

Page#01 Check the test site

Item	Quantity
Received FEMB Tray	1
Good FEMB Tray	1
Bad FEMB Tray	1
WIB Box	1
Shielding Box	1
QR Scanner	1
ESD Gloves	1
Power Supply	1
Adapter Board for HD FEMB	4
ESD Monitor and wrist strap	1
Control PC	1



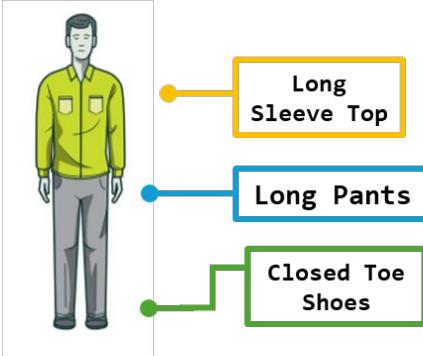
Preparation



Wear ESD glove and **Anti-static Wrist Strap**



Safety First!

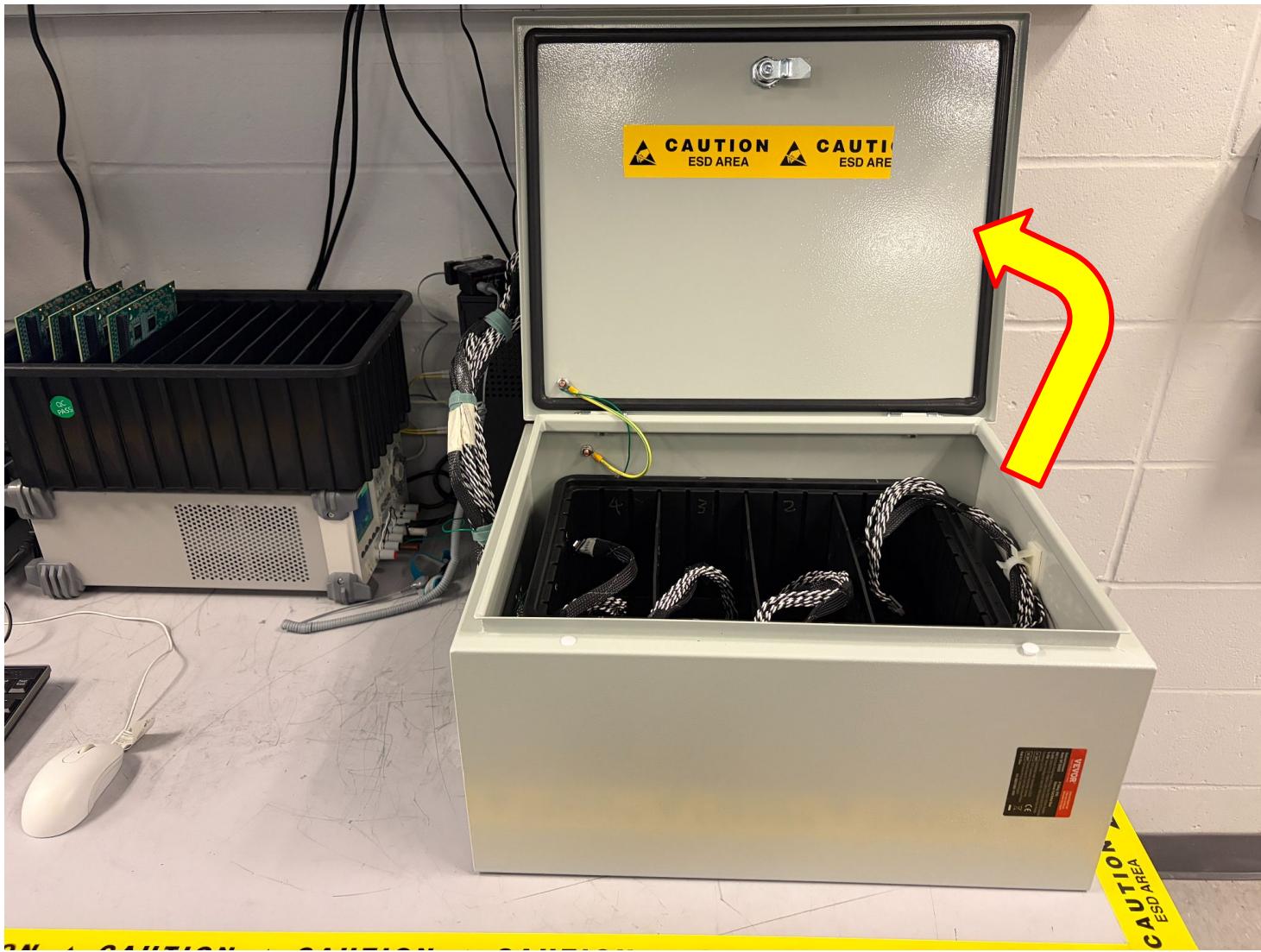


ESD-safe Gloves

Anti-static Wrist Strap



Page#03 Open the Cover of the Shielding Box



Page#04 Install the FEMB into Slot 01

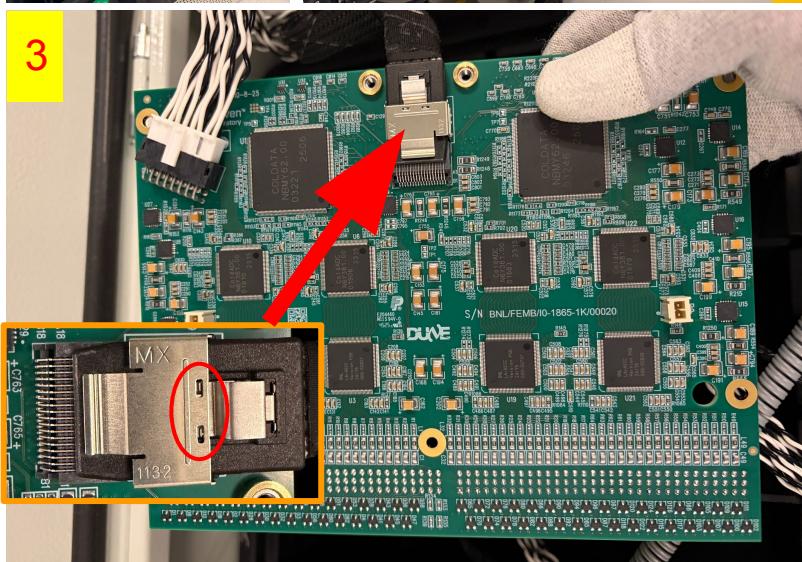
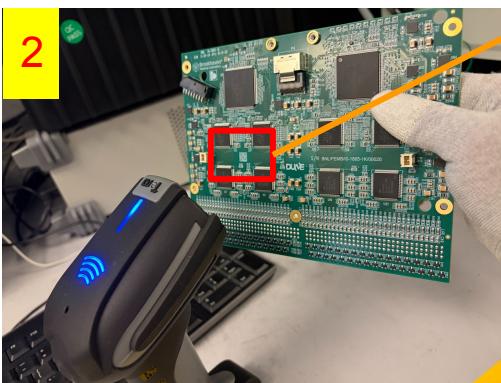
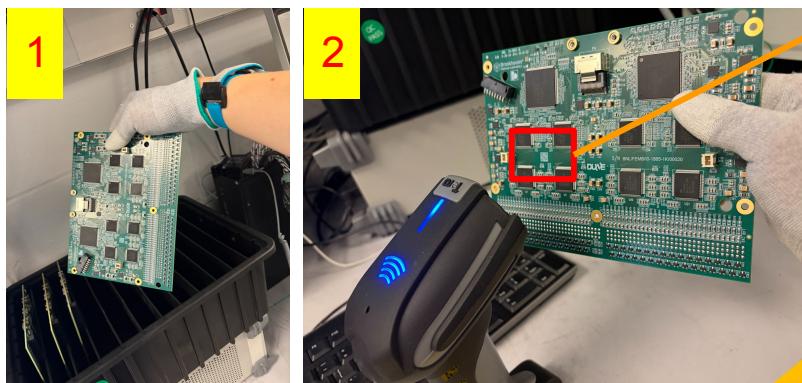
[2/5] Scanning FEMB QR Codes

Step 1: Pick up the board

Step 2: Scan QR ID

Step 3: Insert Power and Data Cable

Step 4: Put the board into test slot 01



FEMB QR CODE SCANNING

Scan the QR code for each FEMB board.
Press Enter to skip empty slots.

Scan FEMB for Slot #1: BNL/FEMB/I0-1865-1K/00020
Scan again to confirm: BNL/FEMB/I0-1865-1K/00020
✓ Slot #1: BNL_FEMB_I0-1865-1K_00020



Page#05 Install the FEMB into Slot 02

Step 1: Pick up the board

Step 2: Scan QR ID

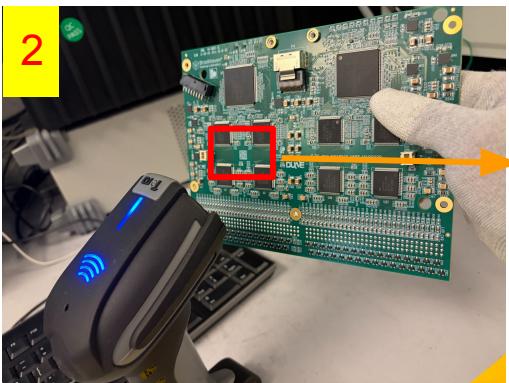
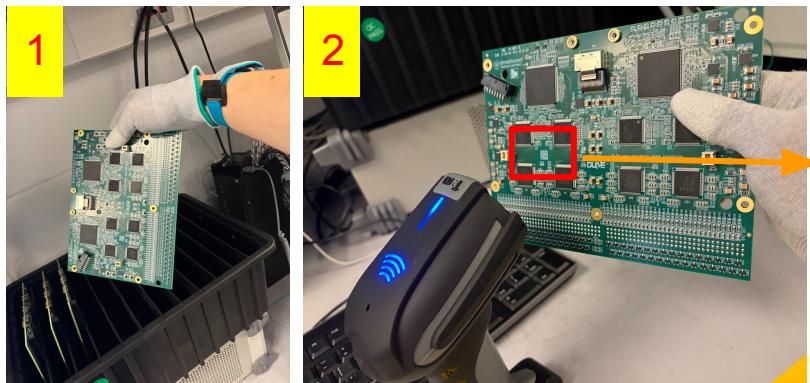
Step 3: Insert Power and Data Cable

