

SE5000 Integration Guidelines

TELEMATIC, D8, RDL, TSG008C

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Telematic Service Providers, SE5000 Integration guidelines

This guide covers all Telematic interfaces to the SE5000: D8, C5/C7 or A4/A8 and front connector VU downloads. It focuses on the 1C tachograph, the Connekt. Its aim is to help TSP fitters to integrate with the Stoneridge Smart Tachograph.

In any case, stay legal: if in doubt with one of the actions recommended herein (power interrupt for instance), contact an approved tachograph workshop to carry the work.

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1. Remote Download (RDL)

The remote Download functionality is based on Annex 1C Appendix 7, and on the HDEI FMS User Guide version 02.01. It differs from the 1B since it introduces new APDUs for the Generation 2 card authentication.

The Telematic device used for remote download, is generally connected to the CAN-C, pins C5 and C7. But there is a shift now from the OEMs to impose using the FMS plug instead. Remote download can be enabled on A-CAN or C-CAN via the Optimo or via the Tacho Link Smart Phone App.

There are some specific settings required depending on which truck the tachograph is fitted on. Please refer to our SIL19_001 for latest information. Current revision D of this SIL indicates:

Setting	Value	Description
C-CAN	Enable or Disable	This controls DDS over C-CAN and does not impact Remote Download
C-CAN Type	Standard or Fast Extended	Most current FMS systems will accept Standard . For vehicles equipped with a Fleetboard , this must be set to Fast Extended .
C-CAN Diagnostics (or A-CAN Diagnostics if the RDL device is connected on A-CAN)	ISO	Most current FMS systems will require ISO. Even the Mercedes Fleetboard.
Remote download activation status	Enable	Remote Download function activation
Remote Download C CAN configuration	Enable	Make sure Remote Download A CAN configuration is set to Disable , or vice-versa : activate Remote Download on only one CAN at a time.
Remote download card writing	Disable	Can be Enable or Disable , however we recommend that this is Disable
Show remote download	No	Can be Yes or No . This will determine whether the driver is aware that a remote download is taking place or not.
Wake-up on CAN	C-CAN or Both	Options: Off , A CAN , C CAN or Both . If the SE5000 is already set to A-CAN , change this to Both . If it is Off , change it to C-CAN . If this is OFF , Remote Download will require Ignition ON.

If the line is not physically terminated (120 ohms resistor between CAN high and CAN low wires at both ends of the CAN-C network), you will need to shunt C7 to C8 at the Tachograph C-plug. This will terminate the C-CAN line. The target, when all units are plugged in, is to measure 60 Ohm between C5 and C7 (equivalent resistor value when two 120-ohms resistor are wired in parallel) at ignition Off. However, some units control this termination by SW, and you may read only 120 Ohms with Ignition OFF.

Most Telematic devices are not able to handle the “remote download card writing”. Our SIL19_001 recommends this parameter to be “Disable”. Failing to do so, the Remote Download would not work beyond the *Card Authentication* phase. We will remove this feature from the 1Cv2 to avoid confusion.

Some other Telematic devices are using the D8 output to pre-determine which driver card is inserted. This is used to pre-assign the card download to a driver. For those, Card RDL will fail if the D8 is missing or set incorrectly.



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Some OEM installations have other Remote Download SW/HW installed by default. If the third-party Telematic device does not work, it may be necessary to disconnect/deactivate those. Even if the Telematic device is wired to C-CAN and the OEM system on A-CAN. In any case, one should not enable remote download on both CAN buses at the same time; choose either A-CAN or C-CAN only.

Additionally, the industry details the interface between the 2 units in the *FMS User Guide* document from the HTEI Working Group. This document highlights that for Remote Download the ISO Card reader must adapt its T=0/T=1 protocol to the VU. The SE5000 only handles the T=0 protocol.

a. Troubleshooting Remote Download issues

i. Truck issues

Remote Download must be authorized on one CAN only. Up to 2019 STONERIDGE MAN VU variants had RDL enabled on both CAN. If both CAN have a Telematic device installed, then you will need to deactivate RDL on one of the CAN. Some other Truck systems may require being deactivated as well, please refer to the OEM Dealer.

