ProtoDUNE-II Naming Conventions

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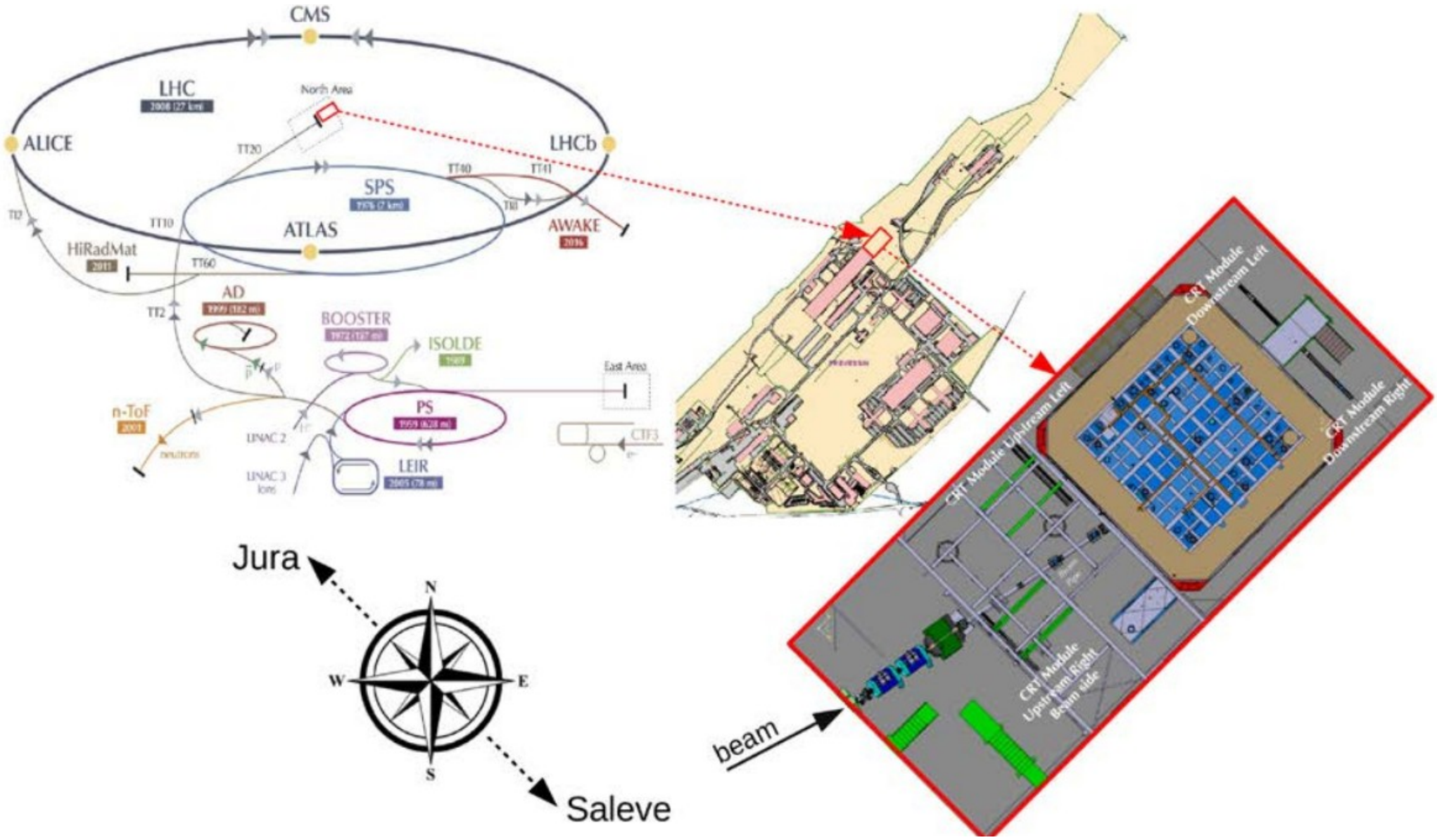
Objectives

- Propose and document a naming scheme of components in ProtoDUNE-II experiment (Detector, electronics, cables, infrastructure items, etc.) to be used consistently for communication by the collaboration.
- Exercise the DUNE naming conventions
  - based on https://edms.cern.ch/document/2403513

