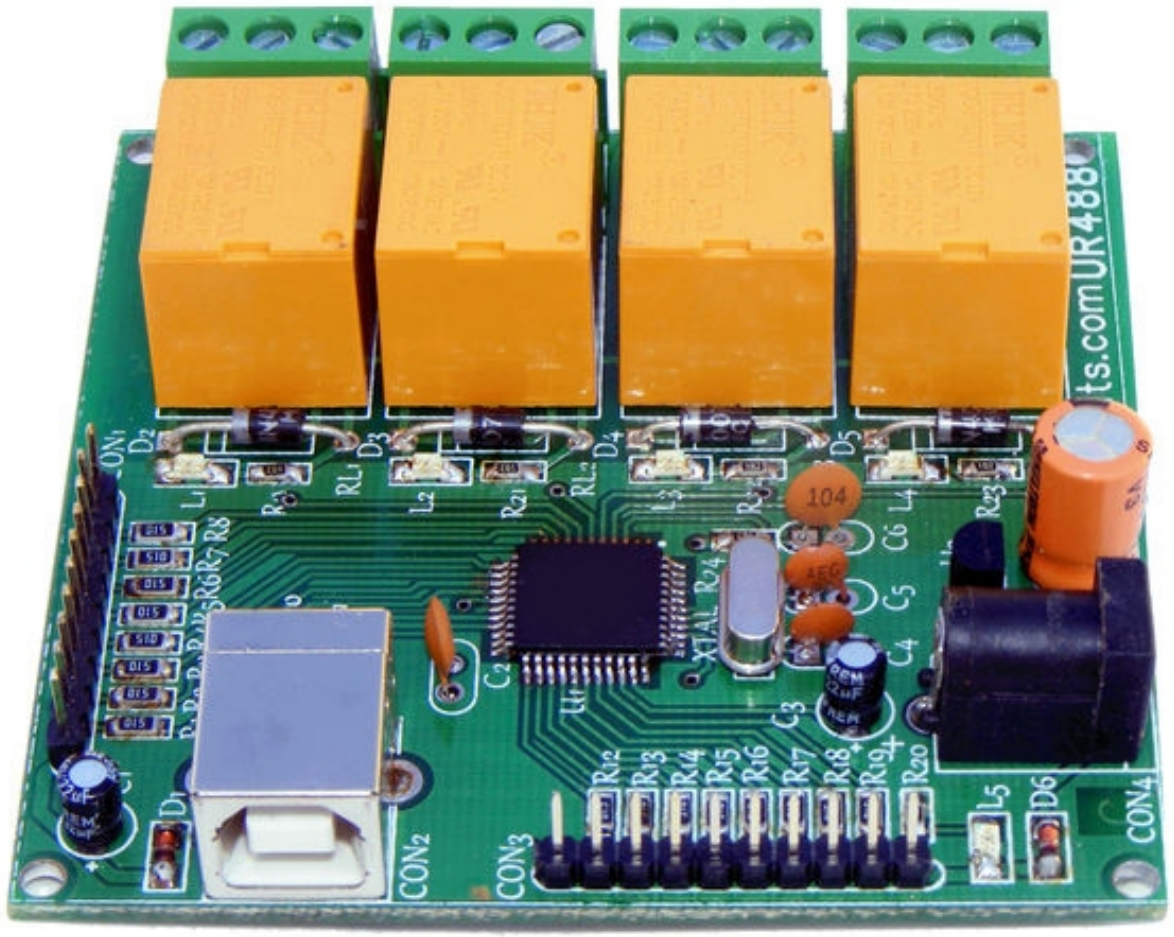
User Manual



4 channel USB Relay Board with 16 Digital/Analog I/O USB Data Acquisition Card

Welcome to the world of Computer Automation. This USB Relay Board - U452 is a perfect companion for all your computer automation projects. It is USB based card having 4 onboard relays for switching external devices and up to 16 digital & analogue I/Os that will help you to monitor various real world scenarios using switches & different kind of sensors to monitor many parameters like Temperature, Pressure, Light, Touch, PH etc. This card is not only good for controlling Relays but a perfect example for Data Acquisition applications.

It appears as a USB CDC (Communications Device Class) device when connected to USB port of a computer. This creates a Virtual Serial (Com) Port, which allows easy communication with the card. Any programming language that supports serial communications (C, C#, C++, VB, VB.NET, Perl, Java etc) can be used to communicate with U452 very easily. Easy to use commands are available to communicate with UR488 which handle various tasks like Switching On/Off of Relays, Controlling Digital Inputs & Outputs, Getting analog data etc.

The controller provides 4 relay outputs to control various electrical devices. Apart from this, the card has up to 16 digital input & output pins. It has also got 8 Analog input pins. All pins can be individually configured as Digital Input or Digital output on the fly. All analog pins can be individually configured as digital I/Os also while taking care of input conditions.

