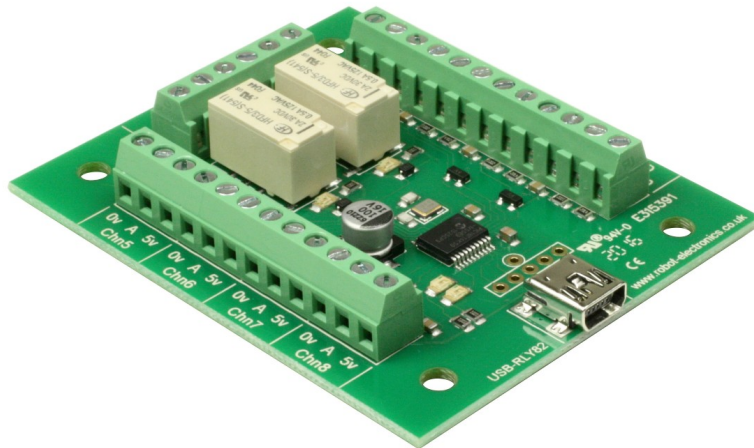


# USB-RLY82 - 2 relay outputs and 8 analogue or digital inputs

## Technical Documentation



### Overview

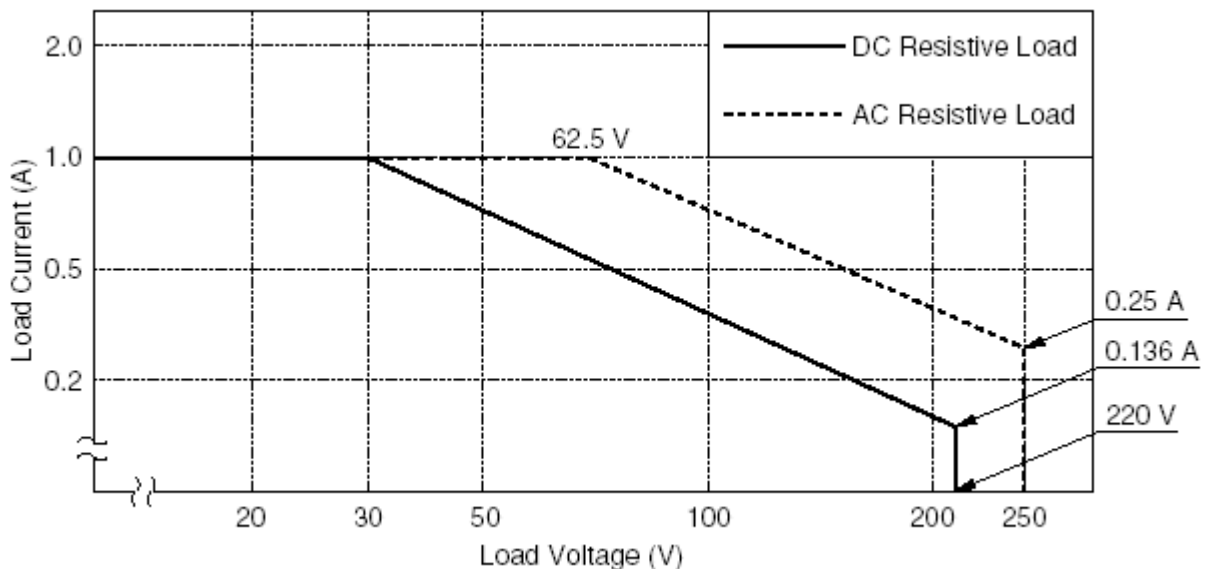
The USB-RLY82 provides two volt free contact relay outputs with a current rating of up to 1Amp each. It is powered from any standard USB bus and has an exceptionally low maximum current consumption of approx. 90mA with all relays on. The relays are SPCO (Single Pole Change Over) types. The normally open, normally closed and common pins are all available on the screw terminals. Eight inputs can either be used for analogue or digital requirements, the 10bit ADC (0-1023 result) can be configured to scale to the 5V USB supply, 4.096V or 2.048V references.

