MCU Education Platform
Controllable on Smartphone

MCU-Multi II-ST

Since **1984**

Homepage

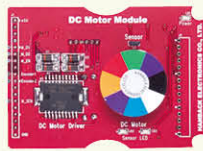# MCU Education Platform Controllable on Smartphone

MCU product is a processor basic training theme that has been used in the training field for a long time. MCU Multi II-ST supports various MCUs to effectively implement creative engineering education in college and high school and each function is configured as a theme board based on it. MCU Multi II-ST is a micro-embedded training system developed to quickly apply to various project classes and user requirements including basic training.

MCU Multi II-ST also provides 32-bit MCU education environment that is widely applied to commercial products.

Labels around the main board:
- Array FND, LED
- Full Color LED
- Text LCD
- Memory
- Fan, Relay
- ADC, DAC
- Temperature/humidity sensor
- Step Motor
- Replaceable MCU module
- Variable resistor
- UART
- Oscilloscope
- Switch element
- DC motor
- Servo motor
- Ultrasonic sensor
- Infrared distance sensor, proximity sensor
- Keypad module
- Switch module
- Bluetooth module
- 3Color Dotmatrix

Servo Motor

This module is equipped with a servo motor set to move by a certain angle.

DC motor

It is a module with built-in encoder that generates DC motor and pulse according to rotation. It is a module to know how to use DC motor control and encoder.

Ultrasonic sensor

It is a module that can understand the principle of ultrasonic wave used as distance sensor and the mechanism to measure distance.
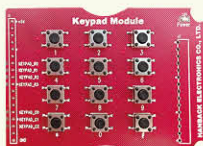
Infrared distance sensor, proximity sensor

It can be used for distance measurement and object detection by extending distance sensor and proximity sensor to one module using infrared rays.

Switch module

motion, you need a switch that generates a signal at a limited distance. It is a module which collects the switch to use at that time.
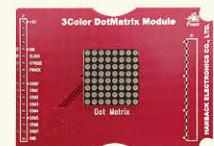
Keypad module

3X4 buttons are implemented and serve as input devices for various applications.

Bluetooth module

It is a module that can build and communicate Bluetooth network using AT command. Only data communication is supported. It does not provide hands-free function.

3Color Dotmatrix

It is a dot matrix module that can display 3 colors and is used as various display devices.

MCU-Multi II-ST is a widely used application theme board. It is equipped with a basic circuit that helps the basic understanding of MCU and consists of distance measurement, control using GPIO, motor application theme board. You can understand how the devices are controlled by MCU using the added application theme board.

Item	Maker	Model	Compiler	Specification
AVR	ATMEL	ATmega 128A	Microchip Studio WinAVR HBE-AVR-ISP	Up to 16 MIPS Throughput at 16MHz JTAG Interface, ISP Program 128KB FLASH, 4KB SRAM, 4KB EEPROM 8-Ch PWM, 8-Ch 10-bit ADC I^{2}C, SPI, 2EA 8-bit Timer, 2EA 16-bit Timer Dual UART
PIC (Option)	MICROCHIP	PIC18F6722	MPLAB IAR EWPIC Pickit 3	Up to 5MIPS Throughput at 20MHz ISP Program, 7.2KB FLASH, 192B SRAM, 128B EEPROM 2-Ch PWM, 8-Ch 10-bit ADC I^{2}C, SPI, UART
8051 (Option)	ATMEL	AT89S 51	IAR EW8051 HBE-8051-ISP	Up to 33MHz Operating ISP Program 4KB FLASH, 128B SRAM 2EA 16-bit Timer, UART
Cortex-M3 (Option)	ST	ST32F103	IAR EWARM	Up to 72MHz Operating JTAG Program 128KB FLASH, 20KB SRAM 6-Ch PWM, 3UART, 2SPI, 2 I^{2}C, CAN USB2.0, 16-Ch 12-bit ADC
Cortex-M4 (Option)	ST	ST32F303	IAR EWARM	Up to 144MHz Operating JTAG Program 1MB FLASH, 4KB SRAM Ethernet Camera, 12-bit ADC

On-Board Device Specification

Classification	Items	Specification
Display Element	Text LCD 16 X 2 line	English letter, number, Special letter, 16x2 lines, 1EA
	LED	Status display element using LED ON/OFF, Red, 8EA
	Array FND	4-digit number display, 1EA
	Full color LED	3 Color(RGB) in 1 device, Diffusion Plate included
Input Element	Push button	6mm x 6mm, 8EA
	Dip switch	8 Port, 1EA
	Rotary switch	4-bit BCD code, Spin interface, 1EA
Motor	Step Motor	12 VDC, 7.5degree/step, 10Mn/m, Hall sensor included, 1EA
Communication	UART	UART 1EA
Memory	EEPROM	2MB, I^{2}C Interface
	SRAM	128KB, 8-bit data
Sensor	Vres	Variable Resistance 1EA
	CdS	Photocell for light detection, 1EA
	SHT21	Temperature Humidity Sensor, I^{2}C Interface
DAC	DAC	4 Ch D/A Convertor, SPI Interface
ADC	ADC	4 Ch A/D Convertor, I^{2}C Interface
Scope	Oscilloscope	2Ch Oscilloscope built-in, Signal can be observed or analyzed using PC