Each Digital pin can support a TTL or Schmitt Trigger Input or a 5V output. Each Analog pin will convert analog voltage (Between 0 to 5V) or Higher (through voltage divider) into 8, 10 or 12 bit resolution raw data. This can be converted into required form using conversion formulas.

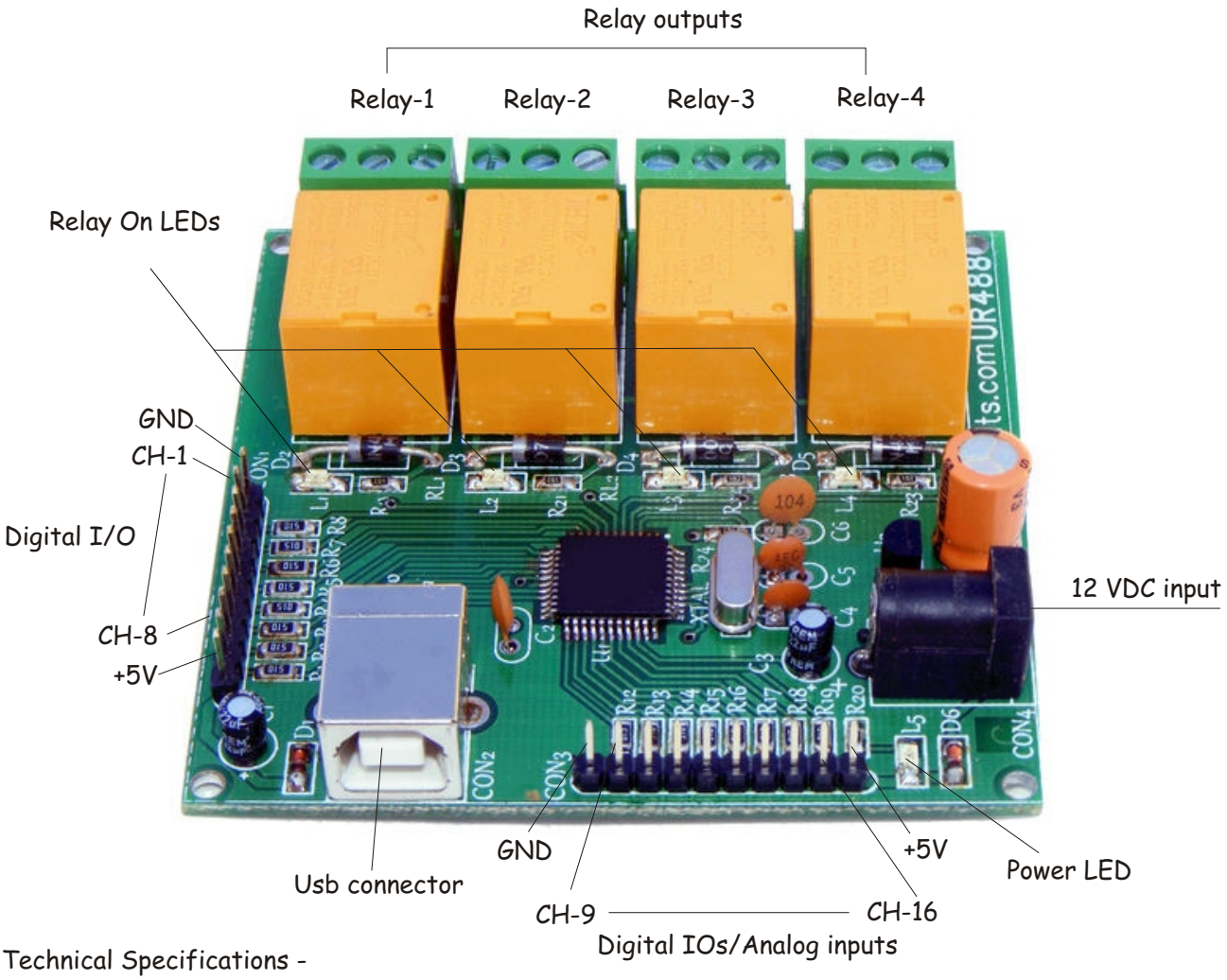
Any kind of sensor wether it is providing digital output or analogue output can be interfaced with U452 and monitored with the help of computer.

Get windows drivers, test applications and sample codes at -

http://iknowvations.in

Manufactured by -

Iknowvations
Rajivnagar,Vidyanagar
Hubli - 580021
India.



Technical Specifications -

No. Of Relays	-	4
Relay Specifications	-	Coil voltage 12V DC, Contact ratings- 5Amp Max.
Digital Inputs/outputs	-	Up to 16.
Analog Inputs	-	Up to 8.
Supply voltage	-	12 V DC (only if you want to operate relay)
ADC Resolution	-	8, 10 and 12 bit -User selectable

Please Read Carefully

This device U452 connects to Usb port of your computer and can be used to control external devices through its relays. Incorrect use or faulty board can cause damage to controller itself or Usb controller of your computer or Motherboard of your computer. **Extreme care should be taken while using this board. It will be totally user's responsibility for the use of this card.**

Iknowvations, it's employees, suppliers, distributors, dealers and/or resellers are not liable to any kind of damage or loss of data as a result of use of this device, including special, incidental, or consequential damages resulting from the use of this device or under any legal theory, including loss of profits, downtime, goodwill damage to, or replacement of equipment or property and any cost for recovering or reproducing any data stored in computers connected with this device.

