RL78/G13
GUIDE FOR ENGINEER

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EMBEDDED PROCESSING 2ND BUSINESS DIVISION
EMBEDDED PROCESSING PRODUCT GROUP
RENESAS ELECTRONICS CORPORATION

The information/materials required at the time of product development summarized and listed for each development phase. Application notes are a list of regrouped by contents.
Please use it as a guidebook when developing.

CONTENT

We summarized and listed up various information and materials required at the time of product development by each development phase.

Also, You can select what you need for your application from our rich selection of application notes that describing how to use a peripheral punction, example applications, how to create a program, and more.

Please use these information, materials and application notes as a guidebook when developing.

List of information and materials required for product development

STEP1 MCU SELECTION

	Item	Content	Link
1	Hardware information	Datasheet	Doc
2	Products & Solutions	RL78 Family Features	Web site
3		Video	Web site
4		Blog	Web site
5		Reference designs (Winning combination)	Web site
6	Product longevity program (PLP)	Overview of product longevity program (PLP)	Web site
7		Product selection (product selector) Note: Refer to PLP column in the chart.	Web site
8	Product Specification Comparison	Introductory Guide to RL78 Microcontrollers	Web site
9		RL78 FAMILY Selection Guide	Doc

STEP2 DESIGNING AND EVALUATING (1/3)

	Item	Content	Link
Common			
1	Hardware	User's manual: Hardware	Doc
2		Hardware manual guide (Electrical Characteristic edition)	Doc
3		Technical update (errata information)	Web site
4		Product change notice (PCN)	Web site
5		Part number guide for RL78 family product (the meaning of character in part number)	Doc
6		Semiconductor reliability handbook	Doc
7		RELIABILITY REPORT (R5F100XXX) (R5F101XXX)	Doc Doc
8		RoHS Product Options → Part Number →Package information → RoHS Info	Web site
9	Software information	RL78 Family User's Manual: Software	Doc
10		RL78 Software Porting Guide Porting sample code generated by Smart Configurator (CS+, e2 studio, IAR)	Doc
11	Evaluation board	RL78/G13 (R5F100LE) Target Board	Web site
12	(for general purpose)	RL78/G13 (R5F100SLAFB) Target Board	Web site
13	Solution Board	Renesas Starter Kit for RL78/G13	Web site
14		CPX3 Evaluation Kit for DC under 48V (J80D2 with RL78/G13)	Web site
15		YRDKRL78G13 Demonstration Kit for RL78/G13	Web site
16		YRPBRL78G13 Promotion Board for RL78/G13	Web site
17	Partner information	Partner products (system solutions provider)	Web site
18		RL78 Partner Ecosystem	Web site

STEP2 DESIGNING AND EVALUATING (2/3)

	Item	Content	Link
Hardware design			
1	Board simulates	ECAD model Note: ECAD can be found by clicking on the respective part number of the product options.	Web site
2	Other	Resonator and matching circuit information	Doc
3		Package information (package outline information, mount manual, etc.)	Web site
4	Development environment	E1/E20/E2 Emulator, E2 Emulator Lite Additional Document for User's Manual (Notes on Connection of RL78)	Doc
Software design			
1	Software information	Getting Started with the RL78 Family Development Environment	Web site
2		RL78 Family Development Environment — Development Tools	Web site
3		RL78 Family Development Environment — Software	Web site
4		RL78 Smart Configurator User's Guide: e² studio	Doc
5		RL78 Smart Configurator User's Guide: CS+	Doc
6		RL78 Smart Configurator User's Guide: IAREW	Doc
7	Training information	RL78 Family Software & Tool Course (Video Collection)	Web site
8	System design	RL78 Low Power MCU	Doc

STEP2 DESIGNING AND EVALUATING (3/3)

	Item	Content	Link
Solution			
1	DALI Solutions	DALI communication Solutions	Web site
2	RL78 Industrial Communication Solutions	RL78 Industrial Communication Solutions	Web site
Support			
1	Support information	FAQ (frequently asked inquiries)	Web site
2		RL78 forum (community)	Web site
3		Ask to technical support Note: Please click login in the upper right corner	Web site

STEP3 MASS PRODUCTION

	Item		Content	Link
1	Writing a program	Programmer	PG-FP6	Web site
2		Writing tool	Renesas flash programmer (GUI tool for PC)	Web site

RL78/G13 APPLICATION NOTE

SUPPLEMENTARY INFORMATION: PLEASE REFER TO THE APPLICATION NOTE LIST AS NECESSARY.

#	Main items	Overview
1	Basic	Hardware Design/Clock/Voltage/Memory
2	Peripheral	MCU peripheral function
3	Safety	Safety function
4	Self programming	Flash writing
5	Security / Crypto	Security/Crypto
6	Connectivity	Wireless of Wi-Fi , Wired of Modbus ASCII/RTU
7	DALI	DALI solution
8	Flash program	Flash programming
9	Memory Driver	Memory driver
10	File System	FAT file system
11	Sound	ADPCM
12	Sensor	Sensor
13	Reality AI	Reality AI
14	Software relation	Software
15	Others	Other

RL78/G13 APPLICATION NOTE [BASIC(1/3)]

