

U96 - User Manual





4 channel USB Relay Board with 36 Digital/Analog I /Os USB Data Acquisition Board

Welcome to the world of Computer Automation. This USB Relay Board - U96 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 36 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 U96 very easily. Easy to use commands are available to communicate with U96 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 36 digital input & output pins. It has also got 15 Analog input pins. All pins will be individually configured as Digital Input or Digital output or Analog input automatically as per input command.

Each Digital pin can support a TTL or Schmitt Trigger Input or a 3.3V output. Each Analog pin will convert analog voltage (Between 0 to 3V) or Higher (through voltage divider) into 12 bit resolution value. The output can be raw data or converted into voltage. The raw data be converted into required form using conversion formulas.

Any kind of sensor whether it is providing digital output or analogue output can be interfaced with U96 and monitored with the help of computer.

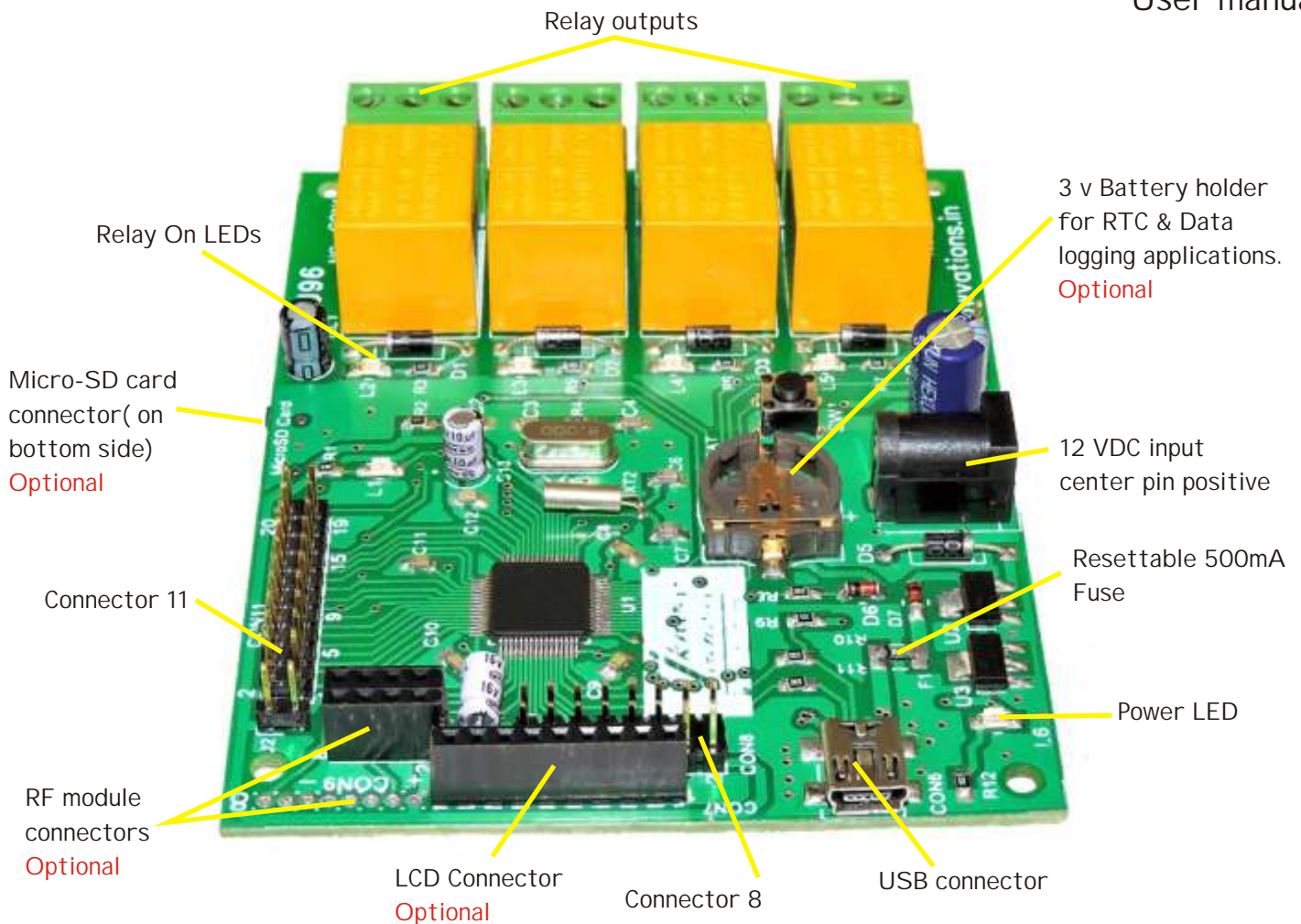
Get windows drivers, test applications and sample codes at -

<http://iknowvations.in>

Manufactured by -

I knowvations
Rajivnagar, Vidyanagar
Hubli - 580031
India.





Technical Specifications -

No. Of Relays	- 4
Relay Specifications	- Coil voltage 12V DC, Contact ratings- 5Amp Max.
Digital Inputs/outputs	- Up to 36 (3 V DC max).
Analog Inputs	- Up to 15 (3 V DC max).
Supply voltage	- 7 - 12 V DC (12 V DC only if you want to operate relay)
ADC Resolution	- 12 bits

Please Read Carefully

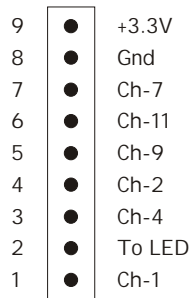
This device U96 connects to USB port of your computer and can be used to control external devices through its relays. Incorrect use or faulty board can cause damage to controller itself or USB controller of your computer or Motherboard of your computer. Extreme care should be taken while using this board. It will be totally user's responsibility for the use of this card.

