FTDI FT2232H

HTLAB.NET Efinix Download Cable

Title	HTLAB.NET Efinix Download Cable		
Size	Number		Revision
A4			Ver 1.0
Date:	2024/05/08	Sheet of	
File:	C:\Users\..\FT2232H.SchDoc	Drawn By:	

FTDI FT2232H

With reference to FT2232H.SchDoc

U1, U2, U3, U4: 1.8V3.3V
4-Bit Dual-Supply Bus Transceiver
- SN74AXC4T774QPWRQ1
- SN74AVC4T774PWR
- 74AVC4T774PWJ
etc.....

AD0 => SCLK
AD1 => MOSI
AD2 <= MISO
AD3 => SS
AD4 => CRST
AD5 <= CDONE
AD6 => HOLD
AD7 => SPI_ENABLE

BD0 => TCK
BD1 => TDI
BD2 <= TDO
BD3 => TMS

U7: 1.8V3.3V
Open Drain Dual Buffer
- SN74LVC2G07DBVR
- 74LVC2G07W6-7
etc.....
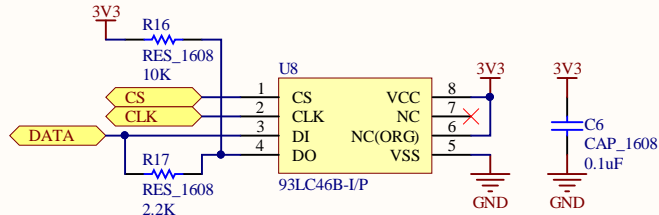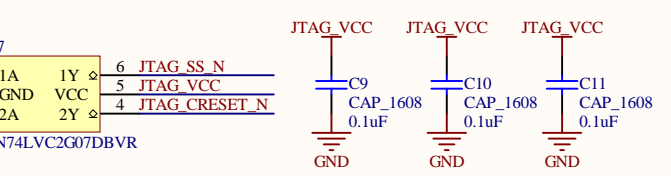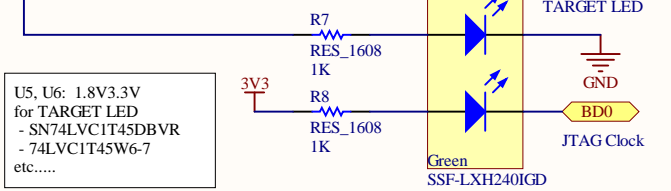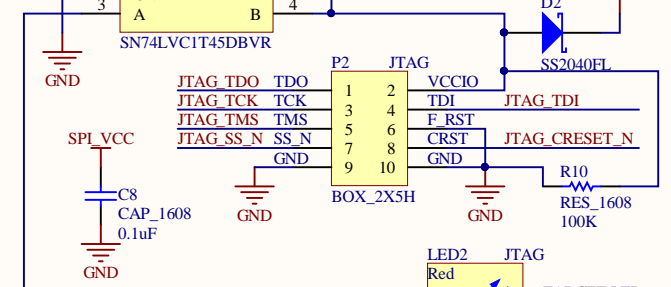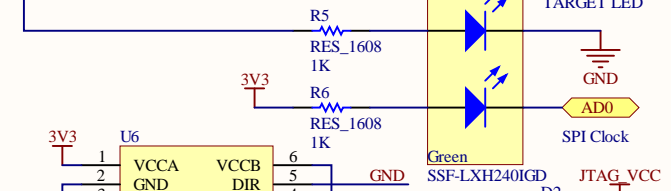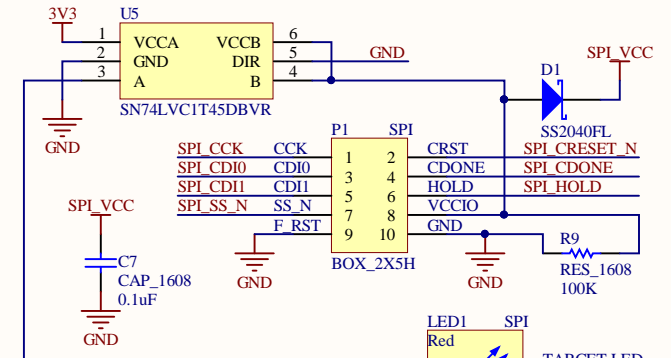
U8: Microchip 93LC46B (93AA46B-I/P, 93LC46B-I/P, 93AA46C-I/P)

U5, U6: 1.8V3.3V
for TARGET LED
- SN74LVC1T45DBVR
- 74LVC1T45W6-7
etc.....

