

Going up/down through PID hierarchy, scan QR codes, and post Locations via iPad

Minnesota's two apps

- We have been developing two apps to provide friendly UIs on the client side to help to communicate with the HWDB.
- iPad app: **This presentation**
 - ▶ Runs on mobile devices (iPads)
 - ▶ Also runs on Macs (both Intel/AS)
 - ▶ Obviously through GUI
 - ▶ Has been already employed Extensively by the HVS to upload their entire PD2 information to the development version of the HWDB.
- Python API:
 - ▶ Runs on various platforms.
 - ▶ Command-line UI.
 - ▶ Takes spreadsheets and upload them to the HWDB.

Requirements

- iPad

- ▶ You will need at least one iPad with iPadOS 14.0 or newer.
- ▶ As a reference, we list the specification of our iPad that we have been using since 2019 below.
 - ➔ Generation : the 6 th generation
 - ➔ Storage : 128 GB
 - ➔ Display : 9.7 inch (diagonal)
 - ➔ Chip : A10 Fusion Chip with 64-bit architecture, Embedded M10 coprocessor
 - ➔ Model # : MR7J2LL/A

- Mac

- ▶ The app also runs on Macs with both Intel and Apple M chips.
The minimum requirement is to have the macOS 11 (Big Sur) or newer running on your Mac.

Deployment

- iPad:

- ▶ For now, you need to let me know your E-mail address.

We'll then send you an invitation, which includes a link to download an app, called TestFlight.

The TestFlight will then let you download/install our app.

- ▶ In the future, we like to improve this method.

(either release the app publicly at the Apple app store or obtain an Enterprise Apple development account)

- Mac:

- ▶ Download the latest version from here:

<https://www-users.cse.umn.edu/~hmuramat/iOS/CPAProductionChecklists.zip>

It is password-protected.

Provide:

Username : DUNE

Password : DUNEana

iPad app

For today, we will go through the three functionality of the app.

1. **The PID Display** : let you go through the PID hierarchy with ease.
2. **The Shipment Tracker** : let you deal with locations of Items.
3. **Generating, Saving, and Printing QR-codes.**

Opening page



Username:

Password:

Accessing to the **production** or **development** version?

Production

Guest

Login

Register your FNAL certification

Version: 3.53

- When the app is launched, this is the page you see.
- Let you login either with or without your credential.
- “Guest” login with let you do everything except communicating with the HWDB.
- Let’s you select either the production or development versions of the HWDB.

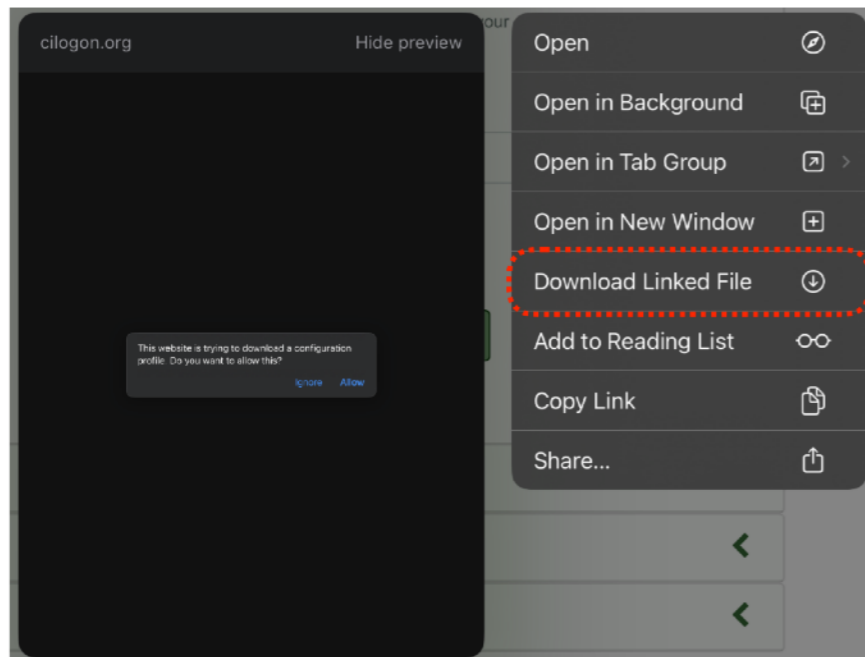
For the 1st timer, need to install their p12 file.
See the next page,

Close

Procedure to obtain your certificate

1. Tap the right button: <https://cilogon.org>
2. Select "Fermi National Accelerator Laboratory" as your Identity Provider and then tap "Log On".
3. Sign on through the FNAL SSO.
4. Choose "Create Password-Protected Certificate".
5. Enter your password for this certificate (this is not the password for your FNAL Services account).
6. Click "Get New Certificate".
7. Press and hold the "Download Your Certificate" button until a window shown below pops up.

Your p12 file



- Step-by-step p12 file installation procedure.

And select "Download Linked File". This should save your p12 file in the Download folder of your iPad.

8. Using "Files", move the downloaded p12 file from Download folder to CPAProductionChecklist folder.

9. Select your downloaded p12 file.

Select your P12 file

Provide your username and password, to be employed within this app. Here the password is the one provided in the 5th step of the Procedure above (i.e., this is not the password for your FNAL Services account).

Username

Password

Tap bellow to install it.

