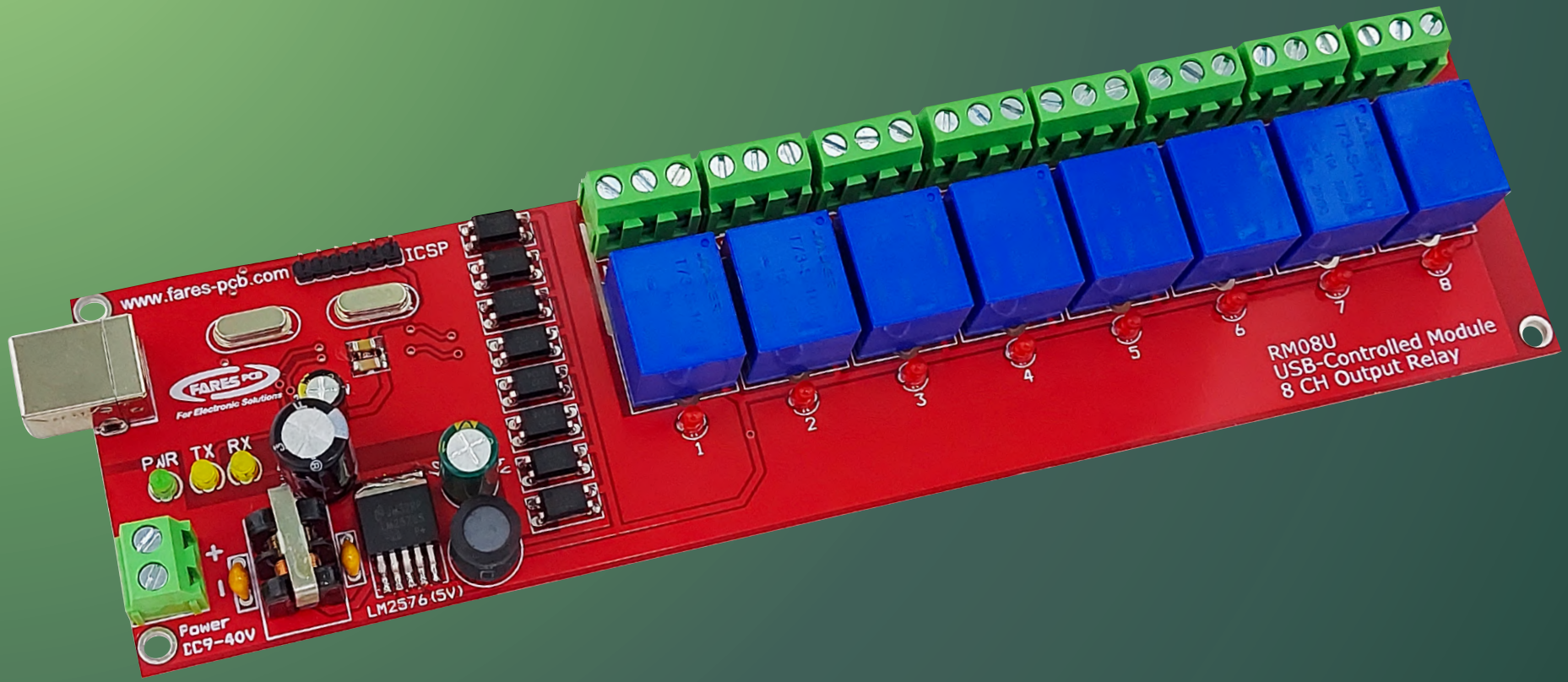
