# DeviceDrive click

### USER MANUAL

DeviceDrive click is a complete Cloud-on-Module solution with Wi-Fi functionality and an integrated PCB antenna. The onboard WRF01-M24A module comes preloaded with DeviceDrive firmware.





# To our valued customers

I want to express my thanks to you for being interested in our products and for having confidence in Mikroelektronika.

The primary aim of our company is to design and produce high quality electronic products and to constantly improve the performance thereof in order to better suit your needs.

Nebojsa Matic CEO

### **Table of Contents**

Introduction	4
1. Set up your product in the cloud	5
2. Installing the Client Simulator	9
3. Set up DeviceDrive click	10
3.1. Connect DeviceDrive click	10
3.2 Connecting to PC over USB/UART converter	11
3.3 Setting up DeviceDrive click with LinkUp	13
4. Device Simulator	15
4.1. Data polling	16
5. Advanced	17
6. Upgrade demo board	19

# Introduction

WRF01 is a Wi-Fi (802.11B/G/N) module from DeviceDrive. By using the DeviceDrive click, you can connect it to your PC and simulate real device behaviour, to learn how the device works and how it communicates to the cloud and to the app.

This document introduces the WRF01 Client Simulator and aims at giving you a quick start for developing with the DeviceDrive click. The program communicates with the DeviceDrive click trough the serial ports and is suited for acting as a client and for prototyping IoT-Products.

The following sections give the steps how to get started:

- Section 4: Set up your product in the cloud
- Section 5: Installing the software
- Section 6: Set up DeviceDrive click
- Section 7: Simulate IoT device
- Section 8: Send custom DeviceDrive click messages
- Section 9: Upgrading your WRF01

# 1. Set up your product in the cloud

In order to use the DeviceDrive click with the DeviceDrive cloud and the client simulator you need to sign up on the DeviceDrive management portal. If you already have an account, you can just sign in and create a new product on your account. Goal: Get a valid product key to use with this tutorial Procedure for signing up:

### 1. Sign up at https://manage.devicedrive.com



### 2. Press email signup

Sign up	<b>Jevice</b> 1 rive		
f	Facebook		
$\square$	Email signup	0	

**3.** Enter your email address and press "Send verification code" 4. You will receive an email with your verification code. Copy this code to your clipboard and paste into the registration form. Then click "Verify code".



5. Enter your preferred password and your name. Then press "Create".



 Register your company name. This is the name of your DeviceDrive management account. It can contain several users and several products.

Congratulations! You are about to activate your first lot [robuikt, but first we need to oreste a partner account for your company. Each company can have several products and addrise multiple users with access to the product management. If you are here by mistake and want to see just your devices and its data press CANCEL and go to privacy portil (privacy/deviced/ve.com).	
Cancel Adco	(

 Register your test product. Enter a name for your product and select "Internal agent". Then copy the product key to your clip board and press "Save".

Dd DEN dri	<b>/ICE</b> i ∨ e				
CASHBOARD	PRODUCTS	USERS	DEVICES	<b>D</b> OTA	C API
Products	View products	Create product			
Edit produ	ct				
		Product Name	New produ	ıct	
		Device processor	Forwarding a	gent \$	
		Cloud name			
		Cloud URL			
		Product Key	4bf40716-	67ff-4e3b-9df7-5	5981685c
			Save	Cancel	

8. Paste the product key somewhere (e.g. Notepad) so that you can use it later.

- 7

# 2. Installing the Client Simulator

Download the software from https://devicedrive.com/downloads

Run the installer. This will install the software and add the examples folder to the program folder.

NOTE: If your Antivirus complains that the software package is not signed, please ignore and run the install anyway.

