

# DFAE training - i.MX28 Overview

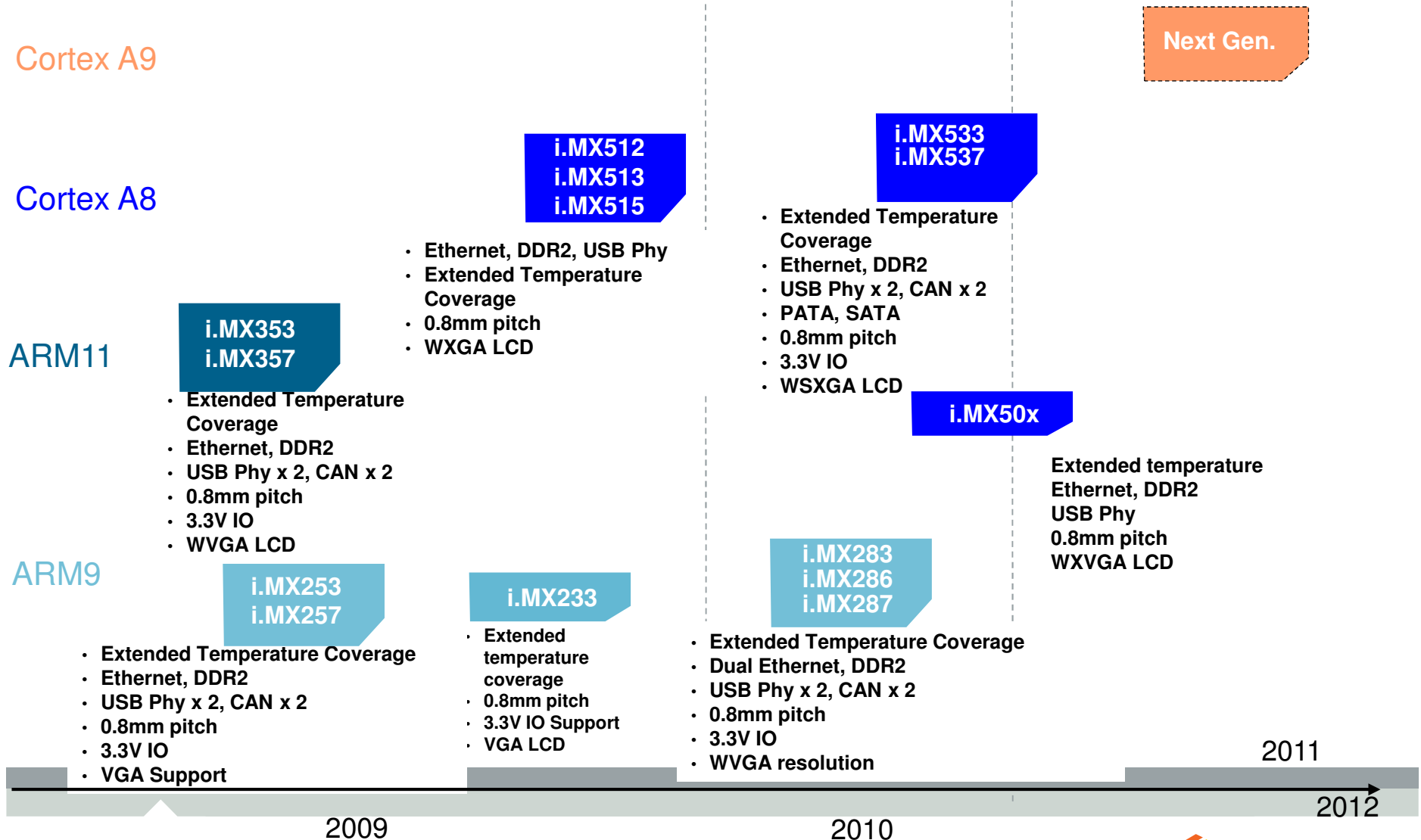
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Dec 2010

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# ARM™ based Processor Roadmap In Industrial Segment



# i.MX28 Family – Value Proposition

The new i.MX28 processor family reaches new levels of integration in an ARM9 device, with on-chip display, power management and connectivity features. Easy-to-use tools and software help you design differentiated industrial, automotive and consumer products in less time.

