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Embedded Artists'

LPC4357 OEM Board DS rev A DS

The Art of Embedded Systems Development – made Easy™



Document status: Preliminary

LPC4357 OEM Board Feature Highlights

The LPC4357 OEM Board provides a quick and easy solution for implementing a high-performance ARM dual-core Cortex-M4/M0 based design around the LPC4357 from NXP.

- Build around NXP's ARM dual-core Cortex-M4/M0 LPC4357 microcontroller with 1Mbyte FLASH and 136Kbyte SRAM
- 32MByte external SDRAM, via 32-bit databus
- 128 Mbyte NAND FLASH
- 16 Mbit QSPI flash
- 100/10Mbps Ethernet interface based on SMSC LAN8720
- 12.000 MHz and 32.768 kHz crystals for LPC4357
- Buffered 32-bit data bus
- uSD memory card interface connector
- +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

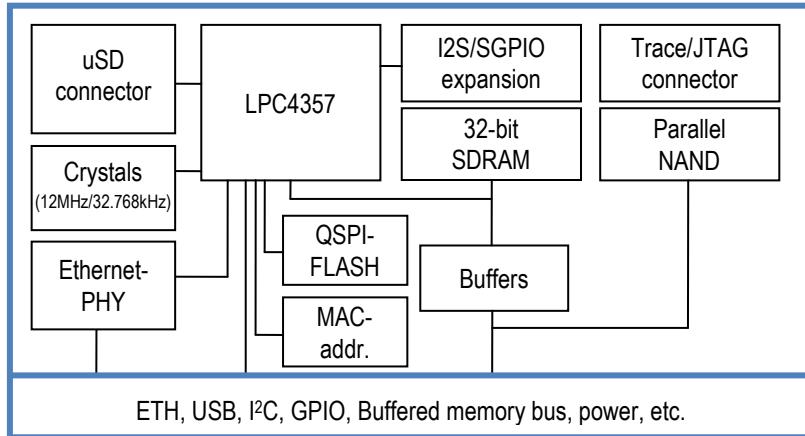


Support Highlights

- 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 LPC4357 OEM Board



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Embedded Artists is a partner of NXP. Together we give engineers an excellent base to work from when creating advanced embedded systems. We have a close co-operation and know everything there is to know about the NXP processors. Take advantage of our unique knowledge! For further information, please contact: support@EmbeddedArtists.com



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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 +5V tolerant pins on LPC4357 | -0.5V to VDD+0.5V -0.5V to +6.0V (see LPC4357 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) | 3.10V | 3.30V | 3.50V |
| Ripple with frequency contents < 100kHz | | | 50mV |
| Ripple with frequency contents \geq 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 sram (120MHz) | | TBD ^[2] | |
| - Ethernet+usb active | | TBD ^[2] | |
| VBAT current | | TBD ^[2] | |
| Operating temperature ^[1] | | TBD ^[2] | |
| Relative Humidity (RH) | | | |
| 0°C < T _A \leq 50°C, non-condensing | 5% | | 80% |
| 50°C < T _A \leq 60°C, non-condensing | 5% | | 50% |
| 60°C < T _A \leq 70°C, non-condensing | 5% | | 35% |

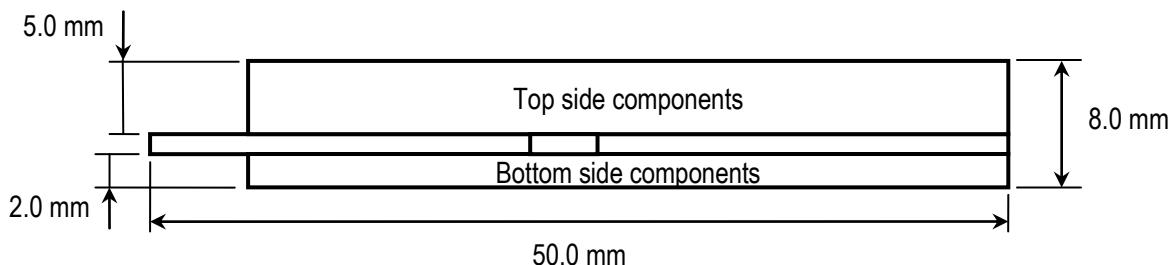
[1] Extended temperature range can be supplied on request. Subject to minimum order volume.

[2] Will be defined after a characterization process.

Mechanical Dimensions

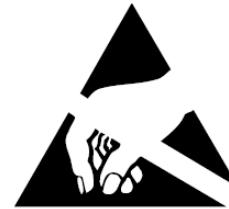
Board width according to SO-DIMM standard: 67.6 mm.

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.



