



HT32F493x5 Series MCU Starter Kit User Guide

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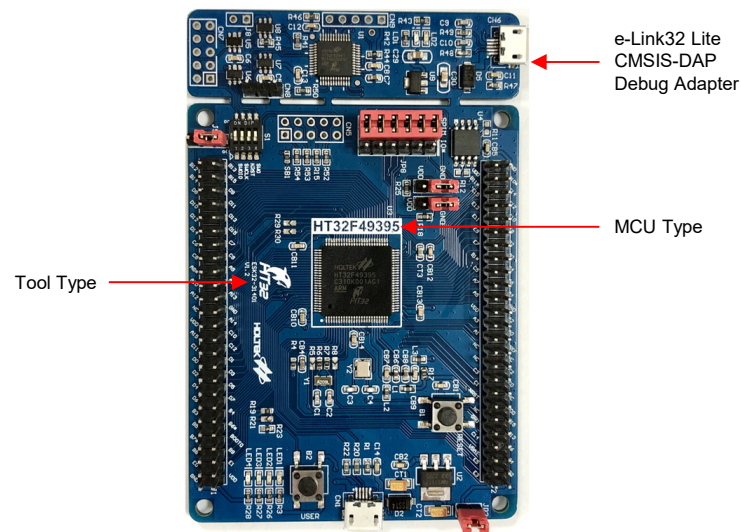
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1. Introduction

The HT32F493x5 Series Starter Kit is based around the 32-bit Arm® Cortex®- M4 high performance microcontroller and is designed to assist users to get up and running with the Holtek 32-bit device range as quickly as possible.

Standard C language programs can be developed using the integrated development environment from Keil µVision and IAR EWARM. Using this foundation, Holtek also provides a comprehensive function library to avoid complicated lower level function development in order to allow designers to focus their time on their specific application development. Using a simple USB cable connection, users only have to connect their PC to the integrated hardware debug interface (e-Link32 Lite Serial-Wire Debugger) to automatically download the programs and immediately commence debug operations.



Features

- Uses the HT32 high performance microcontrollers
Integrated Timer, I²C, SPI, USART, UART, 12-bit A/D converter, USB and I²S etc. Refer to the datasheet of the corresponding MCU for details
- Comprises Target Board and e-Link32 Lite Serial-Wire Debugger
- Used for the testing and development of many external devices
- Use either the Target Board USB connector or the e-Link32 Lite USB connector to supply power

Start

Configure the ESK32-31401 board according in the following sequence to start the application:

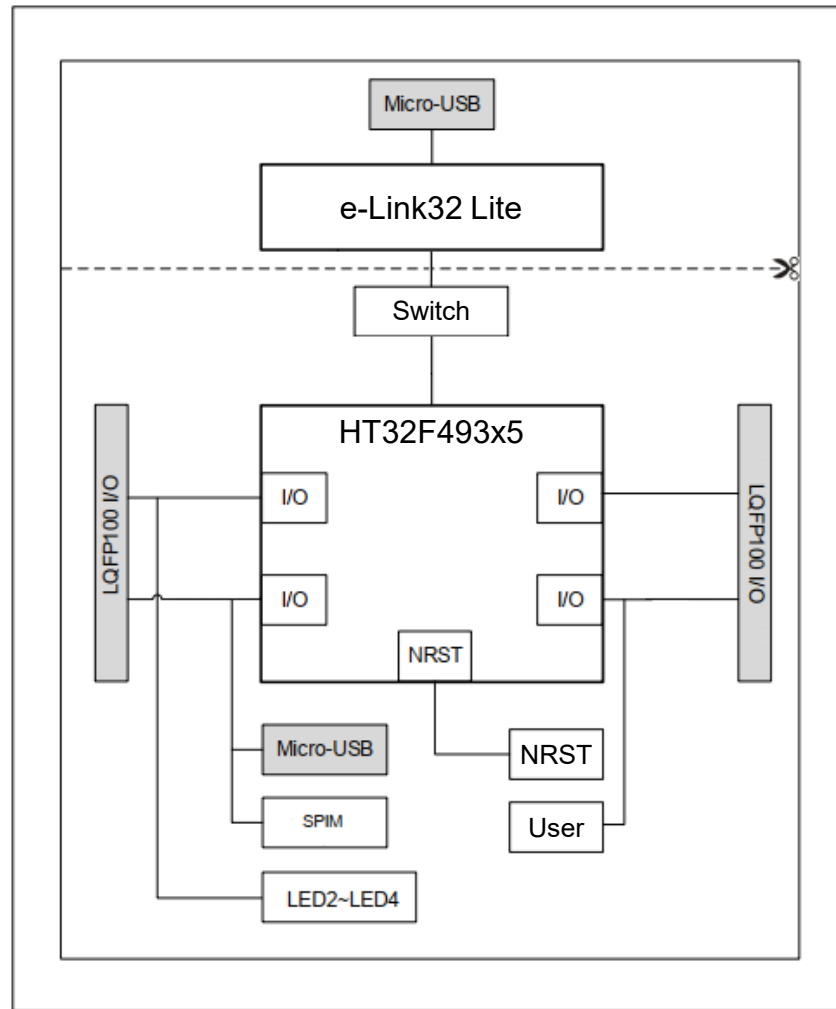
1. Check the position of the jumper on the board:
 - JP1 selects GND or OFF (BOOT0 is 0);
 - JP4 selects GND (BOOT1 is 0);
 - JP8 conjoined jumper selects the IO terminal on the right.
2. Connect the board to the PC using a USB cable and use the USB connector CN6 to supply power.

