EMBEDDED SYSTEM AND RTOS
ARM CORTEX M3
MODEL - ARM-CORTEX-M3

This trainer has been designed with a view to provide practical and experimental knowledge of ARM9 family embedded processor.

SPECIFICATIONS

1.	STM32F205RBT6	:	The high performance STM32 MCU which features:
	* Core	:	Cortex-M3 32-bit RISC
	* Operating Frequency	:	120MHz, 150 DMIPS/1.25 DMIPS/MHz
	* Operating Voltage	:	1.8V-3.6V
	* Package	:	LQFP64
	* Memories	:	128kB Flash, 64+4kB SRAM
	* MCU communication Interfaces	:	3 x SPI, 4 x USART, 2 x UART, 2 x I2S, 3 x I2C, 1 x SDIO, 2 x CAN 1 x USB 2.0 HS/FS device/host/OTG controller with dedicated DMA, on-chip full-speed PHY, 1 x USB HS ULPI (external PHY required)
	* AD & DA converters	:	3 x AD (12-bit, 1µs, shares 16 channels); 2 x DA (12-bit)
	* Debugging/Programming	:	supports JTAG/SWD (serial wire debug) interfaces, supports IAP
2.	AMS1117-3.3	:	3.3V voltage regulator
3.	MIC2075-2	:	onboard USB power management device

4. Power supply switch, powered from 5Vin or USB connection
5. Boot mode selection, for configuring BOOT0 pin
6. Power indicator
7. VBUS LED
8. Reset button
9. 25M crystal
10. 32.768K crystal, for internal RTC with calibration
11. JTAG/SWD interface: for debugging/programming
12. USB connector, used for establishing USB communication between PC and the STM32 development board
13. MCU pins expander, VCC, GND and all the I/O pins are accessible on expansion connectors for further expansion

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Dealer:-

14. 5Vin pinheader, 5V power supply is required when using USB HOST/OTG
15. USB jumper
    * short the jumper when using USB
    * open the jumper to disconnect from related I/O port
16. VBAT selection jumper
    * short the jumper to use system power supply
    * open the jumper to connect the VBAT to external power, such as battery
17. Books for Embedded Systems : 10 Nos in pdf Format
18. Mp4 Video Class for Embedded Systems : 40 Classes in Mp4 on DVD / Pen Drive

EXPERIMENTS

1. RTOS porting on available micro controller board.
2. Interfacing of 4X4 Keyboard to a micro controller using µCOS- II task
3. Interfacing of 4X4 Keyboard, 16X2 LCD display and ADC to a micro controller using µCOS- II task
4. Implement a semaphore for any given task switching on a micro controller
5. Implementation of mutual exclusion in tasks as per 3.
6. Implementation of mailbox and message queue management in tasks as per 3.
7. Implementation of memory management in tasks as per 3.

INTERFACES

1. UART3 interface: easily connects to RS232, USB TO 232, etc.
2. SDIO interface: for connecting Micro SD module, features much faster access speed rather than SPI
3. I2S2/I2S3/I2C1: for connecting I2S peripherals, such as Audio module
4. I2C1/I2C2 interface: easily connects to I2C peripherals such as I/O expander (PCF8574), FRAM (FM24CLxx), etc.
5. SPI1/SPI2 + AD/DA interface
    * easily connects to SPI peripherals such as DataFlash (AT45DBxx), SD card, MP3 module, etc.
    * SPI1 features AD/DA alternative function, supports connecting AD/DA module as well
6. USART2 interface: easily connects to RS232, RS485, USB TO 232, etc.
7. LCD interface: for connecting touch screen LCD
8. ULPI interface: for connecting high-speed USB peripheral (the STM32F205R integrates USB HS controller without any PHY device)
9. UART1 interface: easily connects to RS232, USB TO 232, etc.
10. CAN2 interface: communicates with accessory boards which feature the CAN device conveniently
11. CAN1 interface: communicates with accessory boards which feature the CAN device conveniently
12. ONE-WIRE interface: easily connects to ONE-WIRE devices (TO-92 package), such as temperature sensor (DS18B20), electronic registration number (DS2401), etc.
13. LEDs: convenient for indicating I/O status and/or program running state
14. User key: convenient for I/O input and/or interact with running code
15. Wake-Up button: wake up the STM32 MCU from sleep mode, also used as regular user key
16. Joystick: convenient for I/O input (five positions)