

# Ethernet Sensor Data Transmitter

## **RN171WC** User Manual



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# About this Manual

This document contains instructions for usage and installation of the RADIONODE® RN171WC. Product specifications and certain features herein may be subject to change without prior notice. Figures used in this manual are for explanatory purposes only, and may differ from your system depending on installation conditions. Software screenshots may change after software updates.

## Intellectual Property Rights

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## Notational Conventions



Failure to follow instructions marked with "Warning" may result in slight injury to the user.



Failure to follow instructions marked with "Caution" may result in equipment damage or malfunction.

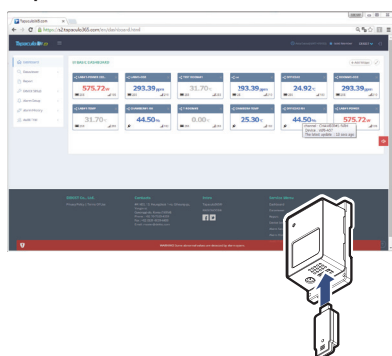


Additional helpful information is marked with "Note".

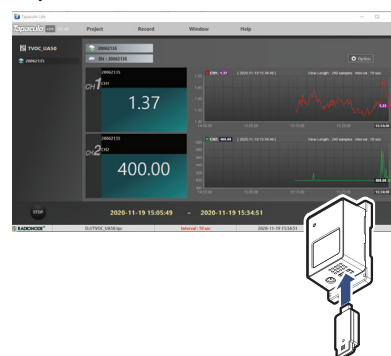
# Introduction

The RADIONODE RN171WC is a data transmitter for UA Series sensors that uses a network connection to send measurements to the Tapaculo® 365 server or Tapaculo Lite program.

Tapaculo® 365



Tapaculo® Lite

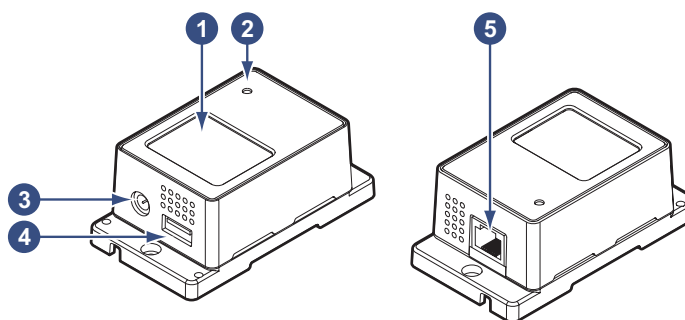


## Key Features

Key features of RN171WC include:

- Compatibility with a wide variety of UA sensors.
- Transmission of measurements over the Internet to Tapaculo 365 or customer servers. See [Tapaculo 365](#) on page 17.
- Transmission of measurements over the local network to the computer where Tapaculo Lite is installed. See [Tapaculo Lite](#) on page 24.
- Telnet connection to your device.
- Read measurements with Modbus communications using PLCs or other devices.
- PoE support.

# Exterior



- 1 Display
- 2 Indicator
- 3 Power Jack
- 4 USB Port
- 5 Ethernet Port

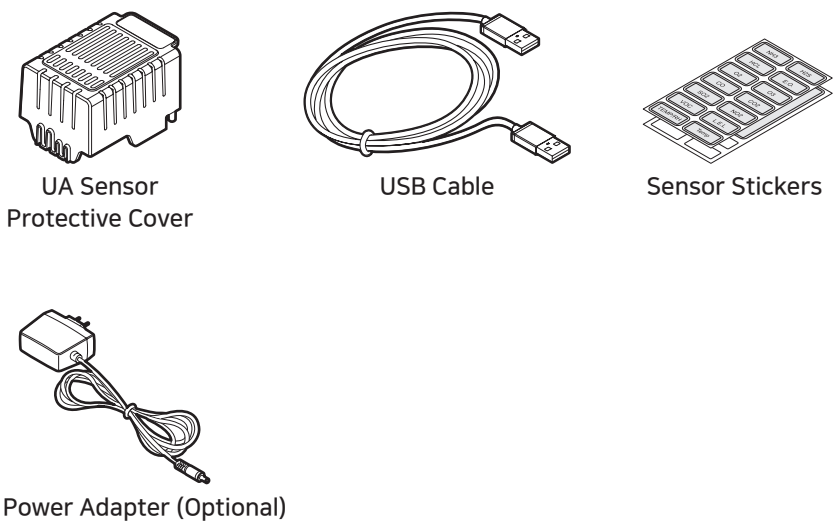
## Compatible UA Sensors

The following UA sensors are compatible with the RN171WC.

UA10	Temperature, RH
UA11-K	Temperature (Type K Thermocouple)
UA11-T	Temperature (Type T Thermocouple)
UA13	Temperature (PT100)
UA20A	4 ~ 20 mA
UA20B	0 ~ 20 mA
UA20C	0 ~ 1 V
UA50	Total Volatile Organic Compound (tVOC)
UA52-O2	Oxygen (O <sub>2</sub> ), atmospheric pressure
UA52-CO2	Carbon dioxide (CO <sub>2</sub> )
UA53-CO	Carbon monoxide (CO)
UA53-NO2	Nitrogen dioxide (NO <sub>2</sub> )
UA53-SO2	Sulfur Dioxide (SO <sub>2</sub> )
UA54-NH3	Ammonia (NH <sub>3</sub> )
UA54-H2S	Hydrogen sulfide (H <sub>2</sub> S)
UA54-HCL	Hydrogen chloride (HCl)
UA54-EO	Ethylene oxide (C <sub>2</sub> H <sub>4</sub> O)
UA59	Carbon dioxide (CO <sub>2</sub> )

