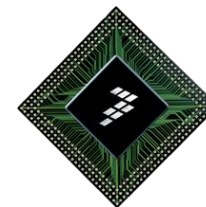




i.MX Product Update

May 2009



Target Markets

Industrial



- HMI (Factory Automation & Building Control)
- Metering (Energy Gateway & Concentrator)
- Industrial Control

Security & Surveillance



- HMI (Access Control)
- IP Cameras & Recorders
- Biometrics

Point Of Sale



- Secure ePOS Terminals
- Data Acquisition (Scanners)
- Fixed and Handheld Printers

Home & Office



- HMI (Appliances, Printers, eBook)
- V2IP / VOIP
- Medical

Apps Processors Industrial Strategy

- ▶ Provide all required peripherals for control and monitoring industrial systems.
 - LCD controller for user interface with touchscreen (up to SVGA resolution)
 - Connectivity modules for links to other systems (USB host, device, OTG, UARTs, Ethernet, CAN)
 - Memory and media cards for updates and storage (MMC, SD, PCMCIA, CF)
- ▶ Linux[®] and Windows[®] CE support as well as Microsoft's new .NET Micro Framework. Also support for RTOS's such as Green Hills and QNX.
- ▶ Extensive range of core and performance levels to suit your needs.
- ▶ Extended Temp range available with full Auto qualified parts coming.
- ▶ Experience managing and supporting long product life spans for required applications including industrial.

ARM920™

ARM926™
400MHz

ARM1136™
532MHz

Next generation ARM[®] core
800MHz+

i.MX Industrial and Embedded Platform Roadmap

Highest Performance
Video Decode – 720p
Video Encode
2D/3D Graphics
Connectivity
BGA Packaging
Rich OS

Cortex A8

High-Res LCD Screens
400+ MHz Performance
Video Decode – D1
Video Encode
Advanced Connectivity
Integrated Analog
BGA Packaging
Rich OS, RTOS

ARM11

Basic LCD Screens
Audio
Integrated Analog
Basic Connectivity
QFP Packaging
Basic RTOS.

ARM9

i.MX31

- i.MX31L +
- OpenGL ES 1.1 3D

i.MX31L

- ARM1136, 400 MHz
- USB (High Speed)
- Video Encode VGA

i.MX27

- i.MX27L +
- D1 Video D/E

i.MX27L

- ARM926, 400MHz
- Ethernet

i.MX357

- i.MX353 +
- Open VG 1.1

i.MX353

- ARM1136, 532 MHz
- Ethernet, DDR2
- USB Phy x 2, CAN x 2

New ARM9

- ARM926, 400MHz
- Ethernet, DDR2
- USB Phy x 2
- Touchscreen
- CAN x 2
- Security for POS

i.MX515

- Cortex A8, 1GHz
- Ethernet, DDR2, USB Phy
- 720p Video Decode
- D1 Video Encode
- OpenGL ES 2.0

Next Gen

- Cortex A8
- 1080p Video Decode
- 720p Video Encode
- Ethernet, USB Phy

Next Gen

- ARM926, 450MHz
- Touchscreen
- Integrated PM
- 1588 Ethernet x 2, L2 Switch
- DDR2, USB Phy x 2, CAN x 2

New Low Cost Arm9

- ARM926, 450MHz
- Touchscreen
- Integrated PM, Audio

In Concept

2009

2010

i.MX Product Longevity

- ▶ FSL, as the leader of the Automotive segment has been always dedicated to maintain product longevity in line with customers end product life time.
- ▶ As a matter of fact and with the following rules:
 - From the first samples
 - Demand for the product may lengthen or shorten this period
- ▶ Freescale plans to keep its i.MX application processors for
 - at least five years for consumer market
 - at least ten years for industrial market

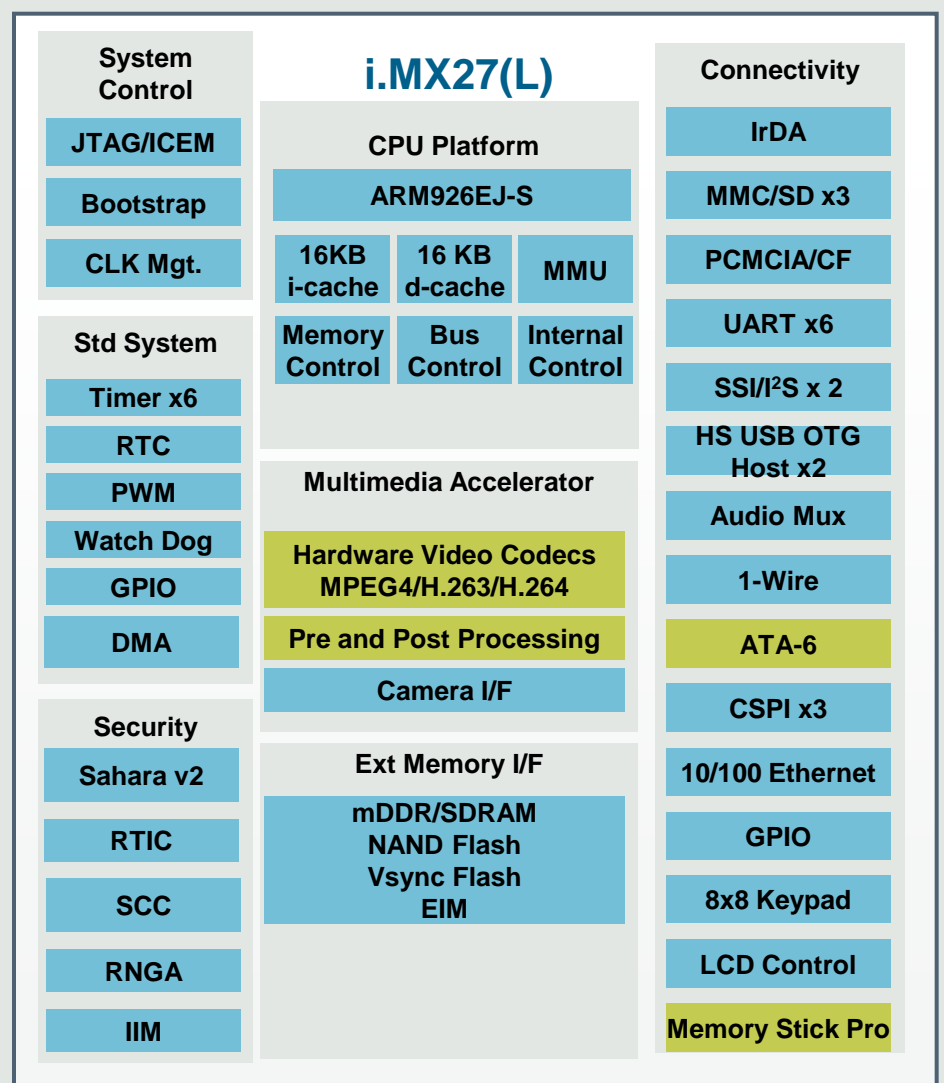
i.MX27(L) Multimedia Applications Processor

