

Innovative and All-round General Purpose HT32

Provide customers with advantages of high integration and practicability, so as to achieve an excellent combination of power, price and performance, with features that can assist customers to shorten the product development process and to quickly seize the market opportunities.



HT32 M0+ Series

The HT32 M0+ MCUs feature an excellent energy-efficient Arm® Cortex®-M0+ processor core, with an optimal balance between price, power and performance. This makes the MCUs suitable for use in the Internet of Things (IoT), wearable device products, and other similar applications. With the advantages in terms of code density, power consumption and price, the M0+ core-based MCUs are not only the first choice for new product design and development, but also the best choice for upgrading traditional products based on an 8-bit MCU to 32-bit MCU-based products with higher performance.

Major Advantages:

- 32-bit Arm® Cortex®-M0+ processor core
- Up to 60 MHz operating frequency
- Up to 256 KB on-chip Flash memory and 32 KB on-chip SRAM
- Flash memory protection
- Multiple booting modes
- 24-bit SysTick timer
- ISP and IAP programming methods
- 3 power domains
- 12-bit SAR A/D converter with a conversion rate of up to 1 Msps
- Real time clock
- I²C, SPI, USART and USB interfaces
- Smart card interface
- Serial wire debug port

Core

Arm® Cortex® -M0+ Processor

Serial Wire Debug
Internal Oscillators
External Oscillators
Real Time Clock
Watchdog Timer
System Clock PLL
NVIC

Power Supply

POR/PDR

Backup Domain Power Management

BOD/LVD

Interfaces

SPI Master/Slave

I²C Master/Slave

USART Interface

UART Interface

USB Interface

Smart Card Interface

HT32 Arm® Cortex®-M0+
Best Choice for Price,
Power, Performance

Memory

16 ~ 256 KB Flash Memory

4 ~ 32 KB SRAM

Multiple Booting Modes

Flash Memory Protection

IAP and ISP Programming Methods

Peripherals

General Purpose Timer

PWM Generator

General Purpose Input/Output Ports

Reset Control Unit

Motor Control Timer

Cyclic Redundancy Check

Peripheral Direct Memory Access

Analog Features

A/D Converter

Comparator



HT32 M3 Series

The Holtek HT32 M3 core series of MCUs, based on the Arm® Cortex®-M3 processor, are specially designed for high performance and low power consumption applications, such as automotive systems, industrial control systems, wireless networks and sensors, etc., which require a 32-bit MCU solution of high performance, low-dynamic and static power consumption specifications. Features such as configurable interrupts and memory protection provide even more outstanding performance and flexibility for this series of MCUs.

Major Advantages:

- 32-bit Arm® Cortex®-M3+ processor core
- Up to 96 MHz operating frequency
- Up to 256 KB on-chip Flash memory and 128 KB on-chip SRAM
- Flash memory protection
- Multiple booting modes
- 24-bit SysTick timer
- ISP and IAP programming methods
- 3 power domains
- 12-bit SAR A/D converter with a conversion rate of up to 1 Msp/s
- Real time clock
- I²C, SPI, USART and USB interfaces
- Smart card interface
- Serial wire debug port
- External Bus Interface

Core

Arm® Cortex® -M3 Processor

Serial Wire Debug
Internal Oscillators
External Oscillators
Real Time Clock
Watchdog Timer
System Clock PLL
NVIC

Power Supply

POR/PDR
Backup Domain Power Management
BOD/LVD

Interfaces

SPI Master/Slave
I²C Master/Slave
USART Interface
UART Interface
USB Interface
Smart Card Interface
CMOS Sensor Interface

HT32 Arm® Cortex®-M3
High Efficiency, Abundant
Peripherals and Interfaces

Memory

16 ~ 256 KB Flash Memory
16 ~ 128 KB SRAM
Multiple Booting Modes
Flash Memory Protection
IAP and ISP Programming Methods

Peripherals

General Purpose Timer
PWM Generator
General Purpose Input/Output Ports
Reset Control Unit
Motor Control Timer
Cyclic Redundancy Check
Peripheral Direct Memory Access

Analog Features

A/D Converter
Comparator
Operational Amplifier

HT32 MCU Lineup for Wide Application Ranges

Choosing a proper 32-bit MCU for your product application should focus not only on performance, but also on power consumption, package type, tooling, and cost. From the energy-efficient M0+ core series to the higher performing M3 core series, Holtek offers a wide range of flexible 32-bit MCU choices to meet your 32-bit application needs.

	16 KB	32 KB	64 KB	128 KB	256 KB	
5V 16 MHz HT32F500xx	HT32F50020	HT32F50030				General Purpose
5V 20 MHz HT32F502xx	HT32F50220	HT32F50230 HT32F50231	HT32F50241			
5V 60 MHz HT32F504xx			HT32F50442	HT32F50452		
3.3V 40 MHz HT32F522xx	HT32F52220	HT32F52230 HT32F52231	HT32F52241 HT32F52243	HT32F52253		
3.3V USB 48 MHz HT32F523xx		HT32F52331	HT32F52341 HT32F52342	HT32F52352		USB
3.3V USB 60 MHz HT32F523xx			HT32F52344	HT32F52354 HT32F52357	HT32F52367	
5V USB 60 MHz HT32F503xx			HT32F50343			
3.3V LCD 60 MHz HT32F573xx		HT32F57331	HT32F57341 HT32F57342	HT32F57352		LCD
5V Touch 60 MHz HT32F542xx		HT32F54231	HT32F54241 HT32F54243	HT32F54253		Touch
5V CAN 60 MHz HT32F532xx			HT32F53242	HT32F53252		CAN
3.3V 72 MHz HT32F123xx					HT32F12364	General Purpose
3.3V 96 MHz HT32F123xx			HT32F12345		HT32F12365 HT32F12366	

