

# DUNE FD2-VD BDE FDR Documentation

Vladimir Tishchenko

05/16/2023



@BrookhavenLab

# DUNE FD2-VD BDE FDR Documentation

- Event in Indico: <https://indico.fnal.gov/event/58968/>

## DUNE FDR: FD2-Bottom Drift Electronics

May 16, 2023

Remote

America/Chicago timezone

Enter your search term



Review Home

Agenda

Review Documentation

Support

✉ [paolag@fnal.gov](mailto:paolag@fnal.gov)

Final Design Review of the DUNE FD2-VD Bottom Drift Electronics (BDE) system

**Review Information**

[Review Home](#)

[Charge Letter](#)



**Starts** May 16, 2023, 7:30 AM

**Ends** May 16, 2023, 1:00 PM

America/Chicago



Remote

Zoom



[Cheng-Ju Lin](#)

[David Christian](#)

[Philippe Farthouat](#)

[Vladimir Tishchenko](#)



[Link to Review Documentation](#)



**Reviewers**

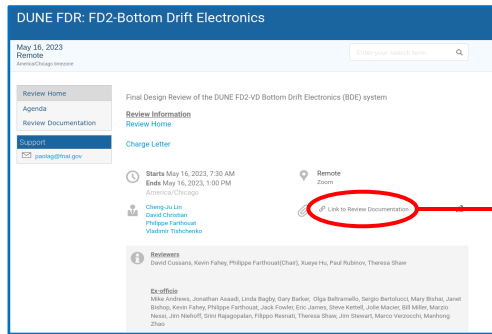
David Cussans, Kevin Fahey, Philippe Farthouat(Chair), Xueye Hu, Paul Rubinov, Theresa Shaw

**Ex-officio**

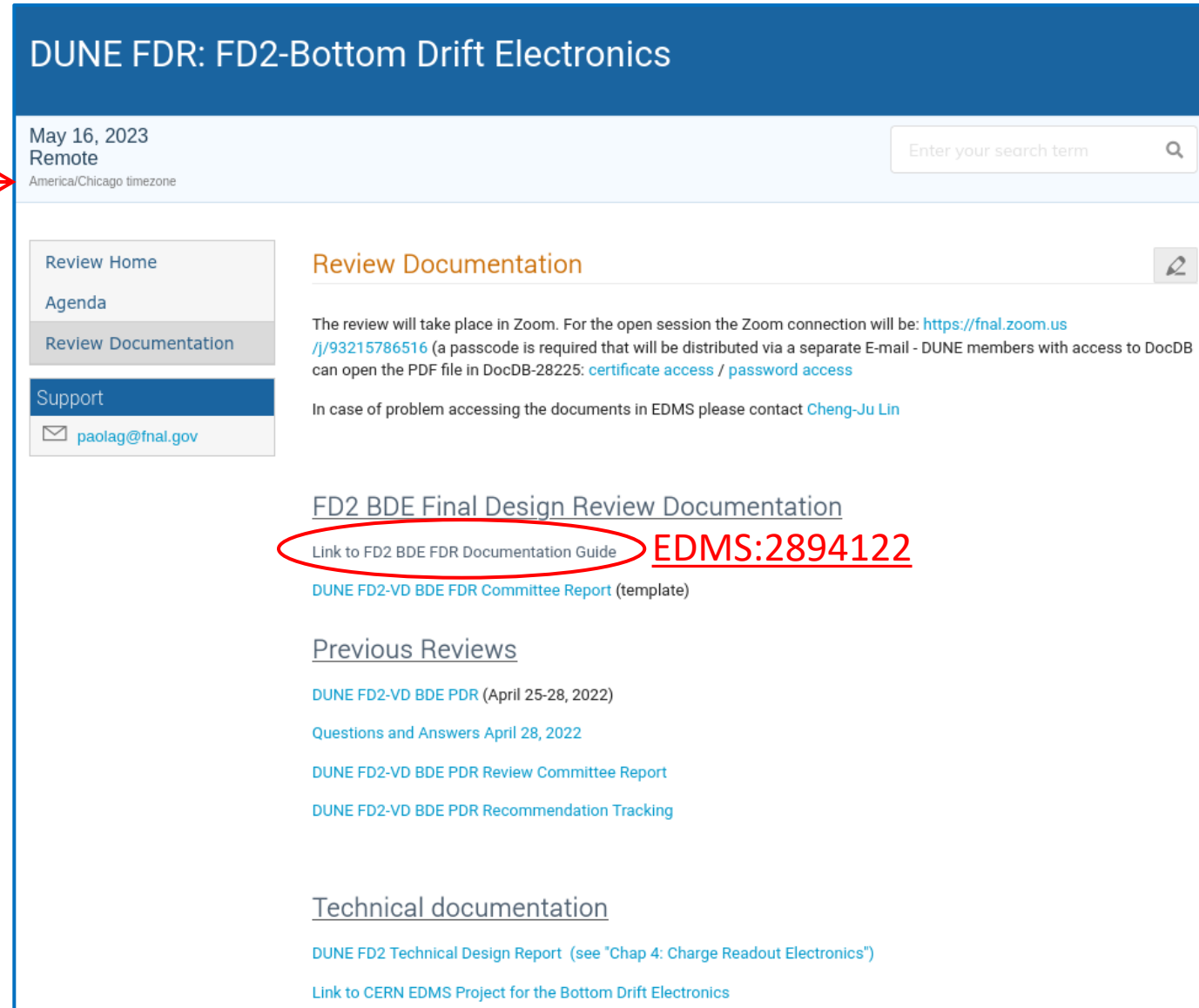
Mike Andrews, Jonathan Asaadi, Linda Bagby, Gary Barker, Olga Beltramello, Sergio Bertolucci, Mary Bishai, Janet Bishop, Kevin Fahey, Philippe Farthouat, Jack Fowler, Eric James, Steve Kettell, Jolie Macier, Bill Miller, Marzio Nessi, Jim Niehoff, Sridhar Rajagopalan, Filippo Resnati, Theresa Shaw, Jim Stewart, Marco Verzocchi, Manhong Zhao