The RDL SDI/CAN Address is supposed to be xFB. Verify this is the case, and ensure that no other units use this address on CAN A or CAN C. Alternatively, set your Telematic hardware to another address (xFC ?).

ii. MAN Specific

MAN trucks can have the DSRC or the RIO box wired to C-CAN. This must be taken into account when fitting a Telematic device:

- If the truck is pre-equipped for FMS, meaning the **KSM module Step 2.1** or higher (FMS Gateway computer) is installed, then MAN recommend the following:
 - Wire the TSP to the **Green FMS Plug X5080** to connect to the Tachograph A-CAN via the KSM module.
 - If required by the TSP, splice the D8 to connect it both to the TSP and to the RIO box.
 - Remove the A-CAN termination between pin 6 and pin 9 of the FMS plug X5080 and turn ON the TSP CAN termination.
 - This has been validated by MAN on the TG2 trucks. For TG3 platforms (MY late 2020), they recommend using the C5/C7 direct connection. See next point:
- If the truck has got no KSM module installed:
 - Wire the TSP to the tachograph C-Plug, C5/C7.



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- If required by the TSP, splice the D8 to connect it both to the TSP and to the RIO box.
- Make sure the overall resistance between C5 and C7 equals 60 Ohms. Refer to “CAN termination” below for more details.
- If this is not working:
 - Please note that the RIO box runs on SDI/CAN Address xFB, so the TSP may need to be reprogrammed (to xFC for instance).
 - If you were to remove the RIO C-plug from Tachograph C5/C7, **make sure to keep the DSRC Module** if this one is wired to C5/C7 (In the MAN TG2 trucks, the module used to be on A-CAN, but it is on C-CAN from the TG3 platform).
 - **Note:** removing the RIO C-plug connection is now forbidden by MAN, so this can only be done in coordination with the MAN dealer.
- Check the tachograph settings in accordance with SIL19_001. Especially remember that the MAN OEM tachographs are delivered with Remote Download enabled on both A-CAN and C-CAN: we recommend that you disable one of them, depending on the installation.

You may face similar FMS/DSRC/TSP integration issues on other OEM as well.

iii. MERCEDES Fleetboard

“C-CAN Diagnostic” may need to be set to MERCEDES if the Telematic device is a MB Fleetboard. Try using MERCEDES or ISO.

Also, since 2020 MERCEDES have the option to connect their Fleetboard to A-CAN.

iv. CAN Termination

The resistance value measured between C5 and C7 must be 60 Ohms when all devices are connected, and ignition is OFF:

- If less (<60 Ohms), remove any terminators which may be installed on the CAN line. If this requires disconnecting the DSRC Module (and its internal CAN termination), you will need to rewire it to the C2-CAN: C1/C4, but this can only be done on our variants 900588Rx10, 35 or 36 and requires changing the *DSRC CAN selection* with Optimo².
- If more (>60 Ohms), add a terminator on the line, for instance by shunting C7 and C8 at the tachograph C-plug, or adding a resistor at one end of the CAN line. **Note:** the Telematic device may have a SW-driven 120 Ohms termination, only measurable if ignition is ON. In which case C5/C7 resistance with ignition OFF must be 120 Ohms.



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v. Verify that an issue is not related to the truck installation.

Disconnect all A-CAN and C-CAN from truck, leave only power and the Telematic C5/C7 connection. Test, if the issue is still present, it is not related to the truck installation.

Verify the VU is programmed as per SIL19_001.

vi. RDL only works with KL15 On

Use Optimo² to make sure *Wake-up on CAN* is set for the CAN used by the Telematic device (A or C or both).

vii. RDL not working, except for a few hours after KL30 Off/On

Some Telematic do close and restart an authentication if there has been an ignition Off/On or if their process was interrupted.

This is not required if the *Tauth* 24 hours delay has not expired. The PA33 version may not allow you to reopen a non-expired session.

Turning Sleep Mode Off and doing a transition KL30 Off/On (power cycle the VU) may prevent this regardless of the Telematic behavior.

viii. RDL not working on some trucks, but ok on others

If Remote Download fails on some trucks, while others in the exact same configuration work correctly, it could be a timing issue, with the first Download request having occurred too early. Restart from fresh: turn ignition Off, remove A-plug, replug, turn ignition ON, wait 1 minute, launch again the remote download.

