

DevKit1207 Evaluation Kit

- *120MHz STM32F207IGT6 ARM Cortex-M3 32-bit Flash Microcontroller*
- *CPU Internal 1MBytes of Flash and 128 (system) +4 (backup) KBytes of SRAM*
- *USB2.0 OTG Full-speed Port and USB2.0 OTG High-speed Port*
- *3.5-inch TFT LCD and 4-wire Resistive Touch Screen*
- *10/100 Ethernet with IEEE 1588v2, CAN2.0B, UART, IrDA, TF, Audio, JTAG,...*
- *G-sensor 3-Axis Acceleration Sensor*
- *Supports for uC/OS-II and FreeRTOS Real-time Operating Systems*

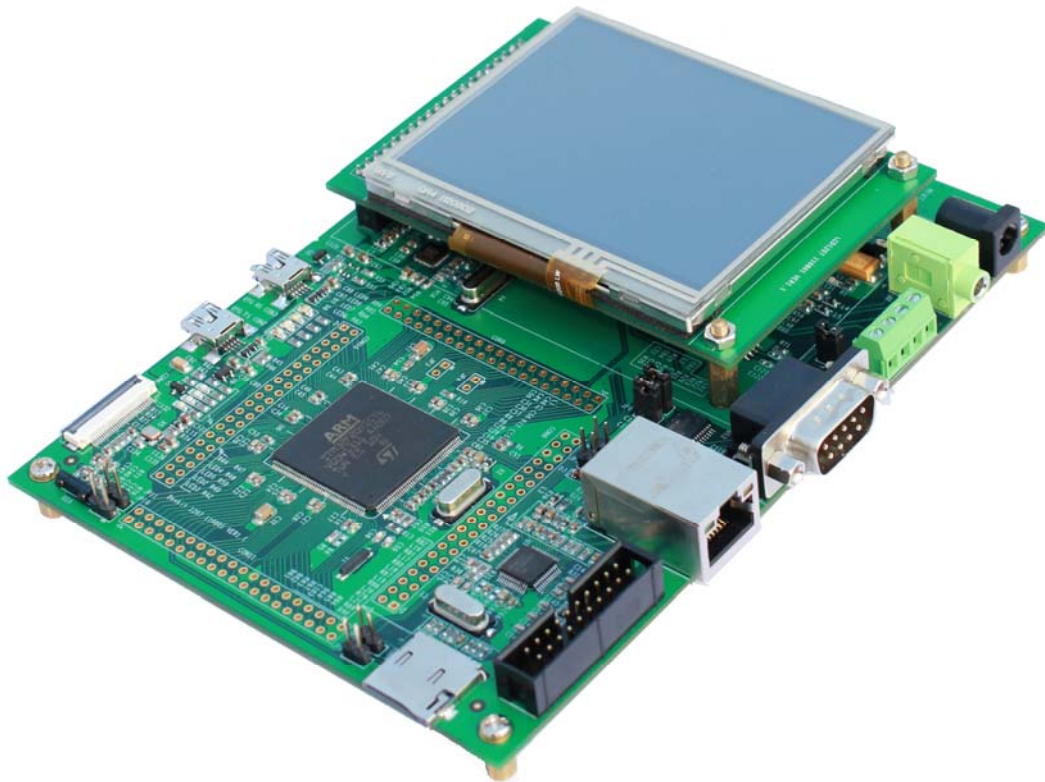


Figure 1-1 DevKit1207 Evaluation Board with 3.5" LCD and Touch Screen

Overview

The STMicroelectronics' STM32F207IGT6 flash microcontroller is among STM32F207xx family, which is based on the high-performance ARM Cortex-M3 32-bit RISC core operating at a frequency of up to 120MHz, with high-speed embedded memories (1Mbytes of flash memory and 128Kbytes of system SRAM), 4Kbytes of backup SRAM, and powerful peripheral functions, including digital camera module interface, High-speed USB OTG, Full-speed USB OTG, Ethernet MAC, CAN2.0B, multiple timers, ADCs and DACs, I2C, I2S, SPI, UARTs/USARTs, SDIO, LCD interface, RTC and programmable IOs. These features makes the device suitable for Industrial, Building and Security, Medical, Appliances and Consumer applications.

Embest DevKit1207 Evaluation Kit is a complete development platform for STM32F207IGT6 devices which enables engineers to easily and rapidly evaluate, prototype and test designs built around the STMicroelectronics STM32F207xx series microcontrollers. The DevKit1207 board has on-board 2Kbits EEPROM and exposed a full range of hardware peripherals to support HS/FS USB OTG, Ethernet, CAN, Serial port, IrDA, TF card, LCD, Touch screen, Audio,

G-sensor, RTC, JTAG, etc. The kit is also provided with an industrial-level 3.5 inch LCD with resistive touch screen and all other necessary accessories to help user observe the testing result and use the platform more conveniently.

