

IPC/USB485D-101E

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Revision	Date	Author	Modification
1.0	02.08.2017	S. Mutter	First Release
1.1	07.01.2022	S. Mutter	Corrected isolation process to logic to 1000 Vrms

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1 Introduction

1.1 General Remarks

The content and presentation of this document has been carefully checked. No responsibility is accepted for any errors or omissions in the documentation.

Note that the documentation for the products is constantly revised and improved. The right to change this documentation at any time without notice is therefore reserved.

Syslogic is grateful for any help referring to errors or for suggestions for improvements.

The following registered trademarks are used:

Windows trademark of Microsoft Corporation

1.2 Contents of this Documentation

This document addresses to system integrators, programmers and instructed installation and maintenance personal working with the IPC/RS485D-101E system. It provides all information needed to configure, setup and program the IPC/RS485D-101E board.

1.3 Additional Products and Documents

1.3.1 Hardware Products

The following hardware products are useful together with the IPC/RS485D-101E board:

- IPC/Compact 8
- TFT/PU8
- IPC/Compact 81

1.3.2 Software Products

The following software products are useful together with the IPC/RS485D-101E board:

- IPC/W10ELTSB16E-8A-64
- IPC/DEBIAN9-8A-64

1.3.3 Documents

The following documents are *required* for correct installation and operation of the IPC/RS485D-101E board:

- DOC/IPC_USB485D (this document)

1.4 Installation

The IPC/USB485D-101E comes already preinstalled into the compliant COMPACT8 system. Therefore there is no need to install the hardware.

1.5 Safety Recommendations and Warnings

The products are intended for measurement, control and communications applications in industrial environments. The products must be assembled and installed by specially trained people. The strict observation of the assembly and installation guidelines is mandatory.

The use of the products in systems in which the life or health of persons is directly dependent (e.g. life support systems, patient monitoring systems, etc.) is not allowed.

The use of the products in potentially explosive atmospheres requires additional external protection circuitry which is not provided with the products.

In case of uncertainty or of believed errors in the documentation please immediately contact the manufacturer. Do not use or install the products if you are in doubt. In any case of misuse of the products, the user is solely liable for the consequences.

1.6 Electro Static Discharge

Electronic boards are sensitive to Electro-Static Discharge (ESD). Please ensure that the product is handled with care and only in a ESD protected environment. Otherwise a proper operation is not guaranteed.

1.7 Life Cycle Information

1.7.1 Transportation and Storage

During transportation and storage the products must be in their original packing. The original packing contains an antistatic bag and shock-absorbing material. It is recommended, to keep the original packing in case of return of the product to the factory for repair. Note that the packing is recyclable.

1.7.2 Assembly and Installation

Observe the EMI-precautions against static discharge. Carefully read the assembly and installation documentation. Make sure that you have all the necessary items ready. The installation procedures must be strictly observed. Note that deviations from the installation guidelines may result in degraded operational reliability or in unfavorable EM-radiation or EM-susceptibility.

1.7.3 Operation

The operating environment must guarantee the environmental parameters (temperature, power supply, etc.) specified in the technical specification section of the COMPCAT system.

The main functionality of the IPC/RS485D-101E is defined by the application programs running on the processor board. The application programs are not part of the delivery by Syslogic but are defined, developed and tested by the customer or a system-integrator for each specific application. Refer to the respective documentation for more information.

1.7.4 Disposal

At the end of the lifespan the IPC/RS485D-101E products must be properly disposed. IPC/RS485D-101E products contain a multitude of elements and must be disposed like computer parts.

1.8 Warranty

A world-wide manufacturer's warranty covers our products. The warranty period starts at the delivery time from our official distributor to the customer. The duration of the warranty period is specified in the respective product catalogs and the offers. All products carry a date code and a job number for identification. The manufacturing data and deliveries are registered in a high level Quality Management System.

The warranty covers material and manufacturing defects. All products must be returned via the official distributor to the factory for repair or replacement. The warranty expires immediately if the products are damaged or operation outside of the specified recommended operating conditions. The warranty also expires if the date code or job number listed on the product is altered or rendered unintelligible. The warranty does not include damage due to errors in firmware or software delivered with the products.

1.8.1 RoHS

The product of the IPC/COMPACT8 family are designed and produced according to the Restriction of Hazardous Substances (RoHS) Directive (2011/65/EU).

