

BARROT

Company Profile



Being the world's most trustworthy short-range wireless communications company

BARROT



20+ years Bluetooth & Wi-Fi
development experience



5 companies (Headquarter: Beijing)



270+ employees, **60%** R&D



30+ local & global distributors



- Bluetooth SIG associated member.
- Outstanding Contributor award.
- Bluetooth technology main committer (5 global specifications announced).
- Commercially prominent Bluetooth stack.
- Leading automotive short-range wireless turnkey solution provider.
- Global technical support abilities, supporting global customers in Japan, Korea, Germany, USA and etc.

Products & Technical Services



Automotive



- Qualcomm, NXP, MTK strategic partner for global Automotive market.
- Offering modules, stack, algorithms, test, certification, consultant and turnkey solution.
- Integrated by Automotive OEM and Tier1 and embedded in billions of vehicles sold worldwide, spanning cars, trucks, and two-wheelers.
- Main customers: Tier1 and OEM.



IP



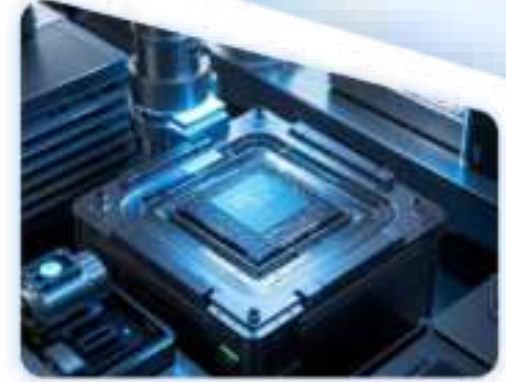
- Global major commercial Bluetooth stack IP provider.
- Running on the mainstream operating systems (Windows[™], Linux, Android[™], FreeRTOS) and is smoothly compatible with a wide range of SoC platforms.
- Broadly adopted in billions of devices of Automotive, two-wheeler, industrial, medical and consumer applications.
- Offering audio codec and audio algorithms.
- Main customers: Tier1 and OEM, industrial and consumer customers.



IoT



- Ultra low energy.
- Supporting fast speed data transfer and multiple connections.
- China operator supply chain supplier.
- Offering chipset, modules, turn-key solutions and Chip-on-board design.
- Main customers: solution design house, end product OEM.



Manufacturing



- IATF16949 qualified.
- Pass global OEM and Tier1s' audits.
- 3300m² Area with automatic SMT line2, module capacity 2KK/month.
- Automatic test environment and equipment.
- Consecutive investment on product quality improvement.

Honors & Qualifications



Dun & Bradstreet
Certificated Enterprise



Zhongguancun IC
competition Top10



IATF 16949



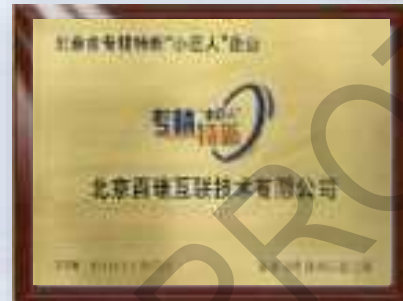
Software Copyrights & IP



Beijing Haidian Key
Innovative Enterprise



Beijing Enterprise Tech.
Center



Beijing Little Giants Enterprise



National Little Giants
Enterprise



Xiaomi Vela Ecosystem
Partner



Bluetooth SIG Associated Member
Sparklink Member
ICCE Member

Core Abilities

-01-



IP

-02-



**Chipset
Design**

-03-



Solution

-04-



Manufacturing

IP

Bluetooth Stack, RF Transceiver, Audio algorithm



World Leading Bluetooth Stack : BARROT® Stack

▶ Bluetooth Stack, LE Audio, Mesh are BQB qualified ◀



Full Profiles

- Support from Bluetooth v2.1 to v6.0, from BR/EDR to LE.
- Mesh stack.
- LE Audio stack.
- Support audio codec: SBC/AAC/LDAC/LC3/LC3 plus
- Audio algorithms
- ECNR (Echo Cancellation Noise Reduction)



Full Platform

- Support mainstream Bluetooth chipsets.
- Support mainstream CPU cores: 8051, Arch, ARM, MIPS, RISC-V, X86.
- Support mainstream OS: Windows™, Linux, Android™, FreeRTOS, ThreadX, NONE-OS and etc.

