

[illegible]

```
Property: BUILD-OPT
ALL = Installed Part.          DBG_D = EV/DV phase only
DNP = Not Installed Part.      DBG_S = Short after design fixed
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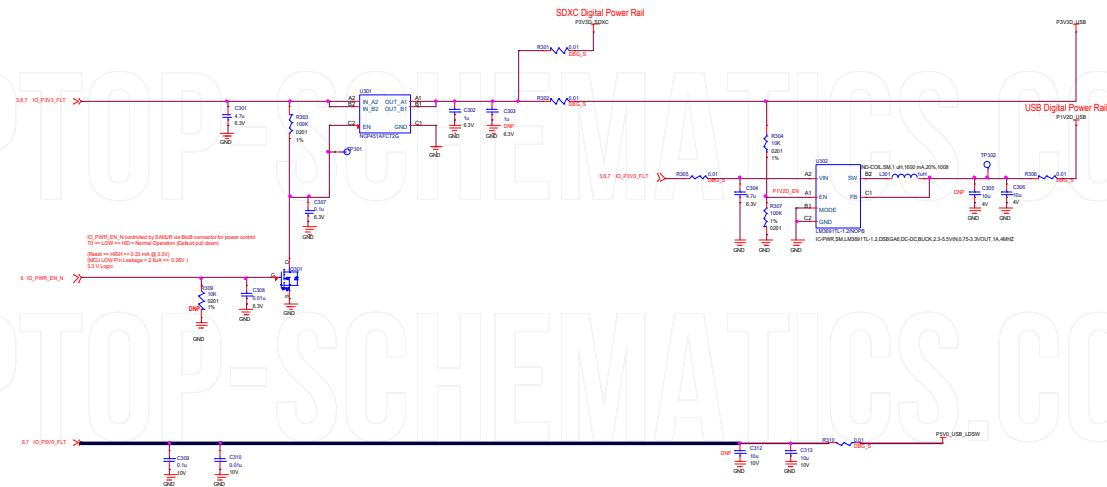
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stack up 04 0.8mm±0.1mm 1-4-1+			Impedance					
Layer	Material	1-4-1+		L3(refer L2 and L4)	L4(refer L3 and L5)	L5(refer L4 and L6)	L1(refer L2)	L6(refer L5)
Top Surface	soldermask	0.8	Target Impedance	Trace Width (mil)	Trace Width (mil)	Trace Width (mil)	Trace Width (mil)	Trace Width (mil)
L1-Component GND	1/3oz+plating	1.2	Single-end, 50Ω±10%	2.3	2.3	1.8	4.25	4.25
PP-EM-285B 1080		2.71	Single-end, 45Ω±5Ω	2.9	2.9	2	5.25	5.25
L2-GND	1/3oz+plating	1.1	Single-end, 42.5Ω±5Ω	3.35	3.35	2.3	5.9	5.9
PP-EM-285B 1067		1.81	Single-end, 40Ω±5Ω	3.7	3.7	2.5	6.6	6.6
L3-Signal Impedance	1oz	1.3	Single-end, 25Ω±5Ω	8.3	8.3	5.8	14	14
Core-EM-285 14mil		14	unit: mil	Width / Space	Width / Space	Width / Space	Width / Space	Width / Space
L4-Signal Impedance	1oz	1.3	Differential, 100Ω±15%	2.2/8.8	2.2/8.8	1.55/10	3/4.5	3/4.5
PP-EM-285B 1067		1.81	Differential, 90Ω±10%	2.7/8.3	2.7/8.3	2/8	4.1/5	4.1/5
L5-PWR	1/3oz+plating	1.1	Differential, 88Ω±10%	2.85/8.15	2.85/8.15	2.1/8	4.3/5	4.3/5
PP-EM-285B 1080		2.71	Differential, 85Ω±10%	3.05/7.95	3.05/7.95	2.25/8	4.3/4	4.3/4
L6-Component GND	1/3oz+plating	1.2	Differential, 70Ω±10%	4.35/6.65	4.35/6.65	3.2/5	6.9/5	6.9/5
