LPC4088-32 OEM Board Feature Highlights

The LPC4088-32 OEM Board provides a quick and easy solution for implementing a high-performance ARM Cortex-M4 based design around the LPC4088 from NXP.

- Build around NXP's ARM Cortex-M4 LPC4088 microcontroller with 512Kbyte internal FLASH and 96Kbyte internal SRAM
- 32MByte external SDRAM, via 32-bit databus
- 128 Mbyte NAND FLASH
- 32 Mbit QSPI flash
- 100/10Mbps Ethernet interface based on SMSC LAN8720
- 12.000 MHz and 32.768 kHz crystals for LPC4088
- Buffered 32-bit data bus
- +3.3V powering
- 200 pos expansion connector
  (as defined in popular SO-DIMM industry standard), 0.6mm pitch
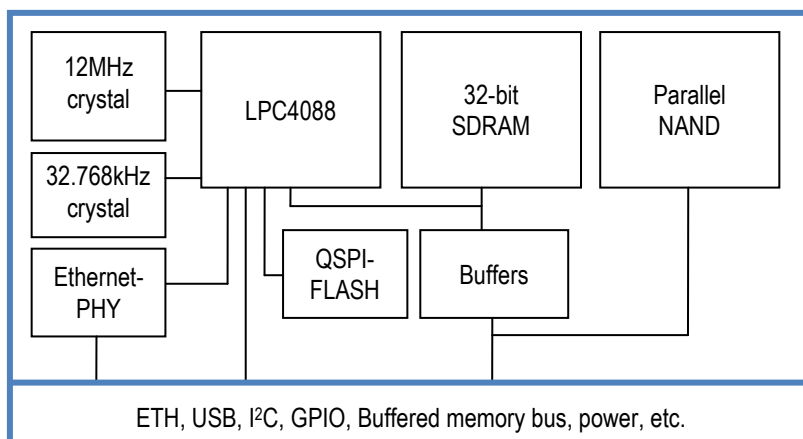- Compact design with dimensions: 68 x 50 mm

Support Highlights

- Access to Embedded Artists support page containing
  - Schematics
  - User's Manual
  - Sample software applications
  - OEM Board Integration Guide
- Supported by Developer's Kit, see picture to right
- Volume discount available
- Customization service available for optimized high-volume design

Block Diagram of LPC4088-32 OEM Board

12MHz crystal	LPC4088	32-bit SDRAM	Parallel NAND
32.768kHz crystal			
Ethernet-PHY	QSPI-FLASH	Buffers	

ETH, USB, I2C, GPIO, Buffered memory bus, power, etc.

NXP Partner

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Absolute Maximum Ratings

Parameter	Rating
VDD to GND (Supply voltage)	-0.5V to +3.6V
General for Digital/Analog Input/Output Voltage	-0.5V to VDD+0.5V
+5V tolerant pins on LPC4088	-0.5V to +6.0V (see LPC4088 DS for details)
Storage temperature	-40°C to 100°C

Stress above these limits may cause permanent damage to the board.

Technical Data

| Parameter	Min	Typical	Max
Supply voltage (VDD to GND)	3.15V	3.30V	3.50V
Ripple with frequency contents < 100kHz			40mV
Ripple with frequency contents ≥ 100kHz			10mV
Supply current			Max observed
- idle, 32kHz RTC active		TBD[2]	
- low-power mode		TBD[2]	
- executing from internal flash (120MHz)		TBD[2]	
- executing from external sdram (120MHz)		TBD[2]	
- Ethernet+usb active		TBD[2]	
VBAT current		TBD[2]	
Operating temperature[1]	-40°C		85°C
Relative Humidity (RH)			
0°C < T_A ≤ 50°C, non-condensing	5%		80%
50°C < T_A ≤ 60°C, non-condensing	5%		50%
60°C < T_A ≤ 70°C, non-condensing	5%		35%

[1] Extended temperature range can be supplied on request. Subject to minimum order volume.
[2] Will be defined after a characterization process.

