



Quectel SC680A Series Smart Module

Introduction

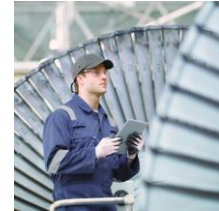
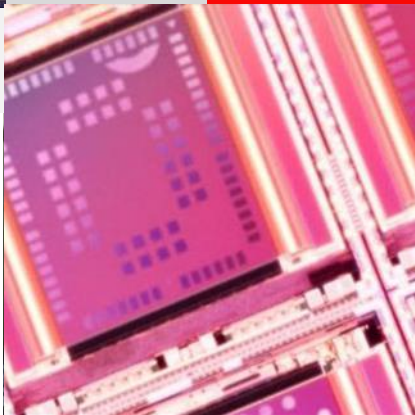
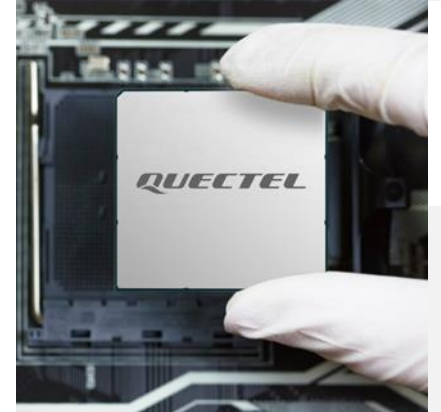
Build a Smarter World



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Smart Solution Introduction

Smart Module Portfolio

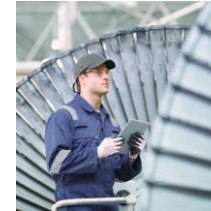
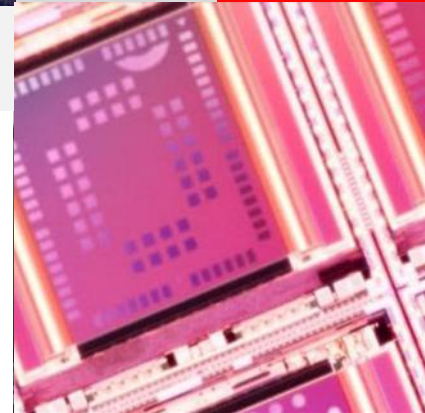
Specifications & Timelines

Typical Applications

Customer Support

Enhancements

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Quectel Smart Solution Advantages

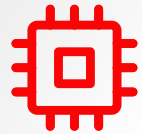


SoC Platforms



Open Android or Linux

Multi-Mode: 5G/ LTE/ UMTS/ GSM



High-performance CPU/ GPU/
NPU/ DSP

Built-in Wi-Fi/ Bluetooth/ GNSS



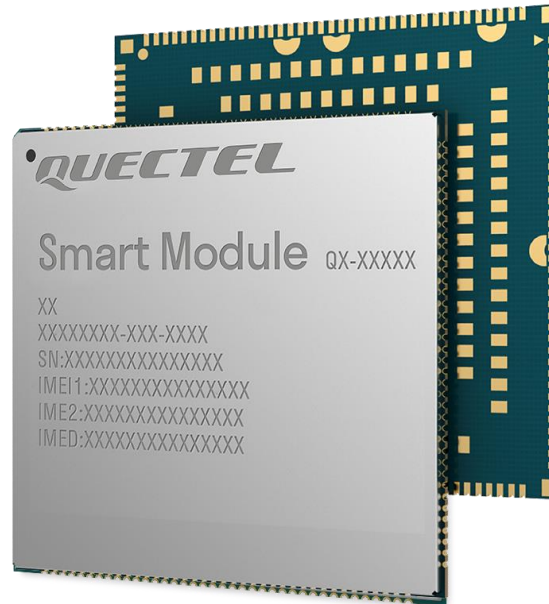
Various Multimedia Functions:
LCD/ Audio/ Camera/ Video

