

# Baby-LIN-RM-II

## Multibus simulation device with I/O interface



### Product description

The Baby-LIN-RM-II allows to control LIN- and CAN-Bus equipped devices by using a standard personal computer. After installation of the supplied **LINWorks** software, you can connect the Baby-LIN-RM-II to a free USB port, and access the LIN- and CAN-Bus devices via LINWorks or own programs by using the Baby-LIN-DLL.

In addition LIN and CAN devices can be controlled using **digital signals** only. This enhances testing facilities based on a **PLC** (Programmable Logic Controller) by a LIN- or CAN-Bus without much effort. This can be extremely beneficial for facilities with long term testing.

Two of the digital inputs can read, scale and map **PWM** (Pulse-width modulation) signals to bus signals. Furthermore the modules digital outputs can be controlled by the values of the bus signals. For instance an output can be set if a signal equals, unequals, is greater or less than a reference value. It also can be tested, if a certain signal value is within a given area or not. All digital outputs can be configured to output **PWM** (Pulse-width modulation) signals as well.

In addition the Baby-LIN-RM-II offers two **programmable buttons**. They may for example be used to start and stop the LIN- or CAN-Bus communication. Furthermore they can be used for many more functions.

The Baby-LIN-RM-II can handle bus voltages in the range of 8-26 VDC.

All communication interfaces (LIN- and CAN-Bus, Digital inputs, USB) are **galvanically isolated**, eliminating interferences between the PC and the board electronics. Only the digital outputs use the ground of the board's logic supply.

The Baby-LIN-RM-II unit includes its own 32-bit microcontroller, which takes care of all **time critical** tasks of the LIN- and CAN-Bus protocol.

The device firmware is field updateable, so the changes of bus specification or upcoming new system features can be adapted easy.

The Baby-LIN-RM-II can be enabled to support **SDF-V3** if an optional voucher code is purchased. This new generation of SDF allows new features like multiple bus sections, conditional macro commands, new system variables, new CRC functions and sub macro calls.

### Operation modes

Any situation that requires communication with a LIN or CAN device is a potential field of application for a Baby-LIN-RM-II. It is a versatile tool that can be used in research laboratories, test departments and production (EOL applications).

The Baby-LIN-RM-II allows for different operation modes to support typical use cases like:

- **Monitor** and log all frames on the bus without the need for a SDF. If a SDF is available signal values can also be monitored.
- **Control** the bus via the **LINWorks** software or customer specific applications by using the **Baby-LIN-DLL**.
- **Program** and store free programmable command sequences in the Baby-LIN-RM-II to run it as a **stand-alone** device without the need for a PC. Thus you can run a bus driven ECU in a **durability test** or **EOL applications** without any PC connected.

### Simulation modes

The Baby-LIN-RM-II is able to simulate different configurations of LIN- and CAN-Bus nodes. It is possible to **simulate any number of nodes** ranging from none to all. These are some typical configurations:

- LIN-Bus: Simulate the **LIN-Bus master** to operate slave nodes.
- LIN-Bus: Simulate any number of **LIN-Bus slave** nodes.
- LIN- and CAN-Bus: Simulate all but one node and realize a **rest-bus simulation**.
- LIN- and CAN-Bus: Simulate **all nodes** and therefore the complete communication on the bus.
- LIN- and CAN-Bus: Simulate no node to **monitor** the bus communication only.

Simulations for the LIN- and CAN-Bus can be done simultaneously.

### LIN- and CAN-Bus properties

The used LIN driver supports bus voltages of 8-26 VDC and can be used to up to 125 kBaud. That way even nodes that operate outside the standard limits of the LIN specifications can be controlled with the Baby-LIN-RM-II. Supported LIN-versions are V.1.2, V.1.3,...V.2.2.

One CAN-Bus of the Baby-LIN-RM-II is designed as a high-speed interface according to ISO-11898 with a SN65HVD251 driver.

One CAN-Bus of the Baby-LIN-RM-II utilizes a fault tolerant low-speed physical layer according to ISO-11519 with a TJA1055T driver.

The maximum supported signal cable length of the LIN- and CAN-Bus is 30m.

### LinWorks suite

The purchase of a Baby-LIN-RM-II includes the licence to download the **LINWorks** suite. This suite is a collection of PC software that supports you during the whole workflow.

The **LDfEdit** allows the inspection, creation and edit of a LDFile (LIN Description File).

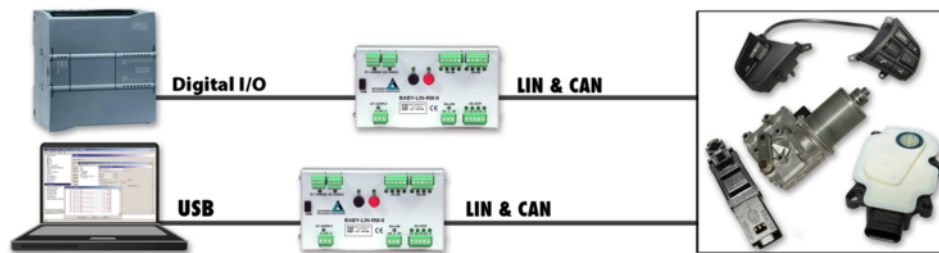
The **SessionConf** allows the inspection, creation and edit of a SDFFile (Session Description File) and features a file import for LDFFiles (for LIN-Bus simulation) and DBC files. It defines everything needed for a complete simulation of each available bus, e.g. which nodes on each bus are available and which nodes should be simulated by the Baby-LIN-RM-II. Moreover it allows to define an application logic. This programming ability is available for each device out of the box.

