MM32SPIN05

Hardware design

What are the precautions for power-on-reset circuit design?

1. Slow rise and residual voltage power-on should not be shown in the power supply to MCU as far as possible.

2. There is no need to use large time constant when power supply is met.

3. A diode in parallel back-to-back, is connected to both ends of the resistor in the RC reset circuit. It is conducive to overcoming the failure of normal reset when MCU is frequently and repeatedly turned on (the parallel diode can discharge fast only to power-down. For repeated power-on reset, MCU fails to reset again since the voltage cannot drop to 0.6V quickly and climb up again).

The recommended RC parameter is 100K plus 0.1 uF capacitor. Another practice is to replace this RC circuit by adding one reset chip and MAX809 is in serial connection with one capacitor on its output pin.

RCC

What are the precautions for using the external clock?

1. The input range of external crystal: 4-24MHz

2. For using the external crystal, the official typical circuit of the external crystal (510ohm in serial circuit and 510Kohm in parallel circuit) must be referred to if the external crystal is used as the HSE clock at -40 ~ 85℃ (full temperature) and 2.0 ~ 5.5V (full voltage).

3. For using the external crystal, the time of HSE ready should be sufficient and relevant adjustment should be made since the internal resistances vary with different external crystals.

What are the precautions for using the internal clock?

It is calibrated to ± 1% at ambient temperature before leaving factory, with a maximum deviation of 5% over full temperature and voltage. When UART communication is used at high and low temperatures, it is recommended to use an external crystal or baud rate adaptation.

How to check the reset status of RCC->CSR register after chip reset?

After power-on reset, except for the POR bit, the other bits on the reset flag register of the chip are indefinite. Read the flag bit after reset and the value read could not reflect the real situation. With stable power supply and voltage, RMVF bit needs to be cleared before the other normal reset states be detected.

Does the chip support the automatic switch between HSI and HSE?

After CSSON is set, the system cannot accurately reflect the loss status of HSE clock.

What is the maximum frequency that the chip can run?

72MHz parameter needs to be loaded from the stored calibrated values. At that time, the flash controller needs to set two latencies.

GPIO

What are the precautions for using GPIO?

1. IO has two characteristics:

FT: 5V tolerant, signals between VDD and 5V can be input

TC: standard IO, input signals does not exceed VDD voltage

It should be noted that for hardware design, the voltage at the TC port cannot be greater than the supply power voltage, otherwise, voltage flow backwards will occur.

2. After power-on, MCU's GPIOs are all in the high impedance state, except PA13/14.

ADC

What are the precautions for using MM32 ADC?

1. If high accuracy ADC is required, VDDA and VSSA are recommended to offer independent and reliable power supply voltage and the voltage difference between VDDA and VDD should not be greater than 100mv.

2. Attention should be paid to input impedance match. If 1Mbps is used as the sampling rate, it only supports 50ohm input impedance.

3. For multiplex sampling and channel switching, an accurate sampling value is required and the sampling hold time of each channel should be enlarged, such as 7.5 cycles.

DMA

Does it support device to device?

It does not support device-to-device P2P and only supports M2M, P2M and M2P modes.

EXTI

What are the precautions for using MM32 EXTI?

It supports external wake-up of STOP. For example, EXTI0 can be mapped to PA0, PB0 and PC0, which use the same interrupt line. If they are all configured to enable, only the last configured one is valid.

SPI

Does SPI support single-line half duplex?

Single PIN is not supported to achieve single-line half duplex. Single-line half duplex can be achieved by the combination of two PIN MISO and MOSI, supplemented with software configuration.

SYSTICK

Does MCU support 1/8 SYSCLK and SYSCLK as the clock source of Systick?

It only supports SYSCLK as the clock source of Systick/4.

UART

What are the precautions for using MM32 UART?

1. When UART is used to communicate with other MCUs or devices at -40 ~ 85℃ (full temperature) and 2.0 ~ 5.5V (full voltage), external crystal is recommended.

2. The embedded clock needs to be calibrated to 1% at 25℃ (ambient temperature). However, when the ambient temperature changes, temperature drift will occur to the clock (specific parameters can be seen in the section: internal clock characteristics of the Data Sheet). Therefore, it is recommended to consider whether the internal clock meets the application needs.

3. During the preliminary design, with the self-adaptation code of software baud rate, MCU is taken as the master while the opposite end as the slave in order to support the normal communication when temperature and voltage change.

Does UART support hardware baud rate self-adaptation?

1. It does not support hardware baud rate self-adaptation, but it provides software baud rate self-adaptation code.

2. In designing software self-adaptation baud rate, new parameters will only take effect by modifying the interger and decimal frequency division, disabling UART, setting new decimal frequency division and then enabling UART.

3. It should be noted that the maximum value of BRR register is 4.

WWDG

Does it support debugging after entering STOP?

MM32 MCU does not support Debug when entering STOP or Standby.

Flash

Can Flash be written directly?

1. Flash memory space can store both code and data. The main flash is divided into blocks based on 16 pages (1K byte per page) or 4 sectors (4K bytes per sector). It can be erased by page or by whole chip.

2. The main flash can be programmed 16 bits per time. When PG bit of FLASH_CR is 1, a half-word (16 bit) is directly written to the corresponding address. This is one programming operation.

3. Flash needs to be erased first and then written. If non 0xFF is written, it will enter hardfault interrupt.

Protect

How does MM32 MCU achieve read-protect?

MM32 MCU supports block protection. For the read-protect of the whole chip, the initial address can be set as 0 and the size as 32K of the whole chip capacity. Then take this chip as one block and set read-protect to achieve the read-protect of the whole chip.

After read-protect is set, can Flash operation still be supported on the internal chip, such as analog EEPROM?

Unless write-protect is set to the corresponding block. For the blocks that have completed the setting of read-protect, the same program can perform Flash block erase to the chip within the same area and write actions. As for the other read-protect blocks and non-protect blocks, operations can be achieved by calling function.

Power supply

Can AVDD and DVDD use different power supplies?

AVDD and DVDD of the chip can use different power supplies, but the voltage difference between DVDD and AVDD cannot be greater than 0.3V, and the power input PIN is connected to 1uF/0.1uF decoupling capacitor.

Reset circuit

What are the precautions for MM32 to design reset circuit?

It is not necessary for low level to be kept too long in the reset circuit. In a typically recommended circuit, 100K resistor and 0.1uF capacitor are recommended.

MM32 ISP

Does ISP only support multiple ports?

Presently, it only supports one port and it is recommended to use PA9/10 for ISP downloading port.