Abundant Peripheral Interfaces

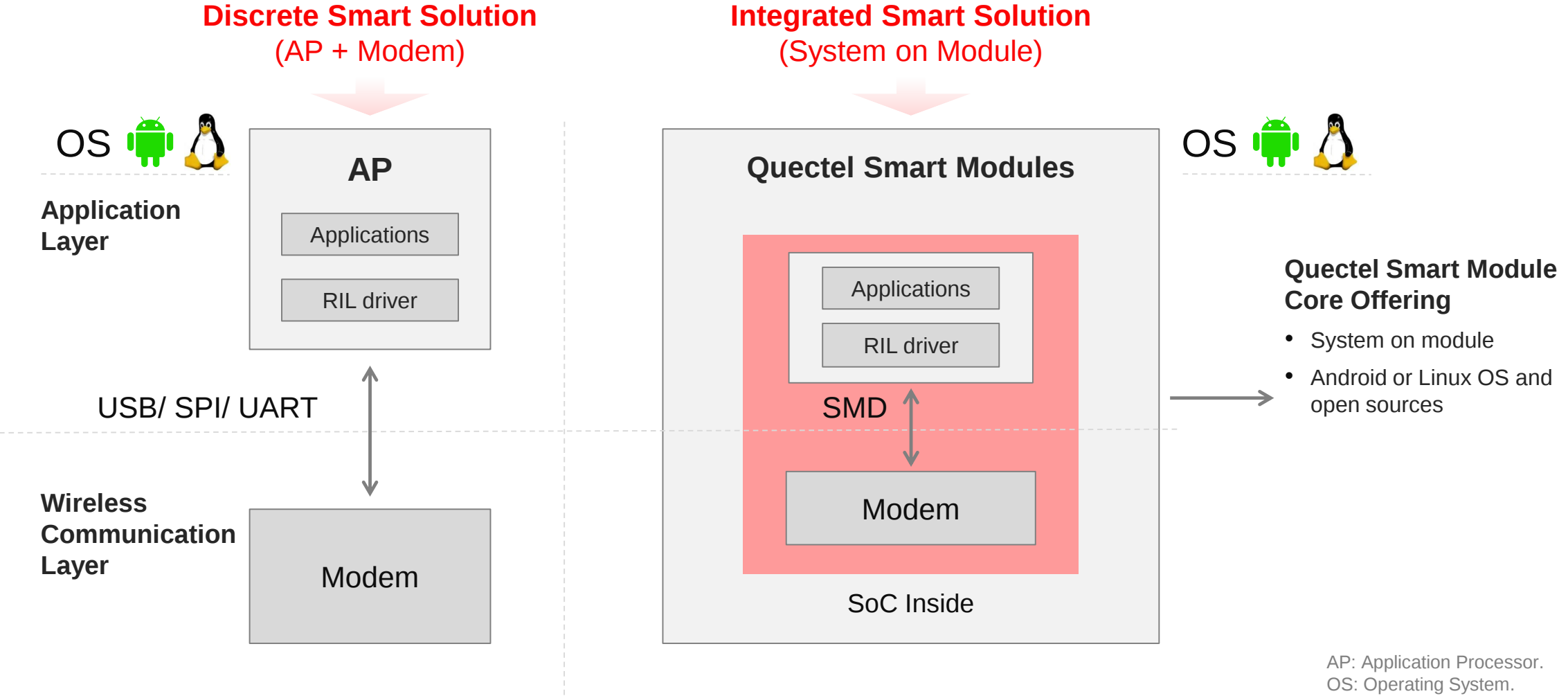


Global Certifications

Strong Customer Support

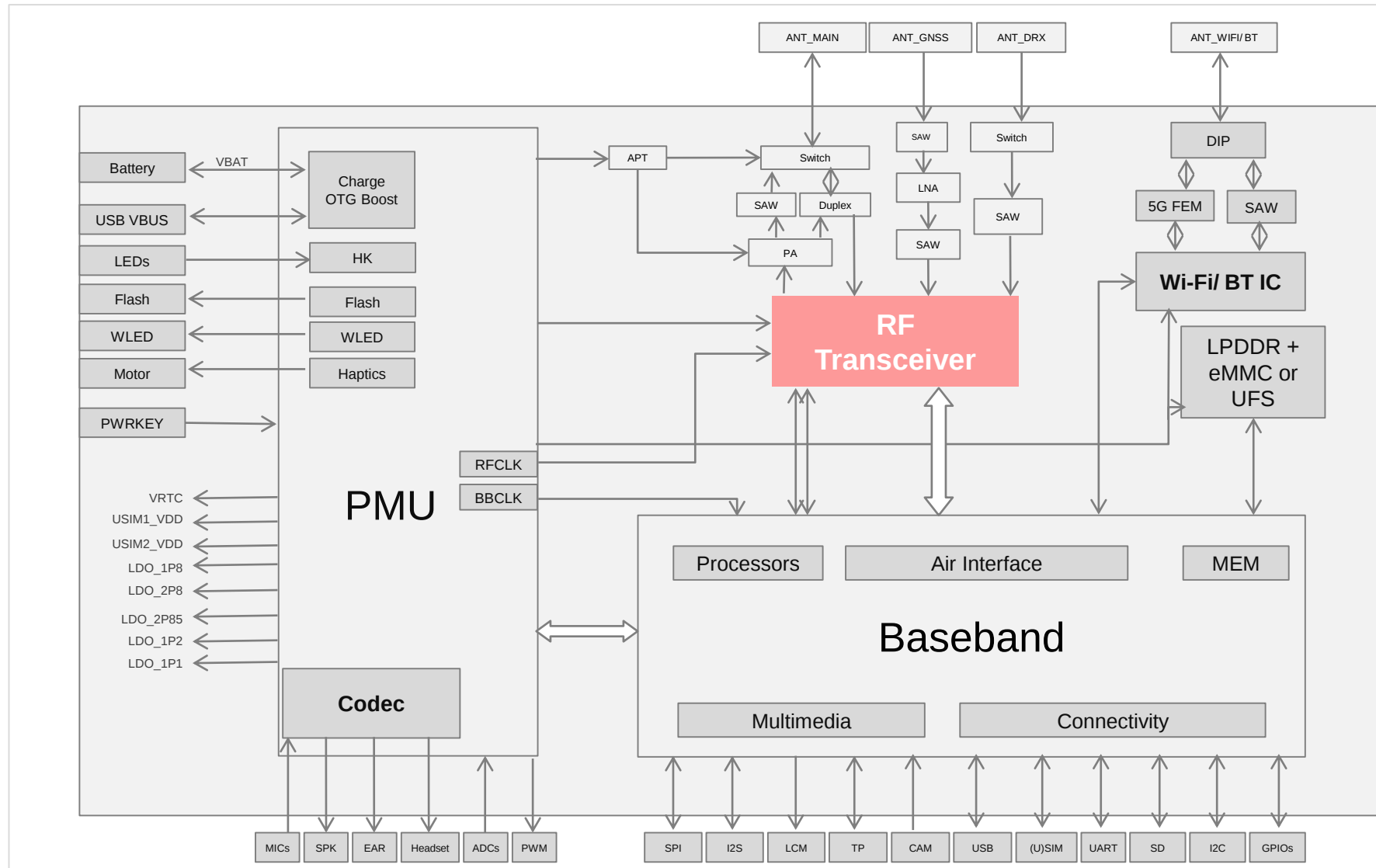


Smart Solution Architecture Comparison



AP: Application Processor.
OS: Operating System.
SMD: Shared Memory Driver.
SoC: System On a Chip.

Smart Module Hardware Block Diagram

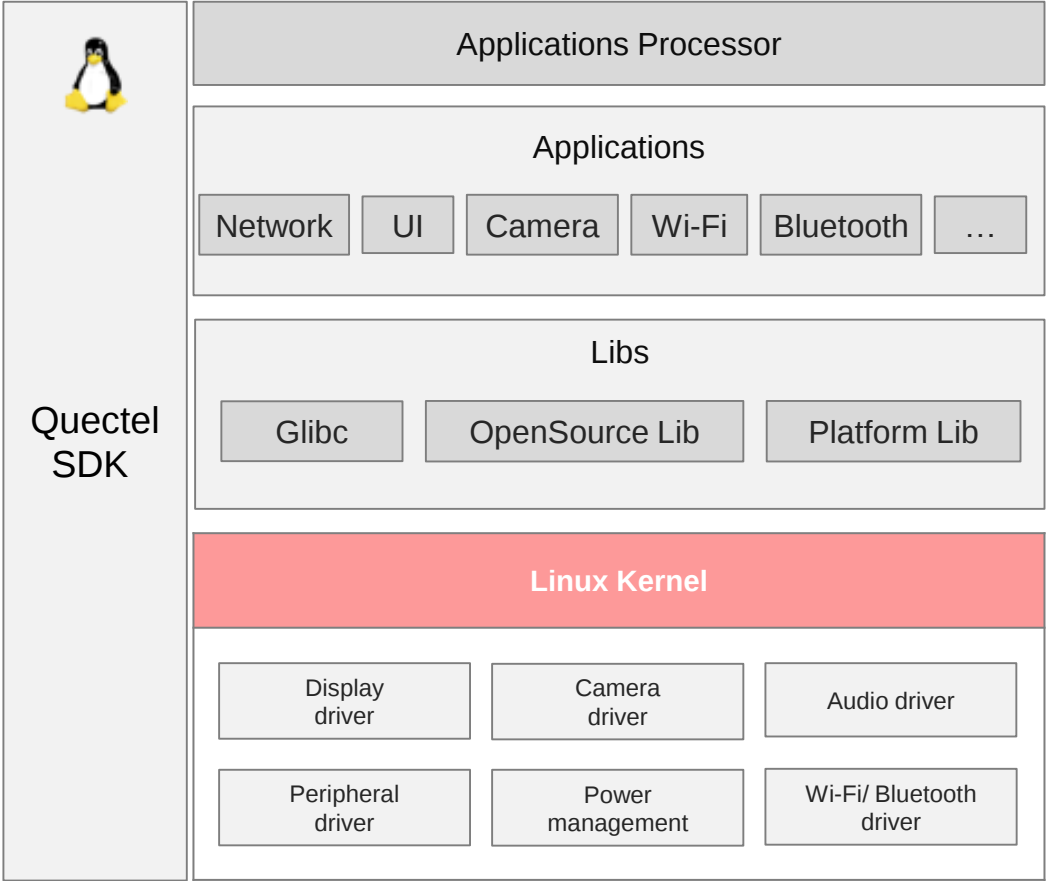
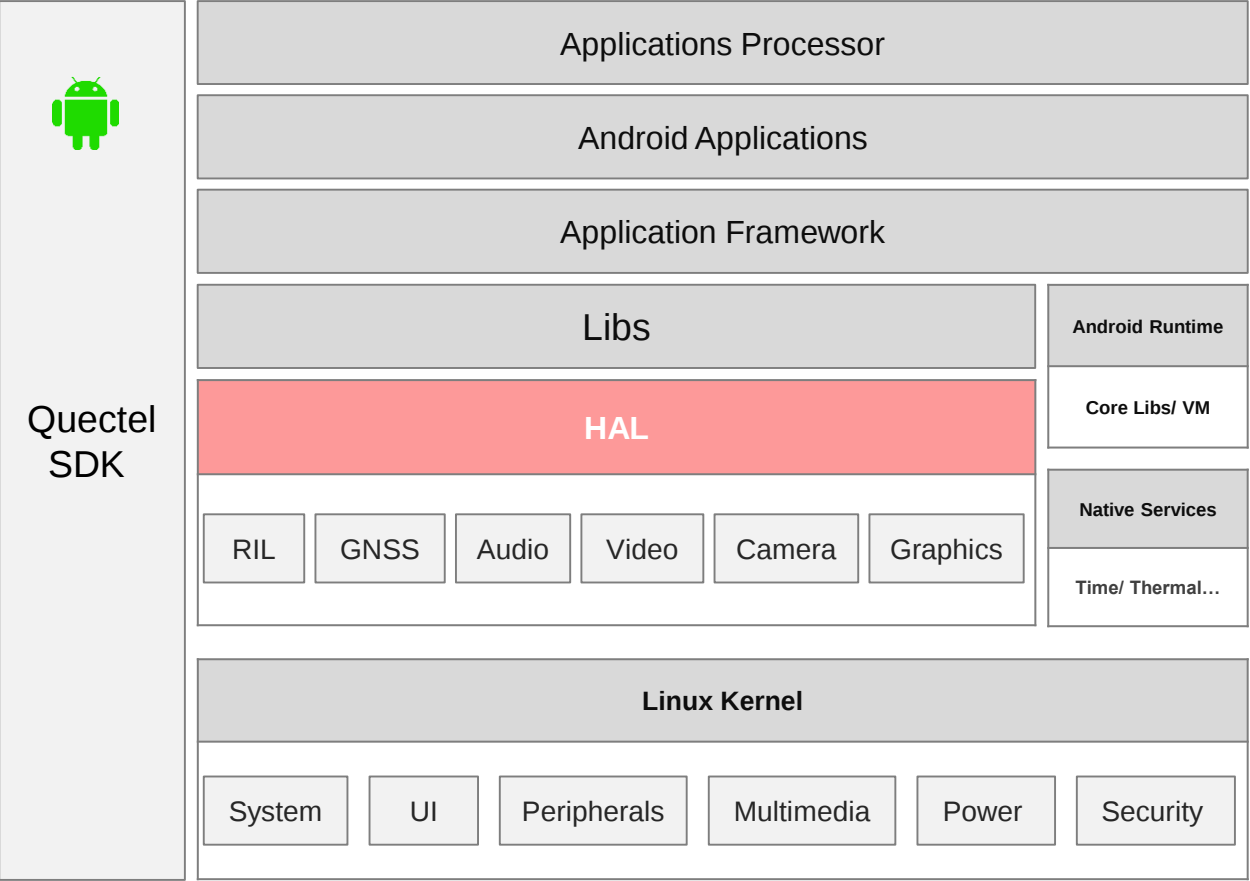


- Baseband: SoC with CPU, GPU, DSP, NPU processors, multimedia and other digital peripherals
- PMU: Provides power supply internally; some PMUs have codec inside
- RF Transceiver: Implements 2G/ 3G/ 4G/ 5G and GNSS functionalities
- Wi-Fi/ Bluetooth IC: Implements Wi-Fi/ Bluetooth functionalities
- LPDDR + eMMC or UFS: Internal DDR and storage

Smart Module SDK System Architecture



Quectel provides Android AOSP or Linux SDK which include libs and source codes to customers under NDA.