Embest has ported uC/OS-II and FreeRTOS real-time operating systems on this board and the software also features the GUI support on uC/OS-II and LwIP_v1.3.2 protocol support on FreeRTOS. Embest provides the uC/OS-II BSP, FreeRTOS source tree and plenty of software examples, board schematic and user manual to help customer better understanding this board and develop your own applications.

Hardware Features

Processor

- STMicroelectronics STM32F207IGT6 Flash Microcontroller
- ARM 32-bit Cortex-M3 CPU with ART accelerator, frequency up to 120MHz
- Onchip 1Mbytes of Flash memory and 128+4Kbytes of SRAM
- Flexible static memory controller that supports Compact Flash, SRAM, PSRAM, Nor and Nand memories
- LCD parallel interface, 8080/6800 modes
- USB 2.0 HS/FS Device/Host/OTG
- 10/100 Ethernet MAC, supports IEEE 1588v2 hardware, MII/RMII
- 2 CAN 2.0B interfaces, 4 USARTs and 2 UARTs, 2 with muxed I2S, 3 SPI (30Mbit/s)
- 8- to 14-bit parallel camera interface (up to 48Mbytes/s)
- 1-/4-/8-bit SD/MMC/SDIO interface, supports up to 32Gbytes storage
- Up to 140 I/O ports up to 60MHz
- Up to 17 timers (two 32-bit timers), up to 120MHz
- 3 x 12-bit A/D converters, 2 x 12-bit D/A converters
- Analog true random number generator
- Low power, supports Sleep, Stop and Standby modes
- Supports booting from Flash, System memory or SRAM
- Supports ISP and IAP programming

External Memory

- Onboard I2C compatible serial interface 2Kbits EEPROM
- Micro SD card slot

Audio/Video interfaces

- 1-channel stereo headphone output jack
- 1-channel speaker output jack
- 3.5 inch TFT color LCD (240 x 320-pixel RGB resolution, 262000 colors, 16-bit 8080 parallel interface, brightness control via PWM)
- 4-wire resistive touch screen
- Camera interface (30-pin FPC connector, support CCD or CMOS camera, software driver has not provided at present)

