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DisplayPort 1.4 via VCK190 VMK180 Zcu102

Course Agenda

2022.2

測試流程參考文件

DisplayPort 1.4 RX Subsystem Product Guide (PG300)

VCK190 Evaluation Board User Guide (UG1366)

ZCU102 Evaluation Board User Guide

VMK180 Evaluation Board User Guide (UG1411)

VCK190/VMK180 - What board should I select in Vivado - with or without the new SD level shifter?

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VCK190

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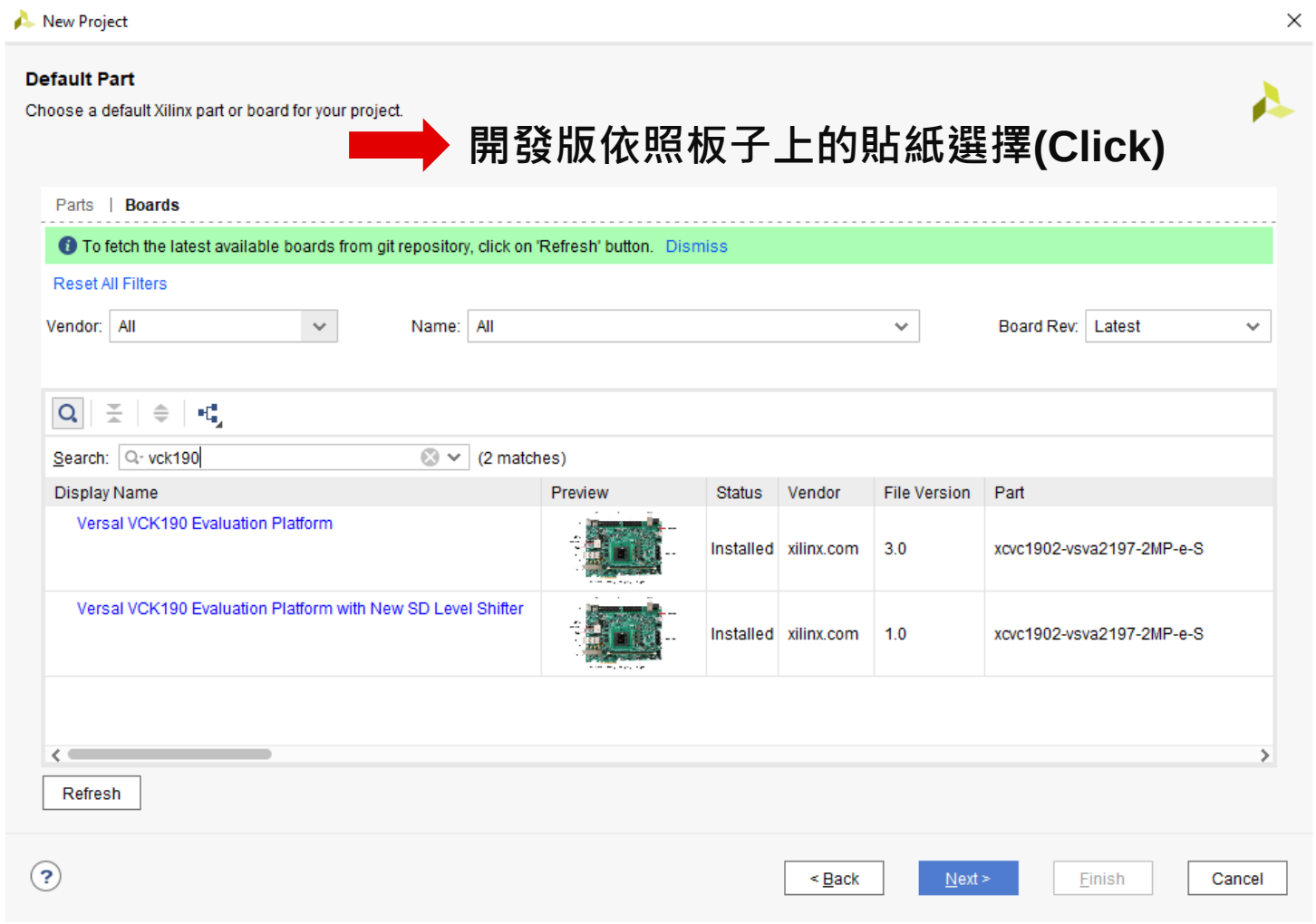

SOLUTION

On the board, there is a sticker that has a number starting with 043. All 043-05005-01-**101**-xxxx (VCK190) and 043-05005-02-**101**-xxxx (VMK180) and later serials have the latest level shifter.

The 101 variant is the first series of boards to ship with the latest level shifter captured in the BOM/Schematics. Select the "New SD Level Shifter" selection for these newer boards.

Boards prior to those serial numbers and serials that are 4 digits have the old IP4856CX25/CZ. Select the "Versal VCK190 Evaluation Platform" for these boards. If there you have any questions questions please open a case or post your question in the community.

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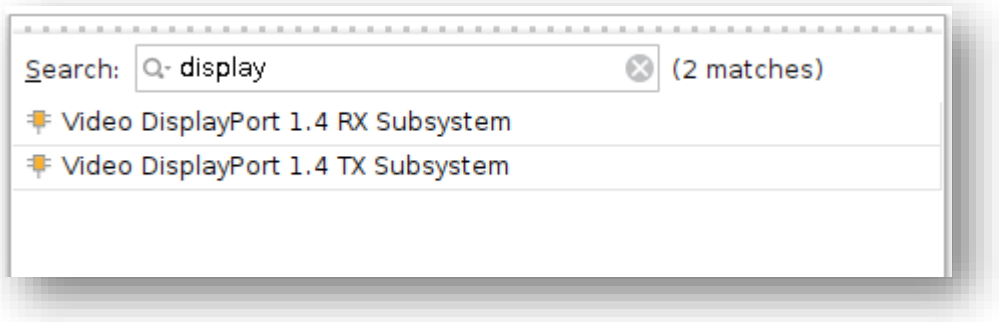
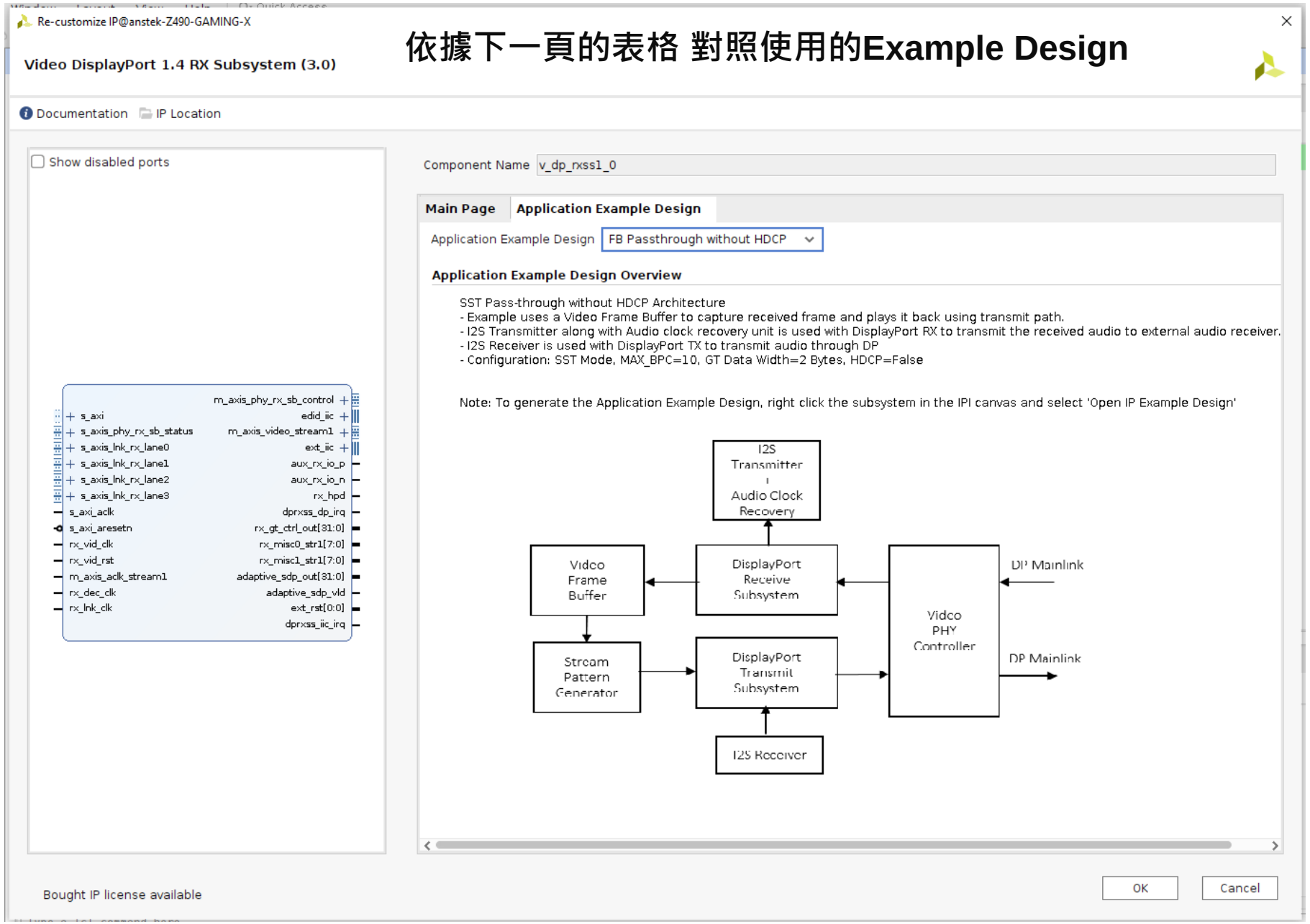
依據開發版以及要進行的測試選擇對應的IP



