

TECHNICAL INFORMATION REPORT

Equipment List

1. UNO R3 Starter Kit
2. HC-SR04 Ultrasonic Distance Sensor Module
3. Piezoelectric Ceramic Vibration Sensor
4. Wi-Fi module Node
5. 1N4007 Diode
6. 47uF Capacitor
7. 1k ohm Resistor

Details of Equipments

1. **UNO R3 Starter Kit 400:** It features a UNO R3 microcontroller, 400 Point Mini Breadboard, LEDs, jumper wires and push buttons.
 - **UNO R3 Board:**
Microcontroller: UNO R3
Operating Voltage: Typically 9 V.
Digital I/O Pins: 14 (of which 6 provide PWM output).
Analog Input Pins: 6.
Flash Memory: 32 KB.
SRAM: 2 KB.
EEPROM: 1 KB.
Clock Speed: 16 MHz.
 - **400 Point Mini Breadboard:**
Size: Compact, around 84 x 55 mm.
Features: Solderless breadboard with 400 tie-points, ideal for prototyping without soldering.
 - **LEDs:**
Voltage: Typically around 2V to 3.2V.
Current: Generally 10-20 mA.
 - **Jumper Wires:**
A mix of male-to-male, male-to-female, and female-to-female.
Length: Various lengths to facilitate flexible connections.
Purpose: Used for making connections between the Arduino, breadboard, and other components.
 - **Push Buttons:**
Type: Momentary push buttons.

Function: To create a digital input for the Arduino when pressed.

- **Estimated Delivery Time:** 5 days
- **Source :** [Arduino UNO](#)

2. HC-SR04 Ultrasonic Distance Sensor Module: Ultrasonic waves are used to measure the distance to an object. It sends out an ultrasonic sound pulse and receives the echo reflected back from the object. The time period between sending the signal and getting the echo is utilized to calculate distance. $\text{Test distance} = (\text{time period} * \text{sound velocity} (340\text{M/S}) / 2$.

- **Operating Voltage:** Typically 5V DC.
- **Measuring Angle:** Approximately 15 degrees.
- **Range:** Effective measuring range is usually between 2 cm to 500 cm (approximately 0.8 inches to 16 feet).
- **Resolution:** Around 0.3 cm.
- **Frequency:** Ultrasonic frequency is about 40 kHz.
- **Dimensions:** Compact size, often around 1.5 x 4.5 x 3 cm (length x width x height).
- **Estimated Delivery Time:** 5 days
- **Source :** [Ultrasonic sensor](#)

3. Piezoelectric Ceramic Vibration Sensor : A piezoelectric transducer that reacts to variations in strain by producing a detectable output voltage change that is proportionate to the vibration strength buffered by this ceramic piezo vibration piece sensor. The piezoelectric ceramic shock produces an electrical signal when the controller analog port detects even minute vibration signals.

- **Working Voltage:** 3.3V or 5V.
- **Working Current:** 1mA.
- **Size :** 15.3 x 8.1 x 2.1 cm
- **Interface Type:** Analog Output
- **Mounting type :** Snap In Mount
- **Model number :** DR-US-019
- **Estimated Delivery Time:** 5 days
- **Source :** [Piezoelectric sensor](#)

4. Wi-Fi module Node-MCU ESP8266 : ESP8266 CP2102 NodeMCU ESP-12E WIFI serial wireless module is an open source Lua based firmware, ultra low cost WI-FI modules, development boards for rapid prototyping, integrated with ESP8266 WIFI chips.

- **Microcontroller:** ESP8266 ESP-12E
- **Connectivity technology :** Wi-Fi, I2C, GPIO

- **Flash Memory:** 4 MB
- **Clock Speed:** 80 MHz
- **Wireless communication standard :** 802.11b
- **Digital I/O Pins:** 11
- **Analog Input Pins:** 1
- **Size :** 10.7 x 7.3 x 1.9 cm
- **Estimated Delivery Time:** 5 days
- **Source :** [Wi-Fi module](#)

5. 1N4007 Diode :

- Used for rectification purposes.
- **Average Rectified Current-Max:** 1A
- **Forward Voltage:** 1V
- **Reverse Voltage-Max [Vrrm]:**1000V
- **Reverse Current-Max:** 5 μ A
- **Peak Current-Max:** 30A
- **Package Style:** DO-41 (DO-204AL)
- **Estimated Delivery Time:** 7 days
- **Source :** [1N4007 diodes](#)

6. 47uF Capacitor: By means of alternating current, the aluminum electrolytic capacitor can prevent direct current flow.

- **Capacitance :** 47 Microfarad
- **Rated working voltage :** 6.3V to 50V
- **Capacitance Tolerance:** $\pm 20\%$ (120MHZ,+20°C)
- **Material :** Aluminum
- **Size :** 6x12mm/0.24x0.47 inch
- **Shape :** Round
- **Estimated Delivery Time:** 7 days
- **Source :** [47uF Capacitor](#)

7. 1k ohm Resistor: 1k Ohm to limit the current through the circuit.

- **Power :** 1 Watt
- **Material :** Metal film
- **Resistance Tolerance:** $\pm 1\%$ tolerance.
- **Estimated Delivery Time:** 5 days
- **Source :** [1k ohm Resistor](#)

Cost

No.	Component	Quantity	Cost(CAD)
1	UNO R3 Starter Kit	1	65
2	HC-SR04 Ultrasonic Distance Sensor Module	1	20
3	Piezoelectric Ceramic Vibration Sensor	1	15
4	Wi-Fi module Node	1	15
5	1N4007 Diode	1 pk	8
6	47uF Capacitor	1 pk	20
7	1k ohm Resistor:	1 pk	15
8	Miscellaneous		40

The project is expected to cost a total of \$200, including materials and other miscellaneous expenses.