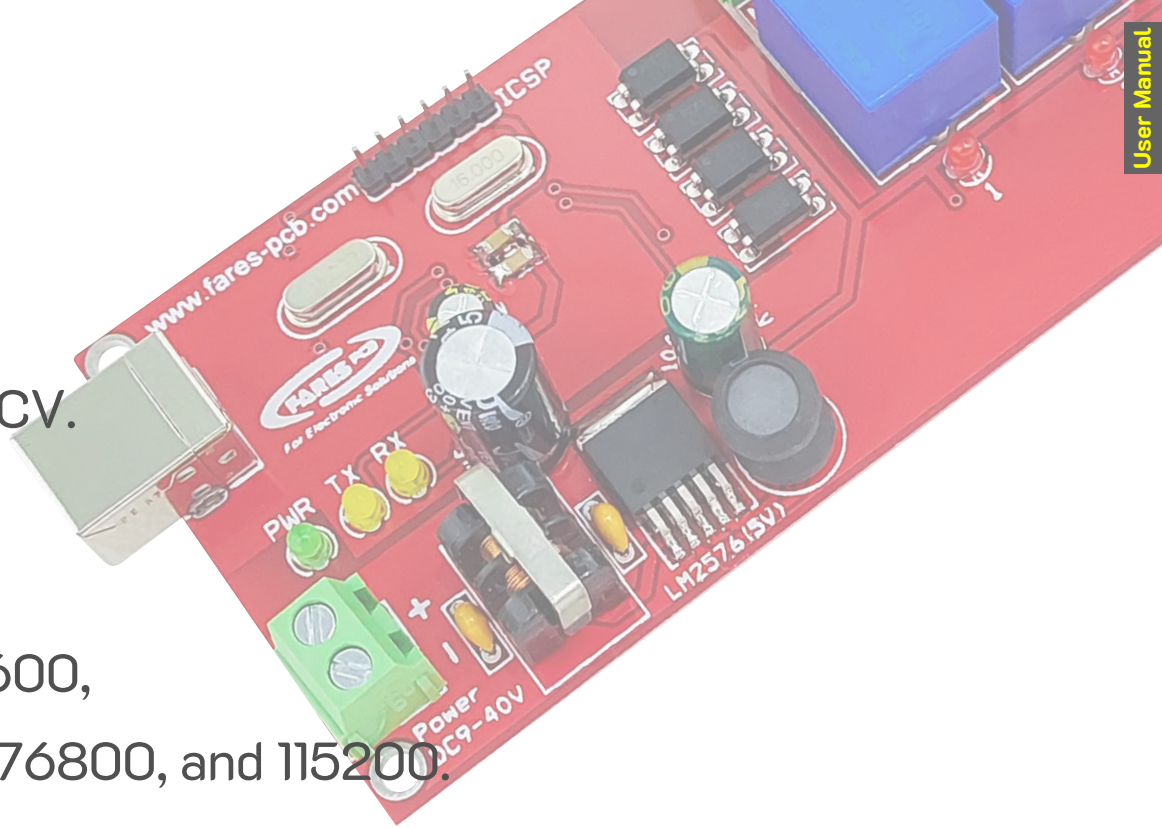