Install Certificate

At the end, your FNAL certificate is installed on your iPad.

DUNE FD1-HD TPC HVS

Production, Installation, Quality Control

Name: hajime

Enter default email recipients for checklist data, one per line:

hmuramat@umn.edu

United States / University of Minnesota Twin Cities

Shipment Tracker

DUNE

ProtoDUNE II

PID Display

Excel sheet uploader

Logout

Release Notes (v3.53)

Expiration date of your certification : Jun 18 08:38:14 2025 GMT

- Once you login, you should see this page.
- 3 things you must do before proceeding.

Provide your name.
Will be used for locally saved file names.

Provide at least one E-mail address.
Will be used to send our Emails.

Select your institution by tapping it.
Will be used when request the HWDB to generate a new PID(s).

Launch the PID Display session!
See the following few pages.

Shows the expiration date of your certificate.

A PID Viewer - PID Display

- If you have previously synced to the HWDB for that Component Type, it displays the PIDs based on what are stored locally (SQLite). Useful if you need PID lists (especially long lists!) with poor network connections.

Close Sync all

The last time when synced: October 25, 2023 at 7:51:11 AM

Sync to HWDB

Show only selected System IDs

System IDs that contain AND System Names that contain

System ID	System Name
000	Invalid
001	FD1-HD Complete Detector
002	FD1-HD Instrumented Anode Plane (with Elec and photon Det.)
003	FD1-HD Anode Plane Assemblies (bare wire planes)
004	FD1-HD Photon Detection System
005	FD1-HD HVS
006	FD1-HD Calibration
021	DAQ
051	FD2-VD Complete Detector
052	FD2-VD Instrumented Top Charge Readout Planes (CRP) (inc. Elect)
053	FD2-VD Instrumented Bottom Charge Readout Planes (CRP) (inc. Elect)
054	FD2-VD Instrumented Cathode Plane (inc. PD)
055	FD2-VD Top Charge Readout Planes (CRP)
056	FD2-VD Bottom Charge Readout Planes (CRP)
057	FD2-VD Top Vertical Drift CRP Electronics
058	FD2-VD Photon Detector
059	FD2-VD Calibration
060	FD2-VD HVS
080	FD-2-VD HV
081	FD1-HD TPC Elec. and FD2-VD Bottom Elec.

Close

The last time when synced: October 25, 2023 at 7:47:47 AM

Sync to HWDB

Show only selected Subsystem IDs

Subsystem IDs that contain AND Subsystem Names that contain

Subsystem ID	Subsystem Name
001	HV Distribution
002	Cold Camera
013	TPC HV Assembly
020	CPA
021	FC
022	EW
023	CPA
998	HWDBUnitTest
999	CPA

On each page, one can sync to the HWDB to update the contents in the local DB.

Close

Component Type ID List

Selected System ID 005	Selected System Name FD1-HD HVS
Selected Subsystem ID 020	Selected Subsystem Name CPA

The last time when synced: October 14, 2023 at 9:23:57 PM
Sync to HWDB

Show only selected Component Type IDs

Type IDs that contain

AND

Type Names that contain

ComponentType ID	ComponentType Name
03318	FSS - Upper Int DSN/Lower Int DSS
03322	FSS - Upper Int DSS/Lower Int DSN
03333	FR4 Frame - Lower Side Bar DSW
04000	CPA Panel Assembly DS
04100	Upper CPA Unit DS
04200	Middle CPA Unit DS
04300	Lower CPA Unit DS
04401	Anti-Rotation Rod - Top
04402	Anti-Rotation Rod - Bottom
04409	Top Hanger Assembly
04501	CPA Plane US
05000	CPA Panel Assembly Center
05100	Upper CPA Unit Center
05200	Middle CPA Unit Center
05300	Lower CPA Unit Center
05501	CPA Plane Center

Close

PID List

Component Type ID D00502004501	Component Name CPA Plane US
--	---------------------------------------

The last time when synced: May 8, 2024 at 10:00:24 PM
Sync to HWDB

Show only selected PIDs

Spec Key Name

AND

Spec Value

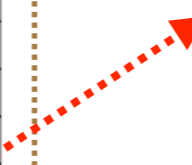
Test Keys that contain

AND

Test Values that contain

Tapping (or clicking) a PID below will copy it to clipboard.
 The ones in **PINK** have been already assigned as sub-components.

PID	Creator	Created Time	Info	Test	QR
D00502004501-00005	Stephen Magill	2023-02-27 10:14:54	i	📊	📄
D00502004501-00004	Stephen Magill	2022-07-26 06:58:32	i	📊	📄
D00502004501-00003	Stephen Magill	2022-07-26 06:41:32	i	📊	📄
D00502004501-00002	Stephen Magill	2022-06-20 14:42:44	i	📊	📄
D00502004501-00001	Stephen Magill	2022-06-20 10:07:10	i	📊	📄



Close PID List

Component Type ID D00502004501	Component Name CPA Plane US
--	---------------------------------------

The last time when synced: May 8, 2024 at 10:00:24 PM
Sync to HWDB

Show only selected PIDs

Spec Key Name

AND OR

Spec Value

Test Keys that contain

AND OR

Test Values that contain

Tapping (or clicking) a PID below will copy it to clipboard.
The ones in PINK have been already assigned as sub-components.

