

마이크로프로세서 응용

Micro - Processor Applications

LEC01. OT

박기완

010-2381-4089

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안내사항

과제 관련

매 주 실습 진행 후 영문 보고서 작성 필수

- 제출 기한 : **다음 실습 전 날 23:59까지** 제출

보고서 양식은 LMS에 업로드 예정

- 보고서 제목은 "**LAB_번호_학번_이름**" 꼭 맞추기

유의사항

- 평가 중점 : 실습 코드 및 MCU 내부 동작에 대한 이해 정도
- 보고서 표절 적발 시 과제 0점
- 지각 제출 시 감점있어요



안내사항

팀플 관련

2인 1조 팀 구성으로 실습 및 텀 프로젝트 진행

- 희망 팀원이 있는 경우 → 조교에게 **팀원 둘 다** 연락주기
- 없는 경우 → 조교가 랜덤으로 팀원을 배치

프로젝트 최종 발표는 기말고사 전 주, 15주 차에 있을 예정

실습 환경

IDE : Microchip Studio

SW : C & Assembly code.

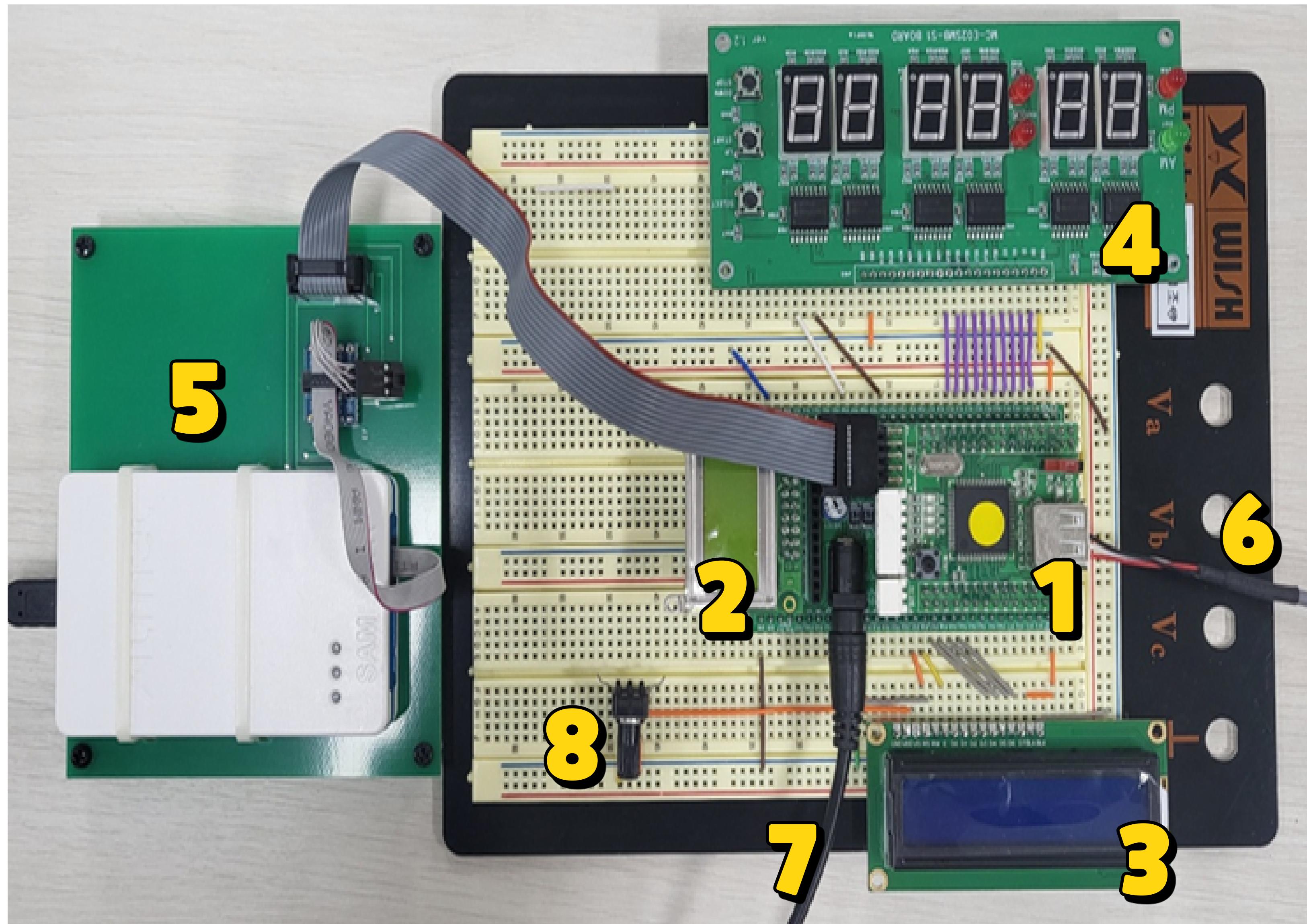
HW : Atmega128

조교 연락처 (QnA)

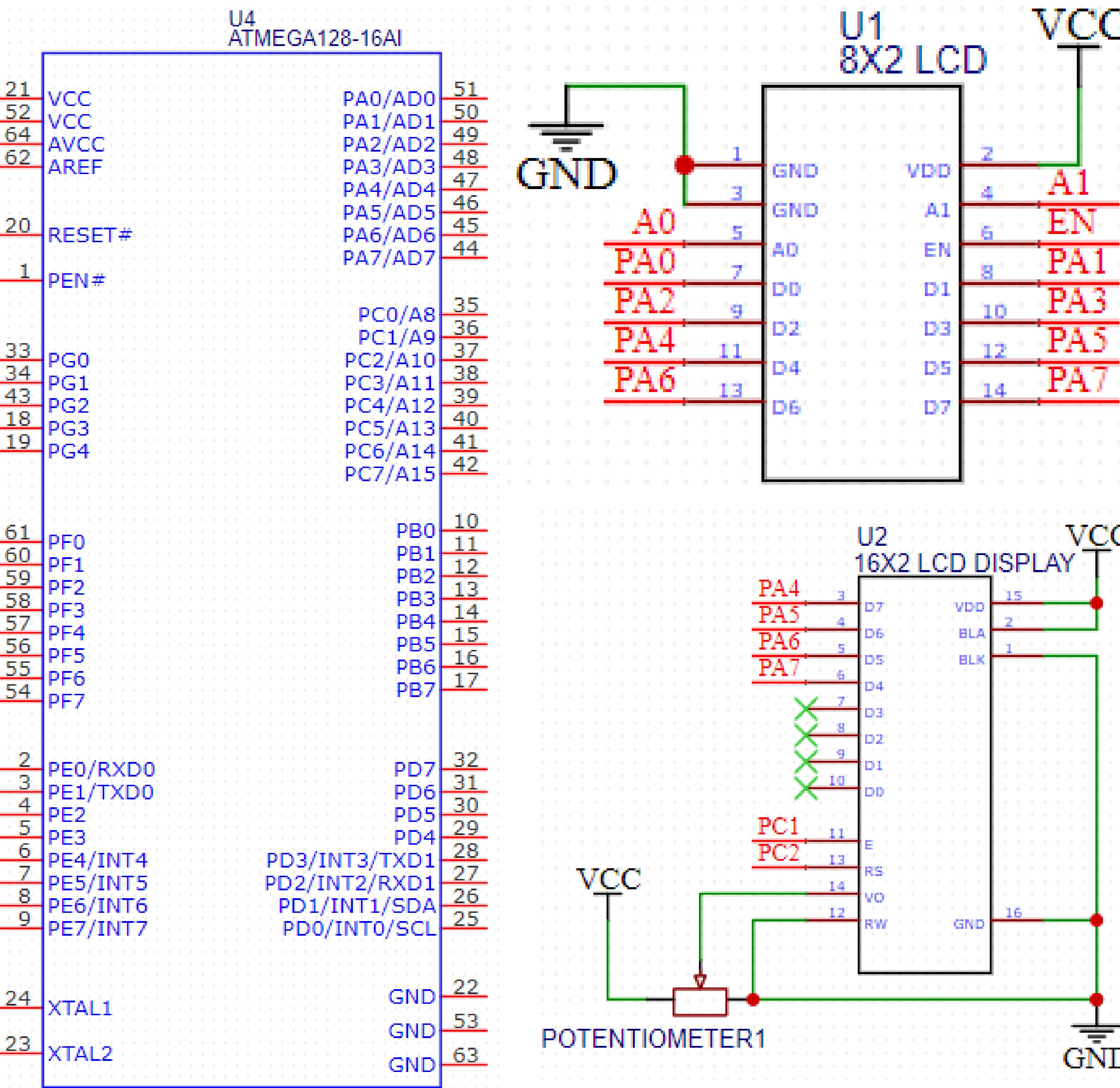
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Email : rldhks6899@hanyang.ac.kr

