



- **Reading real-time data from digital tachograph**
- **with IOBOX-CAN and FOX3 series**
-
-
- **Application Note**

Table of contents

1	Introduction	3
1.1	What is a tachograph?	3
1.2	Hardware Requirements	3
1.3	Main features and benefits.....	3
2	Reading real time data from tachograph	4
2.1	Device configuration	4
2.2	Supported parameters for tachographs on the AVL firmware version 2.15.0	5
2.3	Installation steps	7
3	Documentation	8
3.1	Additional documentation & software tools	8

Version history:

This table provides a summary of the document revisions.

Version	Author	Changes	Modified
1.0.0	F. Beqiri	- Initial version	11/08/2017

Cautions

The information furnished herein by FALCOM is believed to be accurate and reliable. However, no responsibility is assumed for its use. Please, read carefully the safety precautions.

If you have any technical questions regarding this document or the product described in it, please contact your vendor.

General information about FALCOM and its range of products are available at the following Internet address: <http://www.falcom.de/>

Trademarks

Some mentioned products are registered trademarks of their respective companies.

Copyright

This document is copyrighted by FALCOM GmbH with all rights reserved. No part of this documentation may be reproduced in any form without the prior written permission of FALCOM GmbH.

FALCOM GmbH

No liability (incl. patent liability) is assumed with respect to the use of the information contained herein.

Note

Because our products are being continuously improved, specifications and information given in this document are subject to change by FALCOM without notice.

1 INTRODUCTION

This guide provides a quick overview on how to configure your FOX3 series devices in combination with the accessory box IOBOX-CAN, connect the IOBOX-CAN to D8 connector of the digital tachograph, read real time data from this interface and transfer them to your platform server.

1.1 What is a tachograph?

A digital tachograph is a device fitted to a vehicle that automatically records the vehicle identity number (VIN), the vehicle registration number and many others such as the tachograph time, vehicle speed, vehicle total distance, trip distance together with the driver's activity, tachograph status change events, driver IDs, work status changes, driver card insertion/removal events for both drivers etc. Digital tachographs have a D8 connection on pin 8 of the D connector that deliver serial data in several proprietary formats, e.g. VDO and Stoneridge. The IOBOX-CAN device can be connected to this pin to read this real time data. The IOBOX-CAN supports only the VDO and the Stoneridge formats, other tachograph formats are not supported.

1.2 Hardware Requirements

- A compatible digital tachograph (VDO or Stoneridge).
- IOBOX-CAN accessory device.
- FOX3 series devices with firmware 2.15.0 or higher.
- **FOX3/-3G/-4G series with firmware 3.1.0 or higher (coming soon).**
- Connection cable to interface the tachograph with IOBOX-CAN (CA38)
- Installation and power supply cable for FOX3 series device (CA68)
- The input IN4 (pin 8) of the IOBOX-CAN must be connected to the pin 8 of the D-sub connector (D8 pin) of the digital tachograph.

Please note that FOX3 series devices with the IOBOX-CAN can only read time data from the digital tachographs, but NOT remote download of DDD files (driver and vehicle file).