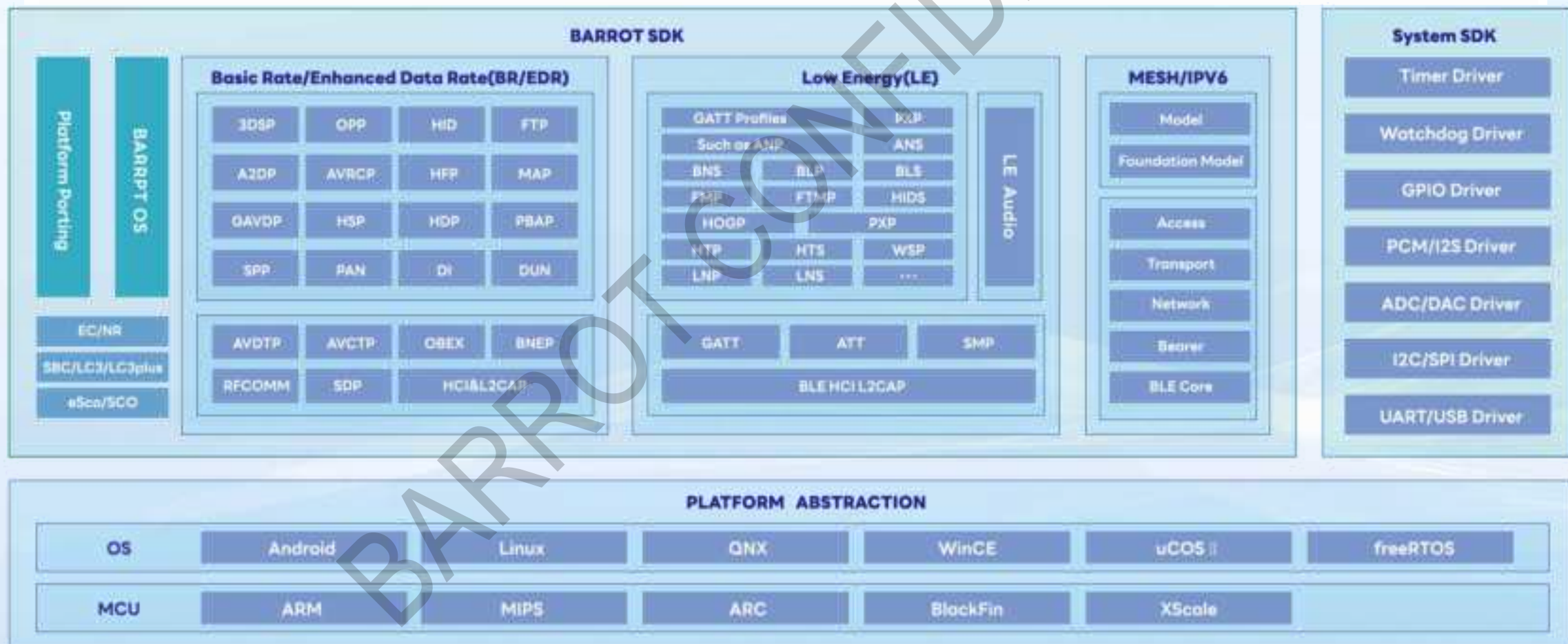


High Quality

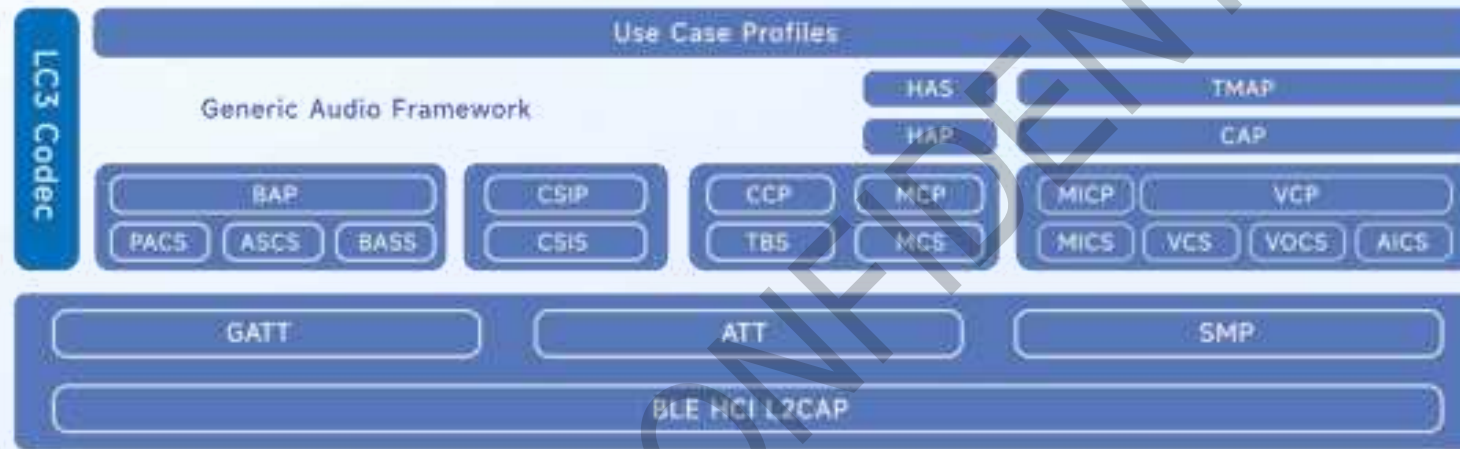
- 150 Patents.
- Lower layer close-coupling, higher layer modulation design.
- High performance, low power consumption.
- Less resources requirements, core stack Flash < 80KB, RAM < 10KB.

BARROT® Stack v6.0 Qualified

Product Name	Product Description	Model Number	Product Qualification Date	Product Publication Date	Internal Visibility	Product Website	Submitted By
BARROT Bluetooth Software	BARROT Bluetooth Host Protocol Stack, is a full implementation of the Bluetooth Specification V6.0 using ANSI C	BARROT Bluetooth Software V3.0	2024-12-25	2024-12-27	Yes		blue tooth



BARROT® LE Audio Stack Architecture



- Codec: LC3, LC3 plus
- Isochronous Channel
- Multiple steaming (support up to 31 separate unicast isochronous streams)

LE Audio's Multi-Stream Audio



Classic Bluetooth Audio: sending all audio steams to leaf headphone and it transfer to right one.

LE Audio: separately sending audio steam to two headphones

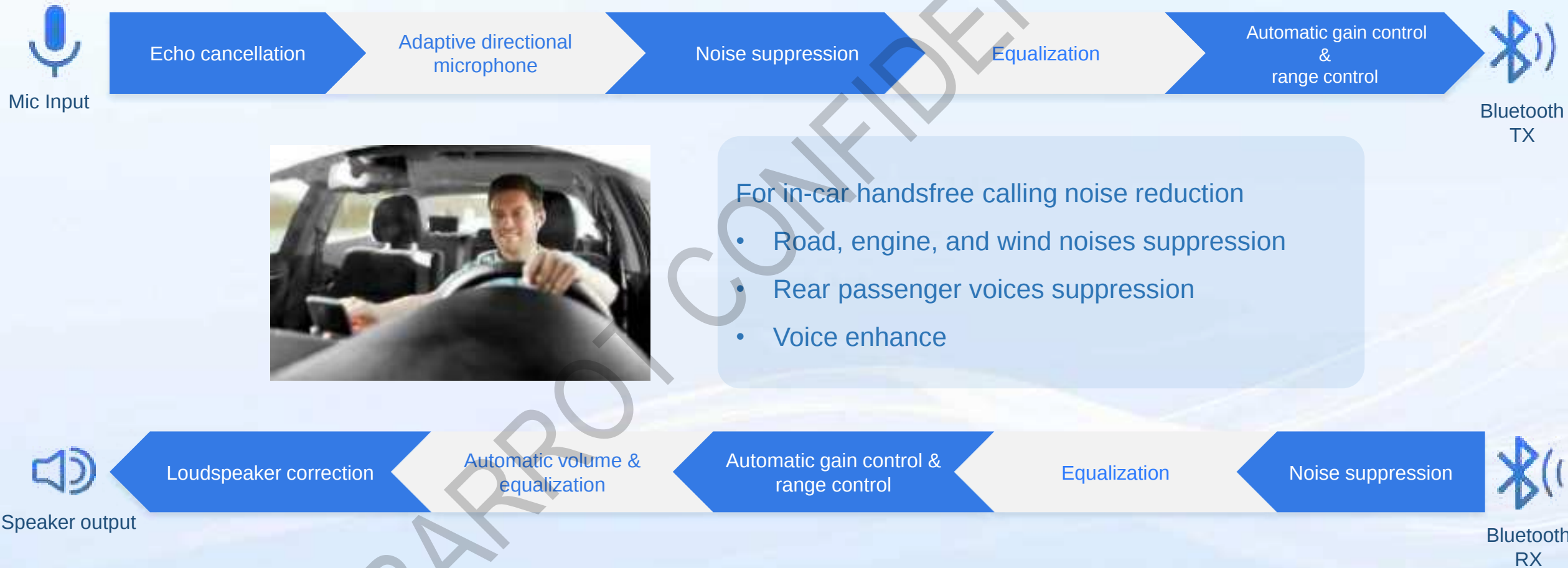
Auracast™ 广播



Simultaneously broadcasting multiple audio steaming, no limitation of receive headset number.