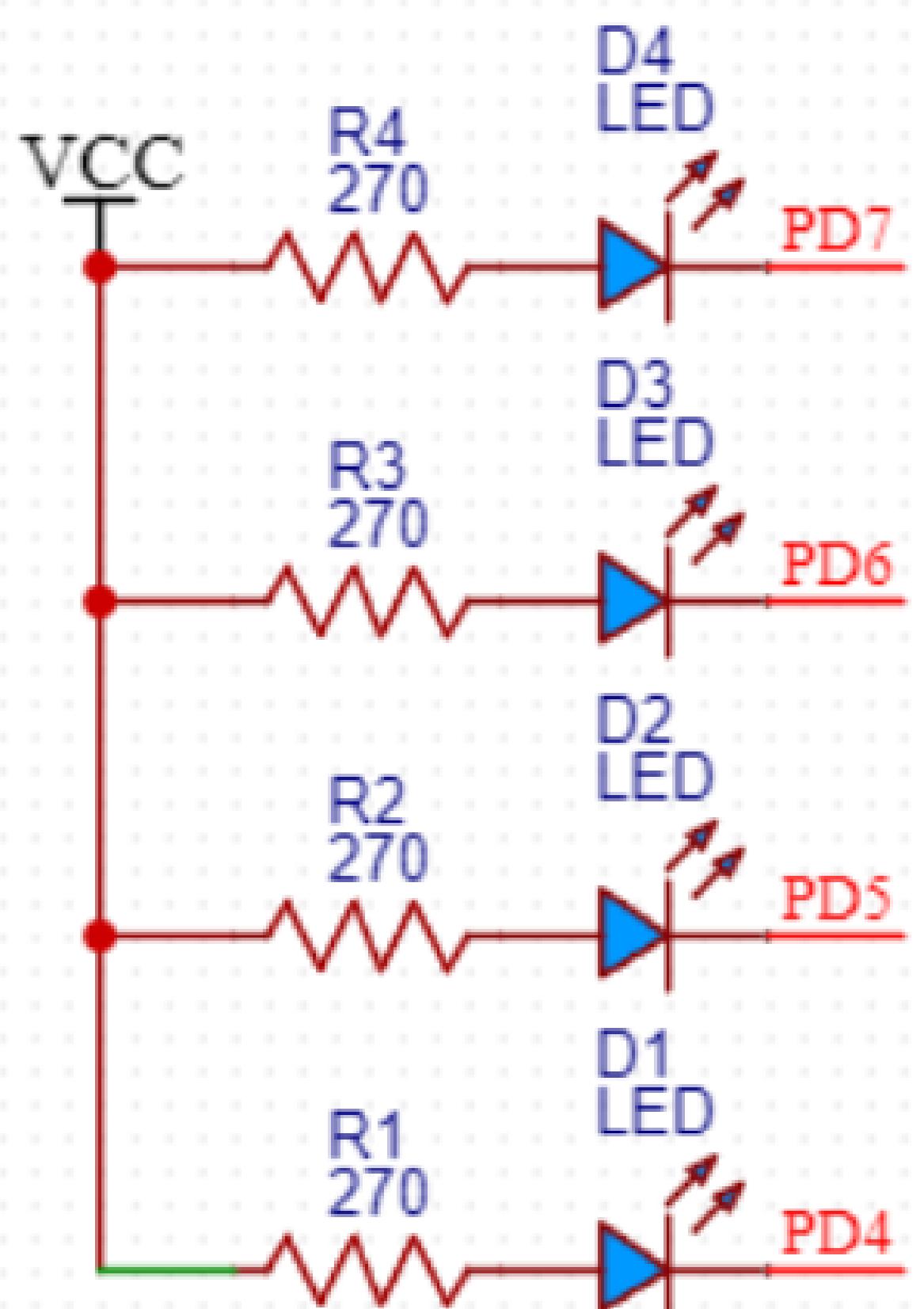
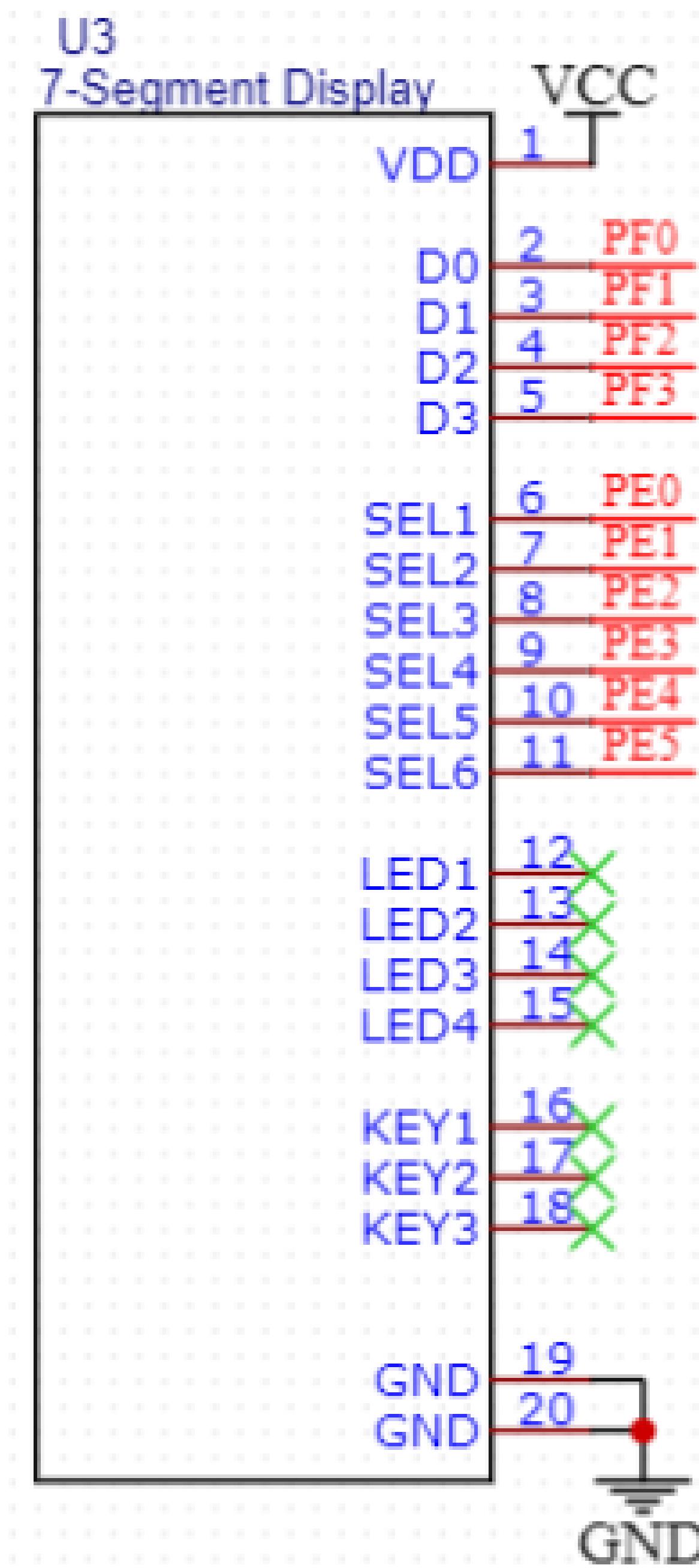
실습 키트 소개



1. ATMega128
2. 8x2 LCD
3. 16x2 LCD
4. 7-Segment Display
5. JTAG Module
6. Serial Communication Cable
7. Power Cable
8. Potentiometer
9. DH sensor
- + . Key Button
- + . Photo Interrupt



키트 회로도





실습 진행 과정

Basic

1. C언어 코드 기반의 다양한 실습 진행
2. Assembly언어 기반으로 코드를 재해석

After

1. Assembly 수준에서 MCU 내부 동작 파악하기
2. 시뮬레이션을 통한 MCU I/O 동작 파악

Term Project

Basic

1. C언어 코드 기반의 다양한 실습 진행
2. Assembly언어 기반으로 코드를 재해석

실습 주제

Atmega128 내장 LED를 모두 켜보자

C code.

```
#include <avr/io.h>

int main(void)
{
    MCUCR = 0x00;
    DDRD = 0xff;
    while(1)
    {
        PORTD = 0x00;
    }
}
```

Assembly

```
.include "m128def.inc"
.def temp = r16
.cseg

main:
    ldi temp, 0x00
    out DDRA, temp
loop:
    ldi temp, 0x00
    out PORTA, temp
    rjmp loop ;
.end
```

After

1. Assembly 수준에서 MCU 내부 동작 파악하기
2. 시뮬레이션을 통한 MCU I/O 동작 파악

Simulator**Register view**

```
R30 = 0x21 R29 = 0x3F R28
R26 = 0x02 R25 = 0x00 R24
R22 = 0xA7 R21 = 0x00 R20
R18 = 0x00 R17 = 0x00 R16
R14 = 0x00 R13 = 0x00 R12
R10 = 0x00 R09 = 0x00 R08
R06 = 0x00 R05 = 0x00 R04
R02 = 0x00 R01 = 0x00 R00
```

Memory view

| Memory 1 | | | | |
|--------------------------|----------|----|----|-------|
| Memory: prog APP_SECTION | | | | |
| prog | 0x000018 | 0c | 94 | 0a 01 |
| prog | 0x00002E | 0a | 01 | 0c 94 |
| prog | 0x000044 | 0c | 94 | 0a 01 |
| prog | 0x00005A | 0a | 01 | 0c 94 |
| prog | 0x000070 | 0c | 94 | 0a 01 |

I/O view

| IO View | | | |
|---------|---------|-------|------------|
| Name | Value | Bits | |
| JTAG | | | |
| LOCKBIT | | | |
| MISC | | | |
| PORTA | | | |
| PORTB | | | |
| PORTC | | | |
| PORTD | | | |
| PORTE | | | |
| PORTF | | | |
| PORTG | | | |
| Name | Address | Value | Bits |
| PIRA | 0x39 | 0xAF | ███████ |
| DDRA | 0x3A | 0xFF | ██████████ |
| PORTA | 0x3B | 0xAF | ███ |

Term Project

열심히 실습



각 조 별로 팀 프로젝트 제안서 제출



팀 프로젝트 제작 및 발표



평가 후 점수 산정



팀 구성

조교 자리

| 1조 | | 2조 | | 3조 | | 4조 | |
|-----|---|-----|---|-----|---|-----|---|
| A | B | A | B | A | B | A | B |
| 5조 | | 6조 | | 7조 | | 8조 | |
| A | B | A | B | A | B | A | B |
| 9조 | | 10조 | | 11조 | | 12조 | |
| A | B | A | B | A | B | A | B |
| 13조 | | 14조 | | 15조 | | 16조 | |
| A | B | A | B | A | B | A | B |
| 17조 | | 18조 | | 19조 | | 20조 | |
| A | B | A | B | A | B | A | B |

* 같은 조원끼리 앉아주세요

MICROCHIP STUDIO 설치



Microchip Studio for AVR® and SAM Devices

Microchip Studio is an Integrated Development Environment (IDE) for developing and debugging AVR® and SAM microcontroller applications. It merges all of the great features and functionality of Atmel Studio into Microchip's well-supported portfolio of development tools to give you a seamless and easy-to-use environment for writing, building and debugging your applications written in C/C++ or assembly code. Microchip Studio can also import your Arduino® sketches as C++ projects to provide you with a simple transition path from makerspace to marketplace.

You can use Microchip Studio with the debuggers, programmers and development kits that support AVR and SAM devices. Extend your development environment with Microchip Gallery, an online app store for Microchip Studio plug-ins developed by Microchip as well as third-party tool and embedded software vendors.

Even though it comes with a new name and look, you will still be able to use any existing documentation and videos about Atmel Studio to learn how to use Microchip Studio.

Please refer to this link for information about our security advisories.

