MXKit Development Kit

User Manual

MXCHIP Development Kit

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Introduction

MXKit Development Kit is an Internet of Things development kit from MXCHIP, Can be used for Internet of Things, smart hardware prototype development. The development kit provides an out-of-the-box intelligent hardware solution that facilitates the verification of the user's software and functions, allowing the product to quickly and securely connect to cloud service platforms and mobile phones, shortening the development cycle, and quickly reaching the market. The MXKit development kit consists of MXKit-Base, MXKit-Core, MXKit-Arduino (optional) and MXKit-Sensor (optional). among them:

● MXKit-Base board is a general-purpose development board with rich peripheral interfaces that is compatible with all MXKit-Core boards;

● MXKit-Core board is an IOT access core board containing MXCHIP wireless communication module;

● The MXKit-Sensor board is an expansion board that contains a variety of sensor types to facilitate the rapid development of various IOT applications.;

● MXKit-Arduino board adopts standard Arduino interface, compatible with any MCU development board with Arduino interface, and provides IOT access function for user products with MXKit-Core board.
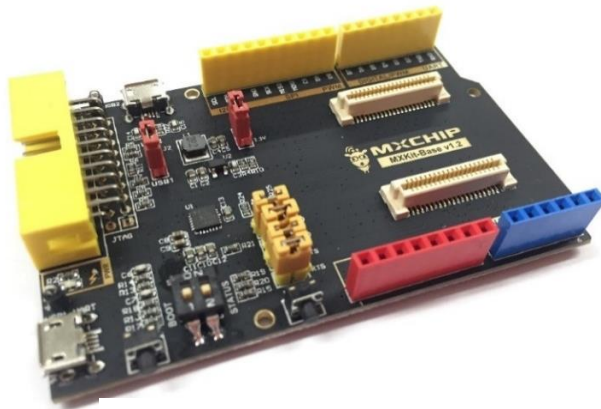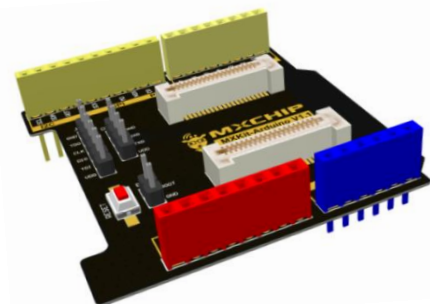

MXKit-Base

MXKit-Core
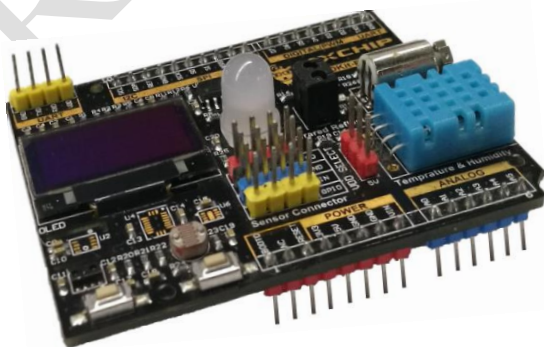
MXKit-Sensor

MXKit-Arduino

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Update instructions

Date	Version	Details
2018-5-8	1.0	Initial document

Content

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Table

1. Development kit introduction and combination

1.1 Development kit combination

MXCHIP provides developers with development kits in two application scenarios, which can be matched according to actual application requirements.

- **Combination one ： perform secondary development on the MXCHIP wireless communication module, suites combination is as follows:**

1. MXKit-Base board：a universal development board with a rich set of peripheral interfaces that connects to the MXKit-core board through the MXPort interface and is compatible with all MXKit-core boards.

2. MXKit-Core board：the on-board MXCHIP wireless communication module is connected to the MXKit-base board through the MXPort interface.

3. MXKit-Sensor board（optional）：an expansion board containing multiple sensors facilitates the development of various applications in real-life simulations, and connects to the MXKit-base board through a standard Arduino interface.

- **Combination two：Use the AT command-supporting module to provide the IoT access function for the user's products (provided the user already has a MCU development board with a standard Arduino interface) the kits are as follows:**

1．MXKit-Arduino board：Using the standard Arduino interface, it is compatible with any MCU development board with a standard Arduino interface and is connected to the MXKit-core board through the MXPort interface.

2．MXKit-Core board： on-board MXCHIP wireless communication module，connect to the MXKit-Arduino board through the MXPort interface.

3． MXKit-Sensor board（optional）：an expansion board containing multiple sensors facilitates the development of various applications in real-life simulations, connecting to the MXKit-Arduino board via a standard Arduino interface.
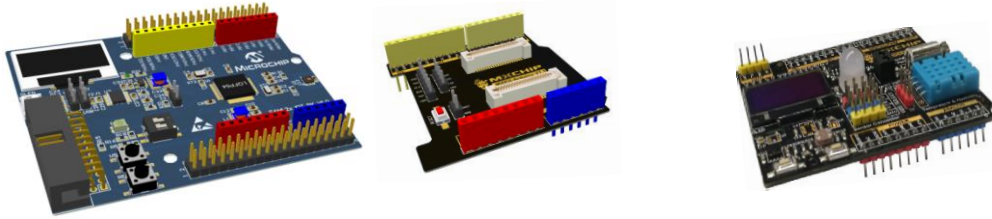
The existing MXKit-Core board modules are shown in tableTable 1.1.

Table 1.1   MXKit-Core

MXKit-Core version	Applicable module	Production status
MXKit-Core-3080	EMW3080	Mass production
MXKit-Core-3090	EMW3090	Mass production
MXKit-Core-110	EMW110	Mass production
MXKit-Core-3047	EML3047	Mass production
MXKit-Core-110A	EMW110A	In production
MXKit-Core-3060	EMW3060	To be launched
MXKit-Core-3239	EMW3239	To be launched
MXKit-Core-5062	EMG5062	To be launched
MXKit-Core-1060	EMB1060	To be launched

1.2   MXKit-Base Introduction

MXKit-Base board is compatible with all MXKit-Core board，it contains rich peripheral interface,themain resources are:

- MXPort interface，connect to MXKit-core board via board-to-board connector.

- Standard Arduino interface

- JTAG/SWD interface

- Provide two USB ports，optional power supply:

— When the jumper cap is connected to USB1 of the J2 interface, select USB1-UART in the lower left to power the system. In addition to supplying power to the system, USB1-UART also virtualizes two UART interfaces as a user serial port and a debugging serial port. Among them, Enhanced COM Port is a user serial port, Standard COM Port is a debugging serial port.

— When the jumper cap is connected to the USB2 of the J2 interface, the upper USB2 is selected to power the system. USB2 can be used as a USB data transmission interface in addition to supplying power to the system.