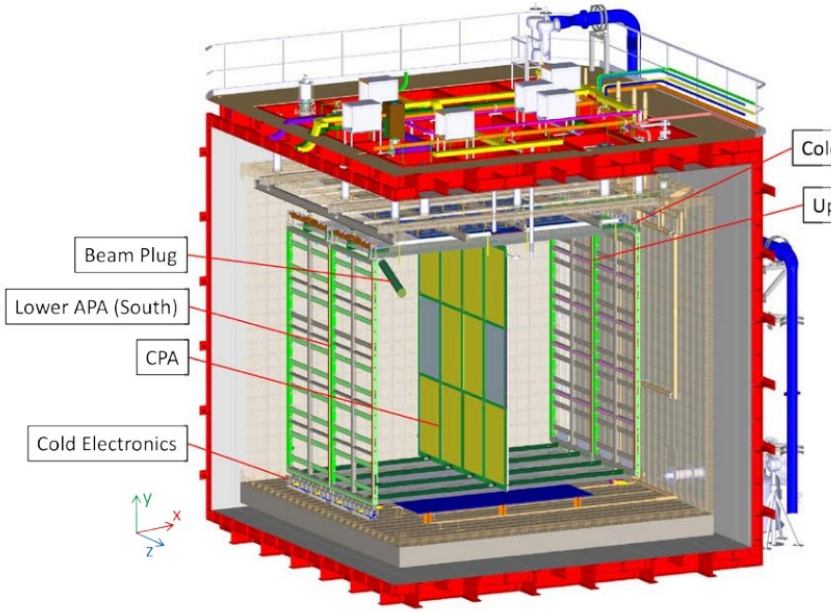
Cardinal Directions for ProtoDUNE



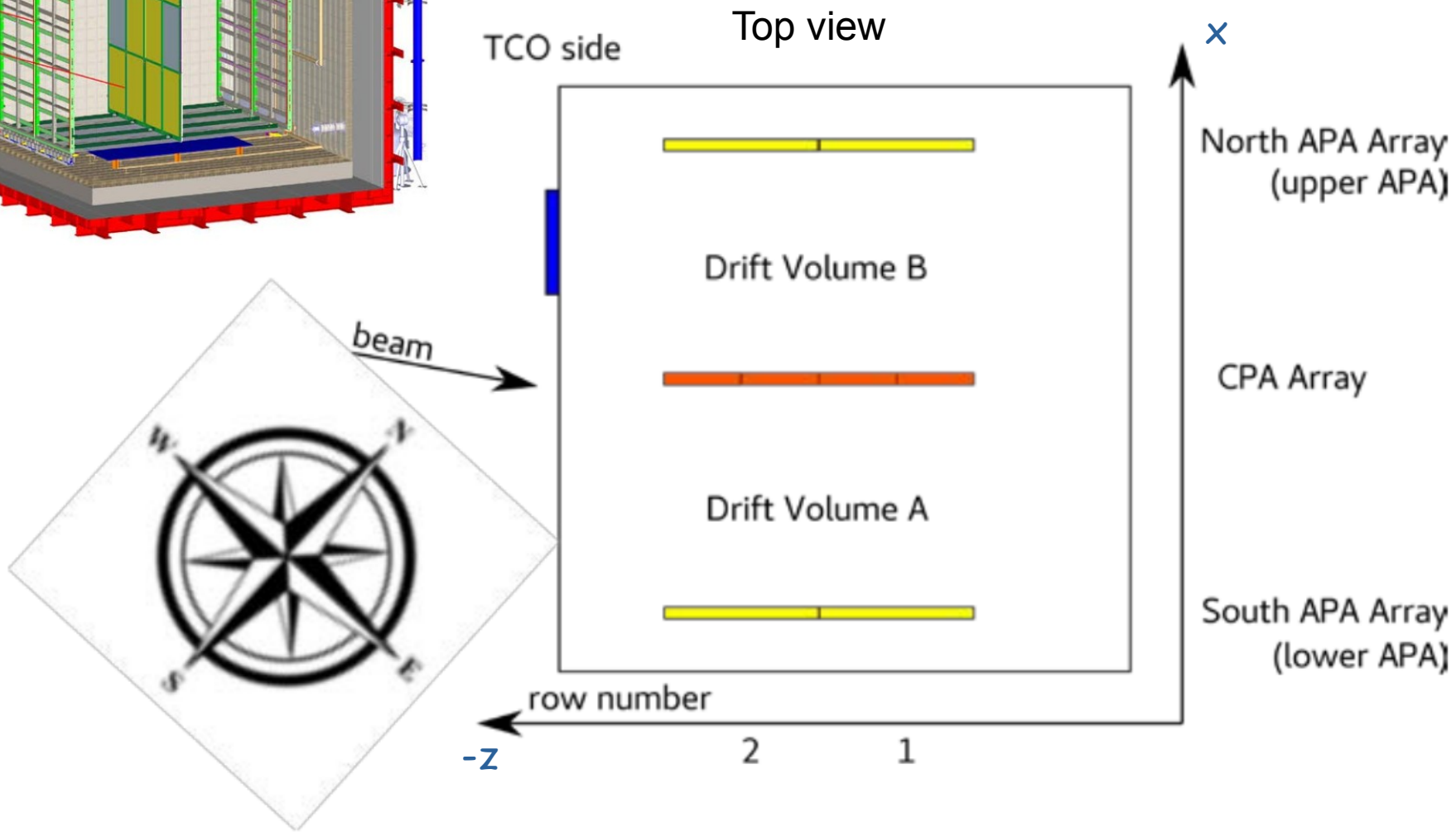
Beam Left = Jura Side = North

Beam Right = Saleve Side = South

ProtoDUNE-II setup



2 APA arrays (4 APAs total) - APA_mxxsu
1 CPA array (4 CPA modules total)



Naming Convention for APA

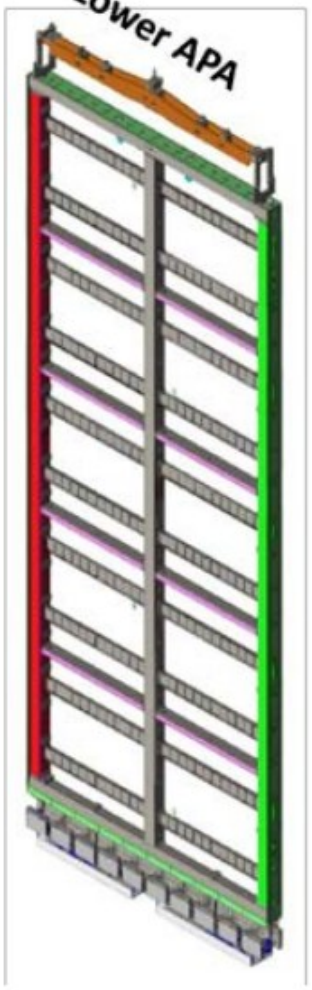
Anode Panel Assembly Positions

