# IPC194

## General Operating,

## Maintenance and Installation Manual

# ipConv
# Protocol Converter

Edition Juni 2005
Version 7.1

DIN EN ISO 9001:2000

# 1 Contents

IPCOMM GmbH                         - 2 -                        IPC194 Manual
Gundstraße 15                                    Copyright © 2004 IPCOMM GmbH

## 1.1 Introduction

All technical information, descriptions and illustrations contained in this Operating, Maintenance and Installation Manual remain our property and shall not be used otherwise than for operating this installation, nor shall they be copied, reproduced or passed on to third parties or brought to their notice without our prior written consent.

The information represented in this manual is in keeping with current standards and is subject to later alterations.

This manual contains important instructions referring to safe installation, commissioning, operation and maintenance.
Read this manual carefully before starting up the Protocol Converter and observe the instructions.

In order to comply with the guidelines for electro-magnetic compatibility in industrial PCs (or other variants) only CE-certified components are used in compliance with project-specific requirements.

It is to be noted that the Protocol Converter (PC) has not been protected against lightning and the operator should, *if desired,* take appropriate protective precautions.

Finally we want to draw your attention to the fact that any warranties with respect to delivered goods will be invalid in the event that:

- Operation, servicing and maintenance are not carried out accurately according to the instructions, repairs are not carried out by our personnel or without our prior written consent.

- Commissioning is not carried out by our personnel or we have not given our approval for the commissioning or the commissioning is carried out by untrained personnel.

- The unit is used inadequately, incorrectly, negligently or inappropriately or for a purpose other than that originally intended.

- The serial number is removed from the product.

## 1.2  Application
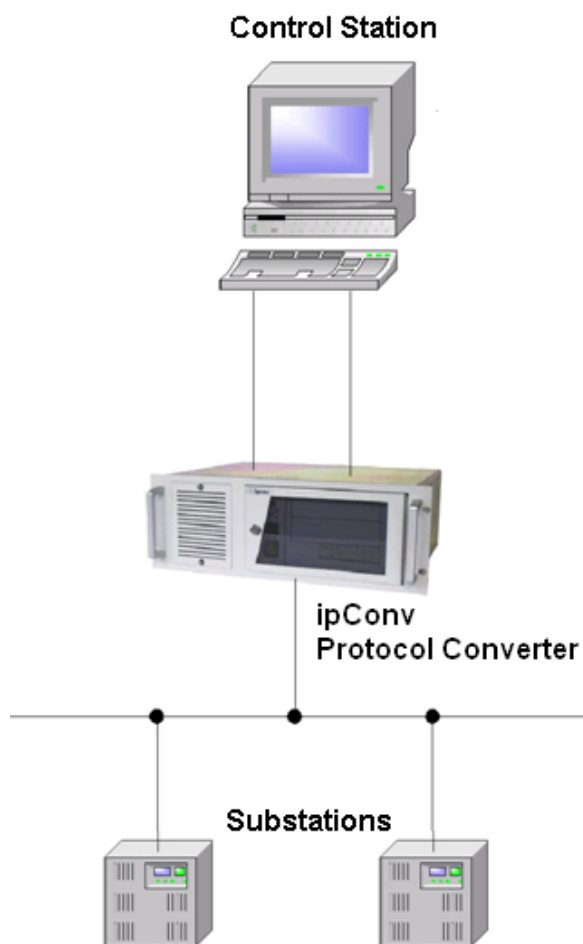
**Control Station**

The Protocol Converter *ipConv* enables the data exchange between incompatible communication terminal facilities using different communication protocols.

The figure opposite shows the basic structure of control station, the Protocol Converter *ipConv* and the substation.

The regular hardware platform employed for the Protocol Converter *ipConv* is an industrial PC (IPC).

**ipConv Protocol Converter**

The configuration of the IPC194 depends on the actual use and is described in the project-specific manual.

The data transfer is principally carried out in both directions to the control station and to the substation via a serial interface, which enables asynchronous data traffic.

