CubeSuite+ Simulator for 78K0/Kx2 V3.00.03

Release Note

R20UT2513EJ0100
Rev.1.00
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Contents

Chapter 1. Target Devices

Below is a list of devices supported by the 78K0/Kx2 simulator.

Nickname	Device name
78K0/KB2 (30/36pins)	μPD78F0500, μPD78F0501 , μPD78F0502, μPD78F0503, μPD78F0503D, μPD78F0500A, μPD78F0501A , μPD78F0502A, μPD78F0503A, μPD78F0503DA
78K0/KC2 (38/44/48pins)	μPD78F0511, μPD78F0512, μPD78F0513, μPD78F0514, μPD78F0515 , μPD78F0513D, μPD78F515D, μPD78F0511A, μPD78F0512A, μPD78F0513A, μPD78F0514A, μPD78F0515A , μPD78F0513DA, μPD78F515DA
78K0/KD2 (52pins)	μPD78F0521, μPD78F0522, μPD78F0523, μPD78F0524, μPD78F0525, μPD78F0526, μPD78F0527, μPD78F0527D, μPD78F0521A, μPD78F0522A, μPD78F0523A, μPD78F0524A, μPD78F0525A, μPD78F0526A, μPD78F0527A, μPD78F0527DA
78K0/KE2 (64pins)	μPD78F0531, μPD78F0532, μPD78F0533, μPD78F0534, μPD78F0535, μPD78F0536, μPD78F0537, μPD78F0537D, μPD78F0531A, μPD78F0532A, μPD78F0533A, μPD78F0534A, μPD78F0535A, μPD78F0536A, μPD78F0537A, μPD78F0537DA
78K0/KF2 (80pins)	μPD78F0544, μPD78F0545 , μPD78F0546, μPD78F0547, μPD78F0547D, μPD78F0544A, μPD78F0545A , μPD78F0546A, μPD78F0547A, μPD78F0547DA

Chapter 2. User's Manuals

Please read the following user's manuals together with this document.

Manual Name	Document Number
CubeSuite+ V1.01.00 78K0 Debug	R20UT0731EJ0100
CubeSuite+ V2.00.00 Message	R20UT2448EJ0100

Chapter 3. Key Word for Uninstallation

To uninstall this product, use the integrated uninstaller (uninstalls CubeSuite+).

Chapter 4. Changes

This chapter describes changes from V3.00.02 to V3.00.03.

4.1 Specifications changed

4.1.1 Simulation on CubeSuite+ V2.00.00

Support simulation on CubeSuite+ V2.00.00. There is no functional change.

Chapter 5. Cautions

This section describes cautions for using the 78K0/Kx2 simulator. The following two types of caution are described:

•Differences between target devices and simulator : Differences from behavior of target devices due to simulator specifications

•Cautions for using simulator GUI : Cautions for using the simulator GUI window

5.1 Differences between target devices and simulator

5.1.1 Flash self programming function

The simulator does not support Flash self programming function.

5.1.2 Reset

If a reset is generated by the Power-on-Clear circuit (POC) or low-voltage detector (LVI) circuit, the simulator will display "STANDBY" in the status bar. (The status is actually reset, not standby.)

And the behavior differs as follows if a reset is generated by the RESET pin.

[Target device]

Goes into reset status when the RESET pin goes to low level. Reset status is released when it goes to high level.

[Simulator]

Does not go into reset status when the RESET pin goes to low level. When it goes to high level, the simulator momentarily goes into reset status, and then the reset status is released immediately.

5.1.3 Oscillation stabilization time of clock oscillation circuit

The simulator does not simulate the clock oscillator oscillation stabilization time.

The oscillation stabilization time is always 0 seconds when a reset or standby is released, regardless of the OSTS register settings. The OSTS register is set to the following values.

