Baby-LIN-3-RCplus

Multibus simulation device with I/O interface, integrated keypad and display



Product description

The Baby-LIN-3-RCplus is part of the third generation of Baby-LINs introducing new and more powerful features.
All devices are powered by a 480MHz Cortex M7 core increasing the possible speed by 60% in comparison to the previous generation, allowing faster SDF execution and leaving reserves for new software features. To emphasize this performance leap the devices are also now equipped with a native high-speed (480MBit/s) USB connection and a USB-C connector, making it more convenient and reliable to use. We also further improve the usability of our devices by offering a male SUB-D9 connector for all bus signals, allowing the user to secure the connector to the device and giving more flexibility for upgrades from one device to another. Of course, we are upholding our compatibility guidelines for previous generations so all devices have still the established three pin plug for the LIN bus.
The power for the Baby-LIN-3-RCplus can be supplied either from the USB or the LIN-Bus side. If the device is powered by the LIN-Bus it can be operated without the need for a PC. All communication interfaces (LIN- and CAN-Bus and USB) are galvanic isolated, eliminating interference between the PC and the board electronics.
The Baby-LIN-3-RCplus allows controlling 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-3-RCplus to a free USB port, and access the LIN- and CAN-Bus devices via LINWorks or custom programs by using the Baby-LIN-DLL.
Two red/green colored LEDs on the side show device information but can also be utilized by the user for other needs.
The Baby-LIN-3-RCplus has an integrated membrane keyboard with 9 keys and a 1,54" ISP color display with 240x240 pixels. Thus, it is usable as an autonomous remote control for the bus. Each of the six function button can be assigned to any commands, the dedicated bigger Start and Stop key allow for quick execution of macros or other functions. Using two keys as SHIFT-keys extends the usable number of six keys up to twelve. The ninth buttons is dedicated to enter or leave the menu of the device to show information, edit features of the device and more.
All this is shown on the new display. An easy to use GUI editor will be implemented in the LINWorks so users can show elements like bus signals or macro results directly on the screen.
Besides one LIN interface the Baby-LIN-3-RCplus also includes one already activated **CAN-HS** bus with a switchable termination resistor. The signals on the SUB-D9 connector are placed in accordance with CiA DS102. The CAN interface also supports **CAN-FD** with up to 8MBit/s [(1)].
As the most versatile device of the new third generation the Baby-LIN-3-RCplus offers a few additional features.
It has a second LIN bus (no independent power supply) to implement gateway functionality or control more nodes simultaneously.
The IO capability was increase now offering two combined digital input/output pins which can scale and map **PWM** (Pulse width modulation) signals to and from bus signals. Furthermore the digital outputs can independently be configured as high-side, low-side or push-pull type to give the user the most flexibility. Both IOs are powered by the LIN bus voltage.
Already known from the previous generation the Baby-LIN-3-RCplus has a microSD card slot [(1)] that can be used for logging or running a saved SDF. The LED on the right side of the slot is used to show the logging status. Furthermore the Baby-LIN-3-RCplus has a **RTC** (Real time clock) with back-up battery included to allow high precise time stamps for the logs.
coming sone As a new feature the USB-C connector of the Baby-LIN-3-RCplus can be quipped with a special adapter cable allowing it to connect the device to an RS232 interface and communicate with a **PLC** (Programmable Logic Controller) via an ASCII command protocoll.
The device firmware is field updateable, so the changes of bus specification or upcoming new system features can be adapted easy.
The Baby-LIN-3-RCplus supports **SDF-V3** and is prepared for **SDF-V4**.
(1) Function requires additional software license(s). See Ordering information for more details.

Operation mode

Any situation that requires communication with a LIN- and CAN-Bus device is a potential field of application for a Baby-LIN-3-RCplus . It is a versatile tool that can be used in research laboratories, test departments and production (EOL applications).

- **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-3-RCplus 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.

