1 Product Overview

1.1 Introduction

The SD6 is a highly integrated Bluetooth 5.0 low energy module device. It has 32-bit ARM® Cortex™-M0 CPU with 512KB Flash, 64KB SRAM and an ultra-low power, high performance, multi-mode radio. It intergrates rich feature peripheral units, programmable protocol and profile to support BLE application, makes customers' product to be built with minimum bill-of-material (BOM) cost.

1.2 Features

1.3 Features

CPU

- 32-bit ARM® Cortex™-M0 CPU
- Up to 64MHz clock

Memories

- 512KB Flash
- 64KB Data SRAM
- 8KB Code Cache

2.4GHz Transceiver

- Compliant to Bluetooth 5.0
- Single-pin antenna: no RF matching or RX/TX switching required
- Support two data rates
  - 2Mbps
  - 1Mbps
- TX Power -20 to +5dBm in 3dB steps

Low power consumption

- Transmitter: 5.5mA@0dBm Tx power, with DC-DC
- Receiver: 5mA @with DC-DC
- Sleep Mode 13μA@with 32KHz RTC and all SRAM retention
- 0.7μA @ OFF Mode(IO wake up only)

Oscillator

- Support 16M XTAL
- Embedded 32M RC oscillator and 32K RC oscillator

PeriPheral

- 20/9 general purpose I/O pins
  - All pins can be configured as digital interface by programmable IO MUX function mapping(except P01)
  - All pins can be configured for wake-up and

external interrupt
  - All pins output state can be retained in sleep mode
- 2x UART
- 6-channel output PWM
- 2x I2C
- 2x SPI
- 1x 12bit ADC, support 6ch or 3ch single-ended input
- 1x PGA, support analog microphone input
- 4ch DMA
- 6x 24bit timer
- WDT
- SWD debug

Flexible power management

- Supply voltage range 1.9V to 3.6V
- Embedded 1.35V buck DC-DC converter(it does not exist in SOP16 package)

Package

- QFN32（4*4*0.75mm）
- SOP16（9.90*3.90*1.40mm）

Certification

- BQB:D054808

Application

- Health and medical
- Wearables
- Internet of things (IoT)

1.3 Pin Assignments and Functions

This section describes the pin assignment and the pin functions for the different package types.