- Initial value after reset, during STOP mode, when MSTOP bit in MOC register = 1: 0x00
- MSTOP in MOC register = 0 after STOP mode release: Values shown in the following table

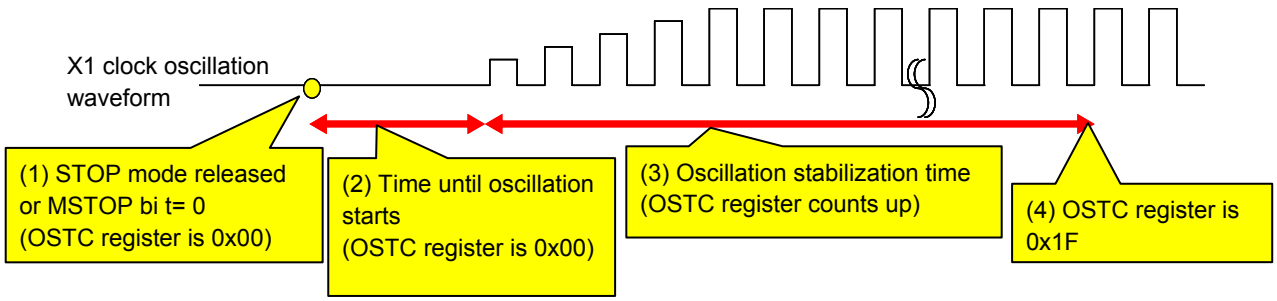
(Maximum value in the target device)

OSTS setting	OSTC value
0x1 (2^{11}/fx)	0x10
0x2 (2^{13}/fx)	0x18
0x3 (2^{14}/fx)	0x1C
0x4 (2^{15}/fx)	0x1E
0x5 (2^{16}/fx)	0x1F

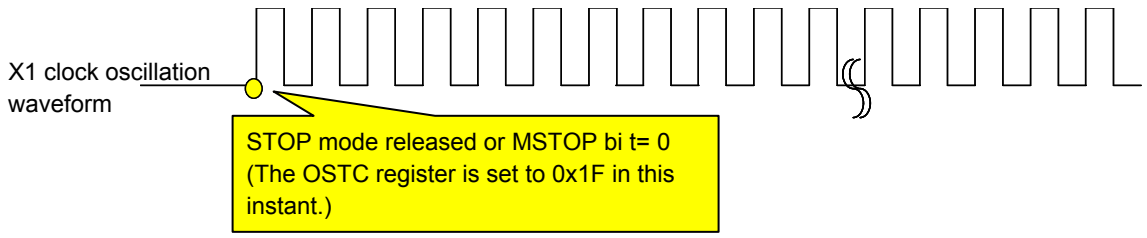
The following figure illustrates this operation.

In the target device, the X1 clock oscillation starts after the states (1) to (4) have passed. In the simulator, states (1) to (4) end instantly and the X1 clock oscillation starts.

Target device (with OSTS set to 0x05)



Simulator (with OSTS set to 0x05)



Therefore, pay attention to the code that waits for oscillation stabilization.

There is no problem if a program is created with the condition that the execution exits the oscillation stabilization wait period when the OSTC register value becomes the maximum value, or when the OSTC register value exceeds the specified value, but if a program is created with the condition that the execution exits the oscillation stabilization wait period when the OSTC register value becomes a value other than the maximum value, the execution enters an infinite loop.

The following shows examples of code that causes/does not cause problems.

(This is an example of when OSTS is set to 0x05)

Correct program example (1)

```
while(OSTC != 0x1f)
{
NOP();/* wait */
}
```

Correct program example (2)

```
while(OSTC <= 0x10)
{
NOP();/* wait */
}
```

Example of program that may cause problems

```
while(OSTC != 0x10)
{
NOP();/* wait */
}
```

5.1.4 Bit 0 (AMPH) of clock operation mode select register

The simulator does not simulate bit 0 (AMPH) of clock operation mode select register (OSCCTL).

Although values can be read and written normally, changing this value does not change behavior.

[Bit 0 (AMPH) of clock operation mode select register (OSCCTL)]

This register is for setting the oscillation-circuit gain (amplification factor) in accordance with the frequency when oscillating the high-speed system clock. In the case of the target device, there is a risk that the high-speed system clock will fail to oscillate if this setting is incorrect, but with the simulator, the high-speed system clock will always oscillate, even if the setting is incorrect.