Coupling for instance bit-synchronous or pulse length modulated (PDM) protocols requires the Telecontrol Transformer (TCT) from IPCOMM GmbH.

**Substations**

For this case we have enclosed an operating manual for the Telecontrol Transformer.

## 1.3  Operation

The Protocol Converter IPC194 is designed for mounting in a 19" housing.

The front panel of the industrial PC corresponds to the level of protection IP42. No degree of protection has been specified for the back of the industrial PC.
In order to maintain operation large temperature fluctuations must be avoided.
An air-conditioned environment is to be recommended for operating the Protocol Converter.
Interference sources like power inverters and power cables close to the Protocol Converter should be avoided.

The following operating conditions are to be observed for interference-free operation:

- Temperature range: 0°C – 55°C
- Relative humidity: 5 % - 90 % **non-condensing**
- Installation site and environmental conditions should comply with the corresponding degree of protection.
- The supply voltage must remain within the allowed voltage range (see technical data at the end of this description).
- It must be ensured that excessive voltage fluctuations in the power supply are avoided.

# 2 Hardware Description

## 2.1 General

An IPC194 is the hardware platform used for our software products ipConv, ipRoute and others, completing our range of hardware in the high-performance segment. Compared with IPC191, IPC194 offers more CPU performance and storage capacity. With its high number of PCI/ISA slots, IPC194 is highly upgradable.
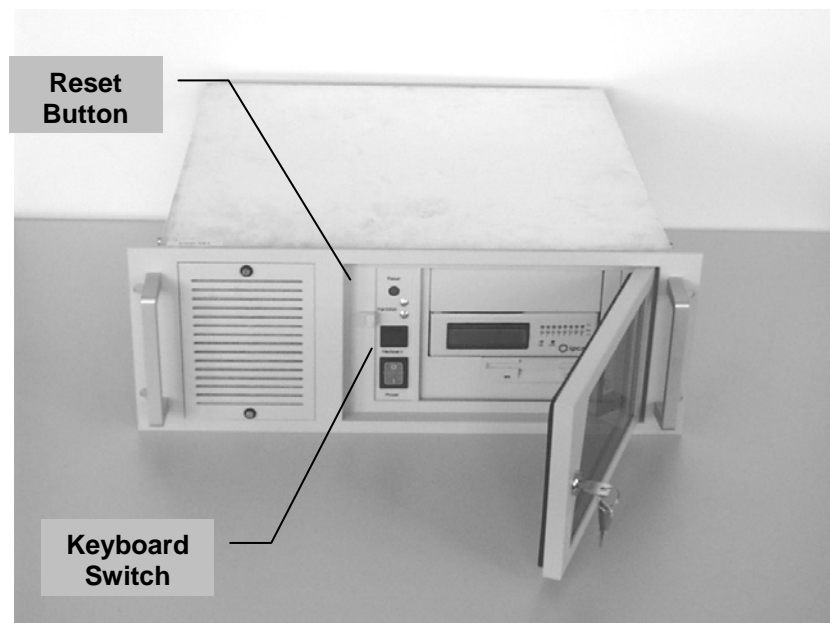


*Figure 1.        Front view Industrial PC*

## 2.2  Hardware Components

### 2.2.1  CPU Module

The CPU module is a all-in-one single board computer equipped with all the necessary interfaces. The CPU module has the following interfaces:

- two RS232 Interfaces
- a bi-directional Parallel Port
- EIDE and FDD Interface
- VGA Interface
- Keyboard Port

### 2.2.2  Floppy

The integrated 3½" floppy disk drive with a 1,44MByte memory allows quick installation of software and fast data exchange.

### 2.2.3  CPU-Module RS-232 Interfaces (DTE)

This interface type is used for COM1 and COM2.