Item	Title	Summary	Sample code
1	RL78 Bootloader - One Image (R11AN0470EU0100)	This example project was created to simplify the understanding and creation of bootloader programs on the RL78. The RL78 has a unique flash interface called the Flash Self-programming Library (FSP). This example project shows the use of the FSP along with hardware features such as boot swap and the general hardware CRC.	-
2	RL78 Family RL78 Hardware CRC Functions	Many applications need to check the integrity of a code image or data communication stream by using a CRC function to verify data errors have not occurred.	Download
3	RL78/G13 Initialization [for CubeSuite+, IAR, and e2studio]	This application note describes the basic setting items that are necessary for initializing the RL78/G13. The sample program discussed in this application note initializes the RL78/G13 and provides on/off control of three LEDs according to the combination of two switch input states.	Download
4	RL78/G13 Initialization CC-RL	This application note describes the basic setting items that are necessary for initializing the RL78/G13. The sample program discussed in this application note initializes the RL78/G13 and provides on/off control of three LEDs according to the combination of two switch input states.	Download
5	RL78/G13 CPU Clock Changing and Standby Settings (C Language) CC-RL	This application note describes how to change the RL78/G13's CPU clock and set it to standby (changing operation modes)	Download
6	RL78/G13 CPU Clock Changing and Standby Settings (Assembly) CC-RL	This application note describes how to change the RL78/G13's CPU clock and set it to standby (changing operation modes)	Download
7	RL78/G13 High-speed On-chip Oscillator (HOCO) Clock Frequency Correction	This application note explains how to correct the oscillation clock frequency of the high-speed on-chip oscillator (HOCO) by using the high-speed on-chip oscillator trimming register (HIOTRM) incorporated in RL78/G13.	Download
8	RL78/G13 High-speed On-chip Oscillator (HOCO) Clock Frequency Correction CC-RL	This application note explains how to correct the oscillation clock frequency of the high-speed on-chip oscillator (HOCO) by using the high-speed on-chip oscillator trimming register (HIOTRM) incorporated in RL78/G13.	Download
9	RL78/G13 High-speed On-chip Oscillator (HOCO) Clock Frequency Correction for Cubesuite+ and IAR Toolchain	This application note explains how to correct the oscillation clock frequency of the high-speed on-chip oscillator (HOCO) by using the high-speed on-chip oscillator trimming register (HIOTRM) incorporated in RL78/G13.	Download
10	RL78/G13 High-speed On-chip Oscillator (HOCO) Clock Frequency Correction for GNURL78 v13.01 Toolchain	This application note explains how to correct the oscillation clock frequency of the high-speed on-chip oscillator (HOCO) by using the high-speed on-chip oscillator trimming register (HIOTRM) incorporated in RL78/G13.	Download

Return to the list of main items in the application note

RL78/G13 APPLICATION NOTE [BASIC(2/3)]

Item	Title	Summary	Sample code
11	RL78/G13 Clock Generator (Clock Switching)	This application note explains how to use the clock generator of the RL78/G13.	Download
12	RL78/G13 Clock Generator (Clock Switching) CC-RL	This application note explains how to use the clock generator of the RL78/G13.	Download
13	RL78 Family RL78 Internal Temperature Sensor Calibration (Using IAR Toolchain)	The following document describes a method to improve the internal temperature sensor accuracy of the RL78 MCU byperforming a calibration.	Download
14	RL78 Family RL78 Low Power MCU	The purpose of this application note is to show prospective users the advantages of the new Renesas RL78 low power 16bit MCU family over the major 8/16/32 low power MCU competitors, and how to utilize key RL78 low power features	-
15	Current Consumption Tuning Solution (E2 Emulator, e2 studio)	This application note introduces the current consumption tuning solution using the E2 emulator.	-
16	Current Consumption Tuning Solution(E2 Emulator, CS+)	This application note introduces the current consumption tuning solution using the E2 emulator.	-
17	RL78/G13 Measurement of Standby Mode Supply Current CC-RL	This application note describes the method for measuring the supply current of the RL78/G13 in the STOP mode or the HALT mode.	Download
18	RL78/G13 Low-power Consumption Operation	This application note describes general methods of reducing power consumption and methods of setting the low-power consumption functions of the RL78/G13.	Download
19	RL78/G13 Low-power Consumption Operation CC-RL	This application note describes general methods of reducing power consumption and methods of setting the low-power consumption functions of the RL78/G13.	Download
20	RL78G13 Utilising the Snooze Mode Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download

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RL78/G13 APPLICATION NOTE [BASIC(3/3)]

Item	Title	Summary	Sample code
21	RL78/G13 Clock Generator (Clock Switching)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download
22	RL78/G13 Clock Generator (Clock Switching) CC-RL	This application note describes the reset mode of the voltage detector (LVD) on the RL78/G13.	Download
23	RL78 Family RL78 Internal Temperature Sensor Calibration (Using IAR Toolchain)	This application note describes the reset mode of the voltage detector (LVD) on the RL78/G13.	Download
24	RL78 Family RL78 Low Power MCU	This application note describes the reset mode of the voltage detector (LVD) on the RL78/G13.	Download
25	Current Consumption Tuning Solution (E2 Emulator, e2 studio)	This application note describes the reset mode of the voltage detector (LVD) on the RL78/G13.	Download
26	Current Consumption Tuning Solution(E2 Emulator, CS+)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download
27	RL78/G13 Measurement of Standby Mode Supply Current CC-RL	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download
28	RL78/G13 Low-power Consumption Operation	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
29	RL78/G13 Low-power Consumption Operation CC-RL	This document describes methods to minimize power dissipation when monitoring switch inputs.	-

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RL78/G13 APPLICATION NOTE [PERIPHERAL(1/9)]

Item	Title	Summary	Sample code
1	RL78/G13 Real-Time Clock	This application note describes the real-time clock (RTC).	Download
2	RL78/G13 Real-Time Clock CC-RL	This application note describes the real-time clock (RTC).	Download
3	RL78/G13 Utilising the Real Time Clock (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace	Download
4	RL78/G13 Utilising the Real Time Clock (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace	Download
5	RL78G13 Ultilising the Real Time Clock (RTC) Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does	Download
6	RL78 Family Real-Time-Clock Watch Error Correction function	TheRL78 RTC Watch error correction function can be used to correct the RTC count value, so the resulting “Time-of-day” results will be more accurate over a long term period compared to when not using Watch error correction function.	Download
7	RL78/G13 Key Interrupt Function	This application note explains how to use the key interrupt function.A 4 x 4 key matrix is scanned to show the numbers of key switches being pressed on a 2-digit 7-segment LED display.	Download
8	RL78/G13 Key Interrupt Function CC-RL	This application note explains how to use the key interrupt function. A 4 x 4 key matrix is scanned to show the numbers of key switches being pressed on a 2-digit 7-segment LED display.	Download
9	RL78/G13 DMA Controller (3-Wire Serial I/O Sequential Reception) CC-RL	This application note explains how to use the DMA controller for sequential reception through the 3-wire serial I/O communication (CSI).	Download
10	RL78/G13 DMA Controller (3-Wire Serial I/O Sequential Reception)	This application note explains how to use the DMA controller for sequential reception through the 3-wire serial I/O communication (CSI).	Download

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RL78/G13 APPLICATION NOTE [PERIPHERAL(2/9)]

