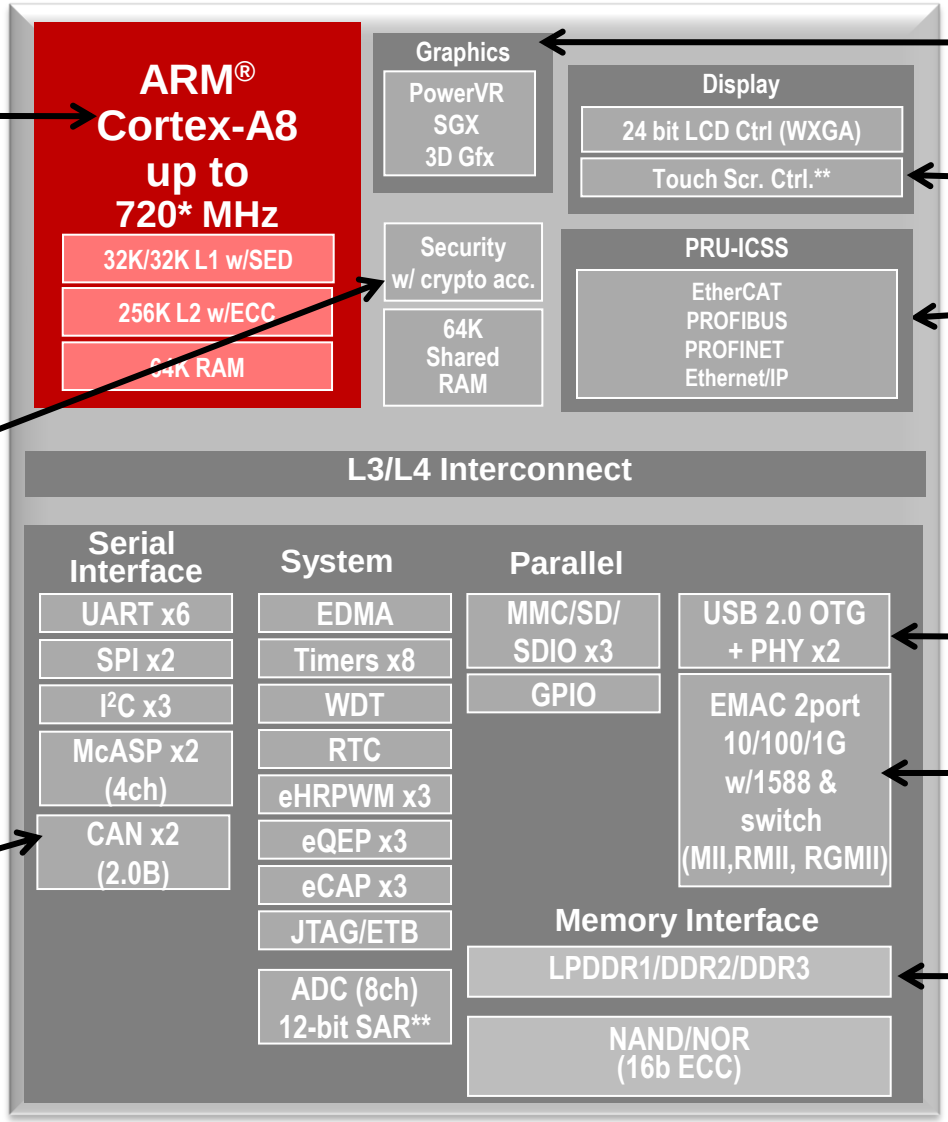


AM335x ARM® Cortex™-A8-based processors are ideal for:



AM335x ARM® Cortex™-A8 based processors

- Achieve faster processing power for system control and OS support
- Protect data with via hardware acceleration of data protection schemes
- Connect to sensors, actuators and control devices

