Smart Sensor Ultrasonic Development Kit for Arduino®

SensComp's Smart Sensor Ultrasonic Development Kit for Arduino® provides a complete kit solution to simplify your product design and packaging.

Features

50 KHz Electrostatic Ultrasonic Smart Sensor with SMT Electronic Circuitry
Range: 1.5' – 35.0'

PWM (ECHO) Output

Arduino® UNO Microcontroller Board

I2C LCD Display Module

Part No.

PID# 620100LF

Benefits

- Compact Design
- Can be Triggered Internally or Externally
- Excellent Receive Sensitivity Using Our 600 Series Electrostatic Ultrasonic Transducer
- Preprogrammed Adruino® UNO Board
- Create Your Own Program Using the Standard Adruino® IDE
- See the Actual Distance to the Target on the Display
- Contains All Items to Develop and Demonstrate an Ultrasonic Sensor Application in a Convenient Kit
- Simple and easy to connect a Smart Sensor to an Arduino

Contents

1 – SensComp Instrument Grade *Smart Sensor
1 – Arduino® UNO Board (pre-programmed)
1 – LCD Display Module
1 – Power Supply 12VDC, 1 Amp
1 – USB 2.0 Cable
10 – Male to Female Jumper Wires (8 in. / 20cm)

*RoHS Compliant

Applications

Level Measurement, Proximity Detection, Presence Detection, Robotics, Product Development and Teaching Tool for Students and Hobbyists.

Description

The SensComp Smart Sensor is based on the ultra-sensitive Series 600 Electrostatic Ultrasonic sensor line with an enhanced version of our 6500 Ranging Module on board. Paired up with the Arduino® microcontroller board and LCD display module offers a quick way to experiment with and design ultrasonic systems.

The Smart sensor's TTL compatible open collector outputs include pullup resistors. Configuration of the onboard oscillator circuit enables the unit to be continually clocked at 5 Hz or can be externally clocked up to 50HZ.

The onboard digitally controlled gain and variable bandwidth amplifier minimizes noise and side lobe detection in sonar applications. The typical absolute accuracy is ±1% of the reading over the entire range.

This compact integrated design of SensComp's Series 600 Smart Sensor along with the Arduino® microcontroller board will expedite the product development process.

*For full specifications and instructions for the Smart sensor visit www.senscomp.com
*For additional information for the Arduino® UNO visit www.arduino.cc/

Series 600 Smart Sensor Specifications

Distance Range: 1.5 ft. – 35.0 ft. default

(0.5 ft. – 35 ft. capable)

Accuracy (over entire range) .... ± 0.1%

Beam Pattern......... See Graph (Typically 15° nominal)

Repetition Rate (astable)…………………5 Hz

May be externally triggered up to a 50 Hz rate

Output.................TTL Level PWM ECHO signal

Power Requirements………………………6 to 24 VDC

Max. Current………………… 55 mA (2A peak for .5mS)

Operating Temperature……………….…-0 to +70° C

(-32 to 158° F)

Dimensions:

Height...0.950 inch

Diameter...1.700 inch

**Mounting Diameter**..................................1.525 inch

Weight...19 grams (0.7 oz.)

For additional information about ultrasonic transducer specifications please visit our website www.senscomp.com

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Smart Sensor Wiring Information

Pin 1 – Power Supply ----------- Requires a +6 to +24 VDC regulated power source with a 100 mA current capacity, with short burst capability to 2 amperes during transmit.

Pin 2 – Common ----------------- Return for DC power supply, TTL outputs and clock signals.

Pin 3 – Echo Output------------- TTL compatible logic level output (0-5 VDC). Changes state when an echo signal is received.

Pin 4 – OSC Output ------------- TTL compatible logic level output (0-5 VDC). The internal 49.4 kHz oscillator output Note: this output is on only when the INIT signal (pin 5) is high.

Pin 5 – INIT Input ---------------- TTL compatible logic level input or output (see "Programmable Jumper"): Initializes a Transmit/receive cycle on the low to high transition. This signal must remain high for the duration of the target detection period.

Pin 6 – BINH Input-------------- TTL compatible logic level input: Enables multiple target detection when high. Leave un-connected or connected to pin 2 for normal operation.

Pin 7 – BLNK Input ------------- TTL compatible logic level input. This input, when high, resets the receiver's threshold so that multiple echoes' can be detected after a single transmit. Leave un-connected or connected to pin 2 for normal operation.