► Specifications:

- **CPU:** ARM926EJ-S, 400MHz
- **Process:** 90nm
- **Core Voltage:** 1.2-1.5V
- **Package:** 404 BGA 17x17mm .65mm
473 BGA 19x19mm .8mm
- **Temp Range:** -20 to 85C
-40 to 85C

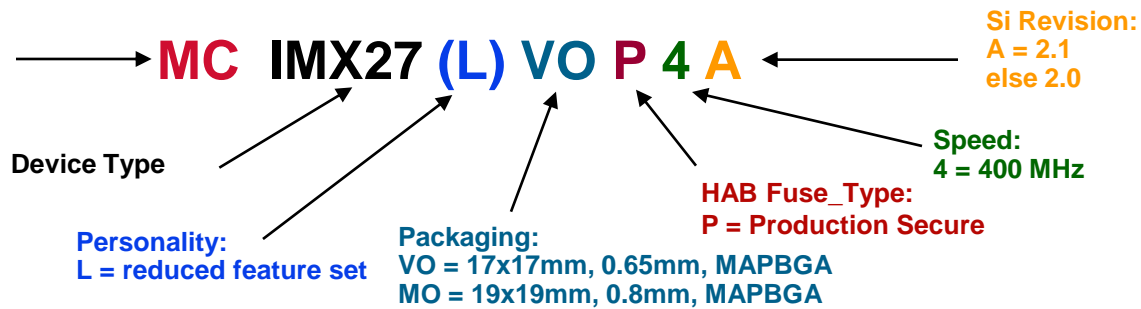
► Key i.MX27 Features and Advantages

- Powerful and cost sensitive ARM9 platform
- Ideal for video encoding, security, IP telephony, POS, general purpose industrial and medical applications
- Multi-standard video codecs at D1 resolution (i.MX27 only)
- Includes pre- and post-processing, scaling
- Robust security platform
- Broad OS support – WinCE6, Linux, RTOS
- Extensive connectivity options
- Ethernet 802.3 MAC
 - USB 2.0 OTG 480Mbps
 - USB 2.0 Host 12Mbps, USB 2.0 Host 480Mbps
 - PCMCIA/CF, Audio MUX
 - MCC, SD, IrDA, 8x8 keypad, CMOS sensor interface
 - ATA-6, Memory Stick (i.MX27 only)



i.MX27(L) Part Number Decoder

Qualification Status:
MC = fully qual'd



For tape & reel orders,
Place an "R2" at the end of the part number.

Device	Part Number	Silicon Revision	Pitch	Package	Speed	Temperature	MPQ
i.MX27	MCIMX27VOP4	2.0	0.65mm	MAPBGA	400 MHz	-20° to +85° C	90
	MCIMX27VOP4A	2.1	0.65mm	MAPBGA	400 MHz	-20° to +85° C	90
	MCIMX27LVOP4A	2.1	0.65mm	MAPBGA	400 MHz	-20° to +85° C	90
	MCIMX27MOP4A	2.1	0.8mm	MAPBGA	400 MHz	-40o to +85o C	90
	MCIMX27LMOP4A	2.1	0.8mm	MAPBGA	400 MHz	-40o to +85o C	90
	Development Tools	MCIMX27ADSE	Freescale i.MX27 ADS		\$2,990	Available Now	
MCIMX27LITEKIT		LogicPD Zoom LiteKit		\$675	Available Now		
MIMX27CSOM		LogicPD Card Engine		\$225	TBD		

