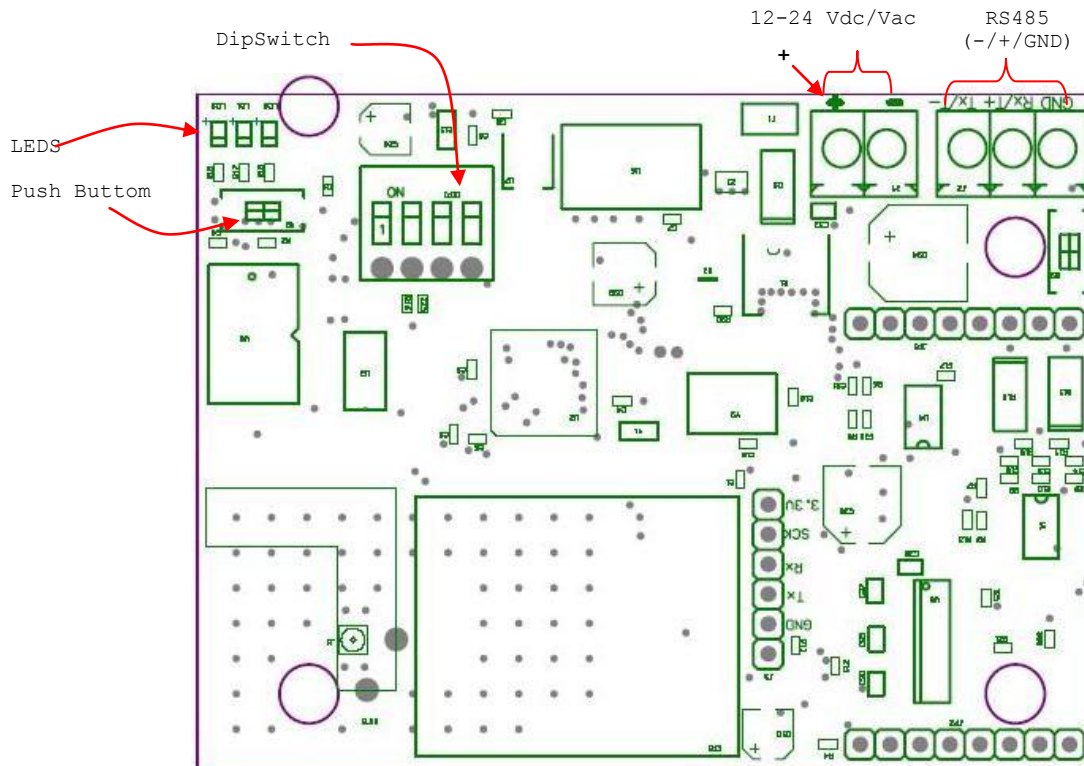


WIRELESS FAMILY DEVICES
ZB-CONNECTION
Router Bridge RS485
(product code: ZR-BR-485-EM)

Document version Number	Date	Firmware Revision	Author
v3.1	26/09/2011	V8.2.145 (2050)	Franco Pierazzoli

3) CARD LAYOUT AND CONNECTION DIAGRAM



4) DEVICE ADDRESSING

The device has not an address

5) ASSOCIATING THE DEVICE TO A COMPATIBLE NETWORK

The process to be followed to join Router-Bridge to a network is the same as for all ZB-Connection routers.

The joining process is activated automatically by the device if the node does not have network parameters, this happens if the device is new or if it has been voluntarily disassociated.

The joining process consists in scanning all 16 radio channels, in search of an "open" and compatible network (a ZB-Connection network).

Scanning continues about 20 seconds. At the end of the scanning process if the joining process terminates unsuccessfully, then device resets and the joining process re-starts.

Network opening is performed by stimulating the Gateway (for further information, refer to the document relating to the Gateway).

6) DISASSOCIATING THE DEVICE FROM THE NETWORK

Device disassociation causes the loss of network parameters, with the consequent exiting of the device from the network it belongs to.