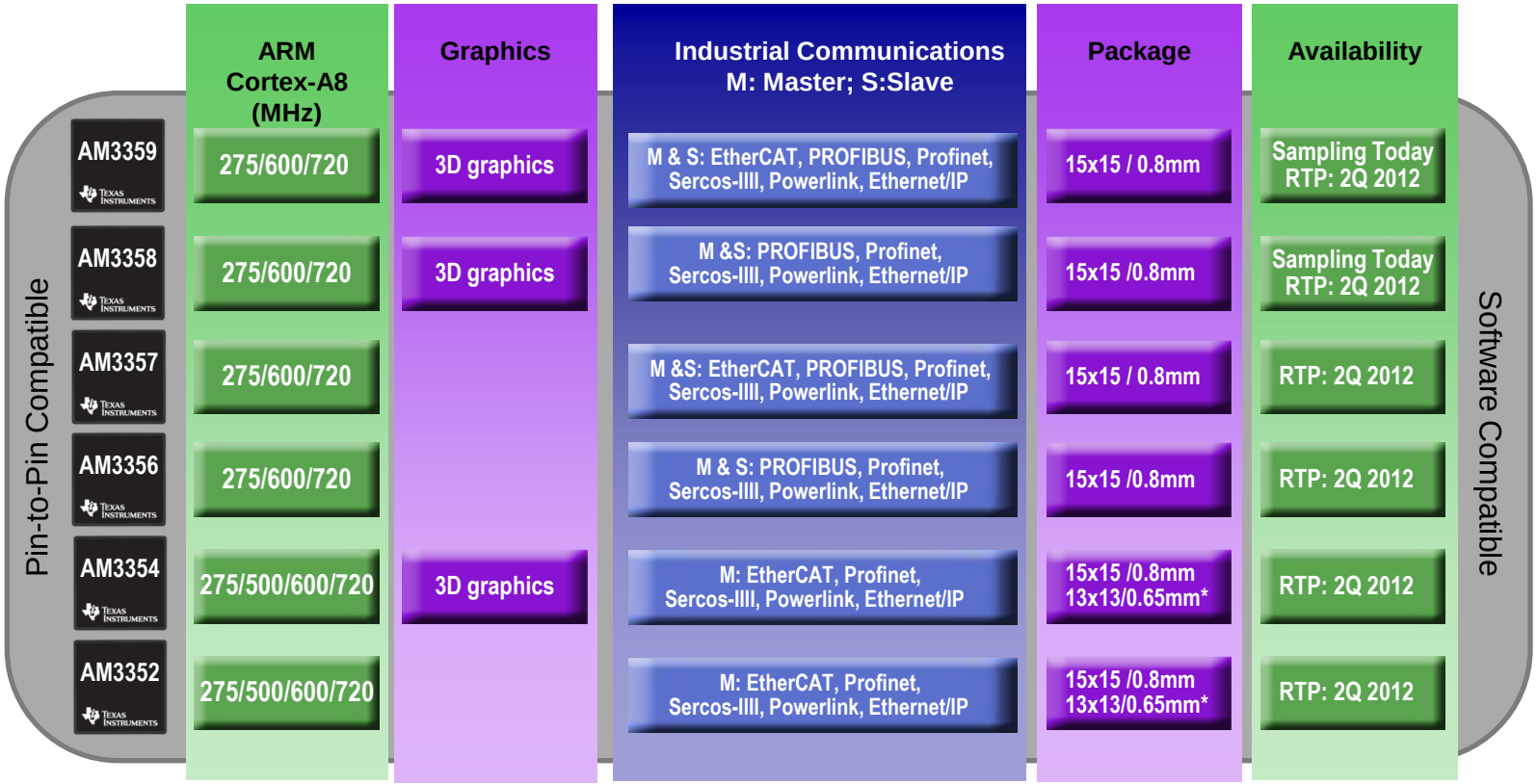


- Create 3D graphical user interfaces
- Enable touch screen interfaces
- Support for Industrial Protocols
- Connect to existing technology with host and device support; Reduce system cost with embedded PHYs
- Deliver fast network connectivity with fast data throughput
- Optimize cost with flexible memory offerings

* *720 MHz only available on 15x15 package. 13x13 is planned for 500 MHz.*
** *Use of TSC will limit available ADC channels.*
SED: single error detection/parity