If the failure reoccurs, verify your tachograph settings as per SIL19_001. Most Telematic devices are not able to handle the “remote download card writing”. If a given Telematic HW/SW works on some SE5000 but fails on some others, make sure this parameter is set to “Disable” on all units.

ix. The Remote authentication fails because the remote company card is invalid

1. Test the company card locally: if it is seen as invalid when inserted in the VU drawer, this is not a RDL issue, but a card issue. Test with another card supplier, the card customization may not match the IOT/Annex 1C.



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2. A company card can be invalid because of index 15 or 16: check the card history for more recent cards. Indeed, the Annex 1C calls for the Tachograph to check cards validity based on index 15 and 16. Since in the past index 15 was used for delivering more cards to the same company, this now causes issues for local and remote downloads.
3. The remote card reader may be using ISO Protocol T=1, see next paragraph for more details.

x. The Remote authentication fails while it works on the competition tachographs

If a Telematic device communicates with the Connekt, but fails to authenticate cards, while it successfully authenticates the card on a competition unit, it can be either:

- A company card was previously used with the Connekt with index 15 or 16 higher than on the card used for this authentication (ref previous paragraph).
- Or the T=1 to T=0 protocol conversion is not programmed correctly:
 - You will see that for instance with a Gen2 card if a General Authenticate CAN message 86 00 is answered with a “wrong length” **67 00** message. The Telematic SW does not correctly handle the card reader T=1 protocol translation into the T=0 protocol. This explains that the same SW works with some Tacho/Gen2 card (inserted in a remote card reader using the T=0 protocol), and not in some others (inserted in a remote card reader using T=1 protocol). A Gen2 CAN log of a working RDL compared to a Gen2 CAN log of a non-working case would give some hints as to what must be modified in the Telematic SW.
 - The Telematic Service Provider must test the various cases: Gen1 or Gen2 card, Card reader using the T=0 or T=1 ISO-protocol, and compare how their SW behaves in each 4 cases.
 - If the Telematic SW already translates the protocol based on Gen1 / FMS Spec annex 3, this is not sufficient. Indeed the new Gen2 APDUs are not covered by the FMS Spec Annex 3.

xi. RDL is working fine with a Gen1 Company Card, but fails with a Gen2

See the delta Gen2/Gen1 in Annex 1C appendix 7 and the HTEI FMS User Guide. Card protocol is described in ISO 7816-3 and -4. Refer to previous paragraph for T=1/T=0 protocol translation information.

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xii. Tachograph RDL is possible but Card RDL fails

Some Telematic are using the D8 DriverID to pre-assign Card download. Make sure D8 is wired and set properly (see next section).

xiii. Other issues

If you still need further advices, please contact your official Stoneridge Distributor with all relevant details, using the checklist at the end of this document, also available in Excel format.

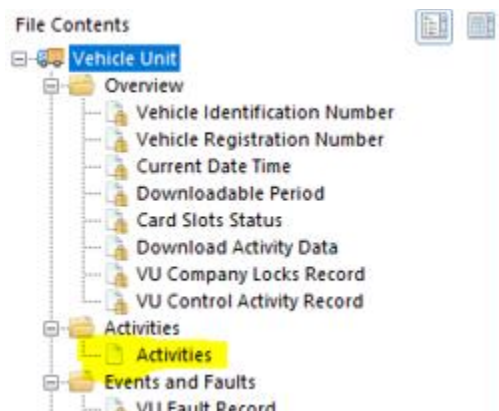
2. Local download

The 1C Tachograph download is only possible with [a 1C capable download tool](#). If not, the Download will fail. This still happens at some fleets in 2020Q4. The Stoneridge Tacholink HW is unchanged, however you must use the latest version of the Tacho Center App from GooglePlay: version 1.8.10.

If the VU stored corrupted data (missing or invalid digital signature), it will generate a code 15 “data integrity error” during attempted download (remote or local). Some tools may stop there, but most tools will continue and complete the download.



Also, the download tool itself may generate signature errors, which is denoted by the missing lock on the Tachosys fileviewer software as shown below:



Some PC-software may not be able to process these files with signature errors. Try and perform a download without the data generating the signature error. But first check your Download tool with [a confirmed 1C capable download tool](#).

Also, some PC-software originally had parsing issues back in 2019, because the blocks shown above were not in the expected order. This must be fixed at the PC-software level.



