waytronic®

Shenzhen Waytronic Electronics Co.,Ltd

waytronic®

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Waytronic Product Family

Extend Voice Chip
- Voice + LED array display + button series chip
- Voice + LCD + RTC + keyboard + IO expansion
- Voice + infrared ranging + IO input and output series chip
- Voice + IO expansion + internal storage chip
- Voice + LED array display + button + clock series chip
- NFC transmission, mobile APP, automatic opening of small programs

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Playback Class
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- WT588S series

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Sensor
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- Low-power ultrasound
- Microwave sensor

Standard Industry Solution
- Atomizer humidifier
- Sleep aid device
- Eye massager
- Electronic lock
- Floor cleaning machine

Driver Chip
- LCD driver chip series
- LED driver chip series

24+ years — Industry experience
70+ items — Invention patents
80+ — R&D personnel
25个 — Exported to countries

Company Profile

Shenzhen Waytronic Electronics Co., Ltd. (formerly Guangzhou Weichuang Electronics Co., Ltd.) is located in Baoan District, Shenzhen, Guangdong Province. It was founded in Guangzhou in 1999. With over 20 years of development, the company has become a national high-tech enterprise that integrates research and development, production, sales, and service for voice technology research, voice product solution design, and control of software and hardware design. The company has several subsidiaries in Beijing, Guangzhou, Wuhan, Shanghai, and other cities, establishing a nationwide business and service network. It covers various fields, including home appliances, medical equipment, security alarm, automotive electronics, multimedia, communication, telephone recording, industrial automation control, toys, and interactive consumer products. The company's integrated chips and modules mainly include: playback, recording, MP3, Bluetooth WiFi, voice recognition, intelligent voice sensing, and functionality expansion, among others.
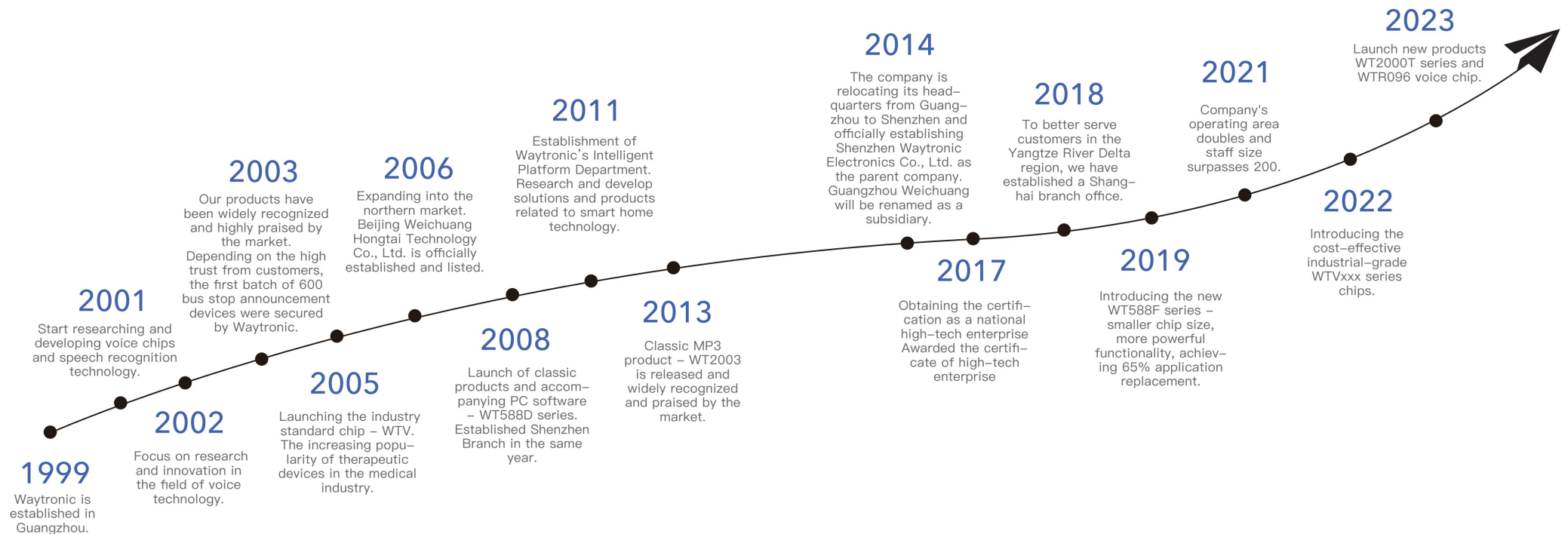
Our Vision

is to become the most influential company in the field of voice and intelligent Internet of Things.

Our Mission

is to provide a more intelligent interactive experience and make complexity simple, making life better.
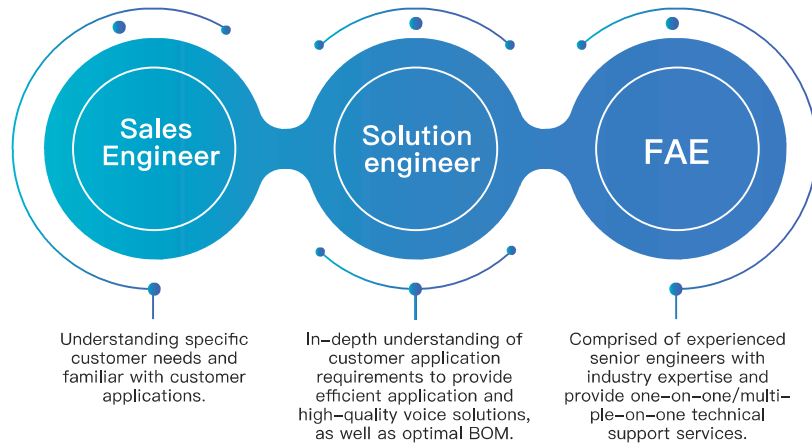
Our Values

Creating together, sharing together Creating the greatest value for our customers, achieving our employees' dreams.

1999 — Waytronic is established in Guangzhou.

2001 — Start researching and developing voice chips and speech recognition technology.

2002 — Focus on research and innovation in the field of voice technology.

2003 — Our products have been widely recognized and highly praised by the market. Depending on the high trust from customers, the first batch of 600 bus stop announcement devices were secured by Waytronic.

2005 — Launching the industry standard chip – WTV. The increasing popularity of therapeutic devices in the medical industry.

2006 — Expanding into the northern market. Beijing Weichuang Hongtai Technology Co., Ltd. is officially established and listed.

2008 — Launch of classic products and accompanying PC software – WT588D series. Established Shenzhen Branch in the same year.

2011 — Establishment of Waytronic's Intelligent Platform Department. Research and develop solutions and products related to smart home technology.

2013 — Classic MP3 product – WT2003 is released and widely recognized and praised by the market.

2014 — The company is relocating its headquarters from Guangzhou to Shenzhen and officially establishing Shenzhen Waytronic Electronics Co., Ltd. as the parent company. Guangzhou Weichuang will be renamed as a subsidiary.

2017 — Obtaining the certification as a national high-tech enterprise Awarded the certificate of high-tech enterprise

2018 — To better serve customers in the Yangtze River Delta region, we have established a Shanghai branch office.

2019 — Introducing the new WT588F series – smaller chip size, more powerful functionality, achieving 65% application replacement.

2021 — Company's operating area doubles and staff size surpasses 200.

2022 — Introducing the cost-effective industrial-grade WTVxxx series chips.

2023 — Launch new products WT2000T series and WTR096 voice chip.

Service

Only with the creative 'soul' can we go far. Committed to serving more engineers as a strategic goal, Waytronic adheres to the product concept of 'more, fast, good, and cost-effective', continuously innovating and optimizing. In the face of the 'neck-holding' phenomenon in the global semiconductor industry and the impact of the 'chip war' in the IoT industry, as well as various international situations and the current situation, Waytronic always insists on providing engineers with quick voice and intelligent IoT application solutions, shortening product development cycles. With the goal of meeting and exceeding the expectations of customer engineers, we are dedicated to providing high-quality voice solutions and the most optimal BOM to customer engineers.

Sales Engineer
Understanding specific customer needs and familiar with customer applications.

Solution engineer
In-depth understanding of customer application requirements to provide efficient application and high-quality voice solutions, as well as optimal BOM.

FAE
Comprised of experienced senior engineers with industry expertise and provide one-on-one/multiple-on-one technical support services.

More
Chips can provide customers' products with richer resources and more personalized functions.

Fast
When designing a product, various functional interfaces such as sensor, expandable button and display can be directly accessed, allowing customer engineers to focus more on product feature and experience design. This facilitates a quick implementation of the selection, prototype, and mass production process, thereby shortening the product development cycle.

Good
Quality and performance compared to competing products have improved by 30%. A team of three consisting of sales representatives, field application engineers, and product managers are available 24/7 for service. Quick samples can be provided within 24 hours.

Cost
Can partially/full substitute MCU usage, simplifying product's integrated BOM to reduce cost for customers.

Service advantage

Rapidly develop, sample, and deliver according to customer demands

- Senior technical after-sales team
- Enjoy team pre-sales, sales, and after-sales services
- Free sample production
- VIP Customer Service Hotline
- One-on-one online communication
- Remote Online Teaching Guidance

Sample	Delivery	Customization	Service
Quick sampling, free voice production in 1 working day. We can provide dozens of voice tones for customers to create their own samples for free, and also provide burning tools.	Timeliness rate reaches 98.83%, with the capability to deliver 500K orders within 5 days. Each delivery has an intelligent scheduling arrangement to strictly monitor the duration of each production process, ensuring quality while also managing customer delivery deadlines.	Exclusive service team follows up, 1 day for evaluation, 5 days for sample delivery, and 15 days for mass production.	VIP customers receive one-on-one professional customer service with continuous tracking. Exclusive service includes one-on-one online communication and remote online teaching team providing full technical support.

Product advantage

Provide industry-leading products and comprehensive product solutions to address diverse product requirements of our customers.

Stable chip performance	Strong resistance to ESD/EFT interference
Supports multiple application scenarios	Industrial, consumer, and toy grade
Powerful	Supports input and output expansion of IO ports, LED column scan display, button column, and sensor expansion
Develop Simple	Standardize Functions, users only need to make a simple call to create professional products.

Rich product line	Diverse chip types, multiple features, wide range of voice seconds, wide adaptation range
Product lifecycle is long	Chip lifecycle is more than 5-10 years
Seamless Product Replacement	Chip iteration upgrades can be compatible with and replace older chips without requiring any modifications from the customers. It also supports OTA upgrades.
Chip compatible with high	Different voice length and audio quality requirements, capable of supporting direct multi-chip solutions compatible replacement for different series of chips.

Application Area

Shenzhen Waytronic Electronic Co., Ltd. is a high-tech company dedicated to the research of voice technology, the design of voice product solutions, control, software and hardware design. Its business scope mainly involves telephone recording, automotive electronics, multimedia, home security communication, household appliances, medical equipment, industrial automation control, toys and interactive consumer products. It is also an outstanding voice chip manufacturer, engaging in research on voice chips and the development of peripheral circuits. We provide customized and executed voice product development plans for customers with special needs, completing a series of services including product research and development, testing, sound processing, and practical application guidance.

- Automatic door
- Industrial automation control
- Automatic lighting system
- Toys
- Pet supplies
- Automotive electronics
- Security alarm
- Smart home
- Fitness equipment
- Small household appliances
- Medical equipment
- Consumer electronics
- Intelligent parking system
- Voice recorder
- Video doorbell
- Automotive dashboard
- Shared equipment

HONORS &PARTNER

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70+

70+ Copyright & Patent Certificates

Playback Class

Series	Model	Communication Interface	Audio Output	Capacity (seconds)	Sampling Rate	Package
WTN6	WTN6XXX-8S	single line/double line	DAC/PWM	6s/20s/40s/80s/170s	6K~32K	SOP8
WT588F	WT588FXXX-8S	single line/double line	DAC/PWM	170s/340s/680s	6K~32K	SOP8
WT588F	WT588FXXX-16S	single line/double line UART	DAC/PWM	1600s~6400s	6K~32K	SOP16
WT588S	WT588SXX-16S	single line/double line	DAC/PWM	4M~128Mbit	6K~32K	SOP16

Playback Class —— Industrial-grade Voice Chip

Series	Model	Communication Interface	Audio Output	Operating Voltage	Capacity (seconds)	Sampling Rate	Package
WTV	WTVXXX-8S	single line/double line/UART/IIC	DAC/PWM	2.4-3.6V	120-890	8K~44.1K	SOP8
WTV	WTVXXX-P(QFN)	single line/double line/UART/IIC	DAC/PWM	2.4-5.2V	120-890	8K~44.1K	QFN32
WT2003H	WT2003HXX-16S	single line/double line/UART	DAC/PWM	2.4-5.2V	380-890	8K~44.1K	SOP16
WT2003H	WT2003HXX-24SS	single line/double line/UART	DAC/PWM	2.4-5.2V	380-890	8K~44.1K	SSOP24
WT2003H	WT2003HXX-32N	single line/double line/UART	DAC/PWM	2.4-5.2V	380-890	8K~44.1K	QFN32
WT2000T	WT2000T-32N	UART/IIC	DAC	2.4-5.5V	380-890	8K~44.1K	QFN32
WT2000T	WT2000T-52N	UART/IIC	DAC	2.4-5.5V	380-890	8K~44.1K	QFN52
WT2605C	WT2605X-32N/24SS	UART	DAC	3.0-5.0V	/	8K~44.1K	QFN32 SSOP24

High-power Voice Chip

Series	Model	Communication Interface	Audio Output	Capacity (seconds)	Sampling Rate	Package
WTN6 Series	WTN6040FP-14S	single line/double line	directly drive 1~3W speaker	40s	6K~32K	SOP14
WT588F Series	WT588F02BP-14S	single line/double line	directly drive 1~3W speaker	170s	6K~32K	SOP14

Voice and firmware download and update standard solution

Update Methods	Model	Update Interface	Maximum Capacity	Update File Types	Operating Voltage	Synthetic Audio Mode
On-board update	WTN6040F-8S	SPI interface	99KByte	bin(voice)	2.2V-5.5V	lower computer software/ web end
	WT588F02B-8S	SPI interface	220KByte	bin(voice)	2.4V-5.5V	
	WT2003H Series	UART interface	external 128M Flash	bin(program+voice)	2.4V-5.2V	
	WTV Series	UART interface	976KByte	bin(program+voice)	2.4V-3.6V	
	WT2000T Series	UART interface	external 128M Flash	bin(program+voice)	2.4V-5.5V	
PC replacement	WT2003H4+FLASH	USB interface	external 128M Flash	MP3/WAV	2.4V-5.2V	customer audio source / our company provides web synthesis
	WT2003H4+TF	USB interface	external 32G TFcard	MP3/WAV	2.4V-5.2V	
	WT2605X+TF	USB interface	external 32G TFcard	MP3/WAV	3.0V-5.0V	
	WT2000T Series	UART interface	external 128M Flash	bin(program+voice)	2.4V-5.5V	
U-disk replacement	WT2003H4	UART controls USB interface	external 128M Flash	MP3	2.4V-5.2V	
	WT2605X	UART controls USB interface	external 128M Flash	MP3	3.0V-5.0V	
	WT2000T Series	UART interface	external 128M Flash	bin(program+voice)	2.4V-5.5V	
MCU replacement	WT588E02B-8S	SPI interface	220KByte	bin(voice)	2.4V-5.5V	
	WT2003H	UART interface	220KByte	MP3	2.4V-5.2V	
	WT2003H+FLASH	UART interface	external 128M Flash	MP3	2.4V-5.2V	
	WT2605X+FLASH	UART interface	external 128M Flash	MP3	3.0V-5.0V	
	WT2605X+TF	UART interface	external 32G TFcard	MP3	3.0V-5.0V	
	WT2000T Series	UART interface	external 128M Flash	bin(program+voice)	2.4V-5.5V	
	WTVXXX-8S	UART interface	/	bin(voice)	2.4V-3.6V	
Bluetooth replacement	WT2605C	Bluetooth	external 128M Flash	MP3	3.0V-5.0V	

Extend Voice Chip

Series	Model	IO Port	Communication Interface	Audio Output	E²ROM	Key Scan	Capacity (seconds)	Drive	Package
WTV Series	WTVXXX-P	17 IO extensions infrared distance measurement RGB dimming	IIC/UART	10bit_DAC	16Kbyte	8*4	380/890	LED:8*10	QFN32
WT2003H Series	WT2003HP8-QFN32	20	UART	16bit_DAC	16K	8*4	100/350	LED:8*10	QFN32
WT2000T Series	WT2000T-QFN32	20	UART	16bit_DAC	20K	8*10	380/1800	LCD:4*12	QFN32
WT2000T Series	WT2000T-QFN52	40	UART	16bit_DAC	20K	8*20	380/1800	LCD:4*32	QFN52
WT588F Series	WT588F02KD-24SS	19	UART	16bit_DAC	256bit	8*2	170	LED:8*10	TSSOP24

Selection Table

Multimedia Chip - Industrial Grade

Series	Model	Communication Interface	Audio Output	Picking Up Sound Method	Audio Format	Audio Bitrate
WT2605 Series	WT2605-24SS	UART	DAC	analog signal、MIC	PCM\MP3	16K-320Kbps
	WT2605C-24SS	UART	DAC	analog signal、MIC	PCM\MP3	16K-320Kbps
	WT2605C-32N	UART	DAC	analog signal、MIC	PCM\MP3	16K-320Kbps
WT2003H Series	WT2003HXX-16S	single line double line/UART	DAC/PWM	analog signal、MIC	PCM\MP3	8K-320Kbps
	WT2003HXX-24SS	single line double line/UART	DAC/PWM	analog signal、MIC	PCM\MP3	8K-320Kbps
	WT2003HXX-32N	single line/ double line/UART	DAC/PWM	analog signal、MIC	PCM\MP3	8K-320Kbps

Multi-channel mixing chip

Series	Model	Communication Interface	Audio Output	Storage Method	Mixing Channel	Package
WT Internal Mixing	WTV380\890	UART/Single line/Double line/IIC	PWM/DAC	internal memory：380-890S	2channels	SOP8/QFN32
	WTV600	UART/Single line	PWM/DAC	external flash:4-128M	16channels	SSOP24
	WT2003HX	UART/ingle line/Double line	PWM/DAC	internal memory:380-890S external flash:4-128M TFcard:32M-32G	2channels	SOP16/QFN32
Internal and External Mixing	WT2003HX	UART/ingle line/Double line	PWM/DAC	internal memory:380-890S external flash:4-128M	one internal + one external channel	SOP16/QFN32
	WTR	UART/Single line	PWM/DAC	internal memory:96S external flash:4-128M	one internal + one external channel	SOP16/SSOP24