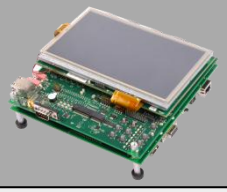
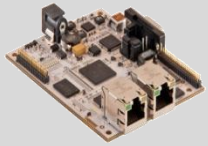
Texas Instruments

AM335x processors - A scalable platform with 6 pin-pin compatible devices



Package	15x15mm (ZCZ)	13x13mm* (ZCE)
ARM speed	Up to 720 MHz	Up to 500 MHz
USB 2.0 OTG + PHY	x2	x1
EMAC	2-port switch	Single port
PRU-ICSS	All I/O pins	Reduced I/O pins

Get to market fast with AM335x dev. tools

	TMDXEVM3358	Starter Kit	TMDXIDK3359	TMDXICE3359	BeagleBone
					
uP/Freq	AM3358 – 720MHz	AM3358 – 720MHz	AM3359 – 720MHz	AM3359 – 720MHz	AM3358 – 720MHz
Memory	512MB DDR2	256MB DDR3	512MB DDR2	256MB DDR2	256MB DDR2
Display	7” SXGA Touch/LCD	4.3” WVGA Touch/LCD	N/A	N/A	Optional
PMIC	TPS65910	TPS65910	TPS65910	TPS65910	TPS65917
WLAN/ BT	WL1271	WL1271	N/A	N/A	N/A
Features	Advanced Connectivity RS-232 (4) 10/100 Ethernet CAN	2x Gb Ethernet ports USB JTAG Zigbee Connector Accelerometer	PROFIBUS I/F CAN PWM Controllers Motor Axis Feedback	Temp Sensor USB JTAG Industrial Protocols CAN	USB-Powered 10/100 Ethernet Expansion USB JTAG
Software	QNX support today	QNX support coming soon	SYS/BIOS, StarterWare	SYS/BIOS, StarterWare	QNX support today
Available	Now	3Q12	Now	Now	Now
	$995	N/A	$895	$99	$89

Texas Instruments

An introduction to QNX and the Neutrino RTOS

QNX SOFTWARE SYSTEMS

QNX at a glance

Global presence: NA, Europe, Asia

Markets: Auto, medical , industrial, networking, consumer, mil-aero

History: 1980-2004 Privately owned

2004-2010 Harman International

2010-2012 Research In Motion

QNX SOFTWARE SYSTEMS

The world's most reliable and high performance OS

Mission-critical reliability
- No crashes or reboots
- Predictable behavior
- Positive brand experience

Technically superior performance
- Responsive interfaces
- Exciting graphics
- Multi-core speed

Rapid development
- Fast coding
- Complete software execution visibility
- Trivial up scaling

Industry standards
- System safety and security
- Quality code
- Easy app porting

Clean intellectual property
- Low risk of lawsuits and recalls

QNX SOFTWARE SYSTEMS

QNX Product Portfolio

QNX Momentics

BUILT ON eclipse

Developer productivity

Performance and footprint optimization

Eclipse ecosystem

QNX Market Specific Solutions

IEC 61508

Common Criteria Secure EAL4+

IEC 62304

QNX Middleware

The cornerstone for a compelling, media-rich, user experience

QNX Neutrino RTOS

The proven foundation for reliable, real-time embedded systems

QNX Board Support Packages

Broad hardware support

Services

Expedite your success with:

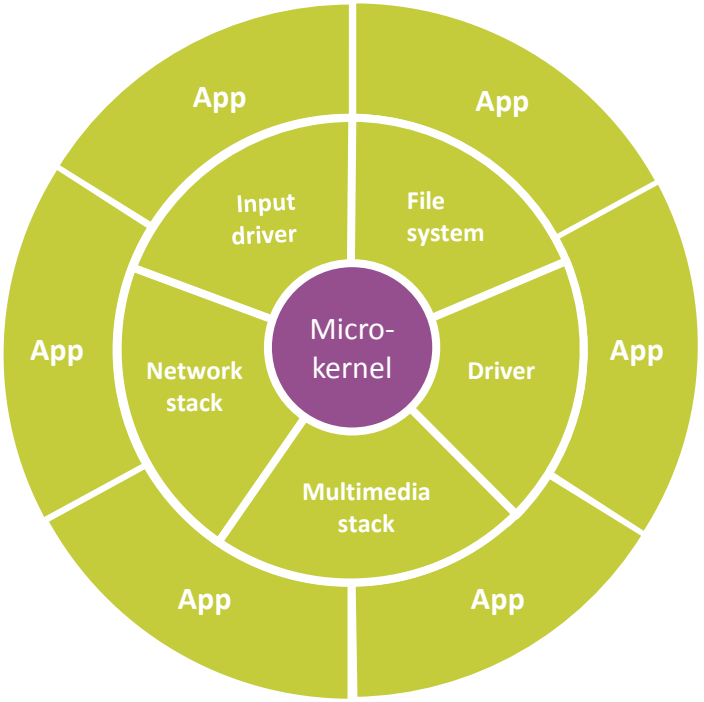
- Training
- Priority Support
- Custom Engineering
- Custom Services Plan

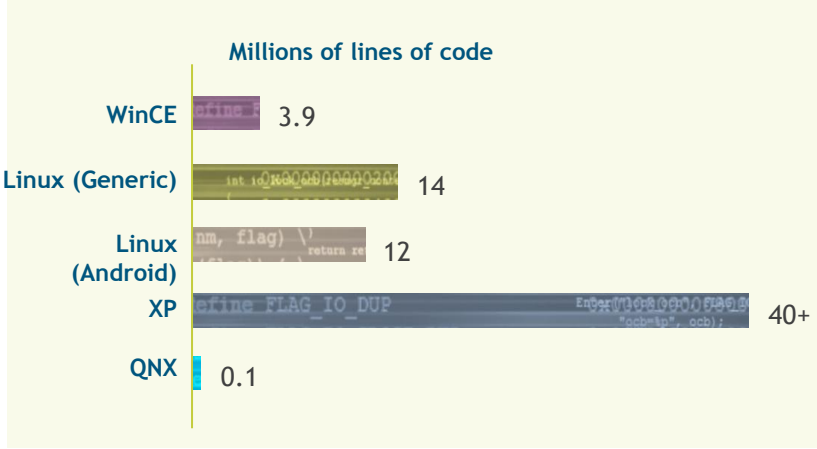
QNX SOFTWARE SYSTEMS

Mission-critical reliability

QNX microkernel architecture

- Microkernel has the fewest possible components with unrestricted CPU privileges
- A fault is contained so that it affects only the faulty component
- Failed components can be dynamically recovered while the system continues to operate





QNX SOFTWARE SYSTEMS

Technically superior performance

Hard real-time performance

Detailed benchmark reports are available from Dedicated Systems at their portal site:
http://download.dedicated-systems.com/

