SNS COLLEGE OF ENGINEERING
(Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

19OE204- IoT System Architecture

Introduction to Arduino & Node MCU

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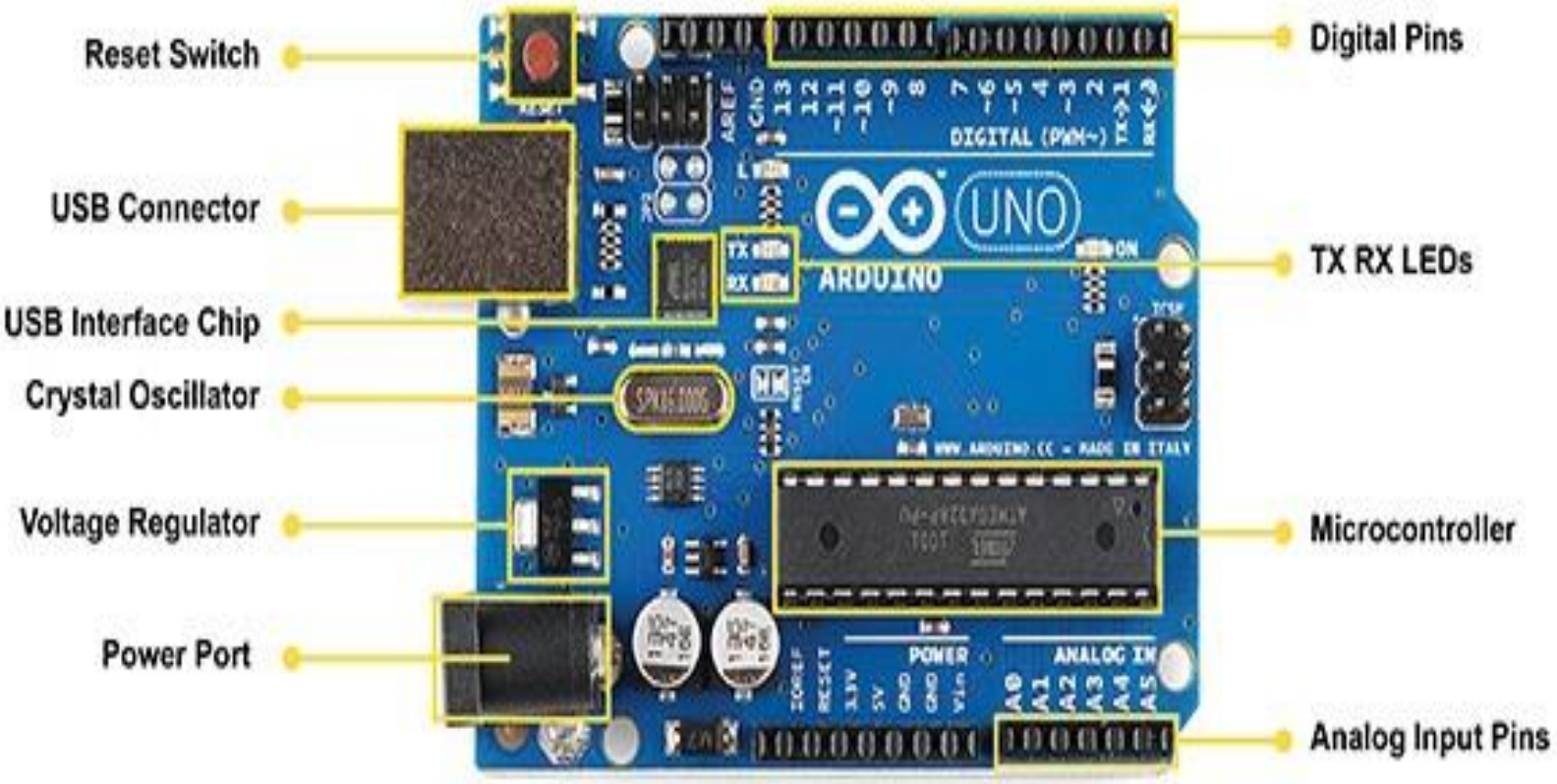
ARDUINO