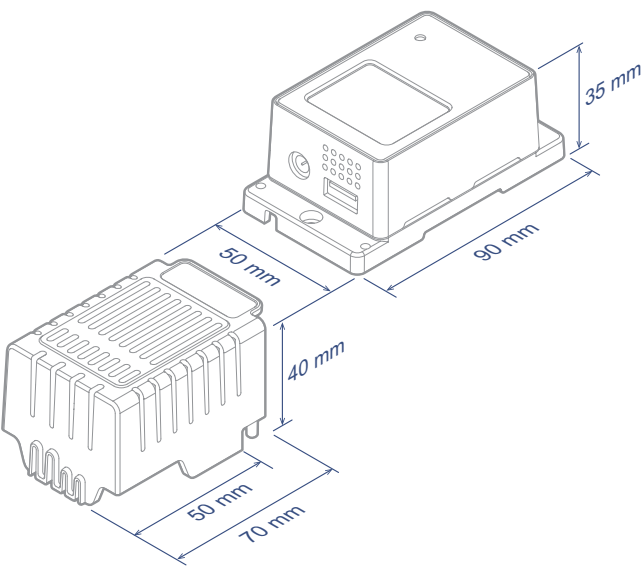
# Accessories

The RN171WC comes with the following accessories:



We recommend using a PoE (Power over Ethernet) supported router. When connected to a PoE router, an adapter is not required, as power is supplied through a network cable.

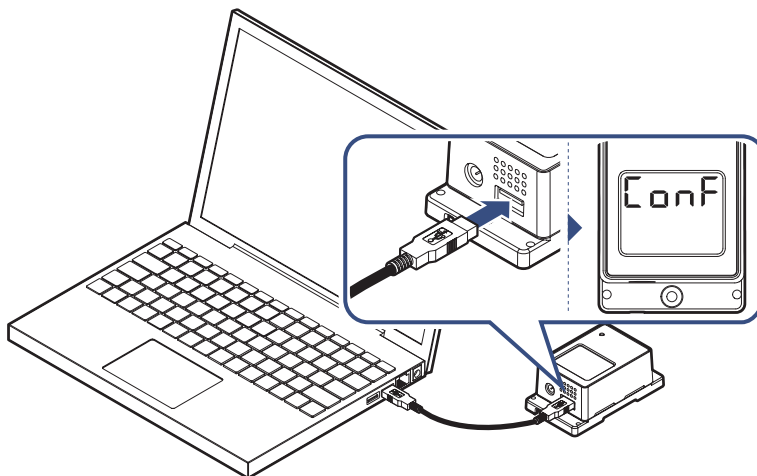
# Specifications



Product name	RN171 plus
Model name	RN171WC
Ethernet	100 Mbps
Modbus Port	502
Telnet Port	TCP: 23, UDP: 50000
USB	2.0
Power	DC 6 V or PoE 48 V (IEEE 802.3af/802.3at)
Power consumption	1.9 W
Size	90 × 50 × 35 mm (with sensor protective cover, total length is 140 mm)

# Configuration

Before installing, connect the RN171WC to your computer and change the settings using the Radionode Terminal program. Install Radionode terminal by downloading from the Radionode website ([www.radionode365.com](http://www.radionode365.com)).



Without a power connection, connect RN171WC to your computer using a USB cable. `Conf` will appear on the display.

Run the Radionode terminal. If the screen background is blue-green, the device has been recognized. Enter "**radionode114**" to call five different device information menus.

```
RadioNode's Terminal V3.00
Main View Configure Help

radionode114
ERR! INVALID INPUT

-----
RADIONODE RN171 SERIES SYSTEM INFORMATION
-----
PRODUCT MODEL      : RN171
HTTP INTERVAL      : 300 Sec.
DATA DESTINATION   : TAPACULO365.COM
ETHERNET MAC       : 000000000000
VIRTUAL MAC        : 049162E32CF3
CURRENT IP ADDR    : 0.0.0.0
MODBUS TCP PORT    : 502
BUILD VERSION      : Sep  4 2020
NVM PARAM SIZE     : 584
HTTP BACKUP DB     : 36040, Stored Samples(0)
-----
[Radionode RN170 Config Information.]
1.Network Setup.
2.System Setup.
3.Buzzer/Siren Setup.
4.HTTP Destination Setup.
5.MODBUS TCP Setup.
9.Quit(Back to normal Operation)
```

- 1.Network Setup.
- 2.System Setup.
- 3.Buzzer/Siren Setup.
- 4.HTTP Destination Setup.
- 5.MODBUS TCP Setup.

Enter the corresponding number to select the menu.



# Network

Select **1.Network Setup** menu to configure the network that your device will use. Parameters will appear with their current settings. Enter "q" to return to the parent menu.

**A.Set DHCP [OFF]**

Select "Off" and configure as shown below to use a static IP address:

**B.Set IP Address [xxx.xxx.xxx.xxx]**

Enter the IP address assigned to RN171WC.

**C.Set GATEWAY Address [192.168.xxx.xxx]**

Enter the gateway IP address.

**D.Set DNS1 Address [192.168.xxx.xxx]**

Enter the IP address of the first DNS server.

**E.Set DNS2 Address [xxx.xxx.xxx.xxx]**

Enter the IP address of the second DNS server.

**F.Set SUBNET MASK [255.255.255.000]**

Enter the subnet mask.

**G.Set VMAC [xxxx0000xxxx]**

Enter the address that will be used as the virtual MAC address.

**H.Set UDP Broadcasting Port [50000]**

Specify the port number for UDP broadcast.

**I.Set TELNET Port [23]**

Specify the port number for Telnet access.

# System

Select **2.System Setup** to change system settings.

**A.Set Device Name [DEVICE-xxxx0000xxxx]**

Edit the device name. Default name includes the Mac address.

**B.Set Destination of HTTP [TAPACULO365]**

Select **TAPACULO365** to send measurement data to Tapaculo 365 server.

When a customer or third-party server is available, select **CUSTOMER** to use a GET-method HTTP request or **CUSTOMER\_V2** to use a POST-method. Then, go to the **4.HTTP Destination Setup** menu and set the server options accordingly. See [Customer Server](#) on page 12.

