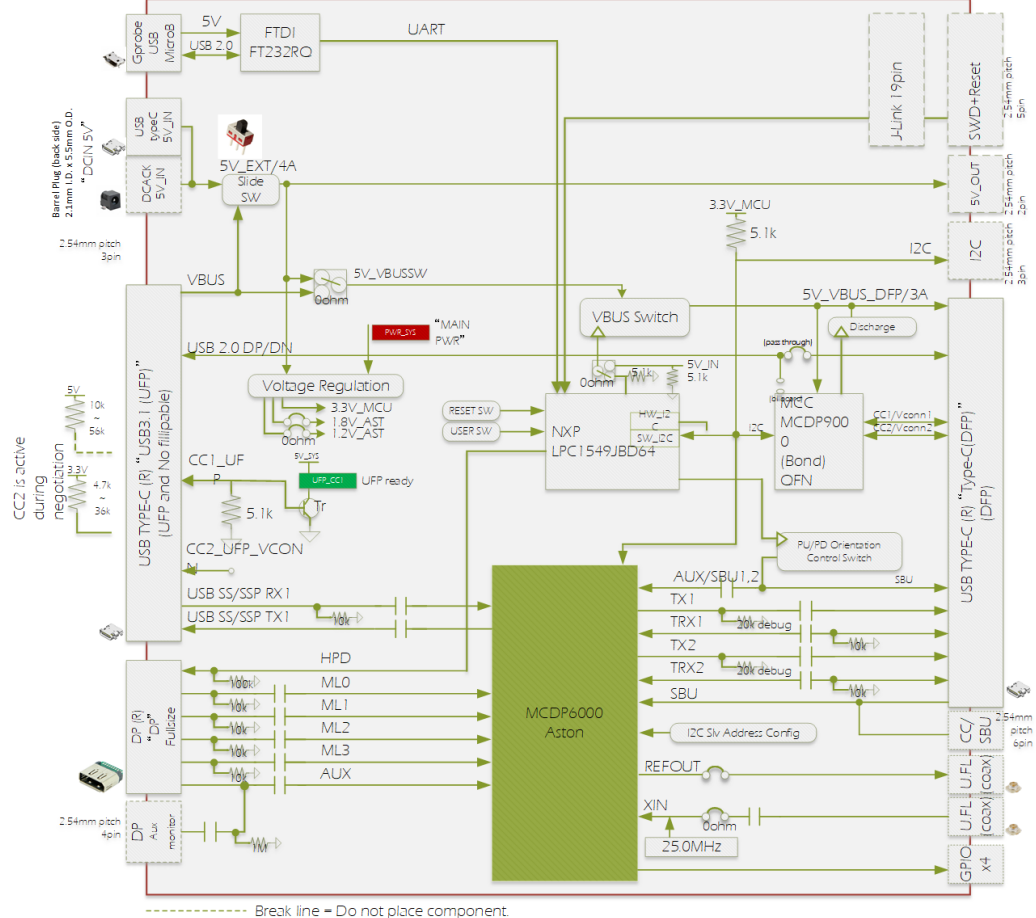


# B0704-RD4-6000-QFN, RevB1 "Aston RD4" MCDP6000

## USB Type-C DP Alt-Mode Switching Retimer (UFP: DP Full size, USB TypeC, DPF: TypeC)

### PCB# 0704

MCDP6000, Reference Design RD4  
System Block Diagram rev.003



### Revision History

Date	Author	Version	Comments
04/13/2018	H. Takeuchi	Rev. A	1st release "Aston RD4"
12/19/2018	Koji.A	Rev. B1	* Updated regulators on 7/3 by H.Takeuchi
05/26/2020		Rev. 03a	Update to Kinetic format

Transmission line characteristic impedance

[Display Port]	90 ohm differential
[USB3.1]	90 ohm differential
[USB3.1+Display Port (shared)]	90 ohm differential

