

PSF AE\_SINK Demo

Software Requirements Specification

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# 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, Jegadheesan |
| Design | Riyas | Jegadheesan |
| 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 | 2 |
| u8MajorVersion | 1 |
| u8HWVersion | 0 |
| u8SiVersion | 0 |
| u8aManfString[21] | Microchip Technology |
| u8PSFMajorVersion | 1 |
| u8PSFMinorVersion | 7 |
| u8PwrThrottleCfg | 0 |
| u8aReserved3 | 0 |
| u16ProducdID | 0x350 |
| 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 | 568 |
| u32aSourcePDO[7] | NA |
| u32aSinkPDO[7] | {[5V, 3A],[9V, A],[15V, A],[20V, 3A]} |
| u32aNewPDO[7]; | User input |
| u32aAdvertisedPDO[7]; | As per negotiated contract |
| u32aPartnerPDO[7]; | 0 |
| u32RDO; | 0 |
| u32PortConnectStatus; | 0 |
| u32PortStatusChange; | 0 |
| u32PortIOStatus; | 0 |
| u32ClientRequest; | 0 |
| u16AllocatedPowerIn250mW; | 0 |
| u16NegoVoltageInmV; | 0 |
| u16NegoCurrentInmA; | 0 |
| u16MaxSrcPrtCurrentIn10mA; | 300 |
| u16PortIntrMask; | 0 |
| u16PowerGoodTimerInms; | 10S |
| u16FeatureSelect; | 0 |
| u16SwapPolicy | 0xC00 |
| u16Reserved1; | na |
| u16aMinPDOPreferredCurInmA [7]; | {2A,2A,2A,2A,0,0,0} |
| u16SnkMaxOperatingCurInmA; | 3A |
| u16SnkMinOperatingCurInmA; | 1A |
| u16DAC\_I\_MaxOutVoltInmV; | 2.5V |
| u16DAC\_I\_MinOutVoltInmV; | 0V |
| u16DAC\_I\_CurrentInd\_MaxInA; | 5A |
| u8SourcePDOCnt; | NA |
| u8SinkPDOCnt; | 4 |
| u8NewPDOCnt; | As per user input |
| u8AdvertisedPDOCnt; | As per negotiated contract |
| u8PartnerPDOCnt; | 0 |
| u8SinkConfigSel; | 0 |
| u8FaultInDebounceInms; | 5mS |
| u8OCSThresholdPercentage; | 0 |
| u8OVThresholdPercentage; | 115 |
| u8UVThresholdPercentage; | 85 |
| u8VCONNOCSDebounceInms; | 2mS |
| u8VBUSMaxFaultCnt; | 3 |
| u8VCONNMaxFaultCnt; | 3 |
| u8Pio\_FAULT\_IN; | eUPD\_PIO5(9) |
| u8Mode\_FAULT\_IN; | ACTIVE\_LOW (20) |
| u8aReserved1; | NA |
| u8Pio\_EN\_VBUS; | NA |
| u8Mode\_EN\_VBUS; | NA |
| u8aReserved2[2]; | NA |
| u8Pio\_EN\_SINK; | eUPD\_PIO6(6) |
| u8Mode\_EN\_SINK; | ACTIVE\_HIGH(c) |
| u8DAC\_I\_Direction; | 0 |
| u8Reserved3; | NA |
| u8ReservedPortPadBytes[32]; | NA |

**set pdo [position] [value]**

When using this command, user must give the value of PDO as ((((voltage)/50) << 10) | ((current)/10)).

For eg: For the PDO (15000U,3000U), the pdo value to be given is 4B12C.

**Initial Rotor Knob position**

Program the EVB by setting the Rotor Knob position to position 4 (considering the positions start from 0) as that is the default position.

# 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

# Meeting minutes

|  |  |  |
| --- | --- | --- |
| **Meeting Minutes** | Project Name | PSF AE Sink Demo |
|  | Date | Sep 15 2020 |
|  | Minutes Taken By | Somu Monika |

|  |  |
| --- | --- |
| **Attendees** | **Name** |
|  | Somu Monika |
|  | Riyas Kattukandan |
|  | Shiva Balasubramanian |
|  |  |
|  |  |
|  |  |
|  |  |

|  |  |  |
| --- | --- | --- |
| **Agenda** | **No.** | **Meeting Topics** |
|  | 1. | Command-set br[value] |
|  | 2. | Command-set pdo[position][value] |
|  | 3. |  |

|  |
| --- |
| **Discussion notes** |
| Set br[value] and get br commands are to be removed from the supported commands because there is no separate API for those commands and any in proper change in baud rate might stop the flow of execution |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Action Items** | | | |  |  |
| **No.** | **New Actions** | **By Whom** | **Deadline** | **Current Status** | **Closed on** |
| 1. |  |  |  |  |  |
| 2. |  |  |  |  |  |
| 3. |  |  |  |  |  |
| 4. |  |  |  |  |  |