Ultrasonic Sonar Module

Hardware Manual Rev 1r0

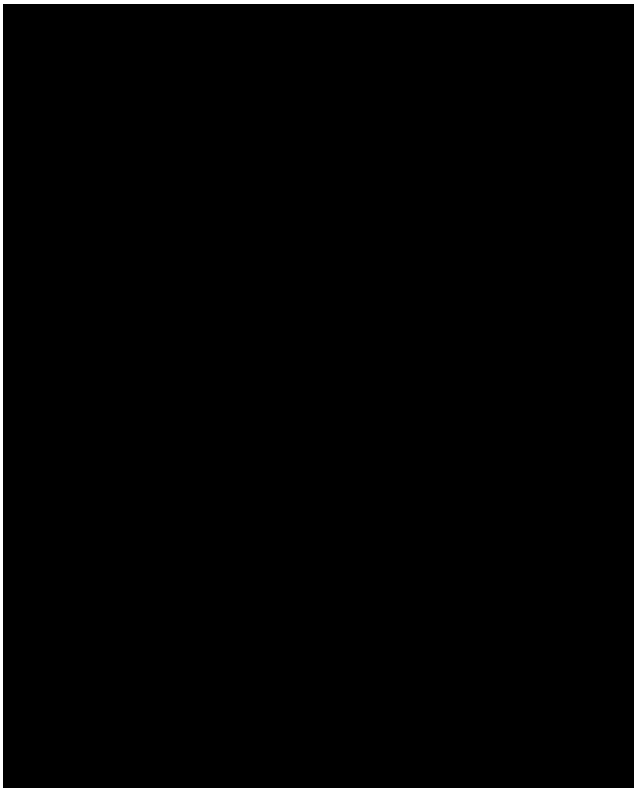

Figure 1. *major Components.*

Important: JP1 is normally OPEN (uninstalled).

Features:

Table 1.

Pin No.	*ID*	*Description*
	T	T G
4	G	
	G	

NOTE:

TIMING DIAGRAM

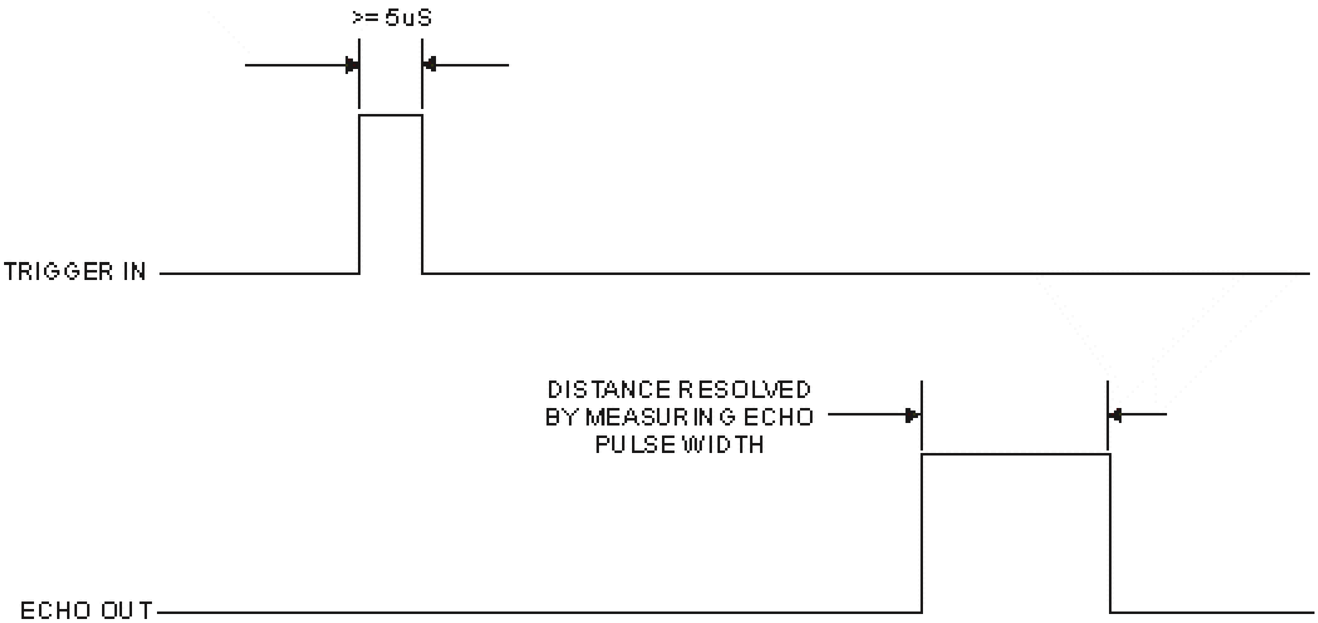

Figure 2.

RESOLVING DISTANCE

As the timing diagram shown in figure 2 illustrates, distance measurement is initiated by activating the trigger input with with a pulse. The US-100 will respond with a echo output pulse. The echo response pulse width corresponds to the time it takes for the ultrasonic sound to travel from the sensor to the object and back. Hence the distance from the object can be computed by:

Distance = Pulse Width * Speed of Sound / 2

A pulse width value greater than 60mS indicates an out of range condition.

