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# EU153-1 Quick Start Guide

## Quick Start Guide

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### Contents

1. Overview .....	2
2. Purpose of this document .....	2
3. Running the Out-of-Box demo .....	3
4. Setting up Adafruit IO .....	8
5. Software License and Disclaimers .....	10
6. References .....	10
Revision History .....	11

## 1. Overview

This is Renesas EU153-1 Water Leakage Sensor.

It demonstrates detection of inappropriately high moisture level or water spilling to allow quick evaluation of Renesas relative humidity using temperature sensors using Renesas WiFi/BLE device and third-party visualization tools.

The solution kits contain the following Renesas Parts

- [HS3001](#) - relative humidity and ambient temperature sensor
- [ISL9301](#) - Li-Ion Battery Charger
- [ISL9122A](#) - Ultra-Low IQ Buck/Boost Regulator
- [ISL9111A](#) – High Efficiency Synchronous Boost Converter
- [SLG59H1401C](#) – GreenFET Load Switch for OR'ing Power MUX
- [SLG59M1557V](#) – GreenFET Single P-Channel Load Switch
- [ISL90727](#) – Digitally Controlled Potentiometer
- [DA16600MOD](#) - Ultra-Low Power Wi-Fi + Bluetooth® Low Energy Combo Module

## 2. Purpose of this document

This Quick Start Guide walks you through the best out-of-the-box experience and provides a step-by-step guide on how to use this solution kit.

### 3. Running the Out-of-Box demo

1. Download the Smartphone App “**Dialog WiFi Provisioning**” from either Google Play (in case of Android phone or tablet) or Apple App Store (for iPhone / iPad) and install it.



2. Unpack the package and take out the board (Figure 1)

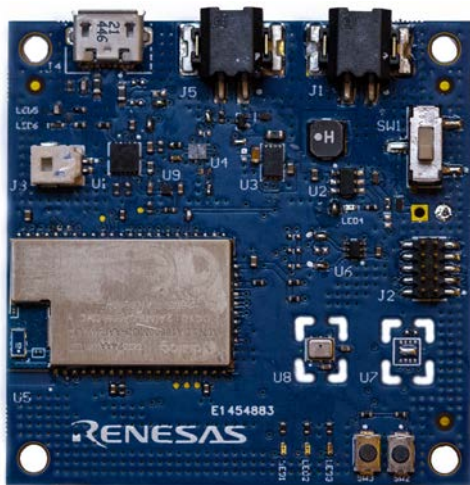


Figure 1: Top and back view of EU153-1 board

- Please check the main connectors that are shown in Figure 2

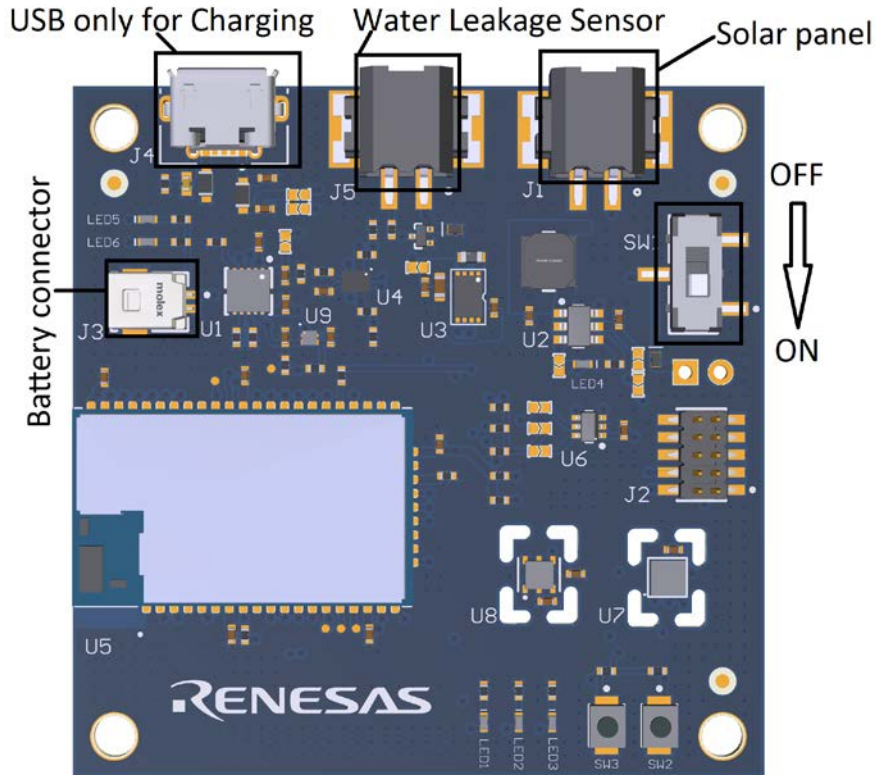


Figure 2: PCB Top View with the default jumper configuration.