I knowvations, its 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.

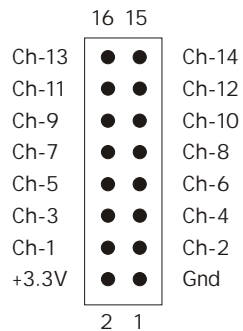
Your purchase and/or use of this board indicates your acceptance of these terms.

Connector details -

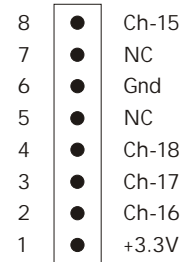
CON-7



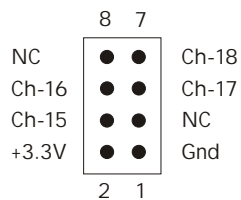
CON-8



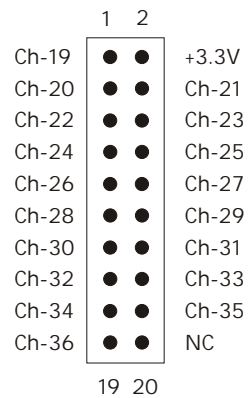
CON-9



CON-10



CON-11



J1



Connect pin1 & pin2 to use Relays.
It supplies 12 V dc power to relays
for their operation.

J2



Connect pin1 & pin2 to use Flash
memory.(Used only in higher versions)

Please note that CON-7 is used for LCD
and CON-9 & CON-10 are used for RF modules.
These modules are supplied in higher
versions only.





Command Reference -

1. For Digital Outputs - **S011** - Set output of Channel 01 to 1.
S010 - Set output of Channel 01 to 0.

There are up to 36 digital Output channels on this card so it will be up to **S361** or **S360**.

2. For Digital Inputs - **GI 01** - Get Input value of Channel 01.
GI 02 - Get Input value of Channel 02.

There are up to 36 digital Inputs channels on this card so it will be up to **GI 36**. The value of input pins will be 1 (if it is High - 3 VDC) or 0 (if it is Low - 0 V DC).

3. For Analog Inputs - **AD01** - Get ADC value of Channel 01.
AD02 - Get ADC value of Channel 02.

There are up to 15 Analog channels on this card so it will be up to **AD15**. The resolution is of 12 bits so the input voltage (0-3V Dc) will be converted to 0 to 4096 Decimal value or direct voltage value.

4. For Relay Outputs - **RI10** - 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.

6. Miscellaneous Commands -

- BORD** - Information about the board.
VERS - Firmware Version Number.

Please note that all commands are sent in CAPITAL letters only.

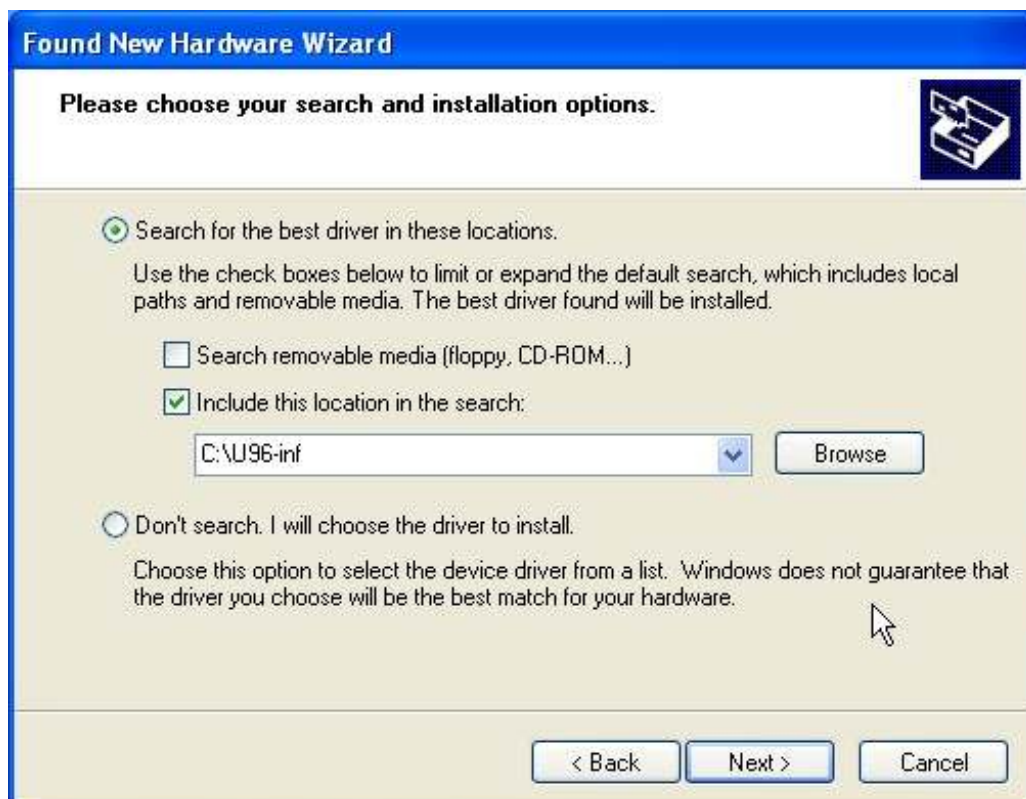


Windows Driver Installations -

Connect the U96 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 U96.inf from download section at <http://iknowvations.in/downloads/>.