Your purchase and/or use of this board indicates your acceptance of these terms.

Command Reference -

1. For Digital Outputs - SO01 - Set Output of Channel 1 to 1.
SO02 - Set Output of Channel 2 to 1.
There are up to 16 digital Output channels on this card so it will be up to SO16.

RO01 - Reset Output of Channel 1 to 0.
RO02 - Reset Output of Channel 2 to 0.
There are up to 16 digital Output channels on this card so it will be up to RO16.

2. For Digital Inputs - GI01 - Get Input value of Channel 01.
GI02 - Get Input value of Channel 02.
There are up to 16 digital Inputs channels on this card so it will be up to GI16.

3. For Analog Inputs - GA01 - Get ADC value of Channel 1.
GA02 - Get ADC value of Channel 2.
There are up to 8 Analog channels on this card so it will be up to GA08. The resolution is of 8,10 & 12 bits so the input voltage (0-5V Dc) will be converted to 0 to 256 or 0 to 1023 or 0 to 4096 Decimal value respectively.

4. For Relay Outputs - RL10 - Make Relay 1 Off.
RL11 - Make Relay 1 On.
There are 4 Relays on this card so it will be up to RL40 & RL41. There are 2 additional commands for relays -

RLA0 - Make All Relays Off.
RLA1 - Make All Relays On.

5. Setting ADC Resolution -

AR08 - Set ADC Resolution to 8 bits.
AR10 - Set ADC Resolution to 10 bits.
AR12 - Set ADC Resolution to 12 bits.

6. Miscellaneous Commands -

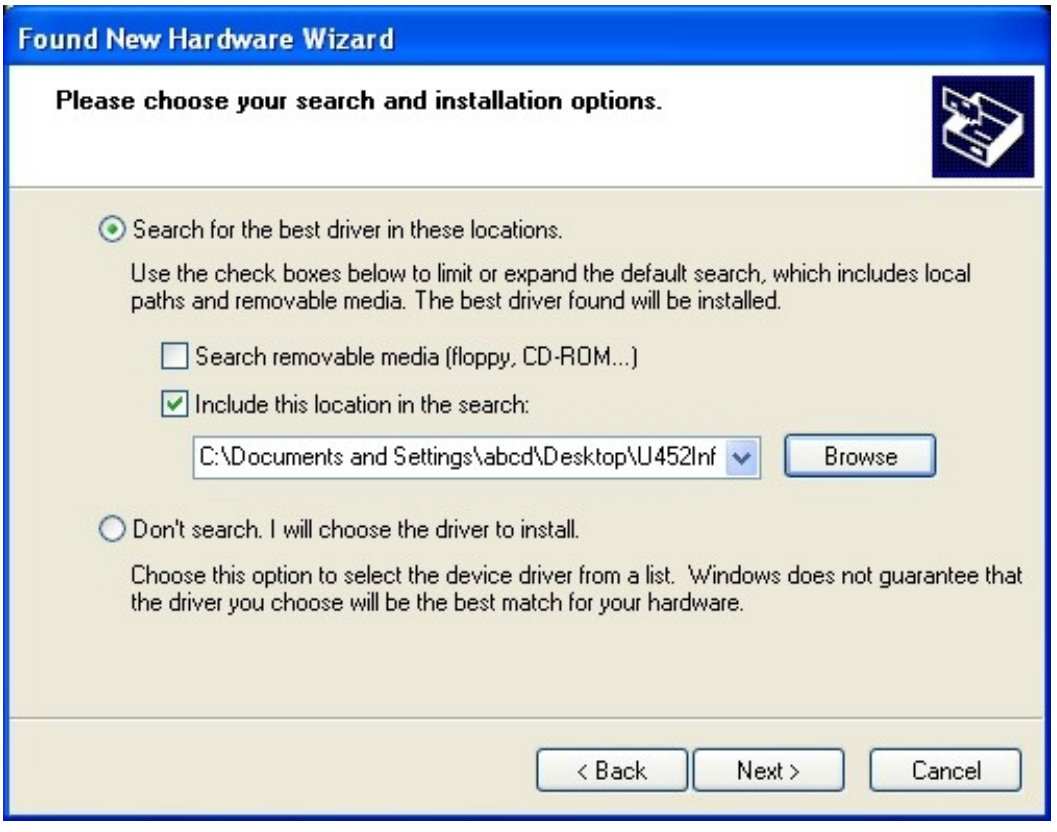
BORD - Issuing this command will return the card Number.
VERS - Issuing this command will return the Firmware Version Number.

