

Communication interface

USB-MUXDIAG-II



User guide

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1. Document's purpose and bibliography

1.1. Purpose

The purpose of this document is to give the user the information required to install and set up the USB-MUXDIAGII interface.

1.2. Bibliography

ISO 11898	Road vehicles – Interchange of digital information – Controller Area Network (CAN) for high-speed communication
ISO 11519-2	Road vehicles – Low-speed serial data communication – Part 2: low speed controller area network (CAN)
ISO 9141	Véhicules routiers – Systèmes de diagnostic – Caractéristiques de l'échange de données numériques
ISO 9141-2	Véhicules routiers – Systèmes de diagnostic – Caractéristiques CARB de l'échange de données numériques
ISO 14230-1	Véhicules routiers – Systèmes de diagnostic – Protocole KeyWord2000 – Partie 1: Couche physique
ISO 14230-2	Véhicules routiers – Systèmes de diagnostic – Protocole KeyWord2000 – Partie 2: Couche liaisons de données
ISO 14230-3	Véhicules routiers – Systèmes de diagnostic – Protocole KeyWord2000 – Partie 3: Couche application
ISO 15765-1	Road vehicles – diagnostics on CAN – Part 1: General information
ISO 15765-2	Road vehicles – diagnostics on CAN – Part 2: Network layer services
ISO 15765-3	Road vehicles – diagnostics on CAN – Part 2: Application layer
ISO 15765-4	Road vehicles – diagnostics on CAN – Part 4: Requirements for emission related systems
ISO 11519-4	Véhicules routiers – Communication en série de données à basse vitesse – Partie 4: interface de communication de données de type B (SAE J1850)
SAE J1979	E/E Diagnostic Test Modes (Décembre 1991)
SAE J1962	Diagnostic Connector (Juin 1992)
USB	Universal Serial Bus Specification, Version 1.1, Copyright © 1998 Universal Serial Bus Specification, Revision 2.0, Copyright © 2000

2. Presentation

2.1. General presentation



The USB-MUXDIAGII allows to interface a PC (or a pocket PC) with the CAN and KWP2000 diagnostic channels of a vehicle using an USB link.

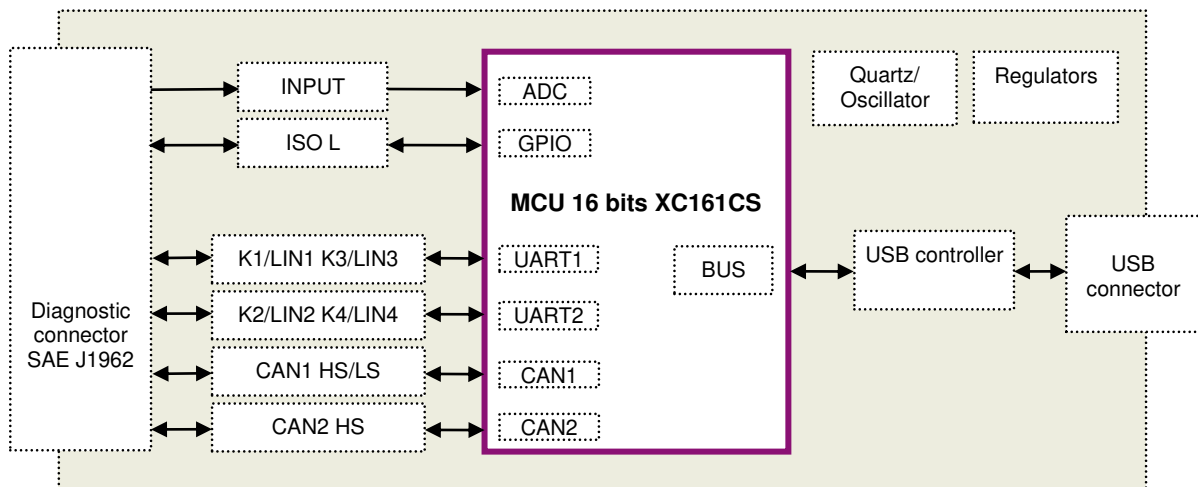
The interface has the following channels:

- 1 CAN high speed or CAN low speed – *fault tolerant* channel to be chosen through the software.
- 1 CAN high speed channel (Norme ISO 11898)
- 2 LIN channels master or slave or ISO9141 to be chosen through the software.
- 2 ISO9141 channels or LIN master to be chosen through the software.
- 2 analog inputs (1 is used for the power supply survey)
- 100 μ sec clock for events timing

The diagnostic channels are managed by the KWP2000 protocol (ISO14230) for K line communication, or by the DiagOnCAN protocol (ISO15765) for CAN communication.