## Industrial-Strength Integration

- ▶ WVGA LCD controller with touchscreen for display-centric applications
- ▶ Numerous connectivity options including dual 10/100 Ethernet (1588 capable) with L2 switch

## Industry-leading Power Management

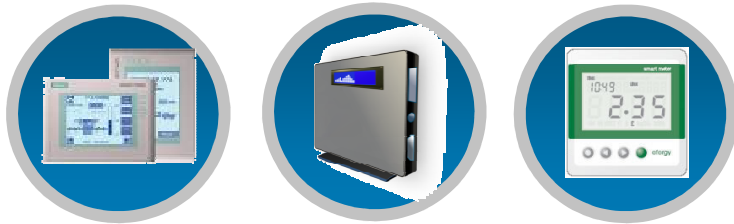
- ▶ Integrated power management simplifies customer design and saves on system cost
- ▶ <0.5 W performance under harshest conditions

## Comprehensive Enablement

- Software BSPs and multimedia codecs available and supported by Freescale at no added cost
- Freescale-owned development system priced at <\$400 include access to all design and layout files.

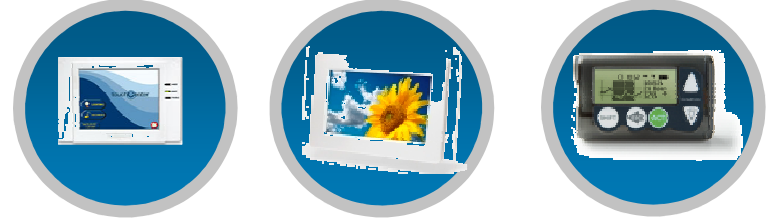
# i.MX28 Target Applications

## Industrial



- Smart Energy Gateways/Meters
- HMI (Factory Automation & Building Control)
- Industrial Control

## Home & Office



- HMI (Appliances, Security Panels, Automation)
- Portable Medical
- Media Gateways/Accessories

## Point Of Sale



- Data Acquisition (Scanners)
- Fixed and Handheld Printers

## Automotive



- Audio Connectivity
- CAN Gateways

# i.MX28x Family

## ► Key Features and Advantages

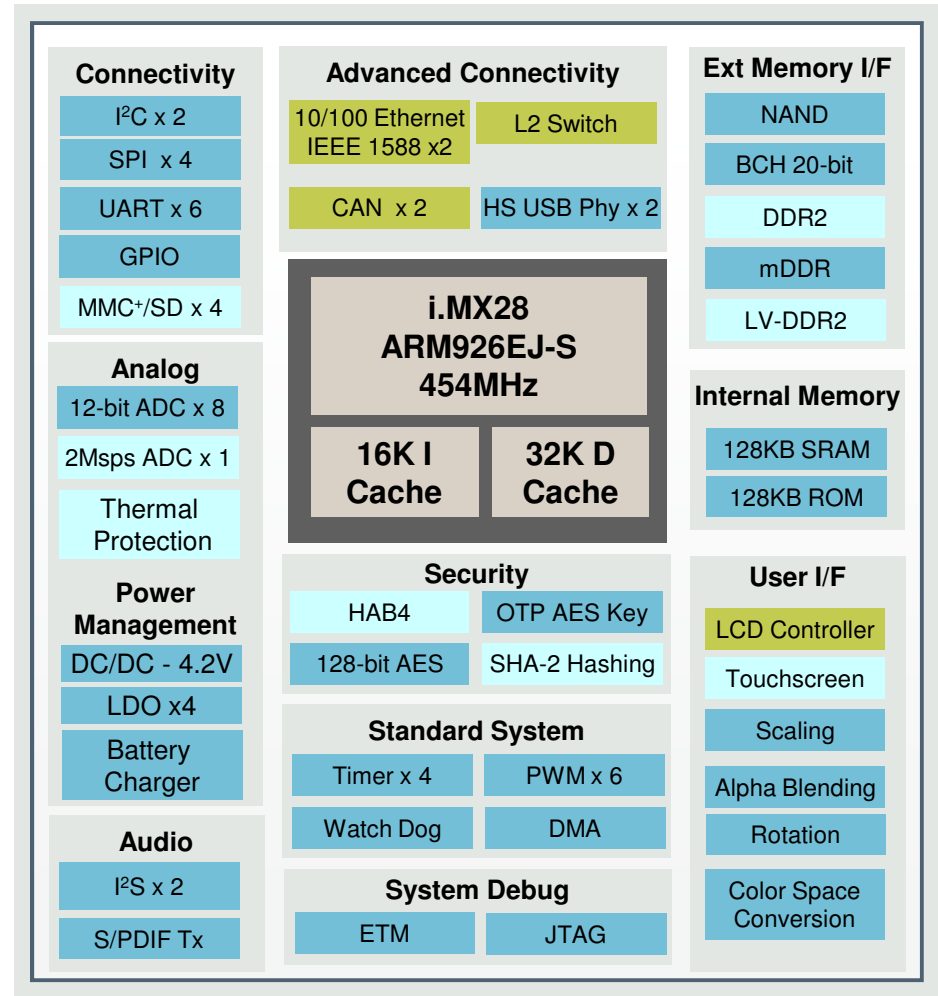
- 454MHz ARM926EJ-S core, 16KB/32KB Cache
- PMU with high efficiency on-chip DC/DC, supports Li-Ion batteries including battery charging
- Dual 10/100 Ethernet with RMI support and L2 Switch
- Dual CAN interfaces
- LCD Controller with Touchscreen
- NAND support – SLC/MLC and eMMC 4.4 managed
- Hardware BCH (up to 20-bit correction)
- 200 MHz 16-bit DDR2, LV-DDR2, mDDR external memory support
- Dual High Speed USB with embedded PHY
- Up to 8 General purpose 12-bit ADC channels and single 2 Msps ADC channel
- Temperature sensor for thermal protection
- Multiple connectivity ports (UARTs, SSP, SDIO, SPI, I2C, I2S)
- Family of products supporting various feature sets