Smart Solution Introduction

Smart Module Portfolio

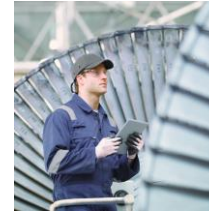
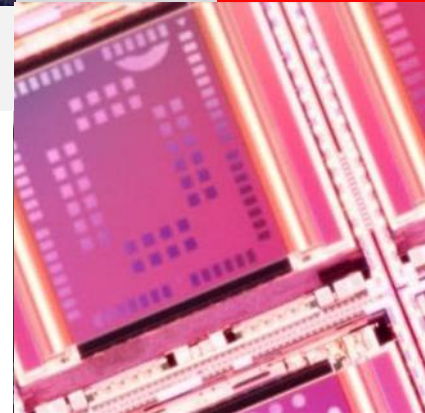
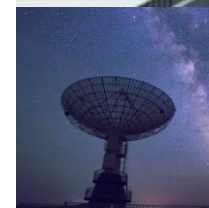
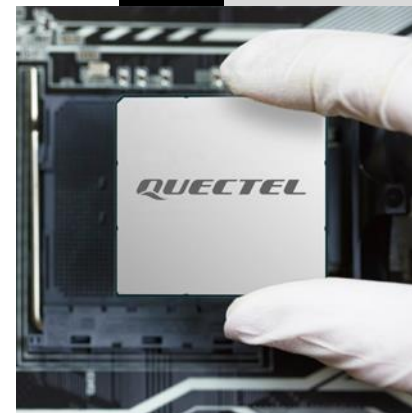
Specifications & Timelines

Typical Applications

Enhancements

Customer Support

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Smart Module Portfolio



Premium Level



SG865W

- QCS8250 ①
- CPU: 8x Kryo585 2.84 GHz
- GPU: Adreno 650
- Camera: 64 MP
- Video: 4K @ 240 fps/ 8K @ 60 fps
- Wi-Fi: 2 × 2 11ax; Bluetooth 5.1



SG885G

- QCS8550 ①
- CPU: 1 + 4 + 3 Kryo™ CPU (3.2/ 2.8/ 2.0 GHz)
- GPU: Adreno 740 – 4K 120 fps UI
- Camera: 64 MP
- Video: 4K @ 240 fps / 8K @ 60 fps
- Wi-Fi: 2.4 & 5 & 6 GHz, Wi-Fi 7; Bluetooth 5.3

High Level



SC600T

- MSM8953 ①
- CPU: 8x A53 2.0 GHz
- GPU: Adreno 506
- Camera: 24 MP
- Video: 4K @ 30 fps
- Wi-Fi: 11ac; Bluetooth 4.2
- Modem: LTE Cat 6
- GNSS: L1



SC66

- SDM660 ①
- CPU: 4 + 4 Kryo260 2.2/ 1.8 GHz
- GPU: Adreno 512
- Camera: 24 MP
- Video: 4K @ 30 fps
- Wi-Fi: 2 × 2 11ac; Bluetooth 5.0
- Modem: LTE Cat 6
- GNSS: L1



SC668S

- QCM6125 ①
- CPU: 4 + 4 Kryo260 2.0/ 1.8 GHz
- GPU: Adreno 610
- Camera: 24 MP
- Video: 4K @ 30 fps
- Wi-Fi: 11ac; Bluetooth 5.0
- Modem: LTE Cat 4
- GNSS: L1



SG560D 5G

- QCM6490 ①
- CPU: 1 + 3 + 4 Kryo670 (2.7/ 2.4/ 1.9 GHz)
- GPU: Adreno 643
- Camera: 64 MP
- Video: 4K30D/ 4K30E
- Wi-Fi: 2 × 2 11ax DBS; Bluetooth 5.2
- Modem: 5G Sub 6/ LTE Cat 18
- GNSS: L1 + L5



SC606T

- MSM8953 ①
- CPU: 8x A53 2.0 GHz
- GPU: Adreno 506
- Camera: 24 MP
- Video: 4K @ 30 fps
- Wi-Fi: 11ac; Bluetooth 4.2
- Modem: LTE Cat 6
- GNSS: L1



SC696S

- QCM6125 ①
- CPU: 4 + 4 Kryo260 2.0/ 1.8 GHz
- GPU: Adreno 610
- Camera: 24 MP
- Video: 4K @ 30 fps
- Wi-Fi: 11ac; Bluetooth 5.0
- Modem: LTE Cat 4
- GNSS: L1

Medium Level



SC600Y

- SDM450 ①
- CPU: 8x A53 1.8 GHz
- GPU: Adreno 506
- Camera: 21 MP
- Video: 1080P @ 60 fps
- Wi-Fi: 11ac; Bluetooth 4.2
- Modem: LTE Cat 6
- GNSS: L1



SC200K

- UIS8581E ②
- CPU: 8x A55 1.6 GHz
- GPU: GE8322
- Camera: 16 MP
- Video: 1080P @ 60 fps
- Wi-Fi: 11ac; Bluetooth 5.0
- Modem: LTE Cat 4
- GNSS: L1



SC680A

- QCM4290 ①
- CPU: 4 + 4 Kryo260 2.0/ 1.8 GHz
- GPU: Adreno 610
- Camera: 25 MP
- Video: 1080P @ 60 fps
- Wi-Fi: 11ac; Bluetooth 5.1
- Modem: LTE Cat 6
- GNSS: L1



SG520B 5G

- QCM4490 ①
- CPU: 2 + 6 Kryo CPU (2.4/ 2.0 GHz)
- GPU: Adreno 613
- Camera: 25 MP
- Video: 1080P @ 60fps
- Wi-Fi: 2 × 2 11ax DBS; Bluetooth 5.2
- Modem: 5G Sub 6/ LTE Cat 15
- GNSS: L1



SC686A

- QCM4290 ①
- CPU: 4+4 Kryo260 2.0/ 1.8 GHz
- GPU: Adreno 610
- Camera: 25 MP
- Video: 1080P @ 60 fps
- Wi-Fi: 11ac; Bluetooth 5.1
- Modem: LTE Cat 6
- GNSS: L1

Entry Level



SC200R

- QCM2150 ①
- CPU: 4x A53 1.3 GHz
- GPU: Adreno 308
- Camera: 13 MP
- Video: 1080P @ 30 fps
- Wi-Fi: 11n; Bluetooth 4.2
- Modem: LTE Cat 4
- GNSS: L1



SC200L

- SL8541E ②
- CPU: 4x A53 1.4GHz
- GPU: Mali-T820
- Camera: 8 MP
- Video: 1080P @ 30 fps
- Wi-Fi: 11ac; Bluetooth 5.0
- Modem: LTE Cat 4
- GNSS: L1



SC200E

- QCM2290 ①
- CPU: 4x A53 2.0 GHz
- GPU: Adreno 702
- Camera: 25 MP
- Video: 1080P @ 30 fps
- Wi-Fi: 11ac; Bluetooth 5.0
- Modem: LTE Cat 4
- GNSS: L1



SG150H

- SL8521E ②
- CPU: 2x A53 1.3GHz
- GPU: Mali-T820
- Camera: 5 MP
- Video: 720P @ 30 fps
- Wi-Fi: 11n; Bluetooth 4.2
- Modem: LTE Cat 4
- GNSS: L1



SC20

- MSM8909 ①
- CPU: 4x A7 1.1GHz
- GPU: Adreno 304
- Camera: 8 MP
- Video: 1080P @ 30 fps
- Wi-Fi: 11n; Bluetooth 4.2
- Modem: LTE Cat 4
- GNSS: L1



