# RIoT\_Monitor Application Manual for RIOT-001

Ver.1.1

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# **Getting Started**

#### **Overview**

This RIoT\_Monitor is an application to receive the Bluetooth Low Energy (BLE) data with using the RIOT-001.



Figure 1 RIOT-001

#### **RIoT\_Monitor Requirements**

To run this application, the following items are required.

#### Table 1

Items	Descriptions
Android Tablet	Android OS 7.0 or later and Bluetooth 4.1 or later recommended
USB Memory	A USB memory for tablet to install the APK file
LICE Conversion Coble	The cable connects between the tablet and the USB memory for the
USD COnversion Cable	USB interface (micro-B, Type-C) on your tablet.
APK File	Application installation file provided by REDC (Size: 20 MB)

REDC tested the application operation with using the following two kinds of tablets.

- LAVIE Tab E TE510/HAW PC-TE510HAW (NEC)
- MediaPad M3 Lite 10 Wi-Fi Model (Huawei)

#### **Initial Setup**

Follow the steps below to install the RIoT\_Monitor app; here are the descriptions with using the HUAWEI MediaPad M3 Lite 10 Wi-Fi model.

Note: Actual display contents may vary depending on the using tablet.

Preset the followings before installation of the RIoT\_Monitor app.

#### 1. Open Settings.

Go to Settings > Security & Privacy > Other Settings (Settings > Security) and touch Unknown sources to allow installation of non-official apps, as shown in Figure 2.



Figure 2 Setting of non-official apps

#### 2. Copy the .apk file provided by REDC to a USB memory to install the app.

If RIoT\_Monitor in an old version has already been installed, go to **Settings** > **Apps** > **RIoT Monitor** and touch **UNINSTALL** to delete it, as shown in Figure 3.

ψ		*i0i <b>m</b> i	6:16 PM
Set	ttings	App info	
	More	RIOT Monitor version 1.19	
	Home screen style	UNINSTALL FORCE STOP	
	Display		
	Sound	Storage 23.27 MB used of Internal storage	>
	Notification & status bar	Permissions Storage and Your location	>
	Navigation key	Notifications	>
	Fingerprint ID	Open by default No defaults set	>
e	Screen lock & passwords	Battery	>
Ø	Security & privacy	Memory An average of 84 MB of memory used in last 3 hours	>
3	Smart assistance		
C	Do not disturb		
8	Accounts		
G	Google		
88	Apps		
٩	Permissions		
	Memory & storage		
	Battery		

Figure 3 Uninstall button

# Installing the RIoT\_Monitor Application

- 1. Connect between the tablet and the USB memory with a USB cable.
- 2. Touch the app icon of Files on the home screen to view files in the USB memory.



Figure 4 Files view in USB memory

3. Touch REDC.RIoT.Monitor-Signed.apk on the screen as shown in Figure 4, and touch **INSTALL** on the screen as shown in Figure 5.

ψ			<b>∦ ፤</b> ∎∎ 8:42 AM
🐼 RIoT Monitor			
Do you want to install this application?	It does not require an	y special access.	
			7
CANCEL		INSTALL	
	$\bigcirc$		

Figure 5 Install button

- **∦ ≣**∎ 8:42 AM ψ X **RIoT Monitor** App installed. DONE OPEN  $\triangleleft$
- 4. After "App installed." displayed on the screen, touch DONE to complete the installation, as shown in Figure 6.

Figure 6 Install completed



5. On the home screen, you can see a new icon of **RIoT\_Monitor**, as shown in Figure 7. The app installation has completed.

Figure 7 Icon of RIoT\_Monitor app

# Start up and Exit of RIoT\_Monitor Application

#### Starting up RIoT\_Monitor

To start up the app of RIoT\_Monitor, touch the icon of **RIoT\_Monitor** on the home screen, as shown in Figure 7. Then, touch **ALLOW** to permit accessing the location information, as shown in Figure 8.



Figure 8 Confirmation message 1



And, touch **ALLOW** to permit accessing files on your tablet, as shown in Figure 9.

Figure 9 Confirmation message 2



After the confirmation messages, the app starts to receive the BLE data, as shown in Figure 10.

