LANSEN

Bridge B4 series (OMS4mioty)

LAN-WMBUS-B4-B(E)/M-(LR)-MIOTY-A1/A2-(X)

DEVICE

The battery or mains powered wireless M-Bus to mioty, OMS4mioty, bridges from Lansen are highly configurable devices used for extending the range between meters and a gateway by converting incoming wM-Bus (OMS3/4) to outgoing OMS over mioty. In other words, it bridges between wM-Bus and mioty.

The enclosure is chosen to make the bridge as discrete as possible to avoid vandalisation.

FEATURES

The configuration of the bridge can be protected via a 16-byte AES-key to avoid unauthorized change of the configuration. It is always possible to read out configuration data from the bridge even without the key.

All bridges from Lansen are firmware upgradeable to ensure long-term reliability and to get the newest features.

PERFORMANCE

Once every 12 hours a packet is sent by the bridge with information about the bridge, such as number of routed packets and current battery level. This packet can be used as an indication that a bridge is fully functional.

Our battery powered bridges use a high performance primary lithium battery to ensure longest possible battery lifetime. For some examples on configuration and expected battery lifetime, refer to section BATTERY CALCULATIONS.

Our bridges are highly immune to electrical disturbances that could be generated by, for example, LED lights, and our long-range bridge models comes with industrial grade immunity.

ROUTING

To ensure best functionality, a randomized delay is used before repeating packets and for each received packet, the RSSI is added.

When each packet is retransmitted, the duration (number of seconds) since the packet was received is also added to the packet. This makes it possible to calculate exactly when the true packet was received by a bridge in case the data is time sensitive.

The bridge supports both short and long transport header and also the optional Authentication and Fragmentation Layer (AFL).

Furthermore, the device supports both Mode 5 and Mode 7 encryption, also known as security profile A and B.

Outgoing mioty packets are encrypted with the bridge mioty network key before transmission. For details regarding OMS over mioty, refer to Technical Report 08 (OMS-TR08).

ANTENNA

The bridge can either make use of two high performance internal receiver antennas or one external antenna, depending on the model. The internal antennas are mounted at 90 degrees from each other to take advantage of horizontal and vertical polarizations for maximum reception range in all directions. The antenna diversity is important to prevent losses due to different polarization, especially indoors since meters can be mounted both to the sides and above/below the bridge.

Bridge models with external SMA interface are suited when large antennas are desirable to cover larger areas or long distances.

CONVERTER

The bridge, by default, receives wirelss M-Bus data in both modes C- and T-mode.

A bridge can be configured to listen in S-mode. However, in this case meters sending in T- or C-mode cannot be received.

CONFIGURATION

All bridges are highly configurable to fit specific needs. Configuration is done with a Lansen Wireless M-Bus dongle together with our program, Lansen Configurator.

With Lansen Configurator it is easy to view routing and see how well bridges hear meters.

The list below displays a couple of parameters which can be changed on the bridges:

- Number of minutes to listen for wM-Bus packets
- Specific time during the day to listen (e.g., at 12:30)
- Specific days to listen (e.g., Mondays and Wednesdays)
- Suppression timer (limit number of packets per meter)
- Meter filtering (whitelisting)

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v.1.1

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FIRMWARE

INPUT MODE (WM-BUS)	T/C-mode (default) or S-mode
OUTPUT MODE (MIOTY)	MIOTY ETSI TS-103-357 (EU1)
REPETITION	1 time
Internal antenna	Vertical polarisation, best horisontal range
External antenna	SMA-interface
MAX SENSORS	2000
MAX PACKET LENGTH	237 - 255
FILTERING	Suppression timer, whitelisting
SECURITY	
WM-BUS	Supports routing of Security Profile A and B according to OMS 4
MIOTY	Network: AES128 encryption
STATUS TX INTERVAL	12 hours

GENERAL INFORMATION

POWER SUPPLY	M: 85-305 VAC
	B-(LR): 2xER34615*, 38Ah, 3.6V
	BE-(LR): 2xER34615***, 38Ah, 3.6V + supercap
STANDARDS	2014/53/EU (RED)
	EN 13757-3/4:2013, OMS 4.0.2
	EN 61000-6-1 (B4, 3V/m)
	EN 61000-6-2 (B4-LR, 10V/m)
	MIOTY ETSI TS-103-357
TEMPERATURE	M: Max: -35°C/+85°C, rec. -30°C/+50°C
	B: Max: -20°C/+85°C, rec. 0°C/+50°C
	BE: Max: -35°C/+85°C, rec. -30°C/+50°C