Audio Algorithm for In-Car



Carplay&Android Auto

- Supports all mainstream car connectivity/mobile screen mirroring protocols, addressing compatibility issues across multiple brands of mobile phones.
- One single software package to accomplish integration adaptation and development. OEMs, Tier1s, and solution companies choose functionalities according to requirements, with support for customization.
- Supports automatic switching between Mainland China and overseas, enabling the corresponding version based on system language.
- Supports independent OTA updates and remote fault diagnosis, enabling rapidly function upgrade and fix issues.
- Users can effortlessly switch between different mobile phones for connectivity and screen mirroring functions with a simple button press.



Bluetooth Technology Committer



2022 Outstanding IOP Contributor
presented by Bluetooth SIG



Award Ceremony



The Bluetooth SIG visits BARROT HQ

Barrot experts listed in white paper as
spec contributor
<https://www.bluetooth.com/learn-about-bluetooth/feature-enhancements/le-audio/le-audio-specifications/>

Bluetooth SIG 2022 award announcement:
<https://www.bluetooth.com/specifications/working-groups/awards/>

The Bluetooth SIG CEO Neville Meijers & CMO Ken Kolderup
visit BARROT Beijing HQ in October, 2024..

BARROT® Stack IP

The BARROT® stack, a commercially prominent Bluetooth stack IP, powers the wireless ecosystem for wearables, smart homes, and connected cars. It is Bluetooth v6.0 BQB qualified (QDID: Q338614) and licensed to numerous Fortune 500 companies globally. Integrated into Xiaomi Vela, the BARROT® stack operates in hundreds of millions of devices, including smart watches, smart bracelets, TWS earbuds, smart speakers, smart home appliances and etc.. Furthermore, it is embedded in over billions vehicles sold worldwide, spanning cars, trucks, and motorcycles across China, Japan, ASEAN, Europe, and North America.



oppo

GRAPHTEC

CASIO



NIHON KOHDEN

RICOH

JEPICO



荣誉证书

在「小米 Vela 生态合作」的卓越表现, 特此授予
北京百瑞互联技术股份有限公司

 **xiaomi vela** | 生态合作伙伴

Xiaomi Vela 开源峰会
2024年12月27日

Chipset Design

Bluetooth Chipset

2018

2019

2020

2021

2022

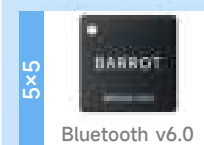
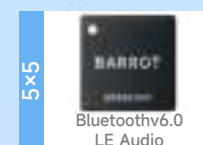
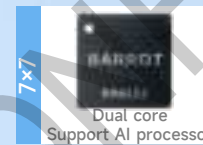
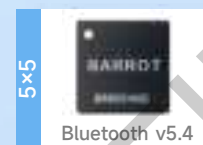
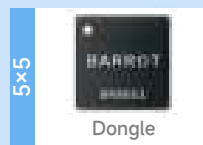
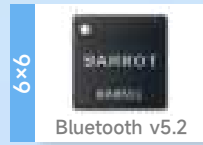
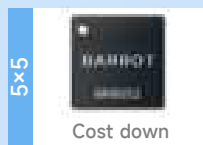
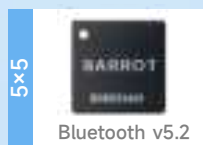
2023

2024

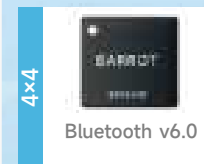
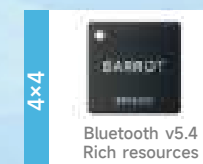
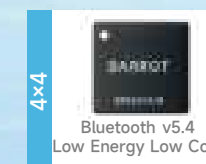
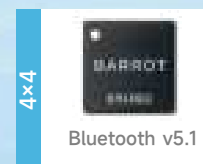
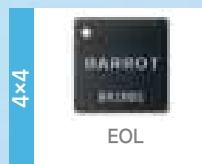
2025

2026

Dual Mode



Low Energy



Independent Design

Using chip foundry standard library units (totally free, without intellectual property issues)

01

Designing based on an open RISC-V processor kernel (totally free, without intellectual property issues)

02

Independently design other modules, including pad, PLL, Analog, RF, baseband, wiring, memory, controllers and etc.

