



SECURE CONNECTIONS  
FOR A SMARTER WORLD

# NXP EdgeReady SOLUTION FOR SMART HMI BASED ON i.MX RT117H

The NXP EdgeReady Smart Human Machine Interface (Smart HMI) solution is designed to reduce the cost and complexity of adding local voice control, advanced graphic user interface, and face and gesture recognition to a wide array of smart home products, white goods, small appliances, building automation devices and industrial IoT applications. The Smart HMI solution is based on the SLN-TLHMI-IoT development kit featuring NXP's i.MX RT117H crossover microcontroller (MCU).

The SLN-TLHMI-IoT development kit comes with fully integrated, production-ready software and NXP's one-stop-shop support for quick, out-of-the-box operation, minimizing time to market, risk and development effort. The kit supports machine learning (ML) enabled vision (face and gesture recognition), far-field voice and speech recognition, and high-quality 2D graphics displays in a versatile, cross-platform framework that gives designers greater flexibility to customize their products. Enabling all of these multimodal capabilities with one NXP high-performance crossover MCU simplifies system design. Developers can customize multiple HMI elements to fit the requirements of any application. The kit enables face/gesture recognition and voice control to be performed locally and entirely offline on the i.MX RT117H MCU, minimizing the user privacy, security and latency concerns associated with cloud-based implementations. Supported by NXP's popular MCUXpresso SDK, the development kit combines best-in-class silicon, software and IP from NXP and leading third-party partners.

## TARGET APPLICATIONS

Smart appliance, smart home, smart building and smart industrial applications that require intuitive human machine interactions.

- Smart Appliances
  - White Goods (Refrigerators, Ovens, Laundry Machines, Air Conditioners, etc.)
  - Countertop Appliances (Coffee Machines, Air Purifiers, Food Processors, etc.)



- Smart Home
  - Alarm and Smart Home Control Panels
  - Universal Remote Controls
  - Home Entertainment
  - Thermostats
- Smart Building, Industrial IoT
  - Elevator Controls
  - Transportation Systems
  - Industrial HMI
  - Access Controls and Identification
  - Healthcare Equipment
- Remote Conference Systems

## i.MX RT117H SMART HMI CROSSOVER MICROCONTROLLER OVERVIEW

The i.MX RT117H microcontroller is a member of the i.MX RT1170 family of crossover MCUs, targeting cost-sensitive embedded Smart HMI applications. The i.MX RT117H MCU features NXP's advanced implementation of the Arm® Cortex®-M7 core, operating at up to 1 GHz, and a power-efficient Cortex®-M4 core, operating at up to 400 MHz. This dual-core architecture provides ample performance and real-time response for edge ML and HMI multitasking. The MCU's software framework, turnkey vision/voice algorithms, graphics display UI capabilities, memory resources (including 2 MB on-chip SRAM) and rich set of on-chip peripherals give developers the utmost flexibility to define and customize their products for different HMI use cases.

The i.MX RT117H MCU is licensed to run NXP's face/gesture recognition library, audio front end runtime library and ML speech engine runtime library and includes essential device and software drivers. See the software block diagram section for more information.

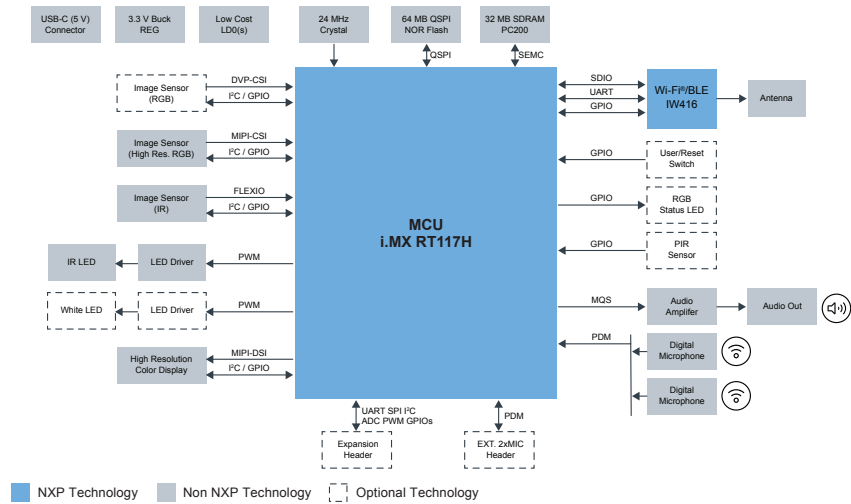
- Software framework
- Camera drivers, image capture and pre-processing
- Face/gesture detection, alignment and recognition
- VoiceSeeker audio front end (AFE) for acoustic echo cancellation (AEC), noise reduction (NR), beamforming and barge-in detection
- Conversa software for full-duplex speaker phone
- 3rd party or VIT for automatic speech recognition (wake words and commands)
- Display drivers, 2D graphics accelerator supported by LVGL
- Built-in security, bootloader and application validation
- All necessary wireless drivers including Bluetooth™ Low Energy and Wi-Fi
- USB mass storage device updates
- Support for secure firmware updates over wireless connections
- Factory automation scripts
- Supported by NXP's MCUXpresso SDK, IDE, GUI Guider and configuration tools