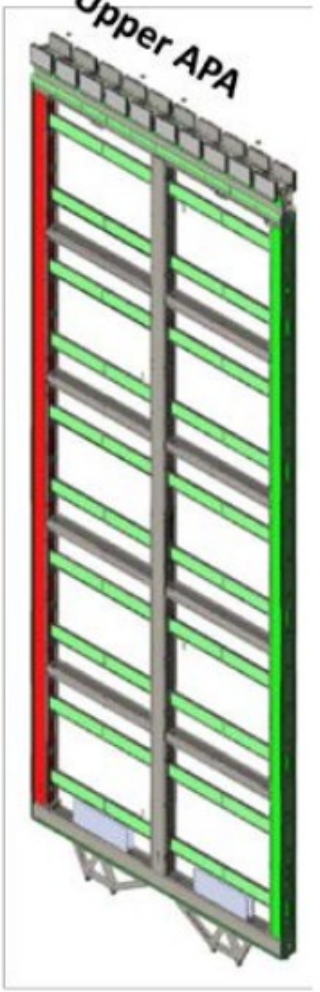
Position ID: APA_mxxsu

Example*: APA_P02SL

- P = ProtoDUNE
- 01 = Detector Row 1 (furthest from TCO)
  02 = Detector Row 2 (nearest to TCO)
- N = North Anode Array
  S = South Anode Array
- U = Upper APA
  L = Lower APA

Example* Description: The position identified is the Lower APA within the South anode array in the 2nd row of ProtoDUNE detector.





