

## LPC-H2124 HEADER BOARD FOR LPC2124 ARM7TDMI-S MICROCONTROLLER

### Features:

- MCU: LPC2124 16/32 bit ARM7TDMI-S™ with 256K Bytes Program Flash, 16K Bytes RAM, RTC, 4x 10 bit ADC 2.44 uS, 2x UART, I2C, SPI, 2x 32bit TIMERS, 7x CCR, 6x PWM, WDT, 5V tolerant I/O, up to 60MHz operation
- standard JTAG connector with ARM 2x10 pin layout for programming/debugging with ARM-JTAG
- two on board voltage regulators 1.8V and 3.3V with up to 800mA current
- single power supply: +5VDC required
- power supply status LED
- power supply filtering capacitor
- RESET circuit with external control of Philips ISP utility via RS232
- RESET button
- DBG jumper for JTAG enable
- BSL jumper for Bootloader enable
- JRST jumper for enable/disable external RESET control by RS232
- 10 Mhz crystal
- extension headers for all uC ports
- PCB: FR-4, 1.5 mm (0,062"), green soldermask, white silkscreen component print
- Dimensions: 76x55 mm (3.0x2.2")
- space between the pin rows: 48.26 mm (1.9")

### Supported devices:

Philips Semiconductors Inc. LPC2124 16/32 bit ARM7TDMI-S™

### JTAG interface:

The JTAG connector is 2x10 pin with 0,1" step and ARM recommended JTAG layout. PIN.1 is marked with square pad on bottom and arrow on top.

**Note:** to enable JTAG interface DBG jumper should be shorted at the time of POWER UP.

**Important:** when JTAG is enabled P1.16-P1.31 ports take their JTAG alternative function no matter of PINSEL1 register value, so during debugging with JTAG these ports are not available for the user program.

### JTAG signals description:

**PIN.1 (VTREF)** Target voltage sense. Used to indicate the target's operating voltage to the debug tool.

**PIN.2 (VTARGET)** Target voltage. May be used to supply power to the debug tool.

**PIN.3 (nTRST)** JTAG TAP reset, this signal should be pulled up to Vcc in target board.

**PIN.4,6, 8, 10,12,14,16,18,20** Ground. The Gnd-Signal-Gnd-Signal strategy implemented on the 20-way connection scheme improves noise immunity on the target connect cable.

**PIN.5 (TDI)** JTAG serial data in, should be pulled up to Vcc on target board.

**PIN.7 (TMS)** JTAG TAP Mode Select, should be pulled up to Vcc on target board.

**PIN.9 (TCK)** JTAG clock.

**PIN.11 (RTCK)** JTAG re-timed clock. Implemented on certain ASIC ARM implementations the host ASIC may need to synchronize external inputs (such as JTAG inputs) with its own internal clock.

**PIN.13 (TDO)** JTAG serial data out.

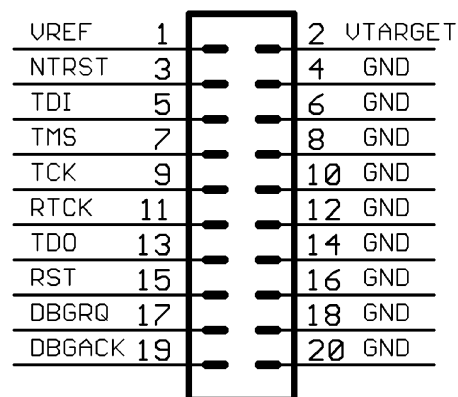
**PIN.15 (nSRST)** Target system reset.

**PIN.17 (DBGREQ)** Asynchronous debug request. DBGREQ allows an external signal to force the ARM core into debug mode, should be pull down to GND.

**PIN.19 (DBGACK)** Debug acknowledge signal. The ARM core acknowledges debug-mode in response to a DBGREQ input.

### JTAG connector layout:

ARM\_JTAG



(PCB TOP VIEW)

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### **Power supply:**

Power supply is made with two LDO adjustable voltage regulators LM1117. Input voltage should be in range 5-9VDC. Watch out the polarity as schematic have no input protection diode and reversing the input power supply will be fatal for LPC2124 microcontroller

### **RS232 interface:**

LPC2124 have two RS232 channels. They both are connected via MAX3232 IC and are available for use with RS232 levels. Channel 0 with TXD0 and RXD0 is used by the Bootloader program to program LPC2124 Flash memory without external programmer. Channel 1 is general purpose RS232 channel and may be used by user program. Channel 0 signals are available on SUB\_D 9 pin connector.

### **RESET:**

Reset circuit is made by simple external RC group. There is possibility to apply RESET externally via RS232 DTR signal (when JRST is shorted this feature is enabled) or by the small RESET pushbutton on the board.

### **Oscillator:**

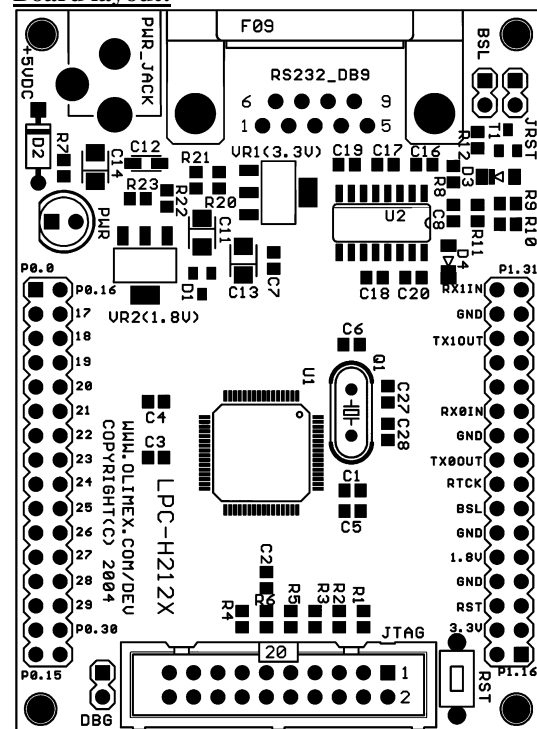
According to LPC2124 datasheets internal PLL will work with external crystal in range 10-25Mhz, however our test with 14.7456 Mhz crystal show that JTAG communication doesn't work properly on devices with above 10Mhz external crystal, so despite 14.7456Mhz crystal allows very convenient communication values we had to install 10Mhz crystal for this device. This makes programming with Philips ISP utility above 38400 bps impossible, but JTAG debugger works without problems, switching crystal to 14.7456Mhz makes ISP programming possible at higher speeds like 115Kbps but JTAG debugger works unreliable.

