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<a name="home">

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<div style="text-align: center;">

<a
href="https://muhammadnavis223039.blogspot.com/p/modul-1-general-input-dan-output.html">[K
EMBALI KE MENU SEBELUMNYA]</a></div>

<br />

<center>

<div style="background-color: white; border: 2px dashed rgb(23, 128, 221); height: 240px; overflow:
auto; padding: 10px; text-align: center; width: 330px;">

<b>DAFTAR ISI</b>

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<div style="text-align: left;">

<a href="#Prosedur">1. Prosedur</a></div>

<div style="text-align: left;">

<a href="#Hardware">2. Hardware dan Diagram Blok</a></div>

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<a href="#Rangkaian">3. Rangkaian Simulasi dan Prinsip Kerja</a></div>

<div style="text-align: left;">

<a href="#Flowchart">4. Flowchart dan Listing Program</a></div>

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<a href="#Video">5. Video Demo</a></div>

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<a href="#Analisa">6. Analisa</a></div>

<div style="text-align: left;">

<a href="#Download">7. Download File</a><br />

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<span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><span
style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><b><div
style="font-size: medium;"><span style="font-family: &quot;times&quot; , &quot;times new
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roman" , serif;"><span style="font-family: "times" , "times new roman" , serif; font-size: small;"><b><br /></b></span></span></div><div style="text-align: center;"><span style="font-size: medium;">Percobaan 6</span></div><div style="text-align: center;"><span style="font-size: medium;">LED RGB, Touch Sensor, dan Sensor Infrared</span></div><div style="text-align: center;"><span style="font-family: "times" , "times new roman" , serif; font-size: small;"><span style="font-family: "times" , "times new roman" , serif;"><b><br /></b></span></span></div><span style="font-size: medium;">1. Prosedur </span><a name="Prosedur"></a></b><span style="font-size: medium;">

<a href="#home">[Kembali]</a></span></span></div><div><span style="font-family: times, times new roman, serif;"><br /></span><div><div style="background-color: white; border: 0px; box-sizing: border-box; margin: 0px; padding: 0px;"><span style="font-family: inherit;">1. Rangkai semua komponen pada breadboard yang terhubung ke mikrokontroler STM32F103C8.<br />2. Buat program untuk mikrokontroler STM32F103C8 di software STM32 CubeIDE.<br />3. Build program yang telah dibuat, lalu inputkan program ke dalam mikrokontroler melalui stlink.<br />4. Setelah program diinputkan, uji rangkaian yang telah dirangkai sesuai dengan output yang ditentukan.</span></div><div style="background-color: white; border: 0px; box-sizing: border-box; margin: 0px; padding: 0px;"><span style="font-family: inherit;">5. Selesai.</span></div><div><br /></div><div><div>

<span style="font-family: "times" , "times new roman" , serif; font-size: medium;"><span style="font-family: "times" , "times new roman" , serif;"><b>2. Hardware dan Diagram Blok </b>

<a name="Hardware"></a>

<a href="#home">[Kembali]</a></span></span></div><div><span style="font-family: "times" , "times new roman" , serif;"><br /></span></div><div><span style="font-family: times, times new roman, serif;"><b>Hardware :</b></span></div><div><span style="font-family: times, times new roman, serif;"><br /></span></div><div><span style="font-family: times, times new roman, serif;">a) Mikrokontroler </span><span style="font-family: inherit;">STM32F103C8</span></div><div><div class="separator" style="background-color: white; clear: both; font-size: 13.2px; text-align: center;"></div><div style="background-color: white;"><div style="font-size: 13.2px;"><br /></div>2. Infrared Sensor</div><div style="background-color: white; font-size: 13.2px;"><br /></div><div class="separator" style="background-color: white; clear: both; font-size: 13.2px; text-align: center;"></div><div class="separator" style="background-color: white; clear: both; font-size: 13.2px; text-align: center;"></div><div style="background-color: white; text-align: left;">3. Touch Sensor</div><div style="background-color: white; font-size: 13.2px;"><br /></div><div class="separator" style="background-color: white; clear: both; font-family: times, "times new roman", serif; font-size: 13.2px; text-align: center;"></div><div class="separator" style="background-color: white; clear: both; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px; text-align: center;"><br /></div></div><div class="separator" style="background-color: white; clear: both; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px; text-align: justify;"><div style="font-family: &quot;Times New Roman&quot;; font-size: medium; text-align: left;"><span>4. Breadboard</span></div><div style="font-family: &quot;Times New Roman&quot;; font-size: medium; text-align: left;"><div class="separator" style="clear: both; text-align: center;"></div><div class="separator" style="clear: both; text-align: center;"><div class="separator" style="clear: both; text-align: justify;"><div class="separator" style="background-color: white; clear: both; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px; text-align: justify;"><div style="font-family: &quot;Times New Roman&quot;; font-size: medium; text-align: left;"><span>&nbsp;</span></div><div style="font-family: &quot;Times New Roman&quot;; font-size: medium; text-align: left;"><span>5. RGB LED</span></div><div style="font-family: &quot;Times New Roman&quot;; font-size: medium; text-align: left;"><div class="separator" style="clear: both; text-align: center;"></div></div></div>&nbsp;<div class="separator" style="background-color: white; clear: both; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px; text-align: justify;"><div style="font-family: &quot;Times New Roman&quot;; font-size: medium; text-align: left;"><span>6. Resistor</span></div><div style="font-family: &quot;Times New Roman&quot;; font-size: medium; text-align: left;"><div class="separator" style="clear: both; text-align: center;"><div class="separator" style="clear: both; text-align: center;"><a href="https://blogger.googleusercontent.com/img/a/AVvXsEgzKilYSChfD8aUaWlwUdXAwPPMDIt6GZUyLv8LNMaavISW-9dowR7nG2GP5d7Szx6LEQa1t20g2fSZuM0Y7tHPwySrxFXLA-HI3rLleT5N27987ztl\_XTxaic7QSeAWm3isslhxm83hlaU4-OsaKTnXgjohQAFvP55dSdmhsu6zWSEQpTsEBMHTdHnbriB" style="margin-left: 1em; margin-right: 1em;"></a></div><br /></div></div></div></div></div></div><div class="separator" style="background-color: white; clear: both; font-family: times, &quot;times new roman&quot;; serif; font-size: 13.2px; text-align: center;"><br /></div><div class="separator" style="background-color: white; clear: both; font-family: times, &quot;times new roman&quot;; serif; text-align: center;"><div style="font-family: Arial, Tahoma, Helvetica, FreeSans, sans-serif; text-align: start;"><span style="font-family: times, &quot;times new roman&quot;; serif;"><b>Diagram Blok&nbsp;</b></span></div><div style="font-family: Arial, Tahoma, Helvetica, FreeSans, sans-serif; font-size: 13.2px; text-align: start;"><span style="font-family: times, &quot;times new roman&quot;; serif;"><br /></span></div><div style="font-family: Arial, Tahoma,

