Contents

1 Document Control .............................................................................................................. 3
   1.1 Document History ......................................................................................................... 3
   1.2 Abbreviations .............................................................................................................. 3
   1.3 Reference Documents .................................................................................................. 3
2 User Safety Warning Information ..................................................................................... 4
3 System Components ........................................................................................................... 6
4 Hardware installation .......................................................................................................... 8
   4.1 Attaching the sensor to the bracket ............................................................................. 8
   4.2 Connecting Sensor to supplied cable set ................................................................... 9
      4.2.1 Power Supply ...................................................................................................... 9
      4.2.2 Communication ................................................................................................. 9
5 Interface Installation and Settings .................................................................................... 11
   5.1 Option 1: Ethernet Interface (available in future release) ....................................... 11
   5.2 Option 2: CAN-Bus Interface .................................................................................... 12
   5.3 Option 3a: RS485 Interface Full Duplex – Moxa UPort 1130 .................................. 14
   5.4 Option 3b: RS485 Interface Full Duplex – Moxa NPort ......................................... 15
6 TMC Software Installation and First-Steps .................................................................... 19
   6.1 New Single Sensor ..................................................................................................... 20
   6.2 New Intersection ....................................................................................................... 24
   6.3 New Arterial .............................................................................................................. 24
   6.4 New Enforcement ........................................................................................................ 24
   6.5 Get your personal Training! ...................................................................................... 24
7 Important Legal Disclaimer Notice ................................................................................... 25
8 Contact ............................................................................................................................... 26

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1 Document Control

1.1 Document History

<table>
<thead>
<tr>
<th>Date</th>
<th>Author</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-05-24</td>
<td>Waldmann</td>
<td>Document created</td>
</tr>
<tr>
<td>2018-10-09</td>
<td>Sokoll</td>
<td>User Safety Warning Information added</td>
</tr>
</tbody>
</table>

1.2 Abbreviations

- CAN: Controller Area Network
- CSV: Comma Separate Value
- ETM: Event Trigger Module
- GUI: Graphical User Interface
- PC: Personal computer
- SM: Statistics Module
- TBC: To be confirmed
- TBD: To be defined
- TISF: Traffic Installation Setup File (*.tisf)
- TMC: Traffic Management Configurator
- TSDG: Target Simulator Doppler Generator
- UDT: Universal Data Transmission
- UMRR: Universal Medium Range Radar
- TMIB: Traffic Management Interface Board

1.3 Reference Documents

[RD1] TMConfigurator_EasyMode.dsk
2 User Safety Warning Information

Read the instructions carefully before you start to work.

Installation
Please observe the following advices when installing and connecting the sensors:
- Only use provided or approved equipment for installation. Use stainless screws with metric thread M3x8. Screw length must be adapted if the customer uses own brackets.
- Only skilled and instructed persons shall install and connect the devices. Proper experience in working with mains voltage, electrical and electronic devices is required.
- Don't connect the devices directly to mains voltage, instead use the voltage given in the manual.
- Don't wire any connections while power is applied to the device.
- Ground the devices carefully to prevent electrical shock.
- All connectors are pin-coded and fit in only one position. Also note the arrows indicating the top side of the sensor.
- Only use fully functional equipment (ladders, aerial work platform, ...) when working above ground. Staff shall be capable of working at heights.
- Use caution when installing the devices on or around active roadways. Pay attention to moving traffic.
- Mount the devices carefully to prevent them from shifting or dropping.
- The devices must be mounted to a stiff and solid support. Vibration, oscillation or any kind of movement will reduce the sensor performance.
- Make sure that your installation methods are in accordance with local safety policy and procedures and company practices.

Technical service
Only use provided or approved equipment for operation. Persons other than authorized and approved electrical technicians shall NOT attempt to connect this unit to a power supply, Traffic Management Interface Board and/or other controllers, as there is a risk of electrical shock by unsafe handling of the power source. Do not attempt to service or repair this unit.
- No user-maintainable parts are contained within the device.
- To avoid electrical shock, do not remove or open the cover.
- Unauthorized opening will void all warranties.
- Smartmicro is not liable for any damages or harms caused by unauthorized attempts to open or repair the device.

Radiation
This product has been tested and found to comply with Part 15 Subpart C of the Federal Communications Commission (FCC) rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This device generates radio frequency energy. There are strict limits on continuous emission power levels. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

- Human exposure to transmitted waves from this device is generally considered as safe.
- Nevertheless, it is considered good practice that humans are not subject to higher radiation levels than necessary.
- This device may interfere with other devices using the same frequency band.

