

## ***QuickStartGuide***

### ***iID®science – iID®Network***

*iID®BEEscience Starter Kit v300.2D*

*iID®BEEscience professional Bundle v313.2D*

***RFID small animal identification and monitoring solution***  
***UHF long distance coupling RFID***

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## Introduction

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*Microsensys is considered as a pioneer in the research of small animals and insects, especially bee colonies using RFID technology. Our pursuit of new solutions and curiosity have led to the development of MAJA®. This product has been absolutely accepted by users and has brought many useful benefits to the field of bee behavior research. We have not stopped and continued to search for solutions that provide researchers and hobby beekeepers with useful information about bee behavior and significantly simplify the management of bee colonies. Our new systems iID®science, inspect, safari and sens are the result of many years of work and experience in bee behavior research.*

*iID®science has advantages as Individual bee identification, possible flight direction recognition and continuous data capturing at beehive entrance.*



**Figure 1: iID®science system**

This document describes in a short form the principle handling and use of the new MICROSENSYS iID®science system, which is made for identification and monitoring of small animals, especially bees and bumble bees. Flight times and fly direction can be recognized due individual bee identification and special designed reading devices.

iID®science system is based on the RFID technology. MICROSENSYS can offer miniature RFID transponders with dimension of 1.6mm x 1.6mm, so that a bee can be signed with this type of transponder.

Detection of these transponders is happening with the help of RFID reading units, which are mounted on the entrance of the beehive. This RFID reader can identify every transponder and logs the UID(unique ID) of the transponder together with a time stamp, so that bee marked with transponder is clearly identified, and its flying direction is recognized.

The system will be controlled by iID®BEE controller, which can control simultaneously up to four external RFID reader devices. This controller provides the interface for the RFID reading units. Additionally, the controller gives some state information by display and three LEDs and stores the read UID data on a removable USB storage memory.





Please read this document carefully to prevent damage and unwanted results.

*Further information on hardware, drivers and application software is available in separate documents.*

## Component overview

### General

iID<sup>®</sup>science is a small animal identification and monitoring system, which consists of the following components:

<p>iID<sup>®</sup>BEEcontroller: designed for iID<sup>®</sup>BEE system running iID<sup>®</sup>DataCapture software. This device is the main component controlling the readers and storing the data</p>	
<p>power supply 12V with appropriate connector and power cord</p>	
<p>iID<sup>®</sup>science reader device AEB-03.C2D: RFID reading component equipped with a special high-performance antenna system optimized for BEE-TAG mic3<sup>®</sup>Q1.6 transponders</p>	
<p>PCAN cable: to connect iID<sup>®</sup>BEE controller and reading devices among each other</p>	

a few well working BEE-TAG mic3®Q1.6: Read-Only RFID transponders, miniaturized, to tag the animal for detection when passing the reader module



PCAN termination resistor



PCAN T-connector



iID®PENsolid UHFcc – for tag initialization and assignment to collections (must be ordered extra)



**\*We recommend to use follow USB flash drives for data storage:** Scan Disc Cruiser Fit, sdcz33-016g-g35 16GB

## Handling



**Figure 2: Back panel iID®BEEcontroller CCO-01DC**

## System setup

To start working with the iID<sup>®</sup>science system, please connect all components as illustrated and described below. Please pay attention to additional remarks shown at the components as well as labels, which are used to identify the correct plugin of different connectors.