2. Hardware Layout

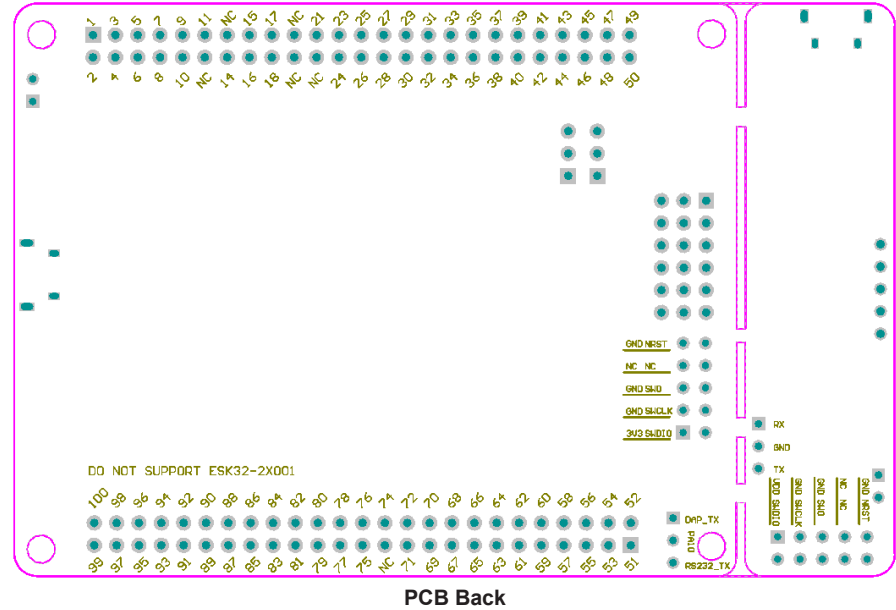
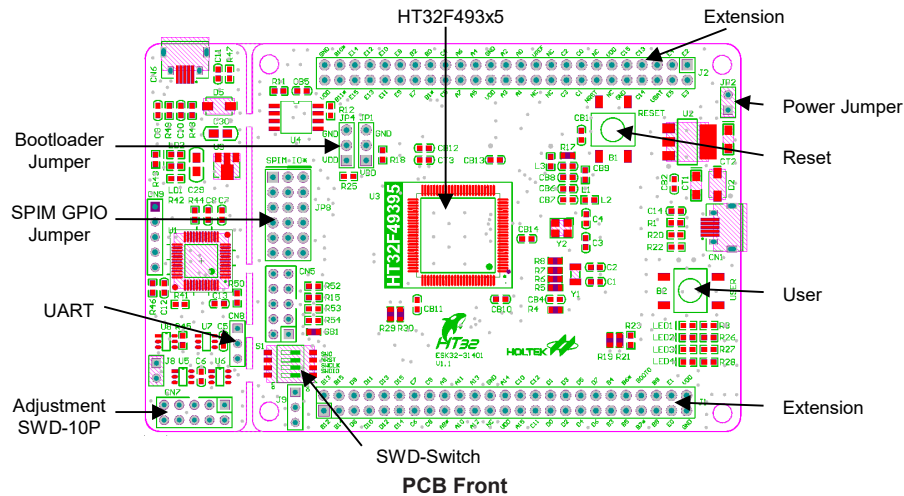
The ESK32-31401 is designed around the HT32F493x5 microcontroller in the 100-pin LQFP.

