## **Description:**

The AtomIR is an IC with the capabilities to capture an incoming SIRC signal and send it to your PC through a USB connection, or to a MCU via UART connection.

The USB connection establishes a Virtual Com Port for communications. From here on I will refer to the Virtual Com Port as "VCP". Connecting to the VCP is as simple as connecting to any other COM PORT on the system.

The UART connection is a serial connection which operates at 19200bps.



## **Pin Description:**

PIN	Description
VDD	5v Power
OSC1/OSC2	Oscillator pins for 12mhz crystal/resonator.
MODE	Pulled HIGH enables USB mode, Pulled LOW enables UART mode.
RCO:RC7,RB4,RB5	General Purpose Output pin (GPO) (USB ONLY)
RB7	In USB mode same as GPO, in UART mode this is TX out.
IR	Input PIN for infrared receiver.
VUSB	Internal Regulator Pin. Connect a 470nf capacitor (USB ONLY)
D+/D-	USB Data Lines
VSS	Ground (0v)

### **Selecting Modes:**

To run the device in **USB** mode simply **remove all power** and pull-**up** the MODE pin with a resistor.

To run the device in **UART** mode simply **remove all power** and pull-**down** the MODE pin with a resistor.

A 10k resistor will do.

### Commands & Protocol (USB):

The AtomIR can accept connections using the following VCP configurations:

Baud: 9600-115200bps Data Bits: 8 Parity: None Stop Bits: 1 Flow Control: None

There are only a few commands for this device.

Command ASCII	Command Description
ОК	Tells the IC or PC that the last command was received.
RXY-Z	Tells the IC what PORT(x), PIN(y) and STATE(z) to set.
Х	Restarts the entire connection.
AT	Tells the PC that we are on that com port and are ready to connect.
DAC	Tells the PC that this is IR DATA and it contains a Address(a) and Command(c) byte

#### **Establish a Connection:**

To get data to and from the IC you must first establish a connection. To do this, simply send the **OK** command and wait for an **AT**. After an **AT** is received you must respond with an **OK**, once this is done you are connected to the device and can send and receive data.

#### **Capturing Data:**

IR Captures are automatic; whenever IR Data is captured it will be sent to the VCP in the following format:

DAC = "D", Address Byte, Command Byte

"D' is used to inform the PC that the following 2 bytes are Address and Command Data. This is the actual infrared commands and addresses received from the IC. No Change is done.

What you do with the data is up to you. The way our software is setup is, it reads the incoming data and checks a switch statement to determine the next course of action.

Once data is received you have 2 options,

- 1. Send an **OK** Command to the IC to finish session and wait for new IR Data.
- 2. Send an RXY-Z Command to the IC to control Pins and finish session.

### Controlling IC Pins (RZY-Z):

Available Ports & Pins:

PORT	PIN	To control a particular pin on the IC, you must first be connected then send out the
С	0	following command:
С	1	
С	2	RXY-Z
С	3	
С	4	R = Tell IC to control PIN
С	5	X = PORT (B or C)
С	6	Y = PIN Y (0-7)
С	7	- = Separator
В	4	Z = STATE Z (1 = HIGH, 0 = LOW)
В	5	
В	7	

This can be sent after a capture to tell the IC to toggle a PIN on a PORT to as specific STATE. For example, you want to set PIN RCO high when Command 1, Address 0 is received you simply test the captured data and send out "RCO-1" This will Toggle PIN RCO to a high state.

Typical Application Circuit (USB):



## Commands & Protocol (UART):

Ok for UART mode it's pretty simple. There are no commands and the only protocol to worry about is the serial data protocol. Data is transmitted from the TX pin to a MCU with these settings:

Baud: 19200bps Data Bits: 8 Parity: None Stop Bits: 1 Flow Control: None

The data received is simply the COMMAND and DATA byte from the decoded SIRC signal. Here is a screen shot of a Logic Analyzer capturing and decoding the data:

For this test a Radio Shack (MODEL: 15-135) Universal Remote was used, programmed for a Sony TV.

Device = 0x01 - TV Command = 0x15 - Power

Q Saleae Logic 1.1.5 - [Connected]		
2 M Samples  4 MHz  Start		Options <del>•</del>
0 ms +9 ms +1 ms	10.000	+2 <sub>,</sub> ms
0 - Serial	<ul> <li>Measurements</li> </ul>	<b>*</b> -
1 - Channel 1	Width: ###	
2 - Channel 2 5 2 2	Duty Cycle: ###	
3 - Channel 3 🖅 🤁 🚛	<u>T1:</u> ### <u>T2</u> : ###	
4 - Channel 4 5 2 2	T1 - T2 = ###	
5 - Channel 5	<ul> <li>Analyzers</li> </ul>	+-
6 - Channel 6	Async Serial	× 0 🕸
7 - Channel 7		
L*		4



# Typical Application Circuit (UART):

## **Electrical Specifications:**

2.7v - 5.5v
40 ℃ to +125 ℃
65 ℃ to +150 ℃
0.3V to (VUSB + 0.3V)
0.3V to (VDD + 0.3V)
800 mW
95 mA
± 20 mA
25 mA
25 mA
90 mA
90 mA