## ► Package and Temperature

- 289 BGA 14x14mm 0.8mm
- -40C to +85C (Industrial, Automotive)
- -20C to +70C (Consumer)

## ► Availability:

- Samples September 2010
- Production: October 2010

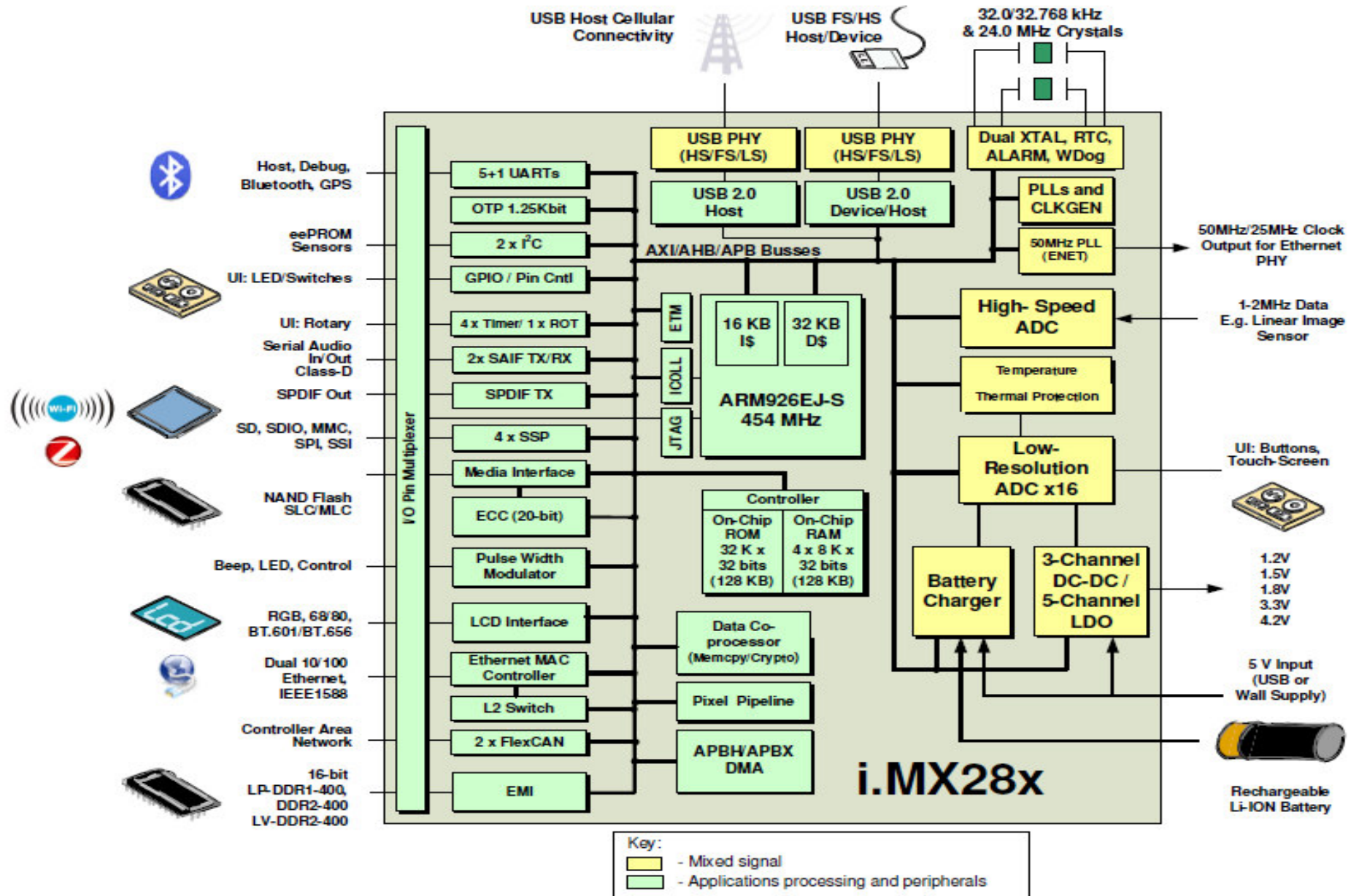


Common IP with  
i.MX233

New or enhanced  
from i.MX233

Not available  
on all variants

# MX28 - Overview



# i.MX28 Family Product Comparison

Feature	i.MX283	i.MX286	i.MX287
On-chip RAM	128KB	128KB	128KB
Memory Interface	NAND Flash, DDR2, mDDR, LV-DDR2	NAND Flash, DDR2, mDDR, LV-DDR2	NAND Flash, DDR2, mDDR, LV-DDR2
LCD Interface	16-bit DDR2, mDDR, SDRAM	16-bit 150MHz DDR1, mDDR	16-bit 200MHz DDR2, mDDR
Touchscreen	Yes	Yes	Yes
Ethernet	x1	x1	x2
L2 Switch	-	-	Yes
CAN	-	x2	x2
12-bit ADC	x8	x8	x8
High Speed ADC	x1	x1	x1
USB2.0	OTG HS with HS PHY x1 HS Host with HS PHY x1	OTG HS with HS PHY x1 HS Host with HS PHY x1	OTG HS with HS PHY x1 HS Host with HS PHY x1
