NXP EDGEREADY SMART TOUCHLESS HMI SOLUTION OVERVIEW

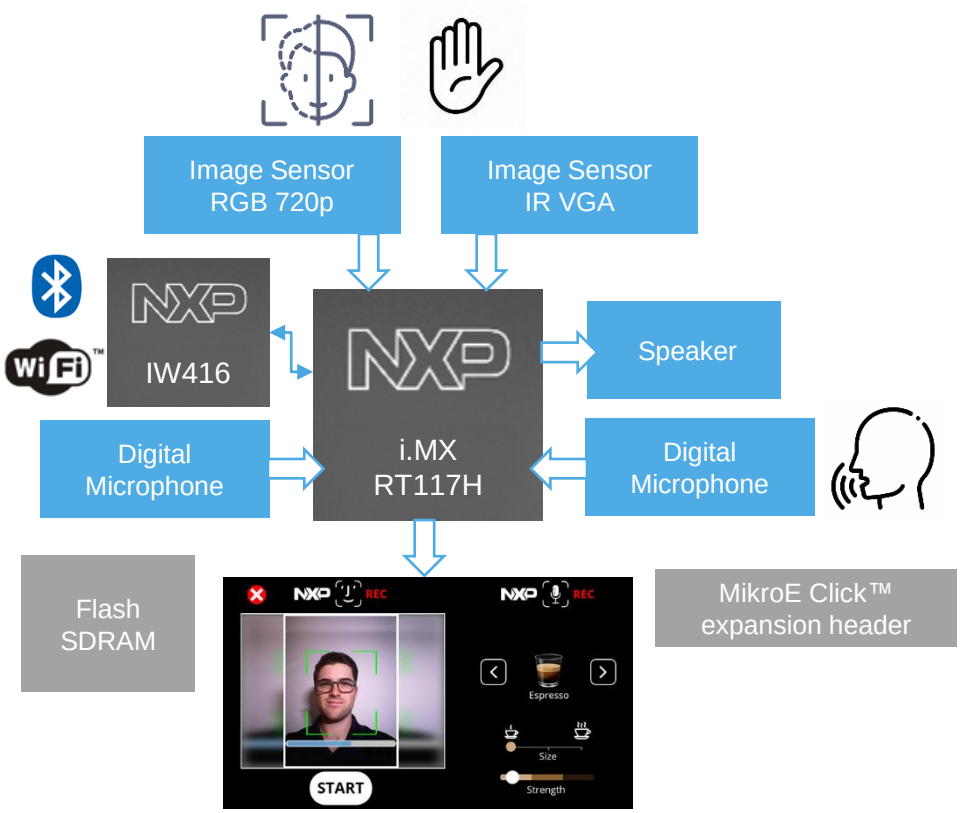
BL Edge Processing

JUNE 2022

SECURE CONNECTIONS FOR A SMARTER WORLD

i.MX RT117H MCU BASED SMART TOUCHLESS HMI SOLUTION

Machine Vision, Voice Control and Graphics Display UI all on one MCU Platform for Advanced and Innovative HMI



Status	Dates
Customer Sample	Mar 2022
Market Launch	Jun 2022

Solution Kit: SLN-TLHMI-IOT

RSL $299

Graphics Display User Interface

- 5.5-inch MIPI LCD display at 720*1280 resolution
- 2D graphics accelerator supported by LVGL
- GUI demo for Coffee Machine, Smart Home Panel and Elevator

Machine Vision

- 720p RGB and VGA IR Image Sensors
- Support user identification through face recognition
- Support gesture control through palm shape recognition

Voice Control

- 2 digital microphones on board and another 2 more through expansion
- VoiceSeeker integrated to support acoustic echo cancellation, noise reduction, beamforming and barge-in
- VIT for wake word and local voice command (English, Mandarian)
- Cyberon for wake word and local voice command with more languages support and separated charge through 3rd party

Wireless Connectivity

- Dual band Wi-Fi 4 + BLE combo: IW416
- Cloud based device management, user data management, OTA, etc.