[Download Microchip Studio](#)

Training

Downloads and Documents

Downloads Documentation

Download Microchip Studio

| Title | Version Number | Date | Download |
|---|----------------|-------------|--------------------------|
| Microchip Studio for AVR and SAM Devices- Offline Installer | 7.0.2594 | 20 Jun 2022 | Download |
| Microchip Studio for AVR and SAM Devices- Web Installer | 7.0.2594 | 20 Jun 2022 | Download |

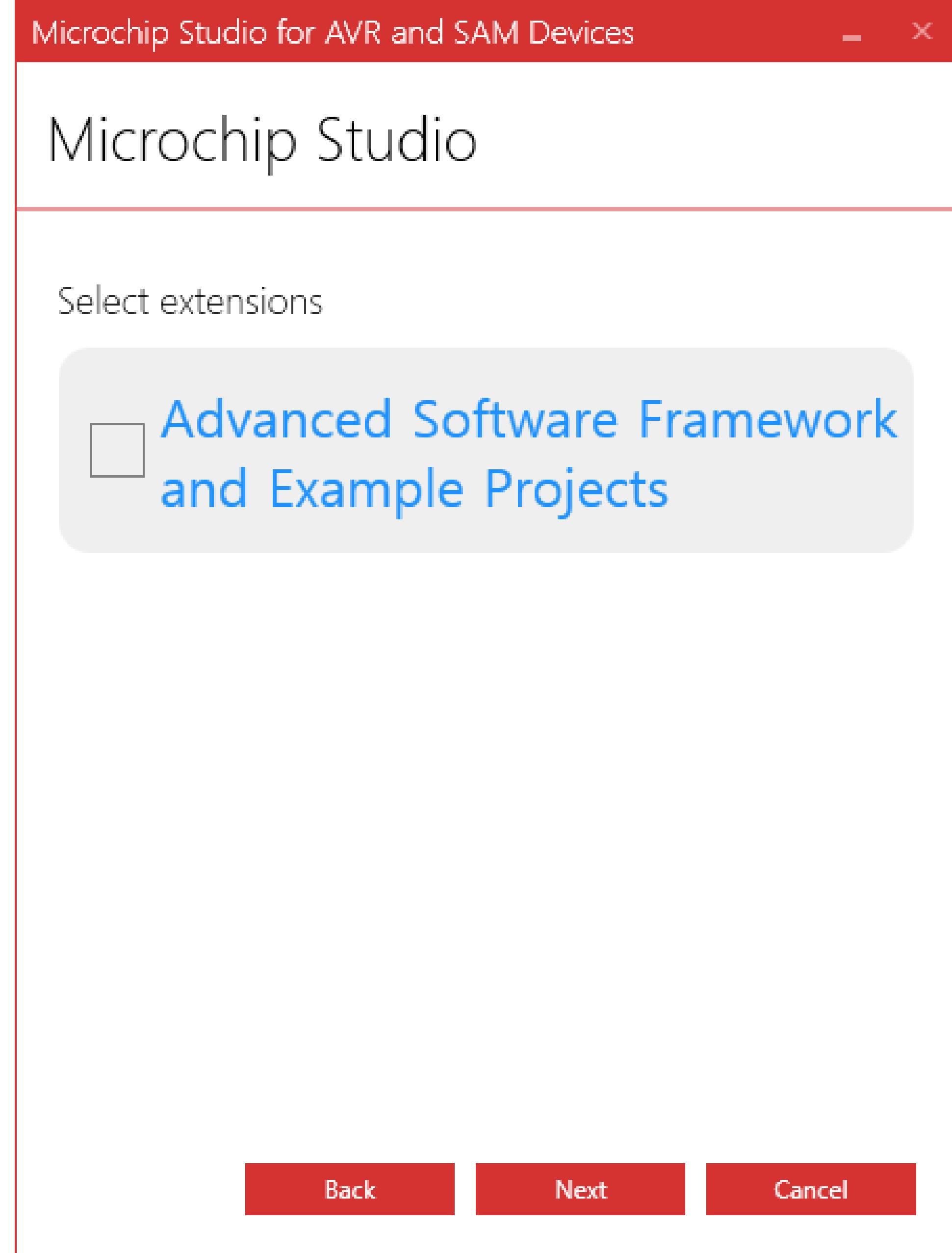
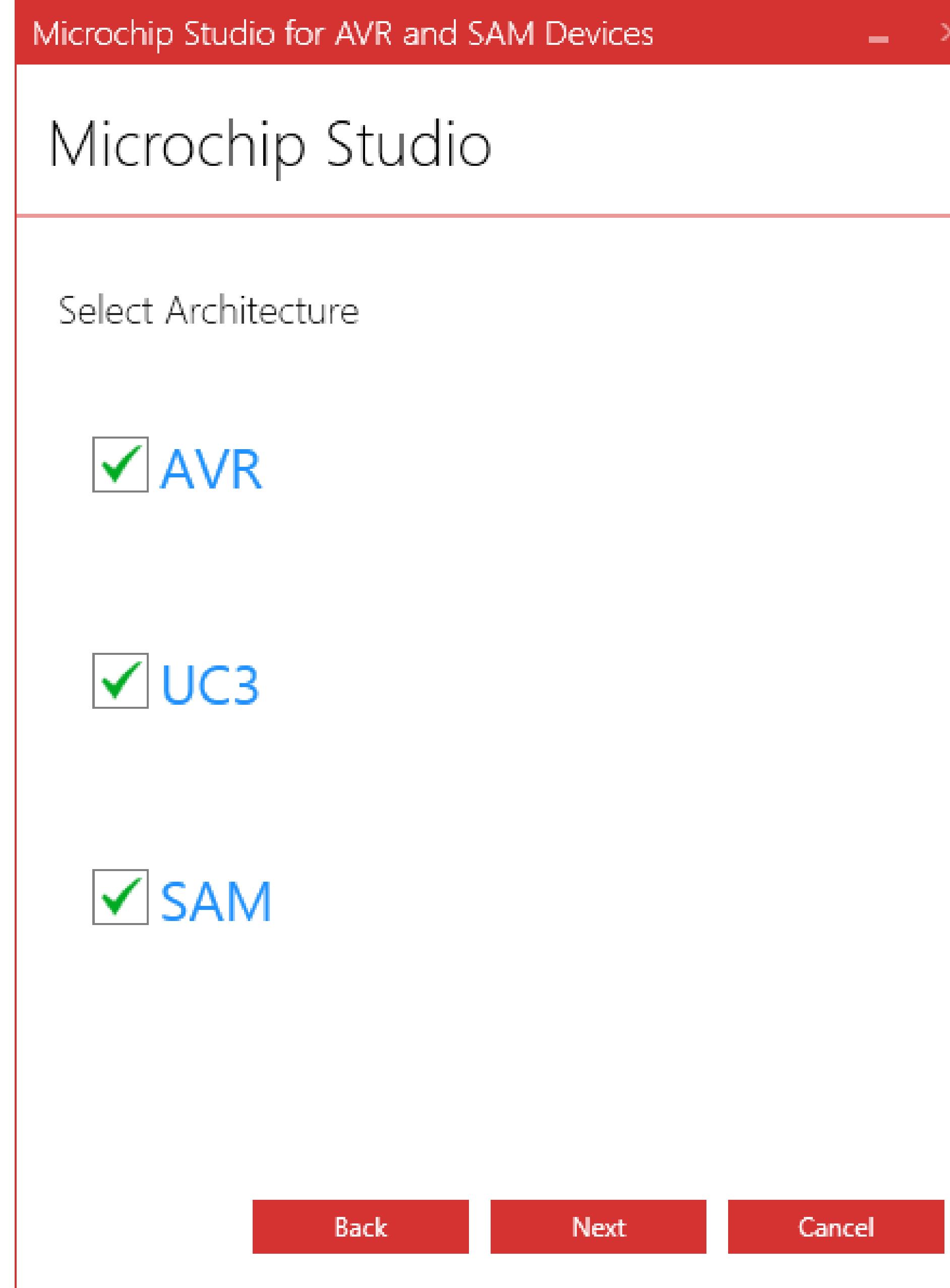
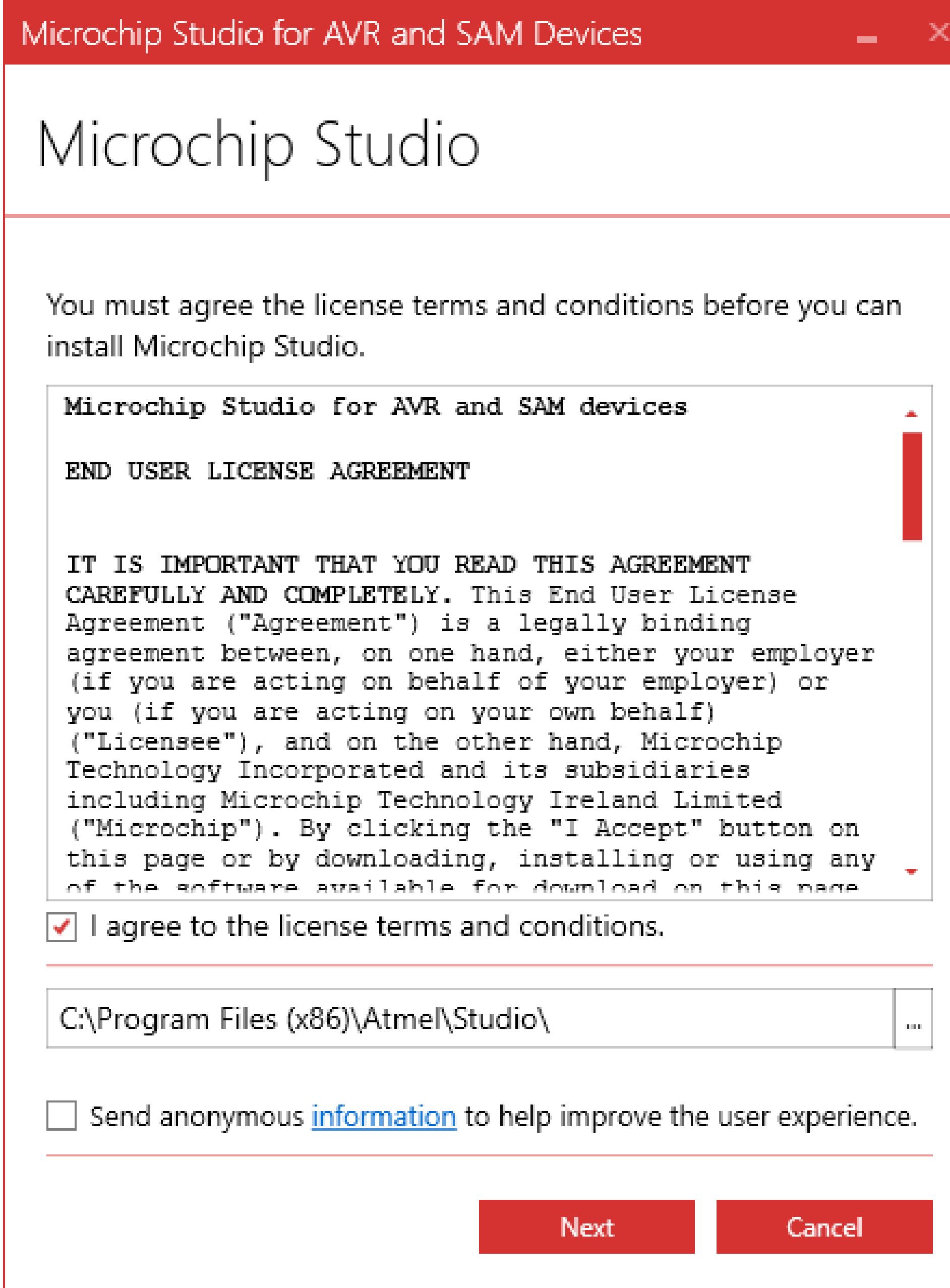
Release Notes