Helvetica, FreeSans, sans-serif; font-size: 13.2px; text-align: start;"><div class="separator" style="clear: both; text-align: center;"><a href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEhOQ-vlBZlZSqUtO5iB-XnAYgZNXhbu\_3UprAOC25MgmuH1poxauajBaEu5\_N8c5jgtZvuc7b1K-cNlSnPYzBg2MhwcttlvQA6r5BRCjOmOYClwEPOZWRPlueEOcfA87wQC7cWk7cnX6S3DPVYigzYOL6gsV72MkLriXkG7aHjc0cmARbAelFeSTPBQ5NET/s791/Screenshot%202025-03-17%20150958.png" style="margin-left: 1em; margin-right: 1em;"></a></div></div></div><div><br /></div></div><div><div>

<span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif; font-size: medium;"><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><b>3. Rangkaian Simulasi dan Prinsip Kerja </b>

<a name="Rangkaian"></a>

<a href="#home">[Kembali]</a></span></span></div><div><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif; font-size: small;"><br /></span></div><div><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><b>Rangkaian Simulasi :</b></span></div><div><div class="separator" style="clear: both; text-align: center;"><div style="text-align: justify;"><div style="text-align: left;"><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><b>&nbsp;</b></span></div><div style="text-align: center;"><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><div class="separator" style="clear: both; text-align: center;"><a href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEgUyyRL3rYyM5sE\_rCsqGhzMHx3z9qM5Q4IjDh-TyfhVsvoqzK6Bw91xIDa5PSBub-yMEadJHNMYkLyucuYF\_vAX2Um4Hh13TcimCqUOf\_GXpN4WGzHC627EgPQKpz9-GFuWGO4N-nlUrF8AHHkbfXgHA-ig0K9bNsDtKe46\_Pr4jq5W7uUk-b1FvdhjxoS/s1307/Screenshot%202025-03-21%20211841.png" style="margin-left: 1em; margin-right: 1em;"></a></div><br /><div class="separator" style="clear: both; text-align: center;"><br /></div></span></div></div></div><div><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><br /></span></div><div><b>Prinsip Kerja :&nbsp;</b></div><div style="text-align: justify;"><div>Rangkaian ini menggunakan mikrokontroler STM32F103C8, yang mana terdapat 2 input yaitu sensor infrared dan sensor touch, dengan outputnya RGB LED. Sensor infrared sebagai input dihubungkan ke pin PB10, sensor touch terhubung ke pin PB7, untuk outputnya yaitu RGB LED, dimana kaki red terhubung ke pin PA6, kaki green terhubung ke pin PA7, dan kaki blue terhubung ke pin PB0.&nbsp;</div><div>Setelah itu lakukan konfigurasi di software STM32 CubeIDE, yang dimulai dari membuka proyek percobaan yang telah dikerjakan. Maka pada tampilan pin out dan konfigurasi dari mikrokontrolernya, berdasarkan rangkaian proteus yang telah dibuat, inputannya yaitu infrared yang terhubung ke pin PB10, touch sensor terhubung ke pin PB7, kemudian outputnya yaitu kaki red terhubung ke pin PA6, kaki green

terhubung ke pin PA7, dan kaki blue terhubung ke pin PB0. Selanjutnya dilakukan konfigurasi pada debug dengan memilih serial wire, kemudian pada bagian RCC dipilih crystal / ceramic resonator.