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Simulation modes

The Baby-LIN-3-RCplus 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-Bus: Simulate **all nodes** and therefor the complete communication on the bus.
- CAN-Bus: Simulate any number of **CAN-Bus nodes**.
- LIN- and CAN-Bus: Simulate all but one node and realize a **residual bus simulation**.
- 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 up to 115200 Baud. That way even nodes that operate outside the standard limits of the LIN specifications can be controlled with the Baby-LIN-3-RCplus . Supported LIN-versions are V.1.2 to V.2.2. The pull-up resistor of the LIN-Bus driver is internally switched to 1 kOhm, if the master node is emulated.

The CAN-Bus interfaces of the Baby-LIN-3-RCplus are designed as CAN-FD interfaces according to ISO-11898-1:2015. They support data baudrates up to 8 MBit/s. A internal 120 Ω termination resistor can be turned on and off by software.

LINWorks suite

The purchase of a Baby-LIN-3-RCplus includes the license 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).

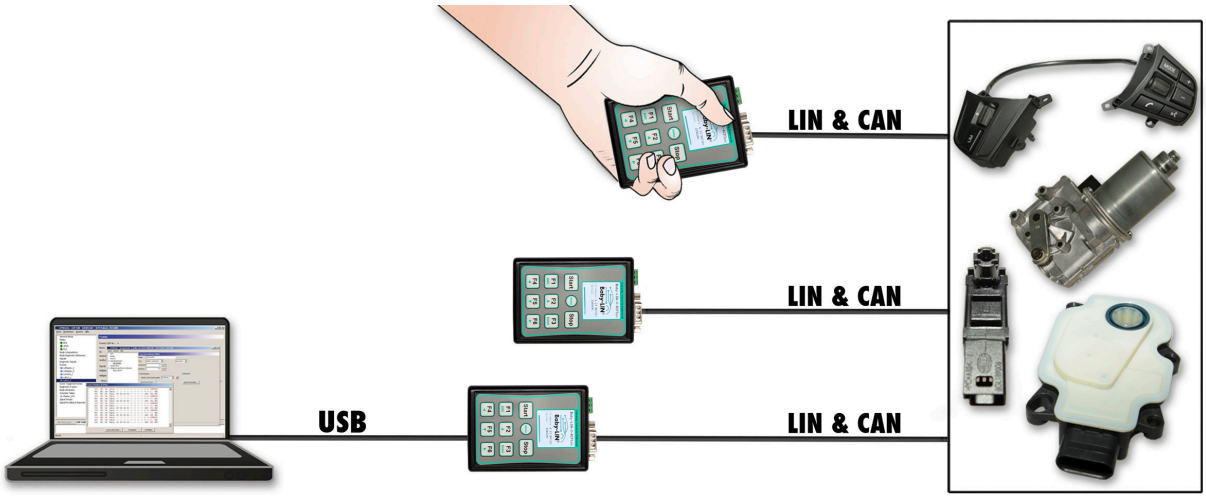
The **SessionConf** allows the inspection, creation and edit of a SDFile (Session Description File) and features a file import for LDFiles (for LIN-Bus simulation) and DBC files (for CAN-Bus simulation). It defines everything needed for a complete simulation of each available bus, e.g. which nodes on each bus are available and which nodes should be simulated by the Baby-LIN-3-RCplus . Moreover it allows defining 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-3-RCplus and upload SDFiles, change the device target configuration, control the bus and monitor the frames and signals on the bus. Even without a LDFile, DBC file or SDFile 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-3-RCplus like controlling and monitoring the LIN- and CAN-Bus interfaces. The **Baby-LIN-DLL** is a native **C/C++** DLL. It is available for **Windows**, **Linux** and **RaspberryPi**. Wrapper for **NET**, **Python**, **VB6** and **LabView** are available. Of course we provide examples for all supported languages.

The **LogViewer** can show and convert the log files of the Baby-LIN-3-RCplus as well as the SimpleMenu.

The **LINWorks** software runs on 32 and 64 bit Windows 10 or higher versions.



