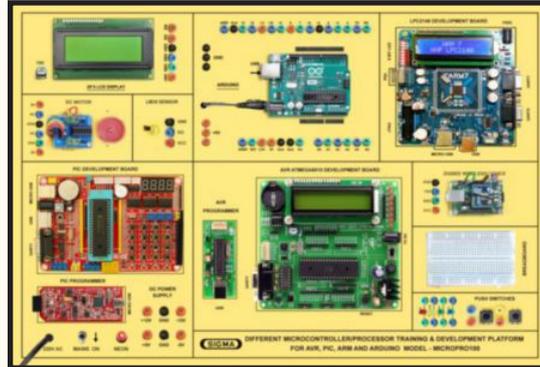# SIGMA

DIFFERENT MICROCONTROLLER/PROCESSOR TRAINING AND DEVELOPMENT PLATFORM FOR AVR, PIC, ARM AND ARDUINO MODEL-MICROPRO100

This trainer has been designed with a view to provide practical and experimental knowledge of programming of Different types of Micro-controller and Microprocessor Boards.

SPECIFICATIONS

Following Hardware is assembled on Single PCB of size - 18 Inch x 15 Inch

1.   Micro Processors

A.   MCU PIC16F877A

1.   PIC Development Board for Microchip PIC Series for any 40 Pin series 16FXXX, 18FXXX etc

2.   ICSP Socket for Programming through PICKIT2

3.   4MHz Crystal

4.   Onboard programmer which program PIC Devices through ICSP Socket for Programming through PICKIT2

5.   USB Port and Rs232 Serial Port

6.   During Testing Easy to Remove Chips with ZIP Socket

7.   On board Regulated Power- Optional Supply 5v, 12v supplies

8.   Easy to test with Burg Connecters wires

9.   7 Segment Multiplexed Display

10.   DC Power Supply Connector (12v Ac or Dc).

11.   Driver for LCD display 16x2 Character

12.   24Cxx I2C EEPROM

13.   RTC Ds1307

14.   4 LED array

15.   4X4 Matrix Key Pad

16.   4 Interrupt Switcher

17.   ULN2003 to Drive Relays and Stepper Motors

B.   MCU ATMEGA8515

1.   AVR Development Board for Atmel ATMEGA16/32 ISP Socket for Flashing
2.   8MHz Crystal
3.   USB Port and RS232 Serial Port
4.   Can be powered with both AC and DC power supply adapters
5.   On board Regulated Power Supply +5V, +12v supplies
6.   7 Segment multiplexed Display
7.   Driver for LCD display 16x2 Character
8.   24Cxx I2C EEPROM
9.   RTC Ds1307
10.   4 LED array, Matrix Key Pad and +12v Relay
11.   4 Interrupt Switches, User buttons and status LEDs
12.   AVR USBASP Programmer
13.   Flash Burner for AVR Series from ATMEL
14.   Communication - USB - AVR DUDE USB
15.   Auto Erase before writing and Auto Verify after writing
16.   ISP Programming Socket Connects through AVR DUDE USB
17.   Device Support - ATMEGA8515, AT89s51, AT89s52, AT89s53, At89s8253
18.   AVR USBASP Programmer
      Flash Burner for AVR Series from ATMEL
      Communication - USB - AVR DUDE USB
      Auto Erase before writing and Auto Verify after writing
      ISP Programming Socket Connects through AVR DUDE USB
      Device Support - ATMEGA8515, AT89s51, AT89s52, AT89s53, At89s8253

C.   MCU LPC2148

1.   Microcontroller: LPC2148 with 512K on chip memory
2.   Crystal for LPC2148 : 12Mhz
3.   40 KB of on-chip static RAM and 512 KB of on-chip flash memory
4.   On board 512 bytes of I2C external EEPROM
5.   Two 10-bit ADCs provide a total of 14 analog inputs
6.   Single 10-bit DAC provides variable analog output
7.   2 Analog Potentiometers connected to ADC
8.   PWM unit - Six outputs
9.   Two Fast I2C Bus
10.   SPI and SSP
11.   USB 2.0 Type B Connector
12.   SD / MMC card holder with SPI interface
13.   No separate programmer required (Program with Flash Magic using on-chip boot loader)
14.   No Separate power adapter required (USB port as power source)
15.   RTOS Support
16.   10 pin (2X5) FRC JTAG connector for Programming and debugging
17.   50 Pin Expansion header for easy access to I/O pins
18.   On board LCD Display 16 x 2
19.   L293D 600mA Dual DC motor Driver