### 1. Features

Full functionality of MCDP6000 Type-C DP Alt-mode Switching Retimer  
MCDP9010 USB Type-C Port Controller + MCU(NXP LPC1549JBD64 + Firmware)

Form factor: 48mm x 69mm  
Material: FR4 t=1.6mm, 6 layers

- 1x Type-C Connector for USB Input
- 1x Full size Display Port Connector for Display Port Input
- 1x Type-C Connector for DP Alt mode support USB Type-C at DFP(Downstream Facing Port)
- 1x U.FL(Hirose) External Clock input
- 1x U.FL(Hirose) Clock output for external device

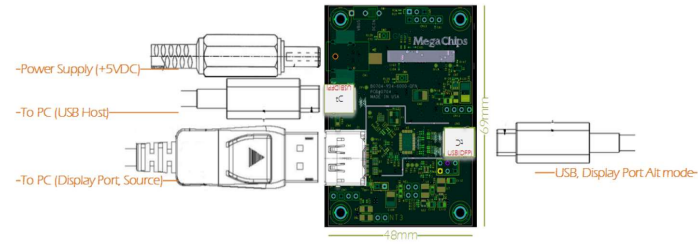
- 1x Power Slide Switch for the system power
- 1x Power Supply: DC+5V Input (Alternate input barrel plug or Type-C Connector)
- \*\* VBUS in the USB Input at UFP can be used as an external power supply for this system. (Default: Disabled)

- 1x MCU Reset button
- 1x USB Micro-B (Communication to the MCU)
- 1x Type-C at UFP Polarity Detection Indicator(LED)

#### [Debug Connectors]

- 1x Display Port AUX Channel Monitor pins at DP Input
- 1x CC Communication & SBU Signal Monitor pins at DFP Type-C
- 1x I2C Interface pins (this net is connected to MCU(as I2C master) and MCDP6000(as I2C slave)
- 1x GPIOx4 pins from MCDP6000
- 1x SWD(Single Wire Debug) Interface for J-Link debugger

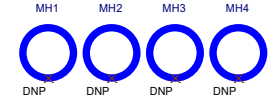
### 2. Outline



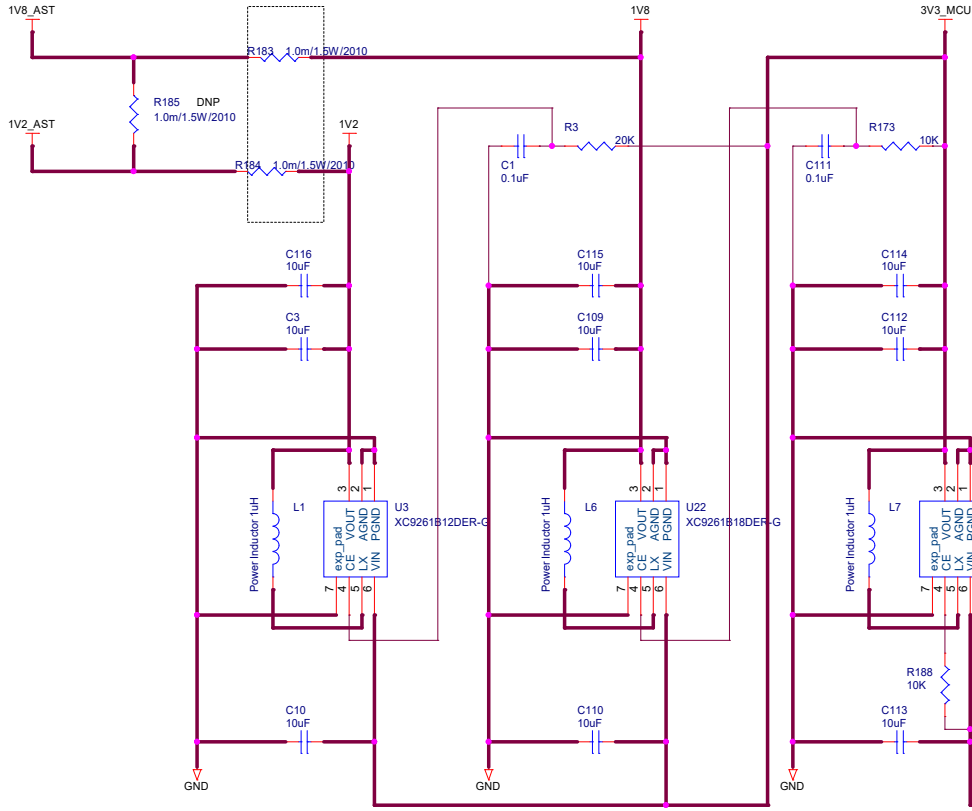
Title			
01. Contents			
Size B	Document Number B0704-RD4-6000-QFN, AstonRD4	Rev 03a	
Date:	Tuesday, May 26 2020	Sheet 1	of 4

