Introduction
The USB interface can be used for convenient, onsite configuration, debug and data access, while offering an alternative option to power the device with a standard 5V supply.

The USB connector is a standard micro-USB female plug, so common USB data cables can be used.

The feature was introduced on the uRADMonitor INDUSTRIAL HW105 (fifth iteration) and the uRADMonitor A3 HW106 (sixth iteration) to answer the need for a convenient device configuration option.
## Summary

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1. uRADMonitor devices with USB support

USB was first introduced on the uRADMonitor A3 and the uRADMonitor INDUSTRIAL to offer a convenient configuration option. While an IOT device offers built in communication options, in some cases it was difficult to connect and configure a device in real time, like it happened in the case of the devices equipped with LoRaWAN connectivity. Therefore the addition of the USB port brought a convenient solution to this requirement.

![Figure 1. Model A3 (HW107) board with USB connector](image1)

![Figure 2. Model INDUSTRIAL (HW105) board exposing the USB connector on the bottom](image2)
2. Serial connection setup

Use a standard USB data cable to connect your computer to the uRADMonitor unit using its USB port.

On your computer open the serial terminal software and set it to 9600bps. Select the appropriate serial port and the following settings - XON checked, RTS Off checked.

Open the connection. The device will display a greeting and will enter powersave mode, where the sensors, the communication module and the data transmission are all stopped.
Now the device is ready to take commands over the serial link.

3. Commands

The current firmware implements commands for configuration, debugging and data access. Each command must be issued between double quotation marks and any following parameters are separated by a comma. No spacing should be added between the elements in double quotation marks and the comma. This format was derived from machine to machine communication (server to device) and it is therefore rigid and inflexible in regards to any typos. However simple commands with no parameters can be send without the double quotation marks. First command you should start to is “help” (or simply just help):

• help , returns a brief list of the supported commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Format</th>
<th>Call example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>setid</td>
<td>&quot;setid&quot;,&quot;id&quot;</td>
<td>&quot;setid&quot;,&quot;14000045&quot;</td>
<td>changes the device ID to the new specified ID. This command is restricted and cannot be used in normal operation.</td>
</tr>
<tr>
<td>sendint</td>
<td>&quot;sendint&quot;,&quot;interval&quot;</td>
<td>&quot;sendint&quot;,&quot;300&quot;</td>
<td>sets the data reporting frequency, in seconds. By default, Ethernet, Wifi and GSM units report the measurements every minute, while LoRaWAN units send every 5 minutes.</td>
</tr>
<tr>
<td>encrypt</td>
<td>&quot;encrypt&quot;,&quot;1</td>
<td>0&quot;</td>
<td>&quot;encrypt&quot;,&quot;1&quot;</td>
</tr>
<tr>
<td>morse</td>
<td>&quot;morse&quot;,&quot;message&quot;</td>
<td>&quot;morse&quot;,&quot;alert&quot;</td>
<td>uses the internal speaker to transmit the message as audible morse encoded.</td>
</tr>
<tr>
<td>reset</td>
<td>&quot;reset.&quot;</td>
<td>&quot;reset.&quot;</td>
<td>will reboot the uRADMonitor device</td>
</tr>
<tr>
<td>powersave</td>
<td>&quot;powersave&quot;,&quot;1</td>
<td>0&quot;</td>
<td>&quot;powersave&quot;,&quot;1&quot;</td>
</tr>
<tr>
<td>key1</td>
<td>&quot;key1&quot;,&quot;value&quot;</td>
<td>&quot;key2&quot;,&quot;WLAN-SSID&quot;</td>
<td>this is a multipurpose parameter depending on uRADMonitor device type: WIFI: it holds the SSID of the Wifi network the device should connect to.</td>
</tr>
</tbody>
</table>

Figure 6. Device response to the help command, showing the list of supported commands

Connected to 14000044 in powersave mode. Unit will reboot on disconnect. 