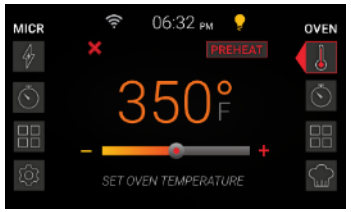
Misc.

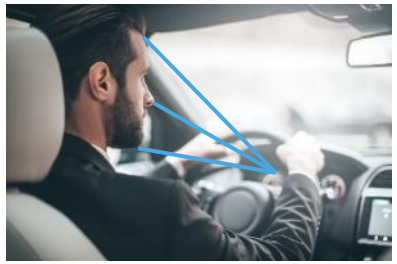
- 32MB flash, 32MB SDRAM, 2W louder speaker
- MikroE Click™ Expansion Header, PIR sensor

SMART TOUCHLESS HMI TARGET APPLICATIONS

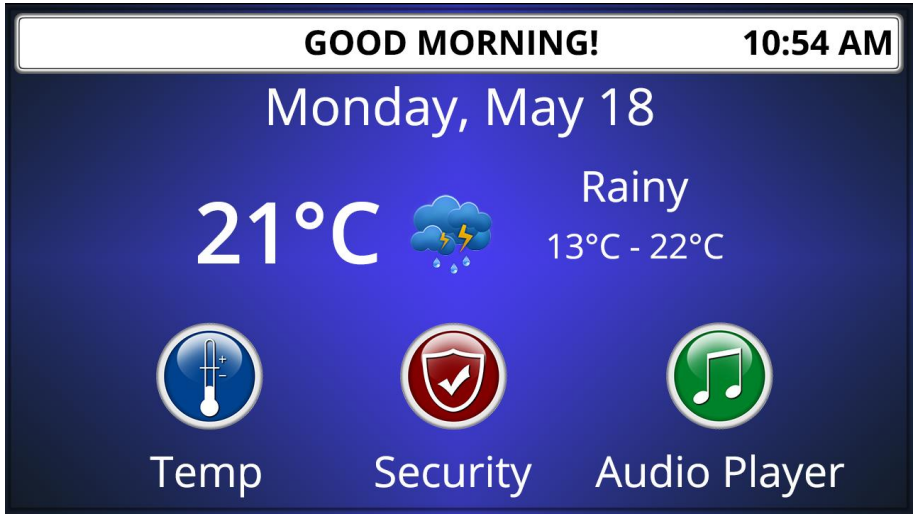
F U T U R E P O S S I B I L I T I E S

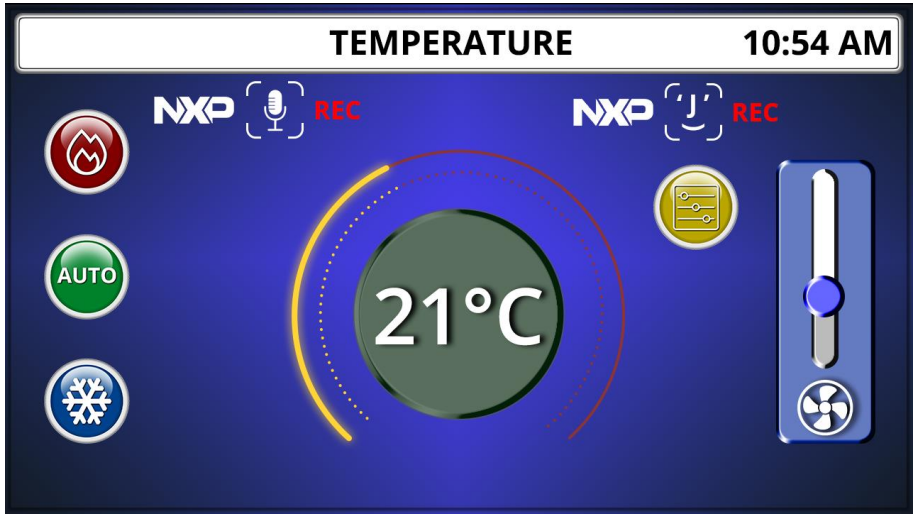
Smart Touchless HMI	Machine Vision	Remote Conference	Payment
• Large screen display with 2D GUI • User identification with face recognition • Touchless control with gesture recognition (hands, head) • Touchless control with far field offline voice control • Wireless connectivity	• 3D or 2D camera input • Object detection and/or identification • Human posture or drowsiness detection • Wired or wireless connectivity	• Speaker identification with face recognition • Speaker face detection and tracking • Far field full-duplex communication • Far field voice control • Wired or wireless connectivity	• Face recognition with liveness detection for payment • Wireless connectivity • EdgeLock security for payment

