



UPD301B Basic Source Demo Read Me

**MICROCHIP**
Microchip Technology, Inc.

Microchip Technology, Incorporated
2355 W. Chandler Boulevard
Chandler, Arizona 85224
480/792-7200

REV	DATE	DESCRIPTION OF CHANGE
1.12	15-July-21	Initial version

Table of Contents

1	Software License Agreement.....	4
2	Terms and Abbreviations	4
3	Introduction.....	5
4	Prerequisites.....	5
5	Setting up the USB-PD Basic Source board for “UPD301B_Basic_Source_AE”.....	7
6	Running the demo.....	8
7	Expected Results	9

1 Software License Agreement

Copyright ©[2019-2020] Microchip Technology Inc. and its subsidiaries.

Subject to your compliance with these terms, you may use Microchip software and any derivatives exclusively with Microchip products. It is your responsibility to comply with third party license terms applicable to your use of third-party software (including open-source software) that may accompany Microchip software.

THIS SOFTWARE IS SUPPLIED BY MICROCHIP "AS IS". NO WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, APPLY TO THIS SOFTWARE, INCLUDING ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGE, COST OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE SOFTWARE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP'S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THIS SOFTWARE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THIS SOFTWARE.

2 Terms and Abbreviations

Term	Definition
PSF	Universal Serial Bus Power Delivery Software Framework
EVB	Evaluation Board
PD	Power Delivery
IDE	Integrated Development Environment
PDO	Power Data Object
PM-PD	Power Module-USB Power Delivery
LED	Light Emitting Diode
GPIO	General Purpose Input Output

3 Introduction

Microchip's USB Power Delivery Software Framework (PSF) is a configurable USB PD solution that is compliant to USB-PD 3.0 specification.

UPD301B Basic Source Demo includes PD Source functionality with the support for Boot time configuration parameters and GPIO based DC-DC controller for port power control. This document is intended to guide a user on setting up the UPD301B Basic Source AE to work properly with UPD301B Basic Source Demo along with a demonstration of a PD device attached to the EVB.

4 Prerequisites

Hardware:

