Sponsor

Blazor WEB APP - interactivity server

- "Blazor is a full-stack web UI framework and is recommended for most web UI scenarios."

  https://learn.microsoft.com/en-us/aspnet/core/tutorials/choose-web-ui

- "Blazor supports interactive server-side rendering (interactive SSR), where UI interactions are handled from the server over a real-time connection with the browser.Interactive SSR enables a rich user experience like one would expect from a client app but without the need to create API endpoints to access server resources."

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Mediator pattern

Mediator is a behavioral design pattern that lets you reduce chaotic dependencies between objects. The pattern restricts direct communications between the objects and forces them to collaborate only via a mediator object.

https://refactoring.guru/design-patterns/mediator
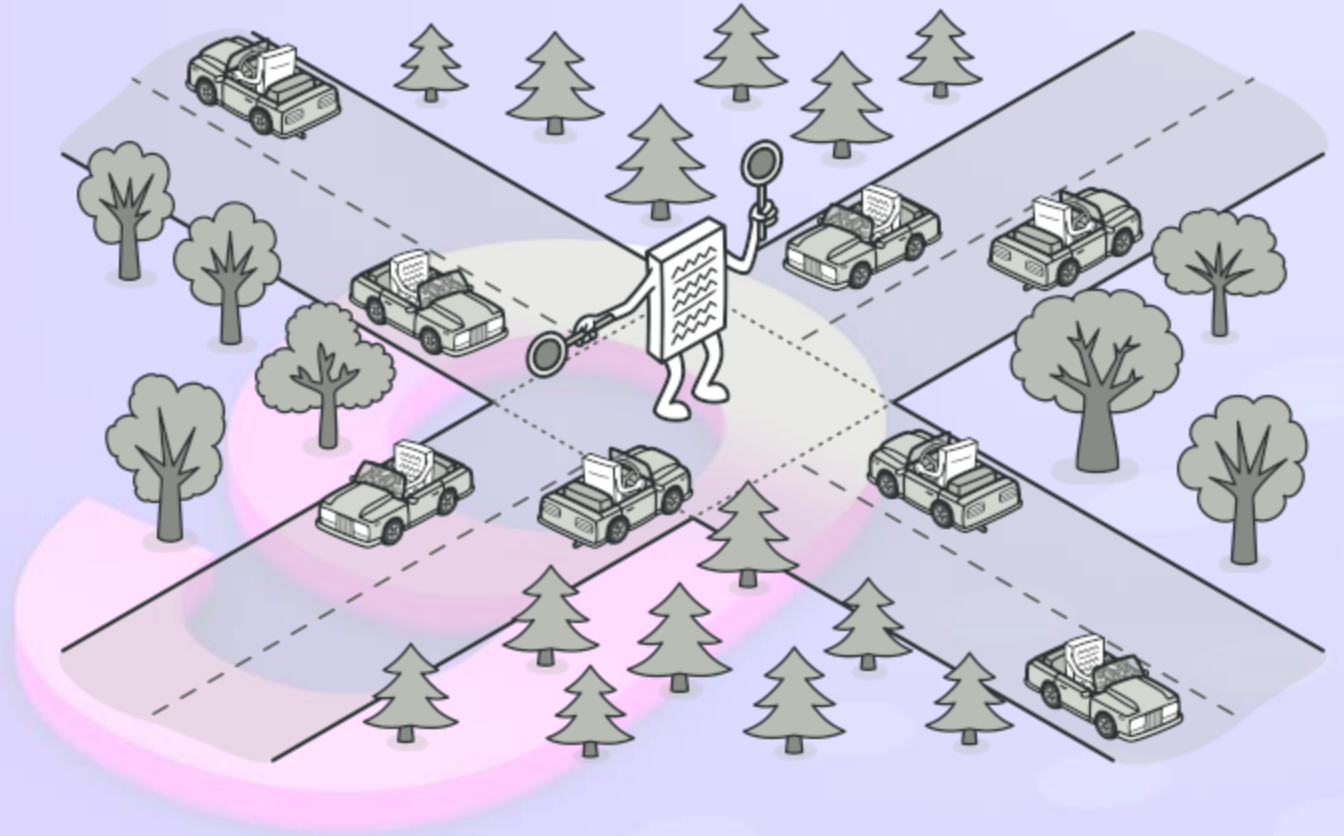
Mediatr

- "Simple, unambitious mediator implementation in .NET"

  https://github.com/jbogard/MediatR

- Simple mediator implementation in .NET

- In-process messaging with no dependencies.