03

07

Mass production

06

Burning and testing with self-owned machines

05

Assembly and Testing

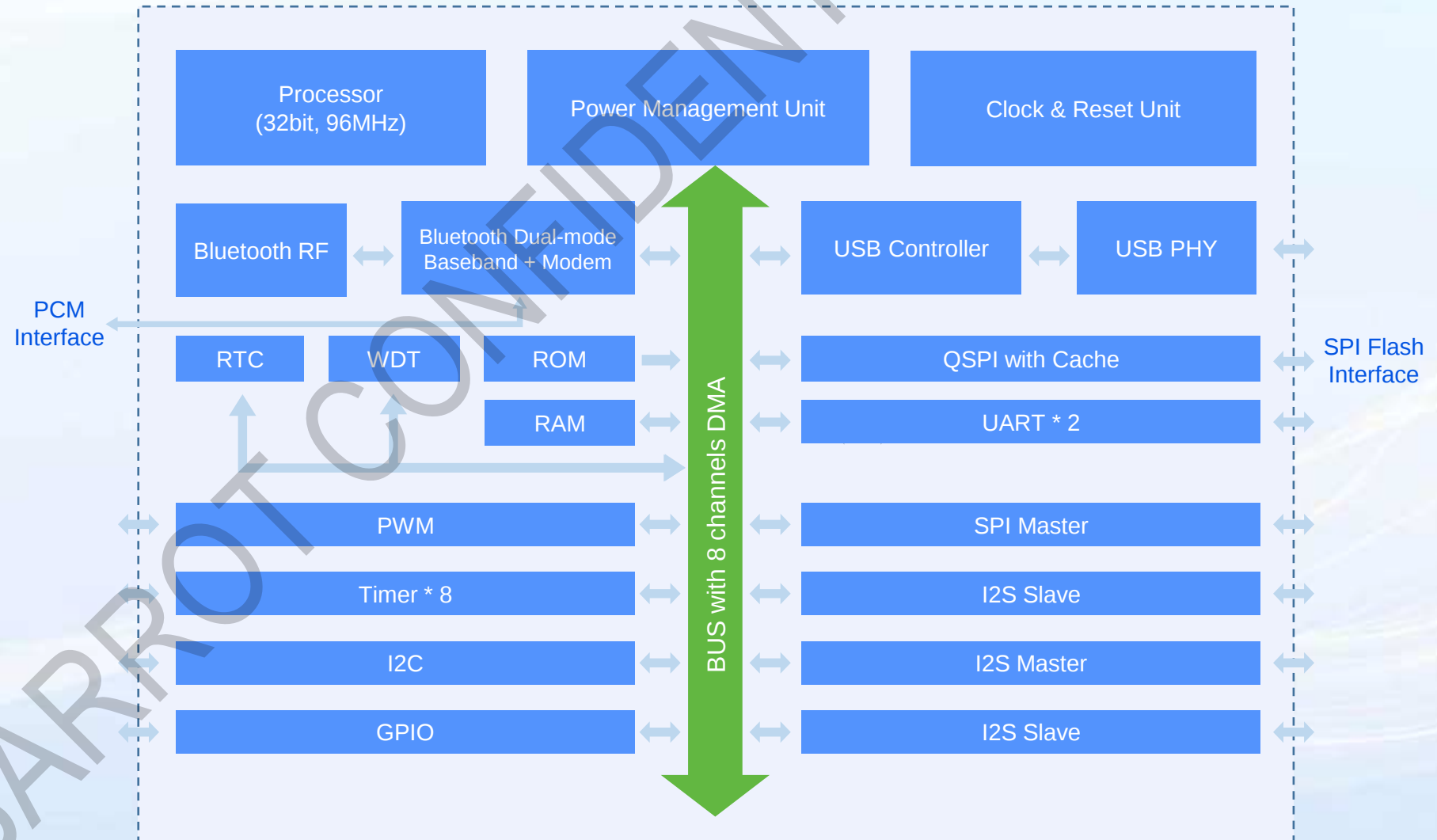
04

Tape Out

BARROT CONFIDENTIAL

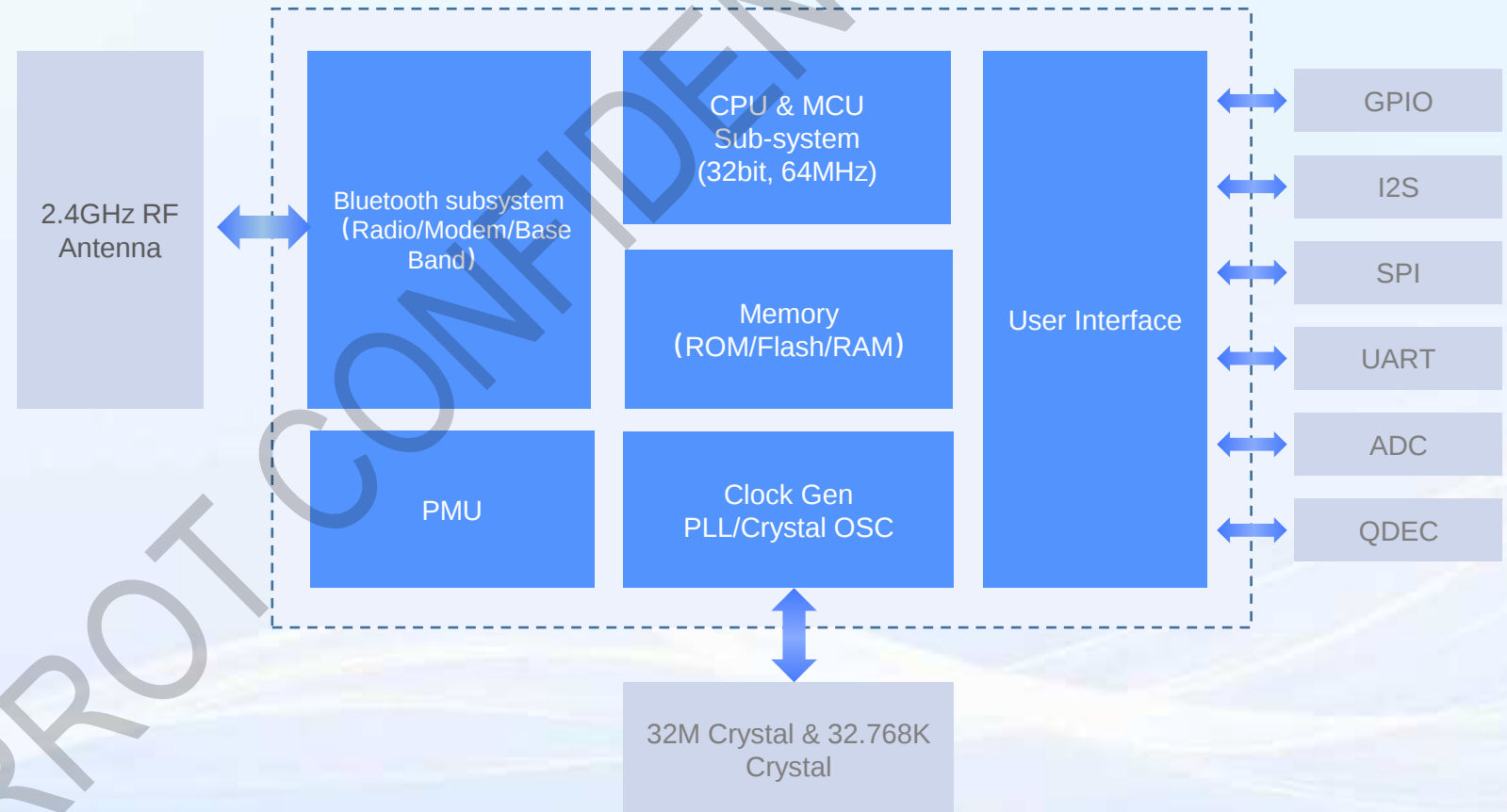
Bluetooth Dual Mode Architecture

- Support Bluetooth v5.4
- High integration
- Flexible configuration of working mode: SOC or HCI
- Rich IO interfaces
- Multiple connections
- Multiple protocols
- Flexibility
- Support OTA



Bluetooth Low Energy SoC Architecture

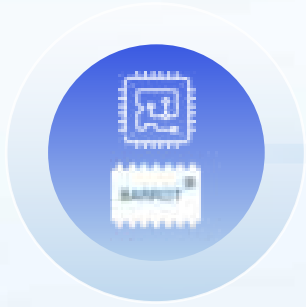
- Support Bluetooth v5.4
- Compatible with 2.4G proprietary protocol
- High integration
- Simple BOM
- Rich IO interfaces
- Multiple connections
- Multiple protocols
- Flexibility
- Support OTA



Automotive

Auto grade turnkey solution (Module + Stack + Algorithm)

Automotive Offerings



Modules

Automotive grade modules, including Bluetooth modules, Bluetooth+Wi-Fi5/6/6e/7



BARROT® Stack

Support Bluetooth v6.0 and LE Audio to meet Automotive handsfree calling, multimedia entertainment and data transfer scenarios.



