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## Chapter 1. Target Devices

Below is a list of devices supported by the Code Generator for 78K0R/Fx3 V3.01.00.01	
Nickname	Device name
78K0R/FB3	μPD78F1804, μPD78F1805, μPD78F1806, μPD78F1807
78K0R/FC3	μPD78F1808, μPD78F1809, μPD78F1810, μPD78F1811 μPD78F1812, μPD78F1813, μPD78F1814, μPD78F1815, μPD78F1816, μPD78F1817 μPD78F1826, μPD78F1827, μPD78F1828, μPD78F1829, μPD78F1830
78K0R/FE3	μPD78F1818, μPD78F1819, μPD78F1820, μPD78F1821, μPD78F1822 μPD78F1831, μPD78F1832, μPD78F1833, μPD78F1834, μPD78F1835
78K0R/FF3	μPD78F1823, μPD78F1824, μPD78F1825 μPD78F1836, μPD78F1837, μPD78F1838, μPD78F1839, μPD78F1840
78K0R/FG3	μPD78F1841, μPD78F1842, μPD78F1843, μPD78F1844, μPD78F1845
The Code Generator is based on the following documents.	
Manual Name	Document Number
78K0R/Fx3 User's Manual	U19145JJ1V0UD00
	U19145EJ1V0UD00

Below is a list of devices supported by the Code Generator for 78K0R/lx3 V3.01.00.01	
Nickname	Device name
78K0R/IB3	μPD78F1201, μPD78F1203
78K0R/IC3	μPD78F1211(38pin), μPD78F1213(38pin), μPD78F1211(44pin), μPD78F1213(44pin)
78K0R/ID3	μPD78F1213(48pin), μPD78F1214(48pin), μPD78F1215(48pin) μPD78F1223, μPD78F1224, μPD78F1225
78K0R/IE3	μPD78F1233, μPD78F1234, μPD78F1235
The Code Generator is based on the following documents.	
Manual Name	Document Number
78K0R/lx3 User's Manual	U19678JJ1V1UD00
	U19678EJ1V1UD00

Below is a list of devices supported by the Code Generator for 78K0R/Kx3 V3.01.00.01	
Nickname	Device name
78K0R/KE3	μPD78F1142/A, μPD78F1143/A, μPD78F1144/A, μPD78F1145/A, μPD78F1146/A
78K0R/KF3	μPD78F1152/A, μPD78F1153/A, μPD78F1154/A, μPD78F1155/A, μPD78F1156/A
78K0R/KG3	μPD78F1162/A, μPD78F1163/A, μPD78F1164/A, μPD78F1165/A, μPD78F1166/A, μPD78F1167/A, μPD78F1168/A
78K0R/KH3	μPD78F1174/A, μPD78F1175/A, μPD78F1176/A, μPD78F1177/A, μPD78F1178/A
78K0R/KJ3	μPD78F1184A, μPD78F1185A, μPD78F1186A, μPD78F1187A, μPD78F1188A
The Code Generator is based on the following documents	
Manual Name	Document Number
78K0R/KE3 User's Manual	U17854JJ8V0UD00
	U17854EJ8V0UD00
78K0R/KF3 User's Manual	U17893JJ7V0UD00
	U17893EJ7V0UD00
78K0R/KG3 User's Manual	U17894JJ8V0UD00
	U17894EJ8V0UD00
78K0R/KH3 User's Manual	U18432JJ4V0UD00
	U18432EJ4V0UD00
78K0R/KJ3 User's Manual	U18417JJ3V0UD00
	U18417EJ3V0UD00

Below is a list of devices supported by the Code Generator for 78K0R/Kx3-A V3.01.00.01	
Nickname	Device name
78K0R/KE3-A	μPD78F1016, μPD78F1017, μPD78F1018
The Code Generator is based on the following documents	
Manual Name	Document Number
78K0R/Kx3-A User's Manual	U19653JJ1V0UD
	U19653EJ1V0UD