Disassociation can be commanded in two ways:

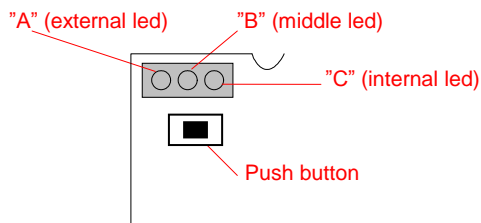
- 1) Receipt of the appropriate command password.
- 2) Holding the pushbutton on the card down for at least 6 seconds.
Disassociation using the push-button is only possible within 20 seconds from when the device is switched on.

7) LED/PUSH-BUTTON INTERFACE

The Router-Bridge has three leds through which it is possible to obtain information on the device's operating state.

Furthermore, the Router-Bridge has a push-button which makes it possible to send commands to the device.

Nomenclature of Router-Bridge leds:



Behaviour of leds at the start-up:

At the reset of Router-Bridge all leds lighted for 2 seconds, then all leds flash fast for another 2 seconds.

At the end of flashing device starts the normal functioning.

How the leds function when the Router-Bridge is NOT on the network:

Led "A" on lighted steady, leds "B" and "C" off

How the leds function when the Router-Bridge is on the network:

Led "A": Working State

Slow flashing (1Hz) -> Closed Router

Fast flashing (4Hz) -> Opened Router

Led "B" (middle led): Radio Link

Turned off -> No router with good link in the proximity

1 flash -> One router with good link in the proximity

2 flashes -> Two routers with good link in the proximity

3 flashes -> Four or more routers with good link in the proximity

Led "C": Radio Activity

Usually turned off

Shortly Lighted on transmitting or receiving a radio message

8) CHARACTERISTICS OF MODBUS DEVICES CONNECTED WITH THE ROUTER-BRIDGE

Router-Bridge can connect to the ZB-Connection Gateway one or more Modbus devices.

The attached devices must comply to ModBus-RTU standard.

The Modbus devices are interfaced with the Router-Bridge by the RS485 port.

Data bits: 8
Handshaking: none

The remaining communication parameters must be definite by setting up the 4 DIP-SWITCH on the Router-Bridge according to the following table:

DIP1 (baudrate)	DIP2	DIP3	DIP4 (stopbit)	Velocità	Parità	StopBit
OFF	OFF	OFF	OFF	9600	nessuna	2
ON	OFF	OFF	OFF	19200	nessuna	2
OFF	ON	OFF	OFF	9600	even - pari	2
ON	ON	OFF	OFF	19200	even - pari	2
OFF	OFF	ON	OFF	9600	nessuna	2
ON	OFF	ON	OFF	19200	nessuna	2
OFF	ON	ON	OFF	9600	odd - dispari	2
ON	ON	ON	OFF	19200	odd - dispari	2
OFF	OFF	OFF	ON	9600	nessuna	1
ON	OFF	OFF	ON	19200	nessuna	1
OFF	ON	OFF	ON	9600	even - pari	1
ON	ON	OFF	ON	19200	even - pari	1
OFF	OFF	ON	ON	9600	nessuna	1
ON	OFF	ON	ON	19200	nessuna	1
OFF	ON	ON	ON	9600	odd - dispari	1
ON	ON	ON	ON	19200	odd - dispari	1

All the devices attached to Router-Bridge must have an univocal address.

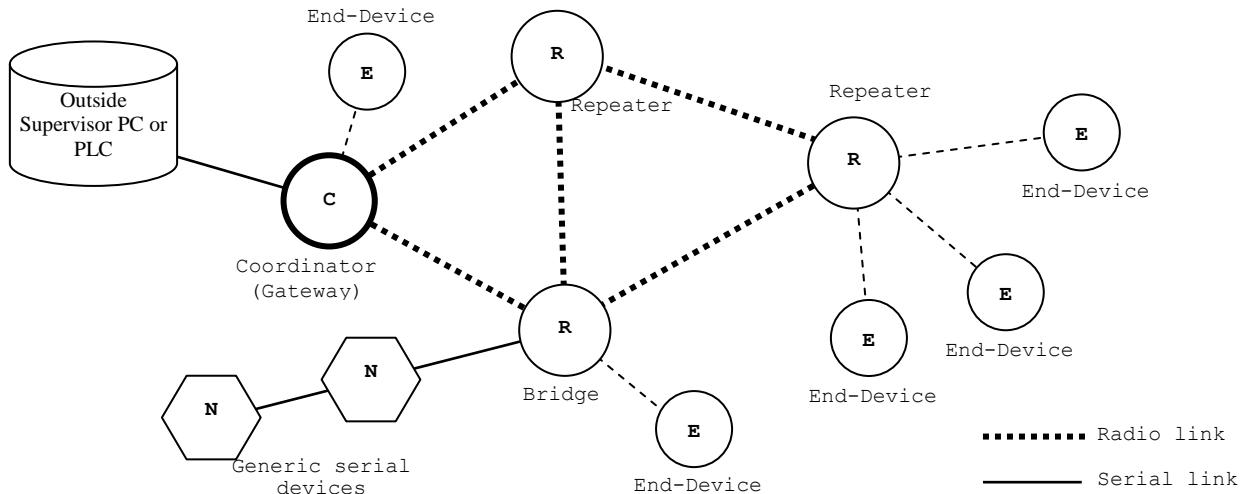
All the devices in the same 4-noks/MODBUSPRO network must have an univocal address.