Channel 1 - CH1 - Input / Output
Channel 2 - Ch2 - Input / Output
Channel 3 - CH3 - Input / Output
Channel 4 - CH4 - Input / Output
Channel 5 - CH5 - Input / Output
Channel 6 - Ch6 - Input / Output
Channel 7 - Ch7 - Input / Output
Channel 8 - Ch8 - Input / Output
Channel 9 - CH9 - Input / Output / ADC 1
Channel 10 - Ch10 - Input / Output / ADC2
Channel 11 - CH11 - Input / Output / ADC3
Channel 12 - Ch12 - Input / Output / ADC4
Channel 13 - CH13 - Input / Output / ADC5
Channel 14 - Ch14 - Input / Output / ADC6
Channel 15 - CH15 - Input / Output / ADC7
Channel 16 - Ch16 - Input / Output / ADC8

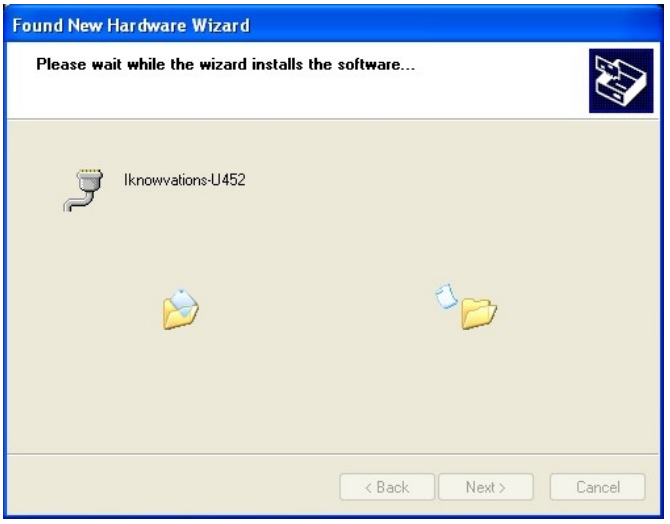
Windows Driver Installations -

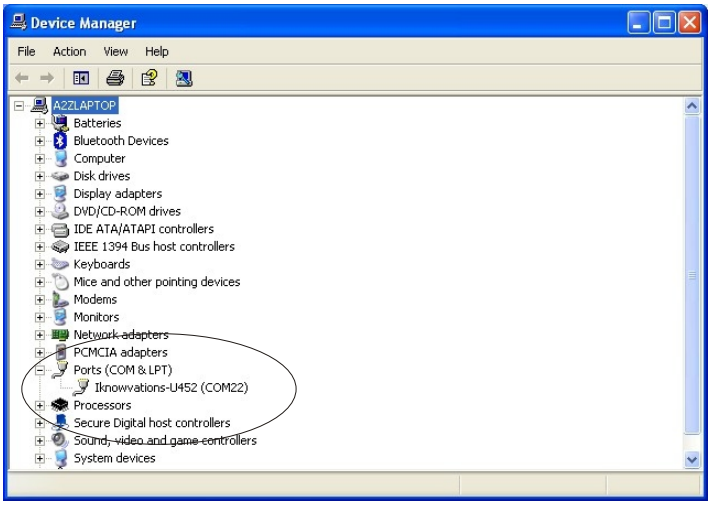
Connect the U452 through USB cable to your computer. If it is for the first time the following window should appear if the device driver is not previously installed. Download driver u452.inf from www.iknowvations.in

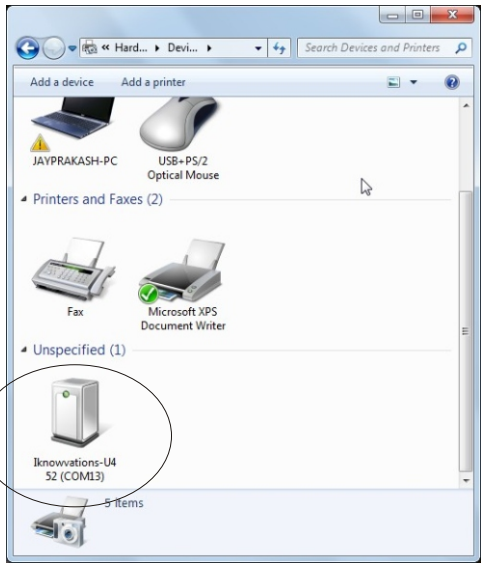
Select " No, not this time" and click "Next". The next window should appear. Select the option, Install from list or specific location (Advanced) and click "Next". The following window should appear.