<table>
<tr><td rowspan="11">

**SERIAL PORT
RS232 DTE
DB9 male connector**



</td></tr>
<tr><td>**Pin**</td><td>**Direction**</td><td>**Description**</td></tr>
<tr><td>1</td><td>INPUT</td><td>DCD   Data Carrier Detect</td></tr>
<tr><td>2</td><td>INPUT</td><td>RXD   Receive Data</td></tr>
<tr><td>3</td><td>OUTPUT</td><td>TXD   Transmit Data</td></tr>
<tr><td>4</td><td>OUTPUT</td><td>DTR   Data Terminal Ready</td></tr>
<tr><td>5</td><td></td><td>GND  Ground</td></tr>
<tr><td>6</td><td>INPUT</td><td>DSR   Data Set Ready</td></tr>
<tr><td>7</td><td>OUTPUT</td><td>RTS   Request To Send</td></tr>
<tr><td>8</td><td>INPUT</td><td>CTS   Clear To Send</td></tr>
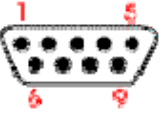<tr><td>9</td><td>INPUT</td><td>RI      Ring Indicator</td></tr>
</table>

*Figure 2.        9-pin DTE RS-232 Interface (computer)*
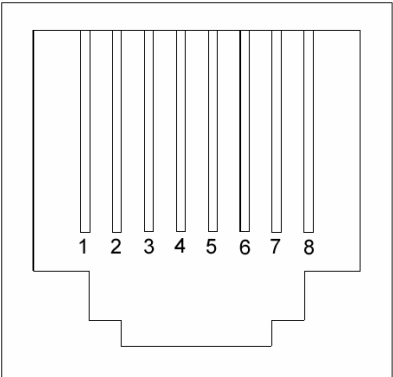
## 2.2.4 RS-232 Communication Board Interfaces

| SERIAL PORT RJ45 female connector | Pin | Direction | Description |
|---|---|---|---|
| | 1 | INPUT | RI     Ring Indicator (optional) |
| | 2 | INPUT | DCD   Data Carrier Detect |
| | 3 | OUTPUT | DTR   Data Terminal Ready |
| | 4 | | GND  Ground |
| | 5 | INPUT | RXD   Receive Data |
| | 6 | OUTPUT | TXD   Transmit Data |
| | 7 | INPUT | CTS   Clear To Send |
| | 8 | OUTPUT | RTS   Request To Send |

*Figure 3.        Pin assignment of RJ45 interface*

| RJ45Bu/EIA-561 | DB9St/EIA-574 | Signal |
|---|---|---|
| 1 (blue) | 9 | RI |
| 2 (orange) | 1 | DCD |
| 3 (black) | 4 | DTR |
| 4 (red) | 5 | GND |
| 5 (green) | 2 | RXD |
| 6 (yellow) | 3 | TXD |
| 7 (brown) | 8 | CTS |
| 8 (white) | 7 | RTS |
| - | 6 | DSR |

*Figure 4.        RJ45/DB9Bu Adapter*

## 2.2.5  CompactFlash

An 64 MB MByte CompactFlash card serves as a mass storage device, i.e. for storing the operating system, the applications and configuration data. As a result the disadvantages involved with the use of a rotating harddisk are avoided, thus improving the reliability of the system substantially since a CompactFlash has an MTBF of 1,000,000 hours.
The CompactFlash adapter is simply connected to the IDE bus of the CPU module and treated just like a harddisk.



*Figure 5.       CompactFlash Adapter*

With the power supply switched off the CompactFlash card can simply be taken out or inserted enabling a quick change to different hardware.



*Figure 6.       CompactFlash Card (Example)*

**Note:** Excessive voltages affecting the PC directly via the supply voltage or indirectly via data lines, power line or flash-overs might cause damage to the PC.
Interference of this kind must be prevented.