The **SimpleMenu** is used to establish a connection to the Baby-LIN-RM-II and upload SDFFiles, change the device target configuration, control the bus and monitor the frames and signals on the bus. Even without a LDFFile/DBC file/SDFFile the bus can be monitored and the frames can be logged.

The **Baby-LIN-DLL** allows customers to create their own application and use all features of the Baby-LIN-RM-II like controlling and monitoring the LIN- and CAN-Bus interfaces. The **Baby-LIN-DLL** is a native C/C++ DLL. A wrapper for .NET applications is also provided as **LabView** files. Examples are available for all supported languages.

The **LogViewer** can show and convert the log files of the SimpleMenu.

The **LINWorks** software runs on 32 and 64 bit Windows versions. A **Linux version** for the main components is also available upon request.



## Technical Specifications

### Device

- CPU: ARM Cortex-M4, 168 MHz
- Memory: 4 MB RAM
- 4 red/green multi colored LED: Signal device and LIN- and CAN-Bus states
- 2 LEDs: Used as switch button indicator or freely programmable
- 12 LEDs: Used as signal indicator for digital input and outputs
- 2 freely programmable push buttons
- Power supply: 8-32 VDC
- Power supply via 3 pin connector (MC 1,5/ 3-ST-3,81)
- Maximum current consumption: 250 mA @ 24 VDC
- Galvanic isolation of all communication interfaces (LIN- and CAN-Bus, Digital inputs, USB, Exception: Digital outputs)

### Interface: LIN

- 1 LIN-Bus interface
- LIN-Bus connection via 3 pin connector (MCVR 1,5/ 3-ST-3,81)
- LIN-Bus supply voltage: 8-26 VDC
- LIN-Bus baud rate: up to 125 kBaud (Support of protocols outside of the LIN specification)
- Supported LIN versions: V1.2, V1.3,...V2.2
- Supported LIN related protocols: Cooling and SAE J2602
- Maximum signal cable length for LIN-Bus: 30 m

### Interface: CAN

- 1 CAN-Bus as high speed interface (CAN-HS) according to ISO-11898 available on hardware but not activated, voucher code required
- 1 CAN-Bus as fault tolerant low speed interface (CAN-LS) according to ISO-11519 available on hardware but not activated, voucher code required
- CAN-HS-Bus connection via 3 pin connector (MCVR 1,5/ 3-ST-3,81)
- CAN-LS-Bus connection via 3 pin connector (MCVR 1,5/ 3-ST-3,81)
- Maximum signal cable length for CAN-Bus: 30m

### Interface: USB Device

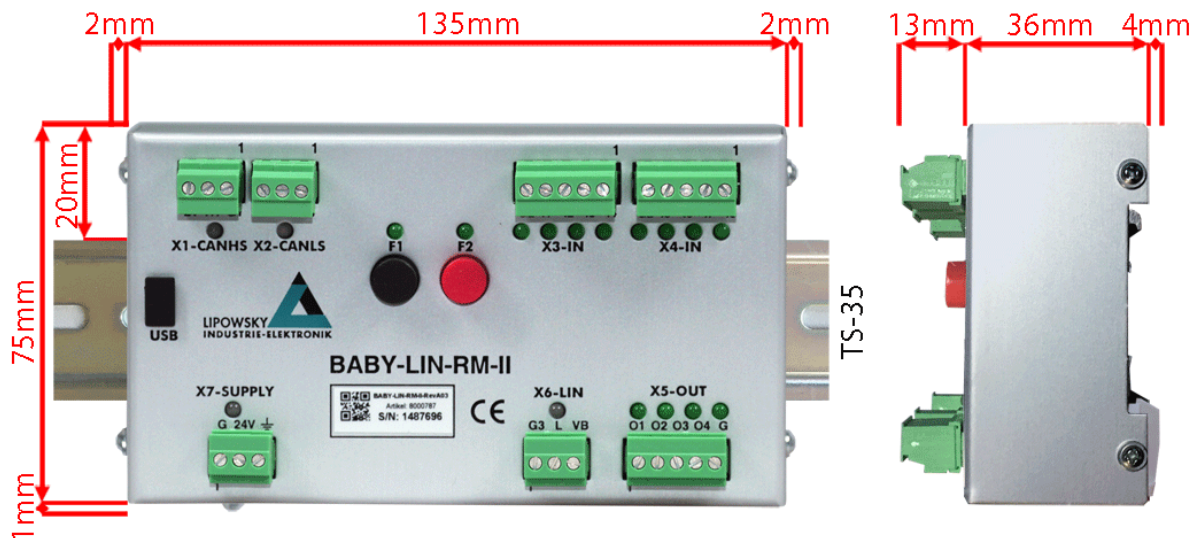
- USB 2.0 interface
- Connection via USB type B-Mini