- 1) Microchip UPD301B Basic Source AE Board

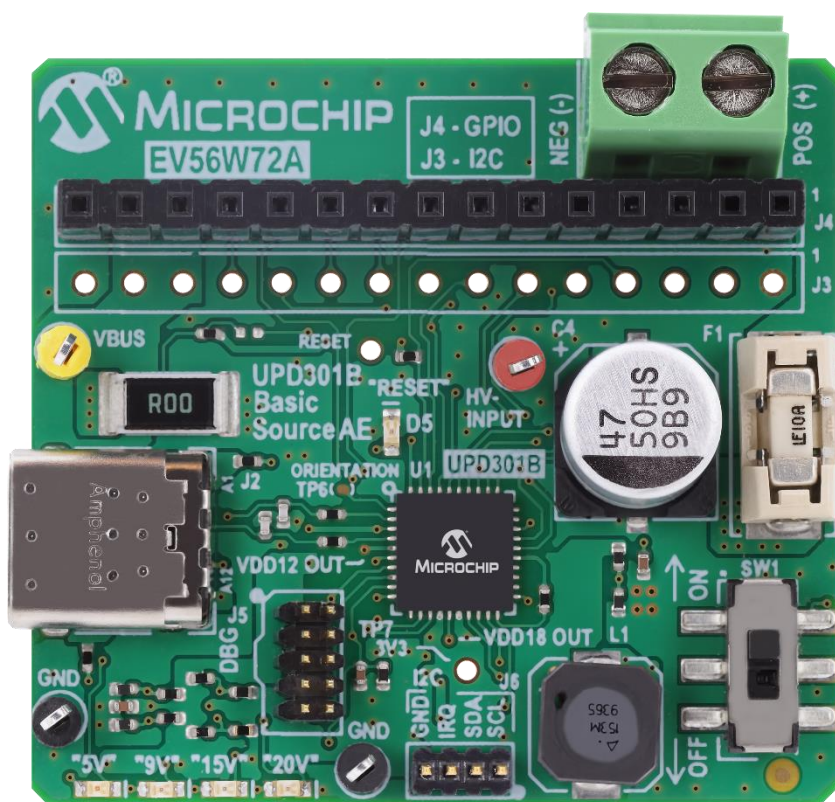


Figure 4.1 Microchip UPD301B Basic Source AE Board

1) Microchip UNG 8122 Rev D PM-PD Card

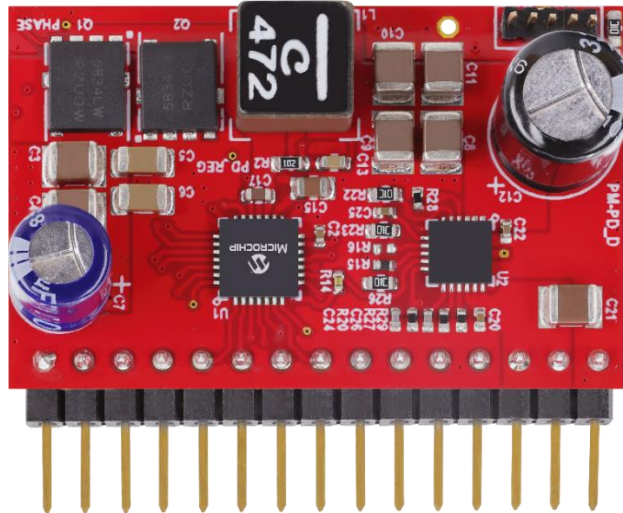


Figure 4.2 Microchip UNG 8122 Rev D PM-PD Card

2) 72W Power Adapter with 24V, 3A output



Figure 4.3 Power Adapter with 24V, 3A output capacity

2) USB-C to USB-C cable

3) [Atmel ICE Debugger kit](#)



Figure 4.4 Atmel-ICE Debugger Kit

4) USB Power Delivery capable Phones or Laptops

5 Setting up the USB-PD Basic Source board for “UPD301B_Basic_Source_AE”

1. Ensure that the board is unpowered before plugging anything onto the board
2. Connect PM-PD card on J4 in correct orientation as shown in Figure 5.1.

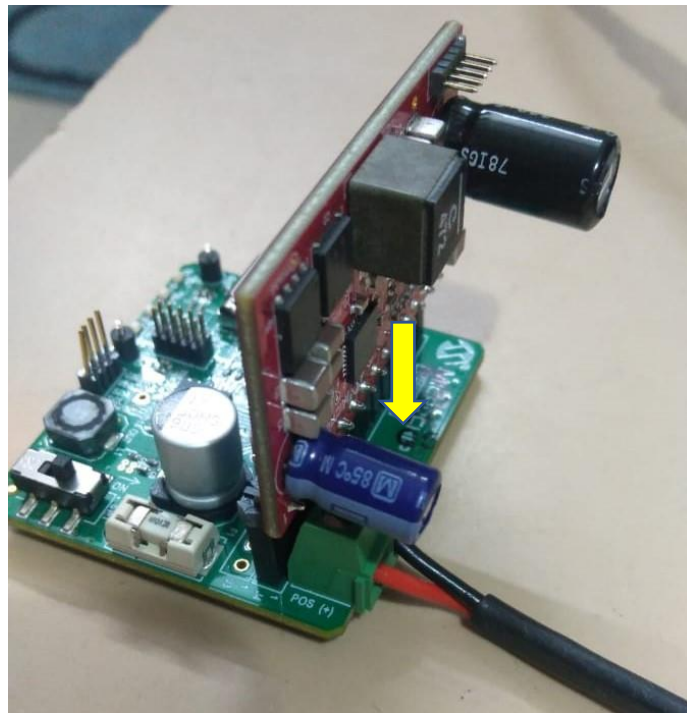


Figure 5.1 PM-PD Orientation

3. Connect one end of Atmel ICE to PC using USB Micro-B cable and the other end to J5 of USB-PD Basic Source as shown in the figure below.