Item	Title	Summary	Sample code
11	RL78/G13 DMA Controller (PWM Output)	This application note explains how to use the PWM output function of the timer array unit (TAU) through the DMA controller.	Download
12	RL78/G13 DMA Controller (PWM Output) CC-RL	This application note explains how to use the PWM output function of the timer array unit (TAU) through the DMA controller.	Download
13	RL78/G13 Multiple PWM generation using DMA CC-RL	The purpose of this application note is to show how to use a Timer and a DMA controller to generate additional PWM outputs.	Download
14	RL78/G13 Group Multiple PWM generation using DMA	The purpose of this application note is to show how to use a Timer and a DMA controller to generate additional PWM outputs.	Download
15	RL78/G13 Group Multiple PWM generation using DMA IAR	The purpose of this application note is to show how to use a Timer and a DMA controller to generate additional PWM outputs.	Download
16	RL78/G13 Utilising the DMAC (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download
17	RL78G13 Utilising the DMAC Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
18	RL78/G13 Utilising the DMAC (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download
19	RL78/G13 DMA Controller (A/D Converter in Sequential Conversion Mode) CC-RL	This application note explains how to transfer data between the A/D converter and the on-chip RAM through the DMA controller.	Download
20	RL78/G13 DMA Controller (A/D Converter in Sequential Conversion Mode)	This application note explains how to transfer data between the A/D converter and the on-chip RAM through the DMA controller.	Download

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RL78/G13 APPLICATION NOTE [PERIPHERAL(3/9)]

Item	Title	Summary	Sample code
21	RL78/G13 DMA Controller (UART Sequential Reception) CC-RL	This application note explains how to use the RL78/G13 DMA controller for sequential reception through the UART.	Download
22	RL78/G13 DMA Controller (UART Sequential Reception)	This application note explains how to use the RL78/G13 DMA controller for sequential reception through the UART.	Download
23	RL78/G13 Timer Array Unit (Interval Timer) CC-RL	This application note describes the interval timer function of the timer array unit (TAU).	Download
24	RL78/G13 Timer Array Unit (Interval Timer)	This application note describes the interval timer function of the timer array unit (TAU).	Download
25	RL78/G13 Timer Array Unit(PWM Output) CC-RL	This application note describes the PWM output function of the timer array unit (TAU).	Download
26	RL78/G13 Timer Array Unit (PWM Output)	This application note describes the PWM output function of the timer array unit (TAU).	Download
27	RL78/G13 Timer Array Unit (Pulse Interval Measurement (Both edges)) CC-RL	This application note describes how the timer array unit measures time intervals between pulses.	Download
28	RL78/G13 Timer Array Unit (Pulse Interval Measurement) CC-RL	This application note describes how the timer array unit (TAU) measures time intervals between pulses.	Download
29	RL78/G13 Timer Array Unit (Pulse Interval Measurement)	This application note describes how the timer array unit (TAU) measures time intervals between pulses.	Download
30	RL78/G13 Utilising the Timer Array Unit (TAU)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download

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RL78/G13 APPLICATION NOTE [PERIPHERAL(4/9)]

Item	Title	Summary	Sample code
31	RL78/G13 Utilising the Timer Array Unit (TAU) (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download
32	RL78/G13 Utilising the Timer Array Unit (TAU) (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does	Download
33	RL78 Window Watchdog Timer	The window watchdog timer (WDT) has two time stamps within the restart is allowed: A dedicated selectable time after WDT start and the overflow time, the so called "open window".	-
34	RL78G13 Utilising the Watchdog Timer (WDT) Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
35	RL78/G13 Utilising the Watch Dog Timer (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download
36	RL78/G13 Utilising the Watch Dog Timer (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace, as well as give an explanation of what the sample code does.	Download
37	RL78/G14, RL78/G1C, RL78/L12, RL78/L13, RL78/L1C, RL78/G23 Group Clock Synchronous Single Master Control Software Using CSI Mode of Serial Array Unit	This application note explains clock synchronous control of a single master by using the 3-wire serial I/O communications (CSI mode) of the serial array unit (SAU) of the RL78/G14, RL78/G1C, RL78/L12, RL78/L13, RL78/L1C, RL78/G23 Group and describes how to use the sample code for this application.	Download
38	RL78/G13 Low-power Consumption Operation (CSI in SNOOZE Mode)	This application note explains how to make low-power consumption settings for CSI slave reception in SNOOZE mode.	Download
39	RL78/G13 Low-power Consumption Operation (CSI in SNOOZE Mode) CC-RL	This application note explains how to make low-power consumption settings for CSI slave reception in SNOOZE mode.	Download
40	RL78/G13 Utilising the Serial Array Unit (SAU) in Sync Mode Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download

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RL78/G13 APPLICATION NOTE [PERIPHERAL(5/9)]

Item	Title	Summary	Sample code
41	RL78/G13 Utilising the Serial Array Unit (SAU) in Sync Mode (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download
42	RL78/G13 Utilising the Serial Array Unit (SAU) in Sync Mode (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new orexisting e2studio workspace; as well as give an explanation of what the sample code does.	Download
43	RL78/G13 Serial Array Unit for 3-Wire Serial I/O (Slave Transmission/Reception)	This application note explains how the serial array unit (SAU) performs slave transmission and reception by 3-wire serial I/O communication (CSI).	Download
44	RL78/G13 Serial Array Unit for 3-Wire Serial I/O (Slave Transmission/Reception) CC-RL	This application note explains how the serial array unit (SAU) performs slave transmission and reception by 3-wire serial I/O communication (CSI).	Download
45	RL78/G13 Serial Array Unit for 3-Wire Serial I/O (Master Transmission/Reception)	This application note describes how the serial array unit (SAU) performs master transmission and reception by 3-wire serial I/O communication (CSI).	Download
46	RL78/G13 Serial Array Unit for 3-Wire Serial I/O (Master Transmission/Reception) CC-RL (renesas.com)	This application note describes how the serial array unit (SAU) performs master transmission and reception by 3-wire serial I/O communication (CSI).	Download
47	RL78/G13 Handshake-based SPI Slave Transmission/Reception	This application note describes how the serial array unit (SAU) performs slave transmission/reception by the simple SPI (CSI).	Download
48	RL78/G13 Handshake-based SPI Master Transmission/Reception	This application note describes how the serial array unit (SAU) performs master transmission/reception by the simple SPI (CSI).	Download
49	RL78/G13 Serial Array Unit (UART Communication) CC-RL	This application note explains how to use UART communication through the serial array unit (SAU).	Download
50	RL78/G13 Serial Array Unit (UART Communication)	This application note explains how to use UART communication through the serial array unit (SAU).	Download