**Operation**

Transmission of radio frequency waves starts after the sensor is powered up and stops when disconnecting it from power. Connecting the device to a TMIB or another controller will not change the transmitted signal. Using a JBOX or SRO does not influence sensor performance.

For testing purposes, the sensor may be laid on its face when it is powered up, given that the surface or connectors will not be damaged by doing so. Please note that this position is not intended for permanent use.

It is recommended that only one connection interface is used at a time. Do not operate the device if the device itself or any cables are damaged. The sensors may become hot during operation, so proper hand protection is recommended for maintenance work. The sensors are designed to work under different environment conditions (temperature, rain, dust, …). Regular maintenance such as cleaning or recalibration is not required.
## 3 System Components

The following components are needed to get started:

<table>
<thead>
<tr>
<th>Installation</th>
<th>Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracket-050400</td>
<td>UMRR-11xxxx-2Cxxxx (Type 44), UMRR-11xxxx-2Dxxxx (Type 45)</td>
</tr>
<tr>
<td>Screws</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication and Power Supply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TMC Software V2.2 and greater</td>
<td></td>
</tr>
<tr>
<td>Download here</td>
<td></td>
</tr>
<tr>
<td>and Windows PC</td>
<td></td>
</tr>
<tr>
<td>DC power supply for sensor</td>
<td></td>
</tr>
<tr>
<td>recommended: 24 V DC</td>
<td></td>
</tr>
<tr>
<td>Connection cable</td>
<td></td>
</tr>
<tr>
<td>CABLE-0C0200</td>
<td></td>
</tr>
</tbody>
</table>
## Communication Interface

**Option 1: Ethernet – available in future release**

- RJ45 Cat5 Patch Cable and Network-Adapter-Card or USB – Ethernet-Adapter

**Option 2: CAN**

- CAN-BUS-to-USB Converter
- CAN2USB-000000

**Option 3: RS485 Full Duplex**

- a) *Standard USB-RS485 Full-Duplex*: Moxa UPort 1130
- b) *Multi Configuration*: Moxa NPort

**ATTENTION**: The RS485USB ("Lindy") device is not suitable. Do NOT connect.
4 Hardware installation

4.1 Attaching the sensor to the bracket

1. Attach the bracket to the sensor using the provided screws. Arrows on the figure indicate where the screws should go.

   *Note: At the back of every sensor is a tag indicating the product description, serial number and the top side of the sensor.*

2. Attach the end of the connection cable to the connector at the rear side of the sensor.

   *Note: Do not apply much force. Socket and plug are protected by design against wrong polarity.*

3. Strap the sensor onto the pole loosely to allow for azimuth adjustments when necessary. With azimuth angle set correctly, tighten the straps.

4. To tilt the sensor for correct elevation setting, loosen the screws on either side of the bracket and adjust the elevation setting. Once the desired elevation angle is obtained, secure the sensor in place by tightening the screws.

   *Note: there is an angular scale at the bracket side with increments of 2 degrees.*
4.2 Connecting Sensor to supplied cable set

4.2.1 Power Supply

<table>
<thead>
<tr>
<th>Connect the banana plugs to a DC power supply. Voltage range must be within 8 – 32 V DC. (24 V DC is recommended)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Red Plug</strong> = +8 ... 32 V DC</td>
</tr>
<tr>
<td><strong>Black Plug</strong> = Ground</td>
</tr>
</tbody>
</table>

4.2.2 Communication

It’s recommended to use just one interface at a time.

**Option 1: Ethernet (available in future release)**

1. Attach the RJ-45 connector of CABLE-0C0200 to the RJ-45 socket of your network card or USB – Ethernet-Adapter.

2. Make sure that your network card or USB-Ethernet-Adapter is correctly installed on your PC (driver installation, etc.)

**Option 2: CAN**

1. Attach the CAN DB-9 connector of CABLE-0C0200 to the DB-9 connector of the CAN-to-USB converter (CAN2USB-000000).

2. The USB connector of the CAN-to-USB converter shall be plugged into a free USB slot of your used computer.
**Option 3a: RS485 Full Duplex – Moxa UPort**

1. Attach the RS485 DB-9 connector of CABLE-0C0200 to the DB-9 connector of the Moxa UPort.

2. The USB connector of the RS485-to-USB converter shall be plugged into a free USB slot of your used computer.

**Option 3b: RS485 Full Duplex - Moxa NPort**

3. Attach the RS485 DB-9 connector of CABLE-0C0200 to the DB-9 connector of the Moxa NPort and connect the ethernet cable from the Moxa to the network card or USB-Ethernet-Adapter.