SC206E

- QCM2290 ①
- CPU: 4x A53 2.0 GHz
- GPU: Adreno 702
- Camera: 25 MP
- Video: 1080P @ 30 fps
- Wi-Fi: 11ac; Bluetooth 5.0
- Modem: LTE Cat 4
- GNSS: L1



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Smart Module Portfolio

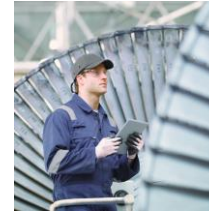
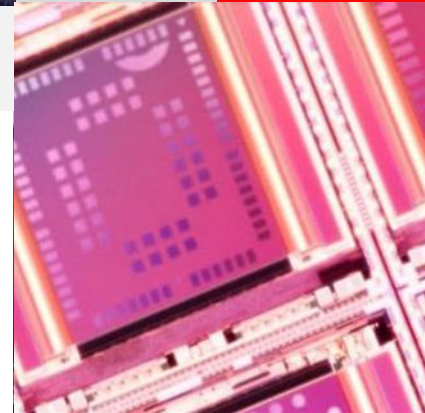
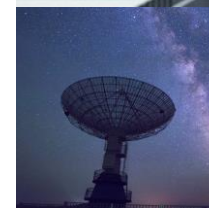
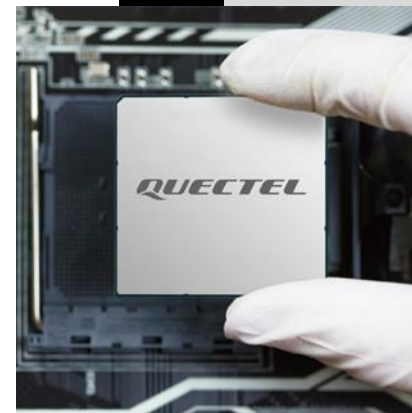
Specifications & Timelines

Typical Applications

Enhancements

Customer Support

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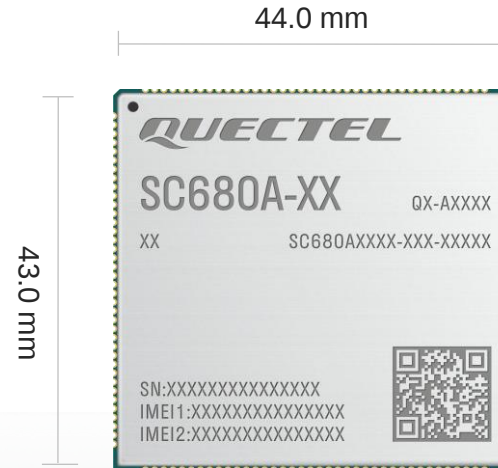


SC680A Series Highlights



Multiple Variants:

- Multi-region variants with global certifications
- Multiple memory configuration

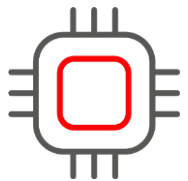


LCC + LGA Form Factor: 43.0 × 44.0 × 2.85 mm



Android OS:

Android 12/ 13/ 14* for SC680A-EM/ -NA/ -WF
Android 13/ 14* for SC680A-JP



Chipset platform: QCM4290.
Powerful system performance,
multimedia, LTE Cat 6, Wi-Fi
802.11ac, Bluetooth, GNSS L1



Long life time:
Till the year of 2028



Compatible with SC600Y,
SC600T, SC606T, SC66,
SC668S, SC696S series

SC680A Series Specifications



Variant		SC680A-EM	SC680A-NA	SC680A-JP	SC680A-WF
Region		EMEA/ South Korea/ South Asia/ Latin America/ India/ Australia/ New Zealand/ South Africa	North America	Japan	Global
LTE	FDD Band	B1/ 2/ 3/ 4/ 5/ 7/ 8/ 20/ 28	B2/ 4/ 5/ 7/ 12/ 13/ 14/ 17/ 25/ 26/ 66/ 71	B1/ 3/ 5/ 8/ 11/ 18/ 19/ 21/ 26/ 28	-
	TDD Band	B38/ 40/ 41	B41	B41	-
UMTS	WCDMA Band	B1/ 2/ 4/ 5/ 8	-	B1/ 6/ 8/ 19	-
GSM/ EDGE		Quad-band	-	-	-
GNSS		Supported	Supported	Supported	-
Wi-Fi/ Bluetooth		Supported	Supported	Supported	Supported
Certification		Regulatory: GCF/ CE/ UKCA/ KC/ RCM	Carrier: Verizon*/ AT&T/ T-Mobile Regulatory: GCF/ PTCRB/ FCC/ IC	Carrier: NTT DOCOMO/ KDDI Regulatory: JATE/ TELEC	Regulatory: CE/ UKCA/ KC/ FCC/ IC/ JATE/ TELEC/ RCM
Project Stage		MP	MP	MP	MP

SC680A Series Features and Interfaces



Key Features		Interfaces	
CPU	QCM4290, A customized 64-bit Arm v-8.0 compliant applications processor (Qualcomm® Kryo™ 260 CPU) Kryo 260 Gold: quad high-performance cores 2.0 GHz + Kryo 260 Silver: quad low-power cores 1.8 GHz	LCM	4-lane MIPI DSI; DSI D-PHY 1.2; Split link supported FHD+ (2520 × 1080) aspect ratio, up to 10 bpc QSEED4, 4 L, Q-SYNC, SVI, CABL, and FOSS
GPU	Qualcomm® Adreno™ GPU 610 Graphics Processing Unit (GPU) @ 950 MHz	Camera	3 × ISP, (13 MP + 13 MP) or (25 MP + 5 MP) @ 30 fps or (16 MP + 16 MP) @ 24 fps Three 4-lane MIPI CSI, up to 2.5 Gbps/ lane Support 4 cameras, up to 25 MP with triple ISPs
Video	Encoding: 4K @ 60 fps; H.265/ H.264/ VP8 Decoding: • 4K @ 60 fps; H.265/ H.264/ VP8/ VP9 • 1080P @ 60 fps; MPEG-2	Touch Panel	Capacitive touch panel, I2C controls
Memory	4 GB + 64 GB (LPDDR4X uMCP, Default) 3 GB + 32 GB (LPDDR4X eMCP, Optional)	Audio	Analog channels: 3 inputs: MIC1, MIC2, MIC3 (including one noise-canceling MIC) 3 outputs: speaker, earpiece, headphone
OS	Android 12/ 13/ 14* for SC680A-EM/ -NA/ -WF Android 13/ 14* for SC680A-JP	USB	× 1 USB 2.0/ 3.1 (Type-C)
WLAN	2.4 & 5 GHz, 802.11a/ b/ g/ n/ ac	(U)SIM	× 2 Support 1.8/ 2.95 V (U)SIM cards, with (U)SIM card detection function DSDS supported
Bluetooth	Bluetooth 2.1 EDR/ 3.0 HS/ 4.2 LE/ 5.1 LE	UART	× 4 Up to 4 Mbps, one of them supports hardware flow control
GNSS^①	• GPS/ BDS/ GLONASS/ Galileo/ NavIC/ QZSS/ SBAS • L1	SD Card	× 1 SD 3.0, 4-bit SDIO
Modem	3GPP Release 10	I2C/ SPI/ ADC/ GPIO/ PWRKEY	Supported
Battery Charge	Supported	Antenna	× 4 Main/ Rx-diversity/ GNSS/ Wi-Fi & Bluetooth

SC680A-NA Timelines



2023												2024		
Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.

SC680A-NA

MP

Certification

Carrier

Verizon

Start

Complete (Planned)

ES: Engineering samples ready. Basic functions are available for customers' simple demo purpose.

CS: Commercial samples ready. Stable hardware design and quite stable software design. New software features can be added upon request.