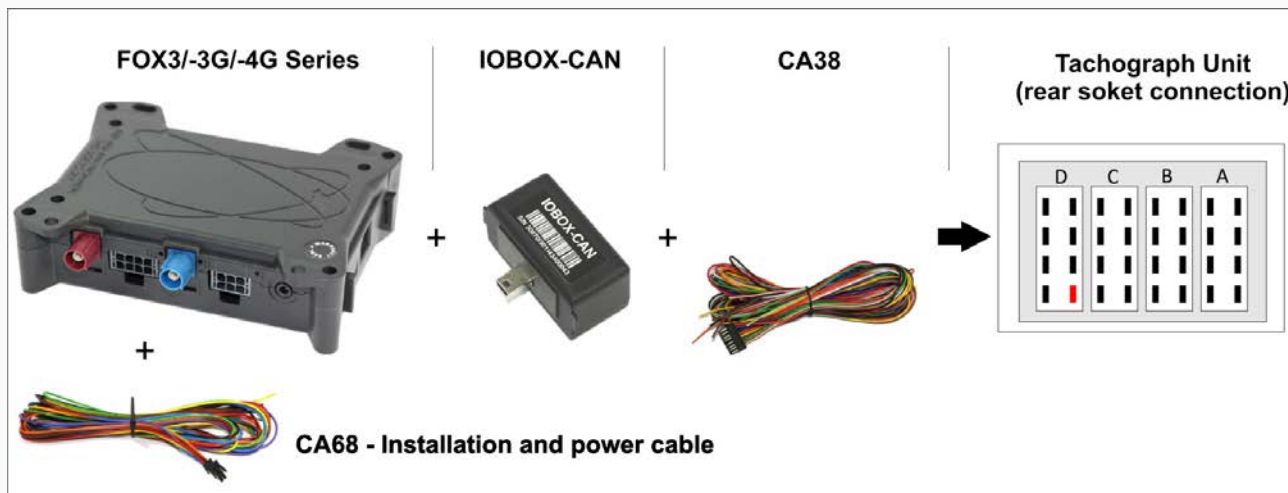


Fig. 1: Requirements for connection to D8 connector of the tachograph

1.3 Main features and benefits

The main features and benefits of digital tachograph data are:

- ✓ Automatic identification of vehicles and drivers
- ✓ Evaluation of driving behavior and safety
- ✓ Monitoring driving times and rest periods

2 READING REAL TIME DATA FROM TACHOGRAPH

2.1 Device configuration

To read this data, you have first to configure your FOX3 series device by sending the following PFAL script to the FOX3 series device with Workbench software. Install the FOX3 series device to the D8 connector of the digital tachograph and start reading of the real time data.

The Workbench software can be downloaded from the FALCOM website (see chapter 3.1). After you have installed it on your PC, load the PFAL script below into your device. More information on how to download the Workbench software, install and load the PFAL script can be found in the hardware manual of the device you are using (see also chapter 3.1).

Enable IN4 (PIN8) on 16pin connector of the IOBOX-CAN to read tachograph data:
\$PFAL,Cnf.Set,DEVICE.DTCO.D8=B0,vdo // for VDO
\$PFAL,Cnf.Set,DEVICE.DTCO.D8=B0,sre // for Stoneridge
To read live data from the tachograph whenever the Drivers ID or state has changed, use the alarm configurations below:
\$PFAL,CNF.SET,AL19=SYS.eDTCO.DRIVER.STATE:TCP.Client.Send,08,"COMPLETE:&(DTCO.D8.COMPLETE) BLOB:&(DTCO.D8.BLOB)"
To read automatically, every minute, specific data from the tachograph together with GPS data <i>e.g. Speed, Date and Time</i> , use the alarm configuration below and enter the dynamic entries, in the format &(dynamic_entry) &(dynamic_entry) &(dynamic_entry) , listed in chapter 1.4:
\$PFAL,CNF.SET,AL18=SYS.Device.eStart:Sys.Timer0.Start=cyclic,6000 \$PFAL,CNF.SET,AL19=Sys.Timer.e0:TCP.Client.Send,08,"SPEED: &(DTCO.D8.VEHICLE_SPEED) DATE: &(DTCO.D8.DATE) TIME: &(DTCO.D8.TIME)"
With the FOX3 series device and accessory box IOBOX-CAN, it is possible to automate reading of the tachograph data using the configuration below, for example, every minute:
\$PFAL,CNF.SET,AL18=SYS.Device.eStart:Sys.Timer0.Start=cyclic,6000 \$PFAL,CNF.SET,AL19=Sys.Timer.e0:TCP.Client.Send,08,"COMPLETE: &(DTCO.D8.COMPLETE) BLOB: &(DTCO.D8.BLOB)"
To request tachograph data from your server side, use the following command
\$PFAL,TCP.Client.Send,08,"COMPLETE: &(DTCO.D8.COMPLETE) BLOB: &(DTCO.D8.BLOB)"
To deactivate the D8 interface on the IOBOX-CAN and use the IN4 (PIN8) on 16pin connector as digital input, use the command below:
\$PFAL,Cnf.Set,DEVICE.DTCO.D8=off

In addition to the D8 interface, the IOBOX-CAN device offers several flexible features such as CAN-Bus interface and programmable inputs and outputs for almost every application within the automobile industry. For more details, please refer to the chapter 3.1, and download the document "FOX3_3G_4G_HardwareManual.pdf" from our website.

2.2 Supported parameters for tachographs on the AVL firmware version 2.15.0

The following table shows the implemented parameters for reading real time data from tachographs.

