URM37 V3.2 Ultrasonic Sensor Manual

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Introduction

URM37 V3.2 Ultrasonic Sensor uses an industrial level AVR processor as the main processing unit. It comes with a temperature correction which is very unique in its class.

Specification

Power: +5V

Current: <20mA

Working temperature: -10℃～+70℃

Detecting range: 4cm-5m

Resolution: 1cm

Interface: RS232，PWM

Servo control: One servo control output

Operating Mode: Serial (PWM) passive control mode; Autonomous Mode; On/OFF Mode

Temperature sensor: 12 bits reading from serial port

Size: 22mm × 51 mm

Weight: 30g

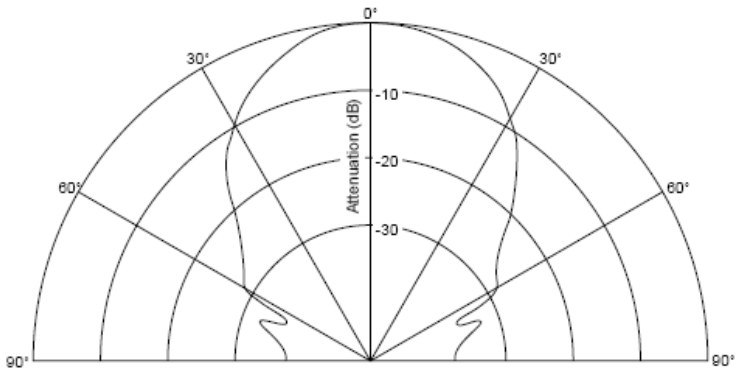


Figure 1: URM37 V3.2 Beam Width

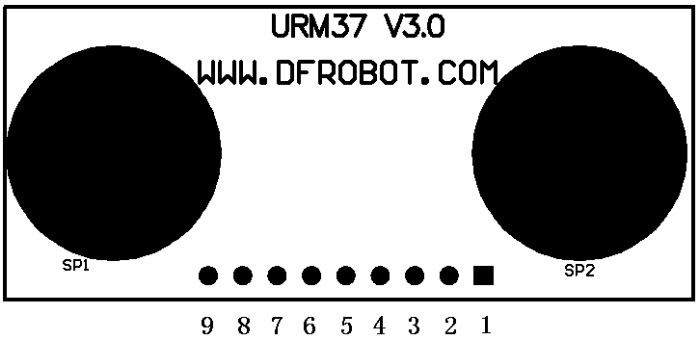


Figure 2: URM37 V3.2 Pin Definition

1: **+VCC** - +5V Power

2: **GND** - Ground

3: **RST** - Reset

4: **PWM** - PWM Output 0—25000US，Every 50US represent 1cm

5: **MOTO** - Servo control signal output

6: **COMP/TRIG**

COMP - On/OFF mode, when the detecting distance is smaller than a pre-set value, this pin pulls low.

TRIG - PWM or RS232 trigger pin

7: **PWR_ON** - Enable pin, enable the sensor when high

8: **RXD** - RS232,TTL communication

9: **TXD** - RS232,TTL communication

Working mode can be changed by writing 0x00,0x01 or 0x02 to EEPROM through serial port.

Mode 1: Serial passive control mode

Under this mode, the sensor is always waiting for command from serial port. Every time it receives a command, it will return the distance and wait for the next command. The degree in the command will be used to control a servo motor to rotate corresponding degree.

Mode 2: Autonomous mode

Under this mode, the sensor will make a sensor reading every 25ms and compare the reading with a threshold (pre-set, user is able to define this value by writing EEPROM), if the reading is equal or smaller than the threshold, pin COMP/TRIG will have low output. In the meantime, pin PWM will output the distance reading, every 50us low level stands for 1cm, by counting the number of these pulses, the distance can be calculated. This mode can be simply used as an ON/OFF switch.

Mode 3: PWM passive control mode

Under this mode, a low pull on pin COMP/TRIG will trigger a sensor reading. The width of the pulse is proportional to the servo rotating degree. After a successful sensor reading, Pin PWM will output pulses, every 50us represents 1cm. If the reading is invalid, a 50000us pulse will be returned.