### Interface: Digital I/O

- 8 digital inputs
- 4 digital outputs
- Digital I/O available via 3 5 pin connectors (MCVR 1,5/ 5-ST-3,81)
- 2 digital inputs can be used to read PWM signals
- All digital outputs can be used to output PWM signals

### Case

- Degree of protection: IP20
- Operating temperature: -20° - +65° Celsius
- Weight: 250 g
- Case dimensions [mm]: 136 x 76 x 36 (L x W x H)  
Elements like connectors, buttons, and the top hat rail mounting adapter are not included.
- Mounting: Top hat rail (TS 35):



## Hardware requirements

The following hardware is required to operate the Baby-LIN:

Requirement	Purpose
A PC with about 200 MB free hard drive space	Required for the installation of the LINWorks software. Please check the software requirements and use cases.
A free USB port	Required to transfer SDFs to the Baby-LIN-RM-II. Required for firmware updates.
Power supply: 8-32 VDC	Voltage supply of the Baby-LIN-RM-II.

## Software requirements

The LINWorks software requires one of the following operating systems:

- Windows XP
- Windows Vista (32 and 64 Bit)
- Windows 7 (32 and 64 Bit)
- Windows 8 (32 and 64 Bit)
- Windows 10 (32 and 64 Bit)
- Linux (a version is available on request)

Some additional tools available in the LINWorks software suite require an installed .NET Framework v4.0.

To install LINWorks components administration privileges are required.

## Scope of delivery

The delivery of a Baby-LIN-RM-II systems includes the following components:

- Baby-LIN-RM-II device
- USB 2.0 cable, 1.5m, Type A to type B-Mini
- Plug components for all terminals:
  - 4 3-pin plugs with screw connection (MCVR 1,5/ 3-ST-3,81)
  - 3 5-pin plugs with screw connection (MCVR 1,5/ 5-ST-3,81)
- Download licence for the LINWorks Suite (includes LINWorks PC software, USB-driver, example files and documentations)

## Ordering informations

Main device		
Item number	Item	Description
8000873	Baby-LIN-RM-II	Multibus simulation device with I/O interface



### Advice

Each device includes a download licence for the LINWorks application suite. This PC software can be downloaded using our client portal: [portal.lipowsky.de](http://portal.lipowsky.de)



### Warning

Country of origin: Germany  
 Customs tariff number: 90308930

Optional hardware components		
Item number	Item	Description
8000855	IF-OUT-N2P-4Ch	Adapter for 4 galvanically isolated high side outputs for the Baby-LIN-RM-II.
3500701	USB 2.0 cable, 1.5m Type A to type B-Mini	This cable connects the Baby-LIN-RM-II to a PC. Such a cable is already within the scope of delivery.
3021130	MCVR 1,5/ 3-ST-3,81	3-pin plug component, screw connection with tension sleeve. Cable outlet vertical to plug-in direction. Screw direction parallel to plug-in direction.
3021140	MCVR 1,5/ 4-ST-3,81	4-pin plug component, screw connection with tension sleeve. Cable outlet vertical to plug-in direction. Screw direction parallel to plug-in direction. Used only by the IF-OUT-N2P-4Ch adapter, not by the Baby-LIN-RM-II itself.
3021150	MCVR 1,5/ 5-ST-3,81	5-pin plug component, screw connection with tension sleeve. Cable outlet vertical to plug-in direction. Screw direction parallel to plug-in direction.



### Advice

All devices are delivered with a full set of plug components. An extra order is necessary for replacement or configuration purposes only.

Optional voucher codes		
Item number	Item	Description
8000800	Option BL-HARP SDFV3-LIN	Licence code for Baby-LIN-RM-II to support enhanced LIN functions of LINWorks. The enhanced functions are available using the new SDF v3 file format.
8000810	Option BL-HARP SDFV3-CAN-HS	Licence code for Baby-LIN-RM-II to support the CAN-High-Speed bus interface. The enhanced functions are available using the new SDF v3 file format.
8000820	Option BL-HARP SDFV3-CAN-LS	Licence code for Baby-LIN-RM-II to support the CAN-Low-Speed bus interface. The enhanced functions are available using the new SDF v3 file format.
8000831	Option-BL-HARP-Jumbo Frames	License code for Baby-LIN-RM-II to support the jumbo frame feature (frames with more than 8 data bytes).



### Advice

All voucher codes can be converted using the option shop: [www.optionshop.de/lipowsky](http://www.optionshop.de/lipowsky)

Optional software components		
Item number	Item	Description
9004210	Customer specific installation.	Installation of customer specific SDF file version and/or installation of license activation key.
9103010	LIN Works CD	PC-Software for all BABY-LIN devices on a physical medium (CD).

**Distributors**

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More details about our distributors can be found on our website under the heading [contact/distributors](#).