8-Channel USB-Controlled Relay Module

General Description

RM8U is a 8-channel USB-controlled relay module. It can be used to control electrical devices remotely from a PC over a USB port such as lamps, motors, and locks. RM8U features a wide operating voltage range (9-40V) and supports serial communication baud rate speeds starting from 2400 up to 115200 bps. RM8U module is well protected, filtered, and fully isolated.

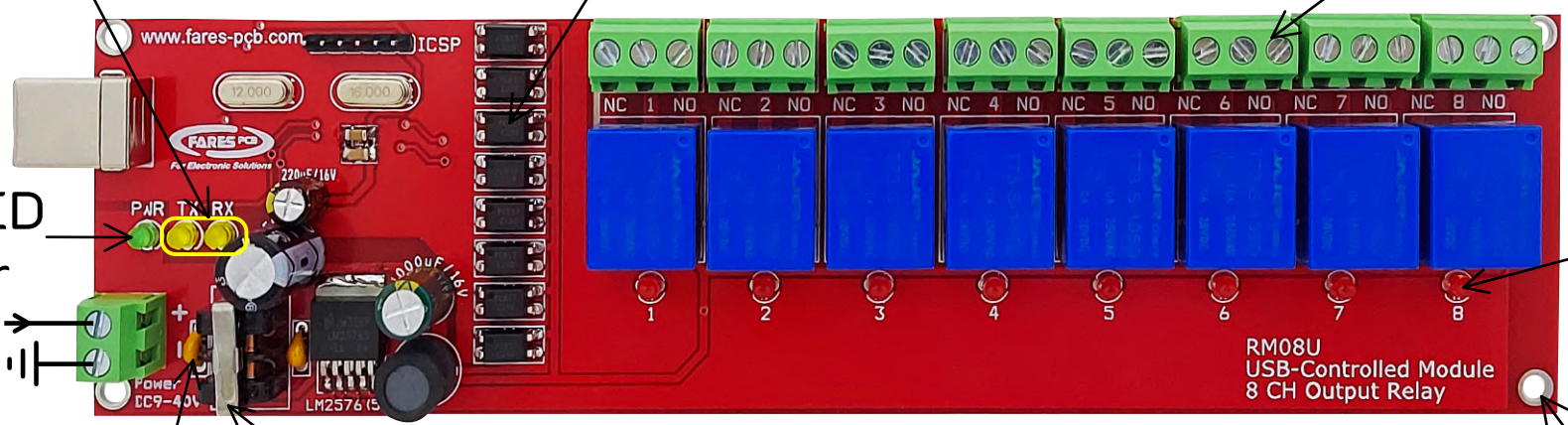
Features



- Supports Windows XP, 7, 10, and 11.
- Supports 8 relay outputs.
- Wide operating voltage range: 9~40 DCV.
- Control: Serial communication.
- Driver: CH340
- Supported baud rates: 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 76800, and 115200.
- Interface: USB type B connector.
- Simple control protocol: Just two-character commands.
- All outputs are optically isolated.
- Both normally open and normally close relay contacts are available.
- Reverse polarity protection.
- On-board DC power filter.

- Power LED indicator.
- Serial communication LED status.
- LED indicator for each relay.
- Mounting: Four (Ø 3.5mm) mounting holes for easy installation.
- Dimensions: 214 X 55 X 21mm.

Board Details



Transmitting/Receiving LED indicators

Opto-isolator

Output terminals

Power LED indicator

Output LED indicator

Input voltage 9-40V

Filter capacitor

Common mode chock inductor

3.5mm mounting hole

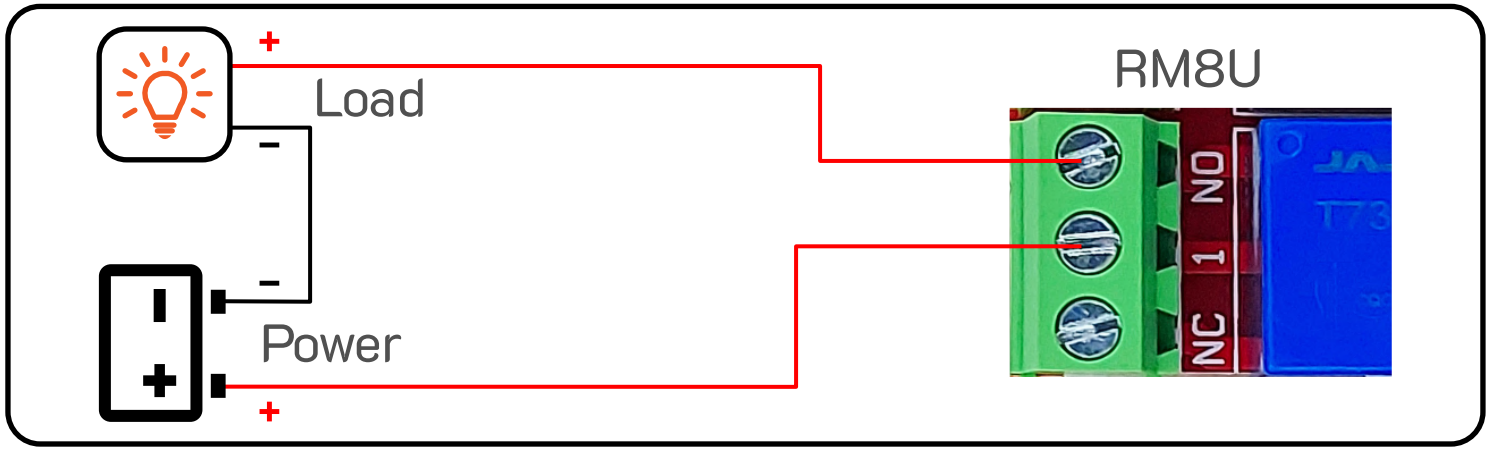
RM8U Powering

Thanks to the on-board switch mode regulator LM2576-5V, RM8U can be powered from a DC voltage source from 9V up to 40V with 1A maximum current. The wide operating voltage feature makes it easy to use in multiple applications. The power input is protected against reverse polarity of voltage and electrostatic discharges USB bridge and control circuit are powered from the USB port. The control circuit is optically isolated from the relay driving circuit for safety.

