Internal Devices

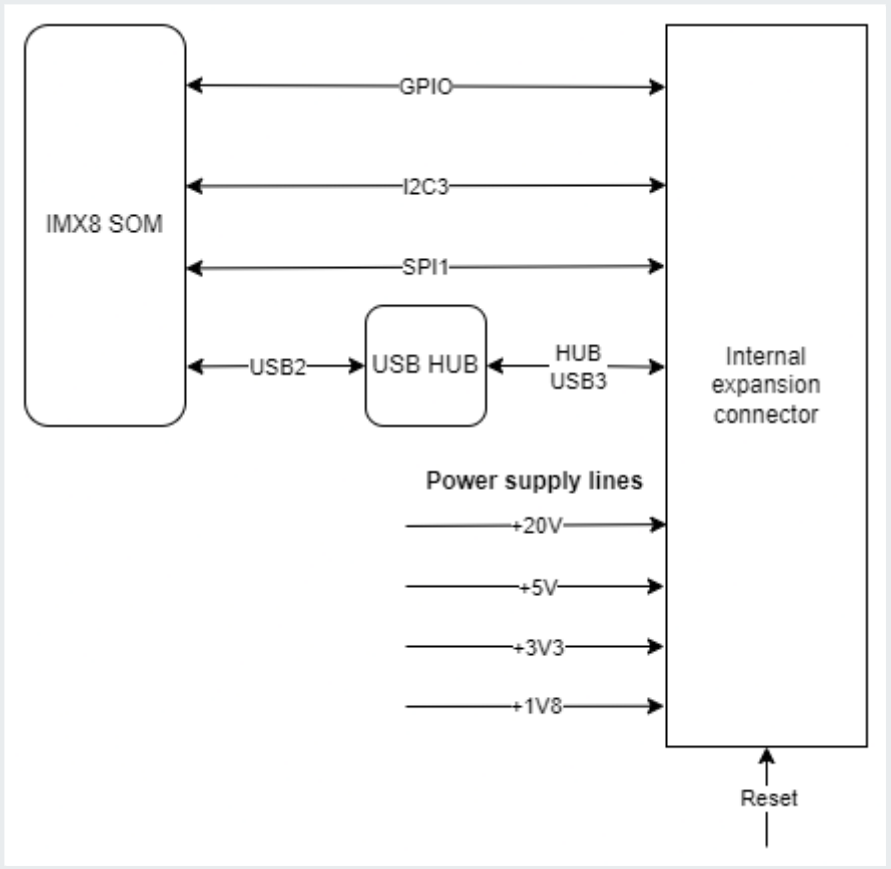
Tiger City IMX Industrial Computer with Linux OS

- Internal expansion connector
- Watchdog + reset
- EEPROM
- FLASH
- RTC
- ESP32 microcontroller
- TPM 2.0
- Secure element TO136
- Buzzer

Internal expansion connector

Part number: **FH1234-221CWG0MUT01**

Internal expansion connector connections diagram



Internal expansion connector connections table

Connector pin	Description
1	GND
2	VIN
3	GND
4	SPI1 MOSI
5	GND
6	SPI1 SCLK
7	GND
8	SPI1 MISO
9	GND