Right-click **BD** and click **Add IP**. Search for DisplayPort 1.4 and select either the DisplayPort 1.4 Receiver Subsystem IP (for RX only (ZCU102, VCU118), Pass-through (KCU105, ZCU102, and VCK190) designs) or the DisplayPort 1.4 Transmitter Subsystem IP (for TX only (ZCU102, VCU118, and VCK190), or Pass-through (KCU105) designs).

依據下一頁的表格 對照使用的Example Design



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IP Setting確認無誤後就打開Example Design 直接生成bit or image即可(不須其餘操作)

Available Example Designs

The following table shows the example designs available for the TX and RX DisplayPort 1.4 subsystems.

Table: Available Example Designs

GT Type	Topology	Video PHY Config [1]		Hardware	BPC	Processor
		(TXPLL)	(RXPLL)			
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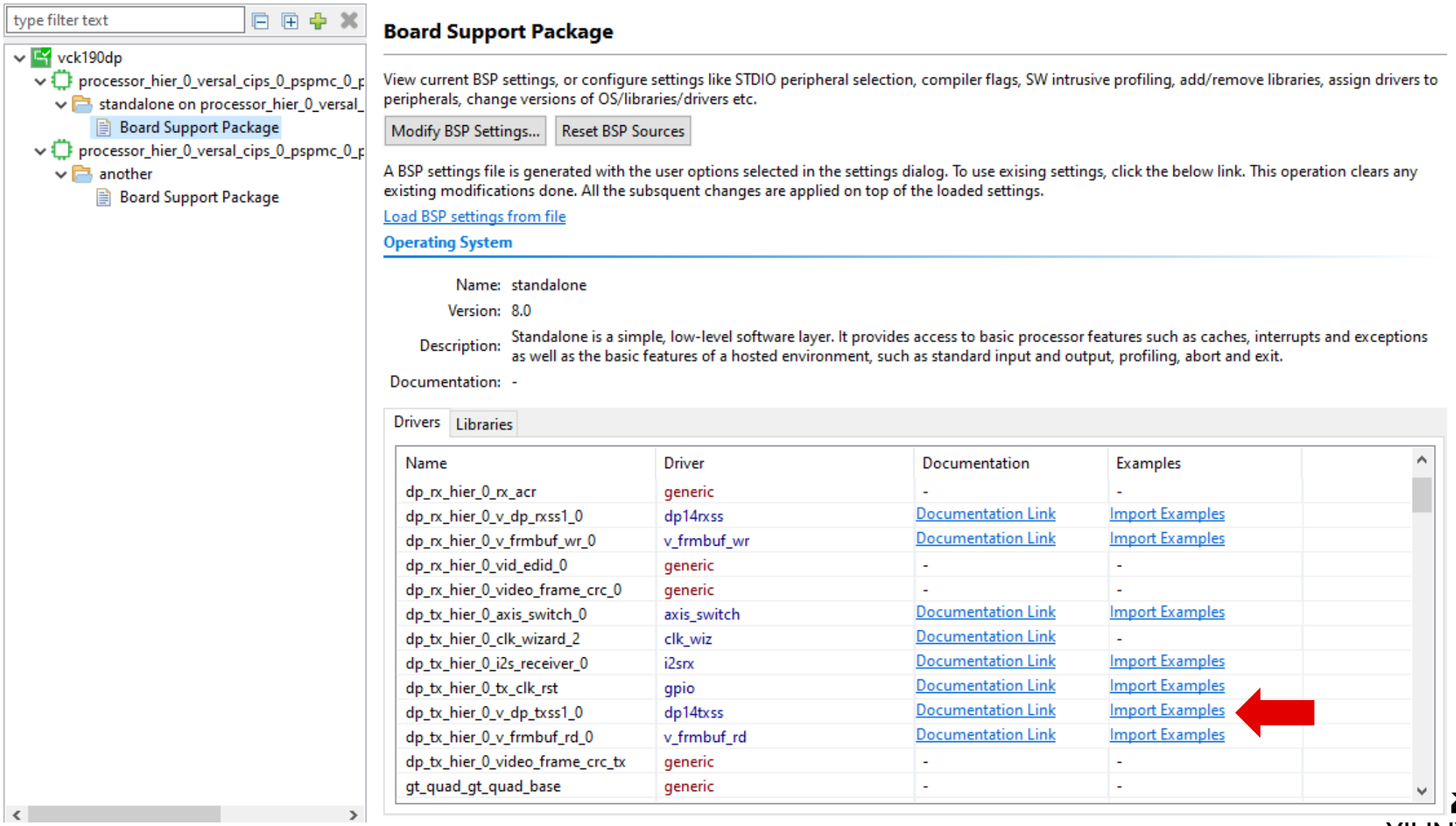
GTHE4	RX only	-	CPLL	ZCU102 + Inrevium TB-FMCH-VFMC-DP	10	A53
	TX only	QPLL	-	ZCU102 + Inrevium TB-FMCH-VFMC-DP	10	A53
	FB Pass-through without HDCP1.3/HDCP2.2/2.3 [2, 3]	QPLL	CPLL	ZCU102 + Inrevium TB-FMCH-VFMC-DP	10	A53
	FB Pass-through with HDCP1.3 and HDCP2.2/2.3 [4]	QPLL	CPLL	ZCU102 + Inrevium TB-FMCH-VFMC-DP	10	A53
	MST FB Pass-through without HDCP1.3 and TX only	QPLL	CPLL	ZCU102+ Inrevium TB-FMCH-VFMC-DP	10	A53
GTYE4	RX only	-	CPLL	VCU118 + Inrevium TB-FMCH-VFMC-DP	10	MicroBlaze
	TX only	QPLL	-	VCU118 + Inrevium TB-FMCH-VFMC-DP	10	MicroBlaze
GTYE5	TX Only	RPLL	-	VCK190 + Inrevium TBFMCH-VFMC-DP	10	A72
	FB Pass-through without HDCP1.3/HDCP2.2/2.3 [2]	RPLL	LCPLL	VCK190 + Inrevium TBFMCH-VFMC-DP	10	A72

