Abstract

In today's automobile environment high end cars and certain heavy goods transport vehicles are fitted with expensive automatic windshield wipers where the maintenance and troubleshooting posed major problems. wipers play a key role during adverse weather conditions by wiping the rain continuously over the windshield area and provides a clear vision to the driver. Wipers are designed and made to clear the water from a windscreen. The windshield wiper system of passenger cars comprises three major subsystems: two wipers and their arms; a mechanism; and an electric motor. The concept of this proposed wiper system is similar with other existing conventional wiper. A wiper generally consists of a metal arm; one end pivots, the other end has a long rubber blade attached to it. The wiper serves to clean the windshield of the car at the front and rear, although not all cars have wipers on the rear side. Wiper works by removing oil, dust, rainwater, and dirt that get stuck to the windshield.

Introduction

wipers are manual systems that work on the principle of manual switching. So here we propose an automatic wiper system that automatically switches ON detecting rain and stops when rain stops. Our project brings forward this system to automate the wiper system having no need for manual intervention. For this purpose, we use rain sensor along with microcontroller to drive the wiper motor.

Wiper working

Our system uses rain sensor to detect rain, this signal is then processed by microcontroller to take the desired action. The rain sensor works on the principle of using water for completing its circuit, so when rain falls on it its circuit gets completed and sends out a signal to the microcontroller. The microcontroller now processes this data and controls the motor. This system is equally useful for Aircrafts and a smaller version of this can be used by motor bikers in their helmets so that they can drive easily in rains. When the wiper switch is in the off position, the wiper will not function. When the wiper switch is in low-speed mode, the wiper will work at low speed. Accordingly, when the wiper switch is in high-speed mode, the wiper will work at a fairly high speed. Now that you hopefully understand how the car wiper works, along with its components and detail functions, you should take care of it as well as possible and be diligent in cleaning it!

