

KS10 FPGA DE10 Daughter Board Assembly Instructions

Please note: This is not a Heathkit. I've built one of these and it works for me.

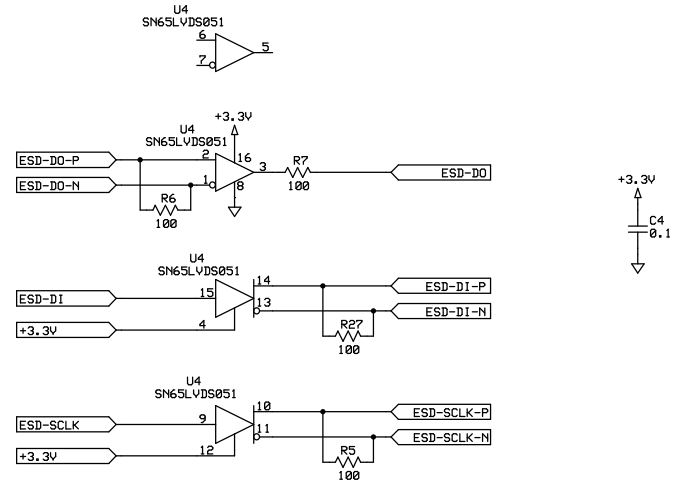
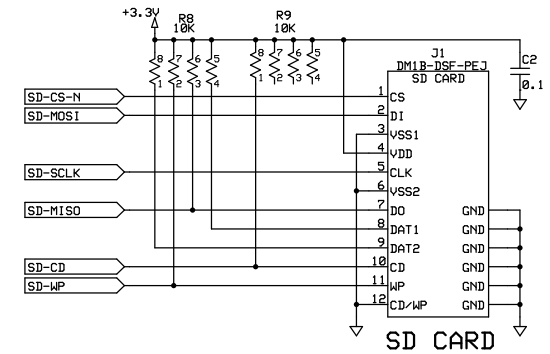
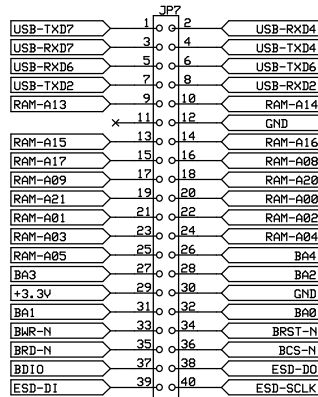
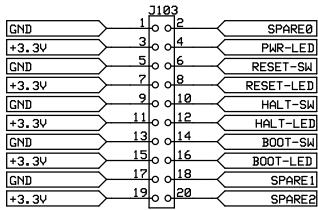
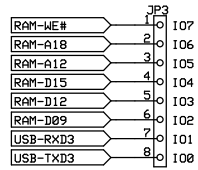
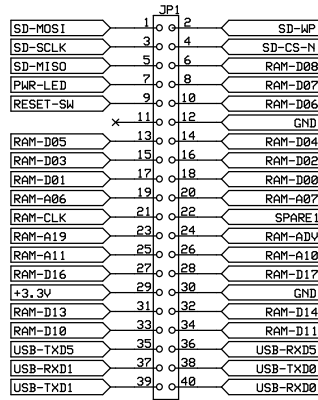
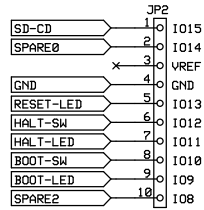
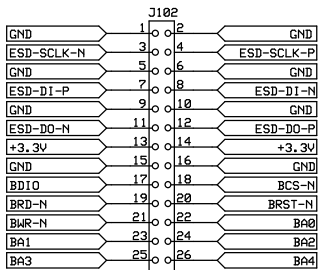
Some thoughts:

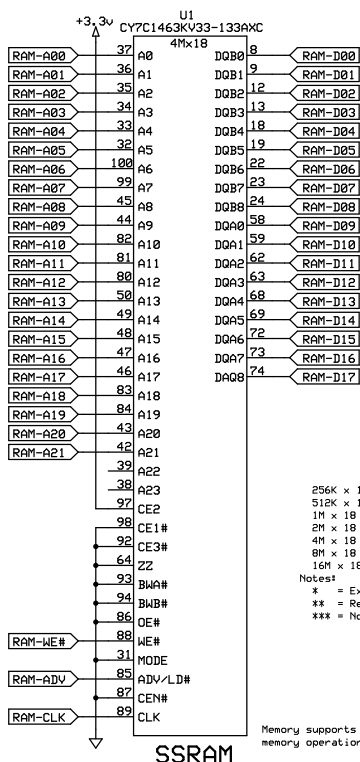
1. I recommend assembling all of the surface mount components before assembling any of the through-hole connectors. That just makes it easier to hold the PWB if it is relatively flat. The order of assembly of the SMT components doesn't matter.
2. JP1, JP2, JP3, and JP7 are mounted on the bottom of the PWB. Before soldering I installed these connectors into the DE10 Nano board and then fitted the KS10 Daughter Board onto the connectors – using the DE10 Nano board as a fixture to ensure that all the connectors were aligned and mated properly. Then I tack solder a few corner pins to hold the connectors in-place. One tack soldered, I removed the Daughter Board and inspected the connectors to ensure everything looked correct. Lastly I soldered all of the connector pins.
3. Lastly install the connectors for U2 and U3 on the top of the PWB. The FT4232 modules provide 8x RS232 channels which are used by the DZ11 terminal multiplexer and/or the LP20 printer.