Mechanical Dimensions

Board width according to SO-DIMM standard: 67.6 mm.
Board height and depth according to picture below:
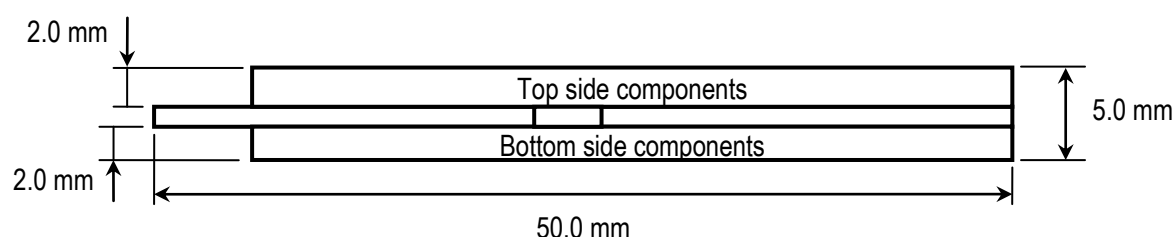
ESD CAUTION

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features ESD protection damages may occur on devices subjected to high energy ESD. Therefore, proper ESD precaution should be taken to avoid performance degradation or loss of functionality.

Pin Information

SO-DIMM pins	I/O, Application Details	Connected to	SO-DIMM pins	I/O, Application Details	Connected to
1	A, Ethernet TXP	Ethernet-PHY	101	P, GND	
2	A, Ethernet RXP	Ethernet-PHY	102	P, GND	
3	A, Ethernet TXN	Ethernet-PHY	103	NC	
4	A, Ethernet RXP	Ethernet-PHY	104	NC	
5	P, VDD3_3A		105	NC	
6	P, GND		106	NC	
7	OD, ETH-LED1	Ethernet-PHY	107	B, GPIO	LPC4088, P5.4
8	OD, ETH-LED2	Ethernet-PHY	108	B, GPIO	LPC4088, P5.3
9	P, VBAT-IN	LPC4088, vbat	109	B, GPIO	LPC4088, P5.2
10	O, RTC-ALARM	LPC4088, rtc-alarm	110	NC	
11	I, RESET-IN	LPC4088, rst-in	111	B, GPIO	LPC4088, P1.16
12	O, RESET-OUT	LPC4088, rst-out	112	NC	
13	NC		113	O, Buffered CS1 (internal NAND)	LPC4088, P4.31 via buffer
14	B, GPIO	LPC4088, P5.0	114	B, GPIO	LPC4088, P4.30
15	O, TCK/SWDCLK	LPC4088, tck/swdclk	115	B, GPIO	LPC4088, P1.16
16	B, GPIO	LPC4088, P5.4	116	B, GPIO	LPC4088, P2.14
17	I, TRST	LPC4088, trst	117	B, GPIO	LPC4088, P2.15
18	B, TMS/SWDIO	LPC4088, tms/swdio	118	B, GPIO	LPC4088, P2.19
19	I, TDI	LPC4088, tdi	119	B, GPIO	LPC4088, P2.21
20	O, TDO/SWO	LPC4088, tdo/swo	120	B, GPIO	LPC4088, P2.22
21	P, V3A	LPC4088, v3a	121	B, GPIO	LPC4088, P2.23
22	P, VREF	LPC4088, vref	122	B, GPIO	LPC4088, P2.25
23	P, VSSA	LPC4088, vssa	123	B, GPIO	LPC4088, P2.26
24	P, GND		124	B, GPIO	LPC4088, P2.27
25	B, GPIO	LPC4088, P2.0	125	NC	
26	B, GPIO	LPC4088, P2.1	126	NC	
27	B, GPIO	LPC4088, P2.2	127	NC	
28	B, GPIO	LPC4088, P2.3	128	NC	
