

EV_MOD_ICU-20201-01

Evaluation Module User Guide

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1 SCOPE AND PURPOSE

This document details the specification, programming, operation, and basic performance of an EV_MOD_ICU-20201-01 ultrasonic sensor evaluation module. This module board incorporates the ICU-20201 Ultrasonic Sensor device with a 45° Field-of-View (FoV) acoustic housing assembly, PIF, two capacitors and an connector.



Figure 1. EV_MOD_ICU-20201-01 Evaluation Module

2 EV_MOD_ICU-20201-01 EVALUATION MODULE BOARD

2.1 PIN ASSIGNMENTS

Table 1. Connector Pinout

PIN	NAME	DESCRIPTION
1	VDD	Digital Logic Supply. Connect to externally regulated 1.8V \pm 5% supply.
2	GND	Ground
3	MUTCLK	External Input/Output 16x Operating Frequency Reference Clock (optional)
4	RTC_CLK/LFCLK	External Input/Output Low Frequency Reference Clock - 32.768kHz typical (optional)
5	INT2	Interrupt Request Open Drain Input/Output 2
6	INT1	Interrupt Request Open Drain Input/Output 1
7	CS_B	SPI Chip Select (active-low, from external SPI host)
8	MISO	MCU In Sensor Out serial data (to external SPI host)
9	MOSI	MCU Out Sensor In serial data (from external SPI host)
10	SCLK	SPI Interface Clock (from external SPI host) CPOL=1, CPHA=1
11	GND	Ground
12	VDDIO	I/O Power Supply. Connect to externally regulated 1.71V ~ 3.63V supply.
13	GND (pad)	Ground
14	GND (pad)	Ground

2.2 ELECTRICAL SPECIFICATIONS

Please refer to DS-000478 ICU-20201 Datasheet for information on the device's electrical characteristics. Please note that the ICU-20201 electrical specifications in the datasheet still apply with different suffixes.

2.3 SCHEMATIC

Electrical connection to the EV_MOD_ICU-20201-01 module is via a 12-pin 0.5 mm pitch flat flex cable (FFC) connector. The electrical schematic of the module, including the connector pinout and the connections to the ICU-20201 sensor, shown in Figure 2. Part numbers for the FFC connector and the recommended FFC cable correspond to the bill of materials listed in Section 2.4. Refer to the ICU-20201 datasheet and application notes for additional information on electrical connections and operation.