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RL78/G13 APPLICATION NOTE [PERIPHERAL(6/9)]

Item	Title	Summary	Sample code
51	RL78/G13 Utilising the Serial Array Unit (SAU) in Async Mode Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
52	RL78/G13 Utilising the Serial Array Unit (SAU) in Async Mode (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download
53	RL78/G13 Utilising the Serial Array Unit (SAU) in Async Mode (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new orexisting e2studio workspace; as well as give an explanation of what the sample code does.	Download
54	RL78/G13 Low-power Consumption Operation (UART in SNOOZE Mode) CC-RL	This application note explains how to make low power consumption settings for UART reception in SNOOZE mode.	Download
55	RL78/G13 Low-power Consumption Operation (UART in SNOOZE Mode)	This application note explains how to make low power consumption settings for UART reception in SNOOZE mode.	Download
56	RL78/G13 Software UART CC-RL	This application note describes how to implement the software UART communication functions by using the external interrupts and timer array unit.	Download
57	LIN / UART Controller Usage: Applications and Frequently Asked Questions	This application note describes how to use LIN and UART controllers of various Rensas microcontroller products.	-
58	RL78G13 Utilising the Serial Array Unit (SAU) in LIN Communications Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
59	RL78/G13 Utilising the Serial Array Unit (SAU) for LIN Communications (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download
60	RL78/G13 Utilising the Serial Array Unit (SAU) for LIN Communications (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download

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RL78/G13 APPLICATION NOTE [PERIPHERAL(7/9)]

Item	Title	Summary	Sample code
61	RL78/G13 Serial Array Unit (SAU)(EEPROM Control Using Simplified IIC) CC-RL [for CS+, e2studio]	This application note explains how to control EEPROM using the simplified IIC function of the serial array unit (SAU).	Download
62	RL78/G13 Serial Array Unit (SAU)(EEPROM Control Using Simplified IIC) [for CubeSuite+, IAR, and e2studio]	This application note explains how to control EEPROM using the simplified IIC function of the serial array unit (SAU).	Download
63	RL78/G14, RL78/G1C, RL76/L12, RL78/L13, RL78/L1C Group I²C Bus Single Master Control Software Using IICA Serial Interface	This application note describes I2C bus single master control using the RL78/G14, RL78/G1C, RL76/L12, RL78/L13, RL78/L1C Group IICA serial interface, sample code that implements that control, and use of the sample code.	Download
64	RL78 I2C Multimaster	This application note describes the RL78 serial interface driver for IICA in the multi-master mode.	Download
65	RL78/G13 Serial Interface IICA (for Master Transmission/Reception)	This application note describes master transmission and reception implemented via serial interface IICA.	Download
66	RL78/G13 Serial Interface IICA (for Master Transmission/Reception) CC-RL	This application note describes master transmission and reception implemented via serial interface IICA.	Download
67	RL78/G13 Serial Interface IICA (for Slave Transmission/Reception)	This application note describes slave transmission and reception implemented via the serial interface IICA.	Download
68	RL78/G13 Serial Interface IICA (for Slave Transmission/Reception) CC-RL	This application note describes slave transmission and reception implemented via the serial interface IICA.	Download
69	RL78G13 Utilising the I2C in Master Mode Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
70	RL78/G13 Utilising I2C in Master Mode (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download

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RL78/G13 APPLICATION NOTE [PERIPHERAL(8/9)]

Item	Title	Summary	Sample code
71	RL78/G13 Utilising I²C in Master Mode (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download
72	RL78G13 Utilising the I2C in Slave Mode Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
73	RL78/G13 Utilising I2C in Slave Mode (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download
74	RL78G13 Utilising I²C in Slave Mode (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download
75	CAN Controller Usage: Applications and Frequently Asked Questions	This application note describes how to use CAN controllers of various Renesas microcontroller products.	-
76	RL78/G13 A/D converter One-shot conversion mode(Low power)	This document describes using the sample program with the Code Generator for e2studio. The CC-RL is used as a compiler in the sample program.	Download
77	RL78/G13 A/D Converter (SNOOZE Mode) CC-RL	This application note describes how to use the low power consumption setting which uses the SNOOZE mode of A/D conversion.	Download
78	RL78/G13 A/D Converter (SNOOZE Mode)	This application note describes how to use the low power consumption setting which uses the SNOOZE mode of A/D conversion.	Download
79	RL78/G13 A/D Converter (Software Trigger and Sequential Conversion Modes) [for CubeSuite+, IAR, and e2studio]	This application note describes the procedures for performing A/D conversion on analog voltages using the RL78/G13's A/D converter (supporting software trigger and sequential conversion modes).	Download
80	RL78/G13 A/D Conveter(Software Trigger and Sequential Conversion Modes) CC-RL	This application note describes the procedures for performing A/D conversion on analog voltages using the RL78/G13's A/D converter (supporting software trigger and sequential conversion modes).	Download

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RL78/G13 APPLICATION NOTE [PERIPHERAL(9/9)]

Item	Title	Summary	Sample code
81	RL78/G13 ADC in One Shot Mode Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
82	RL78/G13 ADC in Repeat Mode Sample Code	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.	Download
83	RL78/G13 Utilising the ADC in One Repeat Mode (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download
84	RL78/G13 Utilising the ADC in One Shot Mode (Using GNURL78 v13.01 Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.	Download
85	RL78/G13 Utilising the ADC in One Shot Mode (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download
86	RL78/G13 Utilising the ADC in Repeat Mode (Using IAR Toolchain)	The purpose of this Application Note is to show the user how to add the associated RL78/G13 sample code to a new or existing IAR Embedded Workbench workspace; as well as give an explanation of what the sample code does.	Download

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RL78/G13 APPLICATION NOTE [SAFETY]