29	B, GPIO	LPC4088, P2.4	129	P, GND	
30	B, GPIO	LPC4088, P2.5	130	P, GND	
31	B, GPIO	LPC4088, P2.6	131	O, Buffered Address bus 15	LPC4088, P4.15 via buffer
32	B, GPIO	LPC4088, P0.10	132	O, Buffered CS2	LPC4088, P2.14 via buffer
33	B, GPIO	LPC4088, P2.8	133	O, Buffered Address bus 14	LPC4088, P4.14 via buffer
34	B, GPIO	LPC4088, P2.9	134	O, Buffered CS0	LPC4088, P4.30 via buffer
35	B, GPIO	LPC4088, P2.10	135	O, Buffered Address bus 13	LPC4088, P4.13 via buffer
36	B, GPIO	LPC4088, P2.11	136	O, Buffered BLS3	LPC4088, P4.29 via buffer
37	P, VCC		137	O, Buffered Address bus 12	LPC4088, P4.12 via buffer
38	P, GND		138	O, Buffered BLS2	LPC4088, P4.28 via buffer
39	P, VCC		139	O, Buffered Address bus 11	LPC4088, P4.11 via buffer
40	P, GND		140	O, Buffered BLS1	LPC4088, P4.27 via buffer
41	A, USB1-DP	LPC4088, USB-D+1	141	O, Buffered Address bus 10	LPC4088, P4.10 via buffer
42	A, USB2-DP	LPC4088, USB-D+2	142	O, Buffered BLS0	LPC4088, P4.26 via buffer
43	A, USB1-DM	LPC4088, USB-D-1	143	O, Buffered Address bus 9	LPC4088, P4.9 via buffer
44	A, USB2-DM	LPC4088, USB-D-2	144	O, Buffered WE	LPC4088, P4.25 via buffer
45	B, GPIO	LPC4088, P2.12	145	O, Buffered Address bus 8	LPC4088, P4.8 via buffer
46	B, GPIO	LPC4088, P2.13	146	O, Buffered OE	LPC4088, P4.24 via buffer
47	B, GPIO	LPC4088, P0.0	147	O, Buffer Address bus 7	LPC4088, P4.7 via buffer
48	B, GPIO	LPC4088, P0.1	148	O, Buffer Address bus 23	LPC4088, P4.23 via buffer
49	B, GPIO	LPC4088, P0.2	149	O, Buffer Address bus 6	LPC4088, P4.6 via buffer
50	B, GPIO	LPC4088, P0.3	150	O, Buffer Address bus 22	LPC4088, P4.22 via buffer
51	B, GPIO	LPC4088, P0.4	151	O, Buffer Address bus 5	LPC4088, P4.5 via buffer
52	B, GPIO	LPC4088, P0.5	152	O, Buffer Address bus 21	LPC4088, P4.21 via buffer
53	B, GPIO	LPC4088, P0.6	153	O, Buffer Address bus 4	LPC4088, P4.4 via buffer

