CarNeTek
車網科技有限公司

Light-Sensing foot-activated tailgate opening and closing system
Product Introduction

Making Tailgate Opening and Closing More Elegant and Convenient

Product Overview

The light-sensing foot activation technology brings smart tailgate functionality into the era of virtual touch, making the operation of electric tailgate simpler and more engaging. When the car owner, carrying the car key (or Bluetooth Tag), approaches the rear of the vehicle, the system automatically detects their presence and uses optical projection technology to display a specific pattern on the ground, unaffected by weather or terrain conditions.

The owner only needs to lightly step on the projected area, and the module will accurately detect the action and send a command to automatically open the tailgate, ensuring a safe distance in the process.

The projected pattern or logo can be customized, enhancing corporate brand image.

Specific Advantages of Laser-Based Foot-Sensing Technology

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High Accuracy:

1. Laser beam features high directionality and focus, enabling precise detection of foot movement and reducing false triggers.
2. With accurate beam control, it effectively distinguishes intentional footsteps from unintentional movements, enhancing system reliability.

Fast Response Time:

1. Laser beam travels at extremely high speed, allowing the sensing system to respond quickly to foot actions and instantly open or close the tailgate.
2. This rapid reaction greatly improves user experience, especially when quick access to the trunk is needed.

Strong Anti-Interference Capability:

1. Compared with infrared sensors, laser has stronger anti-interference ability in strong light environments.
2. Through specialized optical design and signal processing, the influence of factors such as ambient light and dust can be effectively reduced.

Revolutionzing Tailgate Access

Technology Highlight:

1. This system replaces physical interaction with virtual touch, utilizing advanced light and motion-sensing technologies.
2. Optical projection ensures clear visibility of activation zones under various conditions.

Core Features:

1. Contactless Operation: Activates the tailgate without needing to touch the vehicle.
2. Smart Key Detection: Identifies the owner's key or Bluetooth tag to enable the function.
3. Custom Branding: Allows companies to incorporate unique logos or patterns into the projection to increase corporate image.

User Experience:

1. The intuitive design reduces user effort and enhances convenience, especially in scenarios where hands-free operation is beneficial, such as carrying groceries or luggage.
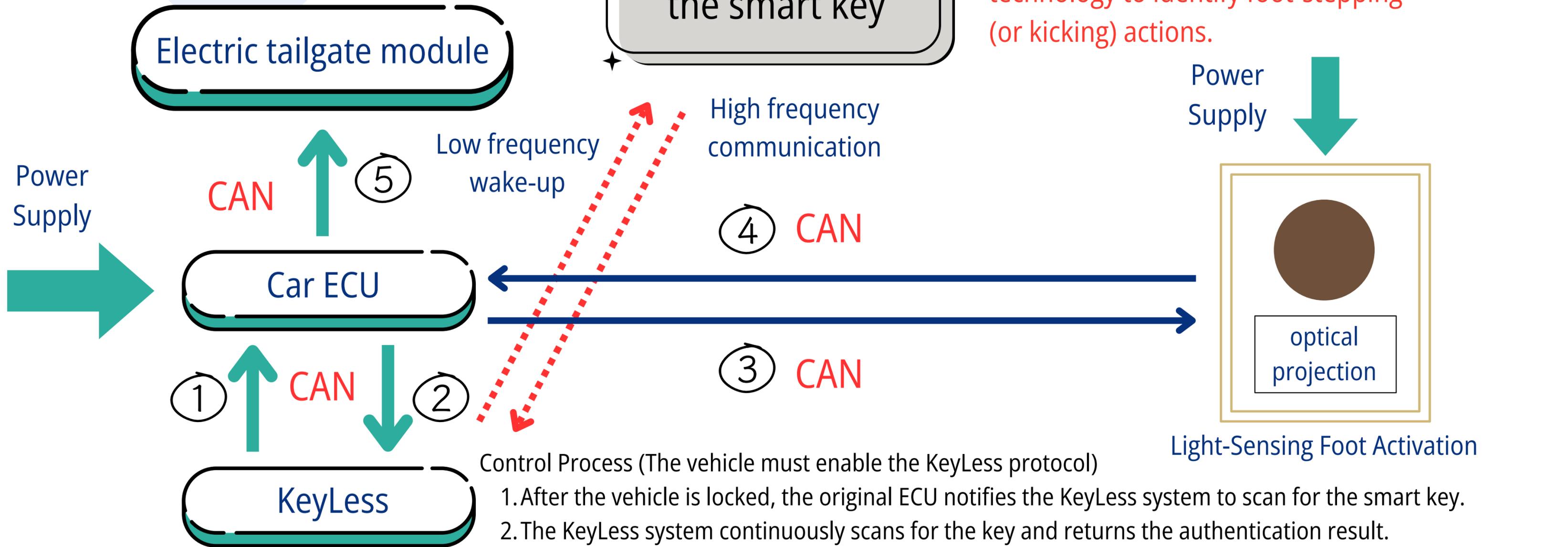2. The system's responsiveness and precision ensure reliability and user satisfaction.