4. Make sure that your network card or USB-Ethernet-Adapter is correctly installed on your PC (driver installation, etc.).
5 Interface Installation and Settings

The following chapter includes the recommended settings for each interface option.

5.1 Option 1: Ethernet Interface (available in future release)

Table 1: Ethernet Adapter Settings

1. Before using the Ethernet Interface, check if all necessary drivers are installed on your used PC and the network adapter is working properly.

You can open the Device Manager by + Break -> Device Manager (on left side)

2. Change the IP address of your used network adapter to **192.168.11.1** and use Subnet Mask **255.255.255.0**

   **For Windows 7:**
   Control Panel -> Network and Internet -> Network and Sharing Center -> Change adapter settings (on left side) -> Right-Click on used Network adapter -> Select "Properties" -> Internet Protocol Version 4 (TCP/IPv4)
5.2 Option 2: CAN-Bus Interface

Before using the CAN to USB converter it is necessary to install the driver first. The latest version can be found on the homepage [http://www.can232.com](http://www.can232.com) via the menu go to Downloads → CANUSB Download

Download and unpack both zip files:
- FTDI USB driver
- CANUSB DLL driver

Table 2: CAN to USB Driver Installation

<table>
<thead>
<tr>
<th>1. Attach the hardware to a free USB slot. The information will be shown that windows has found a new hardware. This will launch the hardware wizard.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Please select “No, not this time” and press Next</td>
</tr>
<tr>
<td>3. Select ”Install from a list or specified location (Advanced)” and click Next</td>
</tr>
</tbody>
</table>
4. Select “Search for the best driver in location” and enter the file path in the combo-box (e.g. C:\CANUSB\Drivers\D2xx).

Press Next.

5. After finishing the installation verify that the driver has been successfully installed. You can open the Device Manager by Win + Break -> Device Manager (on left side).

The device appears as an additional COM port with the label “CANUSB”.
5.3 Option 3a: RS485 Interface Full Duplex – Moxa UPort 1130

Table 3: Moxa UPort driver installation

1. Connect the UPort 1130 to your PC.
   **ATTENTION:** The RS485USB (“Lindy”) device is not suitable. Do NOT connect.

2. Install drivers for your device if necessary. Drivers for various operating systems can be found online, e.g.: [http://www.moxa.com/product/UPort_1130_1130I.htm](http://www.moxa.com/product/UPort_1130_1130I.htm)

   Restart your PC after installation. The following indications show correct installed drivers under Windows 7 (x86 or x64):

   ![Image showing correct installed drivers]

3. Open the windows device manager and adjust the following settings. The used default COM-port number in TMC v1.3 or newer is: 99. For Moxa UPort 1130I, you can change the default port number under "Multi-port serial adapters". Moreover change Interface to “RS-485 4W” for Full-Duplex (4 Wires) communication. The default sensor baudrate is 115 200 bit/s and must match the serial adapter settings (MOXA USB Serial Port).

   ![Image showing device manager settings]

   ![Image showing UPort 1130 properties]

   ![Image showing Moxa USB Serial Port properties]
### 5.4 Option 3b: RS485 Interface Full Duplex – Moxa NPort

#### Table 4: Moxa NPort settings

1. Type the factory default IP into the browser: 192.168.127.254

2. Click on Quick Setup

3. Change the IP and Netmask: 192.168.11.254 255.255.255.0 and click on next

4. Choose the Real COM mode and click on next
5. Use following settings:
   Baud rate: 115200
   Data bits: 8
   Stop bits: 1
   Parity: None
   Interface: **RS-485 4-wire**

   Click on Next

6. Click on Save/Restart

7. Install the NPort Administration Suite
8. Start the NPort Administration Suite
9. Click on Search
10. Click on COM Mapping

11. Click on Add

12. Choose the correct NPort

Click OK
13. Click Apply and remember the COM Port number.
6  TMC Software Installation and First-Steps

Download the TMC installer from our website, and run the installer. The first-time user will have to register the software.

