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**Technical manual for the Code Reader MAH 200**

Version of the described product:

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## GENERAL INFORMATION

This documentation has been created with great care.

Nevertheless, progress in technology can cause changes of the product leading to deviations between this documentation and the actual product.

The content of this documentation, the technical data and the specifications of the product may be changed without prior notice.

No part of this documentation may be copied, reprinted or translated without written permission of the Omnitron AG.

**This technical manual serves to assist the user and does not replace adequate education which is offered by the Omnitron AG and qualified partners.**



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## INTRODUCTION

MAH 200 is a revolutionary new, bar MAH 200. Developed to be the first universal reader, no other single device performs as many functions. With a cost of ownership far less than comparable systems, the MAH 200 incorporates a unique dual path optical system, a 1.3 million pixel CMOS sensor, and a 400 MHz processor. This combination has created a reading system that supports:

- High density matrix codes and larger low density linear codes
- Superior working range
- High-speed omni-directional decoding
- Cordless and cabled interfaces

The MAH 200 sets a new benchmark for size and weight. It is smaller and lighter than comparable systems yet can withstand multiple drops to concrete. It is the only product available in handheld, gun handle, and presentation stand form factors with cabled, batch and cordless versions. The cordless version utilizes the latest Bluetooth™ class 1 radio with a 300 foot operating range. The MAH 200 is rugged and lightweight and the cordless version will operate for more than a complete shift at the highest use rate. The MAH 200 performs more than 3000 reads and transmits from a single battery charge. The MAH 200 will automatically discriminate between all major 2-D matrix and linear bar code symbologies and features a timestamp feature for logging data.

Whether you need a small, palm-held device or a traditional gun, MAH 200 was specifically developed so users may easily choose the device that best meets their needs.

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## TARGETING AND READING TECHNIQUES

The MAH 200 utilizes digital camera technology to take a picture of a symbol. Once an image is captured, the MAH 200 utilizes advanced decoding algorithms to extract data from the captured image.

The MAH 200 is available as a palm-held unit or users may purchase a clip-on pistol-grip handle.

The palm held unit features left and right triggers. These triggers may be programmed to perform various features. The reader is shipped with the left trigger and right trigger functioning as a decode symbol command.

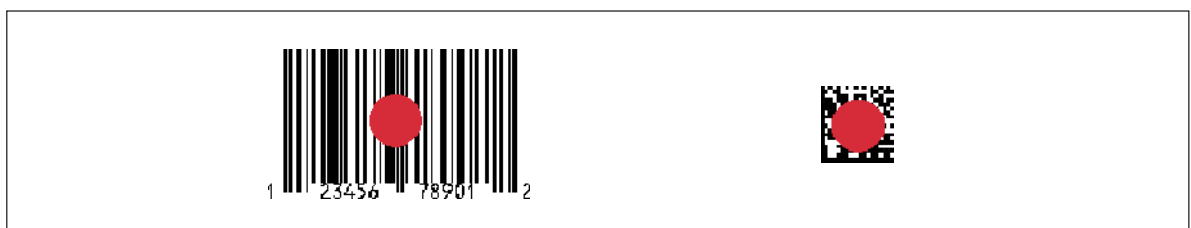
The clip-on pistol-grip handle features a trigger on the handle. The two triggers on the top of the unit also work when the handle is attached.



*The MAH 200 – with and without gun handle.*

### To read a symbol with the MAH 200:

1. The MAH 200 features omnidirectional decoding. Center the symbol in any orientation within the laser dot aiming pattern.



*Laser targeting beam pointed directly into the center of this symbol.*

**NOTE: The MAH 200 can read a symbol that is not centered however, the MAH 200 performs best when a code is centered. If two (2) bar codes are within the imagers decode zone, the MAH 200 will decode the symbol closest to the center of the aiming dot.**

2. The MAH 200 was developed to decode both very small 2-dimensional symbols and larger 1-dimensional symbols. The unit features two imagers to create an innovative dual decode zone. The MAH 200 features a high speed processor and DECODES BOTH ZONES SIMULTANEOUSLY. The unit has one imager focused on a near-field for smaller codes (optimal focal point is 4 inches) and one imager focused on a far-field for larger codes (optimal focal point 9 inches). To read smaller symbols move the MAH 200 closer to the symbol. To read larger symbols move the unit farther away from the symbol. The entire MAH 200 decode zone varies between two (2") and sixteen (16+" or more inches.
3. Hold the MAH 200 still - DO NOT SWIPE OR MOVE THE READER. Press the trigger until the MAH 200 beeps, indicating the bar code has been successfully decoded.