Below is a list of devices supported by the Code Generator for 78K0R/Kx3-L V3.01.00.01	
Nickname	Device name
78K0R/KC3-L	μPD78F1000(44pin), μPD78F1001(44pin), μPD78F1002(44pin),μPD78F1003(44pin), μPD78F1001(48pin), μPD78F1002(48pin), μPD78F1003(48pin)
78K0R/KD3-L	μPD78F1004, μPD78F1005, μPD78F1006
78K0R/KE3-L	μPD78F1007, μPD78F1008, μPD78F1009
78K0R/KF3-L	μPD78F1010, μPD78F1011, μPD78F1012
78K0R/KG3-L	μPD78F1013, μPD78F1014
The Code Generator is based on the following documents	
Manual Name	Document Number
78K0R/Kx3-L User's Manual	U19291JJ3V0UD00
	U19291EJ2V0UD00
78K0R/KF3-L User's Manual	U19459JJ1V0UD00
	U19459EJ1V0UD00
78K0R/KG3-L User's Manual	U19460JJ1V0UD00
	U19460EJ1V0UD00

Below is a list of devices supported by the Code Generator for 78K0R/Lx3 V3.01.00.01	
Nickname	Device name
78K0R/LF3	μPD78F1500, μPD78F1501, μPD78F1502
78K0R/LG3	μPD78F1503, μPD78F1504, μPD78F1505
78K0R/LH3	μPD78F1506, μPD78F1507, μPD78F1508
The Code Generator is based on the following documents	
Manual Name	Document Number
78K0R/Lx3 User's Manual	U19155JJ3V0UD
	U19155EJ3V0UD

Below is a list of devices supported by the Code Generator for 78K0/Ix2 V3.01.00.01	
Nickname	Device name
78K0/IY2	μPD78F0740, μPD78F0741, μPD78F0742, μPD78F0750, μPD78F0751, μPD78F0752
78K0/IA2	μPD78F0743, μPD78F0744, μPD78F0753, μPD78F0754
78K0/IB2	μPD78F0745, μPD78F0746, μPD78F0755, μPD78F0756 32pin are not supporting.
The Code Generator is based on the following documents.	
Manual Name	Document Number
78K0/Ix2 User's Manual	U19353JJ3V0UD00
	U19353EJ3V0UD00

Below is a list of devices supported by the Code Generator for 78K0/Kx2-L V3.01.00.02	
Nickname	Device name
78K0/KY2-L	μPD78F0550, μPD78F0551, μPD78F0552, μPD78F0555, μPD78F0556, μPD78F0557
78K0/KA2-L	μPD78F0560, μPD78F0561, μPD78F0562, μPD78F0565, μPD78F0566, μPD78F0567
78K0/KB2-L	μPD78F0571, μPD78F0572, μPD78F0573, μPD78F0576, μPD78F0577, μPD78F0578
78K0/KC2-L	μPD78F0581(44pin), μPD78F0582(44pin), μPD78F0583(44pin), μPD78F0581(48pin), μPD78F0582(48pin), μPD78F0583(48pin), μPD78F0586(44pin), μPD78F0587(44pin), μPD78F0588(44pin), μPD78F0586(48pin), μPD78F0587(48pin), μPD78F0588(48pin)
The Code Generator is based on the following documents.	
Manual Name	Document Number
78K0/Kx2-L User's Manual	U19111JJ2V1UD
	U19111EJ2V1UD

Please check a checkbox of Code Generator plug-in at additional tab of Plug-in management dialog to use Code Generator for target device.