HT32 MCU Selection Guide

Arm® Cortex®-M0+ General Purpose Series

Cortex-M0+ 32-Bit MCU															
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	Timers ^{*1}	Cap. ^{*2} or PWM	Cpm. PWM ^{*3}	RTC	Interface	Others	I/O	Package	
HT32F52220	40MHz	2.0V ~ 3.6V	16KB	4KB	—	1Msps 12-bit x8	BFTM×1 SCTM×2 GPTM×1	6	—	—	USART×1 UART×1 SPI×1, I ² C×1	—	19	24SSOP	
HT32F52230			32KB	4KB			23						28SSOP		
HT32F52231	40MHz	2.0V ~ 3.6V	32KB	4KB	—	1Msps 12-bit x12	BFTM×2 SCTM×4 GPTM×1 MCTM×1	12	3	√	USART×1 UART×2 SPI×2 I ² C×2	CRC	19	24SSOP	
HT32F52241			64KB	8KB			23						28SSOP		
HT32F52243	40MHz	2.0V ~ 3.6V	64KB	8KB	6CH	1Msps 12-bit x12	BFTM×2 SCTM×4 GPTM×1 MCTM×1	12	3	√	USART×2 UART×4 SPI×2 I ² C×3	CRC DIV	26	33QFN	
HT32F52253			128KB	16KB			38						46QFN		
													40	48LQFP	
													52	64LQFP	

Arm® Cortex®-M0+ 5V General Purpose Series

Cortex-M0+ 32-Bit 5V MCU																
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	Timers ^{*1}	Cap. ^{*2} / PWM	Cpm. PWM ^{*3}	RTC	EBI ^{*6}	Interface	Others	I/O	Package
HT32F50020*	16MHz	2.5V ~ 5.5V	16KB	2KB	—	1Msps 12-bit x12	—	BFTM×1 SCTM×3	3 / 6	—	√	—	UART×2 SPI×1 I ² C×1	LEDC	18	24QFN
HT32F50030*			32KB	2KB				19					24SSOP			
HT32F50220	20MHz	2.5V ~ 5.5V	16KB	4KB	—	1Msps 12-bit x12	—	BFTM×1 PWM×2 GPTM×1	12 / 12	—	√	—	UART×2 SPI×2 I ² C×1	DIV	18	24QFN
HT32F50230			32KB	4KB				19					24SSOP			
HT32F50231			32KB	4KB				22	28SOP							
HT32F50241			64KB	8KB				26	33QFN							
													CRC DIV	36	44LQFP	
															38	46QFN
															40	48LQFP
HT32F50442*	60MHz	2.5V ~ 5.5V	64KB	8KB	6CH	1Msps 12-bit x12	2	BFTM x2 PWM x2 GPTM x1 MCTM x1	16 / 16	3	√	√	USART x2 UART x2 SPI x2 I ² C x2	CRC DIV LEDC	26	32QFN
HT32F50452*			128KB	16KB				38					46QFN			
															40	48LQFP
															54	64LQFP

Arm® Cortex®-M0+ USB Series

Cortex-M0+ 32-Bit USB MCU																				
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	DAC	Timers ^{*1}	Cap. ^{*2} or PWM	Cpm. PWM ^{*3}	RTC	SCI ^{*4}	USB ^{*5}	EBI ^{*6}	I ² S	Inter- face	Others	I/O	Package
HT32F52331	48MHz	2.0V ~ 3.6V	32KB	4KB	—	1Msps 12-bit x12	—	—	BFTM×2 SCTM×4 GPTM×1 MCTM×1	12	3	√	1	√	—	—	USART×1 UART×2 SPI×2 I ² C×2	CRC	24	33QFN
HT32F52341			64KB	8KB					38								48LQFP			
HT32F52342	48MHz	2.0V ~ 3.6V	64KB	8KB	6CH	1Msps 12-bit x12	2	—	BFTM×2 SCTM×2 GPTM×2 MCTM×1	14	3	√	2	√	√	√	USART×2 UART×2 SPI×2 I ² C×2	CRC	26	33QFN
HT32F52352			128KB	16KB					39								48LQFP			
																			51	64LQFP
HT32F52344	60MHz	1.65V ~ 3.6V	64KB	8KB	6CH	1Msps 12-bit x12	2	—	BFTM×2 SCTM×2 GPTM×1 MCTM×1	10	3	√	—	√	√	—	UART×2 SPI×2 I ² C×1	CRC DIV	26	33QFN
HT32F52354			128KB	8KB					38								46QFN			
																			40	48LQFP
																			54	64LQFP
HT32F52357	60MHz	1.65V ~ 3.6V	128KB	16KB	6CH	1Msps 12-bit x12	2	500Ksps 12-bit x2	BFTM×2 SCTM×2 PWM×2 GPTM×1 MCTM×1	18	3	√	2	√	√	√	USART×2 UART×4 SPI×2 QSPI×1*8 I ² C×2	AES CRC DIV	37	46QFN
HT32F52367			256KB	32KB					39								48LQFP			
																			53	64LQFP
																			67	80LQFP

Arm® Cortex®-M0+ USB 5V Series

Cortex-M0+ 32-Bit 5V USB MCU															
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	Timers ^{*1}	Cap. ^{*2} or PWM ^{*3}	RTC	USB ^{*5}	Interface	Others	I/O	Package	
HT32F50343	60MHz	2.5V ~ 5.5V	64KB	12KB	6CH	1Msps 12-bit x12	BFTM×2 SCTM×2 8-PWM×3 GPTM×1	30	√	√	UART×2 SPI×2 I ² C×2 SLED×8 ⁷	CRC DIV	23	32QFN	
													35	46QFN	
													37	48LQFP	
													51	64LQFP	

* Under development, available in 3Q, 2022.

Note: 1. BFTM: Basic Function Timer, SCTM: Single-Channel Timer, 8-PWM: 8 Output channel PWM Timer, GPTM: General-Purpose Timer, MCTM: Motor Control Timer.

