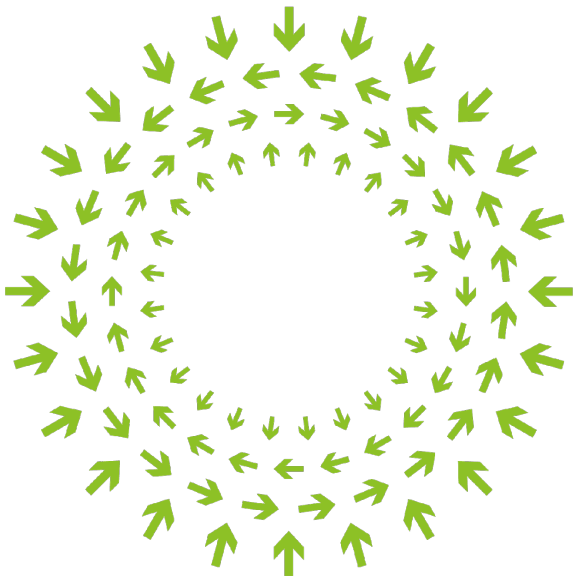

OPEN Compute Project

Open Rack V3 BBU Shelf

Rev: 1.1

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1.2 Acknowledgements

The Contributors of this Specification would like to acknowledge the following companies for their feedback:

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Revision History

Revision	Date	Description	Authors
0.1	03/25/2020	first draft	David Sun
0.2	04/10/2020	Updated thermal, mechanical, compliance sections	Cheng Chen, Chenyu Xu, Ben Kim
0.3	04/30/2020	Section 6.2 Add BBU connector PN	Chenyu Xu
0.4	02/23/2021	Section3.4 Output return is not grounded to chassis 4.1: Added new renderings and updated dimensions 4.2: Added further details on rack mounting features 4.3 – 4.4: Newly added sections 4.5: Added information regarding screws on rear cover 4.6: Added details regarding PCR plastics 4.7: Added details about shelf labeling and silk screening 4.8-4.10: New sections 5. Updated details about PMI, got rid of references about PMC. Added PMI operational diagram 6.1: Updated with latest diagrams of connector 6.2: Added more details regarding connector and new drawings / pictures 6.3: Added further details regarding connector, 2nd/3rd sources, and new drawings 7.2 Added packaging S&V requirements. 8.1 Added UL9540/9540A requirements	David Sun Dmitriy Shapiro Ben Kim
0.5	8/27/21	3.1-3.6 Updated Electrical sections per ORV3 BBU spec Revision0.91. Added 3.7 Parallel Shelves and Hot Swap Added 3.8 Other Requirements Submitted to OCP.	David Sun Dmitriy Shapiro Ben Kim Jayati Athavale
0.6	1/14/22	3.1 Steady state regulation and total regulation upper limit set to 48.1V. Confirmed 5A/us SOH discharge mode upper limit from 51V to 51.2V. 4.3 Designated latch material 4.6 Updated clarification about materials 4.9 New drawing included 6.1 Updated details regarding new connector 8.1 UL9540A Cell/BBU/Shelf reports 9 Added Quality and Reliability items/requirements	David Sun Ben Kim Dmitriy Shapiro Rommel Mercado

0.7	5/9/22	3.7 Clarified BBU Shelf is not hot removable. 7/22/22: 3.1 Maximum cap 60mF/shelf; Output power 15kW to 18kW.	David Sun Dmitriy Shapiro
1.0	8/16/22	Updated with 2022 OCP spec template	David Sun
1.1	9/13/2022	5.1 SOH boost mode maximum output 51.2V-> 51.5V 10.1 Removed UN38.3 for shelf level. Filled in Appendix A and deleted Appendix B for OCP	David Sun

Table of Contents

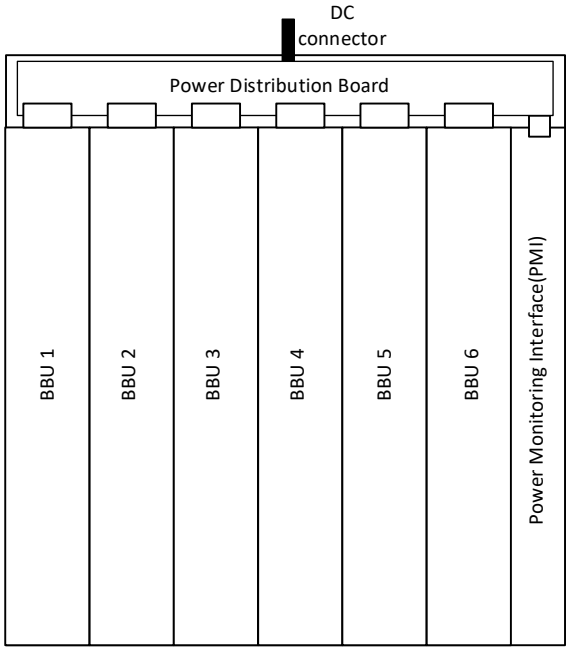
3 Scope

This document defines the technical specifications for Open Rack V3 BBU Shelves used in the Open Compute Project.

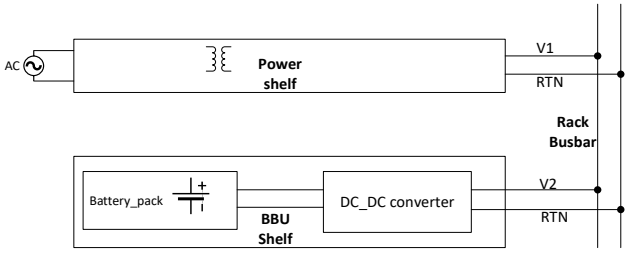
4 Introduction

The Open Rack Power Architecture is comprised of a centralized scalable power shelf and a BBU (Battery Backup Unit) shelf that distributes power over a common bus bar to the payload devices (IT Gear). This spec will define the BBU shelves that fit into the Open Rack. The BBU shelf shall house 6 BBU Modules with 5+1 redundancy to provide the DC power to all the payloads inside the rack. When there is an AC power outage, the BBU shelf shall be able to provide backup power up to the maximum rating of the power shelf for a specified backup time period. The BBU shelf backup time allows the rack to be switched between power sources (ex. utility source to utility source, or utility source to backup generator) with no disruption to the IT gears and allows drain/migrate applications before power loss.

Each BBU shelf consists of a PMI module and 6X 3KW BBU modules. Each BBU module consists of a battery pack and a DC-DC charger/discharger.



BBU Shelf Overview (1)



BBU Shelf Overview (2)

5 Electrical Requirements

5.1 BBU Shelf Discharge Mode Output Parameters

	Min	Nominal	Max	Peak	Unit	*Note
Output voltage Steady state	47V	48.0V@0% load; 47.75V@50% load; 47.5V@100% load; 47.25V@150% load	48.1V	-	V	
Output voltage droop	0.45	0.5*	0.55	-	V	Output voltage droop 0.5V(1%) from 0% load to 100% load
Output voltage steady state total regulation	47.0*	48.0V@0% load; 47.75V@50% load; 47.5V@100% load; 47.25V@150% load	48.1*	-	V	Steady state voltage regulation including 0%-150% load, excluding overshoot /undershoot voltage at step load
Output voltage ripple and noise	-	-	300*	-	mV	Peak to peak
Transient load response	-3%* (>46V)*	-	+3%*	-	-	1. Step load 0%-80% with 0.1A/μS slew rate, 2. Step load 80% with 5A/μS slew rate @≥10% minimum load, 3. Minimum transient voltage shall be >46V at any dynamic load conditions including peak power step (4.3.1, 20%-150%, 5A/us).
Output voltage boost limit for SOH	-	-	51.5*	-	V	BBU boost voltage up to discharge energy at CP mode (e.g.1.5KW)
Startup time	-	-	2*		ms	From discharger activation to BBU output voltage and current fully ramp up including peak load condition (150%).
Output current	0	-	379.2	568.8*	A	See V3 BBU spec for details of peak load.
Output power	0	-	18	27*	KW	See V3 BBU spec for details peak load.