U1 — SN74AVC4T774PWR

VCCA / VCCB / DIR1 / DIR2 / DIR3 / DIR4 / GND / OE
LOW: A <= B HIGH: A => B
A1 A2 A3 A4 / B1 B2 B3 B4

AD4 AD0 AD5 AD1
R1 RES_AR3216 10
B1 → SPI_CRESET_N
B2 → SPI_CCK
B3 → SPI_CDONE
B4 → SPI_CDI0

R11 RES_1608 100K
SPI_VCC

U2 — SN74AVC4T774PWR

AD2 AD6 AD3
R2 RES_AR3216 10
B1 → SPI_CDI1
B2 → SPI_HOLD
B3 → SPI_SS_N

R12 RES_1608 100K
SPI_VCC

AD7 R14 RES_1608 10

U3 — SN74AVC4T774PWR

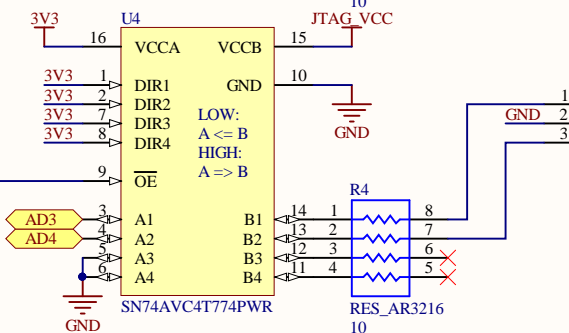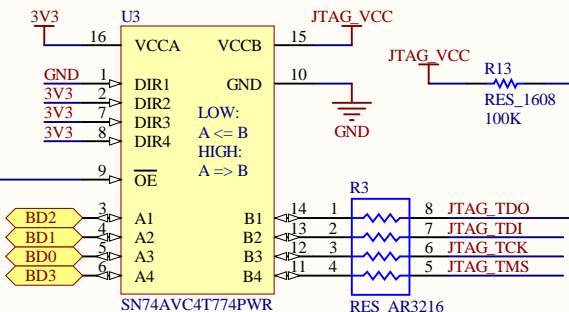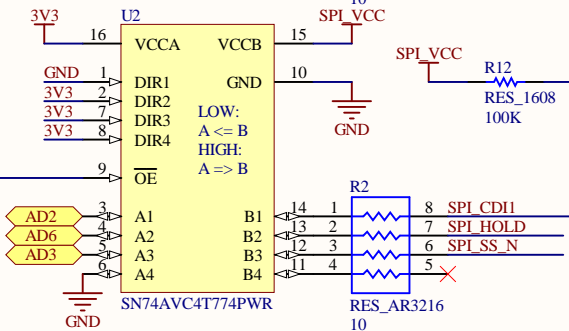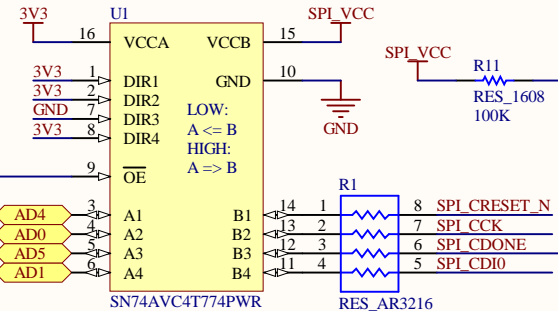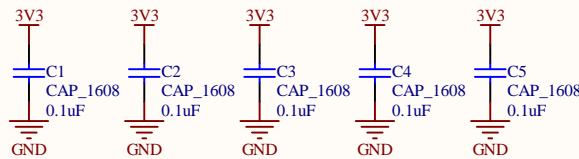BD2 BD1 BD0 BD3
R3 RES_AR3216 10
B1 → JTAG_TDO
B2 → JTAG_TDI
B3 → JTAG_TCK
B4 → JTAG_TMS

R13 RES_1608 100K
JTAG_VCC

U4 — SN74AVC4T774PWR

AD3 AD4
R4 RES_AR3216 10
R15 RES_1608 10

U5 — SN74LVC1T45DBVR

VCCA VCCB GND DIR A B
SS2040FL D1
R9 RES_1608 100K

C7 CAP_1608 0.1uF

P1 — BOX_2X5H SPI
SPI_CCK — CCK — CRST — SPI_CRESET_N
SPI_CDI0 — CDI0 — CDONE — SPI_CDONE
SPI_CDI1 — CDI1 — HOLD — SPI_HOLD
SPI_SS_N — SS_N — VCCIO
F_RST — GND

U6 — SN74LVC1T45DBVR

VCCA VCCB GND DIR A B
SS2040FL D2
R10 RES_1608 100K

C8 CAP_1608 0.1uF

P2 — BOX_2X5H JTAG
JTAG_TDO — TDO — VCCIO
JTAG_TCK — TCK — TDI — JTAG_TDI
JTAG_TMS — TMS — F_RST
JTAG_SS_N — SS_N — CRST — JTAG_CRESET_N
GND — GND