**C.Set HTTP Update Interval [300 Sec.]**

Set data transfer interval in minutes. The input value will change to seconds. When using Tapaculo 365, 1 – 60 minute range is permitted; when using a customer server, 5 – 600 second range is permitted.

**G.Set FND Display Mode [CH1&CH2 ON]**

Select whether to show measurements on the display.

**H.Set Debug Print [OFF]**

This feature is used by service engineers.

# Alarm

Select the **3.Buzzer/Siren Setup** menu to set alarm conditions.

**A.Set Alarm Trigger Mode [CH1 OR CH2]**

Select one or two channels to link the alarm to (there are UA sensors with two measurement channels).

**B.Set Alarm CH1 Min [0.00]**

Enter the lower limit of the normal range allowed for Channel 1.

**C.Set Alarm CH1 Max [0.00]**

Enter the upper limit of the normal range allowed for Channel 1.

**D.Set Alarm CH2 Min [0.00]**

Enter the lower limit of the normal range allowed for Channel 2.

**E.Set Alarm CH2 Max [0.00]**

Enter the upper limit of the normal range allowed for Channel 2.

**F.Set BUZZER Alert Enable [SOUND ON]**

Determine to use the built-in buzzer.

**G.Set Remote SIREN DEVICE Enable [OFF]**

Determine to use a remote alarm beacon if such a device is installed.



Qlight's ST56EL-ETNS-2-WS alarm beacon is supported.

**H.Set Remote SIREN DEVICE IP [192.168.xxx.xxx]**

Enter the alarm beacon IP address.

**I.Set Remote SIREN DEVICE Port [2000]**

Enter the port used by the alarm beacon.

# Customer Server

Select **4.HTTP Destination Setup** to set up a customer or third-party server.

**A.Set HTTP Host URL [xxx.xxx.xxx.xxx]**

Enter the IP address or domain of the server.

**B.Set HTTP Host Port [80]**

Enter the port used by the server.

**C.Set HTTP NMAC [0000xxxx0000xxxx]**

Enter "0000" followed by the server's MAC address.



MAC address is 12 digits by default, but for compatibility with Zigbee devices that use a 16-digit MAC address, add "0000" in front of the original address. Normal system does not require additional setup.

**D.Set HTTP DATAIN File(Get) [/test.jsp]**

Enter the URL of the server program for data-in request processing. Entering "0" disables this request function.

**E.Set HTTP TIMESTAMP File(Get) [/0]**

If you are to use a GET-method HTTP request, enter the URL of the server program that processes timestamp requests. If you are using a POST-method HTTP request, enter the URL of the server program that processes check-in requests. Entering "0" disables this request function.

**F.Set HTTP BACKUP File(Get) [/0]**

If you are to use a GET-method HTTP request, enter the URL of the server program that processes backup-in requests. If you are using a POST-method HTTP request, enter "0" to disable this feature.

For more information, see [HTTP Radionode Protocol V1](#) on page 30 and see [HTTP Radionode Protocol V2](#) on page 34.

Modbus TCP communication is supported for link with PLC. Select **5.MODBUS TCP Setup** to change Modbus settings.

**A.Set MODBUS TCP PORT [502]**

Enter the port number for Modbus communication (generally port number = 502).

**B.SetByteReverse [0]**

Enable/disable reverse byte values (check if PLC uses reverse bytes).

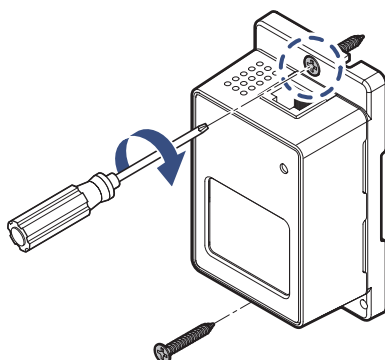
**C.Set Timeout to Keep a live [60] Sec**

Enter communication timeout value.

# Installation

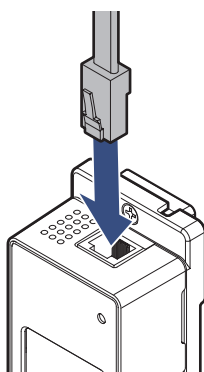
## Installation

Secure the main body to the wall with 2 screws.



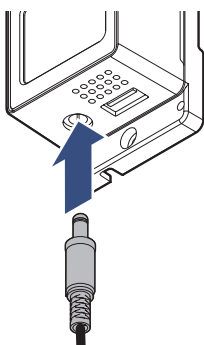
## Connecting Network Cable

Connect the network cable to the Ethernet port.



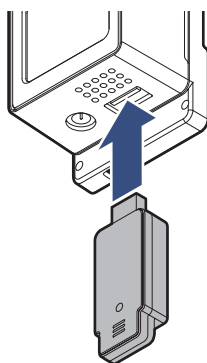
When connected to a PoE-Fi router, an adapter connection is not required, as power is supplied through a network cable.

When using a standard router, connect the adapter to the power jack.

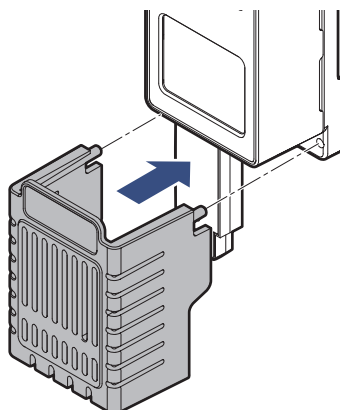


# Connecting UA Sensor

1. Insert the UA sensor into the USB port.



2. There are two protrusions at the top of the sensor protective cover and two holes at the bottom of the body. Place the sensor protective cover over the UA sensor so that the two protrusions fit into the two holes.



# Display

The display shows measurements and the status of the device.



19.20  
42.10

Channel 1 measurement appears at the top of the display and Channel 2 measurement appears at the bottom.