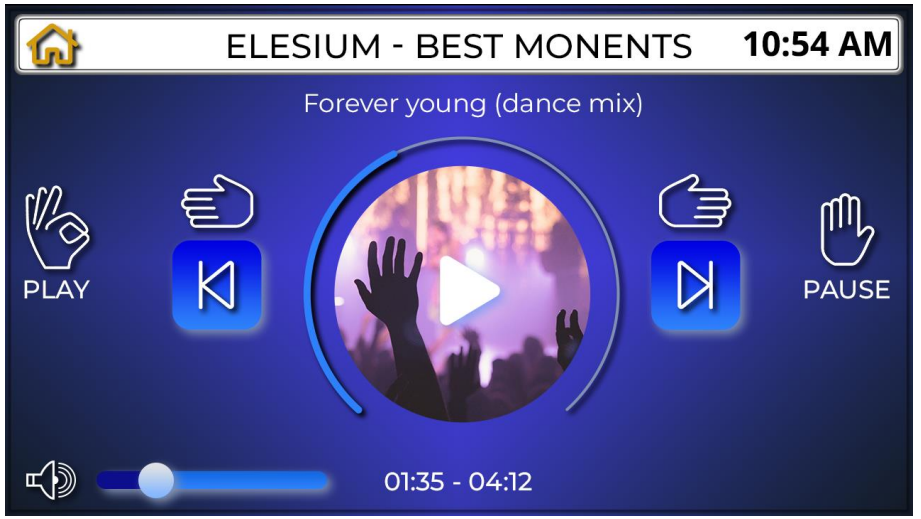




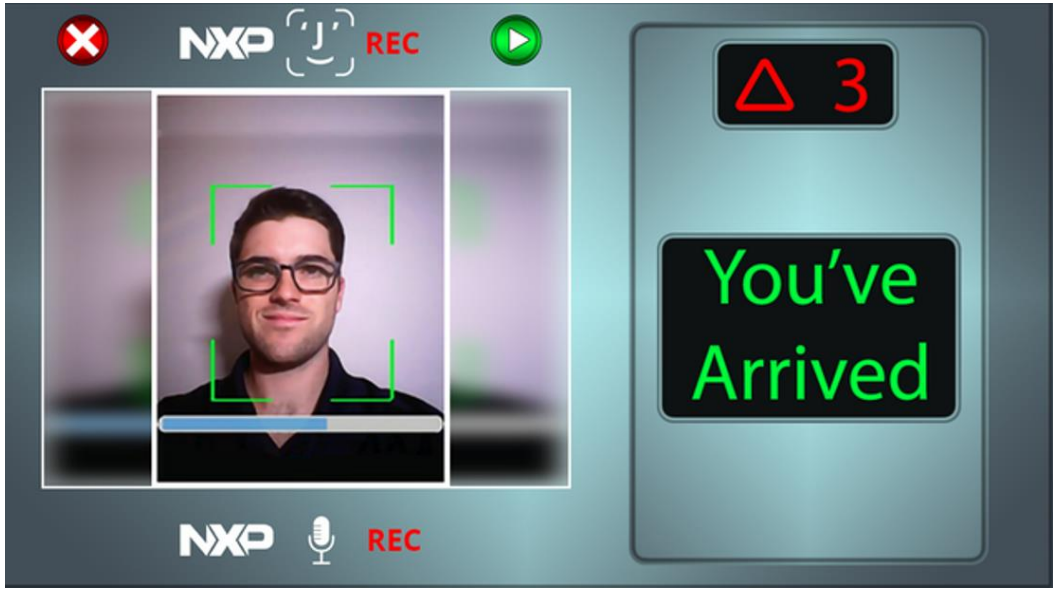
