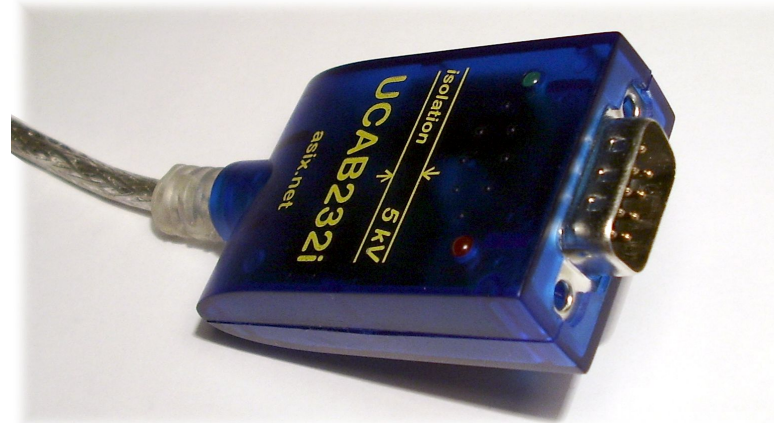


**ASIX<sup>®</sup>**

# **UCAB232i**

USB-RS232 Converter with Galvanic Isolation



*User Guide*

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# 1

## UCAB232i

Thank you for buying our product. If you have any question, please do not hesitate to contact our technical support.

### 1.1 Package Contents

- ✓ UCAB232i Converter
- ✓ CD-ROM with Drivers and User Guide
- ✓ Leaflet

### 1.2 Features

UCAB232i is a completely galvanically isolated USB to RS232 converter suitable for connection vast majority of both industrial and commercial RS232 devices to PC using USB port.

- ✓ Full RS232 implementation
- ✓ Inputs with improved immunity to interference suitable for industrial applications
- ✓ High communication speed
  - ✓ 250 kBaud guaranteed
  - ✓ more than 500 kBaud typically
- ✓ Unrivalled galvanic isolation
  - ✓ 5000 V DC / 1 sec.
  - ✓ 2600 V AC / 1 min.
  - ✓ 560 V RMS / no limit
- ✓ Enhanced ESD protection of all inputs
  - ✓ ±15 kV air discharge HBM
  - ✓ ±8 kV contact discharge HBM
- ✓ Extended temperature range -40 °C to +85 °C
- ✓ Enhanced durability to environmental influences
- ✓ USB 2.0 Full Speed (12 Mbps)
- ✓ LED indication for transmission and reception
- ✓ Drivers for Linux and Windows
  - ✓ for OEM application, proprietary ID can be used
- ✓ Small and compact enclosure

## 1.3 Quick Start

It is necessary to install drivers before first use.

### 1.3.1 Windows

Please insert USB plug connector of your UCAB232i converter into PC USB port.

When a new device has been detected by operating system and it is asking for a driver, select option „Install the driver from specific location” and navigate to the folder containing the driver (available on the enclosed CD-ROM).

When the driver has been installed a new device is detected again – for now, it is a virtual COM port. Please repeat the installation process described above once more.

After that, your UCAB232i converter is ready for use.

### 1.3.2 Linux

LINUX kernel 2.6.31 or newer includes required drivers and there is no need to install them.

## 1.4 How to use the UCAB232i converter

UCAB232i provides user with a galvanically isolated RS232 port on PC equipped with a USB port.

It is designed for using with all ordinary devices with RS232 port such as PC mouse, data modem, data terminal, Smart-Card reader, serial printer. With regard to top quality galvanic isolation, the UCAB232i converter is dedicated for high demanding industry or automotive applications.

### 1.4.1 RS232 interface

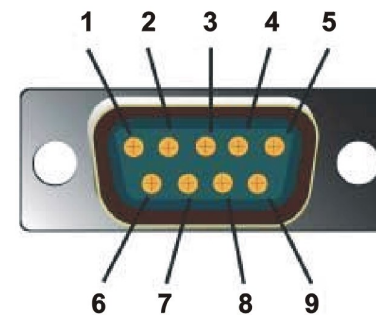


Fig. 1: DB9, pins

UCAB232i provides all RS232 signals.