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



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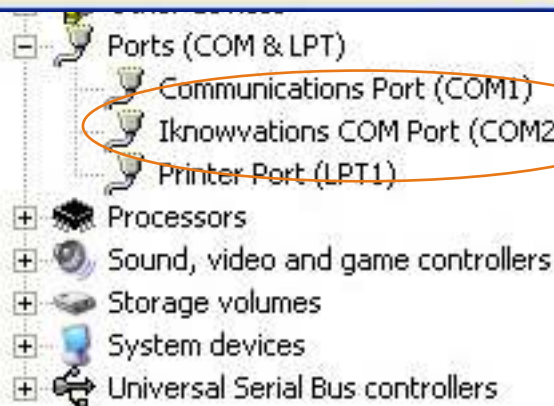
Click "Browse" and then select the location where driver is saved. Click "Next". You may receive a message indicating that the driver has not passed Windows Logo testing. If so, click "Continue Anyway" to continue installation.



Windows is installing the driver for I knowvations COM Port.



Windows has completed installation of the driver for I knowvations COM Port.



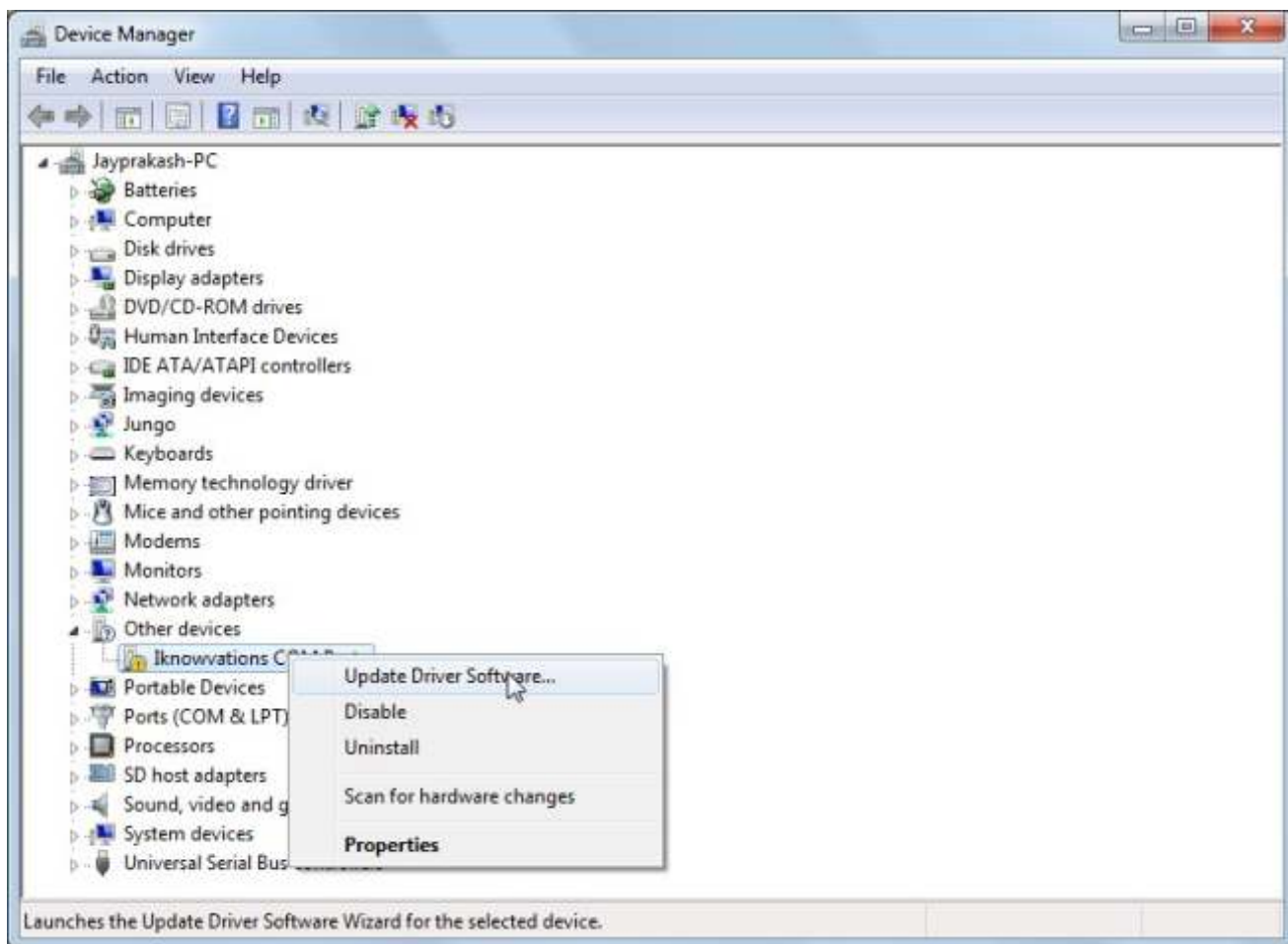
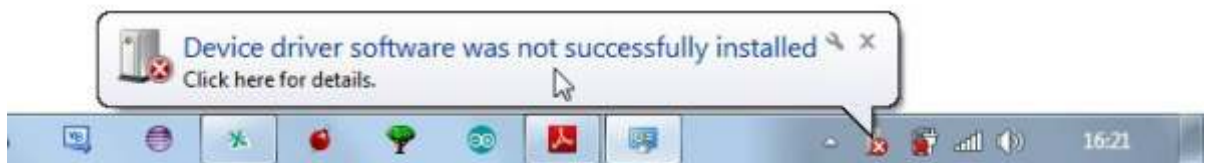
If you check in Device manager it will list I knowvations COM Port and will assign a COM port number - in this case COM27. It may be different for your computer.

You have to note down this number as it has to be used while communicating with the card.