How to open of Plug-in management dialog: [Tool(T)]-[Plug-in Management(P)...] menu of CubeSuite+

Plug-in name	Supported device
Code Generator Plug-in	78K0, 78K0R, V850, a part of RL78(*) *: RL78/I1A, RL78/G12, RL78/G13, RL78/G14, RL78/G1A, RL78/F12, RL78/L12, RL78/F13, RL78/F14
Code Generator Plug-in 2	RL78 except the above, RX

## Chapter 2. User's Manuals

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

Manual Name	Document Number
CubeSuite+ V1.03.00 78K0R Design	R20UT2137EJ0100
CubeSuite+ V1.03.00 78K0 Design	R20UT2138EJ0100
CubeSuite+ V2.02.00 Message	R20UT2871EJ0100

## Chapter 3. Key Points for Selecting Uninstallation Method

There are two ways to uninstall this product.

- Use the integrated uninstaller (uninstalls CS+)
- Use separate uninstaller (uninstalls this product only)

To use the separate uninstaller, select the following from the Control Panel:

- Programs and Features (Windows Vista, Windows 7, Windows 8)

Then select "CS+ Code Generator for 78K".



## Chapter 4. Changes

This chapter describes change

No	Description	Corresponds of code generation						
		78K0R/Fx3 V3.01.00.01	78K0R/lx3 V3.01.00.01	78K0R/Kx3 V3.01.00.01	78K0R/Kx3-A V3.01.00.01	78K0R/Kx3-L V3.01.00.01	78K0R/Lx3 V3.01.00.01	78K0/lx2 V3.01.00.01
1	Additional function generation file mode	-	-	-	-	-	-	-
2	Changes of hdwinit() function	-	-	-	-	-	-	-
3	Changes of API about Simplified I2C by SAU	-	-	-	-	-	/	/
4	Changes of input pulse interval measurement of TAU	-	-	-	-	-	/	/
5	Changes the time of the channel 2 output of TAU1	-	/	/	/	/	/	/
6	Changes the setting external interrupts	/	/	/	/	-	/	/

○ : Correspondence, -: Not correspondence(finish of correction), /: Outside of function

## 4.1 Details of Changes

### 4.1.1 Additional function generation file mode

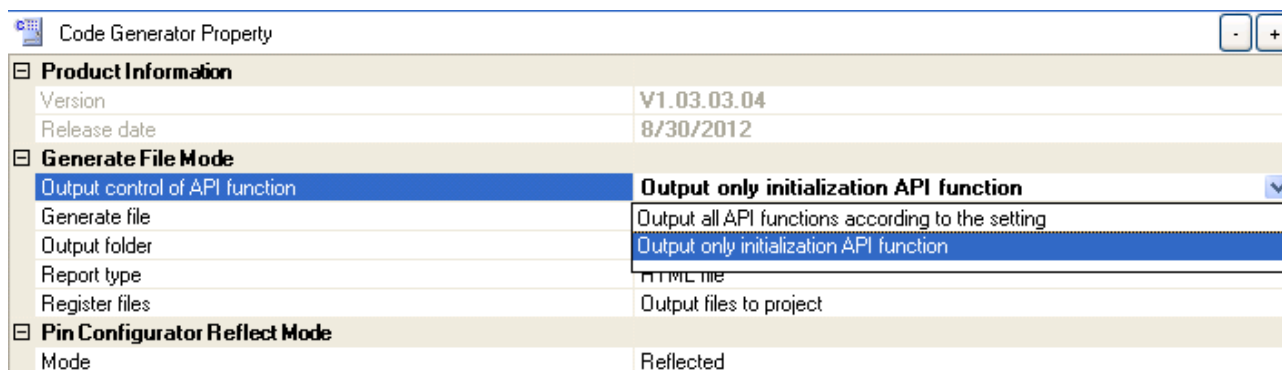
"Output control of API function" has been added to the Code Generator Property for RL78, 78K0R, and 78K0.

"Output all API functions according to the setting": Outputs necessary API functions according to the GUI settings (conventional output method).

"Output only initialization API function": Outputs only initialization functions (Create functions) regardless of the GUI settings.

Users can configure the settings such as interrupt functions according to their needs.

