深圳市海天雄电子有限公司
Shenzhen Haitianxiong Electronic Co., Ltd.

CES-BME5260

Product Manual

Biomedical Electronic Experimental Box

Rev. V1.0

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Introduction

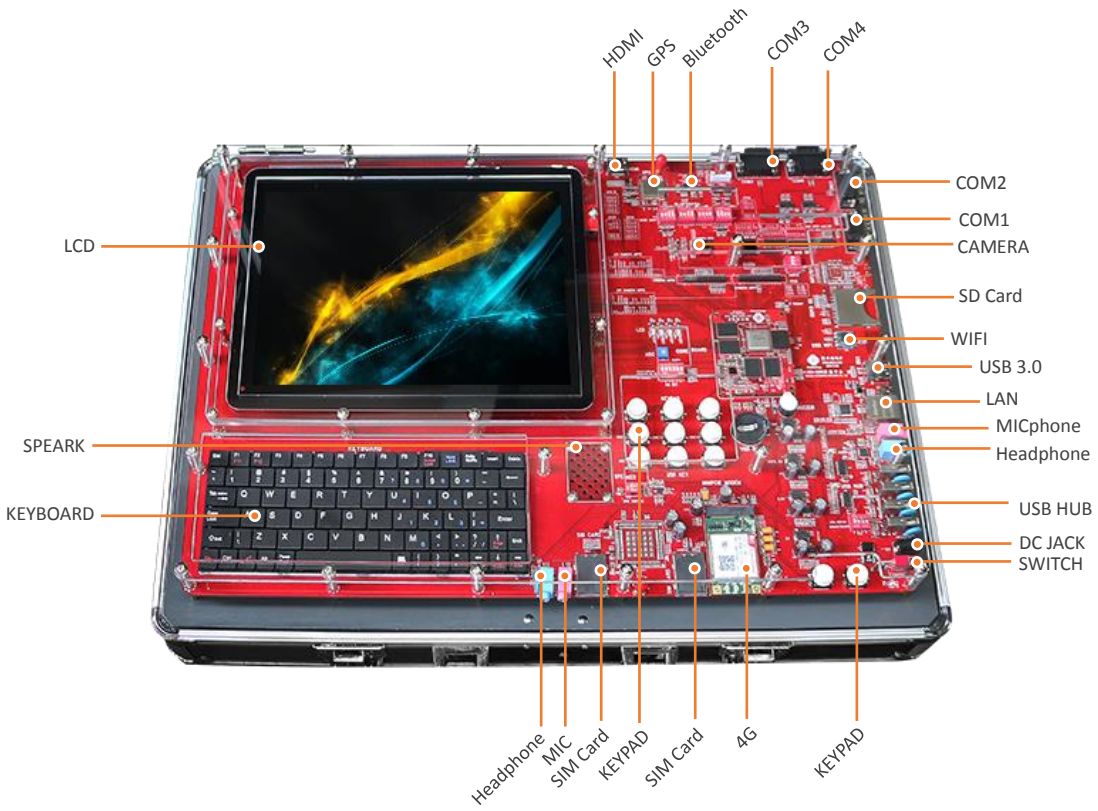
CES-BME5260 biomedical electronic experiment system consists of two parts: embedded system and biological data acquisition. The system integrates embedded microprocessor technology, MMC data storage technology, embedded OS system software technology, data processing technology, network communication technology, biosensor technology, medical imaging technology and other key technologies. The embedded system adopts the mainstream 32-bit embedded ARM solution. The hardware of the device covers the common functional circuits involved in embedded applications including serial communication circuit function, USB main port circuit function, USB slave port circuit function, SD memory card peripheral interface circuit, display LCD interface circuit, touch interface circuit and multi-expansion applications' wireless communication module functions. Biological data collection consists of different medical sensors, through the data protocol with the host computer for data communication. The device software runs an intelligent OS operating system that supports real-time and parallel system tasks. The experimental box provides open software and hardware technical materials, complete experimental software and experimental tutorials, especially suitable for information technology teaching, researching and other applications