RADIO

RECEIVER CLASS	1.5 for B4, 2 for B4-LR
RADIO	14 dBm (25 mW) output power to antennas.
	ERP typical: 11.8 dBm (15.14 mW)
HARDWARE FILTER	For LTE/GSM/GPRS and other disturbances:
	B4: No
	B4-LR: Yes

ENCLOSURE

DIMENSIONS	150x150x53 mm	
IP-CLASSIFICATION	B(E)/M-(LR)-A1:	IP40
	B(E)-(LR)-A2:	IP65 & IP67
	B(E)-LR-A2-X:	IP65
	M-LR-A2-(X):	IP65
COLOR	RAL 9003 (signal white)	
MATERIAL	UV-resistant PC/ABS	
FLAMMABILITY RATING	UL 94 HB	

ACCESSORY

LAN-WMBUS-D2-TC	Configuration dongle
LANSEN CONFIGURATOR	Configuration software
LAN-A-PMB-KIT-ID58-78	Pole mounting kit
LAN-MAG-R4	Magnet with telescopic shaft
LAN-R4-IP-KIT	Sealing kit for A2 enclosure

*Lithium < 5g/cell, UN3091 class 9
**The expected battery lifetime stated is based on simulations and true measurements at the stated recommended temperatures and is valid to the best of our ability but not a guarantee. The calculations and measurements can be sent upon request for your reference and measurements can be sent upon request for your reference.
***One year storage and using whitelist for wM-Bus meters with 100 bytes typical wM-Bus length and transmitting one packet per listening session per meter

OPTIONS FOR LAN-WMBUS-B4 BRIDGE

LAN-WMBUS -	SERIES -	POWER OPTION -	RECEIVER SENSITIVITY	- OUTGOING COMMUNICATION -	ENCLOSURE IP-CLASS -	ANTENNA TYPE
	B4 Bridge	**B** 3.6V/38Ah	**(Blank)** Standard sensitivity	**MIOTY** EU1	**A1** IP40. Suited for indoor use	**(Blank)** Dual internal antenna
		BE 3.6V/38Ah+supercap for extended use in lower temperatures	**LR** Industrial grade immunity and improved receiver sensitivity for optimal robustness and range		**A2** IP65 / IP67. Suited for indoor and outdoor use	**X** SMA connector for external antenna
		M 230 VAC				

	Battery	Dual Internal antenna	LTE/GSM filter	External SMA interface	Typ. sensitivity mode S/TC	Typical lifetime expectancy**	Optimized for
LAN-WMBUS-B4-B-MIOTY-A1	X	X			-107/-105	130 sec/h, 4 meters = (6+1) years*** 20 min/day, 100 meters = (12+1) years***	Cost optimized for few meters indoors
LAN-WMBUS-B4-BE-MIOTY-A2	X	X			-107/-105	130 sec/h, 11 meters = (6+1) years*** 20 min/day, 180 meters = (12+1) years***	Extended battery lifetime for more meters outdoors
LAN-WMBUS-B4-B-LR-MIOTY-A2	X	X	X		-111/-108	15 min/day, 100 meters = (12+1) years***	Daily readings with long range outdoors and industrial mmunity to disturbances
LAN-WMBUS-B4-BE-LR-MIOTY-A2-X	X		X	1 TX/RX	-111/-108	15 min/day, 180 meters = (12+1) years***	Extended battery to support readings of more meters daily outdoors with longest range in one direction
LAN-WMBUS-B4-M-LR-MIOTY-A2-X			X	1 TX/RX	-111/-108		Outdoor for longest range in one direction with support of many meters readings often

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BATTERY CALCULATIONS

This section provides some examples of a battery bridge and the expected battery lifetime for each example. At the bottom of this page is an illustration of how a battery bridge alternates between listening for incoming wM-Bus data, transmitting the data as mioty, and sleeping until it's time for next listening period.

EXAMPLE 1: Hourly data (long packets)

Number of meters: 4
Typical wM-Bus length: 230
Device used: LAN-WMBUS-B4-B-MIOTY-A1
Number of packets saved per listening period: 1

Listen timer (seconds) = 100
Pause timer (seconds) = 3500

A bridge is again configured to listen for incoming wM-Bus data once an hour but this time with lower listening window (100 seconds) due to long packets. The bridge then transmit the data during the rest of the hour (3500 seconds). Furthermore, the bridge saves and transmits one packet per meter every hour.