## Recommended mounting procedure

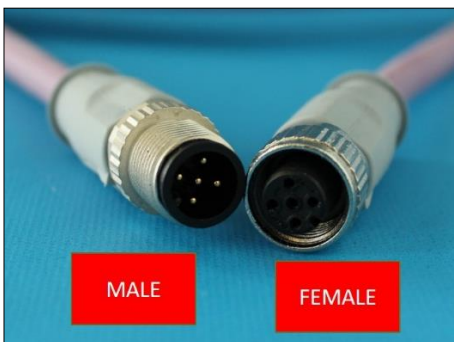
1. Mount the iID<sup>®</sup>science reader AEB-03.C2D devices minimum 1.5m apart. We recommend mounting every AEB-03.C2D with two screws 3x30.
2. To mount the AEB-03.C2D is necessary to drill a hole with diameter 16mm on the beehive's approaching plate. This hole allows to take AEB's cable through the approaching plate.
3. Do not install the iID<sup>®</sup>BEEcontroller and his power supply in a damp location or place where it may come in contact with water
  - Deteriorated insulation on electrical parts may cause an electric shock or fire.
4. Do not place the iID<sup>®</sup>BEEcontroller and his power supply in extremely hot environment ( $t^{\circ}>60^{\circ}\text{C}$ ).
5. Do not tie together antenna and power supply cables.
6. Do not connect more than four reader devices on one iID<sup>®</sup>BEEcontroller.

## Installation procedure

Detailed description can be found in the document *Assembling Instructions-iID<sup>®</sup>science 2D*.

The following chapter is describing the necessary installation steps. Connect all components in the following order:

1. Plug in the male PCAN cable in the female PCAN interface on the iID<sup>®</sup>BEE controller



*Figure 3: female/male connector*

2. As next connect the four T-connector to each other
3. Connect PCAN cable to first T-connector
4. Connect every antennas male with the female on each T-connector
5. Connect the termination resistor on the last T-connector (first is where the purple PCAN cable is connected).
6. Connect the AC power adapter with the delivered cable to the iID®BEEcontroller power supply port

## Start the system

1. Make Back Up of data stored on the USB flash drives
  - a. Plug in the flash drive in PC/Laptop/Tablet
  - b. Open USB drive and **copy** all files to the backup storage
2. Connect the AC power adapter with the delivered cable to the iID®BEE controller power supply port
3. Plug in the USB stick in one of the iID®BEE controller's USB-Ports
4. Turn on the power counter at the controller back side in position "-"  
➔ System need about 120 seconds to boot. In this time on the display appear following notifications:
  1. only PWR LED is flashing, display is off
  2. iID®DataCapture version displayed
  3. the system will start to detect devices
  4. number and address of founded device will be displayed
5. Check screened system time at the display! Default time is Currently Greenwich Mean Time (GMT), UTC +0

In case the components are connected in the correct way, the system is booting up. After about 120 seconds the booting operation is complete, and scanning is running. It can be recognized if the PWR LED is glowing constant and system specification are screened on the display. The system is able to read RFID transponders with the RFID reading units.

## Functionality

System is properly booted and scanning function is running. Data will be stored in a 15 seconds cycles, it means that the system is continuously in scanning mode and the information about scanned UIDs will be stored every 15 seconds on the USB external storage. After every cycle on the display will be screened information about the scanned UIDs. This information includes number of arrived, departed and unknown UIDs. As arrival is to understand UID which is passing through the reader device into the bee house. Departed is UID which is passing through the antenna in direction out of the bee house. As unknown will be recognized UID which is not passing through the antenna in any direction. Example for this case is, if one bee is landing on the antennas platform but is not going into the bee house.



Every detected UID will be stored with time stamp and flying direction. Captured data can be analyzed with simple text editor.

A complete Display and LED state description you will find in the next two tables.