Intended for Internal Use Only

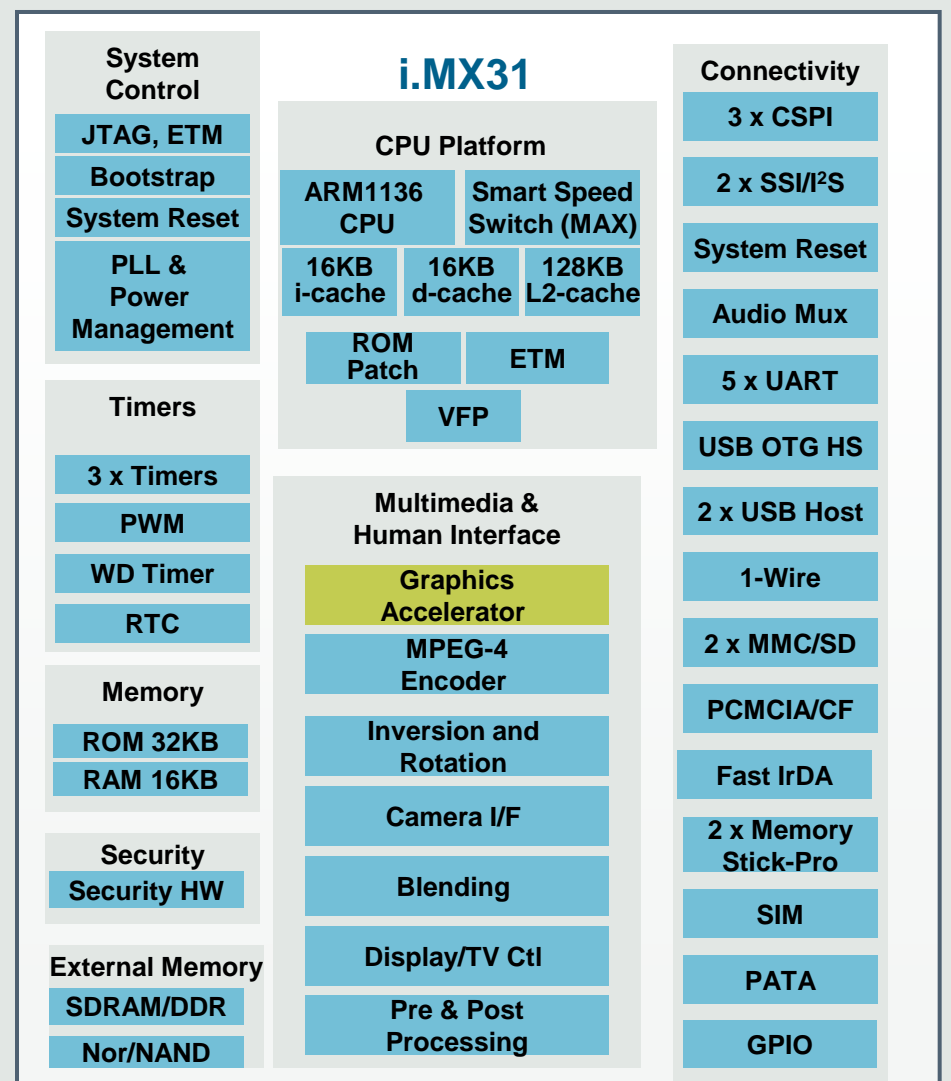
i.MX31 Multimedia Applications Processor

► Specifications:

- **CPU:** ARM1136, 532MHz
- **Process:** 90nm
- **Core Voltage:** 1.2-1.6V
- **Package:** 457 BGA 14x14mm .5mm
473 BGA 19x19mm .8mm
- **Temp Range:** -20 to 70C
-40 to 85C

► Key i.MX31 Features and Advantages

- High performance ARM11 platform with VPU and embedded L2 cache – optimal to support voice recognition and navigation.
- Broad OS support – WinCE, Linux, QNX
- Excellent connectivity options
 - 3x USB
 - ATA-6 Interface for HDD and CD/DVD
 - NAND/NOR Flash
- Robust Multimedia – Audio and video codecs
- Low power - < 500 mW
- High performance display
 - Embedded 3D graphics
 - Hardware Resizing, inversion, Rotation
 - Hardware Color Space Conversion
 - Video/graphics combining



eDMA

eFUSES

Not available on i.MX31L

i.MX31 Part Number Decoder

Qualification Status:

MC = fully qual'd
PC = qual'd

Device Type

MC **IMX31** **(L)** **(C)** **VK** **N** **5** **B**

L = No 3D

Temperature (Amb.):
C = -40° to +85 °C
D = 0° to +70 °C

Packaging:

VK = 14x14mm, 0.5mm, MAPBGA
VM = 19x19mm, 0.8mm, MAPBGA

HAB Fuse_Type:
N = Non-secure

Si Revision:

B = 1.2
C = 2.0
D = 2.0.1
else 1.15

Speed:

4 = 400 MHz
5 = 532 MHz

For tape & reel orders,
Place an "R2" at the end of the part number.