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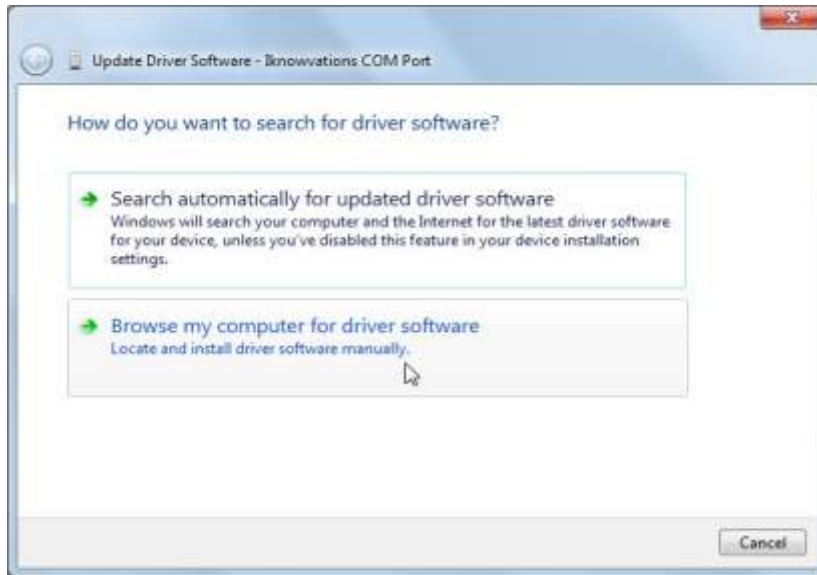
For Windows 7, when you connect U96 for the first time, it will try to install driver but it will not find one so it will inform you that it has not been able to install the driver successfully as shown in following screen shot. Do not worry. We will show how to resolve it.



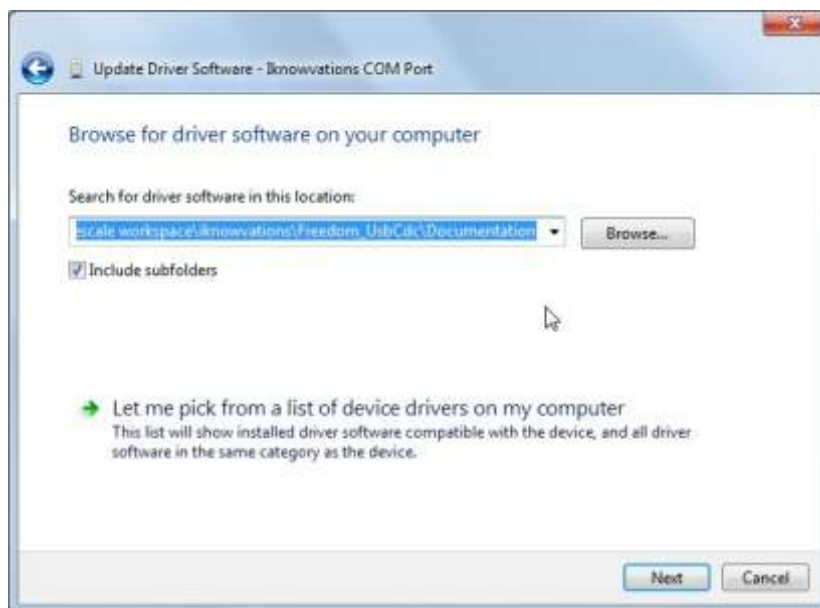
If you check Device Manager, it will list I knowvations COM Port with a yellow sign. No problem. Right Click on the device name & click Update Driver Software option.

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It will ask for the location where you have stored U96.inf file. If you have not, you can download it from our download section at <http://iknowvations.in/downloads/>.



Direct it to where you have stored the U96.inf file.

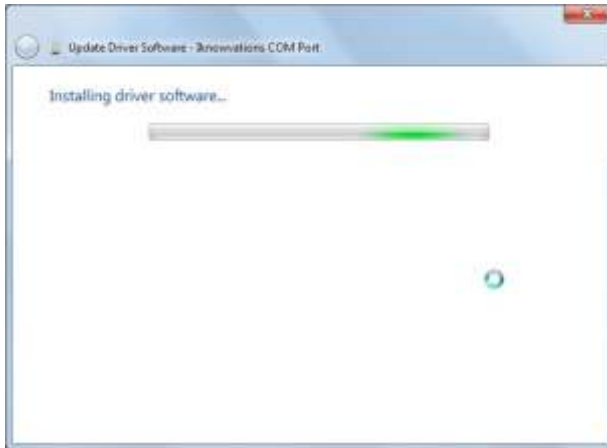


It may ask to verify. Choose "Install this driver software anyway".