Figure 10 Startup screen of RIoT\_Monitor

# Exiting RIoT\_Monitor

To exit the app, touch a history button  $(\Box)$  in the lower of the application screen as shown in Figure 11.

			<b>≵ I</b> □I <b>==</b> 1 8:48 AM
PloT Monitor			
R0145 (74:90:50:80:55:23)	1000.0 -		
[12/3/2019 8:48:04 AM] RSSI = -57	-		
Temperature = 24.8[deg. C] Humidity = 35.1[%RH]	500.0		
Pressure = 1017.9[nPa] Illuminance = 472.0[Lux] Battery = 2.287[V]	-		
	0.0 -		
		08:47:30	08:48:00
	1		
	$\triangleleft$		

Figure 11 History button

After that, touch an exit button (X) on the higher-right of the screen or swipe across the screen to either one of the right or left side, as shown in Figure 12.



Figure 12 Exit screen of RIoT\_Monitor

# **Application Screen of RIoT\_Monitor**

RIoT\_Monitor has three screens of "Main Display", "Individual Display", and "Log Display" as shown in Figure 13. The following pages detail these screens.

	Mai	n [	Dis	pla	y			_								
RIOT Monitor						*	0 <b>=</b> 850 A	I	nd	ividu	Jal	Dis	play	/		
(74.90.50.80.55.23) [12,71/2019.850.30 AM] 8558 - 54 Temperature = 24.8[deg, C] Humidity = 35.0[ka4] Pressure = 1017.0[k92a] Burtiery = 2.293[v]	1000.0 500.0 0.0							R0145	74:90:	50:80:55:23				10 🗩	8.50 AA	Log Display
R0144 (12:34:56:78:9A:BC) [12/3/2019 8:50:35 AM]	1000.0	08.49.40	08:49:50	08:50:00	08:50:10	08:50:20	08:50:30	Temperature 24.8[deg. C]	50.0							10 = 10 AM R0145 [74:90:50:80:55:23]
R551 = -52 Temperature = 24.4[deg, C] Humidity = 35.6[%kH] Pressure = 1077.4[%A] Burninger = 494.0[%u] Battery = 2.463[V]	500.0	08.49.40	08.49.50	08:50:00	08:50:10	08.50.20	08:50:30		10.0	08:50:00	08:50:10	08:50:20	08:50:30	08:50:40	08:50:1	019 8 22 15 444 802 + 48 whth # 3 24 606 - 41 Humidity = 34 55 Weil, Pressure = 1018.0 [Phr], Burninance = 616.0 [Juni, Battery = 2.87 [M] 019 8 2210 44, Batter - 54 whthe # 3 24 66 ar - 54 whthe # 3 24 66 ar - 54 019 8 2320 44, Battery = 2.98 [M] 019 8 2320 44, Battery = 2.88 [M] 019 8 2
								Battery 2.293[v]	5.0 0.0	08:50:00	08:50:10	08:50:20	08:50:30	08:50:40	08:50:1	2019 85:200 AM, HORF - A3 March = 24.6Bpc, Landry = 3.07.0045 Pressure + 1507.9044, Burniance + 52.405, cc), Burney + 2.26(M) 2019 85:30 AM, HORF - A3 March = 2.46Bpc, Landry = 3.4 (Mode Pressure + 1518.5044), Burniance + 44.405, cc), Burney + 2.267(M) 0.019 83:20 AM, HORF - A3 0.019 84:20 AM, HORF - A3 0.019 8
								Pressure 1017.9[kPa]	800.0							2019 85110 AM, 1858 + 43 entral = 2488pc G, Hamidy + 34.7[UH4, Pressure + 1018.0]Phr], Burninance + 484.0[Um], Burney - 2.299(x) 9019 8505 AM, 4508 - 43 entral = 24.0[dogs G, Hamidy + 34.7[UH4, Pressure + 1017.9]Phr], Burninance + 480.0[Um], Burney + 2.297(x) 2019 85045 AM, 1600 - 45 entral = 24.0[dogs G, Hamidy + 35.8[UH4, Pressure + 1017.9]Phr], Burninance + 480.0[Um], Burney + 2.297(x)
									1000.0	08:50:00	08:50:10	08:50:20	08.50.30	08:50:40	08:50:1	2019 55 024 044, HSB = -58 Transe > 2448(mg, United) + 33 (Mel) Fessore + 1017.99(mg, Burninance + 488.03(mg, Burtery + 2.720(Mg)) 2019 55 023 044, HSB = -54 HSB = -54 (HSB = -54 HSB = -54 (HSB = -54) 1018 45 34 544, HSB = -57 1018 45 344, HSB = -57 1018 45 44, HSB = -57 1018 45 44, HSB = -57