### LED indication

The USB-RLY82 provides a red LED mounted immediately next to each relay to indicate whether it is in a powered state (LED on). There are also two LED's next to the USB connector, the first is red to indicate the module is powered (USB supplied) and there is also a green LED to indicate reception of data from the USB.

### Relay power rating

If the contact load voltage and current of the relay are in the region enclosed by the solid and dotted lines in the figure below, the relay can perform stable switching operation. If the relay is used at a voltage or current exceeding this region, the life of the contacts may be significantly shortened.



## Connections

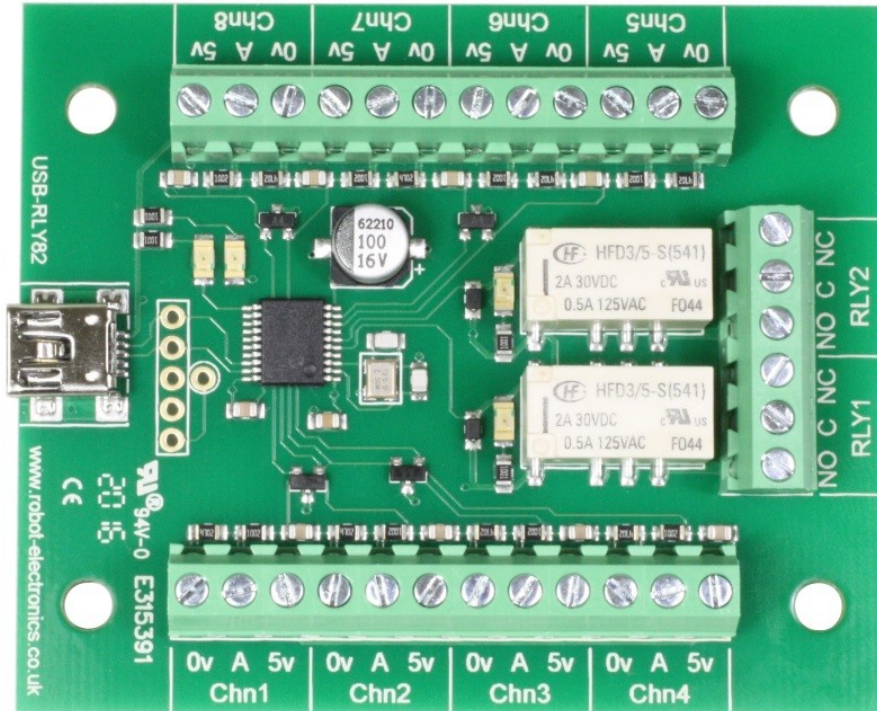
### Analogue/digital inputs 5-8

0V – ground

A – Analogue/digital input (5V max)