Vitis



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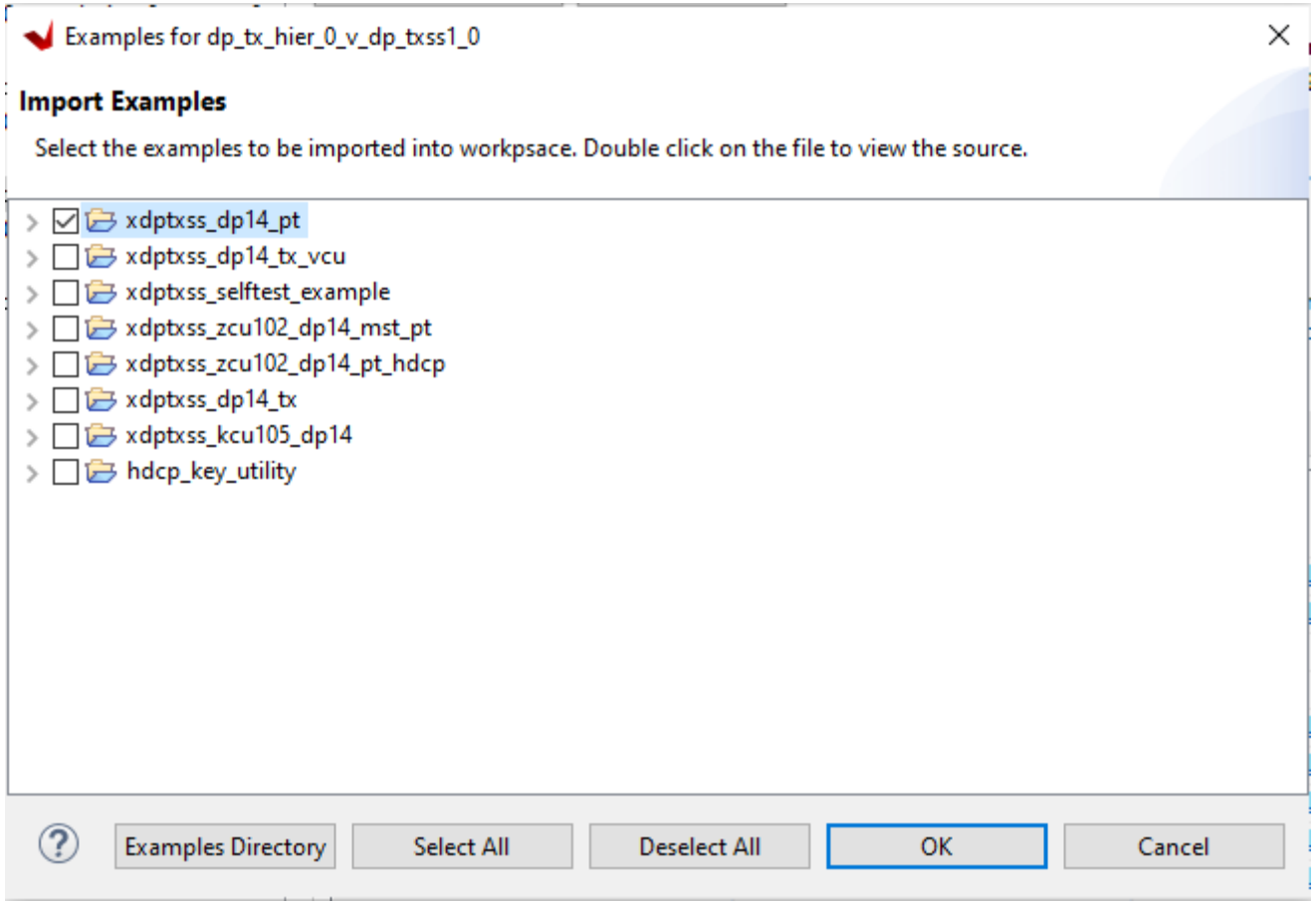
Vitis(也是會分板子跟測試方式 如果是190的pass-through 選擇第一項)



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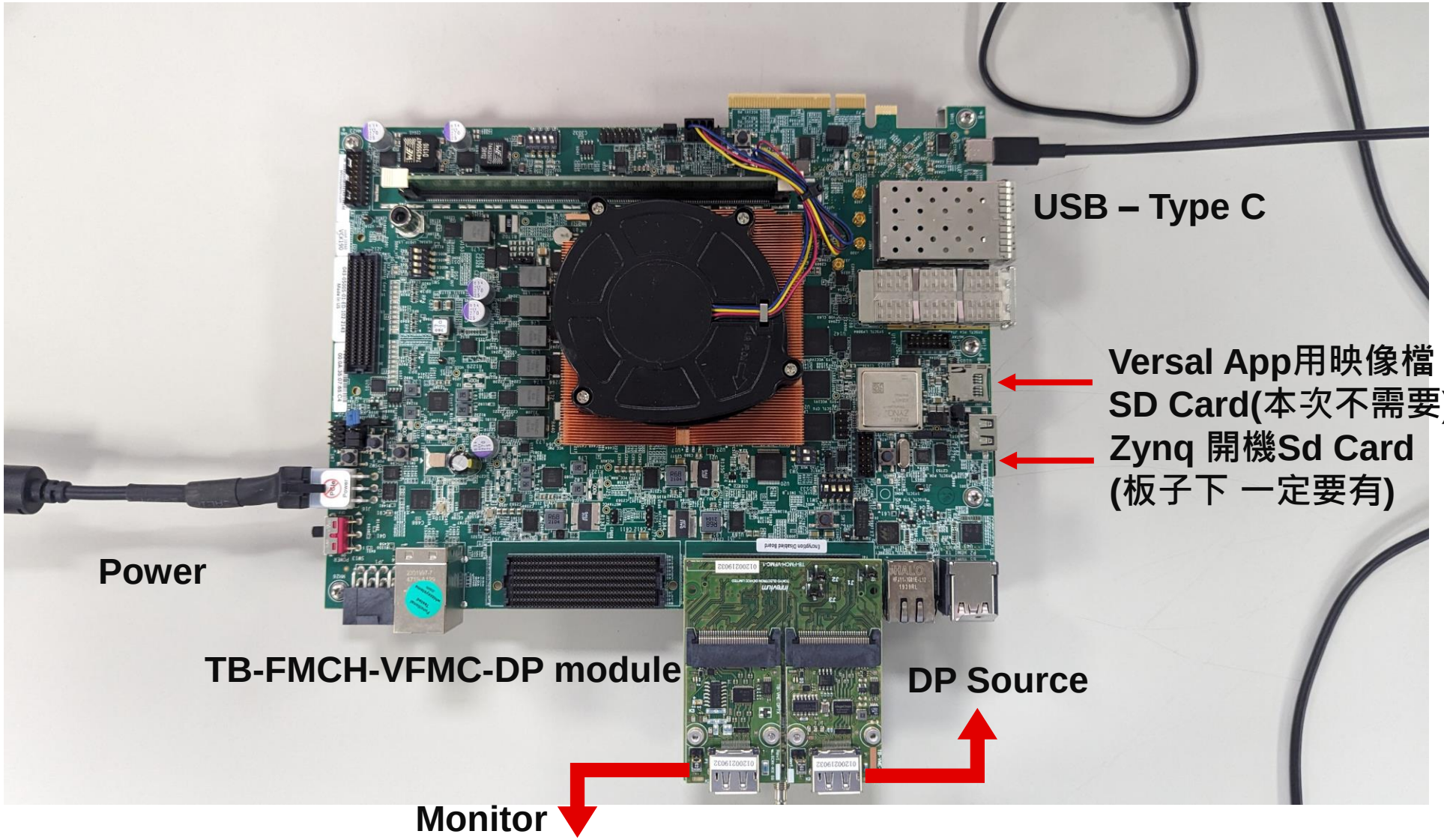
VCK190 Board Setup (生成的同時可以準備設置開發版)



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VCK190 Board Setup (要求有REFCLK 所以要装在2上)

VCK190 Evaluation Board User Guide (UG1366) UG1366 2023-03-17 1.1 English

FMCP1 Connector J51

[Figure 1, callout 20]

The HSPC connector J51 implements a subset of the full FMCP connectivity:

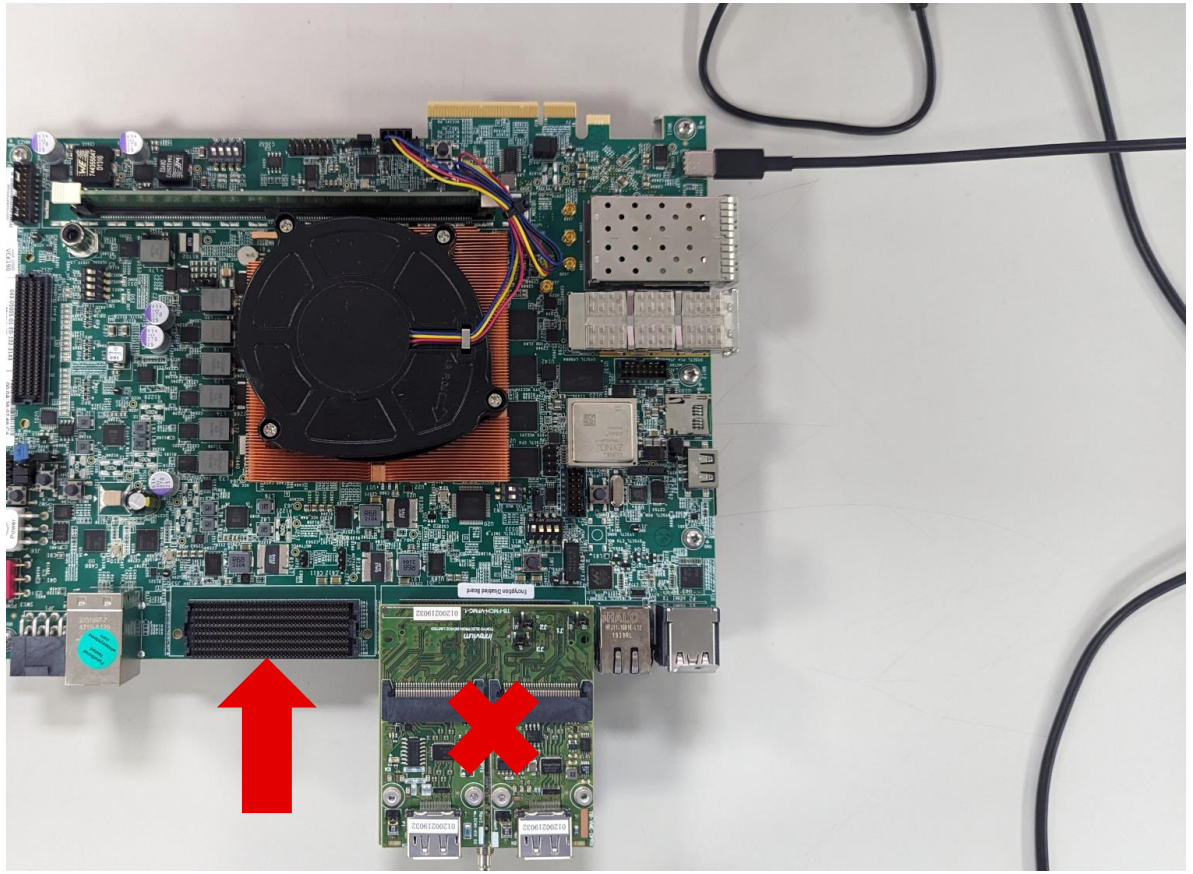
- 68 single-ended or 34 differential user-defined pairs (34 LA pairs: LA[00:33])
- 12 transceiver differential pairs
- 3 transceiver differential clocks
- 2 differential clocks
- 239 ground and 15 power connections

FMCP2 Connector J53

[Figure 1, callout 20]

The HSPC connector J53 implements a subset of the full FMCP connectivity:

- 68 single-ended or 34 differential user-defined pairs (34 LA pairs: LA[00:33])
- 12 transceiver differential pairs
- 3 transceiver differential clocks
- 2 differential clocks
- 1 differential (REFCLK) clock C2M pair
- 1 differential (SYNC) clock C2M pair
- 239 ground and 15 power connections



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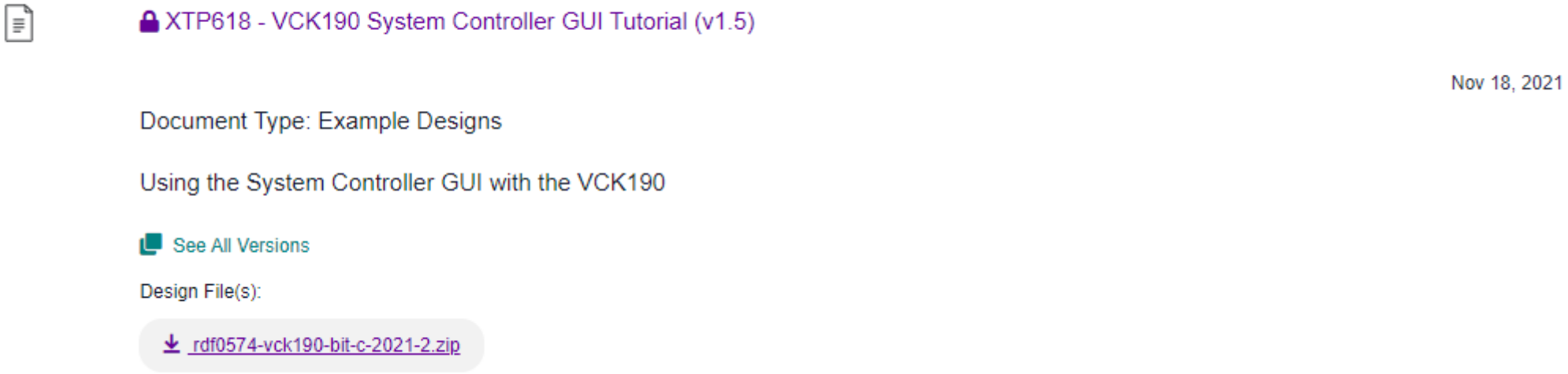
Setting the FMC Voltage to 1.5V

https://www.xilinx.com/products/boards-and-kits/vck190.html#resources

使用System Controller調整電壓



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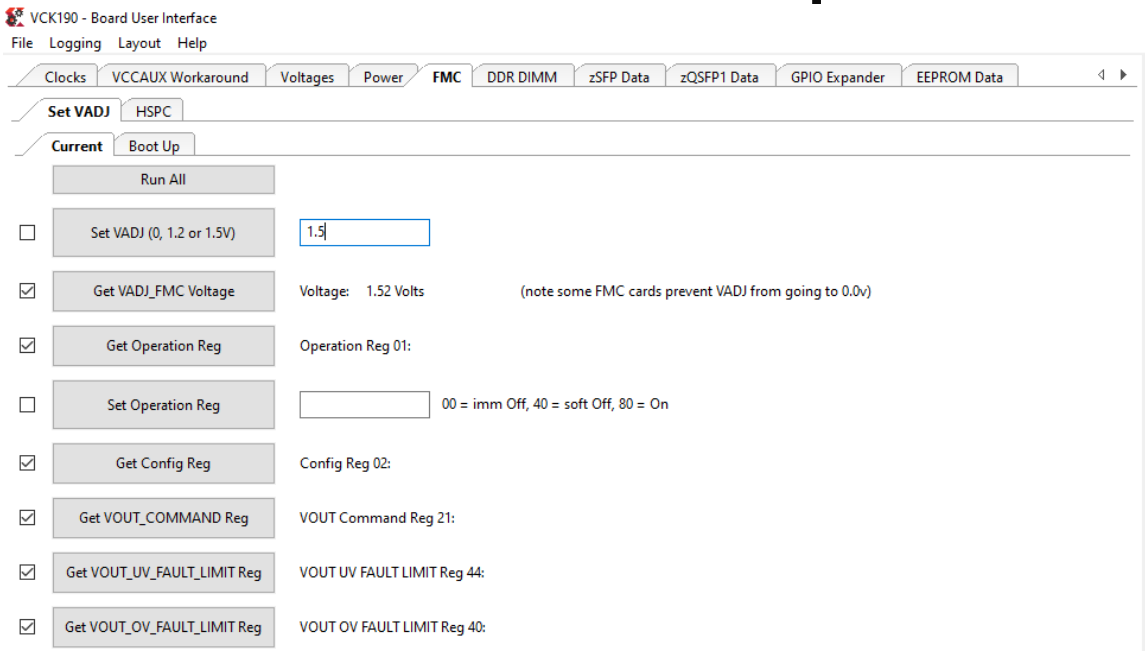
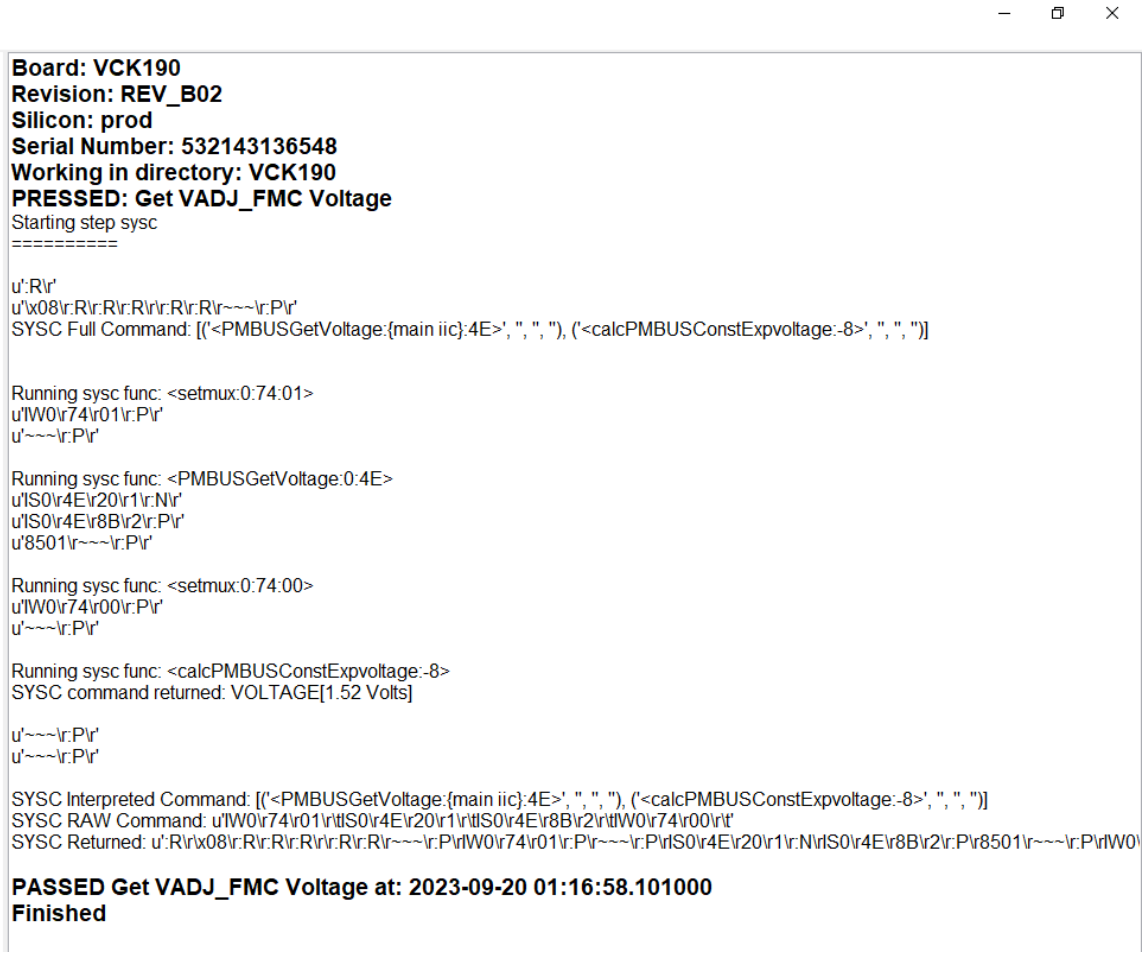
底部切到System controller 上方切到FMC
選擇Set VADJ 讀取當前電壓或更改
若要開機同時更改 到Boot Up來改





