

USB / Ethernet interface box

USB-MUX-4C4L



User Guide

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1. Aim of this document and bibliography

1.1. Aim

The aim of this document is to give the user the information required to install and set up the case USB-MUX-4C4L.

1.2. Bibliography

NXP : TJA1040 High speed CAN transceiver– data sheet

NXP : TJA1055 Enhanced fault-tolerant CAN transceiver – data sheet

FREESCALE : MCZ33897 Single Wire CAN Transceiver – data sheet

FREESCALE : MC33661 LIN Enhanced Physical Interface – data sheet

WIZNET : W5300 10/100 Ethernet controller – data sheet

2. Presentation

2.1. General presentation

The USB-MUX-4C4L is a USB/Ethernet 2nd generation box from the EXXOTEST[®] « Communication Networks Expertise Systems » products range.

allows to interface a PC type computer to a CAN high speed, CAN low speed / fault tolerant, CAN single wire and LIN bus through USB or Ethernet ; it also proposes 12 digital / analog inputs, 4 ISO9141 L / digital outputs and 6 digital / PWM outputs.

Available channels:

- 4 x CAN high speed (Norme ISO 11898) or CAN low speed – *fault tolerant* or CAN single wire (set up by software) channels
- 4 x LIN master or slave or ISO9141 (K) channels (set up by software)
- 12 x analog 0-32V or digital inputs
- 4 x ISO9141 (L) or digital outputs and 6 x digital/PWM outputs
- 1 μ s clock for events dating

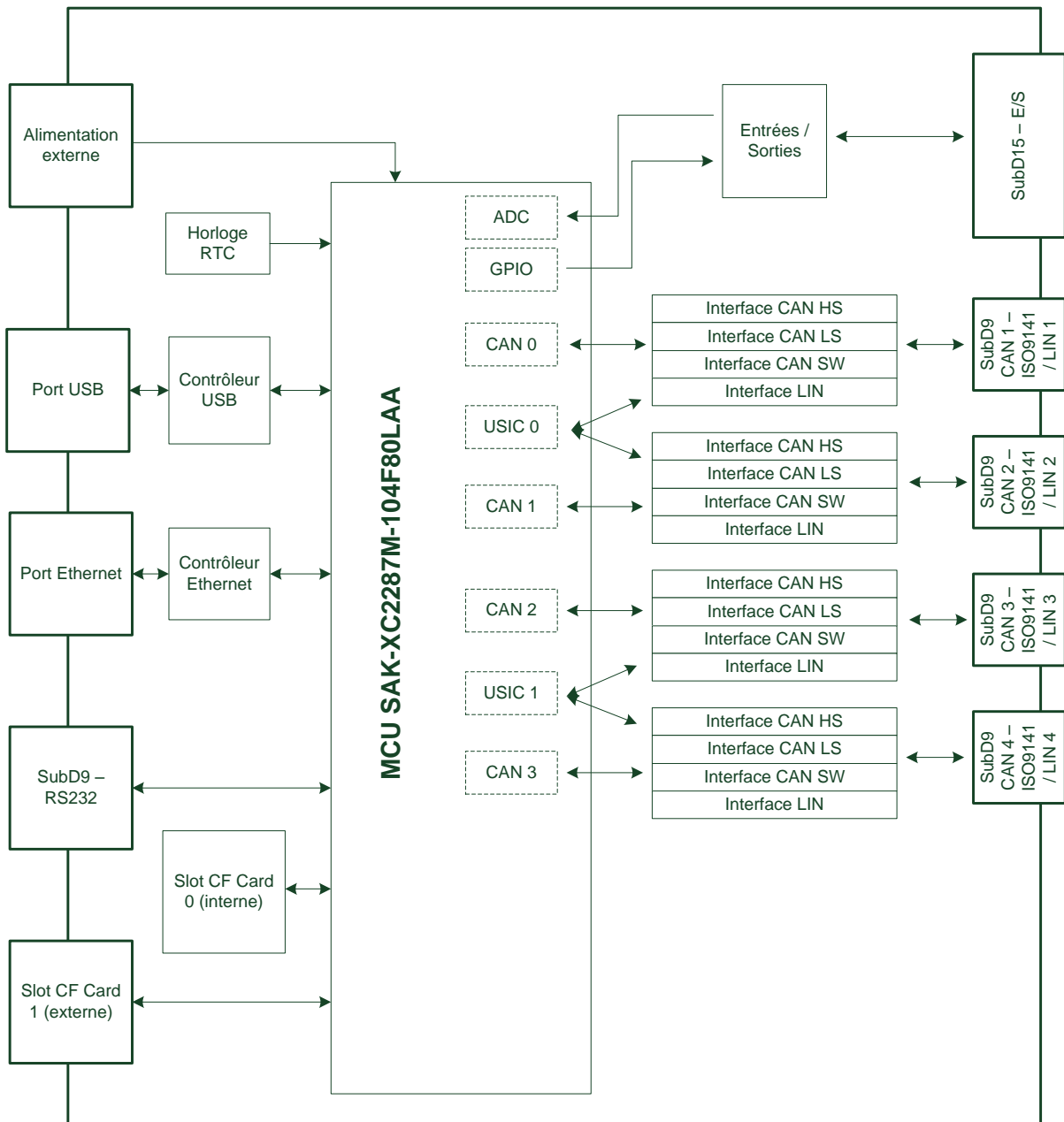
All these channels can be used simultaneously.

