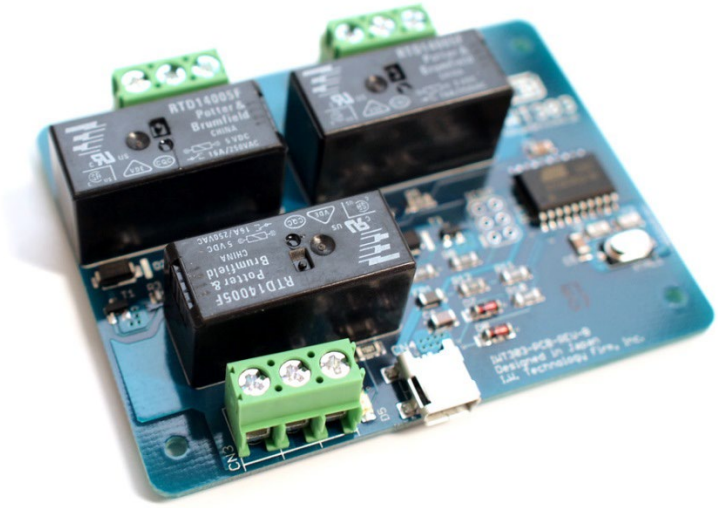
TOKYO DEVICES

IWT303-3C/IWT303-1C

General Purpose Bus-Powered USB Relay Control Board

Revision 1.6.2



The Tokyo Devices IWT303 series is an USB based electromagnetic-relay module. It can be controlled from PCs or single-board computers. The IWT303-1C can control 1 contact point, while the IWT303-3C can control 3 contact points. Each relay's contact capacity is 10A, handling up to a maximum of 250VAC. Control software is open sourced and compatible with Windows and Linux. It can be quickly integrated into your own unique applications.

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1. Specifications

Name	Value	Description
Rated Current	10A max.	* See figure 2
Rated Voltage	AC 250V 10A DC 24V 10A DC 50V 1A	* See figure 2
Contact Type	SPDT	
Number of contacts	IWT303-1C: 1 contact IWT303-3C: 3 contacts	
Cable thickness	AWG26～14	Fixed by screw
Communication Protocol	USB 1.1	
USB Connector Type	Type B mini	
Power type	USB Bus Powered	
Power Consumption	IWT303-1C: 85mA max. IWT303-3C: 250mA max.	
Operating Temperature	-10 ～ 60℃	No condensation
Module size	80×60×20mm.	Without protrusions