Recording Chip

Series	Model	Communication Interface	Audio Output	Single-chip Recording Duration	Sampling Rate	External Storage	Recording Method
WT588F Series	WT588F02A-16S	Keypad/Single-Line	DAC/PWM	60S (can store fixed voice in advance)	8-16K	flash:4M~128M	Circuit/MIC
WTR Series	WTR096A-16S/24SS	Keypad/Single-Line	DAC/PWM	100S (can store fixed voice in advance)	8-16K	flash:4M~128M	Circuit/MIC
WT2003H Series	WT2003HX-16S/24SS	UART/Keypad/ Single-Line	DAC/PWM	180S/360S (can store fixed voice in advance)	8-24K	flash:4M~128M TF/U-disk:128M~32G	Circuit/MIC
WT2605 Series	WT2605X B02/B03 /B04/B05	UART/Keypad	DAC/PWM	380S-890S	8-44.1K	flash:4M~128M TF/U-disk:128M~32G	Circuit/MIC
WT2000T Series	WT2000T-QFN32N/52N	UART/Keypad	DAC	180S/360S/720S	8-44.1K	flash:4M~128M TF/U-disk:128M~32G	Circuit/MIC

Bluetooth Chip

Series	Model	Communication Interface	Audio Output	Bluetooth Function	Operating Voltage	Package
WT2605 Series	WT2605C-32N	UART/keypad	DAC Stereo	Bluetooth 5.1 BR/EDR/BLE	3.0V-5.0V	QFN32
	WT2605C-24SS	UART/keypad	DAC Stereo	Bluetooth 5.1 BR/EDR	3.0V-5.0V	SSOP24
	WT2605D-32N	UART/keypad	DAC Stereo	Bluetooth 5.3 BR/EDR/BLE	3.0V-5.0V	QFN32
	WT2605D-24SS	UART/keypad	DAC Stereo	Bluetooth 5.3 BR/EDR	3.0V-5.0V	SSOP24
	WT2605-24SS	UART/keypad	DAC Stereo	Bluetooth 5.1 BR/EDR	3.0V-5.0V	SSOP24
WT2801 Series	WT2801A-24SS	UART	None	Bluetooth 5.1 BLE	3.0V-5.0V	SSOP24
	WT2801A-32N	UART	无	Bluetooth 5.1 BLE	3.0V-5.0V	QFN32

Voice recognition chip

Series	Model	Recognition Distance	Recognition Rate	Number of Word Entries	Language	Package	Customization Function
WTK6900H	WTK6900H-A	3	85%	40	Chinese、English	SSOP24 QFN32	customizable command words IO port control function PWM output
	WTK6900H-C	5	90%	80	Chinese、English	SOP16/SSOP24 QFN32	
WTK6900F	WTK6900F-C	8	95%	300	multiple global languages such as Chinese, English, Japanese, etc.	SSOP24	
WTK6900G	WTK6900G-M	8	95%	150	Chinese、English	SSOP24	

Memory

Series	Model	Capacity (BIT)	Operating Voltage	Power Consumption	Package	Operating Temperature
WT25QXX Series	WT25Q16X-8S	16M	2.4~3.6V	<1ua	SOP8 (150mil)	-40~85°
	WT25Q32X-8S	32M	2.4~3.6V	<1ua	SOP8 (150mil)	-40~85°
	WT25Q64X-8S	64M	2.4~3.6V	<1ua	SOP8 (208mil)	-40~85°
	WT25Q128X-8S	128M	2.4~3.6V	<1ua	SOP8 (208mil)	-40~85°

Selection Table

Power Amplifier Chip

Parameters	WT8509	WT9110B	WT8623	WT8673
Type	AB/D	D	D	D
Channels	Single channel	Single channel	Single channel	DAC/PWM
Input Audio Type	DAC/PWM	DAC/PWM	DAC/PWM	DAC/PWM
Input Method	single–ended/differential	Single–ended/differential	Single–ended/differential	Single–ended/differential
Package	ESOP8 (grounding of bottom heat dissipation required)	ESOP8 (grounding of bottom heat dissipation required)	ESOP16 (grounding of bottom heat dissipation required)	ESOP16 (grounding of bottom heat dissipation required)
Recommended Power Supply Range	2.5–8.5V	6–14.5V	6–16V	6–21V
Maximum Output Power	8.5V 4R 8.5W	14.5V 4R 28W	16V 4R 32W	21V 4R 64W
Speaker Configuration	4R 8.5W	4R 28W	4R 32W	4R 64W
On/Off Amplifier Control	High for on Low for off	High for on Low for off	High for on Low for off	High for on Low for off
Static Current	≦4.6mA	When it's 9V ≦17mA Typical≦10mA	≦15mA Typical≦10mA	≦15mA Typical≦10mA
Shutdown Current	≦0.1uA	/	≦50uA	≦50uA
ESD Voltage (HBM)	±4000	±2000	±2000	±2000
ESD Voltage (MM)	±400	±300	±200	±200

Parameters	WT1312	WT4890	WT8002	WT8302	WT8871
Type	PWM	AB	AB	D	AB/D
Channels	Single channel	Single channel	Single channel	Single channel	Single channel
Input Audio Type	PWM	DAC/PWM	DAC	DAC/PWM	DAC
Input Method	Differential	Single–ended/differential	Differential	Single–ended/differential	Differential
Package	SOT23–6	MSOP8	SOP8	SOP8/MSOP8	ESOP8 (grounding of bottom heat dissipation required)
Recommended Power Supply Range	2–5V	2.2–5V	2.2–5V	2.5–5V	2–5V
Maximum Output Power	5V 4R 2.3W	5V 8R 1W	5V 4R 2.4W	5V 4R 2.9W	5V 2R 5W/5V 4R 3W
Speaker Configuration	4R 2.3W	8R 1W	4R 2.4W	4R 2.9W	2R 5W/4R 3W
On/Off Amplifier Control	/	High for on, low for off	Low for on, high for off	High for on, low for off	Low for on, high for off
Static Current	≦150uA Typical≦100uA	≦10mA Typical≦5mA	≦10mA	≦4mA	≦10mA Typical≦6mA
Shutdown Current	≦3uA Typical≦1uA	≦2uA Typical≦0.1uA	≦1uA	≦0.1uA	≦2uA Typical≦0.8uA
ESD Voltage (HBM)	±2000	discharge of 100pF through a 1.5KΩ resistor	2000	±4000	3000
ESD Voltage (MM)	±200	discharge of 200–240pF through a 0Ω resistor	200	±400	250

Sensor

Series	Model	Type	Communication Interface	Power Consumption	Distance	Operating Voltage	Package
WTU Series	WTU201F2	Infrared sensing	IO/UART	10UA Approximately	10CM–100CM	DC3.0V~5.5V	SOP8/Module
	WTU506F8	Ultrasonic sensing	UART	30UA Approximately	30CM–350CM	DC3.0V~5.5V	Module
	WTU609F4	Microwave Sensing	IO/UART	30UA Approximately	Adjustable within 100cm	DC3.3V	Module (new)

Driver Chip

Series	Model	Control Mode	Maximum Driving Points	Rank	Operating Voltage	Package
LCD Display	WT0021	3/4-wire SPI	128 points	32X4	2.4~5V	SSOP48
	WT0022	3-wire SPI	128 points	32X4	3~5V	SSOP48
	WT0023	2-wire IIC	128 points (16 keys)	16X8	2.4~5V	SOP28
	WT0024	3-wire SPI	192points	24X8	2.4~5V	LQFP44
LED Display	WT0031	2-wire IIC	128 points	8X16	2.4~5V	SOP28
	WT0032	3-wire SPI	70points	10X7,13X4	2.4~5V	SOP28
	WT0033	2-wire IIC	70points	10X7,13X4	2.4~5V	SOP32
	WT0034A	3-wire SPI	128 points	8X16	2.4~5V	SOP32
	WT0035	2-wire IIC	32points	8X4	2.4~5V	SOP16

New Product – WTR096
Series Chip Resource Introduction

Chip Model	Type	Bit Number	Clock Frequency	Storage Capacity	Voice Seconds	PWM Playback	Software DAC	Hardware DAC	Number Port	External Crystal Oscillator	EXTINT	ADC	Comparator	Recording	MIDI	SPI Master	SPI Slaver	I2C	UART	IR 38K	Touch
WTR096A–16S	FLASH	16bit	16MHZ	1.5M	80s/16k	Yes	Yes	Yes	10	Yes	2	4CH	1CH	Yes	16 CH	Yes	NO	NO	NO	NO	Yes
WTR096A–28SS	FLASH	16bit	16MHZ	1.5M	80s/16k	Yes	Yes	Yes	21	Yes	2	8CH	3CH	Yes	16 CH	Yes	Yes	Yes	Yes	Yes	Yes

1. Compared to traditional voice chips, WTR096 has a 16–bit DAC, which allows for higher sound reproduction quality.

2. WTR096 has a wide range of IO ports that can be used for various customized functions.

3. WTR096 can connect to an external crystal oscillator to achieve precise timing and clock–related functions. (Our company has used WT588F to create a clock calendar function that automatically calculates leap years and leap months).

4. WTR096 supports mixing functions, allowing up to 10 audio channels to be mixed and played simultaneously.

5. WTR096 supports up to 8 channels of AD acquisition, which can be used for battery level checking, AD key expansion, and other functions.

6. WTR096 has a set of SPI interfaces that can be used for external storage expansion, such as SPI, and can also be used for communication using the SPI interface.

7. WTR096 has IIC and UART interfaces, providing rich interface options compared to traditional voice chips. It allows for flexible use of various standard protocols and can communicate directly with microcontrollers without being limited to traditional one–wire or two–wire interfaces.

8. WTR096 has a built–in 38K–IR feature, allowing for customization of various infrared–related functions.

9. WTR096 has a built–in touch function, which can be directly used for products that do not require high touch sensitivity.

10. WTR096 is an erasable chip, allowing for arbitrary replacement of internally stored data. Additionally, WTR096 is a recording chip that provides high–quality recording effects and superior sound reproduction quality.

SPI IIC UART | IR 38K | RTC

16bit DAC | 12bit ADC | Mic | MIDI
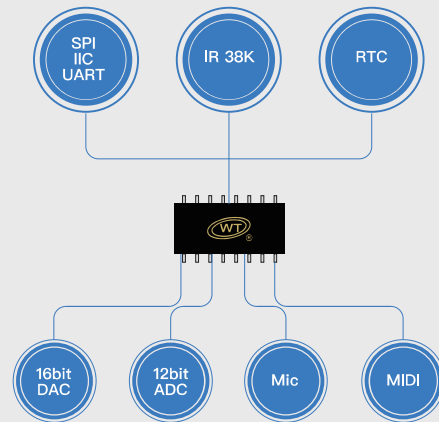
Application scenarios: voice changer, loud–speaker, alarm clock, parrot mimicry, high–end doorbell, electronic medicine box, dashboard, small household appliances, etc.

New Product — WT2000T
Series Chip Resource Introduction

Chip Model	Type	Bit Number	Clock Frequency	Storage Capacity	Voice Duration	DAC	SNR of DAC	ADC	USB	TF	PWM	UART	IIC	SPI	ADC	LCD	IO	INT	EQ	RTC	Operating Temperature
WT2000T–QFN32	FLASH	32bit DSP	160MHZ	2–16M	170s–1800S/8k	16bit*2	Single–ended output ≥97dB Differential output ≥100 dB	1个16bit SNR≥88 dB	1	1	4	3	1	2	16 channels /10bit	4*16	40	12	multi–band	1	–40℃ to +85℃
WT2000T–QFN52				1.5M																	

Client has always had some requirements that our existing chips cannot meet. In order to enrich our product line and create more value for our customers, the company has constantly innovated and launched the WT2000T chip to better improve the Waytronic product family.

Product Features:

1. The WT2000T adopts a highly integrated 32–bit SOC with a maximum frequency of 160M, powerful computing capabilities, and built–in hardware DSP for sound processing.

2. Dual–channel, high–quality, low–cost voice chip with dual 16–bit DAC output. The signal–to–noise ratio is ≥97dB for single–ended output and ≥100dB for differential output. It can be used for high–fidelity and high–performance products, supporting customer audio encryption.

3. Memory mode: Supports internal 2–16M built–in space, external support for flash: 4–256M, TF card: 128M–256G, U disk: 128M–256G.

4. Peripheral hardware driver: Supports PWM and 40 IO input and output configurations.

5. Flexible communication interface supporting various standard protocols: One–wire serial port, Two–wire serial port, UART, IIC, SPI, etc.

6. Integrated LCD hardware driver display interface, supporting up to 4 * 32, 5 * 31, 6 * 30 dots, better meeting customer needs, reducing customer product costs and simplifying BOM.

7. Supports high–quality recording, with higher sound restoration. The WT2000T chip with a 16–bit ADC sampling and ≥88dB signal–to–noise ratio can be positioned as a high–end chip for recording products.

8. 16–channel 10–bit ADC acquisition, wider application areas for the product.

9. EQ: Multiband EQ supports online adjustment and supports variable speed and pitch adjustment, while supporting seamless looping of sound.

10. Integrated internal adjustable LDO, supporting internal voltage detection for more accurate ADC detection.

11. Supports mixing function, it can mix up to 16 audio channels for simultaneous playback.

12. Supports internal MIDI decoding for better audio effects.

40 IO ports | Industrial–grade chip | LCD 4X32 | LED 8X10 | RTC

32DSP

Multi–band EQ | 16bit ADC | DAC SNR>97dB | Multi–channel MIDI
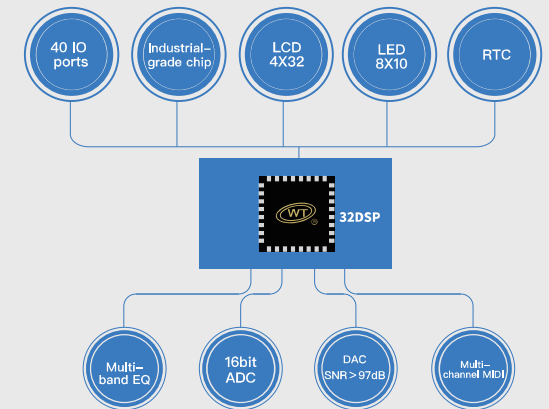
Application scenarios:
LCD: clock products, therapy devices, medical products.
LED drive display: digital tube scan display, display instruments, high–end small household appliances.
Support multi–channel MIDI playback: high–end doorbells, electronic keyboards, children's toy pianos, high–end electronic lock mixing, sleep instrument multi–channel mixing, communication broadcast products, low–speed car alarms, children's voice–changing toys, parrot mimicry toys.
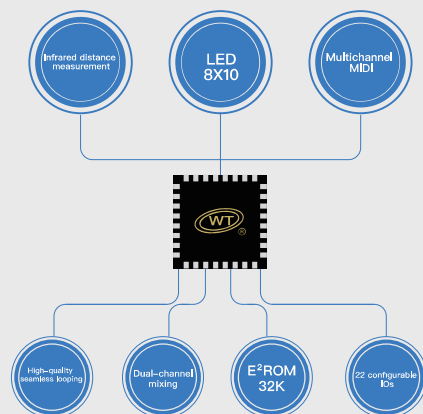
New Product —WTVxxxB
Series Chip Resource Introduction

Chip Model	Type	Kernel	Clock Frequency	Storage Capacity	Voice Seconds	PWM—AP	TF	SPI	PWM	UART	IIC	ADC	IO	INT	EQ	RTC	Operating Temperature
WTVxxxB-QFN32	FLASH	32bit DSP	160MHZ	2-16M	170s-1800S/8k	8Ω0.5W	1	1	4	2	1	10bit	22	12	multi-band	1	-40℃ to +85℃
WTVxxxB-SOP8	FLASH	32bit DSP	160MHZ	2-16M	170s-1800S/8k	4Ω0.8W	0	0	2	1		10bit	4	4	multi-band	1	-40℃ to +85℃

To enrich the product line and create more value for customers, the company continuously innovates and improves its competitive edge by reducing costs in the WTV version and launching the WTVxxxB chip to enhance the Waytronic product family.

Product Features:

1. WTVxxxB utilizes highly integrated 32-bit SOC with a maximum frequency of 160M, providing strong computing power. It also has a built-in hardware DSP to efficiently process sound and industrial-grade quality.

2. WTVxxxB integrates a built-in power amplifier for direct speaker output: 8-ohm 0.5W and 4-ohm 0.8W.

3. Memory options include internal 2-16M built-in space and external support for flash (4-256M) and TF card (128M-256G) in V-Can proprietary format.

4. Supports PWM and up to 20 IO input/output configurations for external peripherals.

5. Flexible communication interfaces supporting various standard protocols: 1-wire and 2-wire serial, UART, I2C, SPI, etc.

6. Supports LED digital display driving.

7. Supports internal MIDI decoding for enhanced sound effects.

8. 16-channel 10-bit ADC acquisition expands application areas.

9. EQ: Supports multi-band EQ with online adjustment capability, pitch and speed adjustment, and seamless sound looping.

10. Internal integrated adjustable LDO with support for internal voltage detection for precise ADC measurement.

11. Supports mixing function for simultaneous playback of two audio channels.

Application scenarios:

LED driver display: digital tube scanning display, instrument display, high-end small appliances;
Supports multichannel MIDI playback: high-end doorbell, electronic organ, children's toy piano, high-end electronic lock mixing, sleep instrument multi-channel mixing, call broadcasting products, car low-speed alarm, children's voice-changing toys, parrot mimicry toys.

New Product — WT2605C
Series Chip Resource Introduction

Chip Model	Type	Kernel	Frequency	Storage Capacity	DAC	ADC	TF	SPI	PWM	UART	IIC	Audio ADC	IO	INT	EQ	RTC	Operating Temperature
WT2605C-QFN32	FLASH	32bit DSP	240MHz	4-8M	16-bit DAC SNR >= 95dB	16-bit ADC SNR >= 90dB	1	1	4	2	1	10bit	27	12	Multi-band	1	-40℃ to +85℃
WT2605C-TSSOP24	FLASH	32bit DSP	240MHz	4-8M	16-bit DAC SNR >= 95dB	16-bit ADC SNR >= 90dB	1	1	2	1	1	10bit	4	4	Multi-band	1	-40℃ to +85℃

In order to enrich the product line, meet more applications, create more value for customers, and continuously innovate to improve the competitiveness of the company's products, we are introducing the WT2605C chip to further enhance the Waytronic product family.

