

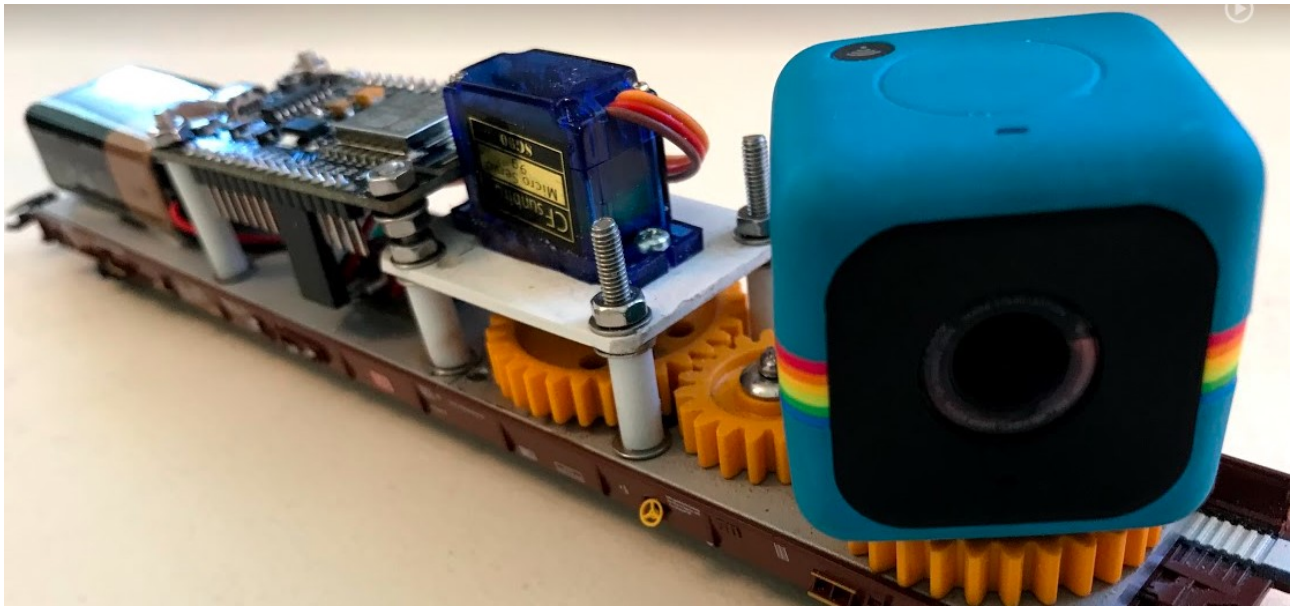
How to build a Loc camera with panning.

Document created 3-6-2020

Rev A: 9-6-2020 – hardcoded WIFI credentials are replaced with log-on box.

Rev B: 19-6-2020 – code changes – and detailed setup and configurations for Blynk and ESP8266

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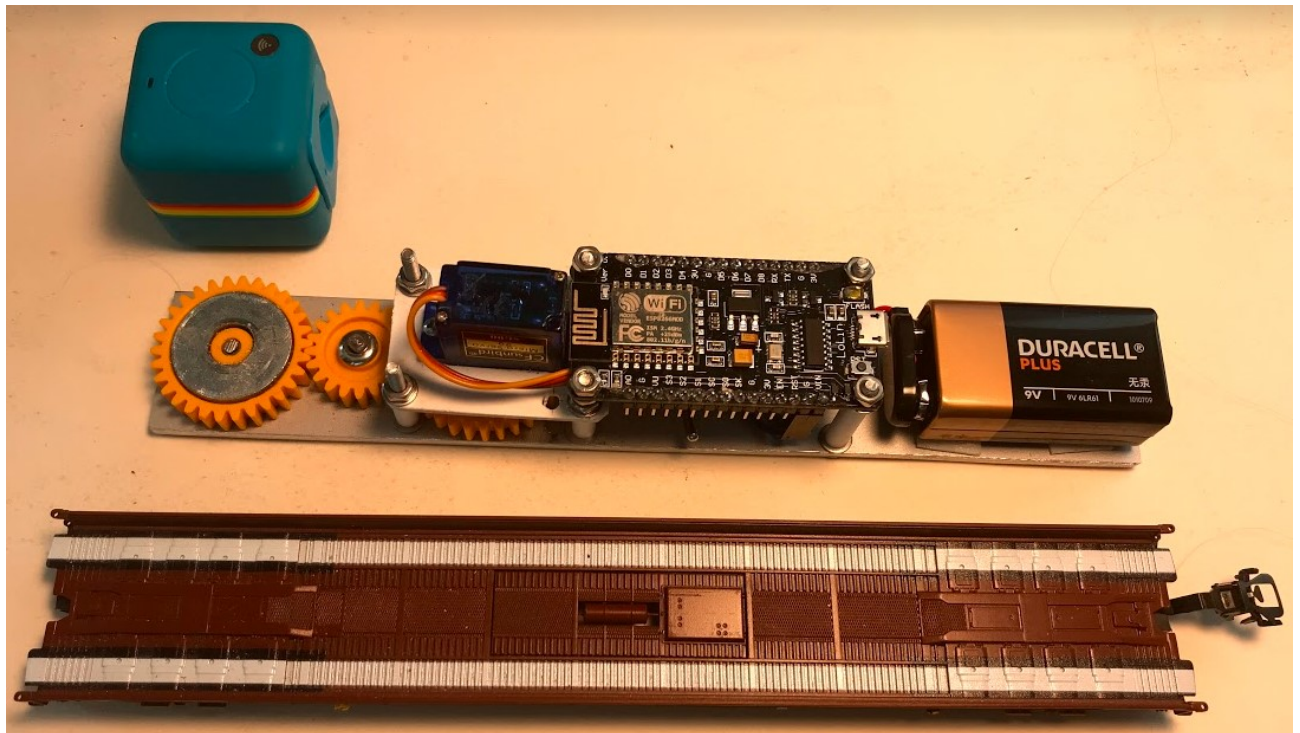


Content

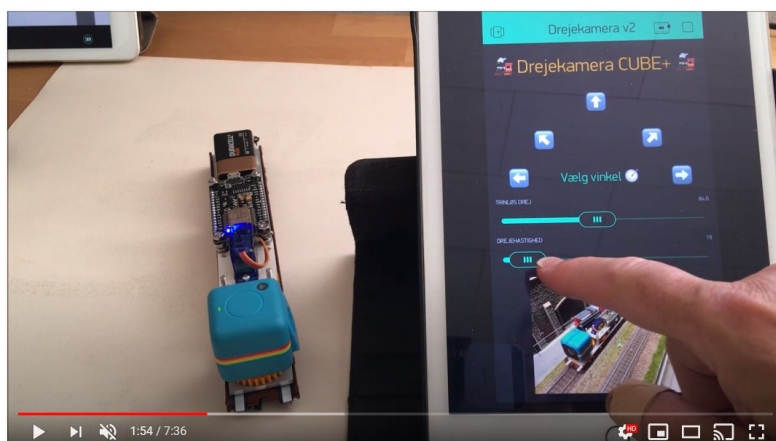
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1 Summary

This document contains a description of how I designed and programmed a camera wagon. The camera can pan and it is controlled by an ESP9266 Node MCU. To operate the camera, I have made an a Blynk app.