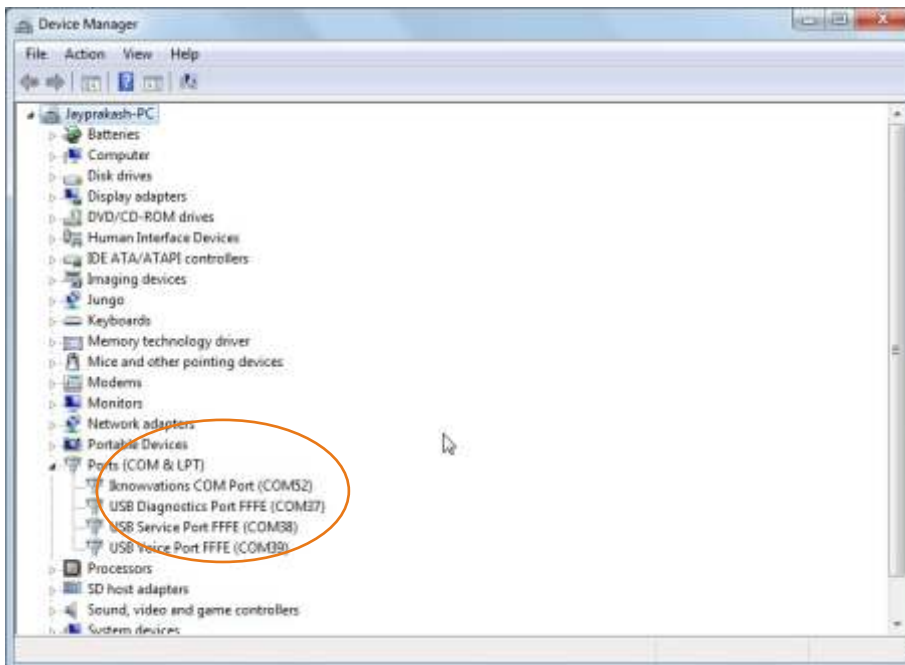


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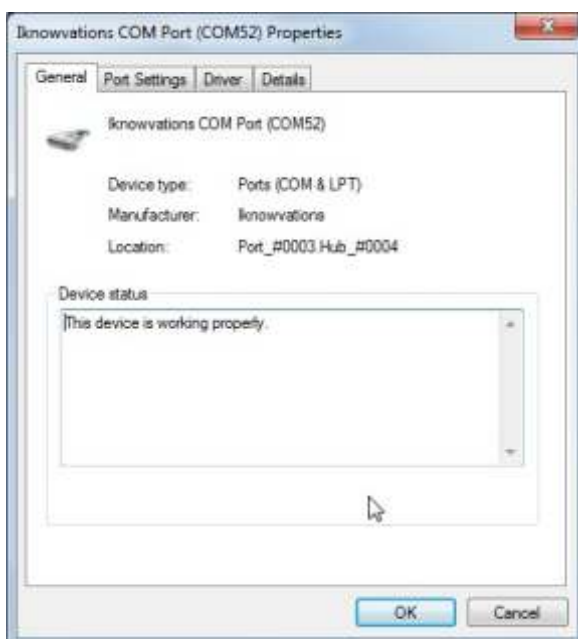


It will instal the driver.



You can check proper installation of the driver in Device Manager showing I knowvations COM Port assigned a COM port number.

In this case it is assigned COM52.



You can also check the properties of the I knowvations COM Port.

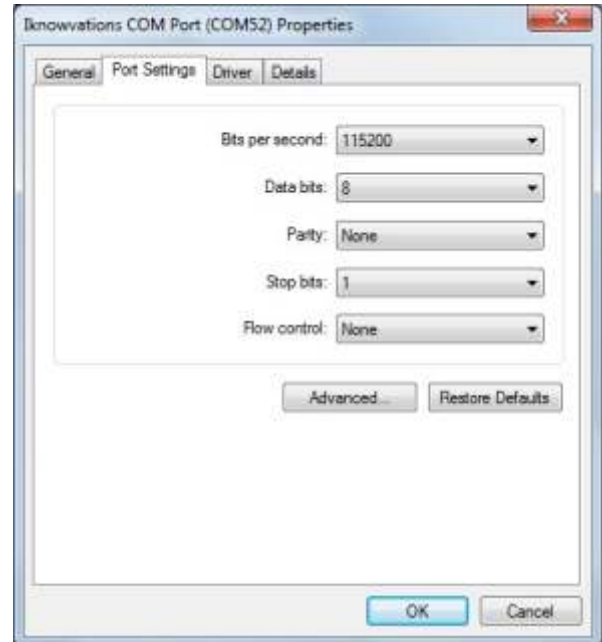
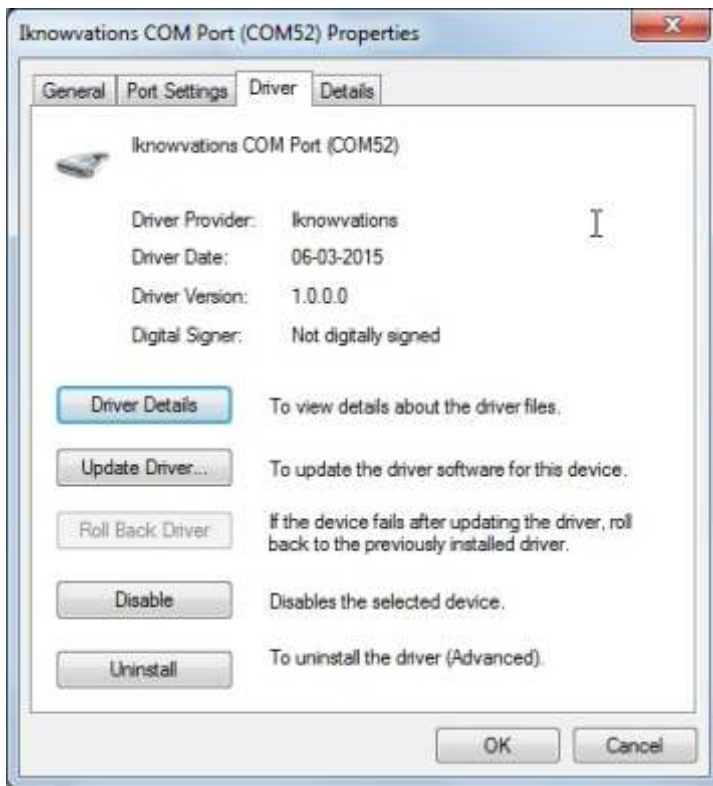
Please note that each board is having unique serial number so each board will get unique COM Port number & will remain same even if you plug the board in any other USB port of your PC or Laptop.

This helps when you develop custom software using U96, it will connect with the same card even if, you change USB port, once it enumerated & provided COM Port number by PC or Laptop.