## VARIOUS PROGRAMMING CODES

### Reader-ID and Firmware

Ausgabe der Leser-ID und der Firmware



M153\_01

### Reseting and storing of reader configurations



M071\_01

Clear All Stored Data



M052\_01

Clear All CodeXML Rules



M049\_02

Reset to USB Factory Defaults



M418\_01

Reset to RS-232  
Factory Defaults



M060\_02

Reset to PS2 Factory Defaults



M188\_02

Save Settings

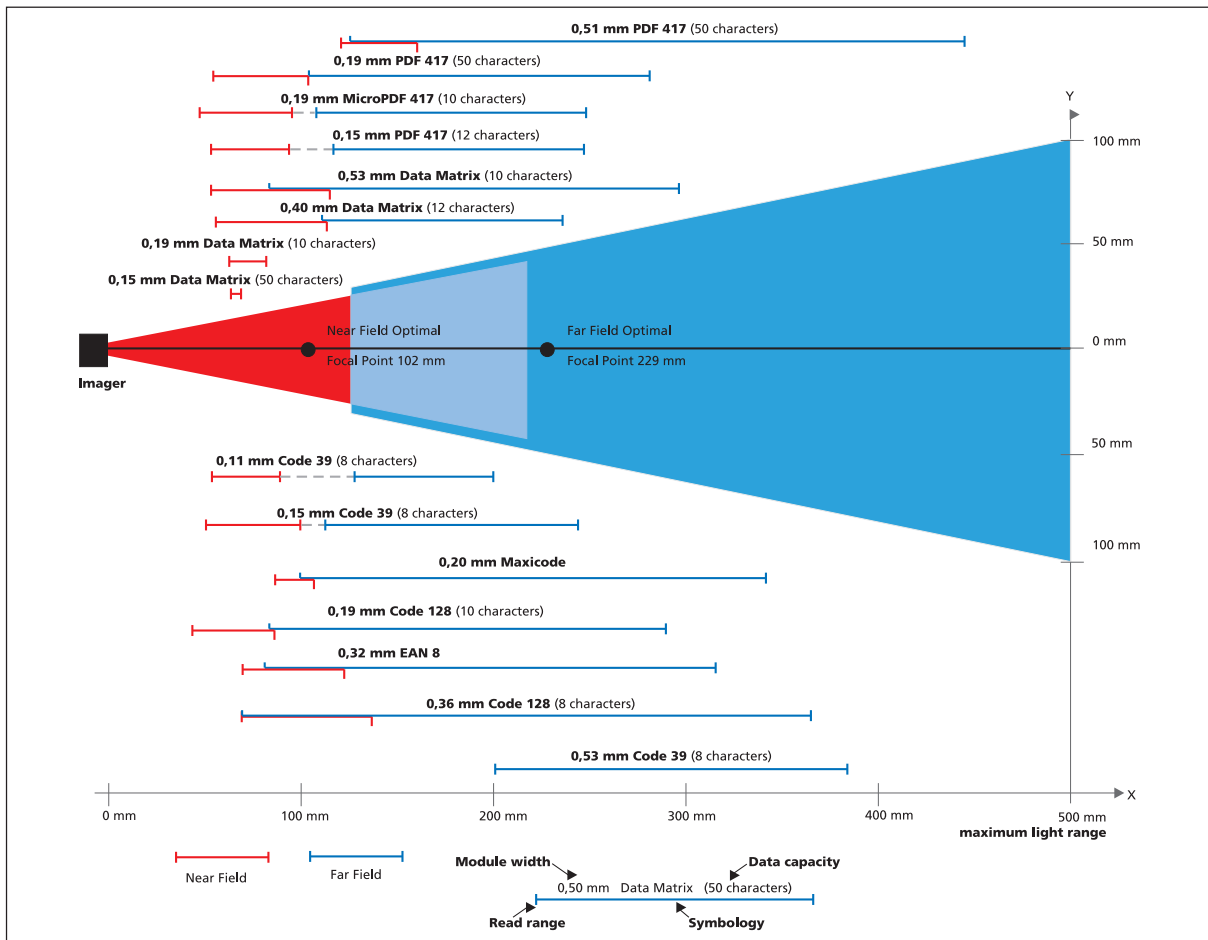


## TECHNICAL DATA

### Overview

|  |
|--|
| <b>Symbologies</b>   |
| MaxiCode, PDF417, Data Matrix, QR Code, MicroPDF 417, GoCode, UCC Composite, Aztec Code, Code 39, Code 128, UPC, EAN, JAN, Int 2 of 5, Codabar, Code 93, UCC RSS, POSTNET, PLANET, Japanese Post, Australia Post, Royal Mail, RM4SCC, KIX Code |
| <b>Sensor</b>  |
| CMOS (1024 x 1280 = 1,3 Mio Pixel)   |
| <b>Optical Resolution</b>  |
| Near- Field 1024 x 640 Pixel und Far Field 1024 x 640 Pixel  |
| <b>Interfaces</b>  |
| USB (standard), RS-232, PS 2, Bluetooth Class 1 Radio  |
| <b>Dimensions</b>  |
| 33 x 109 x 46 mm   |
| <b>Weight</b>  |
| 51 g (without cabel)   |
| <b>Ambient Temperature</b>   |
| 0° C bis 40°C  |

# Decode zone



## SYSTEM REQUIREMENTS

### Operating System

Windows 98 (Version 2), ME, 2000, XP

### Interfaces

USB or RS-232 / seriell / PS 2

### Bluetooth

The MAH 200 supports the seriell communication profil.

## ORDER INFORMATIONEN

| Part-Nr.                    | Description   |
|-----------------------------|---|
| 182028                      | MAH 200 Handheld reader with 1.80m cable for USB interface  |
| 182029                      | MAH 200 Handheld reader with gun format handle, 1.80m cable for USB interface   |
| 182030                      | MAH 200 Handheld reader with batch store, 1.80m cable for USB interface and battery LiON 1300 mAH   |
| 182031                      | MAH 200 Handheld reader with batch store, gun format handle, 1.80m cable for USB interface and battery LiON 1300 mAH                          |
| 182032                      | MAH 200 Handheld reader, cordless, 1.80m cable for USB Interface, battery LiON 1300 mAH and Bluetooth Radio Module Class 1                    |
| 182033                      | MAH 200 Handheld reader, cordless, gun format handle, 1.80m cable for USB Interface, battery LiON 1300 mAH and Bluetooth Radio Module Class 1 |
| 182034                      | MAH 200 Handheld reader with 2,40m cable for PS2 interface  |
| 182035                      | MAH 200 Handheld reader with gun format handle, 2,40m cable for PS2 interface   |
| <u>Options/ Spare parts</u> | <u>Options/ Spare parts</u>   |
| 182036                      | MAH 200 Handheld reader only  |