Check the YouTube video regarding this project: - click on the picture to start the video



1.1 Construction of the wagon

1.1.1 Bottom plate



Metal plate – 31 x 200 x 3 mm. The weight of the plate stabilizes the wagon when driving

Bought in Bauhaus and cut out.

The bottom plate is designed to match the wagon from Rollende Landstraße / Rolling Road

1.1.2 Gear

I have used 3 gear-wheels:

- wheel 31,5 mm
- 1 wheel 21,5 mm is used.

Bought at Conrad.de: <https://www.conrad.de/de/search.html?search=237663>

Shafts 4 mm – bought at bauhaus



Glue a metal disc onto the gear-wheel to carry the camera - check that it is magnetic

1.1.3 Servomotor


<https://www.elextra.dk/details/H34768/servomotor-mikro-3-72vdc-120ms-60-9g>

Servomotor, mikro - 3-7,2VDC, 120ms/60° (9g)



Produktnr. H34768

69,00 DKK inkl. moms

fra 17 kr. / md  uden renter og gebyrer 

55,20 DKK ekskl. moms

Lagerstatus  58 stk. på centrallager.

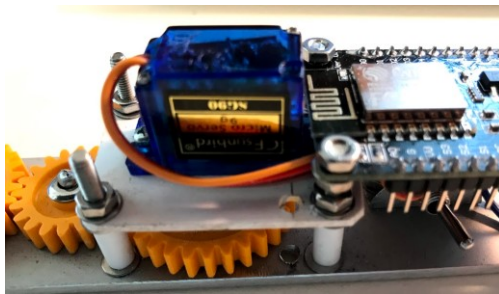
Bestil antal

Læg i indkøbskurv

Selvhentergebyr (butik): Kr. 0,-

Forsendelse (GLS): Kr. 55,- inkl. moms.

[Klik her for tilbud ved min. 23 stk.](#)



The servo is mounted on a 31 x 44 x 2 mm plastic plate

The screws are 3 mm - from the Bauhaus. The bushings are plastic tubes.

1.1.4 ESP8266 – Node MCU

<https://www.conrad.de/de/p/joy-it-entwickler-platine-node-mcu-esp8266-wifi-1613301.html>



The screenshot shows the Conrad.de website interface. At the top, there is a search bar with the text "Schlagwort / Artikelnummer / EAN / Hst.-Teile-Nr. / Bestell-Nr." and a search icon. Below the search bar, there is a navigation menu with "Unsere Produkte" and a promotional banner that says "+++ Jetzt versandkostenfrei Mund- und Nasenschutz bestellen +++". The main content area displays the product "Joy-it Entwickler-Platine Node MCU ESP8266 WiFi Modul" with a star rating of 4.5 (3 reviews), a price of 8,59 € (incl. MwSt., zzgl.), and a quantity selector set to 1. The product image shows the development board with various components like the ESP8266 chip, USB port, and headers. There are also buttons for "Merken" and "Vergleichen".

1.1.5 Power supply

I have used a 9V battery - Here you might consider a different solution so you don't have to change the battery.

A toggle switch to disconnect battery power is also necessary.



1.1.6 Camera

Polaroid Cube+ - wifi.

Unfortunately, it does not appear to be available anymore



Polaroid Cube+ 1440p Mini Lifestyle Action Camera with Wi-Fi & Image Stabilization (Black)

by Polaroid
★★★★☆ 420 ratings | 143 answered questions

Available from these sellers.

Color: Black

1 option from \$251.88

4 options from \$70.00

2 options from \$119.02

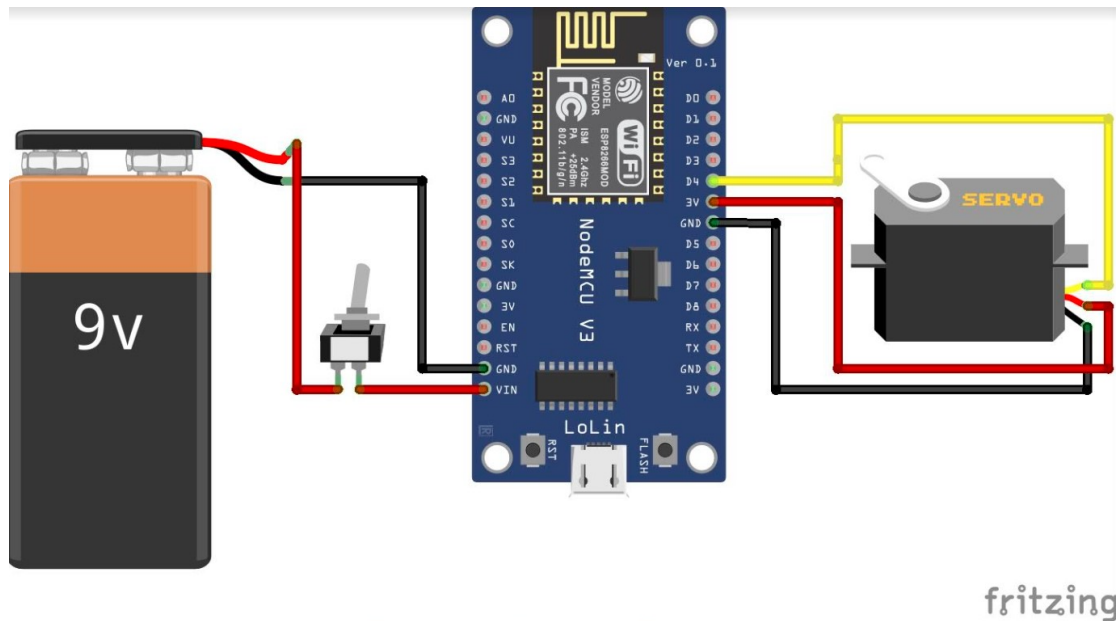
- World's Funnest, Cutest Lifestyle Action Camera in Light & Tiny Cubic Package
- NEW! Wi-Fi + FREE App; Shoot, View, Save, Print & Share with Your Mobile Device
- 8MP still images; Selectable 1440p / 1080p / 720p Video Rate; Full Image & Video Stabilization
- Built-in Rechargeable Battery for up to 107 Minutes of Continuous Recording Per Charge
- 124° Wide-Angle Lens; Magnetic/Clip Mounting Options; Includes MicroSD Card & Polaroid Bumper Case

There is a newer model of this item:



Polaroid Cube+ Live Streaming 1440p Mini Lifestyle Action Camera with Wi-Fi & Image Stabilization (Black)
Currently unavailable

1.1.7 Connect Node CMU with servo and battery



The servo with its three wires is connected in this way:

- Yellow – signal – D4
- Red – 3v
- Black – Ground

The battery is connected to GND and VIN

1.2 BLYNK – app

Here there are two options:


- Import a copy of my Blynk app
- Make your own Blynk-app from scratch

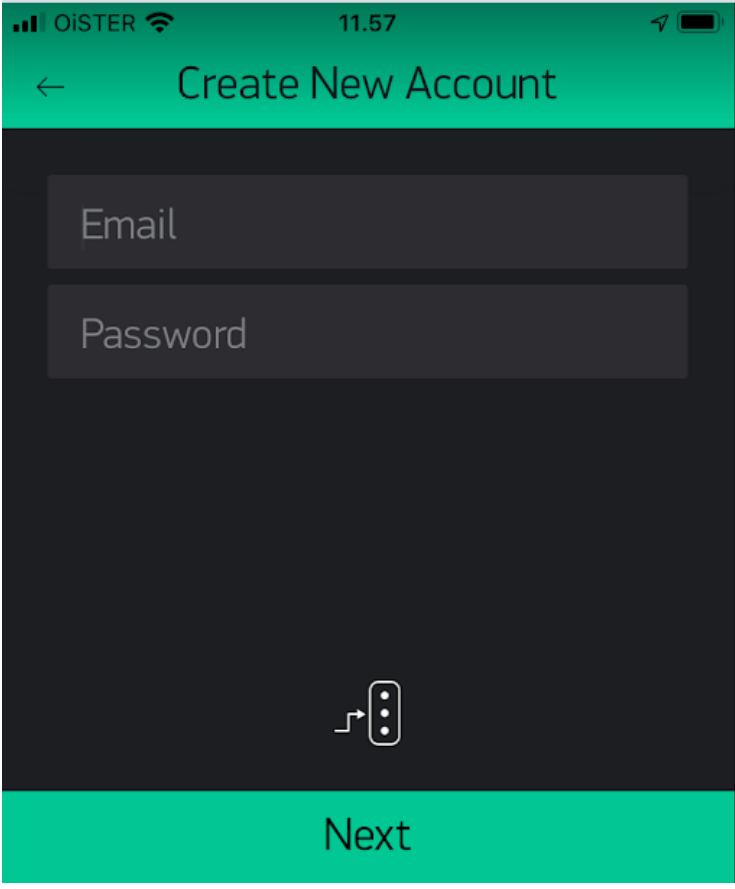
These two options are described in the next two chapters.

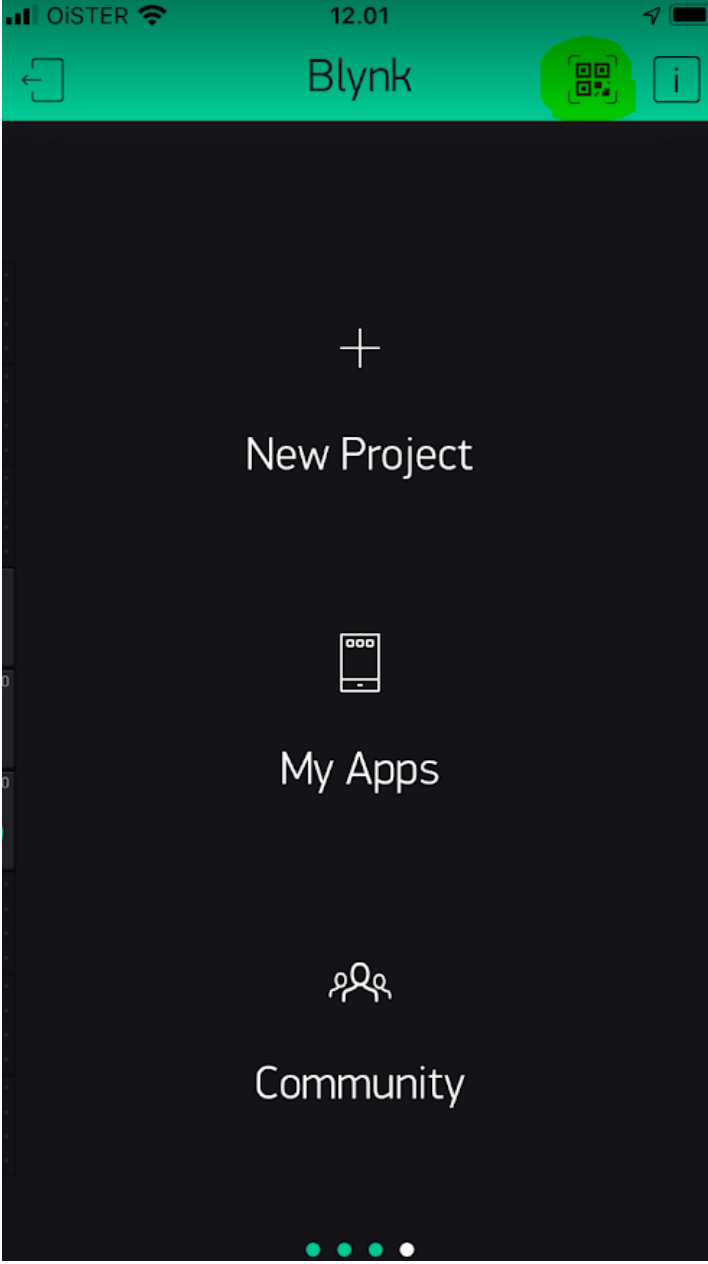
1.2.1 Import a copy of my Blynk app.


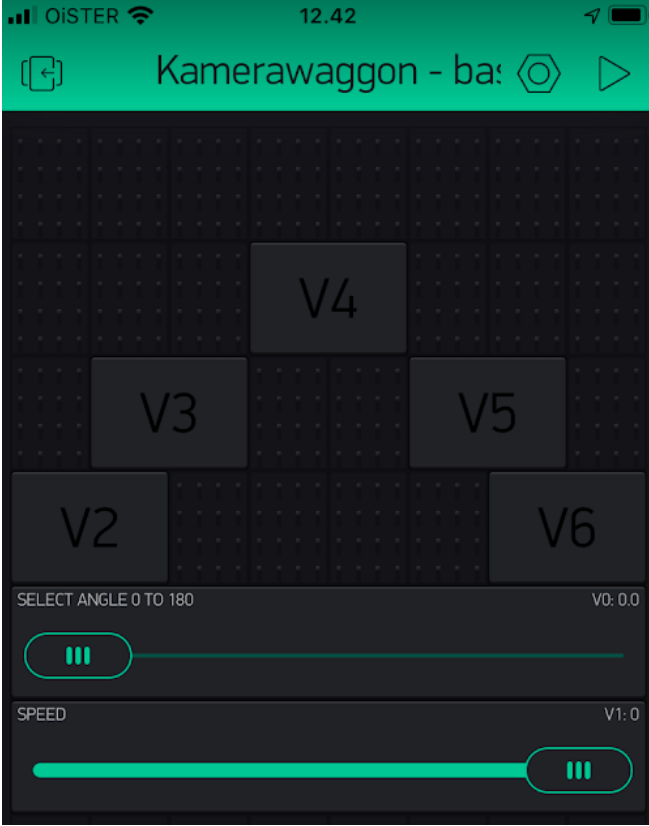
Follow the guide below step 1 to 5 to import a full functional copy of my app.

