

MCU Based Solutions for Voice Control & Face Recognition

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PRODUCTION-GRADE, CERTIFIED AND QUALIFIED TURNKEY SOLUTIONS

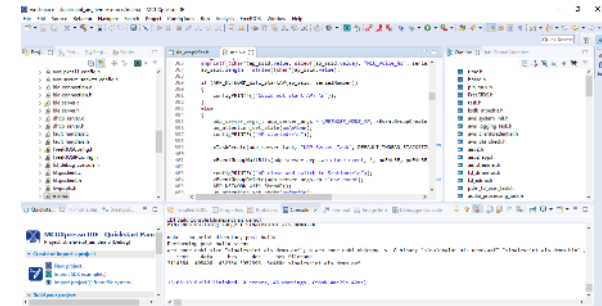
- Hardware reference design
 - Cost and form factor optimized
- Pre-integrated production ready software
 - Fully tested & FCC/CE certified
 - Source code provided for everything except ML/AI intellectual property
 - E.g. Audio front end, speech & face recognition
- NXP one-stop-shop for support & licensing
- Dev kit plug & play out-of-box-experience

OOB HW/SW

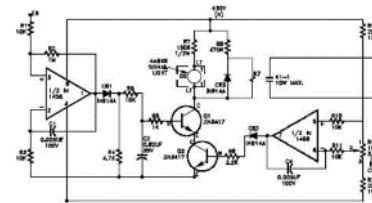


Far-Field

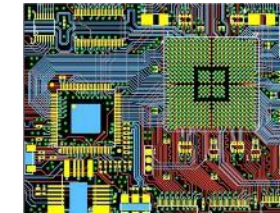
SOFTWARE SOURCE



SCHEMATICS



LAYOUTS



CERTIFICATIONS



BOMS

U1	MIMXRT1052DVL68	i.MXRT1050 Cross Processor
U3	W9812G6JB-6I	128Mbit SDRAM 3V 166MHz
U4	IS26KL256S-DABUQ	256Mb Hyperflash 3V 100MHz Fla
U5	A7101CHTK2	Secure IoT/Authentication Conn
U6	LBEE5KL1DX-883	IC WIFI BT/BLE B/G/N 3-4.8V LGA
U7	MKW21Z512VHT4	KINETIS L 32-BIT MCU CORTEX-M
U8,U9	NX3L2267GM,115	IC ANALOG SWITCH SPDT 10XQF
U10	XCL214B333DR	DC/DC CONVERTER 3.3V 5W

DOCUMENTATION



Solutions for Face Recognition



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I.MX RT106F – MCU BASED SOLUTION FOR SECURE FACE RECOGNITION – NEW FEATURES



- i.MX RT106F – 600 MHz Arm® Cortex™-M7 based MCU
 - Integrates 1 MB SRAM & bundles secure face & expression recognition SW
- Low Cost – Uses inexpensive IR + RGB camera instead of 3D camera
 - MCU based BOM cost ~50% lower than MPU implementations
 - Eliminates SDRAM, eMMC Flash, PMIC, 6+ layer board
- Liveness detection protects against spoofing with photographs or phone/tablet displays
- Low-light capabilities, good for nighttime applications
- Supports databases of up to 3000 faces (RGB only)
- Operates entirely offline – eliminates cloud privacy issues (perhaps cost of Wi-Fi/BLE)
 - Adds support for Wi-Fi/BLE module
 - Available remote face registration capability for PCs & mobile devices (Android)
- Short MCU boot time enables face recognition from standby in less than 800 ms
- Familiar MCU/RTOS platform avoids MPU/Linux learning curve for IoT developers
- NXP EdgeReady solutions slash time-to-market
 - Full reference design, software source, schematics, BOM & layout
 - Customers have gone from concept to production in only four months

FACE RECOGNITION SOLUTIONS PORTFOLIO



Local Face Recognition Single RGB Camera

SLN-VIZN-IOT
i.MX RT106F

LAUNCHED Q1 2020



Secure Local Face Recognition with Liveness Detection for Anti-Spoofing with Dual RGB & IR Cameras

SLN-VIZNAS-IOT
i.MX RT106F

LAUNCHING 4Q 2020

FACE RECOGNITION USE CASES & TARGET APPLICATIONS

Embedded identification and access control for consumer security applications



Secure Access

- Replace key, card, BLE/phone with user face
 - e.g.: smart locks for residential & hospitality applications

User Authorization

- Control equipment access levels / authority
 - e.g.: Cooktop, forklift, coffee machine

