



**New Desktop Reader NEO2**  
**R-DT-NEO2-xx/yy-USB**  
**Dual Technology RFID Device**

**TBD: Intended Use**  
**Safety Notes, Warnings, Office Use Only**  
**Troubleshooting**

iDTRONIC GmbH  
Ludwig-Reichling-Straße 4  
67059 Ludwigshafen  
Germany/Deutschland

Phone: +49 621 6690094-0  
Fax: +49 621 6690094-9  
E-Mail: [info@idtronic.de](mailto:info@idtronic.de)  
Web: [idtronic.de](http://idtronic.de)

Issue 0.1  
– 12. January 2021 –

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## 1 Function Description

### 1.1 Intended Use

TBD

### 1.2 Safety Notes

TBD

### 1.3 RFID Technology Combinations

The device is available with these combinations of RFID electronics:

Target Product	Order Code	Electronics Order Code	RFID Technology
Desktop Reader NEO2 LF USB	R-DT-NEO2-LF	OEM-LF-M1000-USB	LF-RFID
Desktop Reader NEO2 HF USB	R-DT-NEO2-HF	OEM-DES-M1000-USB	HF-RFID
Desktop Reader NEO 2 UHF	R-DT-NEO2-UHF	OEM-UHF-M1000-USB	UHF-RFID
Desktop Reader NEO 2 HF/UHF	R-DT-NEO2-HF/UHF	OEM-DES/UHF-M1000-USB	HF-RFID + UHF-RFID

### 1.4 Reference Documents, Communication Protocol

These documents describe the communication between your software and the RFID electronics.

LF-RFID: OEM-LF1S Hitag 1 & Hitag S Communication Protocol x.y EN.pdf

HF-RFID: OEM-DES Devices Communication Protocol\_x.y\_EN.pdf

HID Mode: The command to set the HID Mode is described in this document.

### 1.5 Operation Modes

When you plug in the device into an USB port, it will connect as VCP and HID Device.

#### 1.5.1 Read/Write Mode

You can freely send commands to any of the RFID electronics and perform read and write operations.

#### 1.5.2 HID Mode

After configuring the device with the HID Configuration Command, the device automatically scans for tags, performs (if configured) other RFID operations and (if configured) converts the data into another form or representation.

#### Important Note

When configured to HID operation, the read/write functions should not be used.

### 1.6 Glossary

VCP = Virtual Com Port

HID = Human Interface Device, e.g. keyboard, mouse, joystick

## 2 HID Mode Configuration Command

This command configures the HID operation mode. One Byte switches the HID mode ON or OFF. The other Bytes configure what data is read and how the data is converted.

### 2.1 Telegram from PC to RFID Device

AA = Start of Telegram  
 00 = Device Address  
 0D = Bytes of Payload (Command + Parameters)  
 FD = Command Code  
 3F = 3F (0011.1111) = OFF  
     C0 (1100.0000) = ON  
 00 = 00: HF 14443A LSB  
     01: HF Ultralight Data  
     02: HF Mifare Data  
     03: HF Mifare Data + UID  
     04: HF 15693 UID  
     05: HF 15693 UID + Data  
     06: HF 14443A MSB  
     07: HF 14443A LSB-DEC  
     08: HF 14443A MSB-DEC  
     09: HF Reserved for future use  
     0A: HF Reserved for future use  
     0B: HF Reserved for future use  
     0C: HF Reserved for future use  
     0D: HF Reserved for future use  
     0E: HF Reserved for future use  
     0F: HF Reserved for future use  
     10: LF Read UID LSB of read-only tag type  
     11: LF Read UID MSB of read-only tag type  
     12: LF Read UID LSB of Hitag1/S tag type  
     13: LF Read UID MSB of Hitag1/S tag type  
     14: LF Read UID LSB-DEC of Hitag1/S tag type  
     15: LF Read UID MSB-DEC of Hitag1/S tag type  
     16: LF Read UID LSB and Memory Page from Hitag1/s tag type  
     17: LF Read UID MSB and Memory Page from Hitag1/s tag type  
     18: LF Read UID LSB-DEC and Memory Page from Hitag1/s tag type  
     19: LF Read UID MSB-DEC and Memory Page from Hitag1/s tag type  
     1A: LF Reserved for future use  
     1B: LF Reserved for future use  
     1C: LF Reserved for future use  
     1D: LF Reserved for future use  
     1E: LF Reserved for future use  
     1F: LF Read FDX-B information  
     20: Legic Read UID  
     21: Legic Read ISO 15693 UID  
     22: ISO 14443 A  
     23: ISO 14443 B  
     24: INSIDE Secure  
     25: SONY FeliCa subset  
     40: UHF Read EPC  
     48: UHF transparent transport\*  
 00 = Memory Position, Blocks (Mifare) or Pages (Ultralight, ISO15693)  
 FF FF FF FF FF FF = Key A  
 10 = 10: HEX  
     20: ASCII  
 60 = 60: Key A  
     61: Key B  
 00 = left MSB nibble: Data Position, right LSB nibble: Data Length  
 BCC  
 BB = End of Telegram

