CES-EDU4412-II

Product Manual

Cortex-A9 Teaching Platform
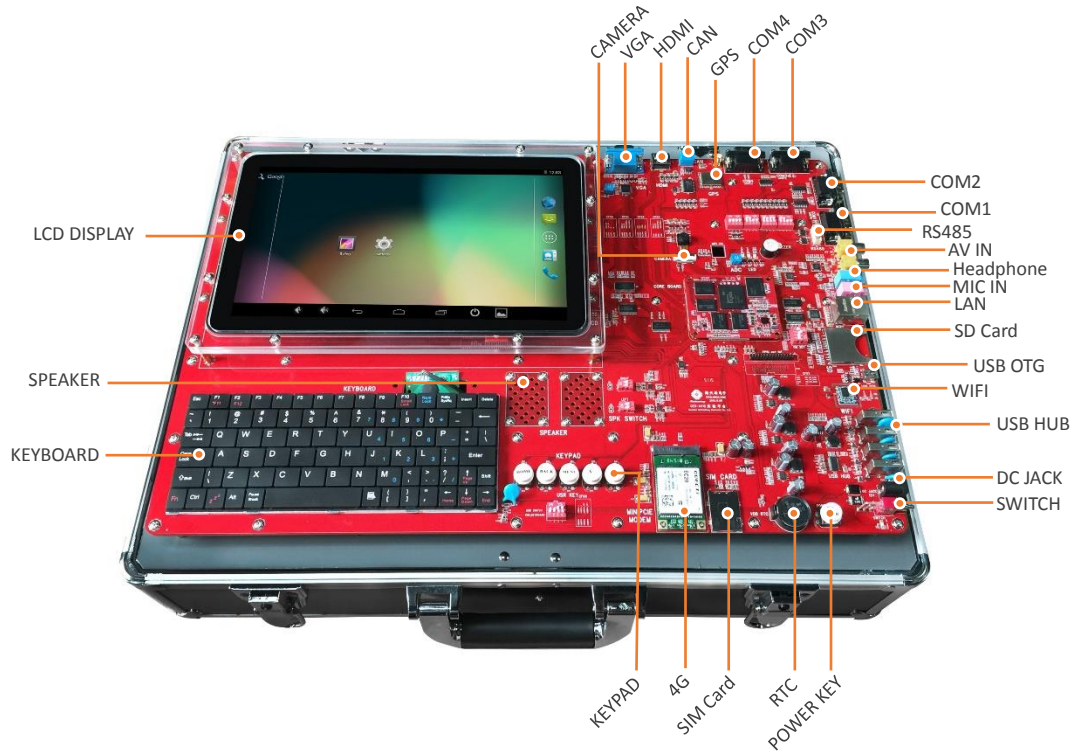
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Platform introduction

CES-EDU4412-II teaching platform is a high professional, integrated, functional embedded teaching platform. With the development trend of embedded technology, this teaching platform integrates the core technology of embedded. The platform design concept comes from the mature product design scheme, which is a more systematic and product-oriented teaching experiment platform.
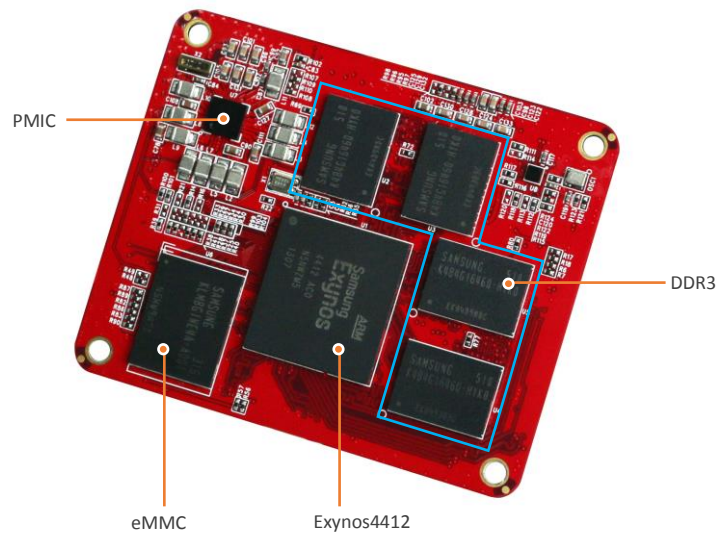
CES-EDU4412-II teaching platform based on 32-bit ARM Cortex-A9 Exynos4412 quad-core processor, frequency up to 1.4GHz. Configured with the current mainstream Android4.4.4 and Linux3.0 operating system. The hardware of the experimental case includes core board and expansion board. The core board integrates the embedded microprocessor, memory chipset and flash memory chip combination power management circuit, and the expansion board includes hardware interface, onboard function and extended function module. Support 4G full Netcom, wireless WiFi networks and ethernet internet access. It also has the functions of GPS navigation, 3 million pixel camera and so on. Hardware interface includes USB, I2C, UART, SPI, HDMI, LAN etc.