⊮ WRF01 Client Simulator — — ×	Windows protected your PC
Welcome to the WRF01 Client Simulator Setup Wizard	Windows SmartScreen prevented an unrecognized app from starting. Running this app might put your PC at risk.
The installer will guide you through the steps required to install WRF01 Client Simulator on your computer.	App: WRF01ClientSimulator.msi Publisher: US, Washington, Redmond, Microsoft Corporation, MOPR, Microsoft Corporation
	Run anywsy Don't run
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.	
	viction circae Simulatear
Cancel < Back Next >	

After the install is finished, you can launch the program from the start menu or the desktop icon.

# 3. Set up DeviceDrive click

This section describes how to connect your DeviceDrive click to the network and configure your product key.

### 3.1 Connect DeviceDrive click

Considering that DeviceDrive click is a board with UART interface you will need additional board to make it working. There are severals ways that you can put in use your DeviceDrive click board.

**Option 1** – click USB adapter (or any USB to UART converter)

**Option 2** – clicker 2 (or any other development system with mikroBUS<sup>™</sup> socket).

#### 3.2 Connecting to PC over USB/UART converter

Your computer will recognize the device, and designate a COM port for it. As soon this is done, will see the COM port in the dropdown [1] in the picture above.

If the connection is successful, the color of the Connection Status Indicator [2] will change from Red to Green. The Host port communication window will give you the exact communication log between the Simulator and WRF01. Use this to learn about how the WRF01 behaves in a normal operating cycle.