**Table 1:** Display description

Display text	Description
<div> <b>CB30D54      05:03:0</b>  <b>ID®BEEscience v01.05</b>  <b>ARR.   / DEP.   / UNK.</b>  <b>13/      20/      5</b>  <b>43.0 Found / sec</b>  <b>Waiting ....</b> </div>	<ul style="list-style-type: none"> <li>- iID®BEE controller name</li> <li>- system clock</li> <li>- iID®software version</li> <li>- arrived bees</li> <li>- departed bees</li> <li>- unknown (not as arrived or departed recognized)</li> <li>- real time counter for founded IDs in a second</li> <li>- time to wait until scanning cycle finished</li> </ul>
Display off, PWR LED flashing	- system is booting
"iID®DataCapture BEEscience v01.05"	- controller is booting up, software version
"Detecting devices..."	- searching for reading devices
"X Devices found Addr: xx/xx"	- number and address of reading devices will be screened
"NO RFID READER DETECTED! Please check system setup"	a) no reader devices detected: check wire connection to reading interfaces
"USB storage not found Please insert an USB storage stick"	a) no USB storage memory detected or USB storage error: check USB stick in USB port, USB memory full, check write protection, plug in USB stick in another USB port, reboot iID® controller

**Table 2:** LED description

PWR	OK	FAIL	Description
off	off	off	- no battery power - check battery and power connection
flashing	off	off	- system is loading
on	off	off	- system is properly booted, scanning for IDs, USB storage memory recognized
on	on	on	- initialization process is running - red shall switch off after about 10 seconds - occurs normally direct after power connection
on	off	on	- error detected, reasons: a) no reading devices detected: check wire connection to reading interfaces b) no USB storage memory detected or USB storage error: check USB stick card in USB port, USB memory full, check write protection, reboot iID controller c) an internal error occurred: contact manufacturer
on	flashing	off	- storing UID data in USB storage memory
on	on	off	- searching for reader devices

## Getting the data

The UID data is stored in csv-files. Maximum file size is settled as default on 10MB. In case when USB stick will be removed or iID<sup>®</sup>BEEcontroller is powered off and the size of 10MB is not reached, the file will be stored as **\*.csv\_InUse**.

Every time the controller is powered on will be created a new folder on the USB stick.

Every time when the USB stick is removed and plugged again in the controller a new csv-file will be created (only in case if **\*.csv\_InUse** is renamed to **\*.csv** or maximum file size is reached) otherwise the data will be continue stored in existing file until the maximum size is reached. The UTC timestamp of creation time is encrypted in the filename of these csv-files.

To get the stored UID Data you need these csv-files. Therefore, is one way offered:

1. pull out the USB-storage device from the controller
2. plug in the USB-storage to your PC/Laptop/Tablet
3. open the folder with csv-files

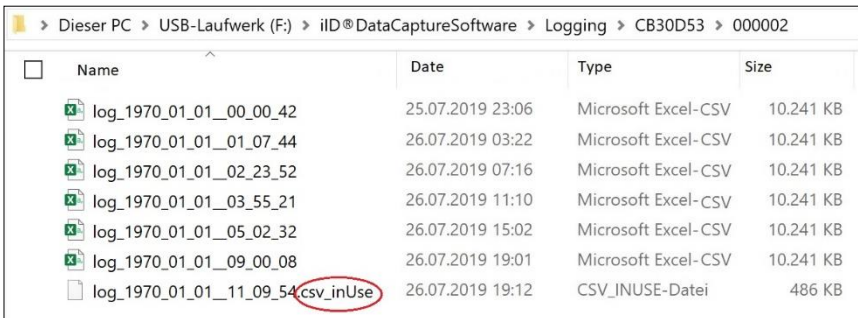
\*new Folder with consecutive number will be created by every new start of the system

- every file with size equal to 10MB is already stored as \*.csv and can be open

- latest logging file is stored as **\*.csv\_InUse**. Follow steps are necessary to get the data from this file

4. change the name form **\*.csv\_InUse** to **\*.csv** (see Figure 4)

- start Microsoft Excel→Open→Browse→choose path of the csv file→select All Files→select the csv file→open (see Figure 5)



