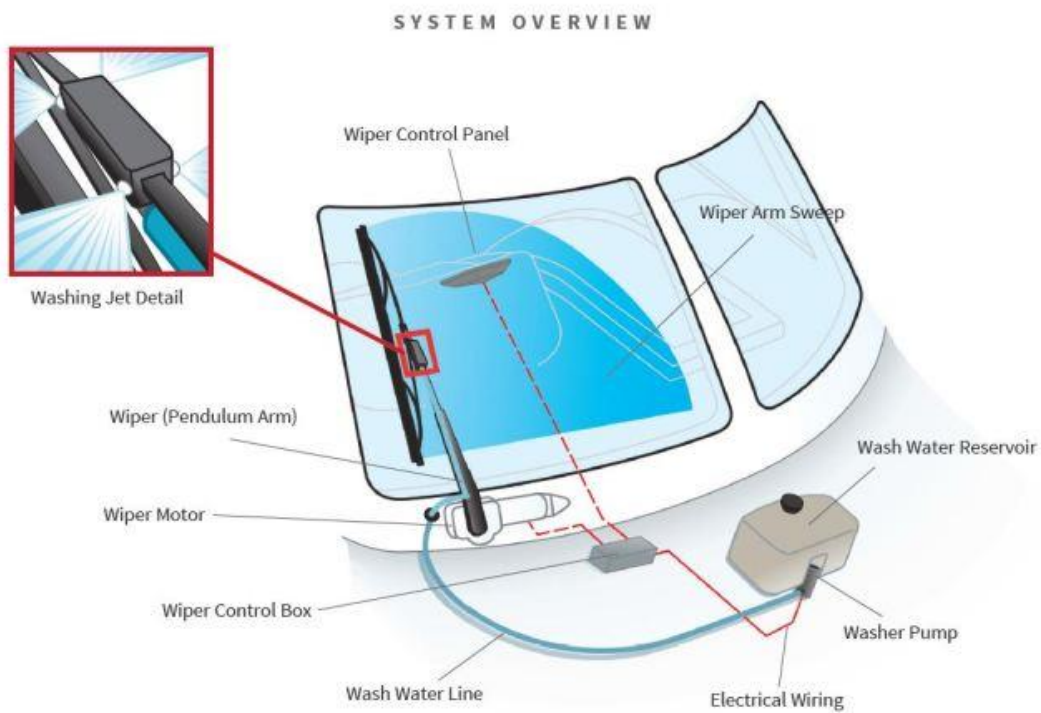


Report on
Vehicle Wiper Control System

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1. Introduction

Wiper systems are an integral part of modern autos, particularly four-wheelers. They are designed to clean dust, water, fog, and mist from the windshield, allowing the driver can see the road ahead more clearly. The components are visible from the outside of the vehicle. It features a silicon rubber blade, a wiper arm linked to the silicon blade, extensible linkage, and pivots. The existing method required the driver to manually engage the wiper and draw up the wiper and turn it on and off the control system.

2. Objectives

- To provide a sense of confidence to the driver while driving 3 wheeler or four wheelers in rain
- To provide a better vision and to clear dust from the windscreen.
- Speed control to clean the windscreen effectively according to the speed of rain.

3. Car Ignition Switch

The ignition switch has four positions: LOCK (0), ACCESSORY (I), ON (II), and START (III).

3.1 LOCK(0)

You can insert or remove the built-in key only in this position. To turn the ignition switch to the LOCK (0) position, the shift lever must be in Park, and you must push the knob or built-in key in slightly.

If the front wheels are turned, the anti-theft lock may make it difficult to turn the ignition switch. Firmly turn the steering wheel to the left or right as you turn the ignition switch.

3.2 ACCESSORY(I)

You can operate the audio system and the accessory power sockets in this position. When you turn the ignition switch to the ACCESSORY (I) position, an “ACCESSORY (I) POSITION” message is shown on the multi-information display.

3.3 ON(II)

This is the normal ignition switch position when driving. Several of the indicators on the instrument panel come on as a test when you turn the ignition switch from the ACCESSORY (I) to the ON (II) position.

3.4 START(III)

Use this position only to start the engine. The switch returns to the ON (II) position when you let go of the ignition switch.

4. Tools Required

4.1 Software Requirement

STM32IDE: STMicroelectronics' STM32 family of 32-bit ARM Cortex-M core-based microcontrollers is supported by a wide range of software integrated development environments (IDEs) with C, C++, Pascal and JAVA support and debuggers from STMicroelectronics and major 3rd-parties (free versions are available) that are complemented by tools from ST allowing to configure and initialize the MCU or monitor its behavior in run time.