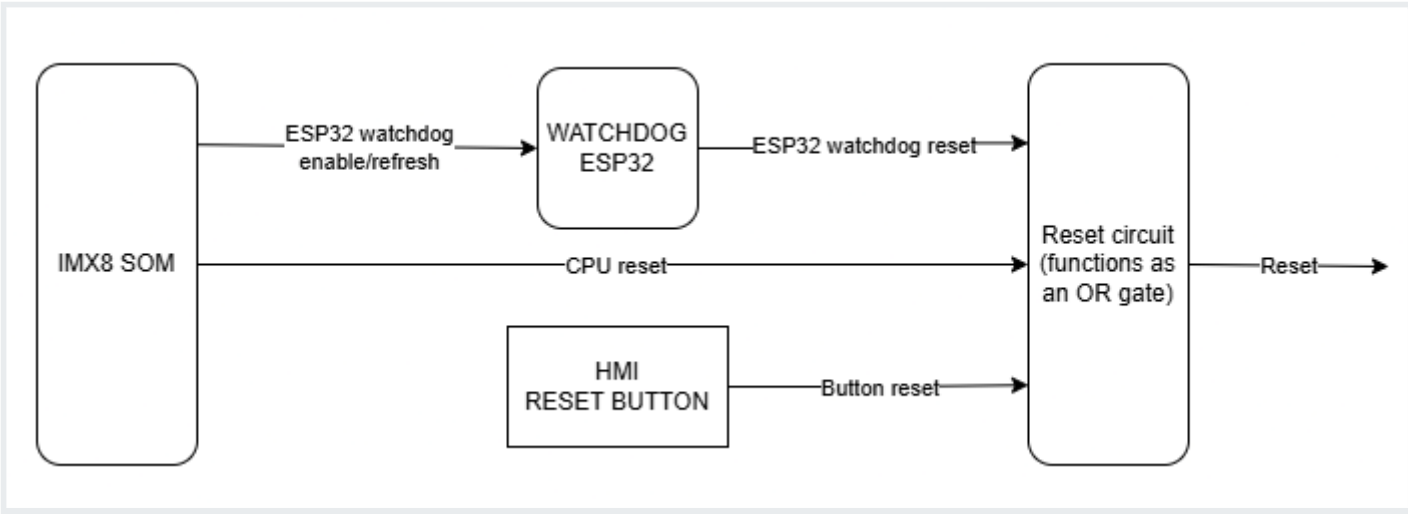
Connector pin	Description
10	RTC battery power supply
11	External watchdog reset
12	NC
13	GND
14	NC
15	NC
16	NC
17	GPIO4 IO25
18	GND
19	GPIO1 IO07
20	GPIO4 IO21
21	GPIO5 IO09
22	Global reset
23	GND
24	I2C3 SDA
25	I2C3 SCL
26	GND
27	+3V3
28	GND

Connector pin	Description
29	USB3 positive pole
30	USB3 negative pole
31	GND
32	+20V
33	UIO reset
34	NC
35	NC
36	+1V8
37	+1V8
38	GND
39	+5V
40	+5V
41	GND
42	GND
43	VIN
44	GND

Watchdog + reset

The device is equipped with a watchdog and a reset circuit.

Watchdog and reset circuit connections diagram



CPU connections table

Signal	Default function	User-space name	
ESP32_WDI	GPIO1_IO01	gpiochip0 1	ESP32_WDI
SOM_GLOB_NRST	GPIO5_IO02	gpiochip4 2	GLOBAL_NRST
GPIO0	GPIO3_IO22	gpiochip2 22	ESP_GPIO0
GPIO2	GPIO3_IO20	gpiochip2 20	ESP_GPIO2
ESP_CHIP_PU	GPIO4_IO20	gpiochip3 20	ESP_CHIP_PU

ESP32 reset

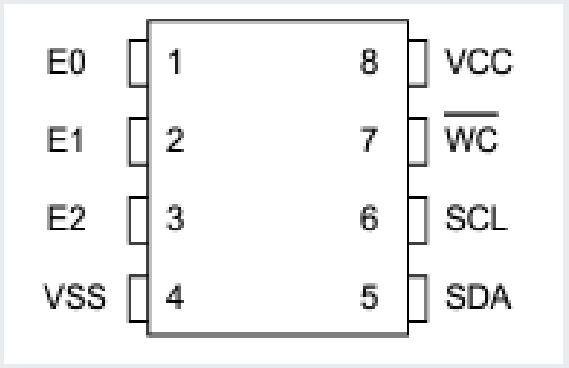
The device is equipped with an ESP32 microcontroller as a watchdog.

EEPROM

The device is equipped with 2 EEPROM memory modules. EEPROM B is read-only and reserved for the producer's purposes.