PID	Creator	Created Time	Info	Test	QR
D00502004501-00005	Stephen Magill	2023-02-27 10:14:54			
D00502004501-00004	Stephen Magill	2022-07-26 06:58:32			
D00502004501-00003	Stephen Magill	2022-07-26 06:41:32			
D00502004501-00002	Stephen Magill	2022-06-20 14:42:44			
D00502004501-00001	Stephen Magill	2022-06-20 10:07:10			

Close **The selected Component**

PID D00502004501-00005	Type Name CPA Plane US
Creator Stephen Magill	Created Time 2023-02-27 10:14:54

Specification

```

{
  "Drawing Number" = "PD2-020-AB01";
  "Location ID" = "CPA_0021";
}
    
```

Parent Component

PID D00501341001-00003	Creator Stephen Magill
Created Time 2023-06-02 09:02:29	Functional Position CPA Plane PID

sub-Components

PID	Name	Position	Creator	Linked Date
D00502002000-00007	CPA Panel Assembly PD2 Center	P2 Parts ID	Stephen Magill	2023-02-27 10:14:55
D00502001000-00007	CPA Panel Assembly PD2 US	P1 Parts ID	Stephen Magill	2023-02-27 10:14:55

Provides the corresponding QR-code. See page 24

More detail info for each PID
 - Displays its Specifications
 - Access to both Parent- and Sub-components.

Close PID List

Component Type ID D00502004501	Component Name CPA Plane US
--	---------------------------------------

The last time when synced: May 8, 2024 at 10:00:24 PM
🔄 Sync to HWDB

Show only selected PIDs

Spec Key Name

Test Keys that contain

AND OR

AND OR

Spec Value

Test Values that contain

Tapping (or clicking) a PID below will copy it to clipboard.
 The ones in **PINK** have been already assigned as sub-components.

PID	Creator	Created Time	Info	Test	QR
D00502004501-00005	Stephen Magill	2023-02-27 10:14:54			
D00502004501-00004	Stephen Magill	2022-07-26 06:58:32			
D00502004501-00003	Stephen Magill	2022-07-26 06:41:32			
D00502004501-00002	Stephen Magill	2022-06-20 14:42:44			
D00502004501-00001	Stephen Magill	2022-06-20 10:07:10			

Access to the all available Test Types

Close **The selected Component**

PID D00502004501-00005	Type Name CPA Plane US
Creator Stephen Magill	Created Time 2023-02-27 10:14:54

Test Types

Tapping (or clicking) a Name below will show the corresponding Test Data.

Name	Creator	Created Time
CPA Planes Assembly QC check	Stephen Magill	2023-02-27 10:14:54

Close **The selected Component**

PID D00502004501-00005	Type Name CPA Plane US
Creator Stephen Magill	Created Time 2023-02-27 10:14:54

The selected Test Type

CPA Planes Assembly QC check

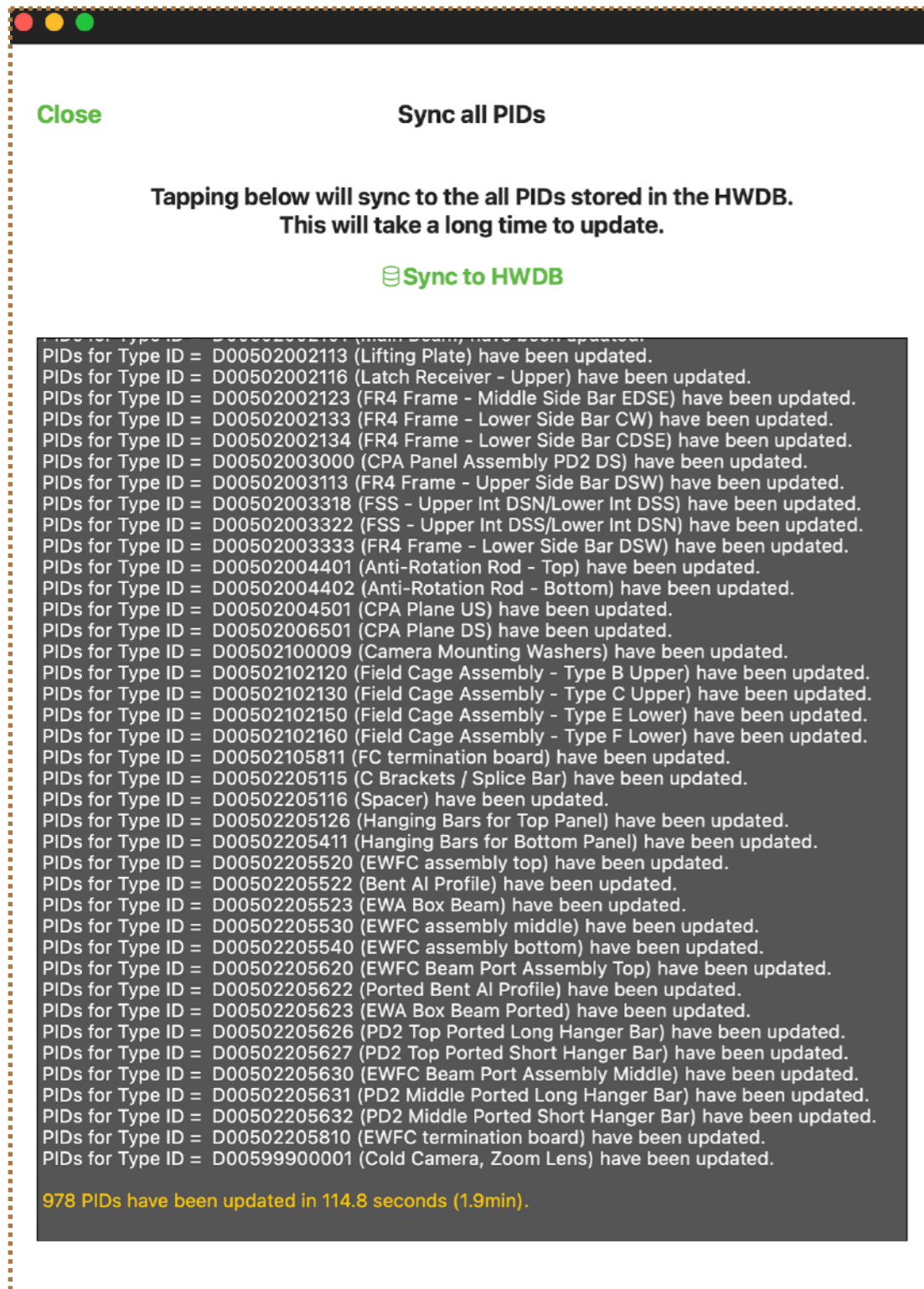
Submitted by Stephen Magill on 2023-02-27 10:14:54

```

        {
          "Alignment Pins L" = 1;
          "Alignment Pins M" = 1;
          "Alignment Pins U" = 1;
          "Bot HV Bus jumpers Front" = 1;
          "Bot HV Bus jumpers Rear" = 1;
          "Bot anti-rot rod" = 1;
          "JBot CONBot" = 1;
          "JBot CONTop" = 1;
          "JTop CONBot" = 1;
          "JTop CONTop" = 1;
          "PP GAPBot" = 8;
          "PP GAPMid" = 8;
          "PP GAPTop" = 8;
          "Sur VISN" = 1;
        }
      
```