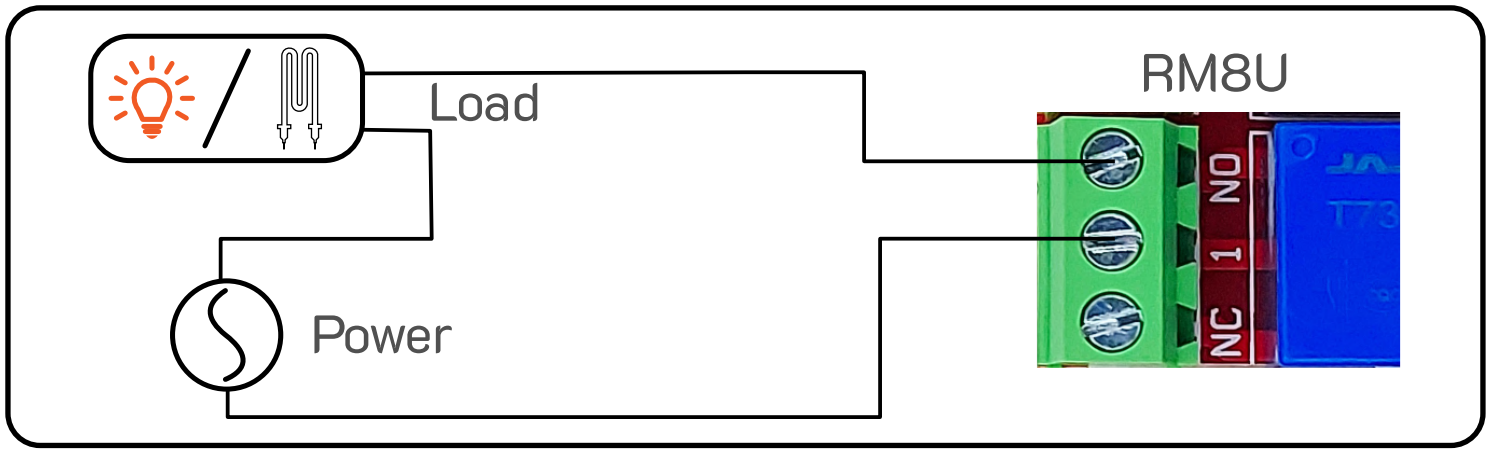
Output relays

Output relays are suitable for both AC and DC switching applications such as lamps, heaters, and AC/DC motors. Relay contacts are rated for a 10A maximum (resistive loads). Each relay has its own LED indicator. Both normally open and normally close terminals are brought out to KF128 screw clamp terminal.

DC non-inductive load connection diagram



AC non-inductive load connection diagram



Inductive loads

It is important to take additional care when using relays to drive inductive loads. An inductive load is simply a coil that works based on magnetic principles like motors, solenoids, and transformers. Inductive loads produce back emf when the magnitude of the load current changes. The back emf can be in the order of tens or even hundreds of voltages. This effect is most severe when power is disconnected from inductive load because the rate of change of current is maximum at that point.

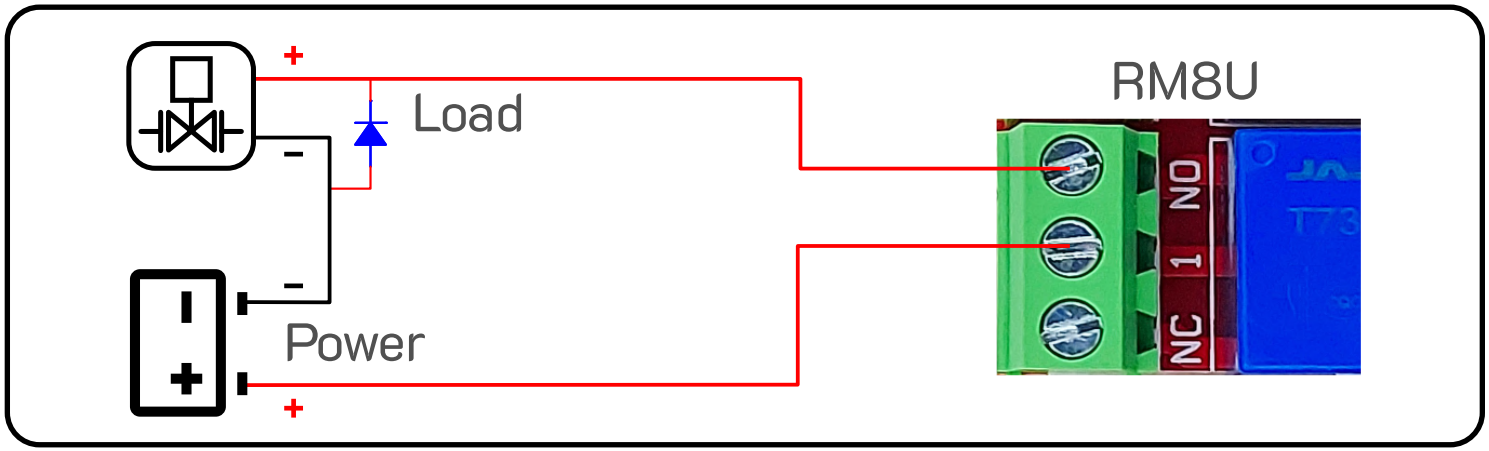
Even though the back emf lives only for a very short time (a few milliseconds) it can cause sparks between the relay contacts and can deteriorate the contact quality over time and reduce the life span.

