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Objective

The SDF-V3 protocol section allows to define any kind of request/response scheme.

To implement K-Line communication support in a SDF LIN bus section, 2 custom specific protocol types already had been implemented:

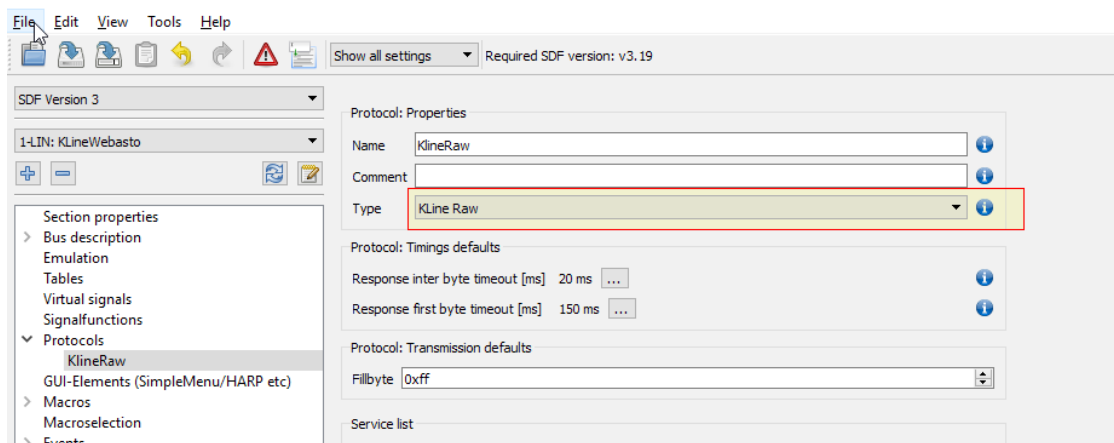
- Webasto Kline Standard
- Webasto Kline UHW V2

These both protocol types are described in AppNote-Protocoloption-Kline-Webasto-RevA.pdf.

To allow even more versatile K-Line communication, a new protocol type K-Line-Raw was implemented.

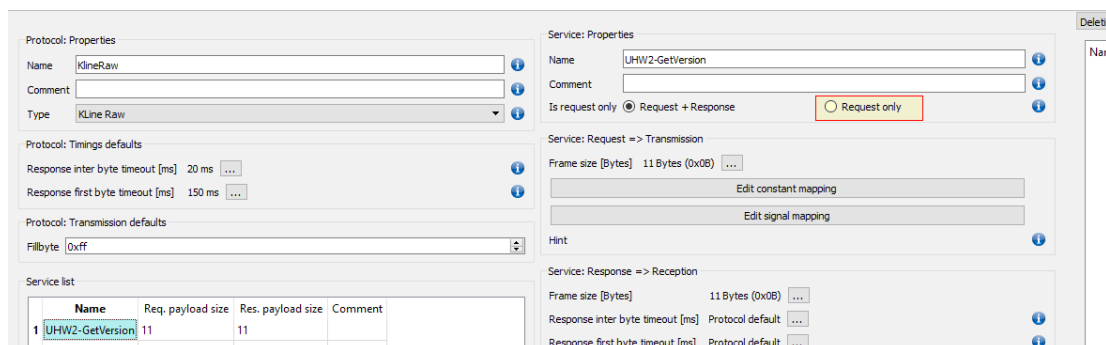
To use this protocol type you must use at least LinWorks V.2.29.4 and a Baby-LIN / Mif-LIN firmware version \geq V. 6.18.

On A Baby-LIN-MB-II a version \geq 2.0.0 needs to be installed.