- Supports request/response, commands, queries, notifications and events, synchronous and async with intelligent dispatching via C# generic variance.

Complex animation management - workflow-core

- "Lightweight workflow engine for .NET Standard"

  https://github.com/danielgerlag/workflow-core

- Workflow Core is a lightweight embeddable workflow engine targeting .NET Standard.

- It supports pluggable persistence and concurrency providers to allow for multi-node clusters.

- Fluent API

- JSON / YAML Workflow Definitions

Expose command for third-party integration

- Simplified Integration
  - Standardized communication protocol accessible via HTTP.

- Platform Independence
  - Create API-Rest for expose input and output
  - Enables interaction from anywhere in the network.

- Secure and Controlled Access
  - Use authentication and authorization to manage access to the commands and data.
  - Protect sensitive input/output operations on the Raspberry Pi.

- Ease of Testing and Debugging
  - Use tools like Swagger or Postman to test endpoints directly.

CODE

RASPBERRY PI3 B+

Specification

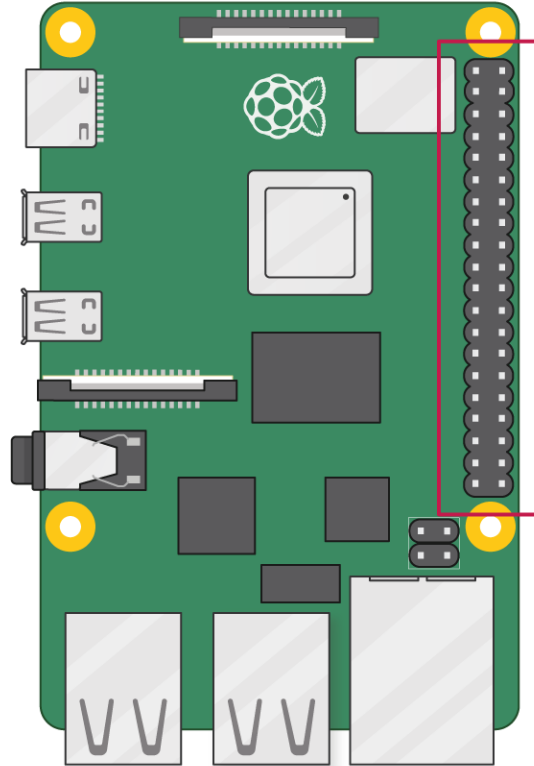|	
Processor:	Broadcom BCM2837B0, Cortex-A53 64-bit SoC @ 1.4GHz
Memory:	1GB
Connectivity:	• 2.4 GHz and 5 GHz IEEE 802.11b/g/n/ac wireless LAN, Bluetooth 4.2, BLE • Gigabit Ethernet over USB 2.0 (maximum throughput 300Mbps) • 4 × USB 2.0 interface
Video and sound:	• 1 x full size HDMI • MIPI DSI display port • MIPI CSI camera port • 4 pole stereo output and composite video port
Multimedia:	H.264, MPEG-4 decode (1080p30); H.264 encode (1080p30); OpenGL ES 1.1, 2.0 graphics
SD card support:	Micro SD format for loading operating system and data storage
Input Power:	• 5V/2.5A DC via micro USB connector • 5V DC via GPIO header • Power over Ethernet (PoE)-enabled (requires separate PoE HAT)
Operating temperature:	0-50°C
Production lifetime:	Raspberry Pi 3 Model B+ will remain in production until at least January 2028