								Buminance 480.0(Lux)	0.0	0850.00	085010	0850.20	0850.30	0150-40	08:50	nimi e skoping (z. koninity - 3. zl. (Mer), Pressure = 1077. (Mer), Burninance = Sek (S), al. Bartiery = 2.275() 2019 & 8.00 AM, Sill (Sol - 54 rather = 3.48(Sep. C), Hamidly = 34.1(Mer), Pressure = 1077.0(Me), Burninance = 544.0(Luc), Bartiery = 2.275() 2019 & 8.00 AM, Sill (Sol - 67 matter = 3.48(Sep. C), Hamidly = 3.31(Mer), Pressure = 1017.0(Me), Burninance = 564.0(Luc), Bartiery = 2.275()
	4		~		0				100.0						00.00.	019 R.M.59 AME; 8551 = -57 Instate = 34.8(6sp. C]. Humidity = 34.4(M4H; Pressure = 1017.9(htta), Bluminance = 557.2(k),ud, Battery = 2.293(h) 2019 R.M.59 AME; 8551 = -64 Instate = 3.4(6sp. c), Humidity = 34.7(M4H; Pressure = 1017.9(htta), Buminance = 564.0(k),ud, Battery = 2.297(h
	7		0					Humidity 35.8[%RH]	50.0							2019 8.48.49 Avl (1551 = 40 entre = 24.85(sp. C). Hamidity = 34.3[VaP4], Pressure = 1017.9[VaP4], Burninance = 88.0[Lu0], Battery = 2.281[M] 2019 8.44 Avl (1551 = 57 entre = 24.85(sp. c), Hamidity = 34.3[VaP4], Pressure = 1017.9[VaP4], Burninance = 568.0[Lu0], Battery = 2.287[M]
										⊲	0				[12	8319 8.461 4.40( : 1653 + 46 mature • 24.6(6s; C; Humidity + 35.6(UHr); Pressure + 1517.9(Hr)a; Bluminance + 480.0(Lus; Battery + 2.293(v) 7/1/2019 8.4609 AM; 1653 + 53
															Te (12 Te	ropentare = 2448ps; CL Humidhy = 35.0[WeB; Pressure = 1017.0[PHz]; Burninance = 480.0[Lud; Bathey = 2.287[N] 2/2019 BABD4 AM2; 8550 = 67 popentare = 2448[Seg, C]; Humidhy = 35.1[WB4; Pressure = 1017.0[PHz]; Burninance = 672.0[Lud; Bathey = 2.287[N]

Figure 13 Three screens of RIoT\_Monitor

#### **Main Display Screen**



Figure 14 Main Display screen of RIoT\_Monitor

- $\bigcirc$  : Display an app title.
- ② : When receiving a BLE data from the RIOT-001, the following items of the board unit appear on the screen. The displayed RIOT-001 information is, from top to bottom, Device Name, Bluetooth Device Address, Received Date, RSSI, Sensor Information (Temperature, Humidity, Pressure, and Illuminance), Battery Voltage. Touch each item to move into an individual display screen.
- ③ : The sensor information and the battery voltage appear in graph form. The display time range is 60 sec period by default.

#### **Individual Display Screen**



Figure 15 Individual Display screen of RIoT\_Monitor

- $\bigcirc$  : Touch the arrow to go back to the main display screen.
- ② : Indicates the device name and the Bluetooth device address of the RIOT-001.
- ③ : Indicates the latest data of the sensor information (Temperature, Humidity, Pressure, and Illuminance) and the battery voltage that are received from the RIOT-001. To view the log display screen, touch each item.
- ④ : Indicates the latest data of them in graph form. The default range of the display time is 60 sec. In addition, the display range (Min./Max.) of each item is set as shown in Table 2.