# [External Power Supply Input and Voltage Regulation]

[Mounting Holes]



{For 1.8V operation (option):  
R 1 : Place, R 2 : DNP }



[5V to 1.2V Buck Regulator]

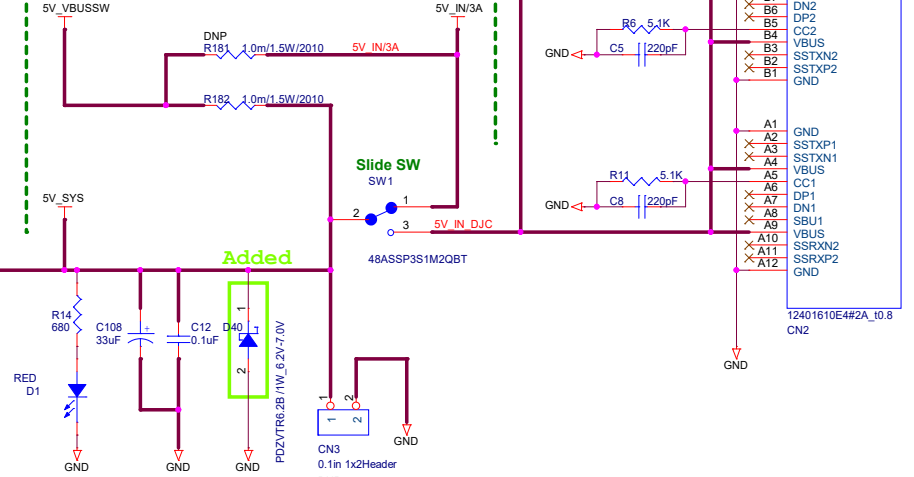
[5V to 1.8V Buck Regulator]

[5V to 3.3V Buck Regulator]

[Main Power Switch and Selector]  
[Power Network Configuration]

[DC Jack for Power Supply: 5V Input]

[TypeC for Power Supply: 5V Input]



[Main System Power LED]

[For External Pheriheral Device/Boards]

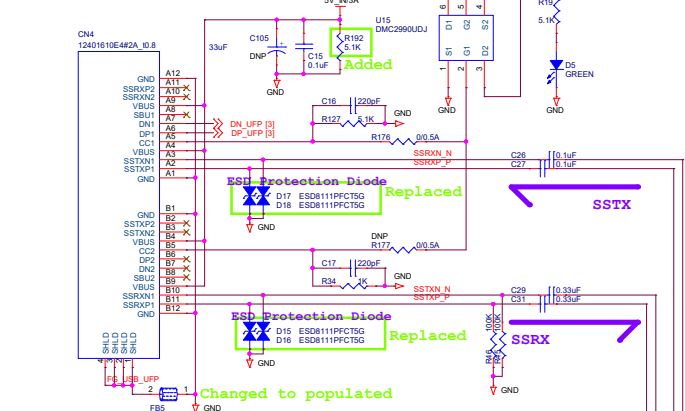


Title			02. Regulators		
Size	A3		Document Number	B0704-RD4-6000-QFN, AstonRD4	
Date	Wednesday, December 19, 2018		Sheet	2 of 4	
Rev	03a				