The USB-MUXDIAGII interface is powered by the USB port of the linked computer or by the linked vehicle's battery.

2.2. Synoptic



2.3. Main characteristics of the CAN channel

2.3.1. Protocol controller: INFINEON TWINCAN

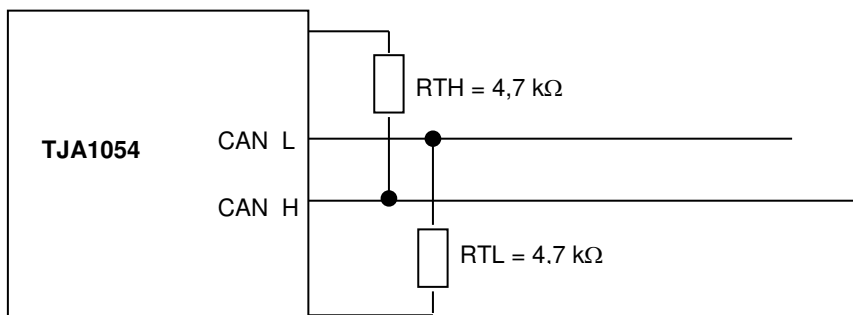
- Standard CAN 2.0B
- Standard identifier 11 bits; extended 29 bits
- Transmission / reception of data up to 8 bytes
- Request for distant transmission (RTR)
- Baud rate up to 1 Mbit/sec
- Spy mode (no acknowledgement or error frame)
- Reading of counters of internal errors
- Detailed information in case of bus error

2.3.2. High speed line interface: PHILIPS PCA82C251

- Standard ISO 11898–24V
- Baud rate up to 1 Mbit/sec
- Channel up to 110 stations on the bus
- Transmission in differential mode
- Short circuit to ground and > 24V battery

2.3.3. Low speed line interface: PHILIPS TJA1054

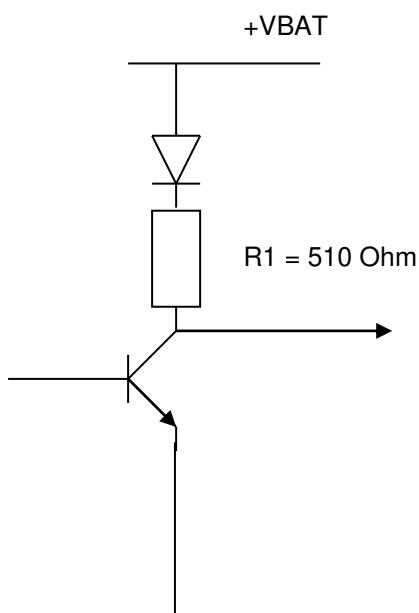
- Baud rate up to 125 Kbit/sec
- Channel up to 32 stations on the bus
- Transmission in differential mode
- Possibility to operate on 1 wire
- Detection and treatment of degraded modes
 - Short-circuit to ground
 - Short-circuit to VCC
 - Short-circuit to the battery
 - Short-circuit between CANH and CANL
 - Open circuit



2.4. Main characteristics of the LIN/ISO9141 channel

- Standard ISO 9141 or ISO 14230
- Baud rate of 9600, 10400, 62500 and 125000 Bauds