- 5V to 3.3V voltage conversion circuit, output 3.3V for module work.

- Two digit dial switch：BOOT & STATUS

- Two buttons：RESET & ELINK

● Provides an automatic control circuit, which can control the DTR_SCI and RTS_SCI of the CP2015 through the host computer to realize the reset of the automatic control system and enter the Bootloader mode function.

The schematic diagram of the MXKit-Base board composition is shown in Figure 1.1. The description of each component and function is shown in Table 1.2.
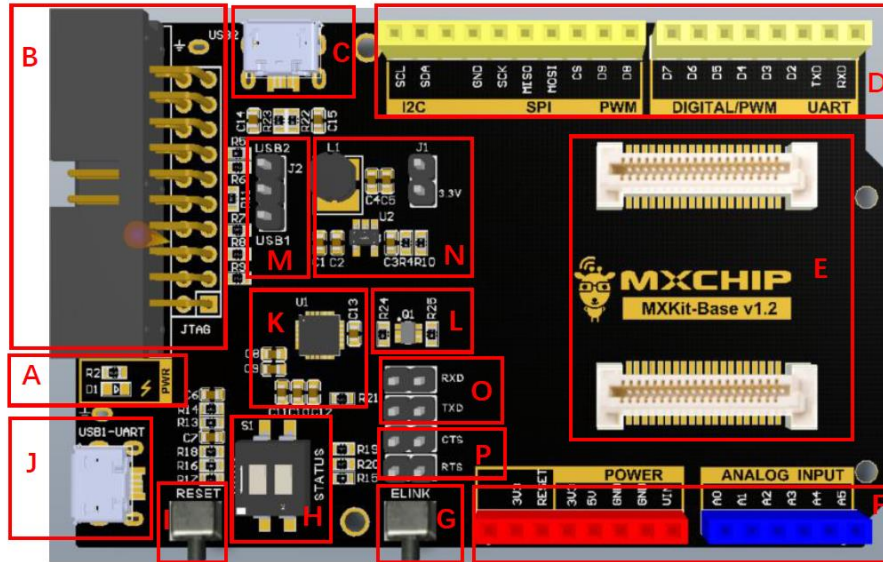
Figure 1.1   MXKit-Base

Table 1.2   MXKit-Base and function description

No.	Description
A	Power indicator
B	Standard JTAG / SWD interface
C	MicroUSB interface for system power and USB data transfer
D, F	Arduino interface
E	MXPort interface
G	Easylink button
H	Two-digit dial switches (BOOT & STATUS)
I	RESET
J	MicroUSB interface for system power and USB to dual UART functionality
K	USB to dual UART
L	Automatic control circuit

M	Power selection
N	5V to 3.3V Power Conversion Circuit
O	USER_UART_TXD & USER_UART_RXD Jumper Terminals for Wireless Modules * The default is short circuit. At this time, the user serial port and debug serial log information of the module are output from J.; * When not shorted, the log information of the module's user serial port will be output from
P	USER_UART_CTS & USER_UART_RTS Jumper Terminals for Wireless Modules * The default is short circuit, open the module's user serial port hardware flow control function; * When not short-circuited, the user's serial port hardware flow control function of the module

1.3 MXKit-Core

MXKit-Core on-board MXCHIP wireless communication module connects to MXKit-Base board or MXKit-Arduino board through MXPort interface, mainly including：

● MXPort interface, connecting to MXKit-Base board or MXKit-Arduino board through board-to-board connector.

● MXCHIP wireless communication module, including Wi-Fi module, BLE module, Wi-Fi + BT module, LoRa module, GPRS module and SigFox module.

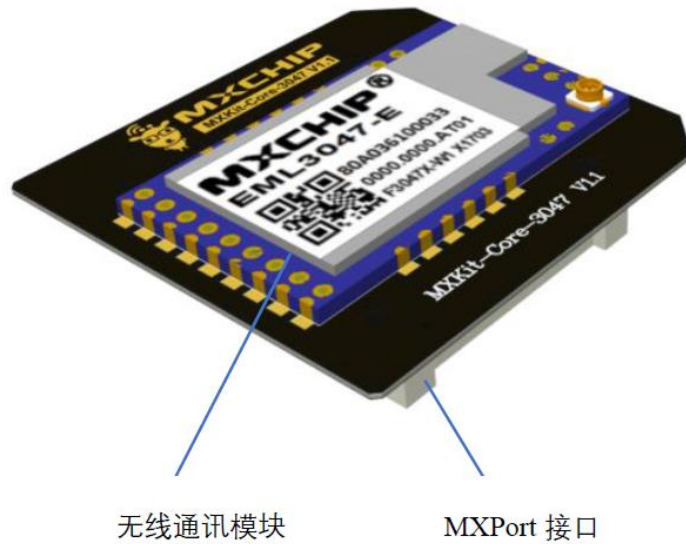The MXKit-Core board schematic is shown in Figure 1.2.

无线通讯模块   MXPort 接口

Figure 1.2 MXKit-Core

1.4 MXKit-Sensor

The MXKit-Sensor board contains a variety of sensors that can be used to simulate various applications. The main resources are：

● Standard Arduino interface;

● 128x64 OLED dual color display;

● Temperature and humidity sensor, light intensity sensor, distance sensor, infrared sensor;

● 8mm RGB tri-color LED, mobile phone control color and brightness adjustment;

● Speed adjustable micro DC motor;

● 2 user buttons;

● Environmental sensor, 9-axis motion sensor (optional);

● Apple's special CP chip (optional);

● UART debugging interface.

The connectors of the MXKit-Sensor board use color to distinguish functions. The yellow plug is a digital signal interface, the blue plug is an analog signal interface, the red plug is a power port, and the MXKit-Base board has a one-to-one correspondence. The functional diagram of the MXKit-Sensor board is shown in Figure 1.3.
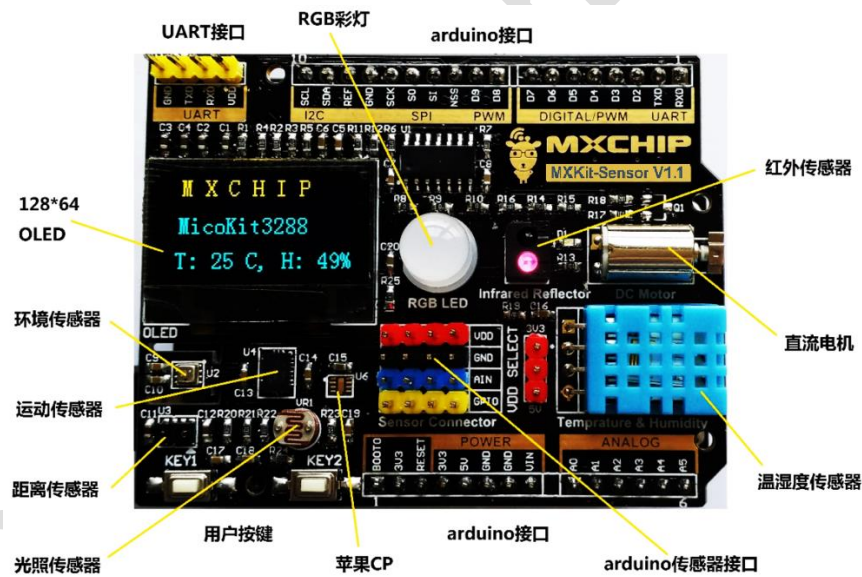
Figure 1.3   MXKit-Sensor