Ketika konfigurasinya telah selesai, save project dan kemudian akan ditampilkan halaman pemrograman. Disini sudah langsung tersedia beberapa program karena konfigurasi yang telah dilakukan sebelumnya. Untuk pemrogramannya dimulai dari #include "main.h" yang merupakan fungsi utamanya. Yang perlu ditambahkan disini adalah codingan pada bagian loopnya, yang terletak di dalam kurung kurawal pada bagian while. Program ini menggunakan fungsi If Else, dimana jika sensor infrared tidak mendeteksi adanya objek dan sensor touch mendeteksi sentuhan, maka output yang dibaca mikrokontroler adalah menghidupkan lampu hijau pada RGB LED. jika sebaliknya infrared mendeteksi sedangkan touch tidak mendeteksi maka akan menghidupkan warna Biru, ketika kedua sensor mendeteksi maka akan menghidupkan warna hijau dan briu (cyan), sedangkan jika tidak ada sensor yang mendeteksi maka akan menghidupkan warna merah

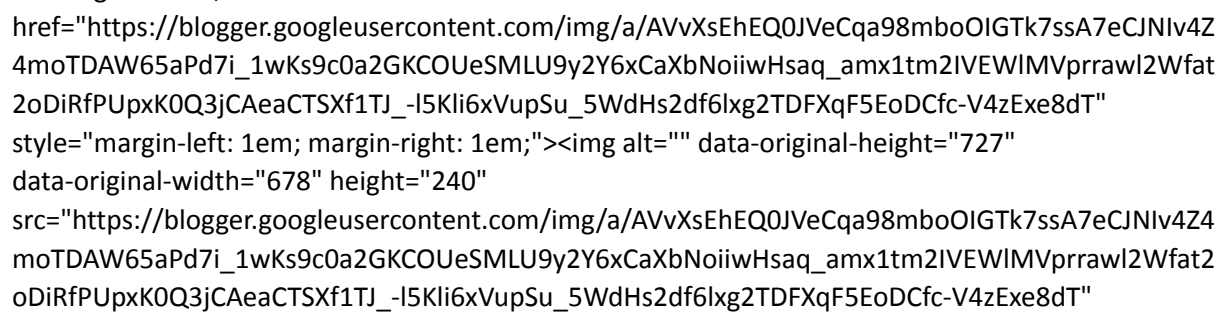
Setelah programnya selesai, dilanjutkan dengan mengcompile programnya ke dalam tipe hex, dan build program tersebut sehingga menghasilkan file dengan tipe hex. Kemudian upload file hex tersebut ke dalam mikrokontroler pada proteus. Setelah rangkaiannya dijalankan, kondisi awal adalah ketika sensor infrared dan sensor touch diberi logika 0, maka output yang ditampilkan adalah RGB LED tidak aktif, kemudian ketika sensor infrared berlogika 0 dan sensor touch tetap berlogika 1, maka outputnya adalah mengaktifkan RGB LED berwarna hijau dan biru yang mana perpaduan antara keduanya menyebabkan warna yang ditampilkan RGB LED berwarna cyan. Kemudian untuk kondisi lainnya, output yang dihasilkan adalah RGB LED kembali mati atau tidak menampilkan warna lampu apapun.

4. Flowchart dan Listing Program

Flowchart

[\[Kembali\]](#)

Flowchart :



