Core.ST.L4.1

USB-programmable Cortex-M4

The USB-programmable Core.ST.L4.1 is based on the 80-MHz 32-bit Cortex-M4 STM32L422 with 128KB flash, 40KB SRAM, and a CoreMark score of 273.55. The exposed pads provide a user-configurable combination of two fast-mode-plus I2C ports, one SPI port, three 12-bit ADCs, multiple timers, USART, an onboard comparator, and capacitive-touch input. A programmable onboard LED provides a convenient status indicator. If more I/O is needed, consider the larger Core.ST.L4.2 in a T48-22 package.

Overview

Revision	b
Package	T44-14
Power	1.71–3.6V (minimum of 3.0V for USB communications)
Component	STM32L422TB
Interfaces	I2C, SPI, USB, USART

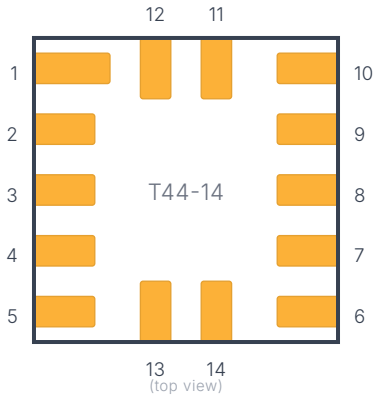
Onboard Features

Status LED	Red · PA8 · (active-high)
Clock	16 MHz HSI16 · 4 MHz MSI · 48 MHz HSI48 — boots HSI16
Software pull-up on pad 4	2.2 kΩ · on pad 4 · (via PA9)
Software pull-up on pad 5	2.2 kΩ · on pad 5 · (via PC15)

Configuration

GPIO pad configuration	EXTI · Pull · Speed · Direction · Output default
Pad function assignments	11 pads — see Pad Assignments
Clock configuration	Low (8MHz, MSI) · Medium (16MHz, MSI) (default) · High (48MHz, MSI) · Max (80MHz, HSI16 + PLL)
Enable software pull-ups	Pad 4 pull-up (via PA9) · Pad 5 pull-up (via PC15)
Programming methods	USB DFU · USART1 · USART2 · USART3 · I²C1 · I²C3 · SPI1
Interfaces	USB · I²C1 · I²C3 · SPI1 · USART1 (enable / role / speed configurable)

Pad Assignments



PAD	TYPE	FUNCTION	NOTE
1	power	GND	
2	digital	A7	
	digital	I2C3.CLK	
	digital	SPI1.MOSI	
	analog	ADC12	
	timer	TIM1.1N	
3	digital	A1	
	digital	I2C1.SMBA	optional SMBus alert
	digital	SPI1.CLK	
	analog	ADC6	
	timer	TIM2.2	
	timer	TIM15.1N	
	other	COMP1.+	
4	digital	B6	
	digital	I2C1.CLK	
	timer	TIM16.1N	
	timer	LPTIM1.ETR	external trigger
	digital	USART1.TX	
	other	G2.IO3	
5	digital	B7	
	digital	I2C1.DAT	
	timer	LPTIM1.2	
	digital	USART1.RX	
	other	G2.IO4	
6	digital	A12	
	digital	SPI1.MOSI	
	timer	TIM1.ETR	external trigger
	digital	USART1.RTS_DE	RS232 ready-to-send / RS485 driver-enable
	digital	USB.DP	
7	digital	A11	
	digital	SPI1.MISO	
	timer	TIM1.4	
	timer	TIM1.BKIN2	break input to disable PWM output
	timer	TIM1.BKIN2_COMP1	break input to disable PWM output based on COMP1 output
	digital	USART1.CTS	RS232 clear-to-send
	other	COMP1.OUT	
	digital	USB.DM	
8	digital	B4	
	digital	I2C3.DAT	
	digital	SPI1.MISO	
	digital	USART1.CTS	RS232 clear-to-send

	other	G2.IO1	
9	digital	A4	
	digital	SPI1.CS	
	timer	LPTIM2.OUT	break input to disable PWM output
	other	COMP1.-	
10	power	V+	1.71-3.6V (>=3.3V for USB)
11	system	BOOT0	internal pull-down defaults to run mode, hold high during reset to enter bootloader
	digital	H3	
12	system	NRST	active-low reset with internal pull-up
13	digital	A14	
	system	SWCLK	
	digital	I2C1.SMBA	
	timer	LPTIM1.OUT	
14	digital	A13	
	system	SWDIO	

Interfaces

I2C1

I2C

Mode	master, slave
Max Clock	1MHz
Address	programmable
Format	7-bit addr

FUNCTION	REQ	PAD(S)
I2C1.CLK	Yes	4
I2C1.DAT	Yes	5
I2C1.SMBA	No	3

I2C3

I2C

Mode	master, slave
Max Clock	1MHz
Address	programmable
Format	7-bit addr

FUNCTION	REQ	PAD(S)
I2C3.CLK	Yes	2
I2C3.DAT	Yes	8

SPI1

SPI

Mode	master, slave
Max Clock	40Mhz (master), 20MHz (slave)

FUNCTION	REQ	PAD(S)
SPI1.CLK	Yes	3
SPI1.MISO	No	7, 8
SPI1.CS	No	9
SPI1.MOSI	No	2, 6

USB

USB

FUNCTION	REQ	PAD(S)
USB.DP	Yes	6
USB.DM	Yes	7

USART1

USART

FUNCTION	REQ	PAD(S)
USART1.TX	Yes	4
USART1.RX	Yes	5
USART1.RTS_DE	No	6
USART1.CTS	No	7, 8

Application Notes

Bootloading

When the chip is blank, it will default into the bootloader when connected over USB. Once there is code in the program space, you need to hold the BOOT0 pin HIGH during reset (either power-on or via the NRST pin) to enter the bootloader.

LED

The onboard LED is connected to PA8 in an active-high configuration.

Single-Wire Debug & Bootloading

The single-wire debug port is available on pads 13 (SWCLK) and 14 (SWDIO). While not absolutely required, it is often helpful to have the ability to hold pads 22 (NRST) low when connecting to the debugger. You can likely also use BOOT0 to help the debugger connect.