Item	Title	Summary	Sample code
1	RL78/G13 Safety Function (A/D Test)	This application note explains the sample code for the A/D test function, which is one of the safety functions of the RL78/G13.	Download
2	RL78/G13 Safety Function (A/D Test) CC-RL	This application note explains the sample code for the A/D test function, which is one of the safety functions of the RL78/G13.	Download
3	RL78/G13 Safety Function (Frequency Detection)	This application note describes the frequency detection function which is one of the safety features offered by the RL78/G13.	Download
4	RL78/G13 Safety Function (Frequency Detection) CC-RL	This application note describes the frequency detection function which is one of the safety features offered by the RL78/G13.	Download
5	RL78/G13 Safety Function (Flash Memory CRC Operation Function)	This application note explains how to use the flash memory CRC operation function, which is one of the safety functions incorporated in the RL78/G13.	Download
6	RL78/G13 Safety Function (Flash Memory CRC Operation Function) CC-RL	This application note explains how to use the flash memory CRC operation function, which is one of the safety functions incorporated in the RL78/G13.	Download
7	IEC60730/60335 Self Test Library of CCRL78 for RL78 MCU Application Notes (R01AN4822EJ0210)	This Application Note provides guidelines of how to use flexible sample software routines to assist with compliance with IEC60730/60335 class B safety standards. These routines are authorized by VDE Test and Certification Institute GmbH. The copy of the test authorized book is attached to the downloading package of this book with self test library source code and CS+ project of the test harness that have been authorized.	Download
8	IEC60730/60335 Self Test Library of CCRL78 for RL78 MCU extended Application Notes (R01AN4819EJ0100)	This Application Note provides guidelines of how to use flexible sample software routines to assist with compliance with IEC60730/60335 class B safety standards. These routines are authorized by VDE Test and Certification Institute GmbH. The copy of the test authorized book is attached to the downloading package of this book with self test library source code and CS+ project of the test harness that have been authorized	Download
9	IEC60730/60335 Self Test Library of CARL78 for RL78 MCU extended	This Application Note provides guidelines of how to use flexible sample software routines to assist with compliance with IEC60730/60335 class B safety standards.	Download
10	VDE Certified IEC60730/60335 Self Test Library	This Application Note provides guidelines of how to use flexible sample software routines to assist with compliance with IEC60730/60335 class B safety standards.	Download

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RL78/G13 APPLICATION NOTE [SELF PROGRAMMING(1/2)]

Item	Title	Summary	Sample code
1	RL78 Family Flash Self Programming Library Type01 User's Manual in Japan and Other Asian Countries (Japanese Release)	The flash self-programming library is software to rewrite data in the code flash memory with the firmware installed on the RL78 microcontroller.	-
2	RL78/G13 Flash Self Programming: Execution	This application note is intended for users who have a basic understanding of the functions of the Type 01 Flash Self Programming Library for the RL78/G13 microcontrollers and who are to design application systems using that library.	Download
3	Flash Self-programming Library Type T01, European Release	The Flash Self-programming library for IAR V2.xx development environments (except linker sample file) can also be used with the IAR V3.xx or later version development environments.	-
4	RL78/G13 Self-Programming (Received Data via CSI) CC-RL	This application note gives the outline of flash memory reprogramming using a self-programming technique. In this application note, flash memory is reprogrammed using the flash memory self-programming library Type01.	Download
5	RL78/G13 Self-Programming (Received Data via CSI)	This application note gives the outline of flash memory reprogramming using a self-programming technique. In this application note, flash memory is reprogrammed using the flash memory self-programming library Type01.	Download
6	RL78/G13 Self-Programming (Received Data via UART) CC-RL	This application note gives the outline of flash memory reprogramming using a self-programming technique. In this application note, flash memory is reprogrammed using the flash self-programming library Type01.	Download
7	RL78/G13 Self-Programming (Received Data via UART)	This application note gives the outline of flash memory reprogramming using a self-programming technique. In this application note, flash memory is reprogrammed using the flash memory self-programming library Type01.	Download
8	RL78/G13 Self-Programming (Received Data via IIC) CC-RL	This application note gives the outline of flash memory reprogramming using a self-programming technique. In this application note, flash memory is reprogrammed using the flash memory self-programming library Type01. The reprogramming data is received via IIC.	Download
9	RL78/G13 Self-Programming (Received Data via IIC)	This application note gives the outline of flash memory reprogramming using a self-programming technique. In this application note, flash memory is reprogrammed using the flash memory self-programming library Type01. The reprogramming data is received via IIC.	Download
10	RL78 Family Data Flash Library Type04 User's Manual in Japan and Other Asian Countries (Japanese Release)	The data flash library is a software library to perform operations to the data flash memory with the firmware installed on the RL78 microcontroller.	-
11	RL78/G13 Flash Data Library Type04	This application note explains how to writes and reads data to and from data flash memory using the Flash Data Library Type04 (flash data library).	Download

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RL78/G13 APPLICATION NOTE [SELF PROGRAMMING(2/2)]

Item	Title	Summary	Sample code
12	RL78/G13 Data Flash Library Type04 CC-RL	This application note explains how to writes and reads data to and from data flash memory using the Flash Data Library Type04 (flash data library).	Download
13	Data Flash Access Library Type T04 (Pico), European Release	A Data Flash Library (FDL) is a software library to perform operations on the data flash memory on the RL78 microcontroller.	-
14	Data Flash Access Library FDL-T01 RL78 Series, European Release	This user's manual describes the overall structure, functionality and software interfaces (API) of the Data Flash Library (FDL) accessing the physical Data Flash separated and independent from the Code Flash. This library supports dual operation mode where the content of the Data Flash is accessible (read, write, erase) during instruction code execution.	-
15	Data FLASH Converter (Data FLASH memory image generation)	The Data FLASH Converter is a windows based tool that generates a Data FLASH memory image from EEPROM emulation data and/or from a program code file that is mapped to the Data FLASH area of a Renesas microcontroller.	-
16	EEPROM Emulation Software RL78 Type 01 User's Manual for RL78/G2x	EEPROM emulation is a feature used to store data in the on-board flash memory in the same way as EEPROM. In EEPROM emulation, EEPROM Emulation Software RL78 Type 01 operates the Renesas Flash Driver (RFD) RL78 Type 01. And RFD writes and reads the data flash memory	Download
17	RL78/G13 EEPROM Emulation Library Pack01	This application note explains how to write and read data to and from data flash memory using the EEPROM Emulation Library Pack01 (Flash Data Library (FDL) and EEPROM Emulation Library (EEL)).	Download
18	RL78 Family EEPROM Emulation Library Pack01 User's Manual	EEPROM emulation is a feature used to store data in the on-board flash memory in the same way as EEPROM.	-
19	RL78 Family EEPROM Emulation Library Pack02 User's manual in Japan and Other Asian Countries (Japanese Release)	EEPROM emulation is a feature used to store data in the on-board flash memory in the same way as EEPROM.	-
20	EEPROM Emulation Library EEL-T01 RL78 Series	This application note describes the internal structure, the functionality and the software interface (API) of Renesas RL78 EEPROM Emulation Library (EEL) Type 01, designed for RL78 flash devices with so called Data Flash based on the MF3 flash technology.	-
21	EEPROM Emulation Library Type T01, European Release, RL78 Family	This user's manual describes the internal structure, the functionality and the software interface (API) of Renesas RL78 EEPROM Emulation Library (EEL) Type 01, designed for RL78 flash devices with so called Data Flash based on the MF3 flash technology.	-