\* the µC will not send actively commands to the UHF-RFID, but transfer automatic telegrams to the HID port

## 2.2 Reply from RFID Device

AA 00 02 00 80 82 BB

### The Bytes in Detail

AA = Start of Telegram  
00 = Device Address  
02 = Bytes of Payload  
00 = Status, 00 = OK  
80 = Status detail, 80 Setting successful  
82 = BCC  
BB = End of Telegram

## 2.3 Examples

### 2.3.1 Shut OFF the HID Operation Mode:

AA 00 0D FD 3F 00 00 FF FF FF FF FF FF 10 60 00 BF BB

### The Bytes in Detail

AA = Start of Telegram  
00 = Device Address  
0D = Bytes of Payload (Command + Parameters)  
FD = Command Code  
3F = 3F (0011.1111) = Switch HID Operation Mode OFF  
00 = 00: HF 14443A LSB  
00 = Memory Position, Blocks (Mifare) or Pages (Ultralight, ISO15693)  
FF FF FF FF FF FF = Key A  
10 = 10: HEX  
60 = 60: Key A  
00 = left MSB nibble: Data Position, right LSB nibble: Data Length  
BF = BCC  
BB = End of Telegram

### 2.3.2 Read Data from Mifare RFID Tag

AA 00 0D FD 3F 00 09 4B FB 5A D0 7C 63 20 60 54 F7

### The Bytes in Detail

AA = Start of Telegram  
00 = Device Address  
0D = Bytes of Payload (Command + Parameters)  
FD = Command Code  
3F = C0 (1100.0000) = ON  
00 = 02: HF Mifare Data  
09 = Memory Position, Blocks (Mifare) or Pages (Ultralight, ISO15693)  
4B FB 5A D0 7C 63 = Key A  
20 = Convert to ASCII  
60 = 60: Key A  
54 = left MSB nibble: Data Position 5<sup>th</sup> Byte, right LSB nibble: Data Length 4 Bytes  
F7 = BCC  
BB = End of Telegram

### 3 Installation

#### 3.1 Communication Interface

The device has a fixed USB cable of 1.2 m length with USB-A plug. Plug it directly into your PC or Laptop. Avoid using a USB prolongation cable.

#### 3.2 Communication Parameters

The communication parameters of the virtual com-port (VCP) are fixed set to:

Parameter	Value
Start bit	1
Data bit	8
Stop bit	1
Baudrate	9600 bps
Parity	No Parity

#### 3.3 USB Interface Electronics · No Drivers Needed

##### CoreChips SL2.1A USB Hub Controller

This device contains the USB 2.0 hub “CoreChips SL2.1A”. Normally these types of ICs do not need a driver. But if yours is not working, the first step you need to do is checking your BIOS setting for USB is enabled. If it still not working check whether the USB port is recognized in your device manager (type “device manager” at search program windows logo).

##### CH340E USB-TTL for VCP

The driver is part of the Windows repository. It will be recognized without and need for user interaction.

