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## SPC574S-DISP Sphaero Discovery+

### Introduction

This manual provides information to application developer on how to set and to use the SPC574S-DISP microcontroller evaluation board.

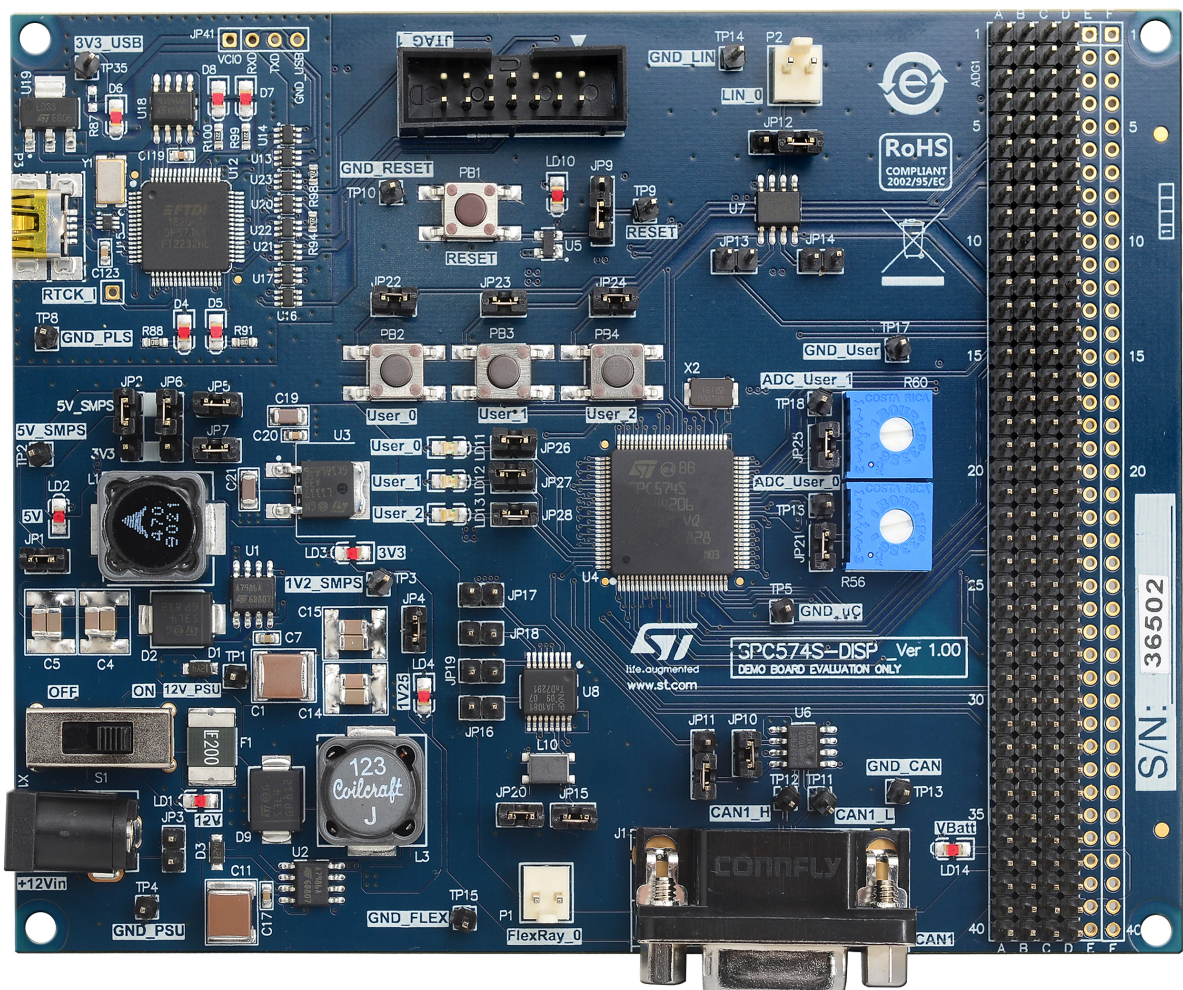
## 1 SPC574S-DISP Discovery+ board

The SPC574S-DISP is a board based on the SPC574S60E3, a microcontroller high performance core, 32-bits power architecture technology CPU. The several interfaces including GPIO's, peripherals such as DSPI, LIN, UART, ISO CAN-FD make the SPC574S-DISP an efficient starter kit for the customer to quick evaluate the microcontroller as well as to develop and debug applications.

An integrated programmer debugger allows debugging and programming the microcontroller without additional tools. The same circuit allows enabling an USB to serial communication channel (USB Virtual COM port).

A standard JTAG port (14 pin 0.1 inch.) allows programming the microcontroller by using external debug and programmer tools.