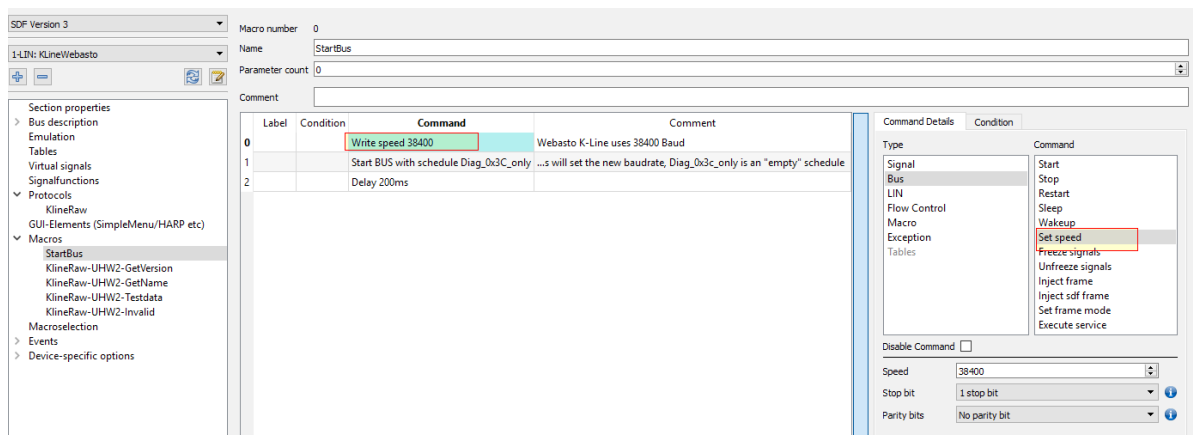


As all protocol variants you can define services, which exist of a Request frame and a response frame. In K-Line Raw protocol request and receive frames can have up 1024 bytes in length.

The response frame can be omitted, by selecting Request only in the Service properties



The byte format and baud rate for the LIN bus interface, which is used for this K-Line protocol can be adjusted with the macro command `Set Speed (Write Speed)`.



You can adjust the stop bit size between 1 and 2 bits and the parity can be selected between no, odd and even parity.

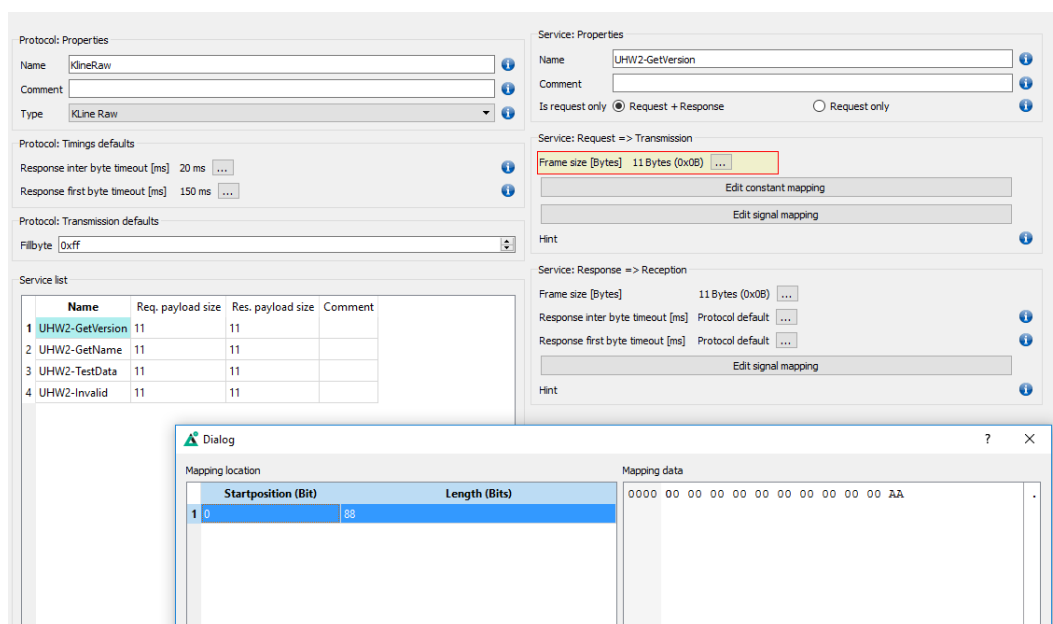
The baud rate supported on the Baby-LIN hardware runs for 9600 baud to 115200Baud.

For baud rates over 20 KBit the integrated slope control in the LIN bus transceiver is automatically disabled.