Output capacitance	0	-	60*	-	mF	Maximum capacitance per shelf
Battery backup time	240*	-	-	-	seconds	15KW discharge time >240s at PCM threshold (e.g.3.9V/cell) ≥4 years @35degC
BBU life	8*	-	-	-	years	15KW discharge time >240s at PCM threshold (e.g.3.9V/cell) ≥4 years @35degC

See V3 BBU Specification for detailed requirements of BBU Discharge mode operation.

5.2 BBU Shelf Charge Mode Input Parameters

	Min	Nominal	Max	Unit	*Note
Input voltage	49	50.5V-51V	53	V	Charger shall accept busbar transient voltage below 49V for <2ms.
Input current	0		33(5.5/BBUx6) *	A	CC/CV mode charge. CC mode charge current is variable and programmable.
Input power	0		1650(275/BBUx6)	KW	

See ORV3 BBU Specification for detailed requirements of charge mode operation.

5.3 Power Shelf to BBU Shelf Transition

When the power shelf loses AC input, the BBU shelf shall provide DC power to the rack. The busbar voltage dip shall stay above 46V during the transition from the power shelf to the BBU shelf.
See ORV3 BBU Module Specification for detailed requirements of PSU Shelf to BBU Shelf transition.

5.4 Grounding

The BBU Shelf output return (negative) shall NOT be grounded to the BBU shelf enclosure.

5.5 BBU Shelf Operation Modes

See ORV3 BBU Module Specification for detailed requirements of BBU operation modes.

5.6 BBU Physical Addressing

Four BBU signal pins are used for physical addressing. There are digital signals that should have internal pull up resistors inside the BBU. On the BBU shelf, these pins can be grounded (0) or left open (1) to determine BBU location. See ORV3 BBU Specification for detailed requirements of BBU addressing.

5.7 BBU Shelves Parallel Operation and Hot Swap

BBU shelves shall support parallel operation when more IT load power and/or backup time are needed. The multiple BBU shelves are daisy chain connected through PMI RJ45 connector #3 and #4. The BBU shelves use BBU_ISHARE, SYNC_START_L, SYNC_STOP_L and CANBUS+/- for parallel operation mode control.
The BBU is hot-swappable to a live BBU shelf.
The BBU shelf is hot-pluggable into a live busbar. However, BBU shelf shall not be hot removable due to high risk of connector and busbar damage.
The BBU shall have an Oring device on each output for N+1 redundancy for parallel operation and redundancy.
To avoid bus voltage glitch at BBU/Shelf hot plug, there should be no capacitors placed on the shared voltage bus after Oring devices either in the BBU or shelf.

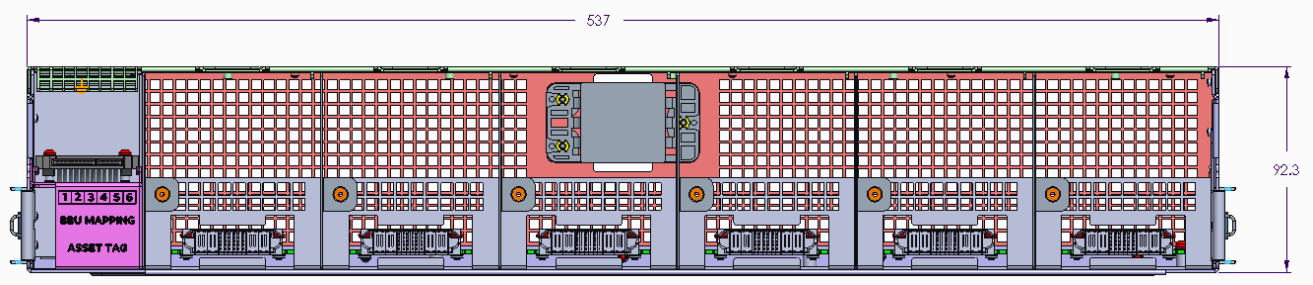
5.8 Other Electrical Requirements

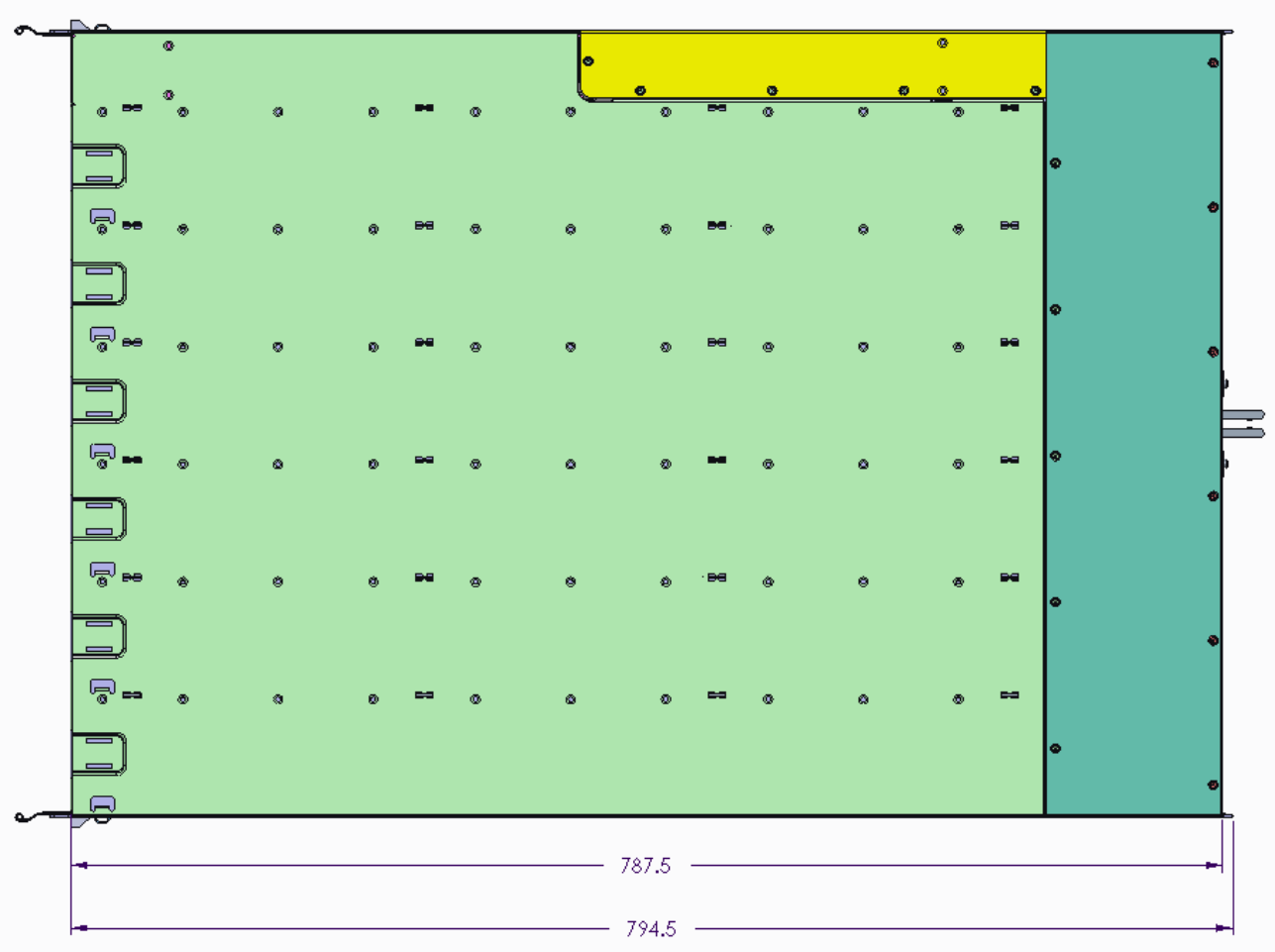
Refer to ORV3 BBU Specification for other electrical requirements related to BBU Shelf.