2.4.1. Line interface : tester mode

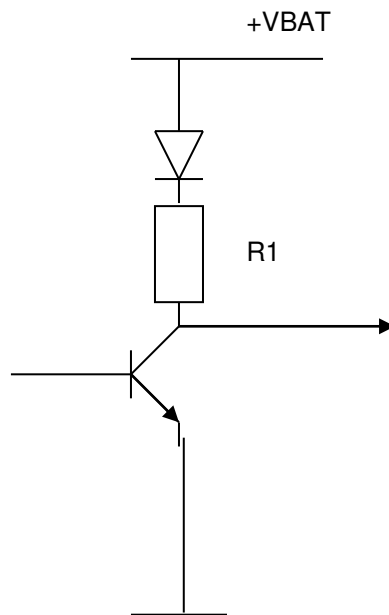


2.5. Main characteristics of the LIN channel

2.5.1. Line interface : MOTOROLA MC33661

- Specification LIN Rev 1.2, 1.3 and 2.0.
- Baud rate of 2400 bauds, 9600, 19200 and 20883 bauds
- Pull-up resistor configuration in master or slave to be chosen through the software

Line emitter / receiver



Configuration	R1
LIN master mode	1 K
LIN slave mode	30 K

3. Technical specifications

3.1. Characteristics

Presentation	PC interface case for USB bus including : - 2 CAN channels - 2 LIN/ISO channels - 2 ISO/LIN channels
Controller	CAN : 1 Infineon TWINCAN controller LIN/ISO : 2 UART
Line interface	- CAN high speed : TJA1040 - CAN low speed : TJA1054 - LIN/ISO: MC33661
Digital inputs / outputs	- 1 analog or digital input 0-16V - 1 analog or digital input power supply supervision (battery voltage measurement) – detection level 5 Volts ± 5%
Connector	16 pins diagnostic connector (SAE J1962)
PC/POCKET PC interface	USB bus 12 Mbit/sec
Dimensions	140 x 58 x 23 mm
Power supply	Provided by USB bus or vehicle (6-36V)
Consumption	Standby mode < 30 mA (12V) Active mode < 200 mA (12V)
Storage temperature	-40 to +85°c
Operating temperature	-20 to +70°c
Isolation	Not isolated

3.2. ECM Compatibility

- EN 55022 (98) + A1 (00) Mesures des perturbations rayonnées en cage full anéchoïde
- EN 55022 (98) + A1 (00) Mesures des perturbations conduites Alimentation AC
- EN 61000-4-2 (95) + A1 (98) + A2 (01) Immunité aux décharges électrostatiques
- EN 61000-4-3 (02) + A1 (02) Immunité aux champs électromagnétiques rayonnés 2 faces
- ISO 7637 (02) Immunité aux perturbations conduites (pulse 1, 2a, 2b, 3a, 3b, 4, 5)

4. Connector

4.1. 16 pins J1962 connector



Pin	Name	Denomination
1	EANA	Analog input (+APC)
2	N.C.	Reserved
3	CANHS1_H	CANH line – bus CAN high speed n° 1
4	GND	Tester ground
5	GND	Signal ground
6	CANHS2_H	CANH line – bus CAN high speed n° 2 (EOBD)
7	KWP1	K line (KWP 1/LIN 1) (EOBD)
8	CANHS1_L	CANL line – bus CAN high speed n° 1
9	CANLS1_H	CANH line – bus CAN low speed n° 1
10	CANLS1_L	CANL line – bus CAN low speed n° 1
11	KWP2	K line (KWP 2/LIN 2)
12	KWP3	K line (LIN 3/KWP 3)
13	KWP4	K line (LIN 4/KWP 4)
14	CANHS2_L	CANL line – bus CAN high speed n° 2 (EOBD)
15	KWP1_L	L line – bus KWP n° 1 (EOBD)
16	VBAT	Analog input and power supply (vehicle's battery)

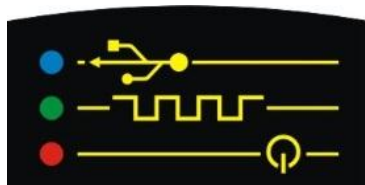
4.2. USB connector

Mini-B type USB connector



Pin	Name	Denomination
1	VBUS	Power supply : +5V
2	D-	Communication signal
2	D+	Communication signal
4	GND	Ground

4.3. LEDs



The LEDs indicate:

- Blue ON: correct link with the PC.
- Blue FLASHING: communication with the PC on the way.
- Bleu OFF: No more link with the PC, peripheral deactivated or in stand-by mode ; may also indicates a trouble with USB.