Bottom Surface	soldermask	0.8	Differential, 50Ω±10%	7.3/4.7	7.3/4.7	5.55/5	13/8	13/8
Total		mil 31.84						
		um 808.74						

IO Power Tree

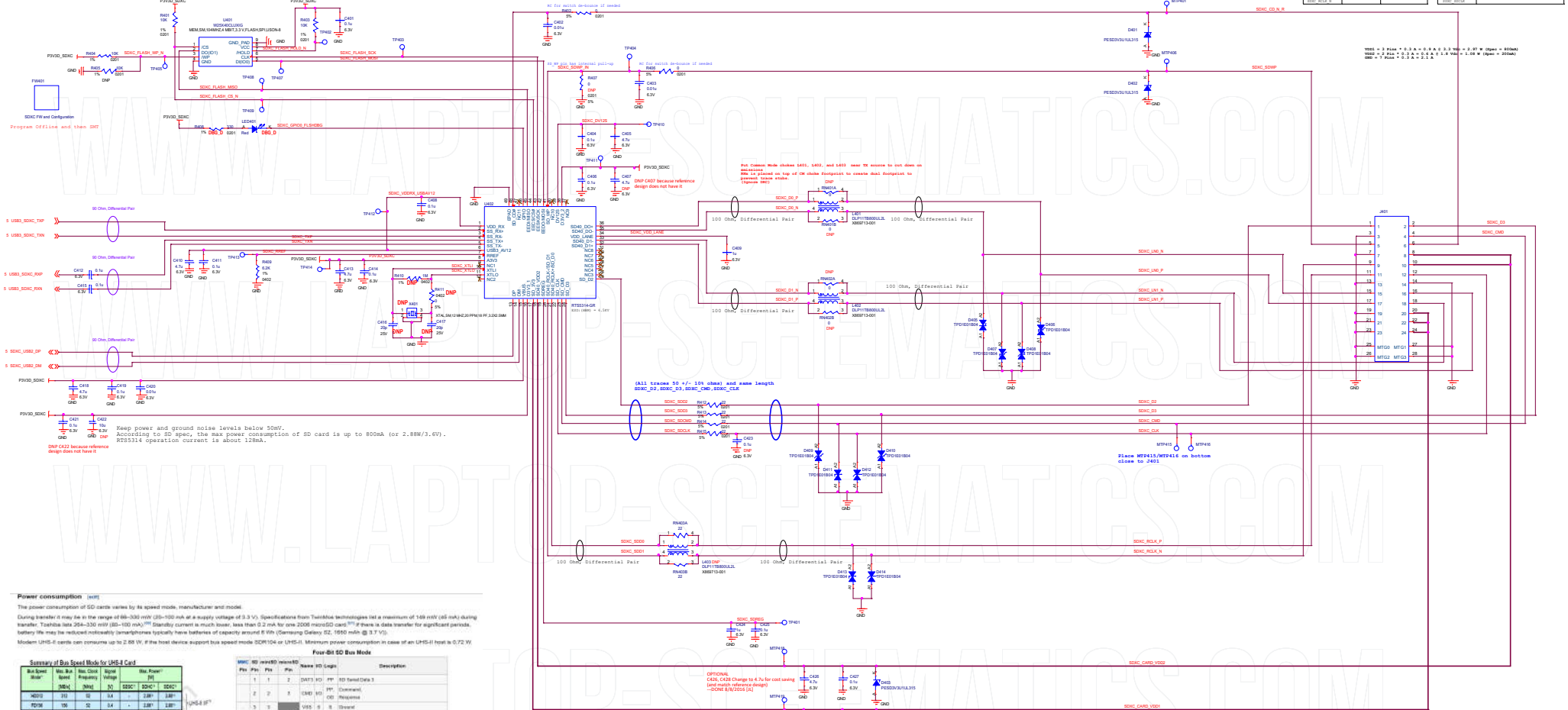


SDXC Card Reader RTS5314

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SD Card	Pin	Signal	Pin	Signal	Pin	Signal
SD Card	1	NC	19	NC	37	NC
SD Card	2	NC	20	NC	38	NC
SD Card	3	NC	21	NC	39	NC
SD Card	4	NC	22	NC	40	NC
SD Card	5	NC	23	NC	41	NC
SD Card	6	NC	24	NC	42	NC
SD Card	7	NC	25	NC	43	NC
SD Card	8	NC	26	NC	44	NC
SD Card	9	NC	27	NC	45	NC
SD Card	10	NC	28	NC	46	NC
SD Card	11	NC	29	NC	47	NC
SD Card	12	NC	30	NC	48	NC
SD Card	13	NC	31	NC	49	NC
SD Card	14	NC	32	NC	50	NC
SD Card	15	NC	33	NC	51	NC
SD Card	16	NC	34	NC	52	NC
SD Card	17	NC	35	NC	53	NC
SD Card	18	NC	36	NC	54	NC

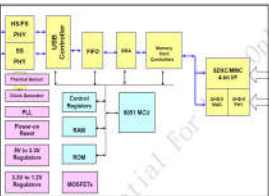
Place SCK, MOSI, MISO, CS_N test points on Bottomside



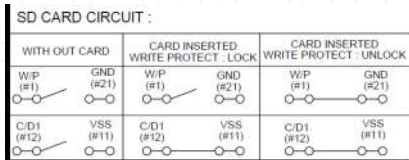
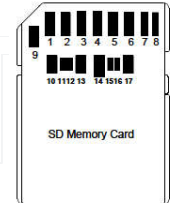
Power consumption (mW)
The power consumption of SD cards varies by its speed mode, manufacturer and model.
During transfer it may be in the range of 60-300 mW (SD-100 mW at a supply voltage of 3.3 V). Specifications from Toshiba technologies list a maximum of 160 mW (all mW) during transfer. Toshiba lists 260-330 mW (SD-100 mW) standby current is much lower, less than 0.2 mW for one 2000 microSD card⁽¹⁾ if there is data transfer for significant periods. battery life may be reduced noticeably (transmitters typically have batteries of capacity around 800 (charging battery) 500 (idle) mAh @ 3.7 V).