6 Mechanical Requirements

6.1 BBU Shelf Physical Dimensions

The 2OU BBU shelf size is 537mm x 92.3mm x 787.5mm [Width x Height x Depth]





6.2 Mounting

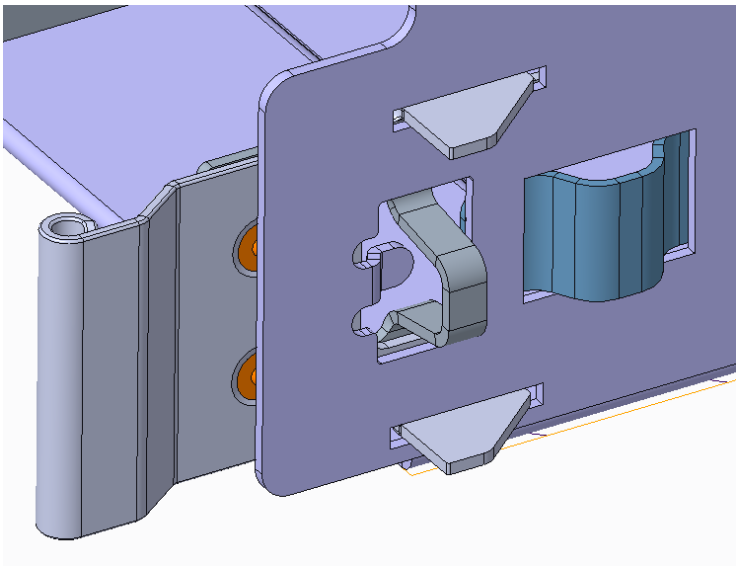
The BBU shelf will be front mounted anywhere in the Open Rack V3 on OU pitch rails (please refer to the Open Rack V3 specifications for more design details). The design of the 48V Output connector allows it to be placed in any location in the rack.

Rack mounting features are of particular importance in the BBU shelf design since they assist in constraining the BBU shelf in X, Y, and Z directions and promote solid electrical contact with the 48V busbar.

6.3 Front Latch & Bumper

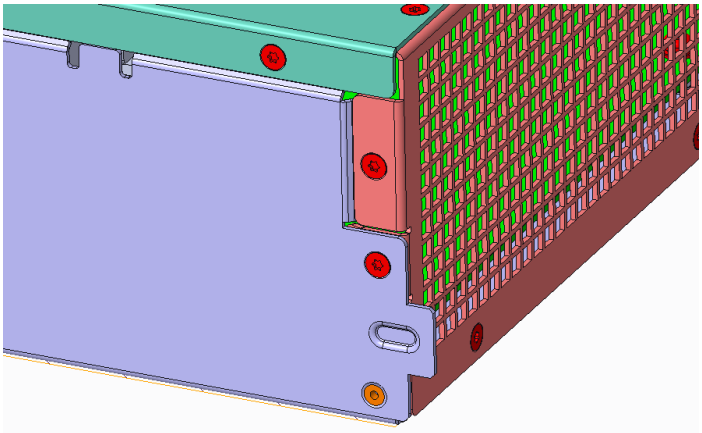
Please refer to the mechanical CAD for the locations of the front latch and bumper. Note that these serve separate functions and should not be a single part.

The front latch is a two-piece design that features a stopper to prevent latch overtravel. The latch shall be designed to withstand shocks seen during fully loaded rack shipping testing in an unpopulated shelf. This shock limit is 16G, including margin. It is highly suggested to use SUS301 Stainless Steel, ¾ Hard.



6.4 Rear Stop

Please refer to the mechanical CAD for the geometry of the rear stop. This is required to interface properly with the ORV3 rack.



6.5 Construction

The BBU shelf can be welded, riveted or screwed together, consistent with meeting shock, vibration and maximum allowable deflection requirements. There shall be no sharp corners or edges.
When assembled into a rack, with rectifiers installed, maximum deflection of the rectifier shelf shall be less than 1.3 mm.

The rear cover of the BBU shelf shall be assembled using flathead screws. No rivets are allowed as the rear must be accessible for assembly and serviceability with a screwdriver

6.6 Materials and Fasteners

The sheet metal material shall be steel, pre-plated hot-dip zinc coated, with 1.0mm - 1.2mm of thickness unless otherwise specified. Any plastic material used should meet UL 94-V0 specifications. It is highly suggested to use PCR (post-consumer recycled) plastic. The following PCR plastics have been qualified for use:

- GLite MBS-200BKR01
- GLite MBS-200GNR01

- Kingfa JH960-6950 C2B-S0759
- Kingfa JH960-6950 C7G-S0023
- Wistron WAM NCT50T##

6.7 Labeling & Markings

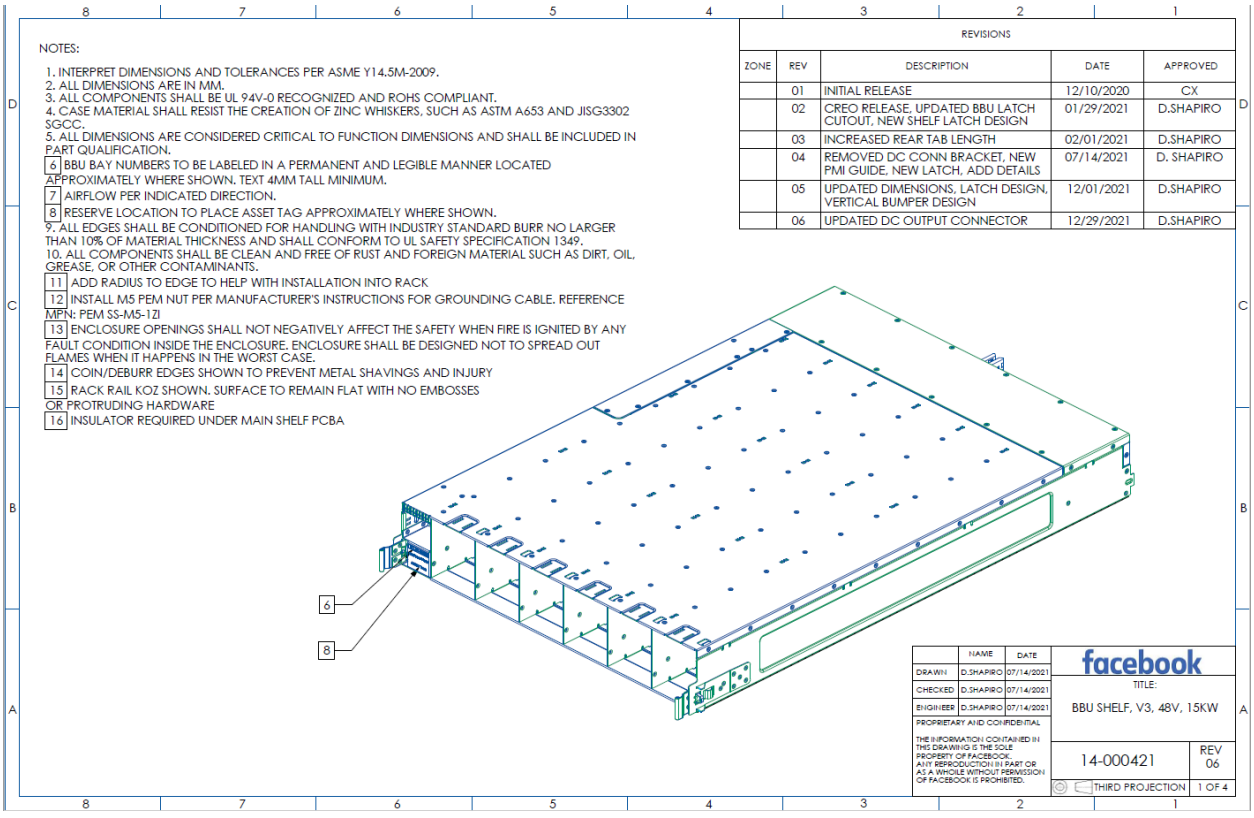
Markings shall be placed on the rear of the BBU shelf that identify which terminal of the DC output connector on the shelf is - and which is +. Markings are to be used as an assembly aid to ensure cables are assembled correctly. Preferred method is silk screening / pad printing.