Access to the all TestData histories.

PID Display : Sync-all page



- Instead of updating these Lists on each pages, we now have a page where one can update all at once.
- It takes **SOME TIME** to sync them all.
- Of course, it depends on the amount of the contents the DB currently holds.
- For now, it takes only ~2mins.

DUNE FD1-HD TPC HVS

Production, Installation, Quality Control

Name: hajime

Enter default email recipients for checklist data, one per line:

hmuramat@umn.edu

United States / University of Minnesota Twin Cities

Shipment Tracker

DUNE

ProtoDUNE II

PID Display

Excel sheet uploader

Logout

Release Notes (v3.53)

Expiration date of your certification : Jun 18 08:38:14 2025 GMT

Launch the Shipment Tracker!
See the following few pages.

Shipment Tracker

- Provides a UI to deal with Location info of components in the HWDB.
 - ▶ Easily to view a location history of an Item.
 - ▶ Provides info of sub-components, if there is any.
 - ▶ Let you enter a new location.
 - ▶ Can attach a picture associated with a particular location.
 - ▶ Let you create a new Item.
 - ▶ Let you create/save/print the corresponding QR-code.
- The ideas:
 - ▶ You pick a particular Component Type to start.
E.g., a Component Type, DUNE CPA shipping crate.
 - ▶ Select an existing or create PID.
E.g., a PID = one of your DUNE CPA shipping crates.
 - ▶ If any, assign its sub-component PIDs.
E.g., PIDs for CPA assembly tools and CPA Panels.

Shipment Tracker : List of Types

- Start by selecting a Component Type (e.g., a Type for shipping crate).
- Two ways to do this:
 1. Easier/faster : You can select one either by scanning a QR code (see below)
 2. or select from the list (see the next page).

The image shows a sequence of three screenshots from the 'Shipment Tracker' app. The first screenshot shows the main interface with a 'Scan a QR code' button. A red dashed box highlights this button, with an arrow pointing to the second screenshot. The second screenshot is a scanner overlay showing a QR code being scanned. Below the QR code, the text reads 'Mini Resistor Board - T/B Type I' and 'D00502000021-00016'. A red dashed box highlights this text, with an arrow pointing to the third screenshot. The third screenshot shows the main interface again, but now the scanned component type is highlighted in yellow in the list below the 'Scan a QR code' button. The list contains one item: 'Mini Resistor Board - T/B' with ID 'D00502000021-00016'. Below the list is a table with columns 'Remove', 'ComponentType ID', and 'ComponentType Name'. The table contains one row: a trash icon, 'D00599800003', and 'Test Type 003'. A red dashed box highlights the 'Scan a QR code' button and the highlighted component type in the list.