-000  
-042

When the device is turned on, the last six digits of the assigned IP address will appear. For example, if the IP address is 192.168.0.42, it will appear according to the left image.

---  
---

Indicates that no sensor is inserted in the device.

0000

If the 0000 appears to be vibrating it indicates that data transfer to the server has failed.

HOLD  
0005

This indicates the number of data sets waiting when data transfer fails (after 0000 appears).

0000

This indicates that re-transfer of a data set was successful.

CONN  
FA IL

This indicates that the device has failed to connect to the Internet.

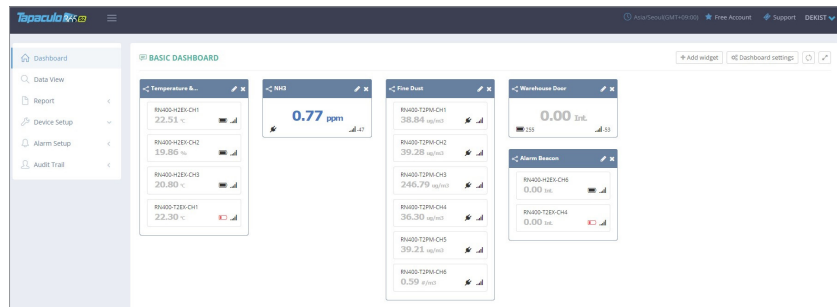
ConF

This indicates that the device is connected to the computer via a USB cable.



# Tapaculo 365

Tapaculo® 365 is a cloud-based sensor monitoring web application operated by DEKIST, a radionode manufacturer. We offer data storage for all sensor-measured data, and provide various features such as emergency alarms, reports, and real-time status based on stored data.



This chapter outlines how to add new devices and channels to Tapaculo 365. For more information on Tapaculo 365, see the information provided on the web page below:

<https://help.radionode365.com/article-categories/tp365-manual>

Key features of Tapaculo 365 include:

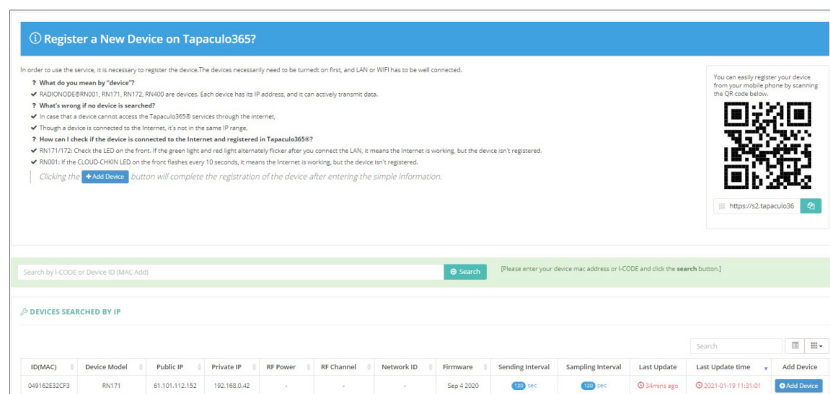
- Measurement data displayed in real-time;
- View measurement data records via charts;
- Create and email periodic reports;
- Alarms notifications sent via e-mail, text, or voice message in the event of an alarm.

Create a user account at the address below to access Tapaculo365.

<https://s2.tapaculo365.com/html/memberjoin.html>

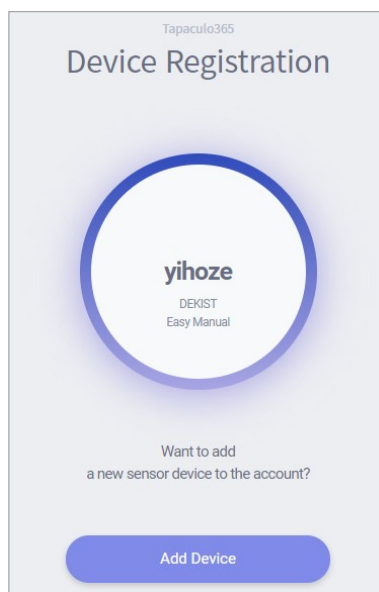
# Adding Devices from Your Smartphone

At the **New Device** page, you will find a unique QR code for your account. The QR code allows you to easily add devices and channels to your smartphone.



Scan the QR code with your smartphone. Alternatively, copy the link address from the QR code image and send it to your smartphone.

1. Your smartphone's default web browser will open with your user information. Tap **Add Device**.



When RN17xWC Series first connects to Tapaculo 365, the following identification code (i-code) will appear:



2. Enter the i-code on the device display. If you do not see an i-code on the display, tap **Search by MAC address** and enter your MAC address.

Tapaculo365

## Device Registration

Please enter the 4-digit number displayed on your product's display for registration.

[Search by MAC address](#)

1	2	3
4	5	6
7	8	9
	0	←

3. If the i-code or MAC address is accurate, the device information will appear as below. Tap **Next**.

Tapaculo365

## Device Registration

Model RN171

MAC 049162E32CF3

IP 61.101.112.152

Area Gangnam-gu, Seoul, South Korea

update 2021-01-21 08:32:06


Next

Home

4. Enter your device name, check the box of the channel that will be used, then enter the channel name and unit that will be used. Tap **Next** to finish.

Tapaculo365

## Device Registration



**RN171**

Please Enter **Device** name

Please Enter **Channel** name

<input checked="" type="checkbox"/>	Channel1 Name	Unit	/
<input checked="" type="checkbox"/>	Channel2 Name	Unit	/

**Next**

Home

# Adding Devices from Your Computer

## Adding Devices

The **New Device** page will appear if there is no added device on login. To add a device that was added later, click **Device Setup > New Device**.