1.8.2 WEEE

This product is not designed ready for operation for the end-user and intended for consumer applications. Therefore, the Waste Electrical and Electronic Equipment (WEEE) Directive (2012/19/EU) is not applicable. But users should still dispose the product properly at the end of life.

2 Product Description

2.1 Product Identification

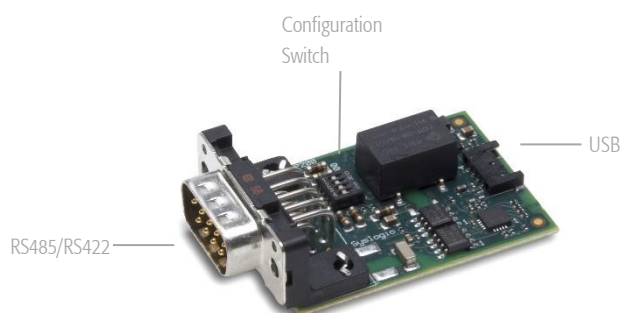


Fig. 1 Converterboard

2.2 Features

The USB to RS422/485 converter board IPC/USB485D-101E is used for communication over standard RS422 or RS485 interface.

The block diagram of the board is shown in Fig. 2.

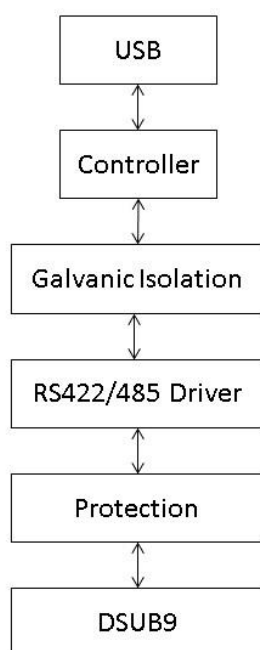


Fig. 2 Block Diagram

The main functional elements are:

- USB 2.0 local bus interface
- Interface configuration switches
- Standard RS422/485 drivers

3 Hardware Description

3.1 Overview

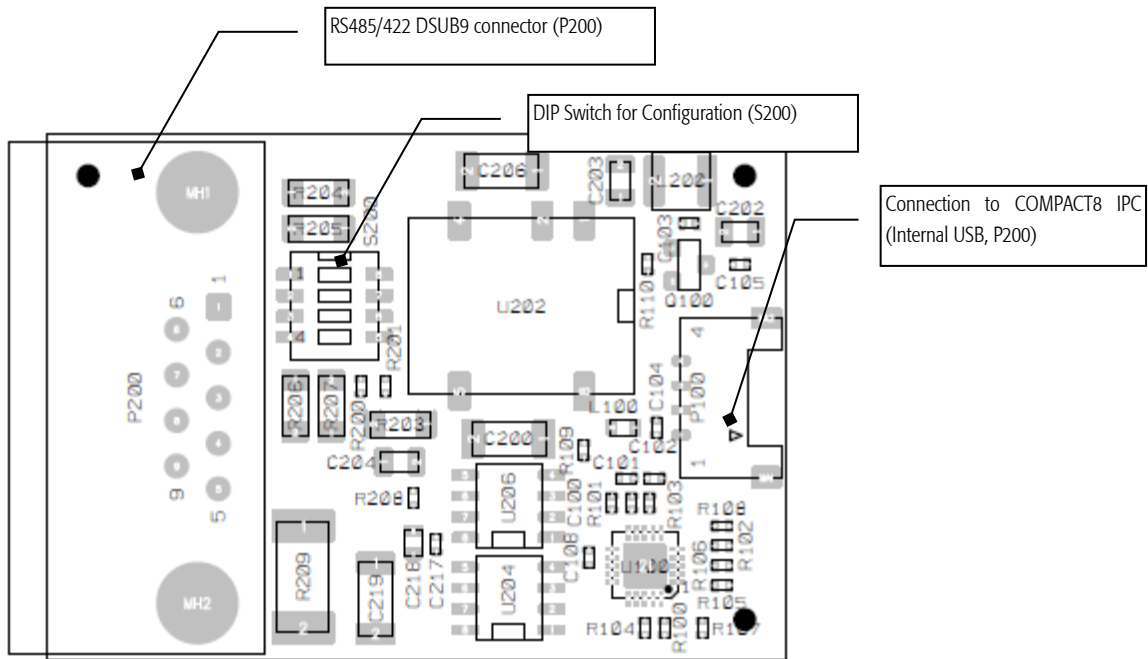


Fig. 3 Board Layout

3.2 Host device interface

The module is connected to a USB port. For Syslogic product the following cables are used:

Host System	Required cable
IPC/COMPACT8	CAB/DM4PL4-15B

Tab. 1 Host controller cable

3.2.1 Main Host Interface (P100)

Syslogic IPC/COMPACT8 are able to supply the main power using the USB interface only. Refer to the power requirements for detailed information.