Step 4: Put the board into test slot 02

[2/5] Scanning FEMB QR Codes

FEMB QR CODE SCANNING

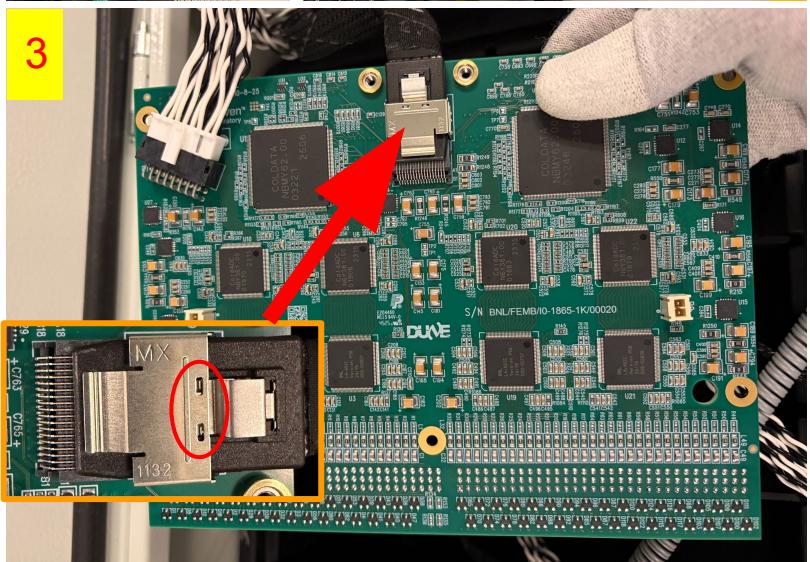
Scan the QR code for each FEMB board.
Press Enter to skip empty slots.



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FEMB QR CODE SCANNING
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Scan FEMB for Slot #1: BNL/FEMB/I0-1865-1K/00020
Scan again to confirm: BNL/FEMB/I0-1865-1K/00020
✓ Slot #1: BNL_FEMB_I0-1865-1K_00020

Scan FEMB for Slot #2: IO-1865-1D 00042
Scan again to confirm: IO-1865-1D 00042
✓ Slot #2: IO-1865-1D 00042
```



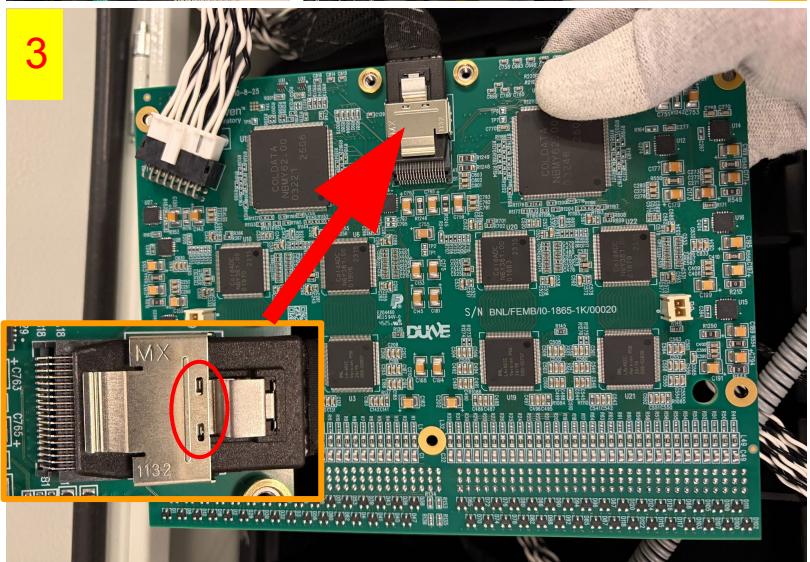
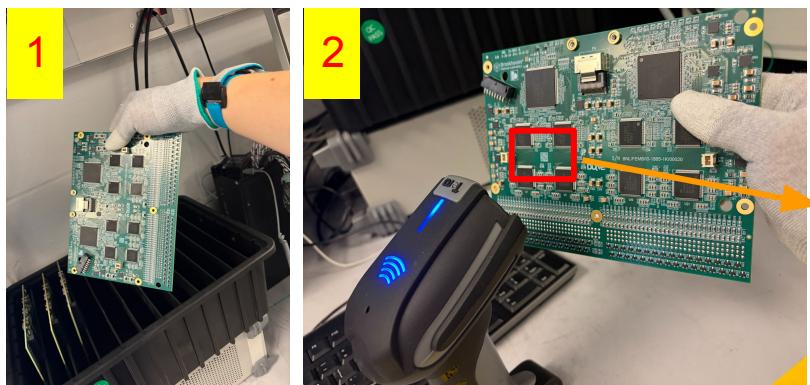
Page#06 Install the FEMB into Slot 03

Step 1: Pick up the board

Step 2: Scan QR ID

Step 3: Insert Power and Data Cable

Step 4: Put the board into test slot 03



FEMB QR CODE SCANNING

Scan the QR code for each FEMB board.
Press Enter to skip empty slots.