J102 is a connector that will be eventually used as a gadget to connect multiple SD Cards emulating multiple RP06s. For now, it is not installed.

J103 is a connector that will be eventually wired to a front panel. For now, it is not installed.

Attached below is drawing of the top layer copper and top layer silkscreen, bottom layer copper and bottom layer silk screen, and a Bill of Materials from Digikey.



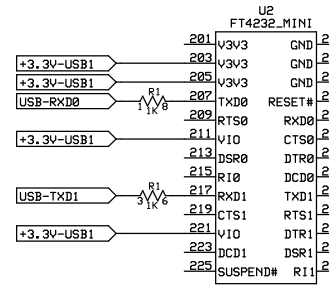
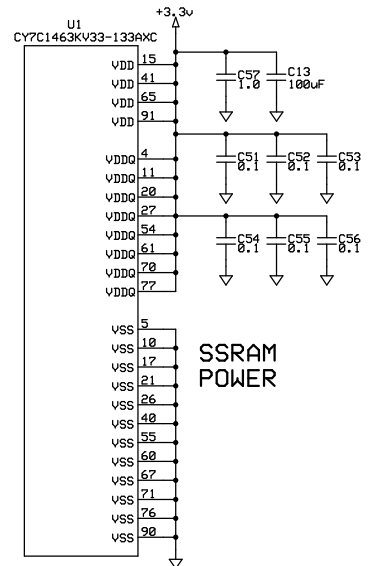


256K x 18
512K x 18
1M x 18 *
2M x 18 **
4M x 18 **
8M x 18 ***
16M x 18 ***

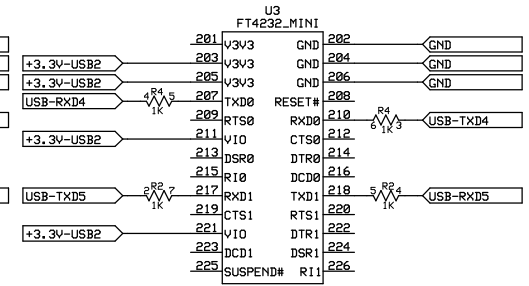
Notes:
* = Expensive
** = Really expensive
*** = Not yet available

Memory supports 2 word burst for 36-bit memory operations

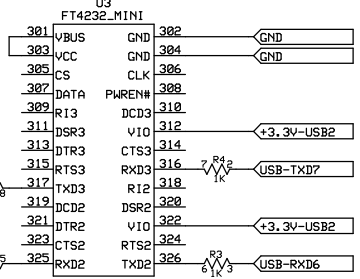
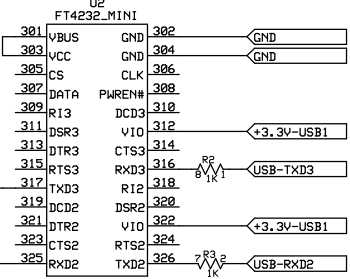
SSRAM

