

PSF AE\_SINK Demo

Software Requirements Specification

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Table of Contents

[1 Introduction 4](#_Toc47594180)

[1.1 Scope 4](#_Toc47594181)

[1.2 References 4](#_Toc47594182)

[1.3 Specifications 4](#_Toc47594183)

[1.4 Terms and Abbreviations 4](#_Toc47594184)

[2 Project Overview 5](#_Toc47594185)

[2.1 Version Control 5](#_Toc47594186)

[2.2 Bug tracking 5](#_Toc47594187)

[2.3 Human resources 5](#_Toc47594188)

[2.4 Review & Approval team 5](#_Toc47594189)

[3 Software Requirements Specification 6](#_Toc47594190)

[3.1 Target platform Requirements 6](#_Toc47594191)

[3.1.1 R\_TP\_BOARD\_REQUIREMENTS 6](#_Toc47594192)

[3.1.2 R\_TP\_HARMONY\_SUPPORT 6](#_Toc47594193)

[3.2 Functional Requirements 6](#_Toc47594194)

[3.2.1 R\_FUNC\_ADC\_ROTOR\_SWITCH 6](#_Toc47594195)

[3.2.2 R\_FUNC\_CURRENT\_MONITOR 6](#_Toc47594196)

[3.2.3 R\_FUNC\_PFC\_CONTROL\_TERMINAL 6](#_Toc47594197)

[3.2.4 R\_FUNC\_POWER\_PROFILES 6](#_Toc47594198)

[3.3 Performance Requirements 7](#_Toc47594199)

[3.4 Compliance Requirements 7](#_Toc47594200)

[3.5 Testing Requirements 7](#_Toc47594201)

[3.5.1 Developer testing 7](#_Toc47594202)

[3.5.2 Validation testing 7](#_Toc47594203)

[3.5.3 Acceptance testing 7](#_Toc47594204)

[3.6 Compatibility Requirements 7](#_Toc47594205)

[3.7 Projects from which Bugs are to be cloned to this project 7](#_Toc47594206)

[3.8 Documentation Requirements 7](#_Toc47594207)

[3.8.1 Developer testing 7](#_Toc47594208)

[3.8.2 Validation testing 7](#_Toc47594209)

[3.8.3 Acceptance testing 7](#_Toc47594210)

[3.9 Miscellaneous Requirements 7](#_Toc47594211)

[4 Project Deliverables 11](#_Toc47594212)

[5 Prerequisites 11](#_Toc47594213)

[6 Assumptions 11](#_Toc47594214)

[7 Dependencies 11](#_Toc47594215)

[8 Known Limitations 11](#_Toc47594216)

# Introduction

This document captures the requirements for the PSF AE\_Sink Demo project.

## Scope

The scope of this document is to list down all the firmware requirements during the entire product life cycle for the successful delivery of PSF AE\_Sink.

The intended audience for this document is Product Marketing Team, Apps Team. This document is for internal use within Microchip.

## References

* SAMD20 Datasheet
* UNG8270\_A
* PSF AE\_SINK\_DEMO

## Specifications

None

## Terms and Abbreviations

|  |  |
| --- | --- |
| PD | Power Delivery |
| NA | Not Applicable |

# Project Overview

## Version Control

All software work items related to & developed under this project will be checked in under the following path in version control system.

<https://bitbucket.microchip.com/scm/ung_apps/usb-pd-software-framework-public.git-> under branch   
feature/upd301c-sink-ae-demo.

## Bug tracking

JIRA-

## Human resources

The following resources constitute the project team for this software development.