Some examples

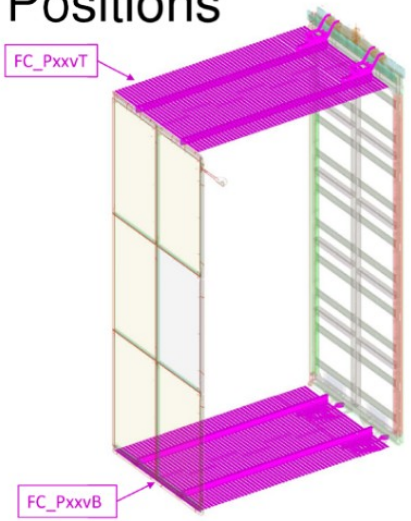
Top/Bottom Field Cage Positions

Position ID: FC_mxxvt

Example*: FC_P01AT

- P = ProtoDUNE Detector
- 01 = Detector Row 1 (furthest from TCO)
  02 = Detector Row 2 (nearest to TCO)
- A = A Drift Volume
  B = B Drift Volume
- T = Top Field Cage
  B = Bottom Field Cage

Example* Description: The position identified is the Top Field Cage within drift volume A in the 1st row of ProtoDUNE detector.



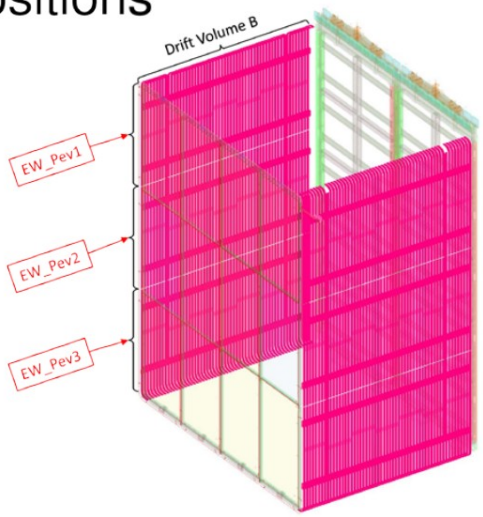
End Wall Field Cage Positions

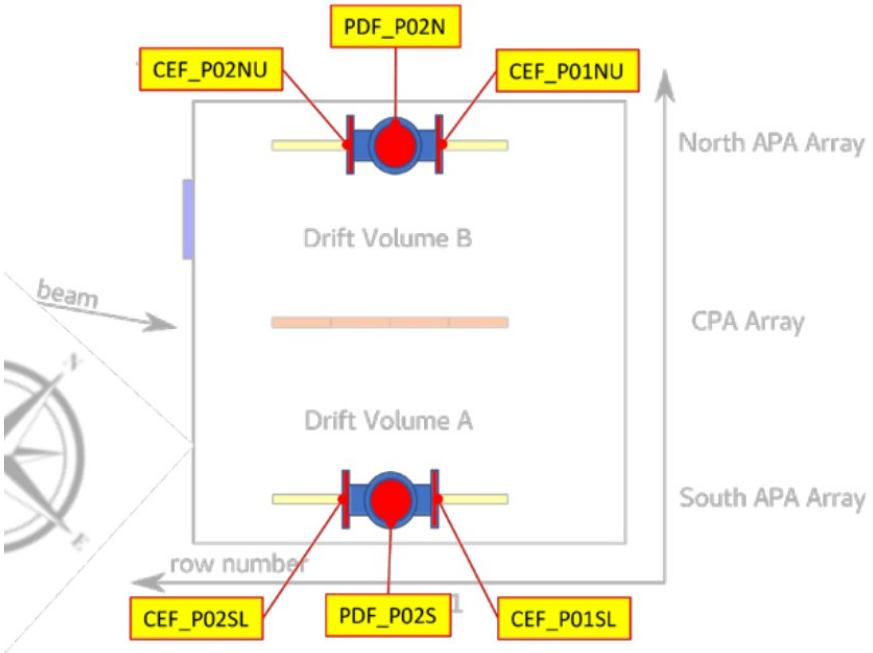
Position ID: EW_mevn

Example*: EW_PWA3

- P = ProtoDUNE Detector
- E = East Side of Detector (furthest from TCO)
  W = West Side of Detector (nearest to TCO)
- A = A Drift Volume
  B = B Drift Volume
- 1 = First element installed (top)
  2 = Second element installed
  3 = Third element installed

Example* Description: The position identified is the 3rd (or bottom) End Wall element within drift volume A in the West side of ProtoDUNE detector.

