



MCU solution for  
offline, hands-free  
local voice control

## MCU-Based Far Field Automatic Speech Recognition Solution for Local Commands

NXP's MCU-based solution for offline far field automatic speech recognition (ASR), leverages the i.MX RT106L crossover processor, enabling developers to quickly and easily add offline voice control capabilities to their products. This turnkey design, with ultra-small form factor, comes completely integrated with all software and speech recognition models for an example wake word and four sets of local commands for smart home, audio player, washing machine, and generic applications, enabling easy out-of-the-box local voice control proof of concept development.

### OVERVIEW

NXP's MCU-based local commands solution provides OEMs with a fully integrated, self-contained, software and hardware solution. It comes with an ASR engine for the local recognition of commands and wake word, and all required far field audio processing algorithms including noise suppression, beamforming, and echo cancellation (barge-in) capabilities, to enable use in acoustically difficult environments.

This cost-effective, easy to use implementation facilitates the demand for low latency, private voice control embedded in a diverse variety of products across home, commercial and industrial applications. It gives users hands-free voice control, without the privacy concerns associated with cloud based services.



### TARGET APPLICATIONS

The i.MX RT106L MCU-based solution for local voice control enables designers to integrate voice into a wide variety of smart home, appliance, retail and industrial products.

- ▶ Smart switches, smart lighting, shade, and fan controls
- ▶ Smart plugs and outlets
- ▶ Smart appliances
- ▶ Set top boxes and residential gateways
- ▶ Alarm/access panels and thermostats
- ▶ Garage door openers
- ▶ Room air conditioners
- ▶ POS terminals
- ▶ Industrial automation
- ▶ Hands-free process control

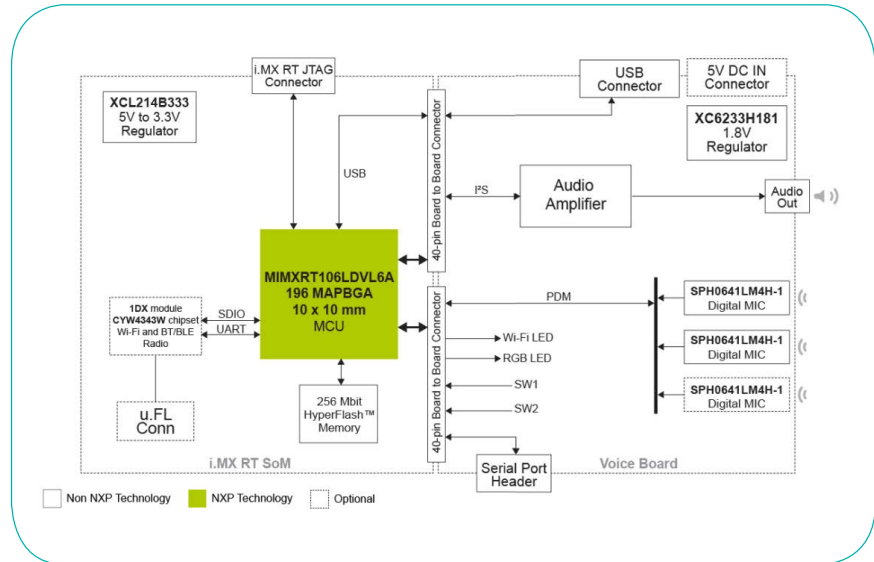


## i.MX RT106L VOICE CROSSOVER PROCESSOR OVERVIEW

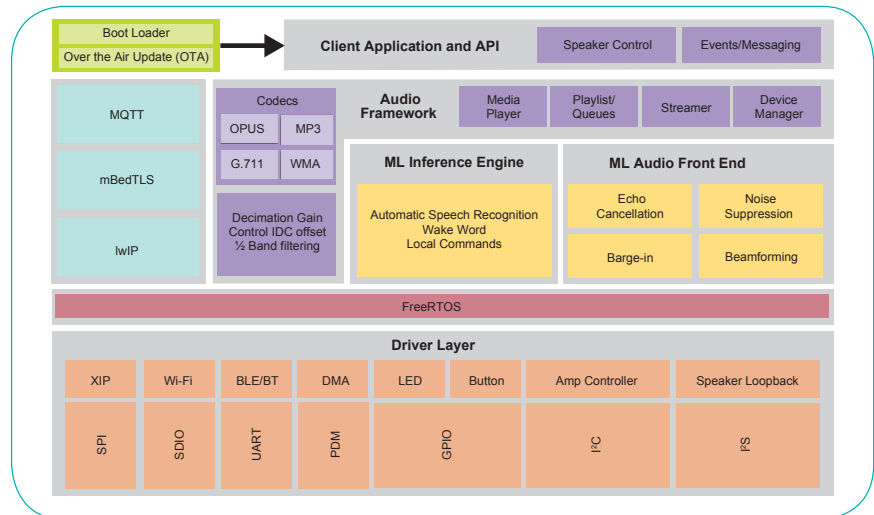
The i.MX RT106L is an EdgeReady solution-specific member of the i.MX RT1060 family of crossover MCUs, targeting offline embedded local voice control applications. It features NXP's advanced implementation of the Arm® Cortex®-M7 core, which operates at speeds up to 600 MHz to provide high CPU performance and best real time response. The i.MX RT106L processor is licensed to run NXP's turnkey local voice control software solution, which includes:

- ▶ Automatic speech recognition (ASR) engine
- ▶ Machine Learning Far field audio front end
- ▶ Acoustic echo cancellation (barge-in)
- ▶ Ambient noise reduction
- ▶ Beamforming
- ▶ Playback processing
- ▶ Codecs
- ▶ Media player/streamer
- ▶ MQTT, lwIP, TLS (optional)
- ▶ All drivers, including Wi-Fi® and Bluetooth (optional)
- ▶ Supported by MCUXpresso SDK, IDE and Config Tools

## HARDWARE BLOCK DIAGRAM



## SOFTWARE BLOCK DIAGRAM



PART NUMBER	DESCRIPTION	FEATURES	DIMENSIONS
SLN-LOCAL-IOT	MCU-based far field local commands solution evaluation and development kit	<ul style="list-style-type: none"> <li>• Turnkey, cost-optimized, production-ready, ASR solution</li> <li>• i.MX RT106L audio crossover processors</li> <li>• Audio amplifier</li> <li>• 32 MB HyperFlash</li> <li>• 802.11 b/g/n Wi-Fi®</li> <li>• Bluetooth®/Bluetooth LE 4.2</li> <li>• Digital MEMS microphones (x3)</li> </ul>	40 x 30 mm dual stack 4-layer PCBs
MIMXRT106LDVL6A	i.MX RT106L voice crossover processor	<ul style="list-style-type: none"> <li>• 600 MHz Arm® Cortex®-M7 MCU with complete local voice control solution software</li> <li>• 1 MB On-chip RAM</li> </ul>	10 x 10 mm 0.65 mm pitch 196-pin MAPBGA

[www.nxp.com/mcu-local-voice](http://www.nxp.com/mcu-local-voice)

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