Modern UHS-II cards can consume up to 2.80 W. If the host device support bus speed mode SDR104 or UHS-I. Minimum power consumption in case of an UHS-II host is 0.72 W.

Summary of Bus Speed Mode for UHS-II Card						
Bus Speed Mode ⁽¹⁾	Min. Bus Speed (MHz)	Max. Bus Speed (MHz)	Signal Voltage (V)	Min. Power ⁽²⁾ (W)		
HS-II	20	50	0.4	~ 2.88 ⁽³⁾	2.88 ⁽³⁾	
PD156	156	52	0.4	~ 2.88 ⁽³⁾	2.88 ⁽³⁾	
HS156	156	200	1.8	~ 2.88 ⁽³⁾	2.88 ⁽³⁾	
HS200	70	100	1.8	~ 1.64	1.64	
HS200	90	50	1.8	~ 1.64	1.64	
HS200	20	50	1.8	~ 0.72	0.72	
HS212	112.5	15	1.8	~ 0.36	0.36	0.6 ⁽⁴⁾
High Speed	25	50	3.3	0.72	0.72	0.72
Default Speed	12.5	25	3.3	0.36	0.36	0.36

Four-bit SD Bus Mode					
MMC/SD	mmc0	mmc0	mmc0	mmc0	SD
Pin	Pin	Pin	Pin	Pin	Description
1	2	3	4	DATA[3:0]	SD Data 3
5	6	7	8	DATA[3:0]	SD Data 2
9	10	11	12	DATA[3:0]	SD Data 1
13	14	15	16	DATA[3:0]	SD Data 0
17	18	19	20	DATA[3:0]	SD Data 3
21	22	23	24	DATA[3:0]	SD Data 2
25	26	27	28	DATA[3:0]	SD Data 1
29	30	31	32	DATA[3:0]	SD Data 0
33	34	35	36	DATA[3:0]	SD Data 3
37	38	39	40	DATA[3:0]	SD Data 2
41	42	43	44	DATA[3:0]	SD Data 1
45	46	47	48	DATA[3:0]	SD Data 0



UHS-II Interface Pad Assignment			
Pin #	Name	Type	Description
4	VDD1	Supply voltage	2.7V to 3.6V
7	ROCK+	Differential Signaling Input	Clock Input
8	ROCK-	Differential Signaling Input	Clock Input
10	VSS3	Ground	
11	DO+	Differential Signaling Input (PD) / Bidirectional (HD)	Input in default