EEPROM device

Part number: **M24C02-RMC6**



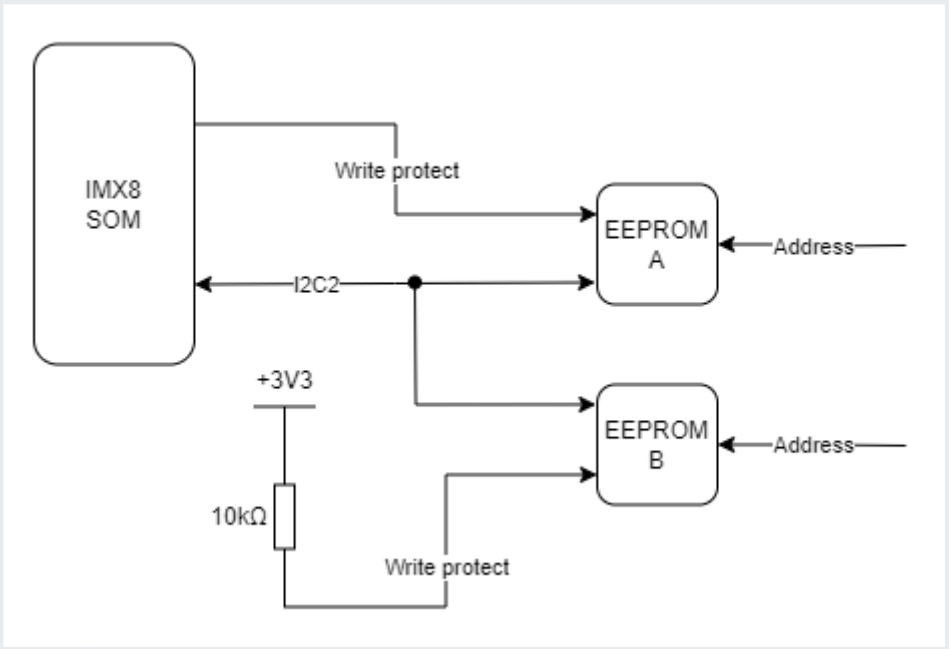
EEPROM A connections table

EEPROM pin	Description	User-space name
1	Address pin 0 (GND)	X
2	Address pin 1 (+3V3)	X
3	Address pin 2 (+3V3)	X
5	I2C2 data	X
6	I2C2 clock	X
7	EEPROM write-protect	gpiochip0 2

EEPROM B (EEPROM SN) connections table

EEPROM pin	Description	User-space name
1	Address pin 0 (GND)	X
2	Address pin 1 (+3V3)	X
3	Address pin 2 (GND)	X
5	I2C2 data	X
6	I2C2 clock	X
7	EEPROM write-protect (pull-up)	X

EEPROM connection diagram



User-space access

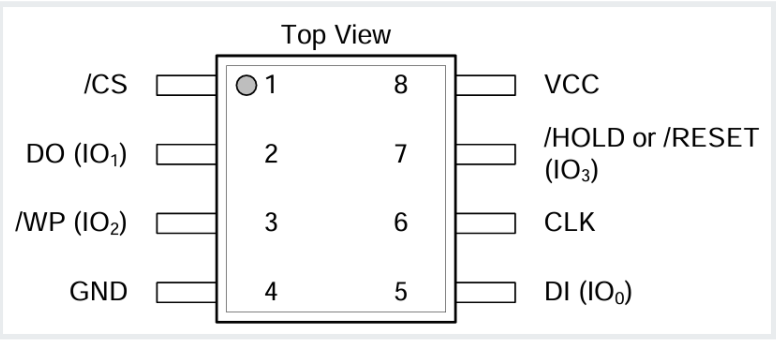
EEPROM device name: **/sys/bus/nvmem/devices/1-00561**
EEPROM device address: **0x56**

I2C2

EEPROMs A and B are connected to the CPU with the I2C2 interface.

FLASH

Part number: **W25Q64JVSSIQ**

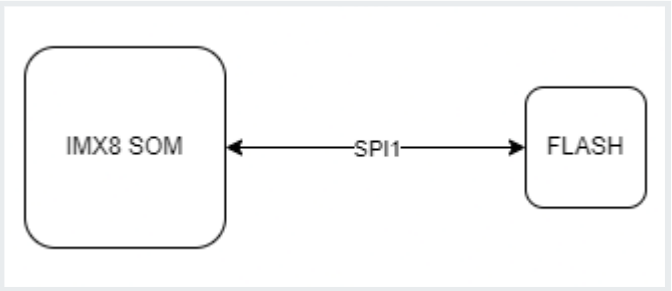


FLASH connections table

FLASH pin	Description	User-space name

1	SPI1_CS0	gpiochip2 21
2	SPI1_MISO	X
3	SPI1_WP	X
5	SPI1_MOSI	X
6	SPI1_SCLK	X
7	SPI1_HOLD	X

FLASH connection diagram



User-space access

FLASH device name: **/dev/mtdblock0**

SPI1

FLASH is connected to the CPU with the SPI1 interface.