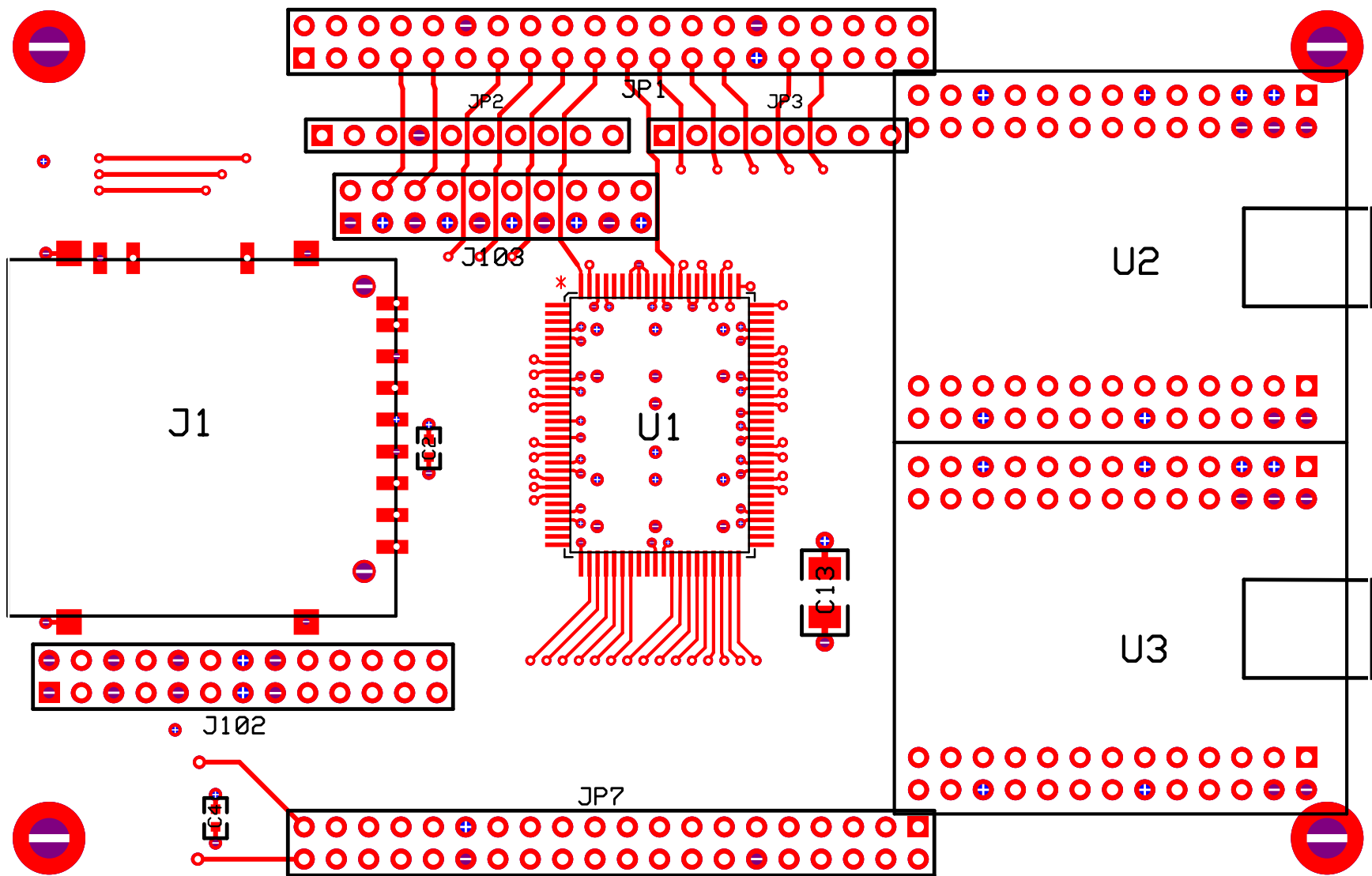


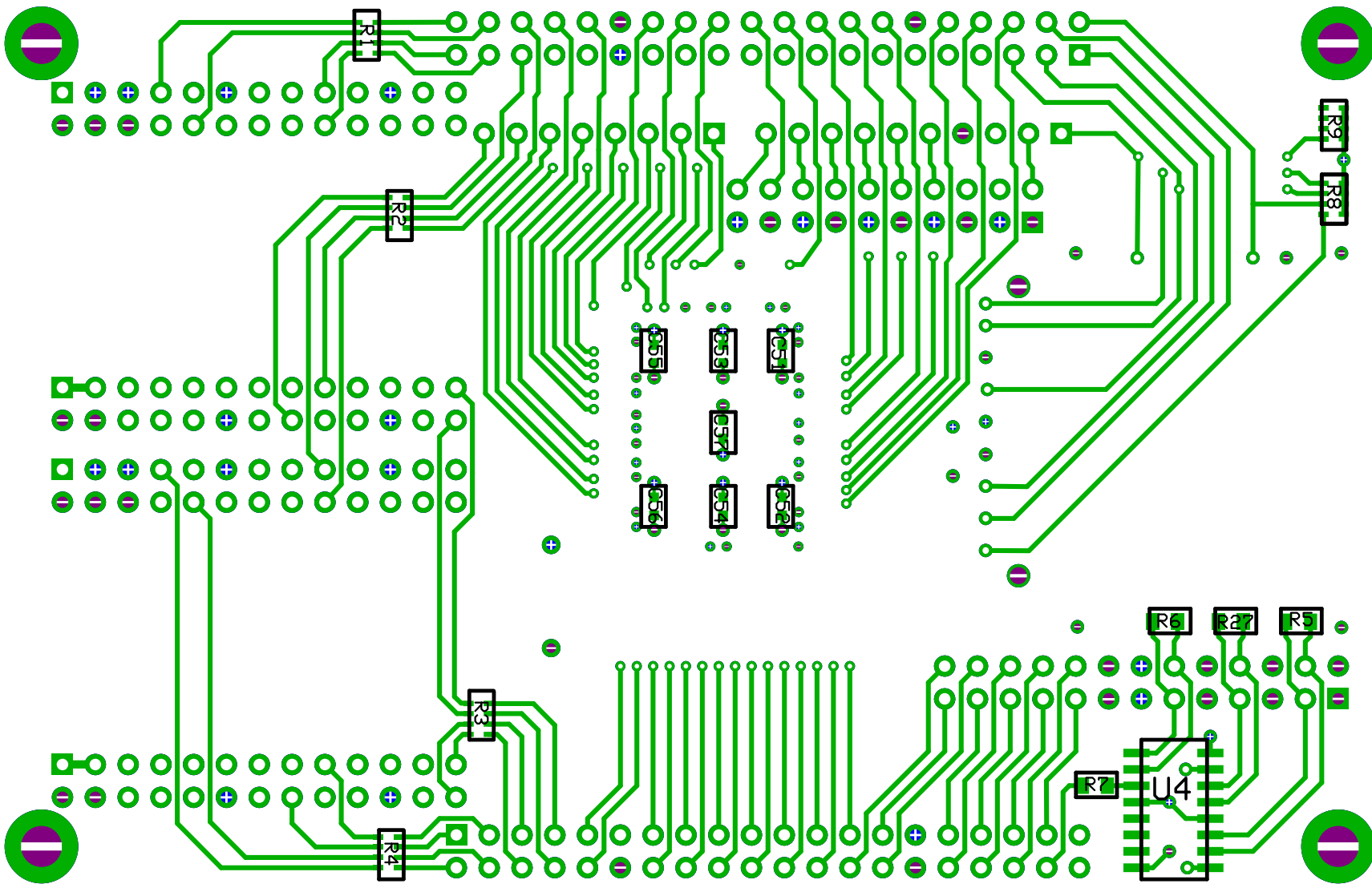
USB



USB







QTY	Manufacturer	Manufacturer Part Number	Cost (ea / USD)	Cost (total / USD)	Digikey Part Number	Description	Reference Designator
8	AVX	06033C104KAT2A	\$0.10	\$0.80	478-3714-1-ND	CAP CER 0.1UF 25V X7R 0603	C2,C4,C51,C52,C53,C54,C55,C56
1	AVX	0603ZD105KAT2A	\$0.20	\$0.20	478-1251-1-ND	CAP CER 1UF 10V X5R 0603	C57
1	AVX	GRM32ER60J107ME20L	\$0.80	\$0.80	490-3390-2-ND	CAP CER 100UF 6.3V X5R 1210	C13
1	Hirose	DM1AA-SF-PEJ(21)	\$3.58	\$3.58	HR845CT-ND	CONN SD CARD PUSH-PUSH R/A SMD	J1
2	Samtec	ESW-120-13-L-D	\$8.66	\$17.32	ESW-120-13-L-D-ND	CONN SOCKET 40POS 0.1 GOLD PCB	JP1,JP7
2	Samtec	TSW-110-15-G-S	\$1.64	\$3.28	SAM12344-ND	ESW-120-13-L-D-ND	JP2,JP3 (Note 1)
DNI	Samtec	TSW-113-07-F-D	\$2.62	N/A	SAM12370-ND	CONN HEADER VERT 26POS 2.54MM	J102,J103 (Note 2, Note 3)