2. Cap.: Input Capture.

3. Cpm. PWM: Complementary PWM for 3-phase motor control or inverter application.

4. SCI: ISO7816-3 Smart Card Interface.

5. USB 2.0 Full Speed Device.

6. EBI: External Bus Interface for NOR Flash / SRAM / LCD.

7. SLED: Strip LED Controller.

8. QSPI Flash ROM.

Arm® Cortex®-M0+ LCD Series

Cortex-M0+ 32-Bit LCD MCU																			
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	DAC	Timers ¹	Cap. ² or PWM	RTC	SCI ⁴	USB ⁵	I ² S	LCD	Interface	Others	I/O	Package
HT32F57331	60MHz	1.65V ~ 3.6V	32KB	4KB	—	1Msps 12-bit x10	—	—	BFTM×2 PWM×2 GPTM×1	12	√	1	√	—	29x4 ~ 25x8	USART×1 UART×2 SPI×2 I ² C×2	CRC DIV	37	46QFN
HT32F57341			64KB	8KB														39	48LQFP
HT32F57342	60MHz	1.65V ~ 3.6V	64KB	8KB	6CH	1Msps 12-bit x10	2	500Ksps 12-bit×2	BFTM×2 SCTM×2 PWM×2 GPTM×1	14	√	2	√	√	37x4 ~ 33x8	USART×1 UART×2 SPI×2 I ² C×2	AES CRC DIV	37	46QFN
HT32F57352			128KB	16KB														39	48LQFP
																		53	64LQFP
																		67	80LQFP

Arm® Cortex®-M0+ Touch Series

Cortex-M0+ 32-Bit 5V Touch MCU																			
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	Timers ¹	Cap. ² or PWM ³	Cpm. PWM ³	RTC	Touch Key	LED Controller	Interface	Others	I/O	Package		
HT32F54231*	60MHz	2.5V~ 5.5V	32KB	4KB	—	1Msps 12-bit x10	—	BFTM×2 SCTM×2 GPTM×1 MCTM×1	10	3	√	24	8×8	USART×1 UART×2 SPI×2 I ² C×2	CRC DIV LEDC	23	28SSOP		
HT32F54241*			64KB	8KB												26	32QFN		
HT32F54243*	60MHz	2.5V~ 5.5V	64KB	8KB	6CH	1Msps 12-bit x10	2	BFTM×2 SCTM×4 GPTM×1 MCTM×1	12	3	√	28	12×8	USART×2 UART×4 SPI×2 I ² C×3	CRC DIV LEDC	26	32QFN		
HT32F54253*			128KB	16KB												38	46QFN		
																		40	48LQFP
																		54	64LQFP

Arm® Cortex®-M0+ CAN Series

Cortex-M0+ 32-Bit CAN MCU																			
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	Timers ¹	Cap. ² / PWM	Cpm. PWM ³	RTC	EBI ⁶	CAN	Interface	Others	I/O	Package		
HT32F53242*	60MHz	2.5V ~ 5.5V	64KB	8KB	6CH	1Msps 12-bit×12	2	BFTM x2 PWM x2 GPTM x1 MCTM x1	16 / 16	3	√	√	1	USART x2 UARTx2 SPI x2 I ² C x2	CRC DIV LEDC	26	32QFN		
HT32F53252*			128KB	16KB												38	46QFN		
																		40	48LQFP
																		54	64LQFP

Arm® Cortex®-M3 General Purpose Series

Cortex-M3 32-Bit MCU																			
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	Timers ¹	Cap. ² or PWM	Cpm. PWM ³	RTC	SCI ⁴	USB ⁵	EBI ⁶	I ² S	Interface	Others	I/O	Package
HT32F12345	96MHz	2.0V ~ 3.6V	64KB	16KB	12CH	1Msps 12-bit x12	2	BFTM×2 GPTM×2 MCTM×2	16	6	√	—	√	√	√	SDIO×1 USART×2 UART×2 SPI×2, I ² C×2	CRC	37	46QFN
HT32F12365	96MHz	2.0V ~ 3.6V	256KB	64KB	12CH	1Msps 12-bit x16	2	BFTM×2 GPTM×2 MCTM×2	16	6	√	2	√	√	√	SDIO×1 USART×2 UART×2 SPI×2, I ² C×2	AES CRC	37	46QFN
HT32F12366			256KB	128KB														51	48LQFP
HT32F12364	72MHz	1.65V ~ 3.6V	256KB	128KB	6CH	1Msps 12-bit x8	—	BFTM×2 SCTM×2 PWM×1 GPTM×1	10	—	√	1	√	√	—	USART×1 UART×2 SPI×2, I ² C×2	AES CRC	32	40QFN
																		38	48LQFP
																		52	64LQFP

Arm® Cortex®-M3 Fingerprint Recognition Purpose

Cortex-M3 32-Bit Fingerprint MCU																			
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	Timers ¹	Cap. ² or PWM	Cpm. PWM ³	RTC	SCI ⁴	USB ⁵	EBI ⁶	CSIF ⁷	Interface	Others	I/O	Package
HT32F22366	96MHz	2.0V ~ 3.6V	256KB	128KB	12CH	1Msps 12-bit x16	2	BFTM×2 GPTM×2 MCTM×2	16	6	√	2	√	√	√	SDIO×1 USART×2 UART×2 SPI×2 I ² C×2 I ² S×1	AES CRC CSIF	37	46QFN
																		51	48LQFP
																		80	64LQFP
																		80	100LQFP

* Under development, available in 1Q, 2022.

Note: 1. BFTM: Basic Function Timer, SCTM: Single-Channel Timer, GPTM: General-Purpose Timer, MCTM: Motor Control Timer.

2. Cap.: Input Capture.

3. Cpm. PWM: Complementary PWM for 3-phase motor control or inverter application.

4. SCI: ISO7816-3 Smart Card Interface.

5. USB 2.0 Full Speed Device.

6. EBI: External Bus Interface for NOR Flash / SRAM / LCD.

7. CSIF: CMOS Sensor Interface.

Package Size

	24 SSOP	28 SSOP	28 SOP							
										
Size	3.9 × 8.6 mm	3.9 × 9.9 mm	7.5 × 17.9 mm							
Lead Pitch	0.64 mm	0.64 mm	1.27 mm							
Thickness	1.75 mm	1.75 mm	2.65 mm							
	24 QFN	32/33 QFN	40 QFN	46 QFN						
										
Size	3.0 × 3.0 mm	4.0 × 4.0 mm	5.0 × 5.0 mm	4.5 × 6.5 mm						
Lead Pitch	0.40 mm	0.40 mm	0.40 mm	0.40 mm						
Thickness	0.55 mm	0.75 mm	0.75 mm	0.75 mm						
	44 LQFP	48 LQFP	64 LQFP	80 LQFP	100 LQFP					
										