Host USB Connector (P101)	
Connector	
Connector Type Assembled	Molex 504050-0491
Mating Connector Type	504051-0401
Pin description	
Pin 1	USB Supply Voltage 5V
Pin 2	USB Data -
Pin 3	USB Data +
Pin 4	USB Ground

Tab. 2 USB Connector P100

3.3 Serial Interface

3.3.1 Configuration Options

The configuration options of the Board are shown in Tab 1.

Switch	State	Mode
S200:3	OFF	Full-Duplex Mode
	ON	Half-Duplex Mode
S200:4	OFF	RS422 Mode
	ON	RS485 Mode

Tab. 3 Serial Interface Configuration Options

Important Note

When the device is configured in RS422Mode, it is necessary to configure the Switch S200:3 for Full-Duplex Mode.

3.3.2 RS485 Full-Duplex/RS422 Termination

If required 120Ohm termination can be enabled using internal switches.

Switch	State	Signal
S200:1	OFF	Termination on RX line not active
	ON	Termination on RX line active
S200:2	OFF	Termination on TX line not active
	ON	Termination on TX line active

Tab. 4 RS485 Full-Duplex/RS422 termination

3.3.3 RS485 Half-Duplex Termination

If required 120Ohm termination can be enabled using internal switches.

Switch	State	Signal
S200:2	OFF	Termination on DATA line not active
	ON	Termination on DATA line active

Tab. 5 RS485 Half-Duplex termination

3.3.4 Process Interface Connector Assignments

The DSUB9 connector pin assignment for the board is shown in Tab. 2 for RS485 Half-Duplex and Tab. 3 for RS422/485 Full-Duplex.

I/O Connector Pin	Process Interface Signal	I/O Connector Pin	Process Interface Signal
1	no connection	6	no connection
2	no connection	7	no connection
3	DATA-	8	DATA+
4	no connection	9	no connection
5	GND		

Tab. 6 Process Interface Connector P200 RS485 Half-Duplex

I/O Connector Pin	Process Interface Signal	I/O Connector Pin	Process Interface Signal
1	no connection	6	no connection
2	RX-	7	RX+
3	TX-	8	TX+
4	no connection	9	no connection
5	GND		

Tab. 7 Process Interface Connector P200 RS422 and RS485 Full-Duplex

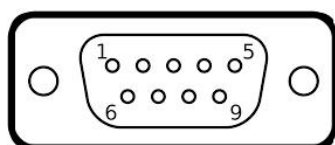


Fig. 4 Pinout (DSUB-9 male, Front View)

4 Programming Information

4.1 Overview

The necessary drivers for Windows, Linux (3.2 and greater) and other OSes are available to download for free from the FTDI website (www.ftdichip.com). In the BSP Linux Debian 8.0 (and newer) and in the BSP Windows 10 IoT Enterprise of Syslogic, the Virtual COM Port drivers from FTDI are already installed and ready to use. The D2XX driver, which allows direct access to the USB device through a DLL is not pre-installed and needs to be downloaded and installed according to the notes of FTDI.

Important Note

When using the D2XX driver, do not overwrite the EEPROM of the FTDI chip. The examples provided by FTDI include a program to write to the EEPROM. If this program is executed, the settings of the Board are overwritten and the board becomes unusable. Syslogic set up the device with specific options to support the different modes of the converter board.

4.2 Windows

In Windows, the device appears in the device manager as USB Serial Port (COMX). It can be used the same way as COM Interfaces. Configurations can be made in the driver options in the device manager.