12	DO-	Differential Signaling Input (PD) / Bidirectional (HD)	Input in default
13	VSS4	Ground	
14	VDD2	Supply voltage 2	1.70V to 1.96V
15	D1+	Differential Signaling Output (FD) / Bidirectional (HD)	Output in default
16	D1-	Differential Signaling Output (FD) / Bidirectional (HD)	Output in default
17	VSS5	Ground	



Frequency	12 MHz
Frequency Tolerance	±30 ppm
Effective Series Resistance	60fmax
Drive level	100uW
Load Capacitance(CL)	16-22pF

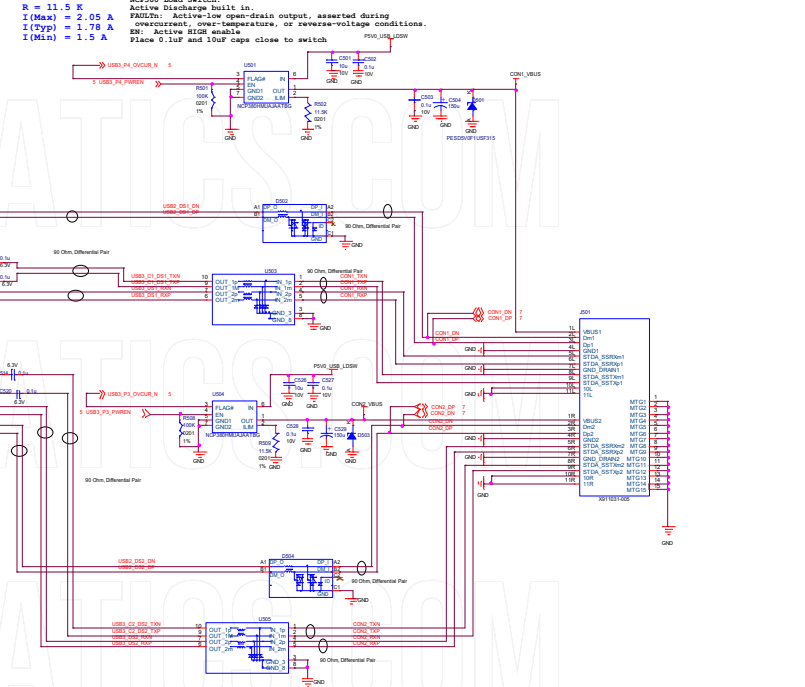
- ### UHS-II Card Operation Modes
- #### SD Bus Interface Modes
- DS - Default Speed up to 25MHz 3.3V signaling
 - HS - High Speed up to 50MHz 3.3V signaling
 - SDR12 - SDR up to 25MHz 1.8V signaling
 - SDR25 - SDR up to 100MHz 1.8V signaling
 - SDR50 - SDR up to 50MHz 1.8V signaling
 - SDR104 - SDR up to 208MHz 1.8V signaling (Optional)
 - DDR50 - DDR up to 50MHz 1.8V signaling (Optional for Standard Size Card)
- #### UHS-II Interface Modes
- FD150 - Full Duplex mode up to 150MB/s at 52MHz in Range B
 - HD312 - Half Duplex with 2 Lanes mode up to 312MB/s at 52MHz in Range B (Optional)

USB 3.0 Hub GL3523

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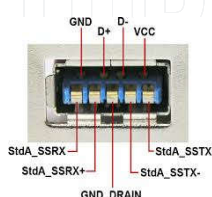
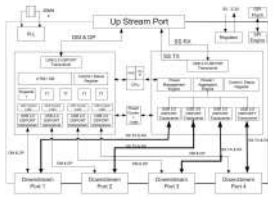
BT: More than the width of the micro-USB is equal to the micro-USB, between the two signals, and can be treated as a single differential pair. (0.127 mm).
 The time difference between signal pairs, of 2 D+.