20.	ULN2003 500mA driver
21.	Two RS-232 Interfaces for direct connection to PC's Serial port
22.	RTC Real-Time Clock with Battery Holder and 3V button cell
23.	TSOP1738 IR receiver
24.	4 USER Switches
25.	4 USER LEDs + 4 LED on PCB
26.	Reset and Boot loader switches
27.	ON/OFF switch
28.	On Board Buzzer Interface
29.	Wireless module adapter for 2.4GHz Zigbee, Bluetooth, WiFi connectivity

D.   MCU ATMEGA328P - Arduino

1.	Arduino Uno Microcontroller board based on the ATMEGA328P
2.	14 Digital Input / Output pins (of which 6 provide PWM output)
3.	16 MHz Ceramic Resonator
4.	Flash Memory : 16KB (of which 2KB used by boot loader)
5.	USB Port
6.	Power Jack – 9V DC, 1A

2.   Hardware

1.	Zigbee Module
2.	DC Motor with Drive L293D 600mA (5-12V)
3.	Temperature Sensor Lm35
4.	Display - 16X2 LCD Display,
5.	DC Power Supplies : +12V, -12V, +5V & - 5V
6.	Breadboard - 400 Points
7.	Different Color LEDs - 4
8.	2 mm interconnection Sockets

3.   Accessories

1.	USB Cable	:	1 No
2.	Ethernet Cable	:	1 No
3.	Jumper wires	:	30 Nos.
4.	Simulation Software and Driver CD	:	1 No.
5.	Practical Manual - Printed + Soft Copy	:	1 No.
6.	E-Books for IOT Subject	:	10 Nos. in PDF Format
7.	Mp4 Video Class for Microprocessor Subject	:	40 Nos

4.   Cabinet and PCB

The complete circuit diagram is screen printed on component side of the PCB with circuit and Parts at the same place. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement. The acrylic cover is fitted on PCB to safeguard parts. It works on 230 V AC Supply.

EXPERIMENTS

1. EXPERIMENTS for MCU PIC16F877A

1. To make LED blink
2. To display data on 7 segment display
3. To display sensor data on 16 x 2 LCD Display
4. To transfer data using RS232 serial port
5. To use 4 x 4 Matrix Key Pad
6. To convert Analog Data into Digital Data using ADC
7. To measure time using RTC
8. To control DC motor using L293D Motor Driver
9. To measure Temperature using Lm35
10. To program PIC IC by PIC Programmer through PICKIT2

2. EXPERIMENTS for MCU ATMEGA8515

1. To make LED blink
2. To display data on 7 segment display
3. To display sensor data on 16 x 2 LCD Display
4. To transfer data using RS232 serial port
5. To use 4 x 4 Matrix Key Pad
6. To measure time using RTC
7. To control DC motor using L293D Motor Driver
8. To measure Temperature using Lm35
9. To program ATMEGA8515PIC IC by PIC Programmer through PICKIT2
10. To implement I2C interface
11. To measure time using RTC

3. EXPERIMENTS for MCU LPC2148

1. To make LED blink
2. To interface I/O
3. To use UART for serial transmission
4. To implement I2C interface
5. To implement SPI interface
6. To implement SD/MMC card interface
7. To control LED brightness using PWM
8. To convert Analog Data into Digital Data using 10 Bit ADC
9. To display sensor data on 16 x 2 LCD Display
10. To measure time using RTC DC Motor Control using L293D
11. Stepper Motor Control using ULN2003
12. To send - receive data using Zigbee
13. To use USB Boot loader
14. To use USB Virtual Com Port
15. To measure Temperature using Lm35

4.   EXPERIMENTS for ARDUINO MCU ATMEGA328P

1.   To make LED blink
2.   To measure analog to digital value using 10-bit ADC
3.   To send - receive data using Zigbee
4.   To implement I2C interface
5.   To implement SPI interface
6.   To measure time using RTC
7.   To control LED brightness using PWM
8.   To control DC motor using L293D Motor Driver
9.   To measure Temperature using Lm35
10.   To display sensor values on 16x2 LCD Display