RASPBERRY PI3 B+

Ultrasonic Ranging Module HC - SR04

The Timing diagram is shown below. You only need to supply a short 10uS pulse to the trigger input to start the ranging, and then the module will send out an 8 cycle burst of ultrasound at 40 kHz and raise its echo. The Echo is a distance object that is pulse width and the range in proportion .You can calculate the range through the time interval between sending trigger signal and receiving echo signal. Formula: uS / 58 = centimeters or uS / 148 =inch; or: the range = high level time * velocity (340M/S) / 2; we suggest to use over 60ms measurement cycle, in order to prevent trigger signal to the echo signal.
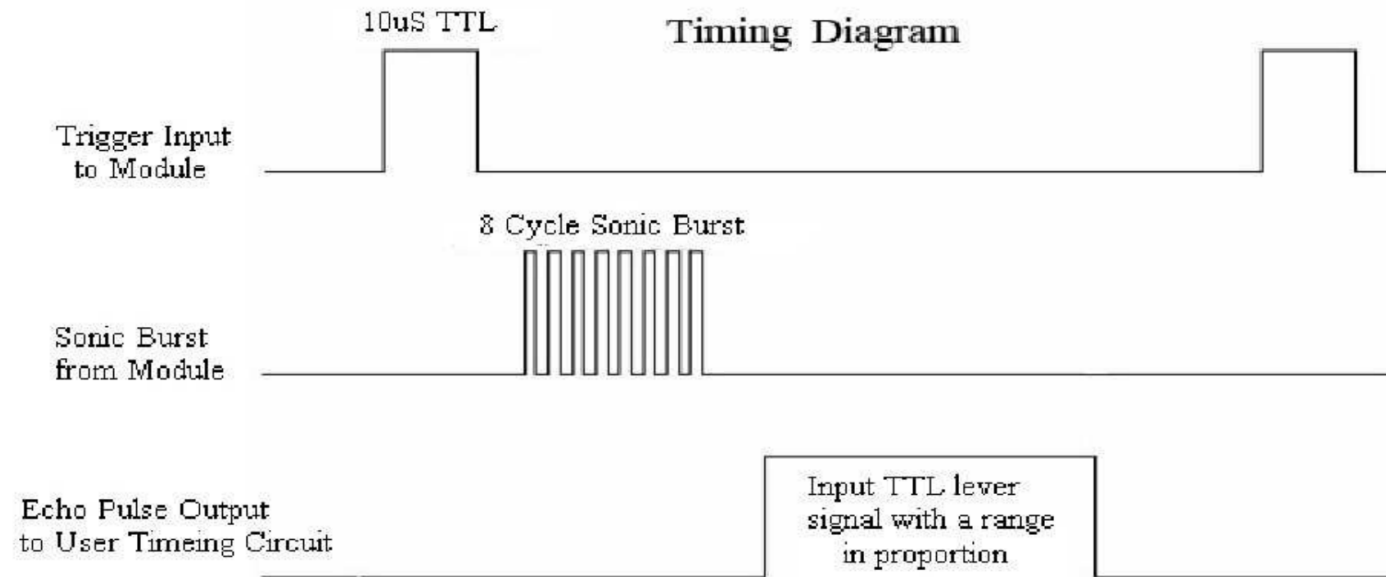
Stepper Motor 5V 4-Phase 5-Wire & ULN2003 Driver Board

FEATURES

- **500-mA-Rated Collector Current (Single Output)**
- **High-Voltage Outputs: 50 V**
- **Output Clamp Diodes**
- **Inputs Compatible With Various Types of Logic**
- **Relay-Driver Applications**

ULN2002A . . . N PACKAGE
ULN2003A . . . D, N, NS, OR PW PACKAGE
ULN2004A . . . D, N, OR NS PACKAGE
ULQ2003A, ULQ2004A . . . D OR N PACKAGE
(TOP VIEW)

1B	1	16	1C
2B	2	15	2C
3B	3	14	3C
4B	4	13	4C
5B	5	12	5C
6B	6	11	6C
7B	7	10	7C
E	8	9	COM
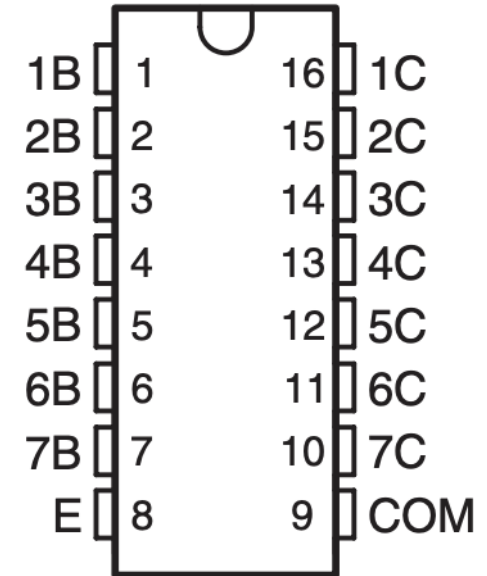
Power Supply 15 W 5 V 3 A