SMART HOME APP







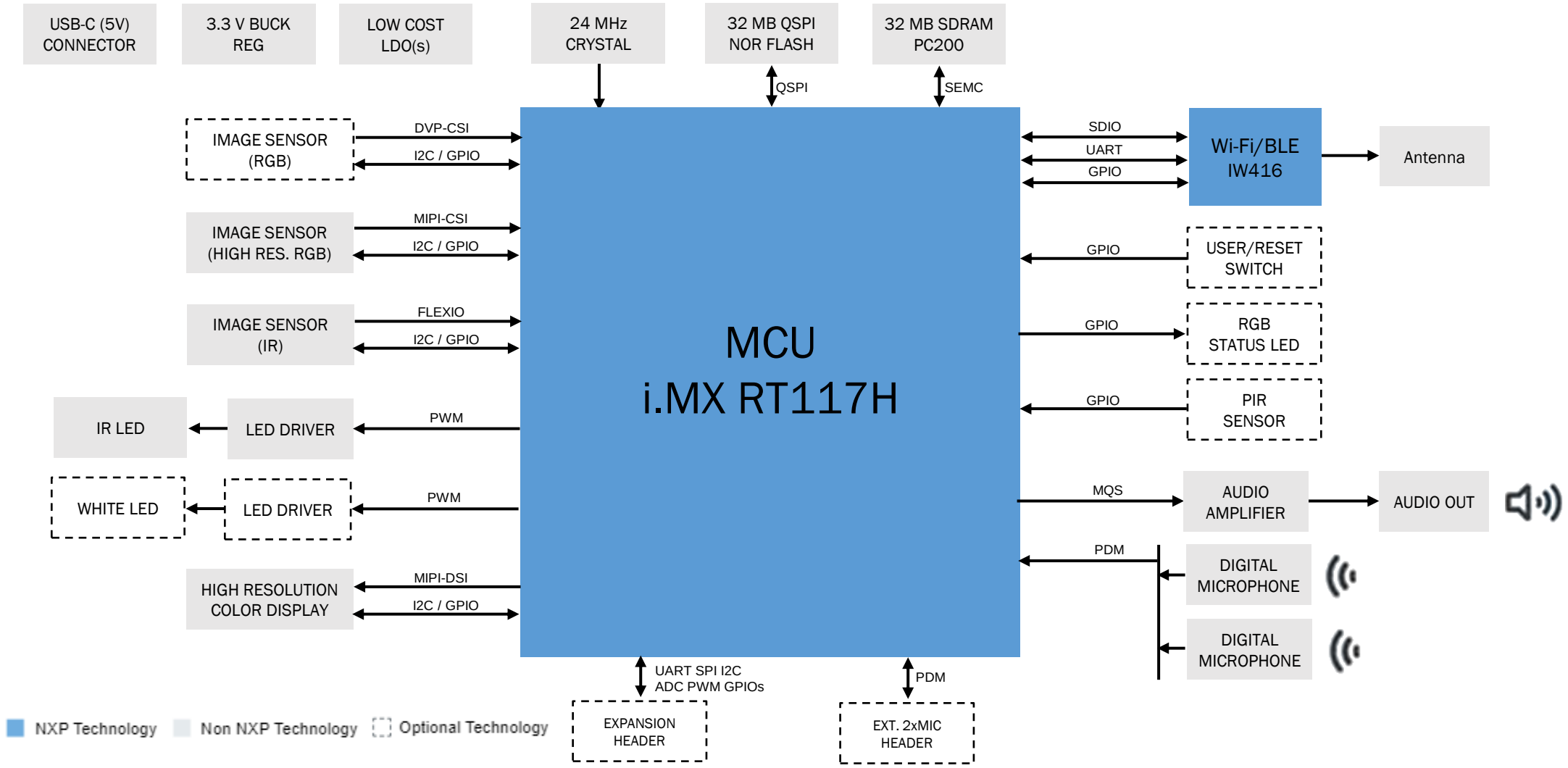
SMART ELEVATOR APP