1.5   MXKit-Arduino

The MXKit-Arduino board uses the standard Arduino interface and is compatible with any MCU development board that has this standard interface. It connects to the MXKit-Core board through the MXPort interface to provide IOT access functions. The main resources are:

● Arduino interface, the lower layer can be connected to the MCU development board through the pin header, and the upper layer can be connected to the MXKit-Sensor board through the row header.

- MXPort interface, connecting with MXKit-Core board

- JTAG／SWD interface

- Debug interface

- BOOT shorting terminal (default is not connected. When shorted, BOOT mode after reset)

- RESET

The functional diagram of the MXKit-Arduino board is shown in Figure 1.4.
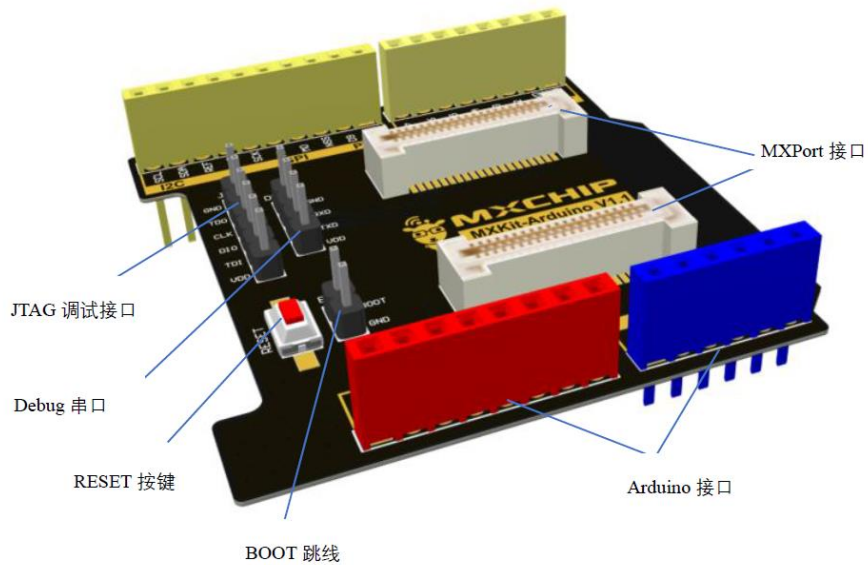
Figure 1.4　MXKit-Arduino

2. MXKit-Base

2.1 Power

The MXKit-Base board is powered by USB interface and can be powered by USB1 or USB2 through J2. The power selection mode is shown in Table 2.1

Table 2.1   USB Selection

J2	Description
Shorted Pin1，Pin2	Power by USB1-UART
Shorted Pin2，Pin3	Power by USB2

USB Selection shows in Figure 2.1
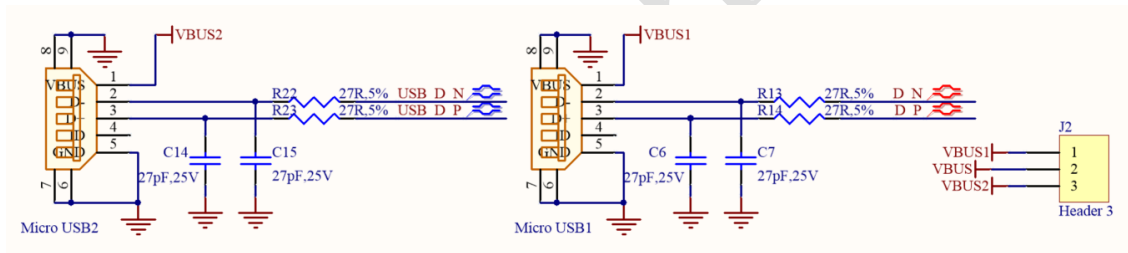
Figure 2.1   USB Selection

MXKit-Base board carries a high efficiency DC-DC of 3.3V, TLV62565. TLV62565 is a high efficiency (95%), constant frequency (1.5MHz) single chip Synchronous Step-Down regulator with output voltage adjustable version and 1.5V, 1.8V fixed voltage output version, the maximum output current 1.5A, but the static loss only 50uA, 2.7V to 5.5V input voltage range makes TLV62565 very suitable for single lithium ion electricity. The application of the pool power supply. The switching frequency is internally set to 1.5MHz, which facilitates the use of small surface mount inductors and capacitors. The device has over temperature protection function, the internal synchronous switch improves the efficiency and eliminates the external Schottky diode.

The circuit diagram of the 5V to 3.3V part is shown in Figure 2.2. When the power supply is working properly, the power indicator D1 will light up. The design has the function of current testing, and the current of the board can be detected through the J1 socket, and then the power consumption can be calculated.

Figure 2.2   USB Power supply

Users need to pay attention to the use: when normal use, J1 must be jumper wire shorted, otherwise it can not output 3.3V power, resulting in the system can not work.

2.2   USB to Dual UART

n order to facilitate users to use and debug, the MXKit-Base board is equipped with USB dual UART circuit and chip CP2105.

●   MODEM interface signal to support hardware and software flow control

●   Interface supports UART 7 / 8 Bit data bits, 1 / 2 stop bits, parity check, Mark/Space check or no check;

●   Communication speed: 300bps-2Mbps (TTL), 320 Byte transmission buffer;

●   The level converter is integrated, and the I/O port level supports 5V-3.3V level logic.

●   Fully compatible with USB 2.0

USB to dual UART is shown in Figure 2.3

Figure 2.3   USB to Dual UART

MXKit-Base is connected by Micro-USB and PC. After installing the driver, the PC port will add two serial ports, as shown in Figure 2.4.
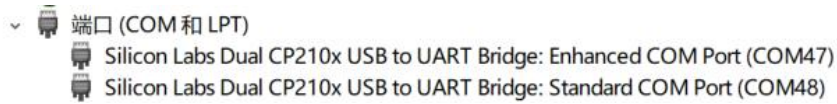
Figure 2.4   Port shown on PC

Enhanced COM Port is user serial port, Standard COM Port is debugging serial port.