MP: Hardware and software ready for mass production. For certification status, please refer to the “certification schedule”



Smart Solution Introduction

Smart Module Portfolio

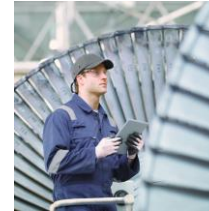
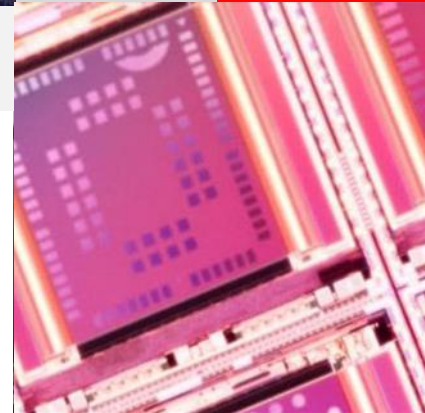
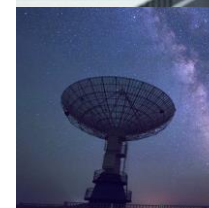
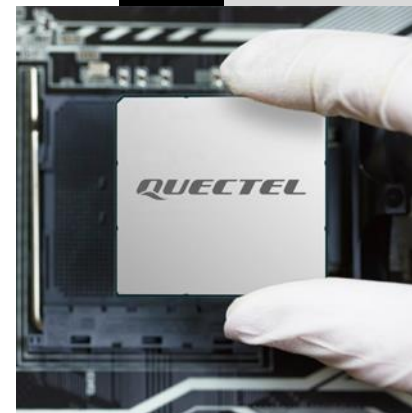
Specifications & Timelines

Typical Applications

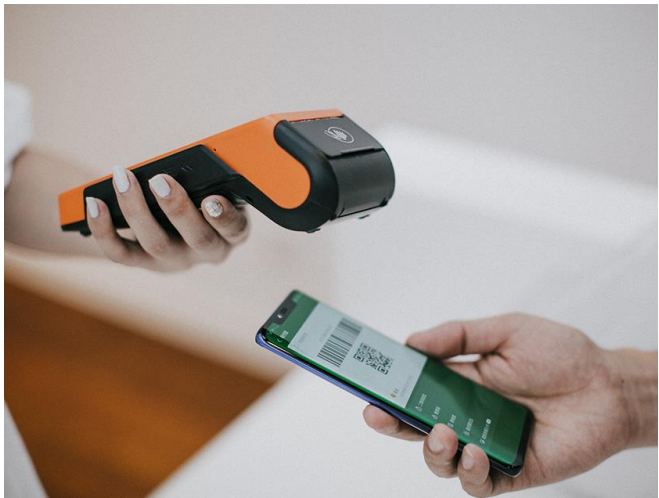
Enhancements

Customer Support

Build a Smarter World



POS and Payment Terminal



Vending Machine



Electronic Cash Register and Kiosk



Configuration

- Magnetic strip cards, IC cards, contactless/ NFC, 1D & 2D codes reader
- Android
- Processor: Quad-Core or Octa-Core
- Memory: eMCP, 1 GB + 8 GB or higher
- Camera: 2 MP or higher
- Display: HD with touchscreen
- 5G/ 4G/ 3G/ Wi-Fi/ Bluetooth/ GNSS
- SAM, SIM Cards
- Audio
- USB ports

Recommended Smart Modules

Industrial Handheld



Different Industrial Applications



Retail



Transportation



Manufacturing



Field Mobility



Warehouse Management



Hospitality

Configuration

- Android
- Processor: Quad-Core or Octa-Core CPU
- Memory: 2 GB + 16 GB or higher
- Camera: 20MP or higher pixel cameras
- Display: 5" HD with touch or higher
- 5G/ 4G/ 3G/ Wi-Fi/ Bluetooth/ GNSS
- RFID
- Scanner
- Audio
- Battery
- IP Sealing: IP68
- TUMBLE: Meet IEC tumble spec
- Drop: Multiple 1.8 m drops to concrete per MIL STD 810H

Recommended Smart Modules



Vehicle Aftermarket — Infotainment & DashCam



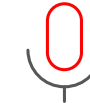
Smart modules provide flexible, reliable, safe, and secure integration for In-Vehicle Infotainment and DashCam products.



Supported functionalities



360 reversing camera



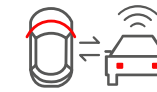
Voice recognition



Real time navigation



App store



Multi-view



CarPlay

Configuration

- Android
- Processor: Quad-Core or Octa-Core CPU
- Memory: 2 GB + 16 GB or higher
- Camera: AHD 2M or higher pixel reversing cameras
- Display: 10" HD with touch
- 5G/ 4G/ 3G/ Wi-Fi/ Bluetooth/ GNSS
- DSP audio, speaker power amplifier, Mic
- 360 cameras input
- CAN bus protocol interface
- USB ports spec

Recommended Smart Modules



Vehicle Aftermarket — 2-Wheeler, Small Electric Car



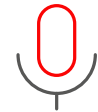
Supported functionalities



Real time navigation



Music



Voice recognition



Call



Configuration

- Android
- Processor: Quad-Core or Octa-Core CPU
- Memory: 2 GB + 16 GB or higher
- Display: 7" HD with touch
- 4G/ Wi-Fi/ Bluetooth/ GNSS
- Speaker, Mic
- USB ports
- Mileage: 80–100 km
- Battery: 48 V or higher

Recommended Smart Modules



Livestreaming and Video Conferences



Live shopping and B2B live broadcast have become the new normal of world's e-commerce development. Video conference system enables people to join the meeting remotely just the same as the off-line meeting. Smart modules provide the premium system performance and are very suitable to be the platforms to design these types of products.



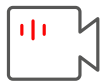
Supported functionalities



Multi-function



Mic



Virtual background



Multi app



Multi shot switching

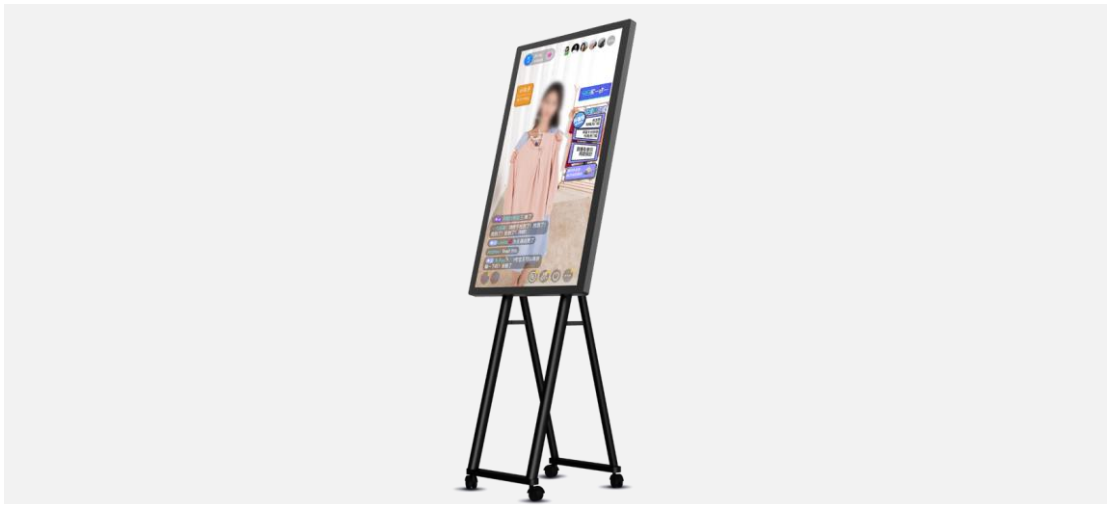


App store

Configuration

- Android
- Processor: Octa-Core CPU
- Memory: 8 GB + 256 GB or higher
- Camera: 21M or higher pixels
- Video: 4K,1080p
- TOPS: 3.5–12.5 TOPS
- Display: 10", 32/43" with touch
- 4G/ Wi-Fi/ Bluetooth/ GNSS
- Speaker, Mic
- Remote control

Recommended Smart Modules





Application Scenarios



Reception



Airport guider



Bank guider



Lawn mower



Hospital guider



Hotel reception



Logistics

Configuration

- Android or Linux
- Processor: Octa-Core CPU
- TOPS: 3.5–12.5 TOPS
- Memory: 8 GB + 256 GB or higher
- Camera: 21M or higher pixels
- Video: 4K,1080p, 720p
- Display: 10" or larger with touch
- 4G/ Wi-Fi/ Bluetooth/ GNSS
- Speaker, Mic
- Battery
- Machinery parts

Recommended Smart Modules





Augmented Reality

Augmented reality overlays computer-generated images on the view of the natural world with the camera on smart phones, tablets, or other mobile devices. Quectel works hard to bring the vision of lightweight and stylish AR glasses to life.

Virtual Reality

Through cutting-edge graphics, best-in-class hardware, and artistically rendering experiences, VR lets us explore new worlds, defy obstacles. VR has enormous potential to transform how we play, work, learn, communicate, and experience the world around us.

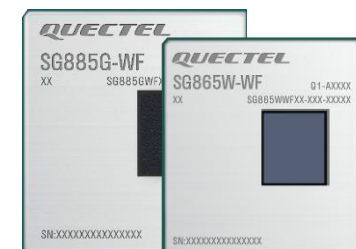
3D Scanner

3D measurement scanners can measure cross-sections, thickness, and perform GD&T measurements in a single scan.