# DUNE FD2-VD BDE FDR Documentation

- Event in Indico: <https://indico.fnal.gov/event/58968/>



Thumbnail of the Indico event page for "DUNE FDR: FD2-Bottom Drift Electronics". The page shows event details for May 16, 2023, including a "Link to Review Documentation" which is circled in red. A red arrow points from this link to the main event page on the right.

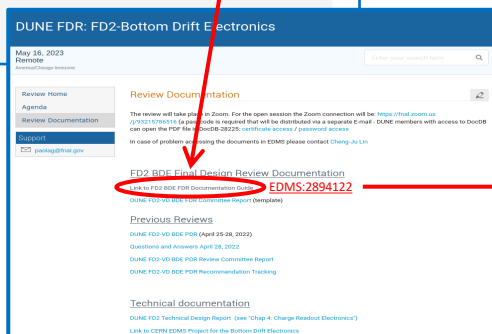
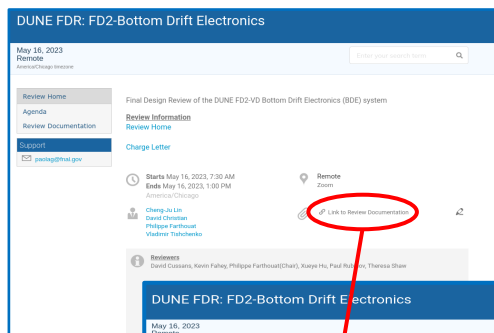


Main event page for "DUNE FDR: FD2-Bottom Drift Electronics". The page displays event information for May 16, 2023, Remote, America/Chicago timezone. It includes a navigation menu with "Review Home", "Agenda", "Review Documentation", and "Support". The "Review Documentation" section provides details about the review taking place in Zoom, including the Zoom connection link (<https://fnal.zoom.us/j/93215786516>) and a passcode. It also mentions that DUNE members with access to DocDB can open the PDF file in DocDB-28225: [certificate access](#) / [password access](#). In case of problem accessing the documents in EDMS please contact [Cheng-Ju Lin](#). The "FD2 BDE Final Design Review Documentation" section features a link to the "FD2 BDE FDR Documentation Guide" circled in red, with the EDMS number **EDMS:2894122** in red text. Below this are links for "DUNE FD2-VD BDE FDR Committee Report (template)", "Previous Reviews", "DUNE FD2-VD BDE PDR (April 25-28, 2022)", "Questions and Answers April 28, 2022", "DUNE FD2-VD BDE PDR Review Committee Report", and "DUNE FD2-VD BDE PDR Recommendation Tracking". The "Technical documentation" section includes links for "DUNE FD2 Technical Design Report (see 'Chap 4: Charge Readout Electronics')", "Link to CERN EDMS Project for the Bottom Drift Electronics", and "Link to Review Documentation".



