

New Desktop Reader EVO2
R-DT-EVO2-xx/yy-USB
Dual Technology RFID Device

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

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1 Introduction

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 EVO2 HF USB	R-DT-EVO2-HF	OEM-DES-M1000-USB	HF-RFID
Desktop Reader EVO2 HF/LF USB	R-DT-EVO2-HF/LF	OEM-DES/LF-M1000-USB	HF-RFID + LF-RFID
Desktop Reader EVO2 Legic/LF USB	R-DT-EVO-LEG/LF	OEM-LEG/LF-M1000-USB	Legic-RFID + LF-RFID
Desktop Reader EVO 2 UHF	R-DT-EVO2-UHF	OEM-UHF-M1000-USB	UHF-RFID
Desktop Reader EVO 2 HF/UHF	R-DT-EVO2-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

Legic: The LEGIC communication protocol is not freely available.

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 5th 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.

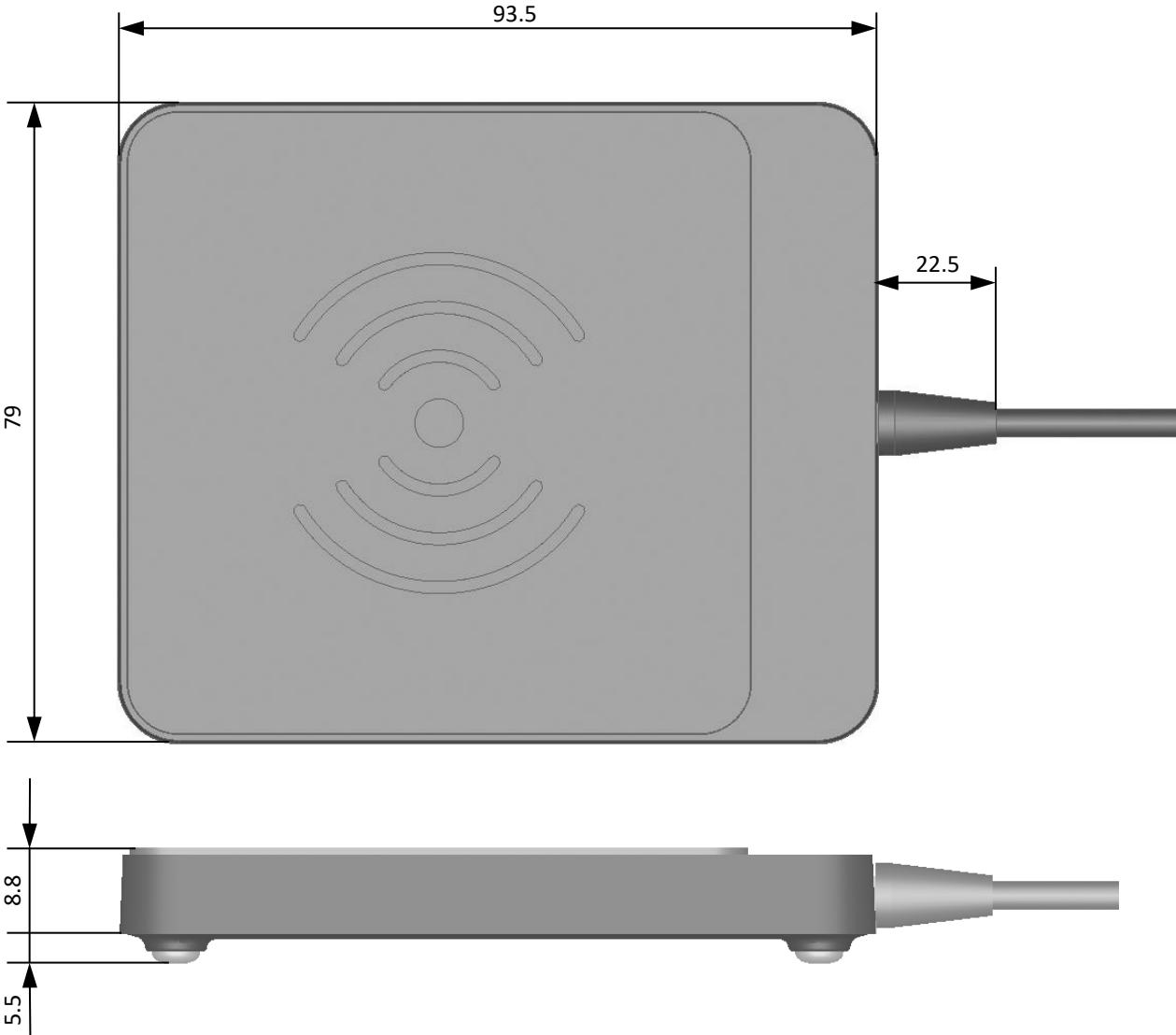
In the event your electronics fail, contact iDTRONIC GmbH via the service e-mail address:

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	2020-07-15	Initial draft
0.2	2020-08-21	Many details updated. Topics added. Dimensional Drawing added.

11 Technical Data

Electrical Specifications	
Power Supply	USB VCP + HID
Power Consumption	< 150 mA, up to 400 mA with UHF-RFID
Connector	Fixed cable with USB-A
Operating Frequencies	125 kHz + 13.56 MHz or 13.56 MHz + 868 MHz
Baudrate	9600 bps
Antenna	Internal
RFID Technologies	HF, HF + LF, Legic + LF

Mechanical Specifications	
Dimensions	Core Housing: 93.5 × 79 × 8.8 mm Overall incl. housing base and anti-kink sleeve: 116 × 79 × 14.3 mm
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	I-Code ILT

Supported Standards / Tags with Legic-RFID Module	
LEGIC RF	All Advant & Prime transponder
ISO1443A+B	Reads only the UID : Mifare DESFire, Infineon SLE, SmartMX
ISO15693	Reads only the UID: EM4035, Tag-It HFI, Infineon SRF55VxxP, ISO18000-3 mode 1
Sony Felica	No encryption included
ISO18092 NFC	Passive mode, peer-to-peer Initiator, NFC Tags 2, 3, 4
Inside Secure	Read and write access to smartcards based on cyphered Inside Secure technology, such as HID iCLASS®

Supported Standards / Tags with UHF-RFID Module	
UHF Tags	All Standard ISO 18000-63* (EPC Class 1 Generation 2)

* 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 301489-3:2019-03 (V2.1.1))
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
Supported Languages	Binary command protocol, VS2005 C++
Demo Software	Windows

Other functions and details to be continued and upgraded.