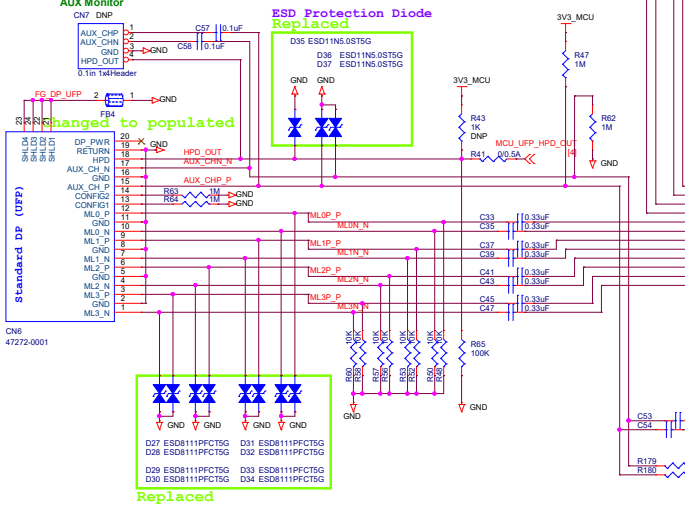
# [MCDP6000 USB,DisplayPort Retimer]

## [Plug Orientation Detect Indicator(LED)]

## [USB - UFP]

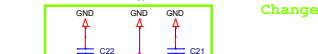


## [Display Port - UFP]



Shared Footprint with NX3225SA as previous selection.

Manufacturer = NDK  
 Manufacturer PN = NX3225SA - Spec# EXS00A-CS11457  
 25.000 MHz +30ppm over all



Change: 1V8 to 1V8\_AST

For smaller OSC

To (MCU, TCPC)

To (MCU, TCPC)

To (MCU, TCPC)

To (MCU, TCPC)

To (MCU, TCPC)

To (MCU, TCPC)

To (MCU, TCPC)

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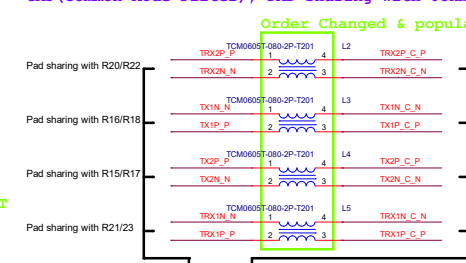
To (MCU, TCPC)

To (MCU, TCPC)

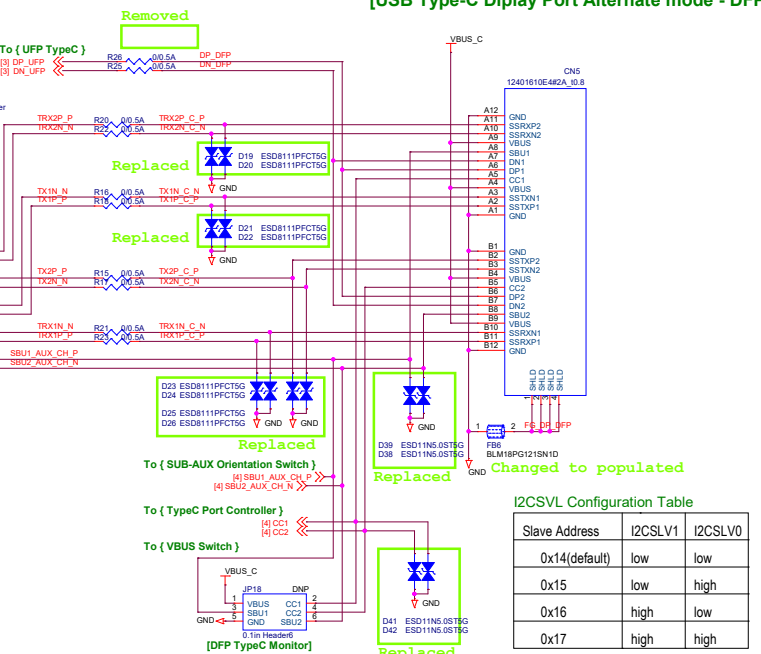
To (MCU, TCPC)