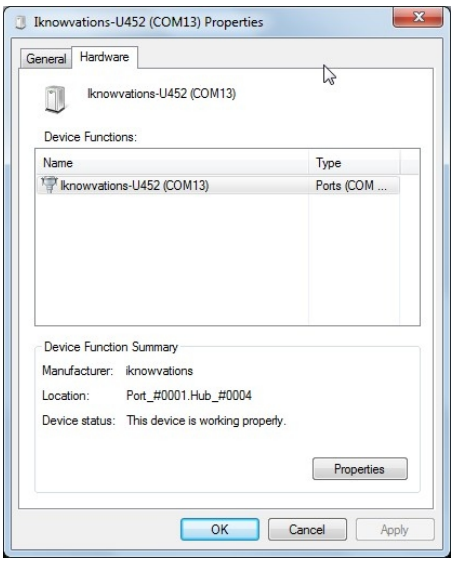


Click "Browse" and then select the location where driver is saved. Click "Next". You may receive a message indicating that the driver has not passed Windows Logo testing. If so, click " Continue Anyway" to continue installation.









After finishing installation you can check the device connection and listing by inspecting Device manager view of Control Panel of your computer as shown in the screen shots.
This will also provide you the com port number assigned to the card by your computer. This number will be used to communicate with the card at latter stage.

If card is not connected or powered up you will get following message -

If the card is connected, you will have following screen.

You are ready to play with U452. The software allows you to turn relays off & on, get input values of pins, set output value of pins, read analog channel values and set ADC resolution of 8, 10 or 12 bits as per your requirement.

Choose the comport after you confirm the number to which you have connected the card. To know the comport number, check Device manager in System in Control Panel of your computer.

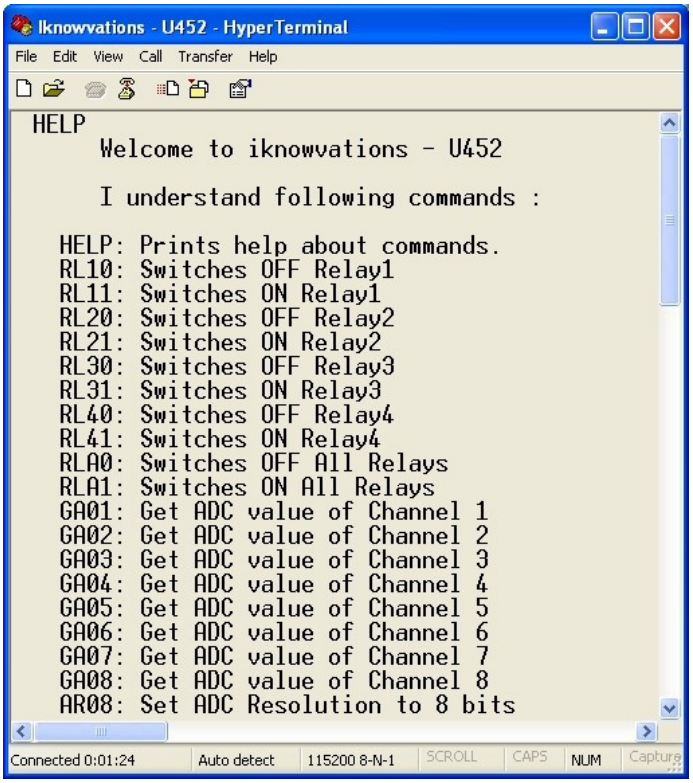
Please note that all the input channels have weak pull up enabled all the time and after first time connection of card the channel setting will be FF that is all channels will be outputs. All the output pins will be 0 that is will be low at this time.

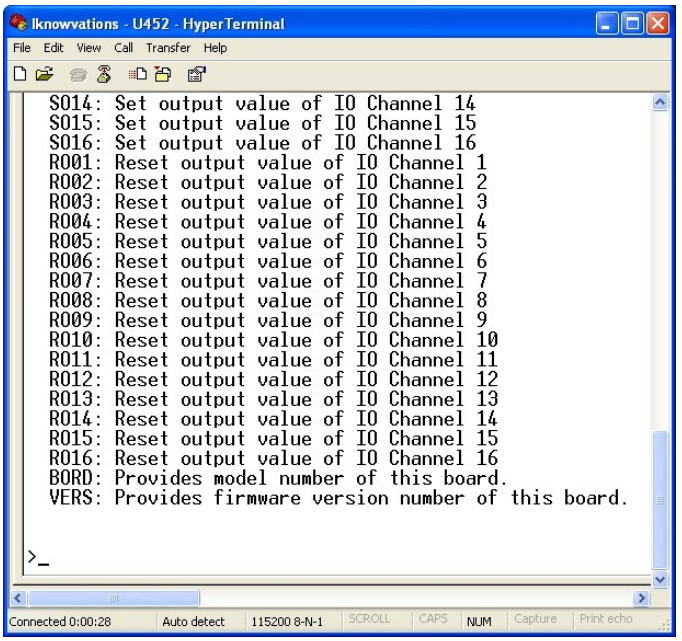
You can connect the card with your computer using USB cable. You have also to apply power 12 V DC to Barrel connector (center +ve) if you want to operate Relay also.
You can communicate with the card through Hyper Terminal Software which generally every computer has pre installed or you can use iKantrol-111 - a special software made by Iknowvations (you can download it free from our website iknowvations.in) or you can develop your own software also.

