# ZMCoup RF 868 / 915

## KNX TP/RF Media Coupler

**ZRFMC868**

**ZRFMC915**

Application Program version: [1.0]

User Manual version: [1.0]_a

www.zennio.com

# CONTENTS

# 1 INTRODUCTION

## 1.1 ZMCoup RF 868 / ZMCoup RF 915

ZMCoup RF is the solution from Zennio for the **interconnection** of **KNX twisted-pair lines and RF** medium.
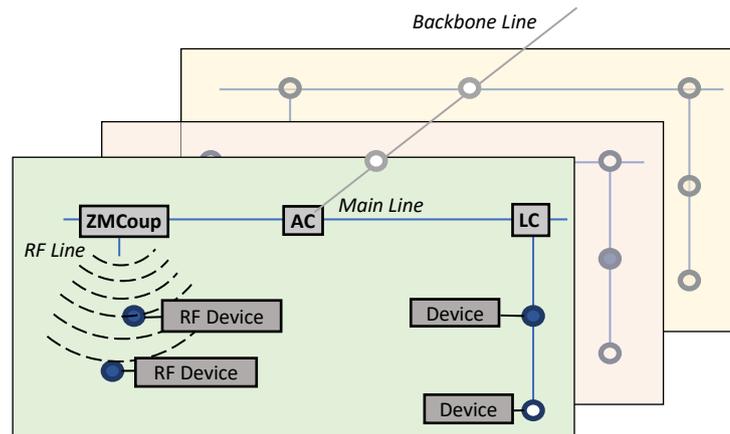


**Figure 1**. Context (Topology)

There are two different products for two different frequencies:

- **ZMCoup RF 868** (ref. ZRFMC868) for 868 MHz.

- **ZMCoup RF 915** (ref. ZRFMC915) for 915 MHz.

Hereafter this document will refer to ZMCoup RF generically for both devices.

These are the most outstanding features of the device:

- Support for **long messages** (up to 254 bytes).

- **High-capacity internal buffer** for the reception of telegrams in installations with high bus loads.

- **No external power required.**

- **Lighting indicator (LED)**: indicates programming mode (red permanent), secure mode (red blinking) and RF traffic (short green blink with every telegram received)

---

- **Retransmitter** function.

- Can be used as an **area or line coupler** with a TP line as main line or main area line.

- **Traffic filtering** according to the project topology and to the built-in address table.

- **Telegram blocking,** group and device-configuration telegrams (telegrams destined to physical addresses).

## 1.2  INSTALLATION

1. **Programming button /**
   **Factory reset button**
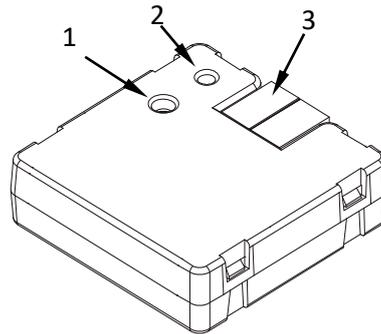2. **Programming / RF traffic LED**
3. **KNX connector**



**Figure 2** Element Diagram

Figure 2 shows a scheme of the device, which does not require an external power supply, it is powered through the KNX bus.

A short press on the programming button (1) will make the device enter the **programming mode**. The Programming LED (2) will then light in red. On the contrary, if this button is held while the device gets connected to the bus, ZMCoup RF will enter the **safe mode**. In such case, the programming LED will blink in red colour.

If the device is already in safe mode and this button is held for more than 10 seconds, a **factory reset** is performed, setting it back to the factory default state, including the initial individual address (15.15.0).

For detailed information about the technical features of the device, as well as on security and installation procedures, please refer to the device **Datasheet**, bundled within the original packaging of the device and also available at http://www.zennio.com.

# 2  CONFIGURATION

ZMCoup RF is intended for the interconnection between a KNX bus and a RF network. This device can be used as a line coupler (for coupling both a RF line to a mainline) and as a RF retransmitter.

## 2.1  ZMCoup RF AS RF/TP COUPLER

ZMCoup RF can be used as a **line coupler** (for coupling both a line to a mainline) or as an **area coupler** (for coupling a main line to an area line, also referred to as *backbone line*). The operation on both cases is analogous – being a line coupler or an area coupler only depends on the location of the device within the topology.

