DUNE FD1-HD TPC electronics: Documentation for the Final Design Review

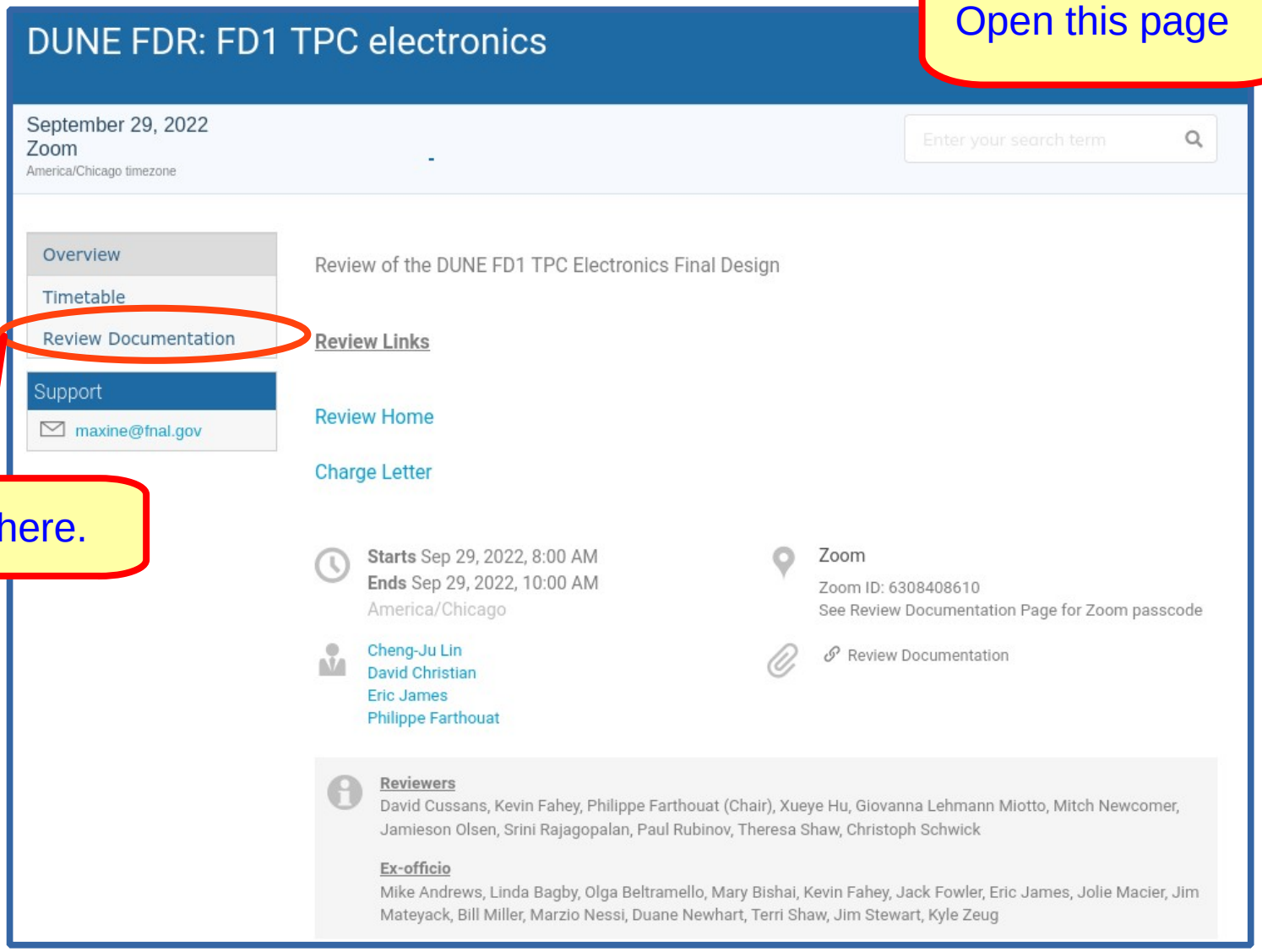
V. Tishchenko
Brookhaven National Laboratory

Final Design Review
29 September 2022

How to access the documentation for the review

Event in Indico: https://indico.fnal.gov/event/56228

Clickable link.
Open this page



Click here.

“Review Documentation” page in Indico

DUNE FDR: FD1 TPC electronics

September 29, 2022
Zoom
America/Chicago timezone

Enter your search term

- Overview
- Timetable
- Review Documentation

Support
maxine@fnal.gov

Review Documentation

The review will take place in Zoom. For the open session the Zoom connection will be: https://fnal.zoom.us/j/6308408610 (a passcode is required that will be distributed via a separate E-mail - DUNE members with access to DocDB can open the PDF file in DocDB-26728: certificate access / password access

In case of problem accessing the documents in EDMS please contact Cheng-Ju Lin

FD1 TPC Electronics Final Review Documentation:

The first two documents are good starting point for the reviewers to jump start on this document-based review.

- **FD1 TDR Chapter on TPC Electronics** (https://edms.cern.ch/document/2606690): This TDR chapter has been extensively updated for the review. It's a good place for people to read about the full TPC electronics system and scope.

- **FDR support document** (https://edms.cern.ch/document/2782297): This document describes the design evolution (e.g. differences between PDR and FDR design), performance results, and QA/QC plan.

- **Complete list of the review documentation** is provided in the excel file in EDMS#2783308. Instructions on how to navigate the spreadsheet is given in the presentation ***Documentation For The Review.***

“Review Documentation” page in Indico

DUNE FDR: FD1 TPC electronics

September 29, 2022
Zoom
America/Chicago timezone

Enter your search term

- Overview
- Timetable
- Review Documentation

Support
maxine@fnal.gov

Review Documentation

The review will take place in Zoom. For the open session the Zoom connection will be: https://fnal.zoom.us/j/6308408610 (a passcode is required that will be distributed via a separate E-mail - DUNE members with access to DocDB can open the PDF file in DocDB-26728: certificate access / password access

In case of problem accessing the documents in EDMS please contact Cheng-Ju Lin

FD1 TPC Electronics Final Review Documentation:

The first two documents are good starting point for the reviewers to jump start on this document-based review.

- **FD1 TDR Chapter on TPC Electronics** (https://edms.cern.ch/document/2606690): This TDR chapter has been extensively updated for the review. It's a good place for people to read about the full TPC electronics system and scope.
- **FDR support document** (https://edms.cern.ch/document/2782297): This document describes the design evolution (e.g. differences between PDR and FDR design), performance results, and QA.
- **Complete list of the review documentation** is provided in the excel file in EDMS#2783308. Instructions on how to navigate the spreadsheet is given in the presentation ***Documentation For The Review.***

Spreadsheet with links to the review documents

Spreadsheet with links to FDR documentation

Category	Subcategory	EDMS	File	Description	Charge question
Design Documents	Technical Design Reports	2606684	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	2,3,4,6
		2606690	Post_TDR_Update__FD1_HD_TPC_Electronics-82.pdf	Updated chapter 4 of TDR: TPC electronics that accurately describes sub-system design at time of Final Design Review.	
		2782297	CE_FDR_Document_docx_cpdf.pdf	Detailed summary of DUNE FD1-HD TPC Electronics design evolution; characterization; QA and QC	
		2782614	ProtoDUNE_II_StatusAndPlans.pdf	The most recent summary of results of system tests in ProtoDUNE	4
	ASIC documentation	2314428	LArASIC_P5B_Datasheet_V1.pdf	LArASIC P5B Datasheet	2
		2314429	COLDADC_P2_Datasheet_docx_cpdf.pdf	COLDADC P2 Datasheet	
		2314430	COLDATA_P3_Datasheet_docx_cpdf.pdf	COLDATA P3 Datasheet	
	Grounding & Shielding Plan	2095975	tms_DUNE_Grounding_8APR2018.pdf	DUNE Far Site Detector Grounding System Requirements	2
		2095958	Dune_Grounding_and_Shielding_Guidelines_25FEB2019_rev0_docx_cpdf.pdf	Dune Grounding and Shielding Guidelines	
		2364510	FD1_TPCElectronics_GroundingShielding.pdf	**FD1 TPC Electronics Grounding and Shielding Plan**	
		2364510	ProtoDUNE_LV_Power_Distributions_FD1.pdf	Grounding scheme for the low voltage power supplies	
		2339405	TechCoordination_grounding.pdf	Detector grounding - TDR chapter	
		2341139	TPC_Bias_Scheme_08-30-2022.pdf	DUNE CE Bias Schematic Diagram	
	Specification of Warm Electronics	2341138	WIB_v3_requirements_v1_docx_cpdf.pdf	Specification for WIB (v3)	2
		2731292	PTC_Requirements_docx_cpdf.pdf	Specification for PTC (upgrade)	
	Mechanical CAD Model for Sub-system	2783038	HIERARCHY_OF_DUNE_CE_ASSEMBLY_DRAWINGS.pdf	**Click the link in Column D to access the tree structure of models with links to drawings**	2
		2774711		Feedthrough, Warm Interface Electronics Crate (WIEC), Frontend Motherboards (FEMB), cold cables	
		2771732		Cable Tray-Trolley, temporary Vertical Cable, Cross port	
	Mechanical Engineering Drawings	2771733	2771733_2774712_Drawings_index.pdf	**Click the link in Column D to access Index of drawings with links**	2
		2774712		Feedthrough, WIEC	
		2771733		Cable trays, trolley, crossing tube, x-shape spool piece, cables, CE Box	
	Electrical Schematics & Board Layouts	2712913	layout_io1826-1c.pdf	FEMB PCB	2
		2712913	Schematics_DUNE_Monolithic_SAMTEC_FEMB_IO1826-C.pdf	FEMB schematics	
		2712914	IO-1750-1-B_artwork.pdf	WIB PCB	
		2712914	DUNE_WIB_V3_IO-1750-1B.pdf	WIB schematics	
		2712915	io1866-1.pdf	PTB PCB	
		2712915	DUNE_PTB.pdf	PTB schematics	
		2712916	io1863-1.pdf	Flange board PCB	
		2712916	DUNE_FLANGE.pdf	Flange board schematics	
		2712917	GerberFiles.pdf	Warm bias voltage filter board PCB	
		2712917	PD2WarmBiasFilterBoardSchematic_6-16-2021.pdf	Warm bias voltage filter board schematiics	
		2339398	PTC3B_preview.pdf	PTC PCB	
		2339398	PTC3A_SchematicsDraft_20180129.pdf	PTC schematics	