CES-EDU4412-II teaching platform equipped with Embedded Cortex-A9 Advanced Experimental Course II as a college experiment teaching material. Students can use the open software resources of this platform to learn and master the embedded core technology. Software resources include Android and Linux dual operating system software package, allowing students a deeper understanding of the embedded operating system, developing the ablities of independent research and development.

Functional interface

Labels on functional interface:
- CAMERA
- VGA
- HDMI
- CAN
- GPS
- COM4
- COM3
- COM2
- COM1
- RS485
- AV IN
- Headphone
- MIC IN
- LAN
- SD Card
- USB OTG
- WIFI
- USB HUB
- DC JACK
- SWITCH
- LCD DISPLAY
- SPEAKER
- KEYBOARD
- KEYPAD
- 4G
- SIM Card
- RTC
- POWER KEY

CoreBoard

Labels on CoreBoard:
- PMIC
- DDR3
- eMMC
- Exynos4412

Hardware Parameters

CPU	Samsung Exynos4412 Quad-core Cortex-A9 SCP package, frequency at 1.4GHz. Support 1MB L2cache, package is 0.65mm, pitch FCFBGA-786, dual-channel DDR3 (1066Mbps)
RAM	2GB DDR3 , speed rate is 800MHz
eMMC	8GB eMMC storage capacity
3D accelerator	ARM Mali-400 MP Core (Quad Fragment processors)
PMIC	Adopt Samsung's S5M8767A, with 9*DC / DC and 28 *LDO output power to achieve intelligent, low power consumption
SOC Module Interface Socket	Choose Panasonic's 0.5mm chip socket, stable and reliable, the overall height significantly reduced, leads to 400 function pins, including I2C bus, I2S bus, SPI bus, 16bit address / data bus, USB, HDMI, UART, LCD, etc.
4G	Using the remote (QUECTEL) EC20 module to achieve full Netcom, fast Internet access, send and receive text messages
WiFi	Support 802.11b / g / n standard
GPS	Currently the highest sensitivity, tracking sensitivity of -165dBm, capture -148dBm
CMOS Camera	Support 3million pixel camera
USB 2.0 OTG	1 *OTG 2.0 slave device port
USB HOST(HUB)2.0	4 *USB HOST interface, connect a variety of USB devices (such as keyboard, mouse, etc.)
SD/HSMMC	4* SDIO port for eMMC, MMC / SD and so on
UART interface	4 *UART port, baud rate up to 115200bps, used to connect GPS, print debugging information
MIPI interface	MIPI display interface
HDMI interface	HDMI 1.4 (1080P / 60Hz) video output interface
LCD Touch Screen	10.1-inch capacitive touch LCD display, resolution of 1024 * 600
VGA Display	1 *standard VGA output interface, supports a variety of VGA LCD
LVDS Display	LVDS interface (4 differential signals)
Ethernet Port	1 *10M / 100M RJ45 Ethernet interface
Audio	IIS signal, the choice of Wolf's WM8960GEFL, stereo input / output
Digital Audio Output Interface	1 * S / PDIF5.1Channel Audio I / F, can transmit PCM stream and Dolby Digital, DTS surround compressed audio signal, as an expansion interface

Function Keys	Including the power button, reset button, interrupt button
LED lights	3 GPIO controlled LED lights
Acceleration	±2g to±16g , I2C interface
Battery	For RTC use, round lithium battery (3V)
External Power Supply	DC JACK power supply seat, 12V/5A DC power supply, with power switch and indicator
Expansion interface	Leads to the user needs signals, including bus, interrupt, I/O and so on

Software Parameters——Android4.4.4

Operating System	Android 4.4.4
Kernel	Linux 3.0.15
System Boot Program	U-boot2010.12
Serial Debugging Tool	Minicom serial terminal
Cross Compilation Tools	Arm-2009q3（gcc4.4.1）
File Format	Ramdisk，Ext4
GUI	Android 4.4.4 KitKat
4G	Support SMS, Internet and other functions
WiFi	Support 802.11b / g / n wireless protocol, Internet access
Camera	Support CMOS Camera driver, support preview, camera, video function
GPS	Supports SIF Ⅲ global positioning, UART serial data interface
LAN	10M / 100M adaptive network port driver, support for ethernet function, providing source code
HDMI	Support HDMI output, images and sound, providing source code
Audio	I2S communication protocol, support for audio playback, providing source code
LCD	10.1-inch capacitive touch LCD display
TOUCH	I2S communication protocol, multi-point capacitive touch, providing source code

VGA	Default support 1024 * 768 resolution, providing source code
USB HOST	Support HOST function, mouse, keyboard, U disk, etc., providing source code
USB OTG	Support ADB and MTP functions, providing source code
Keypad	Support five GPIO button functions, providing source code
SD/MMC	Support high-speed SD / MMC card, the software max support 32GB, providing source code
UART	4 UART ports, support for debugging serial port and communication serial port functions
RTC	Supports RTC function
G3D	3D Graphics Acceleration (Mali-400MP)
IP Camera	Support video, 24-hour real-time monitoring, alarm monitoring

