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SainSmart 101-70-117-03

SainSmart USB 4 Channel DC 12V Relay Module

Model: 101-70-117-03

1. Overview

The SainSmart USB 4 Channel DC 12V Relay Module is a versatile controller designed for computer-controlled switching of external devices and bi-directional data communication. Utilizing a standard USB port, this module is ideal for various custom applications, including automation, data acquisition, and integration with development platforms such as Arduino, Raspberry Pi, DSP, AVR, PIC, and ARM. Its flexible design allows for easy connection to different types of sensors for monitoring, logging, and control purposes.



Figure 1: Top-down view of the SainSmart USB 4 Channel DC 12V Relay Module, showing the four blue relays, USB port, and terminal blocks.

2. Setup Guide

2.1 Driver Installation

Before connecting the module, ensure the necessary drivers are installed on your operating system. This module typically uses FTDI Virtual COM Port (VCP) drivers. Drivers are available for a wide range of operating systems:

- Windows Server 2008 R2, Windows 7 (x64), Windows Server 2008 (x64), Windows Vista (x64), Windows Server 2003 (x64), Windows XP (x64), Windows 2000, Windows ME, Windows 98
- Linux
- Mac OS X, Mac OS 9, Mac OS 8
- Windows CE.NET (Version 4.2 and greater)

The latest drivers can usually be found on the FTDI website or the SainSmart support page. After installation, connect the module via a standard USB cable. The device should be recognized as a COM port in your system's Device Manager (Windows) or equivalent utility (Linux/macOS).

2.2 Physical Connection

Connect the SainSmart USB 4 Channel DC 12V Relay Module to your computer using a standard USB Type-B cable. The module draws power from the USB port for its internal circuitry. For powering the relays, the module requires a 12V DC power supply connected to the VCC and GND screw terminals. Ensure correct polarity when connecting the power supply.



Figure 2: Angled view showing the USB port and the 12V DC power input terminals on the module.

3. Operating Instructions

The module communicates via a virtual serial port. Ensure your application or terminal program is configured with the correct communication parameters.

3.1 Communication Parameters

- **Baud Rate:** 9600
- **Data Bits:** 8
- **Stop Bits:** 1
- **Parity:** None
- **Flow Control:** None

3.2 Relay Control Commands

Relays are controlled by sending specific hexadecimal (HEX) or decimal (DEC) commands to the assigned COM port. Each command consists of three bytes: a header (FF), the channel number (01-04), and the state (00 for OFF, 01 for ON).

Table 1: Relay Control Commands

Channel	Action	HEX Command	DEC Command
FIRST (Relay 1)	OFF	FF 01 00	255 1 0
FIRST (Relay 1)	ON	FF 01 01	255 1 1
SECOND (Relay 2)	OFF	FF 02 00	255 2 0
SECOND (Relay 2)	ON	FF 02 01	255 2 1
THIRD (Relay 3)	OFF	FF 03 00	255 3 0
THIRD (Relay 3)	ON	FF 03 01	255 3 1
FOURTH (Relay 4)	OFF	FF 04 00	255 4 0
FOURTH (Relay 4)	ON	FF 04 01	255 4 1

3.3 Example Usage

To turn on the first relay, send the byte sequenceFF 01 01 (HEX) or 255 1 1 (DEC) to the module's COM port. To turn it off, send FF 01 00 (HEX) or 255 1 0 (DEC).



Figure 3: View of the module highlighting the screw terminals for connecting external devices to the relays.

4. Maintenance

The SainSmart USB 4 Channel DC 12V Relay Module is designed for durability and requires minimal maintenance. To ensure optimal performance and longevity:

- Keep the module in a clean, dry environment, away from dust, moisture, and extreme temperatures.
- Avoid exposing the module to static electricity. Handle it by the edges of the PCB.
- Ensure all connections (USB, power, and relay outputs) are secure and free from shorts.
- Do not exceed the specified voltage (12V DC) or current ratings for the relays.

5. Troubleshooting

If you encounter issues with your SainSmart USB 4 Channel DC 12V Relay Module, consider the following troubleshooting steps:

5.1 No Communication with Module

- **Driver Installation:** Verify that the correct FTDI VCP drivers are installed for your operating system. Check Device Manager (Windows) or equivalent to confirm the module is recognized as a COM port.
- **COM Port Number:** Ensure your software or terminal program is configured to use the correct COM port number assigned to the module.
- **Communication Parameters:** Double-check that the baud rate (9600), data bits (8), stop bits (1), and parity (None) are correctly set in your communication software.

- **USB Cable:** Try a different USB cable or USB port on your computer.

5.2 Relays Not Responding

- **Power Supply:** Confirm that a 12V DC power supply is connected to the VCC and GND terminals and is providing adequate power. The USB connection alone powers the module's logic, but not the relays themselves.
- **Command Format:** Ensure the commands sent are exactly as specified (e.g.,FF 01 01 for ON, FF 01 00 for OFF), including the correct hexadecimal or decimal values and byte order.
- **Relay Click on Boot:** It is a known characteristic that the relays may click a few times during the initial power-up or USB connection. This is typically normal behavior and does not indicate a fault.

5.3 Issues with Non-Windows Operating Systems

For Linux or Mac OS X, direct serial communication might require specific configurations or libraries (e.g., D2XX drivers and 'bitbang' mode) beyond standard VCP setup. Refer to community forums or FTDI documentation for advanced setup on these platforms.

6. Specifications

Table 2: Product Specifications

Feature	Detail
Model Number	101-70-117-03
Brand	SainSmart
Number of Channels	4
Operating Voltage	DC 12V (for relays)
Interface	USB
Contact Type	Normally Open (NO)
Contact Material	Copper
Mounting Type	Plug In Mount
Package Dimensions	5.28 x 4.88 x 0.91 inches
Item Weight	2.08 ounces
Date First Available	September 13, 2012

7. Warranty and Support

SainSmart products are designed for quality and reliability. For specific warranty information, technical support, or to access additional resources such as software examples and updated drivers, please visit the official SainSmart website or contact their customer support. Keep your purchase receipt for warranty claims.

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