Programmable Jumper ------- Internal 5 Hz repetition rate selected when jumper installed. Remove for external INIT input. When connected, an internal oscillator provides the INIT signal, and the INIT pin is an output.
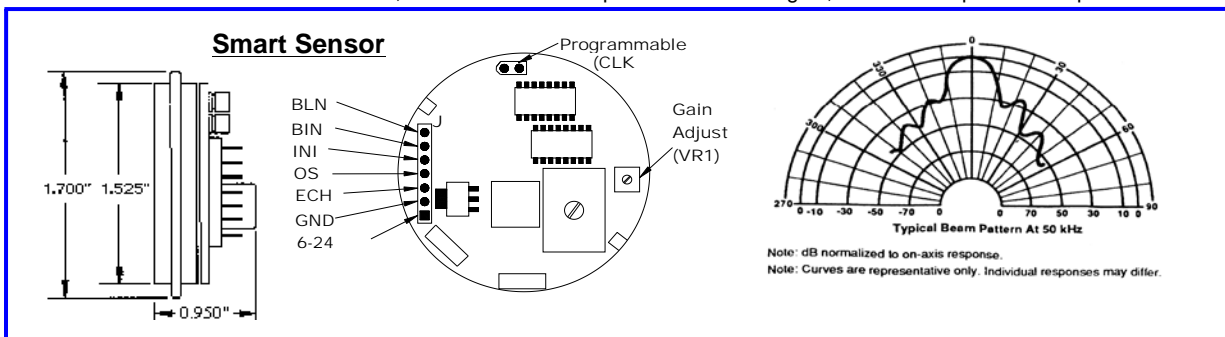
Power Pak

Parameter	Conditions	Min	Nom	Max	Units
Input Voltage		90.0	120.0	264	VAC
Input Frequency		47.0	60.0	63.0	HZ
Inrush Current	Peak measured @ 240 VAC, full load, 25°C, Cold Start			60.0	A
Power Dissipation	Input: 100 ~ 120 VAC; Output: No load			0.075	W
Output Voltage		11.4	12.0	12.6	VDC
Output Current		0.0		1.0	A
Power				12.0	W
Ripple & Noise			120.0		mVp-p

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For more information, visit www.senscomp.com   THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. SEE DISCLAIMER NOTICE AT THE END OF THIS DOCUMENT.

Arduino® Microcontroller Board

Arduino® Uno is a microcontroller board based on the ATmega328P. It is an open-source electronics platform based on easy-to-use hardware and software. Arduino® boards have 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller. Simply connect it to a computer with the supplied USB cable or power it with an AC-to-DC adapter for additional power needed to drive interfaced circuits such as the SensComp Smart Sensor or other Shields designed for use with the Arduino® board.

SensComp offers the Arduino® board in a convenient simple to use, plug and play kit with everything you need to get started learning and developing your ultrasonic detection system. The Arduino® board has been preprogrammed with the code needed to operate the SensComp Smart Sensor and display the distance from the sensor to a detected target on the I2C LCD Display Module. Although the code is pre-loaded on the Adruino® board, to upload the operating code to the Arduino® board see instruction below.

Arduino® UNO is manufactured by Arduino LLC. SensComp has added a program to the Arduino® microcontroller board. The Smart Sensor is manufactured by SensComp. Arduino® & SensComp are not related entities.

Kit Assembly/Operation Instructions

Remove all the components from the box, unpack and confirm all the contents.

1.) Using the jumper wires that were provided in the kit (pull each wire apart so you have 10 separate wires) connect the Smart Sensor, Arduino® board and LCD display together following the wiring diagram on page 4. Make sure that you pay attention to the correct locations of the wires.
2.) Plug the AC/DC Wall Adapter power supply into the wall outlet. Now plug the other end into the power jack of the Adruino® board. The Smart Sensor will start ticking. The display will cycle the intro message and then display the distance that is being measured by the Smart Sensor to the target being detected. If using a high-power USB connection from your computer, it may supply enough power to drive the Smart Sensor, Arduino® board and LCD Display; but it is recommended to use the wall adapter power supply.
3.) Place a flat target in front of the sensor and move it back and forth towards and away from the sensor. You will see the distance changing on the LCD display.

Uploading the Ping_SMRT Code to Arduino® Board

To upload code to your Adruino® board you must first have the open-source Arduino® Software (IDE) loaded on your computer. You can find this on the *Arduino® website* www.arduino.cc/en/Main/Software.
You also need to download the source code file Ping_SMRT.ino found on the SensComp website at the following link. www.senscomp.com/Downloads/Ping_SMRT . This is for operating the Smart sensor with the Arduino® board.

These instructions are for a Windows operating system based computer.