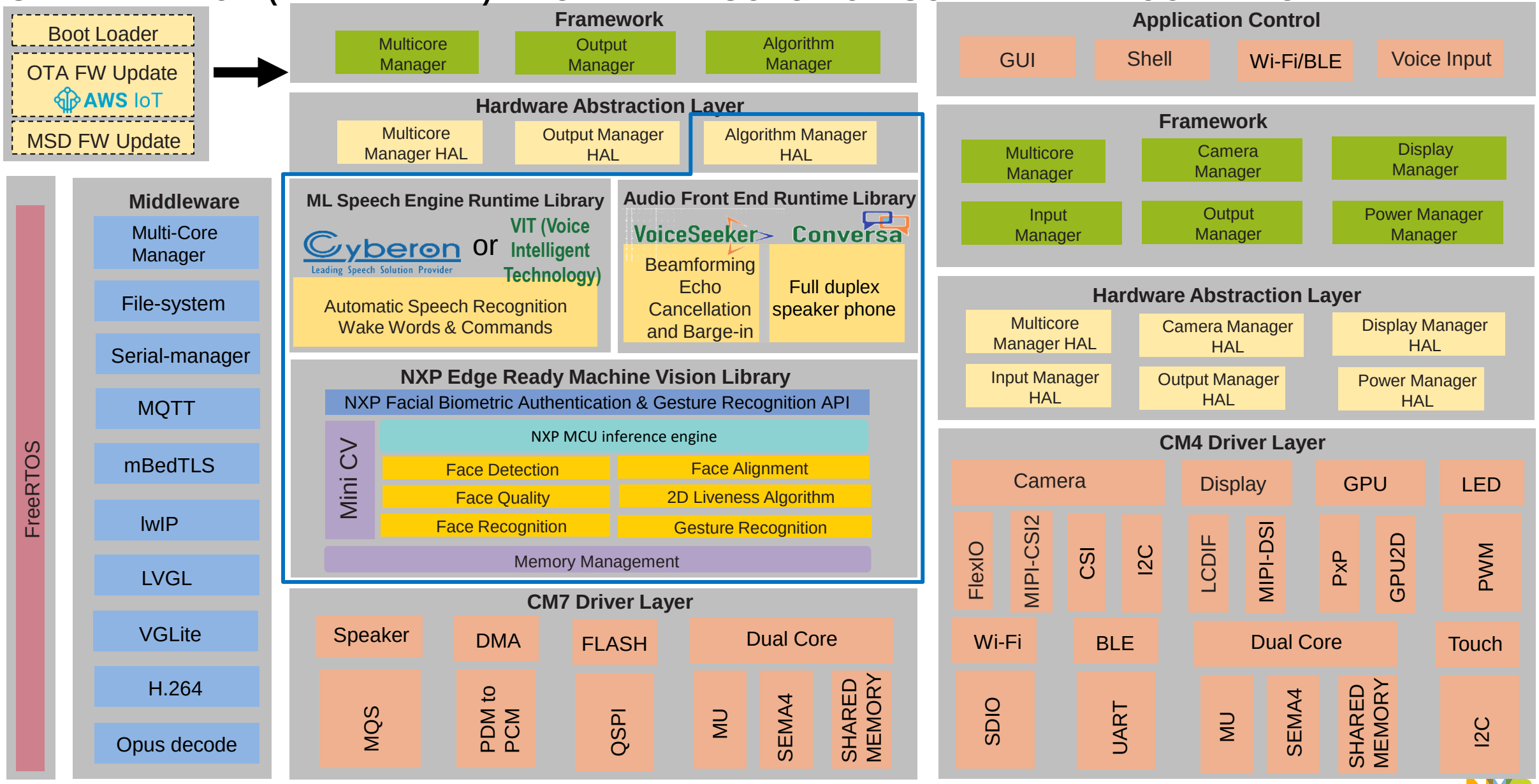
i.MX RT117H MCU-BASED SMART TOUCHLESS HMI SOLUTION