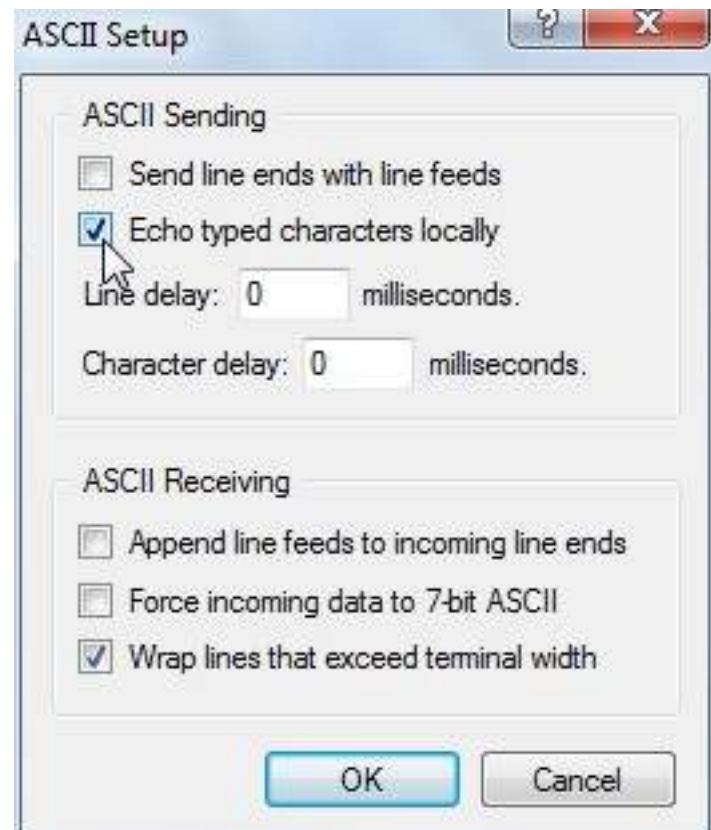
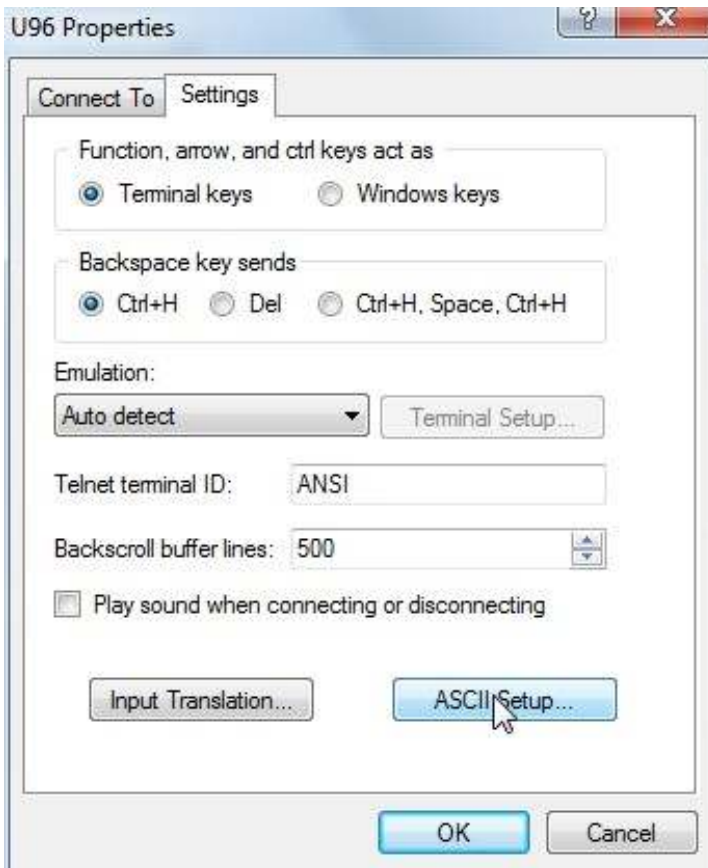
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Set the port setting as show above. Open the Hyper Terminal or any other terminal software & open a connection having above properties & following settings.

Now you can start talking to the card.





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After connecting the card & applying 12 V DC power, start Hyper Terminal connection as shown on previous page. Type any command in CAPs followed by Enter, the board will respond to your commands.

```

U96 - HyperTerminal
File Edit View Call Transfer Help
HELP
Welcome to U69 USB DAQ & Relay Card from Iknowvations.
Following is the list of commands -
RL10- Relay1 OFF, RL11 - Relay1 ON ..Upto RL40 & RL41.
S010- Set CH1 to 0,S011-Set CH1 to 1..Upto S360 - S361.
GI01- Get input value of CH1. Upto GI36.
AD01- Get AD value of CH1.Upto AD15. AD value of CH15.
BORD- Get Board information.
VERS- Get Board Firmware Number.
For more information please visit www.iknowvations.in
>_
Connected 00:01:10 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo
  