Download address of CP2105

https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers

The following two points need to be paid attention to in the user's use：

（1）In Figure 1.1, the O region RXD (J4) and TXD (J6) default using a jumper cap by default, when the module user serial port communicates with the PC by USB1-UART; when the module communicates with the TXD and RXD of the Arduino interface, the RXD (J4) and the jump line terminals need to be disconnected.

（2）When using the hardware flow control function of the user's serial port, the P area CTS (J5) and RTS (J3) in Figure 1.1 need a short jump cap, and please disconnect when the hardware flow control function is not used.

2.3   JTAG /SWD

MXKit-Base supports the standard JTAG (20PIN) downloading debugging interface, which can easily connect debugging tools such as J-LINK or U-LINK2, support JTAG and SWD. The JTAG interface circuit schematic diagram as shown in Figure 2.5.
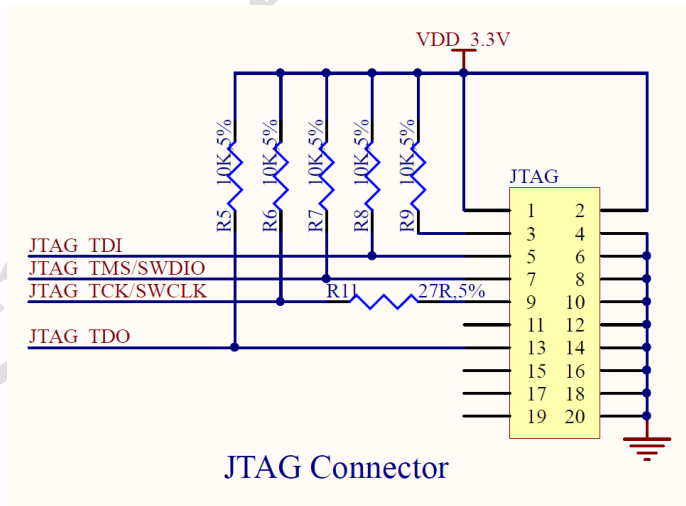

Figure 2.5   JTAG

2.4   Switch and Button

To facilitate user debugging, the MXKit-Base board provides a 2 digit dialing switch and two keys near the bottom left side of the board. The state of BOOT and STATUS can be controlled by the code switch, and RESET and Easylink are controlled by buttons. The schematic diagram of this part is
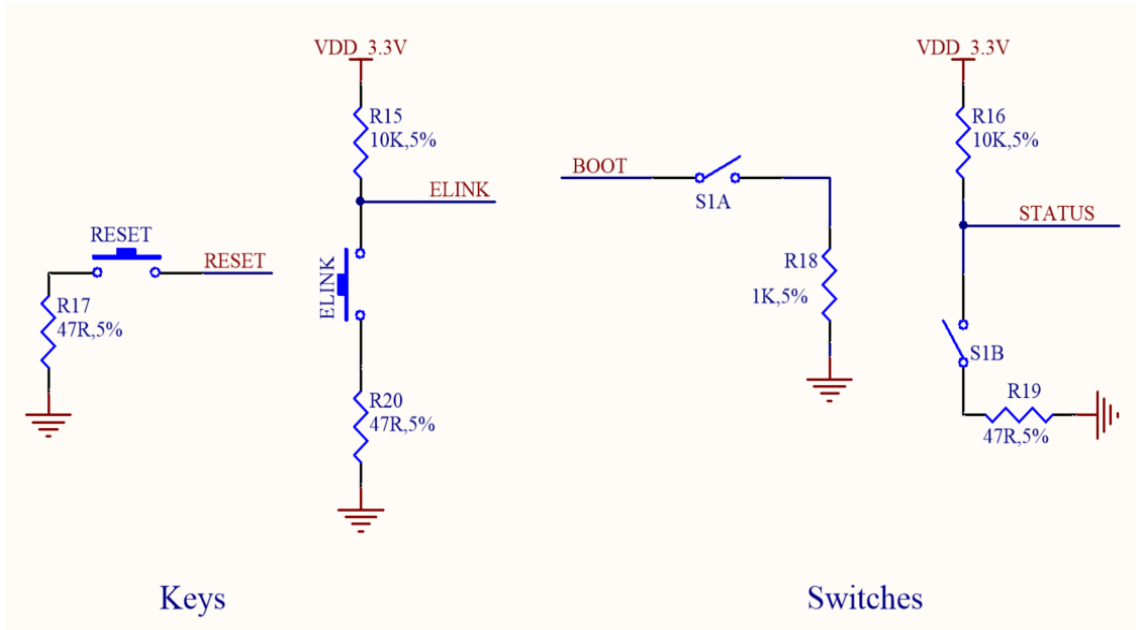
shown in Figure 2.6.

Figure 2.6   Switch and Key

2.5   Work Mode Selection

By controlling the dialing switch and key switch on the MXKit-Base, the user can make the MXCHIP wireless module into different working modes, for example, when the BOOT is allocated to the ON state, it will automatically enter the Bootloader mode after the power boot is started. The corresponding state of the pin in each mode of work is shown in table 2.2.

Table 2.2   MXKit-Base Work Mode

Mode	BOOT	STATUS	EasyLink
Normal	OFF	×	×
Bootloader	ON	OFF	×
ATE	ON	OFF	Press
QC	ON	ON	×

2.6   Automatic Control Circuit

The automatic control circuit is designed on the MXKit-Base board, which can control the DTR_SCI and RTS_SCI of CP2015 through the upper computer, and then realize the automatic control system reset and the function of entering the Bootloader mode. As shown in figure 2.7.
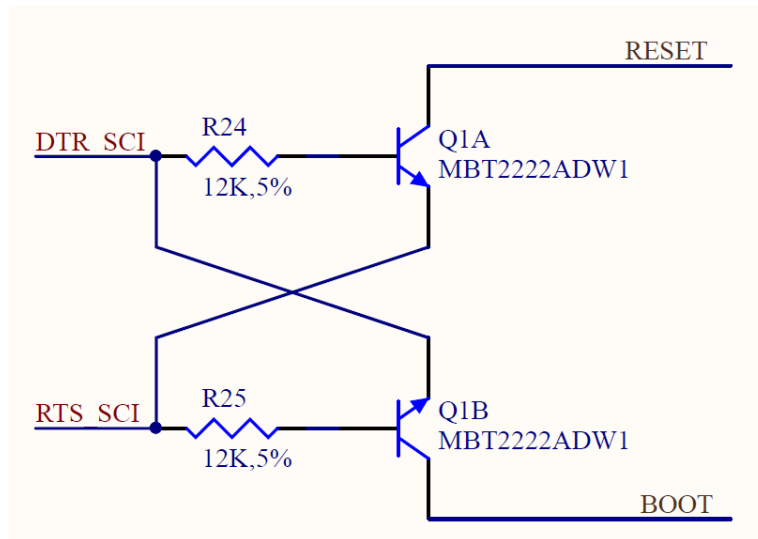
Figure 2.7　Automatic control circuit