Configuration

- Android or Linux
- Memory: 8 GB + 64 GB or higher
- TOPS: 12.5 TOPS

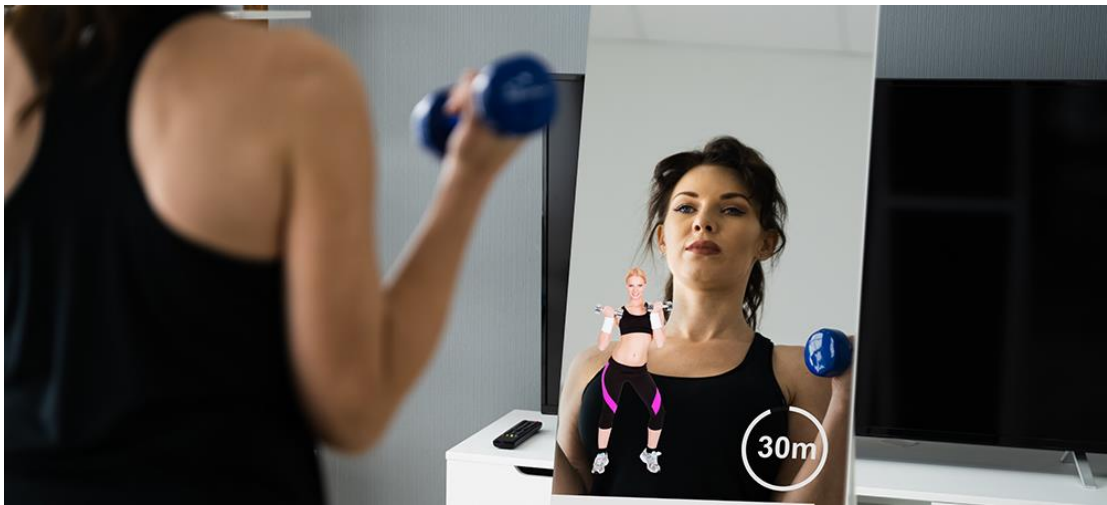
Recommended Smart Modules



Intelligent Fitness Mirror



Intelligent fitness mirror is the product of home fitness needs. It can play fitness course videos and the virtual coaches can correct users' fitness movements in real time.



Installation method and supported functionalities



Floor standing



Wall mount



Full HD IPS



Touch



Infrared sensor



Camera

Configuration

- Android
- Processor: Octa-Core CPU
- Memory: 4 GB + 64 GB or higher
- Camera: 21M or higher pixels
- Video: 4K,1080p
- TOPS: 3.5–12.5 TOPS
- Display: 43" or 55" with touch
- Wi-Fi/ Bluetooth
- Speaker, Mic
- Adapter
- Machinery parts

Recommended Smart Modules



ARM Based SoC Array Server



Mobile applications mushroom and the demands for edging computing increase with the rapid development of mobile Internet. The ARM based SoC array server, instead of the traditional x86 architecture, can be well compatible with mobile applications since most mobile applications are developed based on the ARM architecture.



Application Scenarios



Distributed storage



Distributed computing



Edge computing

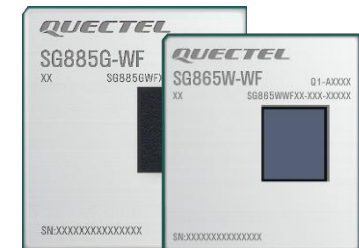


Operation management

Configuration

- Android or Linux
- ARM Based SoC Array Server
- Memory: 8 GB + 64 GB or higher
- Blade quantity: 16
- Net work: 1 Gbps or higher
- TOPS: 12.5 TOPS
- Power supply: AC 100–240 V
- Heat dissipation: Fan or Sink

Recommended Smart Modules





Smart Solution Introduction

Smart Module Portfolio

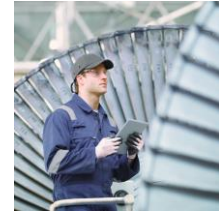
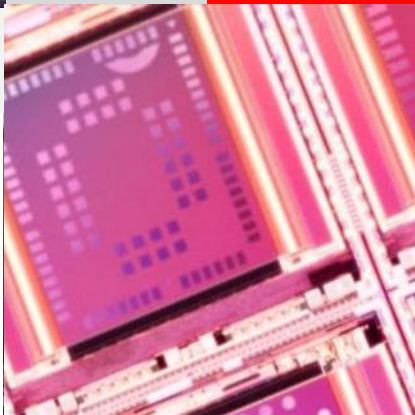
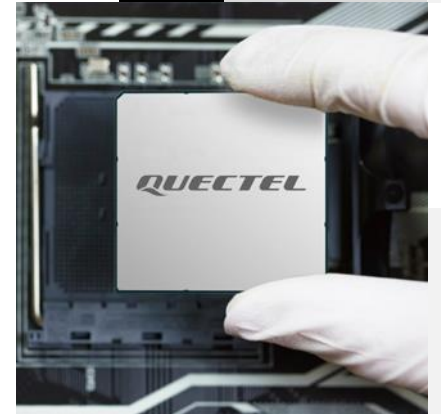
Specifications & Timelines