So, it is important to suppress the back emf to acceptable levels to protect relay contacts. Usually, this requires connecting electronic devices in parallel with the load such that they absorb the high-voltage components generated by the load.

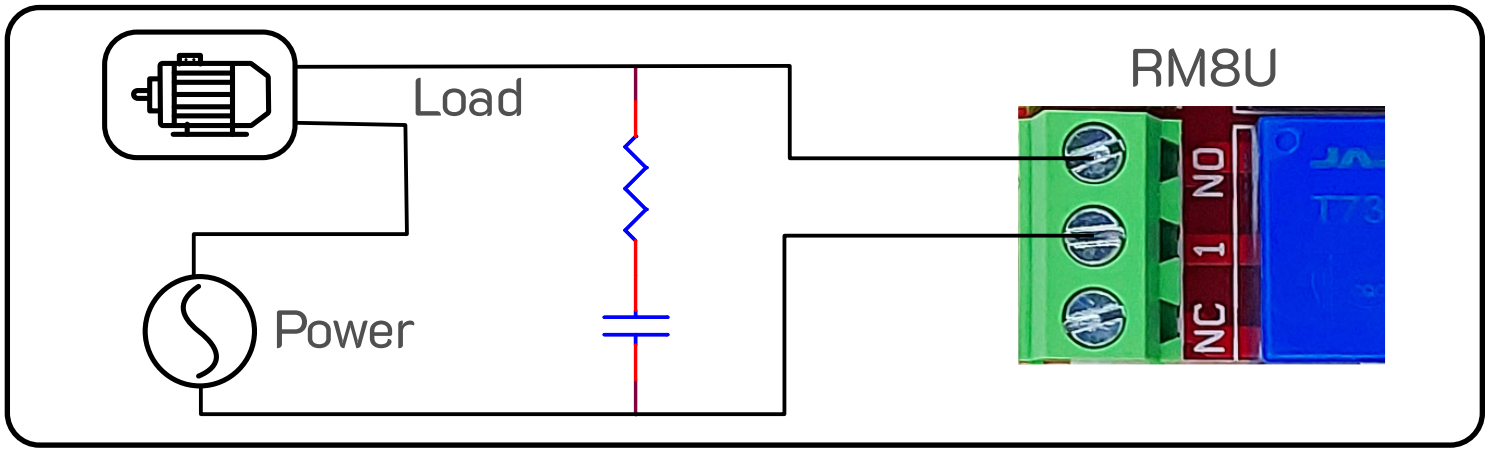
For DC inductive loads such as solenoids and contactors, connecting a diode (fast switching diode is recommended) in parallel to the load (in the reverse direction to the load current) is very effective. A diode used for this purpose is usually called a freewheeling diode.

For AC inductive loads such as motors, connecting a proper capacitor in series with a resistor all in parallel to the relay contact is very effective. This circuit is called a snubber circuit.

DC inductive load connection diagram



AC inductive load connection diagram



Control Commands

One of the most powerful features of this module is the simple easy-to-use command protocol. All instruction commands consist of just two characters. Using any hyperterminal tool, all commands can be applied.

Supported commands can turn ON/OFF output, flip output status, read output status, and read inputs as well as set communication speed to one of ten possible baud rates.