- At first start of the software the Registration window will appear
- Send the generated registration request code to your smartmicro distributor or to tmteam@smartmicro.de

Use this button to copy and send the request code

Use this button to paste the received access code

- You will receive a registration access code via e-mail as fast as possible
- Copy & paste your access code into the registration window using the “paste access code” button

Four different configuration modes are available:
1) **New Single Sensor**, for a fast setup of a single sensor (may include one TMIB)
2) **New Intersection**, for a multi-sensor-setup (up to 4 sensors), esp. at intersections
3) **New Arterial**, for setting up a sensor for Highway Counting project.
4) **New Enforcement**, for setting up a sensor for Red Light / Speed Enforcement purposes
6.1 New Single Sensor

This mode is recommended for a fast setup of a single sensor intersection project. This configuration method is designed as “Plug-And-Play”-Mode.

**Table 5: TMC – New Single Sensor” Setup**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Install the latest TMConfigurator Software (<a href="#">Download Here</a>).</td>
</tr>
<tr>
<td>2.</td>
<td>Start the latest TMConfigurator Software.</td>
</tr>
</tbody>
</table>
| 3. | If *Ethernet Interface* is used:  
Please make sure that the TMC Software and the TCP port 55555 won’t be blocked by your firewall.  
**Minimum needed communication:** "Allow Public Networks”  
*Optional: How to open a port within the Windows Firewall settings:*  
[http://windows.microsoft.com/en-us/windows/open-port-windows-firewall#1TC=windows-7](http://windows.microsoft.com/en-us/windows/open-port-windows-firewall#1TC=windows-7) |
4. Double check sensor connections:
   I.) power supply
      (24 V DC is recommended)
   II.) communication interface
        (Ethernet, PC-USB-Adapter, etc.).

5. By default, the TMC starts up with the Installation Wizard.

   If previously changed, go to:
   File -> Load Desktop and choose the Desktop-File named in [RD1]


   Select „Next“ to proceed. The project settings are saved as a TrafficInstallationSetup-File (*.tisf) on your PC if you click on “Save”

   Please note: For a multi-sensor-setup (up to 8 sensors), it is recommended to select “New Intersection“.
7. Proceed to “Test” for an automatic identification of your connected device.

For **Ethernet**:
- Default Settings are named on “Basic Settings”.
- With TMIB: “Check List” shows wiring principle.

8. TMC will automatically connect over the used interface (Ethernet, RS485 or CAN) to the sensor.

Please, wait till the sensor is automatically found and identified.

If you are having problems to connect to the sensor:
- Check wiring (Power Supply, DSUB-9-Pins, etc.)
- **Ethernet Interface**: You can use a network analyzing tool (e.g. [https://www.wireshark.org/](https://www.wireshark.org/)) and check for correct IP configurations.
9. The *New Single Sensor* project includes a predefined template that can be adjusted to the desired application:
   a. Lane Setup
   b. Sensor Position
   c. Trigger Zones
   d. Statistic Zones
   e. Etc.

If you need further help, each step also includes a corresponding How-To-Video.

10. Finally, apply your settings to the connected device.

The corresponding settings can be saved within the “TISF-File” and should be stored on a backup drive (PC hard disk, flash drive, etc.).

You are ready to take your measurements!
6.2 New Intersection

In a multi-sensor-setup (up to 4 sensors), especially at intersections, it is recommended to use the "New Intersection" option to setup all devices within one project-file (*.tisf). The configuration for this case is done similar to the "New Single Sensor" option.

In difference to "New Single Sensor", the serial number of each device is needed to distinguish the devices. Using the Auto Detection feature, the sensors, TMIBs and their serial numbers are easily detected on a network. Each configuration step includes a corresponding How-To-Video.

6.3 New Arterial

The “New Arterial” option follows the same work flow as a “New Single Sensor” project. One sensor is configured. The focus of the guided installation is on setting up the sensor to report statistics data.

6.4 New Enforcement

The “New Enforcement” option follows the same work flow as a “New Single Sensor” project. One sensor is configured. The focus of the guided installation is on obtaining the vehicle object data.

6.5 Get your personal Training!

smartmicro offers a personal training for technicians, traffic engineers and consultants. Please contact us to schedule your training:

us-support@smartmicro.de, for requests originating from North and South America

eu-support@smartmicro.de, for requests originating from Europe, Russia and Africa

asia-support@smartmicro.de, for requests originating from the Asia Pacific region
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