```
Scan FEMB for Slot #1: BNL/FEMB/I0-1865-1K/00020
Scan again to confirm: BNL/FEMB/I0-1865-1K/00020
✓ Slot #1: BNL_FEMB_I0-1865-1K_00020
Scan FEMB for Slot #2: I0-1865-1D 00042
Scan again to confirm: I0-1865-1D 00042
< Slot #2: I0_1865_1D_00042
Scan FEMB for Slot #3: BNL/FEMB/I0-1865-1G/00063
Scan again to confirm: BNL/FEMB/I0-1865-1G/00063
✓ Slot #3: BNL_FEMB_I0-1865-1G_00063
```



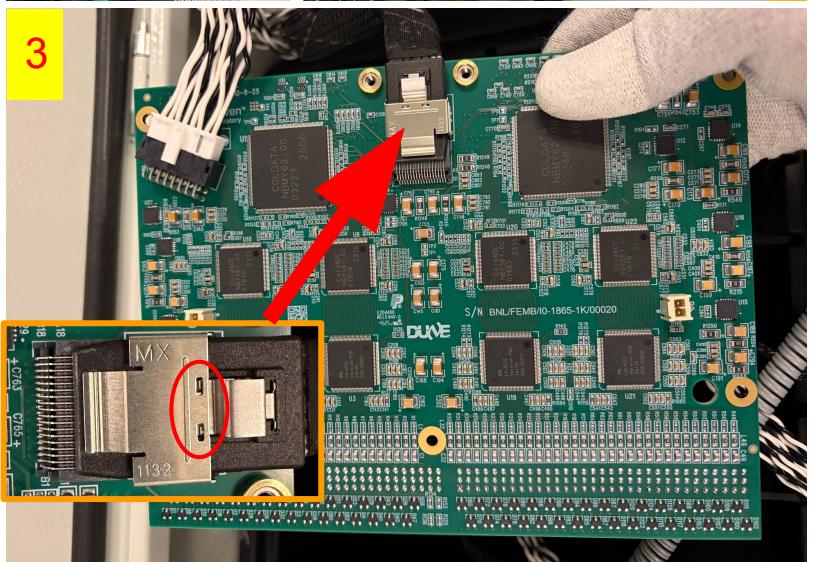
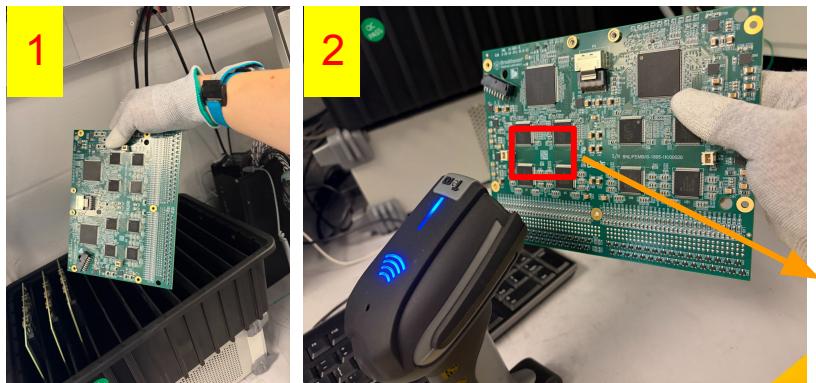
Page#07 Install the FEMB into Slot 04

Step 1: Pick up the board

Step 2: Scan QR ID

Step 3: Insert Power and Data Cable

Step 4: Put the board into test slot 04



FEMB QR CODE SCANNING

Scan the QR code for each FEMB board.
Press Enter to skip empty slots.

