ICM-30670 Shield Hardware
User Guide
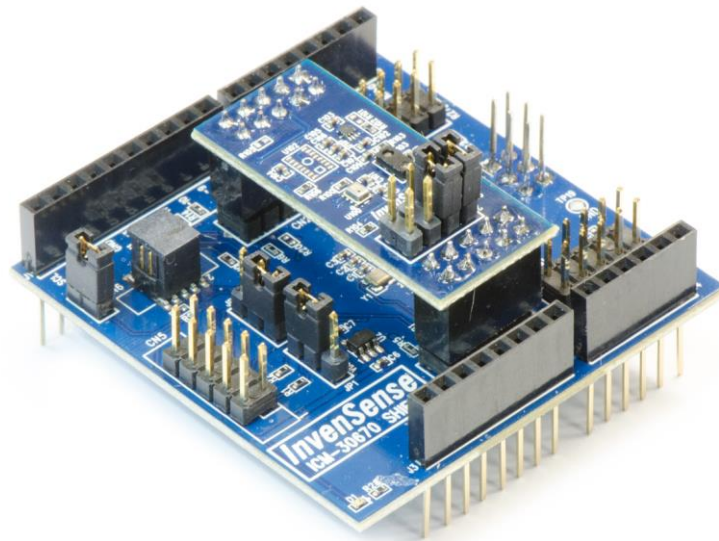
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ADDITIONAL USEFUL LINKS

INVENSENSE WEBSITE:

http://www.InvenSense.com/

ARDUINO WEBSITE:

https://www.arduino.cc/en/Guide/Environment

https://www.arduino.cc/en/Main/ArduinoBoardZero

https://www.arduino.cc/en/uploads/Main/Arduino-Zero-schematic.pdf

1. PURPOSE

The purpose of this document is to give an overview of the features of the ICM-30670 Shield hardware and the InvenSense Sensor Daughter Board (DB).

2. INTRODUCTION

The ICM-30670 Shield board and InvenSense Sensor DB are designed to be used with the Arduino Platform. The library and example sketch for Arduino Zero is available, and may also be used with other Arduino boards with minor changes.

3. ICM-30670 SHIELD

3.1. FEATURES

3.1.1. Connection to Sensor Daughter Boards

The shield board consists of 2 slots to install Sensor DB. Communication with the Sensors on DB is done via the Aux I2C port of ICM-30670.

3.1.2. Arduino Hardware SPI connection for Data Read / Write

The SPI communication from Arduino to ICM-30670 is done via the ICSP connector which CS is at Digital Pin 13 of Arduino.

3.1.3. External Oscillator

ICM-30670 requires an external 32.768KHz clock for RTC. The ICM-30670 Shield is integrated with an external oscillator Y2 to generate this clock. Essentially, the clock source can be an external crystal, the output from a host processor, or the PMIC on an application board.

3.1.4. Power Selection

Jumpers JP1 and JP2 provides power selection. Pin 1-2 of JP1 and JP2 must be shorted if 3.3V is used from Arduino. Switching to Pin 2-3 of JP1 and JP2 will enable power of shield board from 3.3V LDO on board which is connected to external 5V input at VIN of CN8 connector.