Spreadsheet with links to FDR documentation

Category	Subcategory	EDMS	File	Description	Charge question
Design Documents	ical Design Re	2606684	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	2,3,4,6
			df	Updated chapter 4 of TDR: TPC electronics that accurately describes sub-system design at time of Final Design Review.	
				Detailed summary of DUNE FD1-HD TPC Electronics design evolution; characterization; QA and QC	
				The most recent summary of results of system tests in ProtoDUNE	4
	ASIC docume			LArASIC P5B Datasheet	2
				COLDADC P2 Datasheet	
				COLDATA P3 Datasheet	
	Grounding & Shi Plan			DUNE Far Site Detector Grounding System Requirements	2
				Dune Grounding and Shielding Guidelines	
				FD1 TPC Electronics Grounding and Shielding Plan	
				Grounding scheme for the low voltage power supplies	
				Detector grounding - TDR chapter	
				DUNE CE Bias Schematic Diagram	
	Specification of V Electronics			Specification for WIB (v3)	2
				Specification for PTC (upgrade)	
	Mechanical CAD for Sub-system			**Click the link in Column D to access the tree structure of models with links to drawings**	2
				Feedthrough, Warm Interface Electronics Crate (WIEC), Frontend Motherboards (FEMB), cold cables	
				Cable Tray-Trolley, temporary Vertical Cable, Cross port	
	Mechanical Engineering Drawings	2771733	2771733_2774712_Drawings_index.pdf	**Click the link in Column D to access Index of drawings with links**	2
		2774712		Feedthrough, WIEC	
		2771733		Cable trays, trolley, crossing tube, x-shape spool piece, cables, CE Box	
	Electrical Schematics & Board Layouts	2712913	layout_io1826-1c.pdf	FEMB PCB	2
		2712913	Schematics_DUNE_Monolithic_SAMTEC_FEMB_IO1826-C.pdf	FEMB schematics	
		2712914	IO-1750-1-B_artwork.pdf	WIB PCB	
		2712914	DUNE_WIB_V3_IO-1750-1B.pdf	WIB schematics	
		2712915	io1866-1.pdf	PTB PCB	
		2712915	DUNE_PTB.pdf	PTB schematics	
		2712916	io1863-1.pdf	Flange board PCB	
		2712916	DUNE_FLANGE.pdf	Flange board schematics	
		2712917	GerberFiles.pdf	Warm bias voltage filter board PCB	
		2712917	PD2WarmBiasFilterBoardSchematic_6-16-2021.pdf	Warm bias voltage filter board schematiics	
		2339398	PTC3B_preview.pdf	PTC PCB	
		2339398	PTC3A_SchematicsDraft_20180129.pdf	PTC schematics	

The documents are grouped into ”Categories” and “Subcategories”, as originally defined by the Review Office

Spreadsheet with links to FDR documentation

Category	Subcategory	EDMS	File	Description	Charge question
Design Documents	Technical Design Reports	2606684		DUNE Technical Design Report, Volume 4: DUNE FD SP Technology published in JINST 15 (2020) 08, T08010	2,3,4,6
		2606690		nics that accurately describes n Review.	
		2782297		Electronics design evolution;	
		2782614		ystem tests in ProtoDUNE	4
	ASIC documentation	2314428			2
		2314429			
		2314430			
	Grounding & Shielding Plan	2095975		m Requirements	2
		2095958	Dune_Gro	s	
		2364510		elding Plan	
		2364510		ower supplies	
		2339405			
		2341139			
	Specification of Warm Electronics	2341138			2
		2731292			
	Mechanical CAD Model for Sub-system	2783038		tree structure of models with	2
		2774711		ics Crate (WIEC), Frontend	
		2771732		Vertical Cable, Cross port	
	Mechanical Engineering Drawings	2771733	2771733_2774712_Drawings_index.pdf	Click the link in Column D to access Index of drawings with links	2
		2774712		Feedthrough, WIEC	
		2771733		Cable trays, trolley, crossing tube, x-shape spool piece, cables, CE Box	
	Electrical Schematics & Board Layouts	2712913	layout_io1826-1c.pdf	FEMB PCB	2
		2712913	Schematics_DUNE_Monolithic_SAMTEC_FEMB_IO1826-C.pdf	FEMB schematics	
		2712914	IO-1750-1-B_artwork.pdf	WIB PCB	
		2712914	DUNE_WIB_V3_IO-1750-1B.pdf	WIB schematics	
		2712915	io1866-1.pdf	PTB PCB	
		2712915	DUNE_PTB.pdf	PTB schematics	
		2712916	io1863-1.pdf	Flange board PCB	
		2712916	DUNE_FLANGE.pdf	Flange board schematics	
		2712917	GerberFiles.pdf	Warm bias voltage filter board PCB	
		2712917	PD2WarmBiasFilterBoardSchematic_6-16-2021.pdf	Warm bias voltage filter board schematiics	
		2339398	PTC3B_preview.pdf	PTC PCB	
		2339398	PTC3A_SchematicsDraft_20180129.pdf	PTC schematics	

Column “EDMS”
Contains links to EDMS documents.
These are the main links.

Each EDMS document contains one or more files.

Spreadsheet with links to FDR documentation

Category	Subcategory	EDMS	File	Description	Charge question
		2606684	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	
	Technical Design		Post_TDR_Update_FD1_HD_TPC_Electronics-82.pdf	Updated chapter 4 of TDR: TPC electronics that accurately describes	2,3,4,6

Example:

The TDR EDMS contains only one file

CERN Accelerating scie... Signed in as: vtishche Sign out Directory

EDMS Home Fav... Inbox Caddie Search Settings Help

2606684 v.2 Released Public access

DUNE Technical Design Report Volume IV: DUNE Far Detector Single-phase Technology by Cheng-Ju Lin

Report

Created on 2022-09-24
Last Modified on 2022-09-24

Edit | Status | Share | Visibility | More

nfo

Description: Published version from arXiv:2002.03010, February 2020

External reference:
Keywords:

Details

Local administrators: List of Administrators
Context: CENF-LBNF-DUNE
CENF-LBNF-DUNE

Equipment code:
Release procedure: DOC-OWNER
Simple document release procedure

Associated Links:
TDR Volume 1: Introduction to DUNE
TDR Volume 2: DUNE Physics
TDR Volume 3: Far Detector Technical Coordination
TDR Volume 4: Far Detector Single Phase Technology

CDN Links:

This page https://edms.cern.ch/document/2606684/2

Files

Add | Delete | Download all — Per page 10 | View mode:

Name	Size	Last modified date	Last modified by
DUNE-FD-TDR-vol-IV-SP-for-arxiv.pdf	104.0 M	2021-07-12 10:31:25	MARCO VERZOCCHI

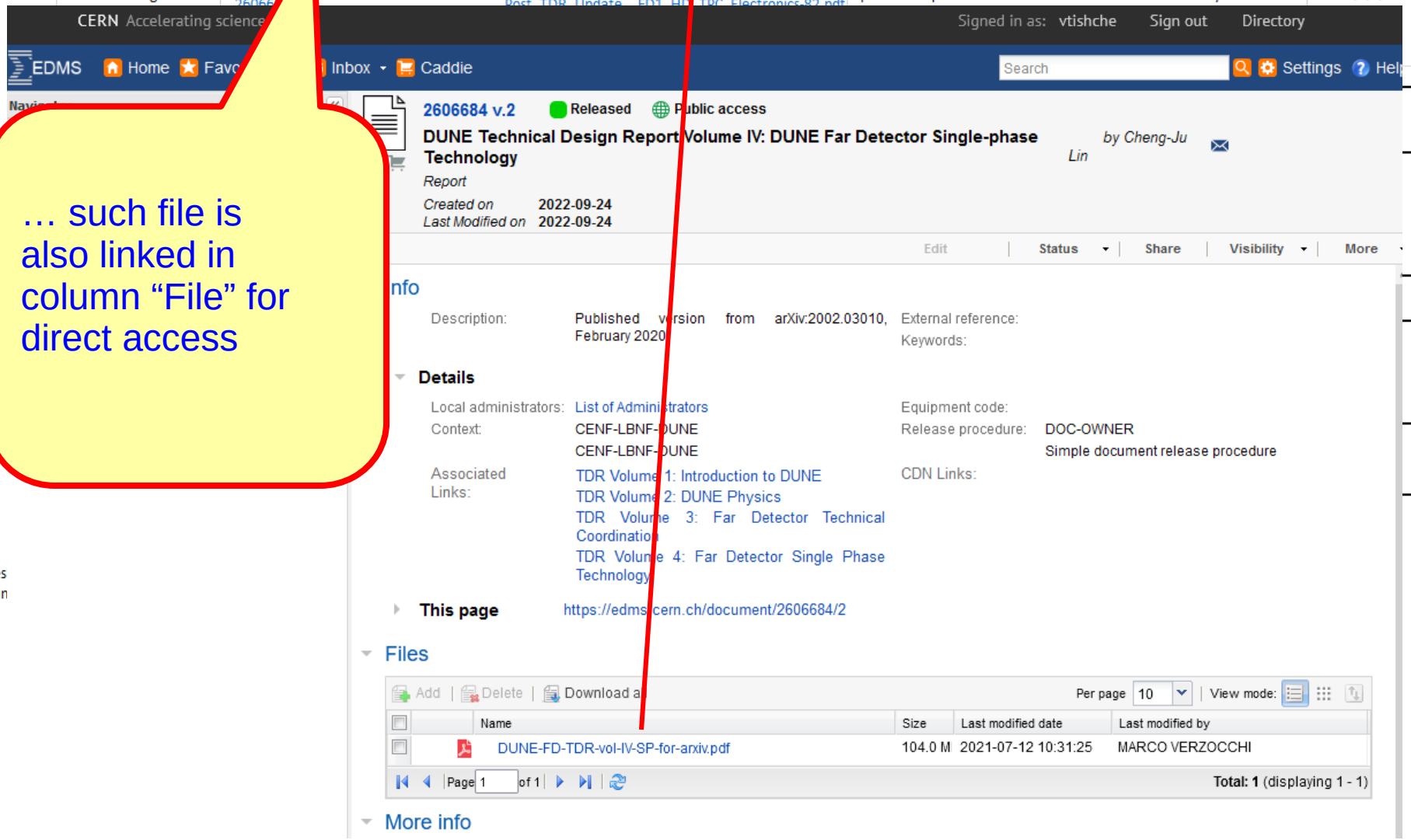
Page 1 of 1 — **Total: 1** (displaying 1 - 1)