Algorithms

Codec: SBC, AAC, LDAC, LC3, LC3 plus
Audio algorithm
Positioning
Channel Sounding
Mesh



Certificates

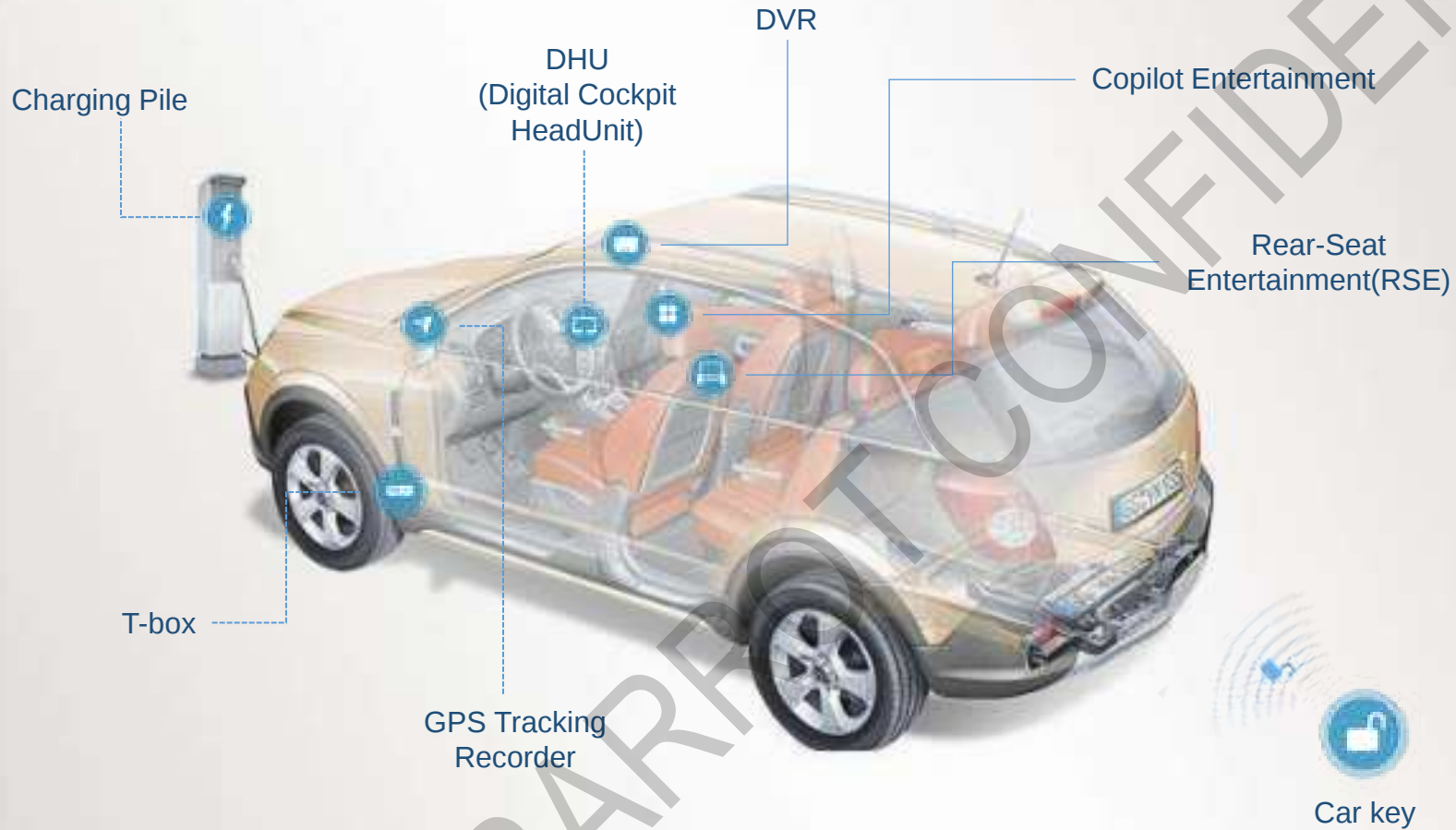
BQB, IOP, AEC-Q104, FCC/IC, CE, TELEC, EMC/EMI, SRRC, WFA, Wireless Carplay, Android Auto, HiCar



Technical Support

Technical support through the entire project lifecycle, including documents, evaluation kit, design review, test, certificate, consultants.

Automotive Ecosystem



Turnkey Solutions

- ◆ Bluetooth handsfree calling and multimedia entertainment
- ◆ Bluetooth multiple connections
- ◆ Wi-Fi wireless display
- ◆ Wi-Fi multiple hotspots
- ◆ RKE/PKE

Technical Abilities

- ◆ Wireless stack
- ◆ Bluetooth/Wi-Fi coexistence
- ◆ Wi-Fi STA/AP/P2P concurrency
- ◆ Handsfree calling&multimedia steaming/audio algorithms
- ◆ GATT/LE data transfer
- ◆ Multiple connections
- ◆ Positioning
- ◆ RF tuning/antenna design

Platform Adaptability

Qualcomm: QM215, SM8475, MSM8930, MSM8950, MSM8905, MDM9X07
 Snapdragon 6125, 6155, 8155, 8255, 8295, 8397
 Sunplus: SPHE5100, 5110, 8368-U, 8368-C, 8368-P, 8368-PD, 9000
 MTK: MT2712s, 2712h, 2735, 8631, 8666, 8676, 8675, 8678
 Telechips Dolphin3, Dolphin5, TCC897X, TCC8030
 SemiDrive: X9M, X9E, X9H, X9HP, X9s, X9HP, G9, V9
 AutoChips: AC8227, AC8015, AC8025
 Rockchip: RV1109, RV1126, PX3, PX5
 Intel Malibou Lake, Apollo
 STM: Accordo5, STM32
 MorningCore: CX7101
 Simcom: SIM7600
 NXP: i.MX6, 8, RT
 Unisoc: A7870
 Mstar: 8339

Siengine: SE1000
 NVIDIA: Jetson TX2, Nano
 ASR: 1806, AMT630, HV100
 Quectel: SC60, AG35, SC200R
 NovaTek: NT98321, NT98323
 Ambarella: A12, CV25
 Renesas: R-Car-H3
 LeadCore: LC1881
 Fullhan: MC6630
 Silan: SQ96A86S
 AllWinner: T113
 ITE: 9866, 9868
 AMD: V2A46
 Primall
 Nexell
 TI



android

Android(version
4.4/6/7/8/9/10/11/12/13/14)



Linux

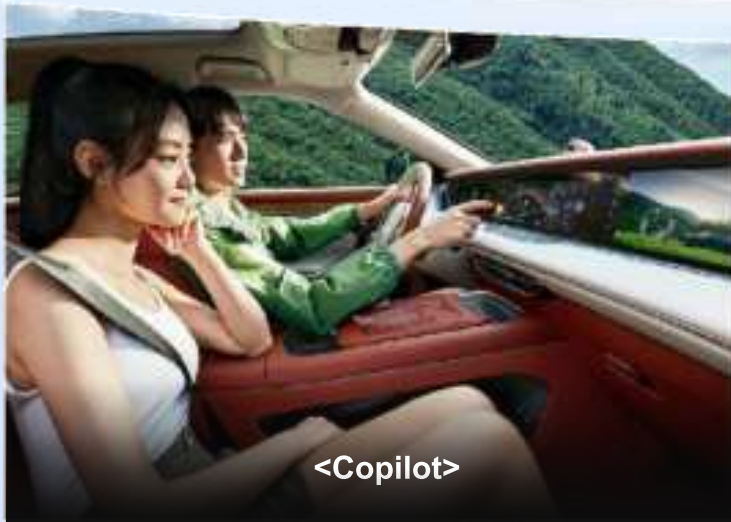
Linux (version 2.60 ~ 5.15)