5V – power output at 5V

USB mini A/B



**Relays 1 and 2**  
NC – Normally connected  
C – Common  
NO – Normally open

### Analogue/digital inputs 1-4

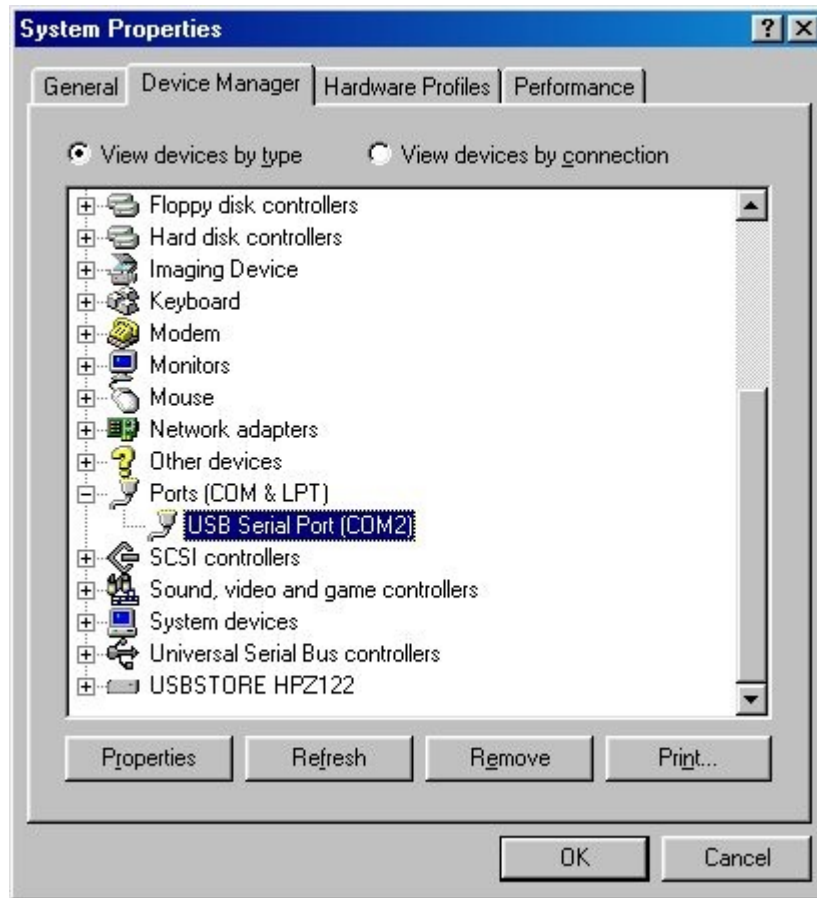
0V – ground

A – Analogue/digital input (5V max)

5V – power output at 5V

## Which COM port?

After installing the drivers, and plugging in the USB-RLY82 module to a spare USB port, you will want to know which COM port it has been assigned to. This will vary from system to system depending on how many COM ports you currently have installed. To find out where it is, right click on your "My Computer" desktop icon and select the "Device Manager" tab. Now scroll down and open the "Ports (COM & LPT)" tab. You should see the USB serial port listed - COM2 in the example below. If you want to change the COM port number - just right click on it, select properties, select advanced and select the COM port number from the available list. The COM port default will probably be set up for 9600 baud, 8 data bits, no parity and one stop bits, but what ever it is just ignore it. These settings are not actually used because we have a full 12Mbits USB connection right into the heart of the processor.



## Commands

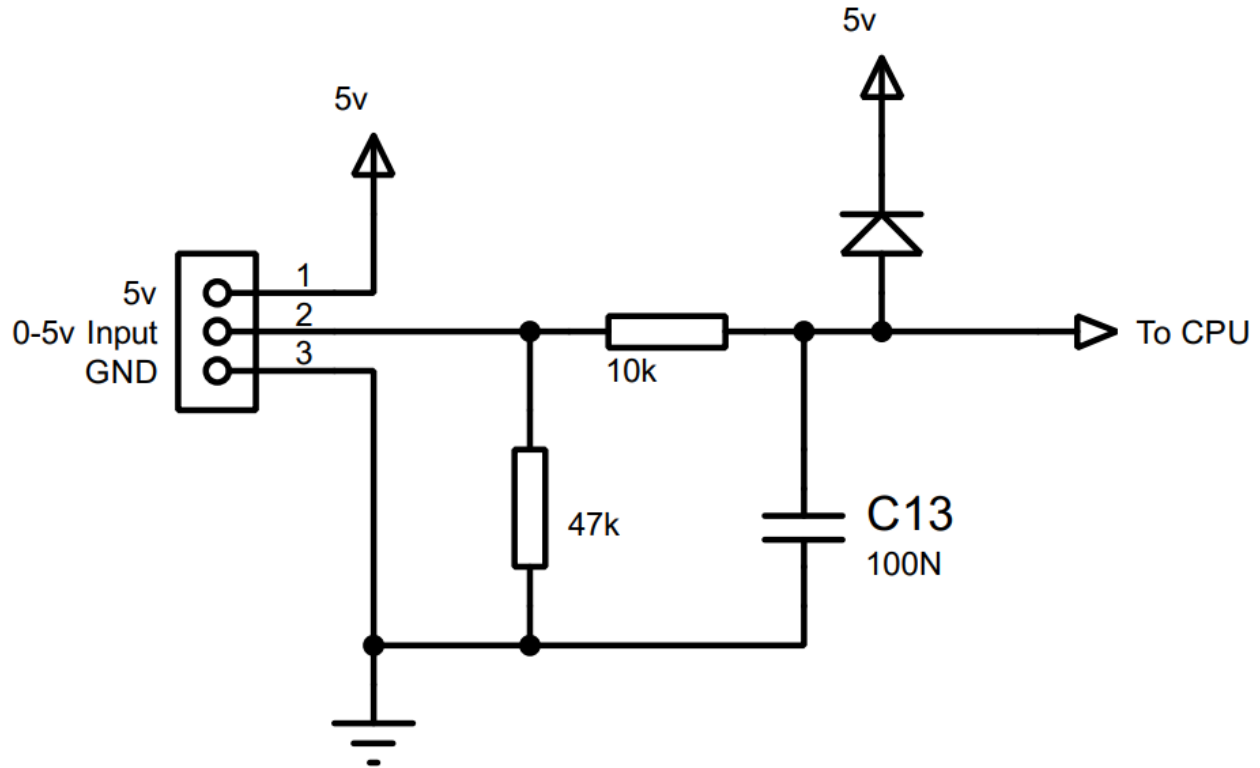
The USB-RLY82 operates with an easy to use command set as described in the table below.

