Introduction

The **LPC2294 and LPC2214** are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/256 kilobytes (kB) of embedded high speed flash memory. A 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty.

With their 144 pin package, low power consumption, various 32-bit timers, 8-channel 10-bit ADC, PWM channels and up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. Number of available GPIOs ranges from 76 (with external memory) through 112 pins (single-chip). With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.

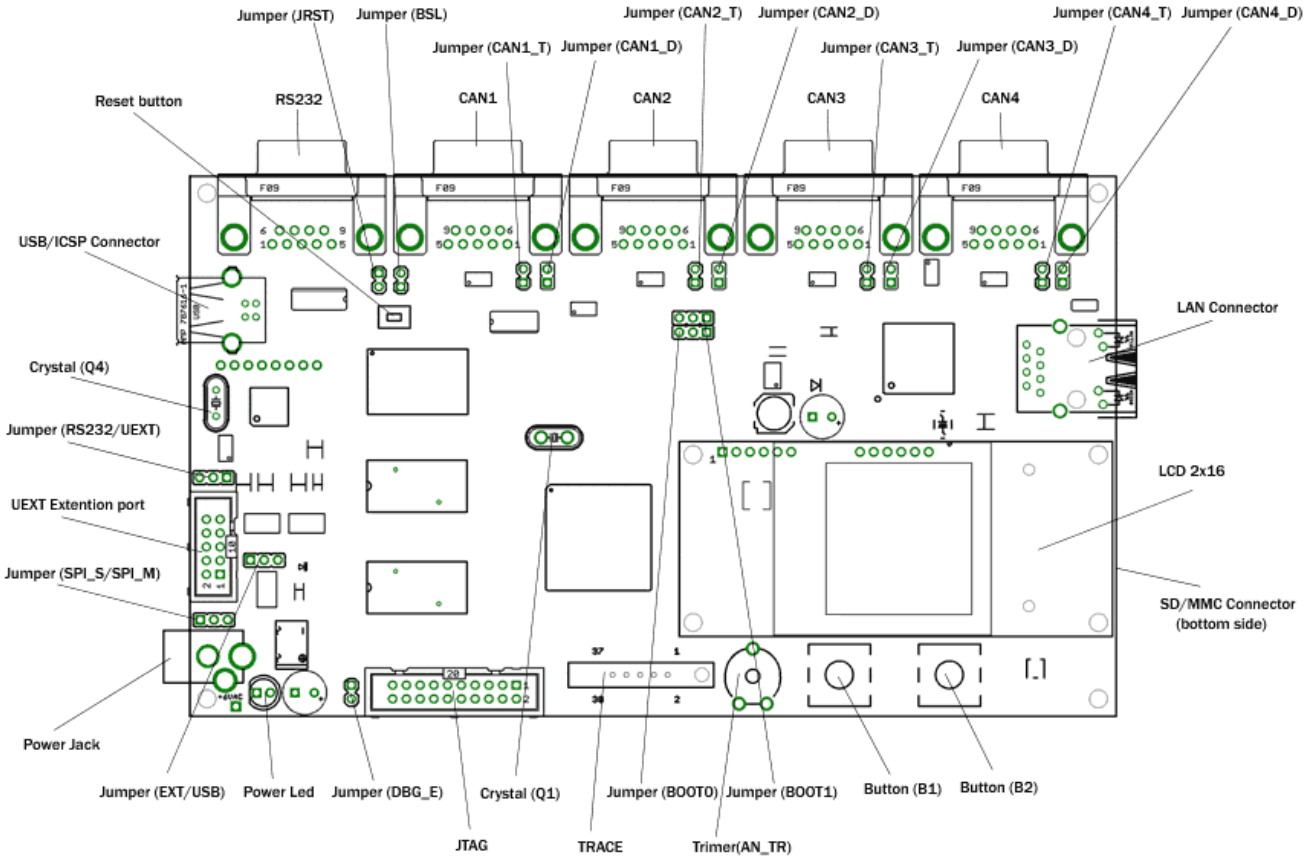
The **LPC E2214** Development board is designed to evaluate **LPC2214** processor. It has the following features:

- MCU: **LPC2214** 16/32 bit ARM7TDMI-S™t with 256K Bytes Program Flash, 16K Bytes RAM, EXTERNAL MEMORY BUS, RTC,4x 10 bit ADC 2.44 uS, 2x UARTs, 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
- 1MB (256Kx32bit) 8/10 ns K6R4016V1D SRAM
- 1MB (512Kx16bit) 55/70ns MX26LV800T FLASH
- USB to RS232 converter
- RESET circuit with external control of Philips ISP utility via USB-RS232 virtual port
- Jumpers for boot select from external memory
- Jumpers for ISP/RUN mode
- Ethernet controller with DM9000E and RJ45 connector
- LCD 16x2 DISPLAY with BACKLIGHT
- 2 BUTTONS
- SD/MMC connector
- POTENTIOMETER connected to AIN0
- RS232 driver and connector
- UEXT connector
- Single power supply: 6V AC or 9V DC required
- Power supply LED
- Power supply filtering capacitor
- Two on board voltage regulators 1.8V and 3.3V with up to 800mA current

The **LPC E2294** Development board is designed to evaluate **LPC2294** processor. It has the following features:

- MCU: **LPC2294** 16/32 bit ARM7TDMI-S™t with 256K Bytes Program Flash, 16K Bytes RAM, EXTERNAL MEMORY BUS, RTC,4x 10 bit ADC 2.44 uS, 2x UARTs, 4x CAN, 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
- 1MB (256Kx32bit) 8/10 ns K6R4016V1D SRAM
- 2MB (1Mx16bit) 70ns TE28F160C3 C3 INTEL FLASH
- USB to RS232 converter,
- 4 CAN drivers and connectors
- RESET circuit with external control of Philips ISP utility via USB-RS232 virtual port
- Jumpers for boot select from external memory
- Jumpers for ISP/RUN mode
- Ethernet controller with DM9000E and RJ45 connector
- LCD 16x2 DISPLAY with BACKLIGHT
- 2 BUTTONS
- SD/MMC connector
- POTENTIOMETER connected to AIN0
- RS232 driver and connector
- UEXT Connector
- Single power supply: 6V AC or 9V DC required
- Power supply LED
- Power supply filtering capacitor
- Two on board voltage regulators 1.8V and 3.3V with up to 800mA current

Board LPC E22x4 (depends of MCU: LPC2214 or LPC2294)



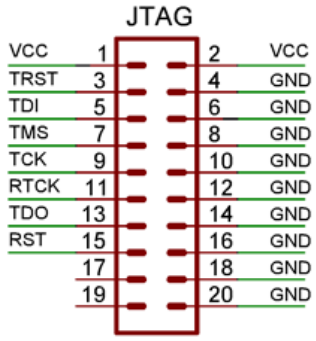
Peripherals

Unit	Description
COM Port (RS232)	RS232 DB9 Female connector for LPC2294 UART0.
CAN1	CAN DB9 Male connector for LPC CAN1 Interface (LPC-E2294 only)
CAN2	CAN DB9 Male connector for LPC CAN2 Interface (LPC-E2294 only)
CAN3	CAN DB9 Male connector for LPC CAN3 Interface (LPC-E2294 only)
CAN4	CAN DB9 Male connector for LPC CAN4 Interface (LPC-E2294 only)
SD/MMC connector	Connector for external SD/MMC cards.
LCD Display	2X16 LCD Display
JTAG Connector	2x10 0.1" step connector for JTAG programming .
UEXT Connector	2x5 0.1” step connector
USB/ICSP connector	USB connector Type B for LPC UART0 interface.
LAN Connector	Ethernet controller with DM9000E and RJ45 connector
SRAM Memory	LPC E2214: 1MB (256Kx32bit) 12 ns K6R4016V1D SRAM connected to CS1 LPC E2294: 1MB (256Kx32bit) 12 ns K6R4016V1D SRAM connected to CS1
Flash Memory	LPC E2214: 1MB (512Kx16bit) 70ns MX26LV800T connected FLASH to CS0 LPC E2294: 2MB (1Mx16bit) 70ns TE28F160C3 C3 FLASH connected to CS0
Buttons	Two buttons connected to interrupt ports - P0.15 (pin 99) and P0.16 (pin 100) and Reset button
Leds	Power supply indicator for board (PWR).

Technical characteristics

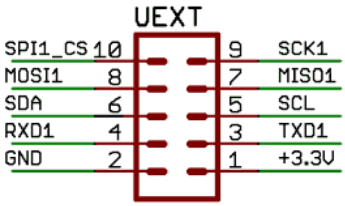
Parameter	Description
Voltage Supply	min 9.0V DC, max 12.0V DC min 6.0V AC, max 9.0V AC or +5V from USB (depending from EXT/USB jumper)
CPU	LPC E2214 -> LPC2214 LPC E2294 -> LPC2294
Crystals	Q1 - 14.7456 MHz HF crystal Q3 - 25 MHz Q4 – 6 MHz
Board dimensions	171 x 99 mm (6.7 x 3.9 ")
PCB	FR-4, 1.5 mm (0,062"), green solder mask, white silkscreen component print
Operating Temperature	form 0ºC to 70ºC