More info

Spreadsheet with links to FDR documentation

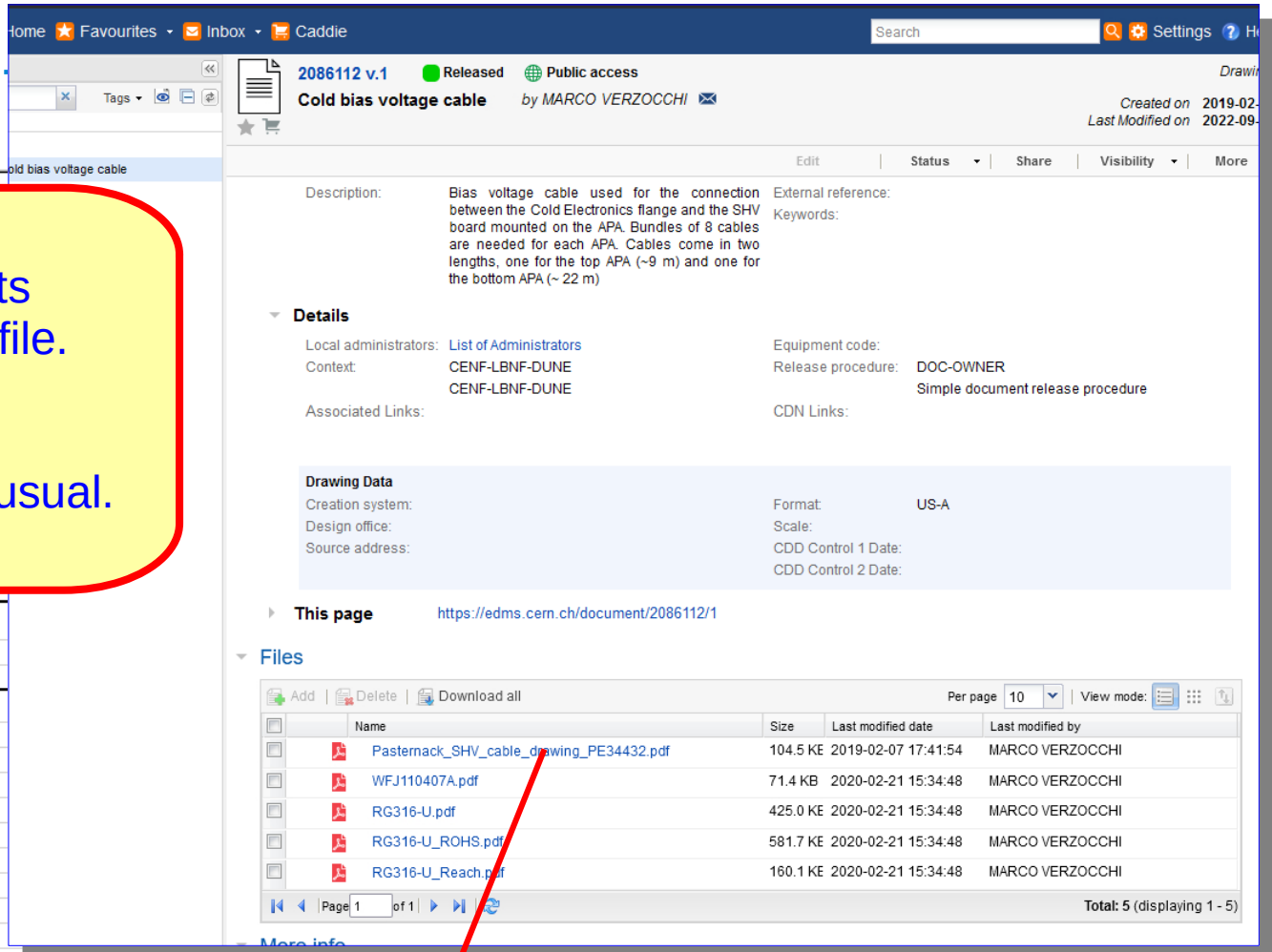
Category	Subcategory	EDMS	File	Description	Charge question
		2606684	DUNE-FD-TDR-vol-IV-SP-for-arxiv.pdf	DUNE Technical Design Report, Volume 4: DUNE FD SP Technology (copy or arXiv:2002:03010, also published in JINST 15 (2020) 08, T08010	
	Technical Design			Updated chapter 4 of TDR: TPC electronics that accurately describes	2,3,4,6

… such file is also linked in column “File” for direct access



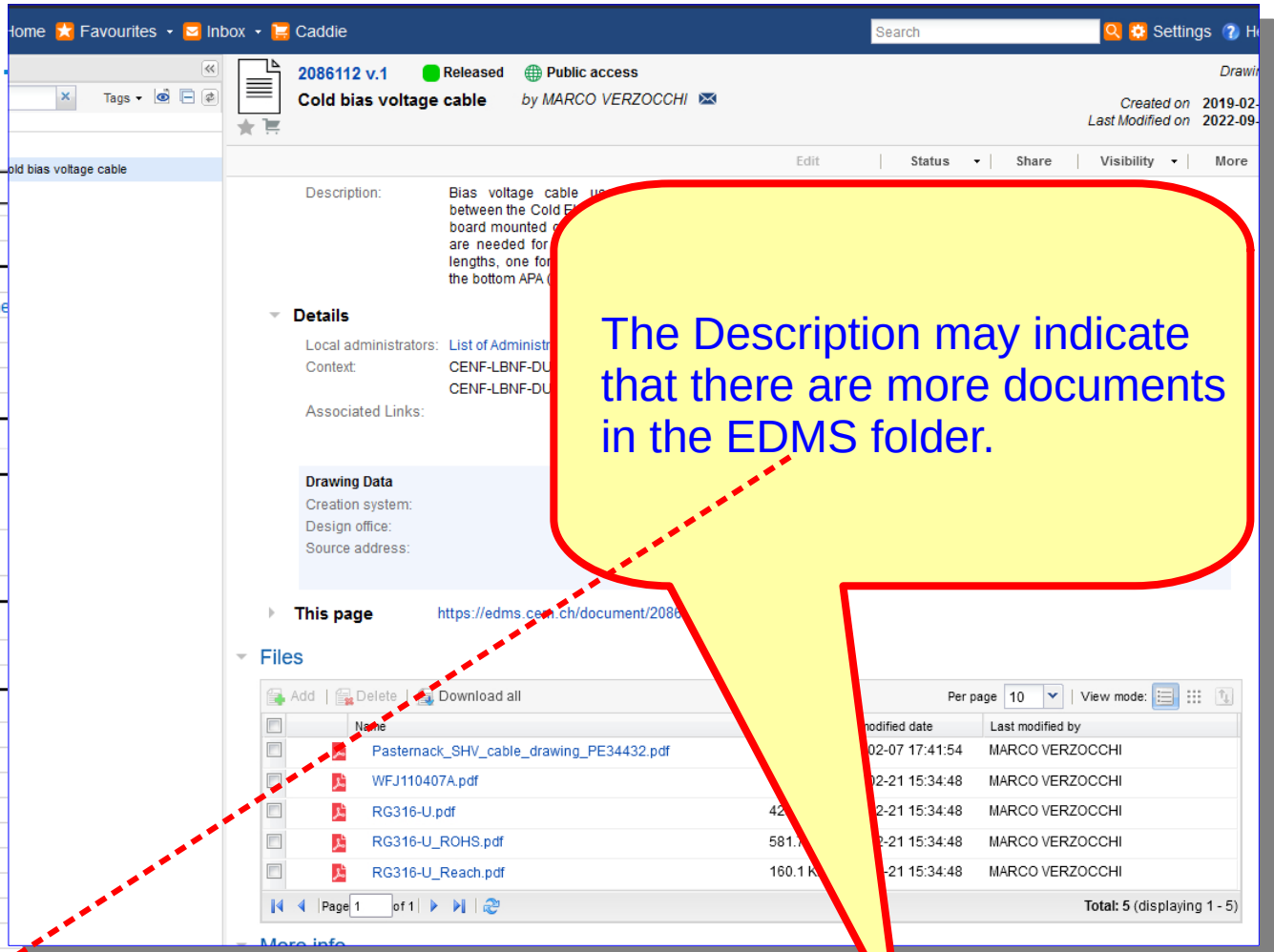
Spreadsheet wi

Some EDMS documents contain more than one file. If there is a particularly relevant file, it is linked in the column “File” as usual.



Category					
Design Documents	Electrical Schematics and Board Layouts	2771733			
		2774712			
		2771733			
		2712913			
		2712913			
		2712914			
		2712914			
		2712915			
		2712915			
		2712916			
		2712916			
		2712917			
		2712917			
		2339398	PTC3B_preview.pdf	PTC PCB	
		2339398	PTC3A_SchematicsDraft_20180129.pdf	PTC schematics	
	Specification of Electrical Cabling and Wiring Connections	2332925	TPCElectronics_Cabling_docx_cpdf.pdf	TPC Electronics Cabling Description and Numbering Scheme	2
		2086112	Pasternack_SHV_cable_drawing_PE34432.pdf	Cold bias voltage cable drawing. See the EDMS folder for more documents.	
		2086114	DCCBL02_22M_REV_C.pdf	Cold power cable drawing. More documents in the EDMS folder.	
		2086113	HDR-223199-XX-ECDP.pdf	Cold clock and data cable drawing. More documents in the EDMS folder.	
		2332922	2857_1.pdf	Cold Fallback return current datasheet	
		2332924	RE__Low_Voltage_AWG_10_-__FW__cable_04.08.82.060.2____2x6_mm2.pdf	Warm bias voltage cables datasheet	
		2332923	605eREV3.pdf	Warm power cable from the PL506 to the PTC - technical specifications	