DTCO Parameters (Dynamic entries)	Description of data received from the D8 of the tachograph
DTCO.D8.COMPLETE	<p>It reports a formatted text. e.g.</p> <p>INFO-DATA: ECU ID: DTCO SW:00</p> <p>Date/Time: 29.04.2015 09:05:13 +120 min</p> <p>Vehicle: moving, 9.898 km/h, V</p> <p>Vehicle ID: ABCD01102013ABCDE</p> <p>Vehicle Reg: N BG 112</p> <p>Driver1 ID:1100000007158000, ???, card ok</p> <p>Driver2 available, no card</p> <p>Motor: 8192 rpm</p> <p>Distance: 731.485 km, trip: 3172.260 km</p> <p>D1=low</p> <p>D2=low</p> <p>Ign=on</p> <p>Drawer=closed</p> <p>OpMode=operational*42</p>
DTCO.D8.BLOB	<p>It reports a string with comma separated value fields:</p> <p>ECU ID, String</p> <p>ECU SW ID, 2 digits hex</p> <p>year UTC, 4 digits decimal</p> <p>month UTC, 2 digits decimal</p> <p>day UTC, 2 digits decimal</p> <p>hour UTC, 2 digits decimal</p> <p>minute UTC, 2 digits</p> <p>decimal second UTC, 2 digits decimal</p> <p>time offset to UTC, 3 digits decimal</p> <p>work state, 2 digits hex, according J1939, SPN 1612, 1613</p> <p>driver1, 2 digits hex, according J1939, SPN 1615-1618</p> <p>driver2, 2 digits hex, according J1939, SPN 1615-1618</p> <p>status, 2 digits hex, according J1939,SPN 1620</p> <p>speed, float, 3 significant figures, km/h</p> <p>distance, float, 3 significant figures, km</p> <p>trip distance, float, 3 significant figures, km</p> <p>K-factor, decimal, pulses/km</p> <p>engine speed, decimal, rpm</p> <p>additional, 4 digits hex, additional info D1 D2 Ignition Drawer op-mode</p> <p>vehicle ID, string</p> <p>vehicle reg., string</p> <p>driver1 ID, string</p> <p>driver2 ID, string</p> <p>Output example: "DTCO",00,2015,04,29,09,14,36,120,4b,10,c0,c0,9.898,733.035,3173.810,12000,8192,0150,"ABCD01102013ABCDE","N BG 112", "1100000007158000", ""*68</p>
DTCO.D8.ECU_ID	<p>It reports max. 4 ascii characters.</p> <p>Output example DTCO*58</p>
DTCO.D8.ECU_SW_ID	<p>It reports 2 digits hexadecimal value</p>

	Output example: 00*00
DTCO.D8.DATE	It reports the date dd.mm.yyyy UTC Output example: 29.04.2015*3B
DTCO.D8.TIME	It reports the time hh:mm:ss in UTC time Output example: 09:31:01*3A
DTCO.D8.TIME_ZONE	It reports the Time zone shift ([+/-]mmm) in minutes Output example: +120*33
DTCO.D8.VEHICLE_STATE	It reports a string: standing moving error Output example: moving*79
DTCO.D8.VEHICLE_SPEED	It reports a decimal number, 3 significant figures [km/h] Output example: 9.898*17
DTCO.D8.VEHICLE_ID	It reports a string, max 17 characters Output example: ABCD01102013ABCDE*04
DTCO.D8.VEHICLE_REG	It reports a string, max 14 characters Output example: N BG 112 *17
DTCO.D8.DRIVER1.ID	It reports a string, max 18 characters Output example: 110000007158000*3A
DTCO.D8.DRIVER2.ID	It reports a string, max 18 characters Output example: 110000007158000*3A
DTCO.D8.DRIVER1.WORKSTATE	It reports string: break available working driving error Output example: driving*0D
DTCO.D8.DRIVER2.WORKSTATE	It reports a string: break available working driving error Output example: available*18
DTCO.D8.DRIVER1.TIMESTATE	It reports a string: break within 15 min!!! break!!! error ok Output example: ok*6B
DTCO.D8.DRIVER2.TIMESTATE	It reports a string: break within 15 min!!! break!!! error ok Output example: ok*6B
DTCO.D8.DRIVER1.CARDSTATE	It reports a string: no card card ok card error N/A Output example: card ok*53
DTCO.D8.DRIVER2.CARDSTATE	It reports a string: no card card ok card error error Output example: no card*5B
DTCO.D8.DRIVER1.OVERSPEED	It reports string: overspeed overspeed error N/A ok
DTCO.D8.DRIVER2.OVERSPEED	It reports a string: overspeed overspeed error ok
DTCO.D8.DISTANCE	It reports a decimal number, 3 significant figures [km] Output example: 742.055*18
DTCO.D8.TRIPDIST	It reports a decimal number, 3 significant figures [km] Output example: 742.055*18
DTCO.D8.D1	It reports a string: low high ERROR N/A Output example: low*18
DTCO.D8.D2	It reports a string: low high ERROR N/A Output example: low*18
DTCO.D8.IGN	It reports a string: off on ERROR N/A Output example: on*6E