**Team lead:**  Riyas

**Team members:** Monika

## Review & Approval team

|  |  |  |
| --- | --- | --- |
| **Phase** | **Reviewer(s)** | **Approver(s)** |
| Requirements | Riyas, Monika | Andrew, Pragash, Jegatheesh |
| Design | Riyas | Jegatheesh |
| Implementation | Monika | Riyas |
| Documentation | Monika | Riyas, Pragash, Andrew |
| Release | Riyas, Monika | Pragash, Andrew |

# Software Requirements Specification

## Target platform Requirements

### R\_TP\_BOARD\_REQUIREMENTS

1. PSF AE\_SINK EVB x 2
2. 60W multi configurable power adapter x 2
3. PD source device(0V-20v)
4. Atmel ICE with adapter
5. UART FTDI cable
6. Type C cable - 3
7. Type C bridge dongle- to measure voltage

### R\_TP\_HARMONY\_SUPPORT

The Demo shall support Harmony 3.

## Functional Requirements

### R\_FUNC\_ADC\_ROTOR\_SWITCH

Different power profiles can be selected based on the knob selection which is connected to PA04 of SAMD20



The corresponding PDOs are,

5V @ 3A

9V @ 3A

15V @ 3A

20V @ 3A

20V @ 3A

20V @ 3A

### R\_FUNC\_CURRENT\_MONITOR

Current negotiated is to be monitored throughout and print on the terminal

### R\_FUNC\_PFC\_CONTROL\_TERMINAL

Default baud rate – 115200

Supported commands -

* **~~set br [value]~~** ~~- to set uart baud rate- Decided to delete this feature; There is no in built API for set and get baudrare;~~
* **set mem [memory\_address] [byte value]** - write memory of SAMD20
* **set pdo [position] [value]** – Insert a new PDO at the mentioned position
* **get version**
* **get br** - Get baud rate
* **get pdo** - Current sink power details
* **get sr [Name]** - Read status registers
  + **Supported names**-
    - GlobalCfgStatusData
    - PortCfgStatus
* **get mem [memory\_address] [length]** - Read memory

### R\_FUNC\_POWER\_PROFILES

Supported PDOs-

5V @ 3A

9V @ 3A

15V @ 3A

20V @ 3A

## Performance Requirements

None

## Compliance Requirements

PD Compliance

## Testing Requirements

### Developer testing

There shall be a test plan and a corresponding test report

### Validation testing

There shall be a test plan and a corresponding test report

### Acceptance testing

There shall be a test plan and a corresponding test report

## Compatibility Requirements

None.

## Projects from which Bugs are to be cloned to this project

None

## Documentation Requirements

### Developer testing

There shall be a test plan and a corresponding test report

### Validation testing

There shall be a test plan and a corresponding test report

### Acceptance testing

There shall be a test plan and a corresponding test report

## Miscellaneous Requirements

PSF configuration values to be set by firmware.

|  |  |
| --- | --- |
| **Features** | **Available=1/Not available=0** |
| INCLUDE\_PD\_3\_0 | 1 |
| INCLUDE\_PD\_SOURCE | 0 |
| INCLUDE\_PD\_SINK | 1 |
| INCLUDE\_VCONN\_SWAP\_SUPPORT | 1 |
| INCLUDE\_POWER\_FAULT\_HANDLING | 1 |
| INCLUDE\_UPD\_PIO\_OVERRIDE\_SUPPORT | 1 |
| INCLUDE\_POWER\_MANAGEMENT\_CTRL | 1 |
| INCLUDE\_PDFU | 0 |
| INCLUDE\_POWER\_BALANCING | 0 |
| INCLUDE\_POWER\_THROTTLING | 0 |
| INCLUDE\_PD\_SOURCE\_PPS | 0 |

**GlobalCfgStatusData**

|  |  |
| --- | --- |
| Features | Value |
| u8MinorVersion | 0 |
| u8MajorVersion | 1 |
| u8HWVersion | 0 |
| u8SiVersion | 0 |
| u8aManfString[8] | null |
| u8PSFMajorVersion | PD stack |
| u8PSFMinorVersion | PD stack |
| u8PwrThrottleCfg | 0 |
| u8aReserved3 | 0 |
| u16ProducdID | 0x301c |
| u16VendorID | 0x0424 |
| u16ProductTypeVDO | 0 |
| u16ProductVDO | 0 |
| u16CertStatVDO | 0 |
| u16IDHeaderVDO | 0 |
| u16SharedPwrCapacityIn250mW | nc |
| u8PBEnableSelect | nc |
| u8aReserved6 | nc |
| u16SystemPowerBankAIn250mW | nc |
| u16MinPowerBankAIn250mW | nc |
| u16SystemPowerBankBIn250mW | nc |
| u16MinPowerBankBIn250mW | nc |
| u16SystemPowerBankCIn250mW | nc |