```
Scan FEMB for Slot #1: BNL/FEMB/I0-1865-1K/00020
Scan again to confirm: BNL/FEMB/I0-1865-1K/00020
✓ Slot #1: BNL_FEMB_I0-1865-1K_00020
Scan FEMB for Slot #2: I0-1865-1D 00042
Scan again to confirm: I0-1865-1D 00042
✓ Slot #2: I0-1865-1D 00042
Scan FEMB for Slot #3: BNL/FEMB/I0-1865-1G/00063
Scan again to confirm: BNL/FEMB/I0-1865-1G/00063
✓ Slot #3: BNL_FEMB_I0-1865-1G_00063
Scan FEMB for Slot #4: BNL/FEMB/I0-1865-1K/00023
Scan again to confirm: BNL/FEMB/I0-1865-1K/00023
✓ Slot #4: BNL_FEMB_I0-1865-1K_00023
```



Page#08 Review Information and Continue the test

Step 1: Review the information

Step 2: Close the Cover



Page#09 Review Result and Open Cover

Step 1: Review the Result

Step 2: Open the Cover



Page#10 Disconnect board at slot 1

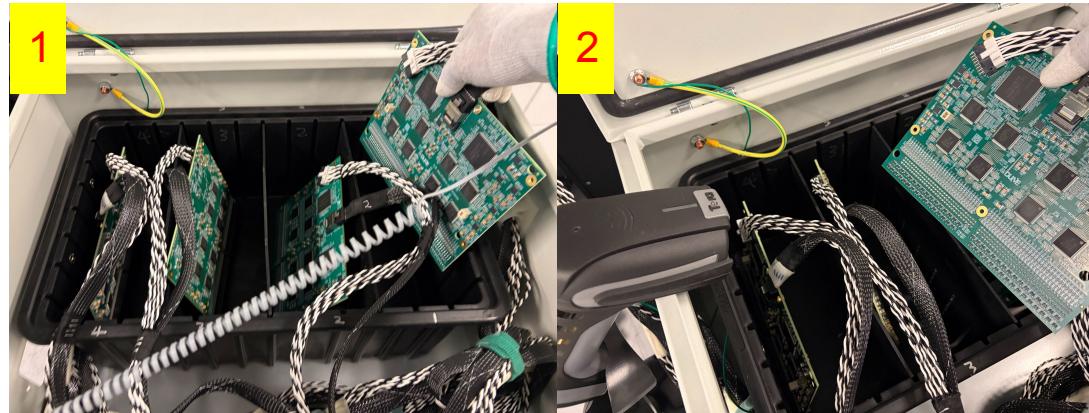
Step 1: Pick up the board at slot 1

Step 2: Scan QR ID and read result

Step 3: Remove Board

Good Board: put into **PASS** tray

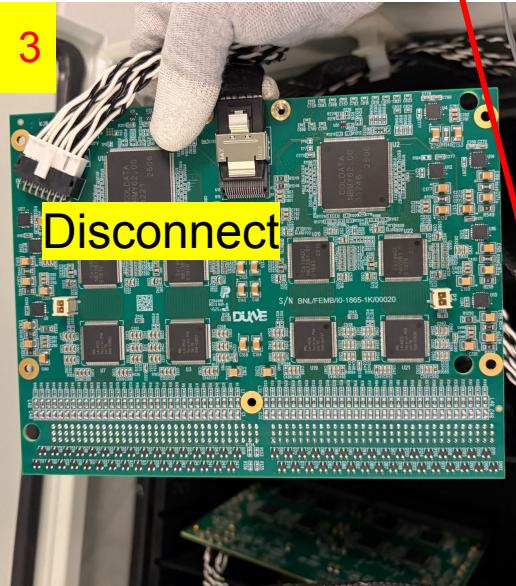
Bad Board : put into **FAIL** tray



BOARD REMOVAL PROCESS

Remove boards one by one. Scan QR code to confirm each board.
PASS -> GOOD tray | FAIL -> BAD tray

Slot #1

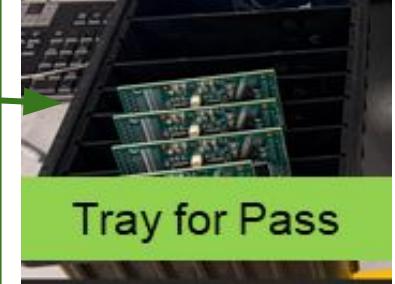


3
Disconnect

FEMB ID on record: BNL_FEMB_I0-1865-1K_00020
Test Result: ✓ PASS