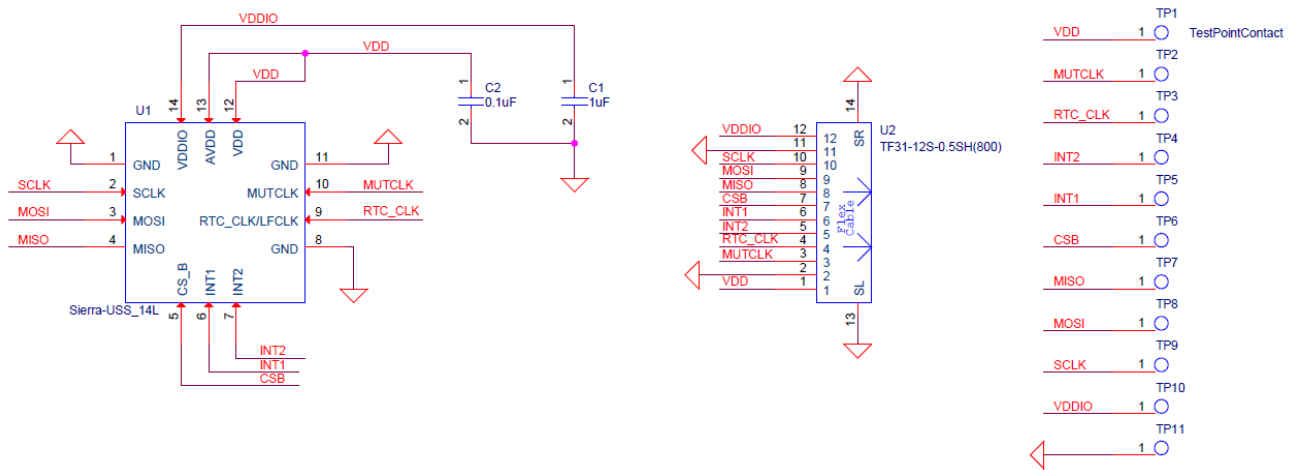


Figure 2. Schematic

2.4 BILL OF MATERIALS

Table 2. Bill of Material

QTY	REFERENCE	PART	PCB FOOTPRINT	MANUFACTURER	MANUFACTURER PART NUMBER
1	PCB	PCB, ICU-X201	N/A	TDK	100-06316
1	U1	ICU-20201	14-pin	TDK	ICU-20201
1	U2	CONN FFC 12POS 0.50MM SMD	12-pin, 0.50mm pitch	Hirose Electric Co Ltd	TF31-12S-0.5SH(800)
1	C1	CAP CER 1UF 16V 10% X6S 0402	0402	TDK	C1005X6S1C105K050BC
1	C2	CAP CER 0.1UF 25V 10% X7R 0402	0402	TDK	C1005X7R1E104K050BB
1		PIF, MESH		Saati	Acoustex B042HY (Custom)
1		ACOUSTIC HOUSING 45° FoV		TDK	AH-21029-045045-01

Table 3. Recommended Flat Flex Cable and Connector

FLAT CABLE CONNECTOR TYPE	Hirose: TF31-12S-0.5SH(800) Datasheet
RECOMMENDED FLAT CABLE	MultiComp Pro: MP-FFCA05123052A Datasheet

2.5 TEST POINT LOCATION

If FFC is not a viable solution, the PCB can be wired out using the test points on the PCB. See Figure 3 for test point location and refer to Figure 2 for schematic. For debugging purposes, a breakout board, 100-06407, can be requested to probe out each connection.

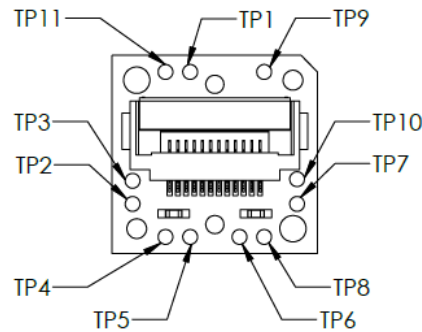


Figure 3. Test Point Location

3 MECHANICAL SPECIFICATIONS

3.1 MODULE DIMENSIONS

The outer dimensions of the EV_MOD_ICU-20201-01 assembly are shown in Figure 4. The acoustic housing mouth has a diameter of 6 mm. During transducer operation the port must not be blocked. The sensor's port may only be covered by a particle ingress filter (PIF).

Table 4. Geometric Dimensions for EV_MOD_ICU-20201-01

EV_MOD_ICU-20201-01	DIMENSION	UNIT
Acoustic port hole mouth diameter	6	mm
Maximum PCB width	12.15	mm
Maximum PCB length	12.65	mm

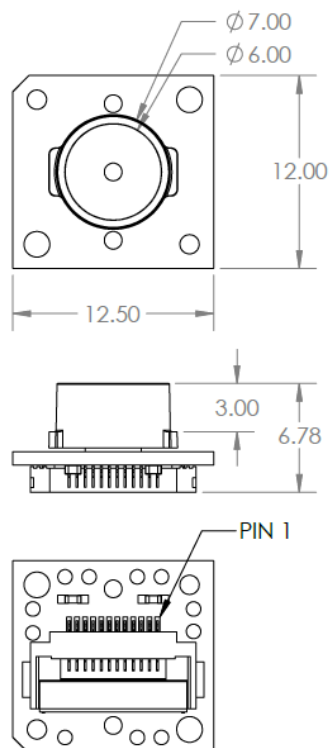


Figure 4. Dimensions of the EV_MOD_ICU-20201-01 Assembly

3.2 ACOUSTIC HOUSING

Please refer to AN-000337 CH201 and ICU-20201 Acoustic Housing Reference Designs for acoustic housing and beam patterns. See AH-21029-045045-01 profile section.

4 CONFIGURATION, PROGRAMMING, AND OPERATION

Please refer to DS-000478 ICU-20201 Datasheet for information on the device's electrical characteristics.

4.1 CONFIGURATION AND PROGRAMMING

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

- AN-000175 SonicLib Programmers Guide
- AN-000329 ICU-x0201 Hello Chirp Example User Guide

4.2 OPERATION

Please refer to the following documents for operation information:

- AN-000398 ICU-20201 EVK Platform User Guide

5 REVISION HISTORY

REVISION DATE	REVISION	DESCRIPTION
04/18/2022	0.1	Preliminary Release
8/18/2022	1.0	Release to production
1/18/2023	1.1	Update BOM and added Section 4. Minor fixes.

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