1. Bluetooth version: 5.3+BR+EDR+BLE

2. Supports Bluetooth protocols: a2dp\avctp\avdtp\avrcp\hfp\spp\smp\att\gap\g att\rfcomm\sdp\l2cap

3. Supports Bluetooth audio decoding: SBC, AAC

4. Supports Bluetooth music playback lyrics/album cover push

5. Supports Bluetooth calling, caller ID, phonebook/call log push

6. Supports Bluetooth BLE data transmission, PHY rate 2M

7. Supports BLE master role, slave role, master/slave integrated mode

8. Supports SPI-Flash, TF card, U disk

9. Supports FAT, FAT32 file system

10. Control mode: customized AT communication interface, default baud rate 115200

11. Power on default does not play; has BUSY status indication, BUSY is high level when playing (configurable)

12. Audio output mode: DAC stereo output

13. Audio can be copied between external Flash, TF card, and U disk. Functions such as updating programs can be performed through TF cards and U disks.

14. Supports high-quality audio formats for voice, with beautiful sound, such as .MP3, .WAV formats, from 8kbps to 320kbps

15. Can support up to 128Mbit Flash, 32G TF card, and 32G U disk.
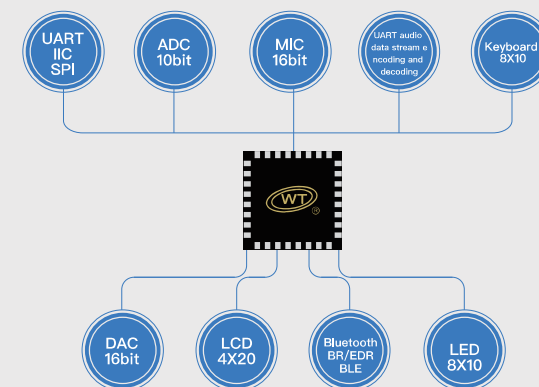
Application scenarios: two and three-wheeled electric vehicle dashboard, car dashboard, fitness equipment, medical devices, Bluetooth speakers, smart home appliances, shared devices, smart homes, white noise speakers, white noise headphones.

Playback Class

Playback Class

Store the sound files that need to be played in the voice chip, and the MCU controls the voice chip to play the required sound files through the IO port instructions. Currently, there are two series: WTN6 and WT588F. WTN6 series belongs to OTP, once the sound files are burned, they cannot be replaced. WT588F series belongs to flash series, after burning the sound files, they can be erased and re-burned, so they can be rewritten again. (The sound files that need to be stored in the voice chip can be made through our company's website). WTN6 currently has 6 seconds, 20 seconds, 40 seconds, 80 seconds, 170 seconds. WT588F series has 170 seconds, 340 seconds, 680 seconds. It can also be externally connected to flash (4M–128Mbit) to store more sound files.

1:1 dimensions Chip Package Diagram

WTN6XX-8S
4.9*6mm

WT588FXX-8S
4.9*6mm

WT588FXX-16S
9.9*6mm

WT588SXX-16S
9.9*6mm

Chip specifications

Playback Class

| Series	Model	Communication Interface	Audio Output	Capacity (seconds)	Sampling Rate	Package
WTN6	WTN6XXX–8S	single line/double line	DAC/PWM	6s/20s/40s/80s/170s	6K~32K	SOP8
WT588F	WT588FXXX–8S	single line/double line	DAC/PWM	170s/340s/680s	6K~32K	SOP8
	WT588FXXX–16S	single line/double line UART	DAC/PWM	1600s~6400s	6K~32K	SOP16
WT588S	WT588SXX–16S	single line/double line	DAC/PWM	4M~128Mbit	6K~32K	SOP16

Function Features

WTN6 Series
- Voperating voltage: 2.4V~5.5V
- Standby current is less than 5ua
- Maximum support for 224 voice addresses
- 12–bit PWM, direct drive 8Ω/0.5W speaker; DAC audio output, can be connected to power amplifier
- Control modes: digital pulse, key, single–wire serial port, two–wire serial port
- Voice capacity: 6 seconds, 20 seconds, 40 seconds, 80 seconds, 170 seconds.

WT588F Series
- Working voltage 2.4~5.5V; standby current less than 5ua. Operating
- 16–bit PWM/DAC output, can directly drive 8R 0.5W speaker.
- Customers can change the internal voice content of the chip through MCU or supporting downloader.
- Supports one–wire serial port, two–wire serial port (UART and IIC communication).
- Supports 5000 address segments. Has hardware SPI interface, UART interface, built–in comparator and other interfaces. Can customize various functions for customers.

Application Solution

Floor Cleaning Robot Application Solution Diagram

LED

Side Brush/Roller Brush

Obstacle Detection

MCU Control System

WT588F WTN6

Speaker

Drive Motor
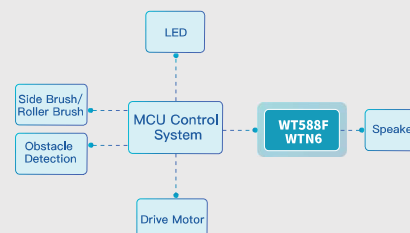
Electronic Lock Application Diagram

LED

Motor driver IC

MCU

WT588F WTN6

Speaker

Touch IC

Typical Applications

Electronic Lock

Floor–cleaning Robot

Blood Pressure Monitor

Doorbell

Massage Gun

Humidifier
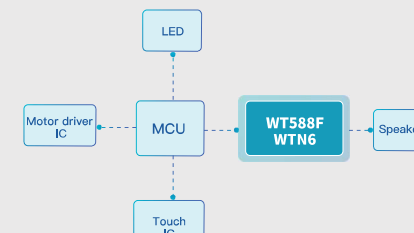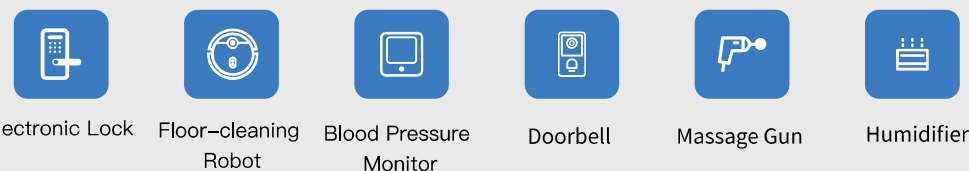
Industrial-grade Voice Chip

The required sound to be played is stored in a voice chip or external storage device, and the MCU controls the voice chip playback through IO port instructions/IIC/UART/AT communication. Currently, there are three series available: WTV, WT2003H, and WT2605. The WTV/WT2003H series belong to the flash series and support on-board voice updates (the .bin file needs to be created through our company's website and stored in the voice chip). The WTV series has a duration of 380/890 seconds, while the WT2003H series has a duration of 350/900 seconds. They can also be expanded with a flash/TF card/USB drive and support on-board serial port voice updates as well as voice updates through the USB interface. The WT2605 series single-chip can have approximately 10 seconds of built-in prompt sound, supports the expansion of flash/TF card/USB drive, allows audio file copying between drive letters, and supports seamless loop playback of MP3 audio.

1:1 dimensions Chip Package Diagram

WTVXXX-SOP8	WT2003HXX-16S	WT2003HXX-24SS	WTVXXX-P(QFN)	WT2003HXX-32N(QFN)	WT2605X-32N(QFN)
4.9*6mm	9.9*6mm	8.65*6mm	4*4mm	4*4mm	4*4mm

Chip Specifications

Series	Model	Communication Interface	Audio Output	Operating Voltage	Capacity (seconds)	Sampling Rate	Package
WTV	WTVXXX-8S	single line/double line/UART/IIC	DAC/PWM	2.4-3.6V	120-890	8K~44.1K	SOP8
	WTVXXX-P(QFN)	single line/double line/UART/IIC	DAC/PWM	2.4-5.2V	120-890	8K~44.1K	QFN32
WT2003H	WT2003HXX-16S	single line/double line/UART	DAC/PWM	2.4-5.2V	380-890	8K~44.1K	SOP16
	WT2003HXX-24SS	single line/double line/UART	DAC/PWM	2.4-5.2V	380-890	8K~44.1K	SSOP24
	WT2003HXX-32N	single line/double line/UART	DAC/PWM	2.4-5.2V	380-890	8K~44.1K	QFN32
WT2000T	WT2000T-32N	UART/IIC	DAC	2.4-5.5V	380-890	8K~44.1K	QFN32
	WT2000T-52N	UART/IIC	DAC	2.4-5.5V	380-890	8K~44.1K	QFN52
WT2605C	WT2605X-32N/24SS	UART	DAC	3.0-5.0V	/	8K~44.1K	QFN32 SSOP24

Function Features

WTV Series

- Operating voltage：SOP8：2.4V-3.6V、QFN20\QFN32：2.4V-5.2V
- Standby current：less than 3uA in deep sleep, less than 30uA in idle sleep
- 10-bit high-precision AD sampling, capable of driving 8R 0.5W speakers directly
- Control mode supports single-wire, double-wire, UART, IIC serial control
- Voice capacity: 380 seconds, 890 seconds, 1800 seconds
- Rich expansion functions, support voice playback, digital tube drive, LED drive, infrared ranging, key scanning, RGB drive

WT2003H Series

- Operating voltage : 2.4V-5.2V
- Supports high-quality audio formats for voice, including MP3 and Wav
- Standby current: less than 3uA in deep sleep, less than 30uA in idle sleep
- 10-bit high-precision AD sampling, capable of driving 8R0.5W speaker directly
- Control methods support one-wire, two-wire, UART
- Built-in capacity of the voice chip: 350 seconds, 900 seconds Supports external Flash with a maximum capacity of 128Mbit,
- TF card with 32G capacity, and U-disk with 32G capacity (TF and U-disk support FAT or FAT32 format)

Application Solution

Body Fat Scale Application Plan Diagram

APP data upload

Bioelectrical Impedance Analysis Measurement — MCU — WTV — Amplifier — Speaker / Digital Tube Display

Battery Detection
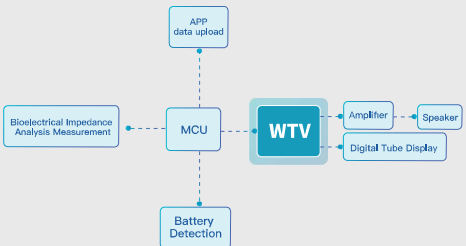
Car Low-speed Alarm Application Diagram

MCU — WT2003H — Amplifier — Speaker

CAN bus module
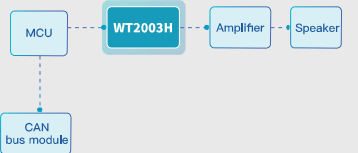
Typical Applications

Floor Scrubber   Body Fat Scale   Low Speed Car Alarm   Sleep Monitor   Elevator   Traffic Equipment

High-power Voice Chip

High-power Voice Chip

Compared with traditional playback voice chips, the main adjustment is to adjust the output circuit. The voice chip can output a power of up to 3W without the need for an additional power amplifier chip to directly drive an 8R3W speaker. Two series have been launched, WTN6040FP-14S and WT588F02BP-14S. They are 40 seconds and 170 seconds of voice respectively. Both chips can repeatedly erase and replace the internal voice files of the chip through the programmer.

1:1 dimensions Chip Package Diagram
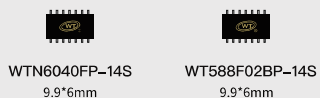
WTN6040FP-14S
9.9*6mm

WT588F02BP-14S
9.9*6mm

Chip Specifications

Series	Model	Communication Interface	Audio Output	Capacity (seconds)	Sampling Rate	Package
WTN6 Series	WTN6040FP-14S	single line/ double line	directly drive 1~ 3W speaker	40s	6K~32K	SOP14
WT588F Series	WT588F02BP-14S	single line/ double line	directly drive 1~ 3W speaker	170s	6K~32K	SOP14

Function Features

WTN6 Series

- Operating voltage:2.4V~5.5V
- Standby current is less than 5ua
- Supports a maximum of 224 voice address segments
- 12-bit PWM, direct drive 8R, 1~3W speaker
- Control mode: Digital pulse, button, one-line serial port, two-line serial port
- Voice capacity: 40 seconds

WT588F Series

- Operating voltage 2.2~5.5V; standby current less than 5ua
- 16bit PWM/DAC output, can directly drive 8R, 1~3W speakers
- Customers can replace the internal voice content of the chip through MCU or supporting programmer.
- Supports one-line serial port and two-line serial port (UART and IIC communication)
- Support 5000 address segments
- It has hardware SPI interface, UART interface, built-in comparator and other interfaces. Various functions can be customized for customers.

Application Solution

433 doorbell application diagram

433 module

button MCU

WTN6 WT588F

SPK

LED
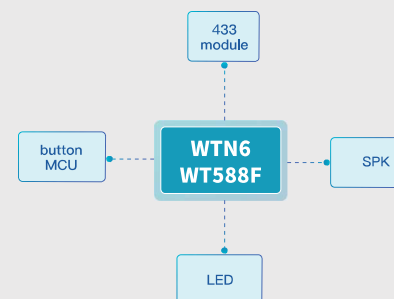
Typical Applications

Fire alarm   Doorbell   Car horn   Medical products   Turnstile   Floor scrubber

Voice and firmware download and update standard solution

Voice and firmware download and update standard solution

On-board update: Reserve the voice chip burning port on the PCBA, and update the voice file in the voice chip through our programmer.

PC update: If the USB interface is reserved on the product, it can be connected to the computer through the USB interface. A simulated U disk will be displayed on the computer, and the voice files that need to be replaced can be replaced into the simulated U disk (i.e. voice chip). You can also replace the MCU program file into a simulated USB flash drive to upgrade the MCU program in the product.

U disk (TF card) update: A USB interface can be reserved on the product. You can put the sound files that need to be replaced into the U disk. Insert the U disk into the product. The MCU can realize the voice chip to replace the voice files in the U disk through serial port instructions. The chip originally contains voice files. You can also put the program files of the microcontroller into a USB flash drive. The voice chip will send the MCU program files in the USB flash drive to the MCU through UART/SPI/IIC and other protocols according to the MCU's requirements, so that the MCU program can be upgraded.

MCU update: You can use MCU to write data through the serial port to erase and replace the original voice of the voice chip. (SPI/UART/IIC, etc.)

Bluetooth update: WT2605C can be connected to the mobile phone through Bluetooth, and the voice files in the mobile phone can be replaced into the WT2605 chip through Bluetooth. The program files of the microcontroller can also be sent to the MCU through WT2605 Bluetooth, using protocols such as UART/SPI/IIC, and according to the requirements of the MCU, so that the MCU program can be upgraded.

1 : 1Chip Package Diagram

WTN6040F-8S	WT2003H-16S	WT2605X-32N (QFN)	WT2000T-32N(QFN)	WT2000T-52N(QFN)	WTVXXX
4.9*6mm	9.9*6mm	4*4mm	4*4mm	6*6mm	4*4mm

Chip Specifications

Update Methods	Model	Update Interface	Maximum Capacity	Update File Types	Operating Voltage	Synthetic Audio Mode
On-board update	WTN6040F-8S	SPI interface	99KByte	bin(voice)	2.2V-5.5V	lower computer software/ web end
	WT588F02B-8S	SPI interface	220KByte	bin(voice)	2.4V-5.5V	
	WT2003H Series	UART interface	external 128M Flash	bin (program+voice)	2.4V-5.2V	
	WTV Series	UART interface	976KByte	bin (program+voice)	2.4V-3.6V	
	WT2000T Series	UART interface	external 128M Flash	bin (program+voice)	2.4V-5.5V	
PC replacement	WT2003H4+FLASH	USB interface	external 128M Flash	MP3/WAV	2.4V-5.2V	customer audio source / our company provides web synthesis
	WT2003H4+TF	USB interface	external 32G TFcard	MP3/WAV	2.4V-5.2V	
	WT2605X+TF	USB interface	external 32G TFcard	MP3/WAV	3.0V-5.0V	
	WT2000T Series	UART interface	external 128M Flash	bin (program+voice)	2.4V-5.5V	
U-disk replacement	WT2003H4	UART controls USB interface	external 128M Flash	MP3	2.4V-5.2V	
	WT2605X	UART controls USB interface	external 128M Flash	MP3	3.0V-5.0V	
	WT2000T Series	UART interface	external 128M Flash	bin (program+voice)	2.4V-5.5V	
MCU replacement	WT588E02B-8S	SPI interface	220KByte	bin(voice)	2.4V-5.5V	
	WT2003H	UART interface	220KByte	MP3	2.4V-5.2V	
	WT2003H+FLASH	UART interface	external 128M Flash	MP3	2.4V-5.2V	
	WT2605X+FLASH	UART interface	external 128M Flash	MP3	3.0V-5.0V	
	WT2605X+TF	UART interface	external 32G TFcard	MP3	3.0V-5.0V	
	WT2000T Series	UART interface	external 128M Flash	bin (program+voice)	2.4V-5.5V	
	WTVXXX-8S	UART interface	/	bin(voice)	2.4V-3.6V	
Bluetooth replacement	WT2605C	Bluetooth	external 128M Flash	MP3	3.0V-5.0V	

Function Features

WT588E Series
- Operating voltage 2.4~5.5V; standby current less than 5ua
- 16bit PWM/DAC output, can directly drive 8R 0.5W speakers
- Supports 6K~32Khz WAV files
- Customers can replace the internal voice content of the chip
- online through the MCU or supporting programmer.
- Support analog SPI communication
- Supports 224 segments of addresses and can be expanded if there are more needs
- The chip has built-in 220k byte storage (excluding main control program)

WT2605C (Bluetooth) Series
- Support FAT, FAT32 file system
- Control mode: AT command communication, default baud rate 115200 (configurable)
- Audio output mode, sample default DAC output
- Audio can be copied to each other through plug-in
- Flash, TF card, U disk, and three types of peripheral devices. Through TF card, U disk, update program and other functions
- Supports high-quality voice audio formats, (8kbps~320kbps) beautiful sound, MP3, WAV formats
- Can support up to 128Mbit Flash, 32G TF card and 32G U disk
- High-power IO driving capability, up to 64mA can be directly driven

Application Solution

Voice update diagram	Voice and firmware update plan diagram
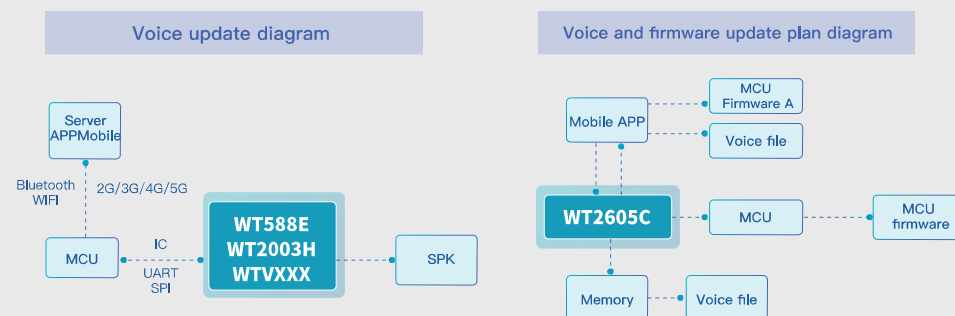
Typical Applications
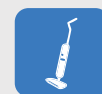
Floor scrubber · Voice prompter · Electric toothbrush · Electronic lock · Car dashboard · Broadcasting system

Extend Voice Chip

Extend Voice Chip

The sensor expansion voice chip is a new solution system formed by voice chip combined with sensor algorithm. It has functions such as IO port expansion, RGB light control, and infrared distance sensing. The infrared sensing supports distance setting. In addition, it has low power consumption and sound Good sound quality and flexible control methods (IIC, one-line, two-line, etc. control methods) are also the characteristics of this product.