This box is directly powered by its USB port, or by an external 110/220v – 50/60Hz adapter in case the USB port power supply is not sufficient

Operating the Ethernet link needs an external power supply.

When the box USB port is connected, the Ethernet feature is automatically deactivated.

2.2. Synoptic



2.3. Main characteristics of the CAN connection

Protocol controller: INFINEON MULTICAN

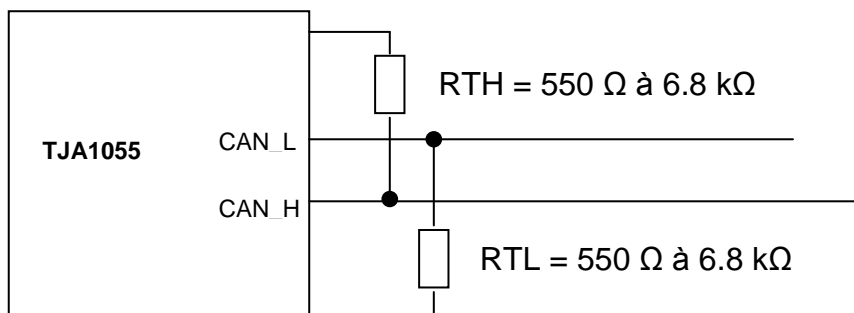
- Standard CAN 2.0B
- Standard identifier 11 bits; extended 29 bits
- Transmission / reception of data up to 8 bytes
- Request for distant transmission (RTR)
- Baud rate up to 1 Mbit/sec
- Spy mode (no acknowledgement or error frame)
- Reading of counters of internal errors
- Detailed information in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

High speed line interface: NXP TJA 1040

- ISO 11898–24V standard
- Baud rate up to 1 Mbits/sec
- Connection up to 110 stations sur le bus
- Transmission in differential mode
- Short-circuit to ground and battery > 24V
- Termination resistors set up by software

Low speed line interface: NXP TJA1055

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

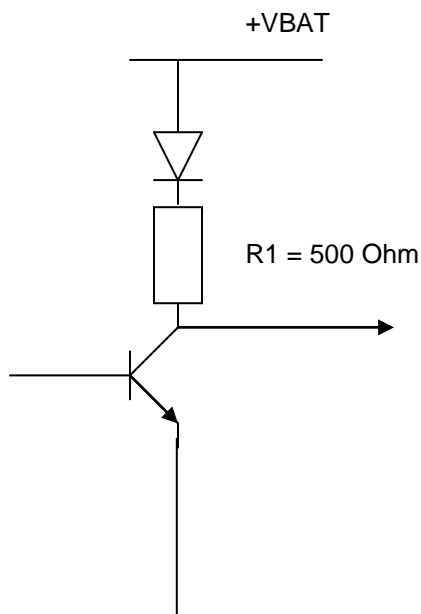


Single wire line interface: FREESCALE MCZ33897

- Baud rate up to 33 Kbit/sec
- Connection up to 32 stations on the bus
- Transmission over 1 wire

2.4. Main characteristics of the KWP2000 connection

- ISO 9141 or ISO 14230 standard
- Baud rate 9600, 10400, 62500 and 125000 Bauds
- Tester (500 Ω) or simulator (30 kΩ) configuration set up by software