Spreadsheet wi



Category	Subcategory	EDMS	File	
Design Documents	ASIC documentation	2314429		
		2314430		
	Grounding & Shielding Plan	2095975		
		2095958	Dune	
		2364510		
		2364510		
		2339405		
		2341139		
	Specification of Warm Electronics	2341138		
		2731292		
	Mechanical CAD Model for Sub-system	2783038		
		2774711		
		2771732		
	Mechanical Engineering Drawings	2771733		
		2774712		
		2771733		
	Electrical Schematics & Board Layouts	2712913		
		2712913		
		2712914		
		2712914		
		2712915		
		2712915		
		2712916		
		2712916		
		2712917		
		2712917		
		2339398	PTC3B_preview.pdf	PTC PCB
		2339398	PTC3A_SchematicsDraft_20180129.pdf	PTC schematics
	Specification of Electrical Cabling and Wiring Connections	2332925	TPCElectronics_Cabling_docx_cpdf.pdf	TPC Electronics Cabling Description and Numbering Scheme
		2086112	Pasternack_SHV_cable_drawing_PE34432.pdf	Cold bias voltage cable drawing. See the EDMS folder for more documents.
		2086114	DCCBL02_22M_REV_C.pdf	Cold power cable drawing. More documents in the EDMS folder.
		2086113	HDR-223199-XX-ECDP.pdf	Cold clock and data cable drawing. More documents in the EDMS folder.
		2332922	2857_1.pdf	Cold Fallback return current datasheet
		2332924	RE__Low_Voltage_AWG_10_-__FW__cable_04.08.82.060.2____2x6_mm2.pdf	Warm bias voltage cables datasheet
		2332923	605eREV3.pdf	Warm power cable from the PL506 to the PTC - technical specifications

Spreadsheet with links to FDR documentation

Category	Subcategory	EDMS	File	Description	Charge question
Design Documents	ASIC documentation	2314429	COLDADC_P2_Datasheet_docx_cpdf.pdf	COLDADC P2 Datasheet	2
		2314430	COLDATA_P3_Datasheet_docx_cpdf.pdf	COLDATA P3 Datasheet	
	Grounding & Shielding Plan	2095975	tms_DUNE_Grounding_8APR2018.pdf	DUNE Far Site Detector Grounding System Requirements	2
		2095958	Dune_Grounding_and_Shielding_Guidelines_25FEB2019_rev0_docx_cpdf.pdf	Dune Grounding and Shielding Guidelines	
		2364510	FD1_TPCElectronics_GroundingShielding.pdf	**FD1 TPC Electronics Grounding and Shielding Plan**	
		2364510	ProtoDUNE_LV_Power_Distributions_FD1.pdf	Grounding scheme for the low voltage power supplies	
		2339405	TechCoordination_grounding.pdf	Detector grounding - TDR chapter	
		2341139	TPC_Bias_Scheme_08-30-2022.pdf	DUNE CE Bias Schematic Diagram	
	Specification of Warm Electronics	2341138	WIB_v3_requirements_v1_docx_cpdf.pdf	Specification for WIB (v3)	2
		2731292	PTC_Requirements_docx_cpdf.pdf	Specification for PTC (upgrade)	
	Mechanical CAD Model for Sub-system	2783038	HIERARCHY_OF_DUNE_CE_ASSEMBLY_DRAWINGS.pdf	**Click the link in Column D to access the tree structure of models with links to drawings**	2
		2774711		Feedthrough, Warm Interface Electronics Crate (WIEC), Frontend Motherboards (FEMB), cold cables	
		2771732		Cable Tray-Trolley, temporary Vertical Cable, Cross port	
	Mechanical Engineering Drawings	2771733	2771733_2774712 ...pdf	**Click the link in Column D to access Index of drawings with links**	2
		2774712		...edthrough, WIEC	
		2771733		...lley, crossing tube, x-shape spool piece, cables, CE Box	
	Electrical Schematics & Board Layouts	2712913			2
		2712913			
		2712914			
		2712914			
		2712915			
		2712915			
		2712916			
		2712...		...s	
		2712917		...board PCB	
		2712917		...board schematiics	
		2339398			
		2339398			
	Specification of Electrical Cabling and Wiring Connections	2332925		...Description and Numbering Scheme	2
		2086112		...drawing. See the EDMS folder for more	
		2086114		...wing. More documents in the EDMS folder.	
		2086113		...a cable drawing. More documents in the EDMS folder.	
		2332922	2857_1.pdf	Cold Fallback return current datasheet	
		2332924	RE__Low_Voltage_AWG_10_-__FW__cable_04.08.82.060.2____2x6_mm2.pdf	Warm bias voltage cables datasheet	
		2332923	605eREV3.pdf	Warm power cable from the PL506 to the PTC - technical specifications	

If no files are linked in the “File” column, refer to the EDMS folder to see the files.

Spreadsheet with links to FDR documentation

Category	Subcategory	EDMS	File	Description	Charge question
Design Documents	Technical Design Reports	2606684	DUNE-FD-TDR-vol-IV-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	2,3,4,6
		2606690	Post_TDR_Upd_TPC_Electronics-82.pdf	Updated chapter 4 of TDR: TPC electronics that accurately describes sub-system design at time of Final Design Review.	
		2782297	_FDR_Document_docx_cpdf.pdf	Detailed summary of DUNE FD1-HD TPC Electronics design evolution; characterization; QA and QC	
			toDUNE_II_StatusAndPlans.pdf	The most recent summary of results of system tests in ProtoDUNE	4
			P5B_Datasheet_V1.pdf	LArASIC P5B Datasheet	2
			asheet_docx_cpdf.pdf	COLDADC P2 Datasheet	
			sheet_docx_cpdf.pdf	COLDATA P3 Datasheet	
			nding_8APR2018.pdf	DUNE Far Site Detector Grounding System Requirements	2
			_rev0_docx_cpdf.pdf	Dune Grounding and Shielding Guidelines	
			oundingShielding.pdf	**FD1 TPC Electronics Grounding and Shielding Plan**	
			Distributions_FD1.pdf	Grounding scheme for the low voltage power supplies	
			nation_grounding.pdf	Detector grounding - TDR chapter	
			eme_08-30-2022.pdf	DUNE CE Bias Schematic Diagram	
			ts_v1_docx_cpdf.pdf	Specification for WIB (v3)	2
			ments_docx_cpdf.pdf	Specification for PTC (upgrade)	
			BLY_DRAWINGS.pdf	**Click the link in Column D to access the tree structure of models with links to drawings**	2
				Feedthrough, Warm Interface Electronics Crate (WIEC), Frontend Motherboards (FEMB), cold cables	
				Cable Tray-Trolley, temporary Vertical Cable, Cross port	
			_Drawings_index.pdf	**Click the link in Column D to access Index of drawings with links**	2
				Feedthrough, WIEC	
				Cable trays, trolley, crossing tube, x-shape spool piece, cables, CE Box	
	Electrical Schematics & Board Layouts		layout_io1826-1c.pdf	FEMB PCB	2
			_SAMTEC_FEMB_IO1826-C.pdf	FEMB schematics	
		2712914	IO-1750-1-B_artwork.pdf	WIB PCB	
		2712914	DUNE_WIB_V3_IO-1750-1B.pdf	WIB schematics	
		2712915	io1866-1.pdf	PTB PCB	
		2712915	DUNE_PTB.pdf	PTB schematics	
		2712916	io1863-1.pdf	Flange board PCB	
		2712916	DUNE_FLANGE.pdf	Flange board schematics	
		2712917	GerberFiles.pdf	Warm bias voltage filter board PCB	
		2712917	PD2WarmBiasFilterBoardSchematic_6-16-2021.pdf	Warm bias voltage filter board schematiics	
		2339398	PTC3B_preview.pdf	PTC PCB	
		2339398	PTC3A_SchematicsDraft_20180129.pdf	PTC schematics	

This column provides a brief information about the linked EDMS documents.

Spreadsheet with links to FDR documentation

Category	Subcategory	EDMS	File	Description	Charge question
Design Documents	Technical Design Reports	2606684	DUNE-FD-TDR-vol-IV-SP-for-arxiv.pdf	DUNE Technical Design Report, Volume 4: DUNE FD SP Tech … y (copy or arXiv:2002:03010, also published in JINST 15 … 8, T08010	
		2606690	Post_TDR_Update__FD1_HD_TPC_Electronics-82.pdf	Updated chapter 4 of TDR: TPC electron… …tely describes sub-system design at time of Fi…	2,3,4,6
		2782297	CE_FDR_Document_docx_cpdf.pdf	Detailed summary of D… …tronics design evolution; characterizati…	
		2782614		…m tests in ProtoDUNE	4
	ASIC documentation	2314428			2
		2314429			
		2314430			
	Grounding & Shielding Plan	2095975		…ts	2
		2095958	Dune_Grounding_and…		
		2364510			
		2364510			
		2339405			
		2341139			
	Specification of Warm Electronics	2341138			2
		2731292			
	Mechanical CAD Model for Sub-system	2783038		…e of models with	2
		2774711		…, Frontend	
		2771732		…t	
	Mechanical Engineering Drawings	2771733		…s with links	2
		2774712			
		2771733		…, cables, CE Box	
	Electrical Schematics & Board Layouts	2712913			2
		2712913	Schematics_DUN…		
		2712914	IO-1750-1-B_artwork.pdf	WIB PCB	
		2712914	DUNE_WIB_V3_IO-1750-1B.pdf	WIB schematics	
		2712915	io1866-1.pdf	PTB PCB	
		2712915	DUNE_PTB.pdf	PTB schematics	
		2712916	io1863-1.pdf	Flange board PCB	
		2712916	DUNE_FLANGE.pdf	Flange board schematics	
		2712917	GerberFiles.pdf	Warm bias voltage filter board PCB	
		2712917	PD2WarmBiasFilterBoardSchematic_6-16-2021.pdf	Warm bias voltage filter board schematiics	
		2339398	PTC3B_preview.pdf	PTC PCB	
		2339398	PTC3A_SchematicsDraft_20180129.pdf	PTC schematics	

This column can be useful for people trying to answer the charge questions.