1:1 Chip Package Diagram

WTVXXX-P
4X4X0.75mm

WT2003H4-24SS
8.65*6mm

WT2000T-32N(QFN)
4*4mm

WT2000T-52N(QFN)
6*6mm

Chip Specifications

Series	Model	IO Port	Communication Interface	Audio Output	E²ROM	Key Scan	Capacity (seconds)	Drive	Package
WTV Series	WTVXXX-P	17 IO extensions infrared distance measurement RGB dimming	IIC/UART	10bit_DAC	16Kbyte	8*4	380/890	LED:8*10	QFN32
WT2003H Series	WT2003HP8-QFN32	20	UART	16bit_DAC	16K	8*4	100/350	LED:8*10	QFN32
WT2000T Series	WT2000T-QFN32	20	UART	16bit_DAC	20K	8*10	380/1800	LCD:4*12	QFN32
	WT2000T-QFN52	40	UART	16bit_DAC	20K	8*20	380/1800	LCD:4*32	QFN52
WT588F Series	WT588F02KD-24SS	19	UART	16bit_DAC	256bit	8*2	170	LED:8*10	TSSOP24

Function Features

B014—IO port expansion

- B014 can control voice playback, stop, volume adjustment and other functions
- Three-way hardware PWM output settings, supporting RGB light breathing mode
- Supports two communication modes, IIC and UART, and can customize various functions for customers
- 20 IO port inputs and output can be set at will ports
- Configuration of deep sleep and related wake-up sources Settings of play Busy

B004—Infrared ranging

- B004 can control voice playback, stop, volume adjustment and other functions
- Self-learning of infrared ranging, customers can self-learn distance according to actual application scenarios
- The setting of infrared ranging rate can be adjusted by the customer according to the actual power consumption.
- Multiple IO output expansion, IO controls more peripheral devices 3-channel hardware PWM output settings, customers can use the appropriate pulse width and frequency according to the actual situation
- Supports two communication modes: IIC and first-line serial port, and can customize various functions for customers

B001—Nigital tube driver WTV series

- Can control voice playback, stop, volume adjustment and other functions
- Supports dynamic display scanning control and can directly drive up to 10-bit 8-segment digital tubes (the number of digital tubes can be flexibly adjusted)
- Based on 8*4 matrix keyboard scanning, it can detect 32 keys and realize functions such as short press, short press to lift, and long press to lift.
- Multi-channel IO output expansion (can reduce the number of digital tubes and increase IO output according to needs)
- Supports PWM dimming of unit digital tubes to ensure consistency in display brightness of each digital tube
- Customers can replace the internal voice content of the chip through the supporting programmer
- Supports two communication modes: IIC and UART serial port, and can customize various functions for customers

B001—Nigital tube driver WT2003H series

- Can control voice playback, stop, volume adjustment and other functions
- Support dynamic display scanning control, directly drive 5-digit 8-segment digital tube
- Based on 8*4 matrix keyboard scanning, 32 key detection can be achieved
- Customers can replace the internal voice content of the chip through the supporting programmer
- Supports UART serial communication mode and can customize various functions for customers

Application Solution

IO expansion diagram

Fingerprint module

Anti-pry detection (input IO)

Button

Main controller

SCL
SDA
INT

WTVXXX-P

RGB light

LED backlight

OLED LCD screen

Motor circuit
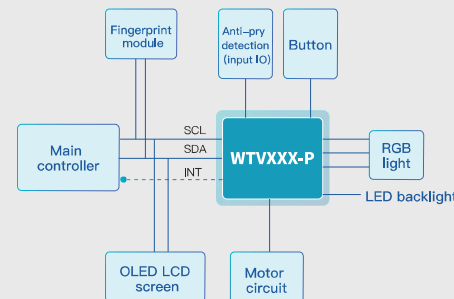
Infrared ranging solution

Fingerprint module

Infrared transceiver circuit

Main controller

SCL
SDA
INT

WTVXXX-P

R light
G light
B light

LED backlight

OLED screen

Motor circuit

Typical Applications

Alarm clock

Forehead thermometer

Smart water cup

Rice cooker

Skipping rope machine

parking system
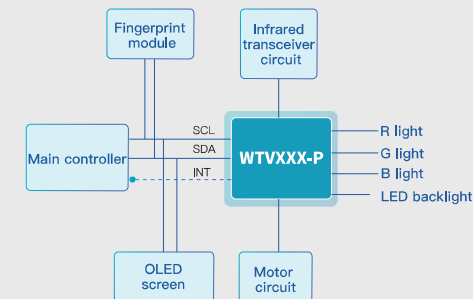
Multimedia Chip – Industrial Grade

Multimedia Chip – Industrial Grade

Our company develops a multimedia codec chip that integrates an internal 0.5W digital power amplifier. The internal integrated data storage space can store the sounds that need to be played into the voice chip or external memory. The MCU commands /IIC/UART/ through the IO port, and can also It is played through the serial port data stream to the chip. It has simple control and supports MP3 audio format with high compression rate. It can also support PCM format. It also supports MIC pickup and converts it into a standard MP3 format digital signal and sends it through the serial port and uploads it to other devices. Currently, there is WT2003H , WT2605, and WT2605C three series; different chips correspond to different application scenarios, which can well meet customers' product needs. Our company's concept of making complexity simple allows customers to quickly get started using our multimedia codec chips.

1 : 1 Chip Package Diagram

WT2003HXX–16S	WT2605–24SS	WT2003HXX–24SS	WT2605C–32N	WT2003HXX–32N
9.9*6mm	8.65*6mm	8.65*6mm	4*4mm	4*4mm

Chip Specifications

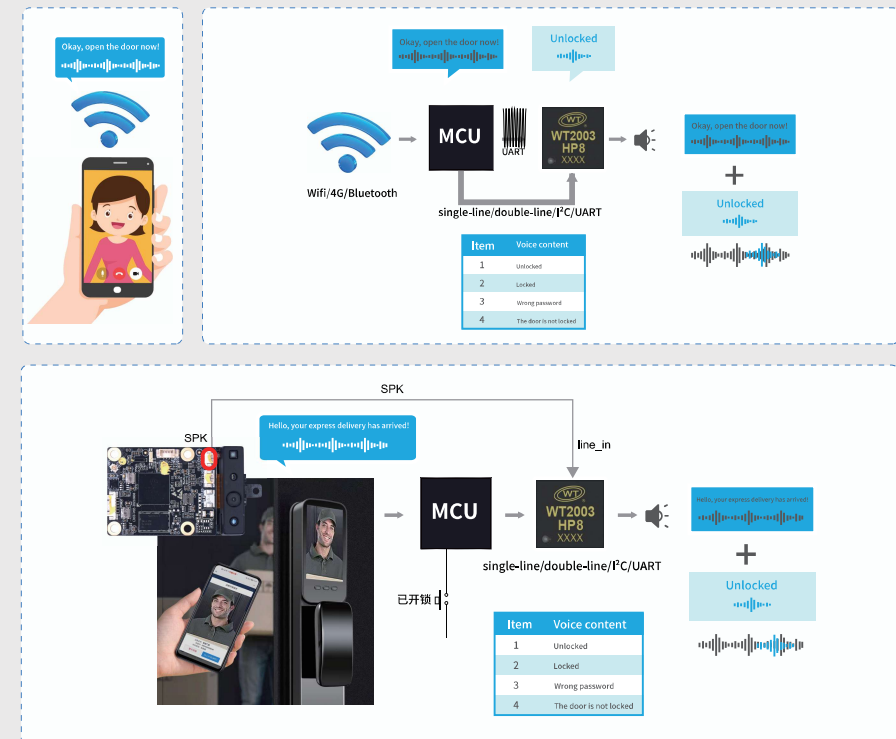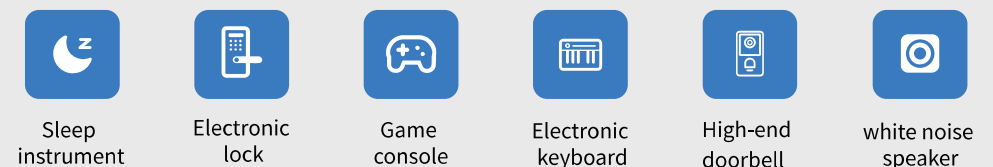| Series	Model	Communication Interface	Audio Output	Picking Up Sound Method	Audio Format	Audio Bitrate
WT2605 Series	WT2605–24SS	UART	DAC	analog signal、MIC	PCM\MP3	16K-320Kbps
	WT2605C–24SS	UART	DAC	analog signal、MIC	PCM\MP3	16K-320Kbps
	WT2605C–32N	UART	DAC	analog signal、MIC	PCM\MP3	16K-320Kbps
WT2003H Series	WT2003HXX–16S	single line double line/UART	DAC/PWM	analog signal、MIC	PCM\MP3	8K-320Kbps
	WT2003HXX–24SS	single line double line/UART	DAC/PWM	analog signal、MIC	PCM\MP3	8K-320Kbps
	WT2003HXX–32N	single line/ double line/UART	DAC/PWM	analog signal、MIC	PCM\MP3	8K-320Kbps

Function Features

WT2003H Series
- Working voltage: 2.4V–5.2V
- Supports high–quality voice decoding formats, supports MP3 and Wav formats, audio sampling rate 8K–44.1K
- Standby current, deep sleep is less than 3uA, in–situ sleep is less than 30uA
- Pick up 16–bit audio ADC sampling, and the output can directly drive 8R 0.5W speakers and DAC output
- Use simple control method to support first line, second line and UART
- Voice chip built–in capacity: 350 seconds, 900 seconds
- Supports up to 128Mbit external Flash

WT2605 Series
- Working voltage: 2.4V–5.2V
- Supports high–quality voice decoding formats, supports MP3 and Wav formats, audio sampling rate 8K–44.1K
- Pick up 16–bit audio ADC sampling and output 16–bit DAC output
- Support UART using simple control method
  It can support up to 128Mbit external Flash, 32G TF card and
- 32G U disk (TF and U disk support format FAT or FAT32)

Application Solution

Streaming media diagram

Server
Mobile APP

Bluetooth WIFI   2G/3G/4G/5G

MCU

Single–line
Double–line
UART

WT2003H
WT2605C

SPK

MIC

Typical Applications

Walkie talkie	Treadmill	Physiotherapy bed	Broadcast megaphone	Heating table	Robot
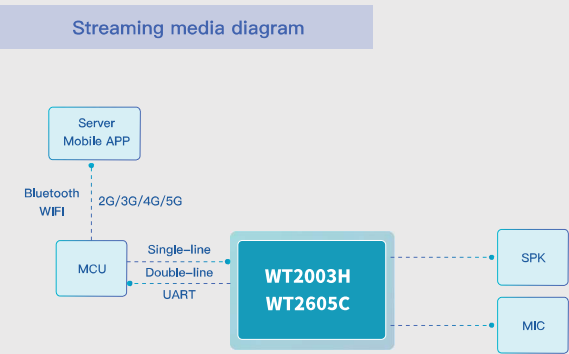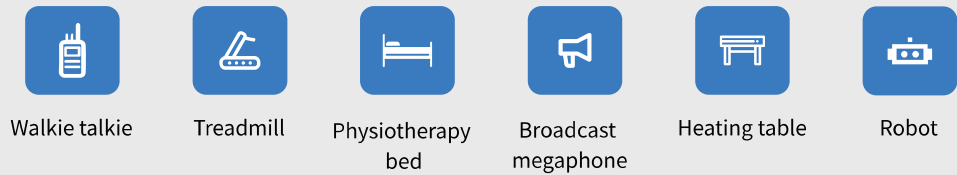
Multi-channel Mixing Chip

Multi-channel Mixing Chip

Waytronic has developed different mixing type chips for different market application scenarios: multi-channel internal voice mixing and playback, supporting up to 16 channels of voice mixing: internal voice + external audio signal input mixing and playback. Voice storage can be a single chip or can support external flash, TF card, etc. The control method is flexible, you can customize button control, and you can also control and play different voice mixes through the serial port.

1 : 1 Chip Package Diagram

WTV890
4X4X0.75mm

WTV380
4.9*6mm

WT2003HX-16S
9.9*6mm

WTV600-24SS
8.65*6mm

Chip Specifications

Series	Model	Communication Interface	Audio Output	Storage Method	Mixing Channel	Package
WT Internal Mixing	WTV380\890	UART/Single line/Double line/IIC	PWM/DAC	internal memory: 380-890S	2channels	SOP8/QFN32
	WTV600	UART/Single line	PWM/DAC	external flash:4-128M	16channels	SSOP24
	WT2003HX	UART/ingle line/Double line	PWM/DAC	internal memory:380-890S external flash:4-128M TFcard:32M-32G	2channels	SOP16/QFN32
Internal and External Mixing	WT2003HX	UART/ingle line/Double line	PWM/DAC	internal memory:380-890S external flash:4-128M	one internal + one external channel	SOP16/QFN32
	WTR	UART/Single line	PWM/DAC	internal memory:96S external flash:4-128M	one internal + one external channel	SOP16/SSOP24

Function Features

WT2003H Series

- Working voltage: 2.4V-5.2V
- Supports voice high-quality audio formats, supports MP3 and Wav formats, audio sampling rate 8K-44.1K
- Standby current, deep sleep is less than 3uA, in-situ sleep is less than 30uA
- 10bit high-precision AD sampling, 16-bit DAC, 16-bit digital power amplifier can directly drive

- 8R 0.5W, 4 ohm 0.8W, supports speakers
- Control mode supports single-line, double-line, and UART
- Voice chip built-in capacity: 350 seconds, 900 seconds
- Supports up to 128Mbit external Flash

Application Solution

Electronic lock scheme diagram

Okay, open the door now!

Wifi/4G/Bluetooth

MCU · UART · WT2003 HP8 XXXX

single-line/double-line/I²C/UART

Okay, open the door now!

Unlocked

Item	Voice content
1	Unlocked
2	Locked
3	Wrong password
4	The door is not locked

SPK

Hello, your express delivery has arrived!

line_in

MCU · WT2003 HP8 XXXX

已开锁 中

single-line/double-line/I²C/UART

Unlocked

Item	Voice content
1	Unlocked
2	Locked
3	Wrong password
4	The door is not locked

Typical Applications

Sleep instrument

Electronic lock

Game console

Electronic keyboard

High-end doorbell

white noise speaker

Recording Chip

Recording Chip

Record the sound files into the chip through MIC or line to realize the on-site recording function. Now there are WT588F series, WTR series, WT2003H series, and WT2605 series. The recording content can be realized from 1 minute to 2160h. You can also store part of the sound in the chip in advance, which can be fixed and not overwritten by deletion, and can be used for product prompt sounds.