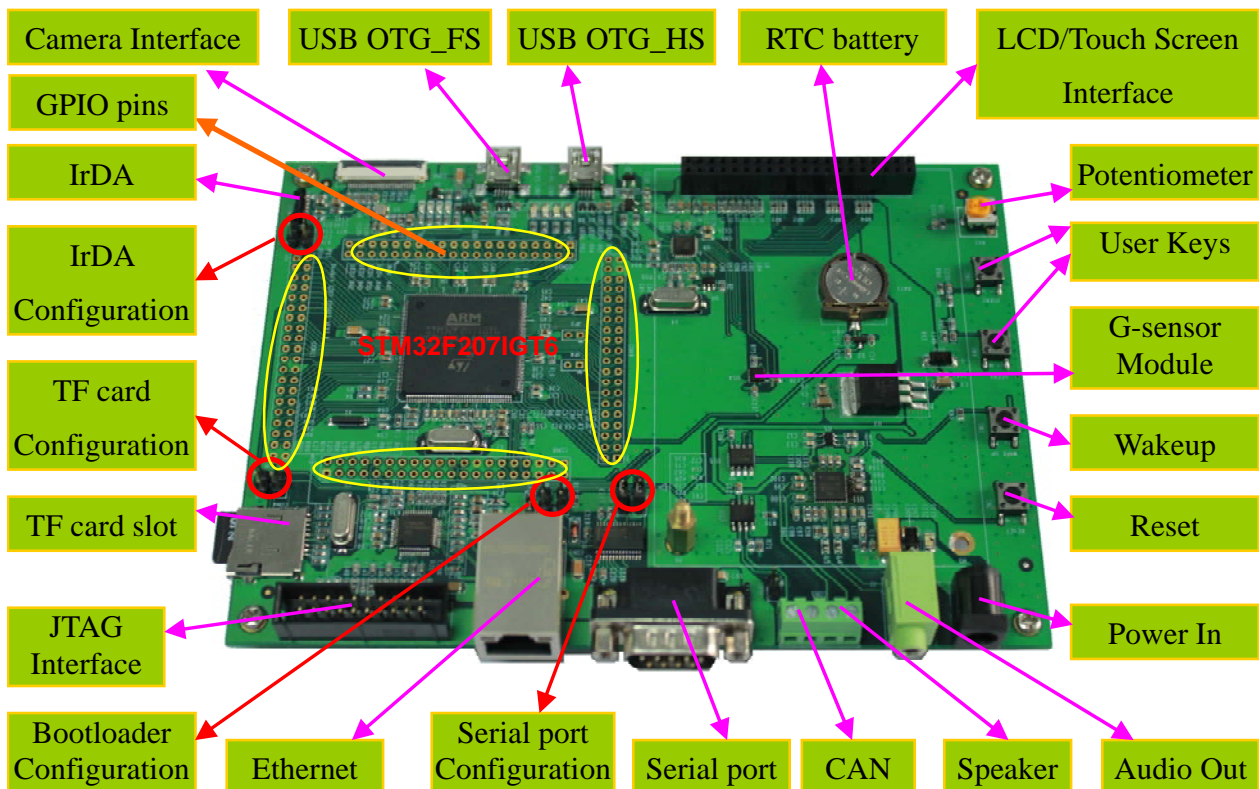
Data Transfer Interfaces

- 1-channel 5-wire RS232 Serial Port
- 1 x USB2.0 OTG/Device/Host, High-speed, 480Mbps
- 1 x USB2.0 OTG/Device/Host, Full-speed, 12Mbps
- 10/100 Ethernet with IEE 1588v2 (RJ45 connector)
- 1 x CAN2.0B interface

- IrDA transceiver
- Input Interface and Other Facilities
- 1 x Potentiometer (A/D converter)
 - 2 x USER buttons
 - 1 x RESET button
 - 1 x WAKEUP button
 - 20-pin standard JTAG interface
 - G-sensor 3-Axis Acceleration Sensor
 - RTC battery socket (User needs to prepare battery, CR1220 model is recommended)
 - 1 x LED for Power indicator
 - 2 x LEDs for USB OTG FS indicators
 - 2 x LEDs for USB OTG HS indicators
 - 4 x User LEDs
 - 140 GPIO pins are all brought out

Mechanical Parameters

- Dimensions: 160 mm x 115 mm
- Input Voltage: +5V
- Power consumption: 0.4A@5V
- Working Temp.: -10 °C ~ 70 °C
- Humidity Range: 20% ~ 90%



Note: RTC battery is not provided in default deliveries, user needs to prepare it yourself, Type model CR1220 is recommended. Some functions need to use Jumpers to configure before using.