Table z Display Range (Will./Wax.)		
Item [Unit]	Min.	Max.
Temperature [degC]	-20	80
Humidity [%RH]	0	100
Pressure [hPa]	800	1100
Illumination [lux]	0	1000
Battery [V]	0	10

### Table 2 Display Range (Min./Max.)

# Log Display Screen

	\$ 💼 15:01
R0145 [74:90:50:80:55:23]	
	_
[2019/11/25-15.01:24]: KSSI = -61 Temperature = 25.8 <sup>1</sup> /C1 Humidity = 42.6 <sup>1</sup> /CPH] Pressure = 1016.6 <sup>1</sup> /CPA] Illuminance = 332.0 <sup>1</sup> /Luv1 Battery = 2.346 <sup>1</sup> /J	
[0010/11/02 15:01/00] - 50	
[2019/11/25 15:01:09]: KSSI = -52 Temperature = 25 0PCI Humidity = 42 6PCHI Descrite = 1016 7PDaI Illuminance = 226 0PU Pattern = 2.251M	
remperature = 25.6 (c), Humany = 42.6 (km), Pressure = 1010.7 (hPa), indminance = 350.0 (Lux), Battery = 2.551 (v)	
[2019/11/25 15:00:48] : KSSI = -61 Temperature = 26 0801 : Humidiku = 40 08/044 Decements = 1016 78-051 : Humidanes = 200 08 will Bettem = 2.26704	
remperature = 25.9[C], Humidity = 42.3[%RH], Pressure = 1010.7[nPa], inuminance = 332.0[Lux], Battery = 2.357[v]	
[2019/11/25 15:00:43] : RSSI = -52	
remperature = 25.9[U], Humidity = 42.2[%H], Pressure = 1016.7[nPa], illuminance = 332.0[Lux], Battery = 2.340[V]	
[2019/11/25 15:00:38] : RSSI = -51	
Temperature = 25.9[C], Humidity = 42.1[%RH], Pressure = 1016.6[nPa], Illuminance = 332.0[Lux], Battery = 2.351[V]	_
[2019/11/25 15:00:33] : RSSI = -52	
Temperature = 26.0[/C], Humidity = 42.0[%RH], Pressure = 1016.6[hPa], Illuminance = 332.0[Lux], Battery = 2.357[V]	
[2019/11/25 15:00:28] : RSSI = -53	
Temperature = 26.0[°C], Humidity = 41.9[%RH], Pressure = 1016.6[hPa], Illuminance = 332.0[Lux], Battery = 2.357[V]	
[2019/11/25 15:00:13] : RSSI = -56	
Temperature = 26.0[°C], Humidity = 41.6[%RH], Pressure = 1016.6[hPa], Illuminance = 324.0[Lux], Battery = 2.351[V]	
[2019/11/25 15:00:03] : RSSI = -54	
Temperature = 26.1[°C], Humidity = 41.4[%RH], Pressure = 1016.5[hPa], Illuminance = 324.0[Lux], Battery = 2.346[V]	_
[2019/11/25 14:59:58] : RSSI = -53	
Temperature = 26.1[°C], Humidity = 41.5[%RH], Pressure = 1016.6[hPa], Illuminance = 324.0[Lux], Battery = 2.357[V]	
[2019/11/25 14:59:48] : RSSI = -38	
Temperature = 26.2[°C], Humidity = 41.5[%RH], Pressure = 1016.7[hPa], Illuminance = 324.0[Lux], Battery = 2.357[V]	
[2019/11/25 14:59:43] : RSSI = -43	
Temperature = 26.3[*C], Humidity = 41.3[%RH], Pressure = 1016.5[hPa], Illuminance = 324.0[Lux], Battery = 2.310[V]	
[2019/11/25 14:59:28] : RSSI = -38	
Temperature = 26.4[°C], Humidity = 41.4[%RH], Pressure = 1016.6[hPa], Illuminance = 332.0[Lux], Battery = 2.351[V]	
[2019/11/25 14:59:18] : RSSI = -39	
Temperature = 26.5[°C], Humidity = 41.2[%RH], Pressure = 1016.6[hPa], Illuminance = 332.0[Lux], Battery = 2.346[V]	
[2019/11/25 14:58:58] : RSSI = -38	
Temperature = 26.7[°C], Humidity = 41.4[%RH], Pressure = 1016.7[hPa], Illuminance = 332.0[Lux], Battery = 2.304[V]	
[2019/11/25 14:58:53] : RSSI = -44	
Temperature = 26.7[°C], Humidity = 41.4[%RH], Pressure = 1016.6[hPa], Illuminance = 328.0[Lux], Battery = 2.346[V]	
[2019/11/25 14:58:48] : RSSI = -38	
Temperature = 26.7[°C], Humidity = 41.3[%RH], Pressure = 1016.6[hPa], Illuminance = 324.0[Lux], Battery = 2.310[V]	
[2019/11/25 14:58:43] : RSSI = -38	
Temperature = 26.8[°C], Humidity = 41.5[%RH], Pressure = 1016.6[hPa], Illuminance = 324.0[Lux], Battery = 2.346[V]	
[2019/11/25 14:58:38] : RSSI = -39	
Temperature = 27.0[°C], Humidity = 43.2[%RH], Pressure = 1016.5[hPa], Illuminance = 324.0[Lux], Battery = 2.304[V]	
[2019/11/25 14:58:33] : RSSI = -38	
Temperature = 27.0[°C], Humidity = 43.2[%RH], Pressure = 1016.5[hPa], Illuminance = 332.0[Lux], Battery = 2.304[V]	
[2019/11/25 14:58:23] : RSSI = -39	
Temperature = 27.1[°C], Humidity = 51.5[%RH], Pressure = 1016.6[hPa], Illuminance = 224.0[Lux], Battery = 2.304[V]	

