

MONITORING SYSTEM FOR METEOROLOGICAL CONDITIONS

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REALIZING A SYSTEM FOR MONITORING METEOROLOGICAL CONDITIONS

Humidity, rainfall, temperature, wind sensors will be used.

A display to display the data of your choice will be used.

Optionally, use a Bluetooth Low Energy system to communicate data with the user's phone.

Development board DUE R3 - Arduino compatible

DESCRIPTION

Arduino Due is a development board based on the Atmel SAM3X8E ARM Cortex-M3 CPU. It is the first Arduino based development board based on a microprocessor with a 32-bit ARM core. It has 54 digital I / O pins (12 of which can be PWM), 12 analog inputs, 4 UARTs (serial port hardware), 84 MHz clockspeed, USB OTG connection, 2 DACs (digital to analog), 2 TWI through power-jack, SPI header, JTAG header, reset button and delete button.

Due R3 contains everything that is needed to support the microcontroller. It is compatible with any Arduino shield that works at 3.3V and is compatible with 1.0 Arduino pinout.

SAM3X has 512KB (2 blocks of 256KB) memory for storing codes. The bootloader is pre-programmed at Atmel's factory and is stored in a dedicated ROM memory. The available SRAM is 96KB, divided into 64 and 32KB, respectively.

You can delete the memory of the SAM3X with the integrated wipe button. This removes your sketch from the MCU. To delete, hold down the delete button for a few seconds while the card is powered up.