DTCO.D8.DRAWER	It reports a string: open closed ERROR N/A Output example: closed*71
DTCO.D8.OPMODE	It reports a string: not activated operational control calibration company unknown error N/A Output example: error*1D

Table 1: Tachograph parameters supported in the AVL firmware version 2.15.0

2.3 Installation steps

1. Connect the IOBOX-CAN to the FOX3 device via the mini-USB connector (refer to the hardware manual of the FOX3 device).
2. Connect the CA38 cable (see wiring diagram below) to the IOBOX-CAN 16pin connector and then connect the GREY wire (PIN 8 on the 16pin connector of IOBOX-CAN) to connector D8 of the tachograph (see below marked in red). Check with a multimeter the GND connection between vehicle and tachograph which should show 0 volts, if not then use PIN 16 on the 16pin connector of IOBOX-CAN for direct GND connection to tachograph.
3. Connect the CA68 cable (installation and power cable) to the main port (8pin connector) and then apply power to the device by connecting the BROWN wire of this cable to GND and the RED wire of this cable to 12/24VDC source in the vehicle's fuse box.
4. More information on how to install properly FALCOM devices in the vehicles is available in a separate document "*AppNotes_AVL_Installation_Guide_vx.x.x.pdf*".
5. The FOX3 device is now ready to receive the data from the D8 serial data port of the tachograph.

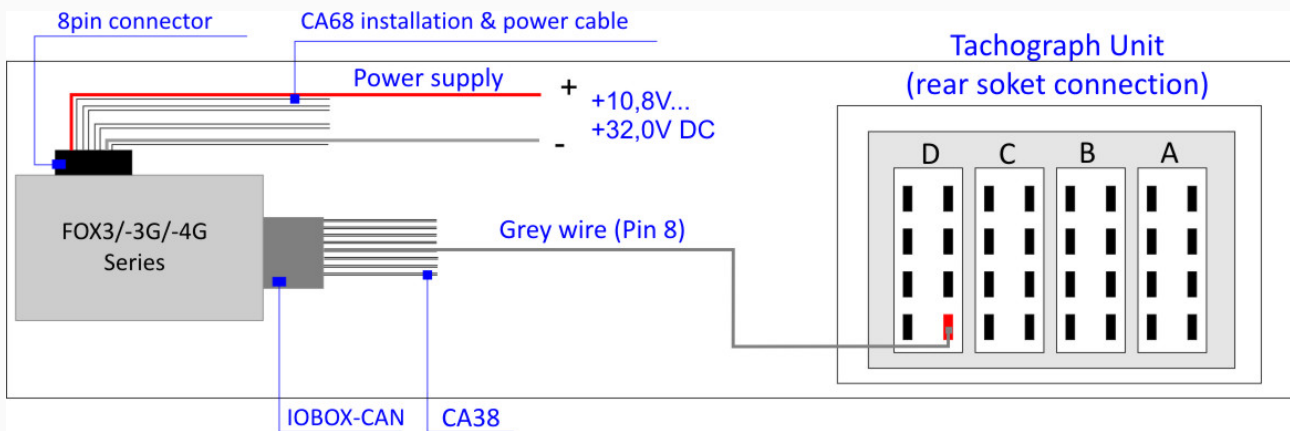


Fig. 2: Installation of FOX3/-3G/-4G series with IOBOX-CAN to the digital tachograph.

3 DOCUMENTATION

3.1 Additional documentation & software tools

If this application note does not cover all the information you need to setup, refer to the additional documents listed below. In order to download some of these documents you will have to log-in first using the provided **Username** and **Password**. Click here to log-in: <http://www.falcom.de/>.

Filename	Description
AVL_PFAL_Configuration_Command_Set.pdf	Lists and describes all PFAL commands supported by the AVL devices.
FOX3_3G_4G_HardwareManual.pdf	Contains instructions for safety and operation of the FOX3/-3G device.
AppNotes_AVL_Installation_Guide.pdf	Provides all the necessary information about installing the FALCOM products properly and safely. (No need to login)
Workbench Software	Description
Falcom_Workbench_32-2.7.2-RC1.exe	FALCOM Workbench configuration tool (Windows XP, Windows Vista, Windows 7 32 bit) - (No need to login)
Falcom_Workbench_64-2.7.2-RC1.exe	FALCOM Workbench configuration tool (Windows XP, Windows Vista, Windows 7 64 bit) - (No need to login)