## 2.3 Operating and Control Elements

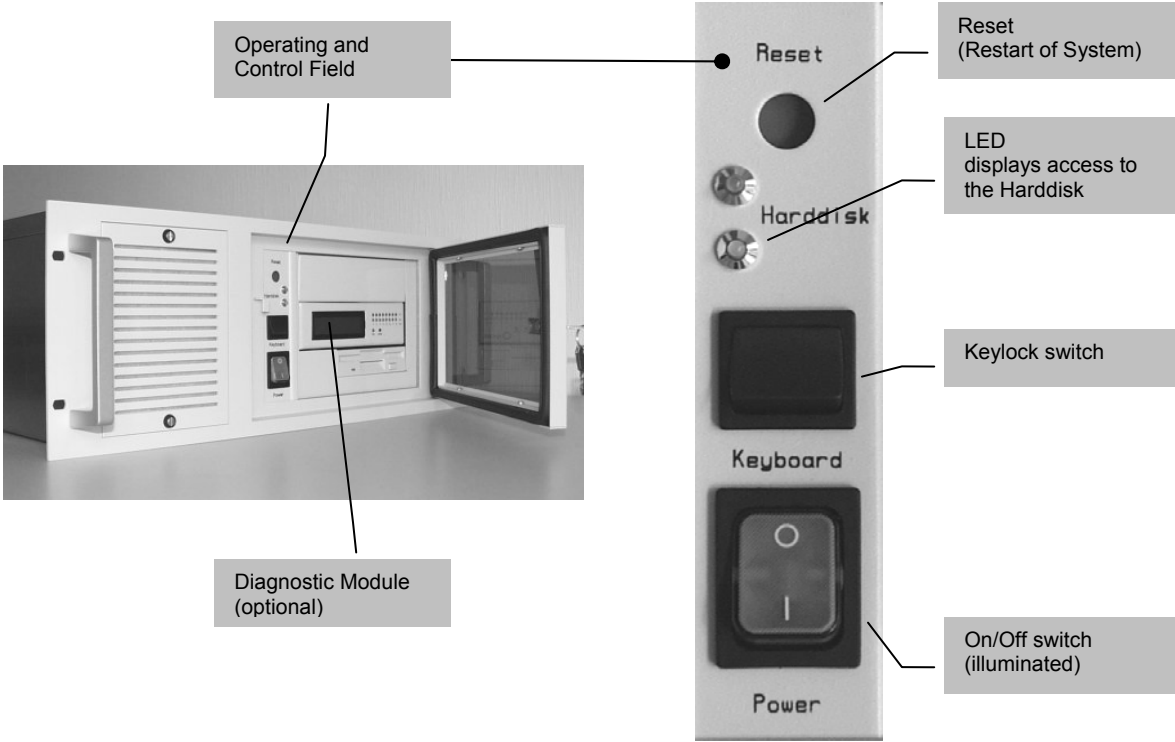The operating and control elements are located behind the lockable front door.



Operating and Control Field

Diagnostic Module (optional)

Reset (Restart of System)

LED displays access to the Harddisk

Keylock switch

On/Off switch (illuminated)

*Figure 7. Operating and Control Elements*

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## 2.4  Diagnostic Module (optional)

This module is located above the floppy drive behind the lockable front door. If your IPC is equipped with an diagnostic module, we have enclosed a separated operating manual for this device.
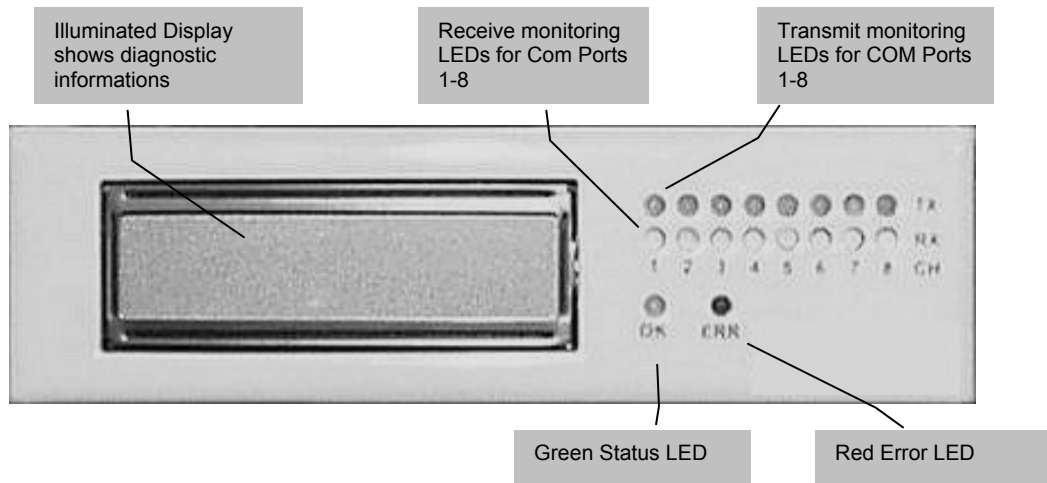