**PortCfgStatus**

|  |  |
| --- | --- |
| Member variables | Value |
| u32CfgData | (CFG\_VCONN\_OCS\_ENABLE) | (CFG\_PORT\_ENABLE) | (CFG\_PORT\_RP\_CURRENT\_VALUE)| (CFG\_PORT\_POWER\_ROLE)) |
| u32aSourcePDO[7] | NA |
| u32aSinkPDO[7] | {[5V, 3A],[9V, A],[15V, A],[20V, 3A],[20V, 3A],[20V, 3A],[20V, 3A], |
| u32aNewPDO[7]; | na |
| u32aAdvertisedPDO[7]; | na |
| u32aPartnerPDO[7]; | na |
| u32RDO; | na |
| u32PortConnectStatus; | na |
| u32PortStatusChange; | na |
| u32PortIOStatus; | na |
| u32ClientRequest; | na |
| u16AllocatedPowerIn250mW; | na |
| u16NegoVoltageInmV; | na |
| u16NegoCurrentInmA; | na |
| u16MaxSrcPrtCurrentIn10mA; | na |
| u16PortIntrMask; | na |
| u16PowerGoodTimerInms; | 10S |
| u16FeatureSelect; | na |
| u16Reserved1; | na |
| u16aMinPDOPreferredCurInmA[7]; | {2A,2A,2A,2A,2A,2A,2A} |
| u16SnkMaxOperatingCurInmA; | 3A |
| u16SnkMinOperatingCurInmA; | 1A |
| u16DAC\_I\_MaxOutVoltInmV; | 2.5V |
| u16DAC\_I\_MinOutVoltInmV; | 0V |
| u16DAC\_I\_CurrentInd\_MaxInA; | 5A |
| u8SourcePDOCnt; | NA |
| u8SinkPDOCnt; | 7 |
| u8NewPDOCnt; | NC |
| u8AdvertisedPDOCnt; | NC |
| u8PartnerPDOCnt; | NC |
| u8SinkConfigSel; | (CFG\_PORT\_SINK\_MODE\_A)| (CFG\_PORT\_SINK\_USB\_SUSP | (CFG\_PORT\_SINK\_GIVE\_BACK\_FLAG) |
| u8FaultInDebounceInms; | 5mS |
| u8OCSThresholdPercentage; | 0 |
| u8OVThresholdPercentage; | 115 |
| u8UVThresholdPercentage; | 85 |
| u8VCONNOCSDebounceInms; | 2mS |
| u8VBUSMaxFaultCnt; | 3 |
| u8VCONNMaxFaultCnt; | 3 |
| u8Pio\_FAULT\_IN; | eUPD\_PIO5 |
| u8Mode\_FAULT\_IN; | ACTIVE\_LOW |
| u8aReserved1; | NA |
| u8Pio\_EN\_VBUS; | NA |
| u8Mode\_EN\_VBUS; | NA |
| u8aReserved2[2]; | NA |
| u8Pio\_EN\_SINK; | eUPD\_PIO6 |
| u8Mode\_EN\_SINK; | ACTIVE\_HIGH |
| u8DAC\_I\_Direction; | 0 |
| u8Reserved3; | NA |
| u8ReservedPortPadBytes[32]; | NA |

# Project Deliverables

* Demo binary
* Demo user guide
* Test reports
* EVB user guide and it’s collaterals
* Release check list
* Release report

# Prerequisites

* R\_TP\_BOARD\_REQUIREMENTS
* PSF SINK library

# Assumptions

# Dependencies

# Known Limitations