- Green ON: Problem with the embedded software.
- Green FLASHING (slow): correct execution of the embedded software.
- Green FLASHING (quick) : communication with the PC on the way.
- Green OFF: no embedded software, it is needed to reload the software (only if blue and red LEDs are ON).

- Red ON : Correct power supply of the interface.

All LEDs OFF: the interface is not powered or deactivated or in USB stand-by mode.

5. Drivers

5.1. Drivers history

5.1.1. USB Drivers

Until now, two drivers allowed the installation of EXXOTEST[®] USB interfaces

- The 1st one, based on a proprietary development kit (JUNGO), named WINDRIVER in our applications, is now obsolete and its support will be interrupted on next March 1st 2012.
- The 2nd one, based on a Microsoft development kit, named EXXOTEST or EXXOTEST_USB in our applications replaces now the 1st one.

Both of them are supported by a same “generic” software library “MUXDLL.dll” since its 6.1.7 version.

5.1.1.1. Windriver drivers

« Windriver » is the historical « Jungo » driver used since the first EXXOTEST[®] hardware and software developments.

It is now obsolete and its support will be interrupted on next March 1st 2012.

5.1.1.2. Exxotest v1.x and v2.x drivers

The development of the “Exxotest” driver was justified by the needs of performances which were not covered by the “Windriver “ version and by the will of ANNECY ELECTRONIQUE to fully master the scalability of its actual and next generations of MUX interfaces.

Again in a way of performance, especially justified by the need to offer a driver version compatible with 64bits Windows OS, the Exxotest driver has undergone a major overhaul in 2011 to reach a version now identified 2.x

Supported operating systems

Operating system	Exxotest V2.x driver	Exxotest V1.x driver
Windows 2000	Not supported	Supported
Windows XP (32 bits version)	Supported	Supported
Windows XP (64 bits version)	Supported	Not supported
Windows Vista (32 bits version)	Supported	Supported
Windows Vista (64 bits version)	Supported	Not supported
Windows 7 (32 bits version)	Supported	Supported
Windows 7 (64 bits version)	Supported	Not supported
LINUX	Under development	Not supported

5.1.2. PCI drivers

Supported operating systems

Operating system	Exxotest V2.x driver	Jungo 6.03 driver
Windows 2000	Not supported	Supported
Windows XP (32 bits version)	Supported	Supported
Windows XP (64 bits version)	Supported	Not supported
Windows Vista (32 bits version)	Supported	Not supported
Windows Vista (64 bits Version)	Supported	Not supported
Windows 7 (32 bits version)	Supported	Not supported
Windows 7 (64 bits version)	Supported	Not supported
LINUX	Not supported	Not supported

5.2. Warning

This new generation of drivers covering all XP to Seven, 32 and 64 bits Windows operating systems for USB and 2000 to XP 32 bits Windows operating systems for PCI, is now available on the “downloads” webpage of www.exxotest.com and in our “KIT CD MUX” in the form of an utility named:

« EXXOTEST[®] Driver Kit and utilities »

All EXXOTEST[®] applications and utilities available on the Exxotest downloads webpage of and in our “KIT CD MUX” have been updated to run optimally with this new generation of drivers:

- MUXTRACE EXPERT – 4.86 version or higher
- DLC / DLC Light – 1.19 version or higher
- MUXSERVER – 1.25 version or higher
- USBMAJ – 2.13 version or higher
- DCP – 1.14 version or higher

If you do use EXXOTEST[®] communication interfaces with third party applications (car manufacturer, component manufacturer, test bench, ...), you should ensure that the designers and / or suppliers of these applications have approved the use of these new drivers and updated their applications accordingly.

In the absence of information of providing of these new drivers from them side, we recommend the continued use of the Exxotest driver v1.47 (USB Driver Kit 1.47 installer)

5.3. Installation

5.3.1. Installation goal

The new driver installation goal is to improve the performances of applications working with EXXOTEST[®] card and interfaces through USB and PCI buses.

5.3.2. Warning

To support this update, any application which is not provided by Anncy Electronique and which works with Exxotest card or interface (proprietary application) must realize a “dynamic load” of the software library or being recompiled with this new library.