Now let us see how we can communicate with U452 with the help of iKantrol-111.
Connect U452 card with USB cable & power it.
Start iKantrol-111.
You will get following screen on your computer.

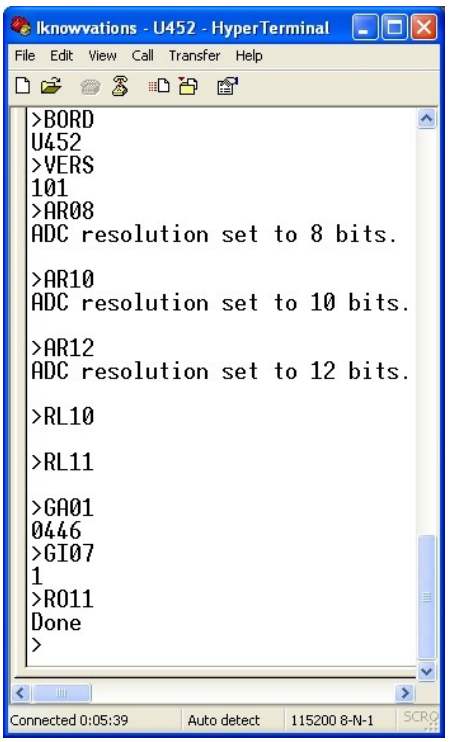
Select the com port to which you have connected the card U452 from available com port list. Press connect button. If the card is connected you will get next screen with all the buttons enabled in blue panel.

Type HELP and press Enter. This is the way to enter any command. Please note that all the commands are entered in CAPs followed by Enter button. HELP command shows all the available commands along with their short description.



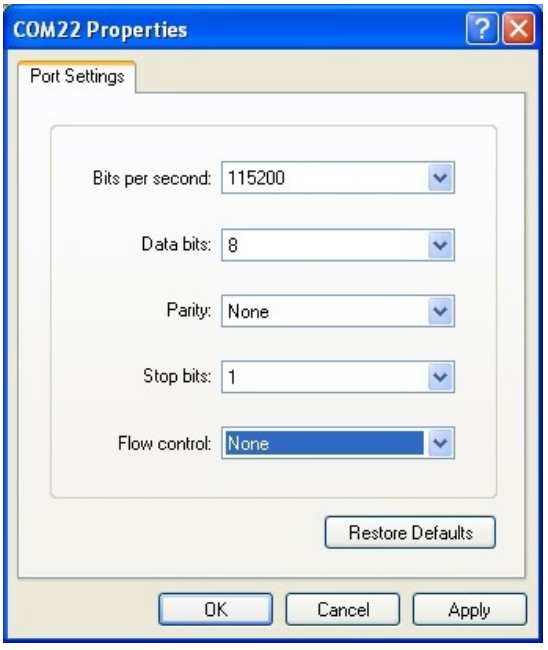


You can experiment with the card by using different commands.



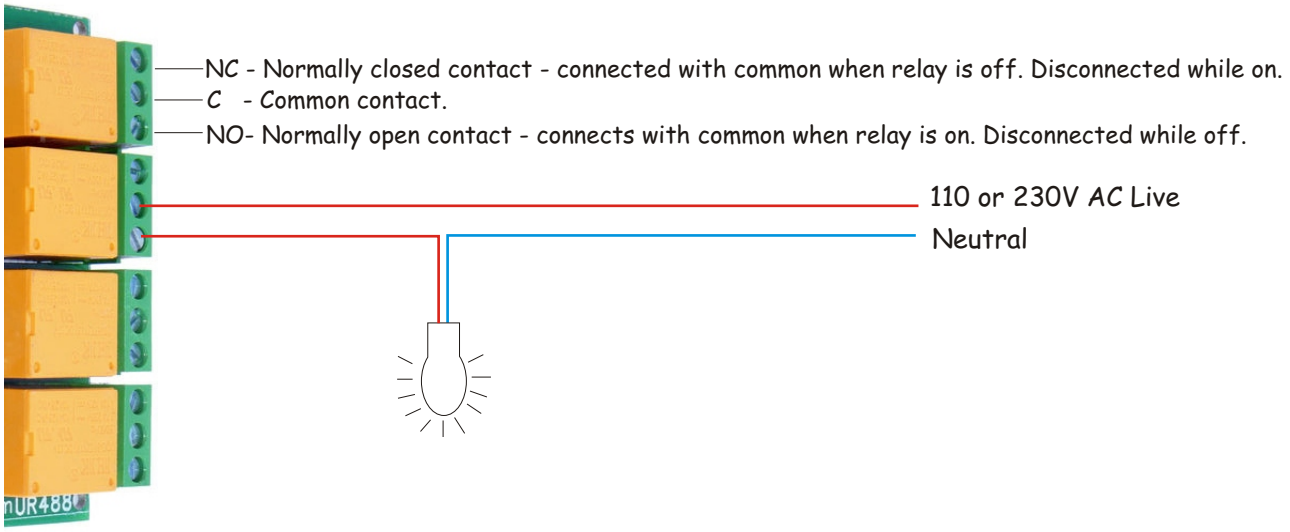
Following is a sample screen, once you are connected with the card and start exploring it.