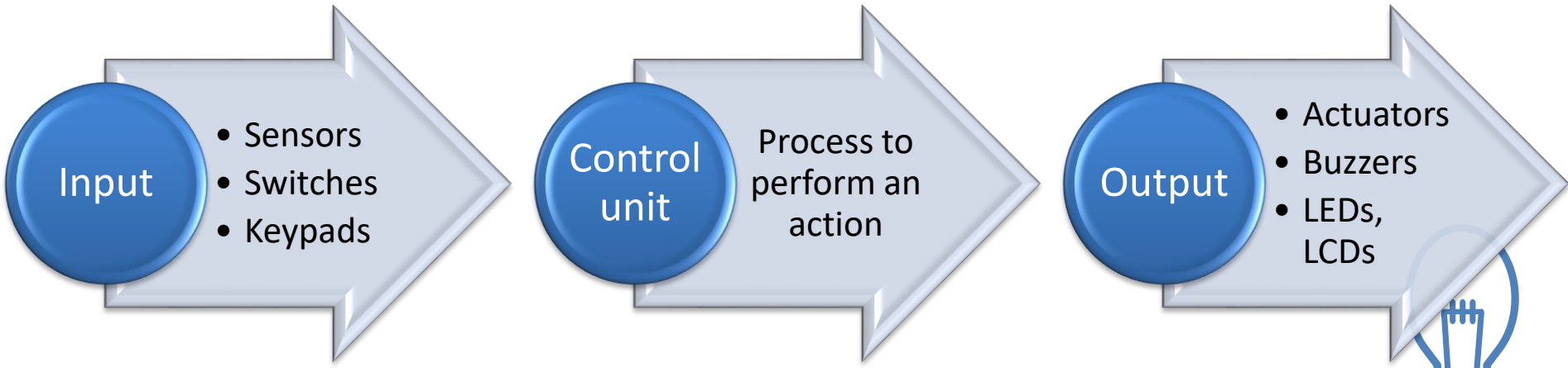
ARDUINO UNO	NODEMCU
➢ ATmega328 microcontroller ➢ Input voltage - 7-12V ➢ 14 Digital I/O Pins (6 PWM outputs) ➢ 6 Analog Inputs ➢ 32k Flash Memory ➢ 16Mhz Clock Speed	➢ Programmable WiFi module. ➢ Arduino-like (software defined) hardware IO. ➢ Programming language or Arduino IDE. ➢ USB-TTL included, plug & play. ➢ 10 GPIOs D0-D10, PWM functionality. ➢ 1-Wire and ADC A0 etc. all in one board.

ARDUINO UNO BOARD

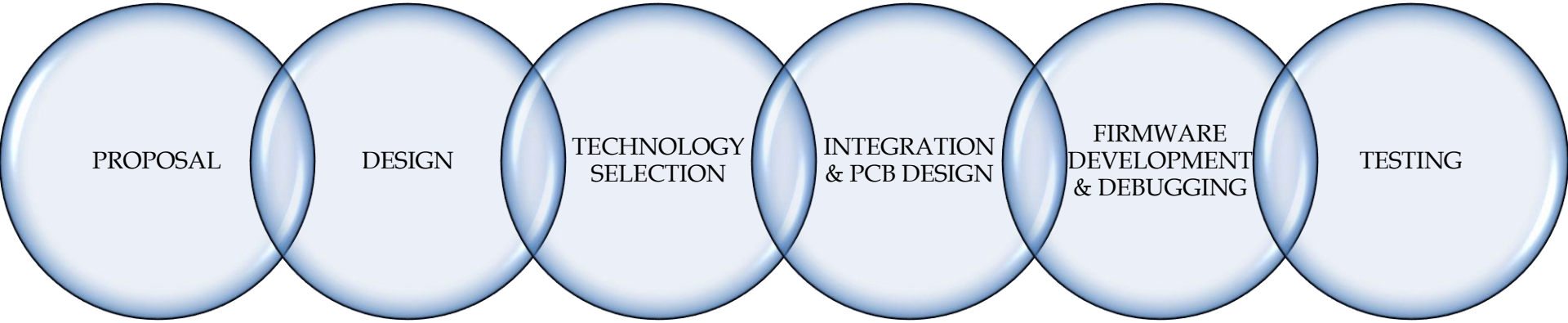


ARDUINO

- General Purpose & Domain Specific Processors
  - Microprocessors
  - Microcontrollers
  - DSPs
- ASICs
- PLDs
- COTS



STEPS TO DESIGN AN EMBEDDED SYSTEM

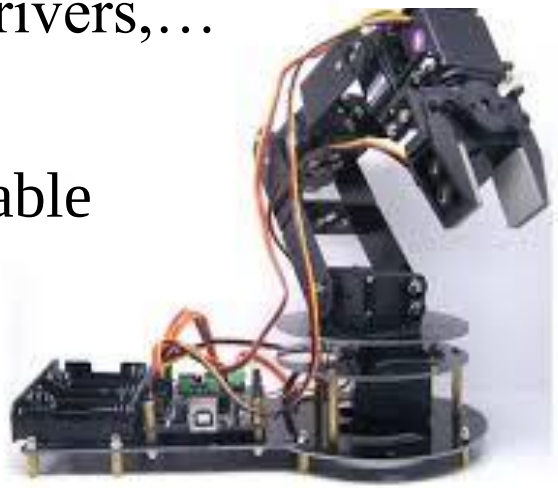


ARDUINO

- Open Source Organization – ES board
  - Open Source Hardware Architectu
  - Open Source IDE
- Boards
  - Purchase preassembled
  - Develop the kit by own
- Arduino boards - Sense and control the physical world
  - digital devices & interactive objects