Drawings and CAD models

Category	Subcategory	EDMS	File	Description	Charge question
Design Documents	Technical Design Reports	2606684	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	2,3,4,6
		2606690	Post_TDR_Update__FD1_HD_TPC_Electronics-82.pdf	Updated chapter 4 of TDR: TPC electronics that accurately describes sub-system design at time of Final Design Review.	
		2782297	CE_FDR_Document_docx_cpdf.pdf	Detailed summary of DUNE FD1-HD TPC Electronics design evolution; characterization; QA and QC	
		2782614	ProtoDUNE_II_StatusAndPlans.pdf	The most recent summary of results of system tests in ProtoDUNE	4
	ASIC documentation	2314428	LArASIC_P5B_Datasheet_V1.pdf	LArASIC P5B Datasheet	2
		2314429	COLDADC_P2_Datasheet_docx_cpdf.pdf	COLDADC P2 Datasheet	
		2314430	COLDATA_P3_Datasheet_docx_cpdf.pdf	COLDATA P3 Datasheet	
	Grounding & Shielding Plan	2095975	tms_DUNE_Grounding_8APR2018.pdf	DUNE Far Site Detector Grounding System Requirements	2
		2095958	Dune_Grounding_and_Shielding_Guidelines_25FEB2019_rev0_docx_cpdf.pdf	Dune Grounding and Shielding Guidelines	
		2364510	FD1_TPCElectronics_GroundingShielding.pdf	**FD1 TPC Electronics Grounding and Shielding Plan**	
		2364510	ProtoDUNE_LV_Power_Distributions_FD1.pdf	Grounding scheme for the low voltage power supplies	
		2339405	TechCoordination_grounding.pdf	Detector grounding - TDR chapter	
		2341139	TPC_Bias_Scheme_08-30-2022.pdf	DUNE CE Bias Schematic Diagram	
	Specification of Warm Electronics	2341138	WIB_v3_requirements_v1_docx_cpdf.pdf	Specification for WIB (v3)	2
		2731292	PTC_Requirements_docx_cpdf.pdf	Specification for PTC (upgrade)	
	Mechanical CAD Model for Sub-system	2783038	HIERARCHY_OF_DUNE_CE_ASSEMBLY_DRAWINGS.pdf	**Click the link in Column D to access the tree structure of models with links to drawings**	2
		2774711		Feedthrough, Warm Interface Electronics Crate (WIEC), Frontend Motherboards (FEMB), cold cables	
		2771732		Cable Tray-Trolley, temporary Vertical Cable, Cross port	
	Mechanical Engineering Drawings	2771732	2771733_2774712_Drawings_index.pdf	**Click the link in Column D to access Index of drawings with links**	2
		2774712		Feedthrough, WIEC	
		2771733		Cable trays, trolley, crossing tube, x-shape spool piece, cables, CE Box	
	Electrical Schematics & Board Layouts	27129	layout_io1826-1c.pdf	FEMB PCB	2
		27129	Schematics_DUNE_Monolithic_SAMTEC_FEMB_IO1826-C.pdf	FEMB schematics	
		27129	IO-1750-1-B_artwork.pdf	WIB PCB	
		2712	DUNE_WIB_V3_IO-1750-1B.pdf	WIB schematics	
		2712	io1866-1.pdf	PTB PCB	
		2717	DUNE_PTB.pdf	PTB schematics	
		271	io1863-1.pdf	Flange board PCB	
		271	DUNE_FLANGE.pdf	Flange board schematics	

Drawings are distributed between two EDMS documents
CAD models are distributed between two EDMS documents as well

Index file for Engineering Drawings

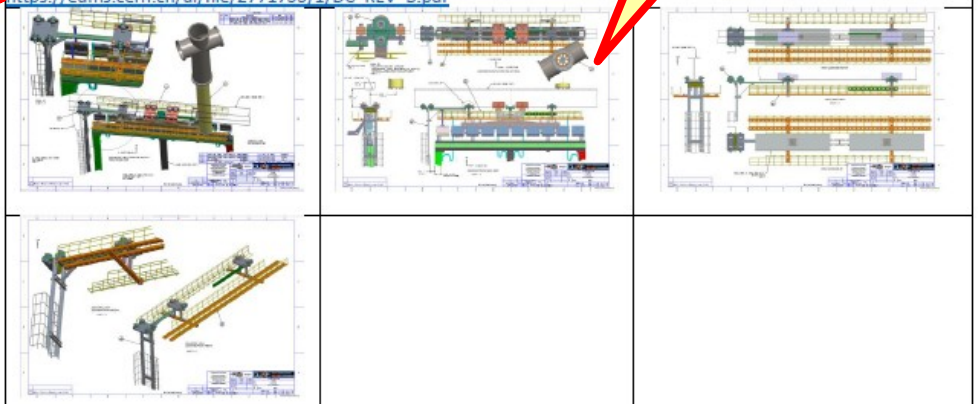
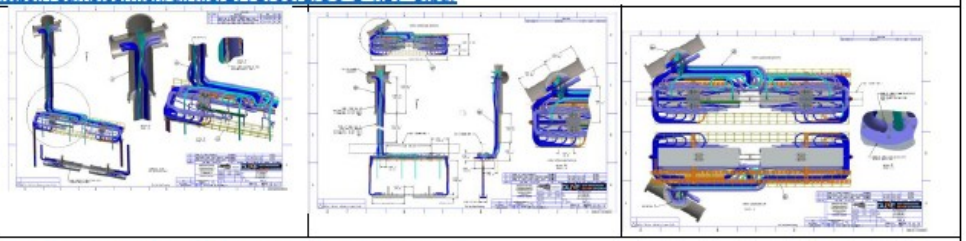
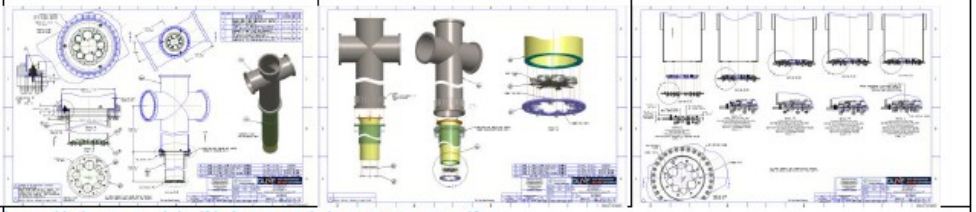
Thumbnail images

Link to the drawing file in EDMS in PDF format

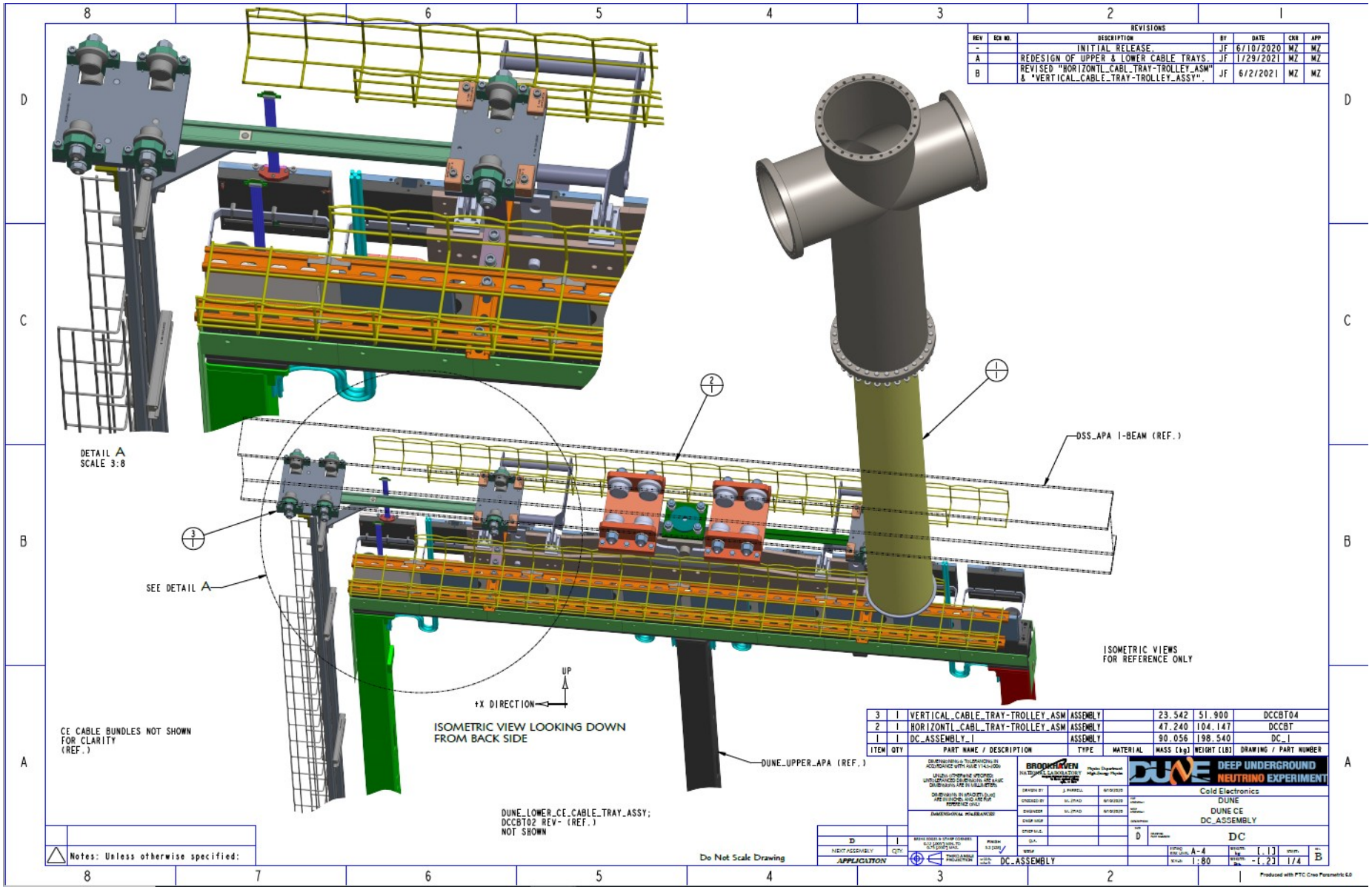
FD1-HD TPC Electronics: Index of drawings