Xiaomi HyperOS

HarmonyOS

Typical Applications



Typical Applications



<T-box +Car key>



< Rearview mirror>



<HUD>



<GPS dashcam>



<after-market>



<1-DIN/2-DIN machine>

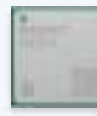
Two-wheelers



 Motorcycle meter

 Electronic Bike meter

Bluetooth Modules Matrix

	Bluetooth 5.1	Bluetooth 5.2	Bluetooth 5.3	Bluetooth 5.4	
SoC	 i480e ² - CSR8670 13.7x21.3x1.7mm - Dual MIC			 i1662e-s ^{A 1} - RTL8762 13.7x16.6x2.5mm - Long Range	 i1647e-s ^{A 1} - KW47 - UART, CAN, LIN, SPI - SE - CS
	 i1121e-s ² - QCC3021 19.8x14.8x3.2mm - UART,USB - Single MIC			 i1581e-s ³ - QCC5181 21.3x13.7x2.5mm - Dual MIC - LE Audio	
HCI (Software ECNR algorithm or hardware DSP)		 i1188-se ² - CSR8811A12 15x12x2.1mm	 i1571-s ² - CYW20713 10x10x1.6mm	 i1552-s ² - BR8051A12 10x10x2.6mm	 i1572-s ^{A 2} - CYW89072 10x10x2.4mm
				 i1595-s ^{A 3} ^{Y25Q4} - QCA8695 14x18mm	 i1531-s ^{A 3} ^{Y25Q4} - CYW88310 14x18mm

¹ Bluetooth data: ATT,GATT

² Classic Bluetooth Audio

³ LE Audio

^A Automotive

^{Planning} Planning, not released

Note: UART is supported by default

Wi-Fi5 Modules Matrix

Wi-Fi only	Bluetooth 5.0		
 i1421-su1 • RTL8821CS-VI • 10x10x2.6mm • SDIO	 i1465-sp A2 • QCA6574A-1 • 23.4x19.4x2.3mm • UART, PCIe • Dual Band 2.4G or 5GHZ • 802.11ac 2x2 MIMO • Single MAC	 i1465-s A2 • QCA6574A-3 • 23.4x19.4x2.4mm • UART, SDIO • Dual Band 2.4G or 5GHZ • 802.11ac 2x2 MIMO • Single MAC	 i1433-sp A2 • CYW88373 • 22x22x2.3mm • UART, PCIe, SDIO • Dual Band 2.4G and 5GHZ • 1x1 SISO • Single MAC
Bluetooth 5.1	Bluetooth 5.2	Bluetooth 5.3	Bluetooth 5.4
 i1559-spu1 A2 • CYW88459 • 22.7x20.2x2.6mm • UART, PCIe • Dual Band 2.4G and 5GHZ • 2x2 MIMO • Single MAC	 i1495-sp A2 • QCA6595 • 23x23x2.9mm • UART, PCIe • Dual Band 2.4G and 5GHZ • 802.11n 1x1 SISO + 802.11ac 2x2 MIMO • Dual MAC	 BC2521-s 2 BC2521-su1 • RTL8821CS • 12x12x2.4mm • UART, SDIO • 1x1 SISO  i1421-si 2 • RTL8821CS • 17x17x2.6mm • UART, SDIO • 1x1 SISO • IPEX socket	 i1421-sw • RTL8821CS • 16x16x2.6mm • UART, SDIO • Dual Band 2.4G and 5GHZ • 1x1 SISO • Single MAC

Wi-Fi6/6e Modules Matrix

	Wi-Fi 6		Wi-Fi 6e	
Bluetooth 5.2	 i1496-sp A 2 - QCA6696 23x23x2.9mm - UART, PCIe - Dual Band 2.4G and 5GHZ 2x2 2.4G ax + 2x2 5G ax - Dual MAC	 BC2652-sp - RTL8852BE 15x13x2.0mm 2x2 MIMO - UART, SDIO		
Bluetooth 5.3	 i1568-sp A 3 - QCA6688 23x23x2.9mm - UART, PCIe - Dual Band 2.4G and 5GHZ 2x2 2.4G ax + 2x2 5G ax - Dual MAC	 i1570-sp A 2 - CYW88570 23.4x19.4x2.4mm - UART, PCIe - Dual Band 2.4G and 5GHZ 1x12.4G ax + 2x2 5G ax - Single MAC	 i1569-sp A 3 - QCA6698 23x23x2.9mm - UART, PCIe - Tri-band 2.4G+5/6GHz 2x2 2.4G ax + 2x2 5G/6G ax - Dual MAC	 i1893-sp A 3 - AW693 23x23x2.9mm - UART, PCIe - Tri-band 2.4G+5/6GHz 2x2 5G/6G ax + 1x1 2.4G ax - Dual MAC
Bluetooth 5.4	 i1890-sp A 2 - AW690 23x23x2.9mm - UART, SDIO - Dual Band 2.4G and 5GHz 1x1 5G ax + 1x1 2.4G ac or 2x2 5G ax - Dual MAC	 i1598-sp A 2 88Q9098 23x23x3mm - UART, PCIe - Dual Band 2.4G and 5GHz 2x2 5G ax + 1x1 2.4G ac - Dual MAC	 i1811-s A 3 - AW611 17.4x16.7mm - UART, SDIO - Dual Band 2.4G and 5GHz 1x1 SISO	 i1821-sp A 2 Y25Q2 - MT7921 23x23x3.3mm - UART, PCIe - Dual band 2.4G and 5GHZ/6GHz 2x2 2.4G ax + 2x2 5G/6G ax - Dual MAC
	 i1852-sp A 2 - RTL8852 16x14x2.4mm - UART, PCIe - Dual Band 2.4G and 5GHZ 2x2 2.4G ax + 2x2 5G ax - Single MAC	 i1880-sw 2 - AIC8800D80I 16x16x2.4mm - UART, SDIO, USB - Dual Band 2.4G and 5GHZ 1x1 ax - Single MAC	 BC3688-s - AIC8800D40 12x12x2.4mm 1x1 SISO - UART, SDIO	Note: BC2652-sp and BC3688-s have no shield covers by default, but can be added according to requirements.