1 : 1 Chip Package Diagram

WT588F02A-16S	WTR096A-16S	WTR096A-28SS	WT2003HX-16S	WT2003HX-24SS	WT2605X-32N(QFN)	WT2000T-32N(QFN)	WT2000T-52N(QFN)
9.9*6mm	9.9*6mm	10*6mm	9.9*6mm	8.65*6mm	4*4mm	4*4mm	6*6mm

Chip Specifications

Series	Model	Communication Interface	Audio Output	Single-chip Recording Duration	Sampling Rate	External Storage	Recording Method
WT588F Series	WT588F02A-16S	Keypad/Single-Line	DAC/PWM	60S (can store fixed voice in advance)	8-16K	flash:4M~128M	Circuit/MIC
WTR Series	WTR096A-16S/24SS	Keypad/Single-Line	DAC/PWM	100S (can store fixed voice in advance)	8-16K	flash:4M~128M	Circuit/MIC
WT2003H Series	WT2003HX-16S/24SS	UART/Keypad/Single-Line	DAC/PWM	180S/360S (can store fixed voice in advance)	8-24K	flash:4M~128M TF/U-disk:128M~32G	Circuit/MIC
WT2605 Series	WT2605X B02/B03/B04/B05	UART/Keypad	DAC/PWM	380S-890S	8-44.1K	flash:4M~128M TF/U-disk:128M~32G	Circuit/MIC
WT2000T Series	WT2000T-QFN32N/52N	UART/Keypad	DAC	180S/360S/720S	8-44.1K	flash:4M~128M TF/U-disk:128M~32G	Circuit/MIC

Function Features

WTR096 Series

- Working voltage: 2.0V~5.5V, standby current less than 5uA
- 16-bit PWM pure audio output, can directly drive 8Ω/0.5W speakers, 16-bit DAC audio output, can be connected to an external power amplifier
- Support UART, IIC, one-line serial port control and button control
- Recording sampling rate: supports up to 16Khz. Fixed voice (reserved voice) sampling rate: maximum support 32Khz
- Microphone with automatic gain control (supports line recording)
- The chip has built-in recording for 100 seconds and can be connected to 4M~128Mbit flash
- Both the chip main control program and flash data can be erased and reprogrammed

WT2003H Series

- Maximum support for external 128Mbit Flash
- Control method: one-line serial port, (UART or button control can be customized)
- Support high-quality recording, recording sampling supports 8K\12K\16K\20K\24K
- Working voltage: 2.4~5.2V
- Sleep current is less than 5uA
- Support PWM output (8R 0.5W direct push speaker), DAC output
- High-power IO driving capability, up to 64mA can be directly driven

Application Solution

Pet feeder application diagram

Water release · Clock · WIFI · Show · Button · MCU main system · MIC · WT588F WTR096 WT2003H WT200T · SPK · Food delivery
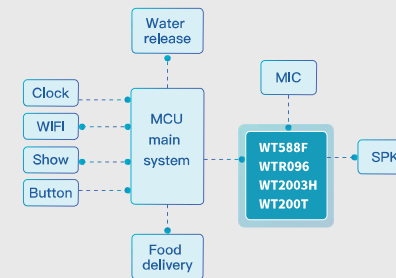
Recording pen application diagram

Button · MIC · Clock Crystal oscillator · MCU · WT2003H · SPK · card/U disk
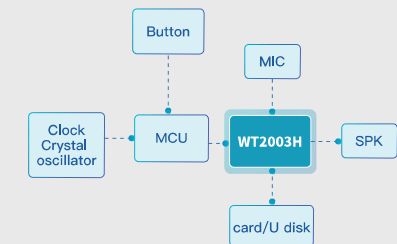
典型应用

Recording pen · Megaphone · Recording toys · Pet feeder · Greeting card · Teaching equipment

Bluetooth Chip

Bluetooth Chip

WT series Bluetooth chips have the characteristics of low cost, low power consumption, high reliability and strong versatility. URAT serial communication control supports Bluetooth audio playback, Bluetooth calls and BLE data transmission functions. It also supports local audio playback (MP3/WAV). format), supports SPI-Flash, TF card, and U disk as storage, with functions such as file index playback, insertion, single loop, all track loop, random play, 31-level volume adjustment, etc., and can support up to 128Mbit external Flash , 32G TF card and 32G USB flash drive.

1 : 1 Chip Package Diagram

WT2605-24SS
8.65*6mm

WT2605C-32N(QFN)
4*4mm

Chip Specifications

Series	Model	Communication Interface	Audio Output	Bluetooth Function	Operating Voltage	Package
WT2605 Series	WT2605C-32N	UART/keypad	DAC Stereo	Bluetooth 5.1 BR/EDR/BLE	3.0V-5.0V	QFN32
	WT2605C-24SS	UART/keypad	DAC Stereo	Bluetooth 5.1 BR/EDR	3.0V-5.0V	SSOP24
	WT2605D-32N	UART/keypad	DAC Stereo	Bluetooth 5.3 BR/EDR/BLE	3.0V-5.0V	QFN32
	WT2605D-24SS	UART/keypad	DAC Stereo	Bluetooth 5.3 BR/EDR	3.0V-5.0V	SSOP24
	WT2605-24SS	UART/keypad	DAC Stereo	Bluetooth 5.1 BR/EDR	3.0V-5.0V	SSOP24
WT2801 Series	WT2801A-24SS	UART	None	Bluetooth 5.1 BLE	3.0V-5.0V	SSOP24
	WT2801A-32N	UART	无	Bluetooth 5.1 BLE	3.0V-5.0V	QFN32

Function Features

WT2801 Series

- Bluetooth version: 5.1BLE
- Supports all packet types of GFSK and π/4 DQPSK
- Support BLE data transparent transmission

- Support PHY rate 1M, 2M
- Support master, slave, master/slave integrated mode
- Control mode: AT command communication, default baud rate 115200

Function Features

WT2605D Series

- Bluetooth version: 5.3+BR+EDR+BLE
- Support Bluetooth protocol: a2dp\avctp\avdtp\avrcp\hf-p\spp\smp\att\gap\gatt\rfcomm\sdp\l2cap
- Support Bluetooth audio decoding: SBC, AAC
- Support Bluetooth BLE data transmission, PHY rate 2M
- Support master, slave, master/slave integrated mode
- Support SPI-Flash, support TF card, U disk
- Support FAT, FAT32 file system

- Control mode: AT command communication, default baud rate 115200
- It does not play by default after power-on; it has BUSY status indication and BUSY is high level when playing (configurable)
- Audio output mode, DAC stereo output
- Audio can be copied to each other through plug-in Flash, TF card, U disk, and three types of peripheral devices. Through TF card, U disk, update program and other functions
- Supports high-quality voice audio formats, (8kbps~320kbps) beautiful sound, MP3, WAV formats
- Can support up to 128Mbit Flash, 32G TF card and 32G U disk

Application Solution

WT2605C scheme diagram

UART serial port control		
Button control	WT2605C-AT-L009 **Bluetooth module**	TF/U disk audio
Audio output		Bluetooth music playback LRC lyrics display
		Number display number broadcast
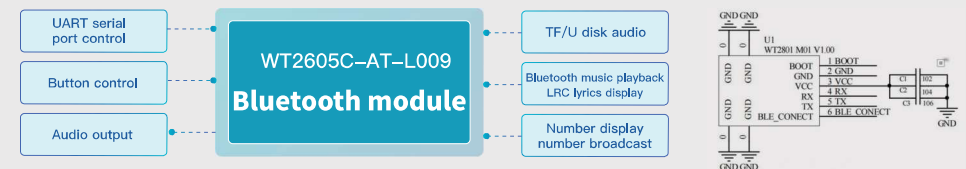
Typical Applications

Car dashboard Smart appliances Fitness equipment shared device Eye massager Early education machine

Voice Recognition Chip

As a local speech recognition chip, the WTK6900 series chip can realize speech recognition, command word self-learning, speech noise reduction and other functions, and has strong echo cancellation and environmental noise suppression capabilities. This series of chip solutions also supports multiple global languages such as Chinese, English, and Japanese, and can be widely used in home appliances, lighting, toys, wearable devices, industry, automobiles and other product fields to achieve voice interaction and control and various intelligent voice solution applications.

1 : 1 dimensions Chip Package Diagram

WTK6900H-C-24SS	WTK6900H-C(QFN)	WTK6900F-C-24SS	WTK6900G-24SS
8.65*6mm	4*4mm	8.65*6mm	8.65*6mm

Chip Specifications

Series	Model	Recognition Distance	Recognition Rate	Number of Word Entries	Language	Package	Customization Function
WTK6900H	WTK6900H-A	3	85%	40	Chinese、English	SSOP24 QFN32	
	WTK6900H-C	5	90%	80	Chinese、English	SOP16/SSOP24 QFN32	customizable command words IO port control function PWM output
WTK6900F	WTK6900F-C	8	95%	300	multiple global languages such as Chinese, English, Japanese, etc.	SSOP24	
WTK6900G	WTK6900G-M	8	95%	150	Chinese、English	SSOP24	

Function Features

WTK6900H-C
● No crystal oscillator required, U disk upgradeable, 5-meter far field reliable identification

WTK6900F-C
● High cost performance, multilingual, large capacity, self-learning 20 items

WTK6900G-C
● Entries can be customized and replaced, strong anti-noise ability, reliable recognition in 8-meter far field, and good performance

Application Solution

Scheme diagram

	WTK6900		MCU
🎤 🔊	RXD TXD		TXD RXD

Memory

WT25Q series flash is highly compatible with our company's voice chips. Currently, it has a full range of 16M~128M, with two packaging forms: SOP8 (150mil) and SOP8 (208mil).

1 : 1 dimensions Chip Package Diagram

WT25Q16X-8S	WT25Q32X-8S	WT25Q64X-8S	WT25Q128X-8S
4.9*6mm	4.9*6mm	4.9*6mm	5.2*8mm

Chip Specifications

Series	Model	Capacity (BIT)	Operating Voltage	Power Consumption	Package	Operating Temperature
WT25QXX Series	WT25Q16X-8S	16M	2.4~3.6V	<1ua	SOP8 (150mil)	-40~85°
	WT25Q32X-8S	32M	2.4~3.6V	<1ua	SOP8 (150mil)	-40~85°
	WT25Q64X-8S	64M	2.4~3.6V	<1ua	SOP8 (208mil)	-40~85°
	WT25Q128X-8S	128M	2.4~3.6V	<1ua	SOP8 (208mil)	-40~85°

Typical Applications

Lamps	Range hood	Fan	Massage chair	Adult products	Air conditioner

Power Amplifier Chip

Power Amplifier Chip

There are many types of power amplifier chips, ranging from 1W to 64W. The power amplifier chips currently promoted are all debugged with our voice chips, and have the highest sound quality matching.

1 : 1 dimensions Chip Package Diagram

SOT23-6	MSOP8	ESOP8/SOP8	ESOP16
1.5*2.82mm	4.75*2.9mm	5.8*4.7mm	5.8*9.8mm
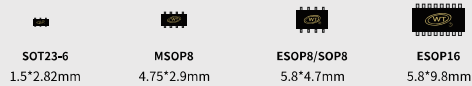
Chip Specifications

Parameters	WT8509	WT9110B	WT8623	WT8673
Type	AB/D	D	D	D
Channels	Single channel	Single channel	Single channel	DAC/PWM
Input Audio Type	DAC/PWM	DAC/PWM	DAC/PWM	DAC/PWM
Input Method	single-ended/differential	Single-ended/differential	Single-ended/differential	Single-ended/differential
Package	ESOP8 (grounding of bottom heat dissipation required)	ESOP8 (grounding of bottom heat dissipation required)	ESOP16 (grounding of bottom heat dissipation required)	ESOP16 (grounding of bottom heat dissipation required)
Recommended Power Supply Range	2.5-8.5V	6-14.5V	6-16V	6-21V
Maximum Output Power	8.5V 4R 8.5W	14.5V 4R 28W	16V 4R 32W	21V 4R 64W
Speaker Configuration	4R 8.5W	4R 28W	4R 32W	4R 64W
On/Off Amplifier Control	High for on Low for off	High for on Low for off	High for on Low for off	High for on Low for off
Static Current	≦4.6mA	When it's 9V ≦17mA Typical≦10mA	≦15mA Typical≦10mA	≦15mA Typical≦10mA
Shutdown Current	≦0.1uA	/	≦50uA	≦50uA
ESD Voltage (HBM)	±4000	±2000	±2000	±2000
ESD Voltage (MM)	±400	±300	±200	±200

Parameters	WT1312	WT4890	WT8002	WT8302	WT8871
Type	PWM	AB	AB	D	AB/D
Channels	Single channel	Single channel	Single channel	Single channel	Single channel
Input Audio Type	PWM	DAC/PWM	DAC	DAC/PWM	DAC
Input Method	Differential	Single-ended/differential	Differential	Single-ended/differential	Differential
Package	SOT23-6	MSOP8	SOP8	SOP8/MSOP8	ESOP8 (grounding of bottom heat dissipation required)
Recommended Power Supply Range	2-5V	2.2-5V	2.2-5V	2.5-5V	2-5V
Maximum Output Power	5V 4R 2.3W	5V 8R 1W	5V 4R 2.4W	5V 4R 2.9W	5V 2R 5W/5V 4R 3W
Speaker Configuration	4R 2.3W	8R 1W	4R 2.4W	4R 2.9W	2R 5W/4R 3W
On/Off Amplifier Control	/	High for on, low for off	Low for on, high for off	High for on, low for off	Low for on, high for off
Static Current	≦150uA Typical≦100uA	≦10mA Typical≦5mA	≦10mA	≦4mA	≦10mA Typical≦6mA
Shutdown Current	≦3uA Typical≦1uA	≦2uA Typical≦0.1uA	≦1uA	≦0.1uA	≦2uA Typical≦0.8uA
ESD Voltage (HBM)	±2000	discharge of 100pF through a 1.5KΩ resistor	2000	±4000	3000
ESD Voltage (MM)	±200	discharge of 200-240pF through a 0Ω resistor	200	±400	250

Application Solution

WT4890 application scheme diagram
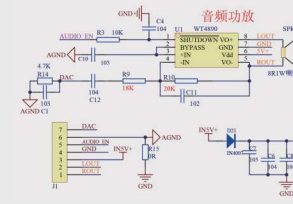
WT8673 application scheme diagram
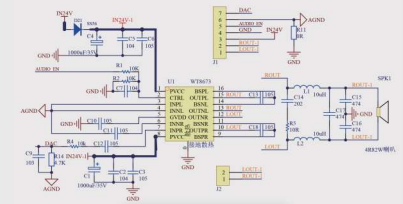
Typical Applications

Toy	Alarm	Sweeper	Electronic locks	Broadcast	Loudspeaker box

Sensor

Sensor

The MCU infrared sensor module is suitable for object detection applications. When an object enters the detection range, the infrared reflected energy will change, and the distance can be determined by detecting the change in reflection. Compared with the common infrared sensing modules on the market, this module is small in size, has an object detection distance of up to 100cm, and has very low standby power consumption, up to 12uA. Two communication methods, IO and UART, are provided for users to choose. They can quickly adjust the characteristics of each module to achieve the advantages of rapid and convenient development.

1 : 1 dimensions Chip Package Diagram

WTU201F2
4.9*6mm

Chip Specifications

Series	Model	Type	Communication Interface	Power Consumption	Distance	Operating Voltage	Package
WTU Series	WTU201F2	Infrared sensing	IO/UART	10UA Approximately	10CM-100CM	DC3.0V~5.5V	SOP8/Module
	WTU506F8	Ultrasonic sensing	UART	30UA Approximately	30CM-350CM	DC3.0V~5.5V	Module
	WTU609F4	Microwave Sensing	IO/UART	30UA Approximately	Adjustable within 100cm	DC3.3V	Module (new)

Function Features

I/O version (B004)
- DATA is connected to low level to enter the infrared ranging learning mode, the LED indicator light starts to flash, and the LED turns off and the learning is completed.
- The default infrared response rate is 500ms
- The effective output of INT pin is high level by default.

UART version (B004)
- Infrared learning mode, customers can self-learn distance according to actual application scenarios
- The setting of infrared response rate can be adjusted by the customer according to the actual power consumption.
- The INT pin is used to detect whether the signal output is high level or low level.

Function Features

B005—Ultrasonic ranging
- Using UART communication, easy to operate
- Ranging distance range 30cm–350cm
- The maximum detection angle is 45° and can work under any lighting conditions
- Not sensitive to the color of the object being measured, can detect transparent glass
- Working voltage: 3.3V–5.5V ultra–low working current, detection frequency at 1hz, detection distance 100cm, average power consumption around 80uA
- Can meet customer customization needs and support client function program upgrades

B017—Radar ranging
Using UART and IO two communication methods, it is a C–band radar transceiver with extremely low power consumption and intelligent sensing. Features of single–ended 5.8G radio frequency and C–band radar transceiver using RF CMOS technology:
- Programmable transmit power (–20dBm~1dBm) <–95dBm receiving sensitivity
- Harmonic suppression ratio: >40dBc
- Doppler frequency range: 5Hz~1.5KHz
- UART parameter setting is convenient and quick
- IO judgment is convenient and fast
- Under 1Hz working condition, the power consumption is controlled to about 30UA.

Application Solution

Electronic lock scheme diagram

Fingerprint module — Infrared transceiver circuit — Facial recognition module — Main controller — RX TX INT — WTU201F2 — Bluetooth module

Typical Applications

Automatic door | Automatic lighting system | Vehicle intelligent parking system | Smart lock | Sensor faucet | Induction prompter
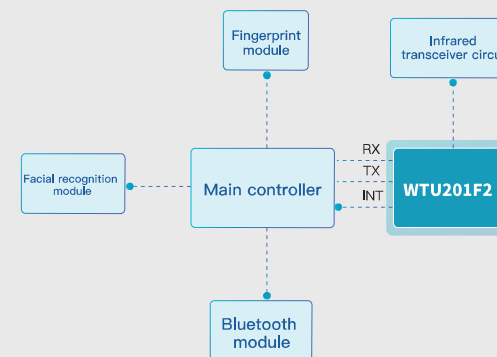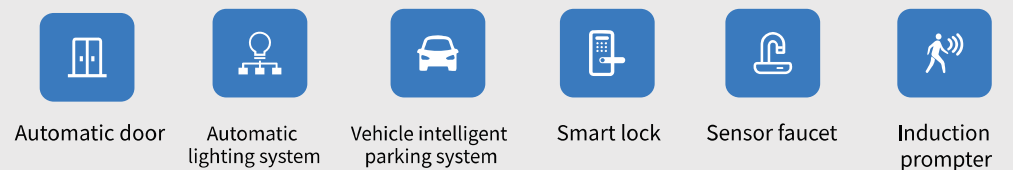
Driver Chip

Driver Chip

WT0021 is a memory-mapped and multifunctional LCD driver IC that can replace TM1621 and HT1621. Its software configuration features make it suitable for various LCD applications, including LCD modules and display subsystems. There are only 4 or 5 pins for connecting the main controller and WT0021, and WT0021 also has a power-saving command to reduce system power consumption. When combined with Vulture Innovation's standard voice chip WT2003H-16S and WT588F02B-16S chip, it only requires UART or IIC serial port control for voice playback and LCD display driving, making operation simpler.