You are strongly advised to check with people who develop these applications before performing this driver update.

5.3.3. Driver installation and applications update

The driver update will be performed accordingly to following steps:

- Either from the KIT CD MUX (if 2012 version or higher) that came with your EXXOTEST[®] card or interface, or from a downloaded version from the www.exxotest.com downloads webpage, execute the installation file :

« **Exxotest_MUX_driver_kit_2.x.x** »

- EXXOTEST[®] applications update:
 - MUXTRACE EXPERT – 4.86 version or higher
 - DLC / DLC Light – 1.19 version or higher
 - MUXSERVER – 1.25 version or higher
 - USBMAJ – 2.13 version or higher
 - DCP – 1.14 version or higher

- Update of the software libraries (MUXDLL.dll) associated to your proprietary (non EXXOTEST[®]) working with EXXOTEST[®] card or interfaces.
Attention: Check with the supplier or service responsible for distributing these applications to the good compatibility of these applications before installing the EXXOTEST[®] Driver Kit and utilities v2.xx

- Update of the firmware of your EXXOTEST[®] interface (USB only) using the USBMAJ utility version 2.13 or higher.

5.3.4. Execution of the installation file

Step 0 : Place the installation CD that came with your hardware in the CD drive of your computer, select the « Drivers » page and launch the installation of the « Exxotest_MUX_driver_kit_2.x.x » file or visit the download area of the www.exxotest.com website to download and execute this file's latest version.

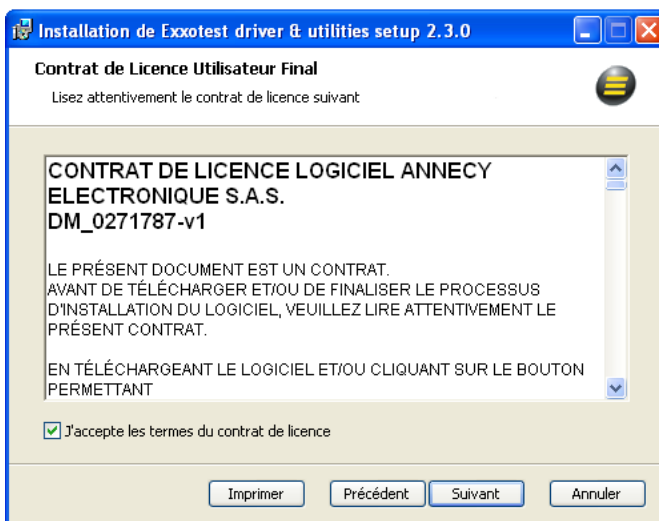
Step 1 : Starting the drivers installation

We recommend you at this step to check that no USB EXXOTEST[®] is connected to your PC



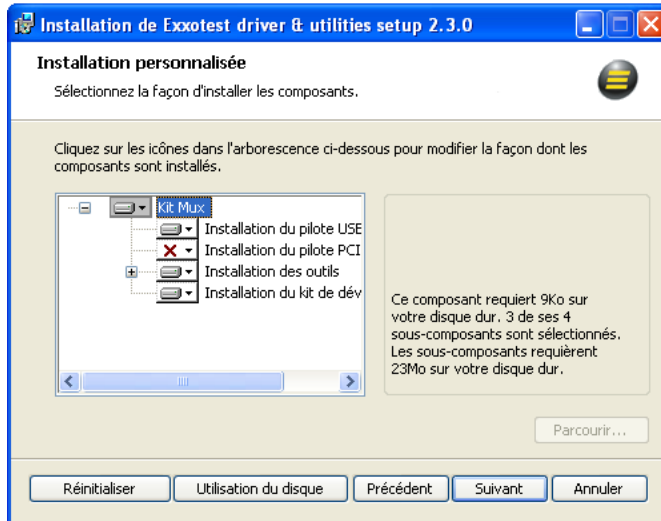
Click on « Next ».

Step 2 : Final user license contract agreement



After reading of the license contract, tick « I accept » and click on « next » to continue the procedure.