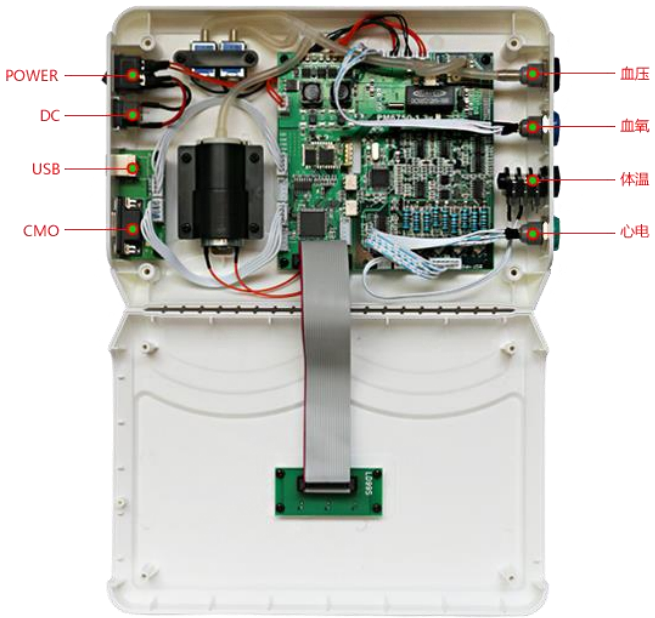
Features

- Embedded ARM Cortex-A15 Exynos5260, six-core processor, frequency up to 1.7GHz
- Onboard 2GB DDR3 and 16GB iNAND FLASH
- Support 9.7-inch eDP interface display, resolution 2048 * 1536px
- Configure mobile 4G communication module, WiFi wireless module, Bluetooth module, GPS, Camera etc.

- Provide Android4.4.2 and Linux3.4.39 operating system package, software is divided into blood oxygen, body temperature, pulse, ECG, blood pressure, breathing unit.
- Provide the experimental routines, program analysis under this system

Function Interfaces





Hardware Parameters

CPU	Samsung Exynos5260, six-cores: dual-core Cortex-A15 + quad-core Cortex-A7, frequency up to 1.7GHz
RAM	2GByte, Samsung K4B4G1646Q DDR3 memory chip, frequency is 1600MHz
FLASH	16GByte, Samsung KLMAG2GEAC iNAND chip
PMU	S2MPA01 power management chip
4G	Support ZTE SIM 7100C chipset, PCI MINI Care interface
WiFi	Support IEEE802.11b / g / n agreement, SDIO interface
GPS	Support SID III global positioning, UART serial data interface
Bluetooth	For high-speed Bluetooth data communications
Camera	800-megapixel camera, Samsung S5K3H7 camera module
LCD	Configuration 9.7-inch capacitive touch LCD screen, pixel 2048 * 1536, LED backlight
Ethernet	10M / 100M Ethernet interface, using DM9621ANP card chip
Audio	IIS signal, WM8976 high quality chip, with amplifier and speaker
HDMI	1*HDMI
UART	4*UART
SD/HSMMC	For SD card WIFI
USB	4*USB2 .0 , 1*USB 3.0
I/O	Lead IO pin for control and interrupt
IRDA	1 set of infrared detection device
RTC	Internal RTC (with back-up lithium battery)
External Power	AC220 DC12V/5A power adapter
Installation method	The motherboard is fixed on the board of the experimental chassis by screws, and a transparent acrylic plate is added to cover the motherboard to prevent the students from damaging the equipment due to frequent contact with the motherboard while in using

Size	51*38*15CM
Medical Module	Blood oxygen, body temperature, pulse, ECG, blood pressure, breath modules

Medical Module

Medical Module	**(A) Blood Oxygen, Body Temperature, Pulse, Blood Pressure Modules** Function: Clinical analyzer to monitor human oxygen saturation, human body temperature and pulse rate Communication Interface: USB communication, RS232 two options, baud rate 4800/115200 optional Module working environment: Working voltage: 5V ± 5%, quiescent current: <20mA, measuring current: <40mA • Blood Oxygen Module Performance Indicators Measuring range: 50 -100% Resolution: 1% Accuracy: ± 1% (85% -100%), ± 2% (70% -84%), ± 3% (50% -69%) • Body Temperature Module Performance Indicators Measuring range: 20 -50 ℃ Resolution: 0.1 ℃ Accuracy: ± 0.2 ℃ • Pulse Module Performance Indicators Measuring range：25-250BPM Resolution：1BPM Accuracy：±1% • Blood Pressure Module Performance Indicators Measuring range: -20 ~ 800mmHg Resolution: 1 mmHg Accuracy: ± 1% **(B) ECG Module** Function: up to 7 channels of ECG detection waveforms, 5-lead ECG cable, optional filtering bandwidth, adjustable ECG sensitivity, with defibrillation, anti-myoelectricity, power grid interference Module performance indicators:

	Signal input range: ± 20uV ~ ± 10mV Polarization voltage: ± 350mV Common mode rejection ratio: Diagnostic mode:> 90dB ,Guardianship or surgical mode:> 110dB Filter bandwidth (frequency response): Diagnostic mode: 0.05 ~ 100Hz, Monitoring mode: 0.5 ~ 40Hz, Operation mode: 1 ~ 20Hz Gain selection: 4 gears optional: × 0.25, × 0.5, × 1, × 2 Accuracy: 5% Calibration signal: Amplitude: 1mV (peak to peak), Accuracy: 3%; **（C）Breath Sensor** Measuring range: 5 ~ 150bpm Background impedance range: <4KΩ Accuracy: 2%±2bpm