Figure 1. SPC574S-DISP board



The SPC574S-DISP evaluation kit consists of:

- SPC574S-DISP Discovery board (Figure 1).
- USB type A to mini-B cable.
- 12 V DC power supply (EU Plug).

Free ready-to-run application firmware examples are available inside SPC5Studio (<http://www.st.com/spc5studio>) to support a quick evaluation and development process.

The PCB, the components and all the HW parts assembled in the board meet requirements of the applicable RoHS directives.

## 1.1 Debug interface

- 14-pins JTAG interface.
- USB integrated programmer debugger.

## 1.2 I/O interface and connectors

- PSU plug (+12 V).
- CAN with DB9 connector.
- LIN and FlexRay, 2 pins.
- UART (2x4 pin – not assembled).

## 2 Hardware description

### 2.1 Power supply section

The external DC supply must be plugged in X1; the switch S1 allows to disconnect the external DC source.

#### 2.1.1 External power supply

The voltage regulators, U1 and U2 are used to generate 5 V and 1.2 V respectively. U3 provide 3.3 V.

The LEDs LD1, LD2, LD3 and LD4 are all ON only when the power supply section works properly and the switch S1 is set in ON position.

**Table 1. PSU section - LEDs description**

Item	Function
LD1	V <sub>ext</sub> (+12 V)
LD2	5 V SMPS
LD3	3.3 V LDO
LD4	1.2 V SMPS

#### 2.1.2 Test points

Some test pins are present to monitor the supply voltage levels.

**Table 2. PSU section - Test points**

Name	Signal/Voltage
TP1	12 V PSU
TP2	5 V SMPS
TP3	1.2 V SMPS
TP7	3.3 V

### 2.2 Crystal oscillator

The external oscillator is connected to a 40 MHz crystal (X2).

### 2.3 Reset section

The reset section is based on the U5. The RESET signal is driven to low level in these two conditions:

- When the VDD\_HV\_IO\_main level is lower than the reset threshold voltage (nominal value: 2.63 V).
- When the pushbutton S2 is pressed; the reset pulse width is fixed. JP9 allows disconnecting the microcontroller to the U5 output.

## 2.4 User LEDs

Three LEDs (LD11, LD12 and LD13) are available for user purposes. The jumpers JP26, JP27 and JP28 allow disconnecting the cathode of each LED's then PE[11], PE[12] and PE[13] can be used for a different purpose.

**Table 3. User LEDs**

LED	μC Pin - Function
LD11	PE[11]
LD12	PE[12]
LD13	PE[13]

## 2.5 User pushbuttons and ADC

Three pushbuttons (PB2, PB3 and PB4) are present and they can be used during the application development or debugging to have an user interface. These pushbutton are connected to the ports PC[15], PD[0] and PE[0] with the jumpers JP22, JP23 and JP 24. The trimmer R56 and R60 allows the user to evaluate the ADC. Removing JP21 and JP25 the ports PI[1] and PI[2] will be disconnected to the cursor of the R56 and R60.

## 2.6 Integrated USB programmer/debugger and JTAG port

The integrated debugger allows the user to program and to debug the software applications. The integrated tool is based on the UDE PLS software and the device FTDI2232H.

The SPC574S-DISP discovery board includes a full-featured, perpetual code-limited PLS software license. The debugger serial number is reported on a label applied on the board.

The integrated debugger SW is accessible via SPC5Studio (<http://www.st.com/spc5studio>), a ST's free integrated development environment. To download the debugger software and to activate license refer to the PLS website.

Jumper options allow to configure the board to be programmed with external programmer by using JTAG port. Removing the solder jumper from SB1 to SB7, the integrated programmer is disconnected and then JTAG port will be enabled to program the microcontroller with a different HW tool.

## 2.7 CAN bus

U6 is the CAN communication transceiver. The jumper JP10 connects the termination resistor for CAN bus (120 Ω) while TP11 and TP12 allow monitoring the output signals CANL and CANH respectively.

The CAN Rx and Tx signals are connected to J1 (DB9 connector).

## 2.8 FlexRay

The U8 is the transceiver to manage the FlexRay communication; the outputs are connected to P1.

## 2.9 LIN and UART

The LINFlex supports LIN Master mode, LIN Slave mode and UART mode. U7 is the transceiver to support the LIN communication.

## 2.10 4x40 connector

The I/O microcontroller pins are connected to a 4x40 pin array (connector ADG1A and ADG1B), an additional connector 2x40 pin, (AGD1C), can be assembled to support further applications.

## Appendix A

### A.1 Precautions

The following precautions are recommended when using the SPC574S-DISP:

- Do not modify and not plug external parts or wires the board when it is supplied
- Do not supply the board with AC source or with a DC source higher than 12 V.
- The connectors and cables should be plugged and removed when the board is not supplied and the USB cable disconnected.
- To use antistatic tools.

## Revision history

**Table 4. Document revision history**

Date	Version	Changes
24-Sep-2019	1	Initial release.

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