RS232 control protocol

RS232 setting：Port rate: 9600; Parity: none; Stop bit: 1

Command: Control command consists of four bits, command+data0+data1+sum. Sum=Low 8 bit of the sum of command+data0+data1.

Command Format	Function	Description
0x11＋NC＋NC＋Sum (Sample: 0x11 0x00 0x00 0x11)	Enable 16 bit temperature reading	Reading the temperature, the return data format will be: 0x11+High(temperature)+Low(temperature)+SUM If the temperature is above 0, the first four bits of High will be all 0. If the temperature is below 0, the first four bits of High will be all 1. The last 4 bits of High together with the Low bits stands for 12bits temperature. The resolution is 0.1. When the reading is invalid, it returns 0x11+0xFF+0xFF+SUM
0x22＋Degree＋NC＋SUM (Sample: 0x22 0x00 0x00 0x22)	Enable 16 bit distance reading	The degree in the command is used to control a servo motor to rotate corresponding degree. Degree: 0-46 stands for 0-270 degrees, for example, 3 stands for 18 degrees. Return data format will be: 0x22＋High(distance)＋Low(distance)+SUM。 When the reading is invalid, it returns 0x22+0xFF+0xFF+SUM
0x33＋Add＋NC＋SUM	Enable internal EEPROM reading	Return data will be 0x33＋Add＋Data＋SUM。

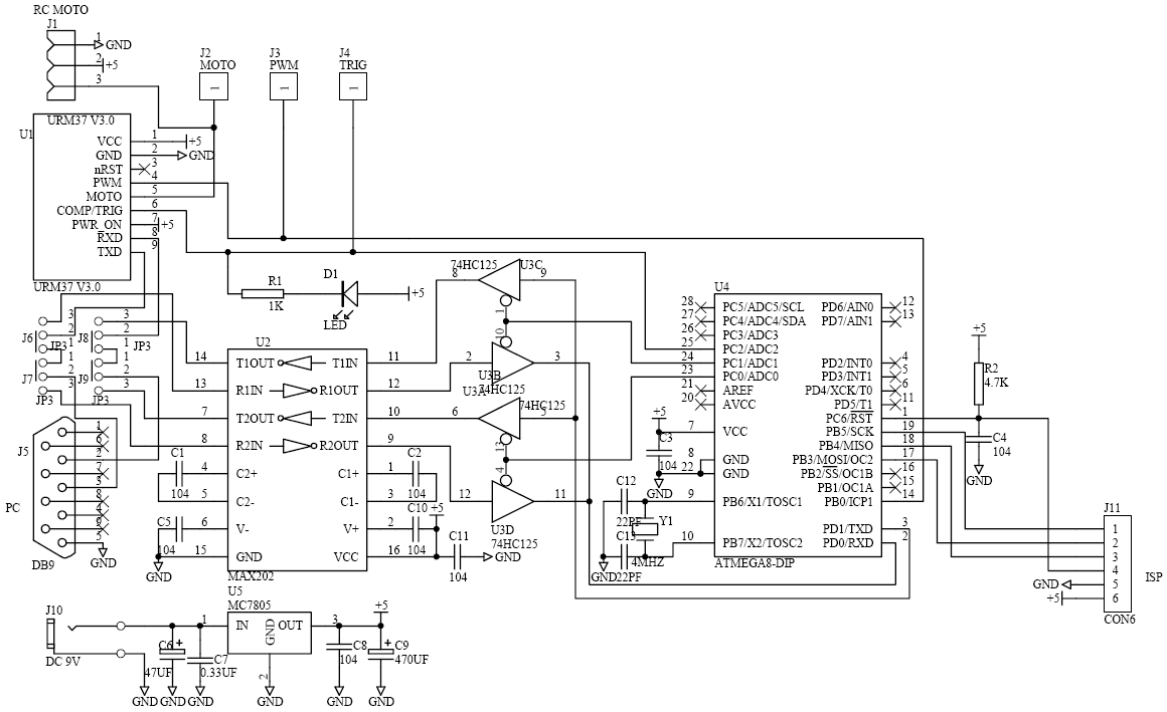
0x44＋Add＋Data＋SUM	Enable internal EEPROM writing	Written data can only from 0-255. Address 0x00-0x02 is used to configure the mode. 0x00 – threshold distance (Low) 0x01 – threshold distance (High) 0x02 – Operation Mode (0xaa for autonomous mode) (0xbb for PWM passive control mode) The return data format will be: 0x44＋Add＋Data＋SUM。