## 4 Avoiding Interference

This is an RFID device. It is part of its normal function to emit radio waves.

### 4.1 Emitted Frequencies During Normal Operation

Target Product	Frequencies
Desktop Reader EVO2 HF USB	13.56 MHz
Desktop Reader EVO2 HF/LF USB	13.56 MHz + 125 kHz
Desktop Reader EVO2 Legic/LF USB	13.56 MHz + 125 kHz

### 4.2 Conflicts With Other Equipment

Avoid other RFID devices operating on the same frequency.

The 13.56 MHz Band is an ISM band. Therefore it can be freely used by remote control equipment e.g. wireless computer mouse, RC cars or other RC toys.

Modern smart phones often have an NFC module emitting radio waves of 13.56 MHz (HF, Legic operating frequency). Either shut off the NFC function of your smart phone or keep the smart phone more than 50 cm away from our RFID device.



## 5 Hardware Settings

There are no hardware settings to be done. All configuration is done using the HID configuration software.

## 6 Status Indications

### 6.1 On Startup

The LED will light up blue for a brief moment while the buzzer gives an audible indication of a successful start.

### 6.2 LED orange/blue

Orange	standard, idle	
Blue	in standard read/write operation mode:	device receives command
	In HID operation mode:	device detects an RFID tag

### 6.3 Buzzer

In HID mode the buzzer signals detection of RFID tags.

## **7 Maintenance, Repair and Disposal**

### **7.1 Maintenance**

The electronics are maintenance-free. Protect it against dirt and liquids.

### **7.2 Repair**

There are no user-serviceable parts. Do not attempt repairs. Do not allow any unauthorized service center or personnel to repair or modify the product.

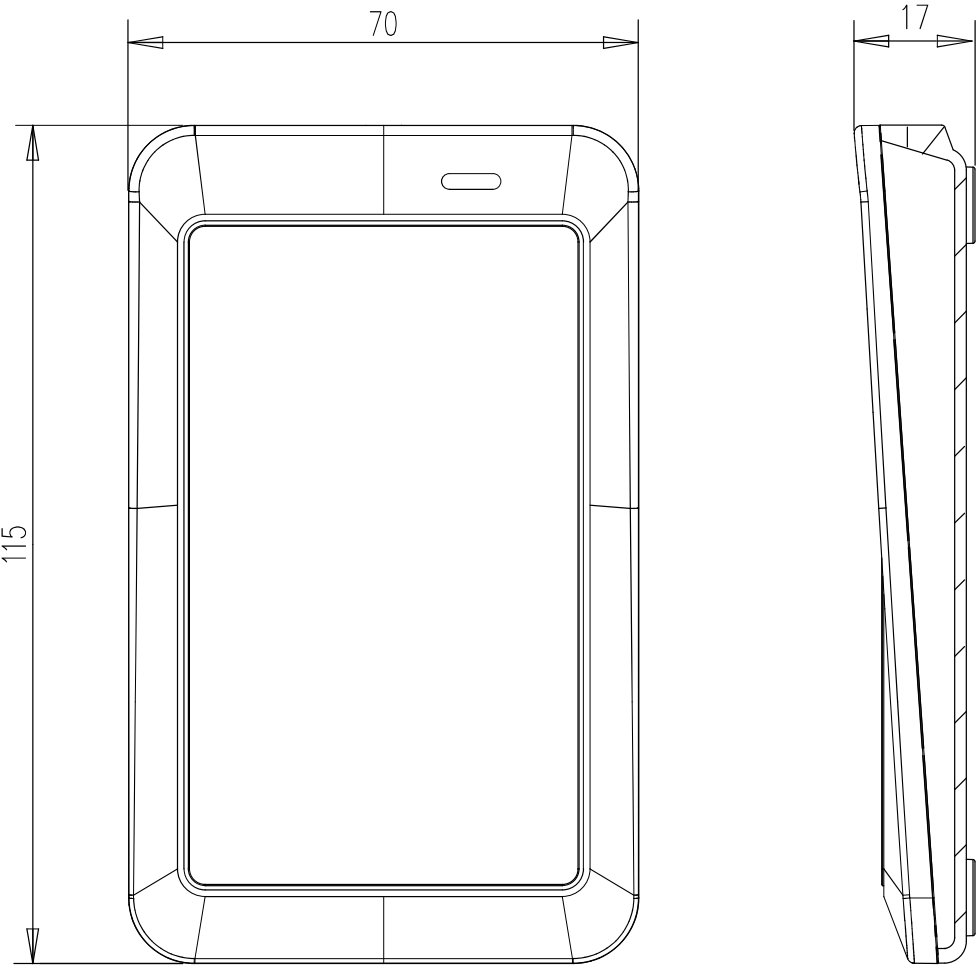
In the event your electronics fail, contact iDTRONIC GmbH via the service e-mail address:

### **7.3 Disposal**

After use dispose of the device in an environmentally friendly way in accordance with the applicable national regulations.

Do not dispose of this device in normal household waste. Contact your local council for information on disposal options for electronic devices in your area.

8 Mechanical Drawings



## 9 Troubleshooting

TBD.

## 10 Revision History

Version	Date	Notes
0.1	2021-01-12	Initial User's Guide Version

## 11 Technical Data

### Electrical Specifications

Power Supply	USB VCP + HID
Power Consumption	< 150 mA
Operating Frequencies	125 kHz + 13.56 MHz
Baudrate	9600...115200 bit/s
Antenna	Internal LF + HF
RFID Technologies	LF + HF, LF + Legic

### Mechanical Specifications

Dimensions	115 × 70 × 17 mm without USB cable
Weight	90 g incl. USB cable
Material	ABS
USB Cable Length	App. 120 cm

### Supported Standards / Tags LF-RFID

Read-only	EM4200 and compatible
FDX-B	Read information
Read/write	Hitag 1, Hitag S

### Supported Standards / Tags with HF-RFID Module

ISO 14443 A and compatible	Read/write: MIFARE® Classic Mini / 1K / 4K, MIFARE Ultralight®, MIFARE Ultralight® C, MIFARE® DESFire®EV1, MIFARE® Smart MX, MIFARE® Plus S / X, MIFARE® Pro X, NTAG 21x Read UID only of all other ISO14443A RFID tags
ISO 14443 B and compatible	SRI4K, SRIX4K, AT88RF020, 66CL160S, SR176
ISO 15693 and compatible	EM4135, EM4043, EM4x33, EM4x35, I-Code SLI / SLIX, M24LR16/64, TI Tag-it HF-I, SRF55Vxx (my-d vicinity)
ISO 18000-3M3	

### Supported Standards / Tags with UHF-RFID Module

UHF Tags	All Standard ISO 18000-63* (EPC Class 1 Generation 2)
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\* ISO 18000-6C became ISO 18000-63 in 2012 due to ISO naming rules that do not allow letters in standards names.

### Applicable Standards

EMC	EN 301489-1:2012-04 (v1.9.21) EN 301489-3:2013-12 (V1.6.1)
Radio Regulation	EN 300330-1:2015-03 (V1.8.1), LF-RFID, HF-RFID, Legic-RFID EN 300330-2:2015-03 (V1.6.1), LF-RFID, HF-RFID, Legic-RFID EN 302208-2:2015-02 (V2.1.1), UHF-RFID
Safety	EN 60950-1:2014-08 (valid till 2020-12-19) EC 62368-1:2018-10 (V3.0, valid as of 2020-12-20)
RoHS 2	EC Guideline 2011/65/EU and amendment 2015/863/EU, updated by 2017/2102/EU EN 50581:2012 (valid till 2024-07-07) EN 63000:2018
REACH	EU Guideline 1907/2006, updated by 2020/171/EU

### SDK Information

Supported OS	Windows XP, Vista, 7, 8, 8.1, 10
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Supported Languages	Binary command protocol, VS2005 C++
Demo Software	Windows

Other functions and details to be continued and upgraded.