Figure 1-2 DevKit1207 Evaluation Board

Function Block Diagram

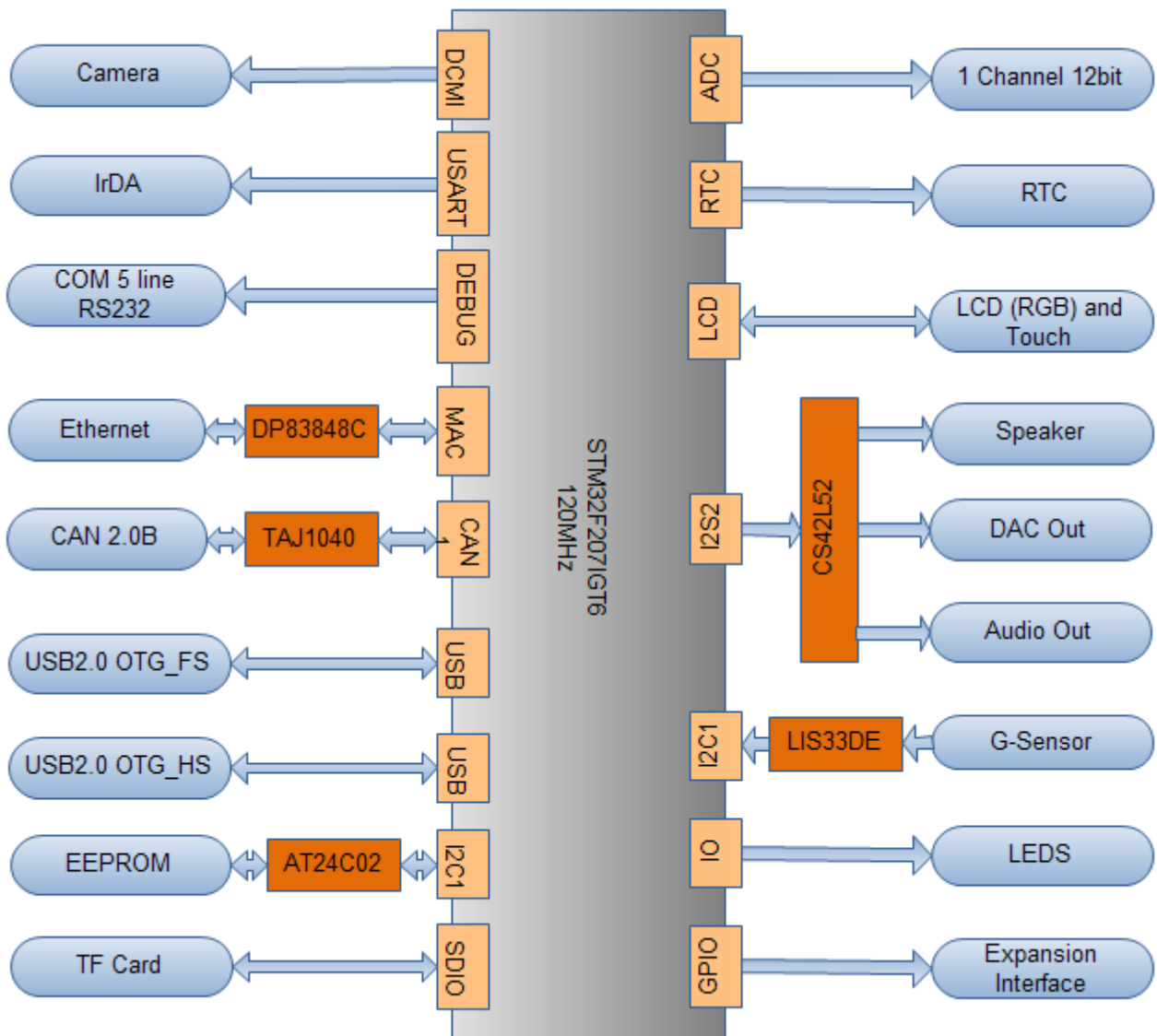


Figure 1-3 DevKit1207 Function Block Diagram

Software

Features

The DevKit1207 Evaluation Kit software mainly features as below:

- Supports for uC/OS-II_v2.86 and FreeRTOS_v6.1.0 real-time operating systems
- Supports UCGUI_v3.90a
- Supports FatFs_vR0.08a file system
- Supports LWIP_v1.3.2 protocol stack
- Provided with plenty of software examples

Boot Modes

The DevKit1207 Evaluation Board is able to boot from CPU internal system memory or embedded SRAM, user needs to configure the boot pins to select the mode. The boot loader is located in system memory. It is used to reprogram the Flash memory by using Serial port or USB OTG FS in Device mode through DFU (device firmware upgrade).

Drivers and Software examples

Embest has provided complete drivers and software examples for this kit. User can demonstrate and test each software example and observe the result from LCD which would be easy to understand.

The software examples mainly include following parts:

- Examples for Basic peripherals drivers (see Table 1-1 below)

Table 1-1

IP/Module	Example	
	Name	Brief Description
ADC	ADC3_DMA	How to use ADC3 and DMA to continuously transfer converted data from ADC3 to the memory.
	DualADC_Interleaved_DM Amode3	How to use the ADC peripheral to convert a regular channel in Dual interleaved mode using DMA in mode 3 with 5Msps.
	DualADC_RegulSimu_DM Amode1	How to use the ADC peripheral to convert regular channels simultaneously in dual mode using DMA in mode 1.
	TripleADC_Interleaved_D MAmode2	How to use the ADC peripheral to convert a regular channel in Triple interleaved mode using DMA in mode 2 with 6Msps.
CAN	LoopBack	How to set a communication with the CAN in loopback mode.
	Networking	how to configure the CAN peripheral to send and receive CAN frames in normal mode. The sent frames are used to control Leds by pressing key push button.
CRC	CRC_Example	How to use CRC (cyclic redundancy check) calculation unit to get a CRC code of a given buffer of data word (32-bit), based on a fixed generator polynomial (0x4C11DB7).