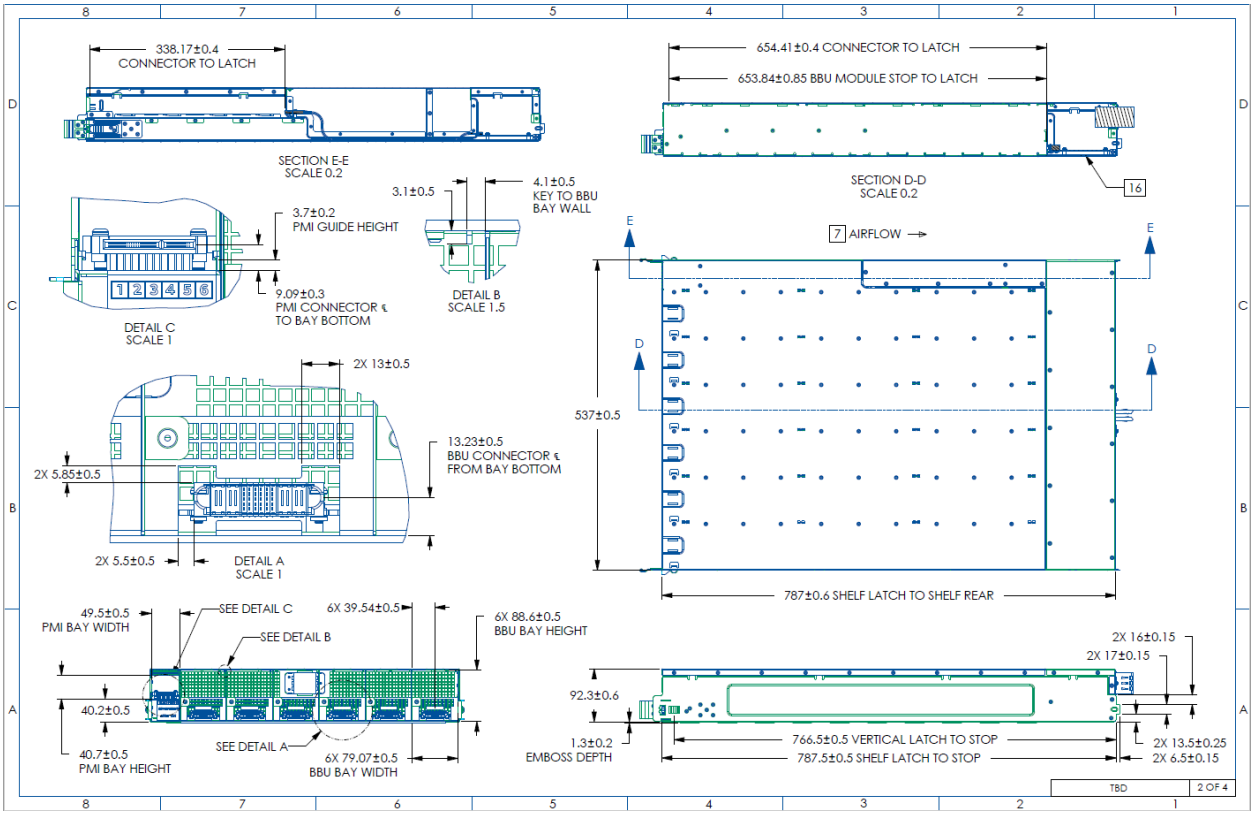
Shelf labeling to be placed on the right side emboss or other approved location.