https://edms.cern.ch/document/2771733

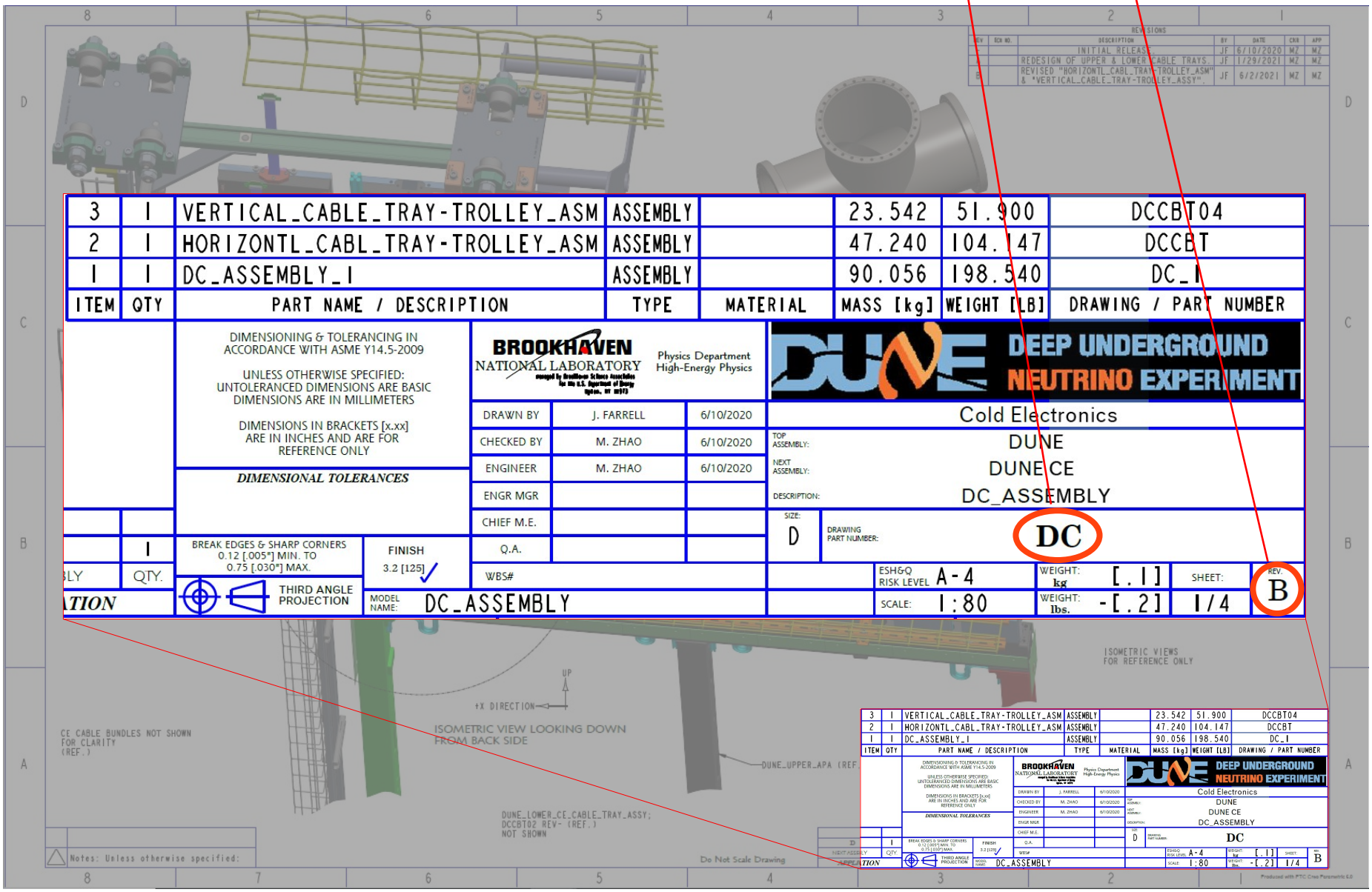
DC_ASSEMBLY

Nr	File link / thumbnail images
1.	https://edms.cern.ch/ui/file/2771733/1/DC_REV_B.pdf 
2.	https://edms.cern.ch/ui/file/2771733/1/DC_1_REV_B.pdf 
3.	https://edms.cern.ch/ui/file/2771733/1/DCFDT_REV_E.pdf 
4.	https://edms.cern.ch/ui/file/2771733/1/DCCBT_REV_D.pdf

Example: https://edms.cern.ch/ui/file/2771733/1/DC_REV_B.pdf



Example: https://edms.cern.ch/ui/file/2771733/1/DC_REV_B.pdf



ITEM	QTY	PART NAME / DESCRIPTION	TYPE	MATERIAL	MASS [kg]	WEIGHT [LB]	DRAWING / PART NUMBER
3	1	VERTICAL_CABLE_TRAY-TROLLEY_ASM	ASSEMBLY		23.542	51.900	DCCBT04
2	1	HORIZONTL_CABL_TRAY-TROLLEY_ASM	ASSEMBLY		47.240	104.147	DCCBT
1	1	DC_ASSEMBLY_1	ASSEMBLY		90.056	198.540	DC_1

DIMENSIONING & TOLERANCING IN ACCORDANCE WITH ASME Y14.5-2009

UNLESS OTHERWISE SPECIFIED: UNTOLERANCED DIMENSIONS ARE BASIC DIMENSIONS ARE IN MILLIMETERS

DIMENSIONS IN BRACKETS [x.xx] ARE IN INCHES AND ARE FOR REFERENCE ONLY

DIMENSIONAL TOLERANCES

BREAK EDGES & SHARP CORNERS 0.12 [.005"] MIN. TO 0.75 [.030"] MAX.

FINISH 3.2 [125]

THIRD ANGLE PROJECTION

MODEL NAME: DC_ASSEMBLY

BROOKHAVEN NATIONAL LABORATORY — Physics Department High-Energy Physics

DRAWN BY	J. FARRELL	6/10/2020
CHECKED BY	M. ZHAO	6/10/2020
ENGINEER	M. ZHAO	6/10/2020
ENGR MGR		
CHIEF M.E.		
Q.A.		
WBS#		

DEEP UNDERGROUND NEUTRINO EXPERIMENT

Cold Electronics

TOP ASSEMBLY: DUNE

NEXT ASSEMBLY: DUNE CE

DESCRIPTION: DC_ASSEMBLY

SIZE: D

DRAWING PART NUMBER: DC

ESH&Q RISK LEVEL A-4

SCALE: 1:80

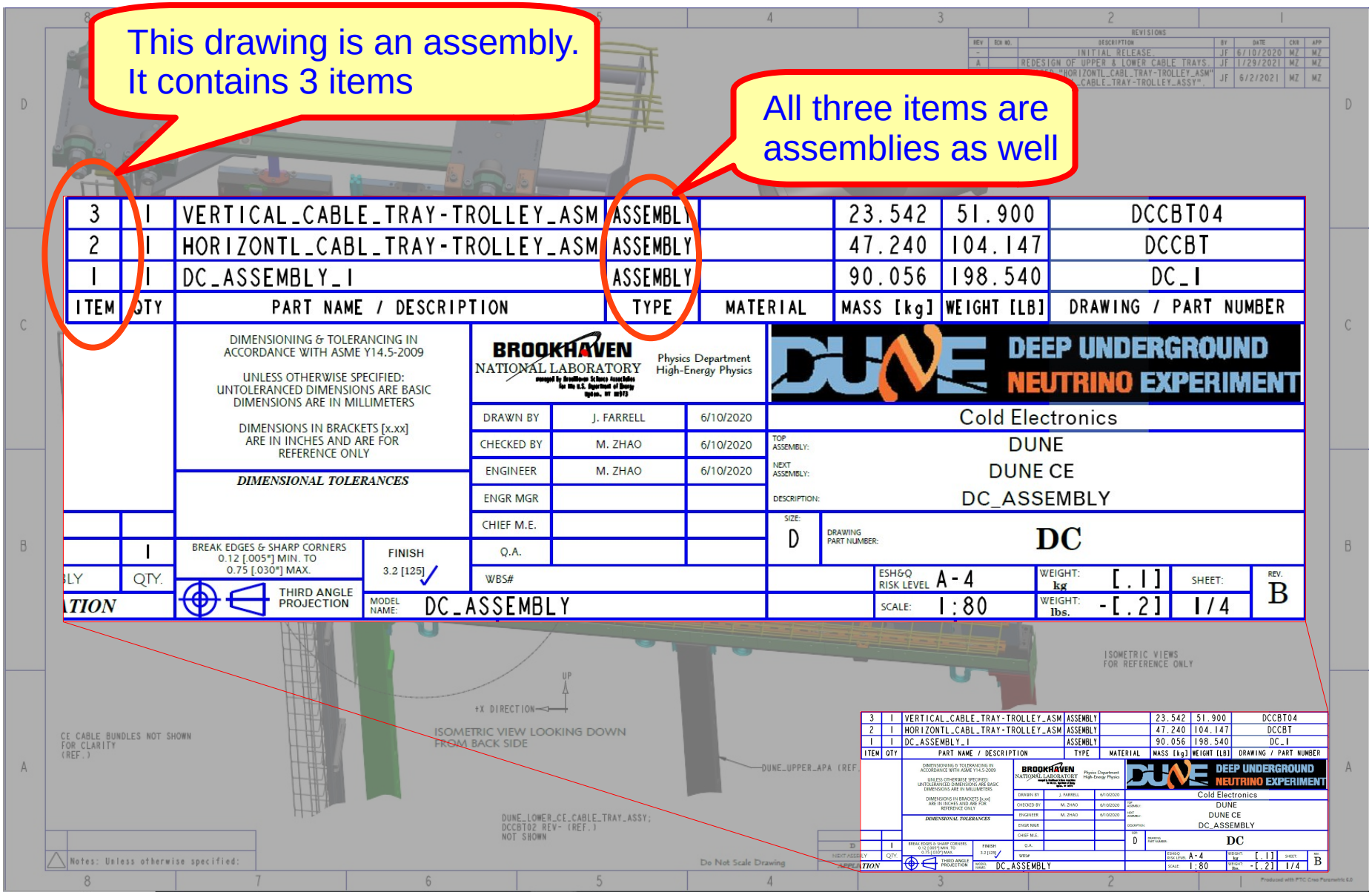
WEIGHT: kg [.1]

WEIGHT: lbs. -[.2]