4	Sullins	PPTC132LFBN-RC	\$1.58	\$6.32	S7081-ND	CONN HDR 26POS 0.1 TIN PCB	Socket for U2,U3
4	Bourns	CAY16-102J4LF	\$0.10	\$0.40	CAY16-102J4LFCT-ND	RES ARRAY 4 RES 1K OHM 1206	R1,R2,R3,R4
DNI	Stackpole	RMCF0805JT100R	\$0.10	N/A	RMCF0805JT100RCT-ND	RES 100 OHM 5% 1/8W 0805	R27,R5,R6,R7 (Note 3)
2	Bourns	CAY16-103J4LF	\$0.10	\$0.20	CAY16-103J4LFCT-ND	RES ARRAY 4 RES 10K OHM 1206	R8,R9
1	Cypress	CY7C1463KV33-133AXC	\$26.43	\$26.43	2015-CY7C1463KV33-133AXC-ND	IC SRAM 36MBIT PARALLEL 100TQFP	U1
2	FTDI	FT4232H MINI MODULE	\$33.02	\$66.04	768-1031-ND	MOD USB HS FT4232H EVAL	U2,U3
DNI	TI	SN65LVDS051	\$4.63	N/A	296-24422-1-ND	IC TRANSCEIVER FULL 2/2 16SOIC	U4 (Note 3)

Note 1: Cut JP3 to size before installing.

Note 2: Cut J103 to size before installing

Note 3: Do not install (DNI)

\$125.37	Total Cost
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