- Development kit SLN-TLHMI-IOT – $299
- MCU
  - i.MX RT117x (1 GHz Cortex-M7 + 400 MHz M4 Cores)
  - 2 MB on chip SRAM
- Camera(s)
  - RGB + IR (optional) CMOS Sensors
- Radio
  - Dual band Wi-Fi 4 + BLE (NXP IW416)
- Display driven by LVGL graphics
  - 5.5” LCD Touchscreen (720 x 1280)
- Audio hardware
  - 2x DMICs + Speaker + Amplifier
- MikroE Click™ Expansion Header
  - E.g. add NFC, more DMICs, IEEE 802.15.4 radio (Zigbee/Thread/Matter), etc.

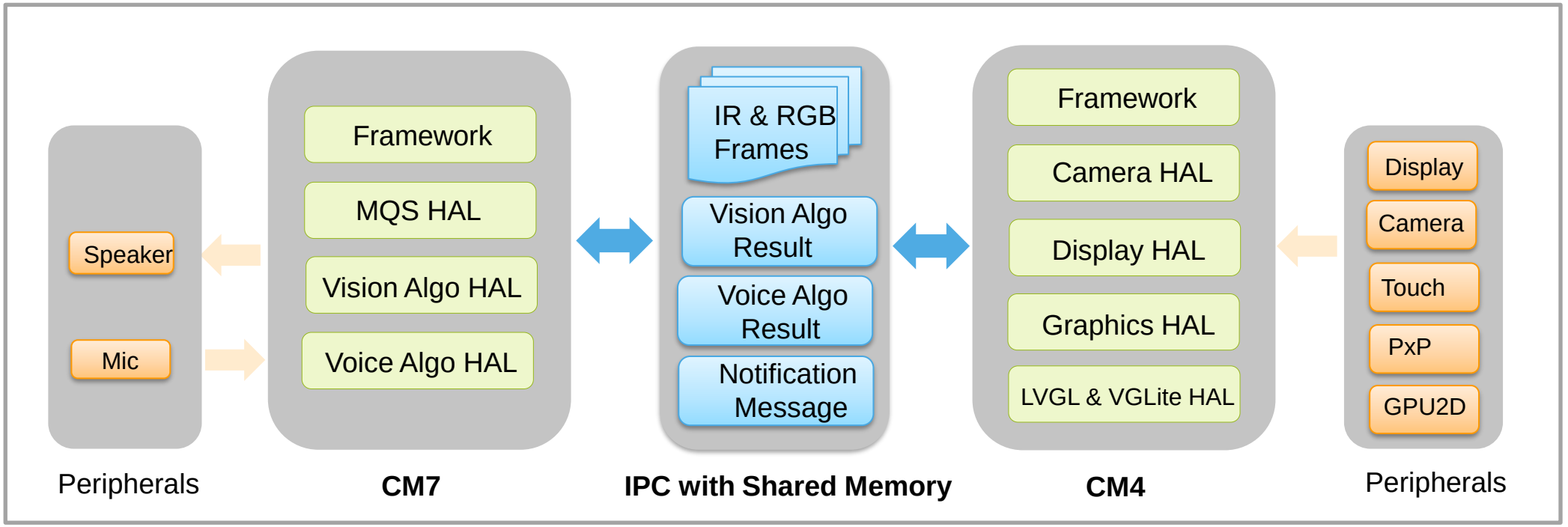
FACE RECOGNITION TOUCHLESS HMI SOLUTION DEVELOPMENT KIT (SLN-TLHMI-IOT) HARDWARE BLOCK DIAGRAM



