

# EV\_MOD\_CH201 Evaluation Module User Guide

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## **1 SCOPE AND PURPOSE**

This document details the specification, programming and operation of an EV\_MOD\_CH201-00-01 (referred to as the EV\_MOD\_CH201 in the remainder of this document) ultrasonic sensor evaluation module. This module board incorporates a CH201 Ultrasonic Sensor device with a 45° FoV acoustic housing assembly, a capacitor and an FFC connector.



**Figure 1. EV\_MOD\_CH201 Evaluation Module**

## 2 EV\_MOD\_CH201 EVALUATION MODULE BOARD

### 2.1 PIN ASSIGNMENTS

PIN	NAME	DESCRIPTION
1	INT	Interrupt output. Can be switched to input for triggering and calibration functions
2	SCL	SCL Input. I <sup>2</sup> C clock input. This pin must be pulled up to VDD externally.
3	SDA	SDA Input/Output. I <sup>2</sup> C data I/O. This pin must be pulled up to VDD externally.
4	PROG	Program Enable. This pin must be pulled down to ground externally.
5	RESET_N	Active-low reset. This pin must be pulled up to VDD externally.
6	VSS	Power return.
7	VSS	Power return.
8	VDD	Power supply input. Connect to externally regulated 1.8V supply

Table 1. EV\_MOD\_CH201 ZIF Connector Pin-Out

### 2.2 ELECTRICAL SPECIFICATIONS

Please refer to DS-000379 CH201 Datasheet for information on the device’s electrical characteristics. Please note that the datasheet covers CH201 part numbers with different suffixes. Regardless, the electrical specifications in the datasheet still apply.

### 2.3 SCHEMATIC

Electrical connection to the EV\_MOD\_CH201 module is via an 8-pin 0.5 mm pitch flat flex cable (FFC) connector. Part numbers for the FFC connectors and the recommended FFC cables are shown in Table 2. The electrical schematic of the module, including the connector pinout and the connections to the EV\_MOD\_CH201 sensor are shown in Figure 2. Note that the 0.1 μF decoupling capacitor, as recommended in the CH201 datasheet, is included in the module. Consult the CH201 datasheet and application notes for additional information on electrical connections and operation.

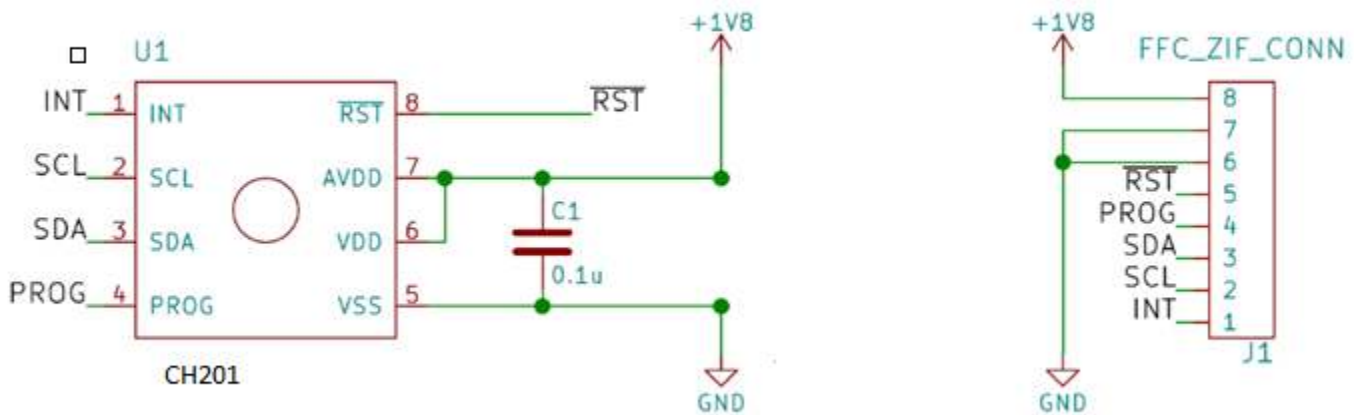


Figure 2. EV\_MOD\_CH201 Schematic

Each EV\_MOD\_CH201 requires its own PROG and INT lines, the remaining connections can be shared. (Refer to the CH201 datasheet for additional information.)

Module connections using a flat flex cable (FFC) are shown in Figure 3.

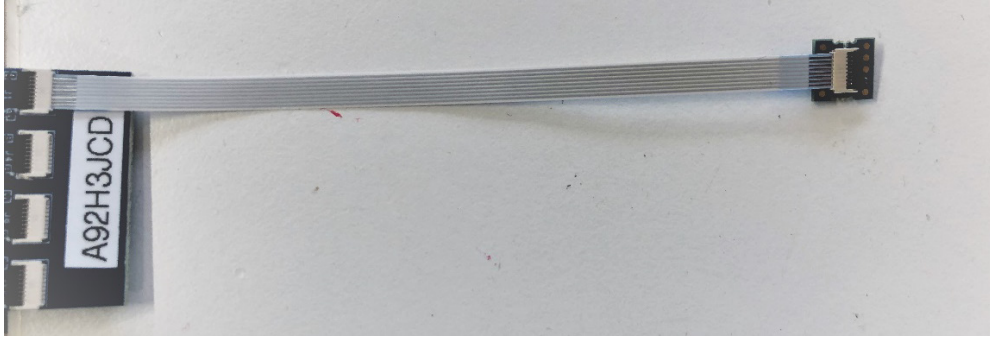


Figure 3. EV\_MOD\_CH201 Module Connection (EV\_MOD\_CH201 acoustic port is facing down)