SPECIFICATIONS

Microcontroller: AT91SAM3X8E

Operating Voltage: 3.3V

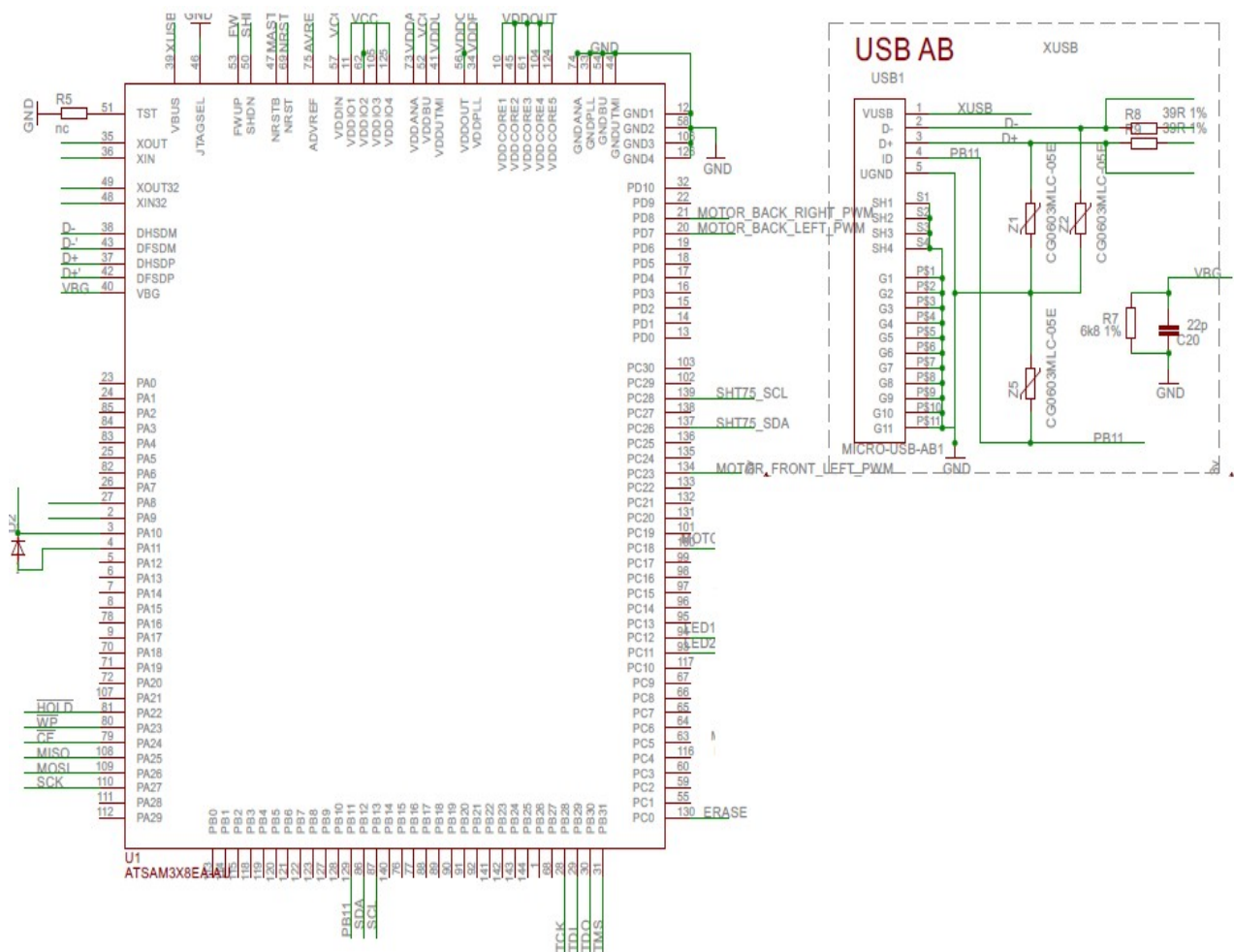
Power supply (recommended): 7V - 12V

Power (Limits): 6V - 16V

Digital I / O Pins: 54 (of which 12 allow PWM outputs)

Analog Inputs Pins: 12

Clock speed: 84MHz



Microcontroller Features

Core

ARM Cortex-M3 revision 2.0 running at up to 84 MHz

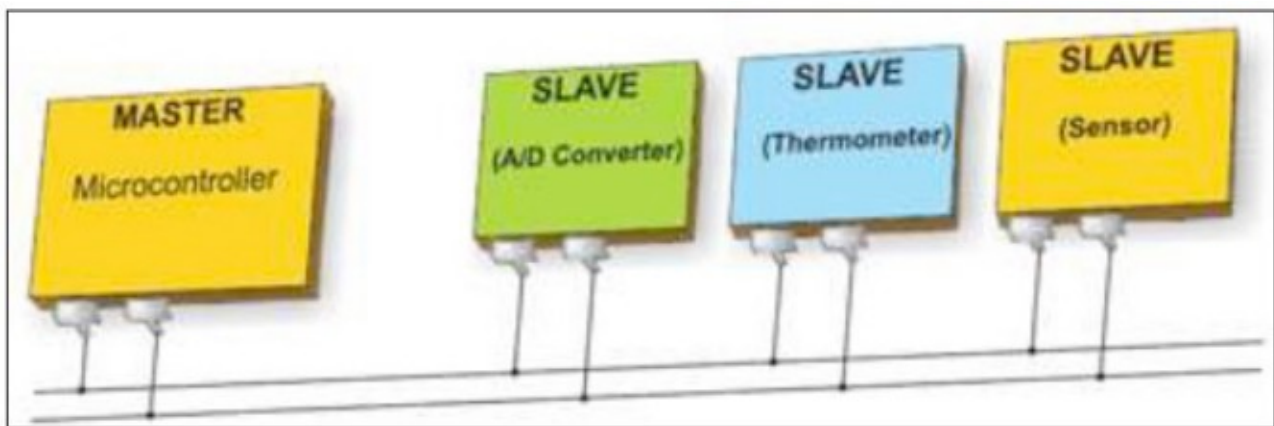
Memory Protection Unit (MPU)

24-bit SysTick Counter

Thumb®-2 instruction set

Nested Vector Interrupt Controller

I2C Communication



Pins

Due: 20 – SDA, 21 – SCL;