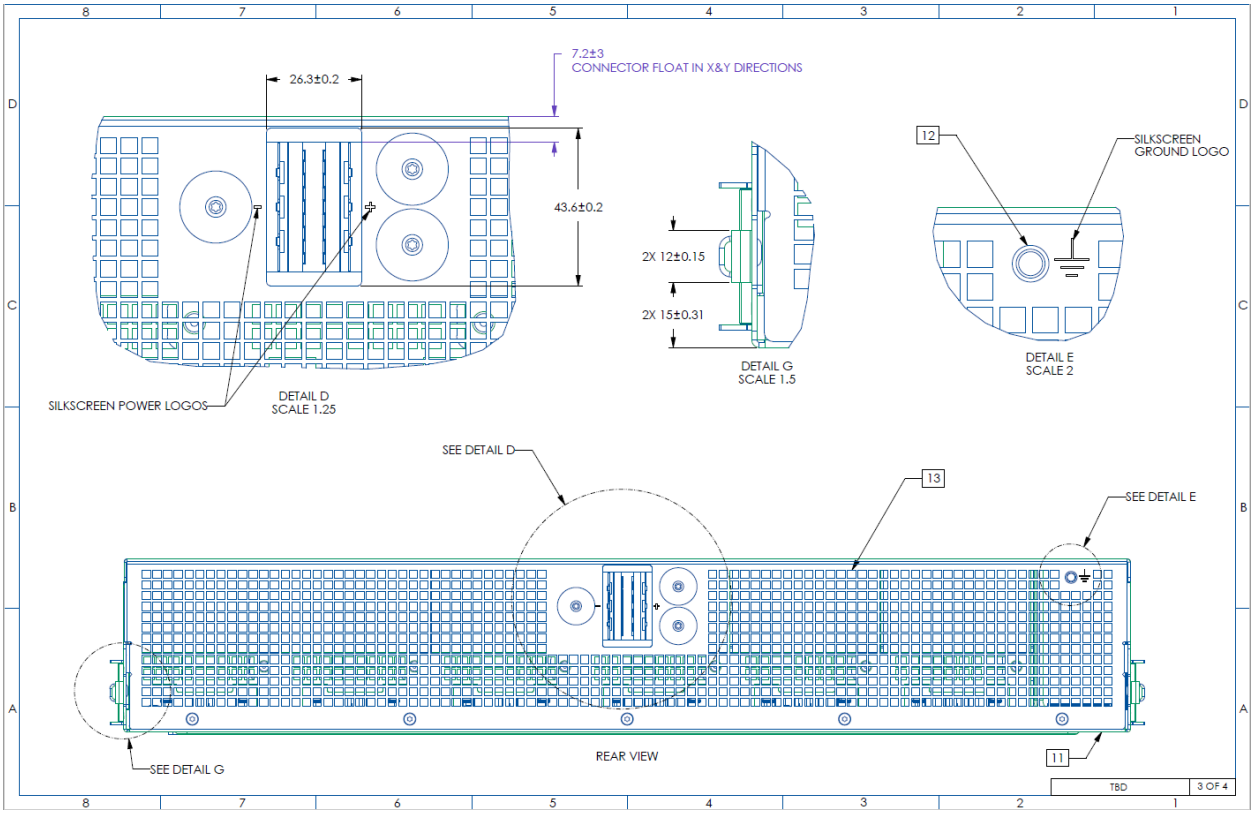
6.8 Front Access

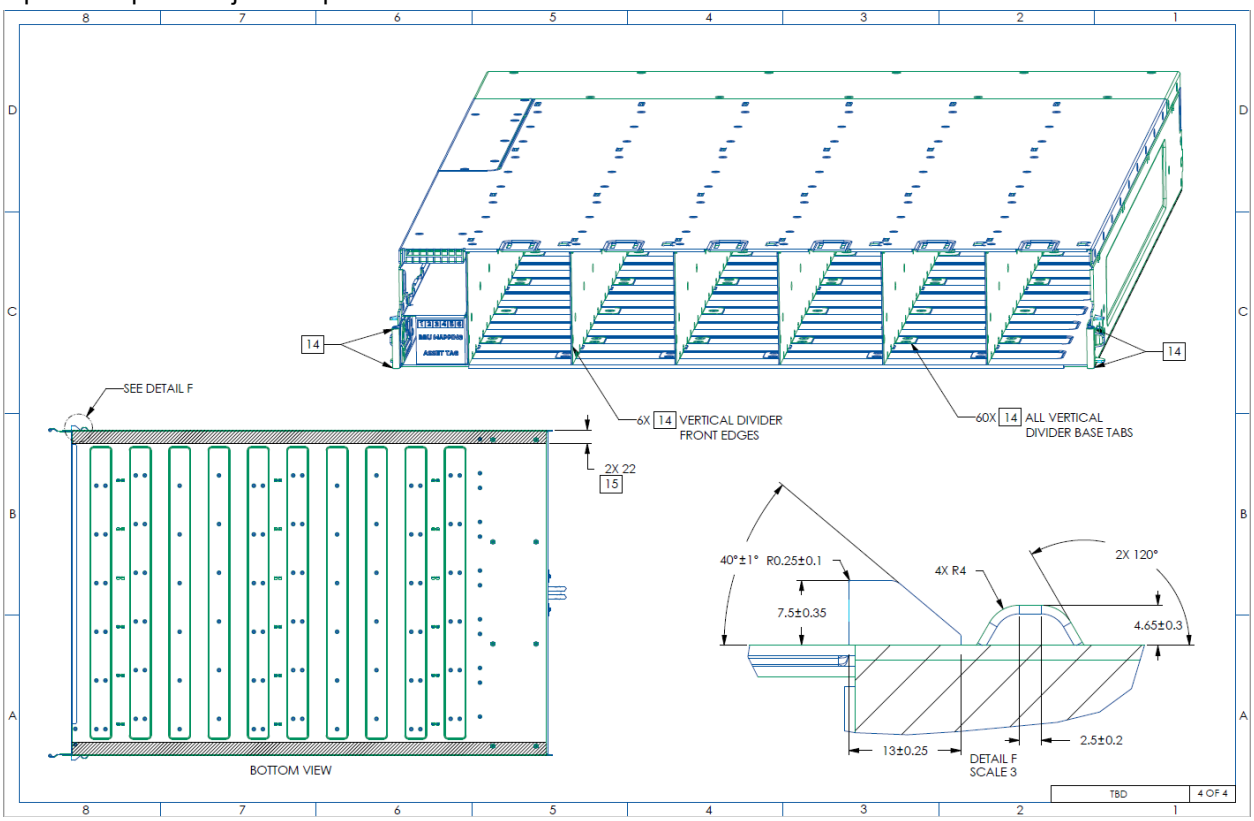
All 6 BBUs shall be toolless accessible from the front and located in the positions defined in the 3D drawing. The PMI shall also be toolless accessible from the front and located in the position defined on the 3D drawing.

6.9 Mechanical Drawings



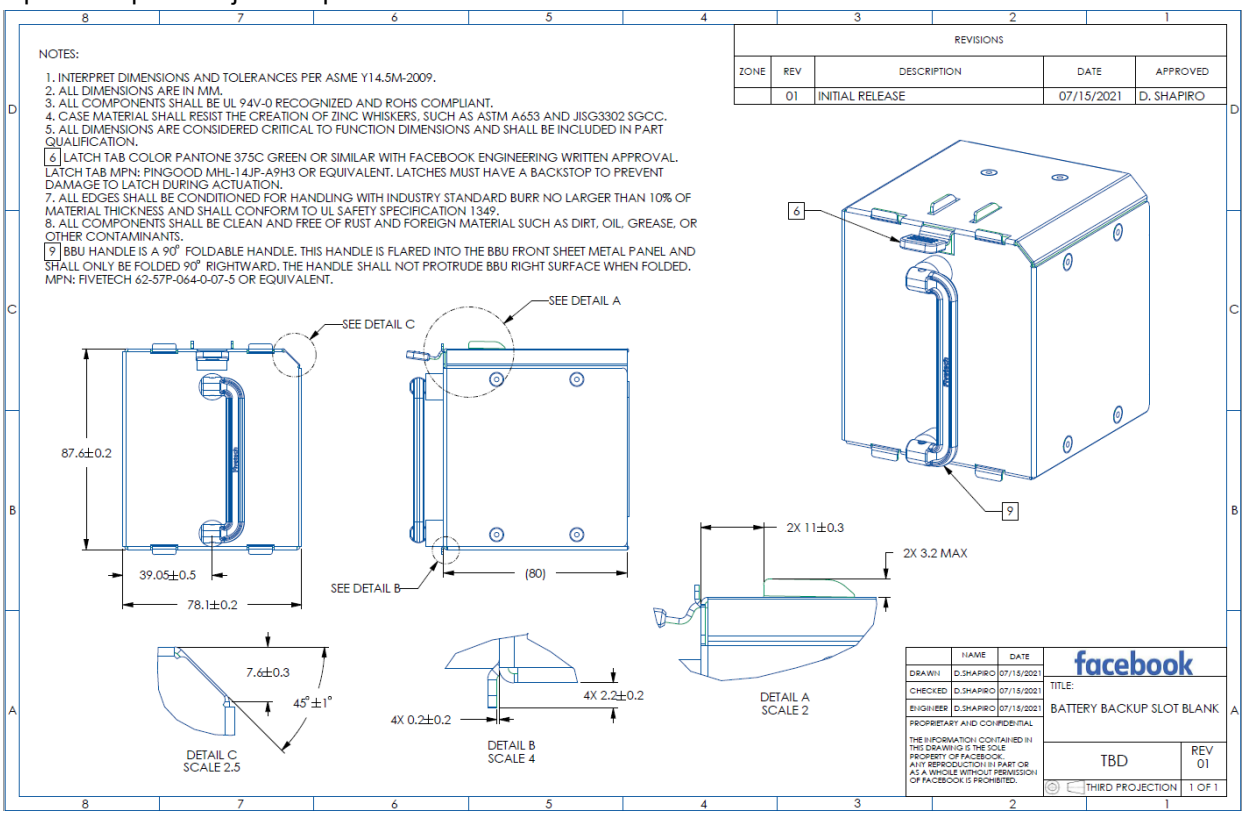

338.17±0.4
CONNECTOR TO LATCH
SECTION E-E
SCALE 0.2
654.41±0.4 CONNECTOR TO LATCH
653.84±0.85 BBU MODULE STOP TO LATCH
SECTION D-D
SCALE 0.2
16
3.1±0.5
4.1±0.5
KEY TO BBU
BAY WALL
3.7±0.2
PMI GUIDE HEIGHT
9.09±0.3
PMI CONNECTOR ℄
TO BAY BOTTOM
DETAIL C
SCALE 1
DETAIL B
SCALE 1.5
7 AIRFLOW
537±0.5
787±0.6 SHELF LATCH TO SHELF REAR
2X 13±0.5
2X 5.85±0.5
13.23±0.5
BBU CONNECTOR ℄
FROM BAY BOTTOM
2X 5.5±0.5
DETAIL A
SCALE 1
49.5±0.5
PMI BAY WIDTH
SEE DETAIL C
SEE DETAIL B
6X 39.54±0.5
6X 88.6±0.5
BBU BAY HEIGHT
40.2±0.5
40.7±0.5
PMI BAY HEIGHT
SEE DETAIL A
6X 79.07±0.5
BBU BAY WIDTH
2X 16±0.15
2X 17±0.15
92.3±0.6
1.3±0.2
EMBOSS DEPTH
766.5±0.5 VERTICAL LATCH TO STOP
787.5±0.5 SHELF LATCH TO STOP
2X 13.5±0.25
2X 6.5±0.15
TBD
2 OF 4


7.2±3
CONNECTOR FLOAT IN X&Y DIRECTIONS
26.3±0.2
43.6±0.2
SILKSCREEN POWER LOGOS
DETAIL D
SCALE 1.25
2X 12±0.15
2X 15±0.31
DETAIL G
SCALE 1.5
12
SILKSCREEN
GROUND LOGO
DETAIL E
SCALE 2
SEE DETAIL D
13
SEE DETAIL E
SEE DETAIL G
REAR VIEW
11
TBD
3 OF 4