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RL78/G13 APPLICATION NOTE [SECURITY / CRYPTO]

Item	Title	Summary	Sample code
1	RL78 Family AES Library: Introduction Guide	RL78 ファミリ用 AES ライブラリ(以下 AES ライブラリ)を導入するための情報を記します。AESライブラリは AES 暗号処理を RL78 マイコンで実現するためのソフトウェアライブラリです。AES ライブラリは RL78 マイコンを用いて効率よく処理が出来るように設計されています。	Download
2	RL78 Family RSA Library: Introduction Guide	RL78ファミリ用 RSA ライブラリ (以下 RSA ライブラリ)を導入するための情報を記します。RSA ライブラリは RSA 暗号処理をRL78ファミリで実現するためのソフトウェアライブラリです。RSA ライブラリは RL78ファミリ用に効率よく処理が出来るように設計されています。	Download
3	RL78 Family SHA Hash Function Library: Introduction Guide	RL78 ファミリ用 SHA ハッシュ関数ライブラリ(以下 SHA ライブラリ)を導入するための情報を記します。SHA ライブラリは SHA-1/SHA-256 のハッシュ演算処理を RL78 マイコンで実現するためのソフトウェアライブラリです。SHA ライブラリは RL78 マイコンを用いて効率よく処理が出来るように設計されています。	Download
4	Random Number Generator	RL78マイコンの高精度な内蔵Low-speedオンチップ発振器(15kHz)と独立した内部高速オンチップ発振器(32MHz)を利用して、ソフトウェアで乱数を生成する方法について説明します。	-

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RL78/G13 APPLICATION NOTE [CONNECTIVITY]

Item	Title	Summary	Sample code
1	RL78/G12 Remotely Controllable Button Pusher	This application note describes an example to control the W-Fi module ESP-WROOM-02 by using RL78/G12 and control the button pusher via a network.	Download
2	RL78/G14 Modbus ASCII/RTU	This Application Note describes a sample program that combines an RL78 microcontroller with a Renesas RS-485 transceiver to enable master/slave functionality over Modbus ASCII/RTU.	Download

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RL78/G13 APPLICATION NOTE [DALI]

Item	Title	Summary	Sample code
1	RL78/G13 DALI-2 Communication driver	This application note describes a sample program that performs DALI (Digital Addressable Lighting Interface) communication using the RL78/G13 microcontroller.	Download

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RL78/G13 APPLICATION NOTE [FLASH PROGRAM]

Item	Title	Summary	Sample code
1	RL78 Microcontrollers Application Note Programmer Edition	The purpose of this application note is to help users understand how to develop dedicated flash memory programmers for rewriting the internal flash memory of the RL78 microcontrollers.	-
2	RL78 Flash Programmer (RL78 Protocol A)	This application note describes how to write the program to the internal flash memory of the RL78 microcontroller that supports the RL78 Protocol A.	Download
3	RL78 Flash Programmer (RL78 Protocol B)	This application note describes how to write the program to the internal flash memory of the RL78 microcontroller that supports the RL78 Protocol B.	Download
4	RL78 Flash Programmer (RL78 Protocol C)	This application note describes how to write the program to the internal flash memory of the RL78 microcontroller that supports the RL78 Protocol C.	Download
5	Flash programmer with Raspberry Pi (RL78 Protocol A)	This application note describes a sample program for a flash programmer that writes to the flash memory of a microcontroller that supports Protocol A.	Download
6	RL78/G13 Boot Loader through SCI	This application note introduces a self-programming boot-loader example. User could update boot-loader program or user program through SCI.	Download

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RL78/G13 APPLICATION NOTE [MEMORY DRIVER]

Item	Title	Summary	Sample code
1	RX Family, RL78 Family, 78K0R/Kx3-L Macronix International MX25/66L Family Serial NOR Flash Memory Control Software	This application note describes how to control MX25/66L serial NOR flash memory, manufactured by Macronix International Co., Ltd., using an MCU manufactured by Renesas Electronics, and it explains the usage of the sample code provided for that purpose.	Download
2	RX Family, RL78 Family, 78K0R/Kx3-L Application Note Micron Technology M25P Series Serial Flash memory Control Software	The application note explains how to control Micron Technology, Inc. M25P series SPI Serial Flash memory and how to user the sample code for the products.	Download
3	RX Family, RL78 Family, 78K0R/Kx3-L Application Note Micron Technology M45PE Series Serial Flash memory Control Software	This application note explains how to control Micron Technology, Inc. M45PE series SPI Serial Flash memory and how to use the sample code for the products.	Download
4	RX Family, RL78 Family, 78K0R/Kx3-L Application Note Micron Technology N25Q Serial NOR Flash Memory Control Software	This application note describes how to control N25Q SPI serial NOR flash memory, manufactured by Micron Technology, Inc., using an MCU manufactured by Renesas Electronics, and it explains the usage of the sample code provided for that purpose.	Download
5	RX Family, RL78 Family, 78K0R/Kx3-L Spansion S25FLxxxS MirrorBit® Flash Non-Volatile Memory Control Software	This application note describes how to control S25FLxxxS MirrorBit®flash non-volatile memory, manufactured by Spansion, Inc., using an MCU manufactured by Renesas Electronics, and it explains the usage of the sample code provided for that purpose.	Download
6	RX Family, RL78 Family, 78K0R/Kx3-L Renesas R1EX25xxx Series Serial EEPROM Control Software	This application note explains how to control Renesas Electronics R1EX25xxx/HN58X25xx Series SPI Serial EEPROMs and how to use the sample code for the products.	Download
7	RX Family, RL78 Family Renesas R1EX24xxx Series Serial EEPROM Control Software	This application note explains the method of controlling R1EV24xxx, R1EX24xxx, and HN58X24xxx series I2C serial EEPROM, manufactured by Renesas Electronics, by using a Renesas Electronics MCU, and also describes the usage of the supplied sample code.	Download
8	RL78/G13 EEPROM Control by Microwire COmmunications CC-RL	This application note shows how to realize Microwire communications by using three-wire serial I/O of RL78/G13 serial array unit.	Download
9	RL78/G13 EEPROM Control by Microwire Communications	This application note shows how to realize Microwire communications by using three-wire serial I/O of RL78/G13 serial array unit.	Download