Current PN	New PN	Revision	FAB	Package	Temp	Speed	Duty cycle
MCIMX31VKN5C	MCIMX31DVKN5D	2.0.1	TSMC	14x14mm	-20 to 70C	532 MHz (1.38-1.52V)	100%
MCIMX31LVKN5C	MCIMX31LDVKN5D	2.0.1	TSMC	14x14mm	-20 to 70C	532 MHz (1.38-1.52V)	100%
MCIMX31VMN5C	MCIMX31DVMN5D	2.0.1	TSMC	19x19mm	-20 to 70C	532 MHz (1.38-1.52V)	100%
MCIMX31LVMN5C	MCIMX31LDVMN5D	2.0.1	TSMC	19x19mm	-20 to 70C	532 MHz (1.38-1.52V)	100%
MCIMX31CVKN5C	MCIMX31CVKN5D	2.0.1	TSMC	14x14mm	-40 to 85C	532 MHz (1.55-1.65V)	25%
MCIMX31LCVKN5C	MCIMX31LCVKN5D	2.0.1	TSMC	14x14mm	-40 to 85C	532 MHz (1.55-1.65V)	25%
MCIMX31CVMN4C		2.0	TSMC	19x19mm	-40 to 85C	400 MHz (1.22-1.47V)	100%
MCIMX31LCMN4C		2.0	TSMC	19x19mm	-40 to 85C	400 MHz (1.22-1.47V)	100%
	MCIMX31CVMN4D	2.0.1	TSMC	19x19mm	-40 to 85C	400 MHz (1.22-1.47V)	100%
	MCIMX31CVMN4D	2.0.1	TSMC	19x19mm	-40 to 85C	400 MHz (1.22-1.47V)	100%
	SCIMX31LDVKN6D	2.0.1	TSMC	14x14mm	-20 to 70C	665 MHz (1.55-1.65V)	25%

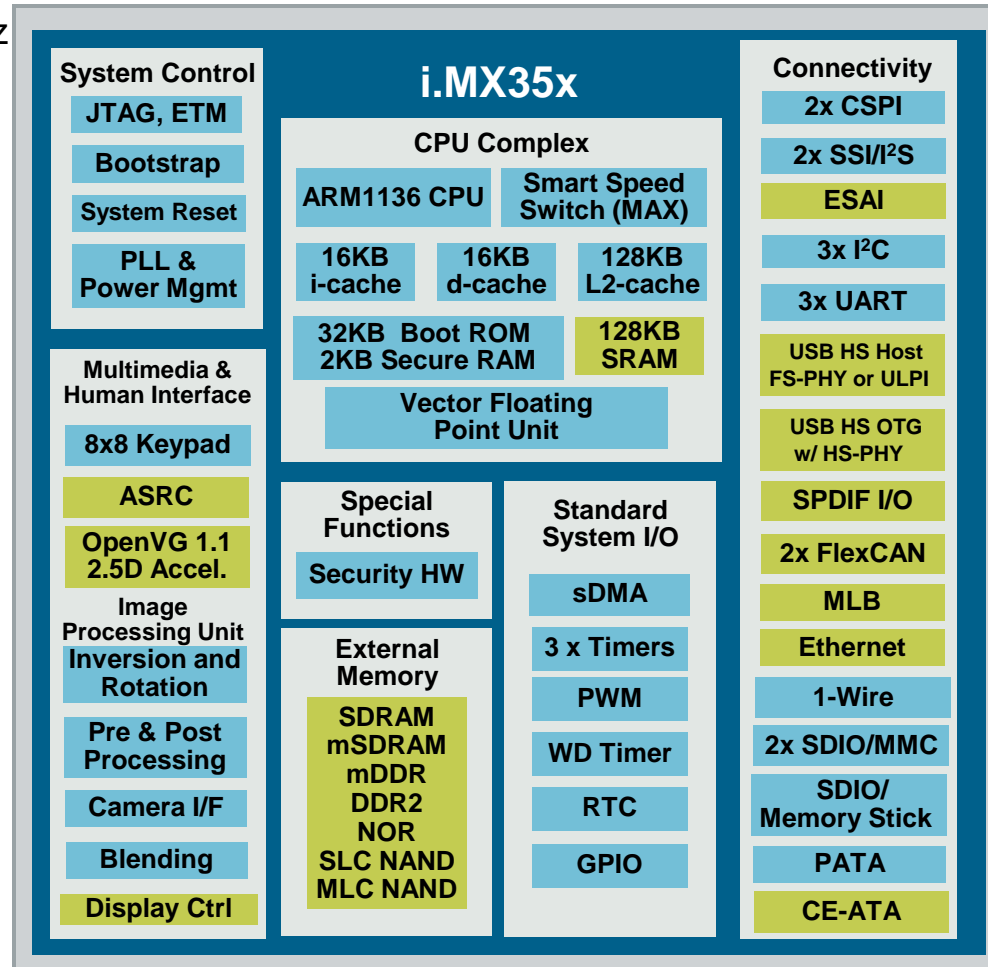
i.MX35x Multimedia Applications Processor

► Specifications:

- **CPU:** ARM1136JF-S, 532MHz
- **Process:** CMOS90LP
- **Core Voltage:** 1.22-1.46V, -40/85C
- **Package:** 400 ball 0.8mm BGA
- **Temp Range:** -20 to 70C
-40 to 85C

► Key i.MX35(G) Features and Advantages

- Same high performance CPU complex as i.MX31
- Enhancements from the i.MX31
 - IPU - Image Processing Unit supporting 24-bit WVGA
 - OpenVG vector graphics processor (i.MX35G)
 - Enhanced Audio Peripherals – Multi-channel audio, S/PDIF, sample rate conversion
 - Flexible Memory Support
 - SDRAM 16/32 bit, 133 MHz
 - DDR2 16/32 bit, 266MHz
 - SLC/MLC NAND
 - Connectivity enhancements
 - 3.3V I/O
 - USB PHY integration
 - 10/100 Ethernet