The automatic control logic table is shown in Table 2.3

Table 2.3 Logic Table

RTS_SCI	DTR_SCI	RESET	BOOT
1	1	1	1
0	0	1	1
1	0	1	0
0	1	0	1

2.7　Arduino Port

MXKit-Base board supports the standard Arduino interface, which can be easily inserted into various Arduino interface expansion boards. The definition of the Arduino interface pin is shown in Table 2.4.

Table 2.4　Arduino

Connector	Pin Number	Pin name	Function
Arduino1 digital	10	D15	I2C1_SCL
	9	D14	I2C1_SDA
	8	NC	NC
	7	GND	ground
	6	D13	SPI_CLK
	5	D12	SPI_MISO
	4	D11	SPI_MOSI

	3	D10	SPI_CS
	2	D9	D9
	1	D8	D8
Arduino2 digital	8	D7	D7
	7	D6	D6
	6	D5	D5
	5	D4	D4
	4	D3	D3
	3	D2	D2
	2	D1	USER_UART_TX
	1	D0	USER_UART_RX
Arduino3 power	1	NC	NC
	2	VDD_3.3V	3.3V input/output
	3	RESET	RESET
	4	VDD_3.3V	3.3V input/output
	5	VDD_5V	5V output
	6	GND	ground
	7	GND	ground
	8	VIN	Power input
Arduino4 analog	1	A0	A0
	2	A1	A1
	3	A2	A2
	4	A3	A3
	5	A4	A4
	6	A5	A5

2.8   MXPort

MXKit-Base board provides a flexible MXPort interface for developers, which is compatible with all MXKit-Core boards. The MXPort interface is shown in Figure 2.8.
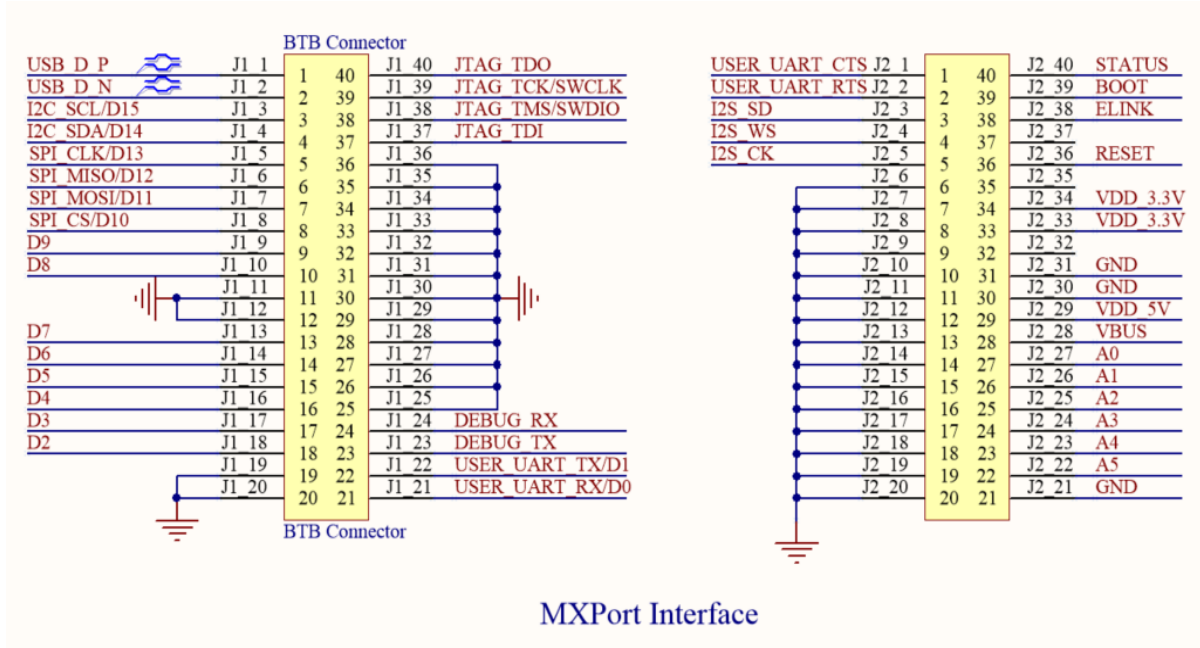
Figure 2.8   MXPort

3. MXKit - Sensor explanation

3.1 OLED Screen

Organic Light-Emitting Diode，OLED, It has the advantages of self luminescence, no backlight, high contrast, thin thickness, wide viewing angle, fast reaction speed, flexible panel, wide use temperature range, simple construction and simple process. It is considered as a new application technology for the next generation of flat panel display

MXKit-Sensor A 0.96 inch, 128X64 dot matrix, yellow and blue dual color OLED display is used, 128x16 is yellow display area, and 128*48 below is blue display area. Its schematic diagram is shown in Figure 3.1. The features of the display screen:

- Lambda high resolution: 128X64 (12864LCD same resolution, but the OLED screen has more pixels per unit area).

- Ultra wide visual angle: greater than 160°；

- Ultra low power consumption: 0.06W (far below TFT display) when normal display.

- Lambda wide power supply range: DC 3V-5V

- Industrial grade: working temperature range -30 C ~70 C;

- Supports multiple operation modes: 8 bit parallel port, 4 line SPI and IIC.

- The band select CS signal, and multiple SPI or IIC devices can work on the same bus.；

- The I/O level compatible with 3.3V and 5V control chips is directly compatible with any setup.

- Brightness and contrast can be controlled by program instruction；

- The lifetime of lambda is not less than 16000 hours.