SDIO*	x3	x3	x4
SPI*	x3	x3	x4
UART*	x6	x6	x6
PWM*	x8	x8	x8
S/PDIF Tx	-	Y	Y
Package	14x14 0.8mm 289 BGA	14x14 0.8mm 289 BGA	14x14 0.8mm 289 BGA

\* Represents maximum available – some pins are shared with other interfaces

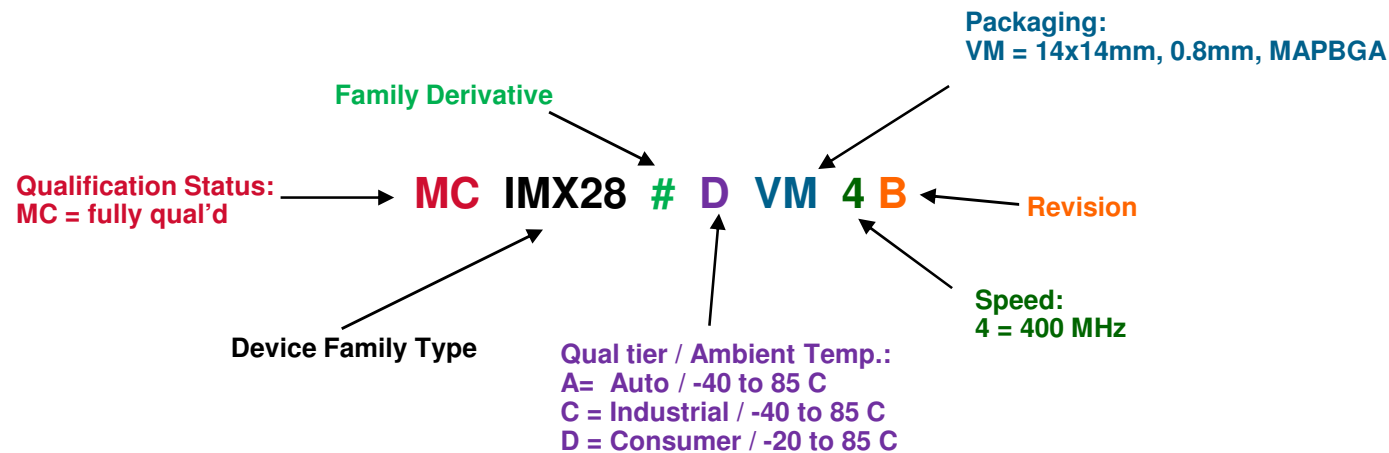
# i.MX28 Automotive Family Product Comparison

Feature	i.MX281	i.MX285
On-chip RAM	128KB	128KB
Memory Interface	NAND Flash, 16-bit 150MHz DDR2, mDDR	NAND Flash, 16-bit 200 MHz, DDR2, mDDR, LV-DDR2
LCD Interface	-	Yes
Touchscreen	-	Yes
Ethernet	x1	x1
CAN	x2	x2
12-bit ADC	x5	x5
High Speed ADC	x1	x1
USB2.0	OTG HS with HS PHY x1 HS Host with HS PHY x1	OTG HS with HS PHY x1 HS Host with HS PHY x1
SDIO	x4	x4
SPI	x4	x4
UART	x3	x3
PWM	x3	x3
S/PDIF Tx	Yes	Yes
Package	14x14 0.8mm 289 BGA	14x14 0.8mm 289 BGA