 The time difference between signal pairs, of 2 D+.
 The UI for high bit rate (2.700ps/line), is 370 ps (nominal).
 201 = 2*370ps = 740ps skew
 PR4 (Inner Layer) => 180ps/in
 PR4 (Outer Layer) => 150ps/in

MC9380 Load Switch:
 Active Discharge built in.
 FMS200 Active-low open-drain output, asserted during overcurrent, over-temperature, or reverse-voltage conditions.
 EN: Active-LOW enable.
 Place 0.1uF and 10uF caps close to switch.

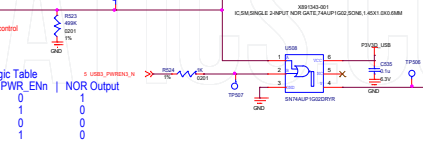


OVCURx = Active Low
 PWRBx = Active Low

Pin	Color	Signal name ("A" Connector)	Signal name ("B" Connector)	Description
Shell		Shield	Shield	Metal housing
1	Red	VBUS	VBUS	Power
2	White	D-	D-	USB 2.0 differential pair
3	Green	D+	D+	USB 2.0 differential pair
4	Black	GND	GND	Ground for power return
5	Blue	StdA_SSRX-	StdB_SSTX-	SuperSpeed transmitter differential pair
6	Yellow	StdA_SSRX+	StdB_SSTX+	SuperSpeed transmitter differential pair
7	Blue	GND_DRAIN	GND_DRAIN	Ground for signal return
8	Purple	StdA_SSTX-	StdB_SSRX-	SuperSpeed receiver differential pair
9	Orange	StdA_SSTX+	StdB_SSRX+	SuperSpeed receiver differential pair



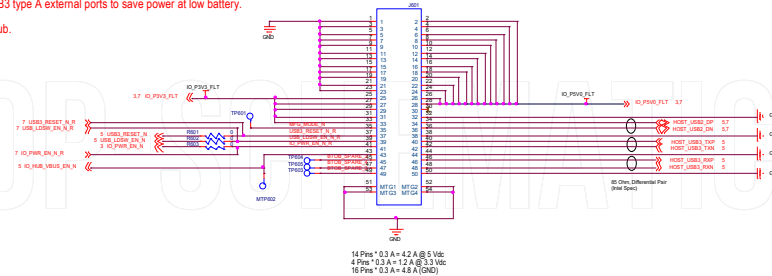
USB_LDSW_ENn	PWR_ENn	NOR Output
0	0	1
0	1	0
1	0	0
1	1	0



IO_PWR_EN_N = SAM JR signal to disable all IO board functionality (removes all power)

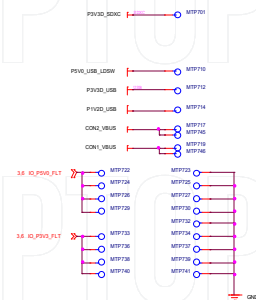
USB_LDSW_EN_N = Power down both USB3 type A external ports to save power at low battery.

USB3_RESET_N = Reset USB 3.0 4 port hub.

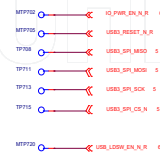


Bottom Side System Test Points

Power TP

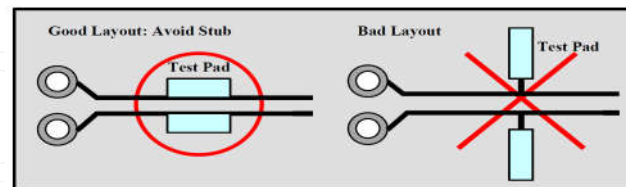
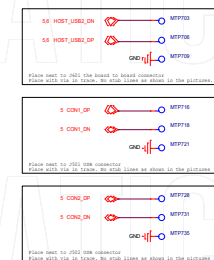


Debug/MTE TP



Note: Some test points are on the respective pages of the signal

USB2.0 TP



Mechanical Holes and Shielding

Holes updated: 4x 2.0mm PTH, 2x 2.95mm PTH, 2x 2.5mm PEM