WRF01 Client Sim	ulator				-		×	
onnect Device sim	ulator Advan	iced						
				nd	DE		E	
					dr	iv	e	
Setup								
Product Key :	598fe244-e6	6e7-46b6-a6d7-da	1982349464	<u> </u>				
Network ssid:			✓ Scan	1				
Network password:								
Int O								
Quick Commands								
Show device	Status	Reboot	Clear	Sleep				
Factory reset	SmartLinkun							
r doctory robot	omarcantap							
ost port communicat	ion							
ost port communicat Com port: COM3	ion	✓ Close	Clear windo	ow 🗸	Show ou	tput	0	
ost port communicat Com port: COM3 "devicedrive":	ion	Close	Clear windo	ww 🗹	Show ou	tput		
ost port communicat Com port: COM3 "devicedrive": "command":"setup" product key":"598(	ion ,"debug_mode =244-e667-46b	Close	Clear windo	ow 🔽	Show ou	tput _enabled	<b>0</b> 9915	
lost port communicat Com port: COM3 "devicedrive": command": setup" product, key": "598/r "devicedrive": {"resu	"debug_mode 244-e6e7-46b #":"OK"}}a	✓ Close       ":"all","error_mod.       r6-a6d7-da 198234	Clear windo e":"all", "ssid_prefix 19464"}1	ow 🔽	Show ou	tput _enabled	5710	
ost port communicat Com port: COM3 'devicedrive": 'command''.'setup'' roduct, key'.''590% 'devicedrive'':{''resu	ion "debug_mode \$244-e6e7-46b k":"OK"}}s	✓ Close ":"all", "error_mode 6-a6d7-da198234	Clear windo e":"all", "ssid_prefix 19464"}a	ow 🗹	Show ou	tput _enabled	<b>.</b>	
est port communicat Com port: COM3 'devicedrive'': command.''setup'' 'devicedrive'':{'resu	ion "debug_mode s244-e5e7-46b k":"OK"}}3	Close ":"all","eror_mod 6-a6d7-da198234	Clear windo e":"all" "ssid_prefx 9464"):	ow 🔽	Show ou	tput _enabled	<b>1</b> 971 11.	
ost port communicat Com port: [COM3] "devicedrive": command "setup" roduct_key": "598f "devicedrive": { resu	ion "debug_mode 2244-€67-45b #":"OK"}}	✓ Cose ":"ali", "error mod 6-a6d7-da198234	Clear windo """all" "ssid_prefix 9464")0	ow 🗹	Show ou	tput _enabled	<b>C</b> 2015	
lost port communicat Com port: COM3 "devicedrive": "command" "setup" "5984 "devicedrive": {"result compand output	ion "debug_mode #244-e6e7-46b #":"OK"}}a	✓ Close ":"ali", "error mod 6-a6d7-da198234	Clear windo "''all" "ssid_prefix 9464")3	ow 🗹	Show ou	tput _enabled	<b>D</b>	
ost port communicat Com port: COM3 "devicedrive": "command " setup" "590" "devicedrive": ("resu ag port output Com port: COM4	ion "debug_mode s244-e6e7-46b h":"OK"})a	✓ Close	Clear windo	ow 🗹	Show ou	tput _enabled	211	
lost port communicat Com port: COM3 devicedrive): command":setup" product_key:":598f devicedrive":{"resu og port output Com port: COM4	ion "debug_mode 2244e667466 #^~OK"}a	Close "2"all", "error_mode 6-a647-da 198234 Close	Clear windo	ow Z «":"DeviceD ow	Show ou	tput _enabled		
lost port communicat Com port: COM3 "devicedrive": "command":setup" product, key:":"5996 "devicedrive": { resu command: resu devicedrive": { resu comport: COM4 1000937586 [cloud]; 10009337586 [setup]	ion "debug_mode 2244-667-46b #^::OK"}}a ssl_enabled=1 param_product	Close Close Close Close Close	Clear windo	ow Z «";"DeviceD ow	Show ou	tput _enabled		
ost port communicat Com port: CDM3 'devicedrive'': Command'' isetup'' product, key ''5364 devicedrive'': ('resu sg port output Com port: CDM4 0009377596 (cloud, 0009377594) setup 0009377592 (setup 0009377592) setup	ion "debug_mode 244e667-486 k"."OK"})3 ssl_enabled=1 param=product g result JSON	✓ Close	Clear windo	ow 🗹	Show ou	tput _enabled		
lat pot communicat Com pott: [COM3] "devicedrive": "command": "setup": "go pott output Com pott: [COM4] 0009377561 [cdud_] 000937554] ['devicedrive": COM41 000937554] ['devicedrive": Command C	ion "debug_mode 244.e6e7.46b *:"OK"}} ssl_enabled_11 param-product great, 350M result, 350M	✓ Close	Cear wind:	ow 🗹	Show ou	enabled		
lost port communicat Com port COM3 "devicedrive"; command": "setus" "devicedrive"; {resu sg port output Com port COM4 000937569; cloud; 000937569; cloud; 0009375549; {cloud; 0009375549; cloud; 0009375549; cloud; 0009375549; cloud; 0009375549; cloud; 000937560; Cerems	ion "debug_mode s244-eBe7-46b ***OK*)}s ssl_enabled=1 param-sproduct great/ 13ON result 13ON buffer rocowing buffer	V     Close       ""all" "error mod.     6e.e8d7.db139234       V     Close       Lingv     close	Cear winds e***alf**sed_prefs 9464**)s Cear winds	ow 🗹	Show ou	tput _enabled		

### NOTE: It is possible to mix up the host port and the log port in the two windows. It is recommended to plug in the HOST port first, and then select the port in the host communication window before connecting the log port.

When DeviceDrive click is connected, enter the product key [the one from the management portal] in to the field marked "Product Key" [3]. If you want the device online right away enter the network ssid and password in their fields. If your product key is defined as a "Forwarding product", you can enter these right away, and start sending data, but if you have an "Internal product" and wish to use the mobile app SDK's, you should LinkUp using the app. In addition, you can attach the log port to your computer with an USB mini cable. This will also register as a COM port in your system. In the "Log port Output" window, select the new COM port.

Check the status indicator on the right-hand side to see that the connection is successful.

When you are ready, press "Init" **(4)**. This will initiate the WRF01. You should see the message "Response OK" in the Serial output window, and if you attached the Log port, you should see the WRF01 internal workings while connecting to your access point (router).

Hold your mouse over the quick commands to get more information about them.

### 3.3 Setting up DeviceDrive click with LinkUp

Linkup is only required if your device is an "Internal product" in the DeviceDrive system.