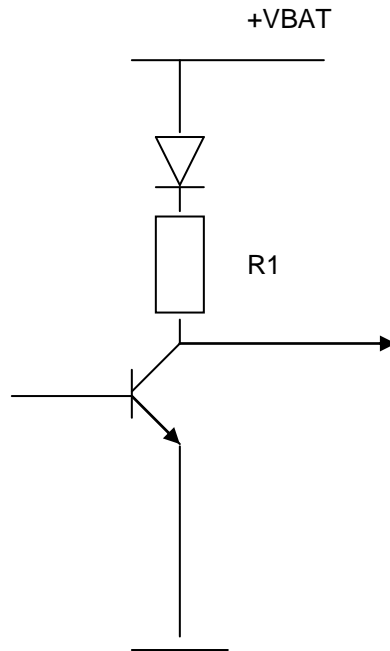
Line interface: tester mode

2.5. Main characteristics of the LIN connection

Line interface : FREESCALE MC33661

- LIN Rev 1.2, 1.3, 2.0 and 2.1 specification
- Baud rate 2400, 9600, 19200 and 20883 bauds
- Master or slave pull-up resistor's configuration set up by software

Diagram of the transmitter/receiver line



Set up type	R1
LIN master mode	1 K
LIN slave mode	30 K

2.6. Characteristics of digital inputs

Diagram of inputs

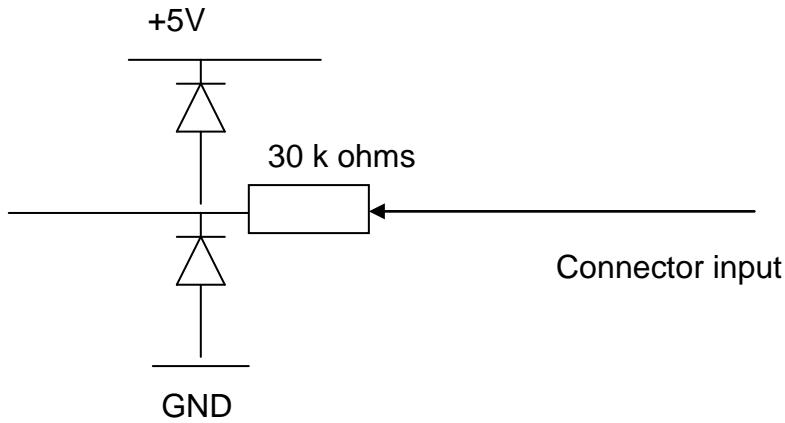
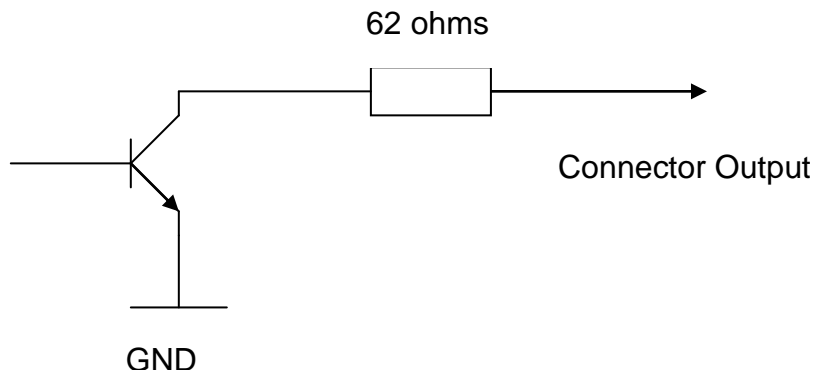


Diagram of outputs



3. Technical specifications

3.1. Technical characteristics

Presentation	PC interface box USB bus or Ethernet including: - 4 x CAN high speed or CAN low speed / fault tolerant or single wire channels - 4 x LIN or ISO9141 channels
Controller	. CAN: 1 MULTICAN . LIN / ISO9141: 3 USIC
Line interface	. CAN high speed: TJA1040 . CAN low speed: TJA1055 . CAN single wire: MCZ33897 . LIN: MC33661 (Master or Slave)
Inputs / Outputs	12 x 0-32V analog or digital inputs (includes 1 timer in.) 4 x ISO9141 L or digital 0-24V output 6 x Digital / PWM outputs 1 x RS232 link
Connectors	4 + 1 DE9 connectors 1 DA15 connector 1 external CF card slot + 1 internal CF card slot
PC Interface	USB 2.0 Hi-Speed bus (12 ou 480 Mbit/sec) Ethernet 10/100 Mbit/sec Auto-MDIX bus
Dimensions	200 x 170 x 50 mm
Time base	500ns RTC clock
Power supply	External 7-36V through specific connector or through USB. Dedicated power supply for each line interface on the front panel.
Consumption	USB: 300 mA External: 110 mA (USB) External: 200 mA (Ethernet)
Storage temperature	-40 à +85°C
Operating temperature	-40 à +85°C (except DLC mode -25 à +85°C)
Isolation	Optional