ID/MAC	Device Model	Public IP	Private IP	RF Power	RF Channel	Network ID	Firmware	Sending Interval	Sampling Interval	Last Update	Last Update time	Add Device
E415F54F43FA	RN4007205	81.501.112.152	192.168.0.10	-	-	-	20200616	1000 sec	1000 sec	Online ago	2021-01-19 11:05:34	Add Device
049162E32CF3	RN171	81.501.112.152	192.168.0.42	-	-	-	Sep 4 2020	1000 sec	1000 sec	Online ago	2021-01-19 11:05:34	Add Device
E415F54F5466	RN400720M	81.501.112.152	192.168.0.45	-	-	-	20200730	1000 sec	1000 sec	Online ago	2021-01-19 11:05:34	Add Device
508CB1F41B3	RN400720X	81.501.112.152	192.168.0.40	-	-	-	20200729	1000 sec	1000 sec	Online ago	2021-01-19 11:05:34	Add Device
D43E394C39B7	RN400720X	81.501.112.152	192.168.0.39	-	-	-	20200729	1000 sec	1000 sec	Online ago	2021-01-19 11:05:34	Add Device

Devices found in the same IP band are listed here. If you do not see your device in the list, you can add it using its i-code. When RN17xWC Series first connects to Tapaculo 365, its i-code is displayed as follows:



Enter the i-code above the device list and click **Search**. Devices can also be searched via MAC address instead of their i-code. The device will be then be added to the list.

To add your device, click the **Add Device** button in the last column.

After registering new device, new data channel will come up on new data channel menu within interval time.

No Image

Device Name:

Device Comment:

Close Save

Enter your device name in the window that appears, upload a picture of the installed device, then click **Save**.

# Adding Channels

Once your device has been added, click **Device Setup > New Data Channel**. All added device channels will be listed.

ID(MAC)	Device Name	Device Model	Last Value	RF Signal	Battery	Sending Interval	Sampling Interval	Last Update	Last Update time	Add Channel
E415F64F43FA-0000E415F64F43FA-CH1	RN400-T2GS	RN400T2GS	0.68	Excellent	D.C. Power	1000 sec	1000 sec	5 mins ago	2021-01-19 11:55:34	Add Channel
E415F64F43FA-0000E415F64F43FA-CH2	RN400-T2GS	RN400T2GS	NULL	Excellent	D.C. Power	1000 sec	1000 sec	5 mins ago	2021-01-19 11:55:34	Add Channel
E415F64F43FA-0000E415F64F43FA-CH3	RN400-T2PM	RN400T2PM	1	Good	D.C. Power	1000 sec	1000 sec	5 mins ago	2021-01-19 11:55:34	Add Channel
E415F64F43FA-0000E415F64F43FA-CH4	RN400-T2PM	RN400T2PM	39.28	Good	D.C. Power	1000 sec	1000 sec	5 mins ago	2021-01-19 11:55:34	Add Channel
E415F64F43FA-0000E415F64F43FA-CH5	RN400-T2PM	RN400T2PM	246.79	Good	D.C. Power	1000 sec	1000 sec	5 mins ago	2021-01-19 11:55:34	Add Channel
E415F64F43FA-0000E415F64F43FA-CH6	RN400-T2PM	RN400T2PM	36.39	Good	D.C. Power	1000 sec	1000 sec	5 mins ago	2021-01-19 11:55:34	Add Channel
E415F64F43FA-0000E415F64F43FA-CH7	RN400-T2PM	RN400T2PM	39.21	Good	D.C. Power	1000 sec	1000 sec	5 mins ago	2021-01-19 11:55:34	Add Channel
E415F64F43FA-0000E415F64F43FA-CH8	RN400-T2PM	RN400T2PM	0.59	Good	D.C. Power	1000 sec	1000 sec	5 mins ago	2021-01-19 11:55:34	Add Channel

This list also includes channels not associated with external sensors or other devices. Adding a channel essentially means selecting a channel to monitor. To add a channel, click the **Add Channel** button in the last column.

Channel ID: E415F64F43FA-0000E415F64F43FA-CH2

Channel Model: RN400T2GS

Channel Name: RN400-T2GS-CH2

Unit: Input

Channel Comment:

Close Save

Enter the channel name in the window, select/enter a unit to use, then click **Save**.

To view the list of added channels, click **Device Setup > Channel List**.

Channel Name	Device Name	Device Model	Last Value	Unit	RF Signal	Battery	Sending Interval	Sampling Interval	Last Update	Modify/Delete
NH3	RN400-T2GS	RN400T2GS	0.77	ppm	Excellent	D.C. Power	1000 sec	1000 sec	5 mins ago	Modify
RN400-H2EX-CH1	RN400-H2EX	RN400H2EX	22.51	°C	Good	Excellent	1000 sec	1000 sec	5 mins ago	Modify
RN400-H2EX-CH2	RN400-H2EX	RN400H2EX	19.96	°C	Good	Excellent	1000 sec	1000 sec	5 mins ago	Modify
RN400-H2EX-CH3	RN400-H2EX	RN400H2EX	20.80	°C	Good	Excellent	1000 sec	1000 sec	5 mins ago	Modify
RN400-H2EX-CH5	RN400-H2EX	RN400H2EX	0.00	INT	Good	Excellent	1000 sec	1000 sec	5 mins ago	Modify
RN400-H2EX-CH6	RN400-H2EX	RN400H2EX	0.00	INT	Good	Excellent	1000 sec	1000 sec	5 mins ago	Modify
RN400-T2EX-CH1	RN400-T2EX	RN400T2EX	22.30	°C	Good	Bad	1000 sec	1000 sec	5 mins ago	Modify
RN400-T2EX-CH4	RN400-T2EX	RN400T2EX	0.00	INT	Good	Bad	1000 sec	1000 sec	5 mins ago	Modify
RN400-T2PM-CH1	RN400-T2PM	RN400T2PM	38.84	ugm3	Good	D.C. Power	1000 sec	1000 sec	5 mins ago	Modify
RN400-T2PM-CH2	RN400-T2PM	RN400T2PM	39.28	ugm3	Good	D.C. Power	1000 sec	1000 sec	5 mins ago	Modify

# Adding Widgets

A widget contains one or several channels. You can add a widget to the dashboard by clicking **Dashboard**, then **Add widget**.