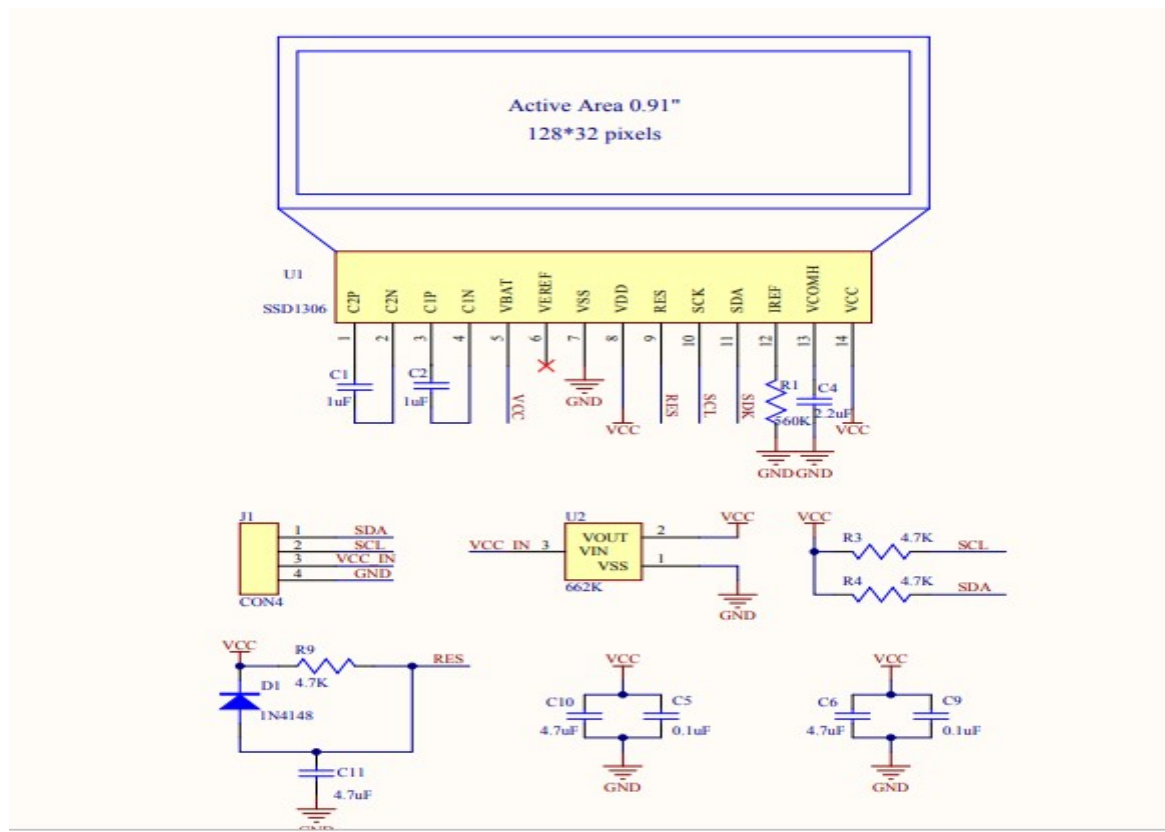
OLED Display Module 0.91 inch I2C SSD1306

SSD1306 is a single-chip CMOS OLED/PLED driver with controller for organic / polymer light emitting diode dot-matrix graphic display system. It consists of 128 segments and 64 commons. This IC is designed for Common Cathode type OLED panel. The SSD1306 embeds with contrast control, display RAM and oscillator, which reduces the number of external components and power consumption. It has 256-step brightness control. Data/Commands are sent from general MCU through the hardware selectable 6800/8000 series compatible Parallel Interface, I2C interface or Serial Peripheral Interface. It is suitable for many compact portable applications, such as mobile phone sub-display, MP3 player and calculator, etc.

FEATURES

- Resolution: 128 x 32 dot matrix panel
- Power supply
 - VDD = 1.65V to 3.3V for IC logic
 - VCC = 7V to 15V for Panel driving
- For matrix display
 - OLED driving output voltage, 15V maximum
 - Segment maximum source current: 100uA
 - Common maximum sink current: 15mA
 - 256 step contrast brightness current control
- Embedded 128 x 32 bit SRAM display buffer
- Pin selectable MCU Interfaces:
 - 8-bit 6800/8080-series parallel interface
 - 3 / 4 wire Serial Peripheral Interface
 - I²C Interface
- Screen saving continuous scrolling function in both horizontal and vertical direction
- RAM write synchronization signal
- Programmable Frame Rate and Multiplexing Ratio
- Row Re-mapping and Column Re-mapping
- On-Chip Oscillator
- Chip layout for COG & COF
- Wide range of operating temperature: -40°C to 85°C

Block Diagram



BME280 shuttle-board

Description

The Bosch Sensortec BME280 shuttle-board is a PCB with a BME280 pressure and humidity sensor mounted on it. It allows easy access to the sensors pins via a simple socket. As all Bosch Sensortec sensor shuttle boards have identical footprint, they can be plugged into Bosch Sensortec's advanced development tools (e.g. the Development Board). Of course, the BME280 shuttle board can also be used for customer's own implementations.