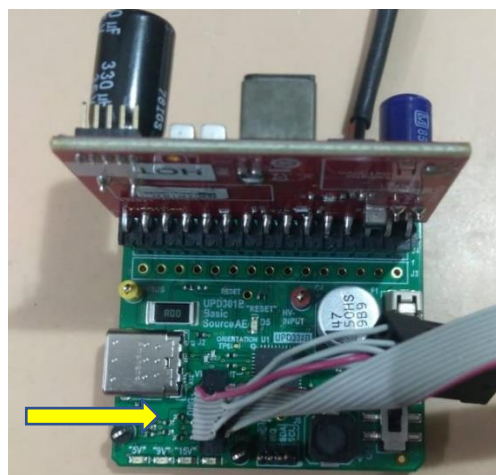


Figure 5.2 Connecting Atmel-ICE Debugger to J5

4. Connect the power adapter as shown in the figure 5.3.
5. The whole connection looks as in the below figure 5.3

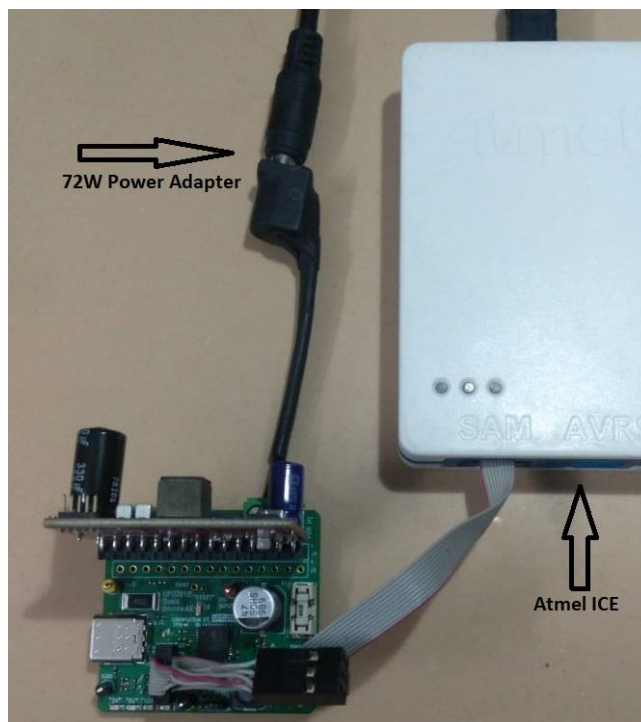


Figure 5.3 Basic Source Full Setup

6 Running the demo

Refer [Getting Started with PSF](#) document for the detailed steps on setting up the build environment, building the UPD301B Basic Source AE PSF project and programming the UPD301B Basic Source.

Refer Appendix 8.2 of [Getting Started with PSF](#) to change any SAMD20 Harmony configuration. Refer 'Boot time Configuration' of [PSF User Guide](#) to change any configuration parameters.

1. Program the UPD301B Basic Source by following the steps mentioned in section 7 of [Getting Started with PSF](#)
2. Connect a PD device to the Port of EVB using a USB-C to USB-C cable.
3. The image demonstrates a scenario where Microchip's UPD301C Basic Sink AE boards is connected to the EVB Port.