DAC	DAC_SignalsGeneration	How to use the DAC peripheral to generate several signals using DMA controller.
DMA	FLASH_RAM	How to use a DMA channel to transfer a word data buffer from FLASH memory to embedded SRAM memory.
EXTI	EXTI_Example	How to configure external interrupt lines.
FLASH	Program	How to program the STM32F2xx FLASH.
	Write_Protection	How to enable and disable the write protection for the STM32F2xx FLASH.
GPIO	IOToggle	GPIO ports are connected on AHB bus, using BSRRH and BSRRL registers one cycle is required to set a pin and another cycle to reset it. So GPIO pins can toggle at AHB clock divided by 2.
	JTAG_Remap	How to use the JTAG/SWD IOs as standard GPIOs and gives a configuration sequence.
I2C	EEPROM	How to use the I2C firmware library and an associate I2C EEPROM driver to communicate with an I2C EEPROM device.
	GSensor-LIS33DE	3-Axis Acceleration Sensor testing example
I2S	Audio	How to play an audio file through the I2S peripheral.
IWDG	IWDG_Example	How to update at regular period the IWDG reload counter and how to simulate a software fault generating an MCU IWDG reset on expiry of a programmed time period.
LCD-Touch	STMPE811QTR	LCD and Touch screen application testing example
Lib-DEBUG	Lib_DEBUG_Example	How to declare dynamic peripherals pointers used for Debug mode.
NVIC	DMA_WFIMode	How to enter the system to WFI mode with DMA transfer enabled and wake-up from this mode by the DMA End of Transfer interrupt.
	IRQ_Priority	How to use the Nested Vectored Interrupt Controller (NVIC) and configure their priorities.
	VectorTable_Relocation	How to relocate the CortexM3 vector table in a specific address other than the default Flash memory base address.
PWR	BOR	How to configure the programmable BOR thresholds using the FLASH option bytes.
	CurrentConsumption	How to configure the STM32F2xx system to measure different Low Power modes current consumption.
	PVD	How to configure the programmable voltage detector using an external interrupt line.

	STANDBY	How to enter the system to STANDBY mode and wake-up from this mode using: external RESET, RTC Alarm A or WKUP pin.
	STOP	How to enter the system to STOP mode and wake-up from this mode using RTC Wakeup Timer Event connected to EXTI Line 22.
RCC	RCC_Example	How to use, for debug purpose, the RCC_GetClocksFreq function to retrieve the current status and frequencies of different on chip clocks.
RNG	RNG_MultiRNG	How to use the RNG peripheral to generate Random 32bit numbers.
RTC	BKP_Domain	How to use the peripherals available on Backup Domain.
	HW_Calendar	How to setup the RTC peripheral, in terms of prescaler and interrupts, to be used to keep time and to generate alarm interrupt.
	TimeStamp	How to use the RTC peripheral and the Time Stamp feature.
SDIO	uSDCard	How to use the SDIO firmware library and an associate driver to perform read/write operations on the SD Card memory
SysTick	SysTick_Example	How to configure the SysTick to generate a time base equal to 1 ms.
TIM	6Steps	How to configure the TIM1 peripheral to generate 6 Steps.
	InputCapture	How to use the TIM peripheral to measure the frequency of an external signal.
	OCActive	How to configure the TIM peripheral to generate four different signals with four different delays.
	OCInactive	How to configure the TIM peripheral in Output Compare Inactive mode with the corresponding Interrupt requests for each channel.
	OCToggle	How to configure the TIM3 peripheral to generate four different signals with four different frequencies.
	OnePulse	How to use the TIM peripheral to generate a One pulse Mode after a Rising edge of an external signal is received in Timer Input pin.
	Parallel_Synchro	How to synchronize TIM peripherals in parallel mode.
	PWM_Input	How to use the TIM peripheral to measure the frequency and duty cycle of an external signal.
	PWM_Output	How to configure the TIM peripheral in PWM (Pulse Width Modulation) mode.

	TIM1_Synchro	How to synchronize TIM1 and Timers (TIM3 and TIM4) in parallel mode.
	TIM9_OCToggle	How to configure the TIM9 peripheral to generate four different signals with four different frequencies.
	TIM10_PWMOutput	How to configure the TIM peripheral in PWM (Pulse Width Modulation) mode.
	TimeBase	How to configure the TIM peripheral in Output Compare Timing mode with the corresponding Interrupt requests for each channel in order to generate 4 different time bases.
USART	USART_IRDA	How to use IrDA to transmit and receive data.
	USART_Printf	How to retarget the C library printf function to the USART.
WWDG	WWDG_Example	How to update at regular period the WWDG counter and how to simulate a software fault generating an MCU WWDG reset on expiry of a programmed time period.