Technical Specifications

Device

- Power supply: 8-26 VDC
- Power supply via 3 pin connector (MC 1,5/ 3-ST-3,81) or male SUB-D9 connector
- Galvanic isolation of the communication interfaces and USB plug side
- CPU: ARM Cortex-M7, 480 MHz
- Memory: 32 MB RAM
- Integrated membrane keyboard with 9 keys
- 1,54" IPS color display with 232x232 pixel resolution
- Real-time clock with back-up battery
- Typical current consumption: 140 mA @ 12 VDC

Interface: USB Device

- USB 2.0 high-speed (480Mbit/s) interface
- Connection via USB-C plug

Interface: LIN

- 1 LIN-Bus interface available by default
- Additional second LIN-Bus interface optionally available on hardware but not activated, voucher code required
- 1 Red/green LED (LED1) to show state of the LIN-Bus and the supply voltage
- LIN-Bus connection via 3 pin connector (MCVR 1,5/ 3-ST-3,81) or SUB-D9 connector
- LIN-Bus supply voltage: 8-26 VDC
- LIN-Bus baud rate: up to 115200 Baud (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-HS-Bus interfaces according to ISO-11898 with up to 1Mbit/s.
- Upgradeable to CAN-FD-Bus according to ISO-11898-1:2015 with data baudrates up to 8 MBit/s, voucher code required.
- CAN-Bus connection via SUB-D9 connector, pin layout according to CiA DS102
- 1 Red/green LED (LED2) to show state of the CAN-Bus
- Internal switchable 120R termination resistor
- Galvanic isolation from LIN-Bus and USB
- Maximum signal cable length for CAN-Bus: 30m

Interface: Digital I/O

- 2 combined digital inputs/output pins
- Capable of PWM frequencies up to 15kHz
- Outputs configurable as low-side, high-side or push-pull output stage, high-side is the default
- Current capability of min. 230mA per channel, internally limited to max. 400mA
- Sourced by LIN-Bus voltage
- Digital I/Os available on SUB-D9

Interface: microSD card

- Supported card types: microSD cards, microSDHC cards
- Supported file system: FAT-32, FAT-16
- Maximum card size: 32 GB
- Allows logging without a USB connection, voucher code required.

Interface: RS232 (coming soon)

- Utilizes the USB-C plug with a special adapter cable to female SUB-D9 connector
- Allows communication per ASCII commands, voucher code required.
- Baudrate up to 115,2kBaud/s

Case:

- Degree of protection: IP20
- Operating temperature: -20° - +60° Celsius
- Weight: 115 g
- Case dimensions [mm]: 92 x 66 x 28 (L x W x H), external connectors not included.

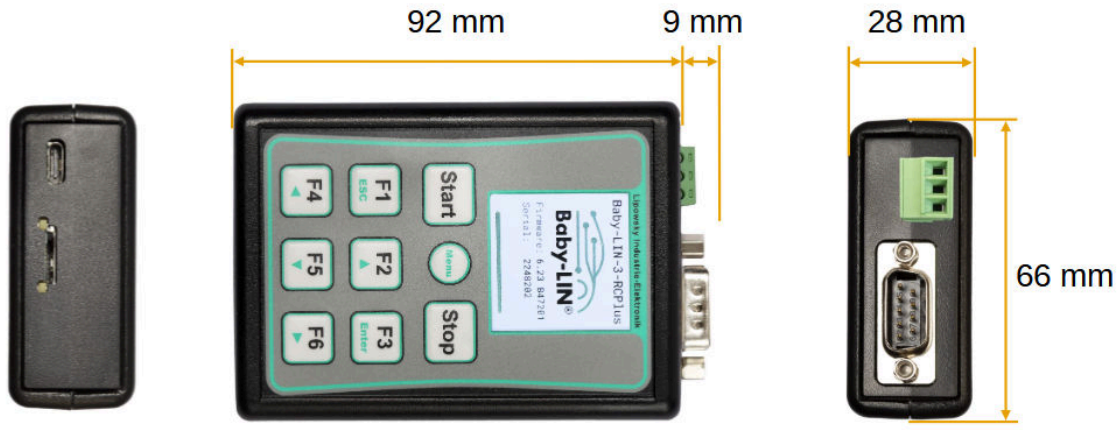
Pin description



Pin	Signal	Description
1	digital IO1	First combined input/output pin
2	CAN-L	Low line of the CAN interface
3	CAN-GND	Ground for CAN interface
4	1.LIN	First LIN-Bus
5	digital IO2	Second combined input/output pin
6	GND	Common ground for LINs and IOs
7	CAN-H	High line of the CAN interface
8	2.LIN	Second LIN-Bus
9	VCC	Supply input for the device and IOs