54	B, GPIO	LPC4088, P0.7		154	O, Buffer Address bus 20	LPC4088, P4.20 via buffer
55	B, GPIO	LPC4088, P0.8		155	O, Buffer Address bus 3	LPC4088, P4.3 via buffer
56	B, GPIO	LPC4088, P0.9		156	O, Buffer Address bus 19	LPC4088, P4.19 via buffer
57	B, GPIO	LPC4088, P4.22		157	O, Buffer Address bus 2	LPC4088, P4.2 via buffer
58	B, GPIO	LPC4088, P4.23		158	O, Buffer Address bus 18	LPC4088, P4.18 via buffer
59	B, GPIO	LPC4088, P0.12		159	O, Buffer Address bus 1	LPC4088, P4.1 via buffer
60	B, GPIO	LPC4088, P0.13		160	O, Buffer Address bus 17	LPC4088, P4.17 via buffer
61	B, GPIO	LPC4088, P0.14		161	O, Buffer Address bus 0	LPC4088, P4.0 via buffer
62	B, GPIO	LPC4088, P5.2		162	O, Buffer Address bus 16	LPC4088, P4.16 via buffer
63	B, GPIO	LPC4088, P5.3		163	O, Buffered CS3	LPC4088, P2.15 via buffer
64	B, GPIO	LPC4088, P5.1		164	I, ABUF_EN	Connected to GND on board
65	B, GPIO	LPC4088, P5.0		165	P, Buffer-VCC	
66	B, GPIO	LPC4088, P0.19		166	P, GND	
67	B, GPIO	LPC4088, P0.20		167	B, Buffer Data bus 15	LPC4088, P3.15 via buffer
68	B, GPIO	LPC4088, P0.21		168	B, Buffer Data bus 31	LPC4088, P3.31 via buffer
69	B, SPIFI-CLK	LPC4088, P0.22		169	B, Buffer Data bus 14	LPC4088, P3.14 via buffer
70	B, GPIO	LPC4088, P0.23		170	B, Buffer Data bus 30	LPC4088, P3.30 via buffer
71	B, GPIO	LPC4088, P0.24		171	B, Buffer Data bus 13	LPC4088, P3.13 via buffer
72	B, GPIO	LPC4088, P0.25		172	B, Buffer Data bus 29	LPC4088, P3.29 via buffer
73	B, GPIO	LPC4088, P0.26		173	B, Buffer Data bus 12	LPC4088, P3.12 via buffer
74	B, I2C-SDA	LPC4088, P0.27		174	B, Buffer Data bus 28	LPC4088, P3.28 via buffer
75	B, I2C-SCL	LPC4088, P0.28		175	B, Buffer Data bus 11	LPC4088, P3.11 via buffer
76	P, GND			176	B, Buffer Data bus 27	LPC4088, P3.27 via buffer
77	P, GND			177	B, Buffer Data bus 10	LPC4088, P3.10 via buffer
78	B, GPIO	LPC4088, P1.2		178	B, Buffer Data bus 26	LPC4088, P3.26 via buffer
79	B, GPIO	LPC4088, P1.3		179	B, Buffer Data bus 9	LPC4088, P3.9 via buffer
80	B, GPIO	LPC4088, P1.5		180	B, Buffer Data bus 25	LPC4088, P3.25 via buffer
81	B, GPIO	LPC4088, P1.6		181	B, Buffer Data bus 8	LPC4088, P3.8 via buffer
82	B, GPIO	LPC4088, P1.7		182	B, Buffer Data bus 24	LPC4088, P3.24 via buffer
83	B, GPIO	LPC4088, P1.11		183	B, Buffer Data bus 7	LPC4088, P3.7 via buffer
84	B, GPIO	LPC4088, P1.12		184	B, Buffer Data bus 23	LPC4088, P3.23 via buffer
85	B, GPIO	LPC4088, P1.13		185	B, Buffer Data bus 6	LPC4088, P3.6 via buffer
86	B, GPIO	LPC4088, P1.18		186	B, Buffer Data bus 22	LPC4088, P3.22 via buffer
87	B, GPIO	LPC4088, P1.19		187	B, Buffer Data bus 5	LPC4088, P3.5 via buffer
88	B, GPIO	LPC4088, P1.20		188	B, Buffer Data bus 21	LPC4088, P3.21 via buffer
89	B, GPIO	LPC4088, P1.21		189	B, Buffer Data bus 4	LPC4088, P3.4 via buffer
90	B, GPIO	LPC4088, P1.22		190	B, Buffer Data bus 20	LPC4088, P3.20 via buffer
91	B, GPIO	LPC4088, P1.23		191	B, Buffer Data bus 3	LPC4088, P3.3 via buffer
92	B, GPIO	LPC4088, P1.24		192	B, Buffer Data bus 19	LPC4088, P3.19 via buffer
93	B, GPIO	LPC4088, P1.25		193	B, Buffer Data bus 2	LPC4088, P3.2 via buffer
94	B, GPIO	LPC4088, P1.26		194	B, Buffer Data bus 18	LPC4088, P3.18 via buffer
95	B, GPIO	LPC4088, P1.27		195	B, Buffer Data bus 1	LPC4088, P3.1 via buffer
96	B, GPIO	LPC4088, P1.28		196	B, Buffer Data bus 17	LPC4088, P3.17 via buffer
97	B, GPIO	LPC4088, P1.29		197	B, Buffer Data bus 0	LPC4088, P3.0 via buffer
98	B, GPIO	LPC4088, P1.30		198	B, Buffer Data bus 16	LPC4088, P3.16 via buffer
99	B, GPIO	LPC4088, P1.31		199	P, Buffer-VCC	
100	OD, NandFlashRdy	Internal NAND flash		200	P, GND	

I/O legend
O: output
I: input
B: Bidirectional
P: Power
A: Analog

OD: Open-drain output
GPIO: General purpose I/O
GPI: General purpose input
GPO: General purpose output

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