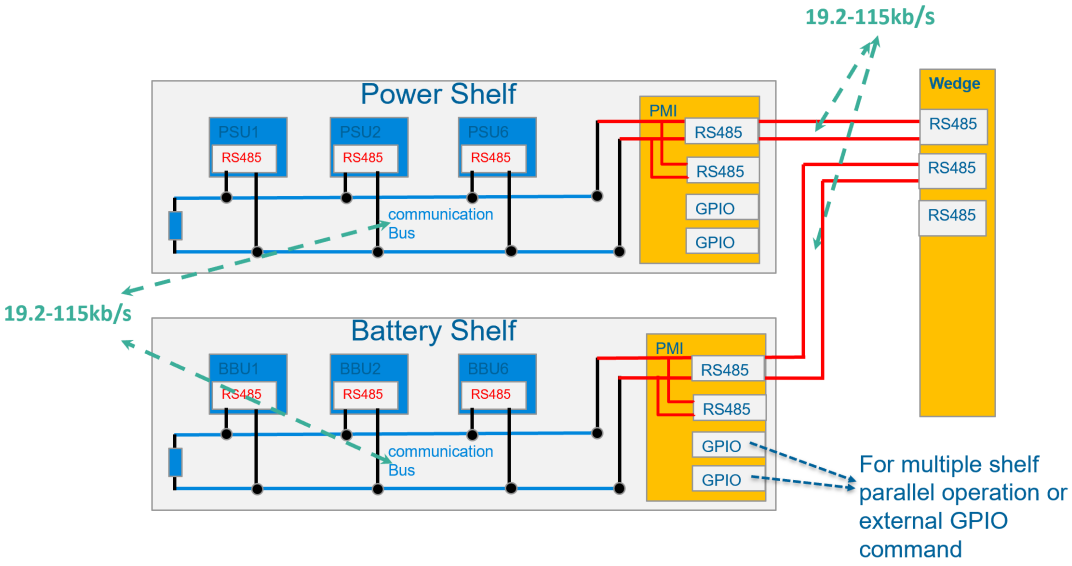
6.10 BBU Slot Blank

Any configuration that dictates the use of less than 6 BBUs in one shelf must include a BBU slot blank in order to properly channel airflow through the operating BBUs. The BBU slot blank features a latch and handle identical to those used on the BBU module. Please reference “OCP Open Rack V3 BBU Module” for more details.



7 Monitoring & Control Interface

Each BBU Shelf shall include a monitoring module (PMI/PMC) to monitor and control various BBU parameters. The monitoring module is connected to rack management controller or facility level monitoring through a monitoring & control interface.
Note it is required that if monitoring module fails, power system shall be able to operate normally.
The 120 Ohm Modbus terminating resistor shall be located on the shelf board next to the BBU farthest to PMI.
See ORV3 BBU Specification, ORV3 Modbus Communication Specification and PMI Specification for details of communication requirements.
PMI (Power monitoring Interface) diagram:



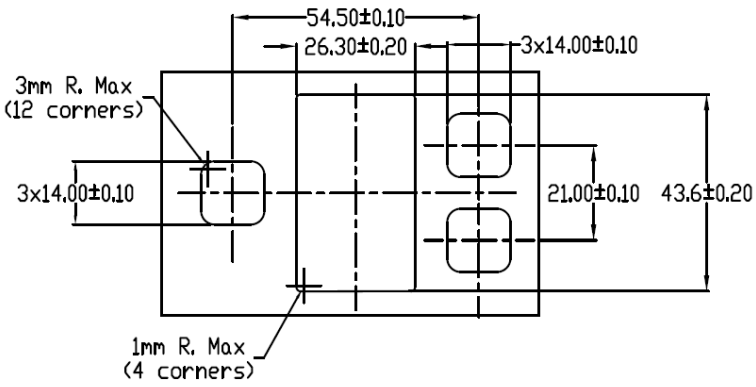
8 Shelf Electrical Connections

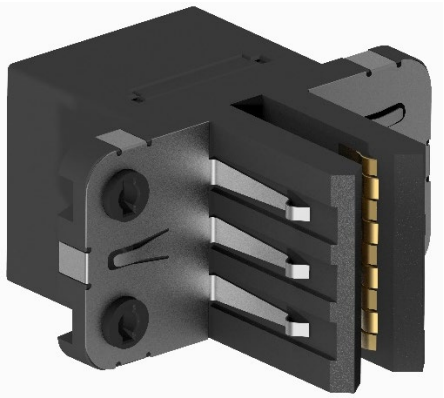
8.1 Input/output Power Connector

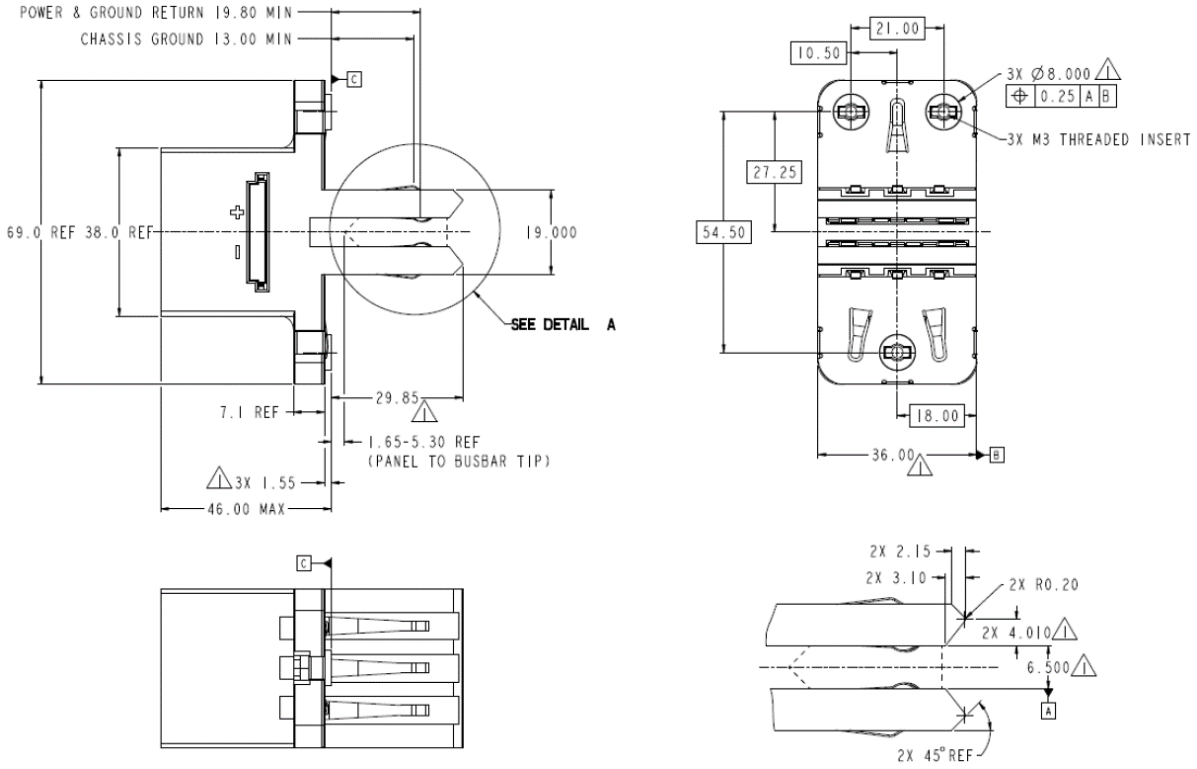
The BBU shelf power connector is the output connector in discharge mode and input connector in charge mode. It is a DC floating connector that blindly mates to the busbar behind the BBU shelf. This enables flexibility in:

- Placing power and battery shelves at any desired location on the rack.
- Adding more power and/or battery shelves as needed.

The DC Output connector shall make contact with the Open Rack V3 busbar. Please refer to the Open Rack V3 Power Shelf 48V Output Connector for more details. A drawing of the housing and recommended panel layout is shown below.