### **Bootloader:**

The Bootloader program is enabled when BSL jumper is shorted at time of power up. In this case Bootloader takes the program control and user may download Flash memory with Philips

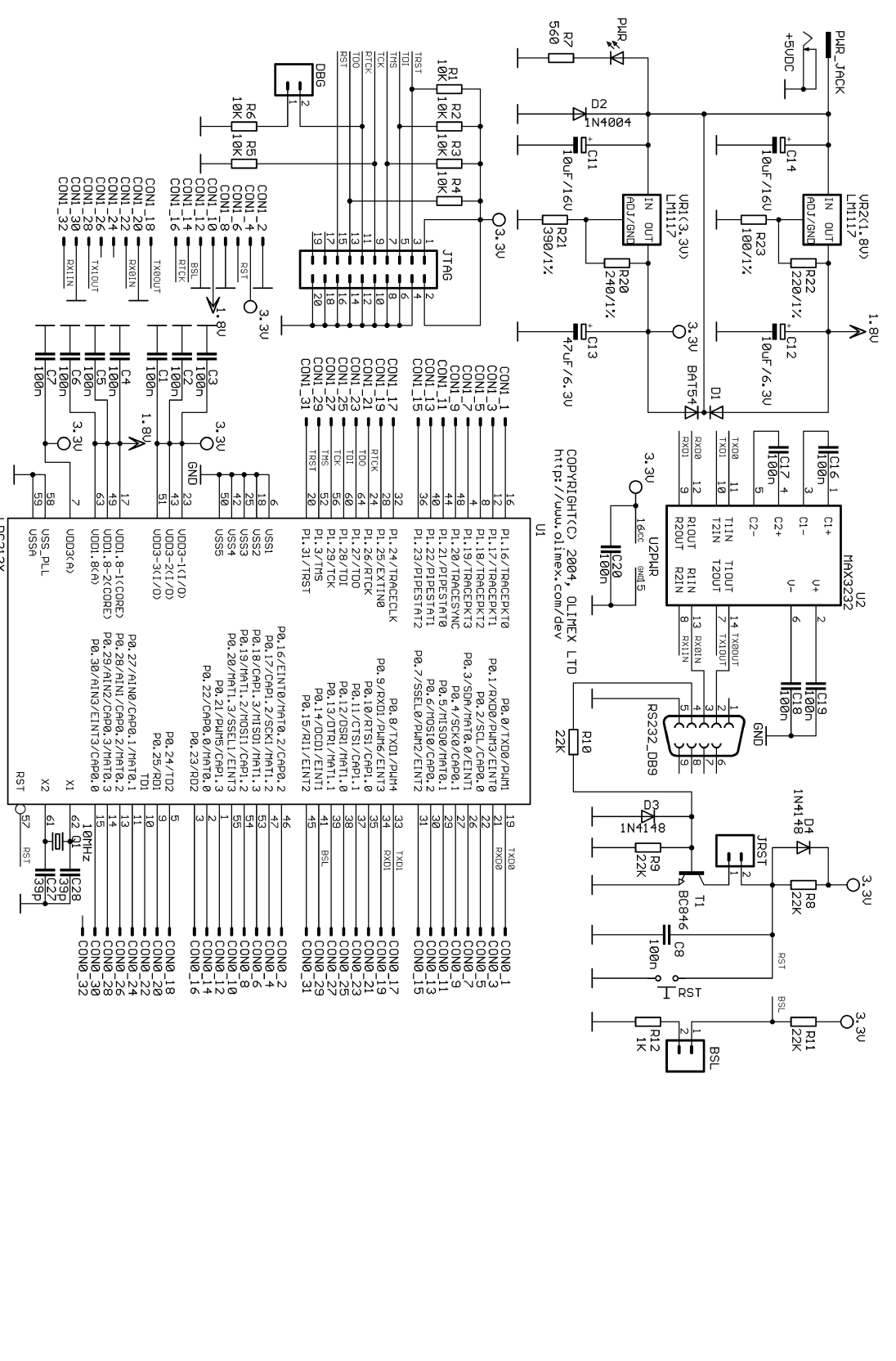
ISP programming utility. Note that if you want to run code in Flash memory BSL jumper should be open at time of power up, otherwise Bootloader will stay in control and will not allow program in Flash to run. The newer versions of Philips ISP utility use DTR signal as RESET control, if you want to use this feature jumper JRST should be shorted otherwise leave it open. (we recommend you when you use bootloader with Philips ISP utility to close both BSL and JRST jumpers, and when you run your code to leave these jumpers open). ISP utility allows many programming speeds to be chosen but with the 10Mhz crystal it works only up to 38400 bps.

### **Board layout:**



### **Ordering codes:**

LPC-H2124 - assembled and tested with LPC2124 microcontroller



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