燒錄成功 應該就會在螢幕上看到畫面 且UART出現以下畫面

```
************************************************************
PlatformInit
VFMC: Setting IO Expanders...
Platform initialization done.
INFO:DPRXSS is SST enabled. DPRXSS works only in SST mode.
INFO:DPTXSS is SST enabled. DPTXSS works only in SST mode.


************************************************
This system is purely a PassThrough system designed to
display the video that is received on the RX.
The TX is non functional in absence of active RX link
Do not change the Monitor once the application is in run mode
This system can be used for DisplayPort Sink Compliance
************************************************


------------------------------------------------------
--                     Menu                         --
------------------------------------------------------

 Select option
p - Pass-through design
UserInput: p
Reading EDID contents of the DP Monitor..
DP RX enabled for Adaptive Sync

------------------------------------------------------
--           DisplayPort RX-TX Demo Menu            --
------------------------------------------------------

 Select option
 1 = Change Lane and Link capabilities
 2 = Link, MSA and Error Status
 3 = Toggle HPD to ask for Retraining
 4 = Restart TX path
 c = Check SUM on Rx and Tx
 d = Quad selection ONLY FOR 8K --> 4K demo
 w = Sink register write
 r = Sink register read
 n = Clone EDID from Monitor
 m = Display MCDP6000 status
 u - Read from MCDP6000
 o - Write to MCDP6000
 z = Display this menu again
 x = Return to Main menu

------------------------------------------------------
> Rx Training done !!! (BW: 0x1E, Lanes: 0x2, Status: 0x9977;0x0).
*** Resolution: 3840 x 2160 @ 30Hz, BPC = 10, PPC = 2, Color = RGB (0) ***

Training TX with: Link rate 14, Lane 4, BPC 10, (0)
......^^..done !
**
```

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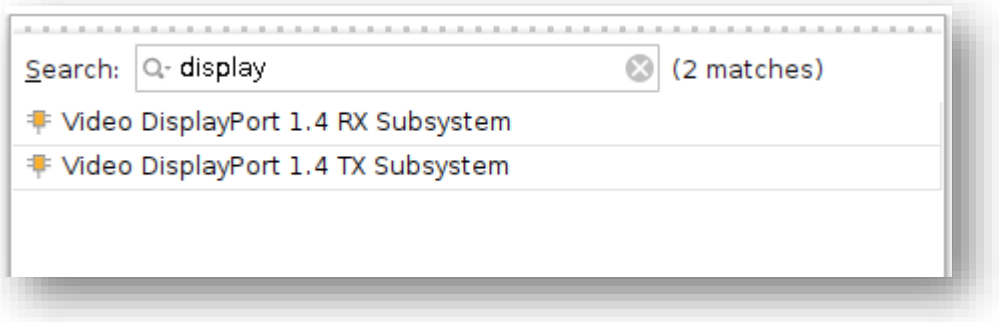

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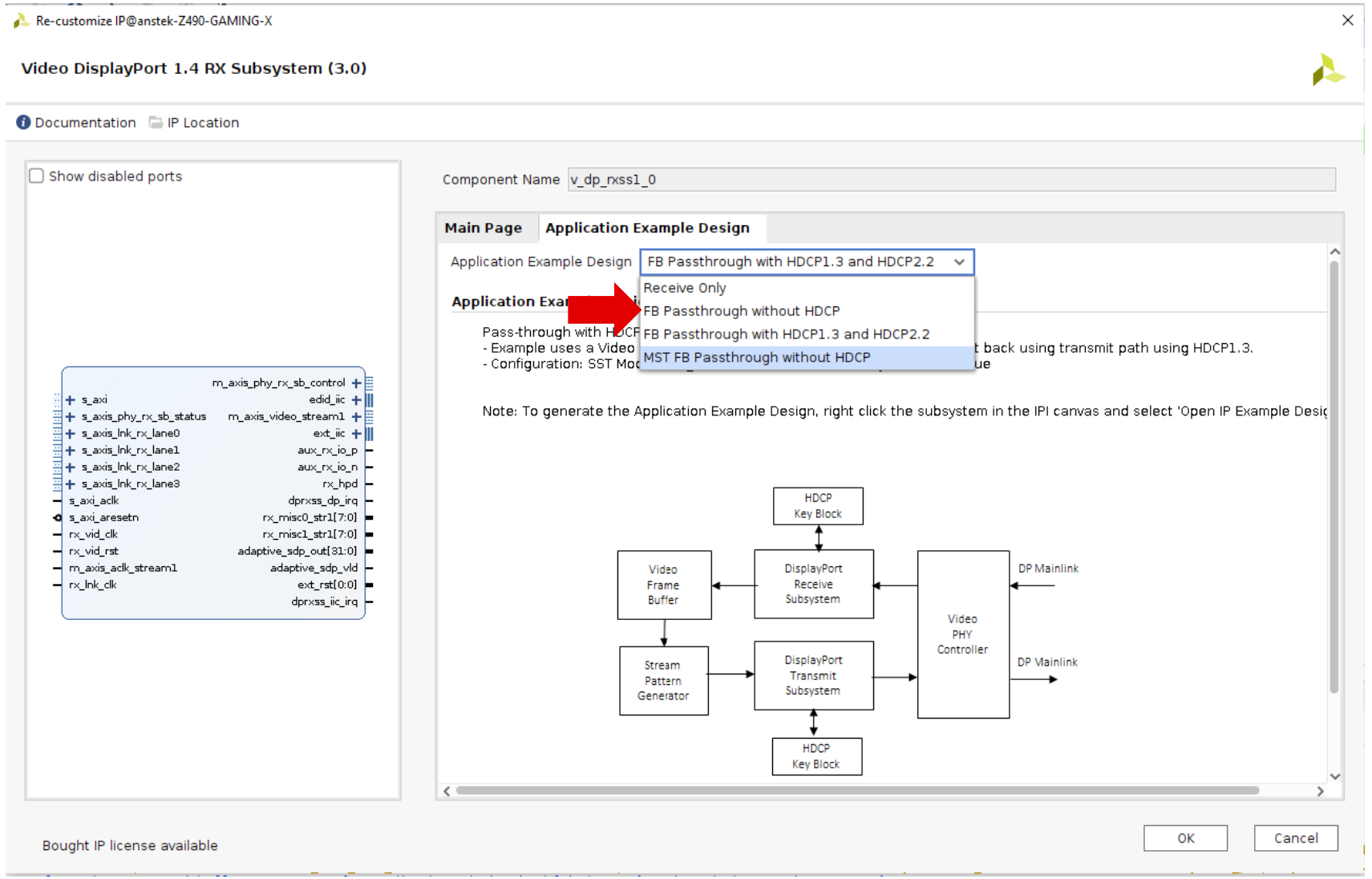
Application Example Design(此次選擇不帶HDCP的Passthrough)