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a. Troubleshooting Local Download issues

If the Local Download fails, verify sleep mode is OFF (for PA33 units), perform a Power Supply Interruption, and try the download again.

If still faulty, verify with another tool: DigifobPro or OPTAC DLT.

3. D8 Broadcast

Serial interface versus CAN: D8 is a serial interface doing broadcast only. Note: it is not part of the 1Cv2 specification; CAN interfaces are offering many more parameters. Yet 1B real-time monitoring traditionally was done over the D8 Serial Output. OEM systems now offer CAN-only interfaces. The Stoneridge D8 specification for our 1C tachograph is unchanged compared to our 1B specification.

Configuring D8: “Serial Data Output” parameter on Optimo must be set to “SRE” and not “2400”, which is only applicable to old Telematic devices (from analog 2400 old times). This can also be changed with a Company card, without using a Workshop Tool. Please refer to the Driver & Company manual on www.se5000.com/product-support

SW PA33: However, the 900588RA / PA33 version requires Sleep Mode to be turned OFF.

ADR: The 900588RAxxRxx, RB, RC, and the RD10R01, RD21R01 are ADR variants which will not send any D8 frames at and after ignition is turned OFF.

If required, use the C-CAN as an alternative: every minute from ignition off, the Telematic device must poll the Tachograph on the C-CAN for RDI F903 (driver1 activity) and/or F904 (Driver2), via a diagnostic request TP.CM_RTS. This requires the VU parameter “Wake-up on CAN” to be set to “C-CAN” or “both”. It also requires the Telematic hardware to be wired to the Tachograph C-plug (C5/C7), not through the FMS plug.

More recent versions (from **RF, RG**) are transmitting one single D8 frame whenever Driver 1 or Driver 2 activity is changed at or after ignition is turned OFF.

Driver consent: the Driver Consent is not impacting the D8 behavior: we keep transmitting the D8 frames when the driver answers NO to the Consent question. This is in line with Annex 1C and our Type Approval, since the D8 is not a Truck external interface.

CAN interface: Third-party Telematic devices may already use CAN as well as D8. Contrarily to the Truck OEM systems which are mainly on A-CAN, Telematic devices will use the C-CAN exclusively (OEM generally void truck warranty if the Telematic is connected on the A-CAN, except via the FMS plug).

Annexes



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[Annex 1C](#) Appendix 7

HTEI [FMS User Guide](#) 02.01

Card index 15 and 16 Stoneridge [Knowledge Article](#)

Stoneridge “Remote Download” [SIL19 001](#)

Card protocol: ref. ISO 7816-3 and -4

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Checklist - Please complete and return with CAN log to your local Stoneridge distributor

<https://www.stoneridgeelectronics.com/support-training>

Your reference:		Stoneridge Tracking 2021C#					
Truck Brand:		Truck Model:		Truck Year:			
Tachograph HW:	900588R _ _ _ R0 _		900208R7. _ / _ _ R _ _				
Telematic HW:		Telematic SW:		CAN Termination at Telematic HW:	YES / NO		
Wiring from Telematic...	... to FMS Plug:	Plug and pins, including termination:					
	... to Tacho:	D8?	C5/C7?	C7/C8?	A4/A8?		
How is the VU configured? Ref SIL19_001	Remote download activation status:						
	Remote Download C CAN configuration:						
	Remote Download A CAN configuration:						
	Remote download card writing:						
	Show Remote Download:						
	Wake up on CAN:						
	Show Driver Card Download:						
Company Card Numbers:	Remote:		Company Lock:		1C Card History:		
					<i>Provide printout</i>		
Is the remote company card accepted when inserted in the VU drawers? YES / NO / UNKNOWN							
Is KL15 status or KL15 transitions impacting the RDL?							
Is the Truck / Telematic combination working fine on another Generation or Manufacturer tachograph?	Which one ?						
Provide a raw CAN log from a working configuration, versus one from the failing configuration.	Identif	Flg	DLC	DO...1..	Time	Dir	
	0 18DAEE11 X			8	3	22 F9	80 FF
	0 18DAEE11 X			8	3	22 F9	23 FF
	0 18DAEE11 X			8	3	22 F9	23 FF
	0 18DAEE11 X			8	3	22 F9	80 FF
	0 18DAEE11 X			8	3	22 F9	22 FF
	0 18DAEE11 X			8	3	22 F9	22 FF