Wi-Fi7 Modules Matrix

Wi-Fi 7

Bluetooth 5.3



i1887-sp

A 3

- QCA6787AQ
- 23x23x2.9mm
- UART, PCIe
- Tri-band 2.4G + 5/6GHz
- 2x2 2.4G be + 2x2 5G/6G be
- Dual MAC



i1897-sp

A 3

- QCA6797AQ
- 23x23x2.9mm
- UART, PCIe
- Wi-Fi 7(6GHz) HBS
- Tri-band 2.4G + 5/6 GHz
- 2x2 2.4/5G be + 2x2 5G/6G be
- Dual MAC



BC1776-sp

- QCC2076
- 23x23x2.9mm
- 2x2 MIMO
- UART, PCIe



BC1776-M2

Y25

- QCC2076
- 22x30x2.9mm
- 2x2 MIMO
- UART, PCIe
- IPEX



i1879-sp

A

Planning

- AW790
- 23x23mm
- UART, PCIe



i1894-sp

A

Planning

- AW794
- 23x23mm
- UART, PCIe



i1825-sp

A

Y26

- MT7925
- 23x23mm
- UART, PCIe

Leading automotive solution provider strongly & directly supported by world leading chipset manufacturer



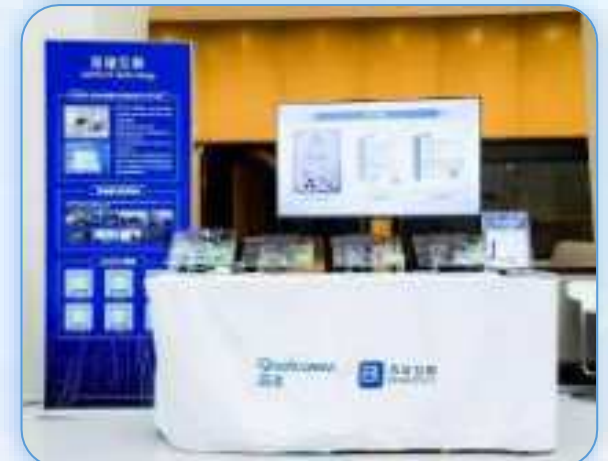
2023 Qualcomm Automotive Summit



Partner & products direct links to NXP website



2024 NXP Automotive Summit



2024 Qualcomm Automotive Summit

Tier1 Customer



· APTIV ·

HYUNDAI
MOBIS

Pioneer



HSAE
航盛



德赛西威



ADAYO 华阳通用

ecarX

Megatronix

Autolink

UAES
联合汽车电子有限公司
United Automotive Electronics System Co., Ltd.

BICV 智联科技
HUBEI AUTO SMART



零束
ZONE

GP Link

Longhorn

ThunderSoft

LINKS

auto-ai
四维智联

Neusoft 东软

SKYPINE 天瀚

LuXshare
立讯精密工业



ALPINE
Emotion in Mobility

SIRUN

PATEO

Panasonic

Automotive OEM



Two-wheelers Successful Stories



MOTORRAD



 Haojiang



绿源

Industrial Applications



<Multiple Function Printer>



<Two-wheelers>



<TV & Live Streaming>



<Lawnmower>

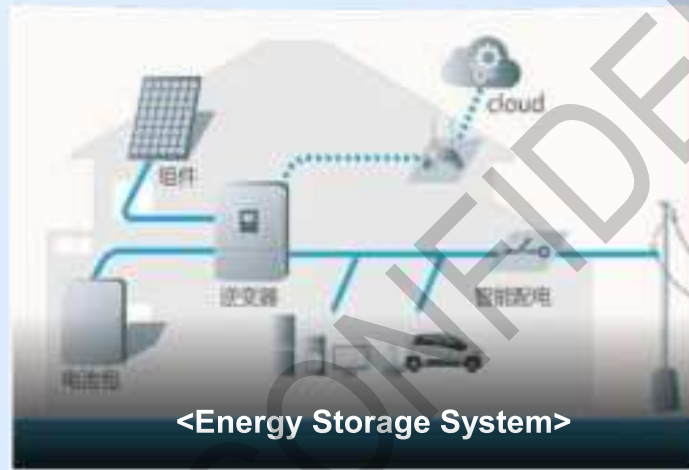


<Smart Home>



<Camera>

Industrial Applications

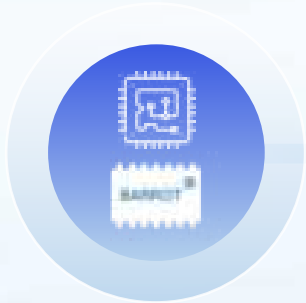


IoT

Turnkey solution(Chipset/Module/COB design +
Firmware + Algorithm)



IoT Offerings



Chipsets & Modules

Bluetooth dual-mode
Bluetooth Low Energy
Chipset working as main controller



Firmware & SDK

Embedded firmware with AT commands via UART communication
SDK for 2nd development
Embedded algorithms, including Mesh, AOA, Findmy, iAP2, and many others



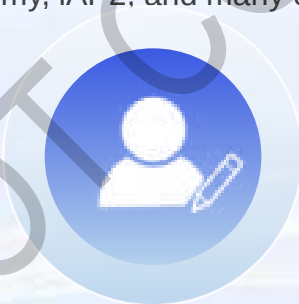
Turnkey Solution

Chip-on-board design
Work with SoC platform for joint development
RF tuning



Certificates

BQB, IOP, FCC/IC, CE, TELEC, EMC/EMI, SRRC and many others



Technical Support

Technical support through the entire project lifecycle, including documents, evaluation kit, design review, test, certificate, consultants

Typical Application Turnkey Solution



<Portable Printer>



<Scanner>



<Joystick>



<Set-top Box>

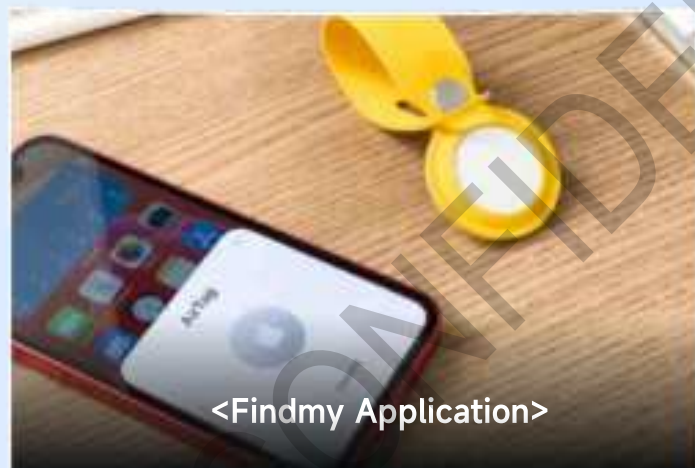


<Remote Controller>



<Mesh Networking>

Typical Application Turnkey Solution



Typical Application Turnkey Solution



Bluetooth Modules Matrix

	Bluetooth 5.2	
Dual-mode	 BR2551e-s - BR8051A01 - SPP,HID, HOGP, iAP2, ATT, GATT 15x12x1.8mm - UART, USB 3xLE+ 7xSPP - Master\slave - OTA - CE, KCC, TELEC, BQB, SRRC	 BR2551e-u1 - BR8051A01 - SPP,HID, HOGP, iAP2, ATT, GATT 15x12x2.5mm - UART, USB 3xLE+ 7xSPP - Master\slave - OTA
		 i2552-s - BR8052A01 - SPP,HID, HOGP, iAP2, ATT, GATT 12.45x10.41x2.1mm - UART 2xLE+ 2xSPP - OTA
	Bluetooth 5.1	Bluetooth 5.4
Low energy	 BR2602e-s - BR1002 - ATT, GATT, HOGP 15x12x2.5mm - Ceramic antenna - UART - Master\slave - OTA	 BR2602e-u2 - BR1002 - ATT, GATT, HOGP 15x12x2.5mm - PCB antenna - UART - Master\slave - OTA - BQB, FCC,CE
		 i2616e - BR1601A02 - ATT, GATT, HOGP, MESH 15x12x1.8mm - UART - PCB antenna - Master\slave - OTA
		 i2616e-s - BR1601A02 - ATT, GATT, HOGP, MESH 15x12x1.8mm - UART - Master\slave - OTA

Note: Connect to MCU via UART using AT commands defined in the programming manual.