# i.MX28 Part Numbering

Part Number	Description	Price Book	MSRP 2010 10KU Re-Sale	General Availability
PCIMX287CJM4B	Consumer, 14x14 0.8mm	Yes	\$5.76	Sept 1, 2010
MCIMX283DVM4B	Consumer, 14x14 0.8mm	Aug 31	\$5.76	Oct. 8, 2010
MCIMX283CVM4B	Industrial, 14x14 0.8mm	Aug 31	\$6.34	Oct. 26, 2010
MCIMX286DVM4B	Consumer, 14x14 0.8mm	Aug 31	\$7.34	Oct. 8, 2010
MCIMX286CVM4B	Industrial, 14x14 0.8mm	Aug 31	\$8.07	Oct. 26, 2010
MCIMX287CVM4B	Industrial, 14x14 0.8mm	Aug 31	\$9.84	Oct. 26, 2010
MCIMX281AVM4B	Automotive, 14x14 0.8mm	Aug 31	\$7.39	Oct. 26, 2010
MCIMX285AVM4B	Automotive, 14x14 0.8mm	Aug 31	\$8.44	Oct. 26, 2010
MCIMX28EVK	i.MX28 Evaluation Kit	Aug 31	\$399	Sept 27, 2010
MCIMX28LCD	i.MX28 LCD Module	Yes	\$199	Sept 27, 2010



Because of an order from the United States International Trade Commission, BGA-packaged product lines and part numbers indicated here currently are not available from Freescale for import or sale in the United States prior to September 2010: MC i.MX28 Part Numbers

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# i.MX28 Development Platform

## Hardware Platform

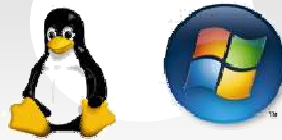


- Ease of Use – BSP/Demo images, development environment build demonstration, video tutorials, reference schematic & layout, documentation
- Small, single-board design with optional add-on LCD module
- MCIMX28EVK – \$399
- MCIMX28LCD – \$199

Full Hardware Evaluation and Development Platform

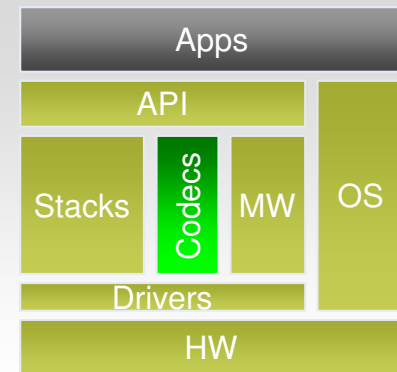
## +Software

*Linux and Microsoft Windows Embedded CE Operating*



- Full-featured, scalable, optimized and proven OS
- Product-worthy software components to support reference design or product development.
- Simplifies HW management, streamlines SW development
- Simple download at no cost.

Complete software package reduces development complexity and improves time to market

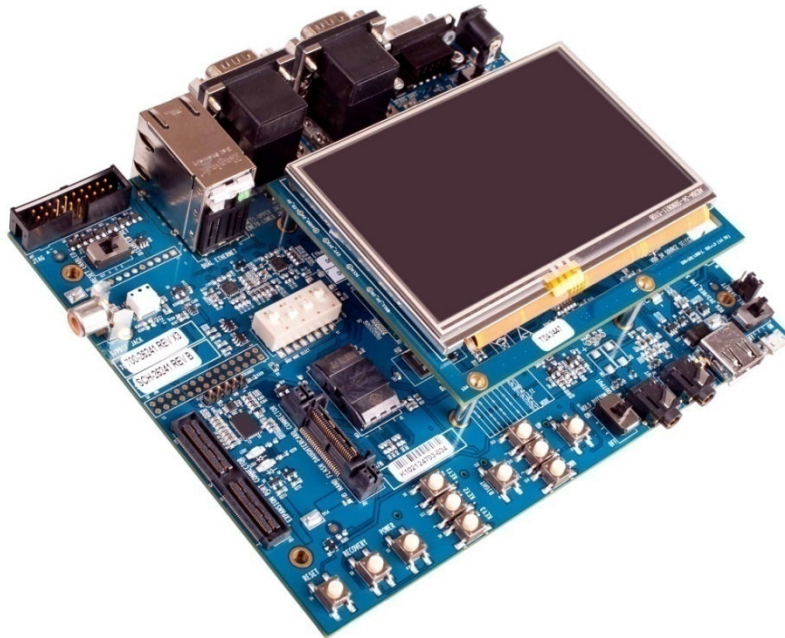


- Broad portfolio of multimedia codecs
- 1588 stack from IXXAT
- Enables differentiated and accelerated product development using EVK platform.
- Simple download at no cost.