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Dimension drawing



Information
The complete technical specifications can be found in our user manual. It contains among other details the following:
- Connector pin assignment
- Electrical characteristics
- Firmware description
- Software description
- Protocol information
- Migration information

The user manual can be found in our LINWorks download package: *https://lipowsky.de/downloads*

Hardware requirements

The following hardware is required to operate the Baby-LIN-3-RCplus :

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 SDFiles to the Baby-LIN-3-RCplus and for firmware updates.

Software requirements

The LINWorks software requires one of the following operating systems:

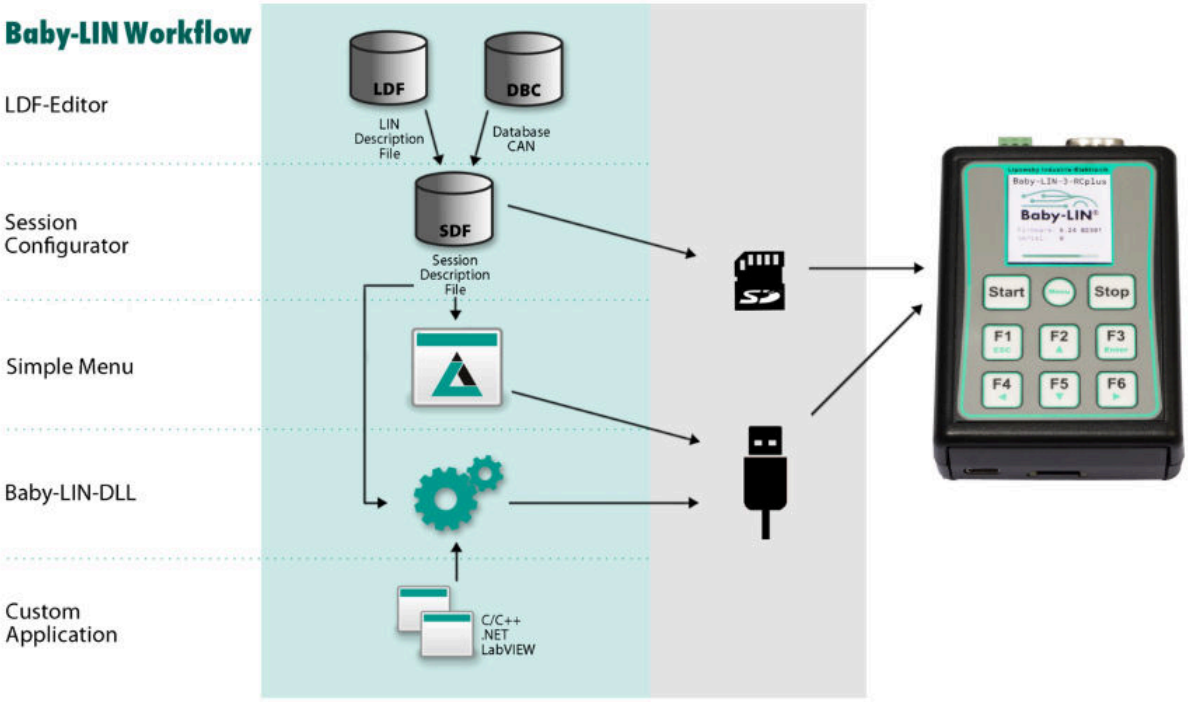
- Windows 10 (32 and 64 Bit)
- Windows 11 (x86 and 64 Bit)

Version incompatitbility
The Baby-LIN-DLL is available for Linux. The exact requirements are available upon 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.