3 Types of reports can be downloaded:

- RTOS Architecture reports
- Platform Evaluations
- Platform Comparison Reports

Dedicated Systems Magazine

QNX SOFTWARE SYSTEMS

Technically superior performance

Hard real-time performance

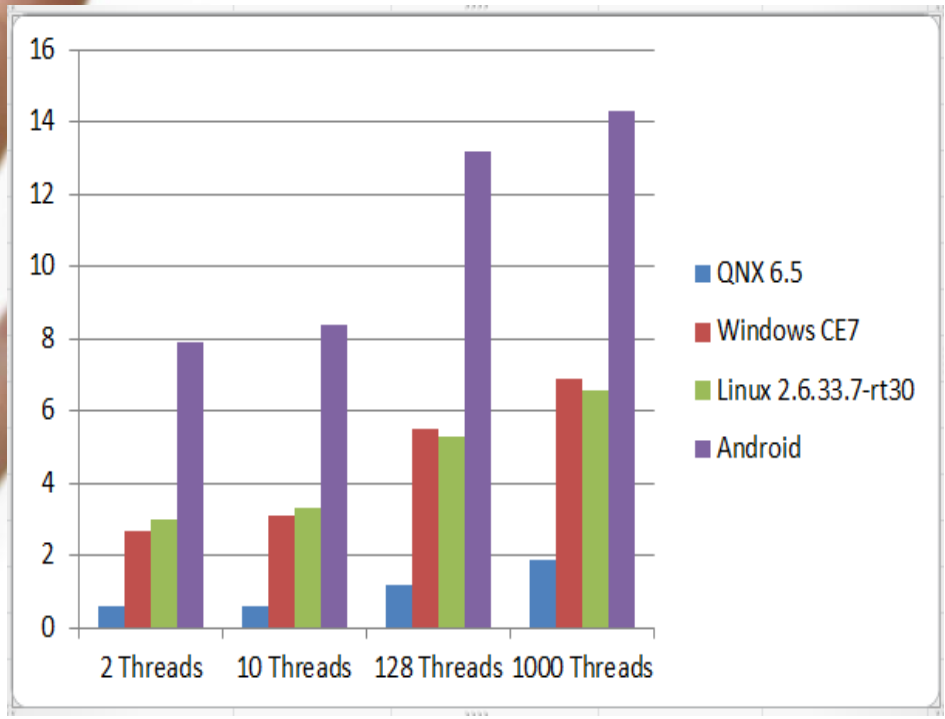


Figure 9a: Average switch latency between x threads, in µs

QNX SOFTWARE SYSTEMS

Collaboration history

- Long term collaboration between TI and QNX
- Multi-customer and multi-market engagements in progress
- Collaboration: BlackBerry PlayBook and OMAP roadmap
- China University program
- On-site joint engineering

QNX SOFTWARE SYSTEMS

QNX support for TI devices

Device Family	QNX BSPs
Sitara™	AM335x, AM35x, AM37x, AM18x
ARM® + DSP	L138, L137
Davinci	DM814x, DM37xx, DM355, DM365, DM644x
DRI (auto)	DRA446, DRA457, DRA459, DRA52x, DRA646, DRA626
WCU	WL1271, WL1273, WL1281Q, WL1283

QNX provides full-featured BSPs for these devices .
Download prebuilt images for trial purposes from Foundry27. (www.foundry27.com)

QNX SOFTWARE SYSTEMS

QNX support for AM335x ARM® Cortex™-A8 platform

TI AM335x EVM

- Startup
- Serial
- Ethernet
- Wifi*
- Bluetooth *
- SD
- I2C
- SPI
- USB/Host
- RTC
- Audio
- Watchdog
- Display Controller
- Touchscreen*
- Open GL ES 2.0 Support*
- EtherCAT*

BeagleBoard.org BeagleBone

- Startup
- Serial
- Ethernet
- Wifi*
- SD
- I2C
- SPI
- USB Host
- RTC
- Watchdog