- Application example for G-sensor
- Application example for SD card supporting FatFs_vR0.08a file system
- Application example for USB Host/Device/OTG (see Table 1-2 below)

Table 1-2

USB Device application examples	
Name	Brief Description
AUDIO	Use board as audio device, similar to USB acoustics, user can play music on PC and output sound through board
DFU	Use board as DFU device, user can use it for system firmware updating.
DualCore	Dual-USB channel testing example. Use HS-USB as MSC device and FS-USB as HID device.
HID	Use board as HID (Human Interaction Device) to implement USB mouse operation.
MSC	Use board as MSC (Mass Storage Device) to implement data exchange between USB Host and board.
VCP	Use board as VCP (Virtual COM Port), user can regard board as a USB-to-COM module
USB OTG application examples	
Name	Brief Description
DRD	DevKit1207 board can be used as either USB Host or USB Device
USB Host application examples	
Name	Brief Description

DualCore	Dual-USB channel testing example, use HS-USB as MSC (Mass Storage Device) host and FS-USB as HID (Human Interaction Device) host.
HID	Use board as HID (Human Interaction Device) host and can recognize USB mouse and USB keyboard.
MSC	Use board as MSC (Mass Storage Device) and can recognize U disk and other mobile storage devices.

- Application example for Ethernet on FreeRTOS/Non-OS/LWIP v1.3.2 protocol stack (see Table 1-3 below)

Table 1-3

Application example for Ethernet on FreeRTOS and LWIP v1.3.2 protocol stack	
Name	Brief Description
httpserver_netconn	Webserver application example based on netconn
httpserver_socket	Webserver application example based on socket
udptcp_echo_server_netconn	TCP/UDP Echo application example based on netconn 的 TCP/UDP
Application example for Ethernet on Non-OS and LWIP v1.3.2 protocol stack	
Name	Brief Description
httpserver	Webserver application example
tcp_echo_client	Simple Echo application example of Tcp client
tcp_echo_server	Simple Echo application example of Tcp server
tftpserver	Tftpserver application example
udp_echo_client	Simple Echo application example of dup client
udp_echo_server	Simple Echo application example of server

- Application example for OS porting on UCOSII_v2.86 and UCGUI_v3.90a

Function Demonstrations

GUI3.90A Function Demonstration (see Figure 1-4)

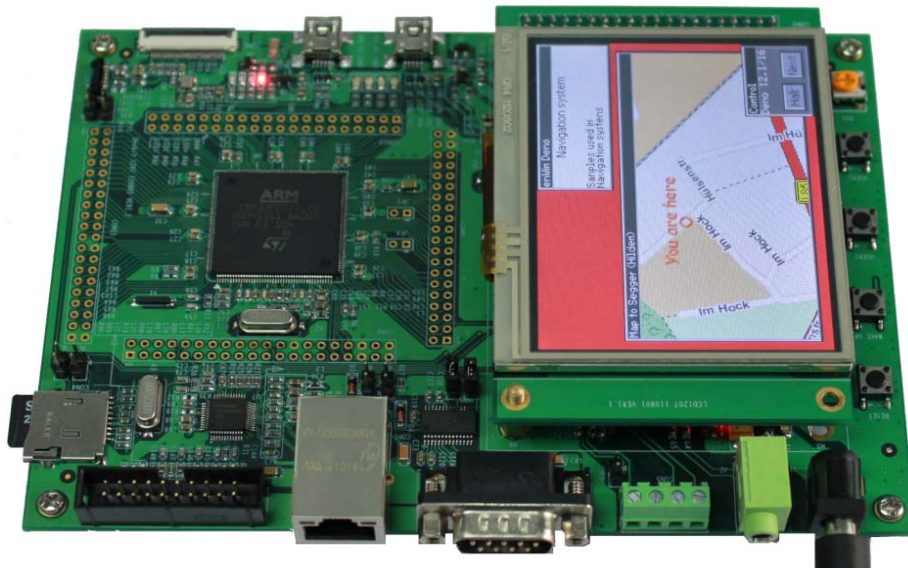


Figure 1-4

2-channel USB Host Function Demonstration (see Figure 1-5)