Size	10.0 × 10.0 mm	7.0 × 7.0 mm	7.0 × 7.0 mm	10.0 × 10.0 mm	14.0 × 14.0 mm					
Lead Pitch	0.80 mm	0.50 mm	0.40 mm	0.40 mm	0.50 mm					
Thickness	1.60 mm	1.60 mm	1.60 mm	1.60 mm	1.60 mm					

Naming Rules

HT32 **x** **x** **xx** **x** **x** **x**

Product Family

HT32 = Holtek 32-bit MCU

Product Type

F = Flash MCU

Product Core

- 1 = Cortex®-M3 Standard MCU
- 2 = Cortex®-M3 ASSP MCU
- 5 = Cortex®-M0+ Standard MCU
- 6 = Cortex®-M0+ ASSP MCU

Product Series

- 500 = 5.0V, Entry Level
- 502 = 5.0V, General Purpose
- 504 = 5.0V, General Purpose
- 522 = 3.3V, General Purpose
- 503 = 5.0V, USB
- 523 = 3.3V, USB
- 123 = 3.3V, USB
- 223 = 3.3V, USB
- 532 = 5.0V, CAN
- 542 = 5.0V, Touch
- 573 = 3.3V, LCD
- 590 = 5.0V, General + 24-bit ADC
- 597 = 3.3V, LCD + 24-bit ADC
- 611 = 5.0V, Smart Card
- 612 = 3.3V, Music
- 613 = 3.3V, Music + USB
- 65x = Motor Control

Optional Version

(NULL), A ~ Z = Revision Code from A to Z or null (blank)

Marketing Name

Functional Category : Serial number from 0 ~ 9

Flash Capacity

- 1 = 8 KB
- 2 = 16 KB
- 3 = 32 KB
- 4 = 64 KB
- 5 = 128 KB
- 6 = 256 KB
- 7 = 384 KB
- 8 = 512 KB
- 9 = 768 KB
- A = 1024 KB

HT32 MCU Development Tools

Good MCU development tools are a necessary requirement for any design process. In order to support the Holtek 32-bit M0+ and M3 core series of MCUs, Holtek and external vendors offer a complete set of software and hardware tools to assist users with easy prototyping and debugging. Holtek's starter kit contains all the basic hardware, including an embedded e-Link32 Pro that provides a simple connection to a PC, allowing users to develop products quickly.

Holtek's expansion boards contain a variety of common electronic components such as switches, LEDs, potentiometer, buzzers, IR components, etc., providing a flexible and complete system to ensure that users can quickly and easily learn how to use Holtek's 32-bit MCUs. A complete software library and comprehensive graphic documents ensure that customers can quickly develop 32-bit MCU-based products.



Holtek development tools can be purchased at Best Modules online shop

Development Resources

Development Resources

- Support multiple development environments and free Keil (Cortex®-M0+ series)
- HT32 firmware, application examples
- Datasheet, user manuals, application notes
- ISP/IAP/Writer tools

Firmware Library



- Peripheral Drivers
- Examples
- Board Support Driver

Development Environment

arm KEIL



USB Debug Adapter

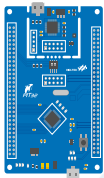
HT32 series online debug / programming tool



Model	Features
e-Link32 Pro	Arm® SWD USB debug adapter for the HT32 MCUs, CMSIS-DAP compliant.

Starter Kit

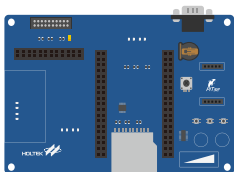
MCU I/O target board for prototyping, including an on-chip USB debug adapter



M0+ Series	Model	M0+ Series	Model
HT32F52342/52352	ESK32-30501	HT32F52344/52354	ESK32-30509
HT32F52331/52341	ESK32-30502	HT32F52357/52367	ESK32-30510
HT32F52231/52241	ESK32-30503	HT32F57342/57352	ESK32-30511
HT32F52220/52230	ESK32-30504	HT32F57331/57341	ESK32-30512
HT32F52243/52253	ESK32-30505	HT32F50343	ESK32-30515
HT32F50220/50230	ESK32-30506	HT32F54231/54241	ESK32-30518
HT32F50231/50241	ESK32-30507	HT32F54243/54253	ESK32-30519
M3 Series	Model	M3 Series	Model
HT32F12365/12366	ESK32-30105	HT32F12364	ESK32-30107
HT32F12345	ESK32-30106		