Figure 3 shows a typical scenario where ZMCoup RF can be installed as any of the nodes the nodes labelled as "AC" (area coupler) or "LC" (line coupler):

- Coupling an area line and a main line requires an **area coupler** (AC). ZMCoup RF is intended for cases where the medium of the former is TP while the medium of the latter is RF.

- Coupling a main line and a line requires a **line coupler** (LC). ZMCoup RF is intended for cases where the medium of the former is TP while the medium of the latter is RF.
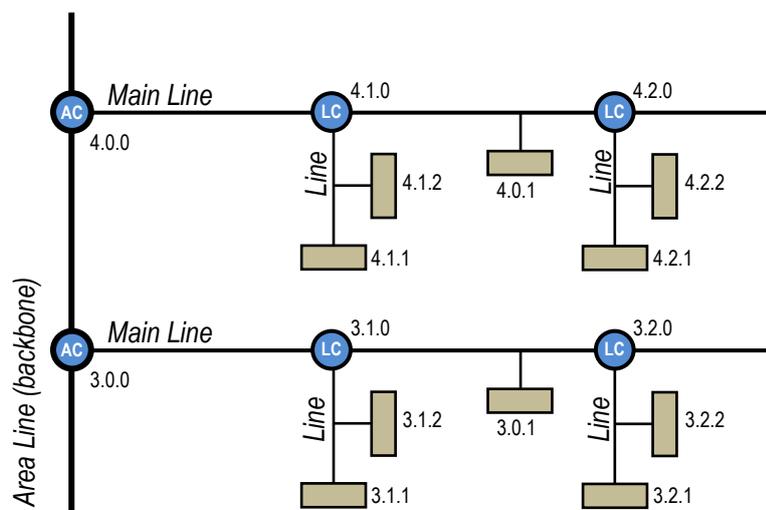


**Figure 3** Line Coupling

It is important to consider that for RF lines or areas it is necessary to identify each of them with a unique **RF Domain**, in order to isolate one from each other. Every RF telegram has its domain and RF devices will only accept telegram with the same domain. An example can be seen on Figure 4.
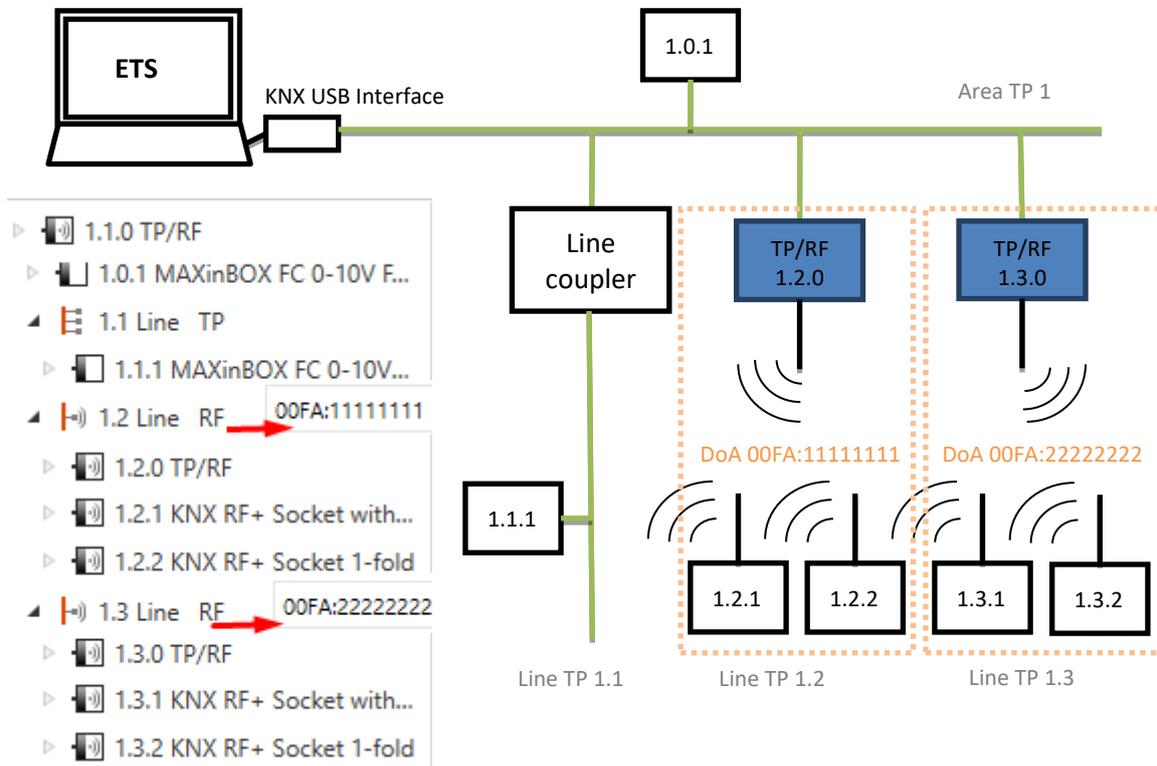