Note:NC stands for any data，SUM stands for sum, Add stands for address。

1. PWN_ON must be set to High to enable sensor.

Servo control command reference table:

DEC	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HEX	***0***	***01***	***02***	***03***	***04***	***05***	***06***	***07***	***08***	***09***	***0A***	***0B***	***0C***	***0D***	***0E***	***0F***
Degree	0	6	12	18	24	29	35	41	47	53	59	65	70	76	82	88
DEC	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**
HEX	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***1A***	***1B***	***1C***	***1D***	***1E***	***1F***
Degree	94	100	106	112	117	123	129	135	141	147	153	159	164	170	176	182
DEC	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	
HEX	***20***	***21***	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***2A***	***2B***	***2C***	***2D***	***2E***	
Degree	188	194	200	206	211	217	223	229	235	241	247	252	258	264	270	



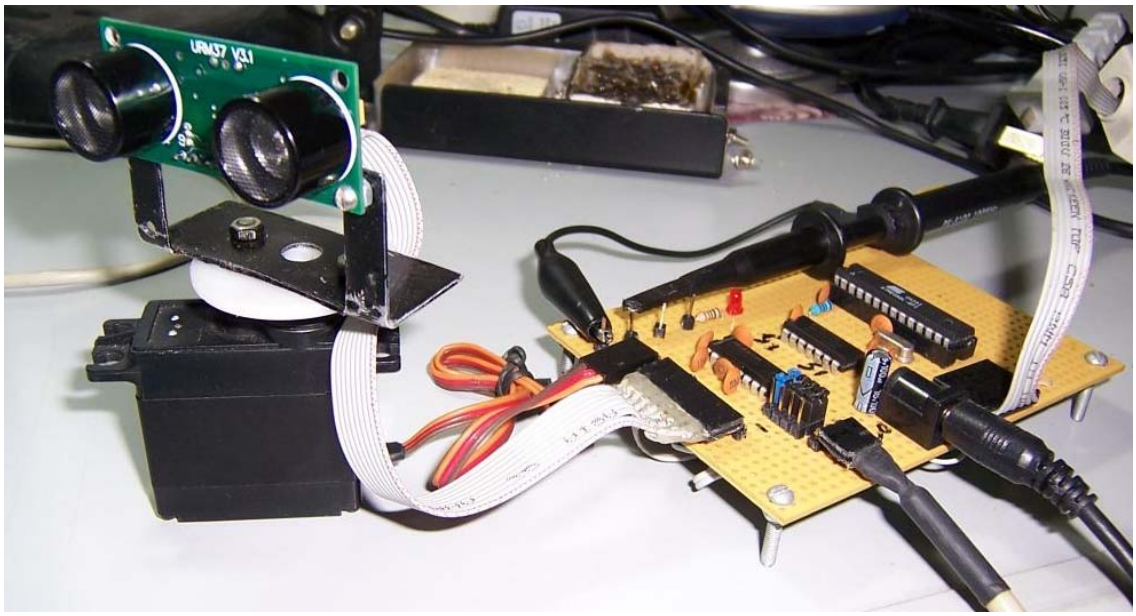


Figure UMRV3.2 control a servo provides 270 degree scanning area

V3.2 Help Mate Download:

http://www.yerobot.com/download/software/URMV3.2HelpMate.rar

Samples:

1) How to interface URM V3.2 to Arduino?

http://www.yerobot.com/forum/viewtopic.php?f=5&t=7&p=10&sid=72f4c2fbb84bf341e767351e898a3c0a#p10

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