User Identification

- Workforce time and attendance tracking machines
- Identify and catalog users (by name or anonymously)
 - e.g.: Retail loyalty program at point-of-sale terminals

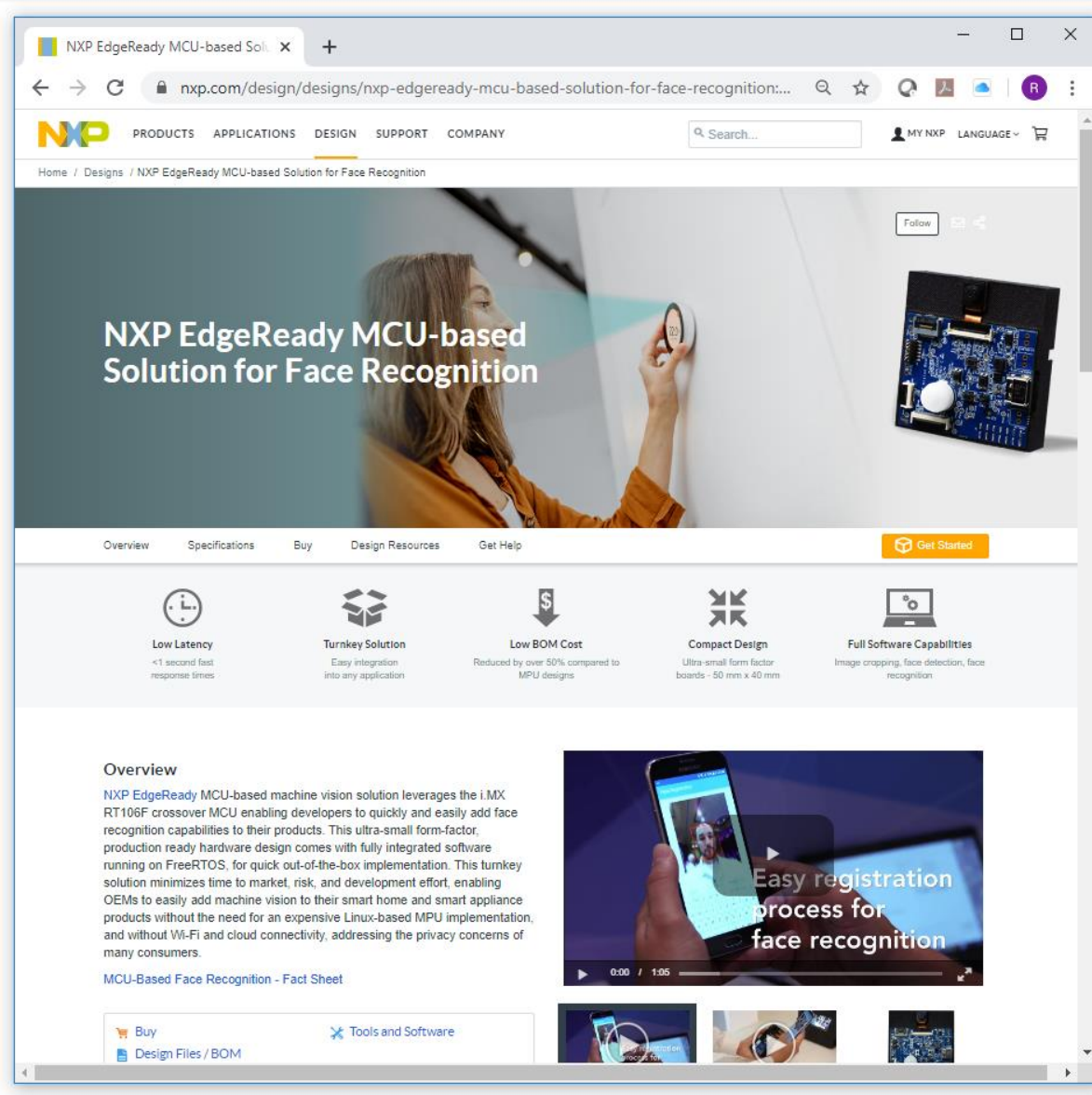
User Customization

- Customize environmental or equipment controls based on user
 - e.g.: thermostat, lighting control

Emotion Detection

- Identify user mood (and react)
 - e.g.: Guest ratings at point-of-sale terminals, building exits, smart toys