IoT Customer



oppo

CASIO



RICOH

JEPICO



FOXCONN

Honeywell

FUNIDE



东莞中嘉

FDC富德康

安瑞创
Anycon

辰奕智能
SENEASY INTELLIGENT



PATEO

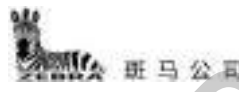
CSU 科大智能



TPV
VISION INNOVATOR

YIPPEE

FIH 富智康
FIH Mobile Limited
富智康集团有限公司



NIIMBOT 精臣

XPRINT 极印



ECOVACS

QUECTEL

Sinocare 三诺

SANTROLL

KING-METER

Ananda



Manufacturing

Factory Certification



IATF 16949



VDA6.3



ISO14001

Manufacturing Processes

PCB loader



PCB labeling



PCB clean



Solder Paste Printing



Solder Paste Inspection



SMT machine1



SMT machine2



Cache machine



OK/NG unloader



X-ray



After AOI



Cache machine



Reflow Oven



SMT placement machine



Before AOI



Manufacturing Processes

PCB loader



PCB labeling



PCB clean



Solder Paste Printing



Solder Paste Inspection



SMT machine1



SMT machine2



Cache machine



OK/NG unloader



X-ray



After AOI



Cache machine



Reflow Oven



SMT placement machine



Before AOI



Manufacturing Processes

Automatic labeling or laser carving



Automatic depaneling & inspection



Automatic loader & unloader



Automatic taping



Automatic PCBA flatness inspection

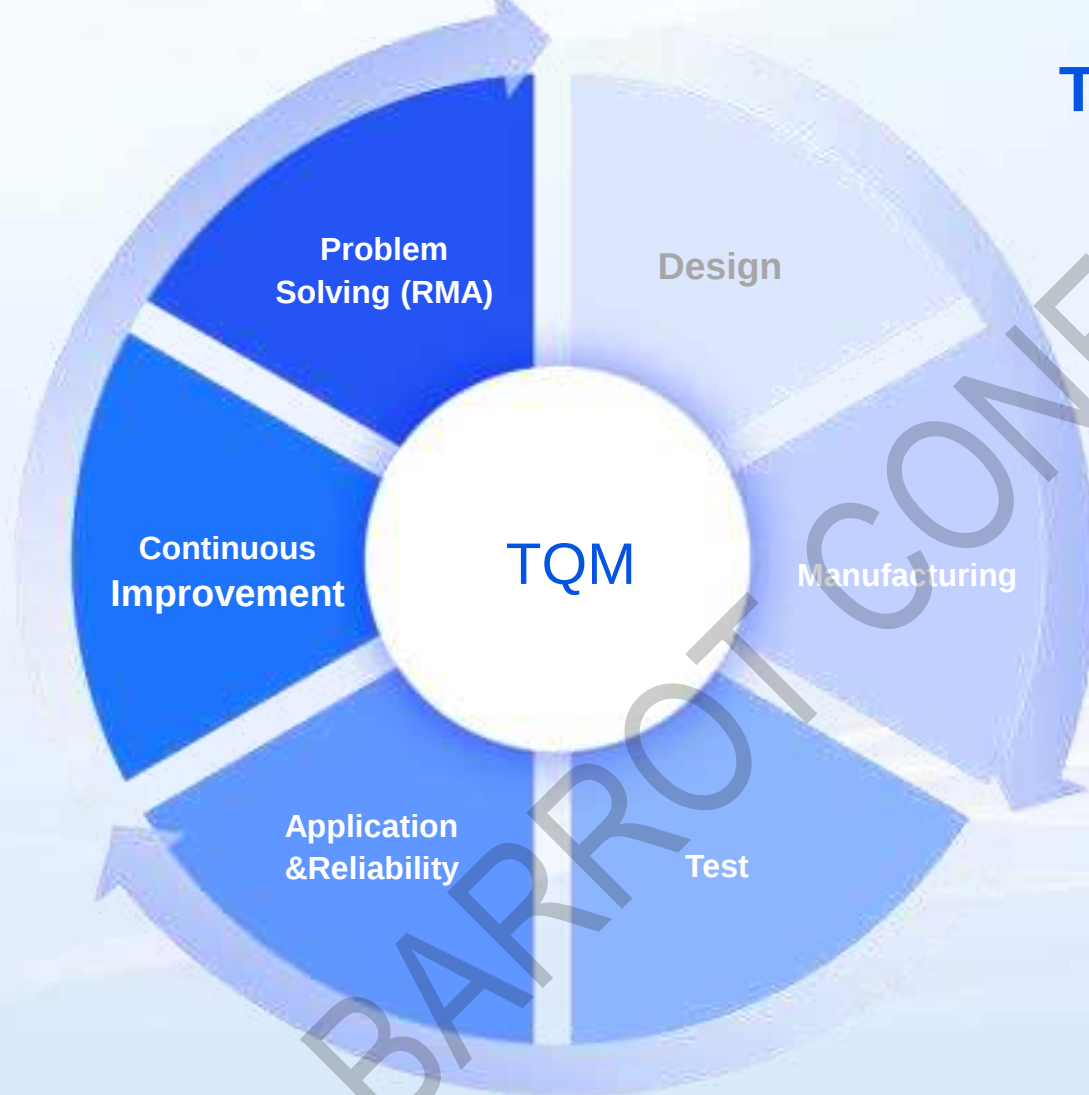


Automatic Test



Zero Defect Target

TQM: Total Quality Management



Total Quality
Culture



Zero Defect
Performance



Lessons Learn
Database

Full Test System



R&D

New product overall test
RF power consumption test
HW/SW full function test
HW/SW compatibility test
Audio test



MP

Frequency calibration test
RF power test
Full function test
PCBA flatness test



ROBUST

AEC Q-104
Environmental reliability test
Mechanical reliability test
Weldability test
ESD test



QUALS

BQB
Wi-Fi
FCC/IC
CE
TELEC
SRRC

Tracing System

**Material
Traceability**

**Process &
Product
Traceability**

**ECN
Traceability**

**Shipping
Traceability**

— We ensure every piece and every change traceable —

THANKS



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