Typical Applications

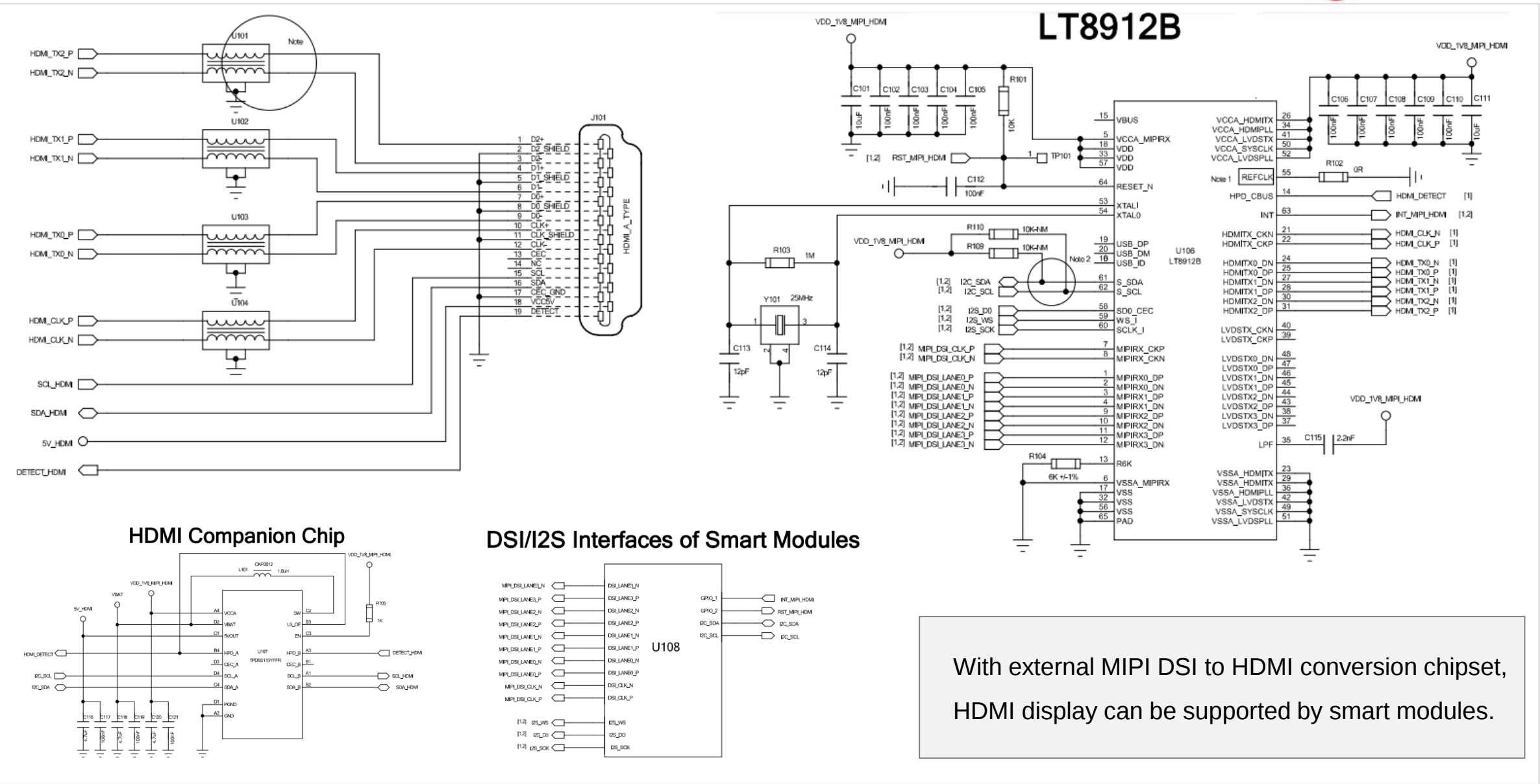
Enhancements

Customer Support

Build a Smarter World



Extensive Function – MIPI DSI to HDMI

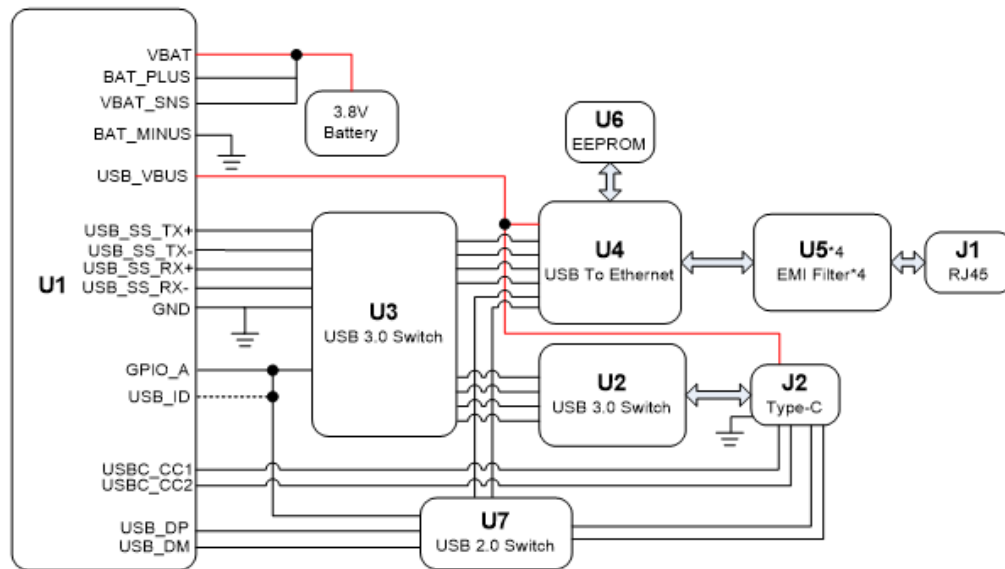


Extensive Function – USB to Ethernet

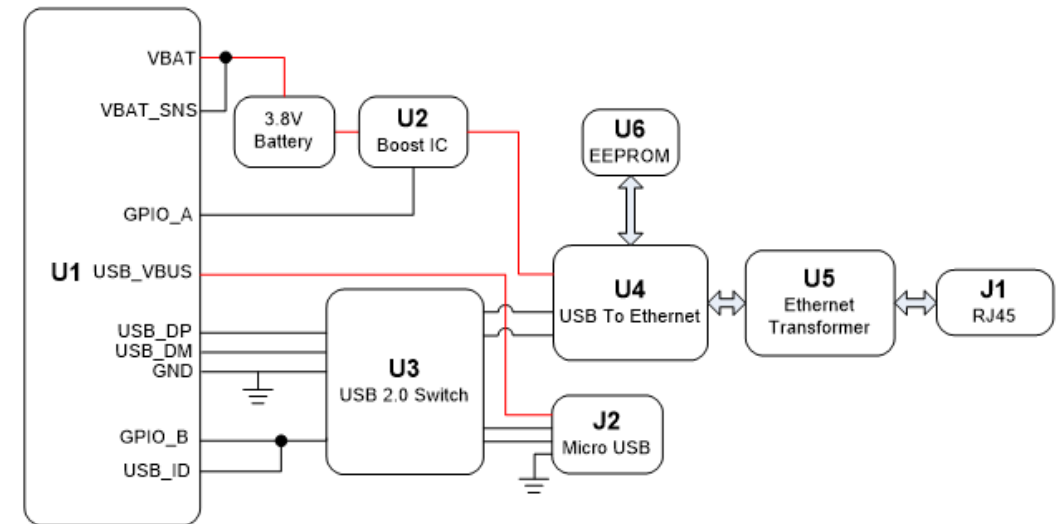


Smart modules have no Ethernet interface, while the USB can be converted to Ethernet when the smart modules work in Host mode. External conversion chipset is needed for the conversion.