Step 3 : Installation options selection

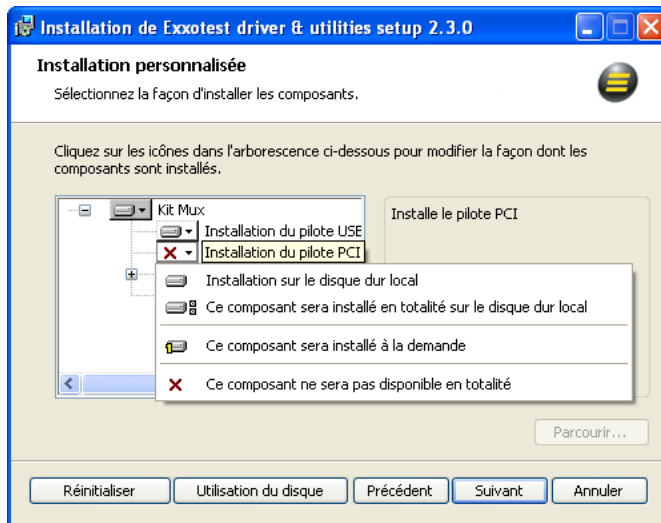


Select or unselect the options to be installed accordingly to your needs.

We therefore recommend you to keep the default configuration.
Click on « Next » to continue.

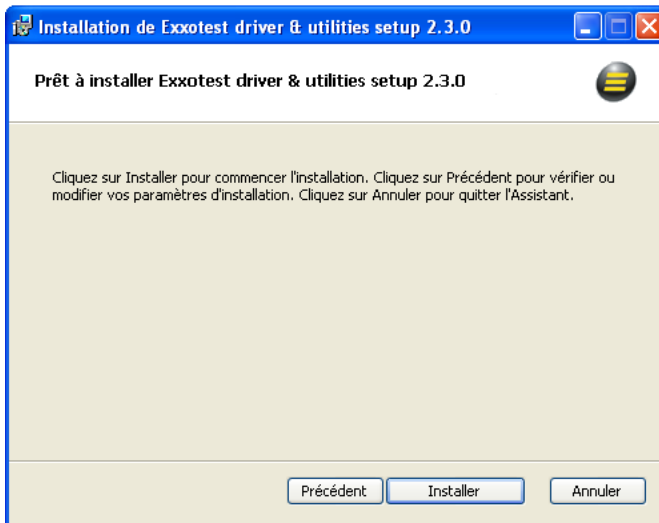
WARNING: PCI cards users, the PCI driver installation is not activated in the default configuration. WE then recommend you to proceed as described here below.

Etape 3 bis : PCI card users only



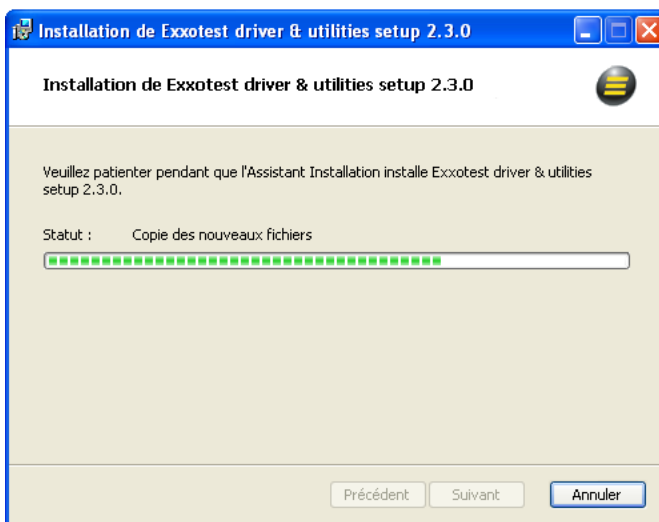
Click on the button in front of “PCI driver installation”, select the option and click on “Next” to continue.