Scan FEMB QR code to confirm: BNL/FEMB/I0-1865-1K/00020
✓ ID matched: BNL_FEMB_I0-1865-1K_00020

>>> Remove FEMB and place in GOOD tray <<<
Press Enter after FEMB is removed and placed in tray...



FEMB ID on record: I0-1865-1D 00042
Test Result: ✗ FAIL

Scan FEMB QR code to confirm: I0-1865-1D 00042
✓ ID matched: I0-1865-1D 00042

>>> Remove FEMB and place in BAD tray <<<
Press Enter after FEMB is removed and placed in tray...



Page#11 Disconnect board at slot 2

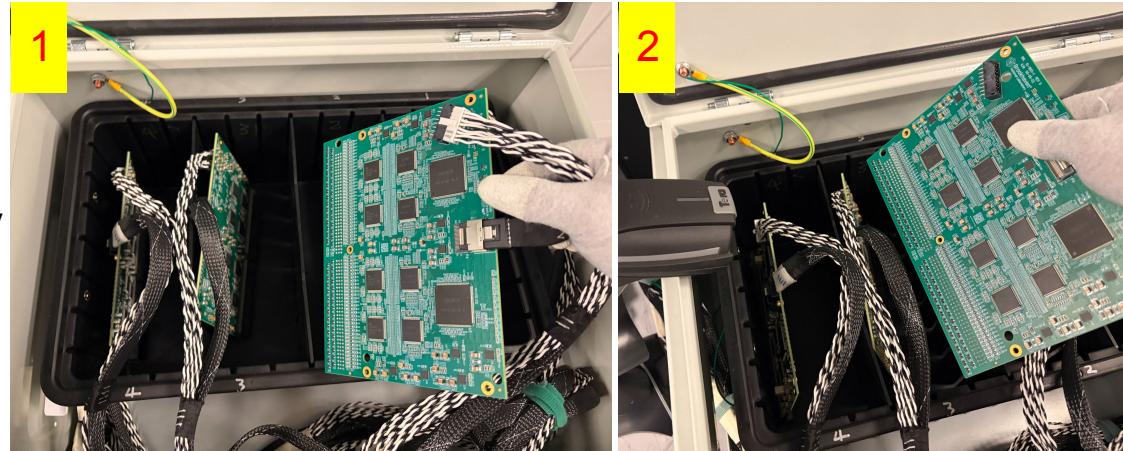
Step 1: Pick up the board at slot 2

Step 2: Scan QR ID and read result

Step 3: Remove Board

Good Board: put into **PASS** tray

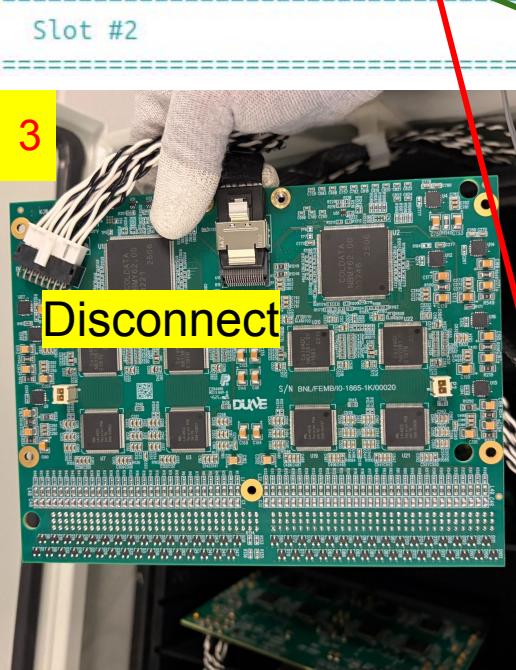
Bad Board : put into **FAIL** tray



BOARD REMOVAL PROCESS

Remove boards one by one. Scan QR code to confirm each board.
PASS -> GOOD tray | FAIL -> BAD tray

Slot #2



FEMB ID on record: BNL_FEMB_I0-1865-1K_00020
Test Result: ✓ PASS

Scan FEMB QR code to confirm: BNL/FEMB/I0-1865-1K/00020
✓ ID matched: BNL_FEMB_I0-1865-1K_00020

->>> Remove FEMB and place in GOOD tray <<<
Press Enter after FEMB is removed and placed in tray...



FEMB ID on record: I0-1865-1D 00042
Test Result: ✗ FAIL

Scan FEMB QR code to confirm: I0-1865-1D 00042
✓ ID matched: I0-1865-1D 00042