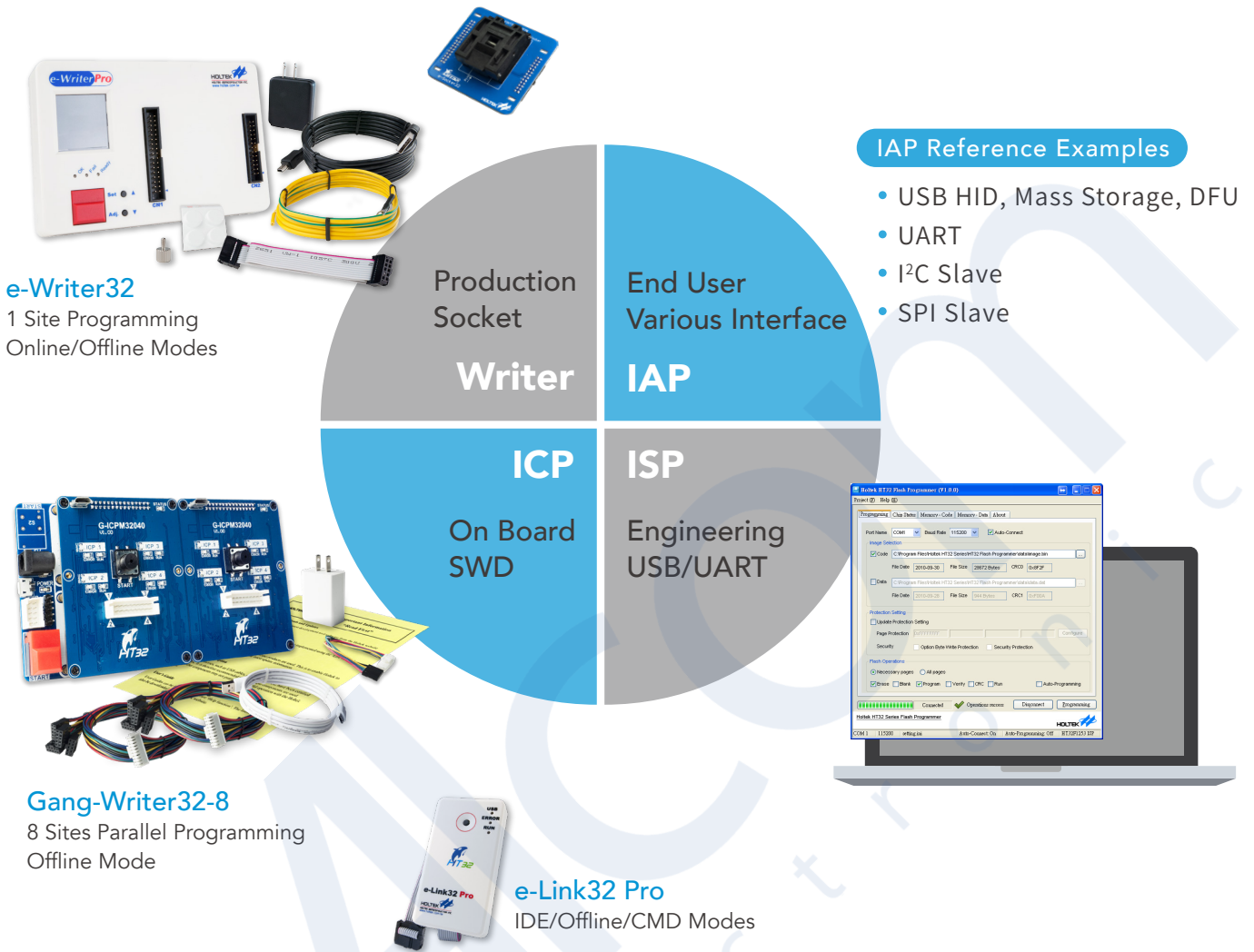
Expansion Boards

Functional extension of starter kit



Model	Features
ESK32-20001 ESK32-20001A	The basic expansion board is designed for use with the ESK-30xxx series of starter kits. Expansion board functions include: <ul style="list-style-type: none"> • User interfaces: 8080/SPI LCD connectors, buzzer, LEDs, potentiometer, keys, touch keys • Communication: RS232 and multiple interfaces for module expansion • Storage: EEPROM, SPI Flash, SD card slot
ESK32-21001 ESK32-21001A	Enhanced version of expansion board with added functions such as smart card connector, audio encoder/decoder, CMOS sensor interface, etc.

HT32 MCU Programming Methods



HT32 MCU Development Resources and Download Website

The development resources include datasheet, reference documents, schematics, HT32 firmware library, PC driver, tools, etc.

Resource Download

<http://mcu.holtek.com/ht32/resource/> 



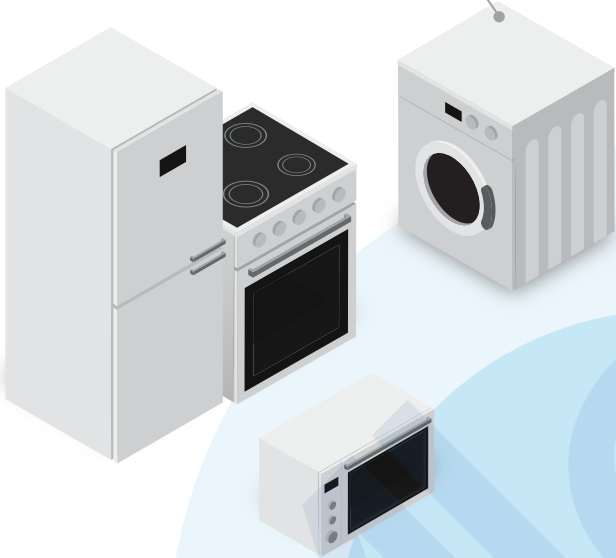
HT32F5 Series (Cortex®-M0+)
HT32_M0p_vxxxxxxx.zip

HT32F1 Series (Cortex®-M3)
HT32_M3_vxxxxxxx.zip

Application Products

Smart Home

More and more household appliances such as smart and connection type of products require 32-bit processing.



IoT/Wearable Devices

The demand for a low power consumption 32-bit MCU in wearable devices is growing.



USB Peripherals

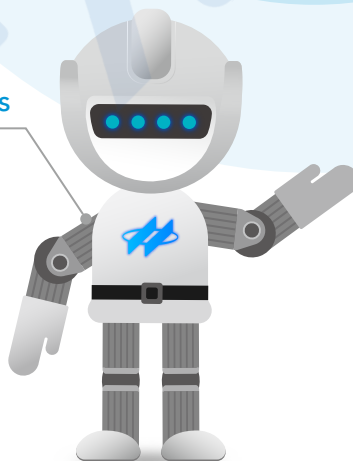
USB is still the most versatile interface and an essential feature of PC-related products.



Smart Products HT32 MCU Solutions

Intelligent Leisure Products

Higher-level leisure products require a 32-bit MCU in terms of computing power and cost efficiency.