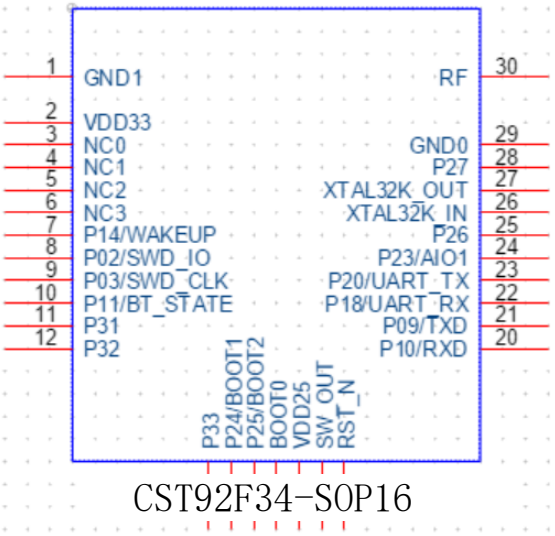


Figure 1.1 Module pin assignments Table 1.1 Pin description

item	Pin name	Type	Description
1	GND	P	Ground
2	BAT_IN	P	3.3V power input
3	NC	/	Reserved
4	NC	/	Reserved
5	NC	/	Reserved
6	NC	/	Reserved
7	P14/WAKEUP	I/O	General purpose input/output
8	P02/SWD_IO	I/O	General purpose input/output / SWD debug IO
9	P03/SWD_CLK	I/O	General purpose input/output / SWD debug CLK
10	P11/BT_STATUS	I/O	General purpose input/output
11	P31	I/O	General purpose input/output
12	P32	I/O	General purpose input/output
13	P33	I/O	General purpose input/output
14	P24/BOOT1	I/O	General purpose input/output
15	P25/BOOT2	O	General purpose input/output
16	BOOT0	I	Boot select[0], enter program mode or test mode when high level input. default pull-down
17	VDD25	I	1.35V BUCK DCDC output power feedback input, and digital 1.2V LDO input. When don't use DC-DC, this pin should connect to VDD
18	SW_OUT	O	1.35V BUCK DCDC switch output. When don't use DCDC, this pin should be float.
19	RST_N	I	Reset pin input, low level active
20	P10/RXD	I	General purpose input/output / Debug RXD
21	P09/TXD	O	General purpose input/output / Debug TXD
22	P18/HCI_RXD	I/O	General purpose input/output / UART_RXD
23	P20/HCI_TXD	I/O	General purpose input/output / UART_TXD
24	P23/AIO1	I/O	General purpose input/output
25	P26	I/O	General purpose input/output
26	XTAL32K_IN	I	32.768KHz crystal input
27	XTAL32K_OUT	O	32.768KHz crystal output
28	P27	O	LED1 driver
29	GND	P	Ground
30	BT_RF	RI/O	RF Port

FCC Statement

This Module complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this module may not cause harmful interference, and (2) this module must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not
installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help important announcement

Radiation Exposure Statement
The module has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

Important Note:
In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling
The final end product must be labeled in a visible area with the following" Contains FCC ID: SMQSD6-MAIN ".

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01r01

List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter.

Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

Limited module procedures

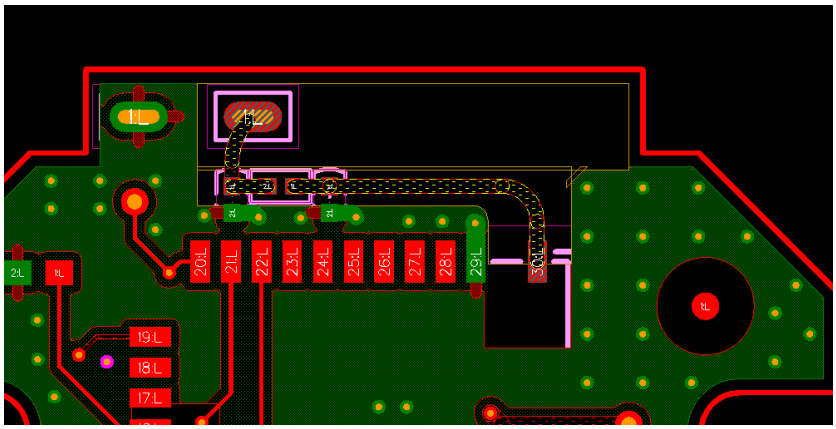
This module will only use in Edan Instruments, Inc's host device only.

We will retain control over the final installation of the modular such that compliance of the end product is assured. In such cases, an operating condition on the limit modular approval for the module must be only approved for use when installed in devices produced by a specific manufacturer. If any hardware modify or RF control software modify will be made by host manufacturer, C2PC or new certificate should be applied to get approval, if those change and modification made by host manufacturer not expressly approved by the party responsible for compliance, then it is illegal.

Trace antenna designs

Please refer to the chart below for main board PCB layout design.

The trace between module PIN30 and antenna must be 50 ohm impedance. At the same time, the antenna and module's PIN30 are reserved for a PI type matching network, which is used for the matching and debugging of the antenna. The series of devices in the PI network can be used for 0 ohm, and parallel devices can not be used, If the device don't need to tune the antenna.



RF exposure considerations

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

Antennas

This radio transmitter has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Model	Type	Peak Gain(dBi)	Frequency Range
IM00001GX	PIFA antenna	2.63 dBi	2400-2500MHz

Label and compliance information

The final end product must be labeled in a visible area with the following "Contains FCC ID:SMQSD6-MAIN ".

Information on test modes and additional testing requirements

When install this modular with limit modular approval, Edan Instruments, Inc will perform the test of radiated emission and spurious emission according to FCC part 15C:15.247 and 15.209 requirement, only if the test result comply with FCC part 15.247 and 15.209 requirement, then the host can be sold legally.

Additional testing, Part 15 Subpart B disclaimer

Edan Instruments, Inc is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

Note EMI Considerations

When integrating the module to the host device. Edan Instruments, Inc will use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties
For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode; see D02 Module Q&A Question 12

How to make changes

This module will only use in Edan Instruments, Inc's host device only.