FOR MORE INFORMATION... www.nxp.com/mcu-vision



- **Download** schematics, BOM, layout
 - Kit comes with software download codes
 - Source, binaries, documentation
 - Coming to MCUXpresso SDK soon
- **Buy** SLN-VIZN-IOT kits (\$199)
- **View** getting started pages and videos
- **Coming soon** www.nxp.com/mcu-vision2
 - SLN-VIZNAS-IOT kit

Solutions for Voice Control



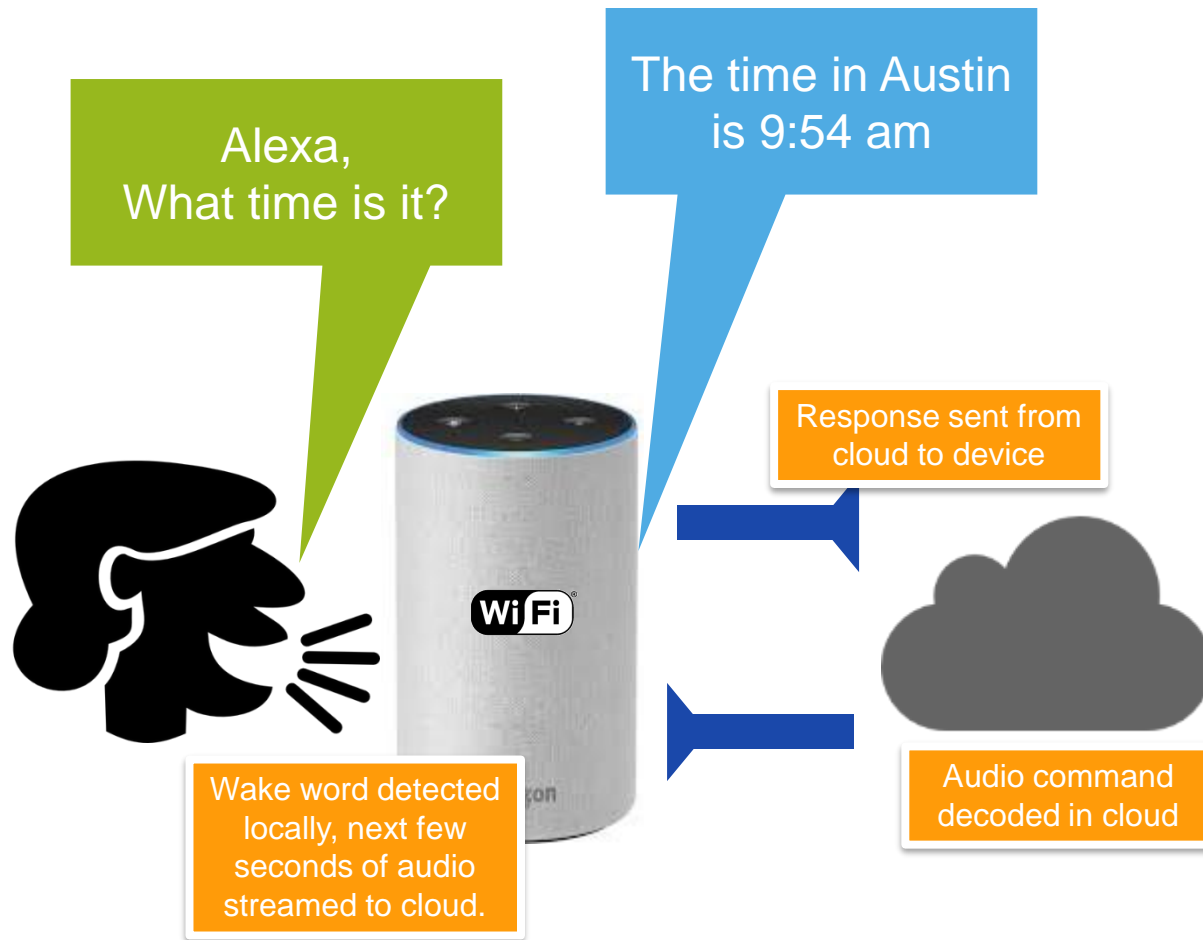
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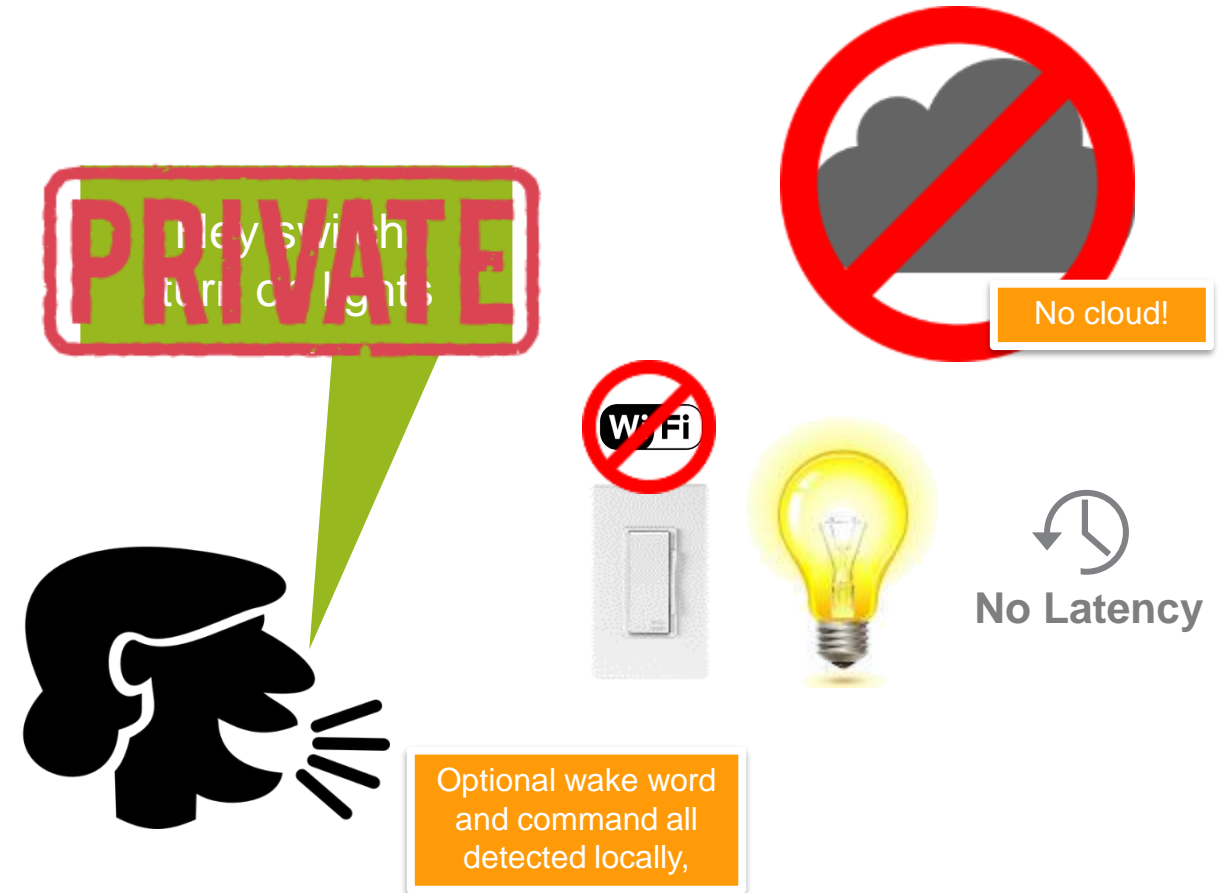
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CLOUD-BASED VOICE CONTROL



