ENGR 3421: ROBOTICS I

Introduction to Linux

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Outline

outline

Story of Linux

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Hello everybody out there using minix -

I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things).

I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)

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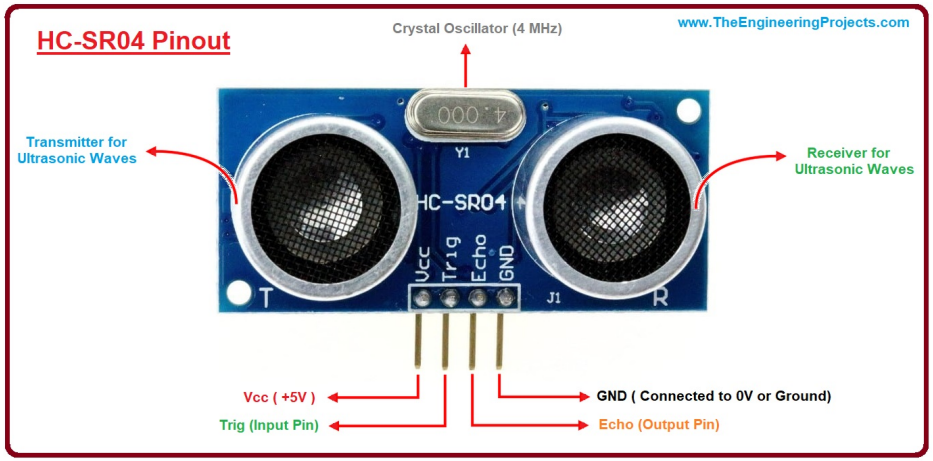
PS. Yes - it's free of any minix code, and it has a multi-threaded fs. It is NOT protable (uses 386 task switching etc), and it probably never will support anything other than AT-harddisks, as that's all I have :-(.

Linux Distros

Distro is a complete operating system based on the Linux kernel that contains a bunch of packages and libraries.