Price. Performance. Personality.

# i.MX28 Evaluation Kit (EVK)

Price. Performance. Personality.		
CPU	Debug	Peripherals
<ul style="list-style-type: none"> <li>▶ i.MX28 Applications Processor (289 BGA)</li> <li>▶ DDR2</li> <li>▶ NAND FLASH</li> <li>▶ SPI Flash footprint</li> <li>▶ ETM Support</li> <li>▶ DC/DC Converter components</li> <li>▶ Li-Ion battery connector</li> </ul>	<ul style="list-style-type: none"> <li>▶ Debug Serial Port</li> <li>▶ JTAG</li> <li>▶ Reset, Interrupt, boot switches</li> <li>▶ Debug display/LED's</li> <li>▶ Power Source</li> </ul>	<ul style="list-style-type: none"> <li>▶ WVGA Touchscreen LCD Display (add-on module)</li> <li>▶ SD/MMC Card Slot</li> <li>▶ Dual USB Host/Device connector</li> <li>▶ CAN connector</li> <li>▶ Dual Ethernet with Switch for testing of features and throughput</li> <li>▶ Navigation keys</li> <li>▶ Line input, headphone output (jack)</li> </ul>



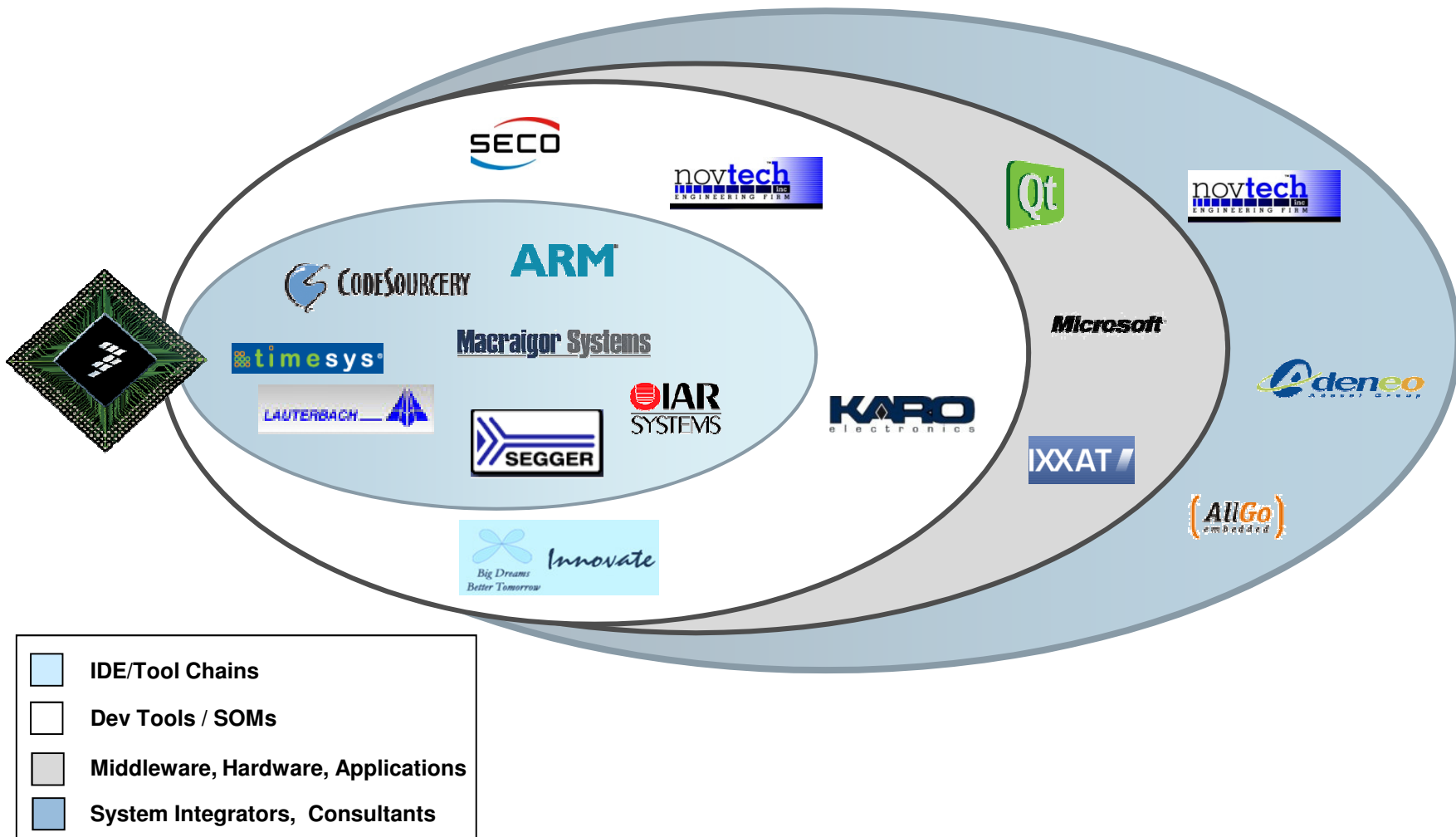
MCIMX28EVK	i.MX28 Evaluation Kit	MSRP \$399
MCIMX23LCD	4.3" WVGA Touchscreen LCD Display (add-on module)	MSRP \$199