4. Configuration

4.1. DB15 « I / O » connector

Analog/Digital inputs/outputs

Pin	Name	Denomination
1	E_ANA/TOR_1	0-32V analog or digital input n°1
2	E_ANA/TOR_2	0-32V analog or digital input n°2
3	E_ANA/TOR_3	0-32V analog or digital input n°3
4	E_ANA/TOR_4	0-32V analog or digital input n°4
5	E_ANA/TOR_5	0-32V analog or digital input n°5
6	E_ANA/TOR_6	0-32V analog or digital input n°6
7	E_ANA/TOR_7	0-32V analog or digital input n°7
8	E_ANA/TOR_8	0-32V analog or digital input n°8
9	GND	Masse
10	S_TOR/PWM_1	0-32V digital or PWM output n°1
11	S_TOR/PWM_2	0-32V digital or PWM output n°2
12	S_TOR/PWM_3	0-32V digital or PWM output n°3
13	S_TOR/PWM_4	0-32V digital or PWM output n°4
14	S_TOR/PWM_5	0-32V digital or PWM output n°5
15	S_TOR/PWM_6	0-32V digital or PWM output n°6

4.2. « DE9 CAN 1 / K-LIN 1 » to « CAN4 / K-LIN4 » DE9 connectors

CAN high speed, low speed, single wire, inputs/outputs channels

« CAN n / K-LIN n », n corresponding to the DE9 connector's number

Pin	Name	Denomination
1	E_ANA/TOR_n	0-32V analog or digital input n°n
2	CAN_L_n	CAN Low of CAN bus n°n
3	GND	Ground
4	LIN_n / ISO_K_n	LIN n°n or ISO K n°n
5	E_WK	Wake transceiver active input
6	(GND)	Optional ground
7	CAN_H_n	CAN High / CAN Single Wire of CAN bus n°n
8	S_TOR_1 / ISO_L_1	Digital 0-24V output n°n or ISO_L n°n
9	Vbat	+CAN or +LIN

4.3. « DE9 IOIOI » DE9 connector

RS232 link (and optionally RS485)

Pin	Name	Denomination
1	SYNC_IN	EXT synchro input
2	RxD	Receive data
3	TxD	Transmit data
4	SYNC_OUT	EXT synchro output
5	GND	Ground
6	RS485_Z	RS485 bus (optional)
7	RS485_Y	
8	RS485_A	
9	RS485_B	

4.4. USB connector

USB standard B type connector

Pin	Name	Denomination
1	VBUS	Alimentation +5V
2	D-	Signal de communication
2	D+	Signal de communication
4	GND	Masse

4.5. Ethernet connector

Ethernet 10/100 connector

Pin	Name	Denomination
1	TX+	Transmit Data +
2	TX-	Transmit Data -
2	RX+	Receive Data +
4	TXCT	Transmit Center Tap
5	TXCT	Transmit Center Tap
6	RX-	Receive Data -
7	RXCT	Receive Center Tap
8	RXCT	Receive Center Tap

4.6. External power supply connector

[7 – 36] volts – 1 A max

JACK 2,5mm connector (lockable)

4.7. LEDs

4.7.1. Power

This LED shows the power supply status of the box

LED status	Meaning
Off	No power supply, or box in extended sleep mode, or box out of order
On (fixed)	Box correctly powered

4.7.2. Status

This LED shows the working status of the box

LED status	Meaning
Off	No power supply, or box out of order, or failure of the firmware. <i>If the power supply is delivered by the USB port, it may mean that the USB port power is not sufficient. It is then needed to power the box using an external power supply.</i>
On (fixed)	Failure or absence of the firmware
Flashing (slow = 1 sec)	Shows that the box is powered but not connected to any computer (USB or Ethernet)
Flashing (middle = 0.5 sec)	Shows that the box is powered and recognized by a computer (USB or Ethernet) Ready to record (DLC mode)
Flashing (quick = 0.1 sec)	Shows that the box is powered, recognized by a computer (USB or Ethernet) and that a PC software is linked with it. Recording (DLC mode)

4.7.3. USB

This LED shows the working status of the USB link with the PC

LED status	Meaning
Off	No more link with the PC, device deactivated or in sleep mode ; may also indicate a USB failure
On (fixed)	Correct link with the PC
Flashing	Communication with the PC processing

4.7.4. Ethernet

This LED shows the working status of the Ethernet link with the PC

LED status	Meaning
Off	No more link with the PC, device deactivated or in sleep mode ; may also indicates an Ethernet failure
On (fixed)	Correct link with the PC
Flashing	Communication with the PC processing

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 Ancey 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.