This issue has been corrected in Code Generator for RL78,78K0R,78K0 V1.00.06



#### 4.1.2 Changes of hdwinit() function

We have changed the initial code for the hdwinit() and main() functions.

```
void hdwinit(void)
{
    DI();
    R_Systeminit();
    EI();
}
```

The above code has been changed to the code given below. Accordingly, interrupts are not enabled within the hdwinit function.

```
void hdwinit(void)
{
    DI();
    R_Systeminit();
}
```

Interrupts are now enabled within the main() function.

```

/*****
* Function Name: main
* Description : This function implements main function.
*****/
void main(void)
{
    R_MAIN_UserInit();
    /* Start user code. Do not edit comment generated here */
    while (1U)
    {
        ;
    }
    /* End user code. Do not edit comment generated here */
}
/*****
* Function Name: R_MAIN_UserInit
* Description : This function adds user code before implementing main function.
*****/
void R_MAIN_UserInit(void)
{
    /* Start user code. Do not edit comment generated here */
    EI();
    /* End user code. Do not edit comment generated here */
}

```

When an old project is used in code generation, the definitions of variables within the main function may lead to errors.

```
[Old project]
void main(void)
{
  /* Start user code. Do not edit comment generated here */
  char c;
  while (1U)
  {
    ...
  }
}
```

[When an old project is loaded into CubeSuite+V1.03.00 and used for code generation]

```
void main(void)
{
  R_MAIN_UserInit();
  /* Start user code. Do not edit comment generated here */
  char c;      <- error!!
  while (1U)
  {
    ...
  }
}
```

In that case, use { }.

```
void main(void)
{
  R_MAIN_UserInit();
  /* Start user code. Do not edit comment generated here */
  {          <- add "{"
  char c;   <- not error!
  while (1U)
  {
    ...
  }
}          <- add "}"
```

This issue has been corrected in Code Generator for RL78,78K0R,78K0 V1.00.06

#### 4.1.3 Changes of API about Simplified I2C by SAU

The R\_IICmn\_StartCondition of Simplified I2C of SAU and the R\_IICmn\_StopCondition were changed. The waiting code for time required for generation of the start condition of Simplified I2C standard and stop condition was added.

This issue has been corrected in Code Generator for RL78,78K0R,78K0 V2.00.00

#### 4.1.4 Changes of input pulse interval measurement of TAU

It corrected that the right measured value was not able to be acquired for the input pulse interval measurement function of TAU, and a high / low width measurement function by interruption function `r_taux_channelx_interrupt()` at the time of use.

This issue has been corrected in Code Generator for RL78,78K0R,78K0 V2.00.00.

#### 4.1.5 Changes the time of the channel 2 output of TAU1

A terminal setup when output functions (square-wave output etc.) were used by the channel 2 of TAU1 was corrected.

```
[before]
/* Set TO12 pin */
P4  &= 0xEFU;
PM4 &= 0xEFU;
TOS1 |= 0x04U;

[after]
/* Set TO12 pin */
P4  &= 0xBFU;
PM4 &= 0xBFU;
TOS1 |= 0x04U;
```

This issue has been corrected in Code Generator for RL78,78K0R,78K0 V2.00.00.

#### 4.1.6 Changes the setting external interrupts

In the 78K0R/Kx3-L (with 44 or 48 pins), when the external interrupt INTP3 or INTP7 is selected, the code for initialization which changes PIM8 into a digital signal is not present.

This issue has been corrected in Code Generator for RL78,78K0R,78K0 V2.03.00.

## Chapter 5. Cautions

This section describes cautions for using Code Generator for RL78,78K0R,78K0.