The general format of commands is

(CMD) (CHN)

Where...

CMD is a character that refers to a command code.

CHN is the channel number that the command is applied to. The channel number starts from 1 up to 8. Note that there is no channel number 0, channel number 0 is assigned for applying commands to all channels.

Once RM8U receives two character commands it responds with a character “o” if the command is executed successfully. otherwise, it replies with a character “r”.

Command code characters are listed in the table below

Command Character	Description
N	Turn on output
F	Turn off output
T	Toggle output
R	Read output status
I	Read input
B	Set baud rate

For example

Turn on output 1

To apply a turn-on command on output number 1 just send characters “N1”

“N” is the character code for the turn-on command.

“1” is the output number 1.

Reverse output 8

To apply a toggle command on output number 8 just send characters “T8”

“T” is the character code for the turn-on command.

“8” is the output number 8.

Turn off all outputs

To apply a turn-off command to all outputs just send characters “F0”

“F” is the character code for the turn-off command.

“0” is the apply-to-all channel number.

Baud rate setting

By default, the baud rate is set to 9600 bps. But user can easily change it to another value by the character code “B” followed by a number from 0 to 9 refers to a specific baud rate.

Baud rates vs reference numbers are listed in the table below

Baud rate	Reference Number
2400	0
4800	1
9600	2
14400	3
19200	4
28800	5
38400	6
57600	7
76800	8
115200	9

Baud rate setting to 115200

To change the baud rate to 115200 bps just send characters “B9”

“B” is the character code for the baud rate setting command.

“9” is the reference number for the 115200 bps baud rate.

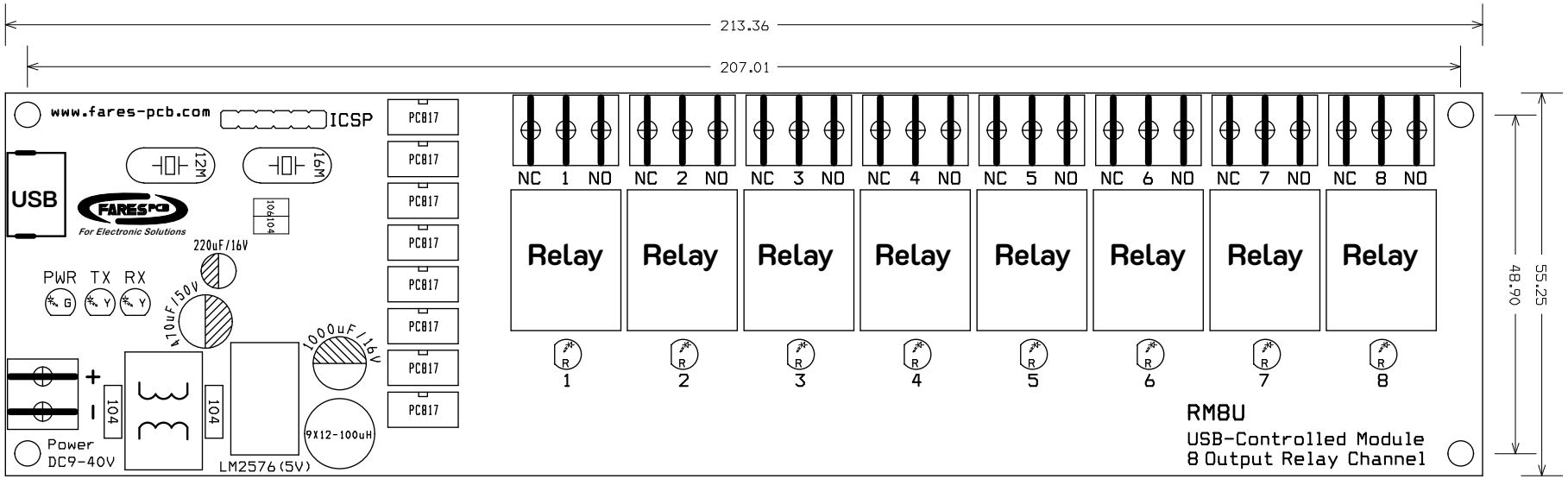
PC Command	Description	RM8U respond
N0	Turn on all relays	“o” ---> All relays are turned on “r” ---> Error
N1	Turn on relay 1	“o” ---> Relay 1 is turned on “r” ---> Error
N2	Turn on relay 2	“o” ---> Relay 2 is turned on “r” ---> Error
N3	Turn on relay 3	“o” ---> Relay 3 is turned on “r” ---> Error
N4	Turn on relay 4	“o” ---> Relay 4 is turned on “r” ---> Error
N5	Turn on relay 5	“o” ---> Relay 5 is turned on “r” ---> Error
N6	Turn on relay 6	“o” ---> Relay 6 is turned on “r” ---> Error
N7	Turn on relay 7	“o” ---> Relay 7 is turned on “r” ---> Error
N8	Turn on relay 8	“o” ---> Relay 8 is turned on “r” ---> Error