The description of RS232 signals is given below in table TB. 1.

Pin	Name	I/O	Description
1	DCD	IN	Data Carrier Detect
2	RD	IN	Receive Data
3	TD	OUT	Transmit Data
4	DTR	OUT	Data Terminal Ready
5	SG	PWR	Signal Ground
6	DSR	IN	Data Set Ready
7	RTS	OUT	Request to Send
8	CTS	IN	Clear to Send
9	RI	IN	Ring Indicator

*TB. 1: RS232 signals description*

### 1.4.1.1 Data rate

The guaranteed data rate is within the range of 300 Baud to 250 kBaud.

With regard to very high speed optocouplers, the UCAB232i converter allows to communicate typically over 500 kBaud. However, this data rate is not guaranteed and could depend on temperature and an external signal quality.

## 1.4.2 LED indicators

UCAB232i is equipped with two LED indicators.

Red LED: data are being sent from PC to a RS-232 connected device

Green LED: data are being sent from a RS-232 connected device to PC


## 1.4.3 Standby

The UCAB232i converter fully supports PC standby mode (sleep).

## 1.4.4 Galvanic isolation

The UCAB232i converter provides unrivalled galvanic isolation which protects PC from an application voltage within of these limits

- ▶ 5000 V DC for period max. 1 sec.
- ▶ 2600 V AC for period max. 1 min.
- ▶ 560 V RMS without any time limits



**Warnings**  
UCAB232i does not comply requirements in terms of safety separation.

Although, technically, the UCAB232i converter assures galvanic isolation within of limits listed above it does not comply requirements in terms of safety separation according to EN 60730-1 standard. ASIX s.r.o. is not liable for any damage caused due to any inappropriate use.

## 1.4.5 Resistance to external influences

UCAB232i is designed and produced with regard to maximum resistance to external influences.

The operating temperature range is between -40 °C to +85 °C. Very low temperatures can cause a rigidity of the USB cable, in this case handle with care. For improving characteristics, special covering passivation has been applied to PCB of your UCAB232i converter.

## 1.4.6 Compact enclosure

Compact design of the UCAB232i converter enclosure with 1 meter cable is most suitable for connection to any RS232 device.

USB232i is supplied without screwlocks on DB9 connector because some applications do not support them. On special request it is possible to supply the USB232i converter with screwlocks included.

# 1.5 Technical Specification

## 1.5.1 Absolute Maximum Ratings

<b>Operating temperature</b>	min. -40 °C	max. +85 °C
<b>Storage temperature</b>	min. -55 °C	max. +125 °C
<b>Active USB current</b>	max. 100 mA	
<b>All input voltages respects to signal ground</b>	max. ± 25 V	
<b>USB to RS232 isolation</b>	5 kV DC / 1 sec.	
	2.6 kV AC / 1 min.	
	560 V RMS / no limit	
<b>ESD immunity</b>	± 8 kV contact HBM	
	± 15 kV air HBM	
<b>Electric Field Immunity</b>	10 V/m	

*TB. 2: Absolute Maximum Ratings*

## 1.5.2 Operating Range

<b>Minimum data rate</b>	300 Baud
<b>Maximum data rate</b>	250 kBaud guaranteed 500 kBaud typically
<b>Low RS232 input voltage</b>	Minimum 0.8 V typically 1.5 V
<b>High RS232 input voltage</b>	Maximum 2.4 V typically 1.8 V
<b>Short-circuit tolerance</b>	No limit
<b>Short-circuit current</b>	maximum $\pm$ 60 mA
<b>Operating system</b>	Windows <sup>1</sup> 32/ 64-bit
	Linux 1.5.0 32/64-bit
	MAC OS 10 32/64-bit
	Windows CE <sup>2</sup>
<b>RS232</b>	full implementation
<b>RS232 connector</b>	DB9
<b>USB 1.1 a 2.0 compatibility</b>	yes, 12 Mbps (Full Speed)
<b>USB connector</b>	A type
<b>Length of USB cable</b>	1 m
<b>Transmit indicator</b>	red LED
<b>Receive indicator</b>	green LED