Figure 16 Log Display Screen

- $\bigcirc$  : Touch the arrow to go back to the individual screen.
- 2 : Indicates the device name and the Bluetooth device address of the RIOT-001.
- ③ : Indicates the BLE data of the sensor information (Temperature, Humidity, Pressure, and Illuminance) and the battery voltage that are sent from the RIOT-001. The received BLE data is stored as a csv file in the "RIoT\_Monitor" folder of the internal memory in every date.

				\$ 3□1	8:53 AM
	Categories		Lo	cal	
Local >	Internal storage > RIoT_Mon	itor >			
×	20191203.csv Dec 3, 2019, 8:53 AM 4.40 KB				
X	20191202.csv Dec 2, 2019, 2:35 PM 130 KB				
X	20191129.csv Nov 29, 2019, 11:42 AM 45.95 KB				
X	20191128.csv Nov 28, 2019, 1:41 PM 170 KB				
×	20191127.csv Nov 27, 2019, 1:57 PM 88.63 KB				
X	20191125.csv Nov 25, 2019, 4:56 PM 33.81 KB				
×	20191122.csv Nov 22, 2019, 3:13 PM 16.70 KB				
X	20191120.csv Nov 20, 2019, 4:45 PM 19.81 KB				
X	20191118.csv Nov 18, 2019, 2:55 PM 17.55 KB				
X	20191031.csv Oct 31, 2019, 3:33 PM 526 KB				
X	20191030.csv Oct 30, 2019, 11:59 PM 1.11 MB				
×	20191029.csv Oct 29, 2019, 11:59 PM 1.11 MB				
X	20191028.csv Oct 28, 2019, 11:59 PM 1.16 MB				
X	20191027.csv Oct 27, 2019, 11:59 PM 1.24 MB				
X	24191026.CSV New folder	Refresh	Sort by	More	
	$\triangleleft$	$\bigcirc$			

Figure 17 Storage location of Log files

# **Editing of App Setup Contents**

Change settings of the RIoT\_Monitor app as desired.

#### Limiting the RIOT-001

Take an example of changing the settings of the RIOT-001 to receive only the BLE communication of "R0144".