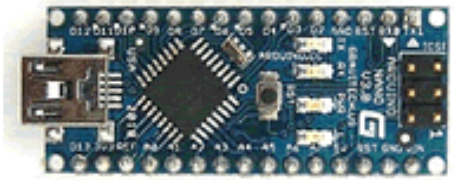
ARDUINO FEATURES & AI

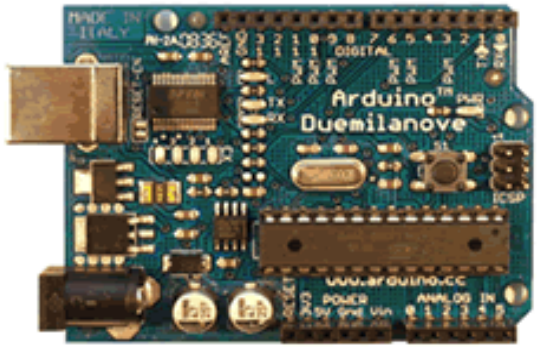
- Open Source Hardware
- Open Source Software
- Third party Hardware
  - Wi-Fi Shields
  - Bluetooth Shields
  - Motor Drivers,…
- Cheap
- Easily available
- Versatile

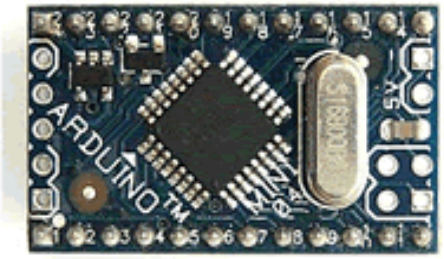


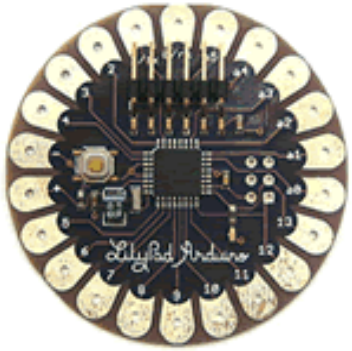
ARDUINO BOARDS

- Same IDE
- Different Hardware architecture





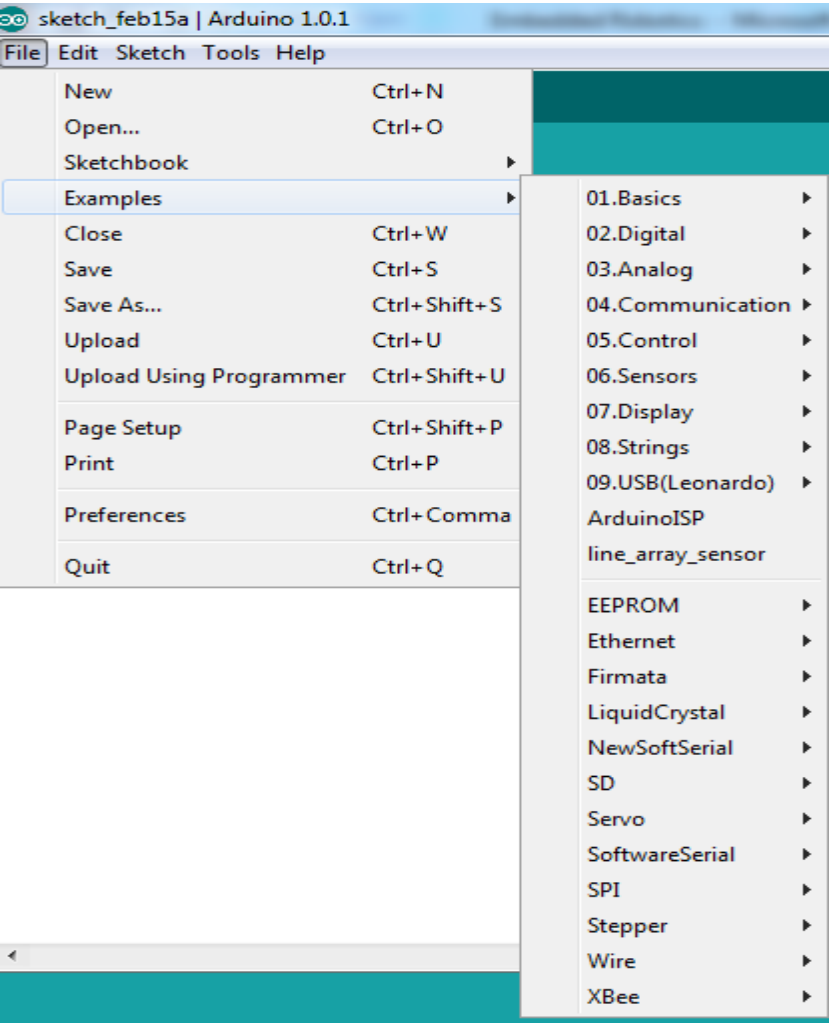




ARDUINO

SPECIFICATION	ARDUINO UNO
Microcontroller	Atmega328
Operating Voltage	5V
Digital I/O pins	14 (6 pins- PWM)
Analog Input pins	6
DC current per I/O pin	40 mA
DC current for 3.3Vpin	50 mA
Clock speed	16 MHz
Flash Memory	32 KB (ATmega 328) – 0.5 KB used-bootloader
SRAM	2KB(ATmega 328)
EEPROM	1KB(ATmega 328)
USB Drivers	**DIFFERENT DRIVERS**
Communication	UART TTL Serial (5V)