Command		Action
dec	hex	
56	38	Get serial number - returns 8 bytes of ASCII that form the unique serial number for module, I.E "00001543"
90	5A	Get software version - returns 2 bytes, the first being the Module ID which is 33, followed by the software version
91	5B	Get relay states - sends a single byte back to the controller, bit high meaning the corresponding relay is powered
92	5C	Set relay states - the next single byte will set all relays states, All on = 2 lowest bits set in byte (xxxxxx11) All off = 0
94	5E	Get digital inputs - returns a single byte reflecting all eight inputs as digital state, All on = 255 (11111111) All off = 0
100	64	All relays on
101	65	Turn relay 1 on
102	66	Turn relay 2 on
110	6E	All relays off
111	6F	Turn relay 1 off
112	70	Turn relay 2 off
128	80	Get ADC results - returns 16 bytes to reflect 8 channels of analogue voltages, these are 2 byte integers (high byte first) for each channel
129	81	Set ADC references - Follow with a channel byte (1-8 or 0 to set all channels) and then a selection byte (setting all channels requires only 1 byte), 0 for USB supply, 1 for 4.096V or 2 for 2.048V
130	82	Get ADC references - returns 8 bytes that reflect the ADC scale selection for each channel, 0 for USB supply, 1 for 4.096V or 2 for 2.048V