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|--------------------------------|----------------|-------------|--------------------------|
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Feedback

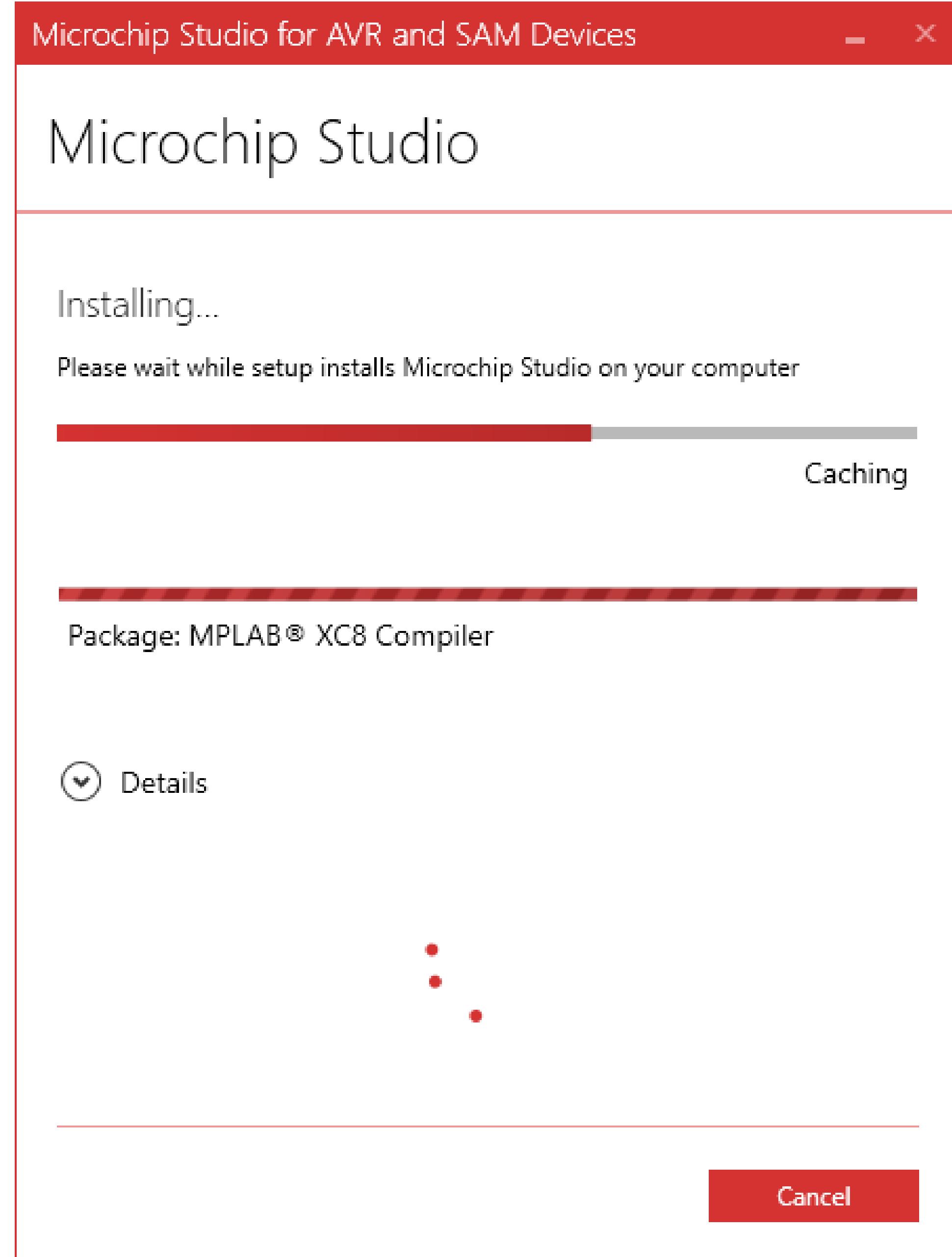
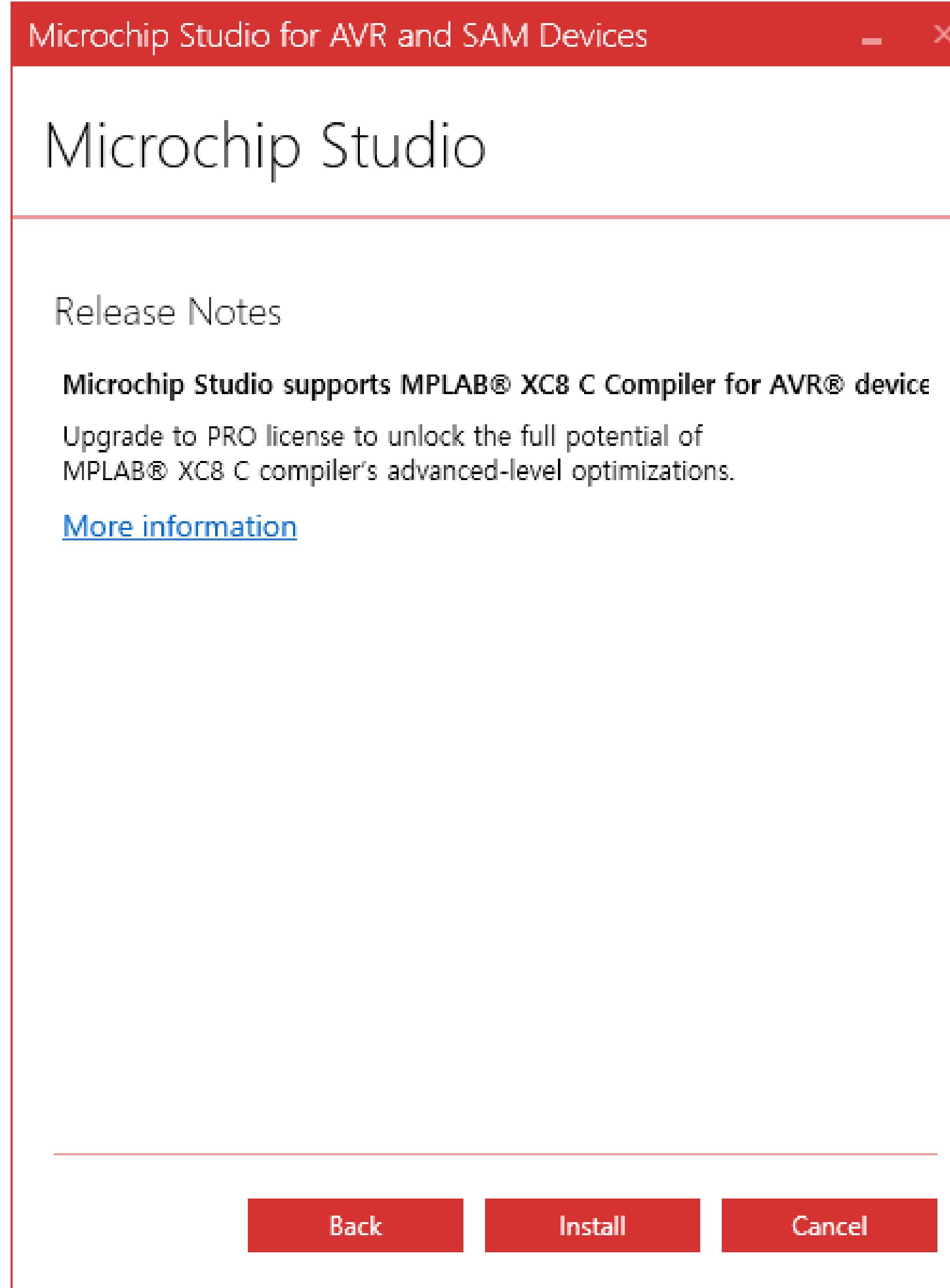
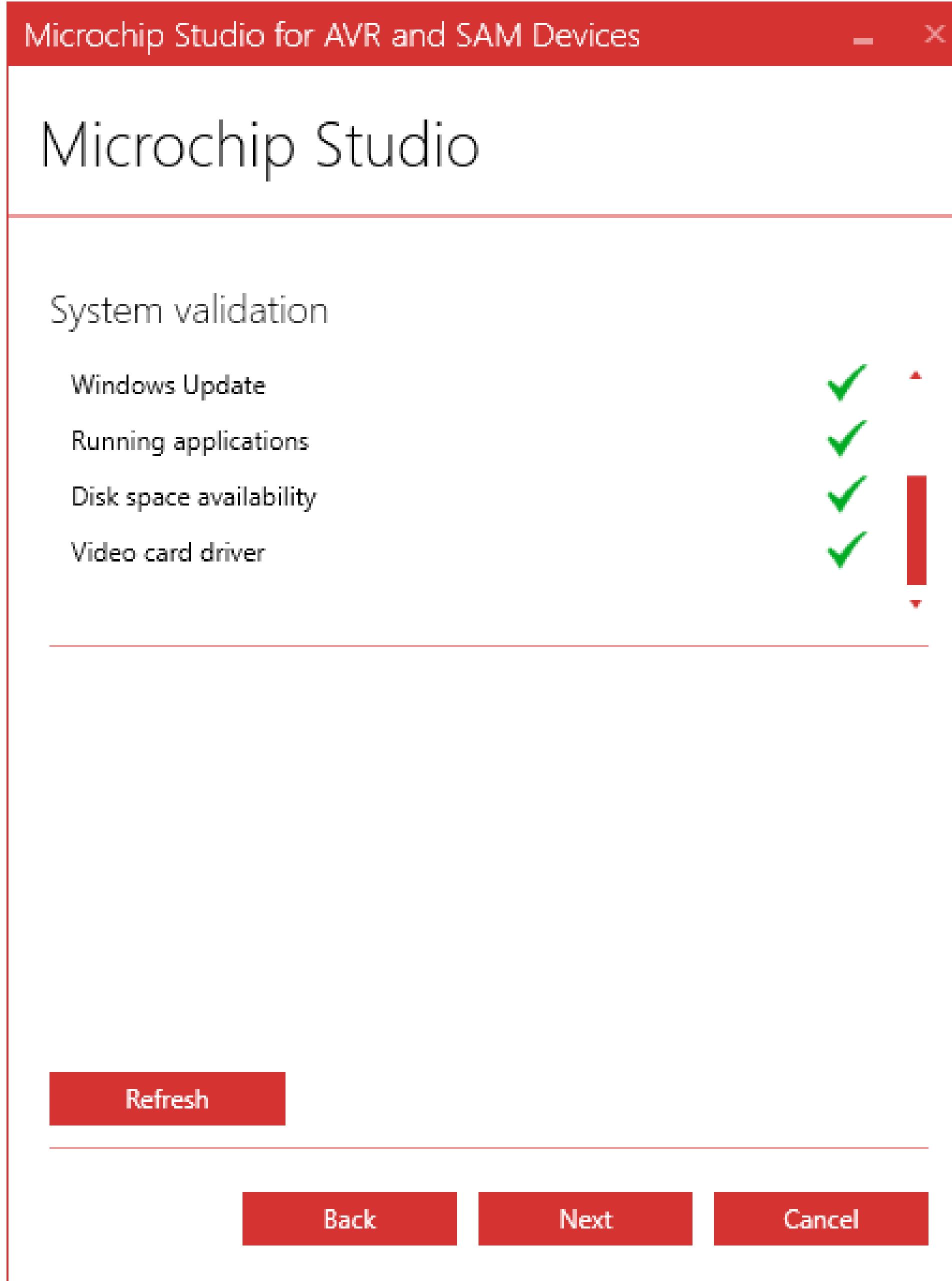
- Google - "Microchip studio" 검색 후 "www.microchip.com" 링크 클릭
- 사진처럼 뜯다면 "Download Microchip Studio" 클릭
- Microchip Studio for AVR and SAM Devices - Web Installer 선택