Software used

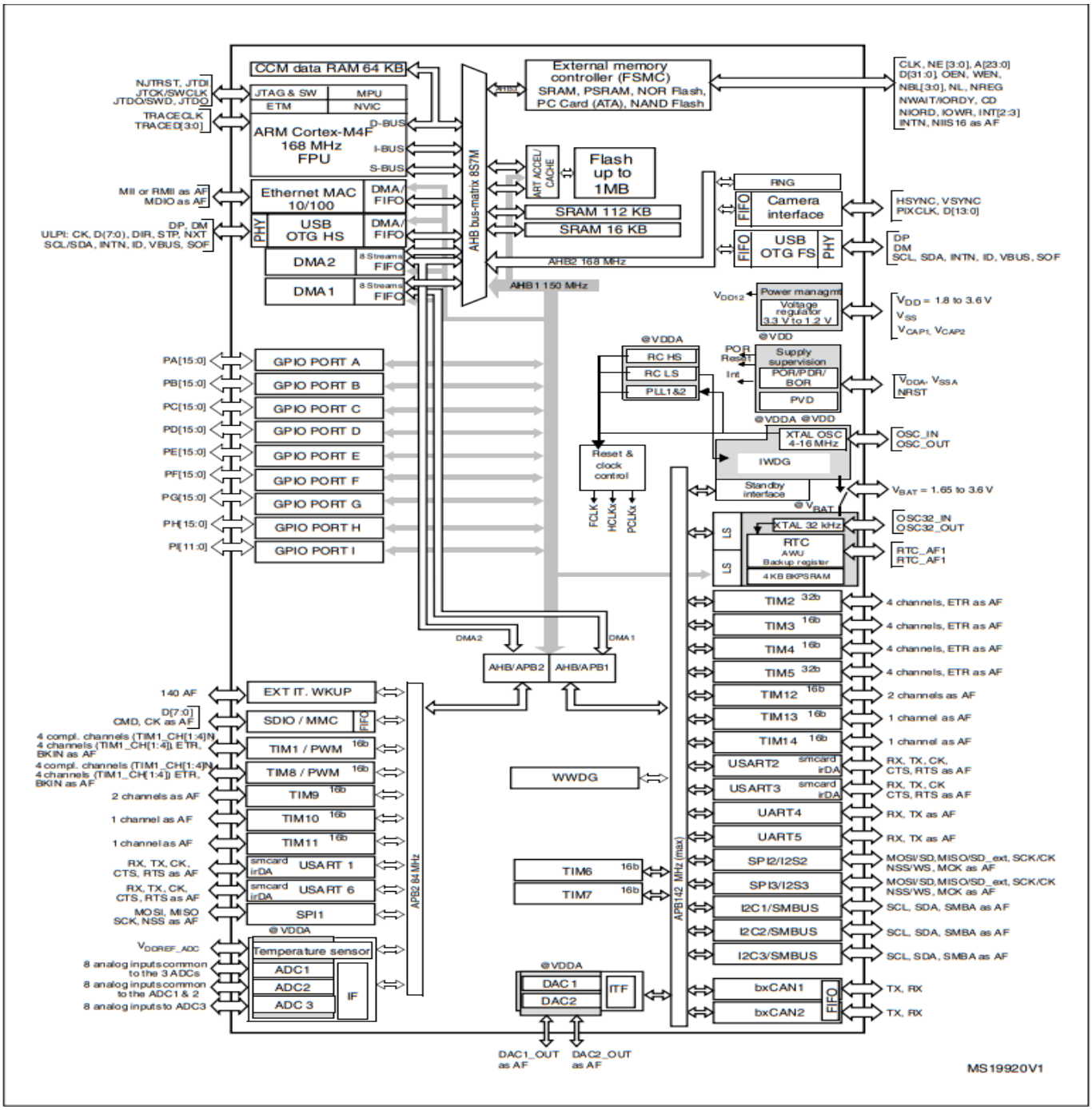
STM32F407VG MICROCONTROLLER BOARD

The STM32405xx and STM32407xx 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. The Cortex-M4 core features a floating-point unit

(FPU) single precision which supports all Arm single precision unit which enhances application security. The STM32405xx and STM32407xx family incorporates high speed embedded memories up to 4 Kbytes of backup SRAM and an extensive range of enhanced I/O and peripherals connected to two AP uses three AHB buses and a 32-bit multi AHB bus matrix.