Cancel Shipment Tracker Add a Type ID

Scan a QR code

Tapping it launches a scanner session

Remove	ComponentType ID	ComponentType Name
🗑️	D00599800003	Test Type 003

SCAN

Mini Resistor Board - T/B Type I
D00502000021-00016

Cancel Shipment Tracker Add a Type ID

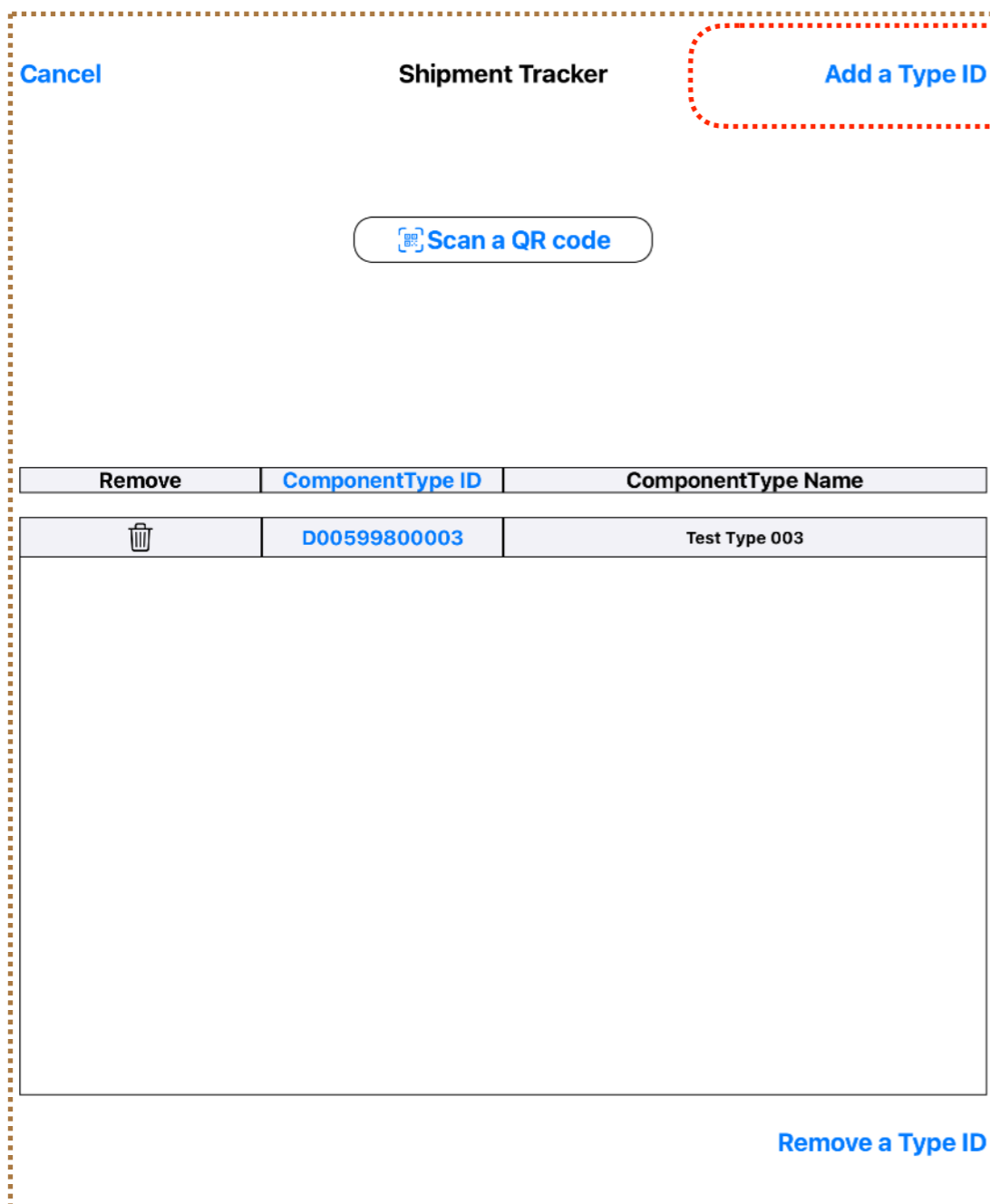
Scan a QR code

Mini Resistor Board - T/B
D00502000021-00016

Remove	ComponentType ID	ComponentType Name
🗑️	D00599800003	Test Type 003

The app recognizes its PID.
Tapping the PID takes you to its location history page (see page 20)

- You could also select a Component Type from the list.
- It shows Types that have been previously selected on your iPad.
- If you don't see what you want, you can **add a new Type**.



Tapping it launches a PID Display session that let's you select a Component Type. (see the next page)

- Selecting a Component Type ID = D00599800007 as an example...

Close Sync all

The last time when synced: June 3, 2024 at 9:37:51 PM
[Sync to HWDB](#)

Show only selected System IDs

System IDs that contain AND System Names that contain

System ID	System Name
000	Invalid
001	FD1-HD Complete Detector
002	FD1-HD Instrumented Anode Plane (with Elec and photon Det.)
003	FD1-HD Anode Plane Assemblies (bare wire planes)
004	FD1-HD Photon Detection System
005	FD1-HD HVS
006	FD1-HD Calibration
021	DAQ
051	FD2-VD Complete Detector
052	FD2-VD Instrumented Top Charge Readout Planes (CRP)
053	FD2-VD Instrumented Bottom Charge Readout Planes (CRP)
054	FD2-VD Instrumented Cathode Plane (inc. PD)
055	FD2-VD Top Charge Readout Planes (CRP)
056	FD2-VD Bottom Charge Readout Planes (CRP)
057	FD2-VD Top Vertical Drift CRP Electronics
058	FD2-VD Photon Detector
059	FD2-VD Calibration

Close Sync all

Selected System ID: 005 Selected System Name: FD1-HD HVS

The last time when synced: June 3, 2024 at 9:37:58 PM
[Sync to HWDB](#)