4.2 Components

STM32F407VG MICROCONTROLLER BOARD:

- The STM32F4DISCOVERY Discovery kit leverages the capabilities of the STM32F407 high-performance microcontrollers, to allow users to develop audio applications easily. It includes an ST-LINK/V2-A embedded debug tool, one ST-MEMS digital accelerometer, one digital microphone, one audio DAC with an integrated class D speaker driver, LEDs, push-buttons, and a USB OTG Micro-AB connector.
- The STM32F405xx and STM32F407xx family is based on the high-performance Arm® Cortex®-M4 32-bit RISC core operating at a frequency of up to 168 MHz. The Cortex-M4 core features a Floating point unit (FPU) single precision which supports all Arm single-precision data-processing instructions and data types. It also implements a full set of DSP instructions and a memory protection unit (MPU) which enhances application security. The STM32F405xx and STM32F407xx family incorporates high-speed embedded.

4.2.1 FEATURES OF STM32F407VG MICROCONTROLLER

- Up to 1 Mbyte of Flash memory.
- Up to 192+4 Kbytes of SRAM including 64-Kbyte of CCM (core coupled memory) data RAM.
- 512 bytes of OTP memory.
- Flexible static memory controller supporting Compact Flash, SRAM, PSRAM, NOR and NAND memories.

4.2.2 Uses

- 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.

5. Working

Let's say the microcontroller is a car. When the button is pressed, the first LED (red) lights up, the wiper lights up, and the second LED (blue) lights up with the corresponding frequency. When the button is pressed again, the third LED (green) lights up and the wiper speed increases compared to before. The fourth press activates the fourth LED (orange) and increases the

wiper speed following the previous steps. After the fifth click, the microcontroller (vehicle) turns off.

6. 4W's and 1H

6.1 What

Wiper system as a safety feature, proven helpful in rainy days.

6.2 Why

To keep the windscreen free from dust and water all the time and provide clear view to the driver

6.3 When

In rainy days

When the windscreen is dirty or suddenly some foreign object comes on the windscreen.

6.4 Who

Will be used in 3 or 4 wheeler vehicles.

7. SWOT

7.1 Strength

Economical

Essential thing

Safety feature

7.2 Weakness

Less focus on new innovation.

Effective in clearing only water and dust particles from the windscreen.

7.3 Opportunities

New innovations in design

7.4 Threat

Parts availability

Competetion in the market

8. Requirement sets

8.1 High-Level requirements

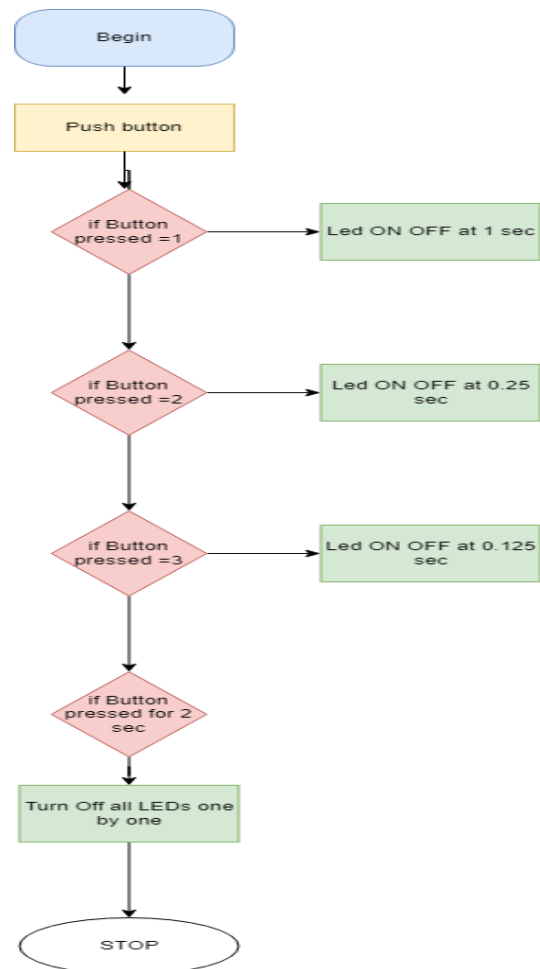
I'D	DESCRIPTION	STATUS
HR_01	Car in Lock mode	Implemented
HR_02	Car in ignition mode	Implemented
HR_03	Turn on the wiper	Implemented
HR_04	Turn off the wiper	Implemented

8.2 Low-Level requirements

I'D	DESCRIPTION	STATUS
LR_01	Wiper turn on	Implemented
LR_02	Wiper in sequence	Implemented
LR_03	Wiper speed	Implemented
LR_04	Wiper Turn off in sequence	Implemented
LR_05	Wiper Off	Implemented

9. Designs

9.2.1 Flow Chart



9.2.1 Block Diagram