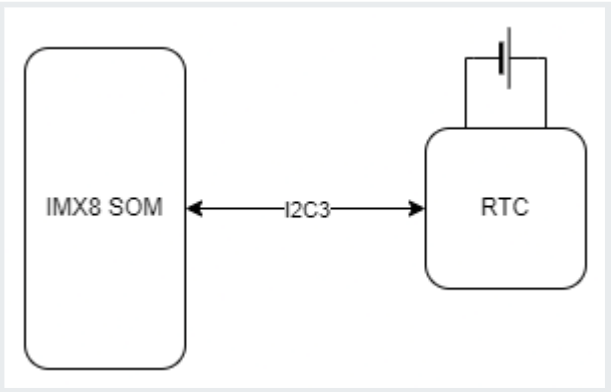
RTC

The device is equipped with a real-time clock operating at 32.768 kHz with a tolerance of 20 ppm. The RTC clock is connected to a DR2032 battery which serves as its power supply.

RTC device

Part number: **DS1338**

RTC connection diagram



User-space access

Device name: **/sys/class/rtc/rtc0**
Device address: **0x68**

RTC connections table

RTC pin	Description
1	Clock oscillator pin no. 1
2	Clock oscillator pin no. 2
3	Battery power pin
5	I2C3 data
6	I2C3 clock

I2C3

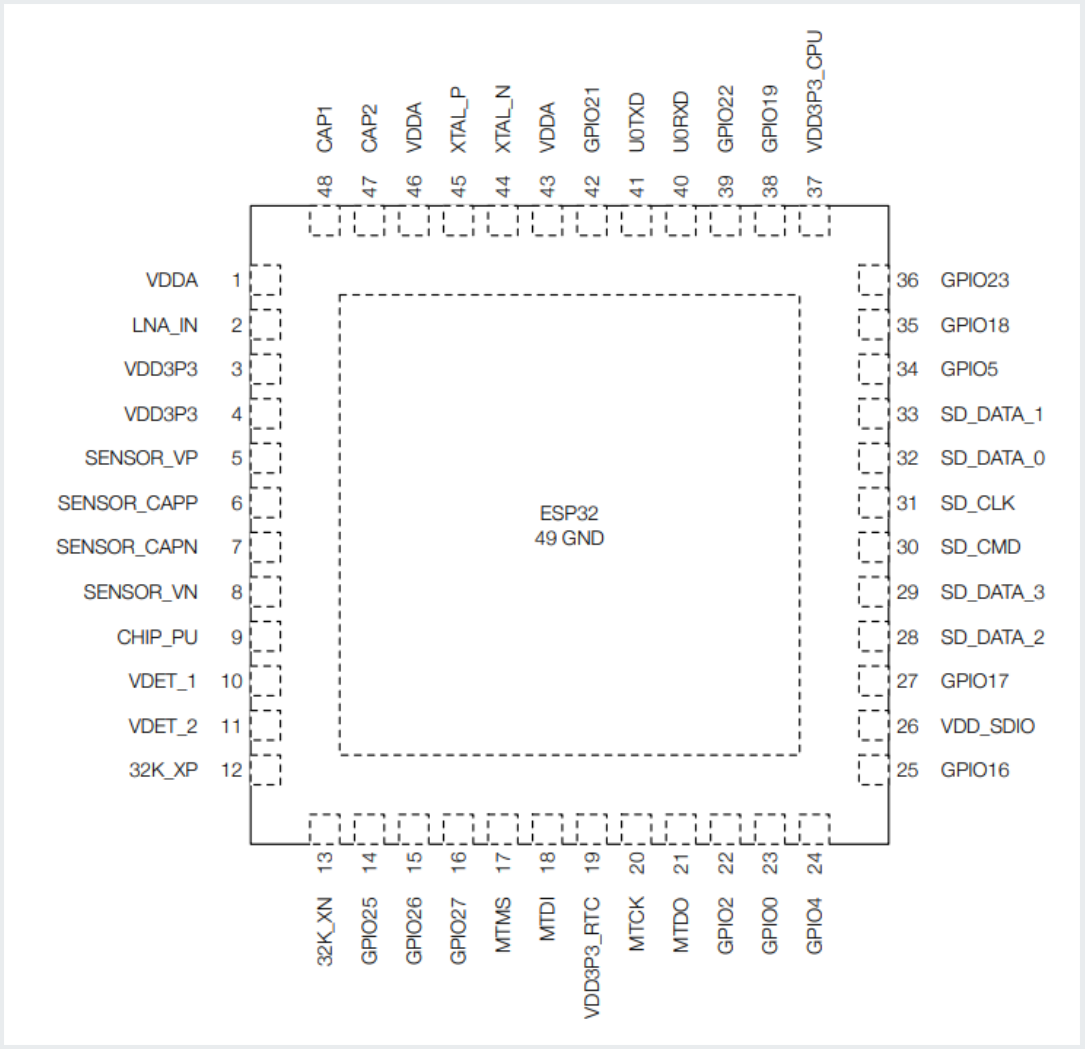
The real-time clock is connected to the CPU with the I2C3 interface.