Show only selected Subsystem IDs

Subsystem IDs that contain AND Subsystem Names that contain

Subsystem ID	Subsystem Name
001	HV Distribution
002	Cold Camera
013	TPC HV Assembly
020	CPA
021	FC
022	EW
023	CPA
997	QAQCTest
998	HWDBUnitTest
999	CPA

Close Sync all

Selected System ID: 005 Selected System Name: FD1-HD HVS

Selected Subsystem ID: 998 Selected Subsystem Name: HWDBUnitTest

The last time when synced: June 3, 2024 at 9:38:05 PM
[Sync to HWDB](#)

Show only selected Component Type IDs

Type IDs that contain AND Type Names that contain

ComponentType ID	ComponentType Name
00001	Test Type 001
00002	Test Type 002
00003	Test Type 003
00004	Test Type 004
00005	Test Type 005
00006	Test Type 006
00007	Test Type 007
00008	Test Type 008
00009	Test Type 009
00010	Test Type 010

- Tapping the Type ID takes you to a list of the corresponding PIDs (see 2 pages later).
- One could add or remove Type IDs from this list.
- This list info is stored on your iPad (see the next page).

Cancel Add a Type ID

Shipment Tracker

[Scan a QR code](#)

Remove	ComponentType ID	ComponentType Name
	D00599800003	Test Type 003
	D00599800007	Test Type 007

Shipment Tracker : List of PIDs

- A list of PIDs for the selected Component Type.
E.g., Type = Shipping Crate, Item = 00001.

Close PID List

Selected Component Type ID D00599800007	Selected Component Name Test Type 007
--	--

+ Add a new PID

PID	Last modified	Latest location	By whom
D00599800007-00001	2024-06-08 09:15:00	University of...a Twin Cities	Hajime Muramatsu

- You can add a new PID (e.g., a new crate).
- Also, the latest locations of each PIDs (crates) are shown.
- Tapping individual PID takes you to its location history page.

Shipment Tracker : History List

- Its history is shown in the order of “Time(CST)”.
- You can add a new LOG or look at the individual entry more in detail.

Close
History List
QR-code

Selected PID D00599800007-00001	Selected Component Name Test Type 007
------------------------------------	--

Sub-component PIDs (Component Type ID : Functional Position)

D00599800002-00164 (Test Type 002 : My Sub Comp 2)

D00599800003-00258 (Test Type 003 : My Sub Comp 1)

+ Create a new LOG

Time (CST)	Location	By whom	Comments
2024-06-08 09:15:00	University of Minnesota Twin...	Hajime Muramatsu	came back to Minnesota
2024-06-08 09:11:00	South Dakota State University	Hajime Muramatsu	at SDSMT, building A, rm 102...
2024-06-07 11:32:00	Fermi National Accelerator La...	Hajime Muramatsu	now at FNAL...
2024-04-18 12:03:58	University of Mississippi	Hajime Muramatsu	
2024-04-17 10:20:58	University of Minnesota Twin...	Hajime Muramatsu	
2024-04-02 01:23:31	University of Minnesota Duluth	Hajime Muramatsu	Start to ship a test material f...

See the next page...

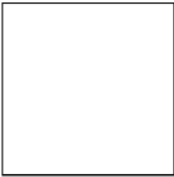
A list of its sub-components is also shown,
if there is any.
E.g., stuff inside of this shipment.

- Looking at a particular history entry of a particular shipment (PID).

[Close](#) **Shipment Info**

Selected PID D00599800007-00001	Selected Component Name Test Type 007
---	---

Comment on this history entry
at SDSMT, building A, rm 102, east side window...etc

Comment: 

Location
South Dakota State University/United States

By whom Hajime Muramatsu	Date/Time in CST Jun 8, 2024 9:11 AM
------------------------------------	--

[✉ Email](#)

- The corresponding stored picture is shown, along with its comments.
No picture was attached to this entry.

- You are not allowed to edit anything here.
- You could send email of this contents though.

- Can enter a new log.