1 : 1 dimensions Chip Package

WT0035	WT0021	WT0023	WT0033	WT0024
9.9*6mm	8.5*6.3mm	18*10mm	20.9*10.6mm	13.6*13.6mm

Chip Specifications

Series	Model	Control Mode	Maximum Driving Points	Rank	Operating Voltage	Package
LCD Display	WT0021	3/4-wire SPI	128 points	32X4	2.4~5V	SSOP48
	WT0022	3-wire SPI	128 points	32X4	3~5V	SSOP48
	WT0023	2-wire IIC	128 points (16 keys)	16X8	2.4~5V	SOP28
	WT0024	3-wire SPI	192points	24X8	2.4~5V	LQFP44
LED Display	WT0031	2-wire IIC	128 points	8X16	2.4~5V	SOP28
	WT0032	3-wire SPI	70points	10X7,13X4	2.4~5V	SOP28
	WT0033	2-wire IIC	70points	10X7,13X4	2.4~5V	SOP32
	WT0034A	3-wire SPI	128 points	8X16	2.4~5V	SOP32
	WT0035	2-wire IIC	32points	8X4	2.4~5V	SOP16

Function Features

WT0021

- Embedded 256KHz RC oscillator
- Option of 1/2 or 1/3 bias and 1/2, 1/3, or 1/4 duty cycle
- Two selectable frequencies for the buzzer
- Embedded time base generator and watchdog timer (WDT)
- Eight time base/watchdog timer clock sources
- An embedded 32x4-bit display RAM memory
- On-chip LCD driver frequency source
- Data mode and command mode instructions
- Provides a VLCD pin for adjusting LCD operating voltage
- On-chip LCD driver frequency source

WTXXX

- Multiple display modes
- 80 dots,　20SEG*4COM, 1/3 bias, 1/4 duty
- 128 dots, 16SEG*8COM, 1/4 bias, 1/8 duty
- I^2C bus communication (SDA, SCL)
- Using CMOS technology
- Optional hardware interrupt INT function, cannot be multiplexed with SEG19/K19 or SEG15/K15
- Low power standby mode, supports wake-up to normal mode with any button press under LCD ON condition.

Application Solution

WT0023 Application Diagram
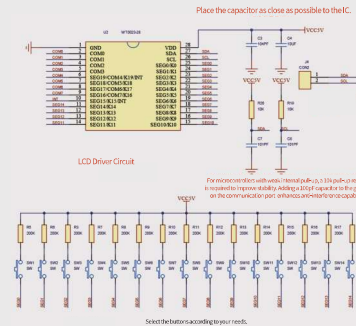
WT2003H Application Plan Diagram
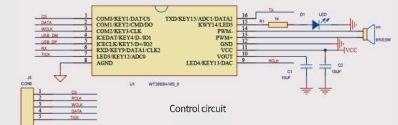
Typical Applications

Alarm clock　Home appliances　Computer　Toy　Medical equipment

Development Process

Development Process for White Noise/Sleep Machine Humidifier Project

Functional Requirements: Implement 10 buttons to control music, natural sounds (wind, rain, thunder), white noise, volume, timing, mist power adjustment; LED driver display timing; low voltage battery detection; charging status indication; charging detection. Ensure that there is no stuttering or interrupted sound playback.

| Project Initiation | Resource Selection | Function Development | Product Validation |

MCU+ regular voice chip — Traditional solution

Resource Selection:
1、Hardware I/O ports 10–20
2、Hardware PWM
3、ADC\INT
4、Program resources: Above 8K

Function Development:
1、Writing speech chip control playback program (3–4 days).
2、Writing key scanning control logic program (2 days).
3、Writing timing function software (1 day).
4、Debugging atomization output and frequency tracking function (4–5 days).
5、Battery level detection and charging detection (1–2 days).

Product Validation:
1、Function module testing and functionality verification: 3–4 days
2、Repetitive testing for improvement of non–standard issue bugs in various functions: 1–2 days

MCU+WT WT Scheme Voice Chip — Waytronic Scheme

Resource Selection:
1、Hardware: 2 IO (Input/Output) ports.
2、Program resources: 2K (2 Kilobytes) space.

Function Development:
1、Button interaction logic (3–4 days)
2、Parameter settings, serial communication (1–2 days)

Product Validation:
1.The functional modules of the voice chip have been standardized, only requiring testing of logical functions (1–2 days).

Compared to traditional solutions, our company's solution has the following advantages::
– Simpler microcontroller development.
– Significantly reduced product development cycle.
– The microcontroller has become simpler rather than complex, leading to cost reduction.

Series	Standard Function Code	Peripheral Interface	Main Function Description	Audio Output Method	Application Scenarios
WT2003 Series	A01 A02	UART communication Supports external storage devices such as TF card, USB flash drive, SPI flash, etc.	1. The voice playback supports a maximum of 65535 segments of audio storage, and the audio supports MP3 and WAV formats. 2. It supports ONEKEY button testing for next song playback. 3. Volume adjustment range is from 0 to 31 levels. 4. It supports firmware upgrade via USB and virtual USB functions, which can be used for customers to independently replace audio for debugging. 5. Operation commands include single song, full song, random loop, DAC, PWM switching, baud rate setting, and various status query commands.	DAC/PWM	Electronic lock, electric vehicle dashboard, etc.
	A03 A04	UART communication Support for external SPI Flash playback or single–chip playback.	1. The maximum supported number of audio segments for voice playback is 65535. 2. Volume adjustment is available from 0 to 31 levels. 3. Offline downloader is supported for customer self–updates, firmware version upgrades, and audio updates using .bin files. 4. Command sleep is supported to put the device into low power consumption mode (minimum: 2uA). 5. Operation commands include single–track or all–track looping, combination playback, DAC and PWM switching, baud rate setting, and various status query commands. 6. Seamless audio looping is supported. 7. Support for upper computer to create voice files.	DAC/PWM	
	A05 A06 A07 A08	Single–line/double–line single–byte communication Support external SPI flash playback or single–chip playback.	1. The maximum number of audio segments supported for voice playback is 320. 2. Volume attainment can be done in 7 levels ranging from 0 to 7. 3. Offline downloader is supported for customer self–updates, firmware version upgrades, and .bin file audio updates. 4. Default low power mode is supported, with a minimum power consumption of 2uA. 5. Operation instructions include single song playback, combination playback, DAC, PWM switching, etc. 6. Single–segment recording is supported. 7. Seamless audio loop playback is supported. 8. Upper computer support is available for creating voice content.	DAC/PWM	
	A15 A16 A17 A18	Single–line/double–line double–byte communication Supports external SPI Flash playback or single–chip playback.	1. The voice playback supports storing up to 65535 audio segments. 2. Volume can be adjusted from level 0 to level 7. 3. Support for offline downloader for customers to update firmware versions and audio files in .bin format. 4. Supports default low power mode (minimum: 2uA). 5. Operating commands include single track playback, combination playback, DAC, PWM switching, etc. 6. Supports seamless audio loop playback. 7. Supports using a PC to create voice recordings.	DAC/PWM	
	A20 A21	UART communication Supports external USB flash drive and external SPI flash playback. It also supports single–chip playback.	1. It supports a maximum of 65535 segments of audio for playback, and the audio supports MP3 format. 2. It supports copy instructions, allowing content from an external USB flash drive to be copied to the built–in flash memory. 3. It supports firmware upgrade via USB flash drive, allowing customers to independently replace and debug audio files. 4. It supports creating folders using instructions. 5. Operational instructions include DAC, PWM switching, baud rate setting, audio deletion, reading file information, and various status query instructions. 6. It supports writing audio files to the chip's built–in memory or external memory via UART.	DAC/PWM	
WTVXXX Series (extension)	B001 B002	(IIC\UART Communication)	1. Voice playback supports storage of up to 65535 audio segments, and the audio supports two formats: .mp3 and .wav. 2. Basic commands include: single track and full track loop, combination playback, address playback, and other extended applications. 3. Supports driving an 8*10 digit display and power voltage detection. 4. Built–in 32 key keyboard controller, based on 8x4 matrix keyboard scanning, supports DMA and flow control. 5. Dynamic display scanning control, directly driving various digit displays. 6. Built–in an AD data reader for button reading.	DAC/PWM	Electronic lock Floor scrubber Small household appliances Medical devices
	B004	Three communication modes are available: UART serial communication mode;IIC communication mode; One–wire communication mode.	1. Voice playback supports storing up to 222 audio segments. Audio can be in either .mp3 or .wav format. 2. Basic instructions include combination playback, volume setting, and address playback, as well as extended applications. 3. Infrared distance measurement speed and response speed can be set. 4. PWM output settings for road hardware, RGB light output mode, and 17 IO ports can be set to high or low levels. 5. Supports default low power consumption (minimum: within 5uA). 6. Infrared sensing distance can reach up to 120cm.	DAC/PWM	
	B014	(IIC communication)	1. Basic instructions: IO port input/output arbitrary settings, playback, loop playback, wake–up source settings, busy settings, storage function, and UART communication functions, etc. 2. Set 3 channels of hardware PWM output, RGB light output mode, and arbitrary settings for 20 IO ports. 3. Supports entering deep sleep mode with power consumption below 2uA. 4. IIC bus supports communication speeds at different rates, fast (10kbps–200kbps), with noise filters on the SCL/SDA input ends.	DAC/PWM	
WT2003HX Series (extension)	B003	(UART Communication)	1. Voice playback supports storing up to 65535 audio segments, and the audio formats supported are .mp3 and .wav. 2. Basic commands include single song or whole song loop, combination playback, volume setting, and address playback for extended applications. 3. Two pressure sensing chip data outputs. 4. Response time: millisecond level. 5. Pressure range: 0~300mmHg (0~400gf/cm^2). Pressure resolution: <10mmHg (0.5gF/sensor area). Minimum trigger pressure: <50mmHg (2.5gF/sensor area).	DAC/PWM	Aerosol product
	B007	(UART Communication)	1. Voice playback supports storage of up to 65535 audio segments, and audio can be in .mp3 or .wav format. 2. Basic commands include: single track or all tracks looping, combined playback, volume control, and address playback. Includes additional applications. 3. Enable seamless looping of specified tracks. 4. Voltage alert detection, settings, and notifications. 5. Supports AD data retrieval and key data requests. 6. Add storage address bit and read functionality. 7. Fogger PWM chasing frequency function.	DAC/PWM	
	B011	(UART Communication)	1. Voice playback supports storage of up to 65535 audio segments, supporting formats such as .mp3 or .wav. 2. Basic commands include single–song and full–song looping, composite playback, volume setting, and address playback. Extended applications are also available. 3. Fixed value setting for chasing frequency output/range. 4. Water level detection. 5. Voltage alarm detection, setting, and notification actions.	DAC/PWM	
WTU Series (Sensors)	B004 (Infrared Ranging)	UART、IO	1. Infrared sensing distance measurement application. 2. Operating voltage: 3.0V~5.5V. 3. Low power consumption. 4. Strong anti–interference capability. 5. Operating current: 45µA (3.3V / detecting object distance of 70cm / detection time = 0.5s). 6. Standby current: 12µA (3.3V / default test distance of 70cm / detection time = 0.5s). 7. Wide operating range, distance of 1~100cm. 8. Factory calibration. 9. Detection distance learning function. 10. Optional communication interface: UART mode or I/O mode.	/	Smart hand sanitizer Faucet Smart robot
	B005 (Ultrasonic distance measurement)	UART	1. Uses serial communication for quick start–up. 2. Measures distances from 20CM to 350CM. 3. Detection range within 40°. 4. Works in various lighting conditions, including sunlight. 5. Insensitive to color and can still detect transparent glass. 6. Operates between 3.3~5.5 volts. 7. Ultra low operational current. 8. Customizable for customer–specific requirements, and supports program upgrades, etc.	/	
	B017 (Millimeter Wave) (New Product)	UART、IO	1. Programmable transmission power (–20dBm–5dBm) 2. Reception sensitivity: –85dBm 3. Harmonic suppression ratio: >40dBc 4. Doppler frequency range: 5Hz–5.99Hz 5. Convenient and fast serial port parameter settings 6. Convenient and fast judgment 7. Power consumption control under 1m2 working condition is around 30uA.	/	

Series	Standard Function Code	Peripheral Interface	Main Function Description	Audio Output Method	Application Scenarios
WT2605C Series	L009 (Bluetooth+MP3+Phonebook) L010 (Bluetooth+Phonebook) A004 (MP3)	UART communication Supports external TF card, U disk, SPI flash and other storage devices.	1. Voice playback supports storage of up to 65535 audio segments, with support for .mp3 and .wav formats. 2. Controlled by AT commands, with two modes available: Bluetooth mode and audio mode (default is Bluetooth mode). 3. Main instructions in audio mode include: query current playback content, obtain battery percentage, OTA upgrade, voice copying, baud rate and other major features. 4. Main instructions in Bluetooth mode include: Bluetooth address, on/off, name, song push, fast forward/rewind, as well as call redialing and answering.	DAC	
	L011 (Bluetooth+MP3+ BLE+phonebook)	UART communication Supports external TF card, U disk, SPI flash and other storage devices.	1. Voice playback supports storing up to 65535 audio segments, with support for both .mp3 and .wav formats. 2. Control via AT commands, with three modes available: Bluetooth mode, audio mode, and BLE data passthrough (default is Bluetooth mode). 3. Main commands in audio mode include: querying current playback content, name and duration; obtaining battery percentage; OTA upgrade; voice copying; baud rate; and other essential functions. 4. Main commands in Bluetooth mode include: Bluetooth address; power on/off; name; song pushing; fast-forward/rewind; and call redial and answer functions. 5. Main commands in BLE data passthrough mode include: BLE transmission power; broadcast data; scanning; connection; and responding with the current status.	DAC	Car instrument Electric vehicle Bluetooth speaker Building intercom Small home appliances
	A021 (Audio Replacement) A001 (MP3, Seamless)	UART communication Supports external TF card, U disk, SPI flash and other storage devices.	1. Voice playback supports storage of up to 65535 audio segments, with support for both .mp3 and .wav formats. 2. Controlled by AT commands, it has two modes: audio mode and file download mode. 3. In audio mode, the main commands include querying the current playback content, name and duration, obtaining battery percentage, OTA upgrade, voice copying, baud rate settings, and other features. In file download mode, data can be interactively exchanged through UART serial communication to transfer files to external storage devices connected to the chip or read file content from the storage device. 4. Copying instructions are supported, enabling content from external USB devices to be copied to the built-in flash memory. 5. Remote USB upgrade and entering PC mode are supported, allowing customers to independently replace and debug audio. 6. Seamless looping playback of audio is supported.	DAC	
WT588F Series	C001 C002 C003 C004	UART communication (9600)	1. Support for playing up to 65535 audio segments, with WAV and ADPCM formats. 2. Support for clock and calendar functions, with alarm clock settings. 3. Volume adjustment range from 0 to 31 levels; support for creating voice prompts using a computer. 4. Sleep mode power consumption of 18uA with timer, and 5uA in complete sleep mode. 5. Operation commands include single track playback, combined playback, looping playback, time settings, and query functions.	PWM Software DAC	Alarm Clock / Electronic Pill Box Small appliances, etc.
	C006	UART communication (9600) EV1527 Decoding Interface Button Interface	1. It is built-in 58 doorbell music options and supports MIDI playback, allowing for simultaneous playback of up to 8 chords. 2. It supports the EV1527 standard protocol decoding. 3. The volume can be adjusted from level 0 to level 4. 4. It has a learning button pairing function, with a maximum capacity to remember 128 remote control codes. 5. Instruction support includes single track playback and loop playback, while key support includes next track and volume increase.	PWM Software DAC	Doorbell / Intercom System, etc.
	C007	UART communication (9600) Matrix keypad Digital tube driver	1. The maximum support for audio playback is 65535 segments, supporting WAV and ADPCM formats. 2. Maximum support for 8-digit LED display, with 2*8 buttons. 3. The LED display supports individual segment control, with overall brightness adjustment from 0 to 7 levels. 4. Sleep power consumption is 5uA; supports voice control from the upper computer. 5. Operation instructions: single track playback, combination playback, loop playback, volume adjustment, LED display control.	PWM Software DAC	LED light board Electric bicycle panel etc.
	C012	Single-line/double-line communication	1. Built-in 58 doorbell music, support MIDI and WAV playback, and can play up to 8 chords simultaneously. 2. Support combined playback of MIDI and WAV files. 3. Volume adjustment from 0 to 15 levels; standby power consumption of 5uA. 4. Command support: single song playback, loop playback, combined playback.	PWM Software DAC	Doorbell/caller, etc.
	C013	Single-line communication Recording line	1. Voice playback supports a maximum of 127 audio segments and supports WAV and ADPCM formats. 2. Supports recording up to 100 seconds; supports creating voice files using a computer. 3. Sleep power consumption is 5uA; volume adjustment ranges from 0 to 16 levels. 4. Operation commands: single track playback, combination playback, loop playback.	PWM/DAC	Recording toys Recording greeting cards, etc.
	C014	UART communication (9600) Infrared receiver	1. Voice playback supports up to 65536 segments of audio and supports WAV and ADPCM formats. 2. Supports infrared decoding and infrared control of sound playback; volume adjustment from 0 to 16 levels. 3. Sleep power consumption of 5uA; supports PC-based voice production. 4. Operation commands: Single track playback, composite playback, loop playback.	PWM Software DAC	Infrared remote controlled fan Infrared remote controlled ceiling light, etc.
	C015	UART communication (9600)	1. The maximum support for voice playback is 65536 audio segments, supporting WAV and ADPCM formats. 2. It supports controlling IO PWM output and fixed frequency square wave output. 3. Volume adjustment range is from 0 to 16 levels; supports upper computer to create voice; sleep power consumption is 5uA. 4. Operation instructions: single track playback, combination playback, loop playback.	PWM Software DAC	Consumer electronic products Toys, etc.
WTR096	C016	Single-line communication line in Line-in mix	1. Voice playback supports a maximum of 223 audio segments and supports WAV and ADPCM formats. 2. Supports line-in mixing function; volume adjustment from 0 to 16 levels. 3. Sleep power consumption of 5uA; supports voice creation by host machine. 4. Operating commands: single track playback, combination playback, loop playback, and support for mixing function control.	PWM/DAC	Electronic lock/ advertising machine, etc.

Electric Vehicle Low Speed Alert System (AVAS) Scheme

The electric vehicle low-speed alert system (AVAS) can be implemented using either the WT2605 or WT2003H chipsets. It is capable of emitting a sound similar to engine acceleration and deceleration when the vehicle's speed is below a set value, such as 20 km/h. Additionally, when the vehicle is in reverse gear, the system will emit a reverse warning signal. This system helps improve the awareness of pedestrians towards approaching electric vehicles in noisy urban environments, reducing the risks faced by pedestrians, cyclists, and vulnerable groups.

Technical Advantages of WT2605/WT2003H

**Serial Port Control of Sound Pitch and Speed:**
The sound frequency, speed, and volume can be adjusted through UART commands, allowing the sound to vary according to the speed of the vehicle, providing high flexibility for customers.

Serial Port Speed Control for Sound Variation:
The MCU directly outputs speed data and the chip can seamlessly loop and play simulated car engine sound effects. This solution enables simple and fast development for the company.

