USB Type-C 3.2 Host

J1
12401610E4#2A

VBUS_Host
FB1
BLM31PG121SH1L
VBUS_Host_Filt
C7 2.2uF
C8 2.2uF
GND

VBUS, CC1, CC2, D-, D+, RX1-, RX1+, TX1-, TX1+, RX2-, RX2+, TX2-, TX2+, SBU1, SBU2, SHIELD, GND

C12 0.1uF
R18 330
GND

Downstream Type-A 3.1

FB2 BLM31PG121SH1L
USBA_VBUS_PORT1
J2 483930003
VBUS_PORT1
C17 2.2uF
C18 100uF
PORT1_D-, PORT1_D+, PORT1_RX-, PORT1_RX+, PORT1_TX-, PORT1_TX+
VBUS, D-, D+, SSRX-, SSRX+, SSTX-, SSTX+, GND, DRAIN, SHIELD

FB5 BLM31PG121SH1L
USBA_VBUS_PORT3
J4 483930003
VBUS_PORT3
C50 2.2uF
C51 100uF
PORT3_D-, PORT3_D+, PORT3_RX-, PORT3_RX+, PORT3_TX-, PORT3_TX+

FB3 BLM31PG121SH1L
USBA_VBUS_PORT2
J3 483930003
VBUS_PORT2
C38 2.2uF
C39 100uF
PORT2_D-, PORT2_D+, PORT2_RX-, PORT2_RX+, PORT2_TX-, PORT2_TX+

FB6 BLM31PG121SH1L
USBA_VBUS_PORT4
J5 483930003
VBUS_PORT4
C52 2.2uF
C53 100uF
PORT4_D-, PORT4_D+, PORT4_RX-, PORT4_RX+, PORT4_TX-, PORT4_TX+

U2 UTC2000/MG

VBUS_Host_Filt
R3 35.7k
R6 5.1k
Plug Orientation
GND

VMON, PLUG_ORIENTATION#, AUDIO_ADAPTER/CONNECTED#, PPC_EN/3-0A_IND#, VCONN1_OUT#/1-5A_IND#, VCONN2_OUT#/LEGACY_IND#

VDD, VSS, VSS, ENABLE, FAULT_IND, OCS#, CFG_SEL, NC
+5VD
C6 0.1uF
R7 10k
R9 10k

CC2, CC1
R10 10k
R11 10k
R13 5.1k
R14 5.1k
Refer to USB type C spec
Figure 4-5

U3 HD3SS6126RUAR

+3V3
R17 10k
Plug Orientation

VDD, HS_OE, HSC(N), HSC(P), HSB(N), HSB(P), SEL, SSB0(N), SSB0(P), SSC0(N), SSC0(P), SSB1(N), SSB1(P), SSC1(N), SSC1(P), NC, TP

BD-, BD+, AD-, AD+
HSA(N), HSA(P) → HOST_D-, HOST_D+
SSA0(P), SSA0(N) → HOST_TX+, HOST_TX-
SSA1(P), SSA1(N) → HOST_RX+, HOST_RX-

TX1-, TX1+, TX2-, TX2+ (C13, C14, C15, C16 0.1uF)
CTX1-, CTX1+, CTX2-, CTX2+
RX1-, RX1+, RX2-, RX2+

USB 3.2 spec sheet
Table 6-18.
Transmitter Normative Electrical Parameters
Table 6-22.
Receiver Normative Electrical Parameters

Microchip's AN2051
Figure 6: UPSTREAM FACING PORT SWITCHED IMPLEMENTATION SCHEMATIC

Optional spi flash memory

Hardware Design Checklist 8.1
By Default USB5744 executes firmware from internal ROM

Pins 38-42
SMCLK -> 10k pull up: I2C slave interface(Hardware Design Checklist9.1)
SMDAT -> 10k pull down: I2C slave interface
CFG_BC_EN -> 10k pull down: Ports1&2 Battery Charging Enabled
CFG_NON_REM -> 200k pull down: All downstream ports removable
RESET_N -> Button pull down:

+5VD
R8 10k
RESET_N
C11 10uF
SW1 SW_Push
GND

+3V3
R4 10k
SPI_DO/SMDAT
R12 10k
SPI_DI/CFG_BC_EN
R5 10k
SPI_CLK/SMCLK
R15 200k
SPI_CE_EN/CFG_NOM_REM
RESET_N

Hardware Design Checklist
Table 9-3 Enables Battery Charging on Port 1 and 2
Table 9-2. All ports Removable