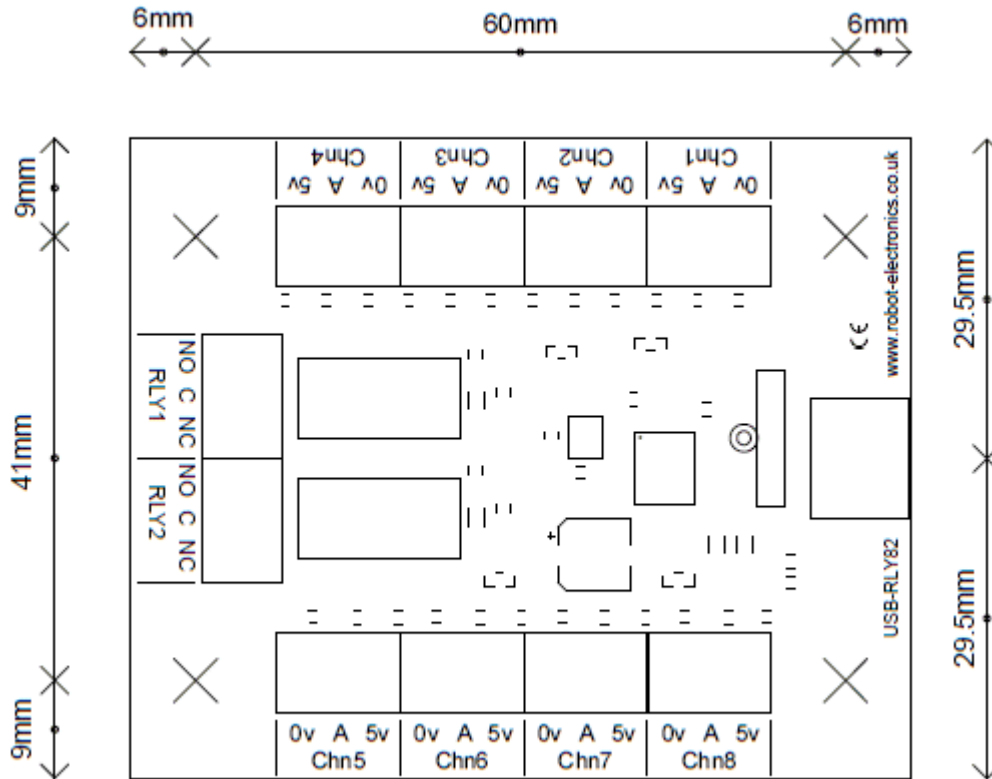
## ADC (Analogue to digital converter) additional information

An analogue to digital converter gives us a digital conversion of an analogue input, if maximum input was 1V and the scale was set to the USB supply then our ADC would only ever reach 20% of its scale = 204  $((1023 / 5) \times 1)$ . To improve the output we can set the reference to 2.048V, now our 1V will reach approx. 500 and give us around 2.5 times the resolution. Each channel can be independently configured to fit a mixed set of requirements.

The input circuit is shown below:

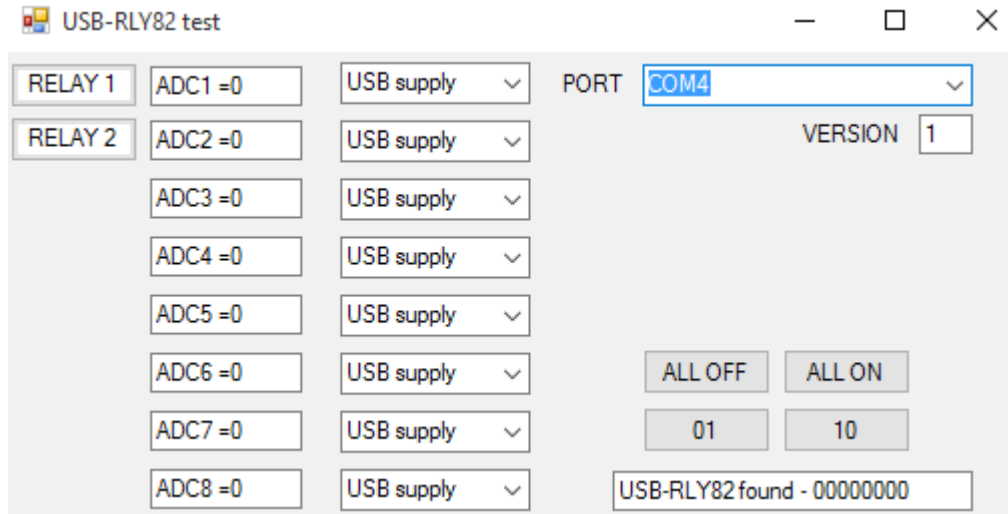


## Board dimensions



## Test program and example source code

To get the USB-RLY82 up and running in the minimum amount of time we have put together an example program to demonstrate the functionality of the module.



Visual studio express C# examples

The test program is available as Visual C# express ready built installation files [here](#), or as Visual C# express project with source files [here](#).

Visual studio express is provided free from Microsoft: <http://www.microsoft.com/exPress/download/>