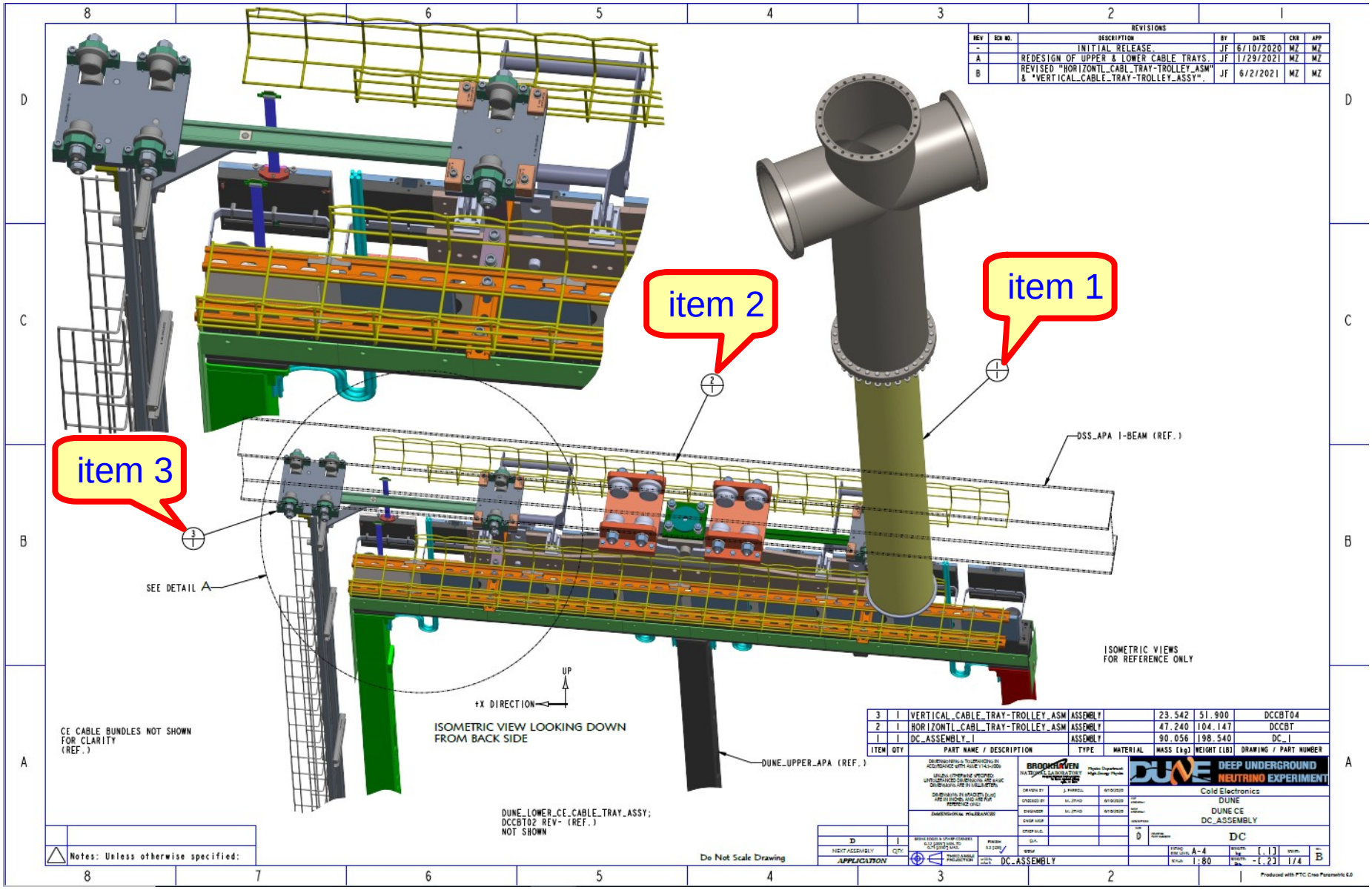
SHEET: 1/4

REV. B

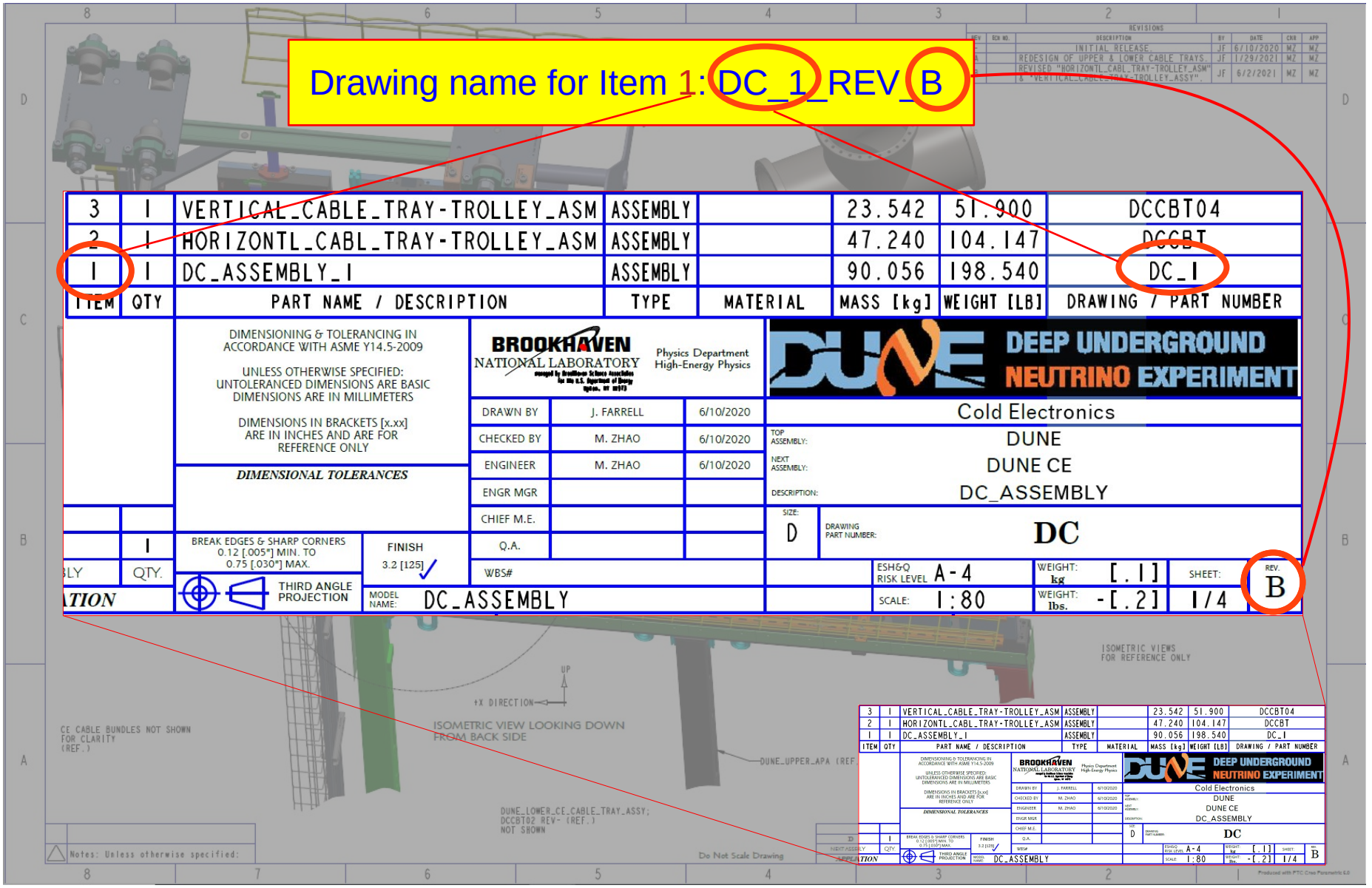
Example: https://edms.cern.ch/ui/file/2771733/1/DC_REV_B.pdf



Example: https://edms.cern.ch/ui/file/2771733/1/DC_REV_B.pdf



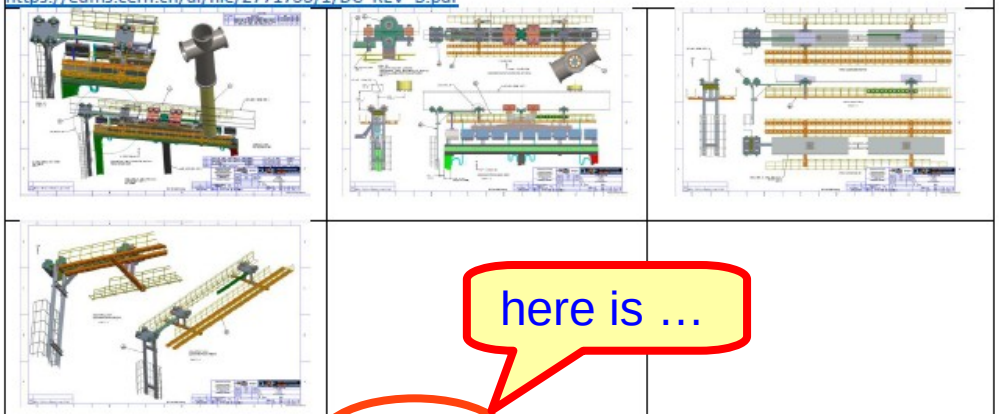
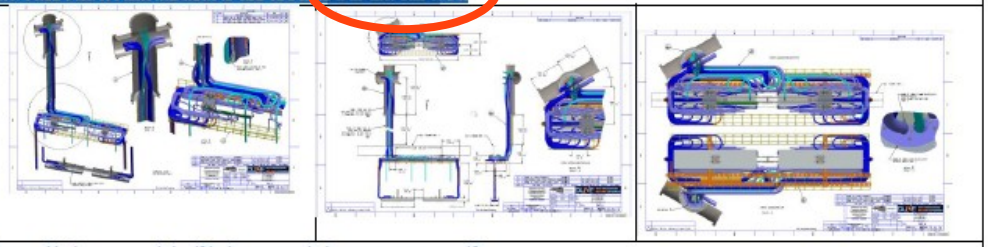
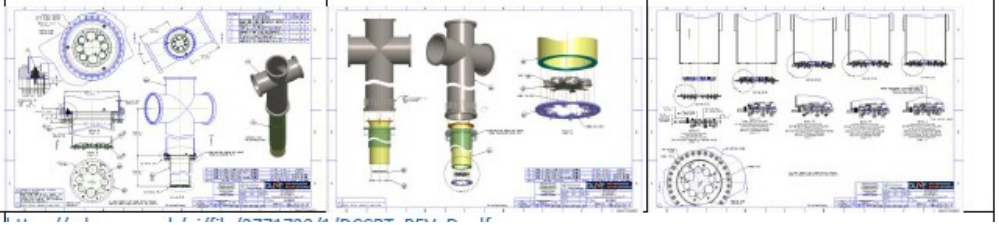
Example: https://edms.cern.ch/ui/file/2771733/1/DC_REV_B.pdf

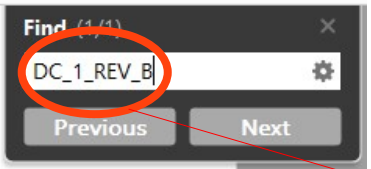


FD1-HD TPC Electronics: Index of drawings

https://edms.cern.ch/document/2771733

DC_ASSEMBLY

Nr	File link / thumbnail images
1.	https://edms.cern.ch/ui/file/2771733/1/DC_REV_B.pdf 
2.	https://edms.cern.ch/ui/file/2771733/1/DC_1_REV_B.pdf 
3.	https://edms.cern.ch/ui/file/2771733/1/DCFDT_REV_E.pdf 