The actual speed of sound depends on several environmental factors, with temperature having the most pronounced effect. The speed of sound in dry is determined approximately by:

V = 331.4 + 0.6T m/s

But one of the feature of US-100 is its built-in temperature compensation. Hence, with temperature effect out of the equation, the distance formula is reduced to:

Distance = PulseWidth * 165.7 meters

Where: PulseWidth in seconds

DETECTION WINDOW CONSIDERATIONS

The US-100 has a detection pattern that spreads out from the sensor mouth at >15 degrees angle. One obvious and probably undesirable effect of this characteristics is the sensor will have an effective larger detection window the further away the object of interest is from the sensor. This will allow the sensor to “see” more objects, hence, will be increasingly distracted by other nearby objects, making it more prone to error.

Long distance detection requires the target object cross section be large enough for accurate and reliable detection.

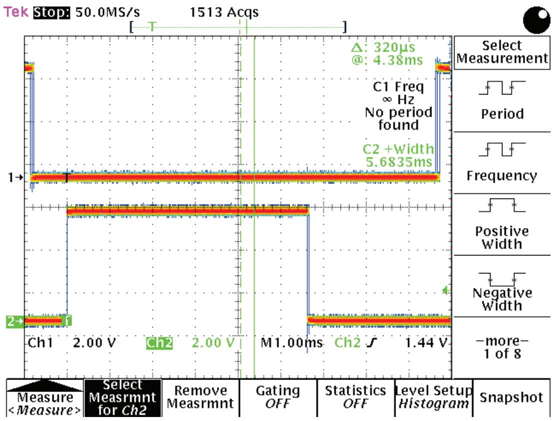

Figure 3.

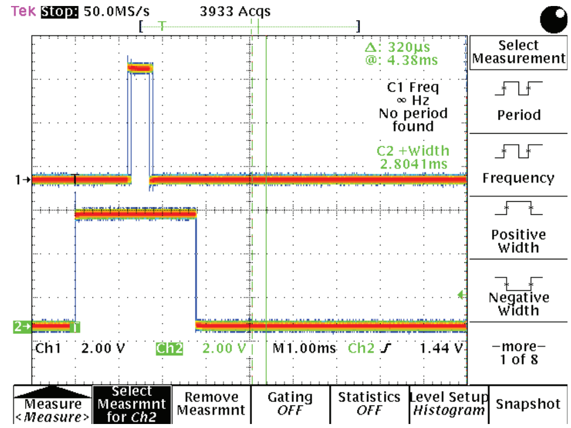

Figure 4.

APPLICATION HINTS

T S/00 F c c c c c c

T S/00 /O c A F c S/00 c

Figure 5.

gizDuino Wiring and Demo Code

```
// Demo sketch
// This sketch will output distance info via the UART port

// port assignment
// change as may be necessary
        const   int trigger=6;
        const   int echo=7;
        float   distance;

void setup(){
        Serial.begin(9600);
        pinMode(trigger,OUTPUT);
        pinMode(echo,INPUT);
}

void loop(){

// Trigger US-100 to start measurement
        // Set up trigger
        digitalWrite(trigger,LOW);
        delayMicroseconds(5);
        // Start Measurement
        digitalWrite(trigger,HIGH);
        delayMicroseconds(10);
        digitalWrite(trigger,LOW);
        // Acquire and convert to mtrs
        distance=pulseIn(echo,HIGH);
        distance=distance*0.0001657;
        // send result to UART
        Serial.println(distance);
        delay(50);
}
```

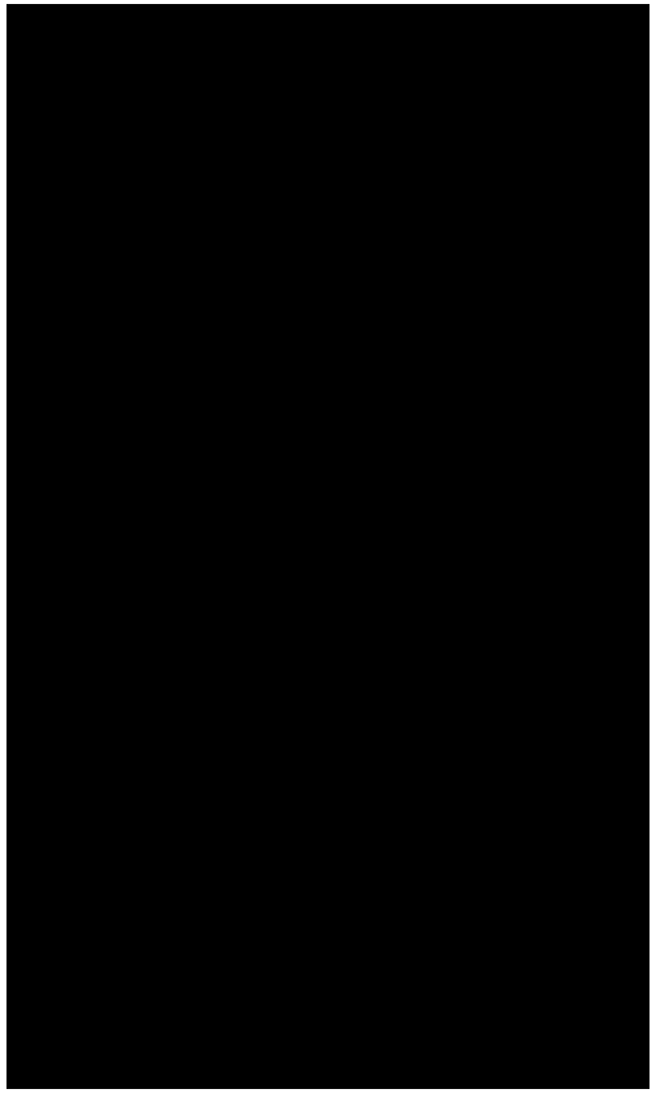

Figure 6. [illegible] *ports instead.*