TB. 3: Operating Range

1 Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, Windows Server 2008 R2

2 Windows Mobile 2003, Windows Mobile 2003 SE, Windows Mobile 5, Windows Mobile 6, Windows Mobile 6.1, Windows Mobile 6.5

## 1.5.3 Certificates

<b>CE</b>	EN 55022 ed.3:2011 EN 55024 ed.3:2011	
<b>Immunity</b>	EN61000-4-2, class B	
	EN61000-4-3, class A	10 V/m
	EN61000-4-8, class A	
	EN55024, class A	

TB. 4: List of certificates

**ELECTROTECHNICAL TESTING INSTITUTE**  
Pod Lisem 129  
171 02 Praha 8 - Troja

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No. of the Test Report: 104880-01/01  
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**TEST REPORT**

**Name of product:** USB - RS232 Converter  
**Type of product:** UCAB232i  
**Ratings:** Power over USB  
**Serial number:**  
**Manufacturer:** ASIX s.r.o. Staropramenná 397/4, 150 00 Praha 5, Czech Republic  
**Production site:** ditto  
**EZÚ product coding system:** 105001 - other services  
**Ordering firm:** ASIX s.r.o. Staropramenná 397/4, 150 00 Praha 5, Czech Republic  
**Number of tested samples:** 1  
**Samples submitted on:** 16.1.2012  
**Location of testing:** EZÚ  
**Tested from** 16. January through 6 February 2012  
**Other data:**  
**The product was tested according to:** EN 55022 ed.3:2011  
EN 55024ed.3:2011

The test results contained in this report refer to the tested items only. The values presented in this report were measured with the accuracy specified in the testing regulations. All measuring instruments used are properly traceable.

This Report shall not be reproduced except as a whole.

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Fig. 2: CE certificate



# 2

## DRIVERS

In this chapter, we will discuss drivers installation, drivers updating and specific COM port setting requirements.

### 2.1 Drivers Installation

#### 2.1.1 Windows operation system

##### 2.1.1.1 Windows XP

Drivers can be installed from enclosed CD-ROM.

When the UCAB232i converter has been inserted into USB port, operating system will detect it as a new hardware. Choose automatic installation (recommended). When have asked for drivers path, check „Search CD-ROM“, drivers will be found automatically. If there is

any trouble with finding the drivers, you can select the option „Install the driver from specific location“ and navigate to the folder containing the driver manually:

[CD]:\drivers\FTDI\_UCAB232\_UMPx\_UMSx\Windows\_2K\_XP\_Vista\_7

When the drivers has been installed a new device is detected again – for now, it is a virtual COM port. Please repeat installation process written above once more.

After that, your UCAB232i converter is ready for use.

##### 2.1.1.2 Windows 7

With Windows 7 operation system drivers are installed automatically from Microsoft update server every time the UCAB232i converter has been inserted into USB port. The successful installation is indicated by a message.

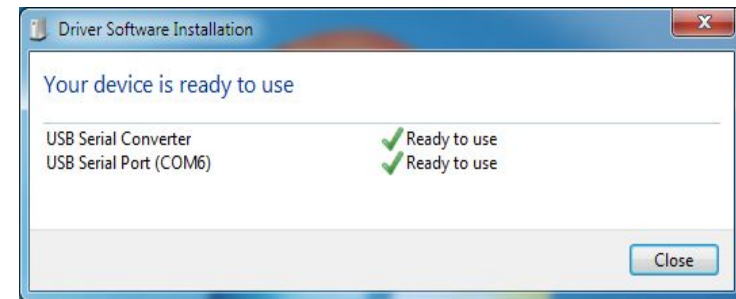


Fig. 3: Drivers Installation

#### 2.1.2 Linux operation system

LINUX kernel 2.6.31 or newer includes required drivers and there is no need to install them. If you use operation system based on that kernel, the UCAB232i

converter will simply start to work when it has been inserted into USB port.