- 1. Open the "RIoT.xml" file provided by REDC on your PC.
- 2. Edit "Target Name" as follows.

```
(Before)

<RIoT>

<!--

<Target Name ="RXXXX" />

-->

(After)

<RIoT>

<Target Name="R0144" />
```

- 3. Store the edited file in a USB memory.
- 4. Connect between the tablet and the USB memory with a USB cable.
- 5. Copy the "RIoT.xml" file in the USB memory to the "RIoT\_Monitor" folder, as shown in Figure 17.
- 6. Exit the app once, and restart it.

If two or more RIOT-001 are set, add new "Target Name" as the above into the .xml file.

#### **Changing the Display Time Range**

Take an example of changing the settings of the display time range to 10 min (600 sec).

- 1. Open the "RIoT\_Monitor.xml" file provided by REDC on your PC.
- 2. Edit "DisplayedPeriod" as follows.

(Before) <Global DisplayedPeriod="60" UpdateInterval="10" UpdateIntervalType="...

(After) <Global DisplayedPeriod="600" UpdateInterval="10" UpdateIntervalType="...

- 3. Store the edited file in a USB memory.
- 4. Connect between the tablet and the USB memory with a USB cable.
- 5. Copy the "RIoT\_Monitor.xml" file in the USB memory to the "RIoT\_Monitor" folder, as shown in Figure 17.
- 6. Exit the app once, and restart it.

#### **Changing Minimum / Maximum Value of Graph**

Take an example of changing the minimum and the maximum values of graphs for the sensor information (Temperature, Humidity, Pressure, and Illuminance) and the battery voltage.

- 1. Open the "RIoT\_Monitor.xml" file provided by REDC on your PC.
- 2. Edit the minimum and the maximum values of each item to suit your specifications as follows.

<DeviceType Name ="RIoT-001"> <Graph Unit="V" Minimum="0" Maximum="10" /> <Graph Unit="deg.C" Minimum="-20" Maximum="80" /> <Graph Unit="RH" Minimum="0" Maximum="100" /> <Graph Unit="hPa" Minimum="800" Maximum="1100" /> <Graph Unit="Lux" Minimum="0" Maximum="1000" /> </DeviceType>

- 3. Store the edited file in a USB memory.
- 4. Connect between the tablet and the USB memory with a USB cable.
- 5. Copy the "RIoT\_Monitor.xml" file in the USB memory to the "RIoT\_Monitor" folder as shown Figure 17.
- 6. Exit the app once, and restart it.

# **Additional Information**

- BLE data is sent from RIOT-001 every 5 seconds, but the RIoT-Monitor may not receive this data depending on the radio wave conditions and internal processing of the app.
   The reception result can be confirmed by the Log display screen (Figure 16).
- As the RIoT\_Monitor app automatically handles to turn the Bluetooth ON, the app must be terminated to turn it OFF. The app also controls not to turn the screen OFF when the app screen is ON.
- It is recommended to select "small" for the font and the display sizes in order to display much more information on a screen. If changing these sizes, go to **Settings** > **Display** and select **Small** as shown in Figure 18.

			<b>≵ I</b> □I <b>■</b> 3:32 PM
Setti	ings	Display	
Se	arch for setting	PERSONALIZED	
	Airplane mode	Wallpaper	>
<b></b>	Wi-Fi	View mode	Small >
*	Bluetooth	Font size	Small >
1	Mobile data	Screen saver	Off >
		SCREEN	
	More	Eye comfort	
	Home screen style	Filter out blue light to help relieve visual fatigue	UT >
Ø	Display	Brightness	>
	Sound	Color temperature	>
	Notification & status bar	Sleep Screen turns off when idle	After 10 minutes of inactivity
•	Navigation key	Auto-rotate screen	
	Fingerprint ID		
Ô	Screen lock & passwords		
Ø	Security & privacy		
3	Smart assistance		

Figure 18 Display Settings

# **RICOH** RICOH ELECTRONIC DEVICES CO., LTD.

Official website https://www.e-devices.ricoh.co.jp/en/ Contact us https://www.e-devices.ricoh.co.jp/en/support/