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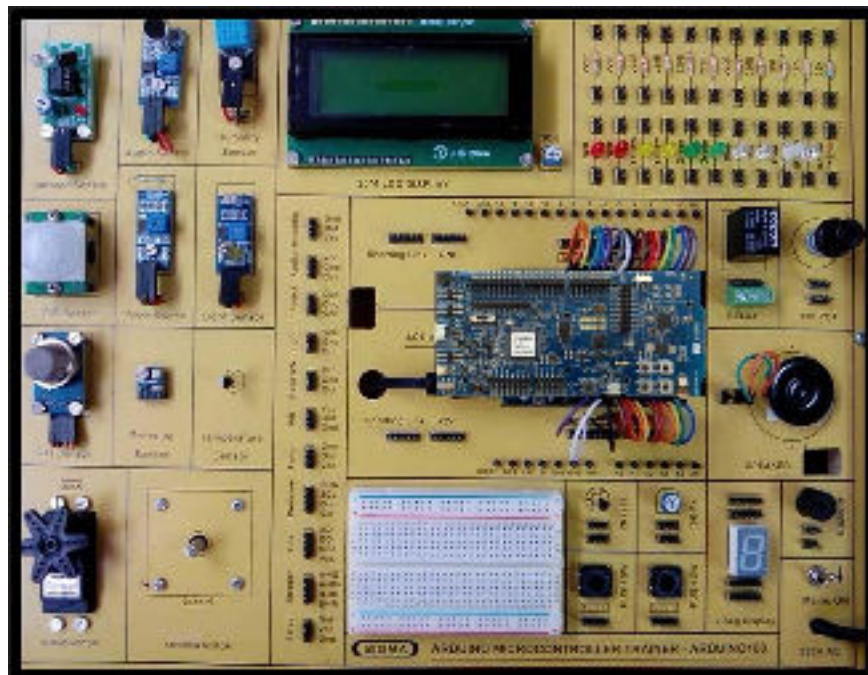
nRF52840 DK MICROCONTROLLER TRAINER

MODEL – nRF52840DK100

This trainer has been designed with a view to provide practical and experimental knowledge of Internet of Things (IOT) with Sensors programing with nRF52840 DK Microcontroller Board.

SPECIFICATIONS

A. Main Specs

1. Following Parts and Modules are assembled on Single PCB of size - 18 Inch x 15 Inch.
2. The complete circuit diagram is screen printed on component side of the PCB with circuit and Parts at the same place.
3. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement.
4. Modules and Parts should be removable without desodlering for easy repair / replacement
5. The acrylic cover is fitted on PCB to safeguard main parts.

B. nRF52840 DK Microcontroller Board

1. Bluetooth 5, IEEE 802.15.4-2006, 2.4 GHz transceiver , 2 Mbps, 1 Mbps, 500 kbps, and 125 kbps
2. IEEE 802.15.4-2006 – 250 kbps
3. Proprietary 2.4 GHz – 2 Mbps, 1 Mbps
4. ARM® Cortex®-M4 32-bit processor with FPU, 64 MHz
5. 212 EEMBC CoreMark® score running from flash memory
6. 52 µA/MHz running CoreMark from flash memory
7. ARM® TrustZone® Cryptocell 310 security subsystem
8. NIST SP800-90A and SP800-90B compliant random number generator
9. AES-128 – ECB, CBC, CMAC/CBC-MAC, CTR, CCM/CCM*
10. Secure boot ready
11. 1.7 V to 5.5 V supply voltage range
12. Fast wake-up using 64 MHz internal oscillator
13. 1 MB flash and 256 KB RAM
14. USB 2.0 full speed (12 Mbps) controller
15. QSPI 32 MHz interface
16. High-speed 32 MHz SPI
17. Type 2 near field communication (NFC-A) tag with wake-on field
18. 48 general purpose I/O pins
19. EasyDMA automated data transfer between memory and peripherals
20. Nordic SoftDevice ready with support for concurrent multiprotocol

21. 12-bit, 200 ksps ADC – 8 configurable channels with programmable gain

22. 64 level comparator

23. 15 level low-power comparator with wake-up from System OFF mode

24. Temperature sensor

25. 4x four channel pulse width modulator (PWM) unit with EasyDMA

26. Audio peripherals – I2S, digital microphone interface (PDM)

27. 5x 32-bit timer with counter mode

28. Up to 4x SPI master/3x SPI slave with EasyDMA

29. Up to 2x I2C compatible two-wire master/slave

30. 2x UART (CTS/RTS) with EasyDMA

31. Quadrature decoder (QDEC)

32. 3x real-time counter (RTC)

33. Single crystal operation

C. Sensors:

1. Air Humidity and Temperature DHT11
2. Air Quality - MQ135
3. Soil / Water Temperature Sensor - DS18B20
4. Leaf Wetness Sensor - Rain Detector Sensor
5. Soil Moisture Sensor
6. Ambient Light Sensor - LDR Light Sensor

D. Modules and Hardware:

1. 20 X 4 - LCD Display
2. 1 Channel Relay board
3. DC Motor with Motor Driver board
4. Stepper Motor with Motor Driver board
5. 7 Segment Display
6. Different Resistors
7. Red, Green, Yellow LED
8. 10K Pot
9. Push Switch – 2 Nos
10. Audio Buzzer Board
11. Breadboard - 400 Points
12. 2 mm interconnection Sockets

E. Accessories

1. USB to Square USB Cable   : 1 No
2. 2 mm Banana Jack Jumper – Connectors   : 30 Nos
3. 9V, 1A Power Adaptor – Barrel 2.1mm   : 1 No
4. Pen Drive - 16 GB with All Codes   : 1 No
5. Printed Manual   : 1 No.
6. Softcopy of Manual – On Pen Drive   : 1 No
7. E-Books for IOT Subject – On Pen Drive : 10 Nos. in PDF Format
8. Mp4 Video for IOT Subject – On Pen Drive : 40 Nos

EXPERIMENTS

1. To understand theory and working of nRF52840 DK Board
2. To understand Operating System for nRF52840 DK Board
3. To understand Communication Protocols
4. To understand USB Interface for nRF52840 DK Board
5. To understand that how to connect 20 x 4 LCD Display to nRF52840 DK Board

6. To understand theory of Air Humidity and Temperature DHT11
7. To understand theory of Air Quality - MQ135
8. To understand theory of Soil / Water Temperature Sensor
9. To understand theory of Leaf Wetness Sensor - Rain Detector Sensor
10. To understand theory of Soil Moisture Sensor
11. To understand theory of Air Ambient Light Sensor - LDR

12. To understand Active Audio Buzzer
13. To understand 1 Channel Relay Board
14. To understand fundamental of DC motor and its driver
15. To understand fundamental of Stepper Motor and its driver

16. To make LED blink
17. To connect LCD Display
18. To measure Humidity using Humidity - DHT11 Sensor
19. To measure Air Humidity and Temperature using DHT11 Sensor
20. To measure Air Quality using Air Quality Sensor
21. To measure Temperature of Soil using Soil Temperature Sensor - DS18B20
22. To measure wetness of Leaf using Leaf Wetness Sensor - Rain Detector Sensor
23. To measure Moisture of soil using Soil Moisture Sensor
24. To measure Ambient Light using LDR Light Sensor

25. To use Audio buzzer for Output signal Alarm
26. To control 1 Channel Relay
27. To operate DC Motor control
28. To operate Stepper Motor

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