JTAG Connector



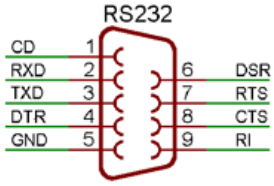
Pin / Name	Connected to:	Functionality
1 - VCC	VCC	-
2 - VCC	VCC	-
3 - TRST	PIN 43	P1.31/TRST
4 - GND	GROUND	-
5 - TDI	PIN 140	P1.28/TDI
6 - GND	GROUND	-
7 - TMS	PIN 113	P1.30/TMS
8 - GND	GROUND	-
9 - TCK	PIN 126	P1.29/TCK
10 - GND	GROUND	-
11 - RTCK	GROUND via jumper	-
12 - GND	GROUND	-
13 - TDO	PIN 144	P1.27/TDO
14 - GND	GROUND	-
15 - RST	PIN 135	RST
16 - GND	GROUND	-
17 - -	no connected	-
18 - GND	GROUND	-
19 - -	no connected	-
20 - GND	GROUND	-

UEXT extension



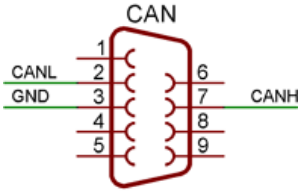
Pin / Name	Connected to:	Functionality
1 - +3.3V	+3.3V	-
2 - GND	GROUND	-
3 - TXD1	PIN 75	P0.8 / TXD1 / PWM4
4 - RXD1	PIN 76	P0.9 / RXD1 / PWM6 / EINT3 (via jumper)
5 - SCL	PIN 50	P0.2 / SCL / CAP 0.0
6 - SDA	PIN 58	P0.3 / SDA / MAT0.0 / EINT1
7 - MISO1	PIN 121	P0.18 / CAP1.3 / MISO1 / MAT1.3
8 - MOSI1	PIN 122	P0.19 / MAT1.2 / MOSI1 / CAP1.2
9 - SCLK1	PIN 101	P0.17 / CAP1.2 / SCK1 / MAT1.2
10 - SPI1_CS	PIN 123	P0.20 / MAT1.3 / SSEL1 / EINT3

RS232 Connector



Pin / Name	Connected to:	Functionality
1 - CD	not connected	-
2 - TXD	PIN 75	P0.8 / TXD1 / PWM4
3 - RXD	PIN 76	P0.9 / RXD1 / PWM6 / EINT3 (via jumper)
4 - DTR	not connected	-
5 - GND	GROUND	-
6 - DSR	not connected	-
7 - RTS	not connected	-
8 - CTS	not connected	-
9 - RI	not connected	-

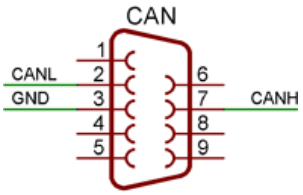
CAN Connector (CAN1)



Pin / Name	Connected to:	Functionality
2 - CANL	CAN LOW	-
3 - GND	GROUND	-
7 - CANH	CAN HIGH	-

- MCP2551 (U7) is connected to LPC CAN1 Interface (TD1 and RD1)
- CANL and CANH are connected via CAN1_T jumper

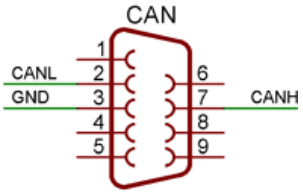
CAN Connector (CAN2)



Pin / Name	Connected to:	Functionality
2 - CANL	CAN LOW	-
3 - GND	GROUND	-
7 - CANH	CAN HIGH	-

- MCP2551 (U6) is connected to LPC CAN2 Interface (TD2 and RD2)
- CANL and CANH are connected via CAN2_T jumper

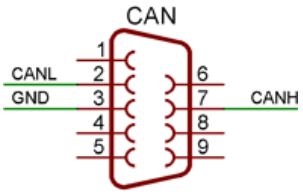
CAN Connector (CAN3)



Pin / Name	Connected to:	Functionality
2 - CANL	CAN LOW	-
3 - GND	GROUND	-
7 - CANH	CAN HIGH	-

- MCP2551 (U8) is connected to LPC CAN3 Interface (TD3 and RD3)
- CANL and CANH are connected via CAN3_T jumper

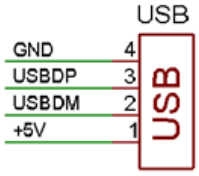
CAN Connector (CAN4)



Pin / Name	Connected to:	Functionality
2 - CANL	CAN LOW	-
3 - GND	GROUND	-
7 - CANH	CAN HIGH	-