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RL78/G13 APPLICATION NOTE [FILE SYSTEM]

Item	Title	Summary	Sample code
1	RL78 Family Open Source FAT File System M3S-TFAT-Tiny: Introduction Guide	This document explains the usage of the Open Source FAT File System M3S-TFAT-Tiny for RL78 Family (hereafter referred to as "TFAT library") along with a sample program.	Download
2	RL78 Family SPI mode MultiMediaCard Driver: Introduction Guide	This application note describes the integration method for enabling use of the M3S-TFAT-Tiny open-source FAT file system (referred to below as the TFAT library) and SPI mode multimedia card driver (referred to below as the MMC driver) in combination.	Download
3	RL78 Family Example of Integration of SPI Mode Multimedia Card Driver into M3S-TFAT-Tiny Open-Source FAT File System	This application note describes the integration method for enabling use of the M3S-TFAT-Tiny open-source FAT file system (referred to below as the TFAT library) and SPI mode multimedia card driver (referred to below as the MMC driver) in combination.	Download

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RL78/G13 APPLICATION NOTE [SOUND]

Item	Title	Summary	Sample code
1	RL78 Family Sound Playback/Compression System (Original ADPCM Codec) M3S-S2-Tiny: Introduction Guide	This document explains M3S-S2-Tiny for the RL78 Family (hereafter referred to as "S2 library").	Download

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RL78/G13 APPLICATION NOTE [SENSOR(1/2)]

Item	Title	Summary	Sample code
1	RL78 Family Sensor I2C Communication Middleware Control Module Software Integration System	This application note explains sensor I2C communication middleware control module for Renesas sensors using Software Integration System (SIS).	Download
2	RL78 Family Sensor Control Modules Software Integration System	This application note explains the sensor control modules for HS300x and HS400x (Renesas high performance relative humidity and temperature sensor), FS2012, FS3000 and FS1015 (Renesas High Performance Flow Sensor Module), ZMOD4410 and ZMOD4510 (Digital Gas Sensors), OB1203 (Heart Rate, Blood Oxygen Concentration, Pulse Oximetry, Proximity, Light and Color Sensor) and I2C communication middleware for Renesas sensors using Software Integration System (SIS).	-
3	RL78 Family HS300x Sensor Control Module Software Integration System	This application note explains the sensor control module for Renesas sensor HS300x (Renesas high performance relative humidity and temperature sensor) using Software Integration System (SIS).	Download
4	RL78 Family HS400X Sensor Control Module Software Integration System	This application note explains the sensor control module for Renesas sensor HS400x (Renesas high performance relative humidity and temperature sensor) using Software Integration System (SIS).	Download
5	RL78 Family FS2012 Sensor Control Module Software Integration System	This application note explains the sensor control modules for FS2012 (Renesas High Performance Flow Sensor Module) using Software Integration System (SIS).	Download
6	RL78 Family FS3000 Sensor Control Module Software Integration System	This application note explains the sensor control module for FS3000 (Renesas air velocity sensor) sensor using Software Integration System (SIS).	Download
7	RL78 Family FS1015 Sensor Control Module Software Integration System	This application note explains the sensor control module for FS1015 (Renesas air velocity sensor) sensor using Software Integration System (SIS).	Download
8	RL78 Family OB1203 Sensor Control Module Software Integration System	This application note explains the sensor control module for OB1203 (Heart Rate, Blood Oxygen Concentration, Pulse Oximetry, Proximity, Light and Color Sensor) using Software Integration System (SIS).	Download
9	RL78 Family ZMOD4410, ZMOD4450 and ZMOD4510 Sensor Control Module Software Integration System	This application note explains the sensor control modules for ZMOD4410, ZMOD4450 and ZMOD4510 (Digital Gas Sensors) using Software Integration System (SIS)	Download
10	Sensor Software Combination Manual	This application note describes code changes required to use the multiple sensor software combinations and runs on certain MCUs of the RA family, RX family, RL78 family and RZ family	-

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RL78/G13 APPLICATION NOTE [SENSOR(2/2)]

Item	Title	Summary	Sample code
11	RL78/G13 Group Environmental sensor module control sample software	This application note explains communication control sample software between “Renesas Starter Kit for RL78/G13”, “ZMOD4410” and “HS3001”.	Download
12	OB1203 Sample application - Sample Code	This application note describes the sample software that is for use with the OB1203 sensor and runs on certain MCUs of the RA family, RX family, and RL78 family, and RE01 group MCUs with 256 KB or 1500 KB of flash memory.	Download
13	FS2012 Sample application - Sample Code	This application note describes the sample software that is for use with the FS2012 flow sensor and runs on certain MCUs of the RA family, RX family, and RL78 family.	Download
14	FS3000 Sample application - Sample Code	This application note describes the sample software that is for use with the FS3000 flow sensor and runs on certain MCUs of the RA family, and RX family, RL78 family.	Download
15	ZMOD4xxx Sample application - Sample Code	This sample software acquires gas data from the ZMOD4410, ZMOD4450 and ZMOD4510 gas sensors and calculates the result. In combination with the I2C driver of the FSP, the sample software controls the ZMOD4410 and ZMOD4510 through the I2C in the MCU to measure gases, acquire ADC data, and calculate the acquired result.	Download
16	HS300x Sample application - Sample Code	This application note describes the sample software that is for use with the HS300x humidity and temperature sensor and runs on certain MCUs of the RA family, RX family, RL78 family, and RZ family.	Download
17	HS400x Sample application - Sample Code	This application note describes the sample software that is for use with the HS400x humidity and temperature sensor and runs on certain MCUs of the RA family, RX family, RL78 family, and RZ family.	Download
18	FS1015 Sample application - Sample Code	This application note describes the sample software that is for use with the FS1015 flow sensor and runs on certain MCUs of the RA family, RX family, and RL78 family.	Download
19	RL78/G13 Group Sensirion environmental sensor module control sample software	This application note explains the communication control sample software between "Renesas Starter Kit for RL78/G13 (RSK)" manufactured by Renesas Electronics Corporation and environmental sensor modules (SVM30, SCD30, and SPS30) manufactured by Sensirion.	Download