- Connect battery and water leakage sensor wire as it is shown in Figure 3

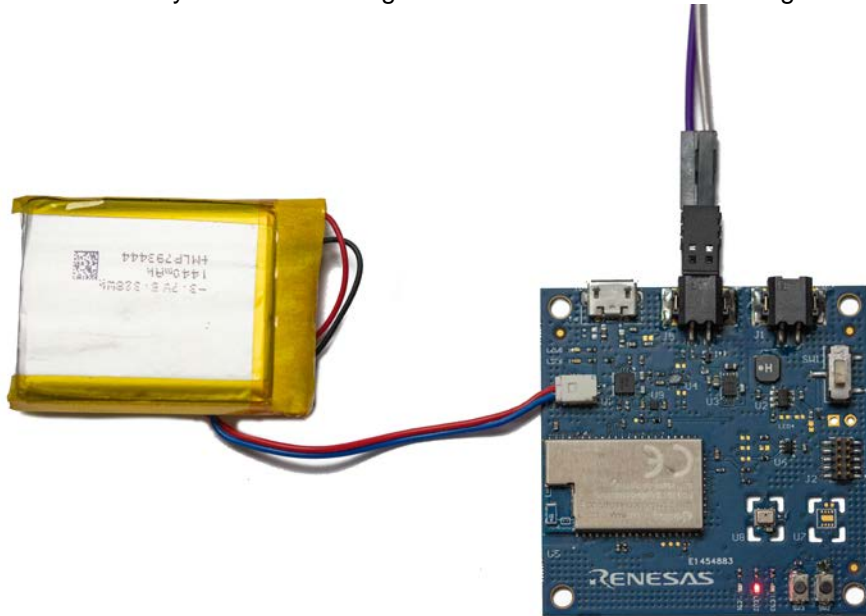


Figure 3. Battery and Water Leakage Sensor connection

- Move the Power Supply Switch to ON Position (Figure 2)
- Verify the board status through the LEDs Status (Table 1). Please note when device is in DPM mode only LED3 can be on.

Led Coding		
LED	LED Status	Information
LED1	ON	Not connected to WiFi Access point
	Blinking	Connected to AP but no communication with MQTT broker
	Blinking	When DPM is off after short SW3 button press starts blinking
LED2	Blink	Indicates wifi communication.
LED3	On/off	Controller remotely via MQTT
LED4	On/OFF	DC/DC Boost error indication when ON.
LED5	ON/OFF	It is on when external power supply is connected (i.e. USB)
LED6	ON/OFF	Charging status indication. On - charging

**Table 1: Leds Coding Table**

7. If the battery is fully discharged or the charge is low, connect the solution kit to a USB cable The green LED (LED5) will come up to indicate external power supply and battery charge status will be shown on yellow LED (LED6). When charging is complete LED6 is off.
8. As soon as the DA16600MOD Bluetooth® communication starts, open Dialog WiFi Provisioning App to setup the device.



**Figure 4. WiFi Provisioning app in Google Play and App Store**

9. When the app starts, follow the procedure shown in Figure 5:
  - Click on **Start DA16600 based** button
  - Click **Start**
  - Select EU153-1 device
  - Scan WiFi Network