**Figure 4** Example of a TP + RF mixed installation

Whatever the location in the topology, ZMCoup RF offers an insulated coupling interface with the possibility of **filtering the traffic** according to the topology or to group-address dependent criteria. In other words, ZMCoup RF will (or will not) let telegrams pass from one medium to the other according to the parameterisation.

**Note**: *the individual address of a line coupler needs to be of the form **X.Y.0** or **X.0.0** in case of working as a backbone coupler*.

## 2.2 ZMCoup RF AS RETRANSMITTER

ZMCoup RF also provides the option of being used as a retransmitter in the RF medium, by enabling this option in the Settings tab in ETS.
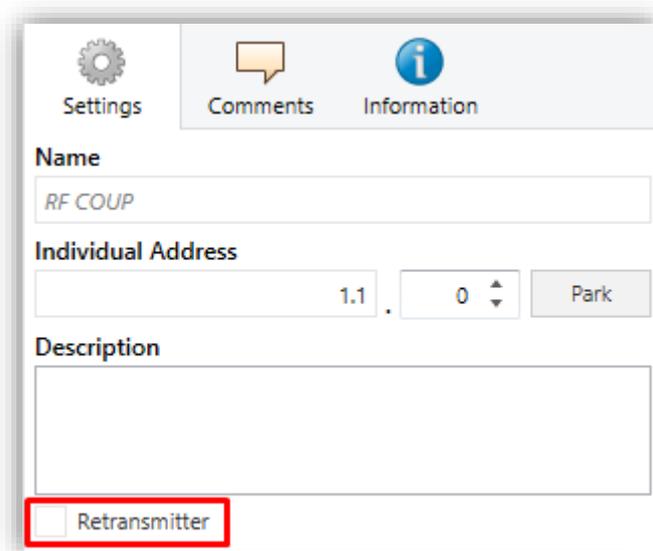


**Figure 5** Retransmitter

Retransmitter functionality allows to increase the range of the RF communication source device. That functionality is fully compatible and independent of the ZMCoup RF as a RF/TP coupler.

## 2.3  TELEGRAM FILTERING

ZMCoup RF provides two complementary filter types:

- **Group address filtering**: ETS automatically generates a group address table for the project loaded. This table is transferred to the line coupler during complete ETS downloads over it.

  The **Filter Table** will determine which group addresses will be routed. A Group Address will be on the Filter Table when, at least, in both devices, one on the lines under ZMCoup RF and other in a different line, there is an object that has such address linked.

  Given the previous condition, when a telegram containing a group address in the "destination address" field arrives, the line coupler will look up if such address exists in the group table, and eventually transmit the telegram to the other side –if the address is found– or drop (block) it –if it is not–.