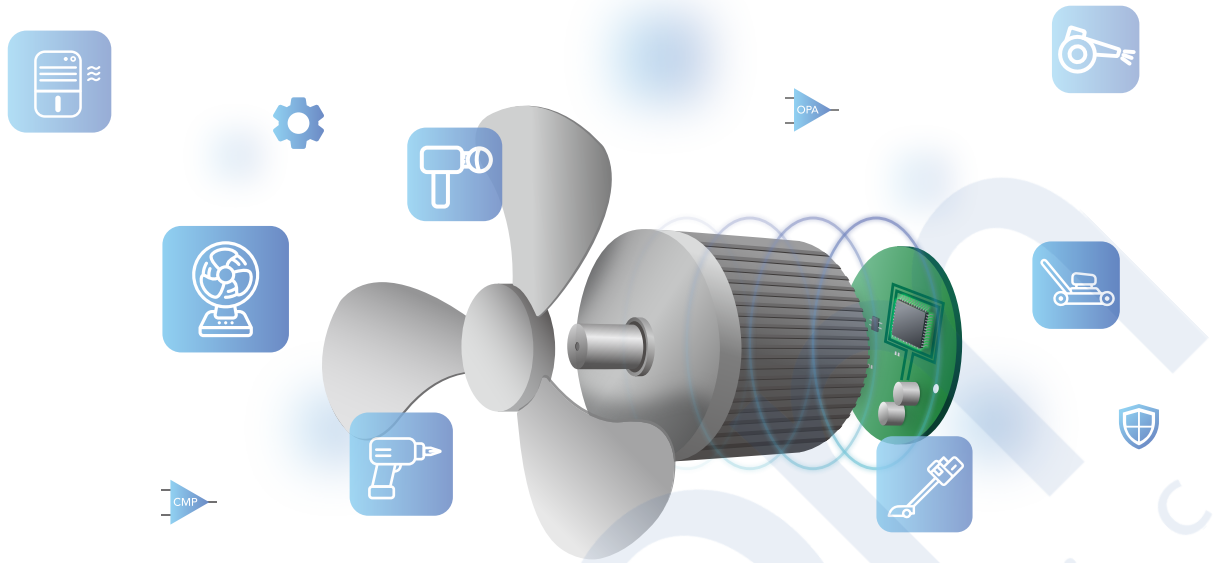
Data Processors/Recorders

32-bit processing capabilities are required for enhanced data processing.



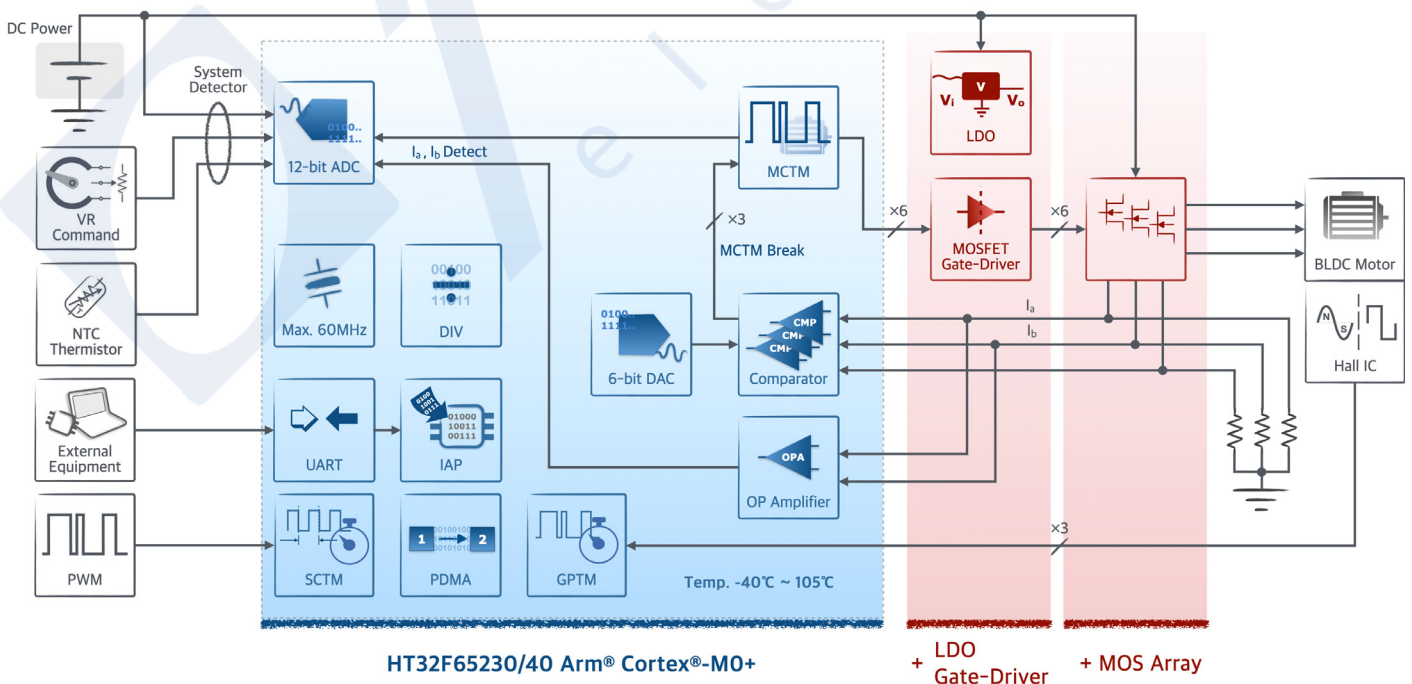
HT32 BLDC Motor Control Applications

BLDC MCUs with integrated intelligent gate-driver and driver



Under the global energy saving and carbon reduction requirements, the use of BLDC motor design for motor products has become a market trend. Its advantages are small size, high efficiency, low noise, long service life, high power density, etc., but the disadvantages lie in higher cost and high complexity of design techniques. Holtek has released a series of Arm® Cortex®-M0+ core BLDC microcontrollers, which support Hall sensor or sensorless FOC controls. For BLDC motor loads with different voltages and power, BLDC SoC MCUs with integrated intelligent gate-driver and driver are also introduced, which effectively reduces the hardware volume and the complexity of the PCB design. In addition, Holtek also provides a Workshop for motor parameter adjustment and software secondary development, assisting customers to rotate motor smoothly in a short period of time, and to mass-produce the finished BLDC products and introduce them into the market in time. With the IEC/UL 60730-1 software certification, the HT32F65xxx series can be widely used in applications such as the fast-growing industrial controls, household appliances, ceiling fans, kitchen ventilators, garden tools, robots, electric scooters, quadcopters, etc.