2. Board Layout

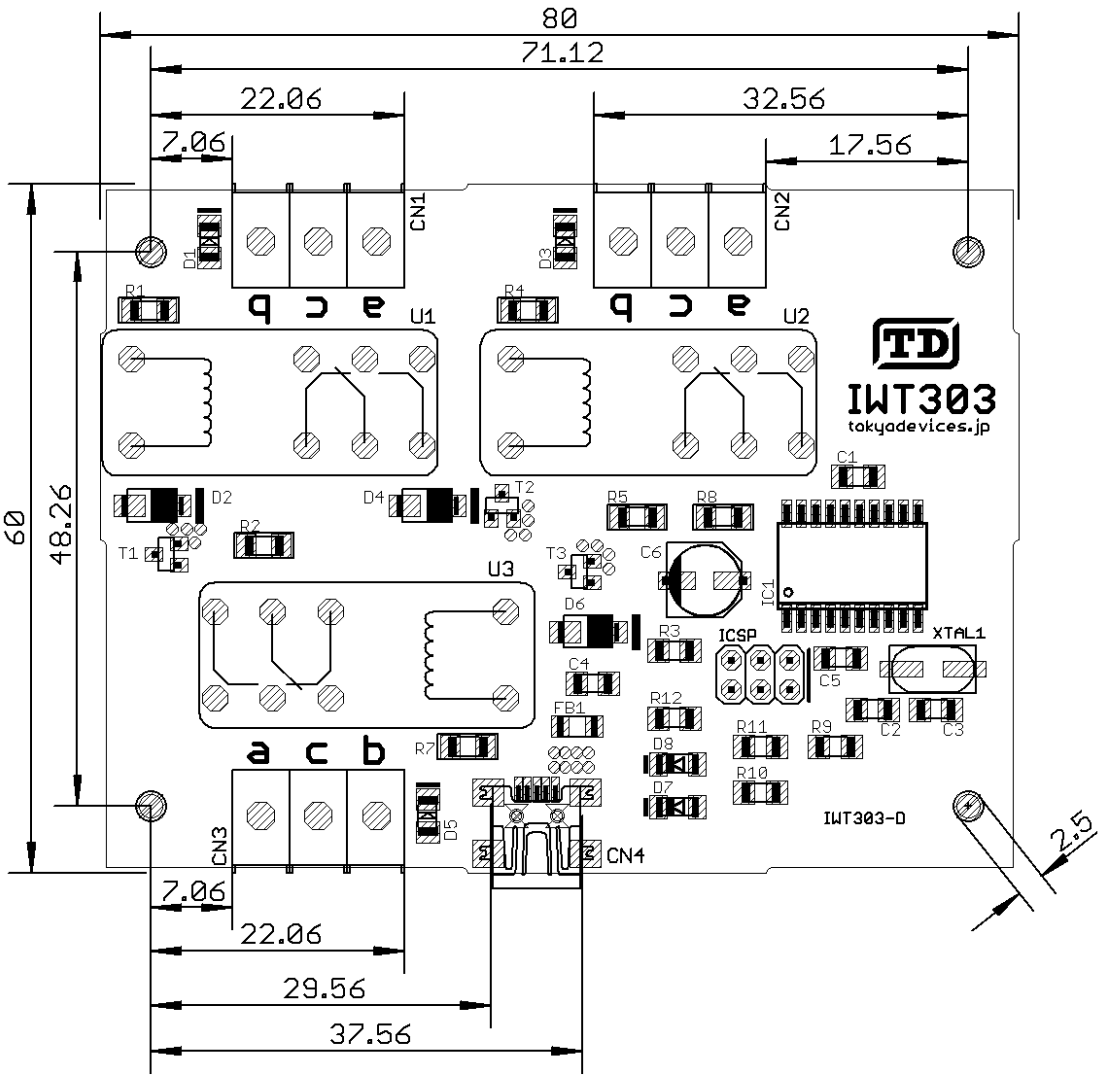


Figure 1 Board Layout

*Some components may have a different appearance

3. Quick Usage

Each relay has three terminal connectors. On the board surface near the terminal connectors, "a, c, b" is printed. When the relay is ON, there's a connection between a-c and a disconnection between c-b. In the ON state, the red LED near the terminal connectors lights up. When the relay is OFF, there's a disconnection between a-c and a connection between c-b. In the OFF state, the LED turns off. When power is turned on, it always starts from the OFF state (a-c disconnected & c-b connected). Please connect to the appropriate terminals depending on the circuit you want to implement.

The IWT303-1C model can only use CN3. The IWT303-3C model can use CN1, CN2, and CN3.

When you connect the USB connector (CN4) to a PC's USB port using a USB cable, the module's power will automatically turn ON.

4. Control relays

The IWT303 series is controlled by the control command 'TD-USB'. TD-USB is a command-line program that operates on Windows or Linux. To obtain TD-USB, please search for the keyword 'IWT303' on the Tokyo Devices website or download it from the following GitHub repository:

Tokyo Devices Web (In Japanese): https://tokyodevices.com/
TD-USB GitHub repository: https://github.com/tokyodevices/td-usb/

4.1. Basic Usage

The basic arguments for TD-USB are as follows:

```
> td-usb iwt303 (operation) [options]
```

The first argument, `iwt303`, is a fixed string representing the target product model (case-sensitive). The second argument, `operation`, is a fixed string representing a specific operation. Specify `options` as needed.