USB 3.0 to 10/ 100/ 1000M Ethernet



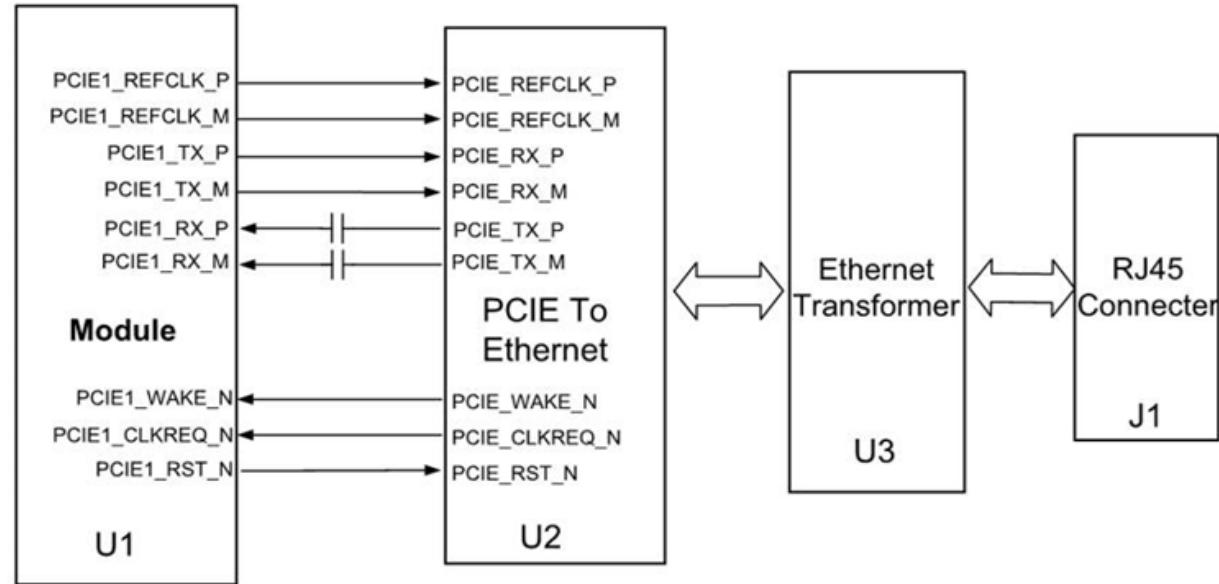
USB 2.0 to 10/ 100M Ethernet



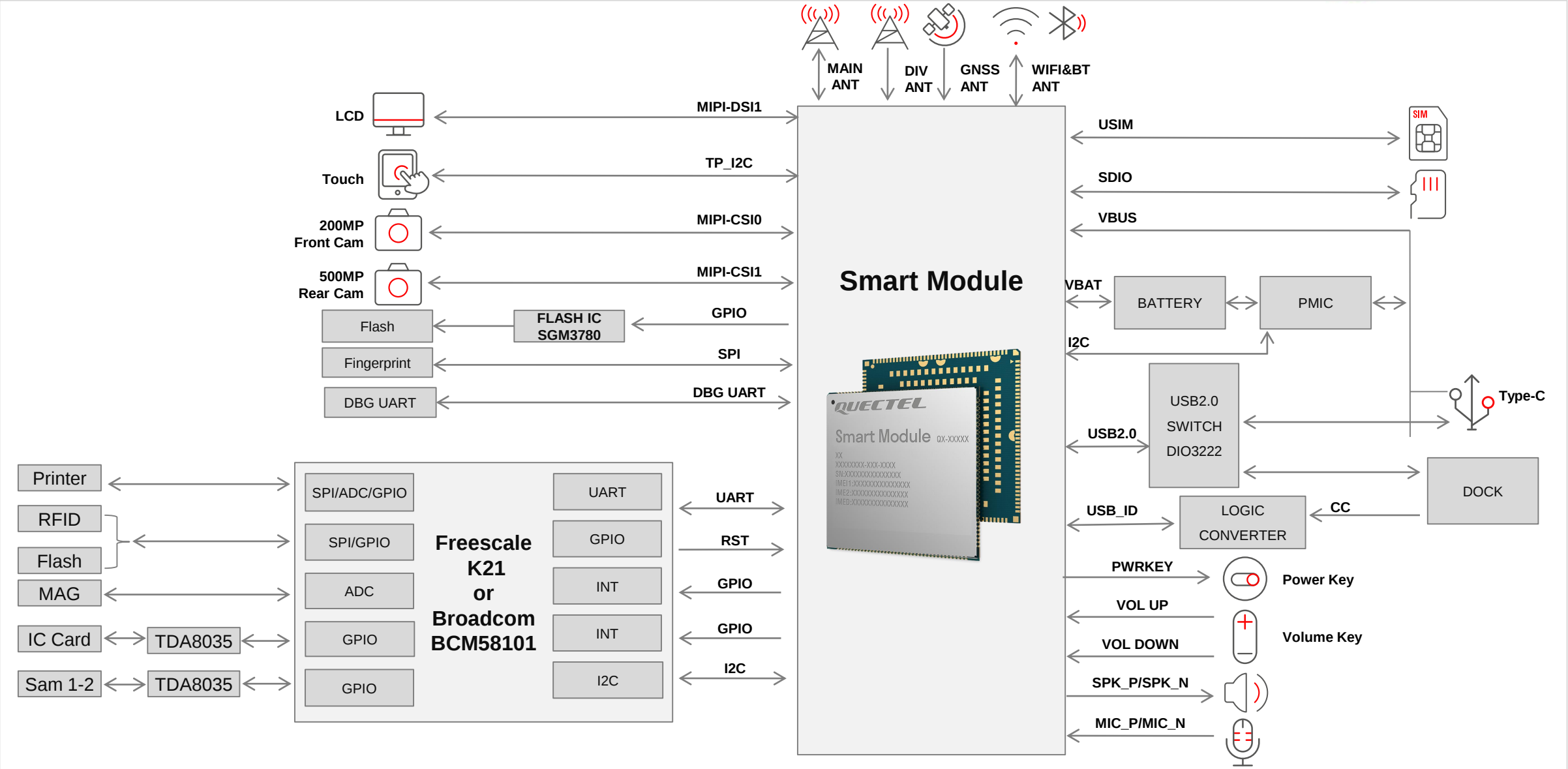
Extensive Function – PCIe to Ethernet



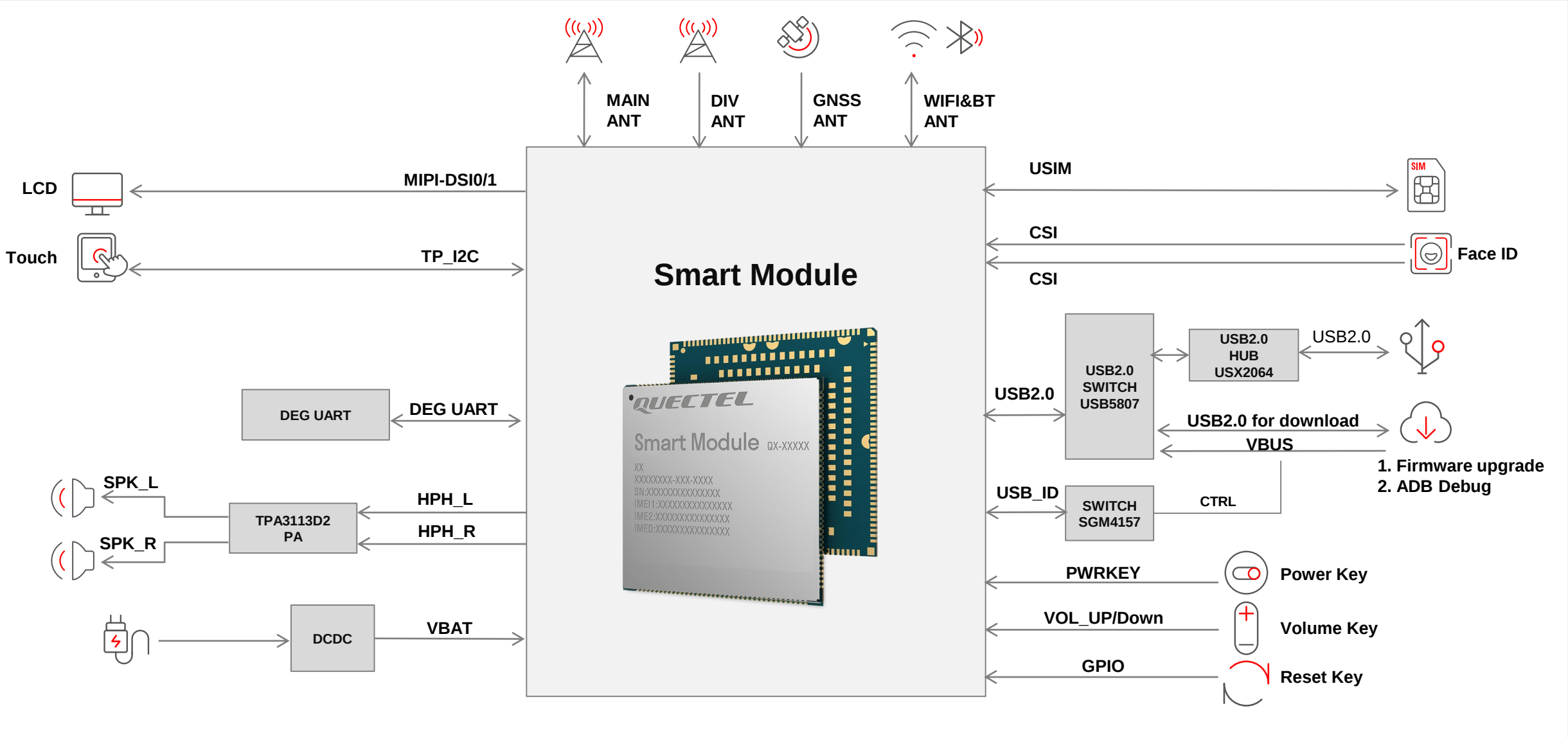
Smart modules have no Ethernet interface, while the PCIe can be converted to Ethernet. External conversion chipset is needed for the conversion.



Typical Solution – POS



Typical Solution – Access Control



Support Package

EVB



SMARTEVBG5-INT-KIT: SC680A

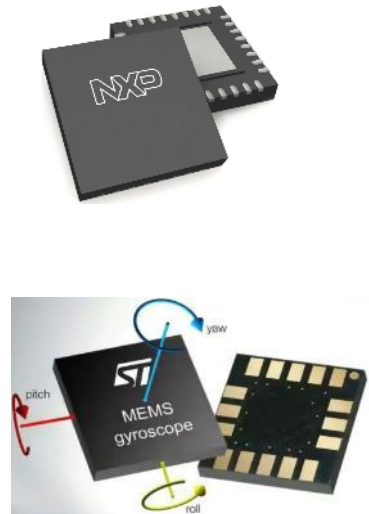
Key Components Supply Services



Customers may face difficulties in finding key components used in their board locally. To accelerate customers' development and shorten the time to market, Quectel will use the supply chain to provide the key components to customers.

✓ Main key components:

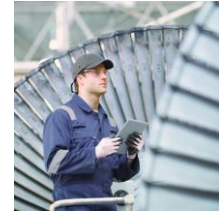
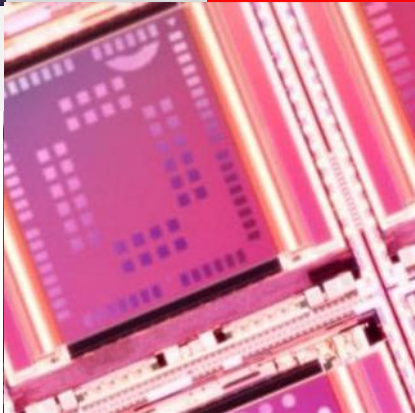
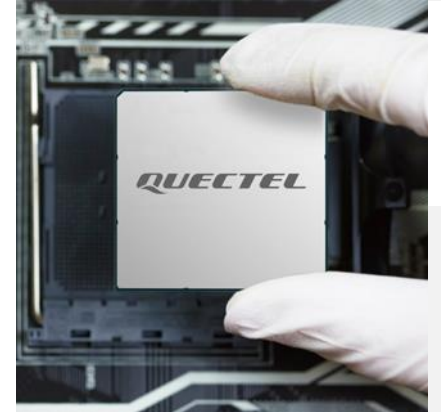
- LCM + TP
- Camera module
- Sensors, NFC ICs, extension ICs, etc.





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Build a Smarter World



1. System Evaluation

- Analyzing customer requirements
- Recommending the right module for the customer
- Evaluating antenna placement
- Designing antennas



2. Design In

- Recommending referenced hardware designs
- Checking schematics and layouts
- Providing software design support

3. Prototype

- Providing design validation testing
- Recommending suppliers

4. Testing Service

- RF testing
- Power consumption testing
- Audio testing
- Reliability & environmental testing
- ESD testing
- Certification testing
- Antenna debugging

5. Mass Production

- Providing assembly and testing guidelines
- Providing after-sales services



**We are a global IoT solutions provider,
backed by outstanding support and
services, to deliver a smarter world.**

- Unbeatable choice from the broadest module portfolio in the world
- High quality range of off-the-shelf and customized antennas
- Superb support with the largest R&D team in the industry
- Continuous innovation in 5G, LPWA, Automotive, and Smart module technology
- A passionate, dedicated team of "Quectelers" ensures our customers always come first

Thank You

Build a Smarter World

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