Listing Program :

```
#include "main.h"

void main()
{
    while(1)
    {
        if (infrared == 0 & touch == 1)
        {
            RGB_LED = 1;
        }
        else if (infrared == 1 & touch == 0)
        {
            RGB_LED = 2;
        }
        else if (infrared == 1 & touch == 1)
        {
            RGB_LED = 3;
        }
        else
        {
            RGB_LED = 0;
        }
    }
}
```

```

0px;"><span style="color: #3f7f5f;"> /* USER CODE BEGIN Header */</span></p><p style="margin:
0px;"><span style="color: #3f7f5f;"> /**</span></p><p style="margin: 0px;"><span style="color:
#3f7f5f;">
*****</sp
an></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> * @file      : main.c</span></p><p
style="margin: 0px;"><span style="color: #3f7f5f;"> * @brief      : Main program
body</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">
*****</sp
an></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> * @attention</span></p><p
style="margin: 0px;"><span style="color: #3f7f5f;"> *</span></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> * Copyright (c) 2025 STMicroelectronics.</span></p><p style="margin:
0px;"><span style="color: #3f7f5f;"> * All rights reserved.</span></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> *</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> * This
software is licensed under terms that can be found in the LICENSE file</span></p><p style="margin:
0px;"><span style="color: #3f7f5f;"> * in the root directory of this software
component.</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> * If no LICENSE file
comes with this software, it is provided AS-IS.</span></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> *</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">
*****</sp
an></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> */</span></p><p style="margin:
0px;"><span style="color: #3f7f5f;"> /* USER CODE END Header */</span></p><p style="margin:
0px;"><span style="color: #3f7f5f;"> /* Includes
-----*/</span></p><p style="margin: 0px;"><span
style="color: #7f0055; font-weight: bold;">#include</span> <span style="color:
#2a00ff;">"main.h"</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> /* Private includes
-----*/</span></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> /* USER CODE BEGIN Includes */</span></p><p style="margin: 0px;"><br
/></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> /* USER CODE END Includes
*/</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color:
#3f7f5f;"> /* Private typedef -----*/</span></p><p
style="margin: 0px;"><span style="color: #3f7f5f;"> /* USER CODE BEGIN PTD */</span></p><p
style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> /* USER CODE
END PTD */</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> /* Private define
-----*/</span></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> /* USER CODE BEGIN PD */</span></p><p style="margin: 0px;"><br /></p><p
style="margin: 0px;"><span style="color: #3f7f5f;"> /* USER CODE END PD */</span></p><p
style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> /* Private
macro -----*/</span></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> /* USER CODE BEGIN PM */</span></p><p style="margin: 0px;"><br
/></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> /* USER CODE END PM
*/</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color:
#3f7f5f;"> /* Private variables -----*/</span></p><p
style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> /* USER CODE
BEGIN PV */</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> /* USER CODE END PV */</span></p><p style="margin: 0px;"><br /></p><p
style="margin: 0px;"><span style="color: #3f7f5f;"> /* Private function prototypes

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-----*/</span></p><p style="margin: 0px;"><span style="color:
#7f0055; font-weight: bold;">void</span> <span style="font-weight:
bold;">SystemClock_Config</span><span style="color: #7f0055; font-weight:
bold;">void</span></p><p style="margin: 0px;"><span style="color: #7f0055; font-weight:
bold;">static</span> <span style="color: #7f0055; font-weight: bold;">void</span> <span
style="font-weight: bold;">MX_GPIO_Init</span><span style="color: #7f0055; font-weight:
bold;">void</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">/* USER CODE
BEGIN PFP */</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><span
style="color: #3f7f5f;">/* USER CODE END PFP */</span></p><p style="margin: 0px;"><br /></p><p
style="margin: 0px;"><span style="color: #3f7f5f;">/* Private user code
-----*/</span></p><p style="margin: 0px;"><span
style="color: #3f7f5f;">/* USER CODE BEGIN 0 */</span></p><p style="margin: 0px;"><br /></p><p
style="margin: 0px;"><span style="color: #3f7f5f;">/* USER CODE END 0 */</span></p><p>
style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color:
#3f7f5f;">/**</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> * @brief The
application entry point.</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> *
@</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line:
underline; text-decoration-style: wavy;">retval</span><span style="color: #3f7f5f;"> </span><span
style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">int</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">
*/</span></p><p style="margin: 0px;"><span style="color: #7f0055; font-weight: bold;">int</span>
<span style="font-weight: bold;">main</span><span style="color: #7f0055; font-weight:
bold;">void</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">/* USER CODE BEGIN 1 */</span></p><p
style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER
CODE END 1 */</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span
style="color: #3f7f5f;">/* MCU
Configuration-----*/</span></p><p style="margin: 0px;"><br
/></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/* Reset of all peripherals, Initializes
the Flash interface and the </span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128,
64); text-decoration-line: underline; text-decoration-style: wavy;">Systick</span><span style="color:
#3f7f5f;">. */</span></p><p style="margin: 0px;"> HAL_Init();</p><p style="margin: 0px;"><br
/></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER CODE BEGIN </span><span
style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">Init</span><span style="color: #3f7f5f;"> */</span></p><p>
style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER
CODE END </span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64);
text-decoration-line: underline; text-decoration-style: wavy;">Init</span><span style="color:
#3f7f5f;"> */</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span
style="color: #3f7f5f;">/* Configure the system clock */</span></p><p style="margin: 0px;">
SystemClock_Config();</p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span
style="color: #3f7f5f;">/* USER CODE BEGIN SysInit */</span></p><p style="margin: 0px;"><br
/></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER CODE END SysInit
*/</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span style="color:
#3f7f5f;">/* Initialize all configured peripherals */</span></p><p style="margin: 0px;">
MX_GPIO_Init();</p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER CODE BEGIN 2
*/</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span style="color:
#3f7f5f;">/* USER CODE END 2 */</span></p><p style="margin: 0px;"><br /></p><p style="margin:

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0px;"> <span style="color: #3f7f5f;">/* Infinite loop */</span></p><p style="margin: 0px;"> <span
style="color: #3f7f5f;">/* USER CODE BEGIN WHILE */</span></p><p style="margin: 0px;"> <span
style="color: #7f0055; font-weight: bold;">while</span> (1)</p><p style="margin: 0px;"> {</p><p
style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER CODE END WHILE */</span></p><p
style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER
CODE BEGIN 3 */</span></p><p style="margin: 0px;"> }</p><p style="margin: 0px;"> <span
style="color: #3f7f5f;">/* USER CODE END 3 */</span></p><p style="margin: 0px;">}</p><p
style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color:
#3f7f5f;">/**</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> * @brief System
Clock Configuration</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> *
@</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line:
underline; text-decoration-style: wavy;">retval</span><span style="color: #3f7f5f;">
None</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> */</span></p><p
style="margin: 0px;"><span style="color: #7f0055; font-weight: bold;">void</span> <span
style="font-weight: bold;">SystemClock_Config</span>(<span style="color: #7f0055; font-weight:
bold;">void</span></span>)</p><p style="margin: 0px;">{</p><p style="margin: 0px;"> <span style="color:
#005032;">RCC_OscInitTypeDef</span> RCC_OscInitStruct = {0};</p><p style="margin: 0px;"> <span
style="color: #005032;">RCC_ClkInitTypeDef</span> RCC_ClkInitStruct = {0};</p><p style="margin:
0px;"><br /></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/** Initializes the RCC
Oscillators according to the specified parameters</span></p><p style="margin: 0px;"><span
style="color: #3f7f5f;"> * in the RCC_OscInitTypeDef structure.</span></p><p style="margin:
0px;"><span style="color: #3f7f5f;"> */</span></p><p style="margin: 0px;">
RCC_OscInitStruct.<span style="color: #0000c0;">OscillatorType</span> =
RCC_OSCILLATORTYPE_HSI;</p><p style="margin: 0px;"> RCC_OscInitStruct.<span style="color:
#0000c0;">HSIState</span> = RCC_HSI_ON;</p><p style="margin: 0px;"> RCC_OscInitStruct.<span
style="color: #0000c0;">HSICalibrationValue</span> = RCC_HSICALIBRATION_DEFAULT;</p><p
style="margin: 0px;"> RCC_OscInitStruct.<span style="color: #0000c0;">PLL</span>.<span
style="color: #0000c0;">PLLState</span> = RCC_PLL_NONE;</p><p style="margin: 0px;"> <span
style="color: #7f0055; font-weight: bold;">if</span> <span style="color: #7f0055; font-weight: bold;">(HAL_RCC_OscConfig(&RCC_OscInitStruct)
!= <span style="color: #0000c0; font-style: italic;">HAL_OK</span></span>)</p><p style="margin: 0px;">
{</p><p style="margin: 0px;"> Error_Handler();</p><p style="margin: 0px;"> }</p><p
style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/** Initializes
the CPU, AHB and APB buses clocks</span></p><p style="margin: 0px;"><span style="color:
#3f7f5f;"> */</span></p><p style="margin: 0px;"> RCC_ClkInitStruct.<span style="color:
#0000c0;">ClockType</span> = RCC_CLOCKTYPE_HCLK|RCC_CLOCKTYPE_SYSCLK</p><p
style="margin: 0px;"> |RCC_CLOCKTYPE_PCLK1|RCC_CLOCKTYPE_PCLK2;</p><p
style="margin: 0px;"> RCC_ClkInitStruct.<span style="color: #0000c0;">SYSClkSource</span> =
RCC_SYSCLKSOURCE_HSI;</p><p style="margin: 0px;"> RCC_ClkInitStruct.<span style="color:
#0000c0;">AHBCLKDivider</span> = RCC_SYSCLK_DIV1;</p><p style="margin: 0px;">
RCC_ClkInitStruct.<span style="color: #0000c0;">APB1CLKDivider</span> = RCC_HCLK_DIV1;</p><p
style="margin: 0px;"> RCC_ClkInitStruct.<span style="color: #0000c0;">APB2CLKDivider</span> =
RCC_HCLK_DIV1;</p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span
style="color: #7f0055; font-weight: bold;">if</span> <span style="color: #7f0055; font-weight: bold;">(HAL_RCC_ClockConfig(&RCC_ClkInitStruct,
FLASH_LATENCY_0) != <span style="color: #0000c0; font-style: italic;">HAL_OK</span></span>)</p><p
style="margin: 0px;"> {</p><p style="margin: 0px;"> Error_Handler();</p><p style="margin: 0px;">
}</p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><br /></p><p style="margin:
0px;"><span style="color: #3f7f5f;">/**</span></p><p style="margin: 0px;"><span style="color:
#3f7f5f;"> * @brief GPIO Initialization Function</span></p><p style="margin: 0px;"><span

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style="color: #3f7f5f;"> * @</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">param</span><span style="color: #3f7f5f;"> None</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> *
@</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">retval</span><span style="color: #3f7f5f;">
None</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;"> *</span></p><p