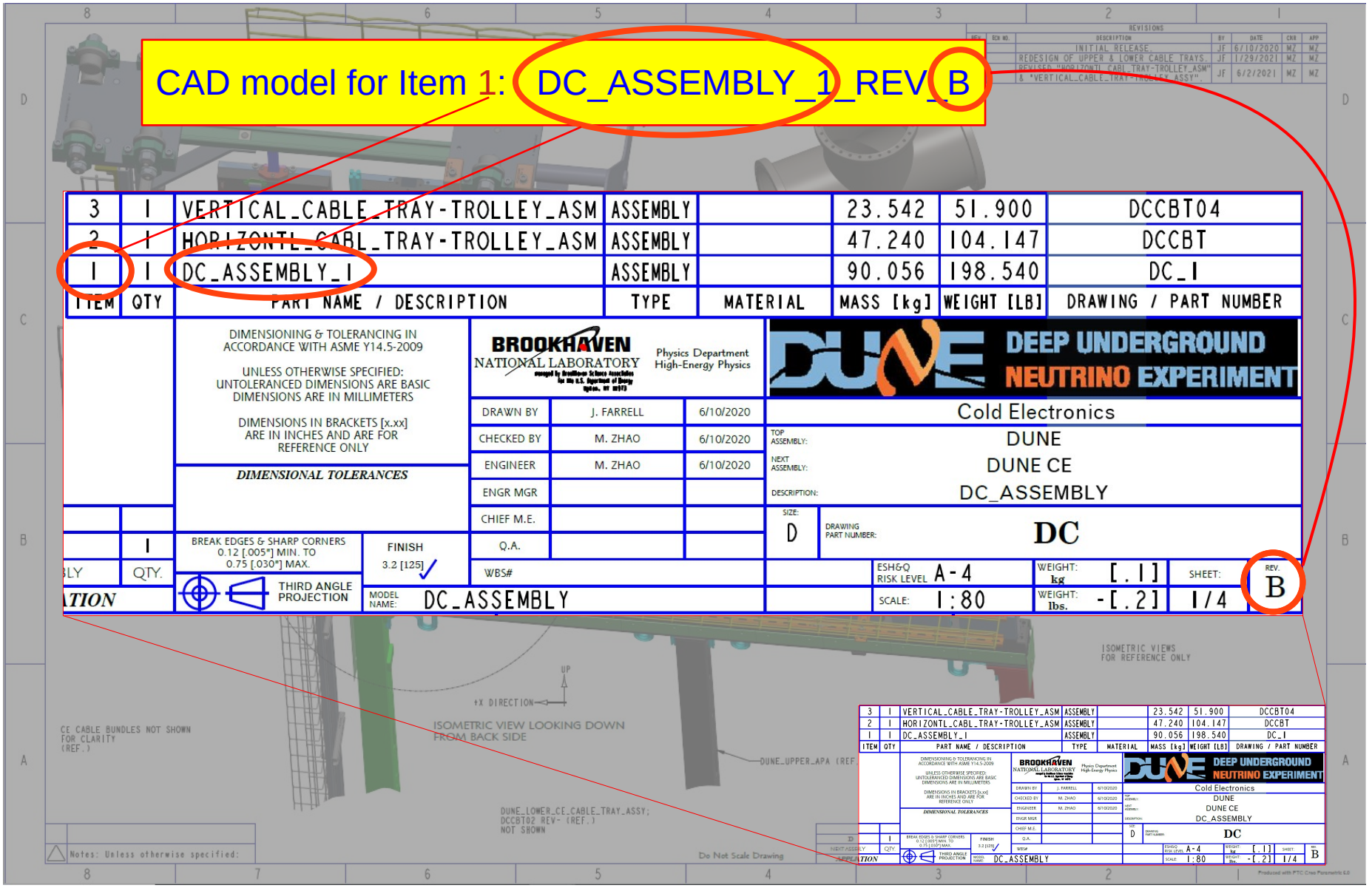


here is …

You can search it in the Index file

you can always search it in EDMS if you prefer to work with EDMS directly

Example: https://edms.cern.ch/ui/file/2771733/1/DC_REV_B.pdf



Locating a CAD model

Category	Subcategory	EDMS	File	Description	Charge question
Design Documents	Technical Design Reports	2606684	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	2,3,4,6
		2606690	Post_TDR_Update__FD1_HD_TPC_Electronics-82.pdf	Updated chapter 4 of TDR: TPC electronics that accurately describes sub-system design at time of Final Design Review.	
		2782297	CE_FDR_Document_docx_cpdf.pdf	Detailed summary of DUNE FD1-HD TPC Electronics design evolution; characterization; QA and QC	
		2782614		summary of results of system tests in ProtoDUNE	4
	ASIC documentation	2314428		et	2
		2314429		et	
		2314430		et	
	Grounding & Shielding Plan	2095975		or Grounding System Requirements	2
		2095958	Dune_Grounding_and_Shieldin	d Shielding Guidelines	
		2364510	FD1_TP	undingShielding.pdf	**FD1 TPC Electronics Grounding and Shielding Plan**
		2364510	ProtoDU	_Distributions_FD1.pdf	Grounding scheme for the low voltage power supplies
		2339405		ordination_grounding.pdf	Detector grounding - TDR chapter
		2341139		Bias_Scheme_08-30-2022.pdf	DUNE CE Bias Schematic Diagram
	Specification of Warm Electronics	2341138	WI	_requirements_v1_docx_cpdf.pdf	Specification for WIB (v3)	2
		2731292		PTC_Requirements_docx_cpdf.pdf	Specification for PTC (upgrade)	
	Mechanical CAD Model for Sub-system	2783038	HIERARCHY_OF_DUNE_CE_ASSEMBLY_DRAWINGS.pdf	**Click the link in Column D to access the tree structure of models with links to drawings**	2
		2774711		Feedthrough, Warm Interface Electronics Crate (WIEC), Frontend Motherboards (FEMB), cold cables	
		2771733		Cable Tray-Trolley, temporary Vertical Cable, Cross port	
	Mechanical Engineering Drawings	1733	2771733_2774712_Drawings_index.pdf	**Click the link in Column D to access Index of drawings with links**	2
		4712		Feedthrough, WIEC	
		1733		Cable trays, trolley, crossing tube, x-shape spool piece, cables, CE Box	
	Electrical S	2913	layout_io1826-1c.pdf	FEMB PCB	2
		2913	Schematics_DUNE_Monolithic_SAMTEC_FEMB_IO1826-C.pdf	FEMB schematics	
		2914	IO-1750-1-B_artwork.pdf	WIB PCB	
		2914	DUNE_WIB_V3_IO-1750-1B.pdf	WIB schematics	
		2915	io1866-1.pdf	PTB PCB	
		2915	DUNE_PTB.pdf	PTB schematics	
			io1863-1.pdf	Flange board PCB	
			DUNE_FLANGE.pdf	Flange board schematics	
			GerberFiles.pdf	Warm bias voltage filter board PCB	
			mBiasFilterBoardSchematic_6-16-2021.pdf	Warm bias voltage filter board schematiics	
			PTC3B_preview.pdf	PTC PCB	
			PTC3A_SchematicsDraft_20180129.pdf	PTC schematics	

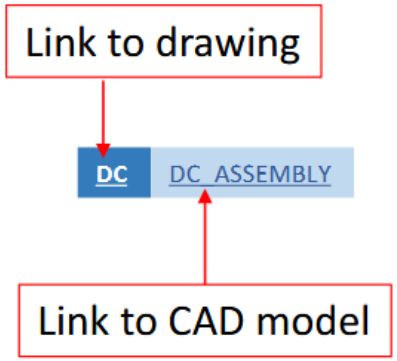
search the model in the hierarchy tree list

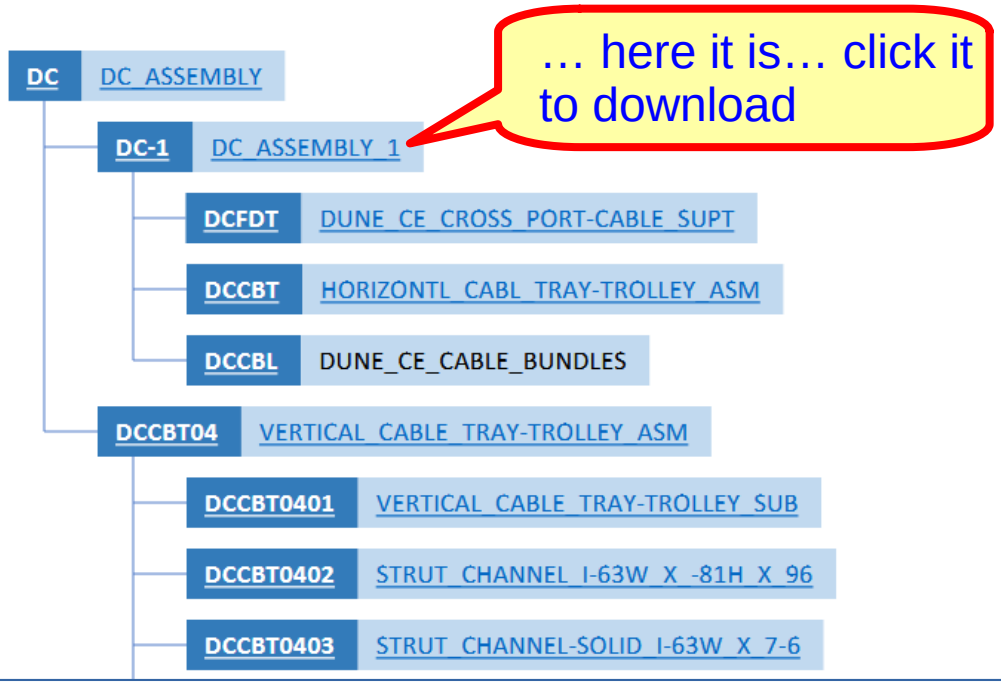
or go to EDMS documents directly

HIERARCHY OF DUNE-FD1 CE ASSEMBLY DRAWINGS

List of acronyms

DC:	DUNE CE
DCFDT:	DUNE CE Feedthrough
DCCBT:	DUNE CE Cable Tray
DCCBL:	DUNE CE Cable
PDII:	ProtoDUNE-II
BCT:	Bridge Cable Tray
W_HDW:	With Hardware





Note: The models are either ZIP file archives, or individual STEP files. A special engineering software is needed to open these files.