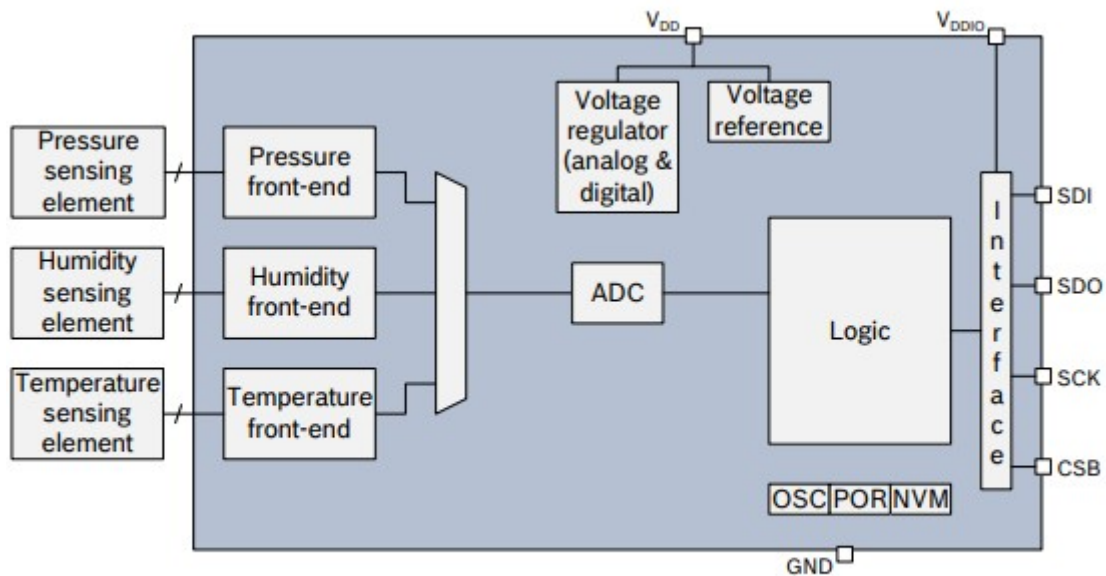


Figure 2: Block diagram of BME280

Table 35: Pin description

Pin	Name	I/O Type	Description	Connect to		
				SPI 4W	SPI 3W	I ² C
1	GND	Supply	Ground	GND		
2	CSB	In	Chip select	CSB	CSB	V _{DDIO}
3	SDI	In/Out	Serial data input	SDI	SDI/SDO	SDA
4	SCK	In	Serial clock input	SCK	SCK	SCL
5	SDO	In/Out	Serial data output	SDO	DNC	GND for default address
6	V _{DDIO}	Supply	Digital / Interface supply	V _{DDIO}		
7	GND	Supply	Ground	GND		
8	V _{DD}	Supply	Analog supply	V _{DD}		

ML8511 UV Sensor with Voltage Output

GENERAL DISCRIPTION

The ML8511 is a UV sensor, which is suitable for acquiring UV intensity indoors or outdoors. The ML8511 is equipped with an internal amplifier, which converts photo-current to voltage depending on the UV intensity. This unique feature offers an easy interface to external circuits such as ADC. In the power down mode, typical standby current is 0.1 μ A, thus enabling a longer battery life.