LOCAL VOICE CONTROL



VOICE CONTROL SOLUTIONS ROADMAP




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Far-Field

**AVS Integration
for AWS IoT Core,
Far field AFE**

*SLN-ALEXA-IOT
i.MX RT106A*

Offline

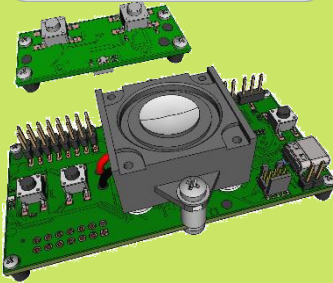


Far-Field

**Local speech recognition,
Far field AFE,
Custom wake word &
offline local commands
(linguistics models - NRE)**

*SLN-LOCAL-IOT
i.MX RT106L*

AVAILABLE NOW

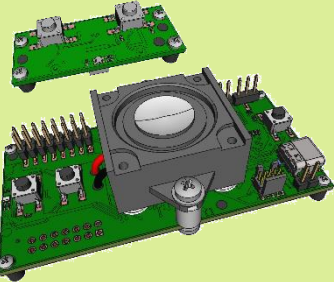


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**AVS Integration
for AWS IoT Core,
Far field AFE,
Low cost Wi-Fi,
Low cost QSPI Flash,
MQS + Low cost amplifier,
Frustration Free Setup**