## SW Tools support:

- Freescale Linux and WinCE BSPs
- Multimedia codecs
  - MP4, AVI, WMA, AAC, MP3
- IEEE 1588 Support (IXXAT)

# i.MX28 Ecosystem

*Worldwide community of partners driving system solutions*



## i.MX28 Partners – IDH/ODM/Tools/Modules

Company	Type	Contact	URL	Product
<b>Allgo Systems</b>	H/W	Aji Anirudhan - <a href="mailto:aji@allgosystems.com">aji@allgosystems.com</a>	<a href="http://www.allgosystems.com">www.allgosystems.com</a>	IDH
<b>ARM</b>	S/W	In planning		IDE/Tool Chain
<b>CodeSourcery</b>	Tools	In progress	<a href="http://www.codesourcery.com">www.codesourcery.com</a>	IDE/Tool Chain
<b>IAR</b>	S/W	In planning	<a href="http://www.iar.com">www.iar.com</a>	IDE/Tool Chain
<b>Digi</b>	H/W	In planning	<a href="http://www.digi.com">www.digi.com</a>	SOM
<b>Innovate Solutions</b>	Tools	In planning		Low cost dev board
<b>Karo</b>	H/W	In progress	<a href="http://www.karo-electronics.de">www.karo-electronics.de</a>	SOM
<b>Lauterbach</b>	S/W	In planning		IDE/Tool Chains
<b>Macraigor</b>	H/W	James MacGregor - <a href="mailto:jamesm@macraigor.com">jamesm@macraigor.com</a>	<a href="http://www.macraigor.com">www.macraigor.com</a>	IDE/Tool Chains
<b>Novtech</b>	H/W, S/W	In planning Yossi Har-nov – <a href="mailto:yossi@novtech.com">yossi@novtech.com</a>	<a href="http://www.novtech.com">www.novtech.com</a>	IDH, SOM
<b>SECO</b>	H/W	In planning		Module linked to Q7 standard
<b>Segger</b>	H/W	In progress		IDE/Tool Chains
<b>TimeSys</b>	S/W	In planning		IDE/Tool Chain
<b>TQ Systems</b>	H/W	In discussion		SOM

## i.MX28 Partners – RTOS, System Integrators

Company	Type	Contact	URL	Product
<b>Adeneo</b>	S/W	<a href="mailto:sales@adeneo-embedded.com">sales@adeneo-embedded.com</a>	<a href="http://www.adeneo-embedded.com">www.adeneo-embedded.com</a>	Linux, WinCE BSP support, Home Energy Gateway BSP support
<b>Allgo Systems</b>	H/W, S/W	Aji Anirudhan - <a href="mailto:aji@allgosystems.com">aji@allgosystems.com</a> In progress	<a href="http://www.allgosystems.com">www.allgosystems.com</a>	Linux, Android
<b>Embedded Access</b>	S/W	Under consideration		MQX RTOS
<b>IXXAT</b>	S/W		<a href="http://www.ixxat.com">www.ixxat.com</a>	1588 Stack, CANOpen

# i.MX28 Collateral

## ► Websites

- Product Summary Page (avail Sept 27): [www.freescale.com/imx28](http://www.freescale.com/imx28)
  - Documentation, Part Numbers, Fact Sheets, Partners
- Tools Summary Page, EVK (avail Sept 27): [www.freescale.com/imx28evk](http://www.freescale.com/imx28evk)
  - Documentation for EVK and BSPs, EVK and LCD Module Design Files, Software
- i.MX28 Extranet site (contact Sujata Neidig for access) – [www.freescale.com/go/imx28](http://www.freescale.com/go/imx28)
- i.MX Tools website: [www.freescale.com/imxtools](http://www.freescale.com/imxtools)
  - Simple way to find everything needed for hardware and software
- CIA: <http://www.freescale.com/go/cia%2D32bit%2Dimx>
  - Overview Presentation, Layout Guidelines, Competitive Info
  - Communicator, 6-Pack
  - Preliminary RM and DS
  - Technical training slides to be posted by Sept 10