If you want to communicate with the card via HyperTerminal then start the HyperTerminal & set the com values as per following screen shot.



Using Relay Outputs -

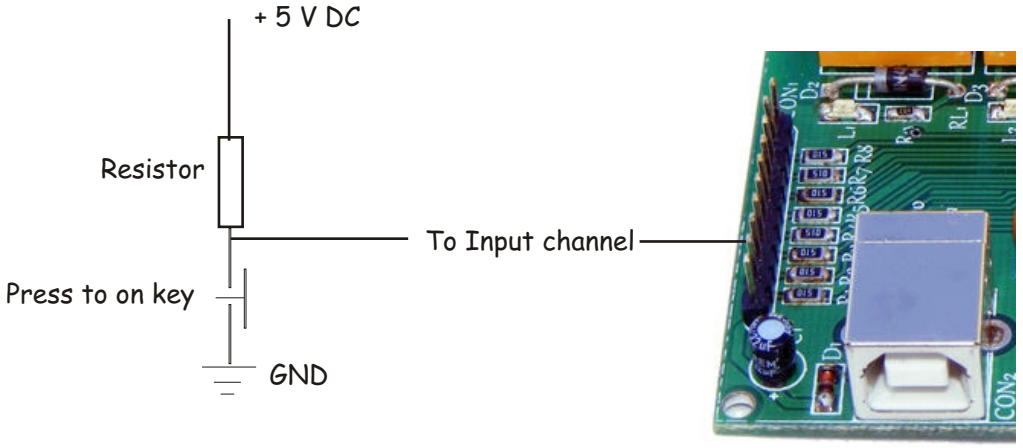
Relay outputs can be used to operate various electrical devices under software control. Extreme care should be taken if you are using 110 or 230 V AC. Iknowvations will not be responsible for any kind of damage or loss whatsoever to life or property. It will be totally user's responsibility.



Use of RC Snubber Circuit across relay contacts is recommended to avoid electrical interference.

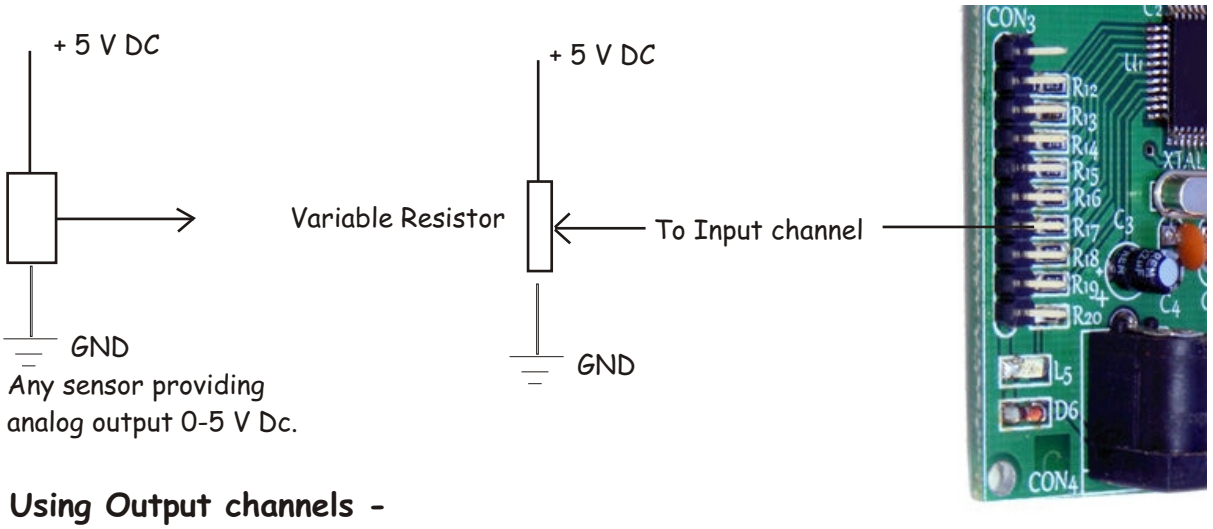
Using Input channels -

Input channels can be used to monitor input conditions of any signal that toggles between 0 and 1, that is between High & Low. Following is one of the ways to monitor input value - Key inputs.