To (MCU, TCPC)

## CMF(Common Mode Filter), PAD Sharing with 0ohm



## [USB Type-C Display Port Alternate mode - DFP]



## I2CSVL Configuration Table

Slave Address	I2CSLV1	I2CSLV0
0x14(default)	low	low
0x15	low	high
0x16	high	low
0x17	high	high

Layout Guide for ESD diodes:  
 Equal distance from the footprint of connector to the ESD diodes to manage the characteristic impedance.  
 Layout Guide for ESD diodes:  
 Place nearby the interface connector.

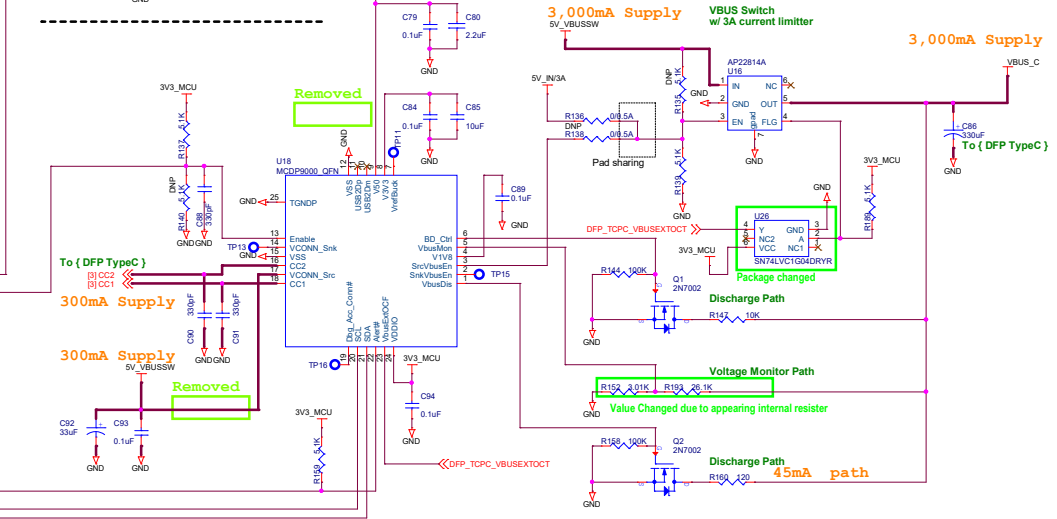
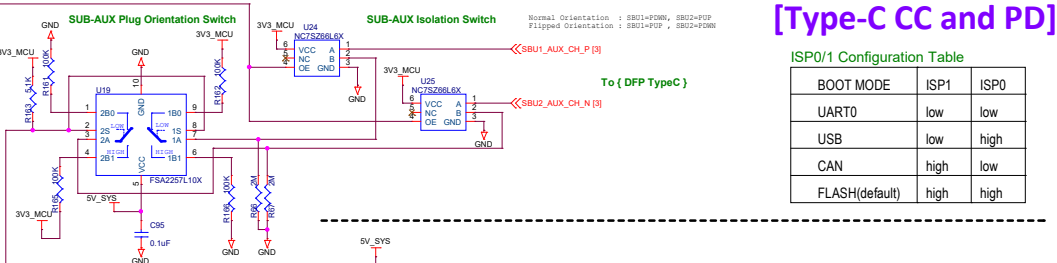
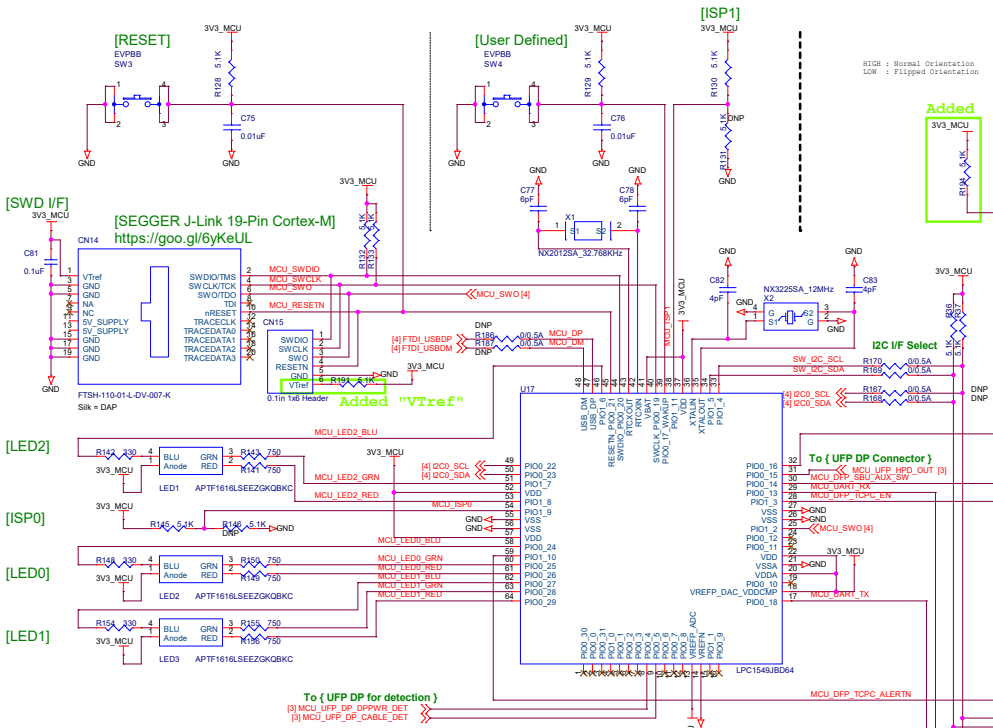
# [Type-C CC and PD]