| 182037                      | Gun format handle for MAH 200   |
| 182038                      | Cable 1,80m for USB Interface   |
| 182039                      | Cable 2.40m (with RS232 Interface and power supply connection)  |
| 182040                      | Cable 1,80m for PS2 Interface   |
| 182041                      | Battery LiON 1300 mAH   |
| 182042                      | Battery LiON 1800 mAH   |
| 182043                      | Bluetooth Module  |

| <b>Part-Nr.</b>             | <b>Description</b>                                       |
|-----------------------------|--|
| <u>Options/ Spare parts</u> | <u>Options/ Spare parts</u>                              |
| 182044                      | Power Supply RS232                                       |
| 182045                      | Battery Charger incl. power supply                       |
| 182046                      | Code Router Software (Bluetooth Edition Windows)         |
| 182047                      | Bracket for MAH 200                                      |
| 182048                      | Bluetooth modem incl. RS 232 cable and power supply      |
| 182049                      | Cable 2.40m for RS232 Interface incl. power supply       |
| 182050                      | Bluetooth USB Dongle, Class 1, 100m, Quick Connect Label |
| 184285                      | Bluetooth modem incl. PS2 Cable                          |

## APPENDIX A – USB INTERFACE

### Installation Guide

To connect the MAH 200 to your host computer via USB interface:



1. Make sure the USB cable is sufficiently attached to your MAH 200 unit (figure 2.1).
2. You DO NOT need to power off your host computer (figure 2.2). The MAH 200 with USB interface can be plugged into any host while the computer is powered up.
3. Connect the USB interface cable to the host (figure 2.3). If you are unsure of the proper location to connect the USB cable please consult the manual of your host computer.
4. The USB interface does not require additional power supply. If you are using the 1300 mA or 1800 mA battery for batch mode, the MAH 200 will automatically recharge the battery whenever the unit is attached to a host that is powered up.
5. The MAH 200 will power on automatically.
6. Scan the USB Keyboard Mode code to then the Save Setting code to configure reader:

#### USB Keyboard Mode (Default)



M134\_01

#### Save Settings



M188\_02

*Note: For more information on other USB modes, please see section 5.2 of the MAH 200 Users Manual*

7. Your MAH 200 unit should be ready for use. Open the application (any Windows based application that accepts Keystroke data – e.g. Notepad) you wish to send data and begin scanning.