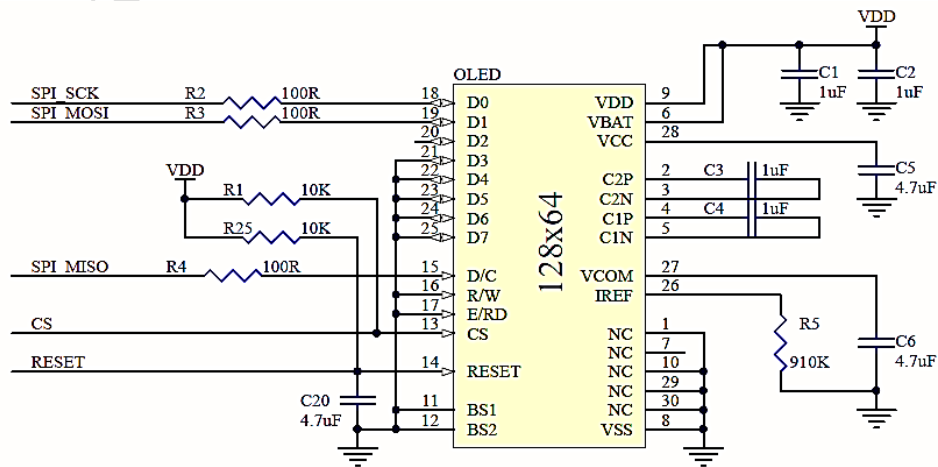- OLED   screen   internal   drive   chip: SSD1306.

图 3.1 Schematic diagram of OLED display circuit

3.2   RGB LED

The MXKit-Sensor board is designed with a 8mm diameter RGB three color LED indicator. Through P9813 drive, the full color control of LED can be realized through mobile phones.

●   P9813 is a full color spot light source LED driver chip, using CMOS technology, providing three constant current driving and 256 level gray modulation output. Using dual transmission mode (DATA and CLK), built in regeneration can enhance transmission distance. It is used for driving display light conversion, all kinds of character conversion, and color animation design. According to the different requirements of different controllers and customers, offline or online operation is required. The features of the chip:

●   IC input voltage 5V ~ 6.5V; built in LDO, 4.5V regulated output.；

●   External single resistor feedback mode, three drive, driving current 0-45mA per drive;

●   The function of checking the input signal.

●   The built in ring oscillator (1.2MHz) supports continuous FREE RUN modulation output and maintains the static function of the screen.

●   The maximum serial input data clock frequency 15MHz;

●   Signal phase locked regeneration, and 1MHz data transmission speed can be up to 1024 at lower level.

●   LED drive port voltage `

●   The circuit principle of this part of 17V. is shown in Figure 3.2. The driving sequence diagram shown in Figure 3.3.
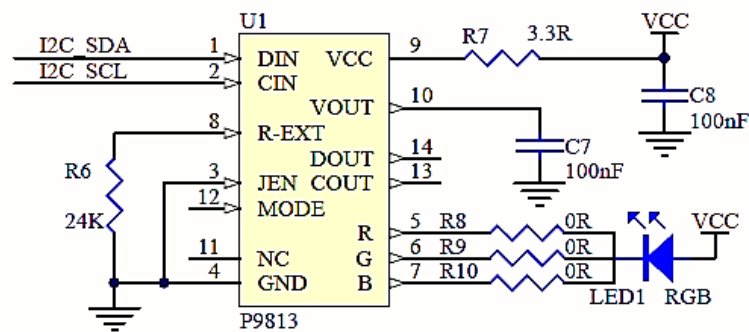

Figure 3.2   RGB

Figure 3.3   P8913 Driving sequence diagram

Note: since P9813 is not a standard I2C interface, in order to save IO, the circuit is connected to the bus of I2C, but it needs to be configured as GPIO to adjust the color and dimming function according to the time sequence diagram.

3.3   Environment Sensor (selection)

The MXKit-Sensor board can select the new digital environmental sensor BME280 of BOSCH, which integrates three sensors, such as digital humidity, temperature and atmospheric pressure, and encapsulates in a 2.5x2.5mm metal package to achieve small volume and low power consumption.

The humidity sensor within the BME280 has a rapid response in a rapidly changing environment with a response time of 1 second and high precision within a wide temperature range (+ 3%). The pressure sensor is an absolute atmospheric pressure sensor with high accuracy (+ 0.25%) and resolution. The built-in temperature sensor optimizes the noise interference and improves the resolution. It is mainly used for the temperature compensation of internal pressure sensors and humidity sensors, and can also be used to monitor the temperature of the environment.

BME280 has a standard I2C (optional SPI) interface, and the circuit connection is relatively simple, as shown in Figure 3.4.
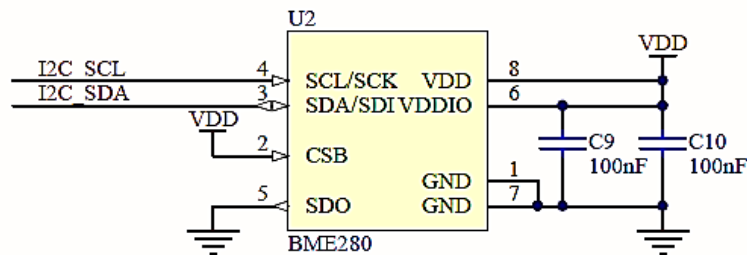

Figure 3.4   Schematic diagram of environmental sensor circuit

3.4   Nine axis motion sensor (selection)

The MXKit-Sensor board can be selected with BOSCH's new digital nine axis motion sensor BMX055, including a 12 - bit three - axis acceleration sensor, a 16 - bit three axis angular rate (Tuo Luoyi) and a fully functional three - axis geomagnetic sensor. The measurement range of the acceleration sensor is: + 2G, + 4G, + 8g, + + 16g; the monitoring range of the gyroscope is from 125 to 2000? /s, and the typical value of the magnetic field measurement is 1300 mu T (X axis, Y axis) and + 2500 mu T (Z axis).

BMX055 has a standard I2C (optional SPI) interface, each sensor has an independent interrupt

function, and the circuit connection is relatively simple, as shown in Figure 3.5.
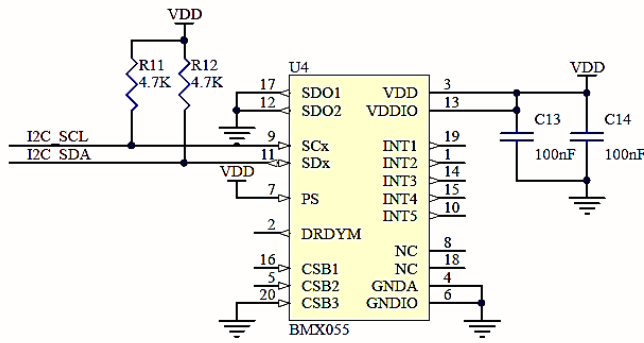

Figure 3.5 Schematic diagram of nine axis motion sensor circuit

3.5 Apple Authentication Chip(Optional)

In order to facilitate the development of apple Home Kit, the MXKit-Sensor board has an apple authentication chip (Apple authentication coprocessor, CP) for the development of Apple authentication peripherals. Please refer to Apple Corp for specific information and usage.