### 5.1 Cautions List

No.	Description	Corresponds of code generation							
		78K0R/Fx3 V3.01.00.01	78K0R/lx3 V3.01.00.01	78K0R/Kx3 V3.01.00.01	78K0R/Kx3-A V3.01.00.01	78K0R/Kx3-L V3.01.00.01	78K0R/Lx3 V3.01.00.01	78K0/lx2 V3.01.00.01	78K0/Kx2-L V3.01.00.02
1	Cautions of the LIN-bus function of UART0, UART2, UART3, UART6 or UARTF.	○	○	○	○	○	○	○	○
2	Cautions of extension code, wakeup function and multimaster of serial interface IICA or IIC0	/	○	○	○	○	○	○	○
3	Cautions of the operation for slave transmission of serial interface IICA or IIC0.	/	○	○	○	○	○	○	○
4	Cautions of cooperation with the linker option	/	/	/	/	/	/	○	○
5	Cautions of CAN controllers	○	/	/	/	/	/	/	/
6	Cautions of file merger	○	○	○	○	○	○	○	○
7	Cautions of critical errors	-	/	/	/	/	/	/	/

○ : Correspondence, -: Not correspondence, /:Outside of function.

## 5.2 Cautions Details

### 5.2.1 Cautions of the LIN-bus function of UART0 or UART2 or UART3 or UART6

The code generator is not supporting the LIN-bus functions of serial interface UART0 or UART2 or UART3 or UART6.

[Workaround] There is no workaround.

### 5.2.2 Cautions of extension code, multimaster, wakeup function of serial interface IICA or IIC0

The code generator is not supporting the extension code, multimaster, wakeup function of serial interface IIC.

[Workaround] There is no workaround.

### 5.2.3 Cautions of the operation for slave transmission of serial interface IICA or IIC0

During slave transmission, if the master receiver does not return an ACK after the final data is received, then the error API IICA\_SlaveErrorCallback(MD\_NACK) will be called, regardless of whether the actual slave transmission process ended. For this reason, the program will not terminate normally.

[Work-around] If the master being communicated with does not return an ACK after the final data reception, change IICA\_SlaveHandler's internal code as follows. (So that it does not check for an ACK after the final data is received. The figure below for the serial interface IICA.)

```
void IICA_SlaveHandler(void)
{
  ...
  if (TRC0 == 1U)
  {
    if (ACKD0 == 0U)
    {
      IICA_SlaveErrorCallback(MD_NACK);
    }
    else
    {
      if (glicaTxCnt > 0U)
      {
        IICA = *gplicaTxAddress;
        gplicaTxAddress++;
        glicaTxCnt--;
      }
      else
      {
        IICA_SlaveSendEndCallback();
        WREL0 = 1U;
      }
    }
  }
}
```

if ((ACKD0 == 0U) && (glicaTxCnt != 0))

### 5.2.4 Cautions of cooperation with the linker option

The setting of on the chip debugging of the code generation is not coordinated with " Set user option byte" of link-option.

[Workaround] There is no workaround.

### 5.2.5 Cautions of CAN controllers

The code generator is not supporting the CAN Controllers.

[Workaround] There is no workaround.

### 5.2.6 Cautions of file merge

If you select Merge File in Generate File Mode in the property of code generator and the source codes are written between each comment below, the file will be merged.

```
/* Start user code. Do not edit comment generated here */
```

```
/* End user code. Do not edit comment generated here */
```

However, if the number of braces ("{" and "}") in the edited source codes (including the comments) are not the same, the edited source codes may disappear when you run the code generator.

[Workaround] There is no workaround.