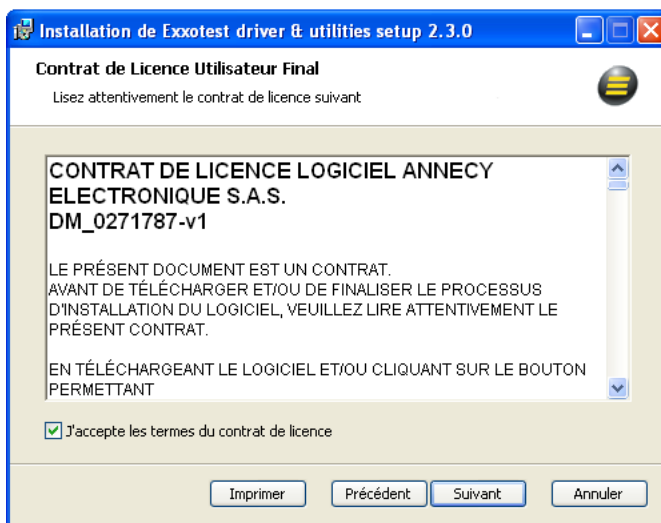
Step 1: Starting the drivers installation

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



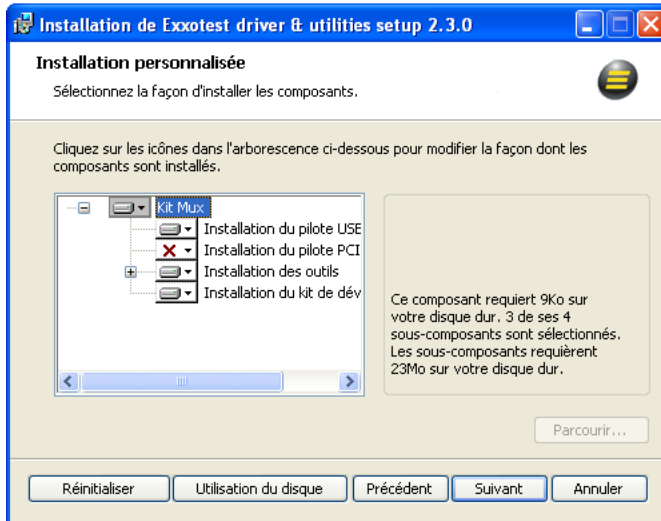
Click on « Next ».

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

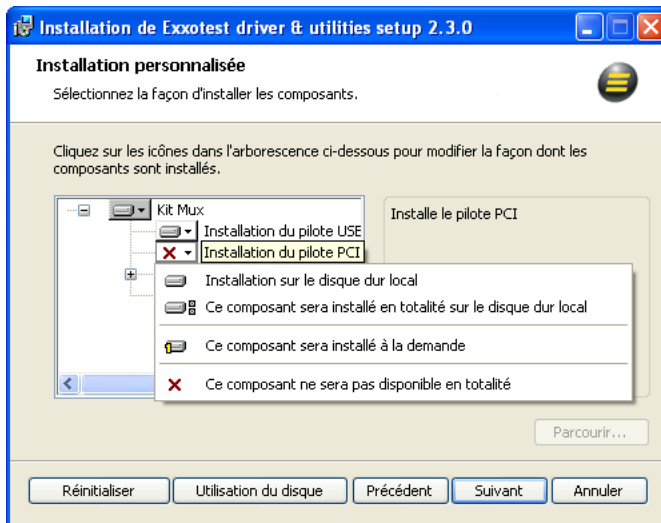


Select or unselect the options to be installed accordingly to your needs.

