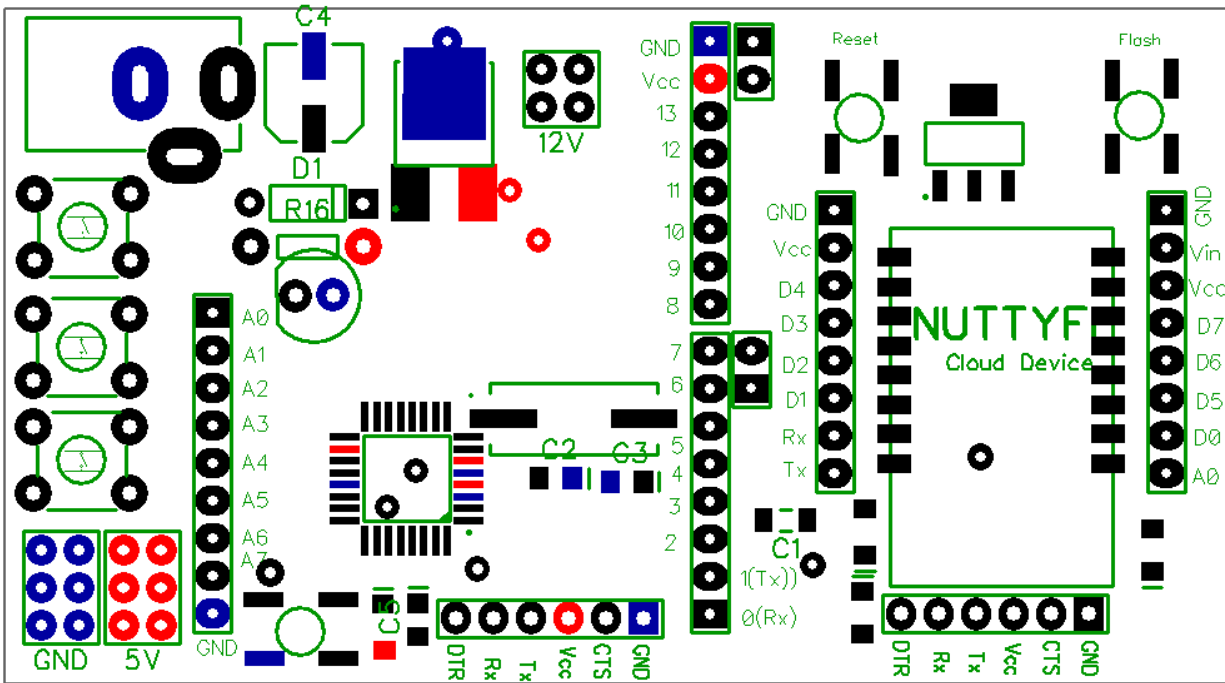
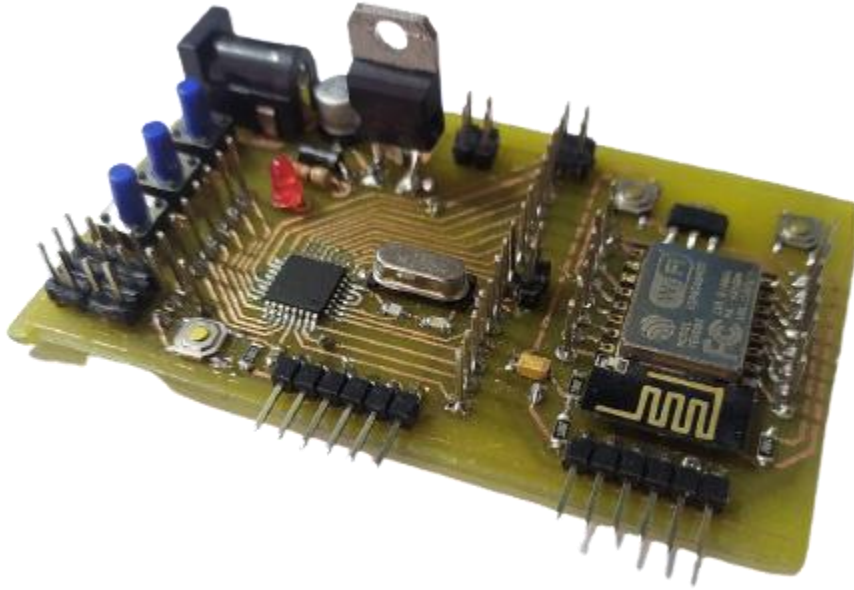