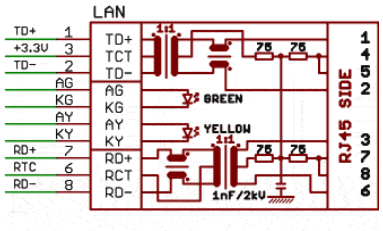
- MCP2551 (U9) is connected to LPC CAN4 Interface (TD4 and RD4)
- CANL and CANH are connected via CAN4_T jumper

USB/ICSP Connector



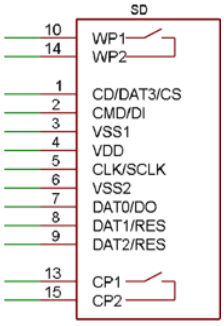
Pin / Name	Connected to:	Functionality
1 - +5V	+5V DC	-
2 - USBDM	FT232BM (PIN 8)	USBDM
3 - USBDP	FT232BM (PIN 7)	USBDP
4 - GND	GROUND	-

LAN Connector



Pin / Name	Connected to:	Functionality
1 - TD+	DM9000E PIN 33	TXD+
2 - TD-	DM9000E PIN 34	TXD-
3 - +3.3V	+3.3V	RXD+
AG	+3.3V	-
KG (SPEED/DUP)	PIN60 or PIN61	Notice: depends of smd jumper SPEED/DUP
AY	+3.3V	RXD-
KY (LINK_ACT)	PIN 62	LINKACT
6 - RTC	-	-
7 - RD+	DM9000E PIN 29	RD+
8 - RD-	DM9000E PIN 30	RD-

SD/MMC Connector



Pin / Name	Connected to:	Functionality
1 - CD/DAT3/CS	PIN 36 or PIN 123	P3.24 / CS3 or P0.20 / MAT1.3 / SSEL1 / EINT3
2 - CMD/DI	PIN 122	P0.19 / MAT1.2 / MOSI1 / CAP1.2
3 - VSS1	GROUND	-
4 - VDD	+3.3V	-
5 - CLK/SCLK	PIN 101	P0.17 / CAP1.2 / SCK1 / MAT1.2
6 - VSS2	GROUND	-
7 - DAT0/DO	PIN 121	P0.18 / CAP1.3 / MISO1 / MAT1.3
8 - DAT1/RES	+3.3V	-
9 - DAT2/RES	+3.3V	-
10 - WP1	PIN 70	P1.24 / TRACECLK
14 - WP2	GROUND	-
13 - CP1	PIN 60	P1.25 / EXTIN0
15 - CP2	GROUND	P1.15 / HTXD

Jumpers

Jumpers	Position	Description
Jumper (JRST) Jumper (BSL)		Disable ICSP programming.
		Enable ICSP programming - via USB (virtual COM port)
Jumper (CAN1_T)		CAN1 Terminator disable
		CAN1 Terminator enable (120 ohm)
Jumper (CAN1_D)		CAN1 Driver enable
		CAN1 Driver disable
Jumper (CAN2_T)		CAN2 Terminator disable
		CAN2 Terminator enable (120 ohm)
Jumper (CAN2_D)		CAN2 Driver enable
		CAN2 Driver disable
Jumper (CAN3_T)		CAN3 Terminator disable
		CAN3 Terminator enable (120 ohm)
Jumper (CAN3_D)		CAN3 Driver enable
		CAN3 Driver disable
Jumper (CAN4_T)		CAN4 Terminator disable
		CAN4 Terminator enable (120 ohm)
Jumper (CAN4_D)		CAN4 Driver enable
		CAN4 Driver disable
Jumper (BOOT1) Jumper (BOOT0)		Selects 8-bit memory on CS0 for boot.
		Selects 16-bit memory on CS0 for boot.
		Selects 32-bit memory on CS0 for boot.
		Selects Internal Flash memory.
Jumper (RS232/UEXT)		Port P0.9/RXD1/PWM6/EINT3 (pin 76) connected to UEXT Extension port
		Port P0.9/RXD1/PWM6/EINT3 (pin 76) connected to LPC UART1 interface
Jumper (SPI_S/SPI_M)		CS pin on SD/MMC connector is connected to P0.20 / MAT1.3 / SSEL1 / EINT3 (pin 123)
		CS pin on SD/MMC connector is connected to P3.24 / CS3 (pin 36)
Jumper (EXT/USB)		External power supply (power jack connector)
		USB power supply.
Jumper (DBG_E)		Disable JTAG programming.
		Enable JTAG programming.

SMD Jumper: SPEED/DUP - KG lan pin connected to DM9000E PIN 60 (#SPEED) or PIN 61(#DUP)