# DUNE FD2-VD BDE FDR Documentation

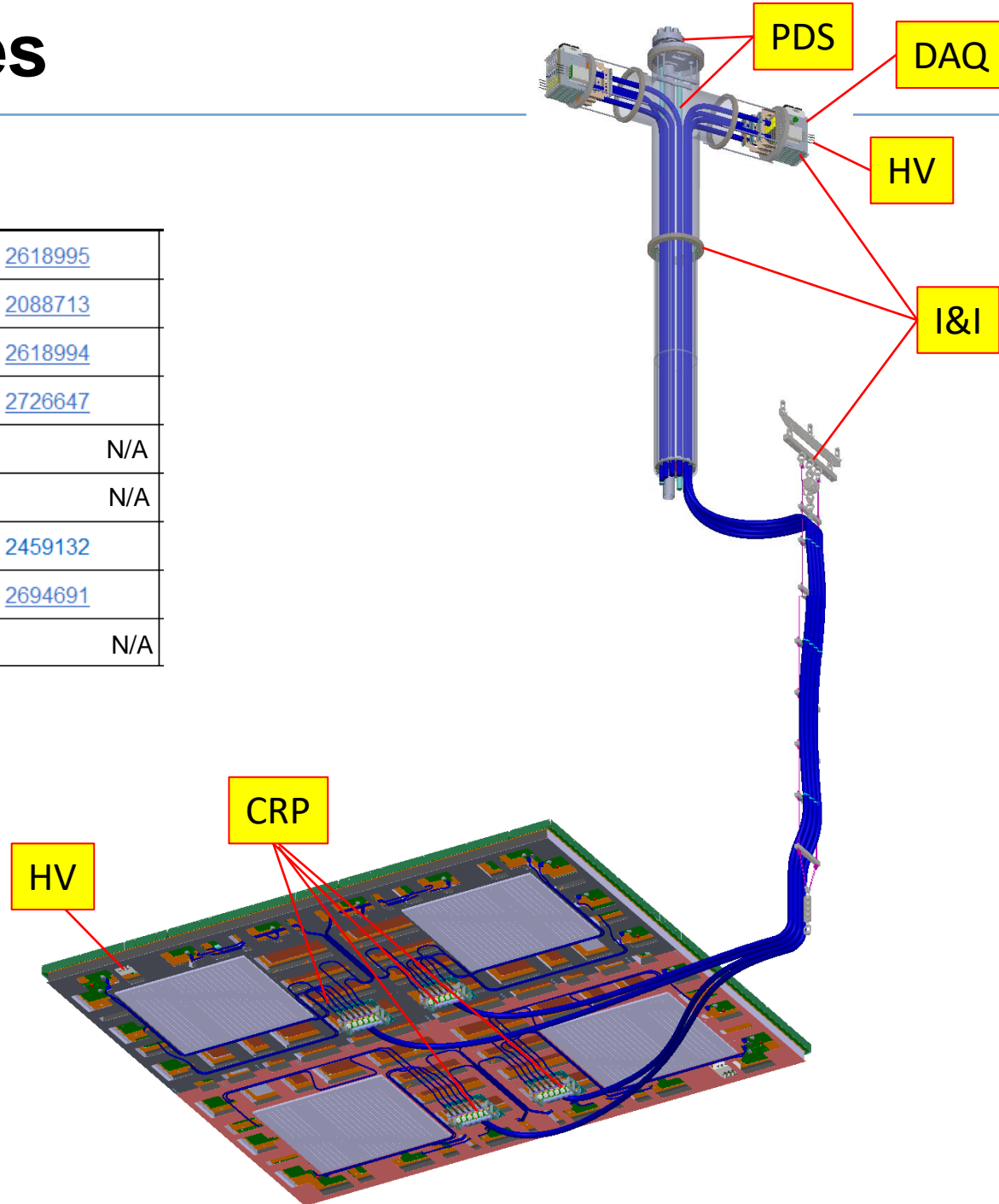
- Event in Indico: <https://indico.fnal.gov/event/58968/>