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Pin Information

| SO-DIMM pins | I/O, Application Details | Connected to |
|--------------|--------------------------|---------------------------------|
| 1 | A, Ethernet TXP | Ethernet-PHY |
| 2 | A, Ethernet RXP | Ethernet-PHY |
| 3 | A, Ethernet TXN | Ethernet-PHY |
| 4 | A, Ethernet RXP | Ethernet-PHY |
| 5 | P, VDD3_3A | |
| 6 | P, GND | |
| 7 | OD, ETH-LED1 | Ethernet-PHY |
| 8 | OD, ETH-LED2 | Ethernet-PHY |
| 9 | P, VBAT-IN | LPC4357, vbat |
| 10 | O, RTC-ALARM | LPC4357, alarm |
| 11 | B, RESET-IN | LPC4357, rst (same as below) |
| 12 | B, RESET-OUT | LPC4357, rst (same as above) |
| 13 | B, GPIO | LPC4357, PE_14 |
| 14 | I, DBGEN | LPC4357, dbgen |
| 15 | O, TCK/SWDCLK | LPC4357, tck/swdclk |
| 16 | A, ADCIN | LPC4357, ADC7 |
| 17 | I, TRST | LPC4357, trst |
| 18 | B, TMS/SWDIO | LPC4357, tms/swdio |
| 19 | I, TDI | LPC4357, tdi |
| 20 | O, TDO/SWO | LPC4357, tdo/swo |
| 21 | P, VDDA | LPC4357, vdda |
| 22 | A, ADCIN | LPC4357, ADC6 |
| 23 | P, VSSA | LPC4357, vssa |
| 24 | P, GND | |
| 25 | B, GPIO | LPC4357, P7_7 |
| 26 | B, GPIO | LPC4357, P7_0 |
| 27 | B, CLKIO | LPC4357, P4_7 |
| 28 | B, GPIO | LPC4357, P4_5 |
| 29 | B, GPIO | LPC4357, P4_6 |
| 30 | B, GPIO | LPC4357, P7_6 |
| 31 | B, GPIO | LPC4357, P8_7 |
| 32 | B, GPIO | LPC4357, P8_6 |
| 33 | B, GPIO | LPC4357, P8_5 |
| 34 | B, GPIO | LPC4357, P8_4 |
| 35 | I, ISP_EN | pull low to enable special boot |
| 36 | B, CLKIO | LPC4357, PF_4 |
| 37 | P, VCC | |
| 38 | P, GND | |
| 39 | P, VCC | |
| 40 | P, GND | |
| 41 | A, USB1-DP | LPC4357, USB-D1+ |
| 42 | A, USB0-DP | LPC4357, USB-D0+ |
| 43 | A, USB1-DM | LPC4357, USB-D1- |
| 44 | A, USB0-DM | LPC4357, USB-D0- |
| 45 | B, GPIO | LPC4357, P7_2 |
| 46 | B, GPIO | LPC4357, P7_1 |
| 47 | B, GPIO | LPC4357, P3_1 |
| 48 | B, GPIO | LPC4357, P3_2 |
| 49 | B, GPIO | LPC4357, PF_10 |
| 50 | B, GPIO | LPC4357, PF_11 |
| 51 | B, GPIO | LPC4357, P4_1 |
| 52 | B, GPIO | LPC4357, P4_4 |
| 53 | B, GPIO | LPC4357, P7_5 |