Name	Date	Type	Size
log_1970_01_01_00_00_42	25.07.2019 23:06	Microsoft Excel-CSV	10.241 KB
log_1970_01_01_01_07_44	26.07.2019 03:22	Microsoft Excel-CSV	10.241 KB
log_1970_01_01_02_23_52	26.07.2019 07:16	Microsoft Excel-CSV	10.241 KB
log_1970_01_01_03_55_21	26.07.2019 11:10	Microsoft Excel-CSV	10.241 KB
log_1970_01_01_05_02_32	26.07.2019 15:02	Microsoft Excel-CSV	10.241 KB
log_1970_01_01_09_00_08	26.07.2019 19:01	Microsoft Excel-CSV	10.241 KB
log_1970_01_01_11_09_54.csv_inUse	26.07.2019 19:12	CSV_INUSE-Datei	486 KB

Figure 4: Folder with stored data

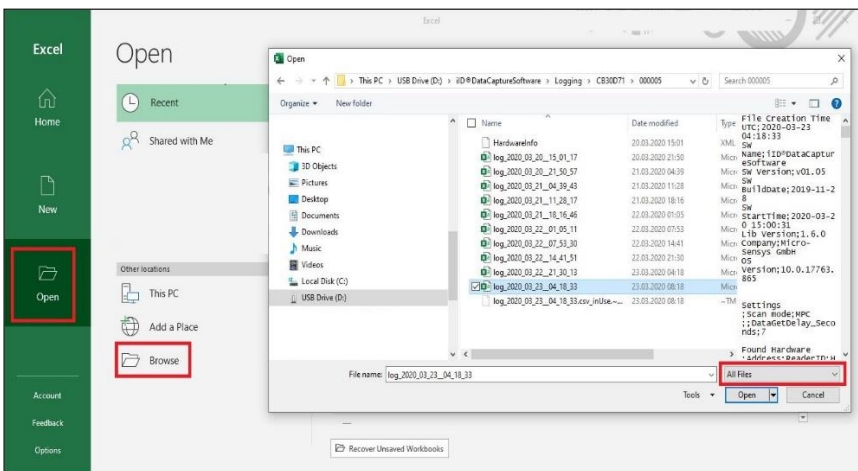


Figure 5: open logging file

### Edit file opened with Microsoft Excel:

- set the column width so that all texts are completely readable
- change the Formatting of data in columns "Timestamp UTC", "FirstTimeFound" and "LastTimeFound" according to this window below to display the time in a correct format, see Figure 5

**Format Cells**

**Number** | Alignment | Font | Border | Fill | Protection

**Category:**

- General
- Number
- Currency
- Accounting
- Date
- Time
- Percentage
- Fraction
- Scientific
- Text
- Special
- Custom**

**Sample**  
iID®BEE logging File

**Type:**  
dd-mm-yyyy hh:mm:ss

dd-mm-yyyy hh:mm  
mm:ss  
mm:ss.0  
@  
[h]:mm:ss  
- \* ##0\_ ; \* ##0\_ ; \* "- ; \_ @ \_  
- \* ##0\_ ; \* ##0\_ ; \* "- ; \_ @ \_  
- \* ##0.00\_ ; \* ##0.00\_ ; \* "-?? ; \_ @ \_  
- \* ##0.00\_ ; \* ##0.00\_ ; \* "-?? ; \_ @ \_  
[s-4009]dd mmmm yyyy  
dd-mm-yyyy hh:mm:ss

Delete

Type the number format code, using one of the existing codes as a starting point.