3.1.5. Debugging Connector

CN7 is used for programming and debugging the ARM cortex M0 processor of ICM-30670. Shunt MUST be installed on JP3 Pin 1-2 if debugging is not in progress.
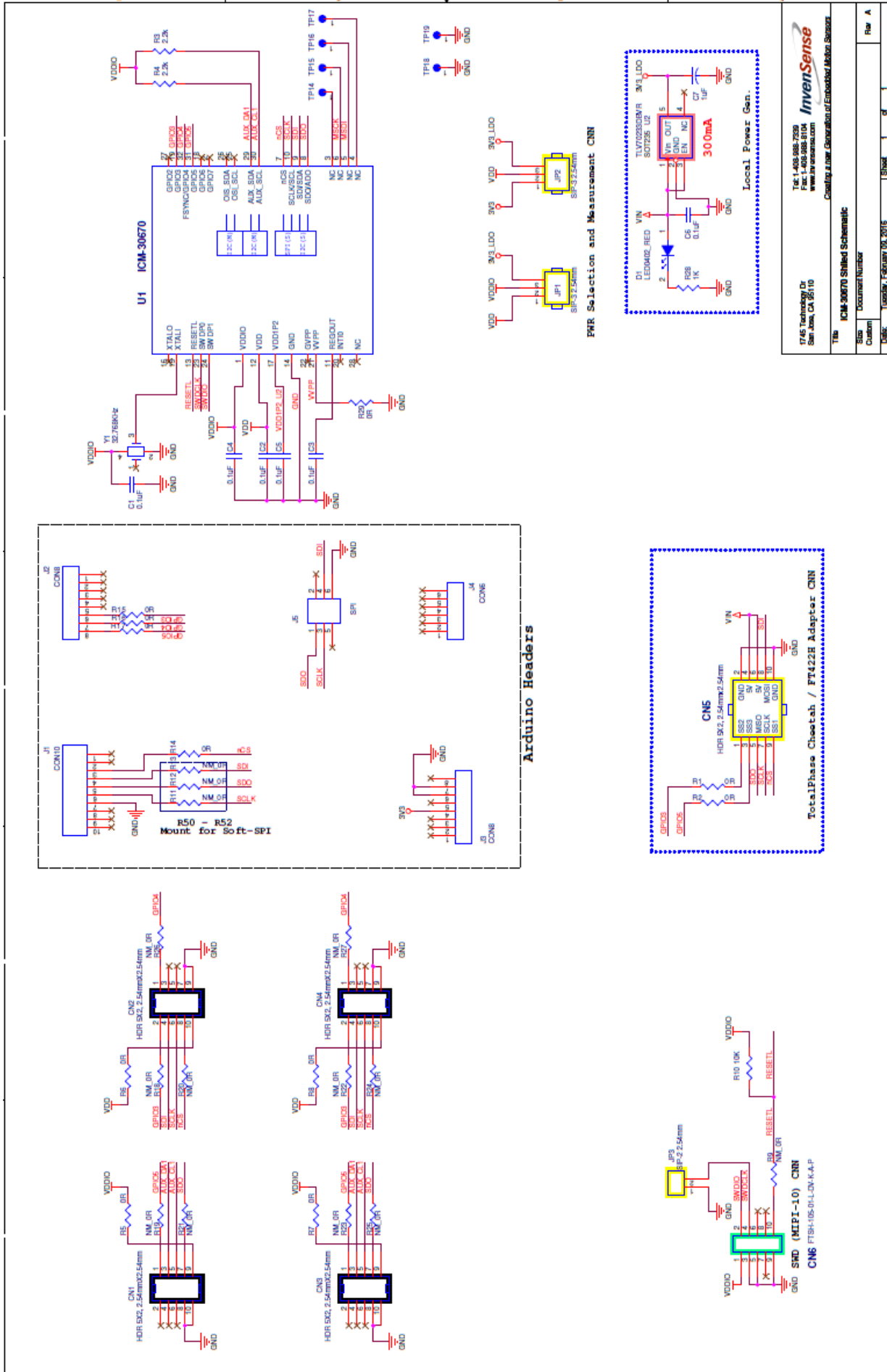
3.1.6. Cheetah Interface

Total-phase's Cheetah interface is an additional interface provided on ICM-30670 Shield board to program M0 flash via SPI interface if Arduino is not available.