Close **Enter a new LOG**

Selected PID	Selected Component Name
D00599800007-00001	Test Type 007

Comment on this history entry

came back to Minnesota

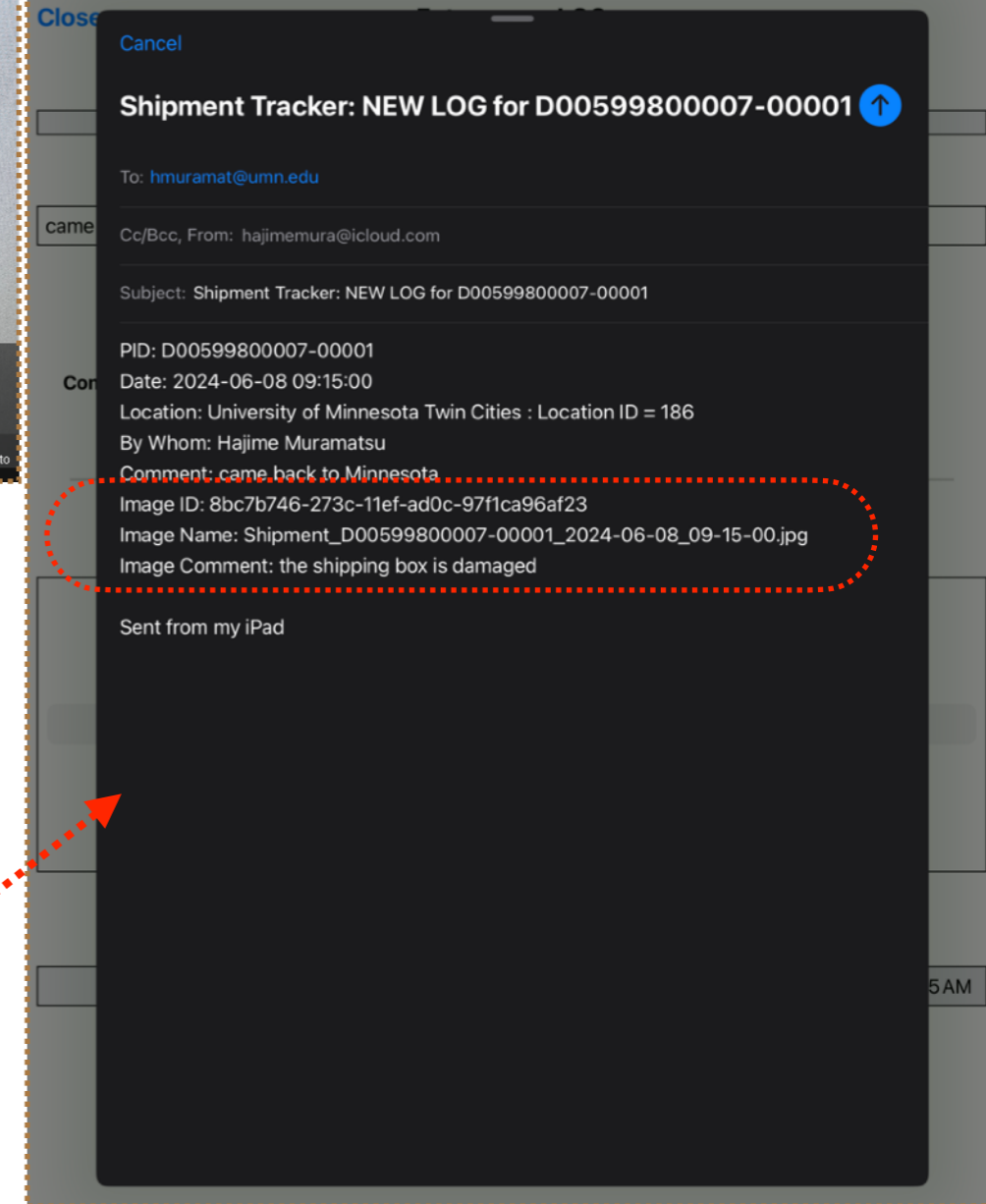
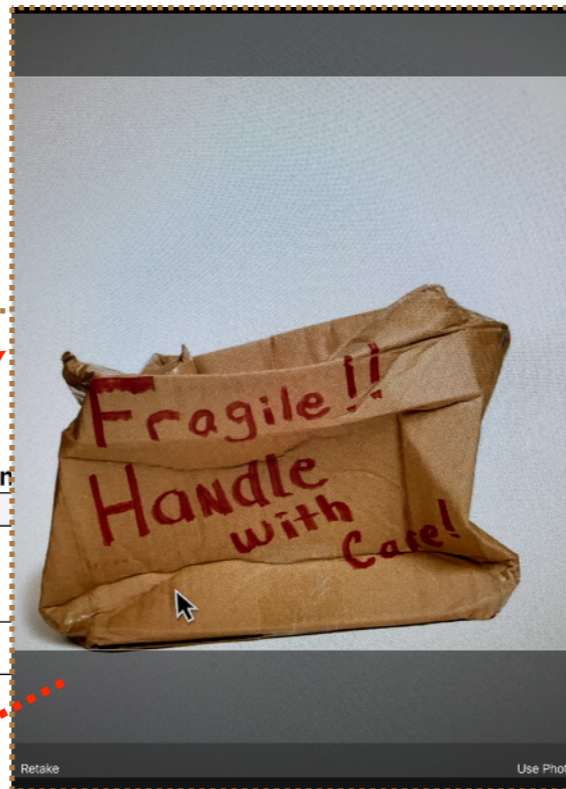
Take a photo

Comment: the shipping box is damaged

Location

- University of Maryland/United States
- University of Medellin/Colombia
- University of Michigan/United States
- University of Minnesota Duluth/United States
- University of Minnesota Twin Cities/United States**
- University of Mississippi/United States
- University of New Mexico/United States
- University of North Dakota/United States
- University of Notre Dame/United States

By whom	Your Local Date/Time	Date/Time in CST
Hajime Muramatsu	Jun 8, 2024 9:15 AM	Jun 8, 2024 9:15 AM



- Could take a picture

- Uploads the contents to the HWDB, along w/ a picture.
- An E-mail message is auto-generated, including the newly assigned "image-id".

Save & Email

- The new LOG we just created is there.

Close History List QR-code

Selected PID: D00599800007-00001 Selected Component Name: Test Type 007

Sub-component PIDs (Component Type ID : Functional Position)

D00599800002-00164 (Test Type 002 : My Sub Comp 2)
 D00599800003-00258 (Test Type 003 : My Sub Comp 1)

+ Create a new LOG

Time (CST)	Location	By whom	Comments
2024-06-08 09:15:00	University of Minnesota Twin...	Hajime Muramatsu	came back to Minnesota
2024-06-08 09:11:00	South Dakota State University	Hajime Muramatsu	at SDSMT, building A, rm 102...
2024-06-07 11:32:00	Fermi National Accelerator La...	Hajime Muramatsu	now at FNAL...
2024-04-18 12:03:58	University of Mississippi	Hajime Muramatsu	
2024-04-17 10:20:58	University of Minnesota Twin...	Hajime Muramatsu	
2024-04-02 01:23:31	University of Minnesota Duluth	Hajime Muramatsu	Start to ship a test material f...