Software Parameters——Android 4.4.2

Operating system	Android 4.4.2
Kernel	Linux 3.4.39
Bootloader	U-boot2012.07
Serial Debugging Tools	DNW V1.01（XP）、Minicom（Ubuntu）
Cross Compiler	Arm-2009q3（gcc4.4.1）
File System	Ramdisk，Ext4
GUI	Android 4.4.2
4G Module	Provide driver to achieve web browsing, send and receive messages
WiFi Module	Support 802.11b / g / n to achieve internet access
Bluetooth Module	Support serial Bluetooth driver (RDA)to achieve Bluetooth data communication, file transfer
Camera Module	Supports MIPI Camera driver and functions include preview, photographs, video, etc. Source programs are provided.
GPS Module	UART serial data interface for SIF III global positioning
Ethernet Unit	10M/100M adaptive network port driver for Web-surfing. Source programs are provided

HDMI Display	Supports HDMI output with image and voice. Source programs are provided
AUDIO Driver	I2S communication protocol for audio presentations. Source programs are provided
LCD Display	Support 9.7-inch eDP screen (pixel 2048*1536) Driver. Source programs are provided
TOUCH Driver	I2C communication protocol for capacitive multi-touch. Source programs are provided
I2C Driver	Camera、HDMI、PMIC are all driving by 2CDriver.Source programs are provided
USB HOST 2.0 Driver	Support mouse, keyboard, U disk. Source programs are provided
USB OTG 2.0 Driver	Support ADB and MTP functions. Source programs are provided
USB HOST 3.0 Driver	Support dual-channel communication with both OTG and HOST functions
Keypad Driver	Support buttons for volume control. Source programs are provided
SD/MMC Driver	Support maximum 32GB software. Source programs are provided
UART Driver	4 UART interfaces for serial debugging and serial communication
MFC Driver	Provide MFC multimedia video format codec
JPEG Driver	JPEG CODEC
2D Driver	2D hardware acceleration
3D Driver	3D hardware acceleration（Mali-T628 MP3）
FIMC Driver	Support V4L2 video image processing
GPIO Driver	Interface for connection with outside GPIO and interruption
IRDA Driver	Support serial infrared
RTC Driver	Support real-time clock
G-Sensor Driver	Support G-Sensor Driver
SPI Driver	Support SPI protocol

Software Parameters——Linux 3.4.39

Operating system	Linux 3.4.39

Kernel	Linux 3.4.39
Bootloader	U-boot2012.07
Cross Compiler	Arm-2009q3（gcc4.4.1）
Serial Debugging Tools	DNW V1.01（XP），Minicom（Ubuntu）
File System	Ext4
GUI	QT4.8.5
WiFi Module	Support 802.11b / g / n to achieve internet access. Driver programs are provided
GPS Module	Supports SIF III global positioning
LAN Module	10M/100M adaptive network port driver for Web-surfing.
Audio Driver	Support audio display
LCD Display	Support 9.7-inch capacitive touch eDP interface screen(pixel 2048*1536).Source programs are provided
TOUCH Driver	Single-point capacitive touch. Source programs are provided
I2C Driver	Support Audio I2CDriver program
USB HSIC Driver	HOST Driver, support for external mouse, keyboard, u disk, Bluetooth and other USB peripherals
USB OTG Driver	Host / Device Driver, host function supports external USB mouse. device function supports ADB and MTP. Source programs are provided
USB 3.0 Driver	Host/Device Driver
MMC Driver	Support high-speed SD / MMC card and SDIO
MFC Driver	Multi-Format Video Codec
UART Driver	Serial communication driver, source programs are provided
JPEG Driver	JPEG CODEC
2D Driver	2D hardware acceleration
3D Driver	3D hardware acceleration（Mali-T628 MP3）

Product Configuration List

	User CD		Power adapter
	Experimental tutorial		Touch pen
	Serial line		Camera
	LAN cable		4G Module
	USB cable		Temperature probe
	Multi-parameter monitor module		Blood pressure cuff
	ECG lead wire		Power adapter
	Blood oxygen finger clip		SD card (optional)

Service Support

Technical Support Contact:

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Technical Support Service Hours:

Monday to Friday：9：00～12：00，13：30～18：00

Disclaimer

This manual information is for reference only, and is subject to change without notice.

For more product information, please visit www.nrisc.com

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