BLDC Motor Control Application Block Diagram



Arm® Cortex®-M0+ BLDC Motor Control Purpose Selection Guide

Cortex-M0+ 32-Bit BLDC Flash MCU																	
Part No.	Max. Freq.	VDD	Flash	SRAM	PDMA	ADC	CMP	OPA	Timer ^{*1}	Cap. ^{*2} or PWM	Cpm. PWM ^{*3}	RTC	Interface	Others	I/O	Package	
HT32F65232	60MHz	2.5V~5.5V	32KB	4KB	6CH	2Msps×1 12-bit×12	2	1	BFTM×2 SCTM×4 GPTM×1 MCTM×1 LSTM×1	12	3	—	USART×1 UART×1 SPI×1 I ² C×1	CRC DIV	20 28 44	24SSOP 32QFN 48LQFP	
HT32F65230			64KB	8KB		1Msps×2 12-bit×8	3	2	BFTM×2 SCTM×4 GPTM×1 MCTM×1			√			40	48LQFP	
HT32F65240																	

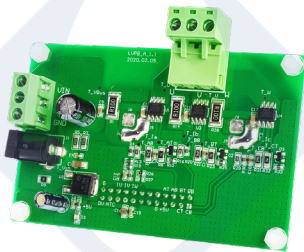
Note: 1. BFTM: Basic Function Timer, SCTM: Single-Channel Timer, GPTM: General-Purpose Timer, MCTM: Motor Control Timer, LSTM: Low Speed Timer.
 2. Cap.: Input Capture.
 3. Cpm. PWM: Complementary PWM for 3-phase motor control or inverter application.
 4. Operating Temperature: -40 °C ~ 105 °C.

Cortex-M0+ 32-Bit BLDC Flash MCU with Gate-Driver																		
Part No.	Max. Freq.	VCC (HV)	LDO	Gate-Driver	Flash	SRAM	PDMA	ADC	CMP	OPA	Timer ^{*1}	Cap. ^{*2} or PWM	Cpm. PWM ^{*3}	RTC	Interface	Others	I/O	Package
HT32F65432A**	60MHz	6V~38V	5V	3P3N	32KB	4KB	6CH	2Msps×1 12-bit×12	2	1	BFTM×2 SCTM×4 GPTM×1 MCTM×1	8	3	√	USART×1 UART×1 SPI×1 I ² C×1	CRC DIV	16 29	32QFN 48LQFP-EP
HT32F65532G		6V~48V		6N				2Msps×1 12-bit×11									22 26	46QFN 48LQFP-EP
HT32F65732G**		6V~110V		6N				1Msps×2 12-bit×11									28	48LQFP-EP
HT32F65440A**		6V~38V		3P3N	64KB	8KB		3	2	26							48LQFP-EP	
HT32F65540G		6V~48V		6N														
HT32F65740G**		6V~110V		6N														

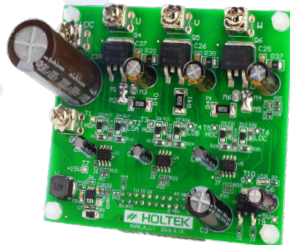
Cortex-M0+ 32-Bit BLDC Flash MCU with Driver																		
Part No.	Max. Freq.	VCC (HV)	LDO	Peak Current	Flash	SRAM	PDMA	ADC	CMP	OPA	Timer ^{*1}	Cap. ^{*2} or PWM	Cpm. PWM ^{*3}	RTC	Interface	Others	I/O	Package
HT32F65C32F	60MHz	6V~32V	5V	3.5A	32KB	4KB	6CH	2Msps×1 12-bit×12	2	1	BFTM×2 SCTM×4 GPTM×1 MCTM×1	8	3	√	USART×1 UART×1 SPI×1 I ² C×1	CRC DIV	16 29	32QFN 48LQFP-EP
HT32F65C40F					64KB	8KB		1Msps×2 12-bit×8	3	2	26						48LQFP-EP	

** Under development, available in 2Q, 2022.
 Note: 1. BFTM: Basic Function Timer, SCTM: Single-Channel Timer, GPTM: General-Purpose Timer, MCTM: Motor Control Timer.
 2. Cap.: Input Capture.
 3. Cpm. PWM: Complementary PWM for 3-phase motor control or inverter application.
 4. Operating Temperature: -40 °C ~ 105 °C.

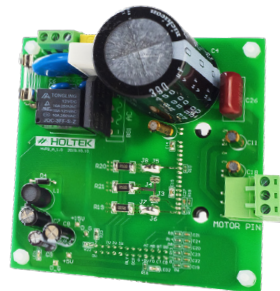
BLDC Motor Control Development Boards



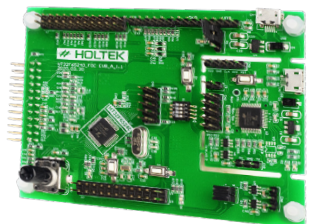
LVPB-A
DC 8V~26V/2.5A



MVPB-A
DC 15V~60V/20A



HVPB-A
AC 85V~265V/2.5A



FOC-EVB



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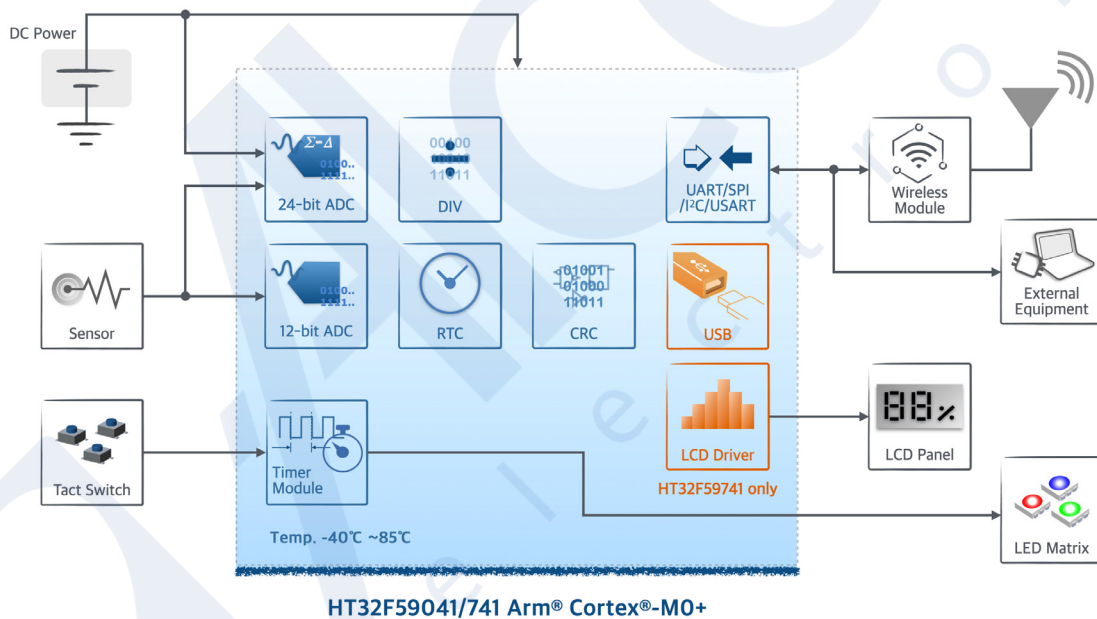
HT32 High Accuracy Measurement Applications