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Board setup

Figure: ZCU102 Board Setup

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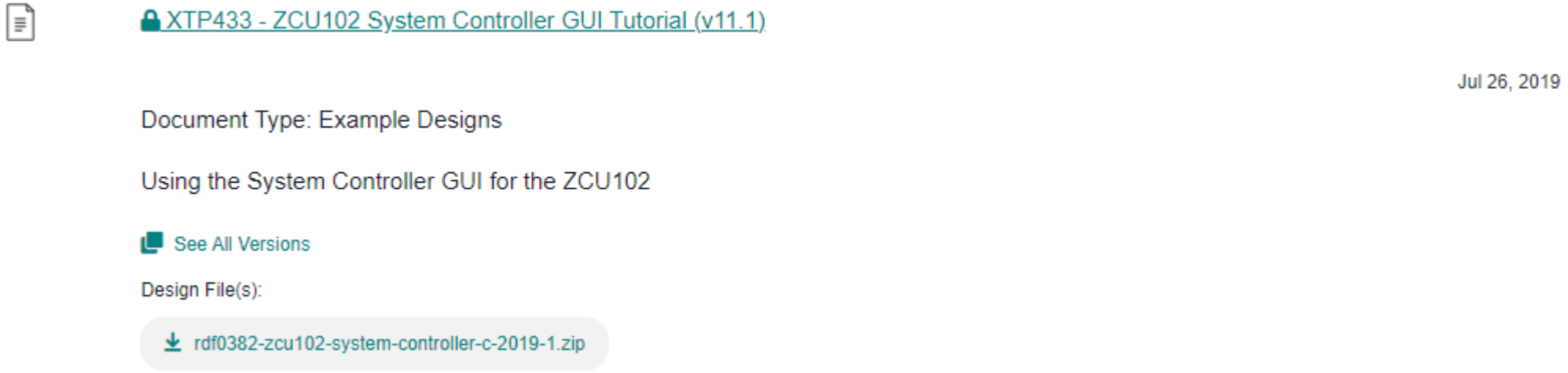
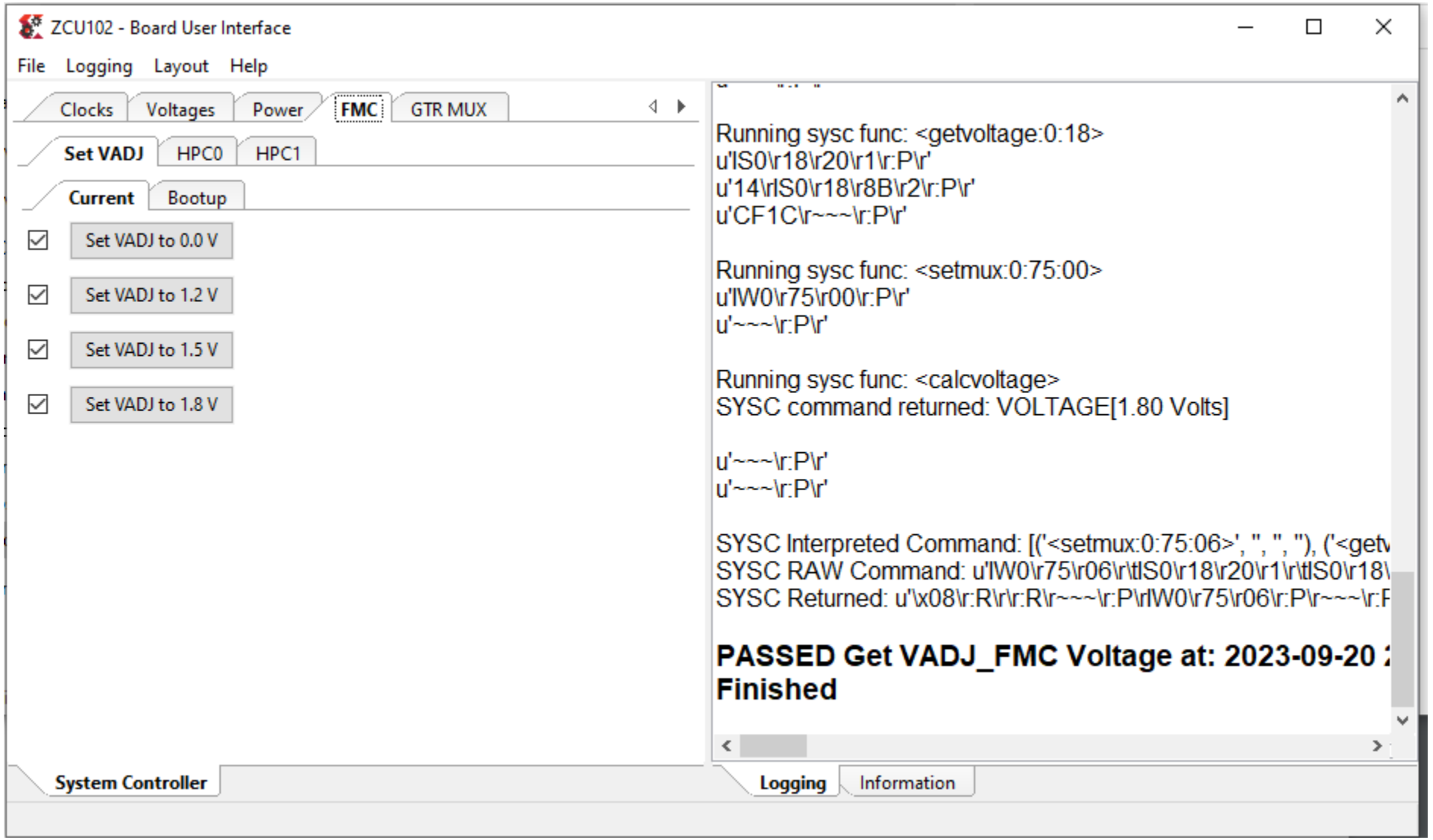
Setting the FMC Voltage to 1.8V