Step 4 : Starting the installation



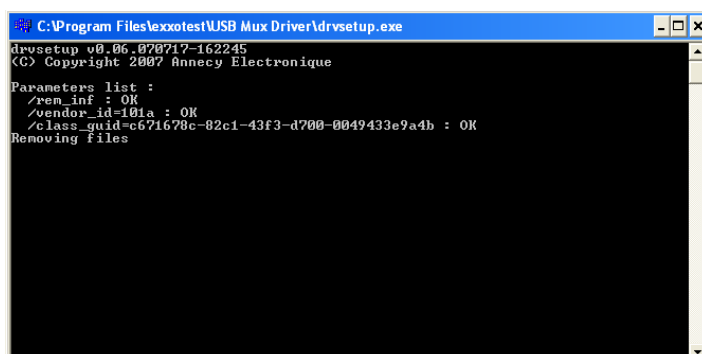
Click on “next » to start the installation as configured previously.

Step 5 : Installation



Installation in progress, no action from your part is required.

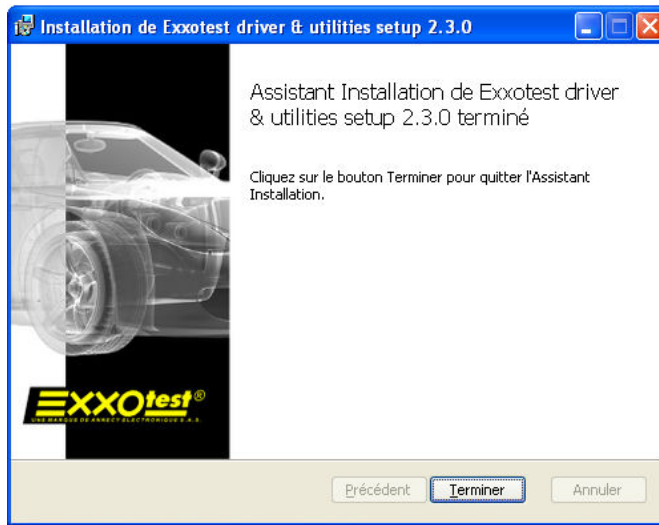
Note: the status indicator may, in certain operations stand still for several minutes.



Deleting of oldest drivers found on your PC

No action from your part is required.

Etape 6 : End of installation

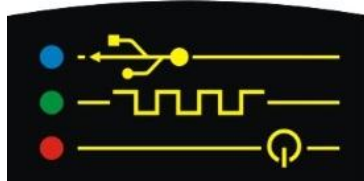


Click on « Finish » to end the installation.

You can now connect your interface(s) to the PC, they will be automatically detected and installed.

6. Troubleshooting

6.1. Interface's LEDs indications



The LEDs indicate:

- Blue ON: correct link with the PC.
- Blue FLASHING: communication with the PC on the way.
- Bleu OFF: No more link with the PC, peripheral deactivated or in stand-by mode ; may also indicates a trouble with USB.
- Green ON: Problem with the embedded software.
- Green FLASHING (slow): correct execution of the embedded software.
- Green FLASHING (quick) : communication with the PC on the way.
- Green OFF: no embedded software, it is needed to reload the software (only if blue and red LEDs are ON).
- Red ON : Correct power supply of the interface.

All LEDs OFF: the interface is not powered or deactivated or in USB stand-by mode.

6.2. Technical support

In case of any failure or help need during or after this installation, please feel free to contact our technical support « MUX »:

- E-mail : support.mux@exxotest.com
- Phone: +33 (0) 450 02 34 34

Please note that all EXXOTEST[®] drivers, embedded software and PC software updates are at your disposal FREE OF CHARGE in the download area of our website:

www.exxotest.com

ANNEX: Optional adapter AMUX-2C2L



Pinout

SUB D9 CAN HS1 / ISO 1	
2	CANL
3	GND
4	ISO1/LIN1
7	CANH
8	L Line ISO1

SUB D9 CAN HS2 / ISO 2	
2	CANL
3	GND
4	ISO2/LIN2
7	CANH

SUB D9 CAN LIN3 / ISO3	
1	Ana. Input (+APC)
3	GND
4	LIN3 / ISO3
9	Power supply. + BAT

SUB D9 CAN LS / LIN4	
2	CANL
3	GND
4	LIN4 / ISO4
7	CANH

Successive editions list

Version	Date	Created / modified by
1	16/05/2012	Gaël PERAGOUX
Modification		
Document's creation (full new version)		
Version	Date	Created / modified by
Modification		
Version	Date	Created / modified by
Modification		