The CP chip has a standard I2C interface, and the circuit connection is relatively simple, as shown in figure 3.6..
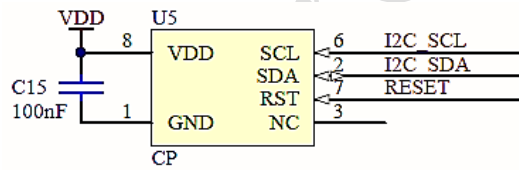

Figure 3.6 schematic diagram of apple CP chip circuit

3.6 Distance and illumination sensor

● The MXKit-Sensor board has designed an integrated environment luminance and proximity sensor APDS-9930, which provides a I compliant ambient luminance sensor (Ambient Light Sensor, ALS) and a proximity sensor with an infrared LED in a single 8 pin package, in which an environmental luminance sensor uses a dual photodiode to approximate 0.01. Human vision reaction with low lumen performance under lux illumination provides high sensitivity to enable devices to operate behind dark glass. The proximity sensor is fully calibrated for 100 mm object detection, eliminating the need for factory calibration of terminal equipment and sub components. From the bright sunlight to the dark room, close to the detection function can work well. The module adds micro optics lens to provide efficient transmission and reception of infrared energy, which can reduce overall power consumption. In addition, the internal state machine enables devices to enter low-power mode, resulting in extremely low average power consumption. It has the following characteristics:

● Optical modules integrated with ALS, infrared LED and proximity detector

♦ Environmental luminance sensing (ALS)

- A visual reaction that approximated the human eye;

- Programmable interrupt function with upper and lower threshold values;

- Up to 16 bits of resolution;

- High sensitivity after the operation of dark glass;

- Low lumen properties of 0.01LUX

- Proximity detection：

- Fully calibrated to 100 millimeter detection;

- Integrated infrared LED and synchronous LED drive;

- Factory calibration exemption from proximity sensors

- Programmable wait timer

- Waiting state power - 90 typical value of A;

- The programmable range is 2.7 milliseconds to more than 8 seconds.

- I C interface compatibility:

- Up to 400kHz;

- Special interrupt pin.

- Sleep mode power - 2.2 A typical value;

- Small package 3.94x2.36x1.35 millimeter。

The APDS-9930 chip has a standard I2C interface, and the circuit connection is relatively simple, as shown in Figure 3.7
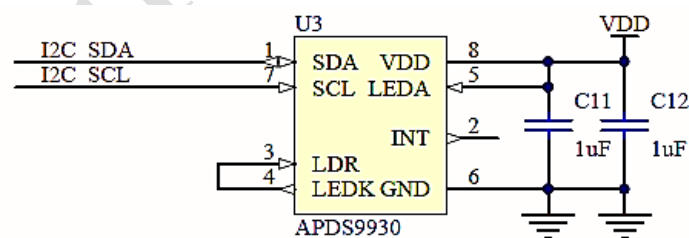

Figure 3.6   Schematic diagram of distance and illumination detection circuit

3.7   Temperature and Humidity Sensor

MXKit-Sensor board designed a commonly used temperature and humidity sensor DHT11, which is a temperature and humidity composite sensor with calibrated digital signal output. It uses special digital module acquisition technology and temperature and humidity sensing technology to ensure that the product has extremely high reliability and excellent long-term stability. The sensor includes a resistive humidity sensor and a NTC thermometer and is connected to a high performance MCU. Therefore, the product has the advantages of excellent quality, strong anti-interference ability and

high cost performance. Each DHT11 sensor is calibrated in an extremely accurate humidity calibration chamber. The calibration coefficients are stored in OTP memory in the form of programs, and these calibration coefficients are called internally during the processing of detection signals. The single line serial interface makes the system integration easy and quick. Ultra small volume, very low power consumption, signal transmission distance up to 20 meters or more, making it the best choice for all kinds of applications and even the most demanding applications. The product is 4 pin and single row pin. The connection is convenient, and the special encapsulation form can be provided according to the needs of users.

The DHT11 data is single line serial interface, and the circuit connection is relatively simple, as shown in Figure 3.8. A sequence diagram is shown as shown in Figure 3.9。
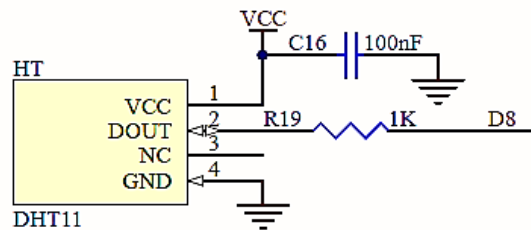

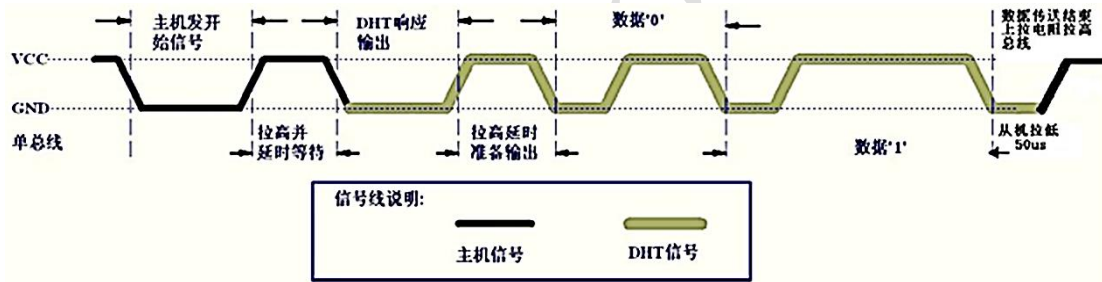Figure 3.8 schematic diagram of temperature and humidity circuit

Figure 3.9 DHT11 sequence diagram

3.8 Infrared reflection switch

● Using RPR220 type optoelectronic pair tube, RPR220 is an integrated reflective photodetector. Its transmitter is a GaAs infrared diode, and the receiver is a high sensitivity, silicon planar photoelectric triode, and RPR220 is packaged in DIP4, which has the following characteristics:

● The plastic lens can improve the sensitivity.

● Small volume and compact structure;

● When the light emitted by the LED is returned, the transistor outputs low level. The photodiode conditioning circuit is simple and stable.