3.2. ICM-30670 SHIELD BOARD IMAGE
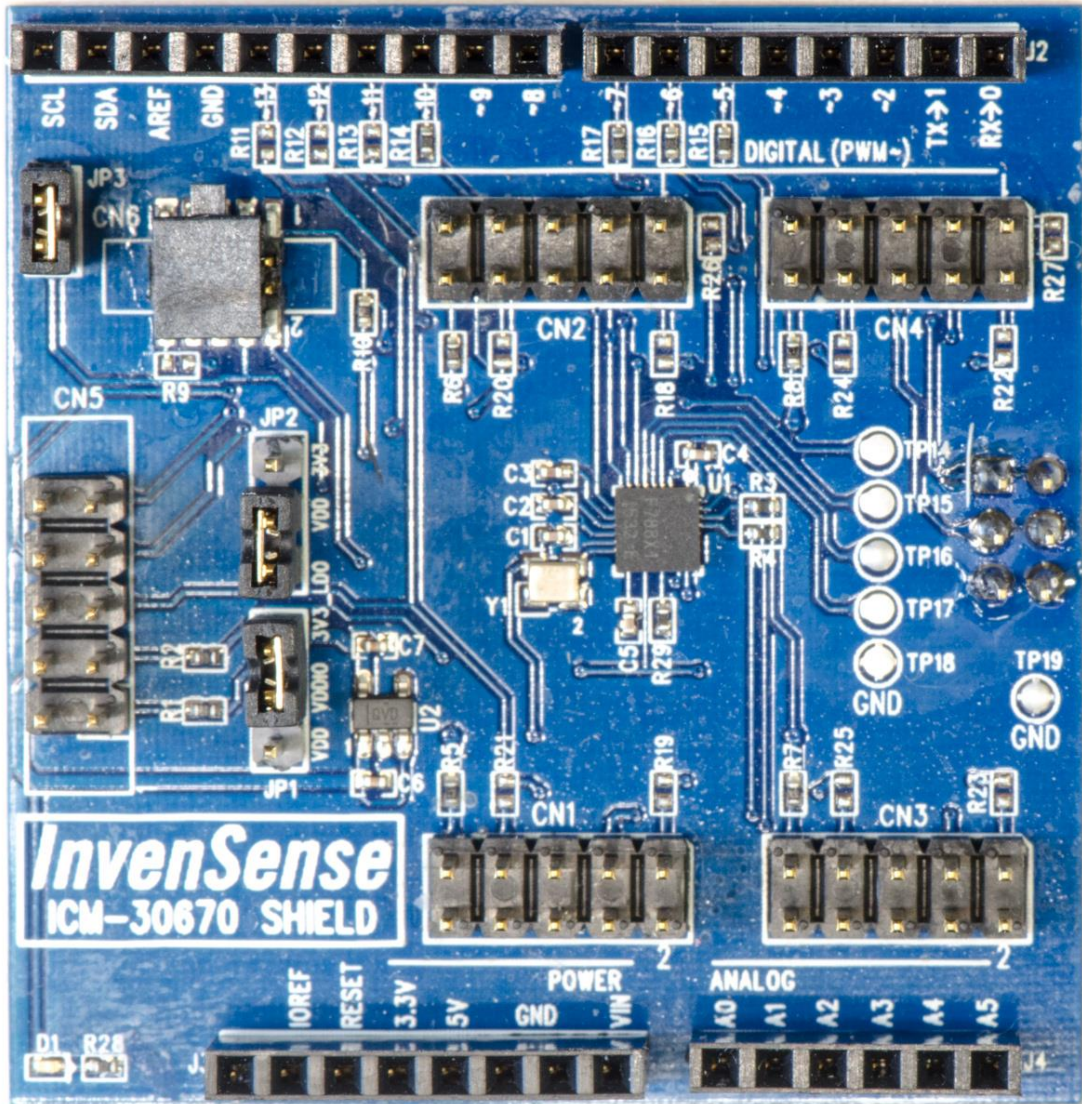
3.3. ICM-30670 SHIELD SCHEMATIC

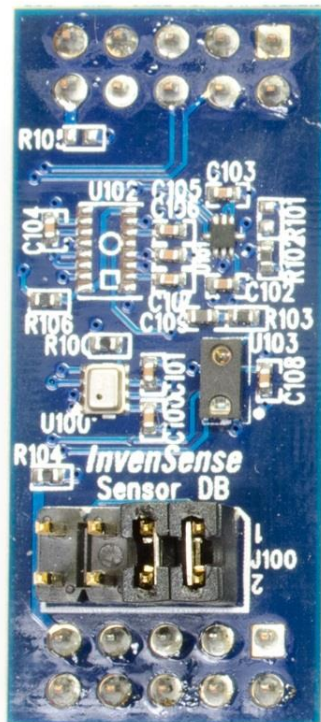# 4. INVENSENSE SENSOR DB

4.1. FEATURES

4.1.1. Sensors Detail

The InvenSense Sensor DB consists of 3 sensors