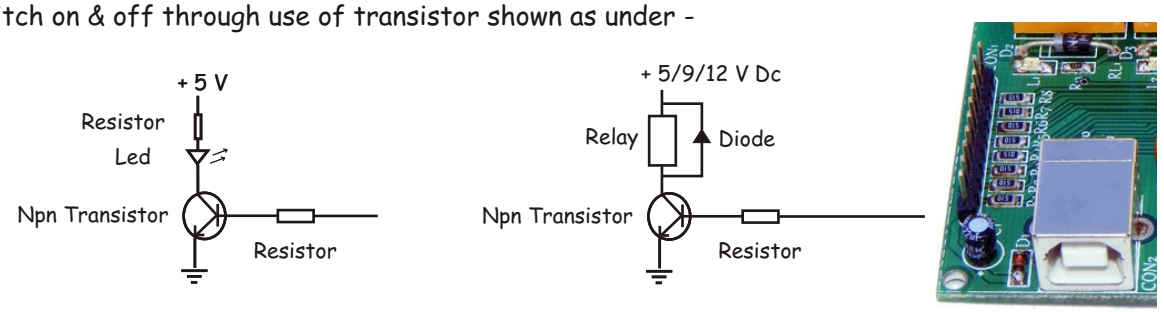
Using ADC channels -

ADC channels can be used to monitor input voltages of any signal that varries between 0 and 5V Dc. Following is one of the ways to monitor ADC input value.



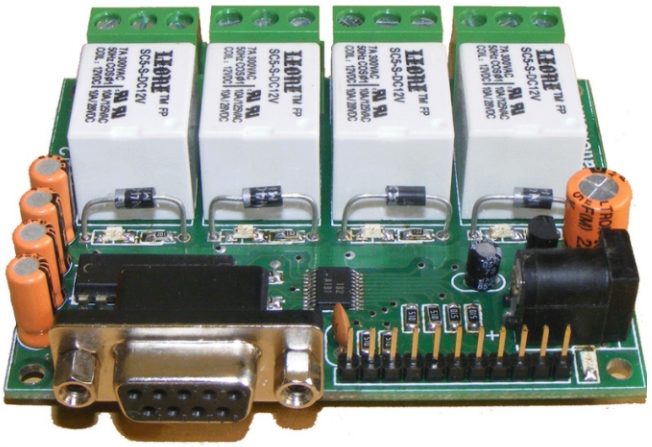
Using Output channels -

Output channels can be toggled between 1 & 0, that is bet High & Low. This signal can be used to switch on & off through use of transistor shown as under -



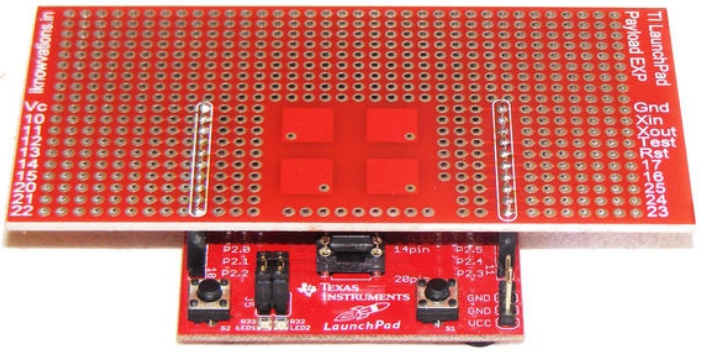
If you have any questions, want any assistance, want us to develop any special products for you just contact us at support@iknowvations.in.

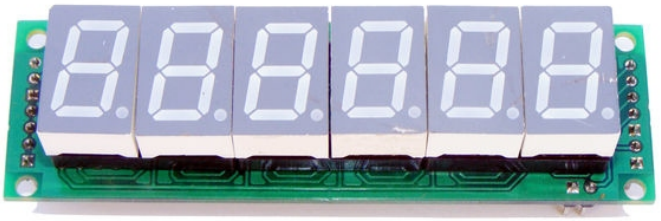
We have other products also that might interest you like -



Just like U452, R242 is an RS232 based Relay Card having up to 9 I/O channels & 4 ADC channels. The ADC resolution is 10 bits.

Experimental Board for TI LaunchPad.





6 digit 7 segment Multipurpose LED Counter

For more information visit - www.iknowvations.in

For experiments & other technical knowledge do read our blog at www.iknowvations.in/blog/

Please Read Carefully

Information in this document is provided solely in connection with Iknowvations products. Iknowvations reserrve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at anytime, without notice.

All Iknowvations products are sold pursuant to Iknowvations terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the Iknowvations products and services described herein, and Iknowvations assumes no liability whatsoever relating to the choice, selection or use of the Iknowvations products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by Iknowvations for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN IKNOWVATIONS'S TERMS AND CONDITIONS OF SALE IKNOWVATIONS DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF IKNOWVATIONS PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING IKNOWVATIONS PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE.

Resale of IKNOWVATIONS products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by Iknowvations for the Iknowvations product or service described herein and shall not create or extend in any manner whatsoever, any liability of Iknowvations.

Information in this document supersedes and replaces all information previously supplied.

The Iknowvations logo is property of Iknowvations.in. All other names are the property of their respective owners.

www.iknowvations.in