THE RANDOM LAB
SOLUCIONES INTERACTIVAS

I'm creative maker and researcher providing consultancy, technical support and development visual arts and multimedia installations and technology related prototypes.

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May 24, 2015

Repair faulty HC-SR04 ultrasonic sensor (solve erratic no-readings problems)

Recently I got some of these cheap sensors from Chinese suppliers, for a workshop I had to teach.
A couple of students reported that their sensors were behaving in an erratic way, sometimes working, then stopping again, the working...
After replacing them with more expensive ones bought at a local store, I decided to try fixing the faulty ones...

EDIT (11/oct/16): have a look at Matthieu comment below, you may get rid of the errors by software instead of hacking the board.

The faulty sensors were bought from different manufacturers, so it wasn't a "bad batch" issue.

Trying to figure out what was happening, I observed that sometimes when I touched the back of the modules' boards made them work again after they got stuck.
Probably there was a bad solder or some interference or bad shielding problem. So, touching here and there, I localized the exact pin that reacted to my fingers. It was one of the receiver transducer's pins (the one not tied to ground).
Then I tested to connect that pin through a 10k resistor to ground but that didn't help. Then to VCC, but it didn't work either.
So I thought that there was some kind o synchronization issue between the transducers, that required the reacting pin of the receiver transducer's to be triggered now and then.
That idea led me to make one more try, this time connecting the pin through the 10k resistor to the TRIGGER input pin of the module, and voila!

Donar

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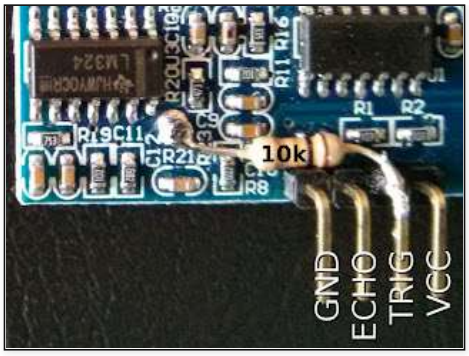
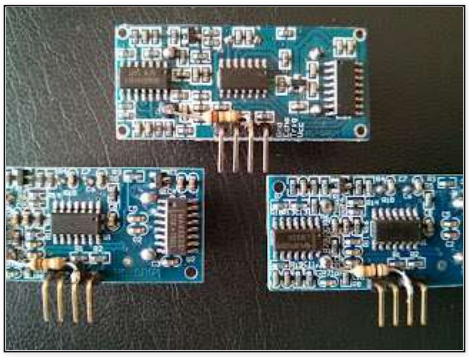


I did the same with the other modules and... all of them started to work right, finally!



Posted by David Sanz Kirbis

Labels: arduino, back, bad, erratic, faulty, fix, HC-SR04, issues, module, problems, repair, resistor, sensor, solder, solve, stability, touch, ultrasonic

34 comments:

Unknown June 25, 2015 at 4:59 PM

Just tried this on one of my cheap Chinese boards - no luck. Still returning ZERO until I make a loud clap then it works for just a minute. Thanks for the idea though!

Reply

Replies

Matthieu DEWAVRIN October 11, 2016 at 8:59 AM

I know this comment is quite old, but hopefuly this would help somebody !
Your issue is due to a lack of timeout of some chinese boards. If it sends a pulse but don't get the echo back, it's stuck. By claping in your hands you produce a sound that trigger the echo and unstuck you from an infinite waiting. The simplest solution is to have a timeout in your software (if you ise Arduino's pulseIn the default timeout is 1 second but you can specify it in microseconds, just look at the documentation), and then, if you trigger the timeout (with pulseIn it returns 0 when timeout occurs), you know that you'll be stucked. At this moment, you have a very simple solution : just switch pinMode on Echo to OUTPUT, and send a LOW pulse, then go back to INPUT. By ding this you simulate an echo and the sensor chip will be unstucked !
I can give code if anybody need

Matthieu DEWAVRIN October 11, 2016 at 9:01 AM

This comment has been removed by the author.

Unknown October 11, 2016 at 9:36 AM

That would be appreciated!

David Sanz Kirbis October 11, 2016 at 9:36 AM

Great info, thanks!