LED1 — SSF-LXH240IGD SPI TARGET LED
Red / Green
R5 RES_1608 1K
R6 RES_1608 1K → AD0 SPI Clock
3V3

LED2 — SSF-LXH240IGD JTAG TARGET LED
Red / Green
R7 RES_1608 1K
R8 RES_1608 1K → BD0 JTAG Clock
3V3

U7 — SN74LVC2G07DBVR
1A 1Y → JTAG_SS_N
GND VCC → JTAG_VCC
2A 2Y → JTAG_CRESET_N
GND

C9 CAP_1608 0.1uF JTAG_VCC
C10 CAP_1608 0.1uF JTAG_VCC
C11 CAP_1608 0.1uF JTAG_VCC

U8 — 93LC46B-I/P
CS CLK DI DO / VCC NC NC(ORG) VSS
3V3
R16 RES_1608 10K
R17 RES_1608 2.2K
CS CLK DATA
C6 CAP_1608 0.1uF

C1 CAP_1608 0.1uF
C2 CAP_1608 0.1uF
C3 CAP_1608 0.1uF
C4 CAP_1608 0.1uF
C5 CAP_1608 0.1uF
3V3 / GND

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Hardware Version : 1.0

66.00 (mm)

100.00 (mm)

25.40（mm）

71.12（mm）

JTAG

SPI

TARGET

TARGET

9
10

1
2

ACTIVE

ACTIVE

10 GND
9 GND
8 CRST
7 SS
6 FRST
5 TMS
4 TDI
3 TCK
2 VCC
1 TDO

10 GND
9 FRST
8 VCC
7 SS
6 HOLD
5 CDI1
4 DONE
3 CDIO
2 CRST
1 CCK

Comment	Description	Designator	Footprint	LibRef	Quantity	Value
CAP_1608	Capacitor 1608	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26	C1608_N	CAP_1608	24	0.1uF
CAP_1608	Capacitor 1608	C12, C13	C1608_N	CAP_1608	2	22pF
CAP_3216	Capacitor 3216	C27, C28, C29, C30, C31, C32	C3216_N	CAP_3216	6	22uF
SS2040FL	Schottky Rectifier SOD-123FL	D1, D2	SOD-123F_N	SS2040FL	2	
PGB1010603	Transient Voltage Suppression (TVS) Diode	D3, D4	TVS_1608_N	PGB1010603	2	
PTC Fuse	PTC Fuse, 200mil Pitch	F1	PTC_DIP_200_7.9	PTC_DIP_200	1	
FB_1608	Ferrite Bead 1608	FB1, FB2	L1608_N	FB_1608	2	470
USB-B	USB Type B	J1	USB_TYPE-B	USB-B	1	
SSF-LXH240IGD	SSF-LXH240IGD, MHK2396EGBTD, 5530112F, WP934MD/LILGD, H-201C, LED-322	LED1, LED2	SSF-LXH240IGD	SSF-LXH240IGD	2	
BOX_2X5H	Header, 5-Pin, Dual row	P1, P2	BOXH_2X5_HORIZONTAL_N	BOX_2X5H	2	
AZ1117CH-3.3	Linear Voltage Regulator IC Positive Fixed 1 Output 1A SOT-223-3	PS1	SOT-223_N	AZ1117CH-3.3TRG1	1	
RES_AR3216	Resistor Array, CAT16-J4 / EXB-V8V	R1, R2, R3, R4	AR8_3216_N	RES_AR3216	4	10
RES_1608	Resistor 1608	R5, R6, R7, R8, R19	R1608_N	RES_1608	5	1K
RES_1608	Resistor 1608	R9, R10, R11, R12, R13	R1608_N	RES_1608	5	100K
RES_1608	Resistor 1608	R14, R15, R20, R21	R1608_N	RES_1608	4	10
RES_1608	Resistor 1608	R16	R1608_N	RES_1608	1	10K
RES_1608	Resistor 1608	R17	R1608_N	RES_1608	1	2.2K
RES_1608	Resistor 1608	R18	R1608_N	RES_1608	1	12K±1%
RES_1608	Resistor 1608	R22	R1608_N	RES_1608	1	0
SN74AVC4T774PWR	4-Bit Dual-Supply Bus Transceiver With Configurable Voltage-Level Shifting and 3-State Outputs With Independent Direction Control Inputs	U1, U2, U3, U4	TSSOP-16_N	SN74AVC4T774PWR	4	
SN74LVC1T45DBVR	Single-Bit Dual-Supply Bus Transceiver With Configurable Voltage Translation and 3-State Outputs	U5, U6	SOT-23-6_N	SN74LVC1T45DBVR	2	
SN74LVC2G07DBVR	Dual Buffer and Driver With Open-Drain Outputs	U7	SOT-23-6_N	SN74LVC2G07DBVR	1	
93LC46B-I/P	1Kb Microwire Serial EEPROM with 16-Bit Organization	U8	DIP-8_300	93LC46B-I/P	1	
FT2232HL	FT2232H Dual High Speed USB to Multipurpose UART/FIFO IC	U9	LQFP-64_P0.5_N	FT2232HL	1	
XTAL4_3225	Crystal , OSC_3225 Oscillator Package	Y1	OSC_3225	XTAL4_3225	1	12MHz