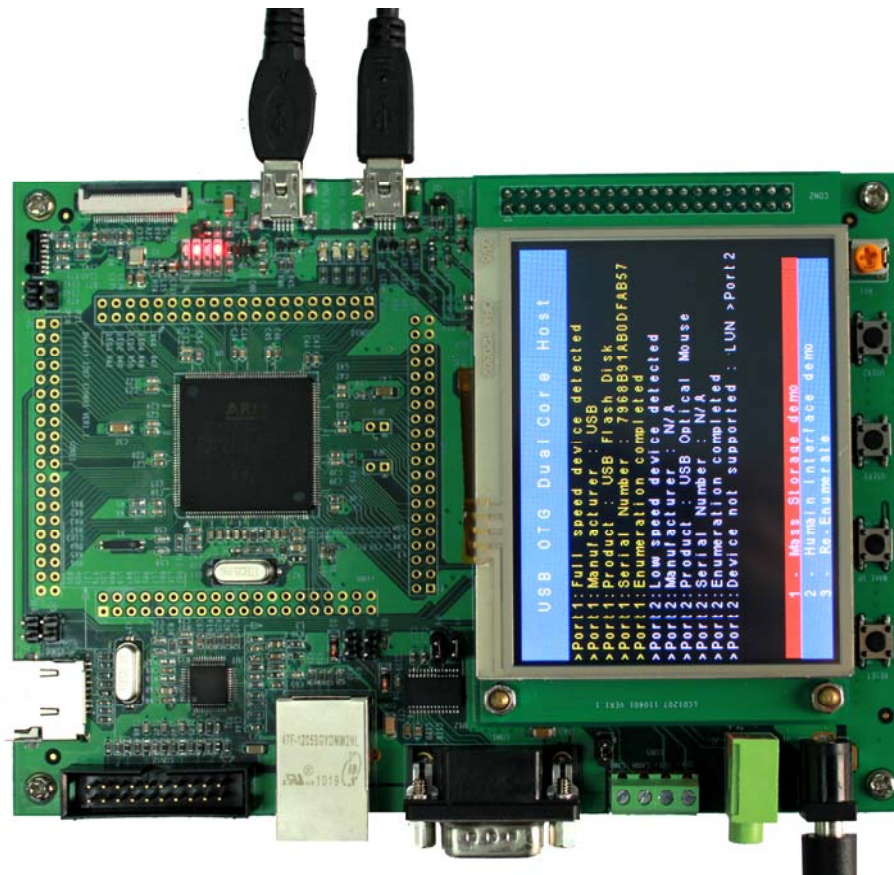


Figure 1-5

Httpserver Network Function Demonstration

1) Input <http://192.168.0.163> in browser and you can visit the webpage on DevKit1207.

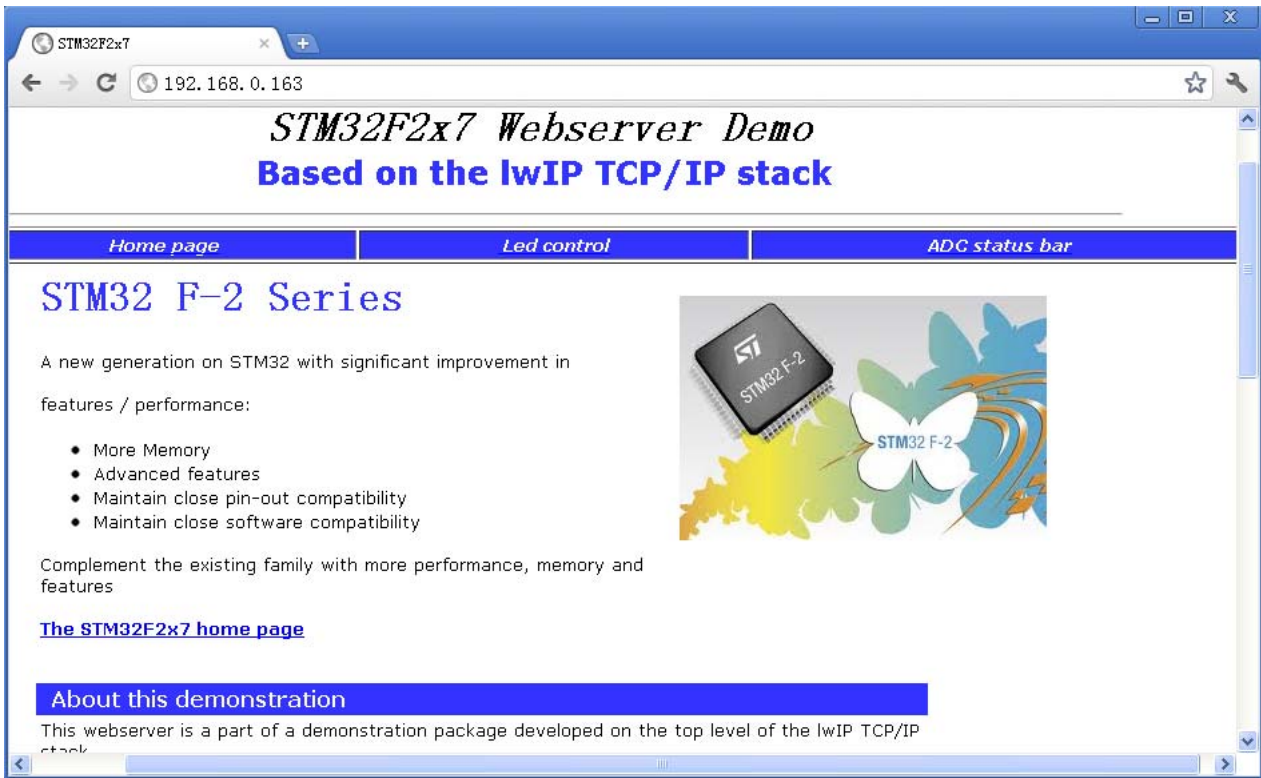


Figure 1-6

2) Click “LED control” to get into LED control interface, select or cancel LED1, LED2, LED3, LED4 and press “Send”, the LEDs on board will work relatively.