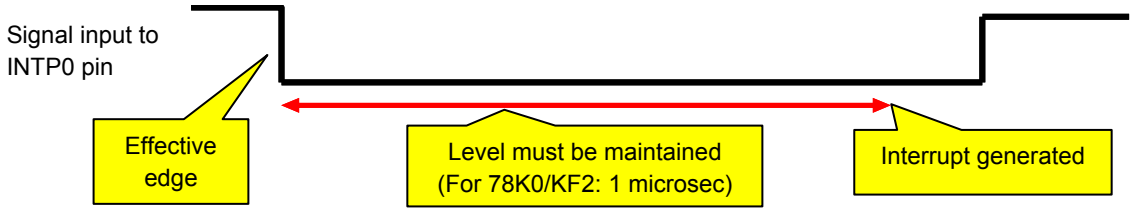
5.1.5 Noise reduction circuit for external-interrupt pin

The simulator does not simulate the noise reduction circuit. For example, if you input the active level to an external-interrupt pin with a noise reduction circuit, the interrupt will be received even if the active-level amplitude is too low.

The example below considers the case when there is input to the INTP0 pin.

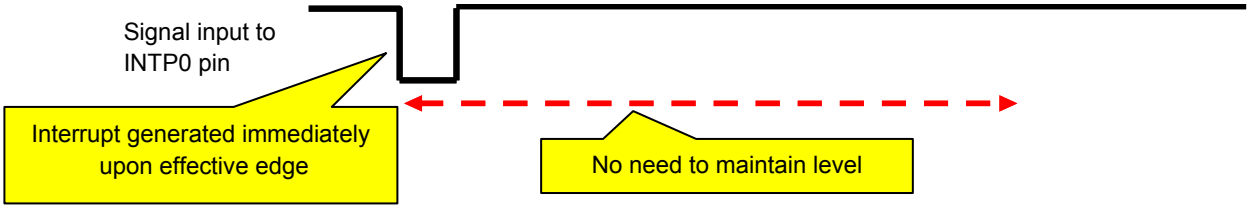
There is a noise reduction circuit on the INTP0 pin of the target device. For this reason, in order to generate an interrupt, it is necessary to input an effective edge to the target device, and subsequently maintain the signal level. (See the user's manual of the target device for the length of time it must be maintained.)

Target device behavior (falling effective edge)



In the case of the simulator, however, this noise reduction circuit is not simulated. For this reason, an interrupt will be generated any time a valid edge is generated. (No need to maintain signal level).

Simulator behavior (falling effective edge)



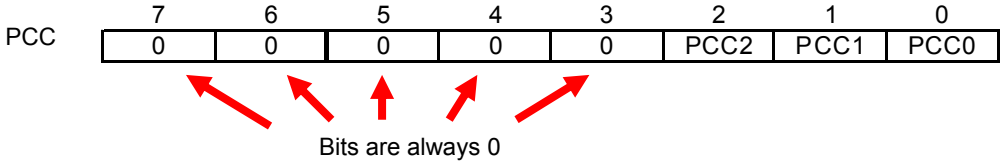
5.1.6 IIC bus simulation

IIC bus simulation is not supported.

5.1.7 SFR 0/1 constant bit

The SFR has bits that are always 0 or 1.

For example, bits 3 to 7 of the processor clock control register (PCC) are always 0.



Although the values of these bits cannot be changed in the case of the target device, the values can be changed in the case o\f the simulator. Note that changing these values has no effect on behavior.

5.1.8 Comparator stabilization time of A/D converter

The comparator stabilization times of the A/D converter are different for the target device and simulator.

[Target device]

It takes 1 microsecond from the start of operation of the comparator until it stabilizes. Any A/D conversion results obtained before stabilization will be invalid. For this reason, it is necessary to ignore the first A/D conversion results.

[Simulator]

Comparator operation stabilizes immediately upon startup. For this reason, A/D conversion results obtained within 1 microsecond of the start of operation will be correct, and there is thus no need to ignore the first A/D conversion results.

5.1.9 Default voltage of AV_{REF} pin

Default voltage of AV_{REF} pin is 5.0V.

Note : The meaning of "Default voltage " is the voltage when the pin have no connection.

5.1.10 Interrupt response time

The interrupt response times of the target device and simulator differ.