MW MEAN WELL

15W Single Output Switching Power Supply

RS-15 series

Features:
* Universal AC input / Full range
* Protections: Short circuit / Overload / Over voltage / Over temperature
* Cooling by free air convection
* LED indicator for power on
* 100% full load burn-in test
* No load power consumption<0.5W
* All using 105℃ long life electrolytic capacitors
* Withstand 300VAC surge input for 5 second
* High operating temperature up to 70℃
* Withstand 5G vibration test
* High efficiency, long life and high reliability
* 3 years warranty

User's Manual

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

IS13252 AS/NZS62368-1   UL62368-1   GB4943.1   BS EN/EN62368-1   TPTC004 IEC62368-1   CB CE UKCA

SPECIFICATION

| MODEL		RS-15-3.3	RS-15-5	RS-15-12	RS-15-15	RS-15-24	RS-15-48
OUTPUT	DC VOLTAGE	3.3V	5V	12V	15V	24V	48V
	RATED CURRENT	3A	3A	1.3A	1A	0.625A	0.313A
	CURRENT RANGE	0 ~ 3A	0 ~ 3A	0 ~ 1.3A	0 ~ 1A	0 ~ 0.625A	0 ~ 0.313A
	RATED POWER	9.9W	15W	15.6W	15W	15W	15.024W
	RIPPLE & NOISE (max.) Note.2	80mVp-p	80mVp-p	120mVp-p	120mVp-p	200mVp-p	200mVp-p
	VOLTAGE ADJ. RANGE	2.9 ~ 3.6V	4.75 ~ 5.5V	10.8 ~ 13.2V	13.5 ~ 16.5V	22 ~ 27.6V	43.2 ~ 52.8V
	VOLTAGE TOLERANCE Note.3	±3.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION Note.4	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION Note.5	±2.0%	±1.5%	±0.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME	1000ms, 30ms/230VAC 1000ms, 30ms/115VAC at full load					
	HOLD UP TIME (Typ.)	70ms/230VAC 12ms/115VAC at full load					
INPUT	VOLTAGE RANGE	85 ~ 264VAC 120 ~ 370VDC					
	FREQUENCY RANGE	47 ~ 63Hz					
	EFFICIENCY (Typ.)	72%	77%	81%	81%	82%	82%
	AC CURRENT (Typ.)	0.35A/115VAC 0.25A/230VAC					
	INRUSH CURRENT (Typ.)	COLD START 65A / 230VAC					
	LEAKAGE CURRENT	<2mA / 240VAC					