->>> Remove FEMB and place in BAD tray <<<
Press Enter after FEMB is removed and placed in tray...



Page#12 Disconnect board at slot 3

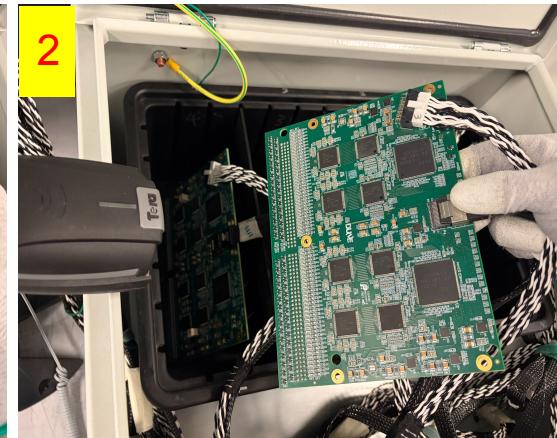
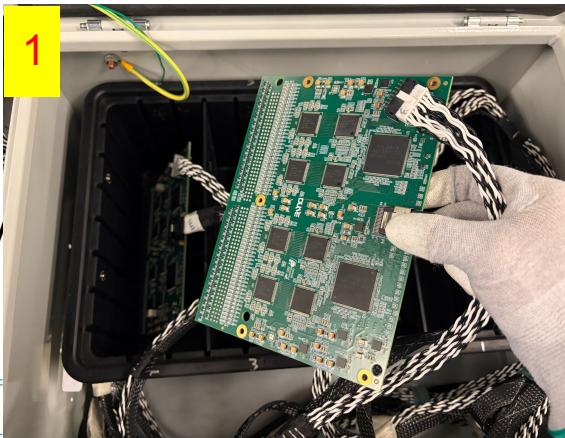
Step 1: Pick up the board at slot 3

Step 2: Scan QR ID and read result

Step 3: Remove Board

Good Board: put into **PASS** tray

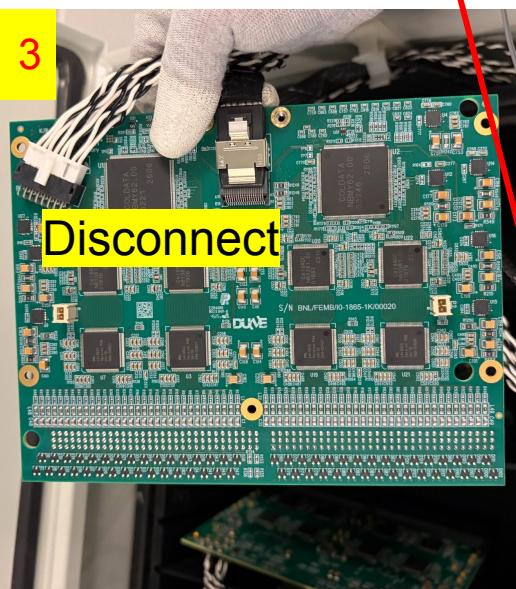
Bad Board : put into **FAIL** tray



BOARD REMOVAL PROCESS

Remove boards one by one. Scan QR code to confirm each board.
PASS -> GOOD tray | FAIL -> BAD tray

Slot #3



3

Disconnect

FEMB ID on record: BNL_FEMB_I0-1865-1K_00020
Test Result: ✓ PASS

Scan FEMB QR code to confirm: BNL/FEMB/I0-1865-1K/00020
✓ ID matched: BNL_FEMB_I0-1865-1K_00020

>>> Remove FEMB and place in GOOD tray <<<
Press Enter after FEMB is removed and placed in tray...



FEMB ID on record: I0-1865-1D 00042
Test Result: ✗ FAIL

Scan FEMB QR code to confirm: I0-1865-1D 00042
✓ ID matched: I0-1865-1D 00042

>>> Remove FEMB and place in BAD tray <<<
Press Enter after FEMB is removed and placed in tray...



Page#13 Disconnect board at slot 4

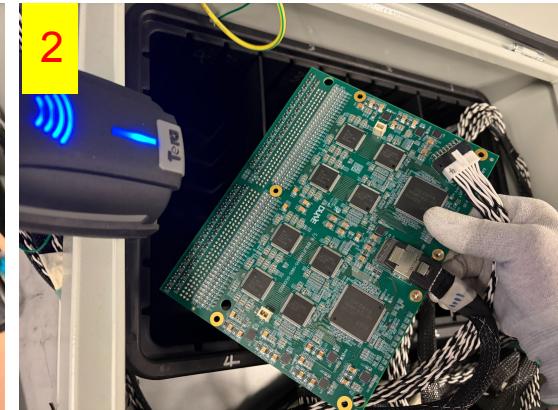
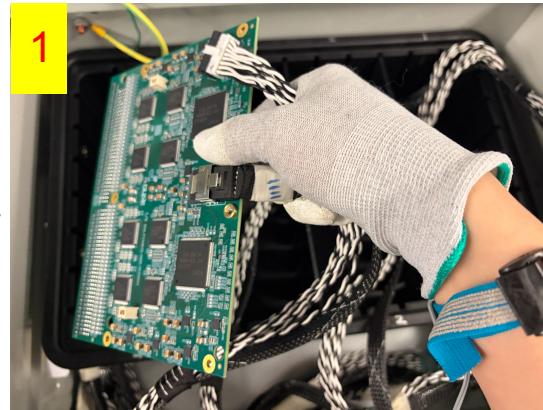
Step 1: Pick up the board at slot 4

Step 2: Scan QR ID and read result