OTA Upgrade:
Through the MCU serial port, specific sections or all of the voice data can be replaced, allowing users to remotely update the engine sound effects in bulk for their terminal products. This reduces the bulk cost for customers and provides flexibility in product promotion.
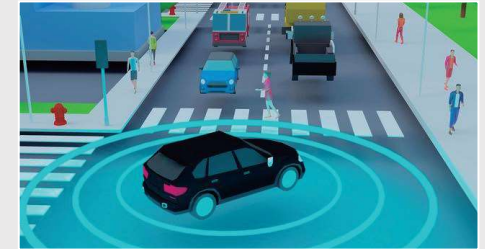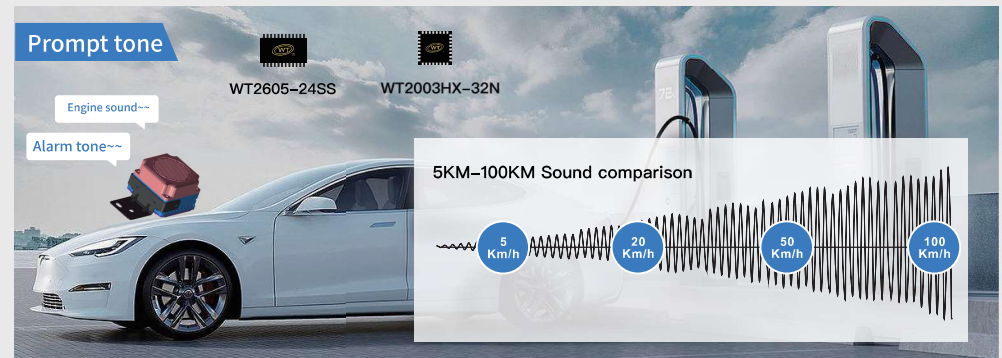
Scheme used: WT2605 Series

Selection Reason: WT2605 is a high-quality MP3 voice codec Bluetooth chip, with a powerful DSP (Digital Signal Processor) core, which can be accessed and data exchanged with external devices through the UART interface, and it is easy to operate. The chip has built-in analog interfaces to provide users with high-quality audio input and output. It has rich peripheral interfaces and functions such as Bluetooth voice switching, seamless looping, frequency and speed conversion, and OTA upgrade.

Scheme used: WT2003H Serie

Selection Reason: WT2003H is a powerful and high-quality industrial-grade MP3 chip that features a high-performance 32-bit processor with a maximum frequency of up to 120MHz. It boasts low cost, low power consumption, high reliability, and strong versatility. It supports OTA serial upgrading and serial transmission speed commands. The chip automatically plays corresponding prompt sound at different speeds (with different frequencies and volumes by default).

Prompt tone

WT2605-24SS   WT2003HX-32N

Engine sound~~

Alarm tone~~

5KM-100KM Sound comparison

5 Km/h   20 Km/h   50 Km/h   100 Km/h

Standard Scheme for Voice and Firmware Update Downloads

1. What should be done when the product design is the same, but the voice content is different?
2. How to add personalized features to the product and stand out from similar products?
3. Want to update the microcontroller program, but have to add a USB to serial chip?
4. The product has bugs and I want to upgrade the MCU program, but don't know where to start.

On-board update

Reserved voice chip burning port on PCBA, voice files in the voice chip can be updated through our company's downloader. How to use it and what are the advantages?

1. During the research and development design phase and debugging phase, the downloader can be used to replace the voice files on the PCBA without the need to repurchase IC, greatly shortening the project cycle.
2. If the same product needs to be exported to different countries with different languages, using the traditional method of directly putting multiple language voices into the voice chip would significantly increase the cost. However, according to the above solution, PCBA can be stocked in advance, and when it needs to be shipped to different countries, only the language of that specific country needs to be downloaded to the PCBA, and then assembled and shipped directly.
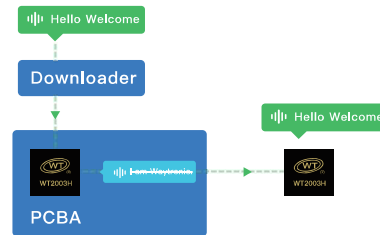
MCU replacement

Using an MCU, data can be written to the voice chip via a serial port, erasing the original voice and replacing it. This can be done through SPI, UART, I2C, and other interfaces. How to use it and what are its advantages?

1. MCU can directly read, write, and erase data with voice IC, allowing for more flexible product design. It enables voice replacement during stock preparation and also allows the product to have the capability of voice replacement.
2. MCU can communicate with the voice chip, treating it as a storage unit, and store configuration data that the microcontroller needs.

PC update
(voice + customer MCU firmware update)

If a USB interface is reserved on the product, it can be connected to a computer via the USB interface. The computer will present a simulated U disk, which can be used to replace the required speech files into the simulated U disk (i.e. voice chip) or replace the MCU program files into the simulated U disk, thereby upgrading the MCU program in the product. How to use it and what are the advantages?

1. In the research and development design stage and debugging stage, direct replacement using a PC eliminates the need to purchase ICs again, greatly reducing the project cycle.
2. End users can use a PC to change the voice, enhancing the user experience and distinguishing it from competitors' products.
3. If the product requires an MCU program upgrade, it can be directly replaced using a PC, eliminating the need to purchase a USB-to-serial IC separately, saving product costs.
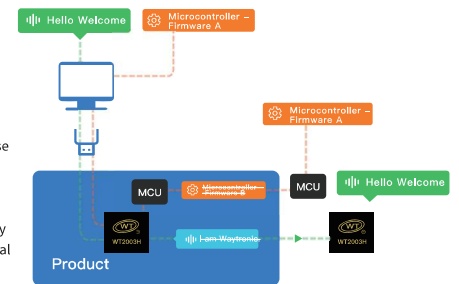
USB drive update
(voice + customer MCU firmware update)

USB interfaces can be reserved on the product, and the sound files that need to be replaced can be stored in a USB flash drive. The USB flash drive can be inserted into the product, and the MCU can use serial commands to replace the original sound files in the voice chip with the ones in the USB flash drive. The MCU can also send the program files of the microcontroller (MCU) in the USB flash drive to the voice chip through UART/SPI/IIC protocols, as per the MCU's requirements, for MCU program upgrades. How to use it and what are the advantages?

1. During the R&D and design stages, as well as the debugging stage, sound files can be directly replaced using a USB flash drive, eliminating the need to repurchase IC chips, greatly reducing project cycles.
2. End-users can use a USB flash drive to change the voice, enhancing the user experience and differentiating the product from competitors.
3. If the product needs to upgrade the MCU program, it can be done directly using a USB flash drive, without the need to purchase a dedicated USB to serial IC, saving product costs.
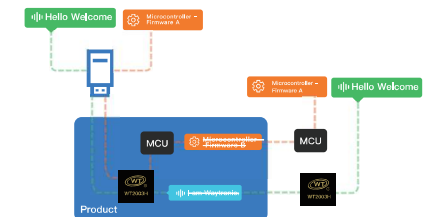
Bluetooth replacement
(voice + customer MCU firmware update)

The WT2605C can be connected to a mobile phone via Bluetooth, allowing for the transfer of voice files from the phone to the WT2605 chip. It can also receive program files from the MCU through Bluetooth, using protocols such as UART/SPI/IIC, and send them to the MCU for program upgrading. How to use it and what are the advantages?

1. It allows for voice replacement in the product, which adds a significant feature to the product, whether it is during stocking or for end-user operation.
2. When the MCU needs to upgrade the program, the WT2605 can directly send the program file to the WT2605 through Bluetooth, and then upgrade the MCU program through the serial port.
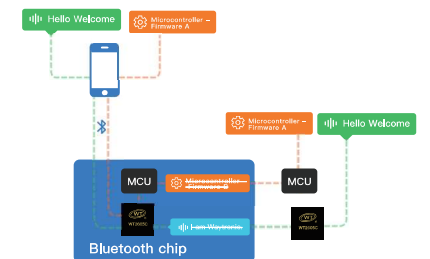
Solutions

3-in-1 Electronic Lock Mixer

Electronic lock mixing solution

As the market develops, electronic locks have become an essential product for every household. Our company has launched a new high-integration, dedicated 3-in-1 voice chip solution, which effectively reduces the cost of customer solutions and conserves device space. It only requires 2 external capacitor components. The solution integrates an external audio signal input port, which allows for independent adjustment of input signal gain through commands. It also integrates an internal memory and external Flash (4M-128M) for storing voice content. It has a built-in integrated digital amplifier with 8R 0.5W and 4R 0.8W options, and supports analog DAC output, which can support the expansion of external 15 IO ports for driving input or output configurations.

WT2003H Series

- Operating voltage: 2.4V-5.2V
- Supports high-quality audio formats for voice, including MP3 and WAV, with audio sampling rates between 8K and 44.1K
- Standby current: less than 3uA in deep sleep mode, less than 30uA in idle mode
- 10-bit high-precision AD sampling, 16-bit DAC, 16-bit digital amplifier capable of driving 8R 0.5W, 4R 0.8W speaker
- Control modes supported: single-line, two-line, UART
- Built-in capacity for voice chip: 350 seconds, 900 seconds
- Maximum support for external 128Mbit Flash
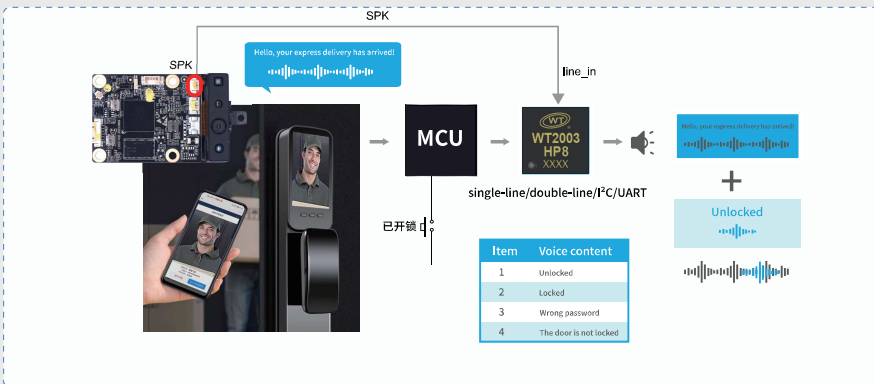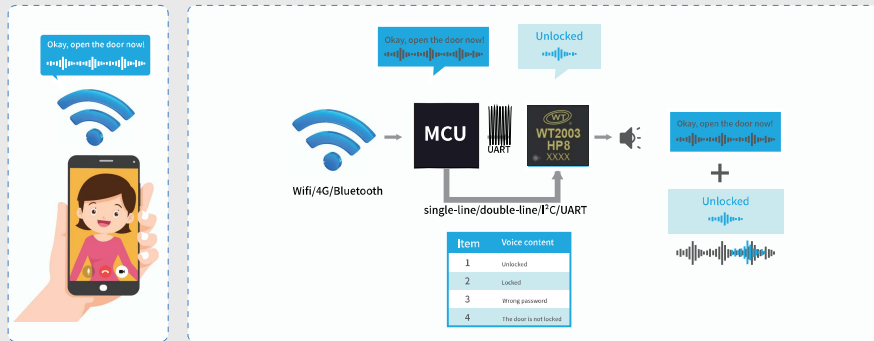
Product Overview of Voice Module

| Module Information	Functional Description	Module Information	Functional Description
WT2003HB01	1. Supports standard asynchronous serial communication (UART). 2. Supports SPI-Flash and USB flash drive as storage devices. 3. Comes with functions like file index playback, insert playback, single track loop, all track loop, and random playback. 4. Simulates USB flash drive functionality, allowing for easy voice swapping.	WT2605B03	1. Support Bluetooth audio mode and MP3 playback mode. 2. Support high-quality audio formats such as WAV and MP3. 3. Support external TF cards (maximum 32G) and USB flash drives (maximum 32G). 4. Standard UART communication with a baud rate of 9600. 5. Built-in 1W power amplifier, directly driving 8R/1W speakers. 6. Bluetooth BQB certification, QDID: 215196.
WT2003HB02	1. Support standard asynchronous serial communication (UART). 2. Support TF card and USB flash drive as storage devices. 3. Come with features such as file index playback, interstitial playback, single track looping, all tracks looping, and random playback. 4. Simulate USB flash drive functionality, allowing for free voice replacement.	WT2605B04	1. Support for streaming media audio encoding and decoding. 2. Support for capturing audio from the microphone and encoding it into MP3 data output. 3. Support for decoding and playing MP3 data received via UART. 4. Standard UART communication with a baud rate of 9600. 5. Built-in 1W power amplifier, capable of driving 8R/1W speakers directly.
WT2003HB03	1. Support standard asynchronous serial communication (UART). 2. Support SPI-Flash, TF card, and USB flash drive as storage devices. 3. Include functions for file index playback, interstitial playback, single track looping, all track looping, random playback, etc. 4. Simulate USB flash drive functionality, allowing for easy voice replacement.	WT2605B05	1. Support Bluetooth audio + BLE data transmission and MP3 playback mode. 2. Support high-quality audio formats WAV and MP3 playback. 3. Support external TF card (up to 32GB) and USB flash drive (up to 32GB). 4. Standard UART communication, AT commands, baud rate 115200. 5. Built-in 1W power amplifier, directly driving 8R/1W speaker.
WT2003HM01	1. Support standard asynchronous serial communication (UART) 2. Support SPI-Flash and USB flash drive as storage devices 3. Provide functions such as file index playback, interstitial playback, single track looping, all track looping, and random playback 4. Simulate USB flash drive functionality, allowing for easy voice replacement.	WT2605B02	1. Supports TF card and USB recording. 2. Supports high-quality audio formats such as WAV and MP3 for playback. 3. External TF card (up to 32G) and USB drive (up to 32G) support. 4. Standard UART communication with a baud rate of 9600. 5. Built-in 1W power amplifier, directly drives 8 ohm / 1W speaker.
WT2003HM02	1. Support standard asynchronous serial communication (UART) 2. Support TF card and USB flash drive as storage devices 3. Provide functions such as file index playback, interstitial playback, single track looping, all track looping, and random playback 4. Simulate USB flash drive functionality, allowing for easy voice replacement.	WTK6900H-M01	1. Simple interface: microphone/speaker/5V power and UART interface. 2. Simple testing process: insert the microphone and speaker directly for power supply and use. 3. Support recognition of 50-100 phrases. 4. Built-in noise reduction algorithm, high recognition rate and accuracy. 5. Support shipment with either surface-mount solder pads or pin connectors.
WT2003HM03	1. Support standard asynchronous serial communication (UART) 2. Support SPI-Flash, TF card and USB flash drive as storage devices 3. Provide functions such as file index playback, interstitial playback, single track looping, all track looping, and random playback 4. Simulate USB flash drive functionality, allowing for easy voice replacement.	WTV-VSB V1.02	1. Type-C 5V power supply 2. Next song playback button, PWM and DAC output interfaces 3. Reserved programming interface for updating voice on the board, convenient for debugging.
WT2003HM04	1. Support UART control mode: with functions such as file index playback, insert playback, single song loop, all tracks loop, and random playback. 2. Support one-wire serial port control mode: voice playback, stop, loop playback, and volume control can be controlled through the coding end. 3. Support two-wire serial port control mode: voice playback, stop, loop playback, and volume control can be controlled through the coding end. 4. Support button control mode: flexible triggering method, can set 15 different triggering methods, up to 10 buttons can be used to trigger control output. 5. Can have a built-in 900-second voice capacity. 6. Support SPI-Flash as storage device.	WT2003HM05	1. Support UART control mode: with functions such as file index playback, insert playback, single song cycle, all tracks loop, random playback, etc. 2. Support single-wire serial control mode: voice playback, stop, loop playback, and volume control can be controlled through the coding terminal. 3. Support dual-wire serial control mode: voice playback, stop, loop playback, and volume control can be controlled through the coding terminal. 4. Support button control mode: flexible trigger mode, can set 15 trigger modes as needed, up to 10 buttons can be used to trigger control output. 5. Can have a built-in 900-second voice capacity. 6. Support SPI-Flash as storage. 7. Module size is 10.16*10.16MM.

*Support various standard application customization schemes for PCBA delivery.

Solutions

Automotive Electronic Voice Interaction Solution (High–End Voice Chip with Amplifier)

The solution uses the high–quality voice chip WT2605-24SS, a 32–bit high–performance CPU with a clock frequency of up to 120MHz. It is equipped with a built–in 0.5W power amplifier and can switch between DAC and PWM audio outputs (PWM can directly drive 8R 0.5W speakers). It utilizes standard UART communication for flexible control and supports low power consumption mode (can maintain below 5uA in deep sleep). The solution also supports external storage devices such as Flash, SD cards, and USB drives.
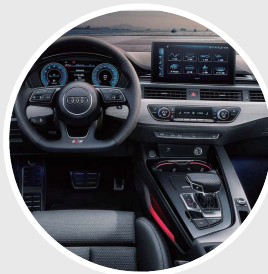
Function features

1. Support high–quality and high–fidelity sound.
2. Support OTA upgrade and USB interface upgrade.
3. Easy control, allowing customers to replace the voice themselves.

Mental Math Master/Calculator Solution

The solution uses WTV380 (QFN32) + WT0021 LCD driver chip, achieving a low–cost mental arithmetic treasure scheme. Only three capacitors are needed for peripheral components to implement the scanning of 24 buttons with 4x6 layout and control 5 LED lights with 5 IO ports. The WT0021 driver chip is controlled by SPI to display on the LCD screen. It has 380 seconds of built–in voice storage space, allowing for high–quality music and prompt voice playback combinations. It also has a built–in 16–bit 8R0.5W PWM amplifier. Functions such as games, multiplication, division, subtraction, addition, and number games can be implemented.

Function features

1. Single–chip solution, simple circuit design.
2. Excellent sound quality, high compression ratio.
3. 27 buttons, with abundant external resources for chip peripherals.
4. Built–in voice options include 380S and 890S, and external FLASH support; ranging from 4M to 128M.

Electric toothbrush solution

Bluetooth version WT2605C, MP3 version WT2003H, voice version WTV890. This solution can be implemented using different chips according to the customer's requirements, including voice playback, music playback, electric motor drive control, battery level detection, charging detection, and LED light control. Alternatively, customers can use the WT series chip with a low–cost 8–pin MCU to achieve the entire solution by simply programming basic logic and interaction functions.