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Matthieu DEWAVRIN December 5, 2016 at 3:36 PM

For those who asked for code, here it is !
It's really simple

```
int getDistance(int trigPin, int echoPin) // returns the distance (cm)
{
long duration, distance;

digitalWrite(trigPin, HIGH); // We send a 10us pulse
delayMicroseconds(10);
digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH, 20000); // We wait for the echo to come back, with a timeout of 20ms, which corresponds approximately to 3m

// pulseIn will only return 0 if it timed out. (or if echoPin was already to 1, but it should not happen)
if(duration == 0) // If we timed out
{
pinMode(echoPin, OUTPUT); // Then we set echo pin to output mode
digitalWrite(echoPin, LOW); // We send a LOW pulse to the echo pin
delayMicroseconds(200);
pinMode(echoPin, INPUT); // And finaly we come back to input mode
}

distance = (duration/2) / 29.1; // We calculate the distance (sound speed in air is aprox. 291m/s), /2 because of the pulse going and coming

return distance; //We return the result. Here you can find a 0 if we timed out
}
```

Matthieu

ardublog April 1, 2018 at 1:02 PM

Matthieu, please, can you deliver that code? Or your code is similar to the Fardenco?
Thanks in advance.

Matthieu DEWAVRIN April 2, 2018 at 3:05 AM

Hi, in fact I am Fardenco, I don't know why my name was changed to my pseudo when I posted this comment
So this is indeed the code I was talking about ;)

Ricard April 27, 2019 at 3:09 PM

Thanks!!

Reply

Unknown July 7, 2015 at 5:28 PM

Thank you very much, the same problem has been resolved.

Reply

Unknown July 31, 2015 at 9:00 PM

Thanks!!!! same problem with 13 hc-sr04

Reply

Unknown July 31, 2015 at 9:01 PM

Thanks!! same problem with 13 hc-sr04

Reply

Chris Hoffman October 28, 2015 at 7:18 PM

that worked. Thanks!

Reply

dessa March 15, 2016 at 3:28 PM

it works, but sensitivity goes down - now it senses only up to 30 cm.
I have idea to put transistor key triggered from one more arduino pin in case no pulse is

received - maybe that could also work.

Reply

Jose Luis October 17, 2016 at 3:38 AM

After testing my code and spending some time debugging i found your guide and it worked for me, nice hack, i attached a picture
https://postimg.org/image/5e7et2nm5/

Reply

Replies

David Sanz Kirbis October 17, 2016 at 6:38 AM

Nice!

Unknown October 19, 2016 at 11:43 AM

Matthieu can u post the code u used to fix the sensor??

Matthieu DEWAVRIN December 5, 2016 at 3:37 PM

Hi, I just posted if above ;)

Reply

2cool November 12, 2016 at 12:36 PM

Thanks.

Reply

Replies

David Sanz Kirbis November 12, 2016 at 11:36 PM

:)

Reply

محمود قرطاس January 1, 2017 at 12:00 AM

Thanks bro it works :D

Reply

G4ttuz0 January 1, 2017 at 12:06 AM

thanks bro it works :D

Reply

Paolin September 26, 2017 at 1:09 PM

not work ....

Reply

Unknown October 2, 2017 at 4:05 AM

my hc-sr04 shows wrong/random reading.This happened after my first usage. first it was right now its a random number reading. any help would be appreciated.

Reply

Replies

Unknown December 16, 2017 at 12:33 AM

It also happened to my sensor.

Reply

Albert October 20, 2017 at 10:56 AM

works great, thanks

Reply

=>Mike January 8, 2019 at 1:50 PM

Brilliant, thanks!

Reply

rupam February 15, 2019 at 7:50 AM

can i use 1k resistor insted of 10k resistor

Reply

Replies

David Sanz Kirbis February 17, 2019 at 12:21 PM

I guess so, just try

Reply

Erik June 19, 2019 at 12:41 PM

Mine seems to get stuck at 4cm. Do you think this would help?

Reply

Replies

David Sanz Kirbis June 19, 2019 at 11:13 PM

I don't know if it will work for you. However, this sensor range is supposed to start at 5cm, so check your code first.

Reply

Unknown August 8, 2019 at 8:44 AM

Bought some HC-SR04 just few days ago. Wouldn't work with above solution. However they work when inverting the trigger signal. I have the trigger high all time and pull it low for 20 µs. Then the pulse length of the echo shows the distance.

More about this version of HC-SR04
Though the board looks the same on first glance the layout is a bit different. The ICs on U3 is RCWL-9200 where I did not find any datasheet for and U1 is a LM324 XJS 834H.

First I watched the signal of trigger and echo on an oscilloscope driving it the regular way. When pulling the trigger high it looked like charging an capacitor and within 20µs did not reach more than 2V, while at the same time the echo was following the trigger signal. Really looked confusing. Now with keeping the trigger high and triggering by pulling low it looks perfect with sharp edges on the signals.

Reply

Replies

David Sanz Kirbis August 8, 2019 at 12:56 PM

Thanks for the feedback and info!

Reply

Unknown August 29, 2019 at 9:15 AM

It Works! Thanks!

Reply

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