including a magnetometer AKM-09911, Pressure sensor BMP-280, and a proximity sensor VCNL4040.
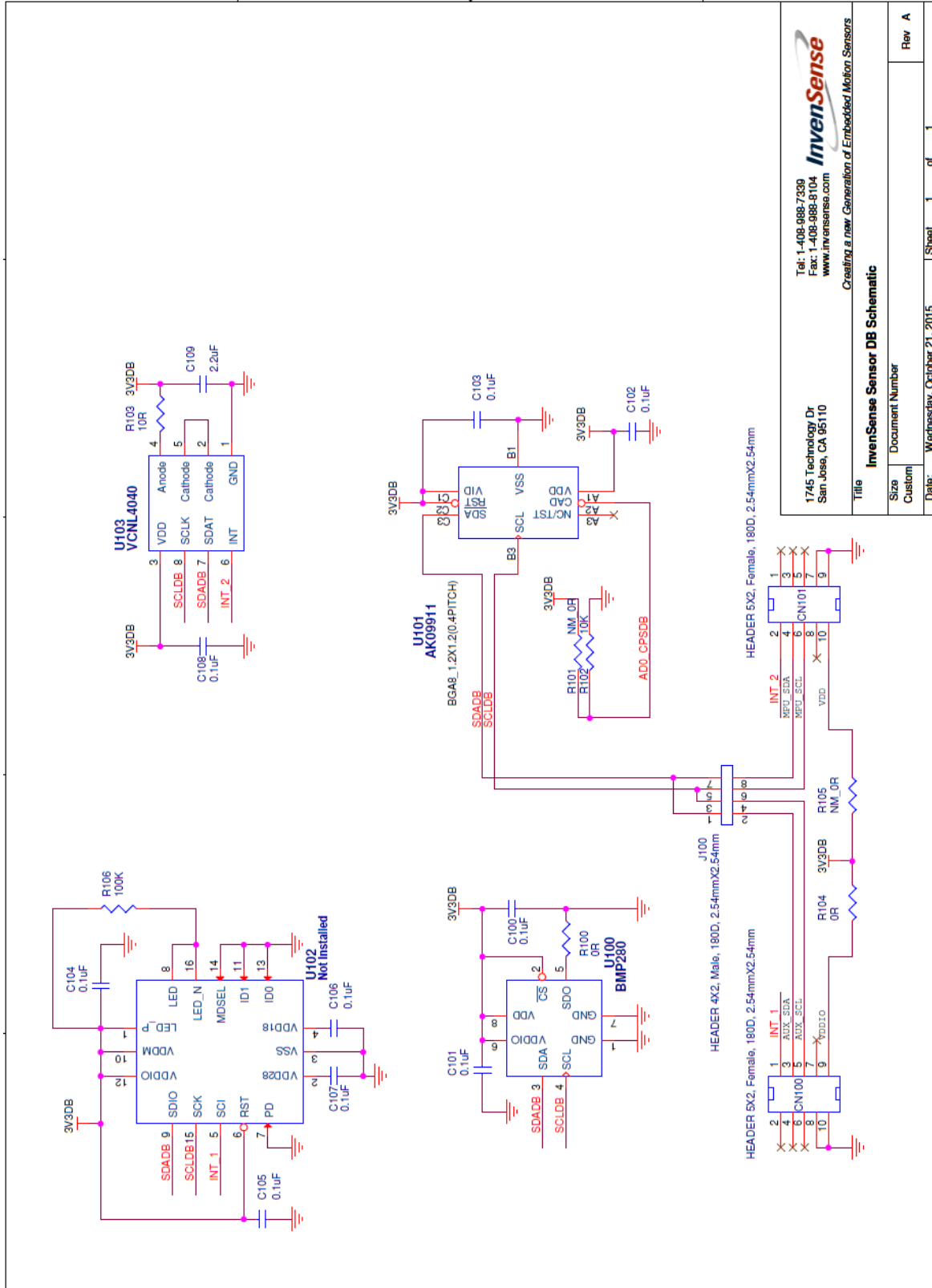
4.1.2. I2C selection

Sensor DB allows selection of communication via AUX I2C of ICM-30670 or Master I2C bus through J100.