ESP32 microcontroller

The device is equipped with an internal ESP32 microcontroller that can be used for internal purposes.

ESP32 device

Part number: **ESP32-DOWD**

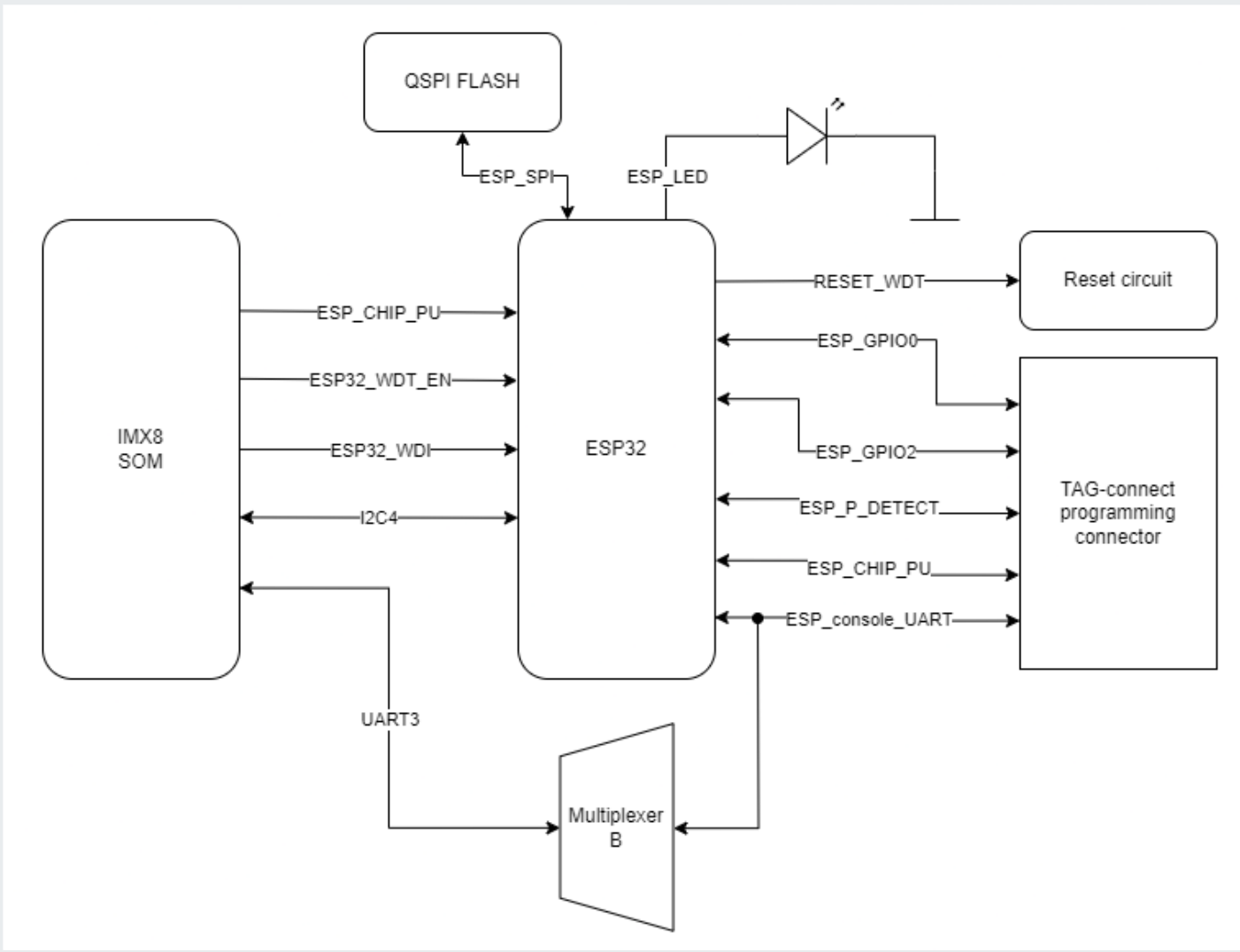


ESP32 connections table

ESP32 pin	Description
8	ESP_P_DETECT
9	ESP_CHIP_PU
14	ESP32_WDT_EN
15	ESP32_WDI
22	ESP_GPIO2
23	ESP_GPIO0
24	RESET_WDT
25	LED_ESP
26	VDD_SDIO
28	ESP_SPI_HD
29	ESP_SPI_WP
30	ESP_SPI_CS0

ESP32 pin	Description
31	ESP_SPI_CLK
32	ESP_SPI_Q
33	ESP_SPI_D
38	I2C4_SCL
39	I2C4_SDA
40	ESP_CONSOLE_RX
41	ESP_CONSOLE_TX