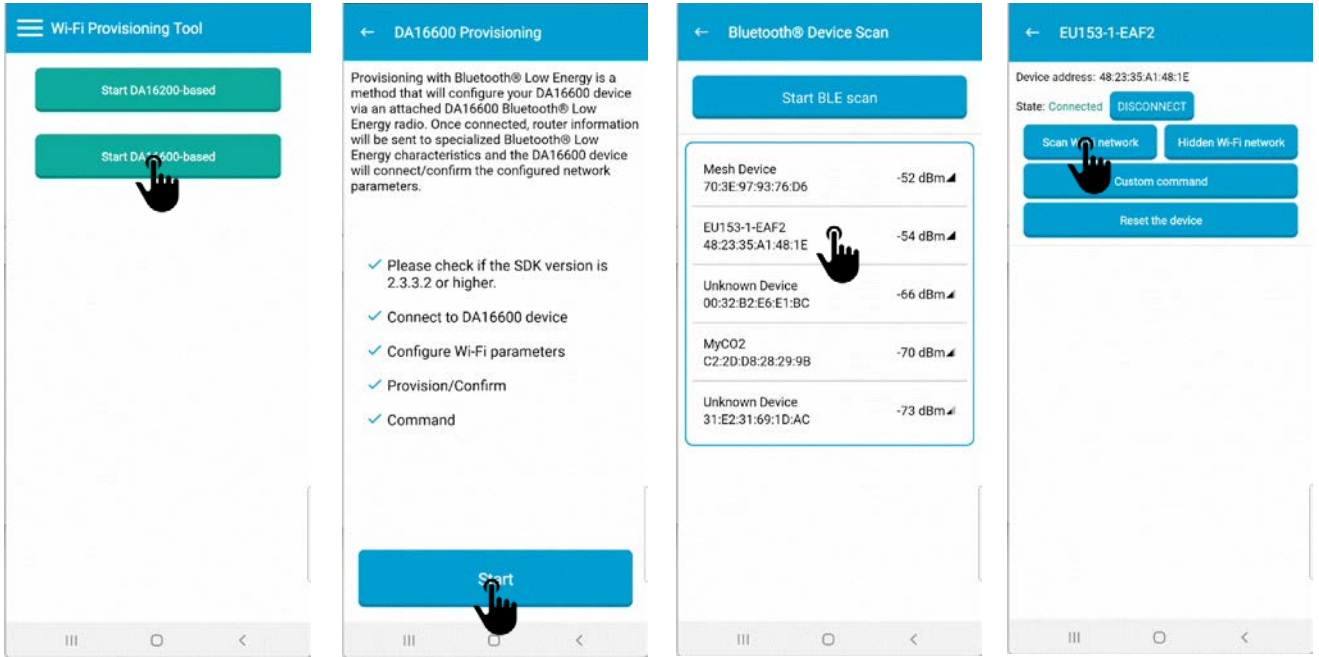


Figure 5: Search for the device using BLE.

10. Next steps are shown in Figure 6:

- Select access point you want to connect,
- Enter credentials,
- Click Connect to selected access point button.
- If the procedure was successful, you will be informed about it in the next pop up screen.