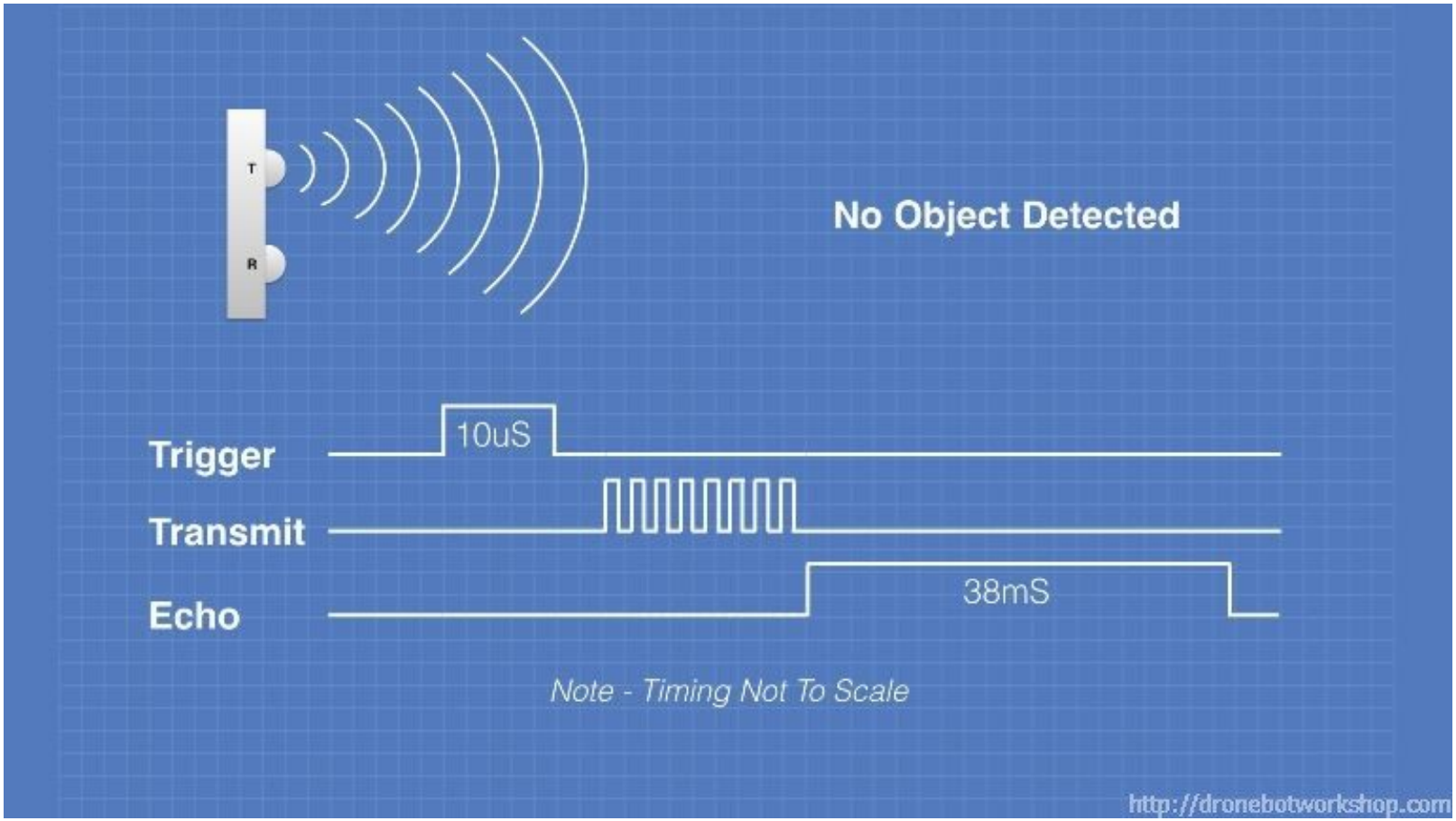
- Debian(for home users)
- Redhat(for enterprises)
- Slackware
- Android