Widget Name \*

Widget Type \* ☒ Number Widget ☐ Text Widget

Channel Selection \*

<input type="checkbox"/>	Channel Name	Device Name	Last Value	Unit	Sending Interval	Last Upc
<input type="checkbox"/>	RN400-T2GS-CH1	RN400-T2GS	0.68	ppm	1200 sec	14min
<input type="checkbox"/>	RN400-T2PM-CH1	RN400-T2PM	5.05	ug/m3	1800 sec	14min
<input type="checkbox"/>	RN400-T2PM-CH2	RN400-T2PM	5.44	ug/m3	1800 sec	14min
<input type="checkbox"/>	RN400-T2PM-CH3	RN400-T2PM	29.06	ug/m3	1800 sec	14min
<input type="checkbox"/>	RN400-T2PM-CH4	RN400-T2PM	4.39	ug/m3	1800 sec	14min

Showing 1 to 5 of 7 rows  rows per page

Close Save

Enter the widget name in the window, select channels, then click **Save**.

# Tapaculo Lite

This chapter outlines how to use Tapaculo Lite. For more information on Tapaculo Lite, see the information provided on the web page below:

<https://help.radionode365.com/article-categories/tapaculo-lite>

## Installing Software

To view sensor measurements on your computer, download and install the following software package from the Radionode website at [www.radionode365.com](http://www.radionode365.com).

- Tapaculo Lite program (Windows or Mac version)
- USB drivers for Windows for UA products

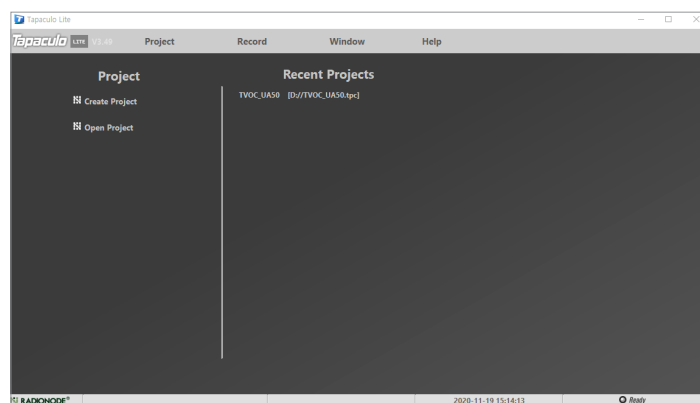
## Starting Tapaculo Lite

A new project must be created first before combining Tapaculo Lite and the sensor. A project may include multiple sensors. Refer to the following procedure when using Tapaculo Lite:



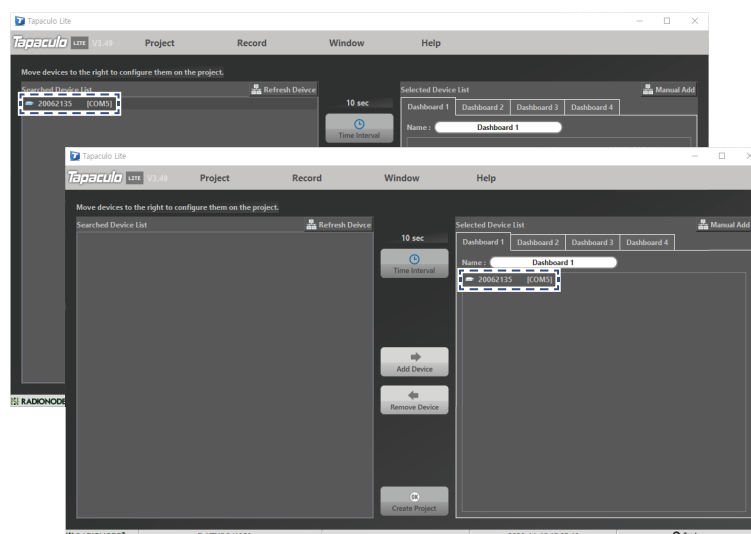
A project is a file that stores and manages sensor data.

1. Click **Create Project** and enter a file name. The new file will contain sensor information.

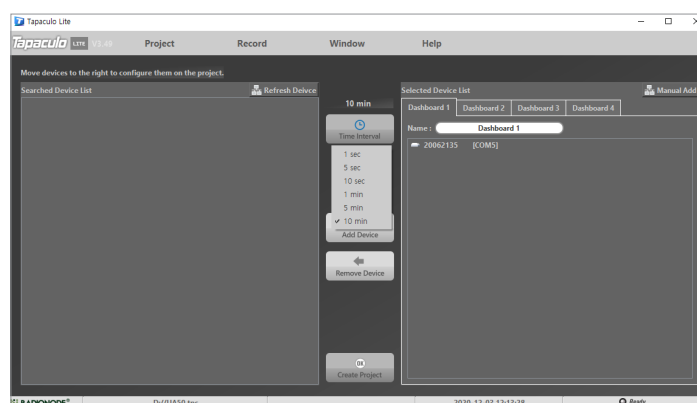




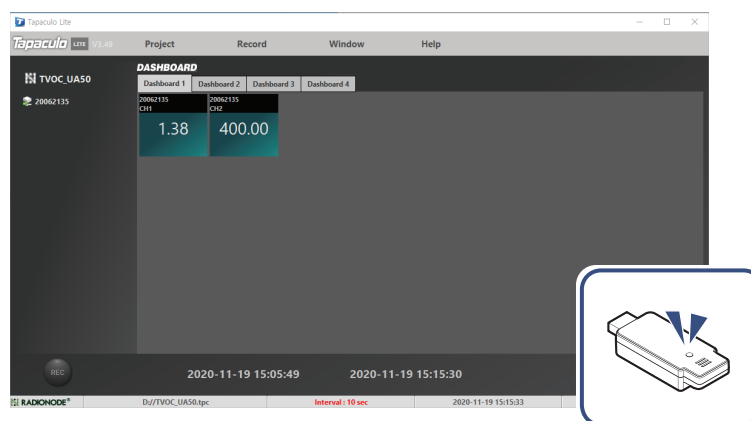
2. Searched sensors appear in the left panel. Select a dashboard and sensor, then click **Add Device**. The sensor will be added to the dashboard.