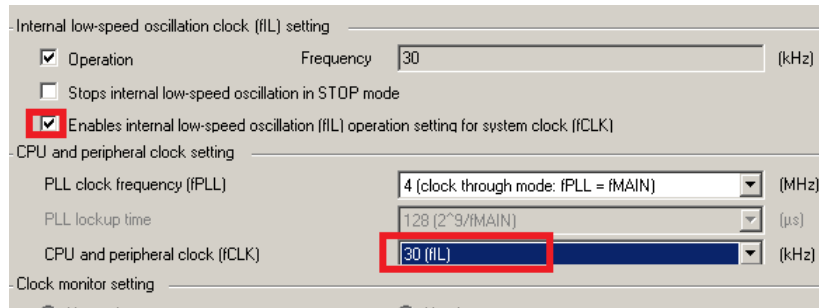


### 5.2.7 Cautions of critical errors

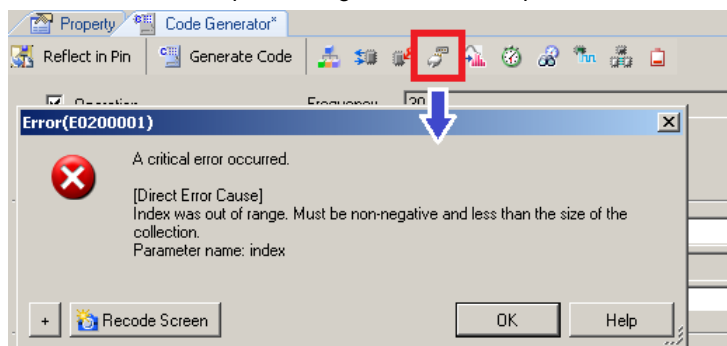
When the following operation is performed by the code generator of 78K0R/Fx3, a critical error occurs.

#### a) Clock

- Check in the two following items.



- Selection of a serial panel will generate an exception.

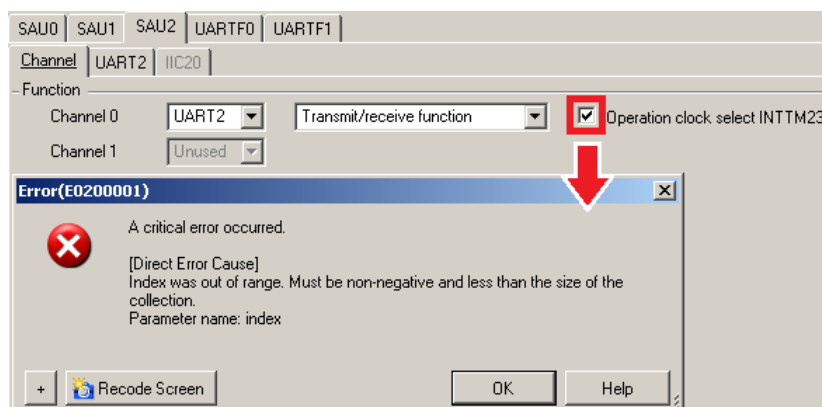


There is no workaround. RL78 Code Generator is corrected in V2.00.01

#### b) Timer and serial

- Use interruption for the channel 3 of timer TAU2 in a certain mode.

- If a clock of operation checks one serial of serial SAU0, SAU1, and SAU2 "Operation clock select INTTM23", an exception will occur.



There is no workaround. RL78 Code Generator is corrected in V2.00.01

## Chapter 6. Restrictions

This section describes the restrictions for the Code Generator for 78K.

### 6.1 Restrictions List

No	Description	Corresponds of code generation						
		78K0R/Fx3 V3.01.00.01	78K0R/lx3 V3.01.00.01	78K0R/Kx3 V3.01.00.01	78K0R/Kx3-A V3.01.00.01	78K0R/Kx3-L V3.01.00.01	78K0R/Lx3 V3.01.00.01	78K0/lx2 V3.01.00.01
1	Restrictions of the coding rule of MISRA-C.	○	○	○	○	○	○	○
3	Restrictions of internal low-speed or internal high-speed oscillator trimming	○	/	○	/	/	/	/

○ : Correspondence, /: Outside of function

### 6.2 Restrictions Details

#### 6.2.1 Restrictions of the coding rule of MISRA-C

Compliance with the MISRA-C (Guidelines for the Use of the C Language in Vehicle Based Software) coding convention is not supported for source code output by the code generator.

#### 6.2.2 Restrictions of internal low-speed or internal high-speed oscillator trimming

Code generator is not equivalent to a setup of internal low-speed or internal high-speed oscillator trimming register

## Notice

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