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Product Introduction
(Proximity Sensing--Car KeyLess)

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Electric tailgate module

The user approaches with the smart key

Light sensing foot-stepping is a long-distance sensing tailgate opening technology that uses laser technology to identify foot-stepping (or kicking) actions.

Power Supply

High frequency communication

Low frequency wake-up

CAN ⑤

Power Supply

CAN ④

Car ECU

CAN ③

optical projection

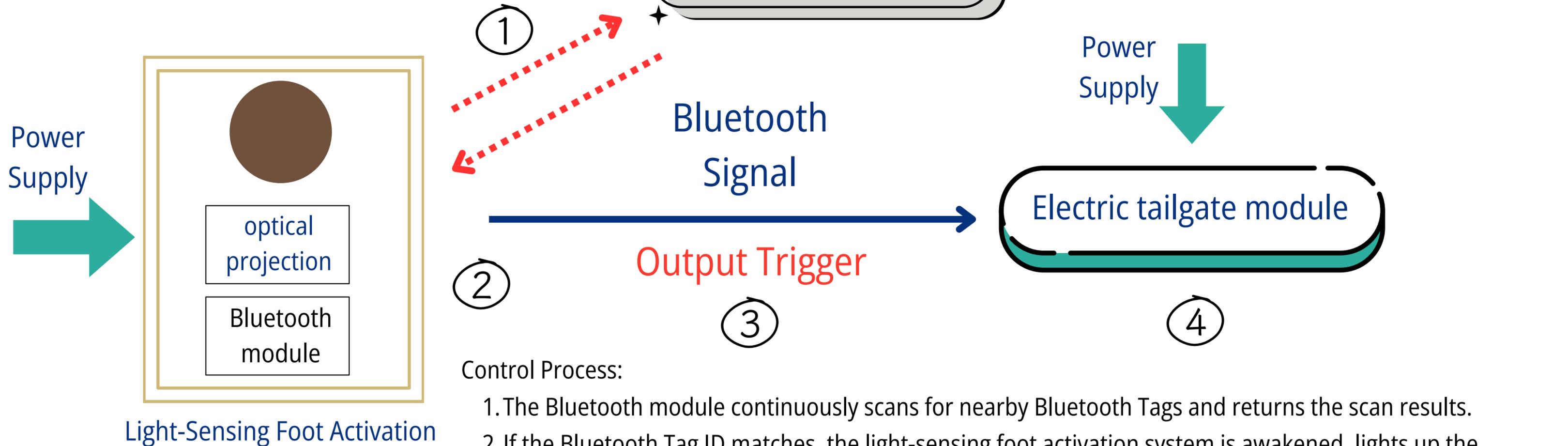① CAN ②

Light-Sensing Foot Activation

KeyLess

Control Process (The vehicle must enable the KeyLess protocol)
1. After the vehicle is locked, the original ECU notifies the KeyLess system to scan for the smart key.
2. The KeyLess system continuously scans for the key and returns the authentication result.
3. If authentication is successful, the ECU wakes up the light-sensing foot activation system via CAN, which then lights up the projection and begins recognition.
4. Once the camera detects a foot activation action, it notifies the original ECU via CAN of the foot activation.
5. The electric tailgate module then opens the tailgate. During sleep mode, only the KeyLess system remains active, while the light-sensing foot activation system stays in a low-power sleep state.

Product Introduction
(Proximity Sensing--Bluetooth Tag)

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The user approaches with the Bluetooth Tag

①

Power Supply

optical projection

Bluetooth module

Light-Sensing Foot Activation

Bluetooth Signal

Output Trigger

②

③

Power Supply

Electric tailgate module

④

Control Process:

1. The Bluetooth module continuously scans for nearby Bluetooth Tags and returns the scan results.
2. If the Bluetooth Tag ID matches, the light-sensing foot activation system is awakened, lights up the projection, and begins recognition.
3. Once the camera detects a foot activation action, it outputs a signal to notify the electric tailgate module to prepare for opening or closing the tailgate.
4. The electric tailgate module opens the tailgate. During sleep mode, the light-sensing foot activation system remains in a low-power sleep state.

Product Introduction

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Determination of Inside or Outside the Vehicle:

- Judged through the vehicle's Keyless Access system (or Bluetooth Tag).

- The working state of the projection lamp is determined via CAN signal (or Bluetooth signal). After the key or Bluetooth Tag is recognized for the first time, the projection lamp lights up immediately. When the key moves away or the engine starts, the projection lamp turns off.

- The projection lamp lights up immediately when the vehicle is turned off or the key/Bluetooth Tag is recognized again.

- The working duration of the projection lamp is determined based on the operating current and LED temperature conditions.

Product Introduction
(Projection Area)

Anti-False Trigger Mechanism:

1. When the user carrying the smart key (or Bluetooth Tag) approaches, the light-sensing camera projects a logo onto the ground.
2. The user performs a foot-stepping (or foot-kicking) action in front of the logo.
3. Upon recognizing this specific foot-stepping action, the system outputs a trigger signal.
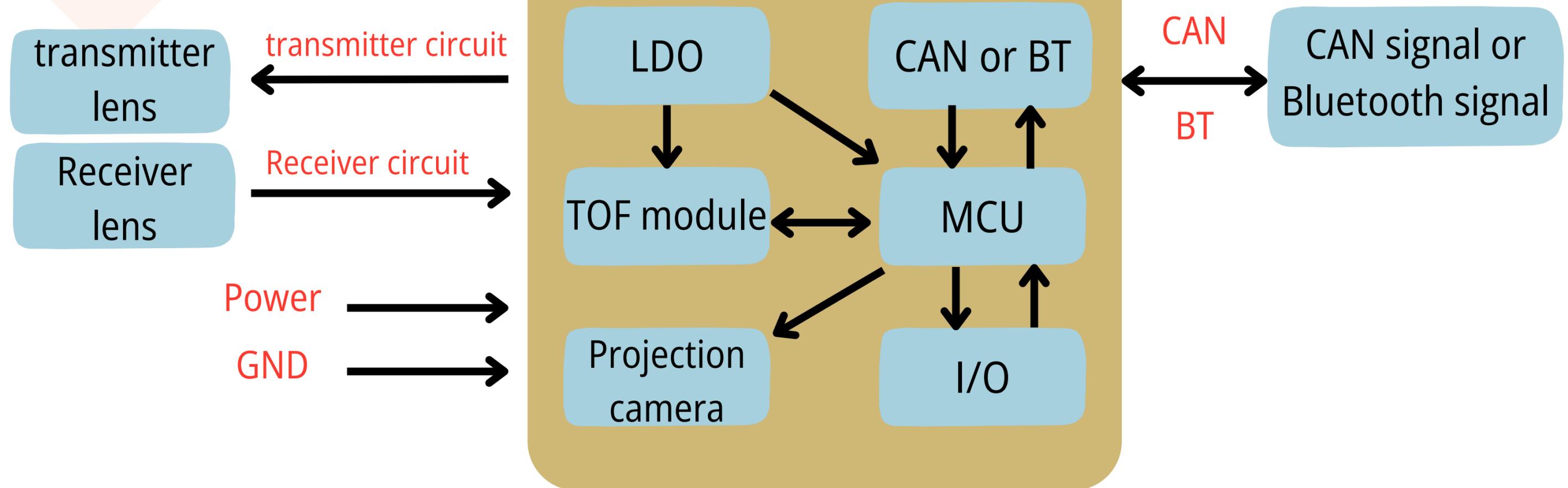
Projection Effect：

