I2C Communication Setup Checklist

The following checklist allows to systematically establish communication with an I2C target device. It provides a systematic approach to overcome common issues encountered when establishing an initial I2C communication.

Description	SmartWave Support	Done
Recheck that SCL and SDA are physically connected correctly	Must be checked manually	☐
1. - Check if SDA, SCL can be pull-down or pull-up 1.1 - Set SCL to high and measure voltage level at SCL. Must be VCC 1.2 - Set SDA to high and measure voltage level at SDA. Must be VCC 1.3 - Set SCL to low and measure voltage level at SCL. Must be 0V 1.4 - Set SDA to low and measure voltage level at SDA. Must be 0V	☐	☐
2. - Check short between SCL and SDA 2.1 - Set SDA to high and SCL to low. Check that both levels are correct 2.2 - Set SDA to low and SCL to high. Check that both levels are correct	☐	☐
3. - Check for maximal clock frequency 3.1 - Apply a clock with the target frequency on SCL and measure the duty cycle. Check that the duty cycle is in the expected range 3.2 -Apply a clock with the target frequency on SDA and measure the duty cycle. Check that the duty cycle is in the expected range	To be implemented	☐
4. - Send a command to the target and check if the Acknowledge (ACK) is received 4.1 - Perform a read within a given range or based on a given list of target addresses 4.2 - If no response (NACK) --> reduce speed (400kHz --> 100kHz) 4.3 - If no response (NACK) --> swap SDA / SCL and retry	☐	☐
5. - Check for the correct target device 5.1 - Perform a read test for known information (e.g. serial number, product ID…) 5.2 - Perform a write / read back test	☐	☐

References:

- Solving common I2C Communication Setup Issues
- UM10204 NXP I2C-bus specification and user manual, Rev. 7.0 — 1 October 2021
- Wikipedia

In case you have any comments or suggestions to the “I2C Communication Setup Checklist” please send an email to office@semify-eda.com.