Inherited from i.MX31

New or enhanced from i.MX31

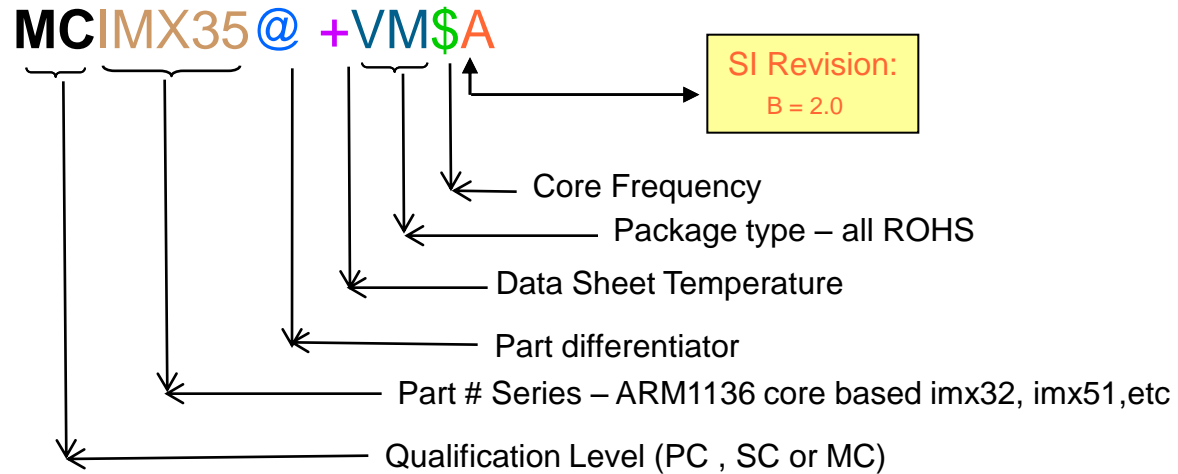
i.MX35x Versions

Part Number	i.MX351	i.MX353	i.MX355	i.MX356	i.MX357
Target Application	Automotive Audio Audio Connectivity	Simple HMI Simple Medical	Automotive Infotainment Mid to Low End Navigation	Automotive infotainment	HMI, Medical Mid End Navigation
Positioning	Low End Automotive	Mainstream i.MX35 device for consumer and industrial. Compared to i.MX31, adds Ethernet, CAN DDR2 memory support, 3.3V I/O, incremental LCD improvements. Improvements to boot from SD/USB	Compared to i.MX31, adds Ethernet support, CAN support, DDR2 memory support, 3.3V IO improvements & improvements to boot from SD/USB	Graphics support for more sophisticated UI for higher end application. Full featured Product for Automotive segment	Graphics Support for more sophisticated UI for higher end applications
Key Differences	No Camera Interface No Graphic No LCD interface No parallel ATA No CE ATA	No ESAI No Graphic No MLB	No Graphic	OpenVG 2.5D	OpenVG 2.5D
Package, Speed, Temp	17*17 BGA 0.8mm 400 ball, 400MHz -40 +85°C	17*17 BGA 0.8mm 400 ball, 532MHz @ -40 +85°C 532MHz @ -20 +70°C	17*17 BGA 0.8mm 400 ball, 532MHz @ -40 +85°C 532MHz @ -20 +70°C	17*17 BGA 0.8mm 400 ball, 532MHz @ -40 +85°C 532MHz @ -20 +70°C	17*17 BGA 0.8mm 400 ball, 532MHz @ -40 +85°C 532MHz @ -20 +70°C
10k resale	\$14.74	Consumer \$11.98 Industrial \$13.77	\$16.38	\$18.01	Consumer \$13.18 Industrial \$14.97
MC Qual	Auto - June 09	Consumer - May 09 Industrial - June 09	auto June 09	Auto - June 09	Consumer - May 09 Industrial - June 09

i.MX35x Part Numbering

Description	Part Number	Si Rev	Package	Qual. Type	Speed	Temp	BC	Availability
i.MX351	MCIMX351AVM4B	2.0	BGA	Auto	400 MHz	-40 to 85	Yes	June 2009
i.MX351	MCIMX351AVM5B	2.0	BGA	Auto	532 MHz	-40 to 85	Yes	June 2009
i.MX353	MCIMX353CVM5B	2.0	BGA	Industrial	532 MHz	-40 to 85	Yes	June 2009
i.MX353	MCIMX353DVM5B	2.0	BGA	Consumer	532 MHz	-20 to 70	Yes	Now
i.MX355	MCIMX355AVM4B	2.0	BGA	Auto	400 MHz	-40 to 85	Yes	June 2009
i.MX355	MCIMX355AVM5B	2.0	BGA	Auto	532 MHz	-40 to 85	Yes	June 2009
i.MX356	MCIMX356AVM4B	2.0	BGA	Auto	400 MHz	-40 to 85	Yes	June 2009
i.MX356	MCIMX356AVM5B	2.0	BGA	Auto	532 MHz	-40 to 85	Yes	June 2009
i.MX357	MCIMX357CVM5B	2.0	BGA	Industrial	532 MHz	-40 to 85	Yes	June 2009
i.MX357	MCIMX357DVM5B	2.0	BGA	Consumer	532 MHz	-20 to 70	Yes	Now

i.MX35x Part Number Definition



Part differentiator	@
Automotive Audio	1
Mainstream consumer/industrial i.MX35	3
Mainstream i.MX35 auto	5
OpenVG	6
Secure	8

Temperature	+
Commercial: 0 to + 70 C	(nothing)
Commercial: -20 to + 70	D
Extended: -40 to + 85 C	C
Auto: -40 to + 85 C	A

Package Type	ROHS
MAPBGA 17x17 0.8mm P	VM

Frequency	\$
400 MHz	4
532 MHz	5

For tape & reel orders,
Place an "R2" at the end of the part number.

