WIPER CONTROL SYSTEM

IMPLIMENTATION USING STM32 MCU

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ABSTRACT

- The aim of the project is to implement the Wiper Control System of the car. Wiper Control system is the an automotive wiper controls the operational speed of a wiper in accordance with rain conditions.
- The aim of proposed system here consists of STM32 microcontroller with the help of LEDs present on STM32.
- The proposed outcome of the project is, when Button pressed for 2 seconds the Wiper System should turn ON.Then the LEDs should turn on one after the other like the wiper system. When button again pressed for 2 Seconds the system needs to be OFF. But, The system would be smart that it should stop by coming to the starting LED.

INTRODUCTION

A wiper is a necessary component that cleans raindrops or any other liquid off the vehicle's windscreen. The prior system required manual wiper activation, by changing the frequency As its results the operation of bringing up the wiper speed is varied.

The project's goals are to improve ageing car's systems by giving automated transmission to the wiping system, to improve the system by incorporating a sensor and actuator, and to create a simple software that would completely operate with the system of the framework.

This proposed wiper system's principle is comparable to those of other existing conventional wipers. Despite the fact that. This system will be upgraded to an automatic control system using a Peripheral Interface to remove water from the windscreen.

The speed of the wiper should be controlled as per user's requirements. And the Wiper system should turn ON after getting some specific signal from the user.

BLOCK DIAGRAM:

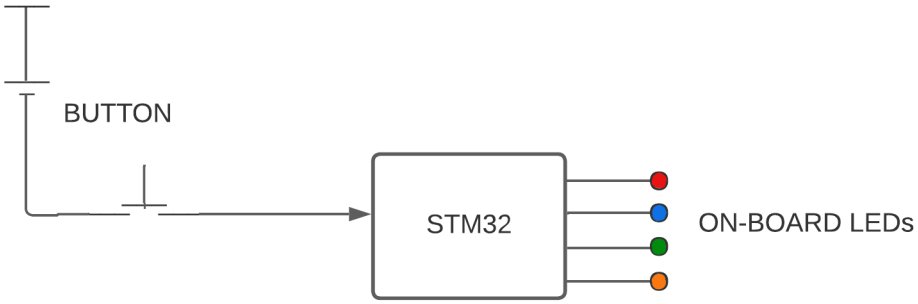

Fig 1. Block Diagram

FLOW CHART:

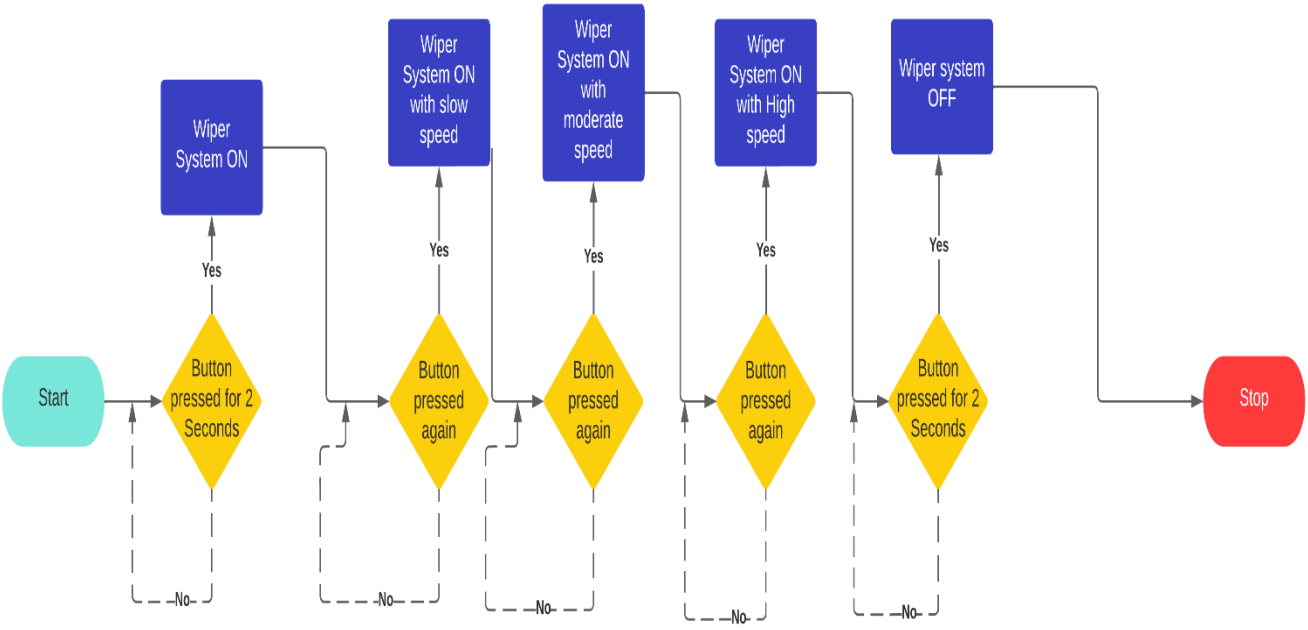

Fig 2. Flow Chart

SOFTWARE REQUIREMENTS :

STM32 CUBE IDE

COMPONENTS :

STM32F4O7VG MICROCONTROLLER BOARD

DESCRIPTION :

○ STM32F407VG

The STM32F407VG family is based on the high-performance Arm® Cortex®-M4 32-bit RISC core operating at a frequency of up to 168 MHz.The STM32F407VG family incorporates high-speed embedded memories (Flash memory up to 1 Mbyte, up to 192 Kbytes of SRAM), up to 4 Kbytes of backup SRAM, and an extensive range of enhanced I/Os.It offers three 12-bit ADCs, two DACs, a low-power RTC, twelve general-purpose 16-bit timers including two PWM timers for motor control, two general-purpose 32-bit timers.

○ FEATURES OF STM32F407VG MICROCONTROLLER

- In a LQFP100 package, the STM32F407VGT6 microcontroller has a 32-bit ARM Cortex-M4 with FPU core, 1-Mbyte Flash memory, and 192-Kbyte RAM.
- On-board ST-LINK/V2 or ST-LINK/V2-A on STM32F4 DISCOVERY (old reference) or STM32F407G-DISC1 (new order code)
- USB ST-LINK with three separate interfaces and re-enumeration capability.
- Virtual Com port Debug port (with new order code only)
- Large-scale storage (with new order code only)
- Board power is supplied through USB or an external 5 V supply source.
- 3 V and 5 V external application power supply

APPLICATIONS OF STM32 MICROCONTROOLLER :

- These microcontrollers are used in a variety of applications, from simple printers to complex circuit boards in vehicles.
- This Microcontroller is utilized in printing and scanning machines , heat ventilation, air conditioning, and security systems.
- This module can be found in a variety of household products.

WORKING PRINCIPLE :

Assume that the automobile is the microcontroller. After pressing the button for 2 seconds, the first led (red) should turn on, Clicking again the wiper will start, and the second led (blue) will turn on for a desired rate. If the button is pressed again, the third led (green) will turn on. The fourth press will turn on the fourth led (orange).The wiper speed will be increased in accordance with the each button press from previous one. The microcontroller (vehicle) is turned off even the led (red) will be turned off after pressing button for 2 seconds.

DETAIL REQUIREMENTS :

○ HIGHLEVEL REQUIREMENTS

Sl. No.	requirements	Description
1	Programming language	C language
2	Arm based microcontroller	STM32F40VGT6
3	operating system	Windows
4	RAM	Min 4GB
5	Hard Disk	Min 250GB

- LOWLEVEL REQUIREMENTS

Sl. No.	Description	Status
1	ON-Ignition key	Implemented
2	Press Multi-functional button	Implemented
3	4 Different Color Leds	Implemented
4	Timer	Implemented
5	OFF-Wiper button	Implemented

CONCLUSION :

- Wiper Control system is so much essential for cars, It helps drivers to see the path by making visible the glasses shaded by rain or snow.
- The implemented project is user friendly which helps the users to make the adjustment in code for turning ON-OFF the system.
- Also it helps the users to control the speed of the wipers which changes according to the pressing of the button.