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RL78/G13 APPLICATION NOTE [REALITY AI]

Item	Title	Summary	Sample code
1	RL78 Family Reality AI Control Modules Software Integration System	This application note explains Data Shipper and Data Collector control modules for Renesas Reality AI, and general UART communication module using Software Integration System (SIS)	Download
2	RL78 Family Reality AI Data Acquisition Module (Data Collector / Data Shipper) - Sample Code	This application note describes sample software for data acquisition for Reality AI. Acquired data is converted into any files using Reality AI Data Storage Tool on PC.	Download
3	RL78 Family Reality AI UART Communication Module Software Integration System	This application note explains a UART communication module for Renesas Reality AI using Software Integration System (SIS).	Download
4	RL78 Family Reality AI Data Collector Control Module Software Integration System	This application note explains Reality AI Data Collector control modules for Renesas Reality AI using Software Integration System (SIS).	Download
5	RL78 Family Reality AI Data Shipper Control Module Software Integration System	This application note explains Reality AI Data Shipper control modules for Renesas Reality AI using Software Integration System (SIS).	Download

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RL78/G13 APPLICATION NOTE [SOFTWARE RELATION(1/2)]

Item	Title	Summary	Sample code
1	RL78 Software Porting Guide RL78/G13 sample code porting (CC-RL) (CS+, e2 studio)	This application note describes how to port the RL78/G13 peripheral sample code to another RL78.	-
2	RL78 Software Migration Guide Source Code Migration from Assembly Language to C Language CC-RL	This application note describes how to migrate the program in the assembly language for the CS+, which is the integrated development environment (IDE), to the inline assembler functions in the C language.	-
3	RL78 Software Migration Guide Migrating from CA78K0R to CC-RL (CS+)	This application note describes how to replace the source codes created by the CA78K0R C compiler for the integrated development environment CS+ with the source codes supported by the CC-RL C compiler for the integrated development environment CS+.	-
4	RL78 Debugging Functions Using the Serial Port	This application note describes how to use the RL78 debugging functions using the serial port.	-
5	RL78 Family C compiler CC-RL Programming Techniques	This application note describes how to reduce the code size, increase the execution speed, and programming techniques to avoid bugs when using the C compiler CC-RL.	-
6	RL78 Family C Compiler Package (CC-RL) Application Guide: Programming Techniques	This application note describes methods of programming for efficiency in terms of code size, speed of execution, and ROM size.	-
7	IAR Embedded Workbench for RL78 Programming Techniques	This application note describes how to reduce the code size, increase the execution speed, and programming techniques to avoid bugs when using IAR Embedded Workbench for RL78.	-
8	RL78/G13 Usage Example of the Code Generator (Sample Program)	This document describes using the sample program with the Code Generator for e2 studio. The CC-RL is used as a compiler in the sample program.	Download
9	RL78/G13 Basic Initialisation for Cubesuite+ and IAR Toolchain	This application note describes the basic setting items that are necessary for initializing the RL78/G13.	Download
10	Integrated Development Environment e² studio How to use IAR Systems compiler in e² studio	This document describes the procedure for using the IAR Systems compiler on the e2 studio.	-

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RL78/G13 APPLICATION NOTE [SOFTWARE RELATION(2/2)]

Item	Title	Summary	Sample code
11	e² studio Creating and executing build CMake project	This document explains processes how to create CMake project in e2 studio and execute Build.	-
12	Integrated Development Environment e² studio: How to use EGit in e² studio	This application note guides user to use EGit in Renesas e2 studio environment.	-
13	RL78 Family CubeSuite+ Startup Guide	The purpose of this document is to help the user understand how to use the RL78 family sample code in CubeSuite+ and also understand basic operations of development tools for the RL78 family.	-

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RL78/G13 APPLICATION NOTE [OTHERS]

Item	Title	Summary	Sample code
1	RL78/G13 Multiplier and Divider/Multiply-Accumulator (A/D Converter in Sequential Conversion Mode)	This application note explains how to use the multiplier and divider/multiply-accumulator in the multiply-accumulator mode (unsigned).	Download
2	RL78/G13 Multiplier and Divider/Multiply-Accumulator (A/D Converter in Sequential Conversion Mode) CC-RL	This application note explains how to use the multiplier and divider/multiply-accumulator in the multiply-accumulator mode (unsigned).	Download
3	RL78 Family Notes and Countermeasures Against Noise	This document describes notes and countermeasures against noise for the RL78 Family.	-
4	RL78/G13 and RX62N/RX621 Digital Stethoscope Reference Design	Digital stethoscopes coupled to a lap top computer / tablet with suitable software and connected to internet for automated or remote diagnosis by a specialist, will be the future trend.	-
5	RL78/G13 Pulse Oximeter Reference Design	Digital Stethoscope Reference Design	-
6	RL78/G13 Evening Out the Variations in Brightness of Multiple LEDs CC-RL	This application note describes the procedures for adjusting LED drive current to even out the variations in brightness of multiple LEDs.	Download
7	RL78 Software LCD Driver	This application note gives an example how to drive and control a LCD by usual ports, using Renesas microcontroller RL78.	-
8	RL78 Family FFT Library: Deployment Guide	This document provides information for deploying FFT Library. Fast Fourier transform (FFT) is an algorithm that executes the discrete Fourier transform at high speed.	Download
9	RL78 Family RL78 Digital Signal Controller Library - Filter	This document presents the specifications for a Digital Signal Controller(DSC) Library function library for the Renesas RL78 which includes generic specifications, detailed specifications for filter algorithm kernels and guidelines for the DSC Library API.	Download
10	RL78 Family Application note Software-based Part Number Reading Out	This application note explains how to read out part number by software.	-
11	78K0, 78K0R, RL78 and V850 Devices Flash Protection and Security Setting Guide	This application note provides a state-of-the-art protection of the Flash contents against a fraudulent readout of the flash contents of the 78K0, 78K0R, RL78 and V850 devices and a guide to security settings of aforementioned Renesas Electronics embedded flash Microcontrollers (MCUs).	-
12	Application execution from RAM	A lot of applications require the code execution from RAM like for example due to safety reasons or e.g. in case of bootloader for flash self-programming. This document will help you to set-up the projects based on the IAR environment.	-

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