

MT2533D

Dual-mode Bluetooth IOT chipset
with integrated audio DSP

MEDIATEK

MediaTek MT2533D is a highly integrated chipset containing a microcontroller unit (MCU), audio Digital Signal Processor (DSP), dual-mode Bluetooth radio, display and camera components, and a wide range of sensor and peripheral interfaces.

The chipset's MCU is an ARM Cortex-M4 processor with floating point unit, integrated with 4MB PSRAM and 4MB flash memory. For its audio functions, a power efficient Tensilica HiFi Mini DSP is built in. This DSP supports multiple codecs, dual microphone with dual microphone noise reduction (DMNR) and speech enhancement features including support for third-party software for voice wake-up.

The Bluetooth subsystem supports dual-mode Bluetooth 2.1 and Bluetooth 4.2 Low Energy. It contains the Bluetooth radio, baseband and link controller.

The display component supports MIPI-DSI and serial interfaces. It provides 2D capabilities of true color, per pixel alpha channel and anti-aliasing fonts, plus 1-bit index color to save memory and computing power. The camera component supports DDR mode with a maximum clock rate of 48MHz, up to VGA.

MT2533D also supports interfaces including UART, I2C, SPI, I2S, PWM, SDIO, MSDC, USB, PCMIF, ADC and dual digital MIC.

Platform



- 208MHz ARM® Cortex®-M4 processor with FPU
- Hardware DFS from 26MHz to 208MHz
- 17 DMA channels
- Crypto engine AES 128/192/256 bits
- True random number generator
- Operating temperature from -40°C to 85°C

Memory



- 160kB SRAM with zero-wait state and 208MHz maximum frequency
- 32kB L1 cache with zero-wait state and 208MHz maximum frequency
- 4MB flash with sleep current down to 100nA and 78MHz maximum frequency
- 4MB pseudo SRAM with sleep current down to 10µA and 104MHz maximum frequency
- eMMC supported through the SDIO interface

Connectivity



- USB 2.0, 3 UARTs, 3 I2Cs, I2S, 6 PWMs, 4 SPI masters, SPI slave, SDIO v2.0 and 5-channel ADC
- Supports 38 GPIO ports

TARGET APPLICATIONS

Bluetooth headsets

Stand-alone, wireless music headsets

Travel earpieces

Vehicle hands-free systems

Bluetooth speakers

BENEFITS

Highly integrated with RF, MCU and memory

Low power mode with RTC

Supports multiple frequency modes to offer improved and extended battery life, while maintaining high performance

Fast 7µs wakeup from sleep mode to active mode

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Bluetooth



- Dual mode Bluetooth 2.1 and Bluetooth 4.2 Low-Energy
- Integrated T/R switch, Balun and PA
- PA provides 7.5dBm output power
- Bluetooth and Bluetooth Low-Energy receiver sensitivity of -93dBm and -96.5dBm, respectively
- Up to 7 simultaneous active ACL links
- 1 SCO or eSCO link with CVSD/mSBC coding

Display



- Hardware 2D accelerator supporting 4-layer overlay, alpha blending, font drawing, 7 types of rotation bitblit and display rotation. It also supports ARGB8888, RGB888, RGB565 and ARGB6666 pixel formats
- DBI serial interface supporting 320 x 320 pixels at 30fps
- 1-lane MIPI DSI interface supporting 480 x 320 pixels at 30fps

Technology and Package



- Highly integrated chipset technology
- 6.2 x 5.8 x 1.05mm 172-ball TFBGA with 0.4mm pitch

Audio



- AAC/SBC for Bluetooth audio
- CVSD/mSBC for Bluetooth speech
- PCM playback: 8-48kHz sample rate
- PCM record: 8kHz and 16kHz sample rate
- Dual-mic noise suppression and acoustic echo cancellation
- Beamforming

Camera



- MediaTek camera serial interface
- VGA 30fps with YUV422 or RGB565

Figure 1. MT2533D