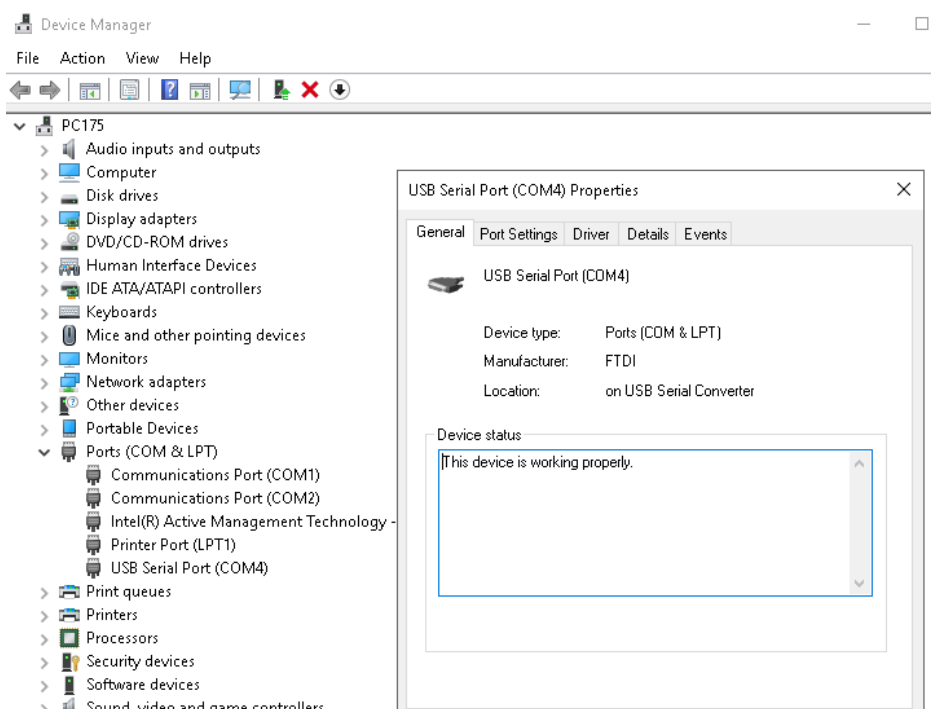


Fig. 5 Device in the Windows Device Manager

4.3 Linux

In Linux, the device can be found as `/dev/ttyUSBX`, when the device driver for the FTDI Chip is installed. In the folder `/SYSLOGIC/test_demos/serial` are examples on how to use the serial interfaces.

5 Technical Data

5.1 General Electrical Data

Important Note

Do not operate the COMPACT base board outside of the recommended operating conditions. Otherwise lifetime and performance will degrade. Operating the board outside of the absolute maximum ratings may damage the hardware.

Absolute Maximum Ratings (over free air temperature range)

Parameter	Symbol	min	nom	max	Unit
internal power supply voltage	Vcc	-0.3		5.5	Vdc
isolation process to chassis (AC, 60s, 500m a.s.l., Ta=25°C)		1000			Vrms
isolation process to logic (AC, 60s, 500m a.s.l., Ta=25°C)		1000			Vrms
creepage distance process to chassis and PCB border		1.5			mm
creepage distance process to logic		2.5			mm
storage temperature range	Tst	-40		90	°C
maximal data rate	Fmax	1		3	Mbps

Tab. 8 General Absolute Maximum Ratings

Recommended Operating Conditions

Parameter	Symbol	min	nom	max	Unit
internal logic supply voltage	Vcc	4.50	5.00	5.25	Vdc
operating free-air temperature range	Ta	-40		+85	°C

Tab. 9 General Recommended Operating Conditions

Electrical Characteristics (over recommended operating range, unless otherwise noted)

Parameter	Symbol	min	typ	max	Unit
logic supply current (Vcc=5V, no external loads)	Icc	115	120	500	mA
full load power dissipation (worst case, including onboard process power dissipation)	Pmax		0.6		W

Tab. 10 General Electrical Characteristics

6 Product Revision History

6.1 Hardware

This paragraph lists the different hardware revisions of the USB485D board delivered beginning with the first prototype lot. All information listed in this document relies on definitive state hardware.

Important Note

This document always covers the newest product revision listed in Tab. 12. Please contact the manufacturers technical support for upgrade options.

Board Identification (see product label)	Product Revision	Remarks
IPC/USB485D-101E	#1	First Release

Tab. 11 Hardware Revision State

7 Manufacturer Information

7.1 Contact

Our distributors and system integrators will gladly give you any information about our products and their use. If you want to contact the manufacturer directly, please send a fax or email message containing a short description of your application and your request to the following address or use one of the information or technical support request forms on our internet homepage:

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