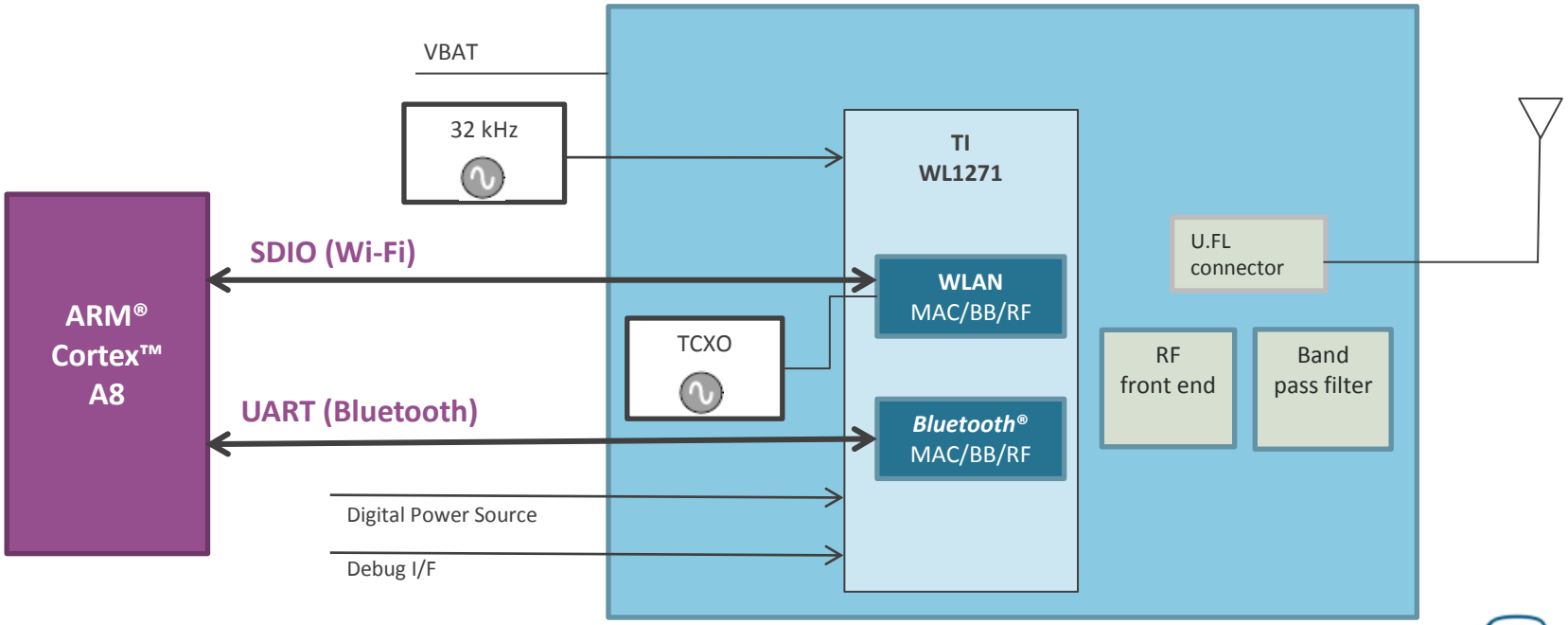
* Functionality currently in development

Visit www.qnx.com/partners/ti for AM335x related updates

QNX SOFTWARE SYSTEMS

TiWi™ | 802.11 b/g/n + *Bluetooth®* module

- FCC/IC/CE/C-Tick certified
- Smaller than a penny (13mm x 18mm x 1.9mm)
- Extended operating temperature: -40 to 85 C
- U.FL connector for external antenna
- On-module TCXO and power regulation
- Bluetooth®



LS RESEARCH
WIRELESS PRODUCT DEVELOPMENT

QNX SOFTWARE SYSTEMS

TI WiFi support

WLAN driver feature overview

WLAN Driver Supports the following roles:

- Station (Client Mode)
- Soft Access Point
- WiFi- Direct device (Client/GO)

MCP3.3 High level Features

- 802.11a/b/g/n
- Security: Open, WPA/WPA2, WEP (64/128)
- WPS and WPSv2 Provisioning (Enrollee and Registrar)
- WMM, WMM-PS (WiFi multimedia)
- CCX
- ARP, Beacon, and Packet Filtering

- Supports WL1271, WL1273, WL1281 and WL1283 connectivity products.

- Based on TI's MCP3.3 WiFi Driver Release.

Conclusion

- TI's and QNX investment in ARM® remains high
- Sitara™ AM335x processor delivers Cortex™-A8 performance, robust graphics, and key peripherals to support numerous end applications
- QNX® Neutrino® RTOS software is an excellent option for the Sitara AM335x to enable customers to get to market quickly.
- Future TI products will continue to integrate the key features and drive higher performance while balancing our customer's cost goals
- QNX will continue to work with TI in a collaborative fashion to support these future TI products.

Visit www.qnx.com/partners/ti for AM335x related update

For more information on AM335x visit www.ti.com/am335x

Slides will be available by April 20 at www.ti.com/qnxrtoswebinar

Contact your local Arrow Representative or visit www.arrownac.com