To make the DeviceDrive click ready for LinkUp, use the "Show Device" [1] button to enable the local AP.

WRF01 Client Simulator		-		×	
Connect Device simulator	Advanced Upgrade WRF01 FW				
Send Introspect	Poll Auto poll 10	seconds	Show device	••	-0
Simulated state Temp	Perature	Light			

NOTE: You can also use SmartLinkup to initiate the SmartLinkup procedure. This procedure lets the user connect the device without having to use the Soft AP.





The DeviceDrive Playground App is available on *Apple Store* and *Android Play*. When you are using the LinkUp procedure, the SSID and password for your network is sent, along with the security token for your device. This is the reason that you need to use the LinkUp system when working with Internal Products. For more information about how to use the DeviceDrive Playground app and the internal product, please see *this video* and the *documentation*.

The screenshots below show how the Playground app lets you link up your new device and show the simulated data from the device simulator.

••••• N Telenor 🗢 10:36 4 🛡 67 % 💷 4	••••• N Telenor 🗢 10:39 🕇 🖲 70 % 💼 9	••••• N Telenor 🗢 10:41 - 1 0 71% - 1	●●●○○ N Telenor 중 10:44
Playground O	Register Device	Connect to Device	Playground O
			My WRF01
+		Open the settings app on your iPhone/iPad and connect to the DeviceDrive network:	20.00 +
Add New Device	This wizard will help you register a new device.	·	Temperature Add New Device
	Enter the name for your new device: My WRF01 device		
	Cancel Next	We'll be waiting	
	•••••	Cancel ○○●○○	

The device state is shown in the app after the introspect and current state have been sent to the cloud. The next section describes how to simulate device behavior.

# 4. Device Simulator

On the top of the DeviceDrive WRF01 Client Simulator, you will find the Device Simulator tab. This tab gives you the opportunity to test the introspection functionality and lets you integrate the DeviceDrive click with an app with our SDK or the DeviceDrive Playground app.

Before you can start simulation, please make sure that you followed the steps in chapter Feil! Fant ikke referansekilden., 6.1 and 6.2.

To be able to send a status update, first press the "Send Introspect" [1] button. This sends a message to the cloud with the "capabilities" of your product. See the Serial specification documentation or this video about more information about the introspection document. This is a prerequisite for the APP you're using to control your device.

When the introspection document is sent you can click the temperature or light controller to send device data to the cloud. The app will automatically update with the new device data.



### 4.1 Data polling

This makes you able to send commands from the app to the device. If you are using the DeviceDrive Playground app, try to flip the button marked "Light".

Press the "Poll" (1) button to read pending status updates from the app. You can check "Auto poll" to let this happen automatically at the given interval.

The simulated state will be updated according to the received messages.

Cennect Device simulator Advanced Send Introspect Pol Auto pol 10 seconds Show device Smulated state Temperature Light	
Send Introspect Poil Auto pol 10 seconds Show device Smulated state Temperature Light	
Simulated state Light	
0,00 Off	

Polling requires SSL to be enabled on the WRF01 (versions below 4.0). Please press "Init" again if the system does not receive messages.
Version 4.0 supports MQTT, so if the WRF01 is already connected to the server, the messages from the app will appear asynchronously without pollina.

• There is no queue system in this software, so if you try to send or receive a lot of messages in rapid succession, you might experience the "System busy" error message. To resolve this, wait for the WRF01 to complete the current operation. This can be seen in the Log window. In a real application you can use our client SDK source code where a queue is implemented.

## 5. Advanced

Use the Advanced screen to send custom messages and choose from a set of predefined message templates.

This screen is suited for those who wish to tweak the messages sent to the server, or to test the whole range of the available commands for the WRF01. By default, the two drop-down menus should point to the folder that came bundled with the installation. To use the WRF01 commands, select "wrf01 commands" [1] in the first dropdown. In the second, you will be able to see the available commands. These match the "Serial specification documentation" and you can enter, or change the properties / values in the text field below.