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LINWorks workflow



Scope of delivery

The delivery of a Baby-LIN-3-RCplus systems includes the following components:

- Baby-LIN-3-RCplus device
- USB-C 2.0 cable, 1m, Type A to type C
- One 3-pin plug with screw connection (MC 1,5/3-ST-3,81)
- One SUB-D9 female plug with solder cups
- Download license for the LINWorks Suite (includes LINWorks PC software, USB-driver, example files and documentations)

Ordering information

Item number	Item	Description
8001058	Baby-LIN-3-RCplus	Multibus simulation device with I/O interface,integrated keypad and display

Information
Each device includes a download license for the LINWorks application suite. This PC software can be downloaded here:
https://lipowsky.de/downloads

Tip
Country of origin: Germany
Customs tariff number: 90308900

Optional hardware components

Item number	Item	Description
3500720	USB 2.0 cable, 1m Type A to type C	This cable connects the Baby-LIN-3 to a PC.
3021303	MC1,5/3-ST-3,81	3-pin plug component, screw connection with tension sleeve. Cable outlet parallel to plugin direction. Screw direction vertical to plugin direction.
3040330	Female SUB-D9 plug	SUB-D9 female plug with solder cups to connector the male SUB-D9 plug of the Baby-LIN-3.
3000686	Industrial 16GB microSD card	This microSDHC card can be used to log the communication or store SDFs.

Optional voucher codes

Item number	Item	Description
8002150	Option BL-Security-Access-Gateway	License code for the Security Access Gateway Application to connect Security DLL's to SDF executed on a Baby-LIN-3-RCplus .
8000891	Option BL-Webasto KLine	License code for software activation of special function of Webasto K-Line Protocol, need a written approval of Webasto.
8000991	Option BL-CAN-1-FD	License code for Baby-LIN-3-RCplus to activate CAN-FD (Flexible Data Rate) support for the CAN-Bus interface.
8000853	Option BL-LIN-2	License code for Baby-LIN-3-RCplus to activate the second LIN bus interface.
8000943	Option BL-microSD-Card	License code for Baby-LIN-3-RCplus to activate logging to the microSD card.

Information
All voucher codes can be converted using the option shop: www.optionshop.de/lipowsky

Optional software components

Item number	Item	Description
9004210	Customer specific installation	Installation of customer specific SDFile version and/or installation of license activation key.
9103010	LINWorks CD	The LINWorks archive with PC software for all Baby-LIN products on a physical medium (CD).

Distributors

Area	Country	Distributor	Website	Phone	E-Mail
Asia		Hongke Technology Co. LTD	www.hkaco.com	+86 20 3874 4538	sales@hkaco.com
		Honghong Technology Co., Ltd.	www.hongtronics.com	+886-2-85015332	sales@hongtronics.com
		Kyoko Co.,Ltd.	www.kyokotec.com		sales@kyokotec.com
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		Círculo SEI North America LLC	www.circulo-sei.com		sales-usa@circulo-sei.com
Europe		ISIT	www.isit.fr	+33 561 306 900	contact@isit.fr
		The Debug Store	www.thedebugstore.com	+44 1490 430526	sales@TheDebugStore.com
Worldwide		Lipowsky Industrie-Elektronik GmbH	www.lipowsky.com	+49 6151 935910	info@lipowsky.de

More details about our distributors can be found on our website under the heading `Distributors`.

Product disposal



After the product is no longer used, it must be disposed of separately from household waste at a designated recycling site. All kind of batteries must be removed from the device and disposed separately. Furthermore, you can also return the device to us for proper disposal, you only have to bear for the shipping costs. Please use this address:

Lipowsky Industrie-Elektronik GmbH
Device disposal
Römerstr. 57
64291 Darmstadt
Germany

Version history

Version	Change	Chapter	Details
1.1	Initial Version		
1.2	Added Abex-Global as distributor	Distributors	