HC-SR04

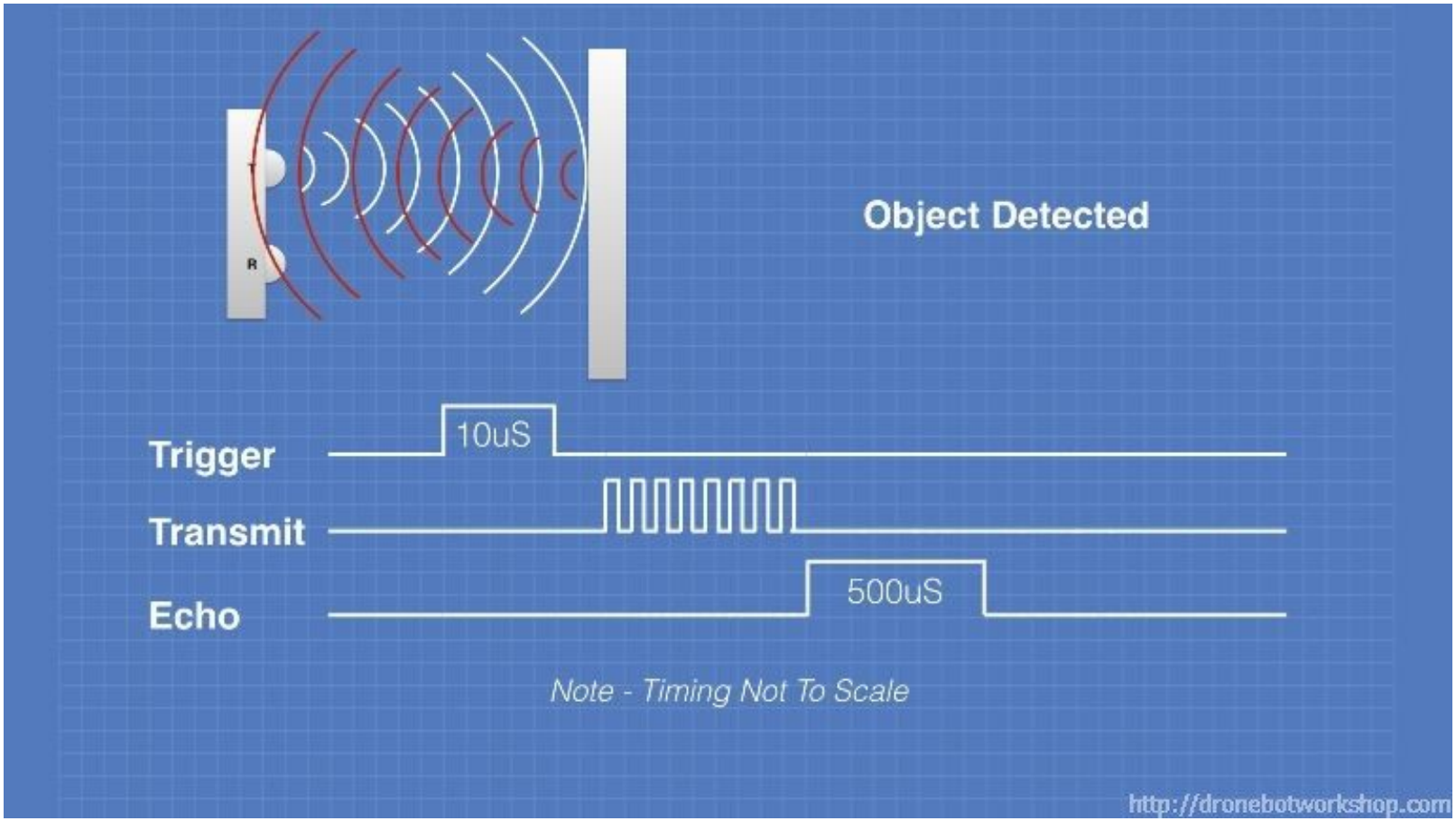


Operating Voltage	5 V
Operating Current	15 mA
Ultrasound Frequency	40 kHz
Max Range	4 m
Min Range	2 cm
Ranging Accuracy	3 mm
Measuring Angle	15 degree

HC-SR04 - No Object Detected



HC-SR04 - Object Detected



$$distance = \frac{Speed \times Time}{2} = 0.034cm/\mu s \times 500\mu s \times 0.5$$

HC-SR04 Workflow

1. A 5 volt pulse of at least 10 μS (10 microseconds) in duration is applied to the Trigger pin.
2. The HC-SR04 responds by transmitting a burst of eight pulses at 40 KHz. This 8-pulse pattern makes the "ultrasonic signature" from the device unique, allowing the receiver to discriminate between the transmitted pattern and the ultrasonic background noise.
3. The eight ultrasonic pulses travel through the air away from the transmitter. Meanwhile the Echo pin goes high to start forming the beginning of the echo-back signal.
4. If the pulse in NOT reflected back then the Echo signal will timeout after 38 mS (38 milliseconds) and return low. This produces a 38 mS pulse that indicates no obstruction within the range of the sensor.
5. If the pulse IS reflected back the Echo pin goes low when the signal is received. This produces a pulse whose width varies between 150 uS to 25 mS, depending upon the time it took for the signal to be received.
6. The width of the received pulse is used to calculate the distance to the reflected object. Remember that the pulse indicates the time it took for the signal to be sent out and reflected back so to get the distance you'll need to divide your result in half.

HC-SR04 Limitations

- Object too far.
- Object too small.
- Object with soft irregular surface.
- Effect of temperature and humidity. A more accurate distance calculation:
  $Speed(m/s) = 331.4 + (0.606 * Temp) + (0.0124 * Humidity)$
- Ultrasound may annoying to animals. Please consider your furry friends (Check the hearing range list).

Voltage Divider