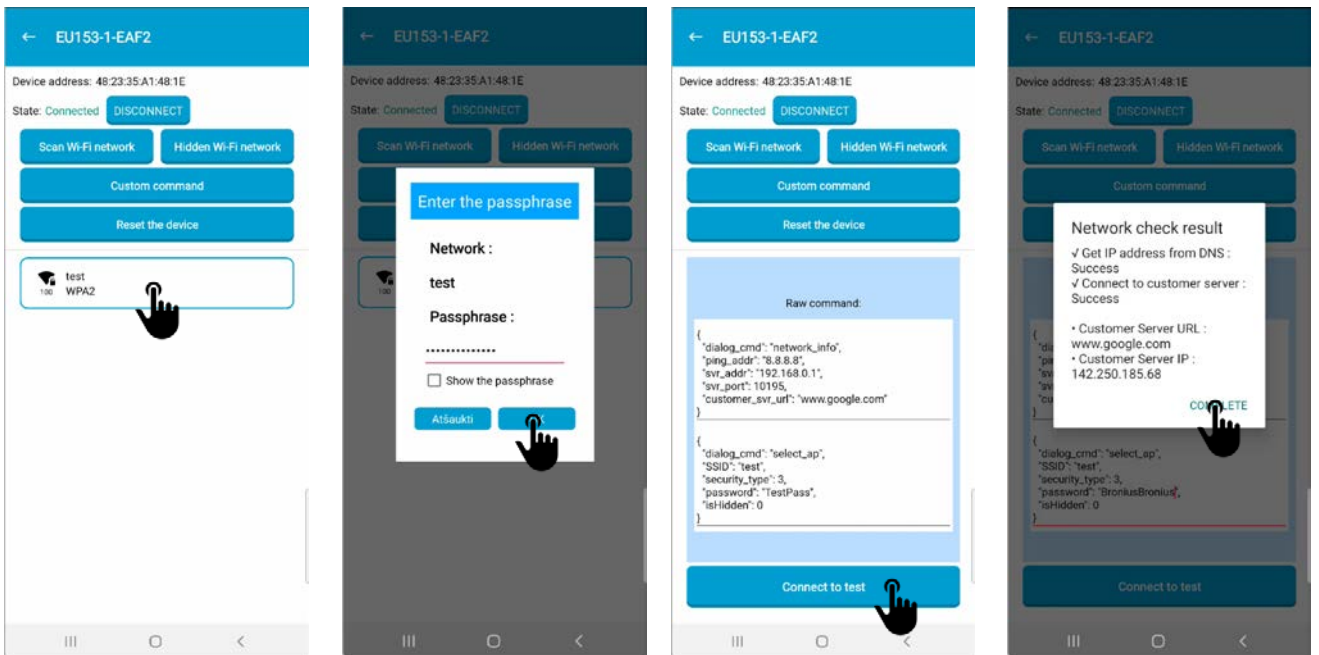


Figure 6. WiFi Provisioning

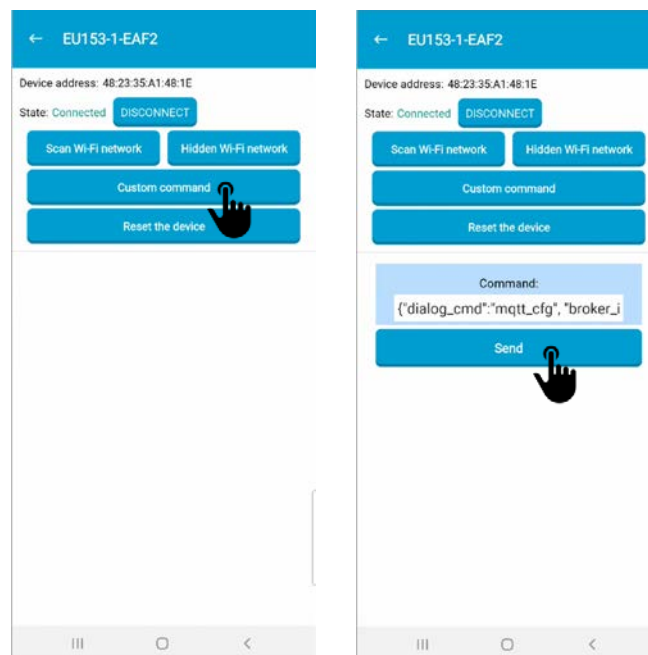
11. When the device is connected to the WiFi you can setup MQTT broker address and client parameters. This is done by copying and pasting custom command in json format. Detailed print screens are in Figure 7.

MQTT broker and client parameters in json format"

```
{
  "dialog_cmd": "mqtt_cfg",
  "broker_ip": "52.54.110.50",
  "port": 1883,
  "user": "mqtt_user",
  "password": "mqtt_password",
  "ping_period": 30
}
```

**Note. The custom command should be copied as one row:**

```
{"dialog_cmd": "mqtt_cfg", "broker_ip": "52.54.110.50", "port": 1883, "user": "mqtt_user", "password": "mqtt_password", "ping_period": 30}
```



**Figure 7. MQTT broker and client parameters**

MQTT broker is accepted only as IP address.

Any MQTT broker/ can be used. As an example, it was tested with Adafruit io service. Detailed info how to set it up



### 4. Setting up Adafruit IO

Adafruit is offering free full featured MQTT broker and dashboard with limited number of devices and data feeds. As it is one of the easiest tools to start with, we have chosen it as tool to visualize data that EU153-1 is providing.

1. If you already have an [Adafruit](#) account you can use it and if not you have to set up.
2. MQTT borker/server credentials can be found by clicking on key in yellow background as it is shown in Figure 8. Active Key is password.