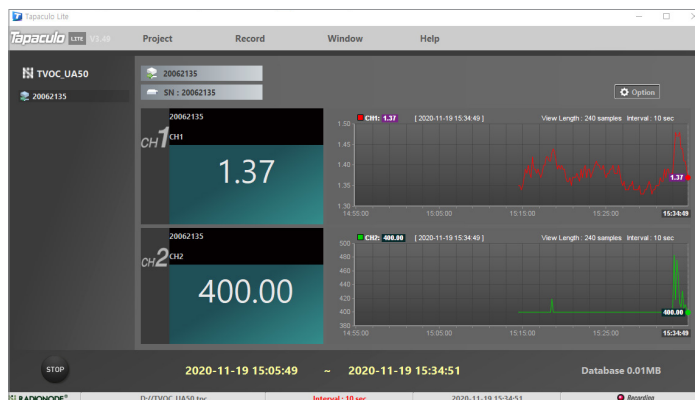
3. Click **Time Interval** and select the measurement interval.



4. Click **OK Create Project** at the bottom of the menu. The Dashboard menu will open and display measurements of sensors registered in the project, and sensor indicators will blink.



5. Click **REC** at the lower-left corner to start logging data. The **REC** button will change to **STOP**.



6. To exit the program, click **STOP**. You cannot exit the program until data logging is stopped.

# Customer Service Information

## Manufacturer Contact Information

DEKIST Co., Ltd. provides repair service and replacement parts for RADIONODE products. To request customer service, contact us via one of the following methods.

- Tel: +(82) 1566-4359
- Fax: (+82) 31-8039-4400
- E-mail: master@dekist.com

## Warranty

Repairs are provided free of charge for product failure under normal operating conditions within one year of the product installation date.

## Limit of Liability

Warranty repairs are not provided in the event of:

- Failure caused by unapproved installation methods;
- Failure caused by user negligence;
- Failure caused after alteration, disassembly, or repair of the product by a person unauthorized by DEKIST;
- Failure caused by corrosion, falling, submersion, or other improper storage methods;
- Failure caused by natural disaster or other unforeseen circumstances, such as storms, floods, earthquakes, lightning, or abnormal voltage;
- Service requested for actions that the user can take, such as replacing consumables;
- Alteration of the software through decompilation or the like

# Certifications

## FCC Class A Digital Device

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user’s authority to operate the equipment.

## KC

This equipment has passed conformity testing for use in work environments, and is likely to cause interference when used in a household environment.

# Telnet Commands

Telnet can be used to access your RN171WC. The default port number is 23.

```
C:\>telnet 192.168.xxx.xxx 23
ATDC
ATDC    3.89,537.00
ATSQUIT
```

- **ATDC:** Shows the Channel 1 and Channel 2 values.
- **ATSQUIT:** Severs the current connection.
- **ATSCON:** Enables terminal mode. Device settings can be changed as you would for a RadioNode terminal.
- **ATSRESET:** Reboots the device.
- **ATSMODEL:** Shows the device model number.
- **ATBSET:** Sounds the built-in buzzer once.
- **ATBAL:** Selects a channel to link alarms.

```
ATBAL OFF
ATBAL CH1
ATBAL CH2
ATBAL CH1 OR CH2
ATBAL CH1 AND CH2
```

- **ATBMIN1:** Sets the lower limit of the normal range allowed for Channel 1.
- **ATBMAX1:** Sets the upper limit of the normal range allowed for Channel 1.
- **ATBMIN2:** Sets the lower limit of the normal range allowed for Channel 2.
- **ATBMAX2:** Sets the upper limit of the normal range allowed for Channel 2.

# HTTP Radionode Protocol V1

Radionode users can build their own servers that receive measurement data from radionode devices including RN400 Series data loggers and RN17xWC Series data transmitters, instead of using Tapaculo 365. This chapter describes GET-method HTTP request format used by radionode devices for customer server developers.

Customer servers must process the following three requests:

- A radionode device requests transmission of measurement data from the server at a set time. This request is called data-in.
- When data transfer fails, a request is made to the server to transfer accumulated data at once. This request is called backup-in.
- Device makes a timestamp request to the server to obtain current time in the event that a backup-in transaction requires a server time reset.

## Data-in

Data-in requests are in the following format:

```
http://SERVER-ADDRESS/DATAIN
?gwid=0004a316d728
&model=RN171WC
&interval=300
&ipaddr=192.168.0.31
&utc=1459249259
__device=00000004a316d728
&nodeid=00000004a316d728
&lqi=255
&child=0
&nodetype=2
&batt=255
&sd1=20.28
&sd2=20.29
```

In `http://SERVER-ADDRESS/DATAIN`, **DATAIN** is the server program name that processes checkin requests, which can be either `datain.php`, `datain.asp` or `datain.js`.

- **gwid**: MAC address of the device
- **model**: Model number of the device
- **interval**: Data transfer interval
- **ipaddr**: IP address of the device
- **utc**: Transfer time (information provided by [www.ntppool.org](http://www.ntppool.org))
- **\_\_device**: The device's MAC address, preceded by 0000
- **nodeid**: The device's MAC address, preceded by 0000
- **lqi**: Indicates the strength of wireless signal, but for RN17xWC Series, this parameter is fixed as 255.
- **child**: Indicates the number of child nodes, but for RN17xWC Series, this parameter is fixed as zero.
- **nodetype**: Indicates the type of node, but for RN17xWC Series, this parameter is fixed as 2.
- **batt**: Indicates the battery status of the device, but for RN17xWC Series, this parameter is fixed as 255.
- **sd1**: Measurement of Channel 1
- **sd2**: Measurement of Channel 2

Measurements can include a negative sign and up to 2 decimal places.