BTF-Lighting WS2812
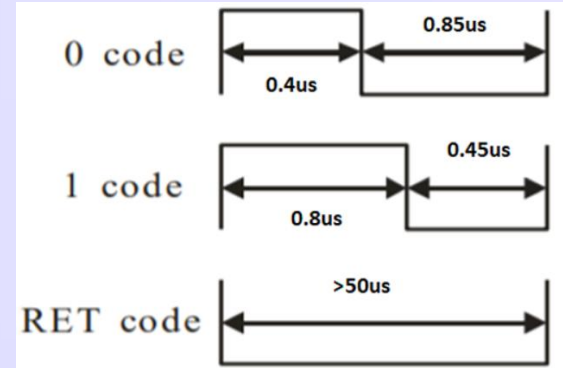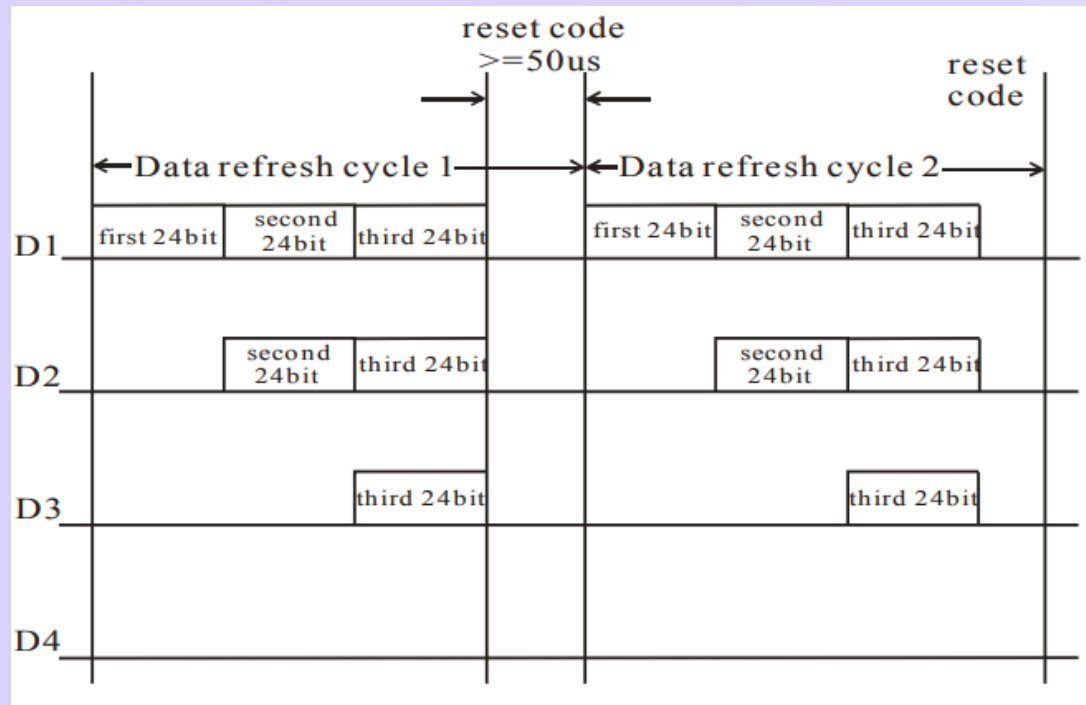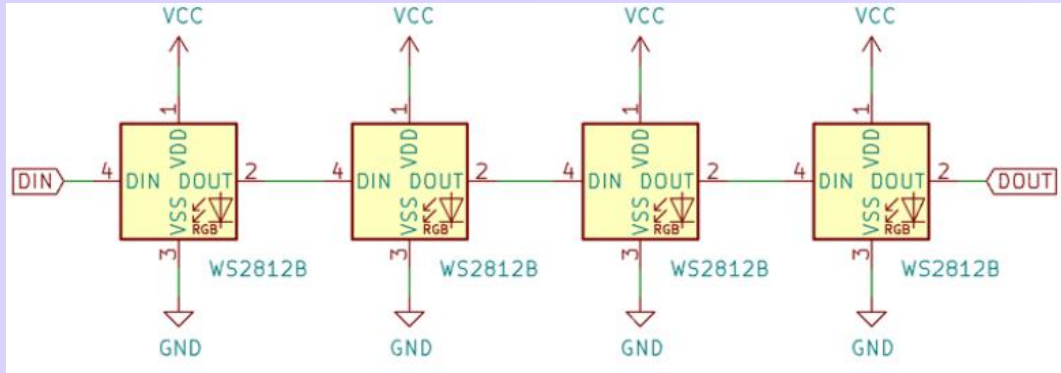
Serial Peripheral Interface