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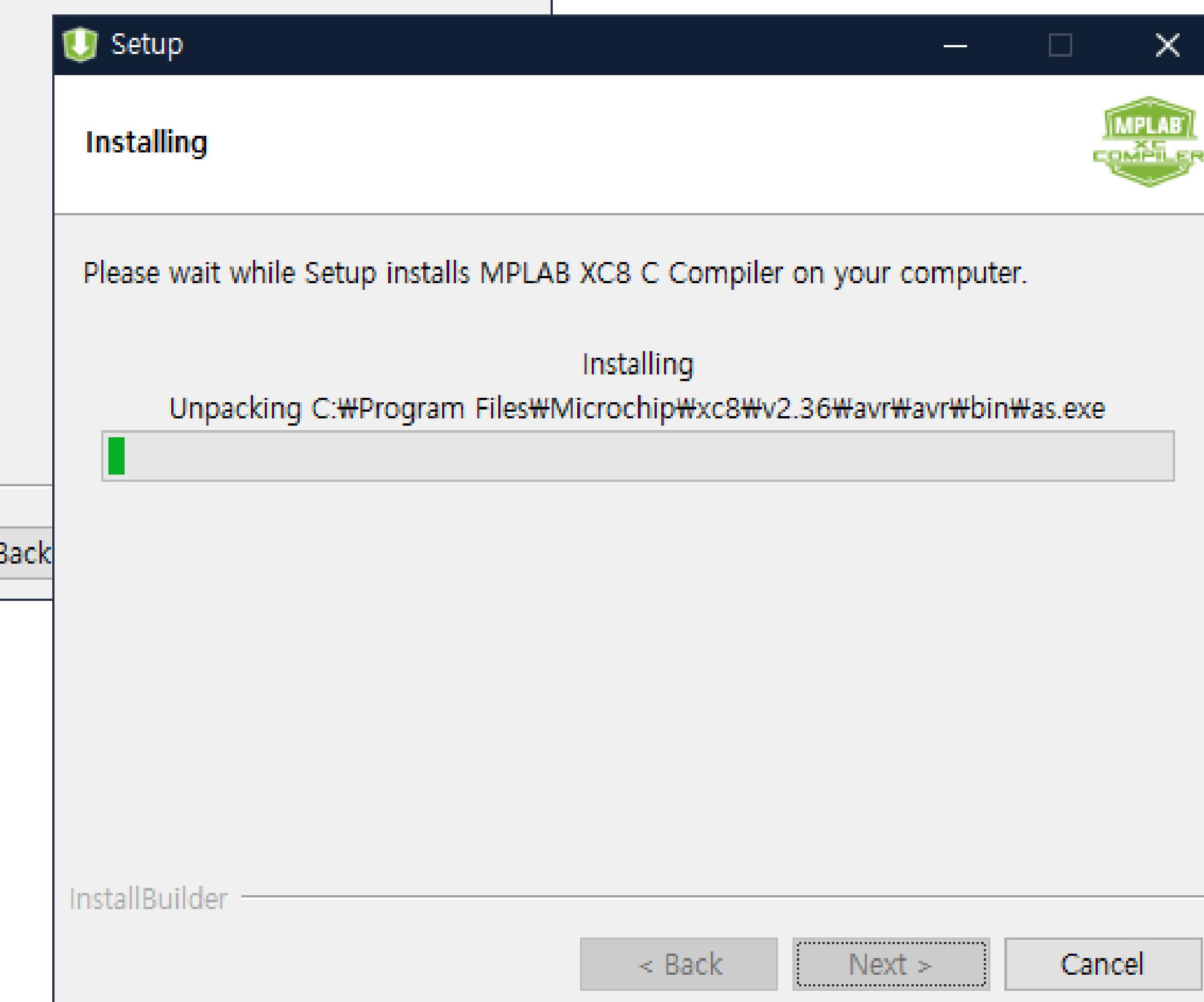
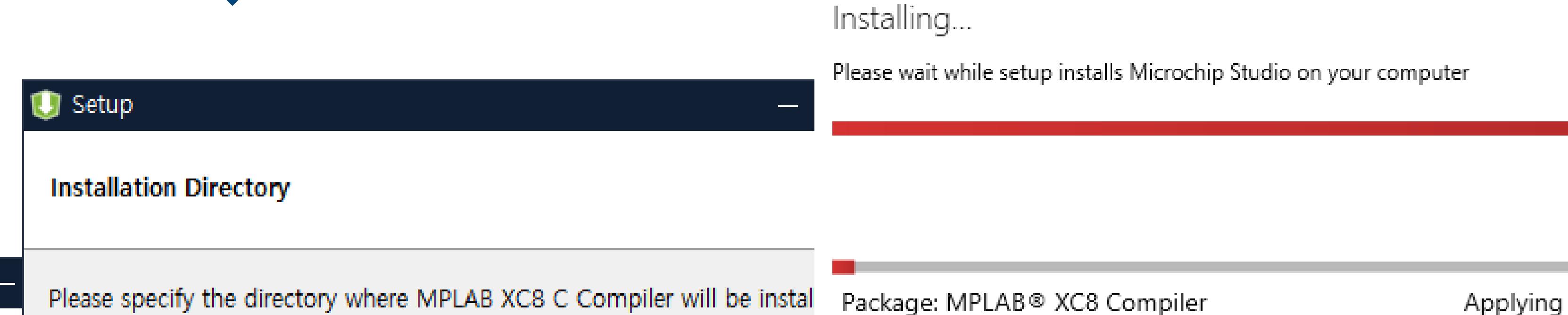
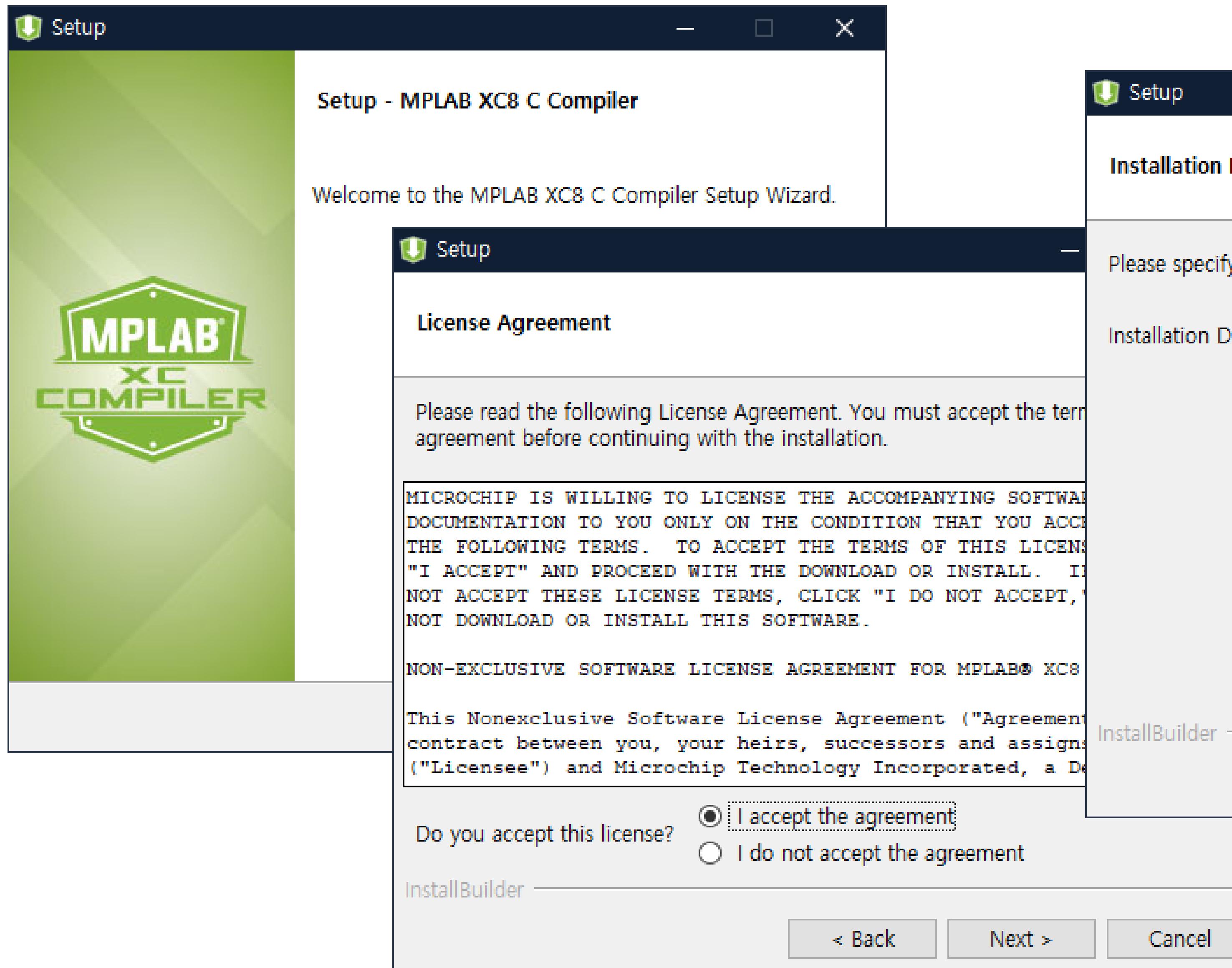
* AVR만 선택해도 상관없음