The server should reply to a datain request with a process outcome in the following XML format:

```
<xml>
<root>
<ack>ok</ack>
</room>
</xml>
```

Abnormal replies include error messages.

```
<ack> MESSAGE </ack>
```

# Backup-in

Backup-in requests are in the following format:

```
http://SERVER-ADDRESS/BACKUPIN
?gwid=0004a316d728
&P000=1459249259|00000004a316d728|UA-DEVICE|-1
|-1|-12.10|23.02|
&P001=1459249319|00000004a316d728|UA-DEVICE|-1
|-1|-12.40|23.42|
&P002=1459249369|00000004a316d728|UA-DEVICE|-1
|-1|-12.50|23.82|
```

A serial number preceded by **P** becomes a parameter name, and several values (including timestamps) are separated by vertical lines (|) and grouped together as parameter values.

```
Pxxx=timestamp|nodeid|device|battery|lqi|ch1|ch2|
```

One parameter value consists of the following elements:

- **Pxxx**: Data number
- **timestamp**: Measurement time
- **nodeid**: The device's MAC address, preceded by 0000
- **device**: For RN17xWC Series, this parameter is fixed as **UA-DEVICE**.
- **battery**: For RN17xWC Series, this parameter is fixed at -1.
- **lqi**: For RN17xWC Series, this parameter is fixed at -1.
- **ch1**: Measurement of Channel 1
- **ch2**: Measurement of Channel 2

The server's reply format to the backup-in request is the same as that to data-in.

```
<xml>
<root>
<ack>ok</ack>
</root>
</xml>
```



# Timestamp

Timestamp requests are in the following format:

```
http://SERVER-ADDRESS/TIMESTAMP  
?gwid=0004a316d728
```

Normal replies to this request include a timestamp.

```
<root>  
  <timestamp> 1459249259 </timestamp>  
</root>
```

# HTTP Radionode Protocol V2

Radionode users can build their own servers that receive measurement data from radionode devices, such as the RN400 Series data loggers or RN17xWC Series data transmitters, instead of the Tapaculo 365. This chapter describes the POST-method HTTP request format used by radionode devices for customer server developers.

Customer servers must process the following two requests:

- The radionode device requests transmission of device information from the server at the start of operation and every six hours thereafter. This request is called check-in.
- The device requests transmission of measurement data from the server at the set time. This request is called data-in.

## Check-in

Check-in requests are in the following format:

```
POST / HTTP/1.1
Host: 192.168.10.1/checkin
Content-Type: application/x-www-form-urlencoded
Content-Length: 589

mac=0000xxxx0000&
ver=20201031&
model=RN171WC&
ip=192.168.100.11&
splrate=60&
interval=300&
tags=xxx|xxx|xxx
```

In `192.168.10.1/checkin`, `checkin` is the server program name that processes check-in requests, which can be either `checkin.php`, `checkin.asp` or `checkin.js`.

- **mac**: MAC address of the device
- **ver**: Firmware version
- **model**: Model No.
- **ip**: IP address
- **splrate**: Measurement interval
- **interval**: Data transfer interval
- **tags**: CH info

This parameter is separated by vertical lines (|) and indicates the nature of each channel.

```
tags=TEMP|RH|NTC_TEMP|NULL|NULL|NULL
```

In this example, there are a total of six channels with Channel 1 indicating temperature, Channel 2 indicating RH, and Channel 3 indicating the temperature measured by NTC external temperature sensor. The remaining channels are not associated sensors or devices.

The server must reply to a check-in request in the following XML format:

```
<xml>
<root>
<ack>ok</ack>
<timestamp>1501912142</timestamp>
</root>
</xml>
```

- **ack**: Processing outcome (**ok** or **error**)
- **timestamp**: Current time of the server in UNIX timestamp format

Data-in requests are in the following format:

```
POST / HTTP/1.1
Host: 192.168.10.1/datain
Content-Type: application/x-www-form-urlencoded
Content-Length: 589

mac=0000xxxx0000&
sig=40&
bat=255&
SMODEL=RN400H2EX&
C000=1505912142|23.22|12.44|122.11|123&
P000=1505911542|23.19|12.40|121.96|123&
P001=1505910942|23.18|12.52|122.04|123&
```

- **mac**: MAC address of the device
- **sig**: Strength of wireless signal
- **bat**: Battery status.

The value ranges from 0 to 255. The battery must be replaced when the value is "5" or less. "-1" is displayed when DC power is connected.

- **SMODEL**: Model number of the device
- **Cxxx**: Current measurement of each channel.

This parameter is separated by vertical lines (|) and indicates the values of the timestamp and each channel.

```
C000=    |Ch. 1|Ch. 2|Ch. 3|Ch. 4
```

- **Pxxx**: Past channel measurements

The server must reply to a data-in request with a process outcome in the following format:

```
<xml>
<root>
<ack>ok</ack>
</root>
</xml>
```

# Modbus Registration

Modbus TCP communication allows reading of the measurement stored in the RN171WC holding resistor. Measurements of each channel are stored as an integer and as a floating point real number simultaneously. House number consists of two bytes and a floating point real number is represented by four bytes, thus the real value of a channel is divided into two.

	Channel 1		Channel 2		Channel 1	Channel 2
	Floating decimal real number		Floating decimal real number		Integer	Integer
Address	0	1	2	3	4	5
Bytes	0x3333	0x41DF	0x999A	0x41E9	0x001B	0x001D
Reverse bytes	0x3333	0xDF41	0x9A99	0xE941	0x1B00	0x1D00
Values	27.9		29.2		27	29

The function code for reading measurements is 3, and other packet components, including transaction ID, are ignored.



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