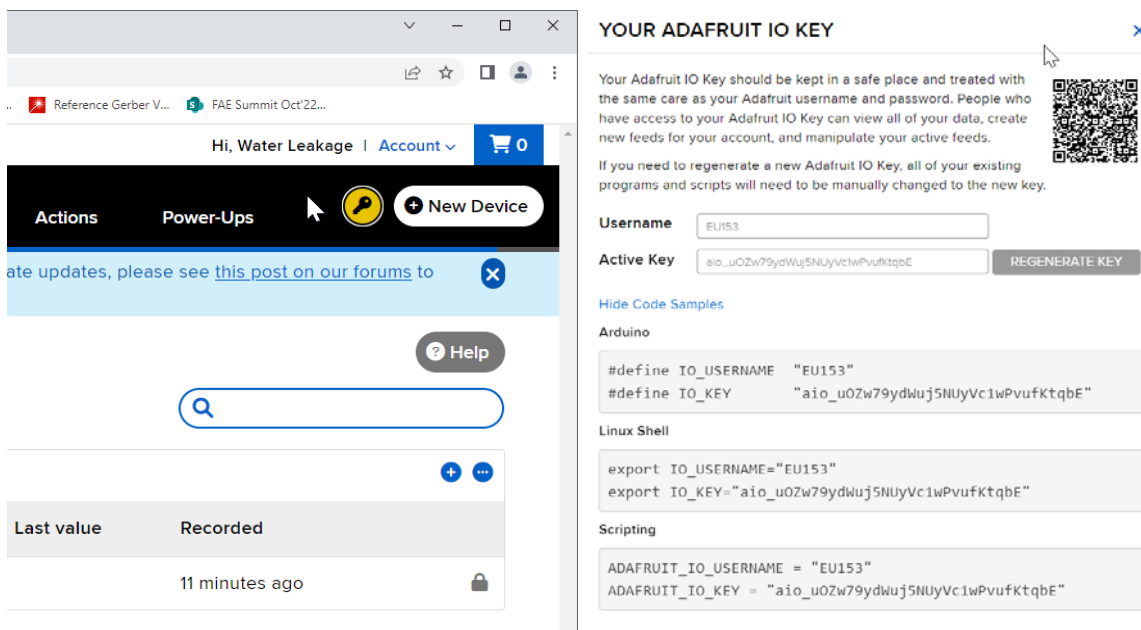


Figure 8. Adafruit IO MQTT broker username and password

3. If you have successfully logged in to io.adafruit.com you will have only one Welcome feed. You can delete it. When device updates the topics your Feeds should look like Figure 9. If you don't want to wait until it is automatically updated you can press button SW2 on EU153-1 board.

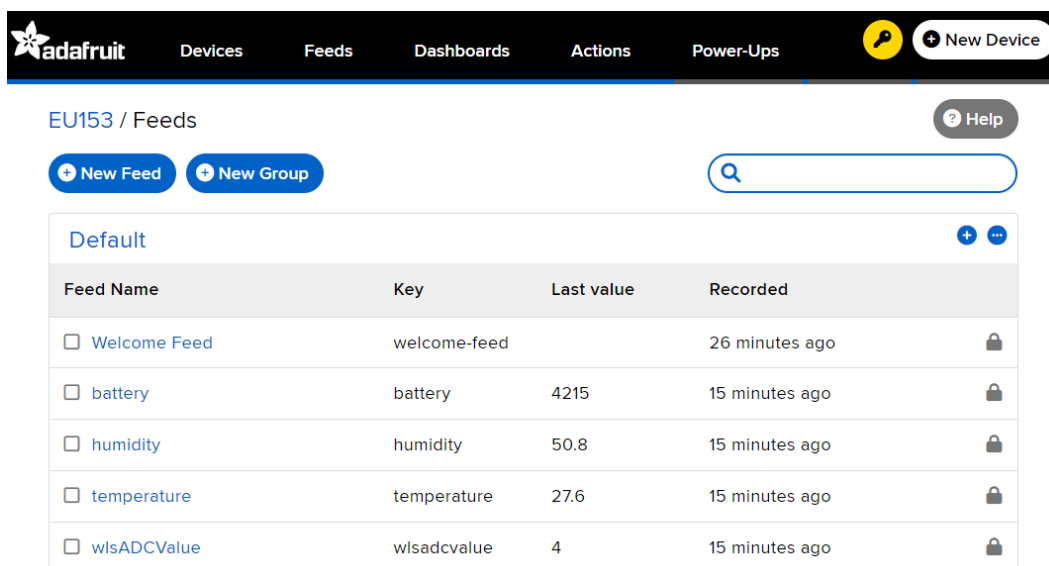


Figure 9. Newly updated topics/ Feeds



4. To control LED3 on the board you have to create new “*userneme/LED3*” feed manually (Figure 10):
  - a. Press New Feed
  - b. Enter the Name for the new feed
  - c. Press Create