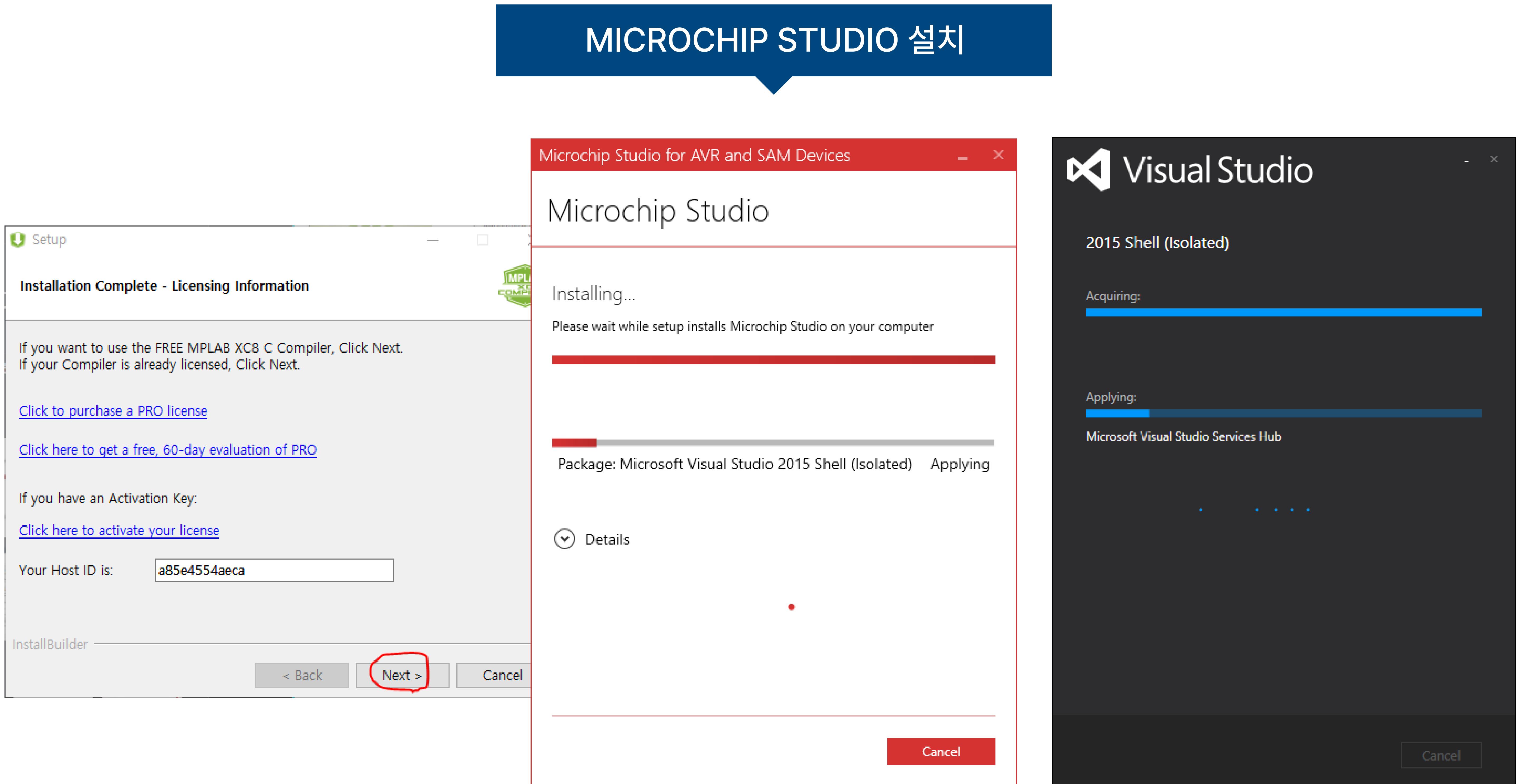
MICROCHIP STUDIO 설치



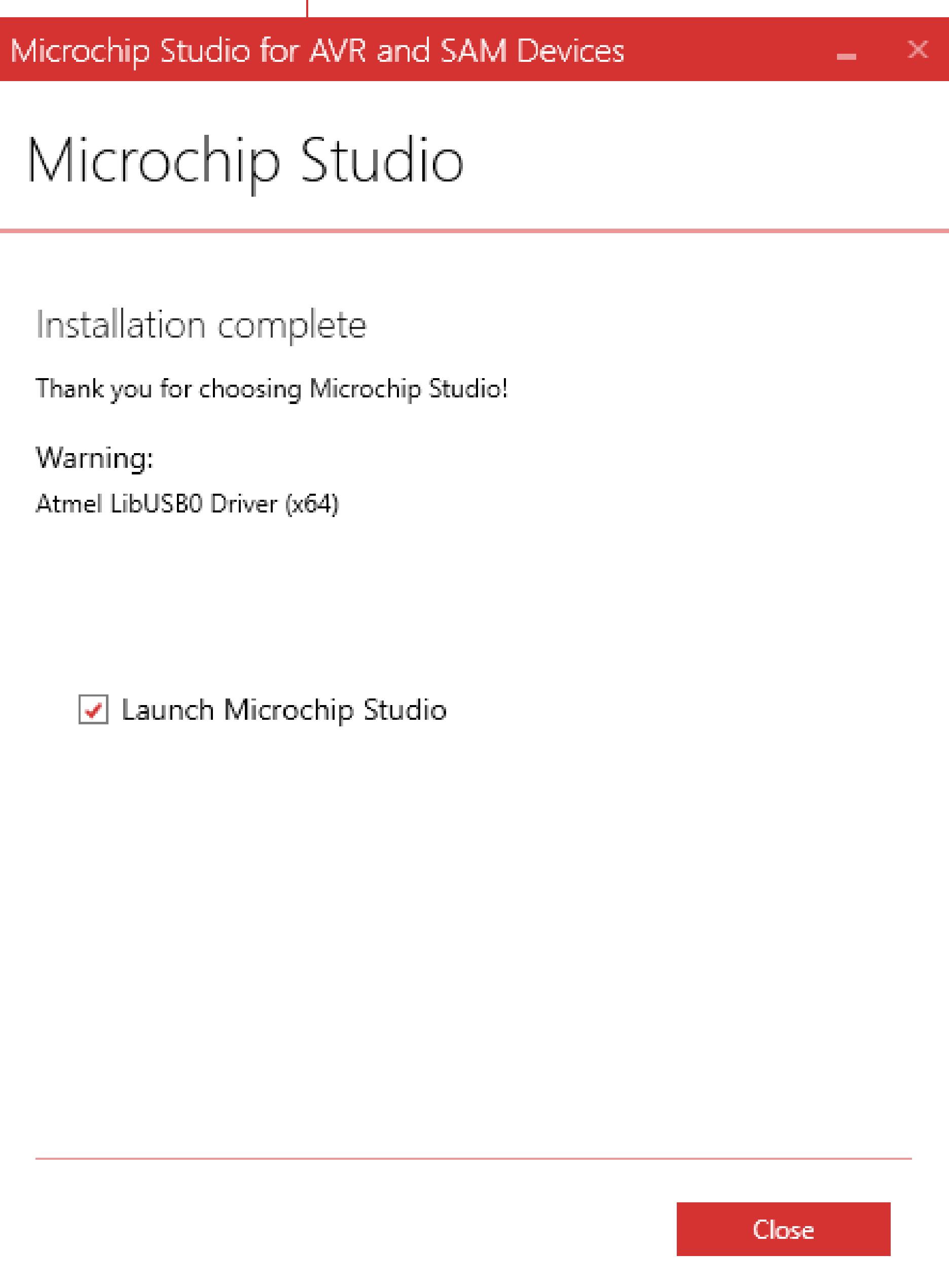
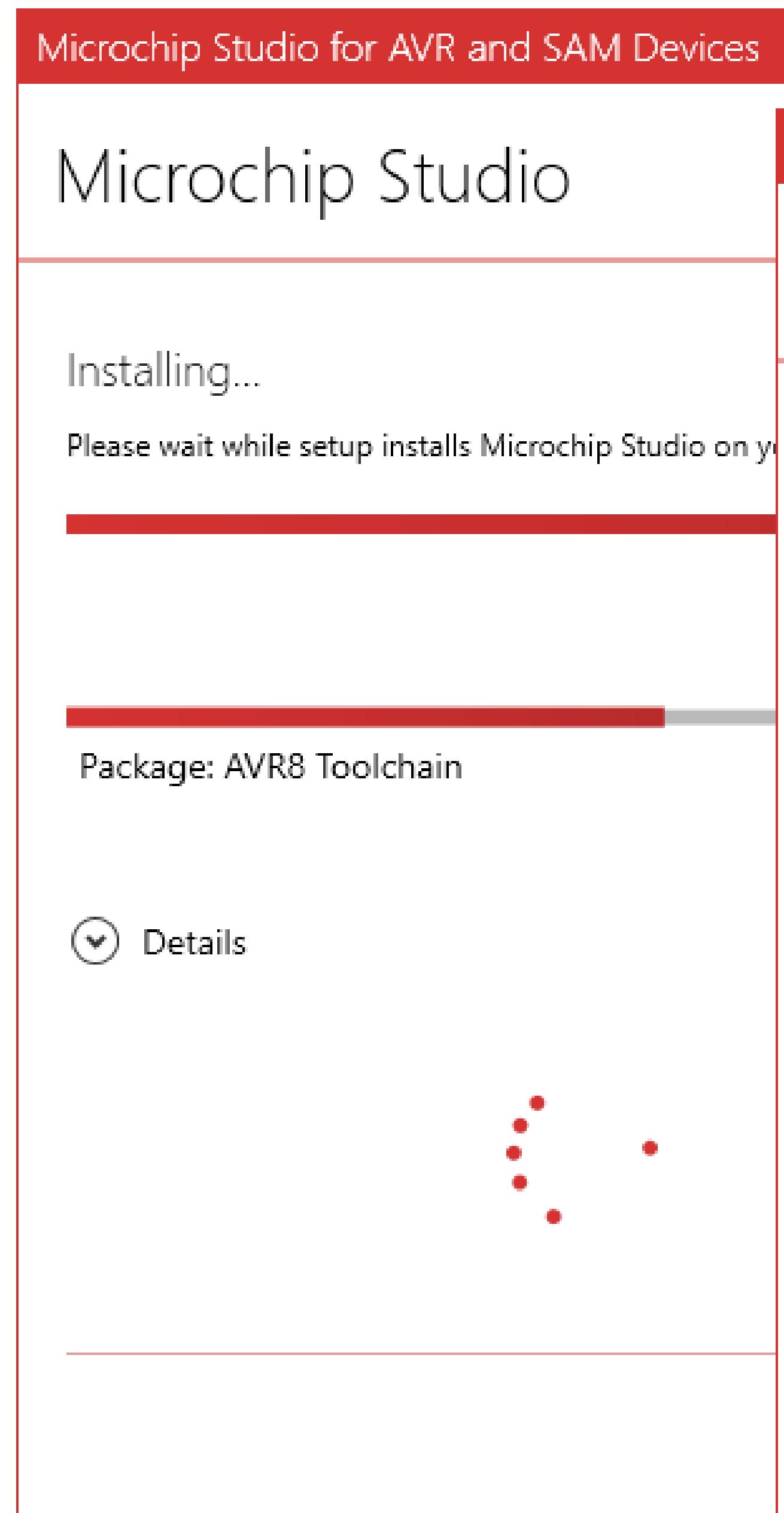
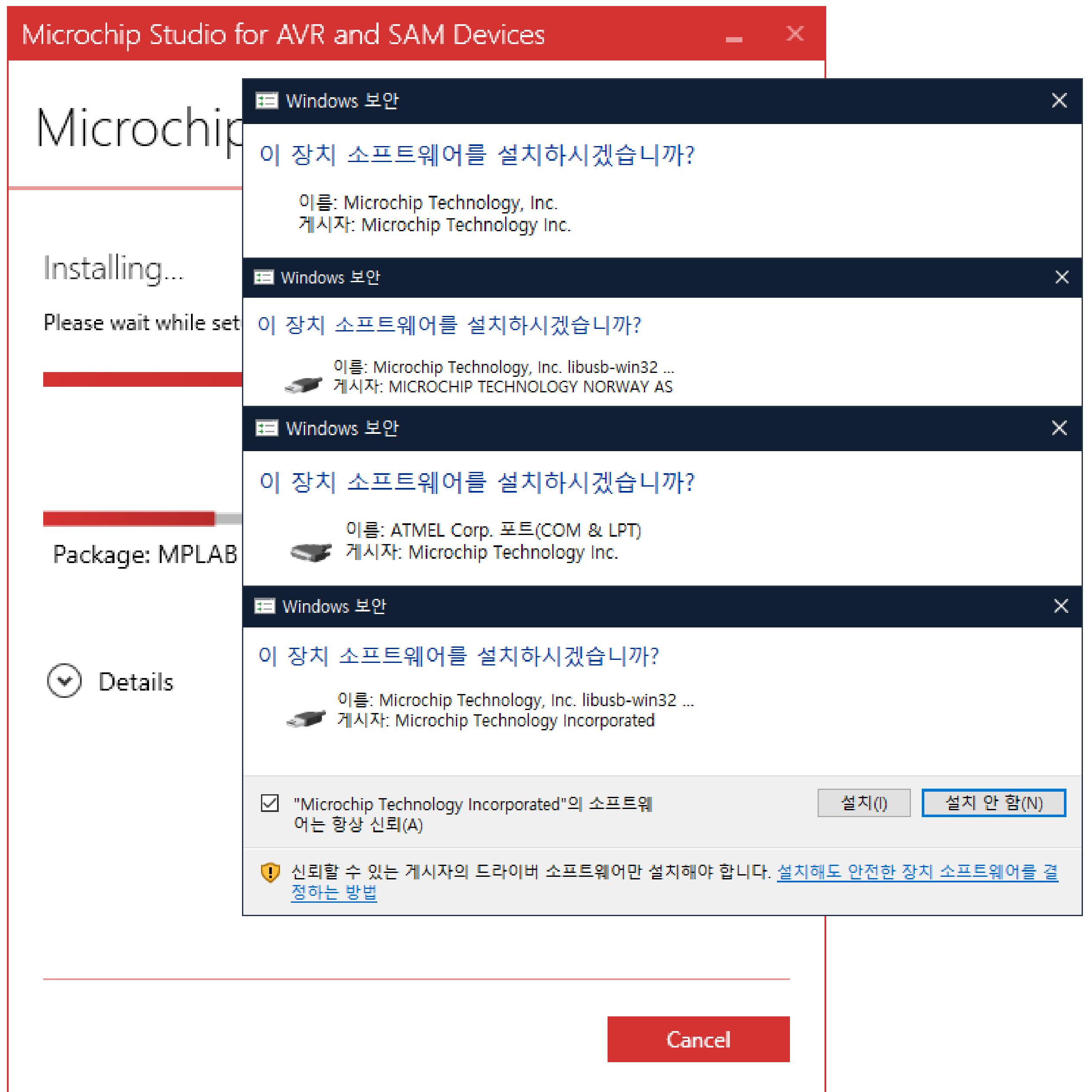