Customized IoT Board with built-in Atmega328 and Wi-Fi Nuttyfi



Pin Diagram



ATmega328 Board:

Pin Description:

Pin Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to Board when using an external power source. 5V: Regulated power supply used to power microcontroller and other components on the board. 3.3V: 3.3V supply generated by on-board voltage regulator. Maximum current draw is 50mA. GND: ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A7	Used to provide analog input in the range of 0-5V
Input/Output Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(Tx)	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.
TWI	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

Technical Specification:

Microcontroller	ATmega328P – 8 bit AVR family microcontroller
Operating Voltage	5V
Recommended Input Voltage	7-12V
Input Voltage Limits	6-20V
Analog Input Pins	6 (A0 – A5)
Digital I/O Pins	14 (Out of which 6 provide PWM output)
DC Current on I/O Pins	40 mA
DC Current on 3.3V Pin	50 mA
Flash Memory	32 KB (0.5 KB is used for Bootloader)
SRAM	2 KB
EEPROM	1 KB
Frequency (Clock Speed)	16 MHz

How to use board:

The 14 digital input/output pins can be used as input or output pins by using `pinMode()`, `digitalRead()` and `digitalWrite()` functions in Arduino IDE programming. Each pin operate at 5V and can provide or receive a maximum of 40mA current, and has an internal pull-up resistor of 20-50 KOhms which are disconnected by default. Out of these 14 pins, some pins have specific functions as listed below:

Serial Pins 0 (Rx) and 1 (Tx): Rx and Tx pins are used to receive and transmit TTL serial data. They are connected with the corresponding ATmega328P USB to TTL serial chip.

External Interrupt Pins 2 and 3: These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.

PWM Pins 3, 5, 6, 9 and 11: These pins provide an 8-bit PWM output by using `analogWrite()` function.

SPI Pins 10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK): These pins are used for SPI communication.

Along with 14 Digital pins, there are 8 analog input pins, each of which provides 10 bits of resolution, i.e. 1024 different values. They measure from 0 to 5 volts but this limit can be increased by using AREF pin with `analogReference()` function.

Analog pin 4 (SDA) and pin 5 (SCA) also used for TWI communication using Wire library.

Reset Button: Making this pin LOW, resets the microcontroller.

Nuttyfi Wi-Fi Board

Nuttyfi IoT is powerful IoT (Internet of Things) Hardware Platform with a WIFI chip to interface your sensor as well as any other microcontroller equipped with sensor and devices, to control using internet.

Nuttyfi is an Internet of Things Hardware platform based on ESP8266 12e series that enables user to build **IoT** products, Research Analysis Systems, Automation and Projects. Using this board, users can monitor, manage, control and search devices from any part of the world. It's can also interface with any IOT web servers, icloud, Local or IOT mobile platform or application easily. Number of services open-source web servers & mobile apps are available in the internet that is freeware to use.

Specification:

- Voltage: Input 5v to 12V DC
- Wi- Fi Direct (P2P), soft- AP.
- Current consumption: 10uA~170mA.
- Flash memory attachable: 16MB max (512K normal).
- Integrated TCP/IP protocol stack.
- Processor: Tensilica L106 32 - bit.
- Processor speed: 80~160MHz.
- RAM: 32K + 80K.
- GPIOs: 17 (multiplexed with other functions).
- Analog to Digital: 1 input with 1024 step resolution.
- +19.5dBm output power in 802.11b mode
- 802.11 support: b/g/n.

- Maximum concurrent TCP connections: 5

Pin Definition:

8 digital pins: From D0 to D7,

Analog pin-A0

Vinput- From 5V to 21v

3.3V output pin

UART Pins to Flash program to Nuttyfi

URL To install Wi-Fi board:

http://arduino.esp8266.com/stable/package_esp8266com_index.json

How to Program:

You have to attach the programmer appropriately as per directed by your instructor or experts.

Be cautious, mishandle or wrong attachment can cause irreversible damage to your board.

USB Over current Protection

Although most computers provide their own internal protection, the fuse provides an extra layer of protection. If more than 500 mA is applied to the USB port, along with external power supply, it can harm your computer. **So, we strongly recommend you to not use any kind of external power supply when you attach upload your program in to board.**