Software Parameters——Linux3.0

Operating System	Linux 3.0
Kernel	Linux 3.0.15
System Boot Program	U-boot2010.12
Cross Compilation Tool	Arm-2009q3（gcc4.4.1）
File System Format	BusyBox1.19.2，Ext4
GUI	QT4.8.5
Video Player	MPlayer1.1
WiFi	Support 802.11b / g / n wireless protocol, providing driver source code
Camera	Support CMOS Camera and USB UVC Camera, provide the driver source code
LAN	10M / 100M adaptive network port driver, support ethernet function, provide the source code
HDMI	Support HDMI output, images and sound, providing the source code
Audio	Support audio playback capabilities, provide the driver source code
LCD	10.1-inch capacitive touch LCD display
TOUCH	Single-point capacitive touch

VGA	Default support 1024 * 768 resolution, providing driver source code
USB HOST	Support HOST function, mouse, keyboard, U disk, etc., provide the driver source code
USB OTG	Support g_file_storage、g_mass_storage、g_ether function
Keypad	GPIO button drive
SD/MMC	Support high-speed SD / MMC card
UART Driver	Support debugging serial port and communication serial port functions
RTC Driver	Support RTC function

Product Configuration List

	User CD		Power Adapter
	Experimental Tutorial		Touch Pen
	Serial Line		Camera（Optional）
	Cable		4G module（Optional）
	USB Cable		SD card（Optional）
	USB to Serial Port		IP Camera（Optional）

Accessories Parameters——4G

4G module using Quectel_EC20, to achieve the whole Netcom, to fast Internet access, send and receive messages.

◆ Support GSM：900 /1800MHz   ◆ Support LTE FDD：B1/B3/B8

◆ Support WCDMA：B1/B8   ◆ Support LTE TDD：B38/B39/B40/B41

◆ Support TD-SCDMA：B34/B39   ◆ Support LTE/WCDMA/TD-SCDMA receive diversity

Accessories Parameters——IP Camera

Feature	Function	Body size is small, the use of software limit and the perfect combination of hardware, more stable.
System	Operating System	Embedded Linux
	System Safety	Three levels of user rights management
System	Number of online users	4 users watch online at the same time
	Dynamic DNS	Comes with dynamic DNS
	Control Protocol	ONVIF2.4 agreement, global agreement, enhance product interoperability
	Processor	Uses a powerful, high-performance programmable media HiSoft processor with built-in ARM926@Max.440MHz and high-speed video coprocessor
	Reset	Press and hold for 15 seconds to restore factory settings
Collection	Image Sensor	1/4 inch 720p progressive scan CMOS sensor
	Sensor performance	Support automatic white balance, automatic gain control, automatic backlight compensation
	Sensor size	3.84*2.16mm
	Signal to noise ratio	≥39dB
	Minimum illumination	0.8Lux / F1.4 (color mode), 0.3Lux / F1.4 (black and white mode)
	Lens / viewing angle	3.6mm@F1.4/56.14°
	Night vision	Dual filter automatically switch, 9 *850nmΦ infrared light, night vision more clear ,night view 10 meters
	IR Control	IR open, night vision function enabled, infrared, ICR automatic detection; IR closed, night vision function disabled, infrared extinguishing, ICR fixed in day view mode
Video	Compression standard	H.264 Main Profile/H.264 Baseline Profile/MJPEG/JPEG Baseline
	Video coding processing	CBR / VBR two rate control mode, and the output rate range of 128 ~ 4096kbps
	Resolution	720p/VGA/QVGA
	Bit rate	CBR / VBR two rate control mode, and the output rate range of 128 ~ 4096kbps
	Maximum frame rate	25fps

	Image adjustment	Brightness, contrast, saturation, color adjustable
Audio	Input	Built-in 48dB microphone
	Output	Built-in speaker (8Ω1W)
	Sampling frequency / bit width	8KHz/16bit
	Compression Standard / Bit Rate	ADPCM/32kbps
LAN	Network Interface	10Mbps/100Mbps, adaptive / RJ45 interface
LAN	Network Protocol	TCP/IP, HTTP, TCP, UDP, SMTP, FTP, DHCP, DNS, DDNS, NTP, UPnP, RTSP , P2P,etc
	Wireless network	WiFi802.11b/g/n
	Antenna	3dBi antenna, the signal is stronger and more stable
	Wireless network security	One key WIFI settings
Storage	Storage method	Local storage / client storage, support 128GTF card storage, support for pre-recorded alarm
	Interface	Micro SD
Cloud Terrace	Rotation angle	Horizontal 280 ° / vertical 80 °
	Preset position	15 preset positions
	Limit method	Using software limit, preset more accurate, PTZ failure rate is low
Alarm	Alarm detection	Motion Detection
	Alarm action	Image E-mail / FTP upload pictures
Physical Instructions	Rated voltage	DC5/2A±0.3V
	Power consumption	Rated power: 3.0W (infrared light on)
	Working environment	Working temperature: -20～70 ℃, working humidity 90%
	Weight	Gross Weight: 615g (Note: subject to physical)
	Shell material	ABS plastic
	Packing Size	208 * 154 * 137mm (L * W * H)
	Installation method	Wall hanging, ceiling

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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