Figure 2.1



Figure 2.2



Figure 2.3

## APPENDIX B – RS-232 INTERFACE

### Installation Guide

To connect the MAH 200 to your host computer via RS-232 interface:

1. Make sure the RS-232 cable is sufficiently attached to your MAH 200 unit (figure 2.4).
2. Connect the RS-232 interface cable to your host computer (figure 2.5). If you are unsure of the proper location to connect the RS-232 cable please consult the manual of your host computer.
3. The RS-232 interface should have come with a power supply. Plug the power supply adapter into the RS-232 interface cable (figure 2.6) and then plug the power adapter into a wall socket (figure 2.7). The RS-232 interface does not require additional power. However, if you are using the RS-232 interface and utilizing Batch functionality, please read the Important Note in section 7.1. If you are using the 1300 mA or 1800 mA battery for batch mode, the MAH 200 will recharge the battery whenever the unit is attached to a RS-232 cable that is plugged into a wall socket.
4. The MAH 200 will power on automatically.
5. Scan the RS-232 One Way Mode code then the Save Settings code to configure reader:

**RS-232 One Way Mode**



**Save Settings**



*Note: All Baud Rate, Parity, Stop Bit and Data Bit settings can be found in Chapter 5 of the MAH 200 User Manual.*

6. Your MAH 200 unit should be ready for use. Open the application (any Serial Communications Software – e.g. Hyper Terminal) you wish to send data and begin scanning.



Figure 2.4



Figure 2.5

**Default Settings**

|           |       |
|-----------|-------|
| Baud Rate | 57600 |
| Stop Bits | 1     |
| Data Bits | 8     |
| Parity    | None  |



Figure 2.6



Figure 2.7



Figure 2.8

## APPENDIX C – PS 2 INTERFACE

### Installation Guide

1. Power off the host computer.
2. Attach the end of the PS2 cable with the single connector **A** to the MAH 200.
3. If external keyboard exists, unattach your keyboard from the host and connect the appropriate connector to the PS2 cable **B**.
4. Connect the other connector to host computer into keyboard port **C**. The MAH 200 is powered by the PS2 port and does not require a power supply.

5. Set the MAH 200 to PS2 mode by scanning the code below, then scan the Save Settings code:

**PS2 Mode**

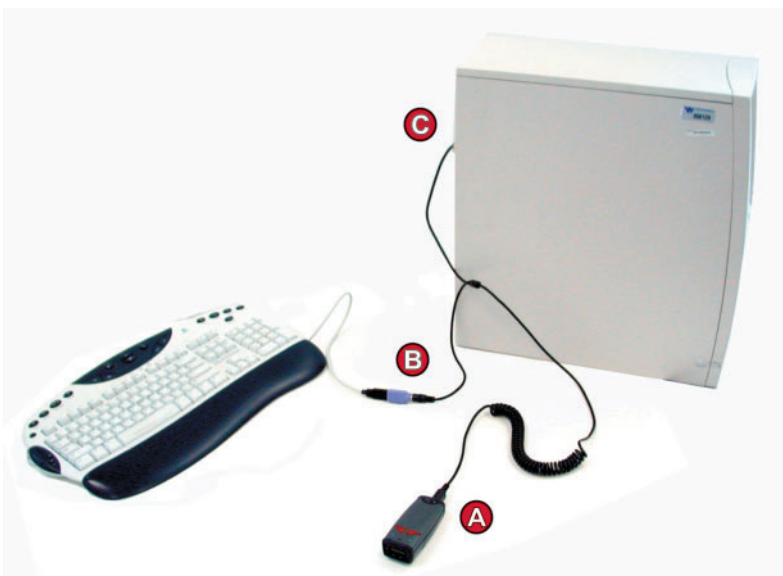
**Save Settings**



6. Your MAH 200 unit is now ready. Open the appropriate application (any Windows based application that accepts Keystroke data – e.g. Notepad) and begin scanning data.

**Upgrade Note:** The PS2 model does not work with a USB cable. If you are upgrading the firmware you must use an RS-232 cable.

**WARNING:** Code does not recommend using Batch or Bluetooth Radio modes with the PS2 interface because you need to disconnect the MAH 200 and the keyboard and this may result in the host computer freezing and requiring you to reboot.