Uses of STM32407VG MICROCONTROLLER

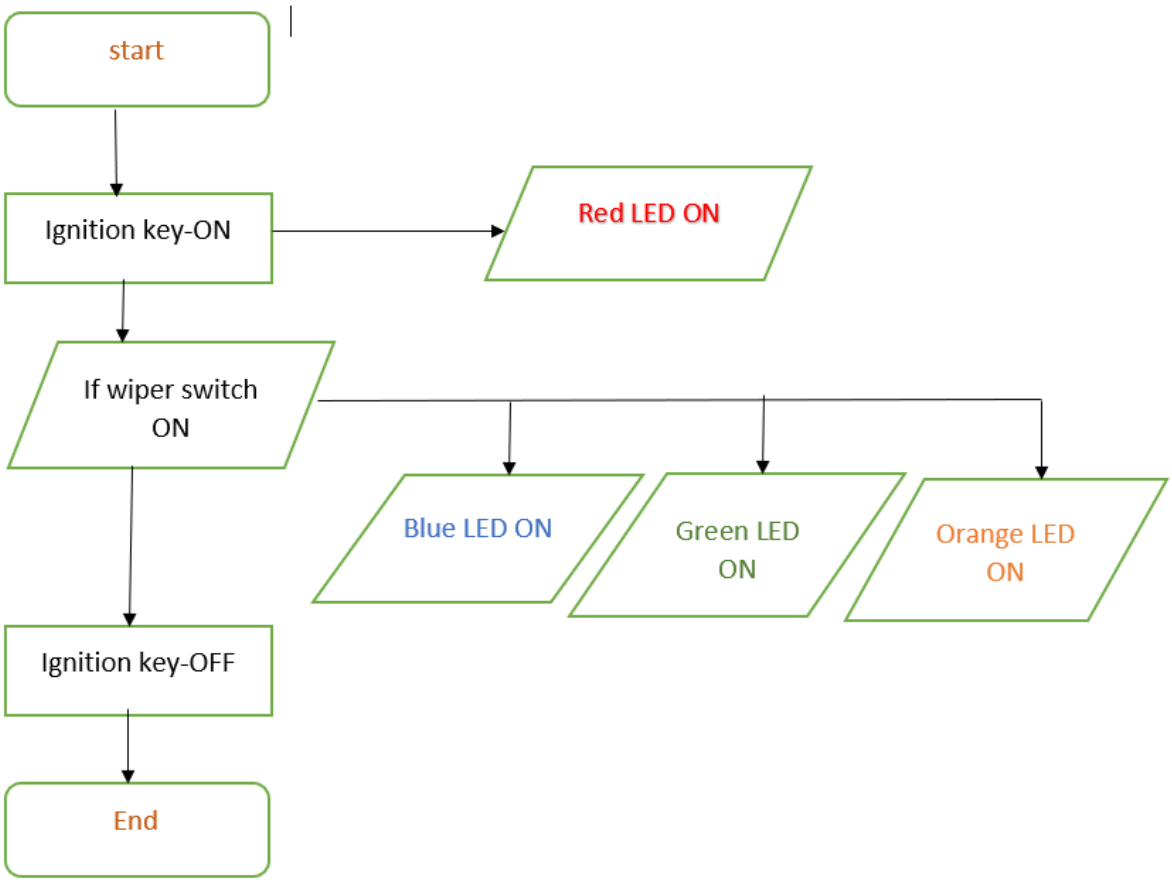
- It printing and scanning machines this device is used. Heat ventilation AC system, also used this device. In different types of devices used in homes comprises of this module.
- The module can be found in a variety of household products.



Overview of the STM32407VG MICROCONTROLLER

- The STM32F407VG Discovery board uses STM32F407VGT6 microcontroller which has ARM Cortex-M4 processor, which is capable of Running up to 168Mhz. This MCU has many peripherals such as GPIO ports, TIMERS, ADCs, DACs, Flash Memory, SRAM, SPI, UART etc. The processor and peripherals talk via BUS-Interface. There are three busses available.
- I-BUS (Instruction Bus) D-BUS (Data Bus) S-BUS (System Bus) I-BUS This bus connects the Instruction bus of the Cortex-M4 with FPU (Floating point unit) core to the Bus Matrix. This bus is used by the core to fetch instructions. The target of this bus is a memory containing code (internal Flash memory/SRAM or external memories through the FSMC/FMC).
- D-BUS This bus connects the data bus of the Cortex-M4 with FPU to the 64-Kbyte CCM data RAM to the Bus Matrix. This bus is used by the core for literal load and debug access. The target of this bus is a memory containing code or data (internal Flash memory or external memories through the FSMC/FMC).
- S-BUS This bus connects the system bus of the Cortex-M4 with FPU core to a Bus Matrix. This bus is used to access data located in a peripheral or in SRAM. Instructions may also be fetched on this bus (less efficient than I Code). The targets of this bus are the internal SRAM1, SRAM2 and SRAM3, the AHB1 peripherals including the APB peripherals, the AHB2 peripherals and the external memories through the FSMC/FMC.

Flow chart



Strength

- Electronic and speed control reduced noise at blade reversal points.
- Reduced weight of the motor and size of the motor.
- Enhanced driver comfort reduced noise from wiper operation.

Weakness

- Additional cost is required to install this system for four wheelers.
- It is not applicable for two wheelers.
- This system applied in the case of water falling on the glass only.

Opportunities

The wiper system of a vehicle is an integrated system that is used to remove rain, dust, oil from a windscreen or windshield. it greatly makes the visibility and affects the safety of passengers and the vehicles also.

Threats

A Wiper Attack involves wiping/overwriting/removing data from the victim.