"help"

setid,sendint,encrypt,morse,reset,setmute,powersave,key1,key2,key3,key4,server,script,rxidelay,lorajoin,loradr,loraddr,lorapctr,beep,alarm,getdata,getssettings

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key2
Format: "key2","value"
Call example: "key2","WLAN-KEY"
Description: this is a multipurpose parameter depending on uRADMonitor device type:
- WIFI: it holds the key of the Wifi network the device should connect to.
- LoRaWAN with ABP join: it holds the NWKSKEY.
- LoRaWAN with OTAA join: it holds the APPEUI.
- GSM: it holds the GPRS user (if any).
This command allows you to configure the key2 value. Maximum key length is 64 characters.

key3
Format: "key3","value"
Call example: "key3","APPSKEY"
Description: this is a multipurpose parameter depending on uRADMonitor device type:
- LoRaWAN with ABP join: it holds the APPSKEY.
- LoRaWAN with OTAA join: it holds the APPKEY.
- GSM: it holds the GPRS password (if any).
This command allows you to configure the key3 value. Maximum key length is 64 characters.

key4
Format: "key4","value"
Call example: "key4","PINCODE"
Description: this is a multipurpose parameter depending on uRADMonitor device type. Currently it is only used by GSM devices, where the value represents the SIM CARD PIN code (if any).
This command allows you to configure the key4 value. Maximum key length is 64 characters.

server
Format: "server","value"
Call example: "server","data.uradmonitor.com"
Description: on devices with Ethernet, WIFI or GSM, this command sets the server the payload should be sent to. This powerful command allows to redirect payloads to other destinations then the default uRADMonitor data server. Please do not change unless you know what you are doing. Maximum length is 64 characters.

rx1delay
Format: "rx1delay","value"
Call example: "rx1delay","4000"
Description: sets the LoRaWAN RX1 window, in milliseconds. RX2 will be automatically set to RX1 + 1000ms.

lorajoin
Format: "lorajoin","1|2"
Call example: "lorajoin","1"
Description: sets the LoRaWAN JOIN mode, where 1 is OTAA and 2 is ABP.

loradr
Format: "loradr","value|255"
Call example: "loradr","0|1|255"
Description: sets the LoRaWAN data rate at device startup. Use 255 for no change (DR remains on previous setting). Value interval is from 5 (SF7) to 0 (SF12).

loraurt
Format: "loraurt","value|255"
Call example: "loraurt","0|1|255"
Description: Toggles the LoRaWAN adaptive data rate at device startup, 1 to enable ADR, 0 to disable ADR. Use 255 for no change (ADR remains on previous setting).

beep
Format: "beep"
Call example: "beep" or beep
Description: if mute is off, will produce a short beep on the speaker

alarm
Format: "alarm"
Call example: "alarm"
Description: if mute is off, will activate the sound alarm for about a minute or until the command is called the second time.
4. Configuration example

For a simple example, let's see how we can configure an INDUSTRIAL WLAN unit to connect to the WIFI network. For WIFI we only need to set key1 (the SSID) and key2 (the Network key) and the device will connect automatically. The keys will be saved to non volatile memory, so this step needs to be performed only once. The WLAN configuration can also be done via the device’s internal hotspot and webpage (connect to uRADMonitor-XX, key device ID and open 192.168.4.1, for details see the manual or the quick guide).

4. Debugging example

For most of the times, the getsettings command will pinpoint any possible issues, often related to wrong credentials. In some cases you might need to check the sensor output too, and here the “getdata” command becomes very useful:

```plaintext
getsettings
Format: "getsettings"
Call example: "getsettings" or getsettings
Description: returns the device configuration in JSON format

getdata
Format: "getdata"
Call example: "getdata" or getdata
Description: returns the last device data in JSON format. Please note that while USB is connected, the device is in powersave mode and all sensors are disabled.

Figure 7. Use getsettings command to check current device configuration

Figure 8. Sequence of commands used to configure WIFI

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This example shows an error in the temperature+humidity+pressure readings, they are all zero. This can happen due to the USB connection putting the device in powersave mode (sensors are stopped), or due to a failure in the electronic sensor measuring these parameters. The USB commands can offer precious insight in understanding the device performance.

4. **Firmware upgrade**

The USB connection will soon be used for firmware upgrades. This section will be detailed once the feature becomes available.

4. **Technical support**

For any questions, issues or for additional help, contact us at support@uradmonitor.com