  The Filter Table can be previewed. By making a right click on ZMCoup RF and selecting the option "**Preview Filter Table**":
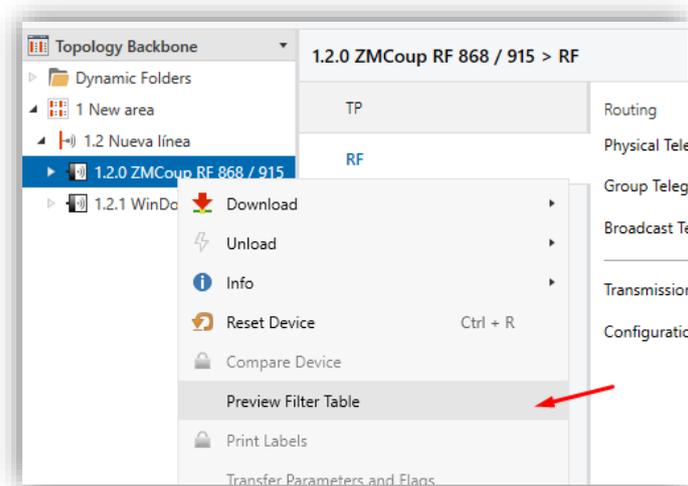


**Figure 6** Preview Filter Table

**Note**: *making further changes to a project (addresses, etc.) requires downloading the updated filter table to the line coupler.*

> **Example**: *if the line coupler has been parameterised to filter group addresses from both lines, when it receives a telegram from the mainline destined to a group address (e.g., 2/5/13) it will check that there is a device in the secondary line with objects that have been assigned such group address (or that such address has at least been marked in ETS to pass through the line coupler; see Figure 7). If so, then the line coupler will let it pass. Otherwise, it won't be transferred to the secondary line. The same would also apply to the inverse case (a telegram originating in the secondary line).*
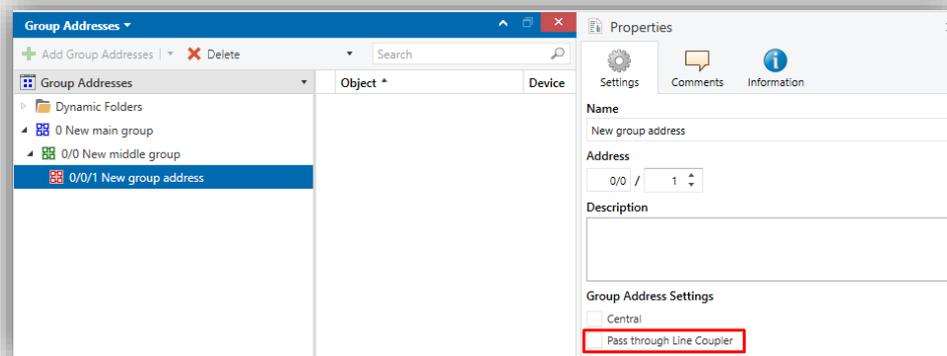>
> 
>
> **Figure 7** *ETS Option to Force Passing a Group Address through the Line Coupler*

- **Physical address filtering**: when the device receives a telegram where the destination address is a physical/individual address (for example, during downloads), it will compare such address with its own physical address (no particular filter table is required for physical address filtering, but a simple comparison).

The physical address of the line coupler determines the line it belongs to, which then, and according to the parameterisation, determines if the telegram will be routed or eventually dropped (blocked). This can be parameterised separately for the mainline and for the line.

> **Example**: *in the example shown in Figure 3, if the coupler with address 3.2.0 reads a telegram on the mainline destined to a device with individual address 3.1.2, it will compare both addresses and conclude that 3.1.2 does not belong to the secondary line, and therefore not transmit it.*

**Notes**:

➢ *The device that sends a telegram needs to have been assigned a physical address that really corresponds to its line. In Figure 3, if the device with address 3.1.1 (a KNX programmer, for instance) changes its address to 7.7.255, it will not be able to send telegrams to, for example, the device with address 4.0.1.*

➢ *As device programming consists in sending telegrams destined to a physical address, in order to perform downloads to a device in a certain line (for example, the device with address 4.1.1 in Figure 3) from a programmer not in that line, it is necessary that the line coupler is configured to let pass all physical addresses from the main line.*

## 2.4  TRAFFIC RF LED

ZMCoup RF has an indicator light that will flash green every time the coupler receives a RF message and this message is accepted. The message will be accepted when:

- Is intended for the coupler itself.

- Is intended for the TP medium and is not filtered by the coupler

- Is retransmitted to the RF medium

.

# 3 ETS PARAMETERISATION

After importing the corresponding database in ETS and adding the device into the topology of the desired project, the configuration process begins by entering the Parameters tab of the device.