| SO-DIMM pins | I/O, Application Details | Connected to |
|--------------|----------------------------|---------------------------|
| 101 | P, GND | |
| 102 | P, GND | |
| 103 | B, CLKIO | LPC4357, P3_0 |
| 104 | B, GPIO | LPC4357, PC_12 |
| 105 | B, GPIO | LPC4357, PC_13 |
| 106 | B, CLKIO | LPC4357, P6_0 |
| 107 | B, GPIO | LPC4357, P6_1 |
| 108 | B, GPIO | LPC4357, P6_2 |
| 109 | I, WAKEUP | LPC4357, WAKEUP3 |
| 110 | I, WAKEUP | LPC4357, WAKEUP2 |
| 111 | I, WAKEUP | LPC4357, WAKEUP1 |
| 112 | I, WAKEUP | LPC4357, WAKEUP0 |
| 113 | A, USB_ID | LPC4357, USB0_ID |
| 114 | O, SAMPLE | LPC4357, SAMPLE_N |
| 115 | B, CLKIO | LPC4357, CLK2 |
| 116 | B, GPIO | LPC4357, P9_2 |
| 117 | B, GPIO | LPC4357, P8_1 |
| 118 | B, GPIO | LPC4357, P8_2 |
| 119 | B, GPIO | LPC4357, PC_2 |
| 120 | B, GPIO | LPC4357, PA_1 |
| 121 | B, GPIO | LPC4357, PA_2 |
| 122 | B, GPIO | LPC4357, PA_3 |
| 123 | B, GPIO | LPC4357, P9_0 |
| 124 | B, GPIO | LPC4357, P9_1 |
| 125 | B, GPIO | LPC4357, PF_8 |
| 126 | B, GPIO | LPC4357, PF_9 |
| 127 | B, GPIO | LPC4357, P4_3 |
| 128 | B, GPIO | LPC4357, P4_2 |
| 129 | P, GND | |
| 130 | P, GND | |
| 131 | O, Buffered Address bus 15 | LPC4357, P6_7 via buffer |
| 132 | O, Buffered CS2 | LPC4357, PD_12 via buffer |
| 133 | O, Buffered Address bus 14 | LPC4357, P6_8 via buffer |
| 134 | O, Buffered CS0 | LPC4357, P1_5 via buffer |
| 135 | O, Buffered Address bus 13 | LPC4357, P2_0 via buffer |
| 136 | O, Buffered BLS3 | LPC4357, PD_10 via buffer |
| 137 | O, Buffered Address bus 12 | LPC4357, P2_1 via buffer |
| 138 | O, Buffered BLS2 | LPC4357, PD_13 via buffer |
| 139 | O, Buffered Address bus 11 | LPC4357, P2_2 via buffer |
| 140 | O, Buffered BLS1 | LPC4357, P6_6 via buffer |
| 141 | O, Buffered Address bus 10 | LPC4357, P2_6 via buffer |
| 142 | O, Buffered BLS0 | LPC4357, P1_4 via buffer |
| 143 | O, Buffered Address bus 9 | LPC4357, P2_7 via buffer |
| 144 | O, Buffered WE | LPC4357, P1_6 via buffer |
| 145 | O, Buffered Address bus 8 | LPC4357, P2_8 via buffer |
| 146 | O, Buffered OE | LPC4357, P1_3 via buffer |
| 147 | O, Buffer Address bus 7 | LPC4357, P1_2 via buffer |
| 148 | O, Buffer Address bus 23 | LPC4357, PA_4 via buffer |
| 149 | O, Buffer Address bus 6 | LPC4357, P1_1 via buffer |
| 150 | O, Buffer Address bus 22 | LPC4357, PE_4 via buffer |
| 151 | O, Buffer Address bus 5 | LPC4357, P1_0 via buffer |
| 152 | O, Buffer Address bus 21 | LPC4357, PE_3 via buffer |
| 153 | O, Buffer Address bus 4 | LPC4357, P2_13 via buffer |

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| | | |
|-----|------------------|------------------------|
| 54 | B, GPIO | LPC4357, P4_8 |
| 55 | B, GPIO | LPC4357, P7_4 |
| 56 | B, GPIO | LPC4357, P7_3 |
| 57 | B, GPIO | LPC4357, P9_3 |
| 58 | B, GPIO | LPC4357, P2_4 |
| 59 | O, GPO | inverted LPC4357, P2_3 |
| 60 | B, GPIO | LPC4357, P9_4 |
| 61 | B, GPIO | LPC4357, P9_5 |
| 62 | B, CLKIO | LPC4357, PF_0 |
| 63 | B, GPIO | LPC4357, PF_1 |
| 64 | B, GPIO | LPC4357, PF_2 |
| 65 | B, GPIO | LPC4357, PF_3 |
| 66 | B, GPIO | LPC4357, P4_0 |
| 67 | B, GPIO | LPC4357, PE_15 |
| 68 | A, ADCIN | LPC4357, ADC5 |
| 69 | A, ADCIN | LPC4357, ADC4 |
| 70 | A, ADCIN | LPC4357, ADC1 |
| 71 | A, ADCIN | LPC4357, ADC2 |
| 72 | A, ADCIN | LPC4357, ADC3 |
| 73 | A, ADCIN/DACOUT | LPC4357, ADC0/DACOUT |
| 74 | B, I2C-SDA | LPC4357, I2C_SDA |
| 75 | B, I2C-SCL | LPC4357, I2C_SCL |
| 76 | P, GND | |
| 77 | P, GND | |
| 78 | B, GPIO | LPC4357, PF_5 |
| 79 | B, GPIO | LPC4357, PC_11 |
| 80 | B, GPIO | LPC4357, PC_3 |
| 81 | B, GPIO | LPC4357, PD_14 |
| 82 | B, GPIO | LPC4357, PF_7 |
| 83 | B, GPIO | LPC4357, PC_14 |
| 84 | B, GPIO | LPC4357, P2_5 |
| 85 | B, CLKIO | LPC4357, P8_8 |
| 86 | B, GPIO | LPC4357, P9_6 |
| 87 | B, GPIO | LPC4357, PF_6 |
| 88 | B, GPIO | LPC4357, P4_10 |
| 89 | B, GPIO | LPC4357, P4_9 |
| 90 | B, GPIO | LPC4357, P8_3 |
| 91 | B, GPIO | LPC4357, PB_6 |
| 92 | B, GPIO | LPC4357, PB_5 |
| 93 | B, GPIO | LPC4357, PB_4 |
| 94 | B, GPIO | LPC4357, PB_3 |
| 95 | B, GPIO | LPC4357, PB_2 |
| 96 | B, GPIO | LPC4357, PB_1 |
| 97 | B, GPIO | LPC4357, PB_0 |
| 98 | B, GPIO | LPC4357, USB0_VBUS |
| 99 | B, GPIO | LPC4357, P8_0 |
| 100 | OD, NandFlashRdy | Internal NAND flash |