FLAT CABLE CONNECTOR TYPE	<a href="#">Molex 503480-0800</a>
RECOMMENDED FLAT CABLE	<a href="#">Molex 151660073...151660094</a>

Table 2. Recommended Flat Flex Cable and Connector

## 2.4 BILL OF MATERIALS

QUANTITY	REFERENCE	PART	PCB FOOTPRINT	MANUFACTURER	MANUFACTURER PART NUMBER
1	PCB	PCB	NA		
1	U1	CH201-00	Custom – 8 Pin	TDK	CH201-00
1	C1	100n 6.3V 20% X7R 0402	0402	TDK	CGA2B1X7R1C104K050BC
1	J1	Connector, FPC-FFC, 8-Pin	8Pin, 0.5 mm Pitch	Molex	503480-0800

Table 3. Bill of Material

### **3 CONFIGURATION, PROGRAMMING, AND OPERATION**

Please refer to DS-000379 CH201 Datasheet for information on the device's electrical characteristics.

#### **3.1 CONFIGURATION AND PROGRAMMING**

Please refer to the following documents for configuration and programming information:

- AN-000154 SmartSonic Hello Chirp Hands-On Document
- AN-000175 SonicLib Programmers Guide

#### **3.2 OPERATION**

Please refer to the following documents for operating information:

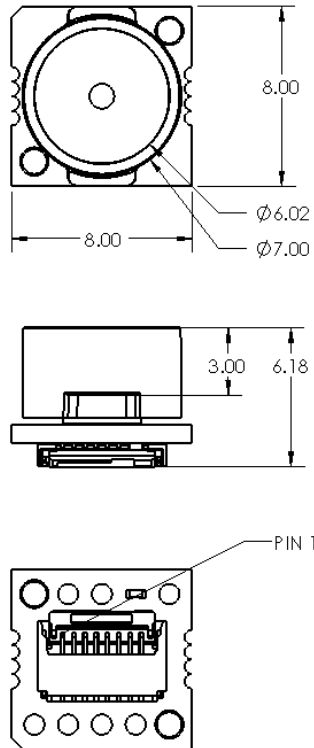
- AN-000155 CHx01 SonicLink Software Quick Start Guide
- AN-000180 CH101 and CH201 SmartSonic Evaluation Kit Users Guide
- AN-000227 SmartSonic Presence Detection Users Guide

## 4 MECHANICAL SPECIFICATIONS

DIMENSION	EV_MOD_CH201	UNIT
Acoustic port hole diameter	6	mm
Maximum width	8.15	mm
Maximum height	8.15	mm

**Table 4. Geometric Dimensions for EV\_MOD\_CH201**

The outer dimensions of the EV\_MOD\_CH201 assembly are shown in Figure 4. The acoustic port has a diameter of 6 mm and is in the center of the front face. During transducer operation the port must not be blocked. The port may only be covered by a particle ingress filter (PIF). Refer to AN-000221 CH201 Mechanical Integration Guide for information on particle ingress filters.

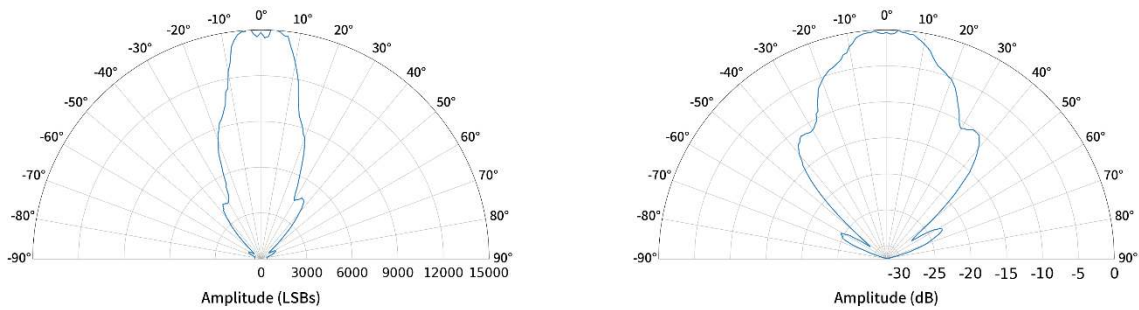


**Figure 4. Dimensions of the EV\_MOD\_CH201 assembly**

## 5 BEAM PATTERNS

### 5.1 BEAM PATTERNS

Pulse-echo beam-pattern plots of the EV\_MOD\_CH201 module are shown in Figure 5. This beam-pattern was measured by placing a 1m<sup>2</sup> target at a 30 cm distance from the CH201 module and recording the ToF amplitude as the sensor is rotated 180°. The plots are shown in both raw LSB units and normalized dB units, where 0 dB corresponds to the peak amplitude (15000 LSB) recorded on-axis. Chirp defines the field-of-view (FoV) as the full-width at half-maximum (FWHM) of the beam pattern; in other words, the FoV is the range of angles over which the amplitude remains above half the peak amplitude (or -6 dB). The sensor’s FoV is approximately 45°, and the pulse-echo amplitude diminishes relatively smoothly from 0° to ±22.5°.



**Figure 5. Representative beam pattern measurements of module (raw linear LSB units left, normalized dB right)**

### 5.2 ENCLOSURE MOUNTING

To ensure optimum acoustic performance, the front of the module (acoustic housing) should be flush with the enclosure’s surface. For further detail refer to AN-000221 CH201 Mechanical Integration Guide.



## 6 REVISION HISTORY

REVISION DATE	REVISION	DESCRIPTION
08/18/2020	1.0	Initial Release

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