4.2. SENSOR DB IMAGE
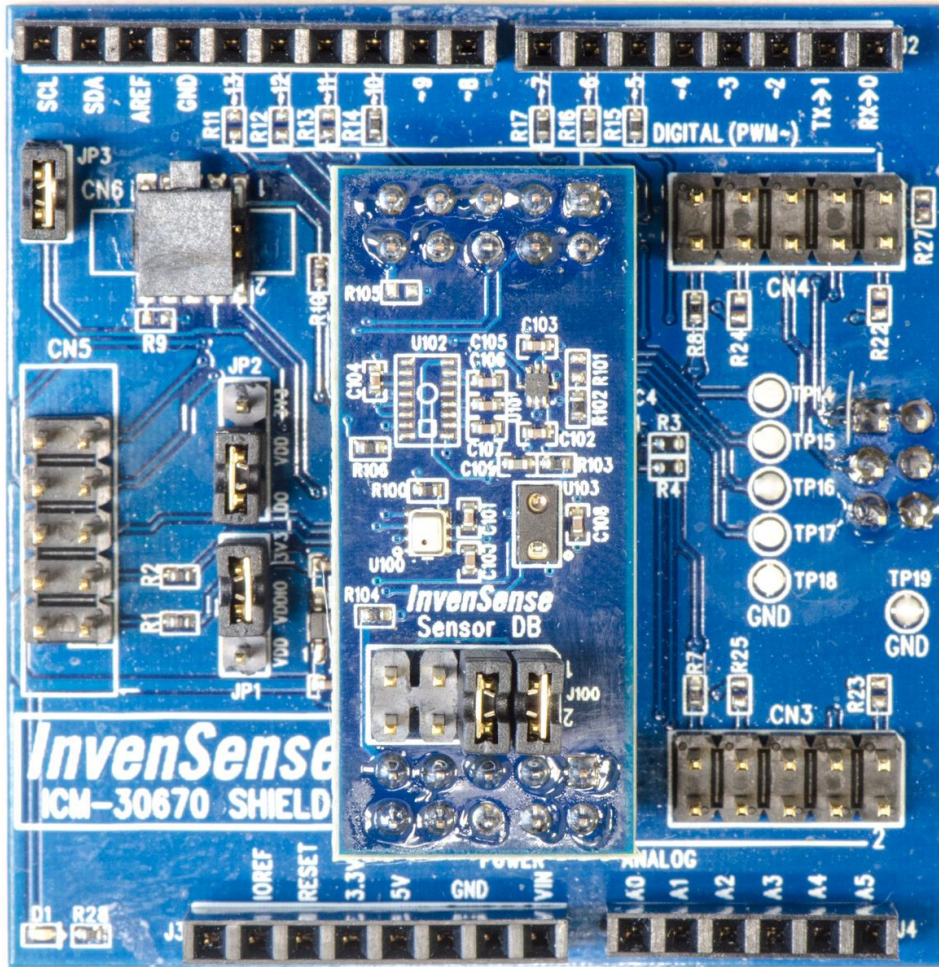
4.3. SENSOR DB SCHEMATIC

5. ICM-30670 SHIELD AND SENSOR DB STACKED

The Sensor DB is designed to stack-up on the ICM-30670 shield board at CN3, CN4 or CN5, CN6 pair as shown below.
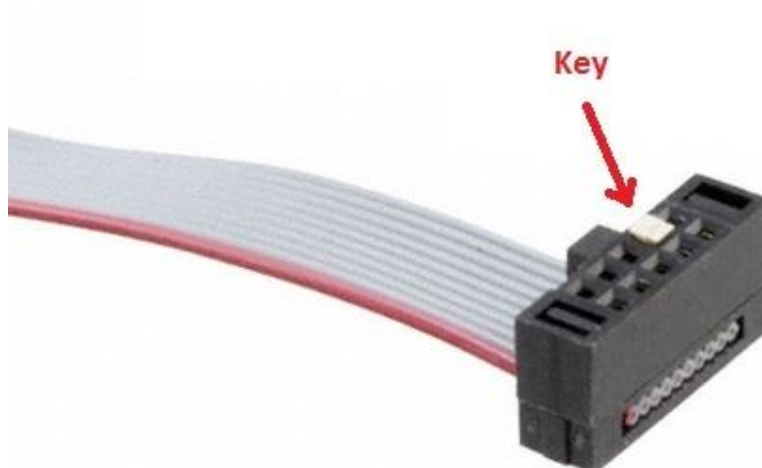
6. DEBUGGING ICM-30670 ON SHIELD BOARD

The J-link adapter from Segger can be used to debug the Cortex M0 on ICM-30670. It can be connected to CN7 as shown below.

Since CN7 is shrouded, if the J-link cable contains a Key (as shown below), it needs to be pried out.

7. REVISION HISTORY

REVISION DATE	REVISION	DESCRIPTION
02/09/2016	1.0	Initial Release

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