OK Cancel

Figure 5: Adjust displayed time

## Description of the excel sheet:

	A	B	C	D	E	F	G	H	I	J	K	L
1	File Creation Time UTC	12.12.2019 13:49:46										
2	SW Name	iID®DataCaptureSoftware										
3	SW Version	v01.04										
4	SW BuildDate	24.10.2019										
5	SW StartTime	12.12.2019 13:49:46										
6	Lib Version	01.05.2011										
7	Company	Micro-Sensys GmbH										
8	OS Version	10.0.17763.107										
9												
10												
11	Settings	Scan mode	MPC	Scanning cycle in seconds								
12		Antenna addresses	DataGetDelay_Seconds	5	It shows to wich collection belong the transponder							
13												
14	Found Hardware	Address	ReaderID	HW-Info	FW-Info	Num-Antennas						
15												
16		0x01	255QCMICSCB30D40			2						
17		0x10	200038 D0.21		98.05.11	2						
18		0x11	200038 D0.21		98.05.11	2						
19		0x12	200038 D0.21		98.05.11	2						
20		0x13	200038 D0.21		98.05.11	2						
21	Capture Timestamp			Transponder id								
22												
23	Timestamp UTC	HexAddress	ReaderID	UID	Collection	DataType	FirstTimeFound	LastTimeFound	NumFound	Direction	Ant1	Ant2
24	12.12.2019 13:49:46	10	200038	255QCMICSB8139500042C	Bee Hive 3	MPC	12.12.2019 13:49:45	12.12.2019 13:49:45	14	Arriving	x	x
25	12.12.2019 13:49:46	10	200038	255QCMICSB8B630001F7	Bee Hive 1	MPC	12.12.2019 13:49:46	12.12.2019 13:49:46	14	Arriving	x	x
26	12.12.2019 13:50:02	12	200038	255QCMICSB8C2430001FE	Bee Hive 1	MPC	12.12.2019 13:49:47	12.12.2019 13:49:51	9	Departing	x	x
27	12.12.2019 13:50:02	11	200038	255QCMICSB8D09700042E	Bee Hive 2	MPC	12.12.2019 13:49:47	12.12.2019 13:50:01	9	Arriving	x	x
28	12.12.2019 13:50:02	11	200038	255QCMICSB8B01410001FC	Bee Hive 3	MPC	12.12.2019 13:49:48	12.12.2019 13:50:01	10	Unknown	x	x
29	12.12.2019 13:50:02	13	200038	255QCMICSB8090600042A	Bee Hive 2	MPC	12.12.2019 13:49:48	12.12.2019 13:49:59	12	Departing	x	x
30	12.12.2019 13:50:02	10	200038	255QCMICSB8C19F0001FA	Bee Hive 1	MPC	12.12.2019 13:49:50	12.12.2019 13:50:00	14	Unknown	x	x
31	12.12.2019 13:50:17	13	200038	255QCMICSB8C9D8000426	Bee Hive 1	DPC	12.12.2019 13:50:02	12.12.2019 13:50:16	7	Departing	x	x

## **iID®BEE initialization tool**

Detailed description can be found in the document *QSG-iID®BEE initialization tool*.

This software provides features to optimize beekeeping management. Operations such as organizing bees into groups, hives etc., can be implemented with such little effort. Furthermore, beehives and honeycombs can be managed individually. For example, storing data of the last honeycomb weight or location of beehive. Another advantage is the possibilities for customizing data capture settings. We suggest ordering the iID®PENsolid UHFcc in addition to your Starter Kit or bundle. To be able to use all functions and advantages of the system and the tool. Detailed description of the software can be found in the document *QSG initialization tool.pdf*

## **Properly shutdown the system**

1. Turn off the controller by pressing the button at the controllers back side in position.
2. Disconnect the AC power adapter from the controller power supply port

## Important notes

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### Important notes!

1. Although iID®BEEcontroller, reader devices, antennae and all accessory parts are particularly protected against water and dust, please make sure to prevent harsh environmental conditions from the device.
2. By mounting and connecting AEB-03.C2D devices, please assure a minimum distance of 1.5 meters between each.
3. Do not tie together the separate antenna, reader and power supply cables together.
4. Pull the USB external storage when "Waiting" counter is screened at the display or the controller is off.
5. By disconnecting and connecting again one of the reader devices, please reboot the controller.

All components shall be used like specified in the respective datasheet. Please be careful that the components are protected against rain and dirt or other bad environmental influences. Please keep the readers away from any metal surroundings during operation mode!

### Questions? Contact us:

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