I/O legend

O: output

I: input

B: Bidirectional

P: Power

A: Analog

| | | |
|-----|--------------------------|---------------------------|
| 154 | O, Buffer Address bus 20 | LPC4357, PE_2 via buffer |
| 155 | O, Buffer Address bus 3 | LPC4357, P2_12 via buffer |
| 156 | O, Buffer Address bus 19 | LPC4357, PE_1 via buffer |
| 157 | O, Buffer Address bus 2 | LPC4357, P2_11 via buffer |
| 158 | O, Buffer Address bus 18 | LPC4357, PE_0 via buffer |
| 159 | O, Buffer Address bus 1 | LPC4357, P2_10 via buffer |
| 160 | O, Buffer Address bus 17 | LPC4357, PD_15 via buffer |
| 161 | O, Buffer Address bus 0 | LPC4357, P2_9 via buffer |
| 162 | O, Buffer Address bus 16 | LPC4357, PD_16 via buffer |
| 163 | O, Buffered CS3 | LPC4357, PD_11 via buffer |
| 164 | NC | |
| 165 | P, Buffer-VCC | |
| 166 | P, GND | |
| 167 | B, Buffer Data bus 15 | LPC4357, P5_3 via buffer |
| 168 | B, Buffer Data bus 31 | LPC4357, PE_12 via buffer |
| 169 | B, Buffer Data bus 14 | LPC4357, P5_2 via buffer |
| 170 | B, Buffer Data bus 30 | LPC4357, PE_11 via buffer |
| 171 | B, Buffer Data bus 13 | LPC4357, P5_1 via buffer |
| 172 | B, Buffer Data bus 29 | LPC4357, PE_10 via buffer |
| 173 | B, Buffer Data bus 12 | LPC4357, P5_0 via buffer |
| 174 | B, Buffer Data bus 28 | LPC4357, PE_9 via buffer |
| 175 | B, Buffer Data bus 11 | LPC4357, P5_7 via buffer |
| 176 | B, Buffer Data bus 27 | LPC4357, PE_8 via buffer |
| 177 | B, Buffer Data bus 10 | LPC4357, P5_6 via buffer |
| 178 | B, Buffer Data bus 26 | LPC4357, PE_7 via buffer |
| 179 | B, Buffer Data bus 9 | LPC4357, P5_5 via buffer |
| 180 | B, Buffer Data bus 25 | LPC4357, PE_6 via buffer |
| 181 | B, Buffer Data bus 8 | LPC4357, P5_4 via buffer |
| 182 | B, Buffer Data bus 24 | LPC4357, PE_5 via buffer |
| 183 | B, Buffer Data bus 7 | LPC4357, P1_14 via buffer |
| 184 | B, Buffer Data bus 23 | LPC4357, PD_9 via buffer |
| 185 | B, Buffer Data bus 6 | LPC4357, P1_13 via buffer |
| 186 | B, Buffer Data bus 22 | LPC4357, PD_8 via buffer |
| 187 | B, Buffer Data bus 5 | LPC4357, P1_12 via buffer |
| 188 | B, Buffer Data bus 21 | LPC4357, PD_7 via buffer |
| 189 | B, Buffer Data bus 4 | LPC4357, P1_11 via buffer |
| 190 | B, Buffer Data bus 20 | LPC4357, PD_6 via buffer |
| 191 | B, Buffer Data bus 3 | LPC4357, P1_10 via buffer |
| 192 | B, Buffer Data bus 19 | LPC4357, PD_5 via buffer |
| 193 | B, Buffer Data bus 2 | LPC4357, P1_9 via buffer |
| 194 | B, Buffer Data bus 18 | LPC4357, PD_4 via buffer |
| 195 | B, Buffer Data bus 1 | LPC4357, P1_8 via buffer |
| 196 | B, Buffer Data bus 17 | LPC4357, PD_3 via buffer |
| 197 | B, Buffer Data bus 0 | LPC4357, P1_7 via buffer |
| 198 | B, Buffer Data bus 16 | LPC4357, PD_2 via buffer |
| 199 | P, Buffer-VCC | |
| 200 | P, GND | |

OD: Open-drain output

GPIO: General purpose I/O

GPI: General purpose input

GPO: General purpose output

CLKIO: Pin dedicated to clock signals

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