4.2. Setting the Contact Point Status

```
> td-usb iwt303 set value
```

`set` is a fixed string that specifies the set operation to write values to the device (case-sensitive). `value` is a decimal notation of a number that represents the contact point status in 3-bit binary. For instance, for the set value '3', 3 in binary is '011', so the contacts for CN1 and CN2 will be ON, and CN3 will be OFF.

4.3. Retrieving the Contact Point Status

```
> td-usb iwt303 get
3
```

`get` is a fixed string specifying the get operation to read values from the device. When retrieval is successful, a number will be returned on a single line in the standard output. The number is a decimal notation of a value that represents the contact point status in 3-bit binary. For instance, for the value '3', 3 in binary is '011', which indicates that the contacts for CN1 and CN2 are ON, and CN3 is OFF.

4.4. Identifying Multiple Modules

```
> td-usb iwt303 list
XXXXXXXXXXXXX,YYYYYYYYYYYYY
> td-usb iwt303:XXXXXXXXXXX get
3
```

By using the `list` operation of the TD-USB command, you can retrieve the serial numbers of multiple devices connected to a single computer. Each recognized device's serial number will be delimited by comma ‘,’ character. When no device has been found, a blank line will be output. Subsequently, by specifying the colon ‘:’ symbol followed by the serial number after the fixed string `iwt303` which designates the product model, you can specify the target device.

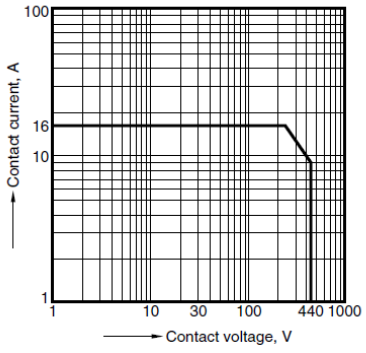
4.5. Using from a Custom Program

To use Tokyo Devices' USB devices from a user application, please call the TD-USB command as an external program from the application side. The TD-USB command writes the results to the standard output. If you want to know the results of the command execution from the application, ensure you receive the standard output through a pipe when calling it as an external program. Please refer to the README file of the TD-USB command, which includes examples of how to call it in Python and C#.

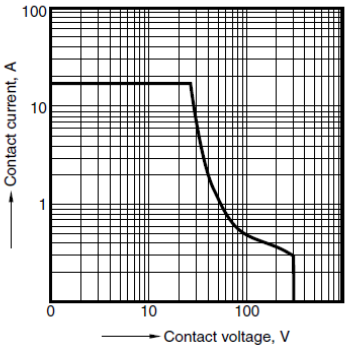
5. Tips

- If the device resets when switching the contact ON/OFF, it's possible that the output current capacity of the USB port is insufficient, or the current capacity of the USB cable being used is lacking. If the USB port's output current capacity is insufficient, please try connecting through a self-powered USB hub. Also, consider replacing the USB cable and testing again.
- Please refer to the following graph for the relay contact capacity. Due to the limitations of the circuit board pattern, the maximum current is up to 10A.

1. Max. switching power (AC resistive load)



2. Max. switching power (DC resistive load)



3. Coil temperature rise
Sample: ALZ11F12, 5pcs.
Measured portion: coil inside
Contact current: 0 A, 16 A

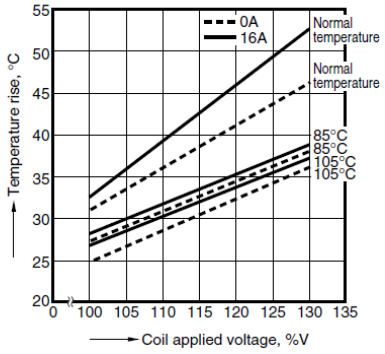


Figure 2 Max. Power for Switching

6. Product Customization

Tokyo Devices offers customization of circuit board exteriors, functionalities, and performance based on customer needs. For more details, please check the "Customization" on the Tokyo Devices website.

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