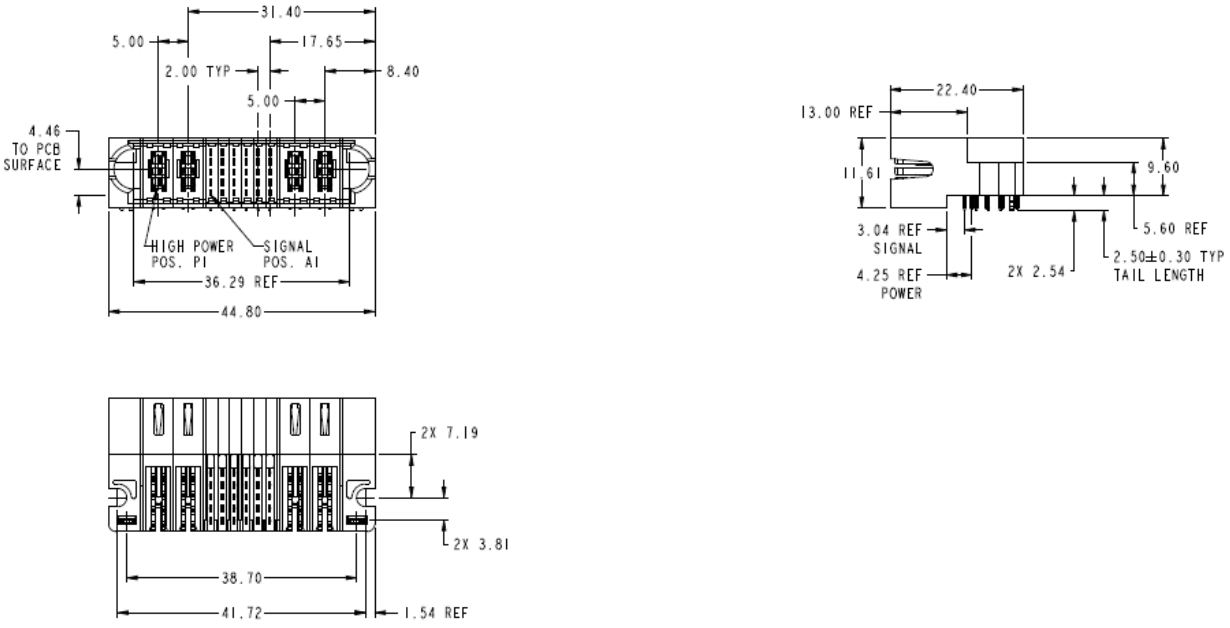






8.2 BBU Blind Made Connector

BBUs plug into the BBU shelf directly and they shall be hot swappable while the rack is powered. The connector PN is Amphenol 10127397-03H1510LF or equivalent. This is a PwrBlade ULTRA HD connector with 4 high power pins, 30 signal pins. Please refer to the drawing for more details. The connector position within the BBU shelf is fixed in X, Y, and Z direction according to the 3D drawing. This cannot be altered due to mix-and-match requirements for the BBUs into the shelf.



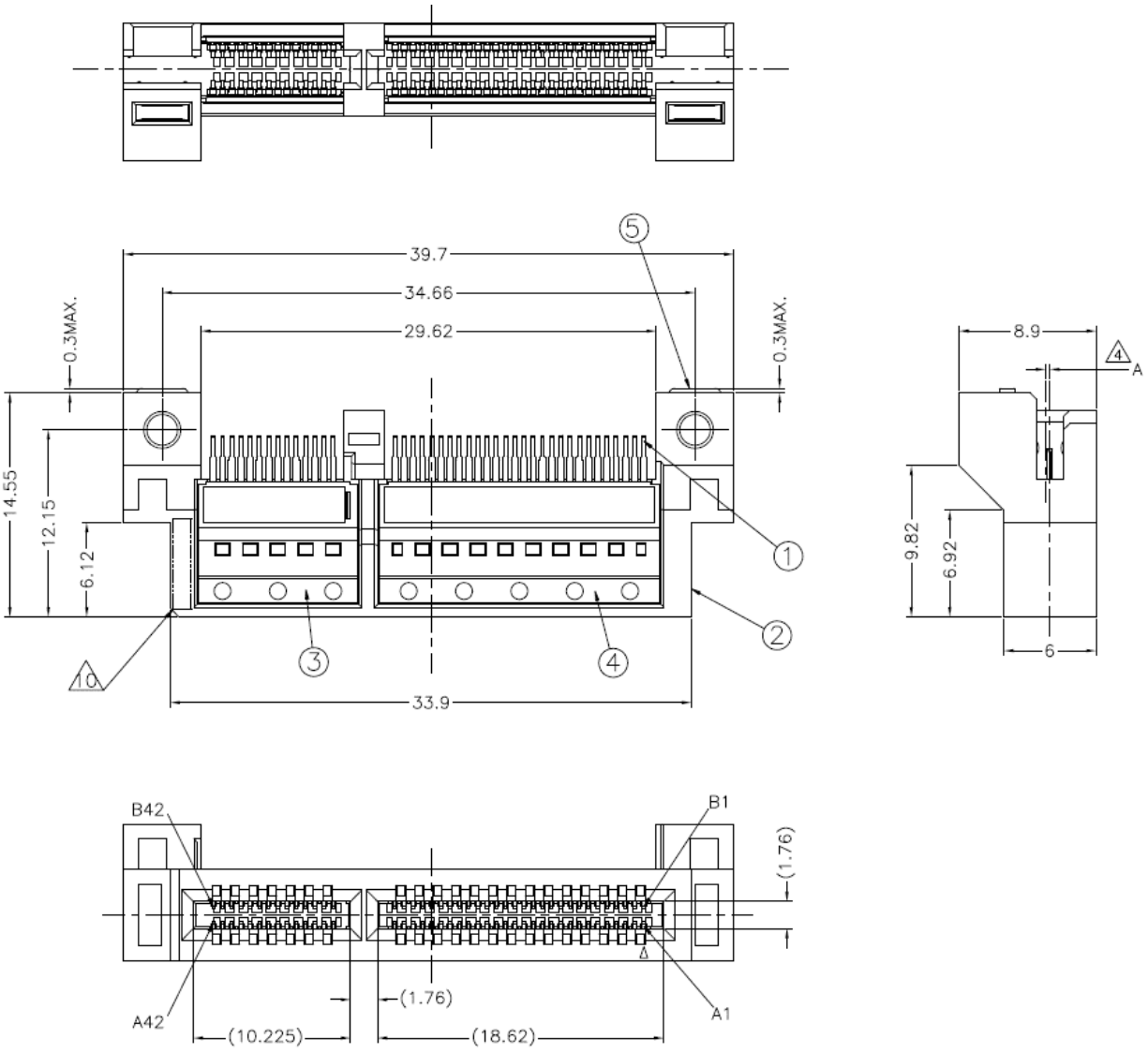
8.3 PMI Backplane Connector

The PMI is a blind-mate module with an edge card on one end. 2C card edge connector. The shelf side features a 2C card edge connector. The location of this connector is fixed, but the connector itself may either be mounted on a PCB or a panel-mounted cable. There are no specific requirements for the interface of this blind mate connector to the main shelf PCB. Please refer to the 3D drawing for the precise position.

PMI plugs into the BBU shelf directly, and it shall be hot swappable while the rack is powered. Please refer to “OCP ORv3 PMI” for connector pinout signals.

Approved connectors are:

- TE Sliver 2340326-01
- Amphenol Mini Cool Edge ME1008413401101
- Molex Edgeline Sliver 2086104157



9 Environmental Requirements

- Gaseous Contamination: Severity Level G1 per ANSI/ISA 71.04-1985
- Ambient operating temperature range: 0°C to 40°C
  BBU shall support normal operation per spec requirements including 4 minutes discharge at full power 3.9V/cell.
- Long term standby mode ambient is 15°C to 35°C.
  This is the data center long term ambient temperature that can be used for battery aging evaluation.
- Operating and Storage relative humidity: 10% to 90% (non-condensing)
- Storage temperature range: -20°C to +60°C
- Operating altitude with no de-ratings: 3000m (10000 feet)
- Air flow: Refer to ORV3 BBU Specification

9.1 Vibration & Shock

The BBU shelf shall meet shock and vibration test per EN 60068-2-6 and 60068-2-27 for both nonoperating and operating condition, with the specifications listed below. During operating vibration and shock tests, the BBU shelf shall exhibit full compliance to the specification without any electrical discontinuities.
During the non-operating tests, no damage of any kinds (included physical damages) should occur and they should not corrupt the functionalities of the PSU per the specifications.

- VIBRATION
  - Operating: 0.5g acceleration, 1.5mm amplitude, 5 to 500 Hz, 10 sweeps at 1 octave/minute per each of the three axes (one sweep is 5 to 500 to 5 Hz)
  - Non-Operating: 1g acceleration, 3mm amplitude, 5 to 500 Hz, 10 sweeps at 1 octave/minute per each of the three axes (one sweep is 5 to 500 to 5 Hz)
- SHOCK
  - Operating: 6g, half-sine 11mS, 5 shocks per each of the three axes
  - Non-Operating: 12g, half-sine 11mS, 10 shocks per each of the three axes

The BBU shelf shall meet Facebook rack level shock and vibration requirements.