Defining a Frame

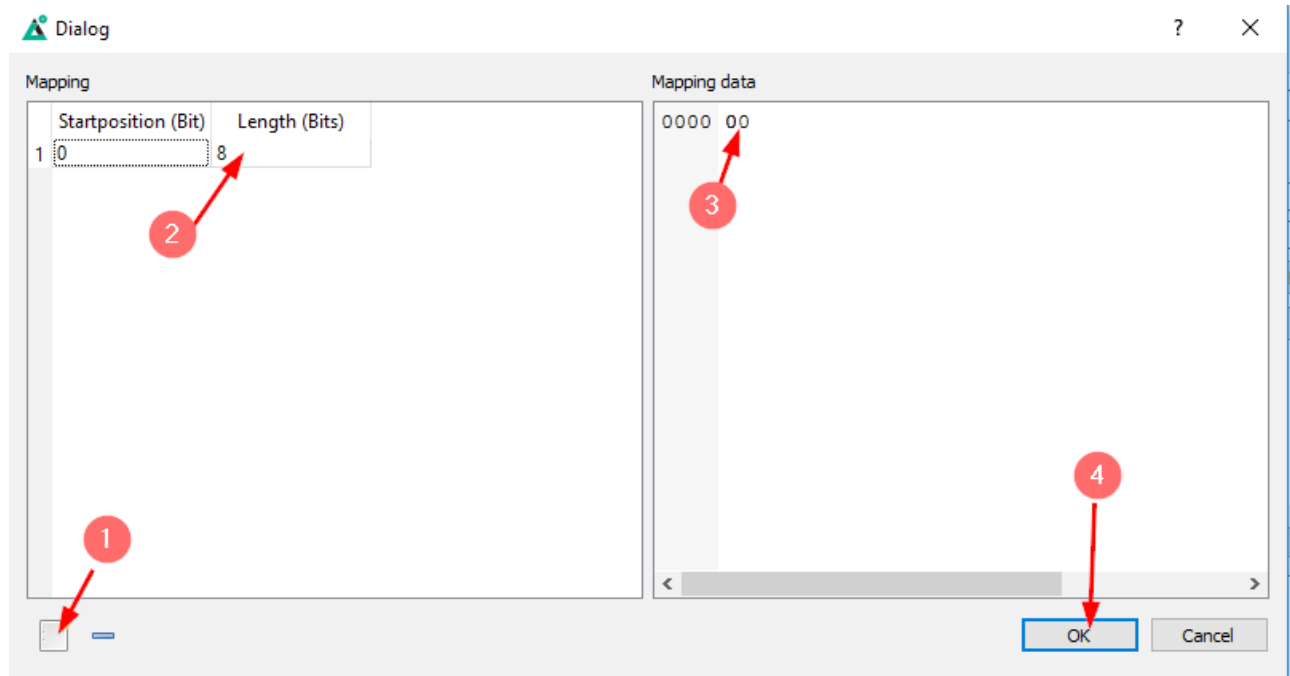
The frame size in K-Line raw protocol can be with a constant value, a variable value or with a value retrieved from a signal.

If the frame size is defined variable, it will be calculated from the length of the available mappings.



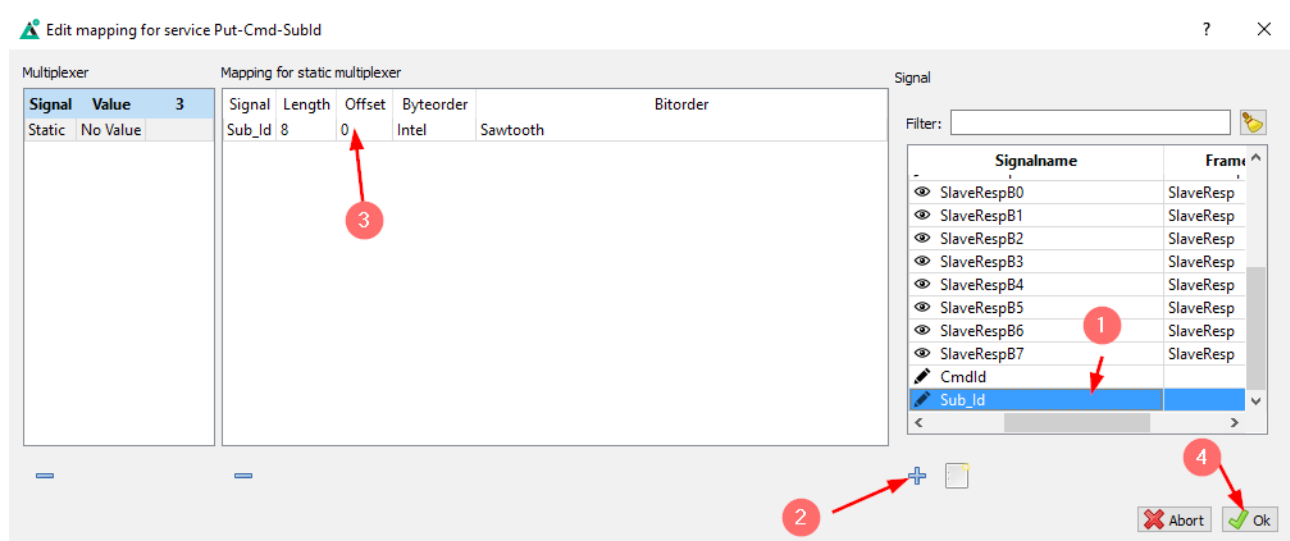
Definition of constant frame content(payload)

For a constant mapping you first add a mapping entry (1), then define start position and size (in bits) of this mapping entry (2), then define the constant values for this mapping entry (3) and finally save the data (4).