Figure 1-7

3) Click “ADCstatus bar” to get the voltage of potentiometer on board.

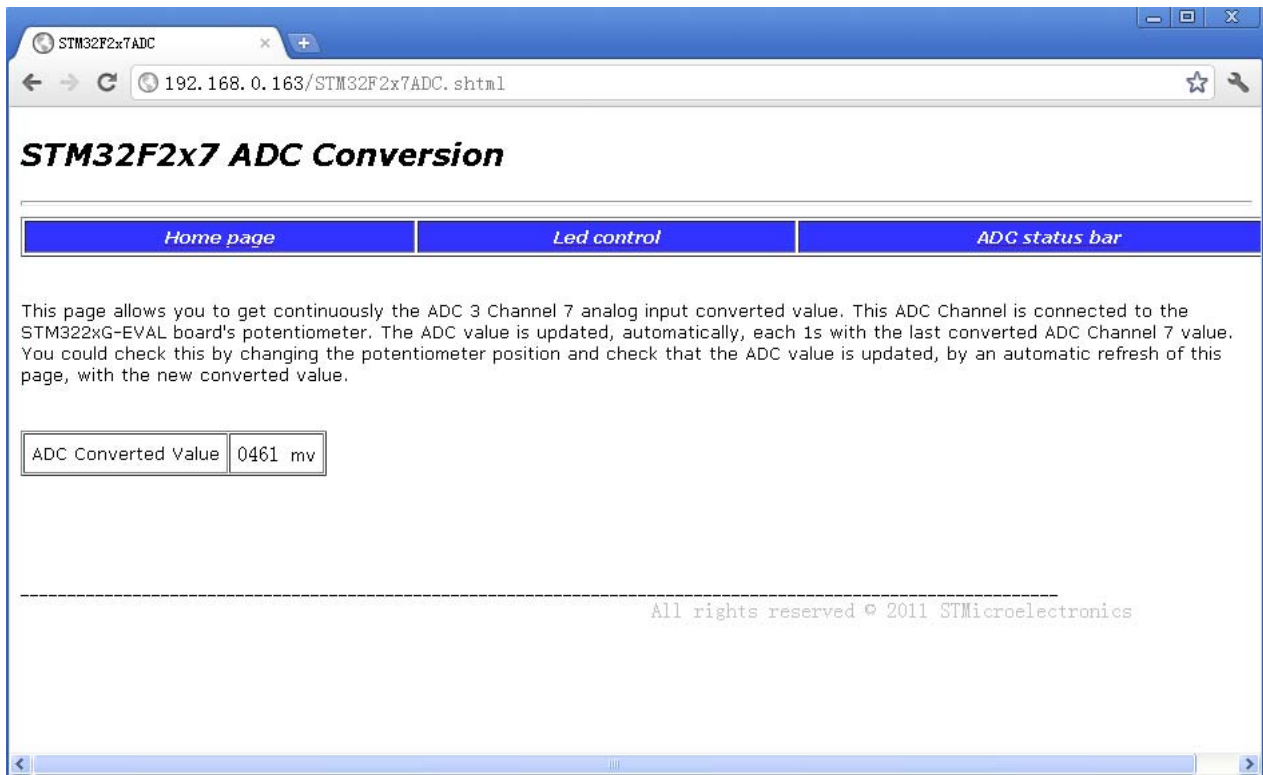


Figure 1-8

Order Information

Order No.	T6010169
Item	DevKit1207 Evaluation Kit
Deliveries	<ul style="list-style-type: none"> • One DevKit1207 Evaluation board • One 3.5 inch LCD with Touch screen • One 5V Power adapter • One cross serial cable (DB9 to DB9) • One cross net cable • One USB cable (Type A Male to Type Mini-B Male) • One USB cable (Type A Female to Type Mini-A Male) • One Product CD (including user manual, schematic in PDF format, datasheet, uC/OS-II BSP, FreeRTOS source tree, software examples)
Price	Please contact us.

More information about this product can be found at:

<http://www.embedinfo.com/english/Product/devkit1207.asp>

<http://www.armkits.com/Product/devkit1207.asp>


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