WS2812B LED Protocol

BTF-Lighting WS2812
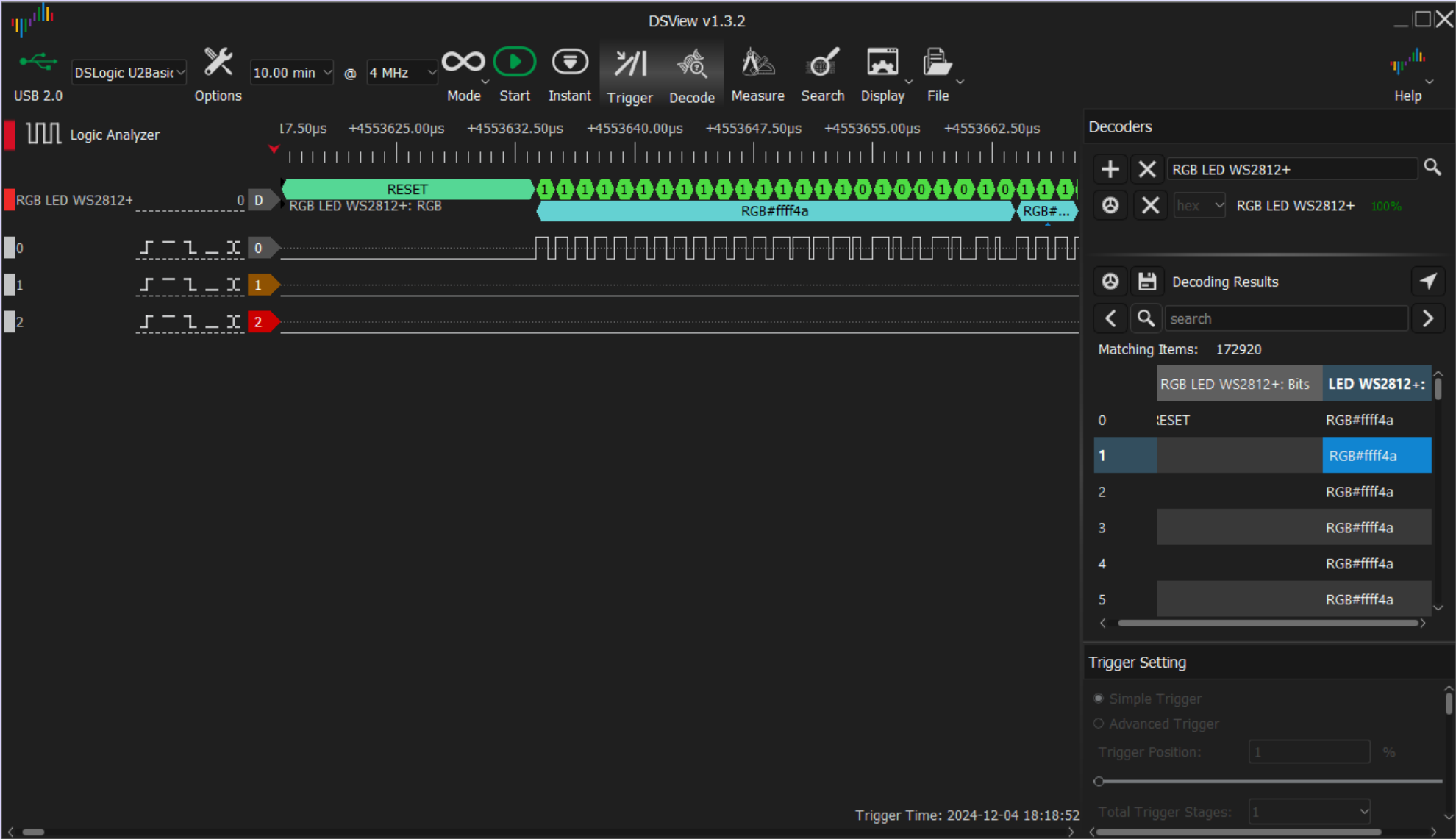
.NET for IoT

GPIO APIs: **System.Device.Gpio**
Device bindings: **IoT.Device.Bindings**
Source: **dotnet/iot**

System.Device.Gpio library and tests which is the main library that has the implementation for protocols such as: GPIO, SPI, I2C, PWM. This library is fully supported by the dotnet team since it has the same level of support that dotnet/corefx does.