U1 USB5744/2G

+1V2
VDD12 (5, 12, 15, 18, 28, 33, 43, 49)
+3V3
VDD33 (16, 31, 44, 55)

VBUS_Host_Filt
R1 50k
C3 4.7uF
R2 100k
VBUS_DET

Upstream

HOST_D-, HOST_D+ → USB2UP_DM, USB2UP_DP
HOST_RX+, HOST_RX- → USB3UP_RXDM, USB3UP_RXDP
HOST_TX+, HOST_TX- → USB3UP_TXDM, USB3UP_TXDP

SPI_CLK/SMCLK
SPI_DO/SMDAT
SPI_DI/CFG_BC_EN
SPI_CE_N/CFG_NON_REM
RESET_N
RBIAS
R16 12k 1%

VSS 57

Load Capacitance equation:
C1,C2 = 2*(C(Load)-C(stray))

C1,C2 = 2*(12pF-5pF) = 14pF

XTALI/CLK_IN, XTALO, ATESET
XTAL1 25MHZ
C1 14pF
C2 14pF

PRT_CTL1, PRT_CTL2, PRT_CTL3, PRT_CTL4/GANG_PWR

Downstream

USB2DN_DM1/PRT_DIS_M1, USB2DN_DP1/PRT_DIS_P1 → PORT1_D-, PORT1_D+
USB3DN_RXDM1, USB3DN_RXDP1 → PORT1_RX-, PORT1_RX+
USB3DN_TXDM1, USB3DN_TXDP1 → PORT1_CTX- (C4 0.1uF), PORT1_CTX+ (C5 0.1uF) → PORT1_TX-, PORT1_TX+

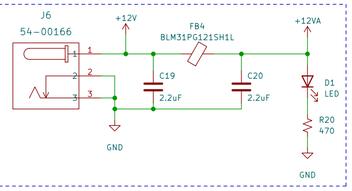
USB2DN_DM2/PRT_DIS_M2, USB2DN_DP2/PRT_DIS_P2 → PORT2_D-, PORT2_D+
USB3DN_RXDM2, USB3DN_RXDP2 → PORT2_RX-, PORT2_RX+
USB3DN_TXDM2, USB3DN_TXDP2 → PORT2_CTX- (C9 0.1uF), PORT2_CTX+ (C10 0.1uF) → PORT2_TX-, PORT2_TX+

USB2DN_DM3/PRT_DIS_M3, USB2DN_DP3/PRT_DIS_P3 → PORT3_D-, PORT3_D+
USB3DN_RXDM3, USB3DN_RXDP3 → PORT3_RX-, PORT3_RX+
USB3DN_TXDM3, USB3DN_TXDP3 → PORT3_CTX- (C46 0.1uF), PORT3_CTX+ (C47 0.1uF) → PORT3_TX-, PORT3_TX+

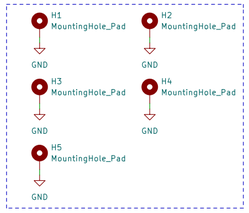
USB2DN_DM4/PRT_DIS_M4, USB2DN_DP4/PRT_DIS_P4 → PORT4_D-, PORT4_D+
USB3DN_RXDM4, USB3DN_RXDP4 → PORT4_RX-, PORT4_RX+
USB3DN_TXDM4, USB3DN_TXDP4 → PORT4_CTX- (C48 0.1uF), PORT4_CTX+ (C49 0.1uF) → PORT4_TX-, PORT4_TX+

Exclusive Electronics	
Sheet: /	
File: USB-C-Hub v2.kicad_sch	
Title: IAN'S USB HUB	
Size: A2	Date:
KiCad E.D.A. kicad (6.0.11)	**Rev: 1.0**
	Id: 1/2