The following hardware block diagram shows the connections between the e-Link32 Lite, the HT32F493x5 and their peripherals, such as buttons, LEDs, USB, SPI Flash and extension interfaces.

The PCB front and back diagrams show where these features are located on the e-Link32 Lite and the ESK32-31401.



Hardware Block Diagram



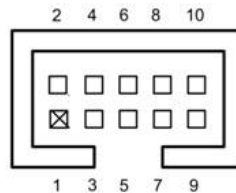
Serial Wire Debug Interface Switch – S1

S1	Description
	Connect the SWD interface between the e-Link32 Lite and the Target MCU – default setting
	Disconnect the SWD interface between the e-Link32 Lite and the Target MCU

SWD-10P Connector – CN5, CN7

CN7 is the SWD connector of the e-Link32 Lite and CN5 is the SWD connector of the Target Board.



- If the e-Link32 Lite is not separated, there is already a PCB line connection on the board, so switching S1 to the ON position can connect the Target Board without an additional flying line connection.
- If the e-Link32 Lite is not separated and S1 is switched to the OFF position, CN7 can be connected to the user's own board through a flying line.
- When the e-Link32 Lite is separated, CN7 can be connected to the Target Board CN5 or the user's own board through a flying line.





• SWD-10P Connector

Pin No.	Description	Pin No.	Description
1	VDD	2	SWDIO
3	GND	4	SWCLK
5	GND	6	NC
7	NC	8	NC
9	GND	10	Reset

e-Link32 Lite Power Option – J8

J8	Description
	Pin 1 of the CN7 connector on the e-Link32 Lite side is used as the input. The reference voltage is supplied through this pin to the voltage conversion chip – default setting
	Pin 1 of the CN7 connector on the e-Link32 Lite side is used as the output. Here the e-Link32 Lite voltage conversion chip is fixed using the 3.3V as the reference voltage

MCU Power Jumper – JP2

JP2	Description
	The MCU VDD pin is connected to the 3.3V power – default setting
	The MCU VDD pin is disconnected from the 3.3V power

The jumper is useful when it is required to measure the MCU power consumption.

Boot Mode Option – JP1, JP4

When booting, users can select either one of three boot modes by configuring the boot pins.



Jumper	Description
JP1 connected to GND or OFF JP4 connected to either or OFF	BOOT1 is X, BOOT0 is 0 Boot from the internal Flash memory – factory default setting
JP1 connected to VDD JP4 connected to GND	BOOT1 is 0, BOOT0 is 1 Boot from the Boot code

Jumper	Description
JP1 connected to VDD JP4 connected to VDD	BOOT1 is 1, BOOT0 is 1 Boot from the internal SRAM

When the PB2 function is not used, it is recommended that JP4 selects the GND terminal to pull down to ground.


UART Option Jumper – J9

The Starter Kit arranges a group of the Target MCU UART to be used as external communication interfaces, which can connect to the host computer or other devices. The Target MCU RX pin has the option of connecting to the e-Link32 UART TX pin or to the extension connector, RS232_TX.