Category	Document	EDMS	File Name	Description	
Design Documents	Technical Design Reports	FD1-HD	<a href="#">2810246</a>	DUNE-FD2-TDR-v2-16Mar2023.pdf See Chapter 4.4 of FD2 TDR: "Bottom Drift Readout". The BDE are almost identical to the FD1-HD TPC electronics. The differences are summarized in section 4.4.3.10. More details on FD1-HD TPC electronics are given in the following four lines.	
			<a href="#">2606684</a>	DUNE-FD-TDR-vol-IV-SP-for-arxiv.pdf DUNE Technical Design Report, Volume 4: DUNE FD SP Technology (copy or arXiv:2002.03010, also published in JINST 15 (2020) 08, T08010)	
			<a href="#">2606690</a>	Post_TDR_Update_FD1_HD_TPC_Electronics-84.pdf Updated chapter 4 of FD1-HD TDR: TPC electronics that accurately describes sub-system design at time of Final Design Review.	
			<a href="#">2782297</a>	CE_FDR_Document_docx_cpdx.pdf Detailed summary of DUNE FD1-HD TPC Electronics design evolution	
			<a href="#">2782614</a>	ProtoDUNE_II_StatusAndPlans.pdf The most recent summary of results of system tests in ProtoDUNE HD	
		<a href="#">2892577</a>	DUNE_Doc_CRP_BDE_ColdboxTests_v1.docx The most recent summary of results of system tests in ProtoDUNE VD		
Requirements & Specifications	Bottom Drift Electronics		<a href="#">2590797</a>	FD2-VD_CE_Requirements_08May2023.xlsx Spreadsheet with all the requirements / specifications for BDE from DUNE Executive Board, Technical Board, and TPC Electronics Consortium	
	WIB			WIB_v3_requirements_v2_docx_cpdx.pdf Specification for WIB	
			<a href="#">2341138</a>	WIBFirmwareDocumentv1.pdf WIB Firmware document	
	PTC			PTC_Requirements	PTC requirements (upgrade)
		<a href="#">2731292</a>	PTC_Specifications	PTC specification (upgrade)	
Interface Documents	CRP		<a href="#">2618995</a>	CRP_BDE_interface_v3.pdf Interface document between CRP and BDE	
	DAQ		<a href="#">2088713</a>	2088713_DID_DAQ_TPC-BDE.docx Interface document between DAQ and BDE	
	PDS		<a href="#">2618994</a>	2618994_DID_BDE-VD-PDS.docx Interface document between Photon Detector Consortium and BDE	
	HV		<a href="#">2726647</a>	2726647_DID_BDE_HVS_v1.docx Interface document between HV and BDE	
	CALCI				No interface between CALCI Consortium and BDE
	TDE				No interface between TDE and BDE

# BDE Interfaces

Interface Documents	CRP	<a href="#">2618995</a>
	DAQ	<a href="#">2088713</a>
	PDS	<a href="#">2618994</a>
	HV	<a href="#">2726647</a>
	CALCI	N/A
	TDE	N/A
	I&I	<a href="#">2459132</a> <a href="#">2694691</a>
	DSS	N/A



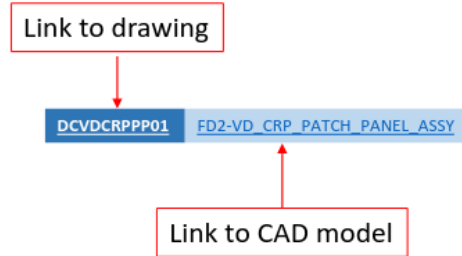
# Mechanical drawings

41	Design files	PTC	<a href="#">2380697</a>	PD2_WarmFilter_Gerber_Files.zip	Warm Filter Board PCB	
42				BOM.xlsx	Warm Filter Board BOM	
43					PTCv4_schematics_annotated_20230509.pdf	PTC Schematic
44				<a href="#">2339398</a>	PTCv4_Cadence_20230111.brd	PTC PCB
45					PTCv4_Gerbers_20230111.zip	PTC Gerber files
46					PTCv4_Gerber_20230111_printed.pdf	PTC BOM
47				<a href="#">2893862</a>	PTC4_BOM_v1.0.xlsx	PTC BOM
48		WIB	<a href="#">2712914</a>	PTC_FW_SW_Document_v1.pdf	PTC firmware and software description	
49					DUNE_WIB_3D.pdf	WIB (v3D) schematic
50					IO-1750-1D.pdf	WIB (v3D) layout
51		Patch Panel		IO-1750-1D_BOM_10132022_AAtech.xlsx	WIB (v3D) BOM	
52					DUNE_VD_patch_panel.pdf	Patch Panel schematic
53					io1889-1a.pdf	Patch Panel PCB layout
54		Mechanical Drawings		IO-1889-1_BOM.xlsx	Patch Panel BOM	
55					EDMS project directory that contains drawings for the CE boxes, cryostat penetration, and WIEC	
56	Cable and Wire Documentation	<a href="#">2894537</a>	CHART_OF_VD_BDE_DRAWINGS_AND_MODELS.pdf	Chart of drawings and models		
57				<a href="#">CERN-0000229685</a>	EDMS project directory that contains drawings for the HV bias cables, data cable, warm/cold power cable, miniSAS.	
		<a href="#">2086112</a>		Cold bias voltage SHV cables		

