HOW TO BUILD YOUR NEXT SUPERCHARGED EMBEDDED UI ON THE I.MX RT1060

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SCALABILITY OF EMBEDDED PROCESSING
THE NEW NORMAL

Ultra-low Power
Dynamic & Static
ARM v8/v8m + GPU/DSP
ARM v7/v7m + 2D/3D
ARM v7m + Audio

Applications Processors

i.MX 7ULP
i.MX 6UL/ULL
i.MX RT

MCU
Low Power i.MX RT Roadmap

- **>600 MHz Premium**
  - **i.MX RT1050**
    - Cortex-M7, 32K/32K L1
    - 512KB SRAM
    - 8/16-bit EMI (SDRAM/SRAM)
    - LCD / CSI / 2D acceleration
    - Standard Security
  - **i.MX RT1060**
    - Cortex-M7, 32K/32K L1
    - 1MB SRAM
    - 8/16-bit EMI (SDRAM/SRAM)
    - LCD / CSI / 2D acceleration
    - Standard Security
  - **i.MX RT1064**
    - Cortex-M7, 32K/32K L1
    - 1MB SRAM, 4MB Flash
    - 8/16-bit EMI (SDRAM/SRAM)
    - LCD / CSI / 2D acceleration
    - Standard Security

- **600MHz Balanced**
  - **i.MX RT1020**
    - Cortex-M7, 16K/16K L1
    - 256KB SRAM
    - 16-bit EMI (SDRAM/SRAM)
    - Standard Security
    - LQFP144
  - **i.MX RT1015**
    - Cortex-M7, 16K/16K L1
    - 128KB SRAM
    - 1x QSPI
    - Standard Security
    - LQFP100

- **500MHz Entry**
  - **i.MX RT1020**
    - Cortex-M7, 16K/16K L1
    - 256KB SRAM
    - 16-bit EMI (SDRAM/SRAM)
    - Standard Security
    - LQFP144

**Features**
- **Cortex-M7**, **32K/32K L1**
- **512KB SRAM**
- **8/16-bit EMI (SDRAM/SRAM)**
- **LCD / CSI / 2D acceleration**
- **Standard Security**

**Timeline**
- **2017**
- **2018**
- **2019**

**Support**
- **Available now**

**BGA196**

**Higher Performance**

**Lower Cost**
**Specifications**

- **Package**: MAPBGA196 | 10x10mm², 0.65mm pitch (130 GPIOs)
- **Temp / Qual**: -40 to 105°C (Tj) Industrial / 0 to 95°C (Tj) Consumer

**High Performance Real Time system**

- **Cortex-M7 up to 600MHz**, 50% faster than any other existing M7 products
- 20ns interrupt latency, a **TRUE Real time processor**
- **512KB SRAM + 512KB TCM/OCRAM**

**Rich Peripheral**

- Motor Control: Flex PWM X 4, Quad Timer X 4, ENC X 4
- 2x USB, 2x SDIO, 2x CAN + 1x CANFD, 2x ENET with 1588, 8xUART, 4x SPI, 4x I2C
- **8/16-bit CSI interface and 8/16/24-bit LCD interface**
- **PXP 2D Graphics Acceleration**
  - 2x Quad-SPI interface, with Bus Encryption Engine
  - Audio interface: 3x SAI/ SPDIF RX & TX/ 1x ESAI

**Security**

- TRNG&PRNG(NIST SP 800-90 Certified)
- 128-AES cryptography
- Bus Encryption Engine: Protect QSPI Flash Content

**Ease of Use**

- **MCUXpresso with SDK**
- FreeRTOS

**Low BOM Cost**

- Competitive Price
- Fully integrated PMIC with DC-DC
- Low cost package, 10x10 BGA with 0.65mm Pitch
- SDRAM interface
MCUXpresso Software and Tools
for LPC & Kinetis MCUs and i.MX RT crossover processors

- **MCUXpresso IDE**
  Edit, compile, debug and optimize in an intuitive and powerful IDE

- **MCUXpresso SDK**
  Runtime software including peripheral drivers, middleware, RTOS, demos and more