ARDUINO IDE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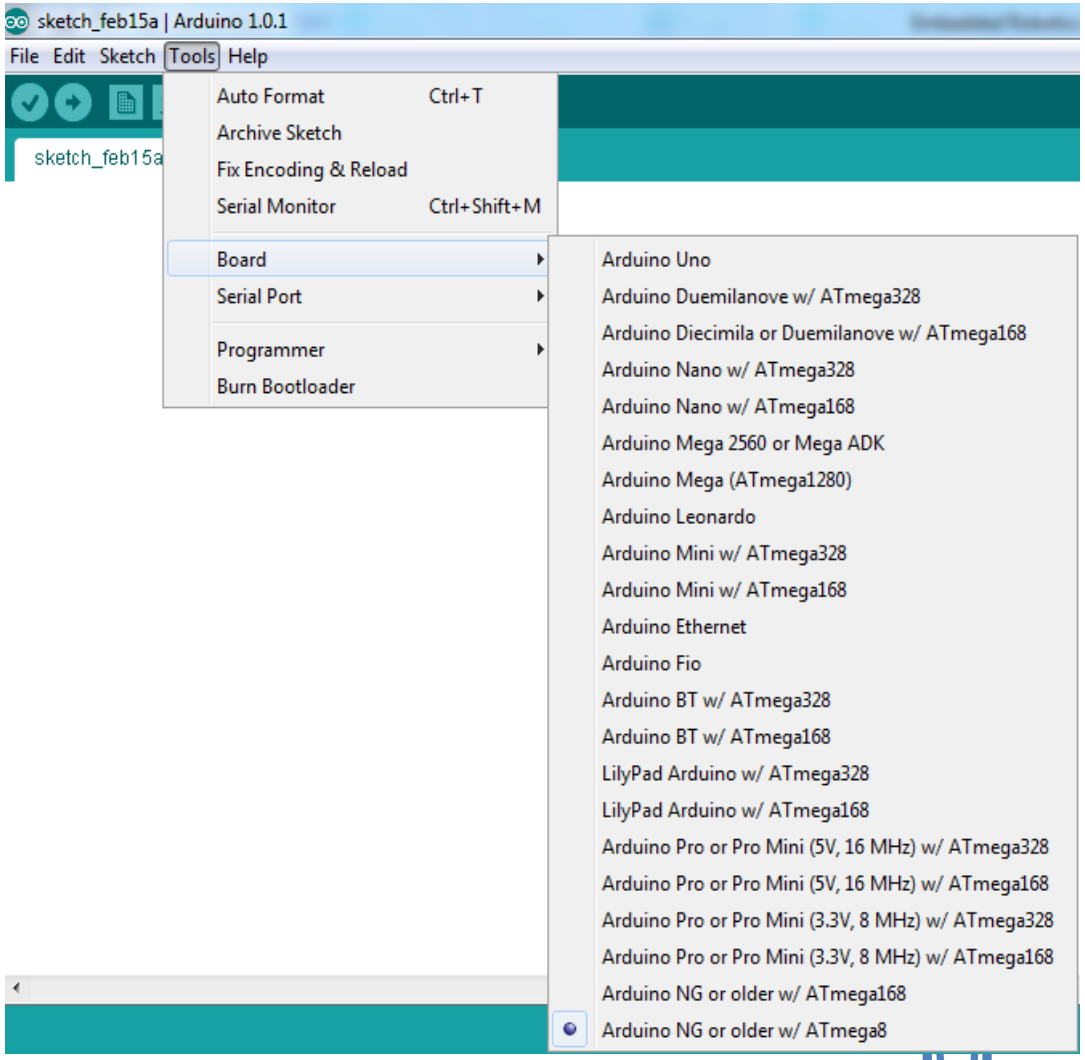
File Edit Sketch Tools Help
New Ctrl+N
Open... Ctrl+O
Sketchbook
Examples
Close Ctrl+W
Save Ctrl+S
Save As... Ctrl+Shift+S
Upload Ctrl+U
Upload Using Programmer Ctrl+Shift+U
Page Setup Ctrl+Shift+P
Print Ctrl+P
Preferences Ctrl+Comma
Quit Ctrl+Q
01.Basics
02.Digital
03.Analog
04.Communication
05.Control
06.Sensors
07.Display
08.Strings
09.USB(Leonardo)
ArduinoISP
line_array_sensor
EEPROM
Ethernet
Firmata
LiquidCrystal
NewSoftSerial
SD
Servo
SoftwareSerial
SPI
Stepper
Wire
XBee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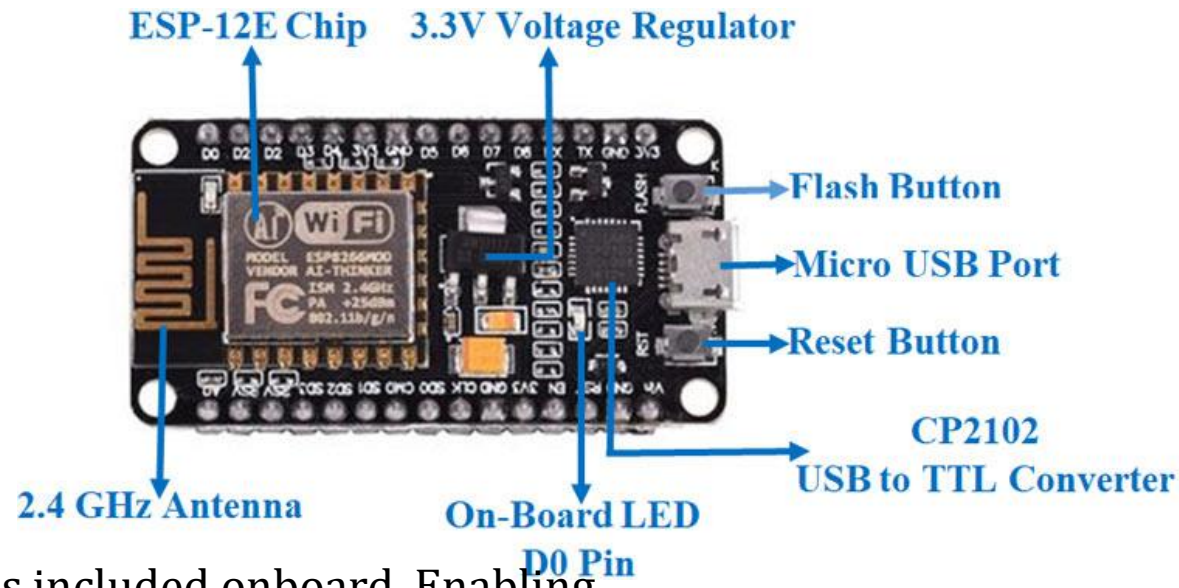
File Edit Sketch Tools Help
sketch_feb15a
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Board
Serial Port
Programmer
Burn Bootloader
Arduino Uno
Arduino Duemilanove w/ ATmega328
Arduino Diecimila or Duemilanove w/ ATmega168
Arduino Nano w/ ATmega328
Arduino Nano w/ ATmega168
Arduino Mega 2560 or Mega ADK
Arduino Mega (ATmega1280)
Arduino Leonardo
Arduino Mini w/ ATmega328
Arduino Mini w/ ATmega168
Arduino Ethernet
Arduino Fio
Arduino BT w/ ATmega328
Arduino BT w/ ATmega168
LilyPad Arduino w/ ATmega328
LilyPad Arduino w/ ATmega168
Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega328
Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega168
Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega328
Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega168
Arduino NG or older w/ ATmega168
Arduino NG or older w/ ATmega8

NodeMCU

- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small Sized module to fit smartly inside your IoT projects




thank
you