Function features

1. The WT series chips are built–in with standard motor drive mode and battery level detection.
2. The voice quality supports high resolution and supports 8K–128Kbps bit rate.
3. The MCU control is simple, only requiring interaction functionality, reducing development time.
4. Customers can replace the voice by themselves and support OTA upgrades.

Intelligent Music Alarm Clock Solution

The solution uses the WT588F02KD-24SS digital tube driver voice chip. The chip uses the built–in clock function of the WT588F02KD chip, with a clock error of 1 second per day. In sleep mode, the power consumption is 10uA. The WT588F02KD can drive the digital tube display and has temperature detection function. It can communicate with a mobile app for time calibration, alarm clock setting, countdown setting, etc.

Function features

1. The WT588F02KD alarm clock solution can automatically calculate leap years and leap months.
2. With the LED turned off, the standby power consumption is less than 10uA, with a timing error of 1 second per day.
3. It can support built–in 200 seconds of voice and external Flash (4M-128Mbit) for a maximum of 3.5 hours.
4. It can drive up to 8 digits on the display, with the ability to set the brightness of each digit (up to 8 levels).
5. It can support up to 20 sets of alarms (customizable and modifiable).
6. It allows for reading the current time, setting the time, and querying alarm settings, among other functions.
7. There are 256 bytes of open space available for the MCU to set and read.

Telephone recording solution

The solution adopts WT2000/ WT2605/ WT2000H high quality recording chips to achieve high–quality voice recording. The recording quality is improved and it supports extended recording time with the ability to be stored externally using Flash. It uses the standard SPI protocol. Recording files can be named based on time and there is support for freely deleting recording files.

Function features

1. Support file timestamp and time recording.
2. Automatically detect recording capacity, provide automatic prompts when full, and automatically delete.
3. Easy control operation, different functions implemented with a single serial command.
4. High sound quality recording, support recording sampling rates from 8K to 44.1K.

Sewing Machine Voice Interaction Solution (Industrial Grade)

The program adopts the WT2605-16S industrial–grade voice chip, which allows for the free copying of voice files (allowing for the replacement of built–in voices). It is capable of supporting Bluetooth mode for playing Bluetooth music. This program supports MIC recording with high audio quality and no background noise, as well as Bluetooth recording, allowing for the recording of music files through Bluetooth. It also supports infrared remote control operation.

Function features

1. Large capacity, allowing users to conveniently store multiple languages.
2. Supports OTA upgrades, USB drive upgrades, and other various methods.
3. High sound quality, supports 16K–320Kbps bit rates.
4. Supports users and allows manufacturers to independently replace audio sources.

NFC Children's Early Education Story Machine Solution

The solution adopts high-quality voice chip with a simple circuit requiring only two capacitors. It supports external NFC chip/TF card/USB and can play MP3 audio files in formats ranging from 32k to 320kbps. It offers great cost-effectiveness and supports voice encryption to prevent voice "cloning" and theft.

Function features

1. The overall BOM (Bill of Materials) for the product is simple, requiring only a few resistors and capacitors.
2. The product uses a standard NFC chip interface, allowing for the option to choose different NFC chips.
3. The development cycle is short, allowing customers to quickly develop their products.
4. The chip supports built-in storage as well as external flash memory, TF cards, and other storage methods.
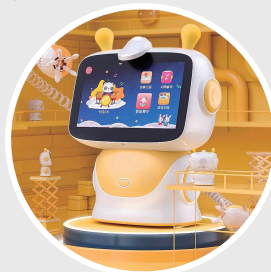
Sleeping Device Voice Solution (High-Quality Seamless Looping)

The solution adopts the high-quality audio chip WT2003H-16S, which can integrate 300 seconds of voice length, high-fidelity audio, and 16-bit DAC audio output. It supports one-wire, two-wire, and UART serial communication, providing flexible control and quick verification with the PC. This solution is designed to help engineers quickly implement their projects. With the implementation of this solution, the sleep aid device can achieve seamless and natural sound, giving users a feeling of being immersed in nature.

Function features

1. The WT2003HX chip supports standard IO peripherals for buttons and LED driving.
2. The chip has built-in voltage detection, eliminating the need for an external voltage detection circuit.
3. Customized functions can be easily modified using a simple 8-pin MCU for UI interaction.
4. Changing the audio source is simple, as it only requires the use of the Waytronic editing interface.

AI Massage Device Intelligent Voice Solution

The solution adopts the WTK6900H-24SS single chip, which features high cost-effectiveness and can directly reduce the overall BOM cost and shorten the project development cycle. The solution supports standard BLE transparent transmission and voice recognition functions, with a recognition distance of 3.3 to 5 meters and a recognition rate of over 90%. It also supports control by mini programs.

Function features

1. Chip integration enables convenient voice control functionality through standard recognition instructions.
2. Support for local voice playback saves voice chip usage.
3. Support for Bluetooth music playback and phone call answering functionality.
4. Integrated BLE audio data communication allows for control through an app.

Couples DIY Holiday Gift Box Voice Solution

The solution uses the WT2605 music module, which supports Bluetooth connection for playing Bluetooth music. It also supports recording through MIC/Bluetooth, with high audio quality and no background noise. Additionally, users can copy their favorite voice files to the module via USB to achieve voice DIY, providing users with high-quality voice DIY gifts.

Function features

1. No need for physical contact to change internal sounds, allowing for easy replacement of greetings without unpacking.
2. Can be used with mobile applications such as WeChat and DingTalk for updating familial greetings through voice messaging.
3. High-quality sound reproduction ensures that the playback recording matches the audio output of the mobile device.
4. Supports USB bulk voice replacement for convenient shipment by manufacturers.
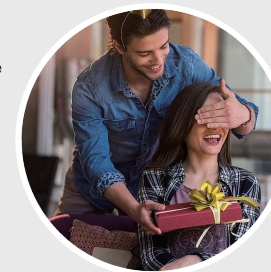
Smart doorbell

Both WTN6040F and WT588F02B chips can be used in smart doorbells, with standard programs supporting the standard EV1527 decoding protocol (can be customized and modified according to customer requirements) and can be synchronized with wireless remote controllers. WTN6040F has 31 polyphonic tones, while WT588F02B has 58 polyphonic melodies.

Function features

1. 2.4~5.5V; standby power consumption less than 5ua
2. PWM output directly drives 8R0.5W speaker, supports DAC output connected to power amplifier chip
3. Supports seamless linking function
4. Standard program includes 58 chord melodies (can be changed according to customer's requirements)
5. Supports customers to create their own sounds using a PC application and download them to the chip
6. One-wire serial communication/ keypad/ UART communication modes
7. EV1527 encoding format (can also be customized according to customer's protocol)
8. Features power-down memory function, adjustable volume, and learning remote control code functions.

Sweeping machine/mopping machine

The WTN6040F and WT588F02B chips can both be used in smart doorbells. The standard program supports the standard EV1527 decoding protocol (custom modifications can be made according to customer requirements) and can be integrated with wireless remote controllers. The WTN6040F chip has 31 chords, while the WT588F02B chip has 58 chord melodies.

Both the WT588F and WT2003H chips have their own advantages. The WT2003H chip provides MP3 audio quality and delivers better sound effects. On the other hand, the WT588F chip is easier to use and offers a higher cost-performance ratio. Both chips can be repeatedly erased and programmed with voice programs through our website, which can be downloaded directly to the chip using a downloader (this enables quick prototyping and shortens the development cycle).
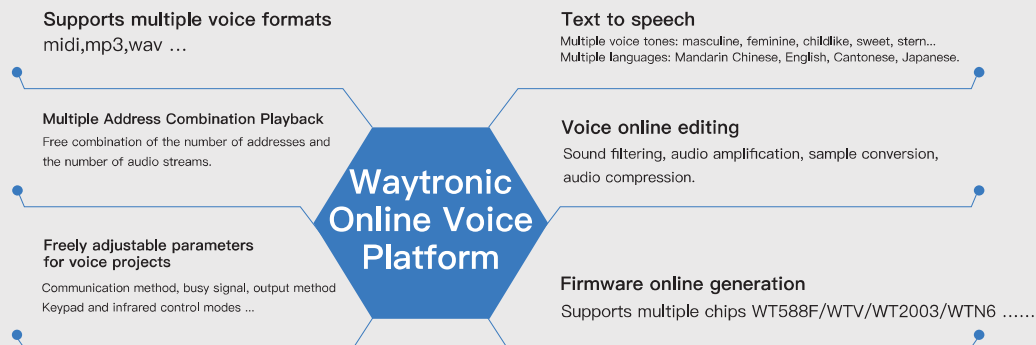
Function features

1. Operating voltage: 2.4~5.5V
2. 16-bit PWM/DAC output, capable of directly driving an 8R 0.5W speaker
3. Supports WAV files with a sampling rate of 6K~32KHz
4. Customers can change the internal voice content of the chip through an MCU or dedicated downloader
5. Supports one-wire serial interface and two-wire serial interface (UART and IIC communication will be available soon)
6. Supports over 1000 address segments
7. Equipped with hardware SPI interface, UART interface, built-in comparator, and other interfaces. Customizable for various functions
8. The chip has a built-in 220KB Flash. For larger capacity, an external flash can be used
9. Both the chip's main control program and Flash data can be erased and rewritten.

The Advantages of Waytronic Online Voice Platform: Platformized development process, quick and flexible development approach, extensive voice resource library, one-minute completion of voice editing and processing, one-click download and debugging, accelerating engineers' project development progress.

Supports multiple voice formats
midi,mp3,wav …

Text to speech
Multiple voice tones: masculine, feminine, childlike, sweet, stern…
Multiple languages: Mandarin Chinese, English, Cantonese, Japanese.

Multiple Address Combination Playback
Free combination of the number of addresses and the number of audio streams.

Voice online editing
Sound filtering, audio amplification, sample conversion, audio compression.

Waytronic Online Voice Platform

Freely adjustable parameters for voice projects
Communication method, busy signal, output method Keypad and infrared control modes …

Firmware online generation
Supports multiple chips WT588F/WTV/WT2003/WTN6 ……

Waytronic Online Voice Platform： https://wt588f.waytronic.com:8443

1、Rich functional mode configuration and support for on-line, off-line, UART, SPI, and IIC control methods, catering to the development habits of more engineers.
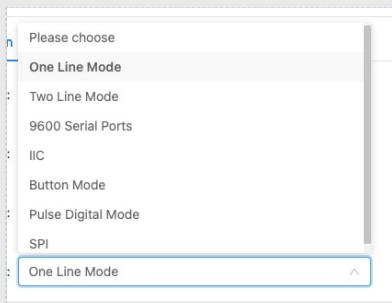
2.Professional audio filtering technology that attenuates the high-frequency range of speech, reducing sibilance and creating a soft and non-irritating sound effect.

3、Massive and diverse MIDI library, supporting 5-8 chords, rich timbre, and beautiful sound expression.
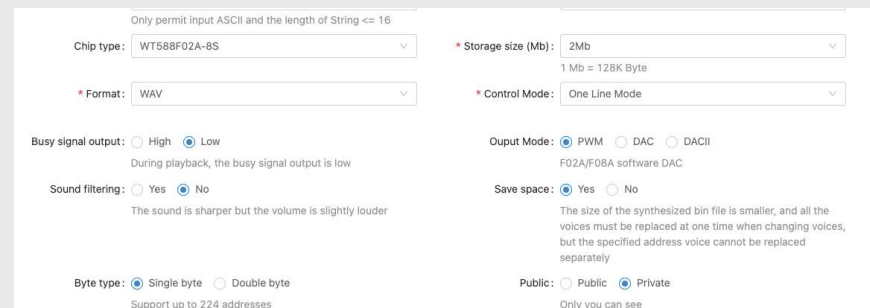
4、TTS voice synthesis engine with multiple voice resource options, supporting multiple languages, including children's voices, announcer voices, and dialects.
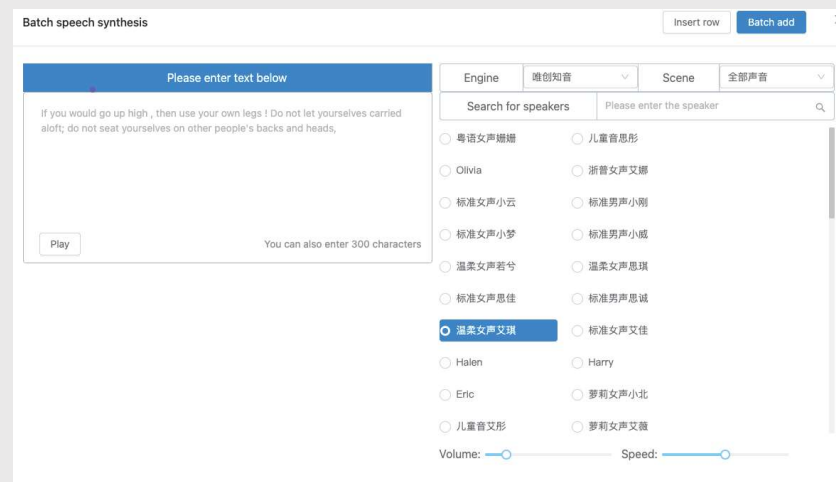
5、Project import and export functions, allowing developers to quickly complete the entire project development by simply adding data to an Excel sheet and including audio. This speeds up the development progress for engineers.
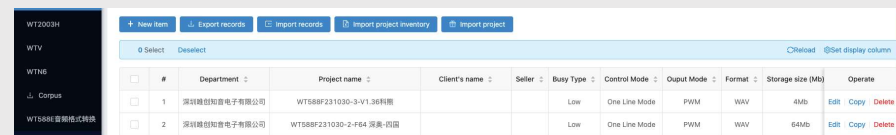
Complementary tools

## Recognition Module Testing Tool

WTK6900G Test module

- Elf entry; standard serial port output
- Distance recognition: 8 meters
- Support for 150 commands (including Chinese)

WTK6900G Series dimming demonstration board

- Standard Xiao Al Wiki Entry;
- Standard Serial Port Output
- Recognize distance of 8 meters
- Support 150 commands (including Chinese)
 Adjust brightness through voice and touch buttons
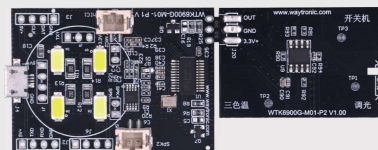
WTVXXX/WT2003H Series programming test tool
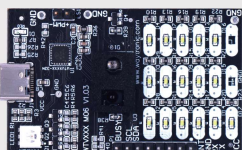
WTVXXX M06 V1.03

- Support for front line, IIC communication. one-line
- Support for voice playback, seamless loop playback, combination playback, PWM output.
- Support for infrared sensing, the farthest sensing distance can reach 120cm, with average
- power consumption below 40ua at 1Hz frequency, INT pin outputs valid signal.
- Support for control of 16 LED displays, support for three-color RGB light control (including support for breathing function) as well as BUSY pin output.

WT2003HM16 test board

- Support for WT2003H/WTV/WT6900H chip M series module testing.
- Support for USB and TF card functionality.
- Support for recording and ONEKEY button (applicable to WT2003H M series modules) functionality.
- Support for SPI, single-wire, two-wire, and UART serial port functionality (requires matching WT2003H burning test board).
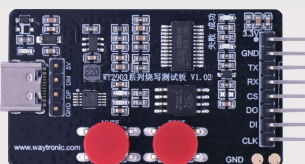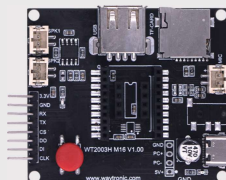
WTVXXX/WT2003H Series programmer

- Board for testing and burning, supporting online and offline voice updates, voice engineering testing, and other integrated functions. It is convenient for users to modify voice content in small batches and for debugging work in early projects.
- Currently supported engineering versions for WTV series/WT2003HX series chips include: UART engineering, single-line engineering, dual-line engineering, single-line double-byte engineering, and dual-line double-byte engineering.
- Combined with the exclusive program upgrade software, it can easily, quickly, conveniently, and efficiently replace engineering or voice by connecting to PC end through Type-C data cable.

## WTVXXX/WT588 Series programming test tool
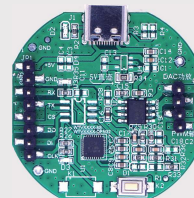
WTVXXX-VSB V1.02

- Support WTV series chip burning test, one-wire, two-wire, UART, I²C, and SPI communication
- Power on defaults to not play, with next track function, BUSY play state indicator, power state indicator
- Coordinate with WTV/WT2003H downloader to replace WTV series audio
- Support PWM output, PWM power amplifier output, DAC output

WT588 Series programming test tool

- Supports burning and testing for WT588FXXA-8S, WT588FXXB-8S, WT588S/HXX-16S using one-wire, two-wire, IIC+, and IIC- (requires compatible adapter)
- Supports burning for WT588DMXX module (requires compatible adapter)
- Supports downloading and testing via external SPI and IIC pins
- Supports PWM output and DAC (8 ohm 1W) output
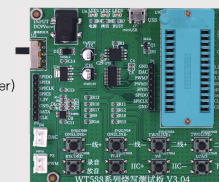
Voiced Sample Box V4.05

- Support WT588FXXA-8S, WT588FXXB-8S, WTN6 series line one, line two, IIC, SPI;
- Default power-on without playback; equipped with BUSY status indication, power status indication;
- Replace the voice of WT588FXXA-8S, WT588FXXB-8S with USB downloader;
- Replace the voice of WT588EXXA-8S, WT588EXXB-8S with computer serial port;
- Support DAC output, PWM output, PWM power output.
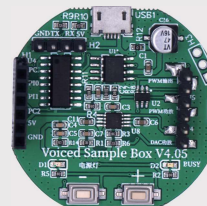
USB Programmer

- Cooperate with VSB board, programmable WT588F02A/08A/02B chip.
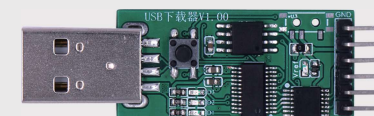
WT-Writer

- Support offline burning and downloading of WTN6/WT588/WTV, WT2003H series chips, and batch burning using robotic arm.
- Support testing of chips with communication protocols such as one-wire, two-wire, UART, I2C, and SPI.
- Support digital display of burning file checksum, burning mode, testing address, etc.
- Support BUSY playback status indication, power status indication, mode indicator lights, etc.