```

Screen shot showing card response of HELP command

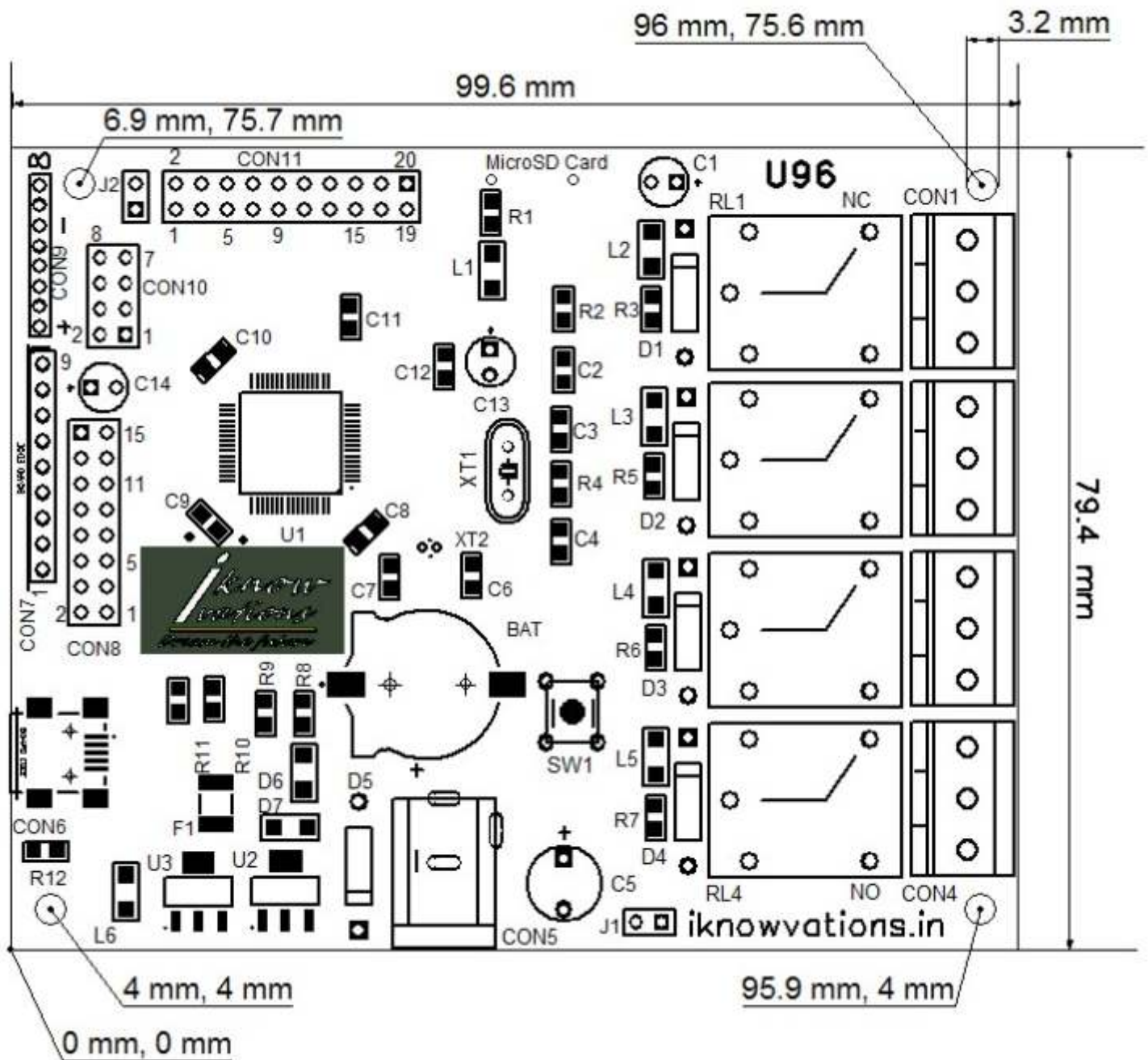
```

U96 - HyperTerminal
File Edit View Call Transfer Help
Done
RL10
Done
S011
Unknown Command !
S011
Done
S010
Done
GI01
1
AD01
1.65
AD02
0.72
AD03
0.48
AD01
1.66
AD01
1.65
AD01
1.65
-
The terminal setting is 115200-8-N-1
Connected 00:04:20 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo
  
```

Annotations:

- Command to switch Off RL1
- Board made RL1 off & responds with "Done"
- Wrong command will be responded with "Unknown Command !"
- Input command for Channel 1. The board responds with 1 as CH1 pin is High.
- Getting AD voltage value of AD Channel 1.
- The terminal setting is 115200-8-N-1

Dimensions of the board



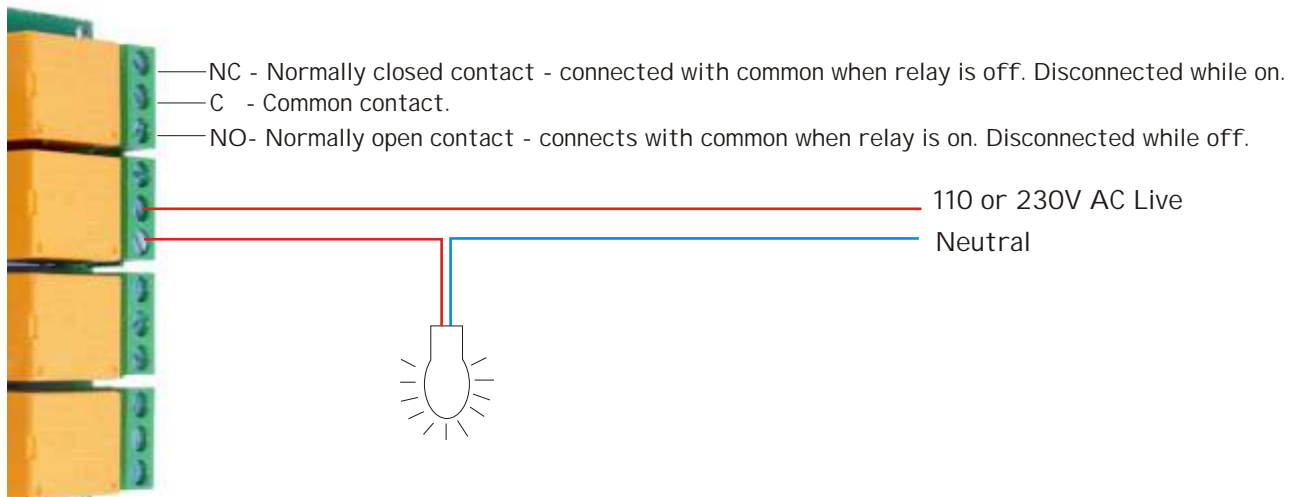


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Using Relay Outputs -

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. I knowvations will not be responsible for any kind of damage or loss whatsoever to life or property. It will be totally user's responsibility.**