In order to accurately monitor the reflection distance, the collector of the triode is connected to the interface of the ADC. The distance of the reflection is detected by measuring the size of the voltage. At the same time, a LED indicator can be used to judge the distance of the rough distance through the change of the brightness of the LED. The schematic diagram of this part is shown in Figure 3.10.
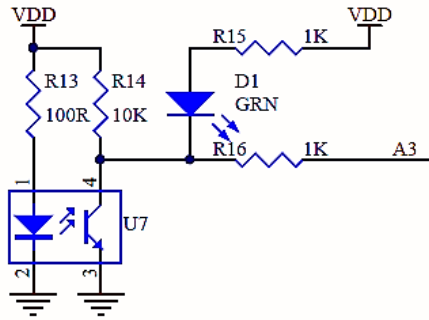
Figure 3.7 Schematic diagram of infrared reflection circuit

3.8 Light sensor

MXKit-Sensor has designed a special light sensor that uses photosensitive resistors, which are generally used for light measurement, light control and photoelectric conversion (changing light changes into electrical changes). Commonly used photosensitive resistor cadmium sulfide photosensitive resistor, it is made of semiconductor materials. The sensitivity of the photosensitizer to light (spectral characteristics) is close to the response of the human eye to the visible light (0.4~0.76) m, as long as the light that the human eye can feel will cause the change of its resistance. When designing the light control circuit, the incandescent bulb (small bulb) light or natural light is used as the control light source to simplify the design.

The photosensitive resistance is the change of the resistance value and can be converted to the change of the voltage. So the input of the ADC is used to monitor the change of the voltage, and the change of the light can be calculated. The principle diagram of this part is shown in Figure 3.11.
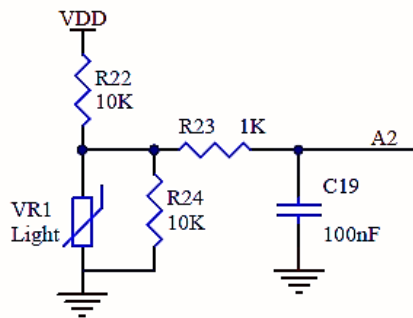

Figure 3.8 Schematic diagram of light sensor circuit

Note: as the maximum input voltage of the different MCU ADC will be different, the resistor value can be adjusted according to the maximum ADC input voltage of the MCU, so that the best effect can be achieved.

3.9 Micro DC motor

In order to simulate the execution mechanism of the site, a hollow cup motor is designed on the MXKit-Sensor board. The model is: LX0610C, the hollow cup motor belongs to the DC, permanent magnet and servo micro motor. Hollow cup motor has outstanding energy saving characteristics, sensitive and convenient control characteristics and stable operating characteristics. As an efficient energy conversion device, it represents the direction of the development of the motor. The hollow

cup motor breaks through the rotor structure of the traditional motor in structure, and adopts the rotor without iron core. The hollow cup motor has outstanding energy saving, control and drag characteristics. The DC motor is driven by a NPN triode, which simplifies the driving mode and uses the PWM signal for speed regulation. This part of the schematic diagram is shown in Figure 3.12.
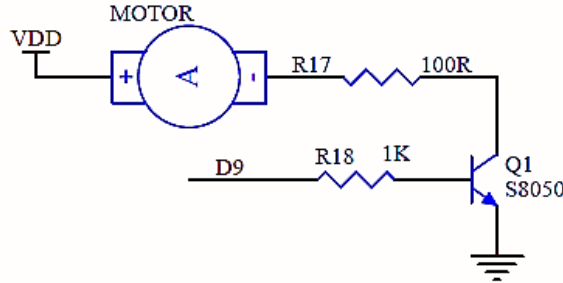

Figure 3.12 schematic diagram of DC motor circuit

3.9   Arduino Connector

The MXKit-Sensor board uses a standard Arduino interface, and the main board of the MXKit-Sensor is seamlessly linked, and can also be inserted in any standard Arduino MCU motherboard. The specific pins are defined as shown in Figure 3.13. The connector uses color to distinguish functions. The Yellow plug-in is a digital signal interface, the blue plug-in is the analog signal interface, and the red plug-in is the power interface.
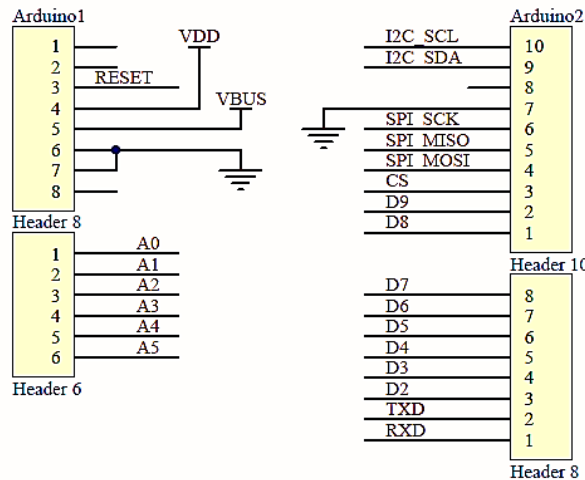

Figure 3.13 schematic diagram of extended board Arduino circuit

3.10   Arduino Sensor Connector

The MXKit-Sensor board also has a Arduino sensor interface, which can be used to connect analog, digital and other sensors, and support two kinds of voltage specifications for 3.3V and 5V (through the "VDD SELECT" selection on the board). Meanwhile, the sensor interface connector also uses color to distinguish functions. The Yellow plug-in is a digital signal interface, a blue plug-in It is the analog signal interface, the red plug-in is the power interface, and the black represents the interface of the ground wire. This part of the circuit is shown in Figure 3.14.
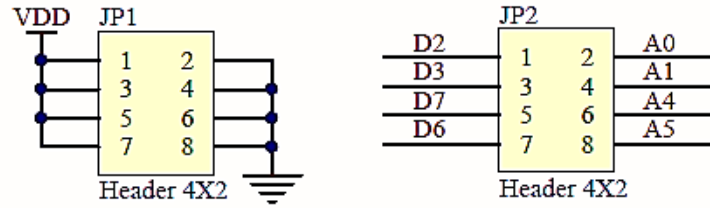
Figure 3.9   Arduino

3.11   UART Connector

MXKit-Sensor board reserved a UART interface (not RS232 interface) to facilitate user debugging and communication.

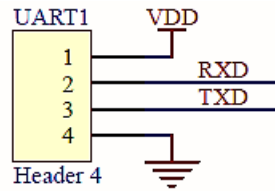The circuit of this part is shown in Figure 3.15.

Figure 3.10   UART

4. Sales and technical support information

If you need to consult or purchase this product, please call Shanghai Qing Ke Information Technology Co., Ltd. during office hours.

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