ESP32 connections diagram



CPU connections table

Signal	CPU pin	Default function	User-space name

ESP_GPIO_0	AC14	GPIO3_IO22	gpiochip2 22
ESP_GPIO_2	AC15	GPIO3_IO20	gpiochip2 20
ESP32_WDI	AF14	GPIO1_IO01	gpiochip0 1
ESP32_WDT_EN	AF13	GPIO1_IO03	gpiochip0 3

I2C4

The microcontroller is connected to the CPU via the I2C4 interface.

UART3

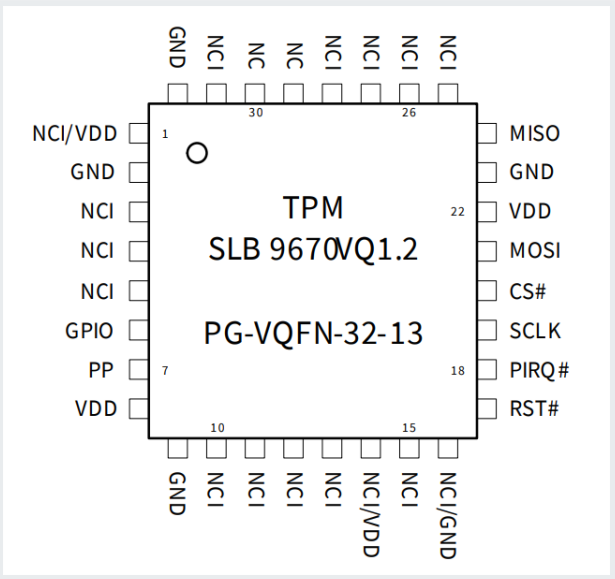
The microcontroller is connected to the CPU via the UART3 interface.

TPM 2.0

The device is equipped with a trusted platform module in 2.0 standard.