24-bit Delta Sigma ADC for high accuracy measurements



Holtek has released its new Arm® Cortex®-M0+ MCUs, the HT32F59xxx series, which are specially designed for high accuracy measurement applications. The integrated A/D converter has an Effective Number of Bits (ENOB) of up to 20.7 and has a conversion rate of up to 1.6 kHz, which combined with the 12-bit SAR A/D converter that has a conversion rate of 1 MHz, allows users to implement fast and accurate measurements. Other resources include an LCD display driver, USB, UART and other commonly used serial transmission interfaces. These make the devices suitable for a diversified range of applications including electronic scales, blood pressure meters, temperature meters, high accuracy industrial controls or instrumentation etc.

High Accuracy Measurement Application Block Diagram



Arm® Cortex®-M0+ High Accuracy Measurement Purpose Selection Guide

Enhanced 24-Bit A/D Cortex-M0+ 32-Bit MCU																
Part No.	Max. Freq.	VDD	Flash	SRAM	ADC		Timers ¹	Cap. ² or PWM	Cpm. PWM ³	RTC	Interface	Others	I/O	Package		
HT32F59041	20MHz	2.5V~5.5V	64KB	8KB	SAR ADC 1Mps 12-bit×12	Delta Sigma ADC 24-bit×4	BFTM×2 PWM×2 GPTM×1 MCTM×1	16	3	√	USART×1 UART×2 SPI×1 I ² C×1	CRC DIV	30	48LQFP		
Enhanced 24-Bit A/D Cortex-M0+ 32-Bit LCD MCU																
Part No.	Max. Freq.	VDD	Flash	SRAM	ADC		Timers ¹	Cap. ² or PWM	RTC	SCI ⁴	USB ⁵	LCD	Inter- face	Others	I/O	Package
HT32F59741	60MHz	1.65V~3.6V	64KB	8KB	SAR ADC 1Mps 12-bit×10	Delta Sigma ADC 24-bit×4	BFTM×2 PWM×2 GPTM×1	12	√	1	√	19×4 ~ 15×8	USART×1 UART×2 SPI×1, I ² C×1	CRC DIV	43	64LQFP

Note: 1. BFTM: Basic Function Timer, SCTM: Single-Channel Timer, GPTM: General-Purpose Timer, MCTM: Motor Control Timer.
 2. Cap.: Input Capture.
 3. Cpm. PWM: Complementary PWM for 3-phase motor control or inverter application.
 4. SCI: ISO7816-3 Smart Card Interface.
 5. USB 2.0 Full Speed Device.

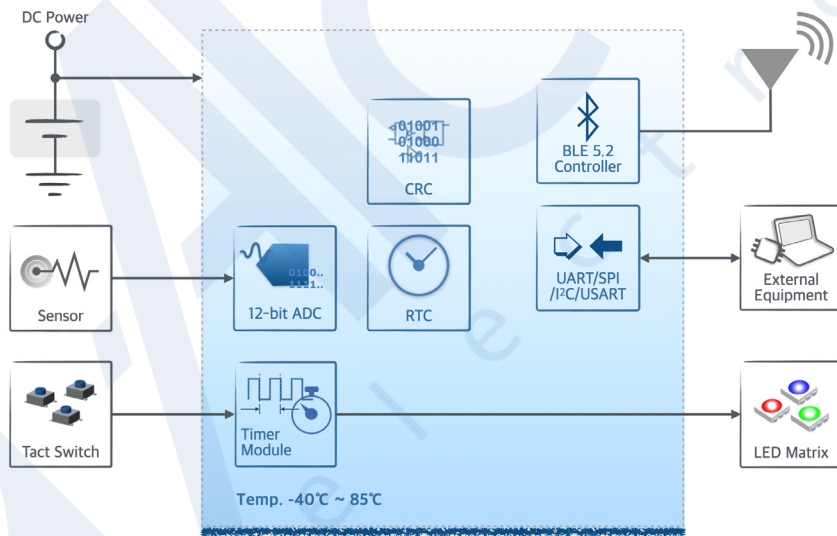
HT32 BT5.2 Low Power Bluetooth Applications

Bluetooth Low Energy wireless data transmission technology that meets the needs of Internet of Things (IoT) applications



Smart phones have led to the widespread popularity of Bluetooth devices. Audio transmission is a larger application of Bluetooth peripherals, following are data transmission (e.g., wearable devices or healthcare) and location services (e.g., indoor guidance or dissemination of point-of-interest information). For the latter two applications, Holtek has released a Bluetooth low energy Arm® Cortex®-M0+ dual-core SoC MCU, the HT32F67741, which has passed the BLE5.2 BQB (Bluetooth Qualification Body) certification. The device is suitable for use in health care products, home appliances, beacons, intelligent leisure products, data loggers, human interface devices (HID) service, etc.

BT5.2 BLE Low Power Bluetooth Application Block Diagram



HT32F67741 Arm® Cortex®-M0+

Arm® Cortex®-M0+ BLE Bluetooth Purpose Selection Guide

Cortex-M0+ 32-Bit BLE MCU														
Part No.	Max. Freq.	VDD	Flash	SRAM	ADC	Timers #	Ver.	Data Rate	Output Power	Sensitivity	Interface	Others	I/O	Package
HT32F67741	40MHz	2.0V~3.6V	64KB	8KB	1Mps 12-bit×6	RTC×1 WDT×1 BFTM×2 SCTM×4 GPTM×1 MCTM×1	5.2	1/2Mbps	+3.5dBm	-94/-91dBm	USART×1 UART×2 SPI×2 I²C×2	CRC×1 TRNG×1	25	46QFN

Note: # BFTM: Basic Function Timer, SCTM: Single-Channel Timer, GPTM: General-Purpose Timer, MCTM: Motor Control Timer.