* System validation 중 Failed이 뜨면 컴퓨터 사양 문제일 가능성성이 높음

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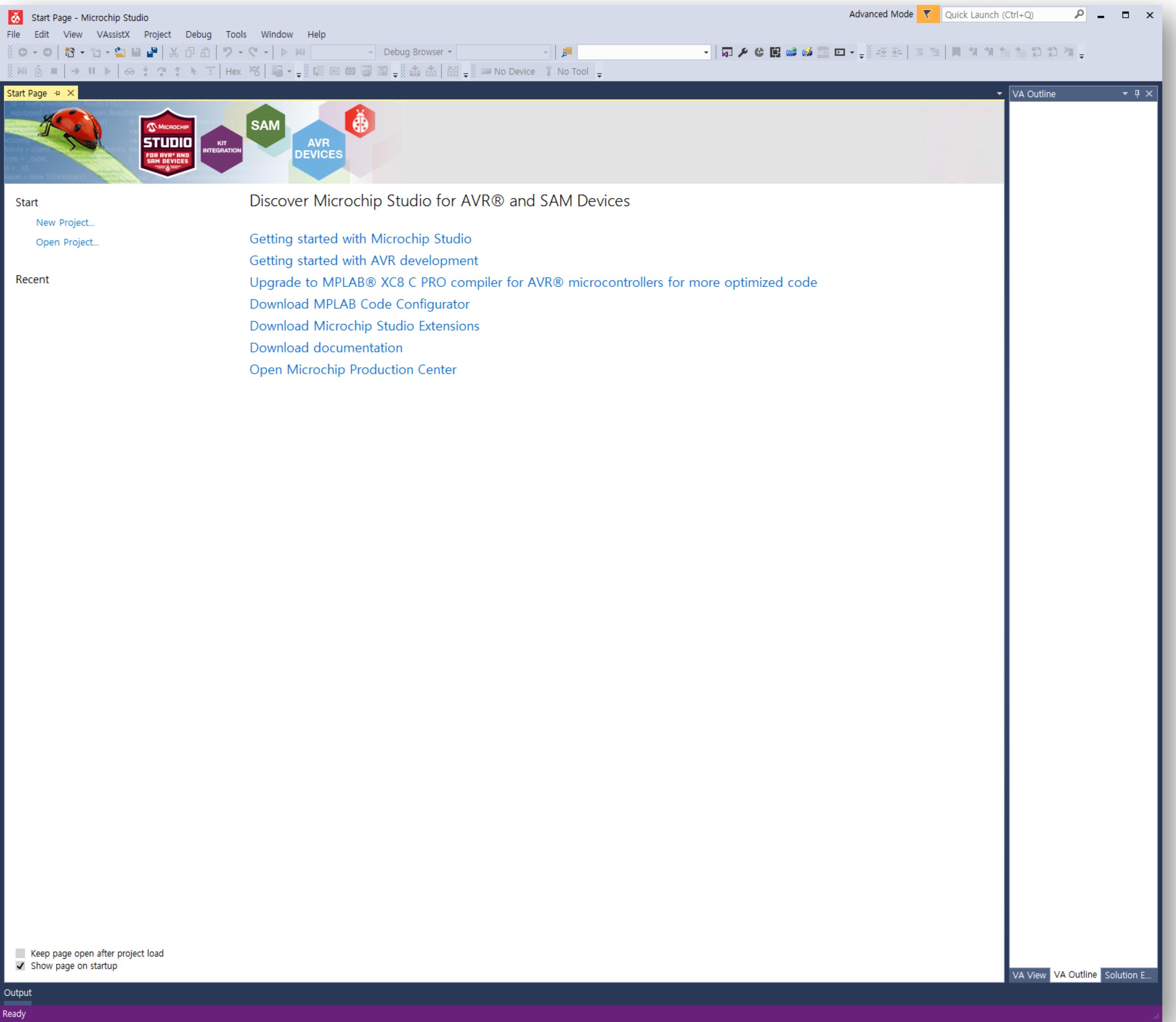