TPM device

Part number: **SLM9670**



TPM connections table

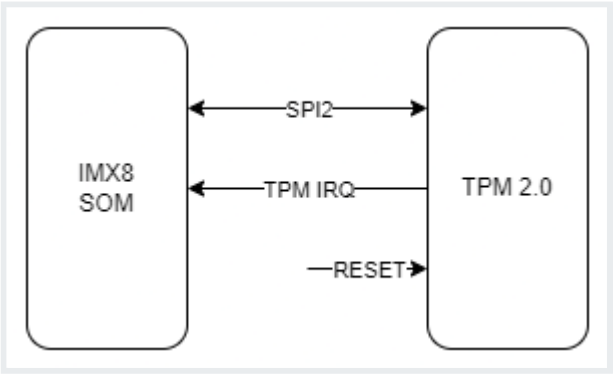
TPM pin	Description

17	Reset
18	TPM_IRQ
19	SPI2 clock
20	SPI2 chip select 0
21	SPI2 master out slave in
24	SPI2 master in slave out

User-space access

Device name: **/sys/class/tpm**

TPM connection diagram



CPU connections table

Signal	CPU pin	Default function	User-space name
TPM_IRQ	AC24	GPIO4_IO23	gpiochip3 23
SPI2_CS0_TPM	A6	GPIO5_IO13	gpiochip4 13

SPI2

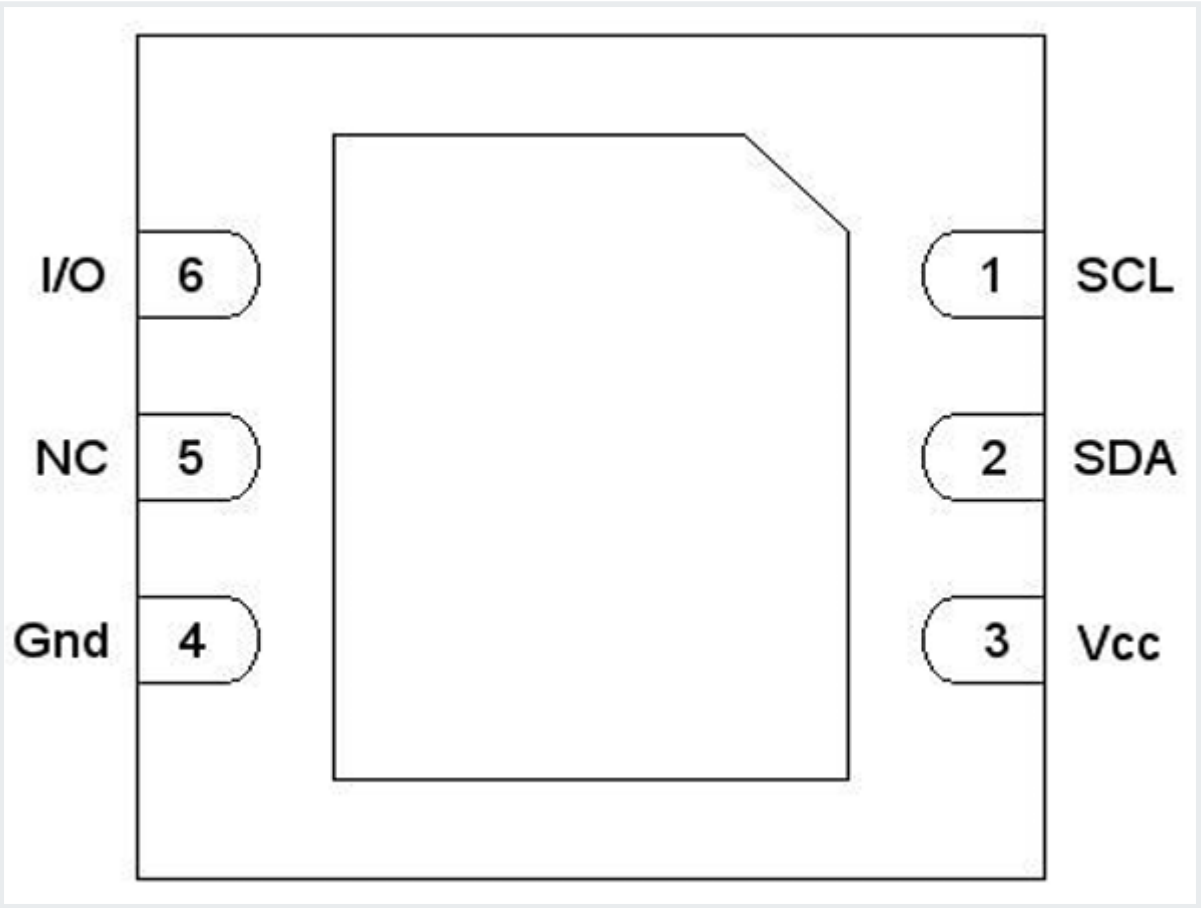
The trusted platform module is connected to the CPU with the SPI2 interface.