IoT.Device.Bindings device bindings library. This is a collection of types which work as wrappers (or bindings) for devices and sensors which are able to talk to a microcontroller unit (or MCU like a Raspberry Pi for example) using the protocols supported by System.Device.Gpio.
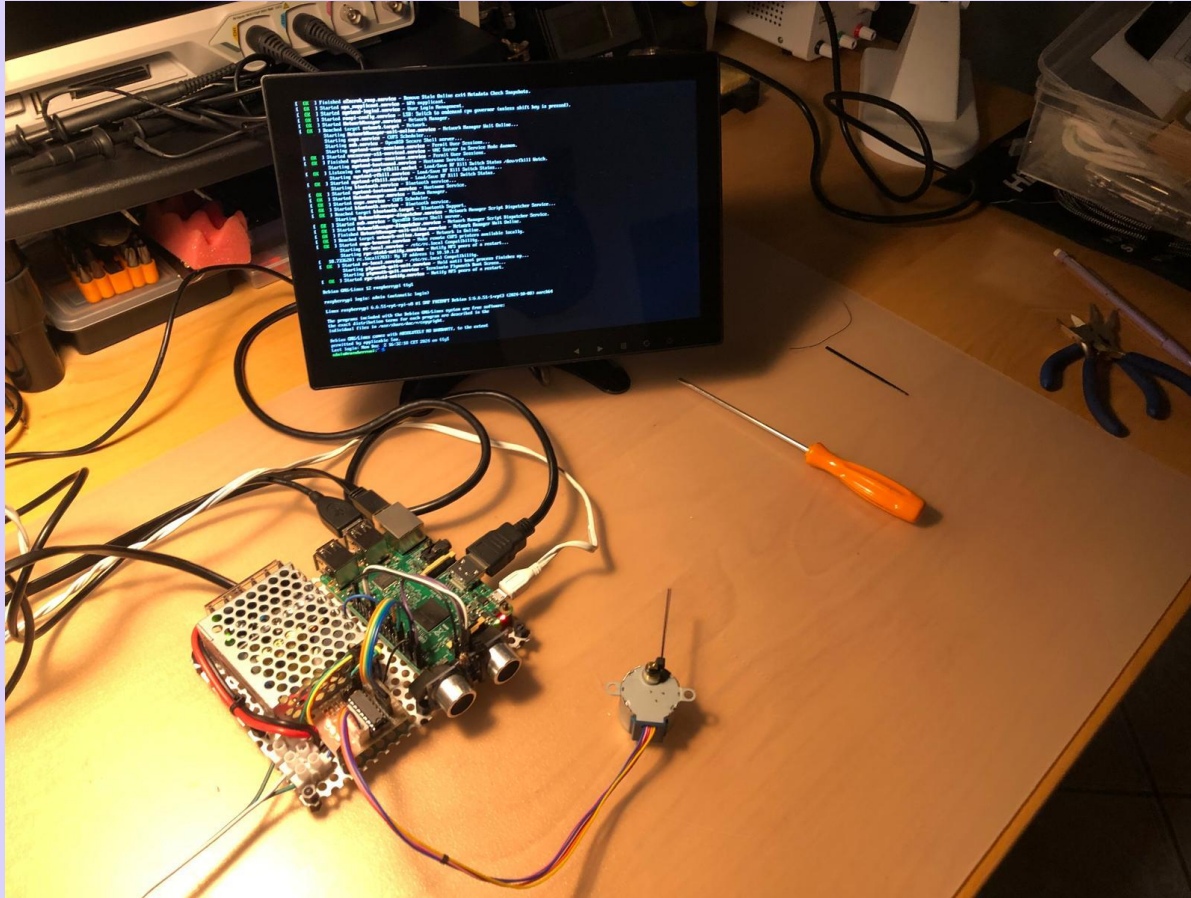
Learn Internet of Things (IoT)
.NET IoT Libraries documentation
Deploy .NET apps on ARM single-board computers

Ws28xx / SK6812 LED drivers
28BYJ-48 Stepper Motor 5V 4-Phase 5-Wire & ULN2003 Driver Board
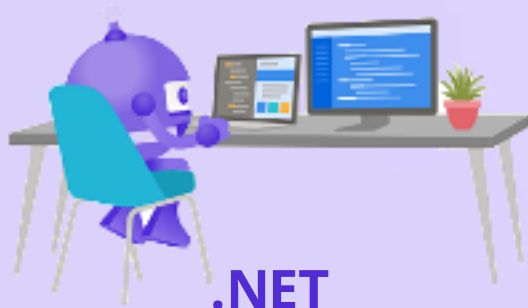HC-SR04 - Ultrasonic Ranging Module

altitudo
beanTech
IT moves your business
[stesi]
Powered by Innovation
CONSORZIO UNIVERSITARIO DI PORDENONE
MOLTIPLICATORE DI VALORE

Work in progress...

CODE

Contacts

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```
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```

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{
    email: mirco.vanini@proxsoft.it,
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    linkedin: proxsoft
}
```