ISPO/1 Configuration Table

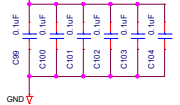
BOOT MODE	ISP1	ISP0
UART0	low	low
USB0	low	high
CAN	high	low
FLASH(default)	high	high

Normal Orientation : SB01+P000, SB02+P001  
 Flipped Orientation : SB01+P0P, SB02+P0RN

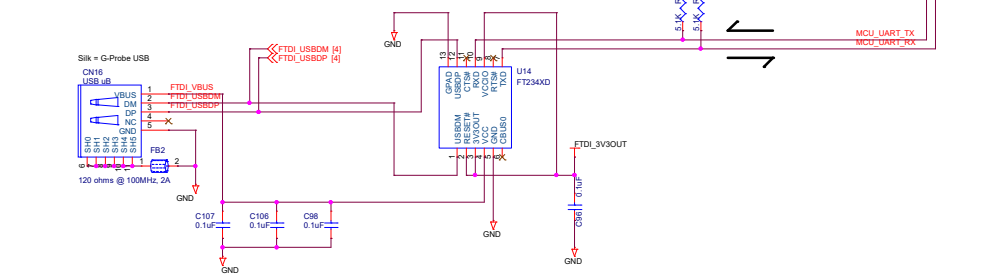
## [MCU+TypeC Port Controller]



Decoupling Caps for U17, Place close to U17



## [USB - UART for GProbe]



[I2C Interface]