SLN-TLHMI-IOT (i.MX RT117H) EDGEREADY SOLUTION SOFTWARE BLOCK DIAGRAM



SLN-TLHMI-IOT (i.MX RT117H) EDGEREADY SOLUTION SOFTWARE ARCHITECTURE

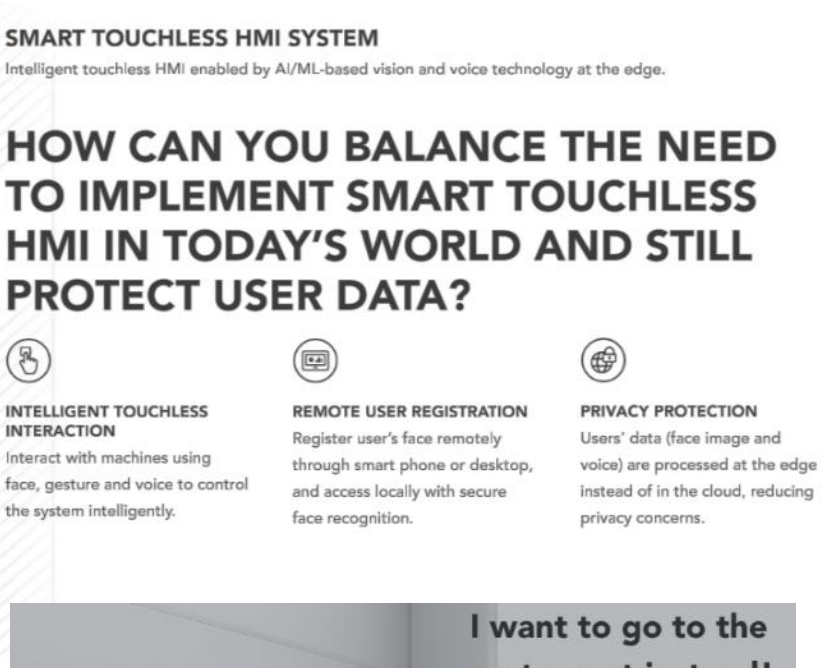


- **CM7 (Vision & Voice algorithm accelerator):**
  - Framework
  - Vision algorithm with VGA input frames
  - Voice algorithm (AFE + ASR) with mic input
  - MQS audio playback
  - IPC communication with shared memory

- **CM4 (UI & System control unit):**
  - Framework
  - CSI/MIPI Camera preview @VGA
  - LVGL GUI @720p with VGLite 2D GPU acceleration
  - Vision algorithm input frames color space conversion with PxP
  - Touch panel input
  - IPC communication with shared memory

SMART TOUCHLESS HMI SOLUTION USE CASE EXAMPLES FROM showroom.nxp.com

- Face recognition for user identification & customization
- Hand position and gesture recognition



- GUI display, voice control and machine vision enabled with single MCU solution
- Combines face recognition & voice control from i.MX RT106F & i.MX RT106S

NXP EDGEREADY FACE RECOGNITION SOLUTIONS – ADVANTAGES SUMMARY

Low cost

- MCU implementation reduces BOM cost as much as 50% vs. MPU + Linux® solutions
- Not an add-on solution - allows developer to replace host MCU with i.MX RT
  - Available MHz & memory, and ability to trade off inference time vs. CPU load

Quick & easy to use

- Turnkey solution – examples of concept to production in only four months
- Familiar RTOS based environment for IoT developers
- No face recognition, speech recognition, audio or ML/AI expertise necessary
- One stop shop, no third-party software
- MCU + RTOS solution minimizes boot time, enabling deep sleep for long battery life
- Plug and play out-of-box-experience
- Worldwide distribution network for sales and support
- Easy to use development tools (MCUXpresso IDE, SDK, configuration & provisioning)

Flexible

- Choose between low-cost CMOS sensors or high-performance 3D SLM cameras
- Common platform for smart lock, touchless HMI, and more to come…
- Offline capabilities lower latency & total cost of ownership, while preserving privacy
- Remote registration capability available on mobile and PC platforms

SECURE CONNECTIONS
FOR A SMARTER WORLD

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

NXP:

SLN-TLHMI-IOT