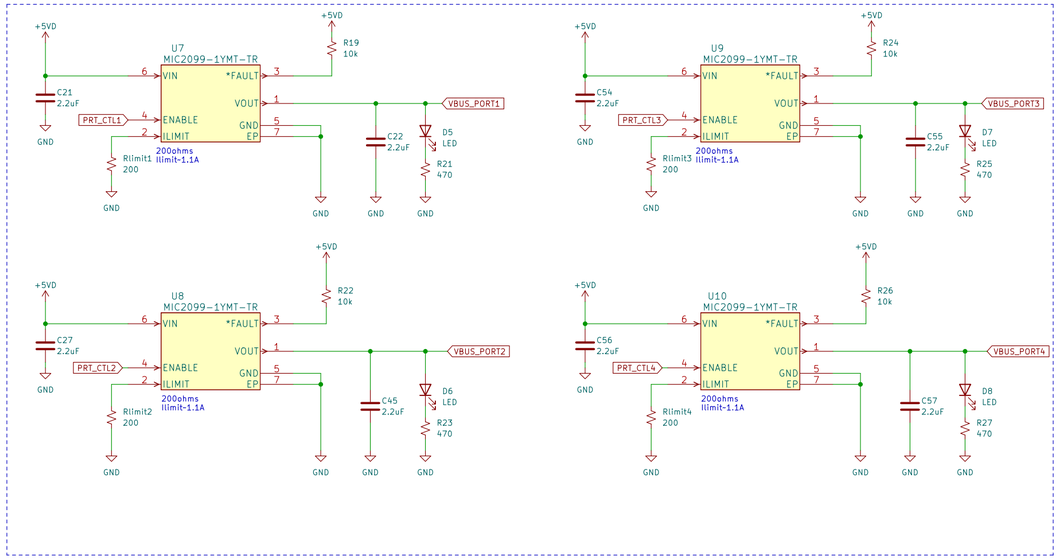
DC Power Supply – Pi Filter



Mounting Holes

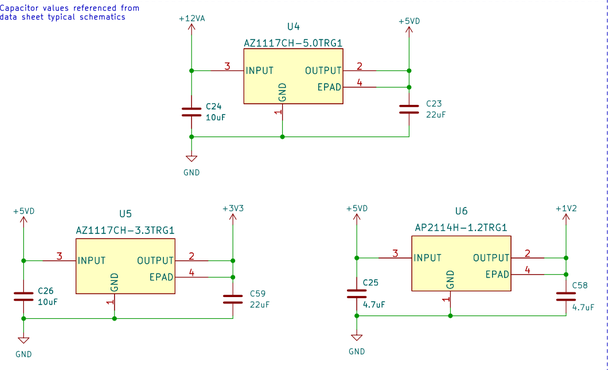


Port Power Control

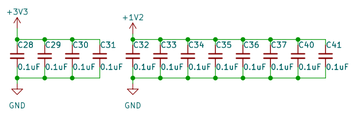


Voltage Regulators

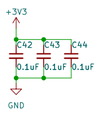
Capacitor values referenced from data sheet typical schematics



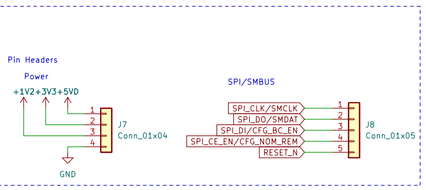
Bypass capacitors for USB5744



Bypass capacitors for HD3SS6126RUAR

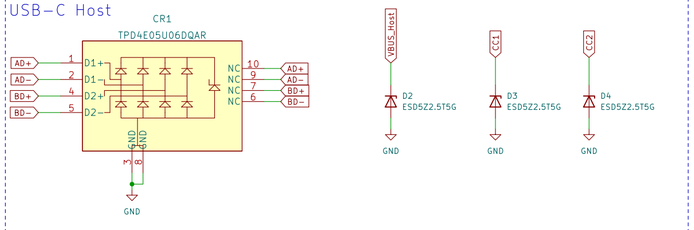


Pin Headers

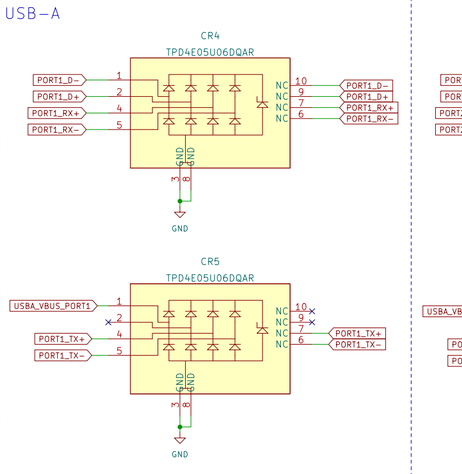


ESD protection

USB–C Host



USB–A



NC pins used for straight through routing

PORT1

PORT2

PORT3

PORT4

Sheet: /Power and pin headers/		
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Title:		
Size: A2	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.11)		Id: 4/2