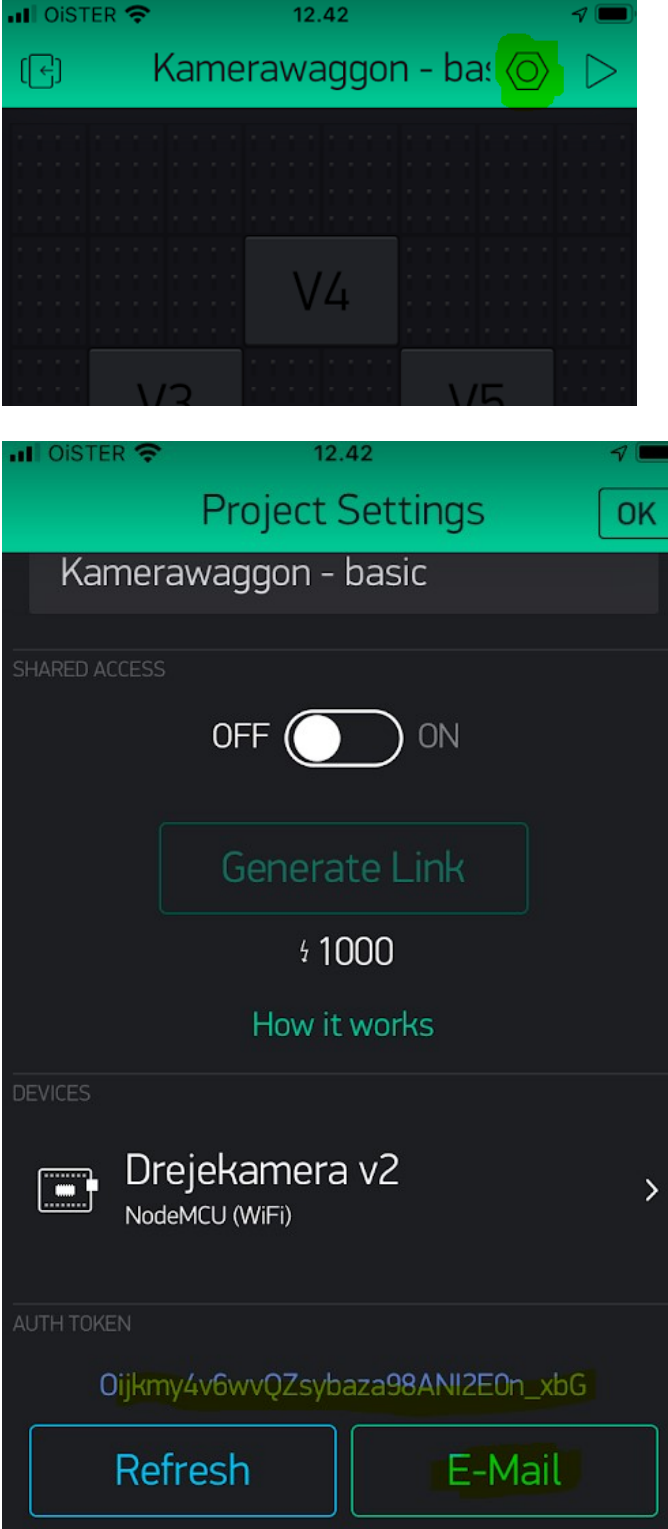
When you have imported my Blynk app – you can make all the changes to it that you want.

Step No	Description	Clip
1	Install Blynk – app on mobile	 <p>The screenshot shows an iPhone search results page for the app 'Blynk - IoT for Arduino'. At the top, the search bar contains 'Blynk' and a search icon. Below the search bar, the app's icon (a green square with a white 'B') is displayed next to the app title 'Blynk - IoT for Arduino...'. Underneath the title, it says 'Værktøjer' and shows a rating of 5 stars with 6 reviews. To the right of the app information is a blue button labeled 'ÅBN'. Below the app information are three preview cards for the app, each showing a different screen of the app's interface. The first card is titled 'DRAG N DROP WIDGETS TO CREATE YOUR OWN APP' and shows a dashboard with various widgets. The second card is titled 'MANY MANY WIDGETS! AND MORE COMING...' and shows a 'Widget Box' with various widget options. The third card is titled 'EASY SET UP LIKE 1-2-3' and shows a 'Graph Settings' screen. At the bottom of the clip area, the text 'Install the App – it is free.' is written.</p>

Step No	Description	Clip
2	Create an account	

Step No	Description	Clip
3	Import project	 <p data-bbox="619 1599 1203 1630">Press the QR-Code – button – and scan this code</p>

Step No	Description	Clip
		
4	<p>Check the project.</p> <p>The project 'Kamerawaggon – basic' should now have been imported.</p> <p>This is the basic project with functionality to operate the servo.</p> <p>You kann change it – add extra texts – buttons and pictures. To do that you must buy more 'Energy' – I have bought for 59 dk – it is 7-8 Euro.</p> <p>You can start with this basic app – and see how it works.</p>	
5	Get the Blynk Token	To get the Blynk-token – press this button

Step No	Description	Clip
		 <p data-bbox="619 1868 1358 2002">Now you can see your Token – it is NOT the same as shown on the picture above. Press the E-mail-button – and your token will be email'ed to you.</p>

1.2.2 Make your own Blynk-app from scratch

Follow the guide below if you want to make your own Blynk app – and not a copy of my app. See previous chapter.

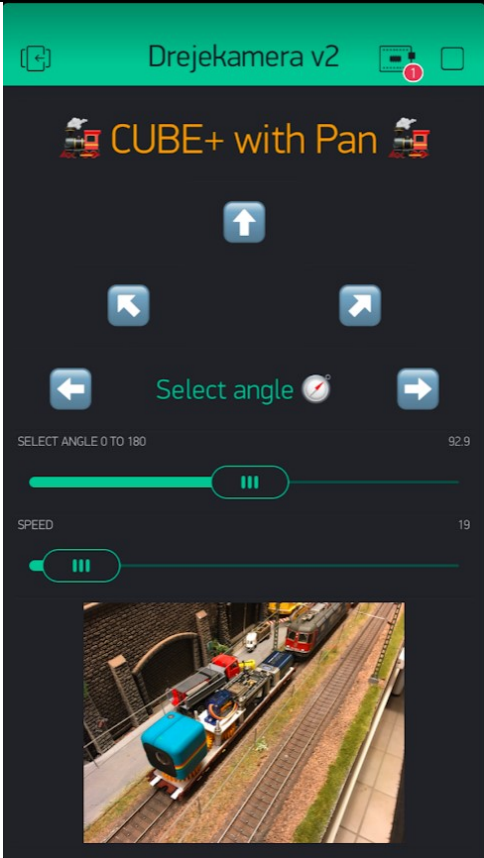
There are many videos on YouTube describing how to work with Blynk.

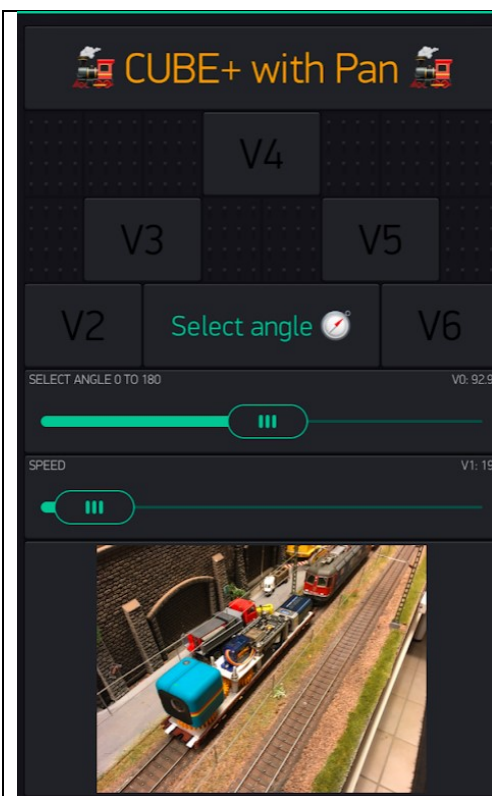
Take a look at this video: <https://www.youtube.com/watch?v=EYrEjC3QEew&t=8s>

Install the Blynk app on your Mobile or iPad and follow the instructions in the video above.