## ► Marketing Collateral – available on Sept 27

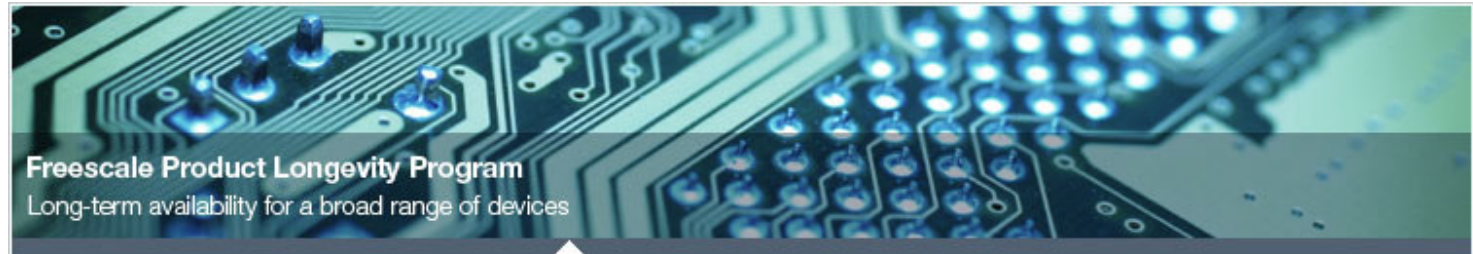
- i.MX28 Industrial & Consumer Fact Sheet
- i.MX28 Automotive Fact Sheet
- i.MX28 EVK Fact Sheet
- i.MX Selector Guide (updated)

## ► Technical Documentation

- IMX28RM – Reference Manual
- IMX28DS - Datasheet
- IMX28CE – i.MX28 Errata
- i.MX28 Power Calculator
- App Notes – i.MX28 Power Management, i.MX233, i.MX25, i.MX28 Differences, i.MX28 Layout Guidelines
- Reference Schematics



# Freescalé's Product Longevity Program



## Freescalé Product Longevity Statement

Freescalé Semiconductor provides a product longevity program for the market segments we serve. For the automotive and medical segments, Freescalé will make a broad range of devices available for a minimum period of 15 years. For all other market segments in which Freescalé participates, Freescalé will make a broad range of devices available for a minimum period of 10 years.

Life cycles for participating Freescalé products will begin at the time of product launch and will include the standard Freescalé end-of-life notification policy (one-year notice for placement of final orders and an additional year until the last ship date). Freescalé will manage the program through our own factories, outside foundries and other manufacturing resources. If it becomes necessary to transfer the production of a participating product to an alternate manufacturing facility, Freescalé will re-qualify that product. These actions demonstrate our intention to provide supply stability to our customers.

Products included in the Freescalé product longevity program:

Search/Filter:

Category	Family	10-Year	15-Year	Product Launch
Applications Processor	i.MX Family	i.MX31	-	2005-06
Applications Processor	i.MX Family	i.MX27	-	2007-06
Applications Processor	i.MX Family	i.MX51	-	2009-11
Applications Processor	i.MX Family	-	i.MX35	2008-10
Applications Processor	i.MX Family	-	i.MX25	2009-06
Applications Processor	i.MX Family	i.MX233	-	2009-08





[www.iMXcommunity.org](http://www.iMXcommunity.org)

**A Freescale supported open web community of developers sharing common interest in transforming i.MX applications processors into practically anything imaginable.**

### **i.MX Community**

- Serves all component enablement peripherals including basic to complex software
- i.MX Forums, Groups and Blogs Posts
- News, Photos and Videos
- Training, Events and Promotions

## Conclusion

- ▶ Strong Industrial Focus of the i.MX product family
- ▶ i.MX28x positioning towards industrial segments
- ▶ Reference design for metering applications
- ▶ Enjoy Selling the i.MX28

# What's next after this training?

- ▶ Message to distributors: i.MX28 reference design proposal
- ▶ FSL would like to have distributor's i.MX28 promotion proposal. The plan is to select 1-2 proposals of the distributors who is interesting in doing an i.MX28 reference design (such as HMI and SOM..., which align with i.MX product strategy). FSL i.MX team will provide full support. And FSL will enable the L2 incentive for these reference designs.
- ▶ The target is to submit the proposal by end of Dec. FSL DSM team will collect the proposal from distributor's Marketing/PM. And FSL will invite interested distributor for further business and opportunity explore.