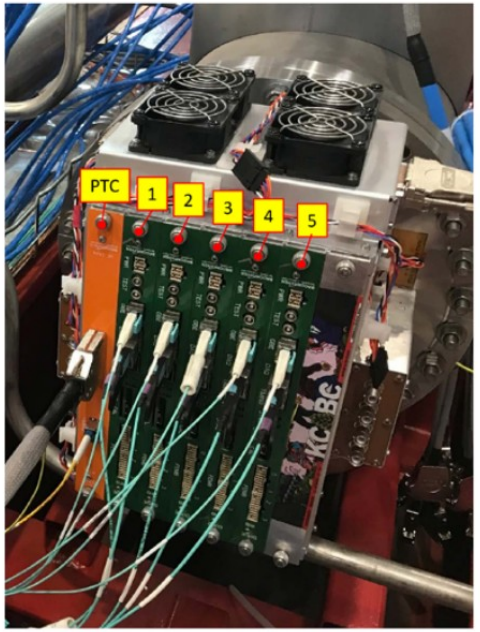




Warm Interface Board Positions (Child of CEF Positions)

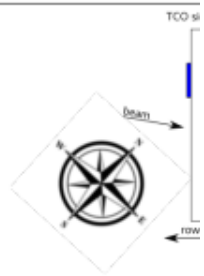
Position ID: WIB_mxxsun

- P = ProtoDUNE
- 01 = Detector Row 1 (furthest from TCO)
  02 = Detector Row 2 (nearest to TCO)
- N = North Anode Array
  S = South Anode Array
- U = Upper APA
  L = Lower APA
- 1 = First WIB
  ...
  5 = Fifth WIB



… more examples

xx = 01,02 (APA row number)
s = S,N (South, North)
e = E,W (East, West)
v = A,B (drift volume)
t = T,B (Top, Bottom)
u = U,L (Upper, Lower)
n,k = 1,2…,9 (element number, channel number, etc.)



ame	Description
APA_Pxxsu	Anode Plane Assembly
CPA_PxxSe	Cathode Plane Assembly (only South in PD-II)
FC_Pxxvt	Top/Bottom Field Cage
EW_Pevn	End Wall Field Cage (n=1,2,3)
GP_Pxxvt	Ground Plane (top, bottom)
SPA_P02s	Spool Piece for APA
PDM_Pxxsnn	Photon Detector Module (nn=01,…,10)
FEMB_Pxxsu_nn	Front-End Mother Board (nn=01,…,20)
CEF_Pxxsu	Cold Electronics Flange
PDF_Pxxs	Photon Detector Flange
WIEC_Pxxsu	Warm Interface Electronics Crate
WIB_Pxxsun	Warm Interface Board (n=1,…,5)
PTC_Pxxsu	Power and Timing Card
CEFB_Pxxsun	Filter Box (n=1,2)
CEFB_Pxxsun_k	Filter Box Connectors (n=1,2; k=1,2,3,4)