EU153 / Feeds

Feed Name	Key
<input type="checkbox"/> Welcome Feed	welcome-feed
<input type="checkbox"/> battery	battery
<input type="checkbox"/> humidity	humidity

Figure 10. Create LED3 Feed

5. Create new Dashboard that would look like

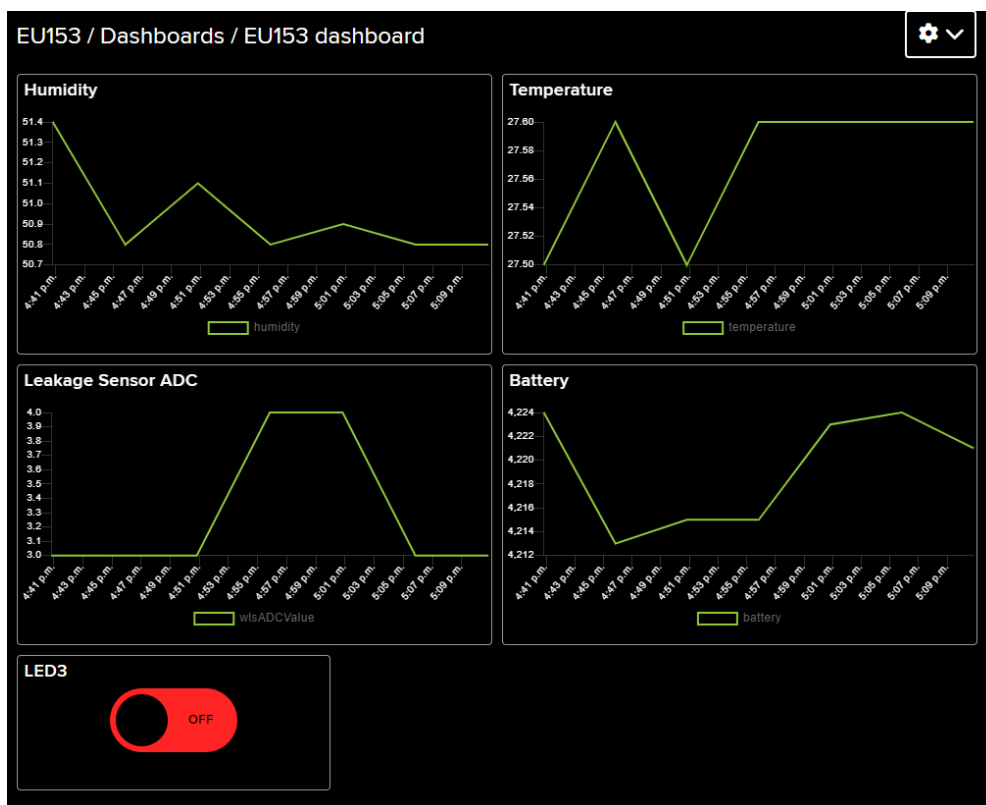


Figure 11. EU153 Dashboard

6. LED3 Value will be controlled using LED3 radio switch on the dashboard.

## 5. Software License and Disclaimers

Please note that the Renesas Software License agreement and disclaimers apply.

For more details please see here:

<https://www.renesas.com/eu/en/document/oth/disclaimer002?language=en>  
and check out Section "General precautions..." at the end of this document.

## 6. References

- [1] Renesas Electronics, "EU153-1 - Hardware User's Guide" – r30an0416ed0101-eu153-1-hw-usermanual.pdf.
- [2] Renesas Electronics, "EU153-1 - Software User's Guide" - r30an0417ed0101-eu153-1-sw-usermanual.pdf.

**Revision History**

Rev.	Date	Description	
		Page	Summary
0.01	02 Feb 2023		Initial version.
0.02	06 March 2023	6 10	Pasting custom command in WiFi provisioning app. Added references to the documents. Document number added.

## 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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