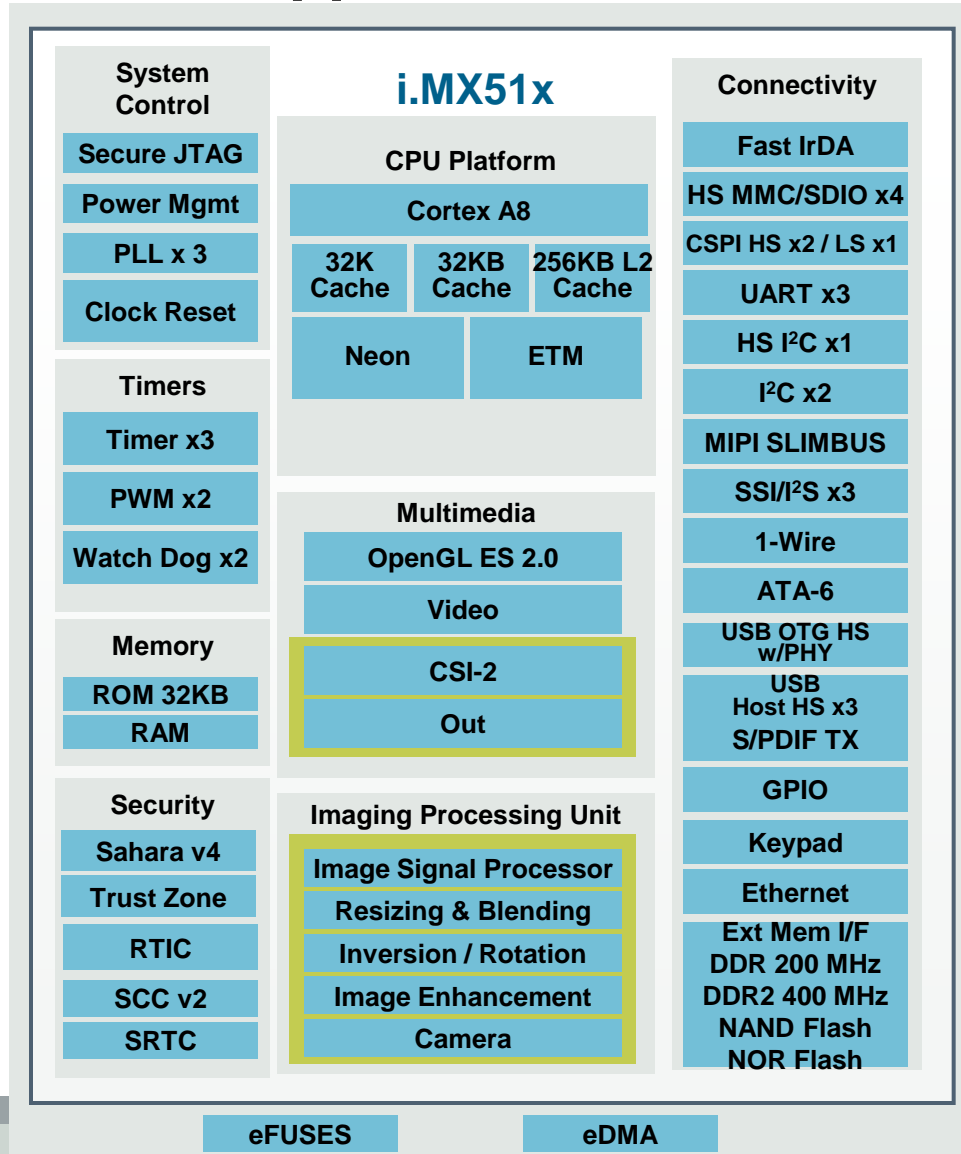
i.MX51x Multimedia Applications Processor

► Specifications:

- **CPU:** Cortex A8, 600 MHz to 1GHz
- **Process:** 65nm, LP-GP
- **Core Voltage:** 0.7-1.1V
- **Temp Range:** -10 to 85C
-40 to 85C