Make sure to get the authorization code – you shall use it later.

Below a description of the Blynk app to control the Servo:

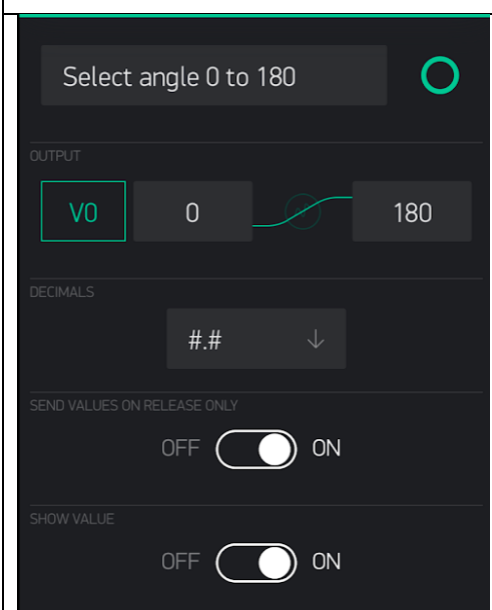
	<p>This is the finished application.</p> <p>There are 5 buttons with arrows and 2 horizontal sliders.</p> <p>The other elements are just texts and pictures - you can compose them as you like.</p>
--	---



This is Design view.

Each of the sliders and the angle-buttons have a virtual pin.

- V0 – select angle slider
- V1 – speed slider
- V2 – 0 degree
- V3 – 45 degree
- V4 – 90 degree
- V5 – 135 degree
- V6 – 180 degree



Detail for: The Select angle slider.

The values are 0 to 180

	<p>Detail for: The select speed slider</p> <p>NB: the values goes from 20 to 0</p> <p>The speed is implemented as an delay in milliseconds between each change of degree.</p> <p>Example – go from 45 to 90 degree.</p> <p>We loop from 45 to 90 – that is 45 steps. In each step we have a delay – if the value of the is small – for example 5 – then the speed is fast. If the delay is high – for example 18 – then the speed is slow</p>
	<p>Detail for: This is button 0 degree – V2.</p> <p>The other 4 buttons are identical – of course another pin (v3 – v4 – v5 – v6) and another label</p>


1.3 Coding the Node MCU – ESP8266

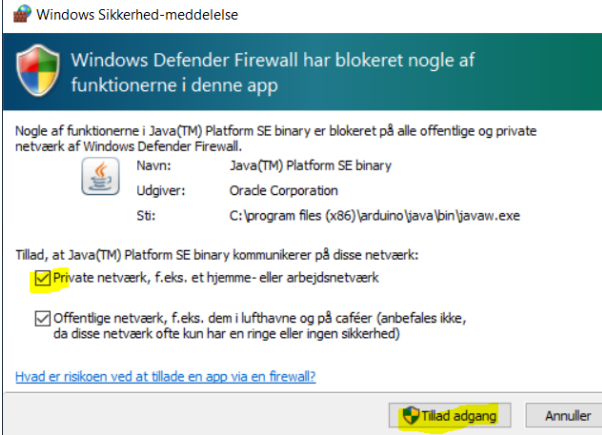

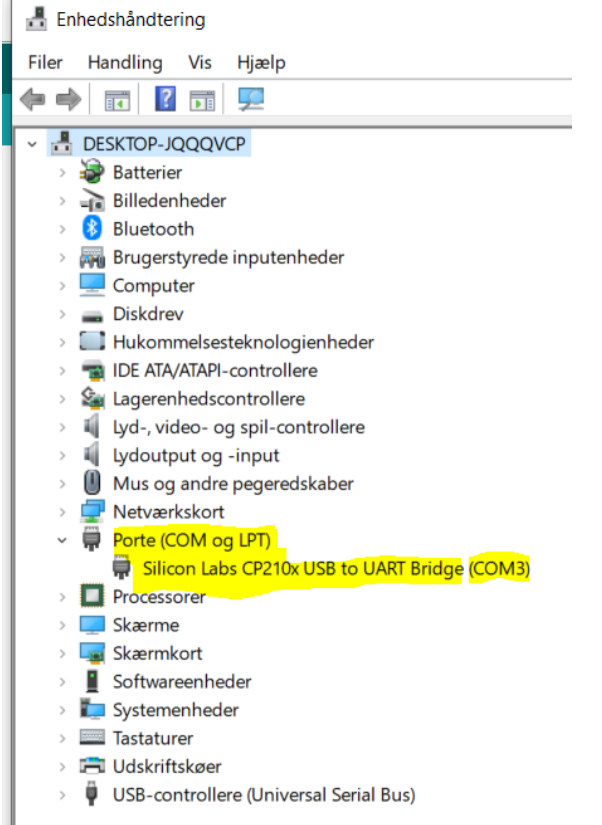
Coding of the Node MCU is done in the Arduino environment. First you must configure the Arduino IDE – and then compile the code and send it to the ESP8266.

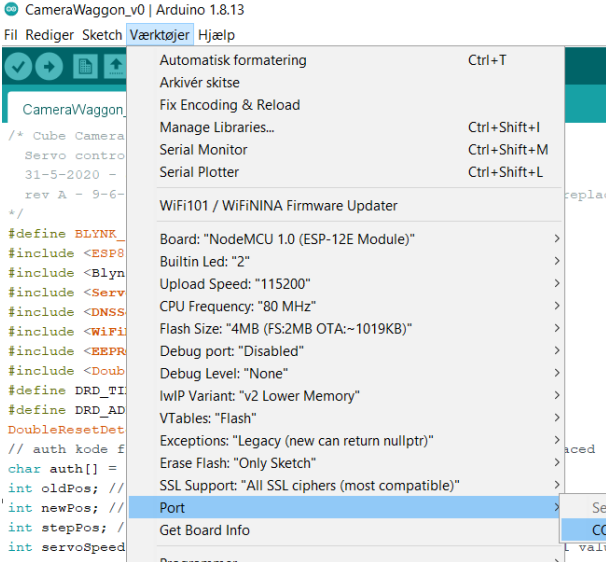

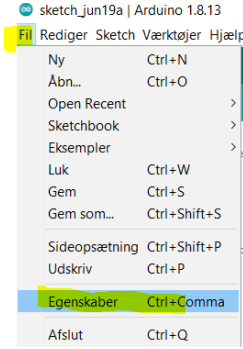
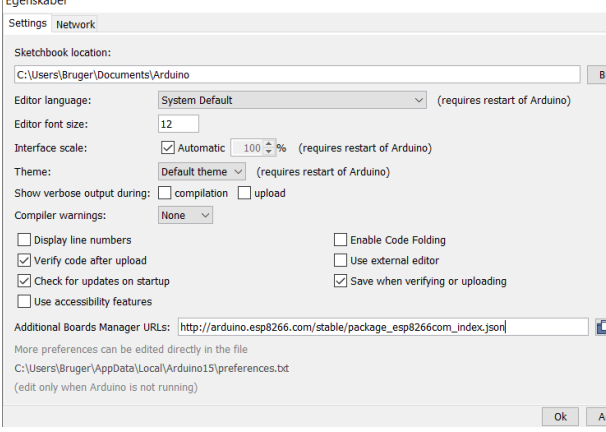
If you are new in Arduino coding you might want to have a look on this video:

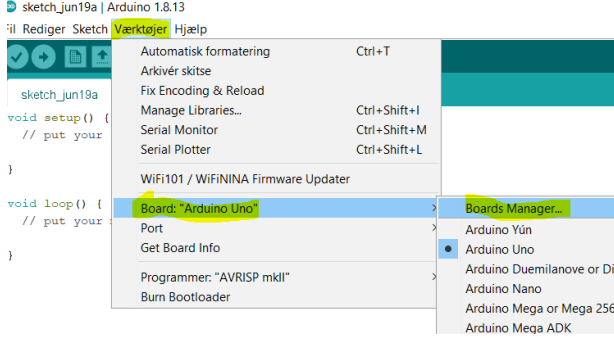
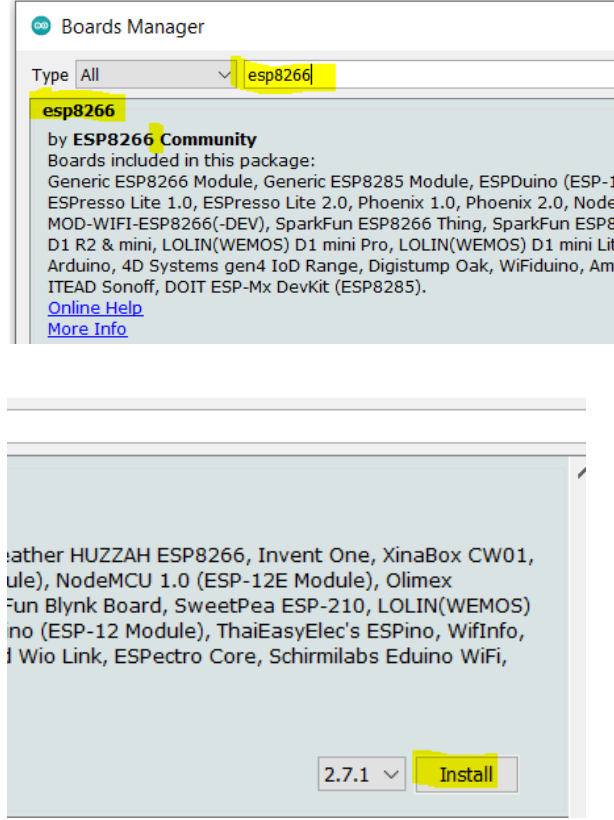
<https://www.youtube.com/watch?v=p06NNRq5NTU&t=331s>

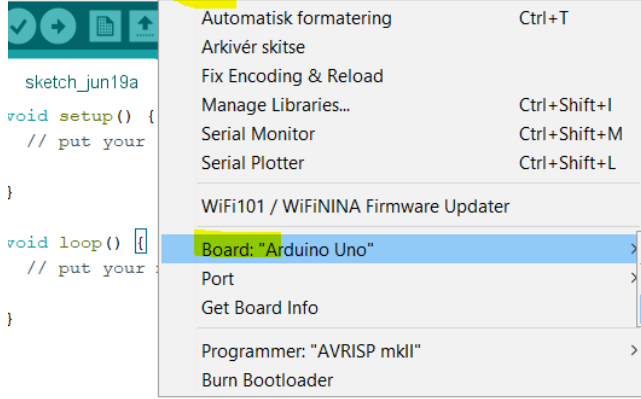
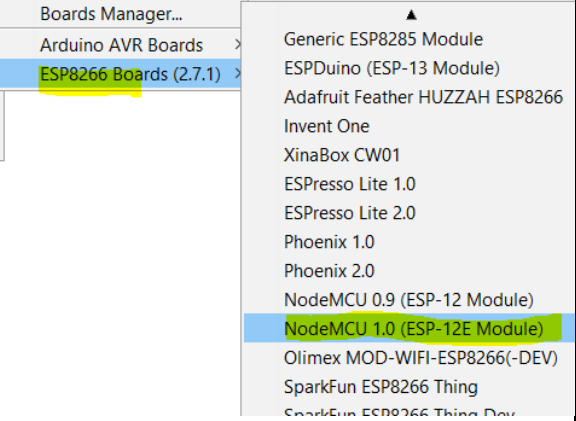
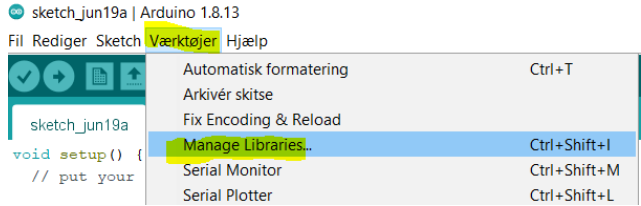
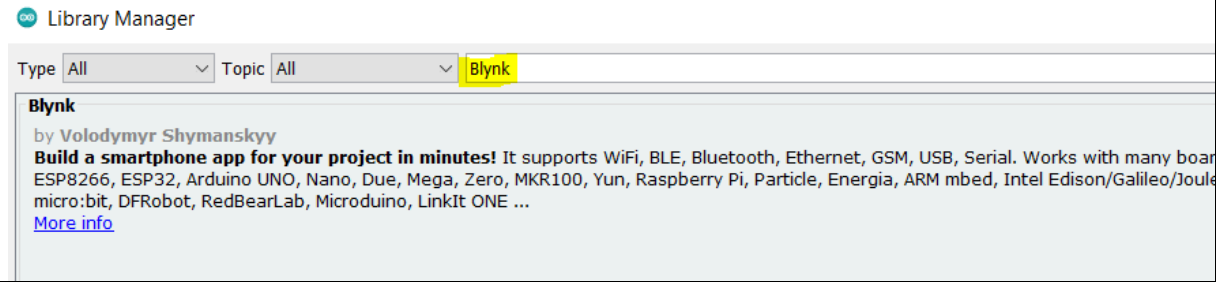
Follow the guide below to code the Node MCU – step 1 to 14.


Step No	Description	Clip
1	Install Arduino https://www.arduino.cc/en/Main/Software	

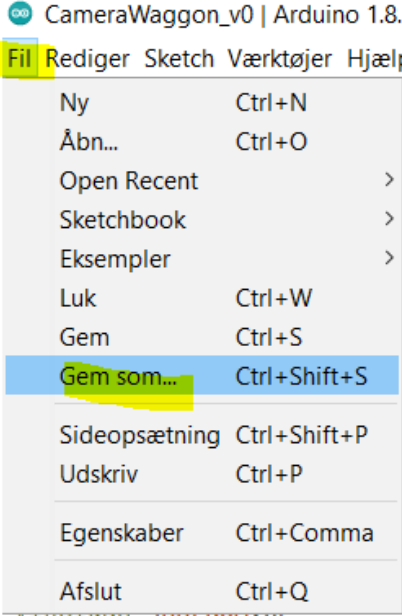
Step No	Description	Clip
2	Start Arduino IDE form the desktop Icon	
3	Connect the ESP8266 to the PC with USB-cable	
4	Check com-port Open device manger – and check the com-port number. In this Example is et COM3	