J9	Description
	The MCU UART RX is connected to the extension connector, RS232_TX – default setting
	The MCU UART RX is connected to the e-Link32 UART TX

e-Link32 UART Connector – CN8

This is the e-Link32 integrated USB to UART function, which is called the “Virtual COM port”, CN8 is the e-Link32 UART side connector.

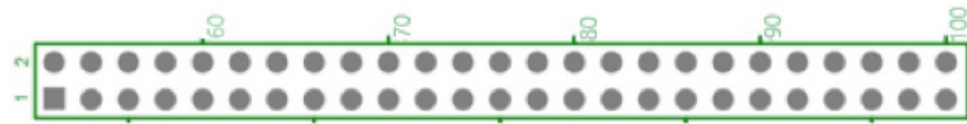
CN8	Description
	Three UART connector pins: TX, GND and RX The e-Link32 will send data on the TX pin while data will be received on the RX pin

- If the e-Link32 Lite is not separated, users can use the e-Link32 “Virtual COM Port” functions by connecting J9 to DAP_TX.
- If the e-Link32 Lite is not separated, and users wish to connect the e-Link32 RX to their board, they need to remove the SB1 resistor from the Starter Kit target board.
- When the e-Link32 Lite is separated, CN8 can be connected to the Target Board or the user’s own board through a flying line.

GPIO and SPIM Jumper Setting – JP8

JP8	Description
JP8 connected to IO	Use the IO function – factory default setting
JP8 connected to SPIM	Use the SPIM function

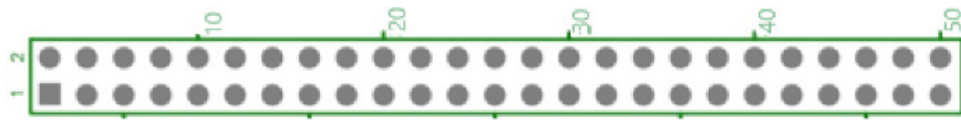
Extension Connector – J1



• Extension Connector – J1

Pin No.	Description	Pin No.	Description
51	PB12	52	PB13
53	PB14	54	PB15
55	PD8	56	PD9
57	PD10	58	PD11
59	PD12	60	PD13
61	PD14	62	PD15
63	PC6	64	PC7
65	PC8	66	PC9
67	PA8*	68	PA9
69	PA10	70	PA11
71	PA12	72	PA13
73	NC	74	GND
75	VDD	76	PA14
77	PA15	78	PC10
79	PC11	80	PC12
81	PD0	82	PD1
83	PD2	84	PD3
85	PD4	86	PD5
87	PD6	88	PD7
89	PB3	90	PB4
91	PB5	92	PB6*
93	PB7*	94	BOOT0
95	PB8	96	PB9
97	PE0	98	PE1
99	GND	100	VDD

Note: “*” indicates that the pins that require to be selected using the JP8 jumper.

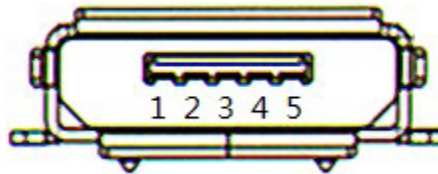
Extension Connector – J2

• Extension Connector – J2

Pin No.	Description	Pin No.	Description
1	PE2	2	PE3
3	PE4	4	PE5
5	PE6	6	VBAT
7	PC13	8	PC14
9	PC15	10	GND
11	VDD	12	NC
13	NC	14	NRST
15	PC0	16	PC1
17	PC2	18	PC3
19	NC	20	NC
21	VREF	22	NC
23	PA0	24	PA1

Pin No.	Description	Pin No.	Description
25	PA2	26	PA3
27	GND	28	VDD
29	PA4	30	PA5
31	PA6	32	PA7
33	PC4	34	PC5
35	PB0	36	PB1*
37	PB2	38	PE7
39	PE8	40	PE9
41	PE10	42	PE11
43	PE12	44	PE13
45	PE14	46	PE15
47	PB10*	48	PB11*
49	GND	50	VDD

Note: “*” indicates that the pins that require to be selected using the JP8 jumper.