- **MCUXpresso Config Tools**
  Online and desktop tool suite for system configuration and optimization
MCUXpresso SDK
Software Framework and Drivers

Architecture:
- CMSIS-CORE compatible
- Single driver for each peripheral
- Transactional APIs w/ optional DMA support for communication peripherals

Integrated RTOS:
- Amazon FreeRTOS
- RTOS-native driver wrappers

Integrated Stacks and Middleware:
- USB Host, Device and OTG
- lwIP, FatFS, LittleFS
- Crypto acceleration plus wolfSSL & mbedTLS
- AWS IoT and Azure IoT
- SD and eMMC card support

Reference Software:
- Peripheral driver usage examples
- Application demos
- FreeRTOS usage demos
- IoT connectivity examples

License:
- Clear BSD 3-clause for startup, drivers, USB stack

Toolchains:
- MCUXpresso IDE
- IAR®, ARM® Keil®, GCC w/ Cmake

Quality:
- Production-grade software
- MISRA 2004 compliance
- Checked with Coverity® static analysis tools

Learn more at: www.nxp.com/mcuxpresso/sdk
Information on NXP Devices and Enablement

• Visit nxp.com for information on devices
  – i.MX RT range of crossover processors: nxp.com/imxrt
  – MIMXRT1060 evaluation kit: nxp.com/mimxrt1060
  – i.MX Processor Community: https://community.nxp.com/community/imx

• MCUXpresso Software and Tools Web Pages
  – MCUXpresso Software and Tools: www.nxp.com/mcuxpresso
    ▪ MCUXpresso SDK: www.nxp.com/mcuxpresso/sdk
    ▪ MCUXpresso IDE: www.nxp.com/mcuxpresso/ide
    ▪ MCUXpresso Config Tools: www.nxp.com/mcuxpresso/config

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    ▪ MCUXpresso Config Tools: https://community.nxp.com/community/mcuxpresso/mcuxpresso-config
Introducing Storyboard™ - Embedded GUI Design Software

- Canadian owned and operated
- Since 2007, over 500 customers
- Developers of Storyboard GUI design software for embedded systems, and professional engineering and design services
- >1,00,000 in-field products with Crank GUIs
- Significant domain expertise in industrial, smart kitchen, consumer appliances, and medical devices
Brands That Trust Crank
Why Crank and NXP?
An NXP Proven Partner

- NXP partner for over a decade
- Extensive i.MX series experience
- Major trade show demo collaboration
- Deliver graphics training - NXP Tech Days
- Offer extensive support of NXP evaluation hardware platforms

We help NXP customers experience true scalability with maximum graphics performance on embedded systems
Crank Storyboard & Scalability

- Software Renderer
- QSPI
- 2D Optimized
- G2D
- Hardware Layers
- Multi-Core
- 3D GPU
- OpenGL
The Storyboard Difference
Crank Storyboard is Different

- Built exclusively for embedded systems so performance is optimal
- Engineers and designers work concurrently more effectively using their tools of choice
- Facilitates 50% faster, and easier, iterative design changes and development cycles
- Smaller memory footprint meaning reduced Bill of Materials (BOM) costs
Key Features of Storyboard

- Import designs directly from Photoshop
- Update easily with PS re-import
- Animate quickly via timeline
- Add behavior via Lua scripting
- Compare and merge specific changes between versions
- Rapid validation and testing on simulator or real hardware
- One tool from prototype to deployment
Coca-Cola Freestyle

Coca Cola required an UI update for existing infield devices along with a solution for new product development
Crank Storyboard Demonstration
What Next?

Join Crank in graphics training

- NXP Connects - June 12-13, 2019
- NXP Tech Day Irvine - Aug 27, 2019

DOWNLOAD the free Crank Storyboard trial

www.cranksoftware.com/free-trial
“When we build our next product, we’ll use Crank without hesitation. They provided the best 3rd party development team I’ve ever worked with. They delivered on their promises, and ensured our product launched on time.”

Rishi Siravuri
Chief Engineer, Electronics
Emerson Thermostat
Thanks for joining

www.cranksoftware.com