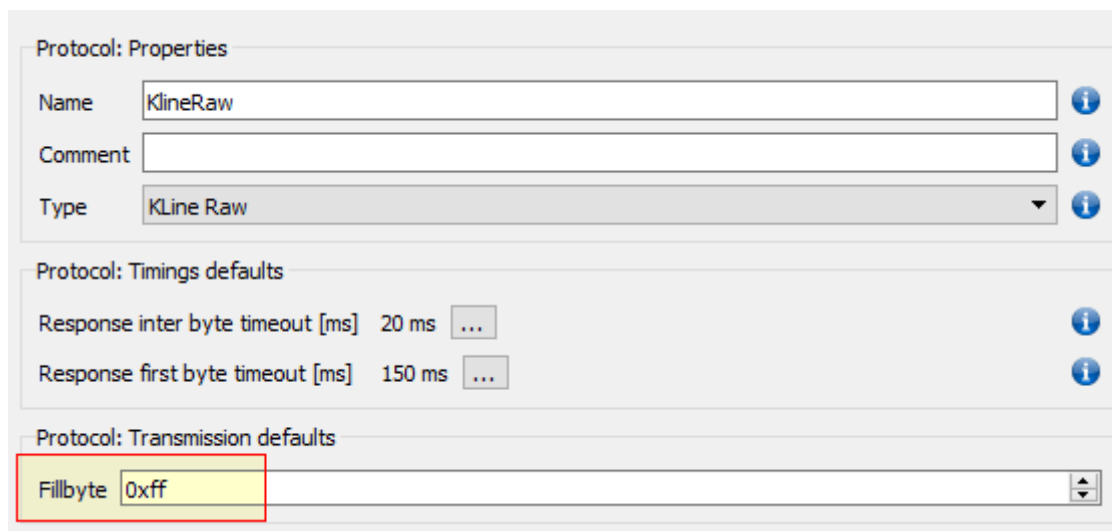
Definition of payload by signal mappings

To define a signal mapping, select requested signal in right signal list (1), add it to mapping list (2) and eventually adjust offset into payload (3), if you have added all signals you want to have in this frame you close with OK (4).



Both payload definition methods can be combined, in this case first the constant mappings will be applied, and the signal mappings will be merged,

Unmapped areas of the frame will be filled with the fill byte given in the general protocol properties.



The screenshot shows a configuration window for the 'KlineRaw' protocol. It is divided into three sections: 'Protocol: Properties', 'Protocol: Timings defaults', and 'Protocol: Transmission defaults'. In the 'Properties' section, the 'Name' is 'KlineRaw', 'Comment' is empty, and 'Type' is 'Kline Raw'. In the 'Timings defaults' section, 'Response inter byte timeout [ms]' is 20 ms and 'Response first byte timeout [ms]' is 150 ms. In the 'Transmission defaults' section, the 'Fillbyte' is set to '0xff', which is highlighted with a red rectangle.

The definitions for the **response frame** are made in the same way, only **that constant payload mappings don't make sense there.**

Start K-Line communication

Typically, when using K-Line communication in a LIN section, the user does not want to have LIN formatted frames on this bus line.

On the other side the Bus communication in a LIN section must be started with start bus command, which then automatically starts either the first schedule of the embedded LDF or the schedule given with the start command.

Using an “Empty Schedule”

So as a best practice, you should have a Diagnostic Fame MasterRequest Only Schedule in your LDF, which you use to start the bus.