Module Device Specification

Classification	Items	Specification
Motor	Motor	4.8 ~ 6.0VDC, Torque 3~4.5Kg/cm
	DC Motor	12VDC, Built-in encoder, Reduction ratio 1/13, Resolution: 6pole, Torque 1.8Kg/cm
Distance sensor	Ultrasonic wave	Measuring distance 2m, Resolution 10 cm
	PSD	10~80cm, 4.5~5.5VDC
Input device	Switch	Reed switch, micro switch, encoder switch each 1EA
	Keypad	Button to configure the keypad, push button 12EA
Display device	3 Color Dotmatrix	8 x 8 pixel
Bluetooth	SPP	SPP, Smartphone support

Training Contents

1. HBE-MCU-Multi II
2. AVR Microcontroller
3. LED, 7-Segment Control
4. Switch module
5. LCD Controller (HD44780) Control
6. LCD Module Program
7. ATmega 128A Interrupt
8. 8-bit timer / counter
9. Operation mode of 8-bit timer / counter
10. 16-bit timer / counter
11. 16-bit timer / counter operation mode
12. Receiving external input using T/C
13. A/D converter and relay control
14. Stepping motor control
15. USART communication
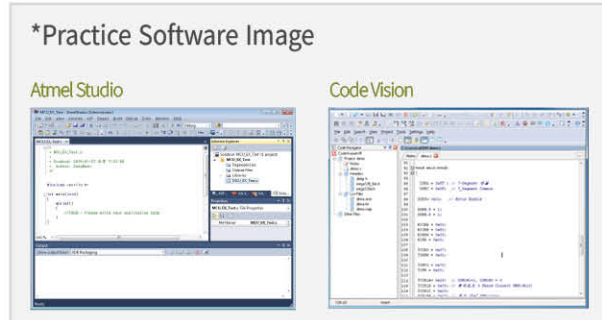16. Serial interface

Practice Example

1. Supply Power   2. Practice Module Wiring   3. Coding

5. Check Result, Debugging   4. Download Program

*Practice Software Image

Atmel Studio

Code Vision

Product Features

Supports ATmega128A, AT89S51, PIC18F6722, Cortex-M3, and Cortex-M4 microcontroller.

Each theme board is configured to enable learning of various microcontrollers with a module design of detachable connector.

Provides a hardware interface that can connect various MCU modules and theme boards.

Theme board is designed as detachable module form that can be separated from the base board.

Users can create the application design by separating the theme board and reconfiguring it.

Provides a dedicated measuring terminal to make it easy to analyze signal from MCU and application program.
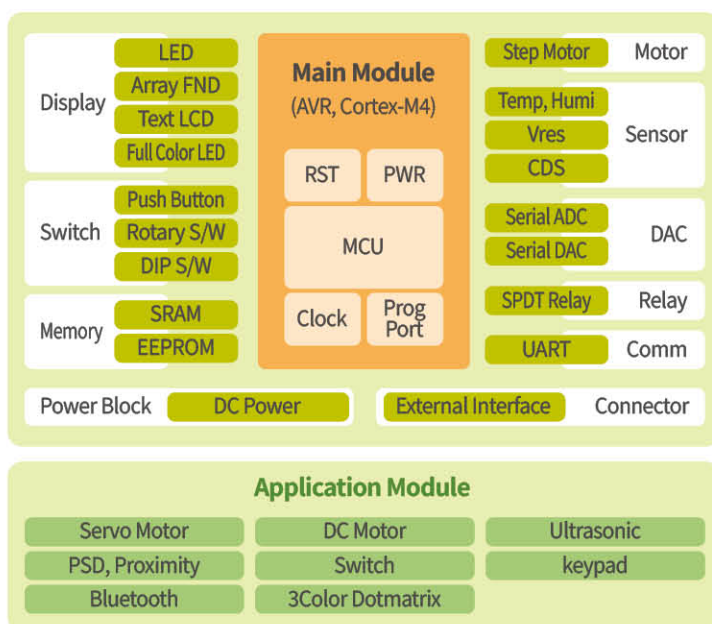
Provides various example program sources required for application practice.

Provides various design environments from basic processor training to application design.

Provides various optional theme boards such as Stack theme board and Actuator theme board to maximize product utilization.

Block Diagram

Display
- LED
- Array FND
- Text LCD
- Full Color LED

Main Module (AVR, Cortex-M4)
- RST
- PWR
- MCU
- Clock
- Prog Port

Switch
- Push Button
- Rotary S/W
- DIP S/W

Memory
- SRAM
- EEPROM

- Step Motor — Motor
- Temp, Humi
- Vres — Sensor
- CDS
- Serial ADC — DAC
- Serial DAC
- SPDT Relay — Relay
- UART — Comm

Power Block — DC Power   External Interface — Connector

Application Module
- Servo Motor
- DC Motor
- Ultrasonic
- PSD, Proximity
- Switch
- keypad
- Bluetooth
- 3Color Dotmatrix

Configuration

MCU-Multi II-ST

AC Power Cable

HBE-AVR-ISP Programmer

USB Cable (A to B Type)

User Guide Book

Jumper Cable (8Pin * 5EA, 4Pin * 10EA, 2Pin * 10EA)

Oscilloscope Probes

User Manual and Platform USB