One could generate the corresponding QR-code. See the next page.


We will add a field that shows its Item Specifications to show the contents soon!

Close Shipment Info

Selected PID: D00599800007-00001 Selected Component Name: Test Type 007

Comment on this history entry

came back to Minnesota

Comment: the shipping box is damaged 

Location: University of Minnesota Twin Cities/United States

By whom: Hajime Muramatsu Date/Time in CST: Jun 8, 2024 9:15 AM

Email

Close **Generate a QR-code** **Print QR-code**

Selected PID	Selected Component Name
D00599800007-00001	Test Type 007

Sub-component PIDs (Component Type ID : Functional Position)

D00599800002-00164 (Test Type 002 : My Sub Comp 2)
D00599800003-00258 (Test Type 003 : My Sub Comp 1)

Display the QR-code



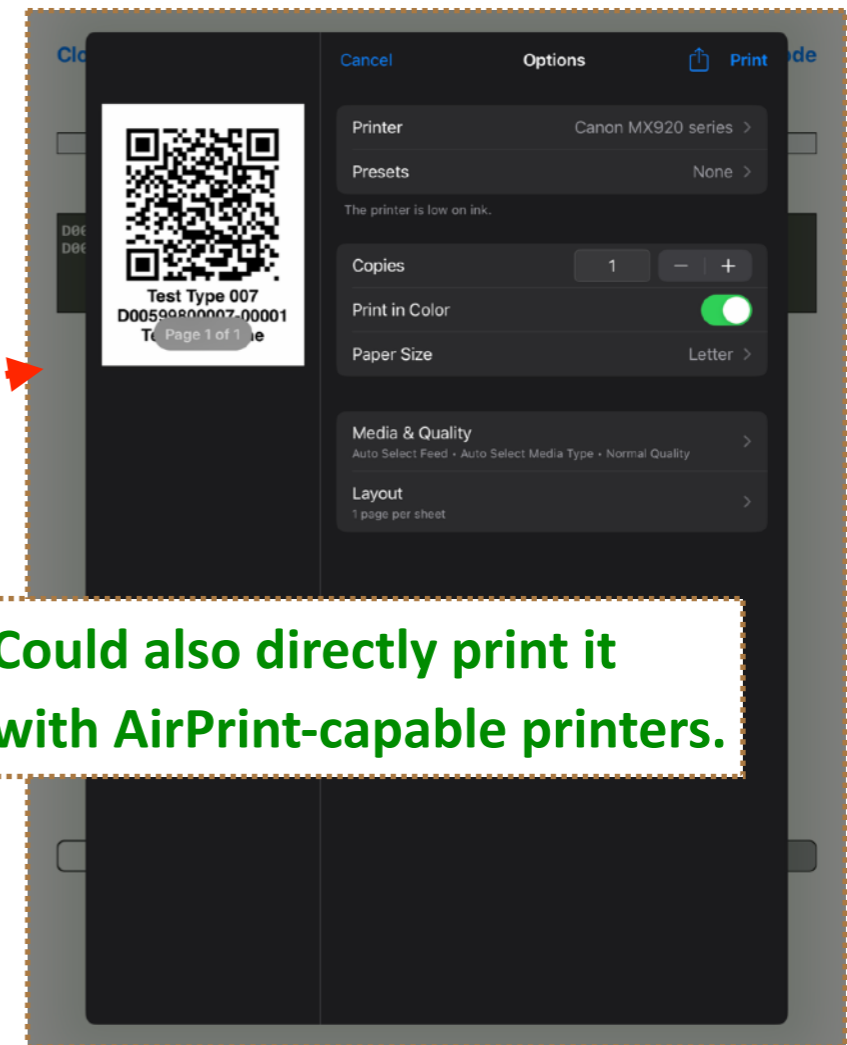
Test Type 007
D00599800007-00001
Test FR4 frame

Additional lines?

Save as: PNG JPG PDF

Where to save?: /Tracker/QRImages/ Photos

Save It!



Could also directly print it with AirPrint-capable printers.

By default, it adds Type Name and PID. One could add extra lines, if wished.

- And you can add a new PID (e.g., a new shipment box).
- You could also assign its sub-components at this time.

[Close](#) **Adding a new PID**

Selected Country/Institution: **United States / University of Minnesota Twin Cities**

Manufacturers:
Hajime Inc

Selected Type ID	Selected Component Name
D00599800007	Test Type 007

2 sub-components are expected.

Func. Pos.	Type ID	Selected PID
My Sub Comp 1	D00599800003	Tap here to select
My Sub Comp 2	D00599800002	Tap here to select

Newly assigned PID

[+ Add this PID](#)

- The app looks up the corresponding Component Type definition.
- If any sub-component Type is defined, it will list it here.
- One can assign sub-component PIDs through "PID Display" session easily.

Once a new PID is generated by the HWDB, the generated PID is displayed here.