CEFAN_Pxxsun	WIEC fan (n=1,2,3,4)
CERTD_Pxxsun	CE Flange RTD (n=1,2,3,4)
CEHEAT_Pxxsun	CE Flange Heater (n=1,2,3,4)
CEDB25_PxxsuF	WIEC crate DB25 connector for Fans
CEDB25_PxxsuH	WIEC crate DB25 connector for Heaters and RTDs
CC_Pxxsu_FEMB_nn_POW	Cold Cable providing power to FEMB (nn=01,…,20)
CC_Pxxsu_FEMB_nn_SIG	Cold Cable for FEMB communication (signals and data) (nn=01,…,2
CC_Pxxsu_BIAS_X	Cold Cable providing the bias voltage to the collection plane (X) of A
CC_Pxxsu_BIAS_U	Cold Cable providing the bias voltage to the first induction plane (U
CC_Pxxsu_BIAS_G	Cold Cable providing the bias voltage to the grid (G) of APA
CC_Pxxsuv_BIAS_FCt	Cold Cable for the Field Cage termination electrode
CC_Pxxsuv_BIAS_FCEW	Cold Cable for the End Wall Field Cage termination electrode
CC_Pxxsuv_GPMON_t	Cold Cable for the Ground Plane Monitor
CC_Pxxsut_FSGND	Field cage failsafe ground return cables. Not routed outside the cryo
CC_Pxxsut_EWFSGND	End Wall failsafe ground return cables. Not routed outside the cryos
TPC_FANS_Pxxsu	Power and monitoring cables for WIEC fans.
TPC_HEATERS_Pxxsu	Power and signal cables for CE flange heaters and RTDs.
TPC_RO_WIEC_Pxxsu	Patch cord for the WIB readout.
TPC_CNTRL_WIEC_Px	Patch cord for the Gigabit Ethernet connection to WIB and PTC.
GBE_WIB_Pxxsun	Gigabit Ethernet connection for the WIBs for testing.
GBE_PTC_Pxxsu	Gigabit Ethernet connection for the PTCs for testing.
TIMING_Pxxsu	LC fibers connecting PTCs to the Timing System
DDSS_PTC_Pxxsu	LC fibers connecting PTCs to the Detector Safety System
Pxxsu_BIAS_X	Warm cable providing the bias voltage to the collection plane (X) of
Pxxsu_BIAS_U	Warm cable providing the bias voltage to the first induction plane (
Pxxsu_BIAS_G	Warm cable providing the bias voltage to the grid (G) of APA

Inventory of CE components for ProtoDUNE-II

Not including instrumentation for the Cold Box

Item	Quantity	Comments
FEMB_Pxxsu_nn	80	All new
SPA_P02s	2	Cross-shape spool pieces will be installed, like in DUNE
CC_Pxxsu_FEMB_nn_POW	80	Cold cables for FEMB power. All new.
CC_Pxxsu_FEMB_nn_SIG	80	Cold Cable for FEMB communication (signals and data). All new.
CC_Pxxsu_BIAS_X	4	Cold Cable providing the bias voltage to the collection plane (X) of APA.
CC_Pxxsu_BIAS_U	4	Cold Cable providing the bias voltage to the first induction plane (U) of APA
CC_Pxxsu_BIAS_G	4	Cold Cable providing the bias voltage to the grid (G) of APA
CC_Pxxsuv_BIAS_FCEW	4	Cold Cable for the End Wall Field Cage termination electrode
CC_Pxxsuv_BIAS_FCt	8	Cold Cable for the Field Cage termination electrode
CC_Pxxsuv_GPMON_t	8	Cold Cable for the Ground Plane Monitors
CC_Pxxsut_FSGND	8	Field cage failsafe ground return cables. Not routed outside the cryostat
CC_Pxxsut_EWFSGND	4	End Wall failsafe ground return cables. Not routed outside the cryostat.
CEF_Pxxsu	4	Cold Electronics Flange. Reuse from PD-I, but with new PTBs.
WIEC_Pxxsu	4	WIEC crates. Reuse from PD-I.
WIB_Pxxsun	20	WIBs. All new.
PTC_Pxxsu	4	PTC. Initially reuse from PD-I; commission the new ones later in run.
… TBD		

can reuse the ones for the upper APAs

Summary

- The main work on creating the naming scheme of CE components for ProtoDUNE-II has been completed. The information is still missing in some places. The document will be updated as soon the design is finalized and new information becomes available.
- A similar effort is needed to name other components in ProtoDUNE-II.
- The most recent draft of the Naming Conventions document for ProtoDUNE-II can be found at
  https://docs.google.com/document/d/1BY-ko6loiEVabnp3YUBOdE0JHuogbbBe/edit?usp=sharing&ouid=105223242902266858501&rtpof=true&sd=true
  (temporary storage).
- An inventory of parts for ProtoDUNE-II has been started.

Thank you!

- Marco for guidance.
- Hucheng, Bo, Kyle, Jason, Shanshan, Matt (and others) for inputs.
- All of you for the attention and future inputs.