1.) Plug the USB cable into a USB port on your computer and into the Adruino® board.
2.) Windows will recognize the Adruino® board and automatically install the drivers for the device if not already previously installed.
3.) Now go to the start menu and right click on My Computer, then select properties.
4.) Click on Device Manager and then expand the ▷Ports: menu. You should see the Adruino® board listed and the port that was assigned to it. Note the port number.
5.) Open the Adruino® IDE program.
6.) On the tool bar, select <Tools> and then <Board:> ; Select the Adruino® /Genuino Uno.
7.) On the tool bar select <Tools> and then <Port:> ; now select the port that was assigned to the Adruino® board by Windows.
8.) Verify you have the following libraries installed in the Arduino® IDE. On the tool bar select <Sketch> then <Include Library>,also both "Wire" and "Liquid Crystal I2C" should be on the list. If these are listed, skip step 9 and 10 and go to step 11.
9.) If you need to add to the library, go to the tool bar and select <Sketch> then <Include Library> and then <Manage Libraries> and you see the available library names you can add.
10.) Find the library name that you want to add and click on <More info>, then click on <Install>. Repeat this for each library you want to add to the library list.
11.) On the tool bar select <File> and then <Open>; locate the file location you stored the file Ping_SMRT.ino and select and open it.
12.) On the tool bar select <Sketch> and then <Upload> or click on the Upload icon ➡.
13.) On the bottom of the screen, you will see "Compiling Sketch"; "Uploading" and then "Done Uploading".
14.) The program should start running and the Smart Sensor's detected range will be seen on the LCD display. You may need to press the reset button on the Adruino® board to start the program running.

Wiring Diagram
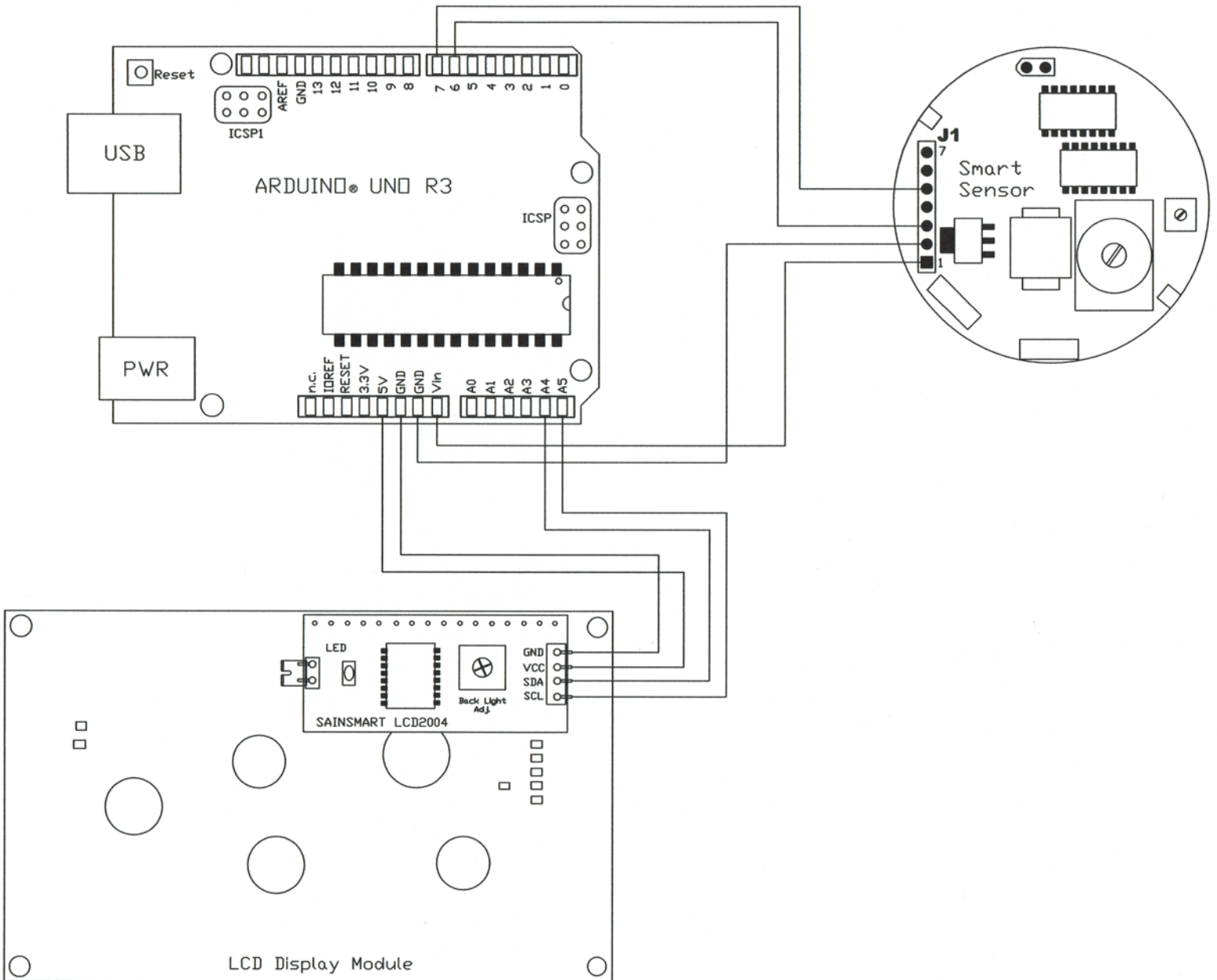
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