Step No	Description	Clip
		<p>Now choose this port in Arduino:</p> 
5	Open Arduino IDE	
6	<p>Install ESP8266 – board</p> <p>Choose File -> Properties –</p> 	 <p>Copy the URL for the line below to the “Additional boards Manager URL”</p>
		<p>http://arduino.esp8266.com/stable/package_esp8266com_index.json</p>

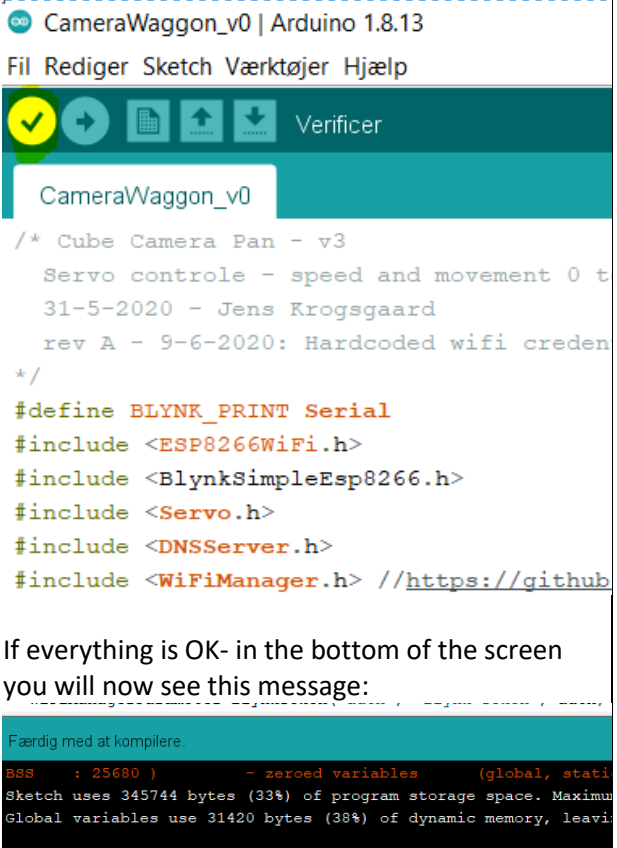
Step No	Description	Clip
7		 <p>In the Board manager- search for esp8266 – now you should see esp8266 – as below</p>  <p>Now – hit the Install button</p>
8	Choose the NodeMCU 1.0 board – as shown below	

Step No	Description	Clip
	<p>sketch_jun19a Arduino 1.8.13</p> <p>il Rediger Sketch Værktøjer Hjælp</p>  <pre> sketch_jun19a void setup() { // put your } void loop() { // put your } </pre>	
9	<p>Add extra Libraries</p> <p>Go to this menu</p>  <p>Now you must add 3 Library's – choose the last version – and install them The 3 library's is listed below:</p>	
	<p>Find Blynk library – and install it</p> 	
	<p>Find WiFiManager library – and install it:</p>	

Step No	Description	Clip
	<p>Library Manager</p> <p>Type All Topic All wifi manager</p> <p>WiFiManager by tzapu,tablatronix WiFi Configuration manager with web configuration portal for ESP boards Library for configuring ESP8266/ESP32 modules WiFi creden and custom parameters at runtime. More info</p> <p>Find DoubleResetDetector library – and install it</p> <p>Library Manager</p> <p>Type All Topic All DoubleResetDetector</p> <p>DoubleResetDetector by Stephen Denne Library to detect a double reset, using ESP8266 RTC Memory. An alternative start-up mode can be used. One example use is to allow re-configuration of a device's wifi. More info</p>	
10	Remove existing code – and paste in the code	<p>When you start Arduino – there are some line with codes – remove these lines</p>  <p>Now copy and paste in the code-lines (see row below)</p> <p>Save the projects</p>

Step No	Description	Clip
		 <p>CameraWaggon_v0 Arduino 1.8.13</p> <p>File Rediger Sketch Værktøjer Hjælp</p> <ul style="list-style-type: none"> Ny Ctrl+N Åbn... Ctrl+O Open Recent > Sketchbook > Eksempler > Luk Ctrl+W Gem Ctrl+S Gem som... Ctrl+Shift+S Sideopsætning Ctrl+Shift+P Udskriv Ctrl+P Egenskaber Ctrl+Comma Afslut Ctrl+Q <p>Choose a destination and name for the project</p>
	<pre> /* Cube Camera Pan – v3 Servo controle - speed and movement 0 to 180 degree 31-5-2020 - Jens Krogsgaard rev A - 9-6-2020: Hardcoded wifi credentials and blynk token is replaces with logon-box. */ #define BLYNK_PRINT Serial #include <ESP8266WiFi.h> #include <BlynkSimpleEsp8266.h> #include <Servo.h> #include <DNSServer.h> #include <WiFiManager.h> //https://github.com/tzapu/WiFiManager #include <EEPROM.h> #include <DoubleResetDetector.h> #define DRD_TIMEOUT 10 #define DRD_ADDRESS 0 DoubleResetDetector drd(DRD_TIMEOUT, DRD_ADDRESS); // auth kode fra BLYNK app - Drejekamera V3 - default kan bee replaced char auth[] = "oxgU9UqRgP4mWTVt-cx62sVdxqY-IUEx"; int oldPos; // servo - old position int newPos; // servo - new position int stepPos; // step position for servo - used when you step from old to new position int servoSpeed; // speed of servo - delay - big value - slow, small value fast Servo servo; void setup() { // initial values EEPROM.begin(512); Serial.begin(115200); // Loc camera with panning.pdf Page 13 rev A: 9-6-2020 // WIFI - connect WiFiManager wifiManager; // wifiManager.resetSettings(); //Uncomment this to wipe WiFi settings from EEPROM on // boot. Comment out and recompile/upload after 1 boot cycle. // Input blynk token WiFiManagerParameter BlynkToken("auth", "Blynk Token", auth, 34); wifiManager.addParameter(&BlynkToken); </pre>	

Step No	Description	Clip
	<pre> if (drd.detectDoubleReset()) { // when reset button is activated by a double click a reconnect to wifi i initiated. Serial.println("Double Reset Detected"); digitalWrite(LED_BUILTIN, LOW); wifiManager.startConfigPortal("ConnectCameraTrain"); } else { Serial.println("No Double Reset Detected"); digitalWrite(LED_BUILTIN, HIGH); // temporary hotspot ConnectCameraTrain is credited wifiManager.autoConnect("ConnectCameraTrain"); } strcpy(auth, BlynkToken.getValue()); //if you get here you have connected to the WiFi Serial.println("connected...yeey :)"); pinMode(BUILTIN_LED, OUTPUT); // Initialize the BUILTIN_LED pin as an output, I like blinkies. Blynk.begin(auth, WiFi.SSID().c_str(), WiFi.psk().c_str()); servoSpeed = 10; servo.attach(2); // 2 means D4 pin of ESP8266 } // Slider angle - 0 to 180 degree BLYNK_WRITE(V0) { turnServo(param.asInt()); } // Slider speed - from 20 to 0 BLYNK_WRITE(V1) { servoSpeed = param.asInt(); } // Button - 0 degree BLYNK_WRITE(V2) { turnServo(0); } // Button - 45 degree //Loc camera with panning.pdf Page 14 rev A: 9-6-2020 BLYNK_WRITE(V3) { turnServo(45); } // Button - 90 degree BLYNK_WRITE(V4) { turnServo(90); } // Button - 135 degree BLYNK_WRITE(V5) { turnServo(135); } // Button - 180 degree BLYNK_WRITE(V6) { turnServo(180); } // Turn servo an angle // Speed is implemented as delay between each angle // long delay - slow speed // short delay - fast speed void turnServo(int turnTo) { oldPos = servo.read(); newPos = turnTo; if (oldPos <= newPos) { for (stepPos = oldPos ; stepPos <= newPos; stepPos += 1) { servo.write(stepPos); delay(servoSpeed); } } } </pre>	