Click [here](#)

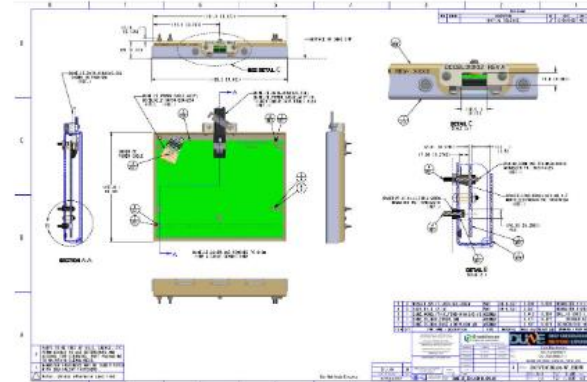
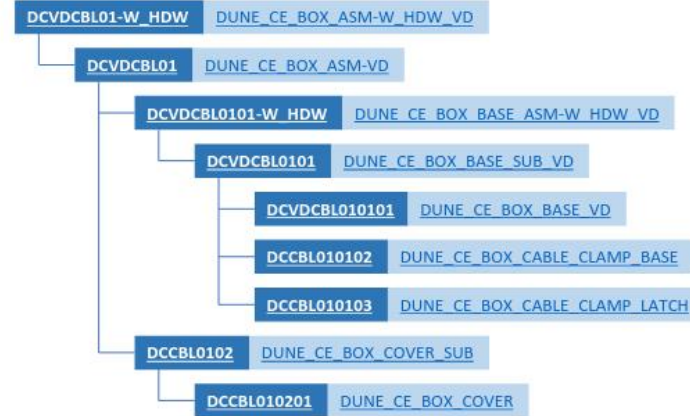
# Chart of drawings

## CHART OF VD BDE DRAWINGS AND MODELS



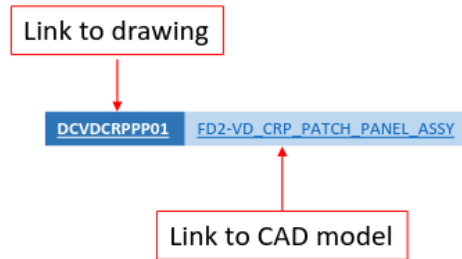
## CHART OF VD BDE DRAWINGS AND MODELS

### CE BOX



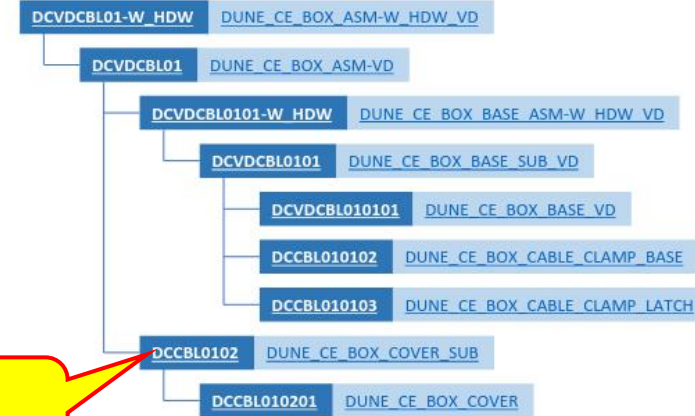
# Chart of drawings

## CHART OF VD BDE DRAWINGS AND MODELS

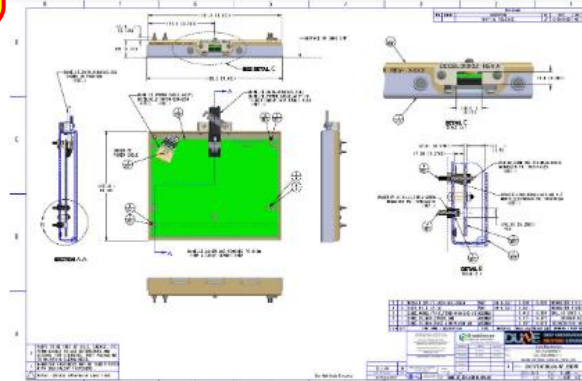


## CHART OF VD BDE DRAWINGS AND MODELS

### CE BOX



Click [here](#)