https://www.xilinx.com/products/boards-and-kits/ek-u1-zcu102-g.html#resources

使用System Controller調整電壓



Setting the FMC Voltage to 1.8V



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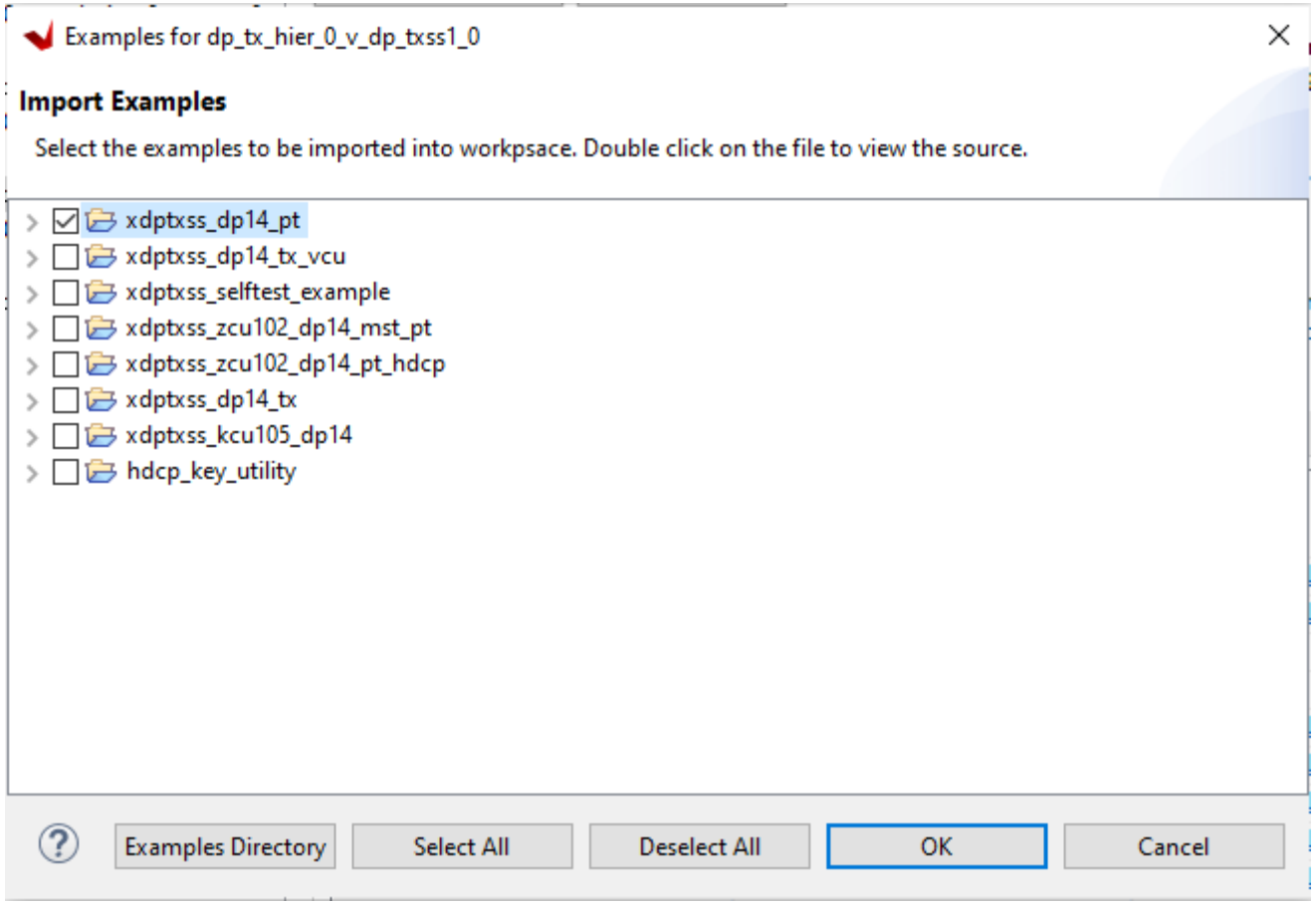
Vitis(也是會分板子跟測試方式 我們選單純的PT測試 就選第一項)



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可能遇到的問題

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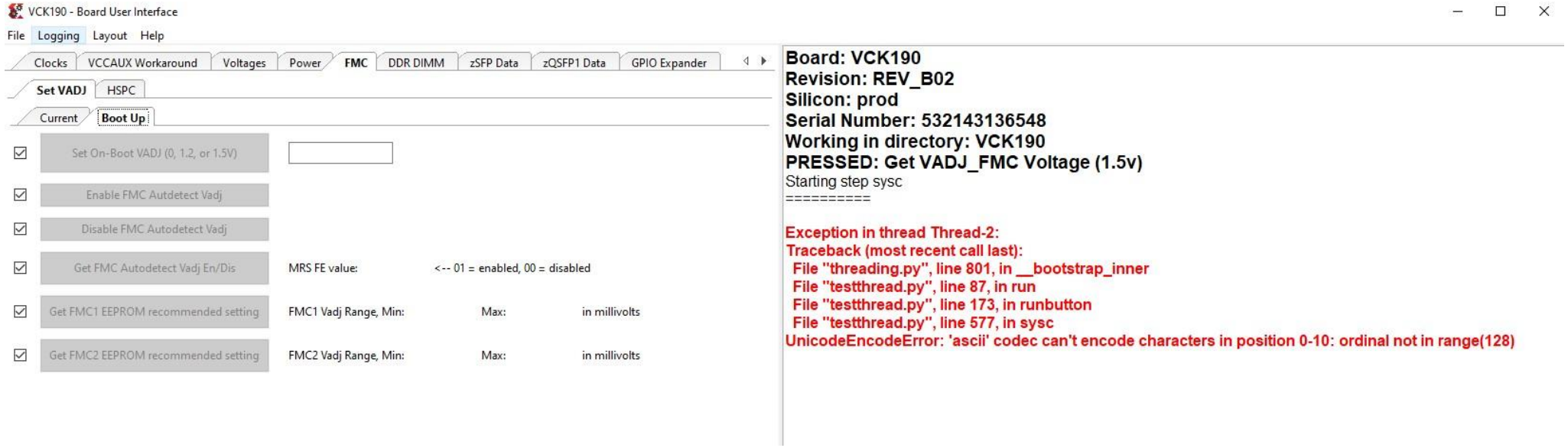
2022.2

可能出現的問題

UART顯示Platform init階段失敗

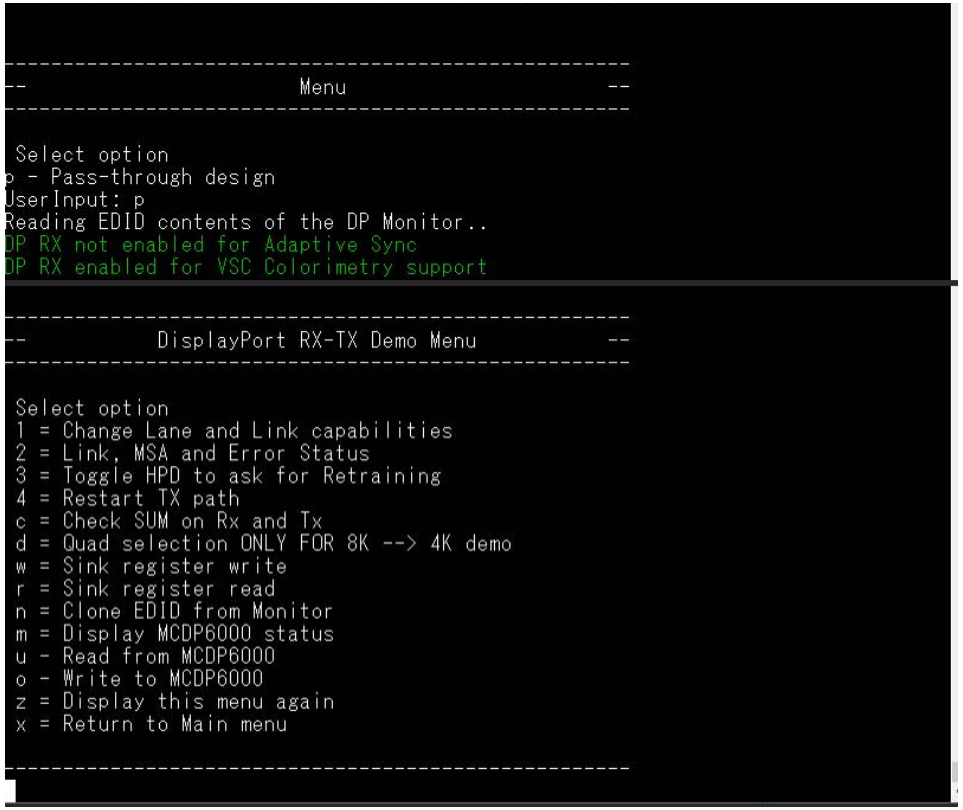
確認FMC電壓是否符合要求

無法讀取更改電壓 檢查是否全英文路徑 以及其他設備干擾(螢幕,藍芽耳機等)