*SLN-ALEXA2-IOT
i.MX RT106A*

Offline



**Local speech recognition
Far field AFE,
“Text-to-model” wake word
& offline local commands
(phonemic models - no NRE)**

*SLN-LOCAL2-IOT
i.MX RT106S*

COMING

Solutions for Alexa Built-In



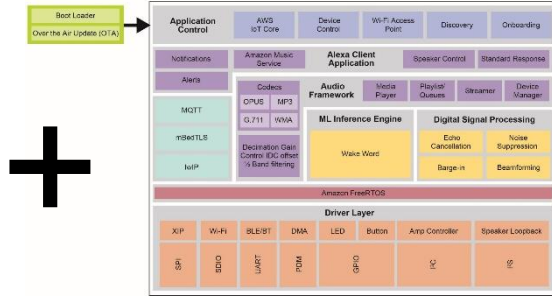
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i.MX RT106A – FIRST QUALIFIED TURNKEY MCU SOLUTION FOR



Far-Field

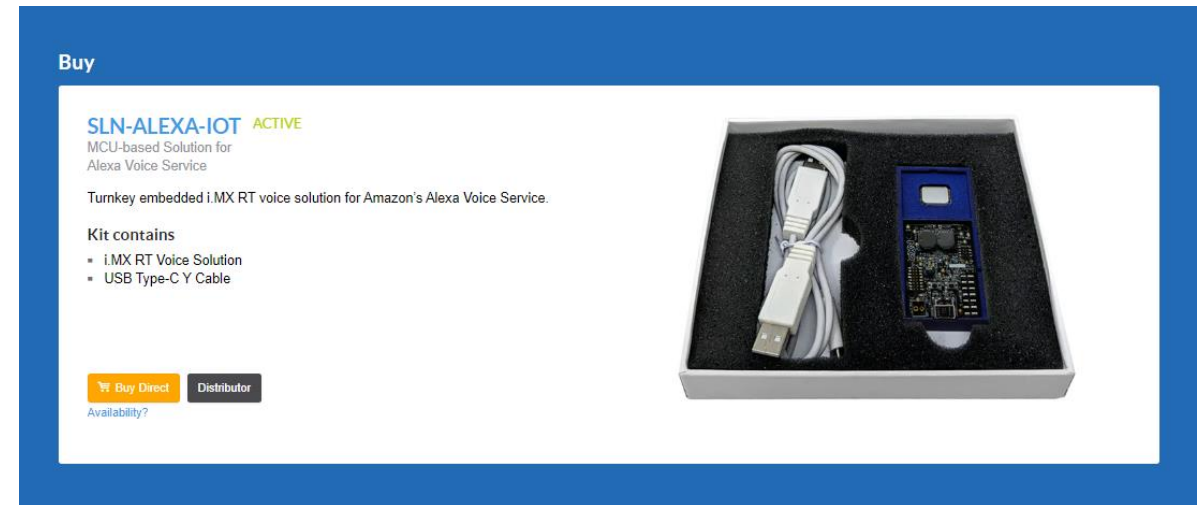
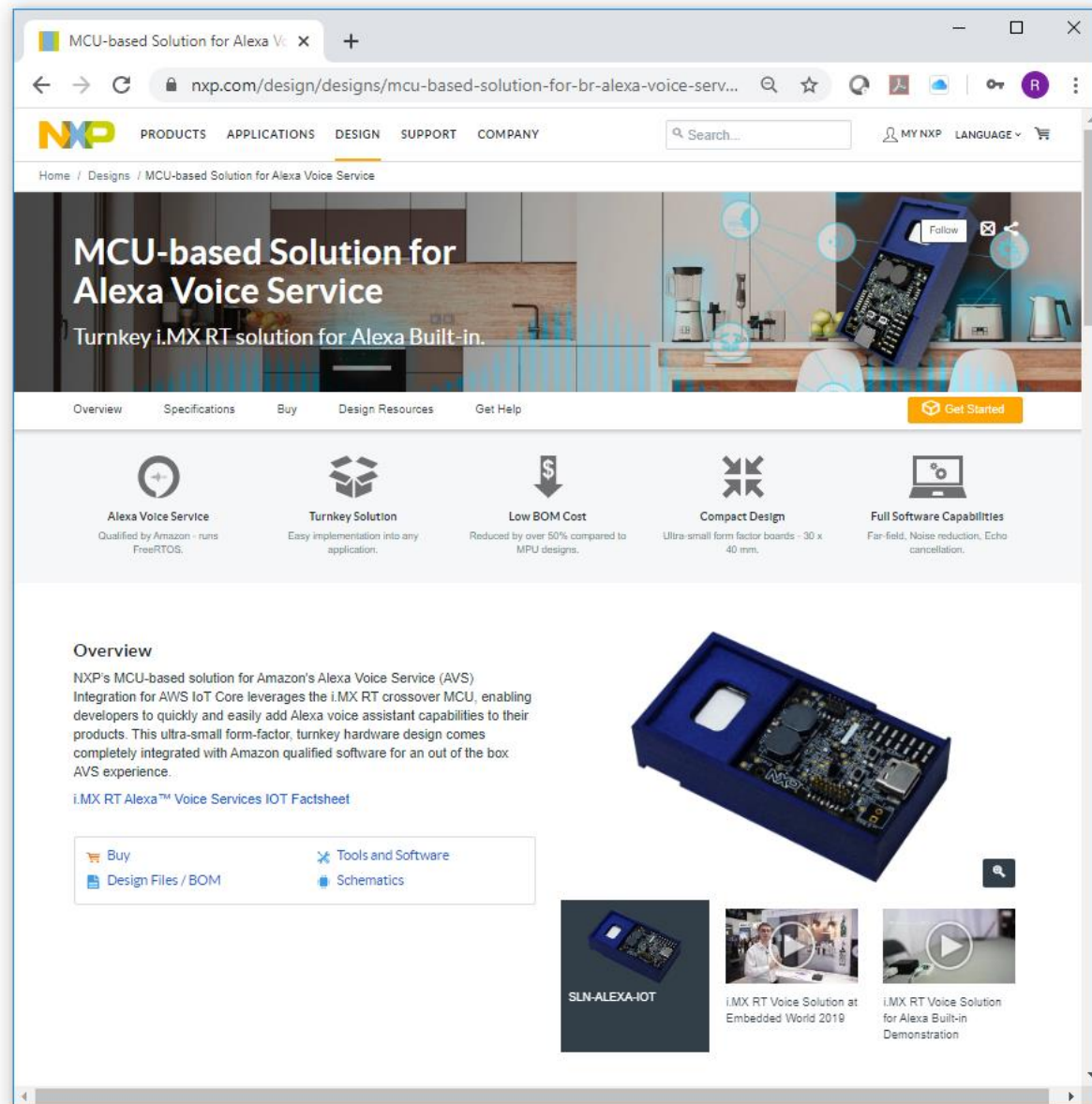
- Low cost
 - Arm Cortex-M7 – 600 MHz with 1 MB SRAM
 - No external DSP or wake word engine with, integrated codec
 - Replaces host MCU (not an add on solution)
 - *AVS Integration for AWS IoT Core* cloud offload enables MCU usage
 - Half the cost of a Linux based full AVS implementation
 - Eliminates SDRAM, eMMC Flash, PMIC and uses 4-layer board
 - Cloud offload reduces frequency, size and cost of OTA updates
- Fast & easy – concept to production in as little as four months
 - Familiar MCU+RTOS platform (no Linux learning curve)
 - Turnkey solution – one stop shop – includes all software
 - No voice or audio expertise necessary – machine learning far field AFE
 - No System Integrator needed, no third-party engagements
 - Plug & play out-of-box-experience, similar to Amazon Echo speaker
 - Amazon AVS qualified, meets performance of Amazon's Echo Dot
 - Worldwide availability & support
- Flexible
 - 2 or 3 mic. support for 180° or 360° far-field implementations
 - Easy to change Wi-Fi/Bluetooth (e.g. to add 5 GHz)

SUCCESS STORY – iDevices® – LIGHT SWITCH



- Four-month design cycle!
 - Design kicked off in early February 2019
 - First production run in June
- Launched August 2019 – \$99 MSRP
 - Available from Amazon.com and Hubble’s home builder channels
- Glowing reviews of NXP solution quality & support
 - Public endorsements from Shawn Montieth (CTO)

FOR MORE INFORMATION... www.nxp.com/mcu-avs



- **Download**
 - Schematics, BOM, layouts documentation
 - Alexa SDK included in MCUXpresso SDK
 - Source, binaries, documentation
- **Buy** SLN-ALEXA-IOT kits (\$149)
- **View** getting started pages and videos

Offline Local Voice Control



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FISHEYE DOORBELL SOLUTION: NXP IMXRT106F+ GENESYSLOGIC GL3004





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