The duplicate address presence makes impossible the correct working of all the device network.

9) CHARACTERISTICS OF THE RADIO TRAFFIC CAUSED BY ROUTER-BRIDGE

A ZB-Connection network is composed by several devices which can be divided into two groups:

- 4-noks proprietary devices
- Generic Modbus devices (attached to a Router-Bridge)



4-noks proprietary devices

The 4-noks proprietary devices send towards the Gateway the information about their internal status with a regular cadence or afterwards to specific events. The data are collected from the Gateway and kept in the internal memory, to be at disposal when required (Agent management).

If the external device (Supervisor PC or PLC) requires data from a 4-noks proprietary device, the answer is formed drawing to the data locally available in the Gateway.

For this reason a data request to a 4-noks proprietary device doesn't generate any radio message, so there is a complete separation between the local serial communications (between the Gateway and client) and the radio network traffic (between Gateway and all 4-noks proprietary devices).

Generic Modbus devices (attached to a Router-Bridge)

If the external device (Supervisor PC or PLC) requires data from a generic modbus device the serial message is converted in a radio message and it is sent to the Router-Bridge which the generic modbus device is attached to.

As the Router-Bridge receives the radio message from the Gateway it arranges to send it on the serial line.

The answer coming from the generic modbus device arrives to the Router-Bridge, it is transformed in a radio message and it is sent to the Gateway which, at last, arranges to turn it into a serial message to be sent towards the outside device.

Gateway and Router-Bridge are substantially responsible only for the transport of the message. Unlike the first case there is not any separation between the local serial traffic (between Gateway and outside client) and the radio traffic present in the network.

This involves that for a correct working of the network the local serial traffic must consider the intrinsic limits of the radio network.

10) TRAFFIC LIMITATIONS

The requests turned to generic modbus devices have the following limitations:

Message length

Both the requests and the answers must not exceed the length of 52 bytes; this involves the prohibition to read more than 26 registers (HoldingRegister or InputRegister) in a single message.

Request frequency

The time delay between the receiving of an answer and the following request must not be less than one second.

Frequency of the requests in the case of absence for answer

The time delay between two consecutive requests the first of which it has not received answer must not be lower than 3 second.

This is translated in a time-out of communication of at least 3 seconds.

11) ROUTER-BRIDGE DATA

It is possible to extract some information about Router-Bridge's operation.

These information are accessible through reading of 12 InputRegister address set by 40001 to 40011.

The read request should be directed to the same logical address of one of the modbus devices connected to the Router-Bridge.

11.1) ROUTER-BRIDGE INPUT REGISTERS

InputRegister[40001]	Router-Bridge Device Type (101)
InputRegister[40002]	Router-Bridge Firmware Version
InputRegister[40003]	Router-Bridge EUI64 (bytes 0,1)
InputRegister[40004]	Router-Bridge EUI64 (bytes 2,3)
InputRegister[40005]	Router-Bridge ShortID
InputRegister[40006]	Cost (distance from the Gateway in terms of hop)
InputRegister[40007]	Wireless Signal Level of the last message received (dB+100)
InputRegister[40008]	Number of Router-Bridge neighbours
InputRegister[40009]	Number of good Router-Bridge neighbours
InputRegister[40010]	Number of End-Device children of Router-Bridge
InputRegister[40011]	Received message counter