style="margin: 0px;"><span style="color: #7f0055; font-weight: bold;">static</span> <span
style="color: #7f0055; font-weight: bold;">void</span> <span style="font-weight:
bold;">MX_GPIO_Init</span>(<span style="color: #7f0055; font-weight: bold;">void</span>)</p><p
style="margin: 0px;">{</p><p style="margin: 0px;"> <span style="color:
#005032;">GPIO_InitTypeDef</span> GPIO_InitStruct = {0};</p><p style="margin: 0px;"> <span
style="color: #3f7f5f;">/* USER CODE BEGIN MX_GPIO_Init_1 */</span></p><p style="margin:
0px;"><br /></p><p style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER CODE END
MX_GPIO_Init_1 */</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span
style="color: #3f7f5f;">/* GPIO Ports Clock Enable */</span></p><p style="margin: 0px;">
__HAL_RCC_GPIOD_CLK_ENABLE();</p><p style="margin: 0px;">
__HAL_RCC_GPIOA_CLK_ENABLE();</p><p style="margin: 0px;">
__HAL_RCC_GPIOB_CLK_ENABLE();</p><p style="margin: 0px;"><br /></p><p style="margin: 0px;">
<span style="color: #3f7f5f;">/*Configure GPIO pin Output Level */</span></p><p style="margin:
0px;"> HAL_GPIO_WritePin(GPIOA, R_Pin|G_Pin, <span style="color: #0000c0; font-style:
italic;">GPIO_PIN_RESET</span>);</p><p style="margin: 0px;"><br /></p><p style="margin: 0px;">
<span style="color: #3f7f5f;">/*Configure GPIO pin Output Level */</span></p><p style="margin:
0px;"> HAL_GPIO_WritePin(B_GPIO_Port, B_Pin, <span style="color: #0000c0; font-style:
italic;">GPIO_PIN_RESET</span>);</p><p style="margin: 0px;"><br /></p><p style="margin: 0px;">
<span style="color: #3f7f5f;">/*Configure GPIO pins : R_Pin G_Pin */</span></p><p style="margin:
0px;"> GPIO_InitStruct.<span style="color: #0000c0;">Pin</span> = R_Pin|G_Pin;</p><p
style="margin: 0px;"> GPIO_InitStruct.<span style="color: #0000c0;">Mode</span> =
GPIO_MODE_OUTPUT_PP;</p><p style="margin: 0px;"> GPIO_InitStruct.<span style="color:
#0000c0;">Pull</span> = GPIO_NOPULL;</p><p style="margin: 0px;"> GPIO_InitStruct.<span
style="color: #0000c0;">Speed</span> = GPIO_SPEED_FREQ_LOW;</p><p style="margin: 0px;">
HAL_GPIO_Init(GPIOA, &GPIO_InitStruct);</p><p style="margin: 0px;"><br /></p><p
style="margin: 0px;"> <span style="color: #3f7f5f;">/*Configure GPIO pin : B_Pin */</span></p><p
style="margin: 0px;"> GPIO_InitStruct.<span style="color: #0000c0;">Pin</span> = B_Pin;</p><p
style="margin: 0px;"> GPIO_InitStruct.<span style="color: #0000c0;">Mode</span> =
GPIO_MODE_OUTPUT_PP;</p><p style="margin: 0px;"> GPIO_InitStruct.<span style="color:
#0000c0;">Pull</span> = GPIO_NOPULL;</p><p style="margin: 0px;"> GPIO_InitStruct.<span
style="color: #0000c0;">Speed</span> = GPIO_SPEED_FREQ_LOW;</p><p style="margin: 0px;">
HAL_GPIO_Init(B_GPIO_Port, &GPIO_InitStruct);</p><p style="margin: 0px;"><br /></p><p
style="margin: 0px;"> <span style="color: #3f7f5f;">/*Configure GPIO pins : IR_Pin touch_Pin
*/</span></p><p style="margin: 0px;"> GPIO_InitStruct.<span style="color: #0000c0;">Pin</span> =
IR_Pin|touch_Pin;</p><p style="margin: 0px;"> GPIO_InitStruct.<span style="color:
#0000c0;">Mode</span> = GPIO_MODE_INPUT;</p><p style="margin: 0px;"> GPIO_InitStruct.<span
style="color: #0000c0;">Pull</span> = GPIO_NOPULL;</p><p style="margin: 0px;">
HAL_GPIO_Init(GPIOB, &GPIO_InitStruct);</p><p style="margin: 0px;"><br /></p><p
style="margin: 0px;"> <span style="color: #3f7f5f;">/* USER CODE BEGIN MX_GPIO_Init_2
*/</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"> <span style="color:
#3f7f5f;">/* USER CODE END MX_GPIO_Init_2 */</span></p><p style="margin: 0px;"><br /></p><p
style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color: #3f7f5f;">/* USER CODE

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BEGIN 4 */</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>*/ USER CODE END 4 */</span></p><p style="margin: 0px;"><br /></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>*/</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">> * @brief This function is executed in case of error occurrence.</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">> * @</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">retval</span><span style="color: #3f7f5f;">> None</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">> */</span></p><p style="margin: 0px;"><span style="color: #7f0055; font-weight: bold;">void</span><span style="font-weight: bold;">>Error_Handler</span><span style="color: #7f0055; font-weight: bold;">void</span></p><p style="margin: 0px;"></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>*/ USER CODE BEGIN Error_Handler_Debug */</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>/* User can add his own implementation to report the HAL error return state */</span></p><p style="margin: 0px;"><span style="color: #7f0055; font-weight: bold;">>__disable_irq();</span><p style="margin: 0px;"><span style="color: #7f0055; font-weight: bold;">>while</span><span style="color: #7f0055; font-weight: bold;">>(1)</span><p style="margin: 0px;"><span style="color: #7f0055; font-weight: bold;">>{</span><p style="margin: 0px;"><span style="color: #005032;">>uint8_t</span><span style="color: #005032;">>ir_status = HAL_GPIO_ReadPin(GPIOB, IR_Pin); <span style="color: #3f7f5f;">>//</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>Membaca</span><span style="color: #3f7f5f;">>IR sensor</span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>(PB10)</span><p style="margin: 0px;"><span style="color: #3f7f5f;">>uint8_t<span style="text-decoration-color: rgb(254, 155, 0); text-decoration-line: underline; text-decoration-style: wavy;">t</span><span style="color: #3f7f5f;">>touch_status = HAL_GPIO_ReadPin(GPIOB, TOUCH_Pin); <span style="color: #3f7f5f;">>//</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>Membaca</span><span style="color: #3f7f5f;">></span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>Touch<span style="font-weight: bold;">>Sensor</span><span style="text-decoration-color: rgb(254, 155, 0); text-decoration-line: underline; text-decoration-style: wavy;">></span></p><p style="margin: 0px;"></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>// LED</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>Biru</span><span