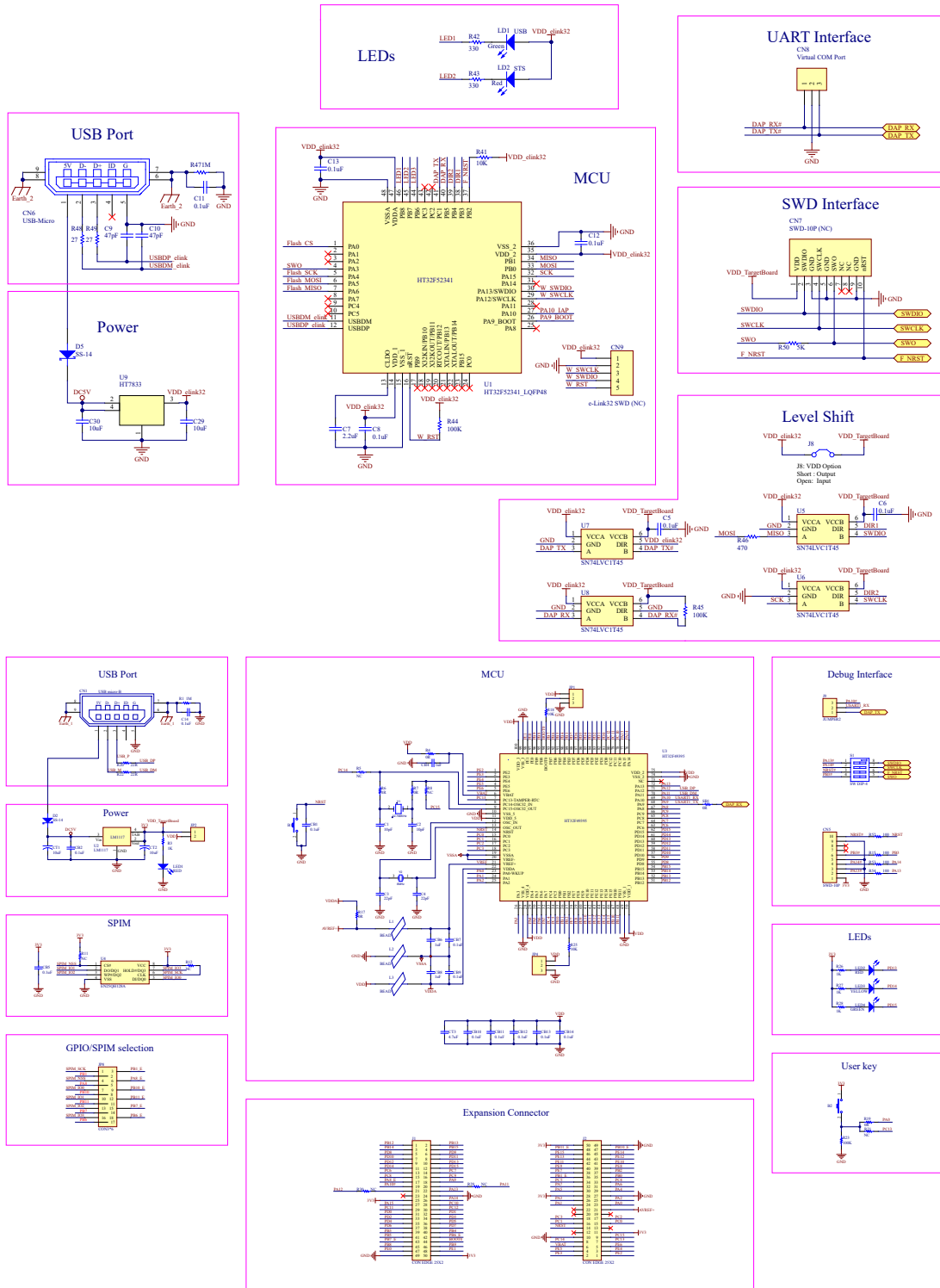
Micro USB Type B Connector – CN1/CN6



• Micro USB Type B Connector

Pin No.	Description	Pin No.	Description
1	USB_5V	2	D-
3	D+	4	NC
5	GND		

3. Schematics



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