Secure element TO136

The device is equipped with a secure element that can be used for data encoding.

Secure element device

Part number: **IDEMIA TO136**



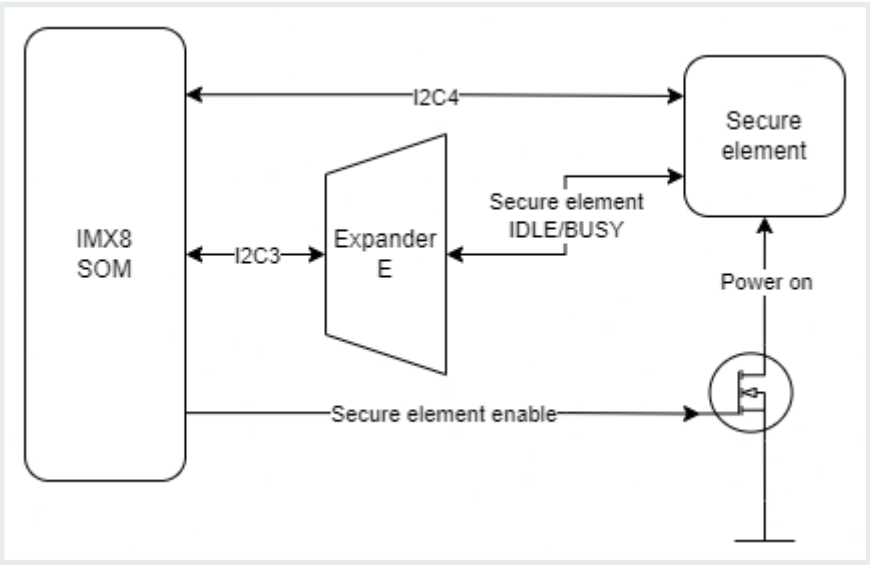
Secure element connections table

Secure element pin	Description
1	I2C4 clock
2	I2C4 data
3	+3V3
6	IDLE/BUSY state report

User-space access

Device address: 0x50

Secure element connections diagram



Expander E

The secure element is connected to the Expander E connected to the CPU via the I2C3 interface.

I2C4

The secure element is connected to the CPU via the I2C4 interface.

Buzzer

The device is equipped with a buzzer.

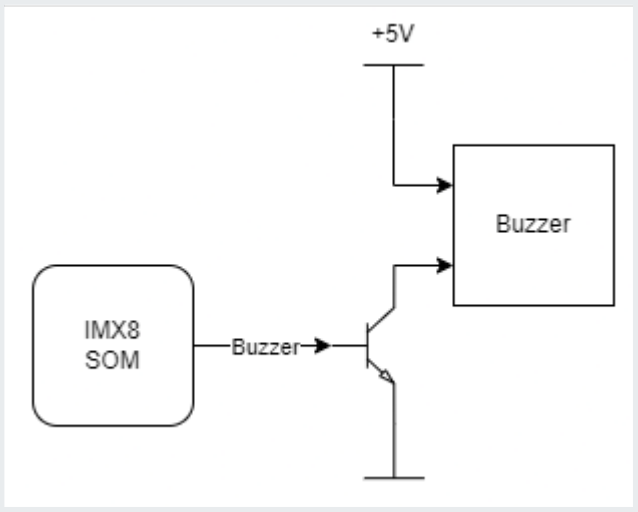
Buzzer device

Part number: **LD-BZEG-0905**

User-space access

Device name: **gpiochip3 7**
Label: **"BUZZER"**

Buzzer connection diagram



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