Step 3: Remove Board

Good Board: put into **PASS** tray

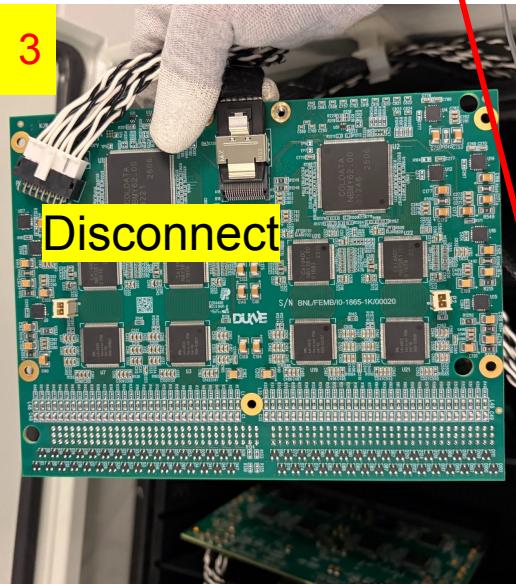
Bad Board : put into **FAIL** tray



BOARD REMOVAL PROCESS

Remove boards one by one. Scan QR code to confirm each board.
PASS -> GOOD tray | FAIL -> BAD tray

Slot #4



3

FEMB ID on record: BNL_FEMB_I0-1865-1K_00020
Test Result: ✓ PASS

Scan FEMB QR code to confirm: BNL/FEMB/I0-1865-1K/00020
✓ ID matched: BNL_FEMB_I0-1865-1K_00020

>>> Remove FEMB and place in GOOD tray <<<
Press Enter after FEMB is removed and placed in tray...



FEMB ID on record: I0-1865-1D 00042
Test Result: ✗ FAIL

Scan FEMB QR code to confirm: I0-1865-1D 00042
✓ ID matched: I0-1865-1D 00042

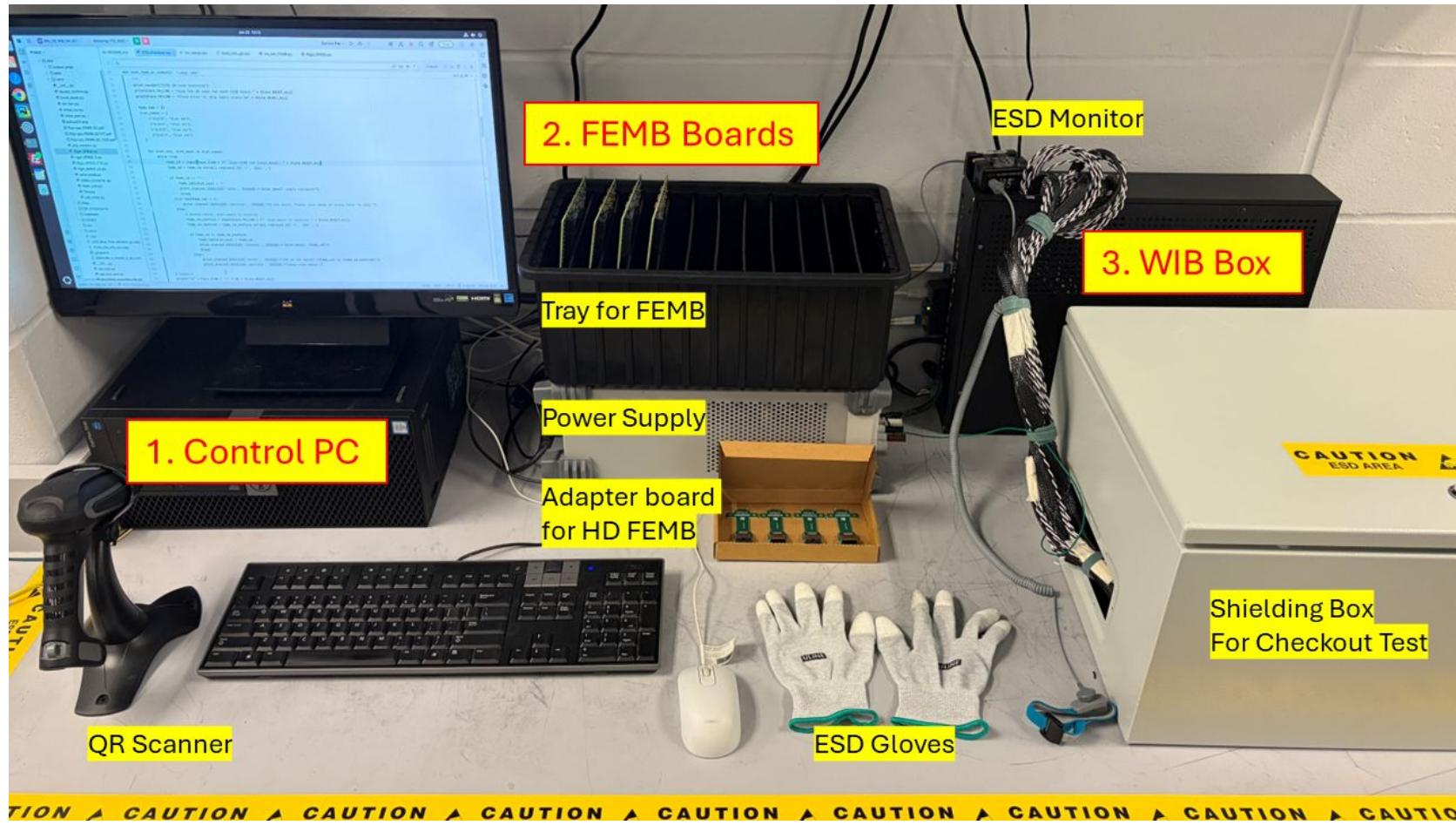
>>> Remove FEMB and place in BAD tray <<<
Press Enter after FEMB is removed and placed in tray...



Page#14 Clean the Test site

Step 1: Clean the test site

Step 2: Prepare for next test cycle



Page#08 Review Information and Continue the test

Step 1: Review the information

Step 2: Close the Cover

Step 3: Enter 'y' to Continue the Test

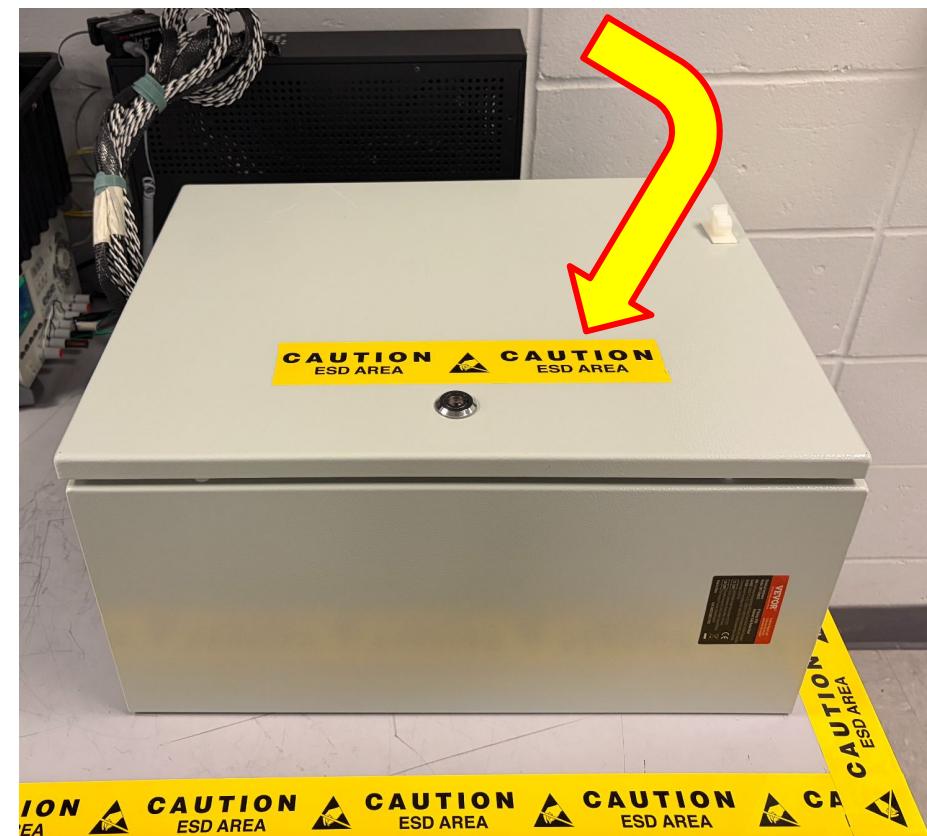
```
FEMB Assignment Summary:  
Slot #1: BNL_FEMB_I0-1865-1K_00020  
Slot #2: IO-1865-1D 00042  
Slot #3: BNL_FEMB_I0-1865-1G_00063  
Slot #4: BNL_FEMB_I0-1865-1K_00023
```