style="color: #3f7f5f;">></span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>menyala</span><span style="color: #3f7f5f;">></span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>jika</span><span style="color: #3f7f5f;">>IR</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>aktif</span><span style="color: #3f7f5f;">></span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>HAL_GPIO_WritePin(BLUE_GPIO_Port, BLUE_Pin, ir_status);</span></p><p style="margin: 0px;"></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>// LED</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>Hijau</span><span style="color: #3f7f5f;">></span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>menyala</span><span style="color: #3f7f5f;">></span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>jika</span><span style="color: #3f7f5f;">>Touch</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">>aktif</span><span style="color: #3f7f5f;">></span></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>HAL_GPIO_WritePin(GPIOA, GREEN_Pin, touch_status);</span></p><p style="margin: 0px;"></p><p style="margin: 0px;"><span style="color: #3f7f5f;">>// LED
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</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line:
underline; text-decoration-style: wavy;">Merah</span><span style="color: #3f7f5f;"> </span><span
style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">menyala</span><span style="color: #3f7f5f;"> </span><span
style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">jika</span><span style="color: #3f7f5f;"> </span><span style="color:
#3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">tidak</span><span style="color: #3f7f5f;"> </span><span style="color:
#3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">ada</span><span style="color: #3f7f5f;"> sensor </span><span
style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">yang</span><span style="color: #3f7f5f;"> </span><span style="color:
#3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">aktif</span><span style="color: #3f7f5f;"> </span></p><p
style="margin: 0px;">    <span style="color: #7f0055; font-weight: bold;">if</span> (ir_status ==
<span style="color: #0000c0; font-style: italic;">GPIO_PIN_RESET</span> &amp;&amp; touch_status
== <span style="color: #0000c0; font-style: italic;">GPIO_PIN_RESET</span>) { </p><p style="margin:
0px;">        HAL_GPIO_WritePin(GPIOA, RED_Pin, <span style="color: #0000c0; font-style:
italic;">GPIO_PIN_SET</span>); <span style="color: #3f7f5f;"> // </span><span style="color: #3f7f5f;
text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style:
wavy;">Nyalakan</span><span style="color: #3f7f5f;"> LED </span></p><p style="margin: 0px;">
        RE<span style="text-decoration-color: rgb(254, 155, 0); text-decoration-line: underline;
text-decoration-style: wavy;">D</span> </p><p style="margin: 0px;">    } <span style="color:
#7f0055; font-weight: bold;">else</span> { </p><p style="margin: 0px;">
        HAL_GPIO_WritePin(GPIOA, RED_Pin, <span style="color: #0000c0; font-style:
italic;">GPIO_PIN_RESET</span>); <span style="color: #3f7f5f;"> // </span><span style="color:
#3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">Matikan</span><span style="color: #3f7f5f;"> LED </span></p><p
style="margin: 0px;">    RE<span style="text-decoration-color: rgb(254, 155, 0); text-decoration-line:
underline; text-decoration-style: wavy;">D</span> </p><p style="margin: 0px;">    HAL_Delay(10);
<span style="color: #3f7f5f;"> // Delay </span><span style="color: #3f7f5f; text-decoration-color:
rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style: wavy;">kecil</span><span
style="color: #3f7f5f;"> </span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64);
text-decoration-line: underline; text-decoration-style: wavy;">untuk</span><span style="color:
#3f7f5f;"> </span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64);
text-decoration-line: underline; text-decoration-style: wavy;">stabilisasi</span><span style="color:
#3f7f5f;"> </span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64);
text-decoration-line: underline; text-decoration-style: wavy;">pembacaan</span><span style="color:
#3f7f5f;"> sensor</span></p><p style="margin: 0px;">    }</p><p style="margin: 0px;"> }</p><p
style="margin: 0px;"> <span style="color: #3f7f5f;"> /* USER CODE END Error_Handler_Debug
*/</span></p><p style="margin: 0px;">}</p><p style="margin: 0px;"><br /></p><p
style="background-color: #e0e0e0; margin: 0px;"><span style="color: #7f0055; font-weight:
bold;">#ifdef</span> USE_FULL_ASSERT</p><p style="background-color: #e0e0e0; margin:
0px;"><span style="color: #3f7f5f;"> /*</span></p><p style="background-color: #e0e0e0; margin:
0px;"><span style="color: #3f7f5f;"> * @brief Reports the name of the source file and the source
line number</span></p><p style="background-color: #e0e0e0; margin: 0px;"><span style="color:
#3f7f5f;"> *      where the assert_param error has occurred.</span></p><p
style="background-color: #e0e0e0; margin: 0px;"><span style="color: #3f7f5f;"> * @</span><span

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style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline;
text-decoration-style: wavy;">param</span><span style="color: #3f7f5f;"> file: pointer to the source
file name</span></p><p style="background-color: #e0e0e0; margin: 0px;"><span style="color:
#3f7f5f;"> * @</span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64);
text-decoration-line: underline; text-decoration-style: wavy;">param</span><span style="color:
#3f7f5f;"> line: assert_param error line source number</span></p><p style="background-color:
#e0e0e0; margin: 0px;"><span style="color: #3f7f5f;"> * @</span><span style="color: #3f7f5f;
text-decoration-color: rgb(255, 128, 64); text-decoration-line: underline; text-decoration-style:
wavy;">retval</span><span style="color: #3f7f5f;"> None</span></p><p style="background-color:
#e0e0e0; margin: 0px;"><span style="color: #3f7f5f;"> */</span></p><p style="background-color:
#e0e0e0; margin: 0px;"><span style="color: #7f0055; font-weight: bold;">void</span>