If a bridge finishes transmitting the data as mioty before the pause timer is up, it will simply sleep until it's time to listen for incoming wM-Bus data again.

Expected battery lifetime: (6 years + 1 year storage)**

EXAMPLE 2: Hourly data (short packets)

Number of meters: 4
Typical wM-Bus length: 47
Number of packets saved per listening period: 1
Device used: LAN-WMBUS-B4-B-MIOTY-A1

Listen timer (seconds) = 130
Pause timer (seconds) =3470

In this case, a bridge is configured to listen for incoming wM-Bus data using whitelist on four specific meters once an hour (130 seconds) and transmit the data during the rest of the hour (3470 seconds). Furthermore, the bridge saves and transmits one packet per meter every hour.

If a bridge finishes transmitting the data as mioty before the pause timer is up, it will simply sleep until it's time to listen for incoming wM-Bus data again.

Expected battery lifetime: (6 years + 1 year storage)**

EXAMPLE 3: Listen once per day (daily data)

Number of meters: 180
Typical wM-Bus length: 100
Number of packets saved per listening period: 1
Device used: LAN-WMBUS-B4-BE-LR-MIOTY-A2

Listen timer (minutes) = 15
Pause timer (minutes) = 1425

Here, a bridge with long range (-LR) and extended battery (-BE) is configured to listen for incoming wM-Bus data once a day (15 minutes) and then transmit the data during the rest of the day (1425 minutes). The bridge saves and transmits one packet per meter once a day.

If a bridge finishes transmitting the data as mioty before the pause timer is up, it will simply sleep until it's time to listen for incoming wM-Bus data again.

Expected battery lifetime: (12 years + 1 year storage)**
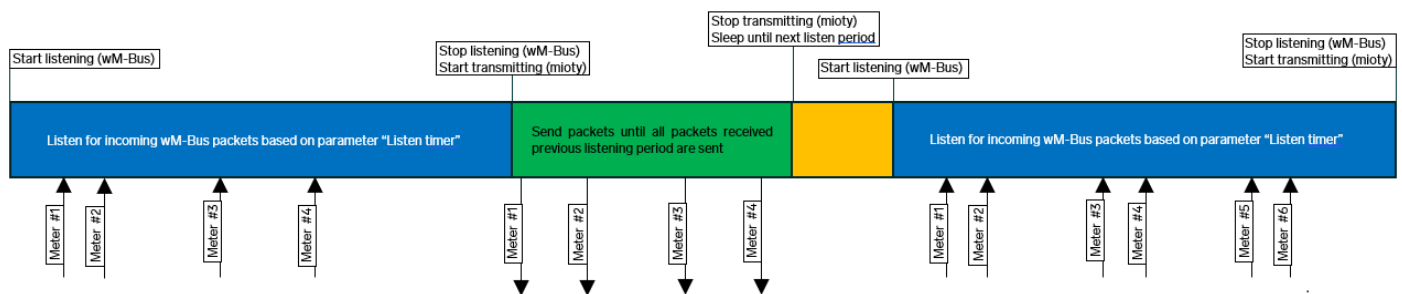
EXAMPLE 4: Listen once per week (weekly data)

Number of meters: 1000
Typical wM-Bus length: 100
Number of packets saved per listening period: 2
Device used: LAN-WMBUS-B4-B-LR-MIOTY-A2-X

Total number of minutes per day = 10080
Listen timer (minutes) = 10
Pause timer (minutes) = 10070

This case is useful if there's a big number of meters which should be collected but the data itself is not time critical and does not need to be collected often. In this case, a bridge with long range (-LR), normal battery (-B) and an external antenna (-X) is used. It's configured to listen for incoming wM-Bus data once a week (10 minutes) and transmit the data for the rest of the week. If a bridge finishes transmitting the data as mioty before the pause timer is up, it will simply sleep until it's time to listen for incoming wM-Bus data again.

Expected battery lifetime: (12 years + 1 year storage)**

****The expected battery lifetime stated is based on simulations and true measurements at the stated recommended temperatures and is valid to the best of our ability but not a guarantee. The calculations and measurements can be sent upon request for your reference and measurements can be sent upon request for your reference.

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