The projection camera uses a 5W power SMD LED with a luminous flux of 500 lumens. Within the pattern area, the highest illuminance is approximately 45,000 lux, the lowest is around 22,000 lux, and the average illuminance is about 33,000 lux. The projected pattern is clearly visible to the human eye even during the daytime.

Product Introduction
(Hardware Diagram)

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1. The key components of this solution are the MCU, TOF module, projection camera, and CAN FD transceiver (the Bluetooth Tag includes a built-in Bluetooth module).
2. For vehicles with communication signals, communication can be conducted via CAN.
3. When the vehicle is turned off, the MCU reads the raw data from the TOF module, processes the data, and determines whether to light up the projection lamp and recognize foot movements

Product Specifications

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- Operating voltage：8~36V

- Operating current：< 460mA

- Operating temperature：-40~+85℃

- Storage temperature：-40~+95℃

- Protection level：IP67 (main device)
  IP65 (bluetooth tag)

- Projection color: Green

- Typical power consumption：<5W

- Installation height：350~400mm

- Installation angle：10 degree

- Main device size：103 x 60 x 35mm (L x W x H)

- Bluetooth tag size：56 x 34 x 7mm (L x W x H)

- Main device weight：85g

- Bluetooth tag weight：8g

- Relative position between the lens and the projected logo：15cm

- Bluetooth Tag is able to identify 2 sets of ID

- Dedicated app can be used to fine-tuning settings (e.g. sensing distance, foot-operated response time, door opening time, etc.)

Installation and Usage Instructions

1. Main Device Installation Location:

- Installed inside the rear bumper or underbody shield, secured using a bracket mounted onto the rear bumper or the underbody shield.

2. Sensing Range:

- When the user carrying a Keyless smart key or Bluetooth tag approaches the vehicle within approximately 3 meters, the light sensor device activates and projects the LOGO onto the ground with a breathing effect (gradually brightening and dimming).
- When the user moves away from the vehicle beyond approximately 5 meters, the LOGO turns off.

3. Bluetooth Tag Battery Life:

- The Bluetooth tag uses a CR2032 battery, and under normal usage, the battery life exceeds 1 year.

Logo Customization

- Under sunlight, using a green background with black text will achieve the best display effect.
- Logos for most car models can be created, but more complex logo need to be discussed before customization.

Product Appearance and Dimensions

Main Device

103 (L) x 60 (W) x 35 (H) mm

Bluetooth Tag

56 (L) 34 (W) 7 (H) mm

Special Notice

1. This product must be used in conjunction with a power tailgate system. If the original vehicle is not equipped with a power tailgate, please install a power tailgate system beforehand.

2. Some vehicle models may require an additional relay. If the opening and closing of the power tailgate share the same signal, no relay is needed. However, if the opening and closing use two separate signals, a relay must be installed.

Thank you

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