## 2.2 Drivers Update

UCAB232i is based on FTDI IC, FTDI Chip company ([www.ftdichip.com](http://www.ftdichip.com)) steadily updates drivers for their ICs. To keep your drivers updated follow this chapter.

### 2.2.1.1 Windows XP

Windows XP drivers are stable for a long time, thus there is usually no reason for update them with the exception that another software application using FTDI IC on the same PC requires it. In that case, drivers are available on the enclosed CD-ROM or for download at [www.ftdichip.com](http://www.ftdichip.com)

### 2.2.1.2 Windows 7

Signed drivers are automatically downloaded from Microsoft update server when the UCAB232i converter has been inserted into USB port. Every time operation system is being updated, drivers are kept updated, too.

Another way how to update drivers in Windows 7 is very complicated or rather impossible.

## 2.3 Troubleshooting and Special Requirements

Some of applications have special requirements for RS232 communication, which demand particular correct settings of the UCAB232i converter.

If there is any difficulty in communication between the RS-232 connected device and PC try options listed below.

Red LED indicates transmitting, it can serve as a check on that software application sends data to a correct PC port. In other case, please check the COM port number in software application and the assigned COM port number by operating system.

The COM port number can be found and/or changed in Control Panel/Device Manager/Ports.

If the RS-232 connected device does not reply (LED indicator does not blink) although software application sends data, it is possible that there is not correctly set „Baud rate“ (communication speed), „Data bits“, „Parity“, „Stop bits“ or „Flow control“. Please check that the settings meets specification of the RS-232 connected device.

### 2.3.1.1 High demands on time response

If the connected device replies (LED indicator blinks) but software application still does not receive data it is

possible that the software application has high demands on time response.

The way of communication through USB is very different than communication through RS232. USB uses packets of 64 B size. Furthermore, a RS-232 device can receive only on PC request. Hence it is almost impossible to assure time response lower than about 1 ms.

Time response settings can be done in Control Panel/Device/Manager/Ports/.../Port Settings/ /Latency Timer. In case of troubles set this number to 1 ms.

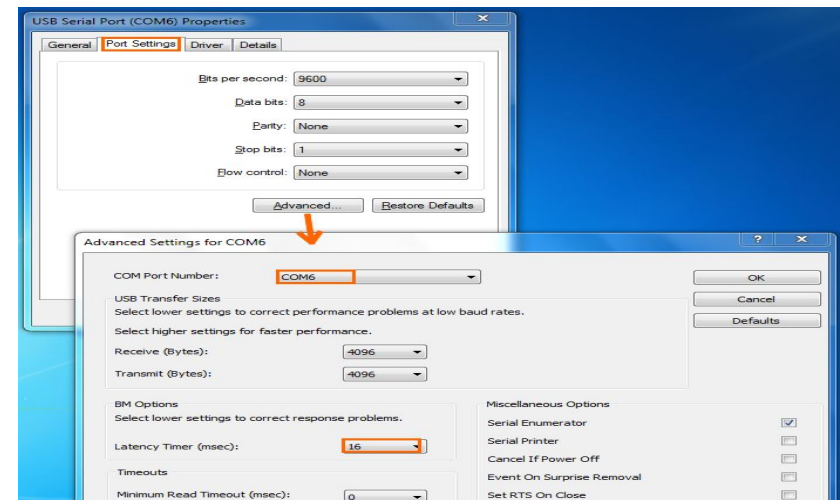


Fig. 4: COM port Enhanced Settings

## 2.4 User OEM Application

The UCAB232i converter allows user to design an OEM application after which the converter is found and listed as a customer hardware.

For doing this, it is necessary to modify drivers, particularly, to change the UCAB232i converter VID and PID, which are originally set to 0403 / 6001, to customer numbers and write these numbers with the MPROG utility to the converter EEPROM.

Before a modification of EEPROM it is advisable to create a backup of EEPROM in case there is any trouble with VID/PID identifiers.