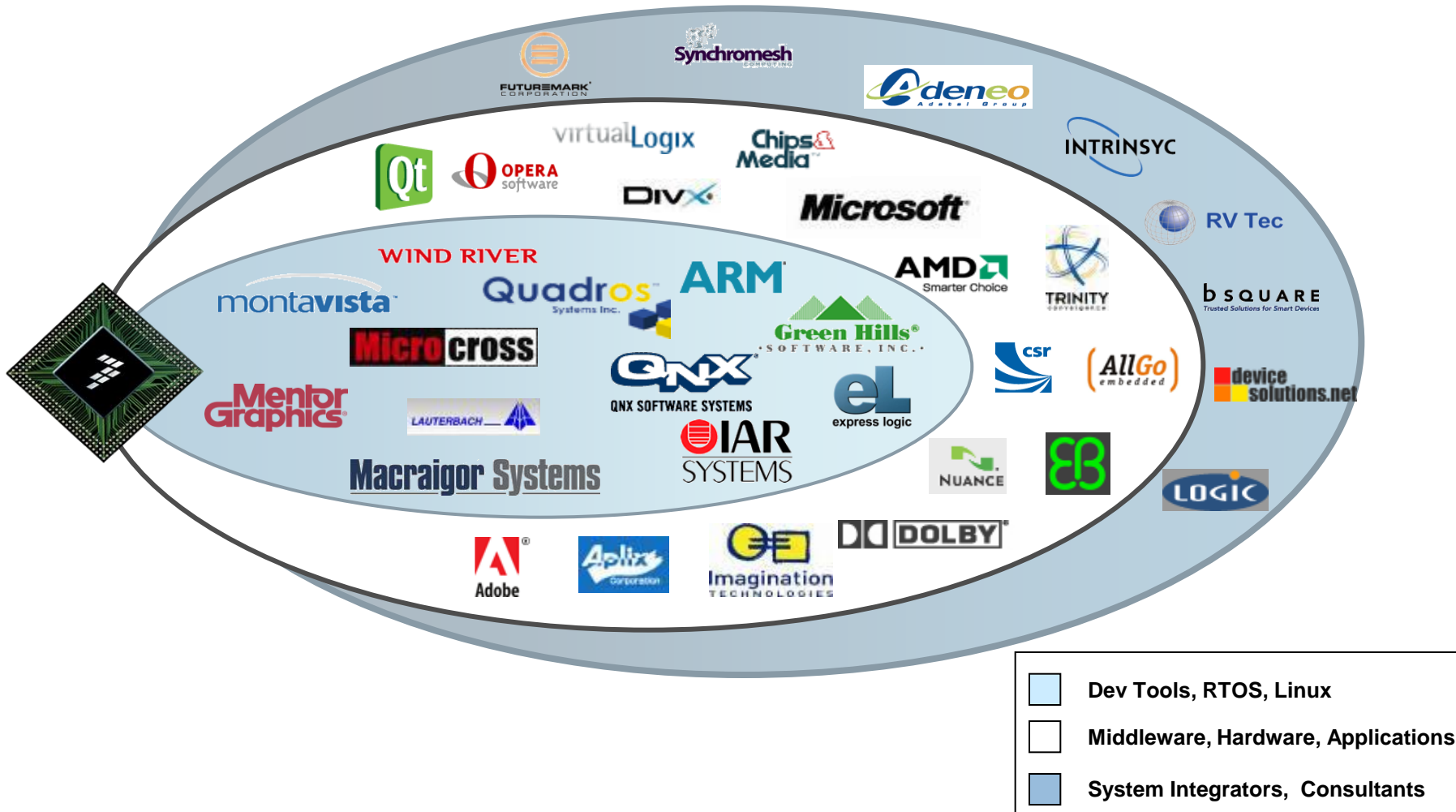
► Key i.MX51 Features and Advantages

- High performance CPU: Cortex A8, 600 – 800 MHz
 - Advanced speech and navigation
- Low power: 0.7V core operation
- Delivers rich graphics and UI in HW
 - OpenGL ES 2.0 3D (AMD Z430)
 - OpenVG 1.1 graphics accelerator (AMD Z160)
 - Neon Vector floating point co-processor
 - Dual display up to WXGA
- Drives high resolution video in HW
 - Multi-format D1 video encode
 - Multi-format HD720 video decode
- Mixed signal integration - HD720 TV out and high speed USB with embedded PHY



MAD Ecosystem

A worldwide community of partners driving system solutions on Freescale platforms.



Multimedia Alliance Network Partners

- ▶ IDE's/Tool Chains
 - ARM LTD
 - Code Sourcery
 - Green Hills
 - IAR Systems
 - Mentor Graphics
 - Microcross
 - Wind River
- ▶ RTOS
 - Express Logic
 - Green Hills
 - Mentor Graphics
 - Micrium
 - Segger Systems
 - Quadros
 - QNX
 - Wind River
- ▶ JTAG Tools
 - ARM LTD
 - American Arium
 - Green Hills
 - IAR Systems
 - Kyoto Microsystem
 - Lauterbach
 - Macragigor Systems
 - Mentor Graphics
 - Sophia Systems
 - Signum
 - Wind River

- ▶ Linux OS
 - Monta Vista
 - Wind River
 - Timesys
- ▶ Development Boards
 - Logic PD
 - Phytec
 - Eurotech
 - iWave
 - Atmark
 - Kyoto
 - Cogent
- ▶ VoIP/V2IP
 - Trinity Convergence
 - ITRI
 - Hellosoft
 - SpiritDSP
- ▶ Flash
 - Adobe
 - Bsquare
 - Calsoft
- ▶ GUI/UI/HMI
 - Trolltech
 - Mentor
 - QNX
 - Swell SW
 - Altia
 - Fluffy Spider

- ▶ Codecs
 - DivX
 - Visual On
 - Actimagine
- ▶ Browsers
 - Opera
 - Access
- ▶ Java
 - Aplix
 - Aonix
- ▶ Navigation
 - Elektrobit
 - NavinGo
- ▶ Graphics
 - Mazatech
 - Yappa
 - AGS
- ▶ Other
 - Futuremark
 - Nuance
 - Loquendo
 - Virtual Logix
 - Cidana

i.MX31/i.MX27 PDK Hardware Overview

Personality Module

Provides the devices most commonly tailored to meet a specific target product or customer requirement:

VGA Touch-screen Display

Buttons

Connectivity

- USB, Ethernet
- BT, Wifi
- GPS

•User I/O

•Communications

- FM Receiver
- FM Transmitter
- TV Encoder
- Headset Connector
- Speaker
- Microphone

Camera

Storage (HDD)

External connectors

i.MX31 Processor Module

- i.MX SoC
- DDRSDRAM
- NAND Flash
- USB transceiver
- Power Management IC
- Audio ASIC
- Touch Screen Controller

68mm

38mm

Design. Debug. Demo

Can be attached to:

- De-bug module for software development
- Personality module for demonstration
- Both De-bug and Personality

Debug Module

Provides Functions required for hardware and software development, but would not reside on a final product:

- Debug Ethernet
- Debug Serial Port
- JTAG
- Reset, Interrupt, boot switches
- Debug LEDs
- CodeTest interface
- Power Source
- Current/Power monitoring

Software Development Kit

Product-worthy software components to support reference design or product development.