```
Total FEMBs installed: 4  
[3/5] Configuration Review
```

Please review the configuration:

```
Tester: lke  
Email: lke@bnl.gov  
SLOT0: BNL_FEMB_I0-1865-1K_00020  
SLOT1: IO-1865-1D 00042  
SLOT2: BNL_FEMB_I0-1865-1G_00063  
SLOT3: BNL_FEMB_I0-1865-1K_00023
```

```
Proceed with checkout test? (y/n): y  
{'tester': 'lke', 'SLOT0': 'BNL_FEMB_I0-1865-1K_00020', 'SLOT1': 'IO-1865-1D', 'test_site': 'BNL', 'toy_TPC': 'y', 'top_path': '/home/dune/Documents', 'bottom_path': '/home/dune/Documents/data', 'Rigol_PS_for_WIB': 'True', 'Rigol_PS_ID': 'USB', 'CTS_LN2_Fill_Wait': '1800', 'CTS_Warmup_Wait': '3600', 'Network_Uplink': 'eth0', 'Power_Supply_Controller': 'RIGOL TECHNOLOGIES,DP832,DP8C164453747,00.01.19'}  
[CONFIG] Power supply mode: USB  
[USB] USB device reset  
[✓] Power Supply Connected: RIGOL TECHNOLOGIES,DP832,DP8C164453747,00.01.19  
[4/5] Running Checkout Test
```



Page#02 Input Tester Information and Email

[1/5] Tester Information

Enter your name: lke

Email will be used for result notification.

Please enter your email address:

>> lke@bnl.gov

Please enter again to confirm:

>> lke@bnl.gov

✓ Email confirmed!

Page#09 Review Result and Open Cover

Step 1: Review the Result

Step 2: Open the Cover

```
=====
TEST RESULTS SUMMARY
=====

=====

CHECKOUT TEST - TEST RESULTS
=====

FEMB Status by Slot:
    ✓ Slot 1: BNL_FEMB_I0-1865-1K_00020 - PASS
    ✗ Slot 2: IO-1865-1D 00042 - FAIL
    ✓ Slot 3: BNL_FEMB_I0-1865-1G_00063 - PASS
    ✓ Slot 4: BNL_FEMB_I0-1865-1K_00023 - PASS

=====

Example
XXX OVERALL RESULT: FAIL XXX

Failed FEMBs:
    • Slot 2: IO-1865-1D 00042

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SENDING EMAIL NOTIFICATION
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Please Check Email!
✓ Email sent to: lke@bnl.gov
```