Before pressing send, make sure that there is an EOT character at the end of your transmission. It will be marked with a small rectangle after your last bracket.



If there is no EOT char, press the "Add EOT" button.

When ready, press "Send" [1] to send the message or command to the device.

In addition to all of the available WRF01 commands, this software comes with some examples of introspection and status messages you can try.

In the text field you can add your own text or messages and send to the WRF01. If you are using your own cloud and require special messages, this is where you can send them.

The "Browse" (2) button lets you select the base folder to show template messages from.

Connect D	evice simulator	Advanced					
Example: {"devicedr { "commar "module" "protoco } ]0	wf01 command alam demo sales demo temperature der text input demo wrf01 command	S V Mes	isage: upgrade (	client raw v	Browse	^	-6

NOTE: This software strips your message of all <CR> <LF> characters before sending them to the WRFO1. In a real-world application, do not use these characters in a WRFO1 command. They have to comply exactly with the serial specification. If a command does not start with exactly {"devicedrive": the message will be interpreted as a cloud message transfer, and not a WRFO1 command.

# 6. Upgrade demo board

The upgrade pane lets you easily experiment with upgrading and downgrading your WRF01 module on DeviceDrive click.

Notice that the upgrade itself has to be defined in the management portal.

Perform each of the steps manually or just press "Do all" **(1)** to upgrade automatically (but you still need to define the upgrade in the management portal).

Define the upgrade in the management portal (click the link in point 1) [2].

Click each of point 2-4 or just press "Do all" to run automatically.

You should see that the current version field updates to the selected version [3].



# DISCLAIMER

All the products owned by MikroElektronika are protected by copyright law and international copyright treaty. Therefore, this manual is to be treated as any other copyright material. No part of this manual, including product and software described herein, may be reproduced, stored in a retrieval system, translated or transmitted in any form or by any means, without the prior written permission of MikroElektronika. The manual PDF edition can be printed for private or local use, but not for distribution. Any modification of this manual 'as is' without warranty of any kind, either expressed or implied, including, but not limited to, the implied warranties or conditions of merchantability or fitness for a particular purpose. MikroElektronika shall assume no responsibility or liability for any errors, omissions and inaccuracies that may appear in this manual. In no event shall MikroElektronika, its directors, officers, employees or distributors be liable for any indirect, specific, incidental or consequential damages [including damages for loss of business profits and business information, business the right to change information contained in this manual at any time without prior notice, if necessary.

#### HIGH RISK ACTIVITIES

The products of MikroElektronika are not fault – tolerant nor designed, manufactured or intended for use or resale as on – line control equipment in hazardous environments requiring fail – safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines or weapons systems in which the failure of Software could lead directly to death, personal injury or severe physical or environmental damage ['High Risk Activities']. MikroElektronika and its suppliers specifically disclaim any expressed or implied warranty of fitness for High Risk Activities.

#### TRADEMARKS

The MikroElektronika name and logo, mikroC, mikroBasic, mikroPascal, Visual TFT, Visual GLCD, mikroProg, Ready, MINI, mikroBUS<sup>™</sup>, EasyPIC, EasyAVR, Easy8051, Click boards<sup>™</sup> and mikromedia are trademarks of MikroElektronika. All other trademarks mentioned herein are property of their respective companies. All other product and corporate names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies, and are only used for identification or explanation and to the owners' benefit, with no intent to infringe.

The FTDI Chip® and Windows® logos and product names are trademarks of FTDI Chip and Microsoft® in the U.S.A. and other countries.

Copyright © 2019 MikroElektronika. All Rights Reserved.



If you want to learn more about our products, please visit our website at www.mikroe.com

If you are experiencing some problems with any of our products or just need additional information, please place your ticket at www.mikroe.com/support

If you have any questions, comments or business proposals, do not hesitate to contact us at office@mikroe.com



Designed by Mikroelektronika Ltd.

# **Mouser Electronics**

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Mikroe: MIKROE-3663