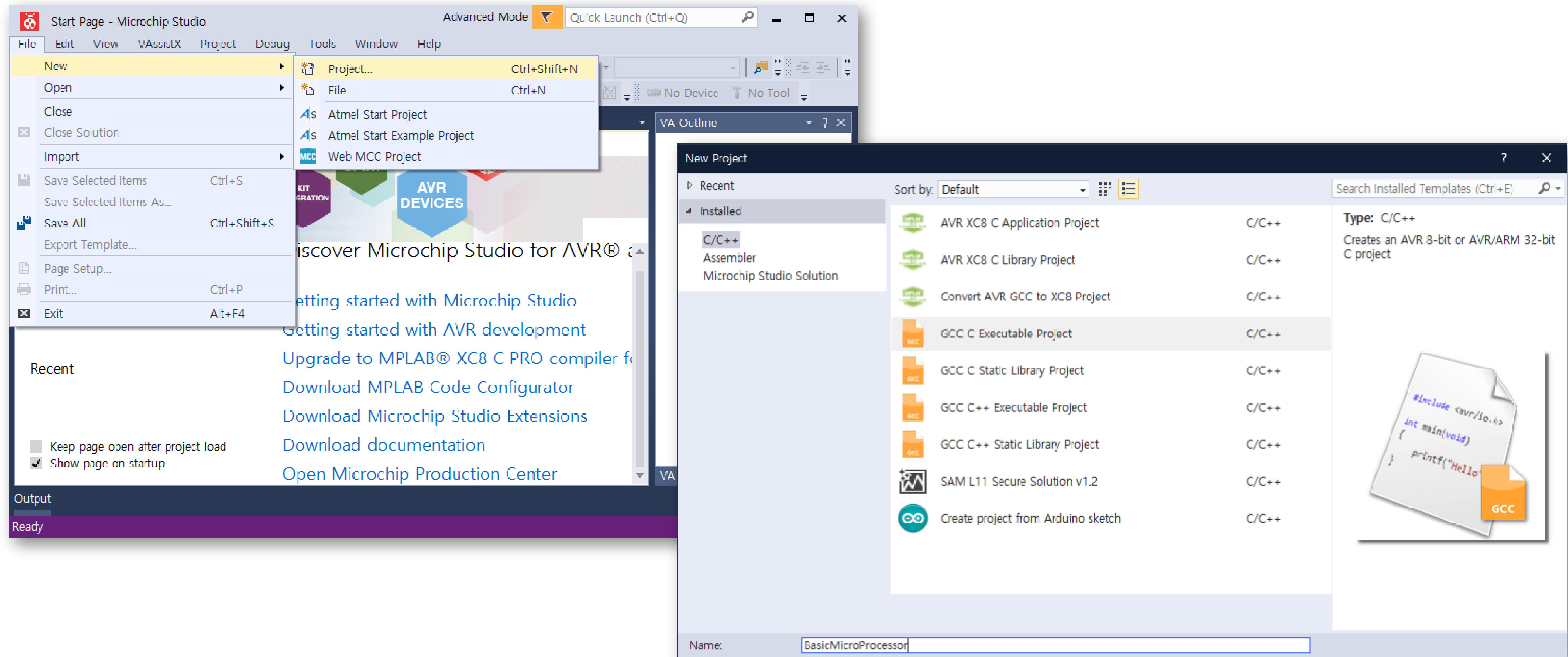
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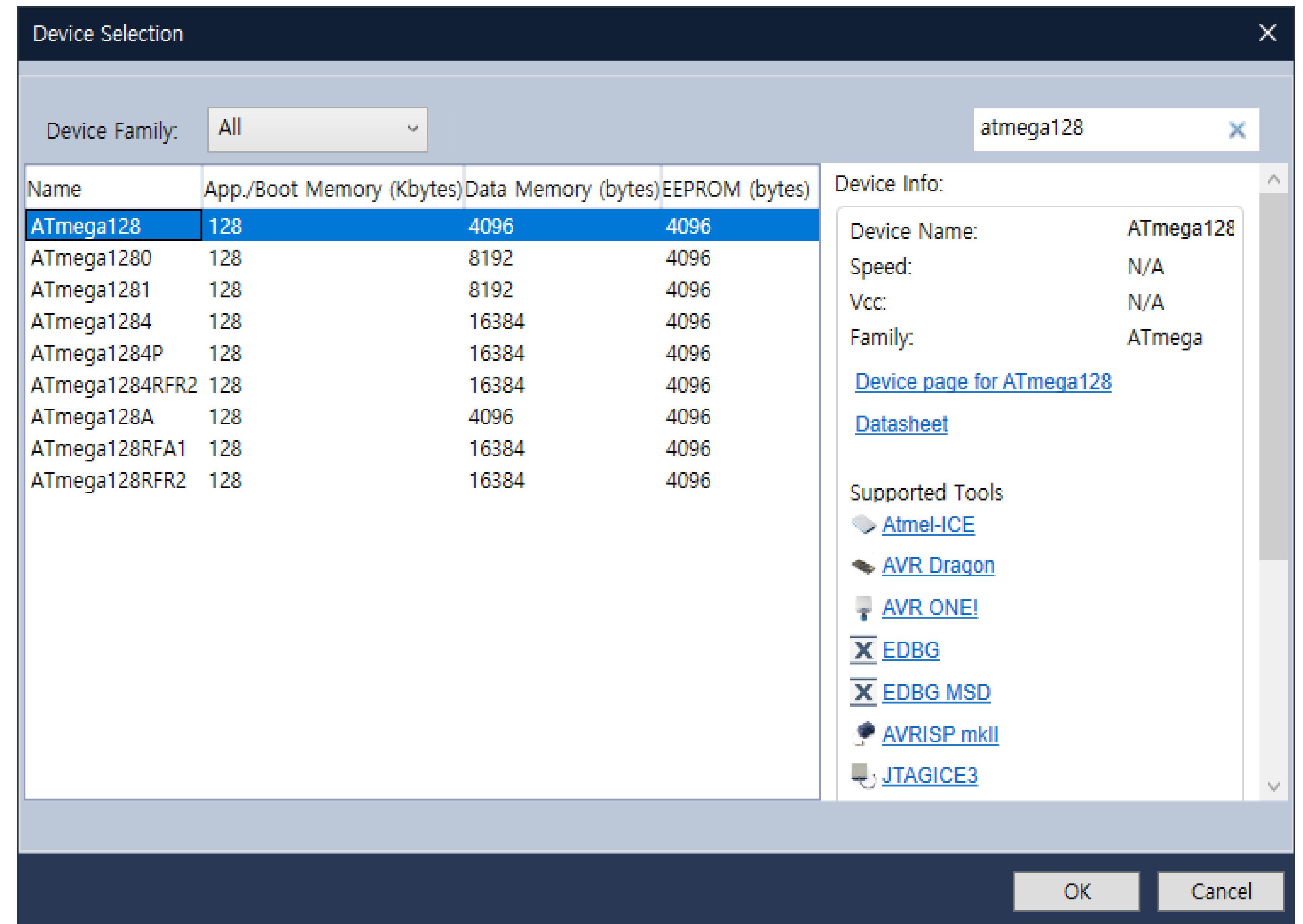
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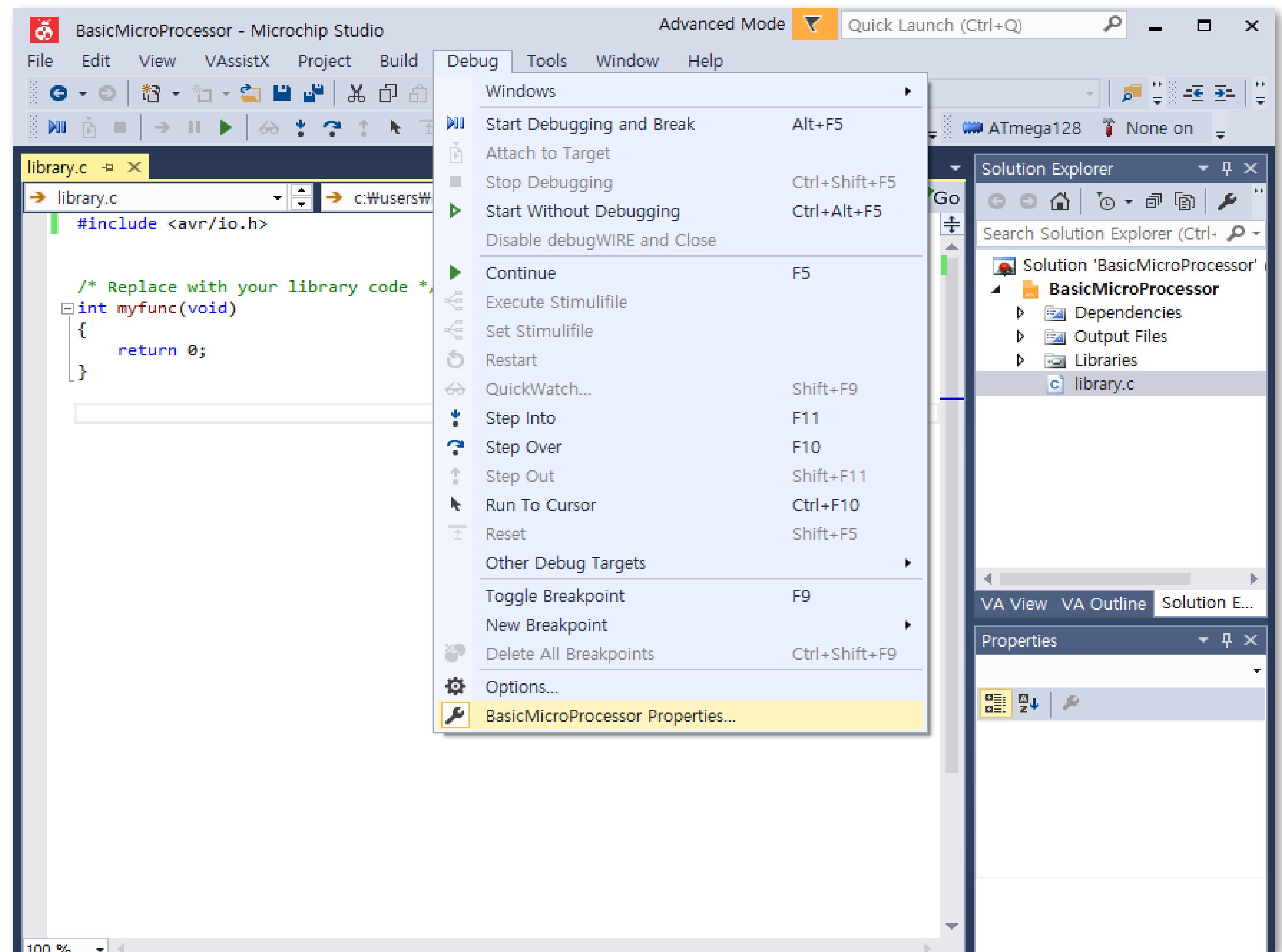
MICROCHIP STUDIO 프로젝트 생성



MICROCHIP STUDIO 프로젝트 생성



MICROCHIP STUDIO 기본 설정



MICROCHIP STUDIO 프로젝트 생성