### SLN-TLHMI-IoT KIT CONTAINS

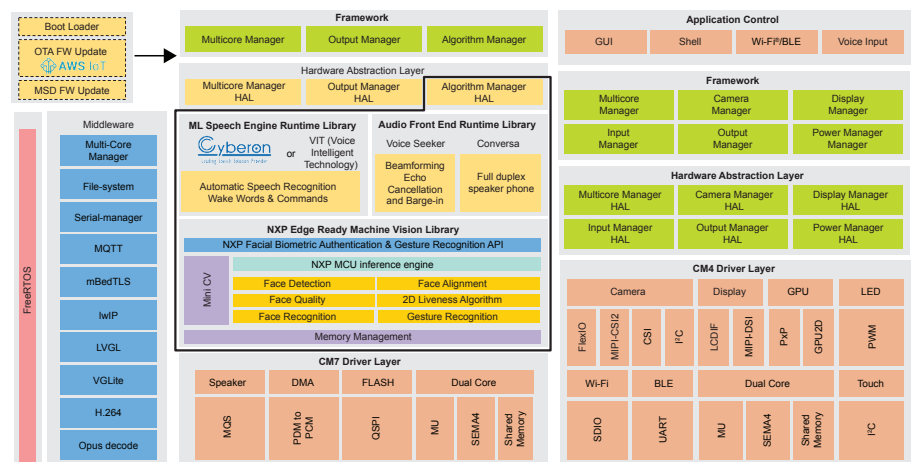
- i.MX RT117H MCU on evaluation board
- USB Type-C Cable
- Application examples for a quick, out-of-the-box experience
  - Smart Coffee Machine App
  - Elevator Controls App
  - Smart Home Control Panel App



### HARDWARE BLOCK DIAGRAM



### SOFTWARE BLOCK DIAGRAM



PART NUMBER	DESCRIPTION	FEATURES	DIMENSIONS
SLN-TLHMI-IoT	MCU-based Smart Human Machine Interface solution evaluation and development kit.	<ul style="list-style-type: none"> <li>• NXP EdgeReady turnkey software solution for Smart HMI</li> <li>• i.MX RT117H Smart HMI crossover processor</li> <li>• 720P RGB Camera</li> <li>• 5.5" TFT display (1280 x 720)</li> <li>• Audio amplifier and speaker</li> <li>• VGA IR Camera</li> <li>• 64 MB QSPI NOR Flash</li> <li>• 32 MB SDRAM</li> <li>• Dual band Wi-Fi® + BLE 5.2</li> <li>• MikroE Click™ expansion header</li> <li>• General Purpose Header</li> <li>• External Microphones</li> <li>• MIC x 2</li> </ul>	166 x 155 x 44 mm
MIMXRT117HDVMA	i.MX RT117H Smart HMI crossover MCU	<ul style="list-style-type: none"> <li>• 1 GHz Arm Cortex-M7 + 440 MHz Arm Cortex-M4 with runtime license for Smart HMI software</li> <li>• 2 MB on-chip RAM</li> </ul>	14 x 14 x 1.37 mm (LFB GA 289)
IW416UK/AI CZ (AW-AM510 module)	IW416: 2.4/5 GHz Dual-Band 1 x 1 Wi-Fi (802.11 n) + BLE 5.2	<ul style="list-style-type: none"> <li>• 802.11 a/b/g/n dual band</li> <li>• Up to MCS7 data rates (150 Mbit/s)</li> <li>• DRCS (Dynamic Rapid Channel Switching) for simultaneous 2.4 GHz and 5 GHz bands</li> <li>• 802.15.4, LET, etc. coexistence</li> <li>• WPA3, WPA2, WPA2 and WPA mixed mode, WEP</li> </ul>	Device: 3.95 x 3.565 x 0.495 mm (WLCSP76) Module: 12 x 12 x 1.85 mm