[Target device]

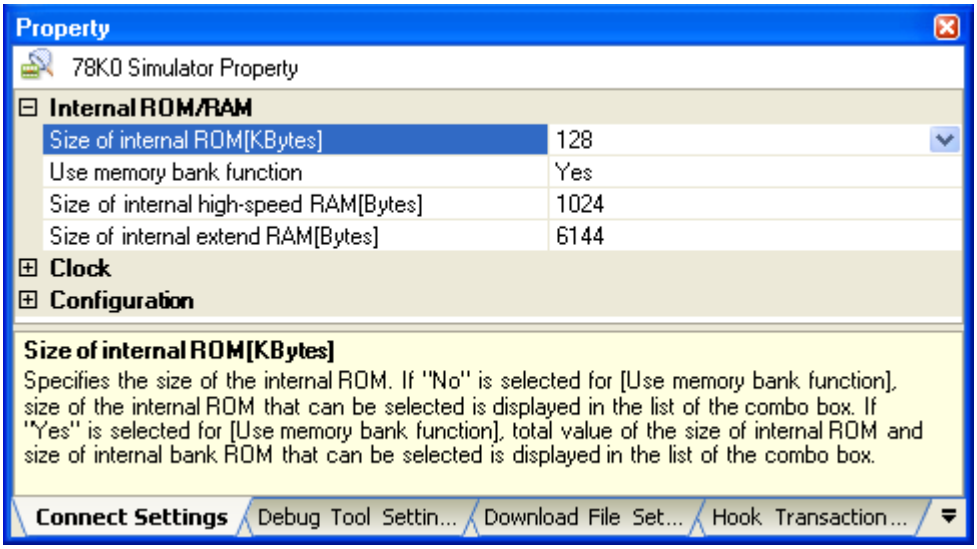
It takes 7 to 33 clock cycles from the generation of an interrupt until actual vector interrupt processing begins.

[Simulator]

Vector interrupt processing begins immediately upon the interrupt.

5.1.11 Memory size switching / internal expansion RAM size switching registers

With the simulator, the internal ROM size, internal high-speed RAM size, and internal expansion RAM size are specified via the Property Panel.



For this reason, it does not simulate the memory size switching register (IMS) and the internal expansion RAM size switching register (IXS). Although the values of these registers can be changed, doing so will not change the memory sizes. (It will be ignored.)

5.2 Cautions for using simulator GUI

5.2.1 Cautions for controlling each windows

The following keyboard operations are not available in the simulator windows (signal-data editor window, I/O panel window, and serial window).

* Navigation via tab or arrow keys (←, ↑, →, ↓)
* Deletion via the Del or Backspace keys
* Copy & paste and other operations via the Ctrl + C, V, X, A, or Z keys.

Perform the above operations as follows.

* Navigation: Navigate using the mouse.
* Deletion: Right click and perform the action via the context menu.
* Copy & paste, etc.: Right click and perform the action via the context menu.

5.2.2 Cautions for closing simulator GUI window

The simulator GUI window can only be closed by disconnecting from the debugging tool, or by closing CubeSuite+ proper. (The X button cannot be clicked.)
Additionally, although it appears that the X button can be pressed if Aero is enabled in Windows Vista, pressing this button will not close the GUI window.

5.2.3 Cautions for showing help for the simulator GUI window

Pressing the F1 key in the simulator GUI window will not display the help if none of the internal windows are visible (e.g. the I/O panel window).
To display the help for the simulator GUI window, from the GUI window's menu, select [Help] > [Main Window].

5.2.4 Cautions for disconnecting the debug tool

CubeSuite+ may exit if the debugging tool is disconnected while any of the following dialog boxes is open from the simulator GUI window. Make sure that the following dialog boxes are closed before disconnecting the debugging tool.

- Save As
- Open
- New
- Color
- Font
- Customize
- Loop
- Select Pin
- Search Data
- Format (UART)
- Format (CSI)
- Message (e.g. Error)
- Parts Button Properties
- Analog Button Properties
- Parts Key Properties
- Parts Level Gauge Properties
- Parts Led Properties
- Parts Segment LED Properties
- Parts Matrix Led Properties
- Parts Buzzer Properties
- Pull up / Pull down
- Entry Bitmap
- Object Properties

5.2.5 Cautions for setting the Host Machine's language and region

If a Japanese OS is installed on your Host Machine, then if the language or region is set to other than Japanese/Japan, the menus and dialog-box names of the simulator GUI window will be shown in English. Similarly, if a non-Japanese OS is installed on your Host Machine, then if the language or region is set to Japanese/Japan, the menus and dialog-box names of the simulator GUI window will be shown in Japanese.

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