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

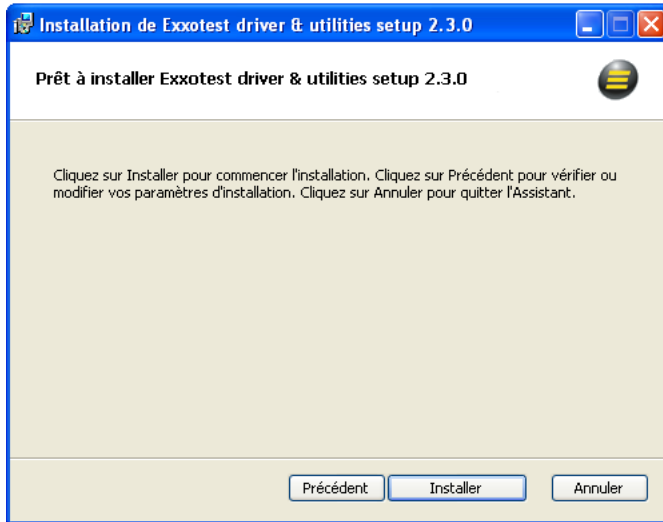
WARNING: PCI cards users, the PCI driver installation is not activated in the default configuration. WE then recommend you to proceed as described here below.

Etape 3 bis : PCI card users only



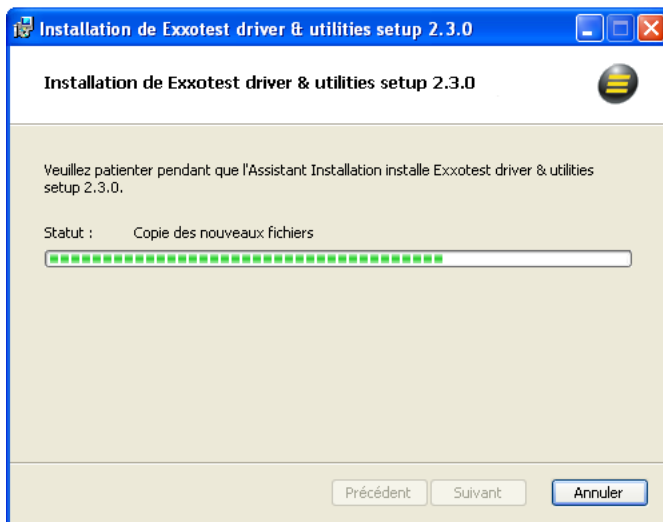
Click on the button in front of “PCI driver installation”, select the option and click on “Next” to continue.

Step 4 : Starting the installation



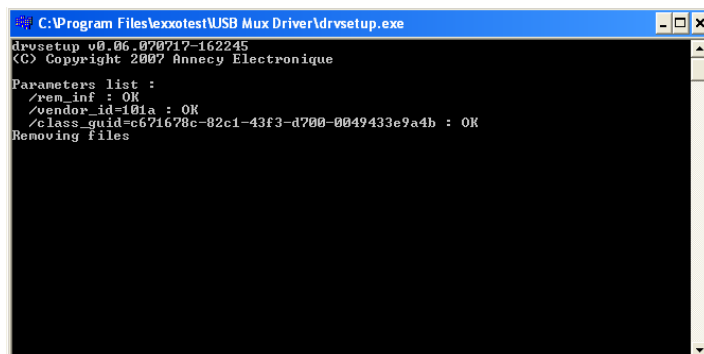
Click on “next » to start the installation as configured previously.

Step 5 : Installation



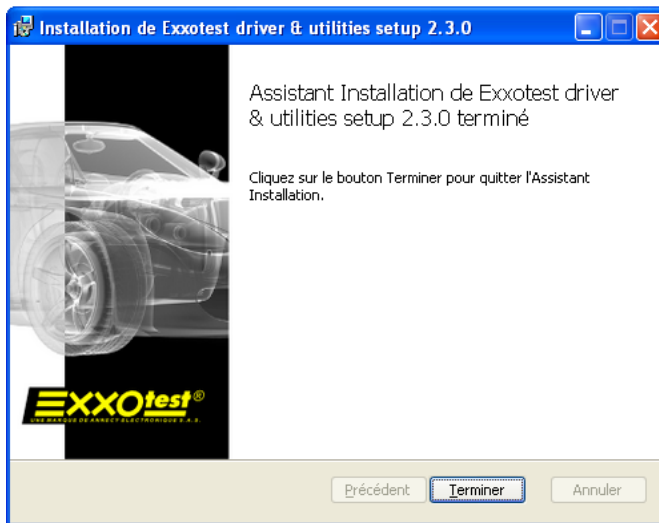
Installation in progress, no action from your part is required.

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.

Step 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.

5.4. 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

Successive editions list

Version	Date	Created / Modified by
1	20/11/2011	Gaël PERAGOUX
Modification		
Document's creation		
Version	Date	Created / Modified by
2	16/05/2012	Gaël PERAGOUX
Modification		
Update – Drivers section		
Version	Date	Created / Modified by
Modification		