## APPENDIX D – BLUETOOTH RADIO OVERVIEW

### Overview

This version of the MAH 200 features a Bluetooth® wireless radio. The radio allows for point to point wireless communication with other Bluetooth devices that support serial port protocol (SPP). The following guide will give you general instructions on connecting your MAH 200 to a desktop or laptop computer with a Bluetooth radio.

### Connecting With A *Quick Connect Code*

The easiest way to connect to a Bluetooth device is to visit Code's web site and create a *Quick Connect Code* that is specific to your device (figure 2.9). This code will link your MAH 200 directly to the desired Bluetooth device. To create a *Quick Connect Code*, you will need to know the Bluetooth address (often referred to as the BD\_ADDR) of that device. You can usually find the 12-character Bluetooth address somewhere on the device near the device's serial number (see figure 2.10).



If you purchased a CodeXML Bluetooth Modem or a Belkin® Bluetooth adapter from Omnitron from an authorized distributor, a *Quick Connect Code* is included. The CodeXML Bluetooth modem is a simple hardware solution for customers who wish to enjoy the benefits of cordless data collection without modifying existing applications or installing software. Please contact the Omnitron Support Team for more information.

**Note:** While installing the Bluetooth Configuration Manager software that came with the adapter, make sure to take note of the Virtual COM Port the software has assigned for the adapter (e.g. COM 10). This is the COM Port your MAH 200 will connect through.

Scan the RF One Way - Max Range code below then the *Quick Connect Code* and your MAH 200 will automatically connect. You should also scan the Save Settings code if you want to save these settings (**Note:** If the MAH 200 unit powers off without scanning the Save Settings code, you will lose your settings).

#### RF One Way Mode (Max Range)



#### Quick Connect



#### Save Settings



## APPENDIX D – BLUETOOTH RADIO OVERVIEW (CON'T)

### Radio Range and Transferring Data

The MAH 200 radio is a Class 1 device. If connected to another Class 1 device the unit has roughly a 300 foot line of sight operating range. If connecting to a Class 2 or Class 3 device, the operating range may drop to match the lower range. Once a unit is connected, the application software on the host must be open to receive data.

When the MAH 200 detects the radio is out of range, the MAH 200 will store data on the reader's non volatile memory. The reader will continue to try and send data until radio is back in range. Once the data is sent the data will be erased from the units memory. If the radio cannot connect in 90 seconds, it will give an error beep. The reader will continue to try and connect until it has reached the programmable radio time out setting.

### The MAH 200 Bluetooth protocol allows for two (2) forms of communication:

1. One Way Mode - Defined as one way communication between the reader and host. One Way mode only recommended when connecting to a device well within its specified range or if connected to a device without an operating system (i.e. printer). There are two settings in this mode:

- Max Range (Default) - Greater range but data reliability is lower
- Max Reliability - Limits range but reliability is improved

#### RF One Way Mode (Max Range)



M127\_01

#### RF One Way Mode (Max Reliability)



M128\_01

**Note:** While robust, One Way Mode doesn't guarantee data integrity and you may have data loss.

2. RF Two Way Mode - This is two way communication between the host and reader. This requires the implementation of software at the application level.\* The reader receives confirmation via packet protocol verification and is 100% reliable. Data will be automatically retransmitted if necessary.

#### RF Two Way Mode



M129\_02

\* Note: You will need to install application software that supports packet communication to operate in RF Two Way Mode. Omnitron offers a Windows or Pocket PC version of software called CodeXML Router - Bluetooth Edition (BE) that provides for end-to-end Bluetooth handshakes that eliminate out-of-range data loss. CodeXML Router - BE also offers Bluetooth to keyboard wedge communication for applications that require keyboard port input.

If you are using the CodeXML Bluetooth modem, you must use RF Two Way Mode.

## APPENDIX D – BLUETOOTH RADIO OVERVIEW (CON'T)

### Save Settings

Scan the code below to make the RF settings permanent on the reader:

### Save Settings



### Disconnecting from the Device

You may force disconnection by reading the disconnect code below (The MAH 200 may not appear disconnected in the slave Bluetooth connection manager for 10 – 15 seconds after the command is issued). The MAH 200 will also disconnect after 90 seconds of inactivity (Note: You may change the radio frequency sleep time out setting however, it may reduce battery life).

### Disconnect



### Reconnecting to the Device

If the device is saved in RF mode it will automatically reconnect when:

1. MAH 200 is powered up
2. MAH 200 wakes from sleep mode
3. MAH 200 reads another code