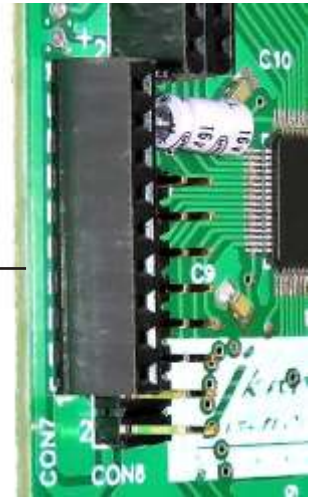
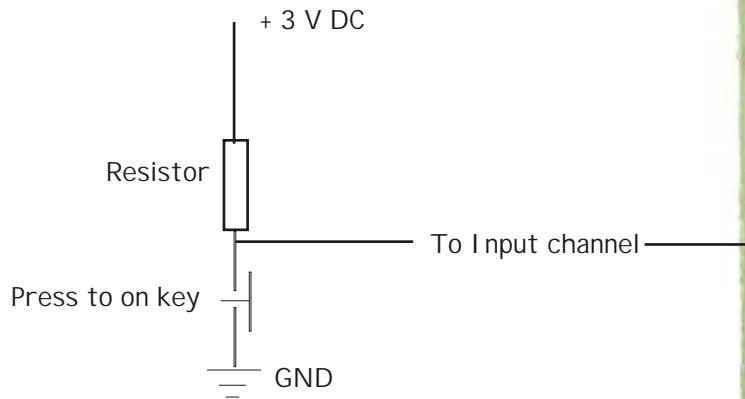


Use of RC Snubber Circuit across relay contacts is recommended to avoid electrical interference.



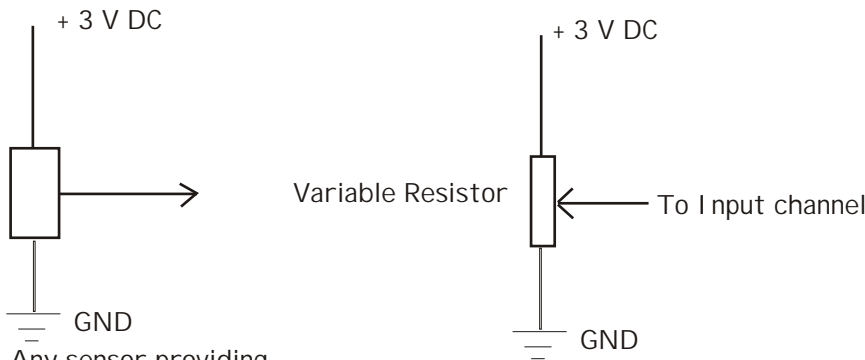
Using Input channels -

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.

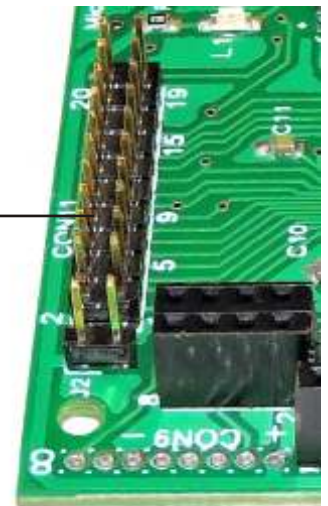


Using ADC channels -

ADC channels can be used to monitor input voltages of any signal that varies between 0 and 3 V Dc. Following is one of the ways to monitor ADC input value.

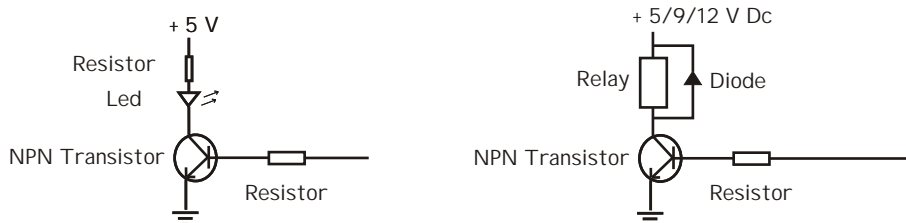


Any sensor providing analog output 0-3 V Dc.



Using Output channels -

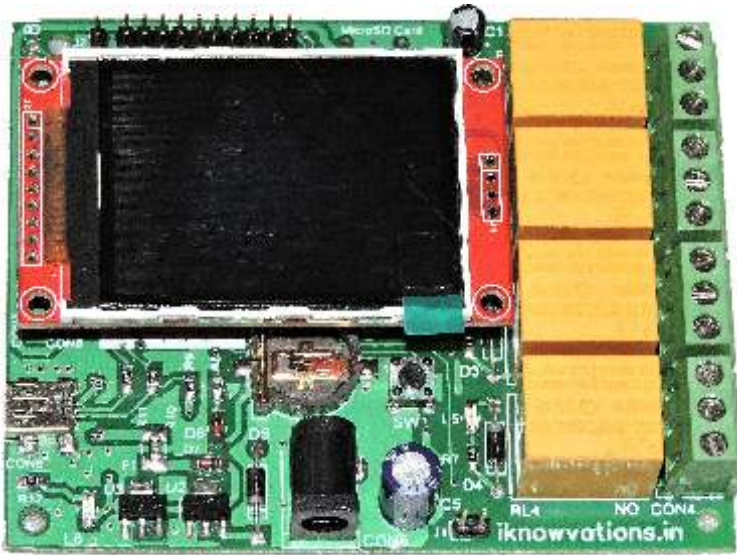
Output channels can be toggled between 1 & 0, that is bet High & Low. This signal can be used to switch on & off higher voltage loads through use of transistor shown as under -



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Coming Up.....



U96 with LCD



U96 with RF module





Revision history

Document revision history

Date	Revision	Changes
15-June-2015	1	Initial release.

For more information visit - www.iknowvations.in





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