Please note that, depending on where the device is placed, the lower levels of the topology need to be **configured as RF** as well as the **RF domain**:
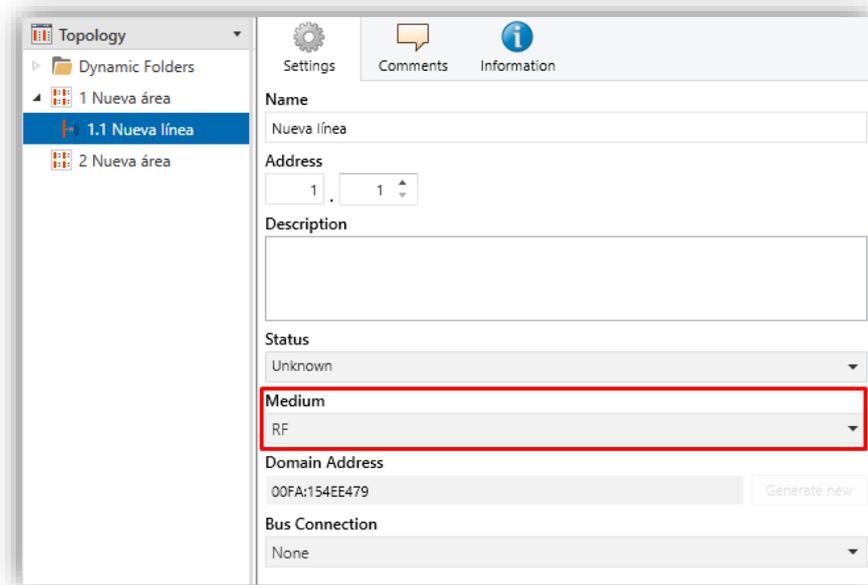


**Figure 8** ZMCoup RF 868 / 915 as a Line Coupler.

**Note:** *This application program does not have any communication object available.*

## 3.1  TP

This screen permits parameterising the behaviour of ZMCoup RF regarding the telegrams received from the main line (medium TP).



**Figure 9** Main Line (TP) configuration tab.

- **Routing**

  ➢ **Physical Telegrams** [*Filter (Normal) / Route All / Block All*]**:** sets the behaviour of the coupler regarding **physical address telegrams**.

    - "Filter (Normal)": enables the physical addresses filtering. If this option is chosen, only RF devices coupled under ZMCoup RF could be configured.

    - "Route All": enables the routing of all the physical address.

    - "Block All": disables the routing of all the physical address.

  ➢ **Group Telegrams** [*Filter (Normal) / Route All / Block All*]**:** sets the behaviour of the device regarding **telegrams destined to group addresses**.

    - "Filter (Normal)": only the telegrams on the filter table will be routed. See section 2.3 for more information.

    - "Route All": every group telegram received will be routed.

    - "Block All": none of the group telegrams received will be routed.

➢ **Broadcast Telegrams:** [*Route All (Normal) / Block All*]: **s**ets the desired action for **telegrams intended for address 0/0/0.**

- **Confirmation:** sets when the line coupler should confirm (by sending an immediate ACK message) the reception of telegrams:

  ➢ **Group Telegrams** [*If Routed (Normal) / Always*].

  ➢ **Physical Telegrams** [*If Routed or Addressed (Normal) / Always*].

**Note**: *Transmitting all telegrams (option "Routed All") is intended for diagnostic purposes and may cause risks or conflicts or generate a large amount of traffic in the KNX installation if permanently activated. However, this option is required to be able to* **perform downloads** *to devices in a different line than the programmer.*

## 3.2 RF

This screen permits parameterising the behaviour of ZMCoup RF regarding the telegrams received from the RF line.



**Figure 10** RF line configuration tab.

- **Routing.** The parameters available for routing telegrams from the RF medium are completely analogous to those described in the "TP" tab. See section 3.1 for a detailed description.

The following parameters are specific for the RF line:

- **Transmission Power** [*Maximum / Medium / Minimum*]: three levels for the adjust according to the needs of the installation.

- **Configuration Via** [*TP and RF / Only TP*]: enables performing ETS downloads over the ZMCoup RF from the TP and RF medium or, exclusively, via TP.

Join and send us your inquiries
about Zennio devices:

**http://support.zennio.com**