assert_failed(uint8_t *file, uint32_t line)</p><p style="background-color: #e0e0e0; margin:
0px;"></p><p style="background-color: #e0e0e0; margin: 0px;"> <span style="color: #3f7f5f;"> /*
USER CODE BEGIN 6 */</span></p><p style="background-color: #e0e0e0; margin: 0px;"> <span
style="color: #3f7f5f;"> /* User can add his own implementation to report the file name and line
number,</span></p><p style="background-color: #e0e0e0; margin: 0px;"><span style="color:
#3f7f5f;"> </span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64);
text-decoration-line: underline; text-decoration-style: wavy;">ex</span><span style="color:
#3f7f5f;"> </span><span style="color: #3f7f5f; text-decoration-color: rgb(255, 128, 64);
text-decoration-line: underline; text-decoration-style: wavy;">printf</span><span style="color:
#3f7f5f;">("Wrong parameters value: file %s on line %d\r\n", file, line) */</span></p><p
style="background-color: #e0e0e0; margin: 0px;"> <span style="color: #3f7f5f;"> /* USER CODE END
6 */</span></p><p style="background-color: #e0e0e0; margin: 0px;"></p><p
style="background-color: #e0e0e0; margin: 0px;"><span style="color: #7f0055; font-weight:
bold;">#endif</span> <span style="color: #3f7f5f;"> /* USE_FULL_ASSERT
*/</span></p></div></div></div></div></div></div></div><div><span style="font-size:
medium;"><b style="font-family: times, &quot;times new roman&quot;; serif;">5. Video Demo
</b><a name="Video"></a><span style="font-family: times, &quot;times new roman&quot;; serif;">
</span><span style="font-family: times, &quot;times new roman&quot;; serif;">
</span><a href="#home" style="font-family: times, &quot;times new roman&quot;;
serif;">[Kembali]</a></span></div><div><br /></div><div class="separator" style="clear: both;
text-align: center;"><iframe allowfullscreen="" class="BLOG_video_class" height="266"
src="https://www.youtube.com/embed/b4Fb1YlXos4" width="320"
youtube-src-id="b4Fb1YlXos4"></iframe></div><br /><div class="separator" style="clear: both;
text-align: center;"><br /></div><div><br /></div><div><span style="font-family: &quot;times&quot;
, &quot;times new roman&quot;; , serif; font-size: medium;"><span style="font-family:
&quot;times&quot;; , &quot;times new roman&quot;; , serif;"><b>6. Analisa </b>
<a name="Analisa"></a>
<a href="#home">[Kembali]</a></span></span></div><div><br /><div class="separator"
style="clear: both; text-align: center;"><br /></div></div><div class="separator" style="clear: both;
text-align: center;"><a
href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEg-dlMDPUeq0SstwROtLEV8t9
1T3rkTp8D0zura-6kKYEWmkxFpPinoF2wYp1Y_83rZ3gNS2gEo6g3fLF2m9nUZd2EYUA9h_hRFGH9ZFTgc
m29dpHeVlpw5lVZFn0aIkCjmdhO4rfWtayU2soZGkoBzh79wpWOkd_hjYetyk6Rd8RK_FvSJ21_PNUSH5
YIH/s3841/WhatsApp%20Image%202025-03-21%20at%2021.29.16_b45a7302.jpg"
style="margin-left: 1em; margin-right: 1em;">

</a></div><br /><div class="separator" style="clear: both; text-align: center;"><a href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEiD3I7G8C5eFJr2gni1YWpJOpUb xTqwv-yhvjOgdRG9IFNA3Sz9R-j8IGX3P-87K2oLmni24QAqLJ7tfp\_6eb1Qt6WuOjd0l\_ft3F00RWqb48v AdD9K5qPfrTtlrG3fzSDIFI3y36\_dmEA\_ryqGasyoqky-SR9s3Uvj3J8aLJhnG13TVC1ygESPysBd7XEP/s405 2/WhatsApp%20Image%202025-03-21%20at%2021.29.16\_7ad8c1e7.jpg" style="margin-left: 1em; margin-right: 1em;">

</a></div><br /><div class="separator" style="clear: both; text-align: center;"><a href="https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEjeRO7\_qWuQi21IOaPS17830e lLwDg2bT9lfqHIBVzi2RpzwqKzIS6asZJQvvEPA27lyNky-7om0sucW6AstqtBTiZL5rr3jdOezMw37WOPIRb UC\_TGgntCV-prVOnWep1pHWBTtzAnM0C6zeU-l4QNWWVFrvxMCrWs8nJS7LVTPvrhfWyl65f7Wift9Ds o/s3889/WhatsApp%20Image%202025-03-21%20at%2021.29.16\_efd3bd6f.jpg" style="margin-left: 1em; margin-right: 1em;">

</a></div><div class="separator" style="clear: both; text-align: center;"><br /></div><br /><div><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif; font-size: medium;"><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif;"><b>7. Download File</b>

<a name="Download"></a>

<a href="#home">[Kembali]</a></span></span><br />

</div><div><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif;"><br /></span></div><div><div><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif;">Download HTML</span><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif;"><a href="#">Download</a></span><br /><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif;">Download Video Demo<span></span></span><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif;"><a href="https://drive.google.com/file/d/1dULhXYfwKkfoc3Sz8uQOhRPAeVDyf-z5/view?usp=sharing">Download</a></span></div><div><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif;"><span><span><span>Datasheet Mikrokontroler STM32F103C8<span></span></span></span></span></span><span style="font-family: &quot;times&quot;; , &quot;times new roman&quot;; , serif;"><a href="https://drive.google.com/uc?export=download&amp;id=1H1f7gOqv9bUGkc2Flm-WcoK8GPif7

x0u">Download</a>]</span></div><div><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><span><span><span>Datasheet Sensor Infrared</span></span></span></span><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;">[<a href="https://drive.google.com/uc?export=download&amp;id=1ep2aHCWE3IlzmVU1QDjUxLrqtDWqQ6zZ">Download</a>]</span></div></div></div></div></div><div><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><span>Datasheet RGB LED</span></span><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;">[<a href="https://drive.google.com/uc?export=download&amp;id=1T8GTJQglTGgbYtGsIMvBoKNbJXdbB5iF">Download</a>]</span></div><div><div><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;">Datasheet Sensor Touch&nbsp;</span><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;">[<a href="https://drive.google.com/uc?export=download&amp;id=1k2jyxNskosoFOcZDpZl9rq1NJGxUYrvW">Download</a>]</span></div><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;">&nbsp;</span></div><div><span style="font-family: &quot;times&quot; , &quot;times new roman&quot; , serif;"><span><span><br /></span></span></span></div>