RL78/G13, 78K0/Kx2

Migration Guide from 78K0 to RL78: Key Interrupt

Introduction

This application note describes how to migrate the key interrupt of the 78K0/Kx2 to that of the RL78/G13.

Target Device

RL78/G13, 78K0/Kx2

When using this application note with other Renesas MCUs, careful evaluation is recommended after making modifications to comply with the alternate MCU.

Contents

1. Summary of Differences between Functions

Table 1.1 summarizes the differences between the key interrupt function of the 78K0/Kx2 and the key interrupt function of the RL78/G13.

Table 1.1 Summary of Differences between Functions

Item	78K0/Kx2	RL78/G13
Maximum number of input channels (Note1)	8ch	8ch
Valid edge of key interrupt input pin	Falling edge	Falling edge
Key interrupt name	INTKR	INTKR
I/O buffer power supply of key interrupt input pin (Note2)	EV_{DD}	EV_{DD0}
Low-level width of key interrupt input	MIN.250ns (1.8 V≦EVDD≦5.5 V)	MIN.250ns (1.8 V≦EVDD0≦5.5 V) MIN.1us (1.6 V≦EVDD0＜1.8 V)

Note1. The different products have the different number of channels. For details, refer to the appropriate user's manuals (hardware).

Note2. The different products have the different I/O buffer power supply for the pins. For details, refer to the appropriate user's manuals (hardware)

2. Comparison between Registers

Table 2.1 compares the registers for the key interrupt functions of the 78K0/Kx2 and the RL78/G13.

Table 2.1 Comparison between Registers

Item	78K0/Kx2	RL78/G13
Key return mode register	KRM register	KRM register
Port mode registers	PM7 register	PM7 register
On-chip pull-up resistors	PU7 register	PU7 register

3. Sample Code for Key Interrupt Function

The sample code for the key interrupt function is explained in the following application note.

- RL78/G13 Key Interrupt Function CC-RL (R01AN2700)

4. Documents for Reference

User's Manual:

- RL78/G13 User's Manual: Hardware (R01UH0146)
- 78K0/Kx2 User's Manual: Hardware (R01UH0008)

The latest versions can be downloaded from the Renesas Electronics website.

Technical Update/Technical News:

The latest information can be downloaded from the Renesas Electronics website.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Mar.29, 2019.	-	First edition issued

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)
   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.
2. Processing at power-on
   The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.
3. Input of signal during power-off state
   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.
4. Handling of unused pins
   Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.
5. Clock signals
   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.
6. Voltage application waveform at input pin
   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).
7. Prohibition of access to reserved addresses
   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.
8. Differences between products
   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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