# DCCBL0102\_REV\_A

Item #



Part name

Quantity

Type: part or assembly

ITEM	QTY	PART NAME / DESCRIPTION	TYPE	MATERIAL	MASS [kg]	WEIGHT [LB]	DRAWING / PART NUMBER
2	2	CAPTIVE_SCREW_PF11-M3-0_UNFASTD	PART	304_SST	0.006	0.014	PEM_PF11-M3-0
1	1	DUNE_CE_BOX_COVER	PART	ALUM_5052	0.158	0.349	DCCBL010201

<p>DIMENSIONING &amp; TOLERANCING IN ACCORDANCE WITH ASME Y14.5-2009</p> <p>UNLESS OTHERWISE SPECIFIED: UNTOLERANCED DIMENSIONS ARE BASIC DIMENSIONS ARE IN MILLIMETERS</p> <p>DIMENSIONS IN BRACKETS [x.xx] ARE IN INCHES AND ARE FOR REFERENCE ONLY</p> <p><b>DIMENSIONAL TOLERANCES</b></p>		 <p>Physics Department / High-Energy Physics</p>							
DRAWN BY		J. FARRELL	Sep-08-21	Cold Electronics					
CHECKED BY		M. ZHAO	9/8/2021	TOP ASSEMBLY: DUNE_CE_BOX_ASSY-W_HDW					
ENGINEER		M. ZHAO	9/8/2021	NEXT ASSEMBLY: DUNE_CE_BOX_ASSY					
ENGR MGR				DESCRIPTION: DUNE_CE_BOX_COVER_SUB					
CHIEF M.E.				SIZE: D					
Q.A.				DRAWING PART NUMBER: <b>DCCBL0102</b>					
WBS#				ESH&Q RISK LEVEL		A - 4	WEIGHT: kg 0.2	SHEET: 1/1	REV. A
WBS#				SCALE:		1 : 1	WEIGHT: lbs. 0.38		

BREAK EDGES & SHARP CORNERS 0.12 [.005"] MIN. TO 0.75 [.030"] MAX.		FINISH 3.2 [125]					
THIRD ANGLE PROJECTION		MODEL NAME: DUNE_CE_BOX_COVER_SUB					

3 PARTS TO BE FREE OF OILS, GREASE, ETC. PERMISSIBLE TO USE DETERGENTS AND ALCOHOL FOR CLEANING. PART PACKAGING TO MAINTAIN CLEANLINESS.

2 TYPE PF11 CAPTIVE PANEL SCREWS TO BE INSTALLED PER MFR'S INSTRUCTIONS AS SHOWN IN PEM BULLETIN PF, www.pemnet.com

1 FASTENERS TO BE INSTALLED USING PINCH PEN PN: 8003518 AND ANVIL PEM PN: 8003521


1 "DUNE\_CE\_BOX\_COVER" TO BE CHROMATE CONVERSION COATED, ALODINE/IRIDITE GOLD or EQUIVALENT, BEFORE INSTALLING SELF-CLINCHING PANEL SCREWS.

Notes: Unless otherwise specified:

Do Not Scale Drawing

ITEM	QTY	PART NAME / DESCRIPTION	TYPE	MATERIAL	MASS [kg]	WEIGHT [LB]	DRAWING / PART NUMBER
2	2	CAPTIVE_SCREW_PF11-M3-0_UNFASTD	PART	304_SST	0.006	0.014	PEM_PF11-M3-0
1	1	DUNE_CE_BOX_COVER	PART	ALUM_5052	0.158	0.349	DCCBL010201

 <p>Physics Department / High-Energy Physics</p>									
DRAWN BY		J. FARRELL	Sep-08-21	Cold Electronics					
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ENGR MGR				DESCRIPTION: DUNE_CE_BOX_COVER_SUB					
CHIEF M.E.				SIZE: D					
Q.A.				DRAWING PART NUMBER: <b>DCCBL0102</b>					
WBS#				ESH&Q RISK LEVEL		A - 4	WEIGHT: kg 0.2	SHEET: 1/1	REV. A
WBS#				SCALE:		1 : 1	WEIGHT: lbs. 0.38		