7.2 Packaging

Packaged unit must satisfy test requirements stated below.

Package Vibration	1.146 G_{rms}, 2-200-2 Hz, all three axes, Random Vibe	ISTA 3E 06-06
Package Drop	8-inch drop	ISTA 3E 06-06
Package Compression	Maximum compression loading on a bulk pack	ASTM D 642-94

10 Compliance requirements

The BBU shelf shall be designed for compliance to allow worldwide deployment. Additionally, the manufacturer is fully responsible for:

- ensuring the complete compliance of the BBU shelf in the environment it is intended to function (as described by the Rack Spec)
- maintaining and updating the BBU shelf safety reports to current requirements and all new released requirements.
- all design and recertification costs required to update the power supply to meet the new
- requirements.

- Meeting EMC requirements
- Meeting Safety requirements
- Meeting all applicable environmental compliance requirements

The manufacturer is responsible for obtaining the safety certifications specified below.

10.1 Safety Standards

The product is to be designed to comply with the latest edition, revision, and amendment of the following standards. The product shall be designed such that the end user could obtain the safety certifications: UL 62368-1, IEC 62368-1 and EN 62368-1; hazard-based performance standard for Audio video, IT & Communication Technology Equipment.
UL1973 (Recog) cRUus
IEC62133
62368-1 (UL/IEC)
UL9540
UL9540A
The manufacturer shall obtain the following safety certifications for the BBU shelf as applicable. Only requirements that absolutely rely on or are affected by the system may be left to the system level evaluation [i.e. minimize Conditions of Acceptability].

The BBU shelf safety test shall be performed together with Power/Battery Management Controller (PMC) and any component or signal that controls charging and discharging battery shall be evaluated under single fault condition per UL62368-1 Annex M. Below are common requirements for North America and Europe. For other countries, different certifications may be required:

- UL or an equivalent NRTL for the US with follow-up service (e.g. UL or CSA).
- CB Certificate and test report issued by CSA, UL, VDE, TUV or DEMKO
- CE Marking for EU
- UL9540A report issued by certification body such as CSA, UL or TUV
- UL9540A Cell report from NRTL Lab
- UL9540A module level report from NRTL lab.
- UL9540A shelf level report (inhouse)

10.1.1 Component Safety requirements

Following are the safety requirements for major components:

- All Fans shall have the minimum certifications: UL and TUV or VDE.
- All current limiting devices shall have UL and TUV or VDE certifications and shall be suitable rated for the application where the device in its application complies with IEC/UL 62368-1.
- All printed wiring boards shall be rated UL94V-0 and be sourced from a UL approved printed wiring board manufacturer.
- All connectors shall be UL recognized and have a UL flame rating of UL94V-0.
- All wiring harnesses shall be sourced from a UL approved wiring harness manufacturer. SELV Cable to be rated minimum 80V, 130C.
- Product safety label must be printed on UL approved label stock and printer ribbon. Alternatively, labels can be purchased from a UL approved label manufacturer.
- The product must be marked with the correct regulatory markings to support the certifications that are specified in this document.
- BBU shelf shall not explode or spread fire when battery module undergoes thermal runaway condition.

10.2 EMC Requirements

The BBU shelf shall meet the following requirements in the latest edition of standards when operating under typical load conditions and with all ports fully loaded.

The BBU integrated into the shelf is called the component battery backup unit. The manufacturer shall provide the proof of compliance for the component power supply that are required for spare parts shipment. The component power supply shall not contribute any noncompliant conditions to the end-use product.
If at any time it is found that a supplier's BBU causes the end-use product to fail emissions and/or immunity testing, the supplier will be instructed to investigate and resolve the problem.
The BBU shelf shall have minimum 6dB margin from the Class A limit for the radiated and conducted emissions. Depending on the system manufacturer's design goals and business needs, more margin may be required when it is integrated into the final end system.
The following EMC Standards (the latest version) are applicable to the product.

- FCC /ICES-003
- CISPR 32/EN55032
- CISPR 35/EN55035 - Immunity
- EN61000-3-2 - Harmonics
- EN61000-3-3 - Voltage Flicker
- VCCI
- KN 32 and KN35

Each individual basic standard for immunity test has the following minimum passing requirement. Higher level of passing criteria may be applied depending on the system manufacturer's design goals and business needs.

- EN61000-4-2 Electrostatic Discharge Immunity
  - Contact discharge: >4kV
  - Air discharge: >8kV
- EN61000-4-3 Radiated Immunity
  - > 3V/m
- EN61000-4-4 Electrical Fast Transient Immunity
  - AC Power Line: >1kV
  - Signal Line: >0.5kV
- EN61000-4-5 Surge
  - AC Power Line: >1kV (Line-to-line), >2kV (Line-to-earth)
  - Signal Port: >1kV
- EN61000-4-6 Immunity to Conducted Disturbances
  - DC Power Line: > 3Vrms
- EN61000-4-8 Power Frequency Magnetic Field Immunity, when applicable
  - > 1A/m
- EN61000-4-11 Voltage dip and sag

10.3 Environmental Compliance

The BBU shelf (including all components inside) shall comply with the following minimum environmental requirement and manufacturer shall provide full material disclosure, Declaration of Conformity and technical documentations to demonstrate compliance. The system manufacturer may have additional requirements depending on its design goals and business needs.

- RoHS Directive (2011/65/EU and 2015/863/EU); aims to reduce the environmental impact of EEE by restricting the use of certain substances during manufacture
- REACH Regulation (EC) No 1907/2006; registration with the European Chemicals Agency (ECHA), evaluation, authorization and restriction of chemicals.

- Halogen Free: IEC 61249-2-21, Definition of Halogen Free, 900ppm for Br or Cl, or 1500ppm combined
- US SEC conflict mineral regulation to source mineral materials from socially responsible countries, if applicable
- Waste Electrical and Electronic Equipment ("**WEEE**") Directive (2012/19/EU) if applicable; aims to reduce the environmental impact of EEE by restricting the use of certain substances during manufacture

10.4 Documentation

The manufacturer shall provide reproducible copies of all pertinent documentation relating to the following:

- Product Information
- Schematics, PCB layout artwork and bill of material including key component specifications at each design phase
- Functional test report at each design phase
- Applicable compliance reports, certifications and declaration of conformance.
- Other applicable certificates required by the system manufacturer.

11 Quality and Reliability

- Any electronic passive and active components used in the power shelf and/or power shelf PCBA shall meet derating requirements per IPC9592B.
- If there are any e-caps used in the power shelf and/or power shelf PCBA the e-caps shall meet >8 years e-cap life.
- A reliability prediction shall be performed for the BBU shelf using Telcordia SR-332 Issue 4 Method I, Case 3 (Parts stress) or Method 1 Case 1 (Part Count) as would be applicable. The target MTBF for the BBU shelf shall be 1,000,000 hrs at 45C, 100% load.
- A comprehensive DFMEA shall be performed for the BBU shelf. The DFMEA report shall include a list of critical components, risk areas, and corrective actions taken.
- It is required to meet the quality process requirements as specified in IPC-9592B, Section 6 ("Quality Process"), which include PFMEA, statistical process control (SPC), corrective action process, yield control, materials traceability, product change notice (PCN), qualification of change, etc. as would be applicable.

Appendix A - Checklist for IC approval of this Specification (to be completed by contributor(s) of this Spec)

Complete all the checklist items in the table with links to the section where it is described in this spec or an external document.

Item	**Status or Details**	**Link to detailed explanation**
Is this contribution entered into the OCP Contribution Portal?	Yes	If no, please state reason.
Was it approved in the OCP Contribution Portal?	Yes	If no, please state reason.

Is there a Supplier(s) that is building a product based on this Spec? (Supplier must be an OCP Solution Provider)	Yes	List Supplier Name(s) Delta
Will Supplier(s) have the product available for GENERAL AVAILABILITY within 120 days?	No	If more time is required, please state the timeline and reason for extension request. Please have each Supplier fill out Appendix B.