HDSC 华大半导体 HUADA SEMICONDUCTOR

32 Bit Microcontrollers

HC32L110 / HC32F003 / HC32F005 Series

Special port use and precautions

Applicable objects

Series	Product Model
HC32L110	HC32L110C6UA
	HC32L110C6PA
	HC32L110C4UA
	HC32L110C4PA
	HC32L110B6PA
	HC32L110B4PA
HC32F003	HC32F003C4UA
	HC32F003C4PA
HC32F005	HC32F005C6UA
	HC32F005C6PA
	HC32F005D6UA

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1 Abstract

This application note mainly introduces the special port applications and precautions for HC32L110 / HC32F003 / HC32F005 series. This application note mainly includes.

- RESET port multiplexed as I/O function
- External crystal port multiplexed as I/O function
- SWD programming port multiplexed as I/O function
- UART programming port

multiplexed for I/O function

Caution.

- This application note is an application supplement for HC32L110 / HC32F003 / HC32F005 series, and cannot replace the user's manual. Please refer to the user's manual for specific functions and register operations and other related matters.

2 Function Introduction

GPIOs are general purpose input and output modules that allow the MCU to set an IO to analog mode as an ADC input, to digital input and output, or to a peripheral port for use by a specific peripheral. Before using the port function, you need to turn on the GPIO module clock control function.

The special multiplexable ports of this GPIO series include RESET, external crystal pin, SWD, UART programming interface, etc. Users need to choose different multiplexing methods according to the characteristics of these ports and application features in different applications.

3 Introduction of special port multiplexing function

3.1 RESET pin multiplexed as input port

A system reset is generated when the external reset pin detects a low level. This reset pin has a built-in pull-up resistor and an integrated burr filter circuit. The burr filter circuit filters out burr signals less than 20uS (typical), so the low signal added to the reset pin must be greater than 20uS to ensure a reliable chip reset.

The RESET pin can be multiplexed as input port P0.0. To use RESET as input port P0.0, the reference flow is as follows.

1. GPIO module clock control function is turned on: PERI_CLKEN.GPIO is set to 1
2. RESET_USE_IO clock control bit of the System Control Register:

SYSCTRL1. RES_UIO Enable Note.

— When reusing the RESET pin as an input port, it is still important to ensure that the peripheral circuitry is designed so that the pin cannot go low (Low-Level) at power-up, otherwise the program will not run.

— This port already has a built-in pull-up resistor, so even if this pin is used as an input port, it can only be used as an "input with pull-up capability".

3.2 External crystal port multiplexed as I/O port

When no external high-speed crystal or low-speed crystal is used, the following ports can be multiplexed for I/O functions.

X32MOUT	P0.1
X32MIN	P0.2
X32KOUT	P1.5
X32KIN	P1.4

The multiplexed I/O function flows as follows.

1. GPIO module clock control function is turned on: PERI_CLKEN.GPIO is set to1 .
2. P0.1 and P0.2, P1.5 and P1.4 need to be configured as digital ports: P0ADS and P1ADS related bits are configured as 0.
3. Function configuration registers are selected for GPIO functions: P01_SEL, P02_SEL, P15_SEL, P14_SEL are set to 0.
4. Select input and output direction: Set the relevant bits of P00DIR and P1DIR (0:output, 1 :input)

3.3 SWD debugging programming port multiplexed as I/O function

The SWD port is used as the debug and download port for this series of MCUs. Users can choose whether to reserve this port for debug or mass production programming according to their actual needs.

The SWCLK and SWDIO pins can be multiplexed as I/O pins if the SWD port is not required for debug programming. The reference flow for multiplexing I/O functions is as follows.

1. GPIO module clock control function is turned on: PERI_CLKEN.GPIO is set to 1
2. The SWD_USE_IO clock control bit (SYSCTRL1. SWD_UIO) of the system control register is enabled
3. P27_SEL.SEL and P31_SEL.SEL are set to 0
4. P2DIR.P27 and P3DIR.P31 are set to

input or output Note.

— From power-up until SWD is multiplexed and configured for I/O port effect, the levels of P27 and P31 pins are high by default, so care should be taken and circumvented in the design of peripheral circuits.

— When the SWD port is multiplexed as an I/O function, the in-circuit debug and download functions via SWD are disabled.

— During user debugging, you can restore SWD online debugging and download functionality by erasing or downloading other programs that do not multiplex the SWD through the serial port, or by adding a few seconds of delay before multiplexing the SWD port in the application.

3.4 UART off-line programming port multiplexed as I/O port

This series of MCU uses UART ports P3.5 (TX) and P3.6 (RX) for offline programming function, and users can choose whether to reserve this port as a burn-in port for subsequent mass production downloads according to their needs in actual applications.

In order to enter the download mode with our offline programmer, the P3.5(TX) port will output a high level pulse of about 10ms as a handshake signal when the MCU is powered on. When this port (P3.5) is used as an output function in an application, the hardware circuit should consider avoiding the impact of this pulse on the whole application, or avoid using this port as an output function as much as possible.

3.5 Other GPIO Function Configuration

For other function configuration, please refer to the user manual of the series.

4 Summary

Through the above introduction, together with the user manuals of HC32L110 / HC32F003 / HC32F005 series, we can understand how to multiplex the special port Reset pin, external crystal pin, SWD pin and UART download port of this MCU series as I/O pins in the application and the precautions. If you need to know more about the usage and operation of the module, please refer to the corresponding user's manual.

5 Other Information

Technical support information: www.hdsc.com.cn

6 Version Information & Contact

Date	Versions	Modify records
2018/8/15	Rev1.0	Initial release.

If you have any comments or suggestions in the process of purchase and use, please feel free to contact us.

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