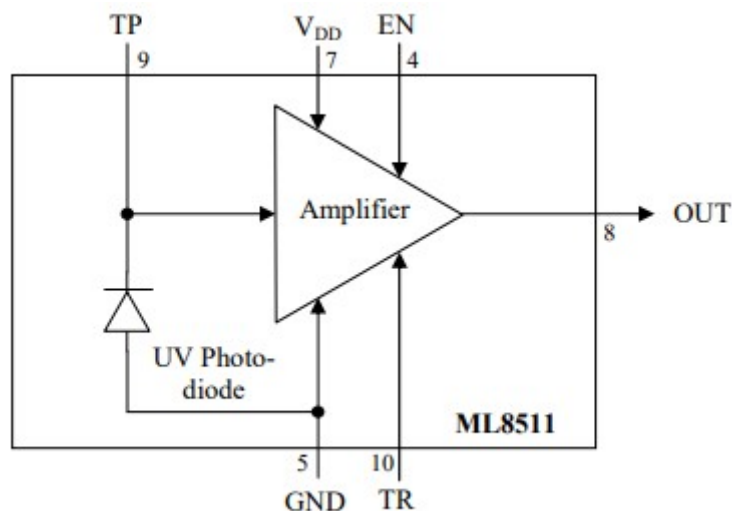
FEATURES

- Photodiode sensitive to UV-A and UV-B
- Embedded operational amplifier
- Analog voltage output
- Low supply current (300 μ A typ.) and low standby current (0.1 μ A typ.)
- Small and thin surface mount package (4.0mm x 3.7mm x 0.73mm, 12-pin ceramic QFN)

APPLICATIONS

- Smart phone, Watch, Weather station, Bicycle navigation, Accessory, Gaming

BLOCK DIAGRAM



PIN CONFIGURATIONS

Pin	Symbol	I/O	Function
7	VDD	PW	Supply voltage. Decouple this pin to ground with 0.1 μ F capacitor.
5	GND	PW	Ground
4	EN	I	Active high enable pin. (High: Active mode, Low: Standby mode)
8	OUT	O	Output (Low in power down or standby mode)
9	TP	I/O	Test pin. Do not connect.
10	TR	I/O	Internal reference voltage. Decouple this pin to ground with 1 nF capacitor.
1,2,3, 6,11,12	NC	-	No Connection. Do not connect.

YL-69 Soil Hygrometer Humidity & Soil Moisture Detection Sensor

Product Description

This is a simple sensor that can be used to detect soil moisture/ relative humidity within the soil The module is able to detect when the soil is too dry or wet. Great for use with automatic plant watering systems

Info / Specs:

Sensitivity is adjustable via the blue digital potentiometer

Operating voltage 3.3V-5V

Module dual output mode: digital output or analog output giving more accuracy

Has pre-drilled hole for easy installation

Small board PCB size: 3cm * 1.6cm

Power indicator (red) and digital switching output indicator (green)

Uses the LM393 comparator chip

Connections:

VCC connect to 3.3V-5V

GND connect to GND

DO digital value output connector (0 or 1)

AO analog value output connector

Light Sensor

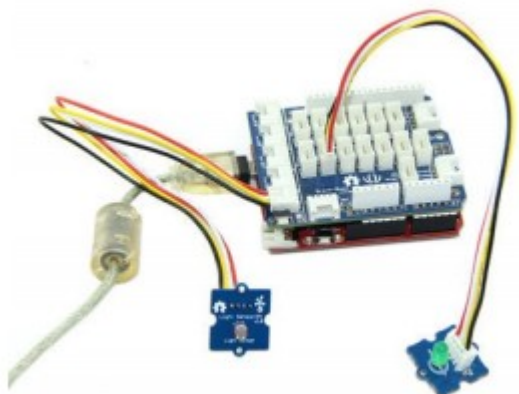
The Grove - Light Sensor module incorporates a Light Dependent Resistor (LDR). Typically, the resistance of the LDR or Photoresistor will decrease when the ambient light intensity increases. This means that the output signal from this module will be HIGH in bright light, and LOW in the dark