F0	Turn off all relays	“o” ---> All relays are turned off “r” ---> Error
F1	Turn off relay 1	“o” ---> Relay 1 is turned off “r” ---> Error
F2	Turn off relay 2	“o” ---> Relay 2 is turned off “r” ---> Error
F3	Turn off relay 3	“o” ---> Relay 3 is turned off “r” ---> Error
F4	Turn off relay 4	“o” ---> Relay 4 is turned off “r” ---> Error
F5	Turn off relay 5	“o” ---> Relay 5 is turned off “r” ---> Error
F6	Turn off relay 6	“o” ---> Relay 6 is turned off “r” ---> Error
F7	Turn off relay 7	“o” ---> Relay 7 is turned off “r” ---> Error
F8	Turn off relay 8	“o” ---> Relay 8 is turned off “r” ---> Error

T0	Toggle all relays	“o” ---> All relays are Toggled “r” ---> Error
T1	Toggle relay 1	“o” ---> Relay 1 is Toggled “r” ---> Error
T2	Toggle relay 2	“o” ---> Relay 2 is Toggled “r” ---> Error
T3	Toggle relay 3	“o” ---> Relay 3 is Toggled “r” ---> Error
T4	Toggle relay 4	“o” ---> Relay 4 is Toggled “r” ---> Error
T5	Toggle relay 5	“o” ---> Relay 5 is Toggled “r” ---> Error
T6	Toggle relay 6	“o” ---> Relay 6 is Toggled “r” ---> Error
T7	Toggle relay 7	“o” ---> Relay 7 is Toggled “r” ---> Error
T8	Toggle relay 8	“o” ---> Relay 8 is Toggled “r” ---> Error

R0	Read all relay states	“$x_1x_2x_3x_4x_5x_6x_7x_8$” Where x is the relay state x=”n” if relay state is ON x=”f” if relay state is OFF
R1	Read relay 1 state	“n” ---> Relay 1 state is ON “f” ---> Relay 1 state is OFF “r” ---> Error
R2	Read relay 2 state	“n” ---> Relay 2 state is ON “f” ---> Relay 2 state is OFF “r” ---> Error
R3	Read relay 3 state	“n” ---> Relay 3 state is ON “f” ---> Relay 3 state is OFF “r” ---> Error
R4	Read relay 4 state	“n” ---> Relay 4 state is ON “f” ---> Relay 4 state is OFF “r” ---> Error
R5	Read relay 5 state	“n” ---> Relay 5 state is ON “f” ---> Relay 5 state is OFF “r” ---> Error
R6	Read relay 6 state	“n” ---> Relay 6 state is ON “f” ---> Relay 6 state is OFF “r” ---> Error
R7	Read relay 7 state	“n” ---> Relay 7 state is ON “f” ---> Relay 7 state is OFF “r” ---> Error
R8	Read relay 8 state	“n” ---> Relay 8 state is ON “f” ---> Relay 8 state is OFF “r” ---> Error

Mechanical Dimensions Diagram



All dimensions are in mm

For our full range of products, see our website at **http://www.fares-pcb.com**
If you have any technical questions about our products,
e-mail us at **www.support@fares-pcb.com**

FARES PCB co. (Head office)
32 El-Falaky st, Bab El-Louq, Tahrir, Cairo, Egypt.
Tel: +202-27901841
Mob: +201022457902

FARES PCB Co reserves the right to make changes in circuit design, software and/or specifications at any time without prior notice. For the latest updated information, please visit our website at http://www.fares-pcb.com.

Information furnished by is believed to be accurate and reliable. However, **FARES PCB** assumes no responsibility arising from the use of the specifications described.