▶ **Documentation:** Release notes, user/reference guides, data sheets

▶ **Development Tools:** FSL tools and listing of 3rd party tools

▶ **Demo Applications:** set of apps for demos or to serve as starting point for customers



▶ **Middleware:** Gstreamer or WinCE framework, multimedia codecs, connectivity protocol stacks, wireless applications, power management



▶ **BSP:** standard O/S optimized with additional drivers to support peripherals on Personality Module



Freescale



Third Party or Open Source



FreescalE Codec Value Proposition

▶ *Multimedia codecs are a key platform feature to drive i.MX design wins*

▶ Freescale has a broad portfolio of multimedia codecs

- Audio Codec: MP3, AAC LC, AAC+, WMA, ...
- Video Codec: H263, MPEG2 MP, MPEG4, H264 BP, WMV9 SP/MP
- Image Codec: BMP, GIF, JPEG, PNG

▶ Enables differentiated and accelerated product development using PDK platforms

▶ Standard Software Packages (libraries, parsers, wrappers, docs) that support multimedia use cases

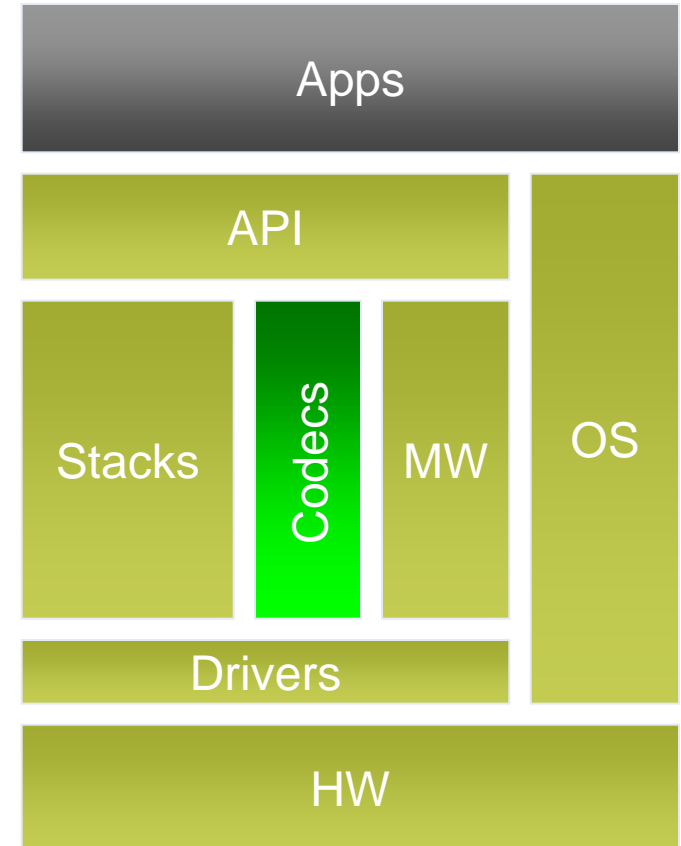
▶ VPU Software Packages that enable hardware-accelerated codecs on the MX27, MX31 and future NPIs

▶ Evaluation (limited A/V playback) and Production software versions

▶ **Software licensing required, but no licensing fee**

▶ Marketing web pages and streamlined, web-based, click-through licensing and delivery systems

▶ Support services from TIC/CPO teams using CRM/CQ systems



i.MX27 IP Camera Reference Design

A complete form-factor reference design based on the i.MX27 that demonstrates a high performing, low power, and cost attractive solution for the digital IP video surveillance market.

► Features

- Downloadable design files, BOM and docs
- Compression of H.264, MPEG-4 (part 2) at 30fps up to D1
- Wired streaming to standard browser via TCP/IP
- Power-over-Ethernet enabled
- OSD (On-Screen Display) for time-stamp overlay
- Motion detection

► Collateral

- Web Site has been updated:
www.freescale.com/imx27ipcamera
- Customer presentation available via extranet site.

► Training

- DFAE Training, 09/30 & 10/01, 2hr hands-on session

► Availability:

- Now available for order through distributor
 - Inventory: 100 cameras 9/30, 150 cameras 10/31
- IP camera Linux BSP available on website end of Sept.



MCIMX27IPCAM – \$1,995
Now available for order!

i.MX35 Third Party Development Boards

Cogent

- ▶ Strong design capabilities and solid Linux partner.
- ▶ Focus on General Embedded.
- ▶ SRP: \$589
- ▶ www.cogcomp.com



IcyTecture

- ▶ New company with talented i.MX-focused engineers.
- ▶ Multimedia demo capabilities.
- ▶ SRP: \$ 1,1099, LCD \$100 to \$300
- ▶ www.icytecture.com



Phytec

- ▶ Strong third-party network and large presence in Europe.
- ▶ Focus on industrial customers.
- ▶ CAN support.
- ▶ SRP: \$789
- ▶ <http://www.phytec.com/products/sbc/ARM-XScale/phyCORE-ARM11-i.MX35.html>