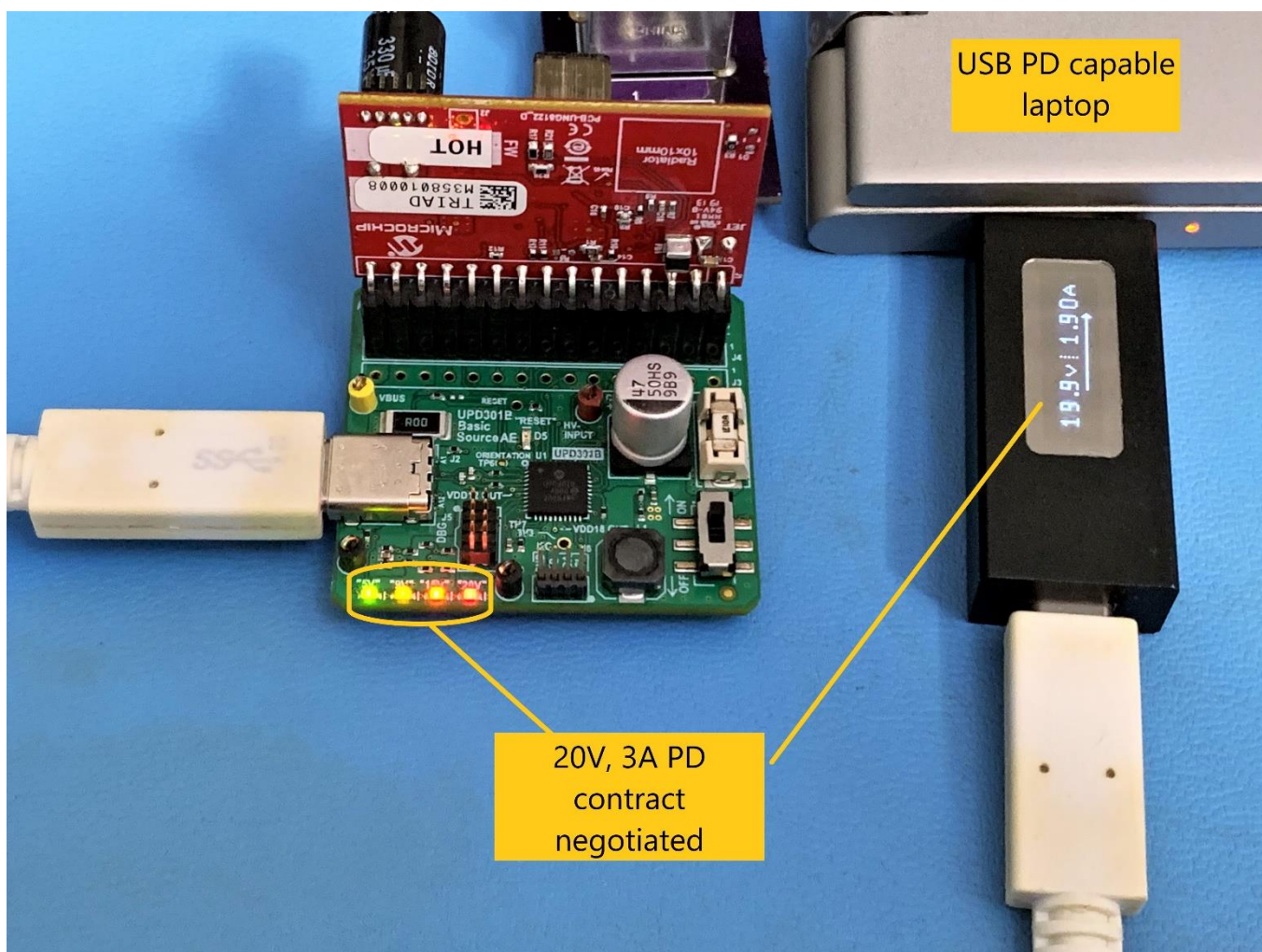


Figure 6.1 UPD301C Basic Sink AE connected to the PD port

7 Expected Results

1. Once the hex file is programmed, the RESET LED blinks and none of the LED will glow.
2. Once a PD Device is attached to a PD port, Source capabilities will be advertised by the PSF, followed by a PDO request from the device.
3. PSF checks if the PDO requested by the device is within the range of its capabilities. If so, it accepts the request and starts driving the requested voltage in the VBUS.
4. Once an explicit power contract negotiation is in place, the device starts charging. The PDO status LEDs will turn on indicating the negotiated voltage as shown in Figure 7.1.
5. In our case, Microchip's UPD301C Basic sink connected in the Port has requested 20V and the status of PDO status LEDs is shown in Figure 7.1.

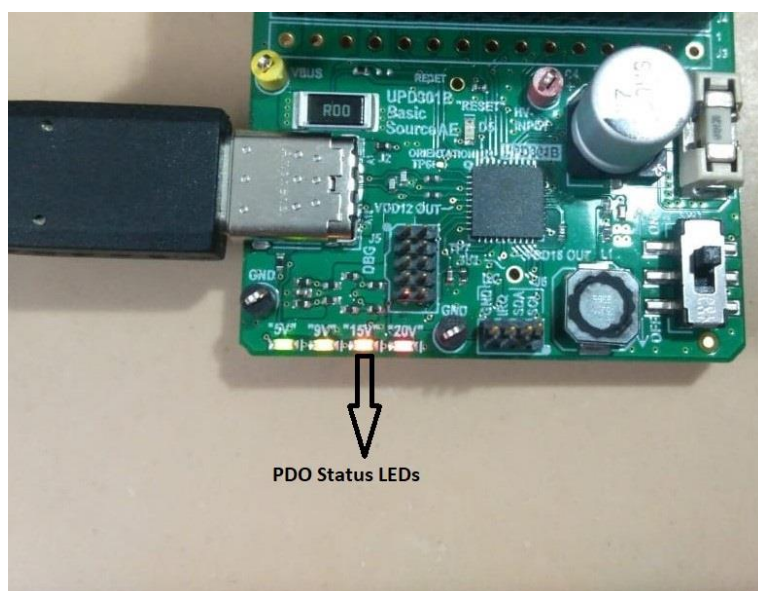


Figure 7.1 PDO Status LEDs after device attach.