可能出現的問題

Not enabled for Adaptive Sync

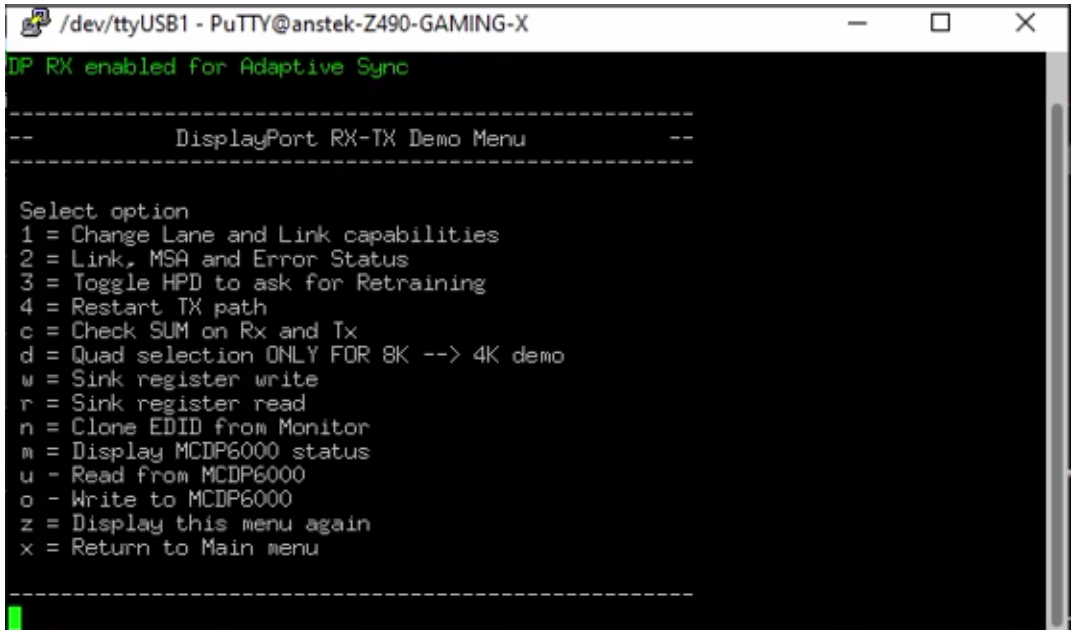


請確認DP源及顯示器是否至少DP1.2以上 且已開啟AdaptiveSync功能

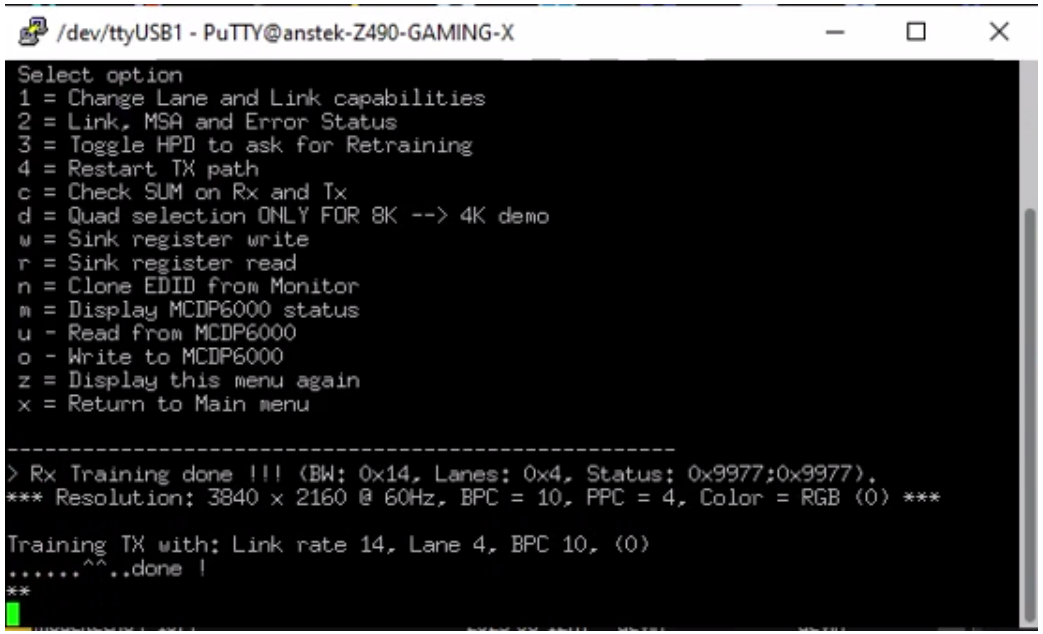
可能出現的問題

2021.2會遇到只有單一顆處理器可以training的bug 但2022.2測試正常

其中一顆會卡在這畫面



另一顆會正常training



哪一顆會有問題不一定

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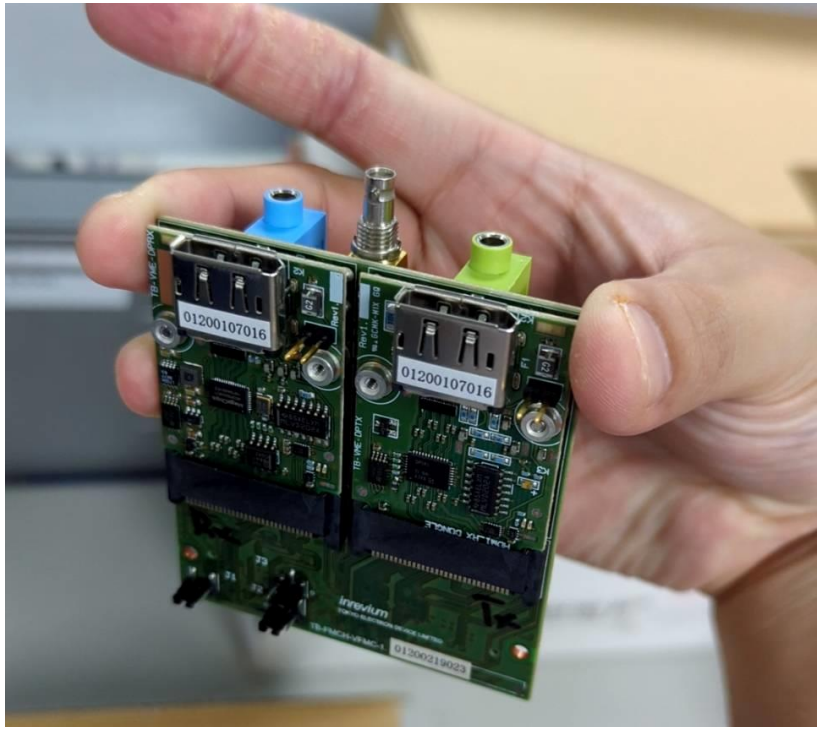
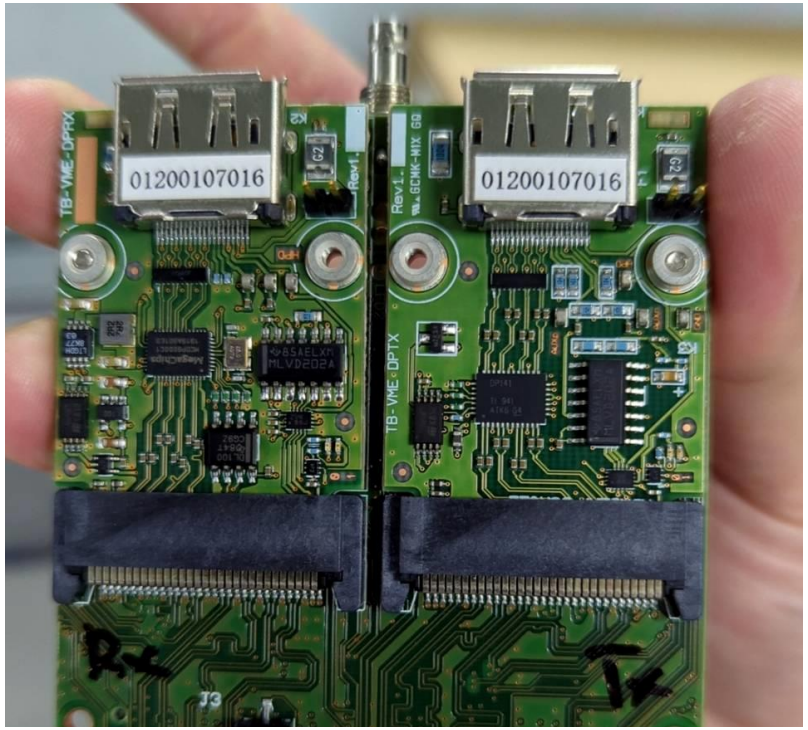
可能出現的問題

Platform init成功 無法成功training





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