Step No	Description	Clip
	<pre> else { for (stepPos = oldPos ; stepPos >= newPos; stepPos -= 1) { servo.write(stepPos); delay(servoSpeed); } } void loop() { Blynk.run(); } </pre>	
11	Copy in the Blynk-Token	<p>In the Blynk installation – step 3 – you emailed the Blynk token. Now find this token and paste it into the code:</p> <p>That is – replace the yellow-marked text in the code above with your Blynk token.</p> <p>When you have done it save the project.</p>
12	Compile the project	<p>Press the Check/compile button</p>  <p>If everything is OK- in the bottom of the screen you will now see this message:</p> <p>Færdig med at compilere.</p> <p>BSS : 25680) - zeroed variables (global, stati Sketch uses 345744 bytes (33%) of program storage space. Maximum Global variables use 31420 bytes (38%) of dynamic memory, leavi</p> <p>This is Danish – in English it must be Finish compiling..</p>

Step No	Description	Clip
		<p>If there are errors they will be listed and you must correct them.</p>
13	Send the code to the ESP8266	 <p>CameraWaggon_v0 Arduino 1.8.13 Fil Rediger Sketch Værktøjer Hjælp</p> <pre> CameraWaggon_v0 /* Cube Camera Pan - v3 Servo controle - speed and movement 0 to 180 degrees 31-5-2020 - Jens Krogsgaard rev A - 9-6-2020: Hardcoded wifi credentials and Blynk */ #define BLYNK_PRINT Serial #include <ESP8266WiFi.h> #include <BlynkSimpleEsp8266.h> </pre> <p>If everything is OK – you will see this message in the bottom of the screen</p> <p>Done uploading.</p> <p>Leaving... Hard resetting via RTS pin...</p>
14	Test – test – test	

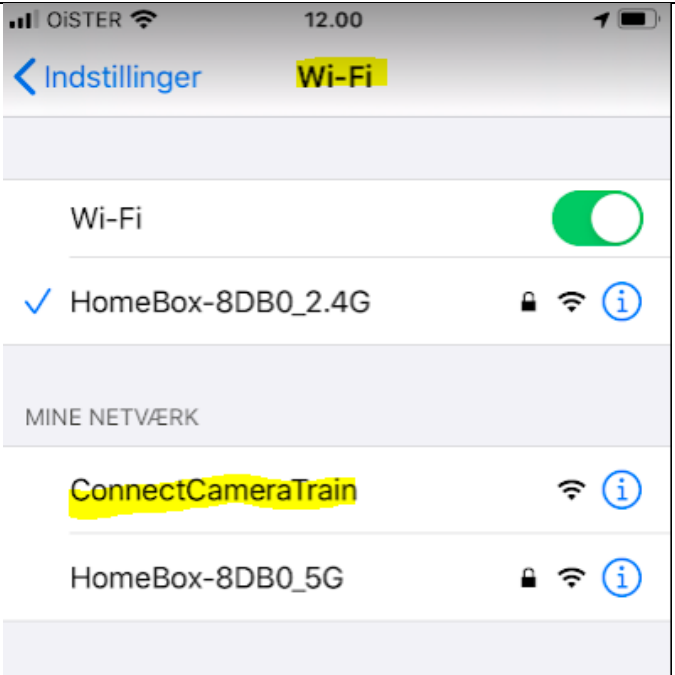
Step No	Description	Clip
	If there are problems connecting the Blynk app to the ESP8266 then take a look at the rest of this chapter.	

Follow this procedure to connect the Camera Train to your wifi-network – if it not connected automatically:

1 – Find your Blynk token – from mail or in the Blynk app. Copy this token to the clipboard

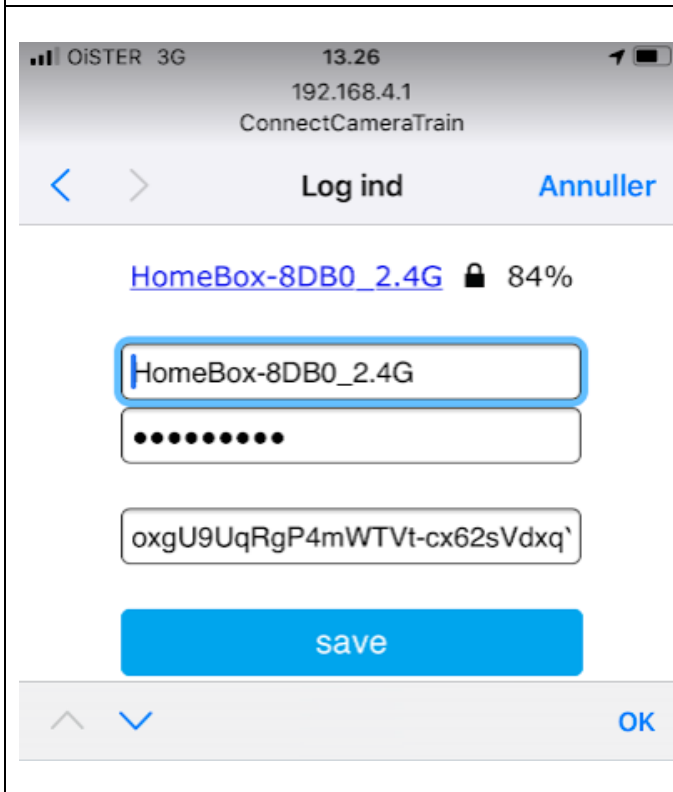
2 – Turn on the camera-train with the switch button.

3 – On your Mobile/Ipad or PC – find the hotspot 'ConnectCameraTrain – and choose this hotspot. See Examples below

	<p>Choose the hotspot ConnectCamaraTrain</p>
--	--



Choose the first button – ‘Configure WiFi’

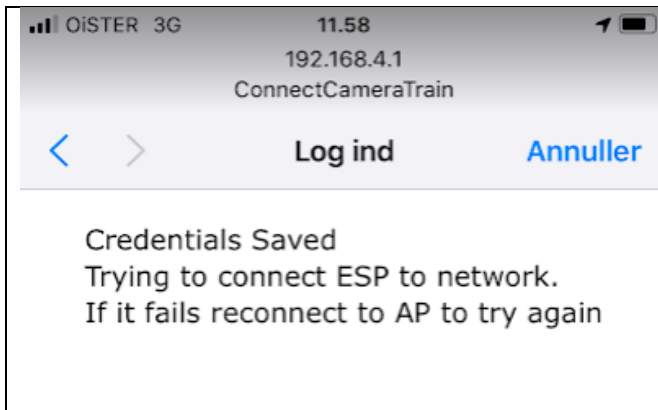


Choose your WiFi network and type in the password.

The next field is for the Blynk Token (see previous chapter).

Paste in this token here.

Click Save.



If everything is Ok – you should now see this message (picture to the left) And there must be a blue-light on the ESP8266 – as shown below.