Easy to use light sensor module

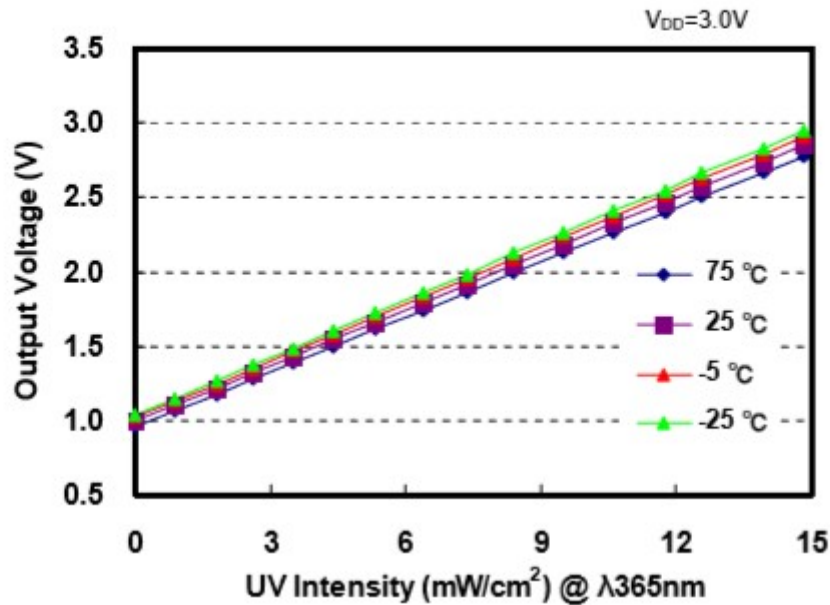
- ⌚ Resistance decreases as luminance increases
 - ▼ Low resistance (in bright light) triggers a HIGH signal towards the output module
 - ▼ High resistance (in darkness) triggers a LOW signal towards the output module
- ⌚ Easily integrates with Logic modules on the input side of Grove circuits
- ⌚ Uses Standard 4-pin Grove Cables to connect to other Grove modules such as Grove Power Modules, Logic Gates and Grove - Base Shield

Specifications

- ⌚ Voltage: 3-5V
- ⌚ Supply Current: 0.5-3mA
- ⌚ Light resistance: $20K\Omega$
- ⌚ Dark resistance: $1M\Omega$
- ⌚ Response time: 20-30 secs
- ⌚ Peak Wavelength: 540 nm
- ⌚ Ambient temperature: $-30\sim 70^{\circ}\text{C}$
- ⌚ LDR Used: GL5528



OUTPUT VOLTAGE– UV INTENSITY CHARACTERISTICS



RAIN SENSOR MODULE

Description

The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity through a potentiometer. The analog output is used in detection of drops in the amount of rainfall. Connected to 5V power supply, the LED will turn on when induction board has no rain drop, and DO output is high. When dropping a little amount water, DO output is low, the switch indicator will turn on. Brush off the water droplets, and when restored to the initial state, outputs high level.

Specifications

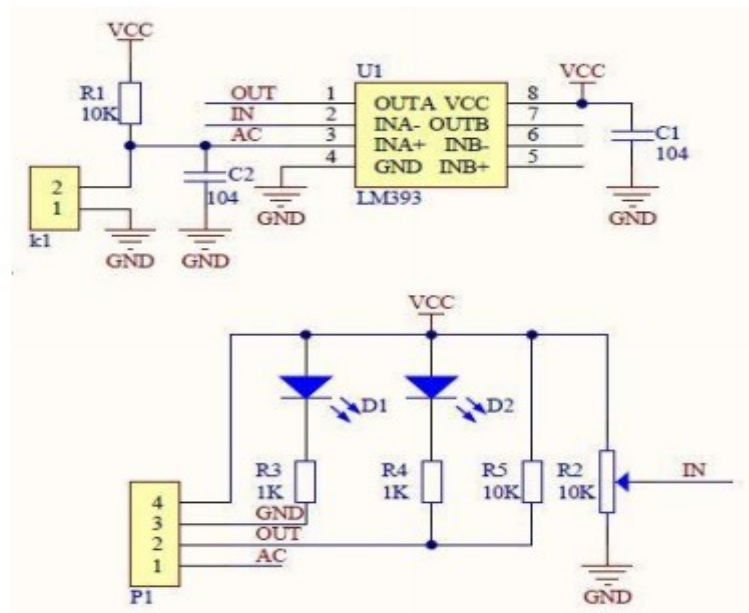
- ⌚ Adopts high quality of RF-04 double sided material.
- ⌚ Area: 5cm x 4cm nickel plate on side,
- ⌚ Anti-oxidation, anti-conductivity, with long use time;
- ⌚ Comparator output signal clean waveform is good, driving ability, over 15mA;
- ⌚ Potentiometer adjust the sensitivity;
- ⌚ Working voltage 5V;
- ⌚ Output format: Digital switching output (0 and 1) and analog voltage output AO;
- ⌚ With bolt holes for easy installation;
- ⌚ Small board PCB size: 3.2cm x 1.4cm;

⌚ Uses a wide voltage LM393 comparator

Pin Configuration

1. VCC: 5V DC
2. GND: ground
3. DO: high/low output
4. AO: analog output

Schematic Diagram



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