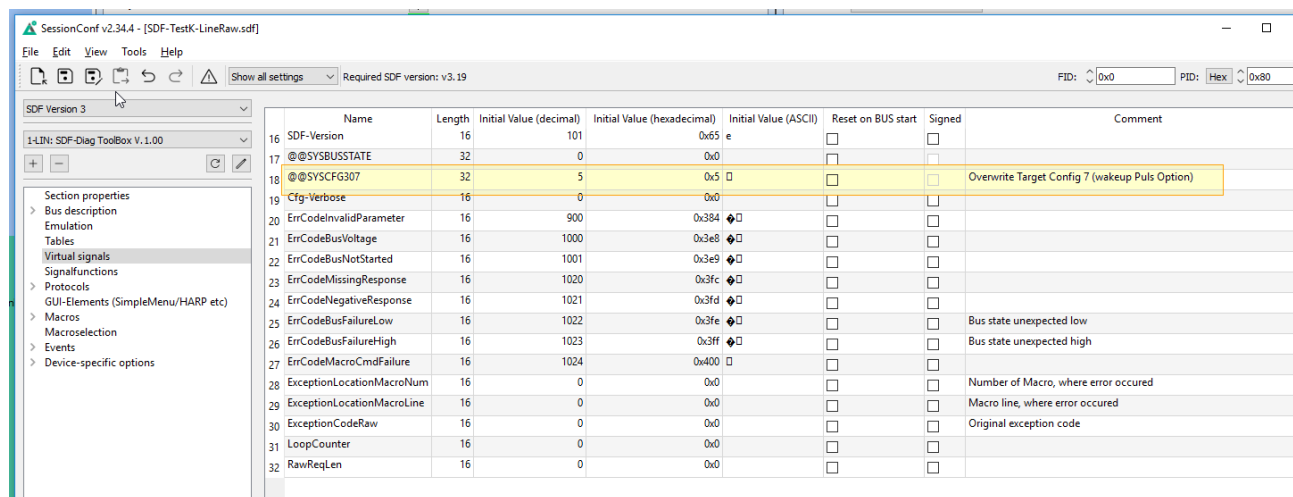
This will lead to have an “empty” schedule running as MasterRequests will be executed as silent frames.

Then you can use macro commands Execute Service to transmit and receive Kline raw frames only on the bus line.

Omitting Wake Puls generation

A bus start in LIN section will generate a wake pulse event by default.

If you want to omit this you can do this by integrating the system signal @@SYSCFG307 with an initial value of 5 in the virtual signals page of the corresponding LIN section.



Name	Length	Initial Value (decimal)	Initial Value (hexadecimal)	Initial Value (ASCII)	Reset on BUS start	Signed	Comment
16 SDF-Version	16	101	0x65	e	<input type="checkbox"/>	<input type="checkbox"/>	
17 @@SYSBUSSTATE	32	0	0x0		<input type="checkbox"/>	<input type="checkbox"/>	
18 @@SYSCFG307	32	5	0x5		<input type="checkbox"/>	<input type="checkbox"/>	Overwrite Target Config 7 (wakeUp Puls Option)
19 Cfg-Verbose	16	0	0x0		<input type="checkbox"/>	<input type="checkbox"/>	
20 ErrCodeInvalidParameter	16	900	0x384	♦□	<input type="checkbox"/>	<input type="checkbox"/>	
21 ErrCodeBusVoltage	16	1000	0x3e8	♦□	<input type="checkbox"/>	<input type="checkbox"/>	
22 ErrCodeBusNotStarted	16	1001	0x3e9	♦□	<input type="checkbox"/>	<input type="checkbox"/>	
23 ErrCodeMissingResponse	16	1020	0x3fc	♦□	<input type="checkbox"/>	<input type="checkbox"/>	
24 ErrCodeNegativeResponse	16	1021	0x3fd	♦□	<input type="checkbox"/>	<input type="checkbox"/>	
25 ErrCodeBusFailureLow	16	1022	0x3fe	♦□	<input type="checkbox"/>	<input type="checkbox"/>	Bus state unexpected low
26 ErrCodeBusFailureHigh	16	1023	0x3ff	♦□	<input type="checkbox"/>	<input type="checkbox"/>	Bus state unexpected high
27 ErrCodeMacroCmdFailure	16	1024	0x400	□	<input type="checkbox"/>	<input type="checkbox"/>	
28 ExceptionLocationMacroNum	16	0	0x0		<input type="checkbox"/>	<input type="checkbox"/>	Number of Macro, where error occurred
29 ExceptionLocationMacroLine	16	0	0x0		<input type="checkbox"/>	<input type="checkbox"/>	Macro line, where error occurred
30 ExceptionCodeRaw	16	0	0x0		<input type="checkbox"/>	<input type="checkbox"/>	Original exception code
31 LoopCounter	16	0	0x0		<input type="checkbox"/>	<input type="checkbox"/>	
32 RawReqLen	16	0	0x0		<input type="checkbox"/>	<input type="checkbox"/>	

Prerequisites

All device capable to run SDF-V3 files and using the latest Baby-LIN firmware can execute the K-Line Raw protocol.

Limitations

As for all the other K-Line protocol variants only communication following the request / response scheme is supported. Reception of data streamed continuously by the connected node is not supported.

Document Revision history

Date	Revision	Action	By	Comment
2.12.2020	A		AL	First Release
16.10.2023	B		AL	Added @@SYSCFG307 info