*Figure 8.        Diagnostic Module*

### 2.4.1  Power LED

Power indication is located inside the power switch and shows when ON that electrical power is available.

### 2.4.2  Status LED (Diagnostic Module)

Status LED (OK) is blinking while system startup. After successful operating system startup it remains ON as long as no hardware fault was detected.

### 2.4.3  Error LED (Diagnostic Module)

Upon detection of an hardware error, this LED goes ON. It also goes ON for short time in case of a hardware reset (by pressing the reset button).

### 2.4.4  LC-Display (Diagnostic Module)

LC-Display is used to shows diagnostic information from Diagnostic Module and software diagnostic information.

# 3 Mounting

The 19" industrial PC is mounted in a 19" standard housing. The following points must be observed when mounting.

- The industrial PC is mounted on guiding rails.

- The IPC is fastened with 4 screws on the front (screws not supplied).

- The ventilation openings must not be covered or obstructed.

- Ensure that the air can circulate freely at the front and back of the IPC.

- Connection to the mains is done via the supplied cable at the back of the IPC.

# 4  Maintenance

## 4.1  Replacing the Filter Element

For failure-free operation it is necessary to regularly check the filter element in the filter housing.

The filter housing can be opened via two screws (bayonet joint) on the IPC front panel.
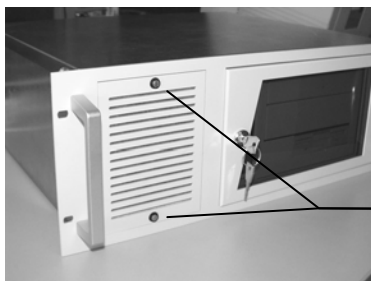


Screws with bayonet joint

After removing the covering-grid, the filter element itself can be removed easily. If the filter element looks dirty like in the picture below, it should be replaced as soon as possible.
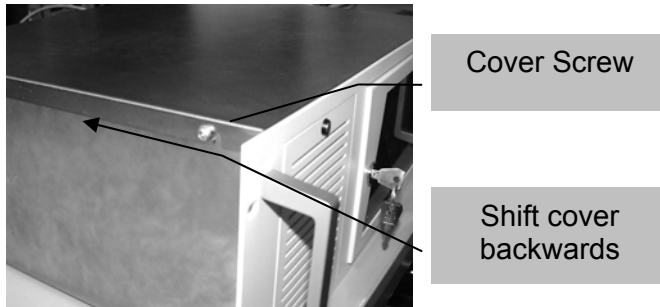


Filter Element

## 4.2  Opening the Case

Should it become necessary to open the IPC-case, the both screws located on the upper right and left side of the case must to be removed.

**Caution:**  If you open the housing of the industrial PC it is to be ensured that the computer has been switched off and taken off the mains supply.



Cover Screw

Shift cover backwards

After pushing the cover a little bit backwards it can be pulled up at the front easily. Notice, that the grounding wire has to be disconnected before removing the cover completely.



Ground wire connection

Don't forget to reconnect the grounding wire before assembling the IPC-cover again.

# 5 Technical Data

*Chassis*

- 19" rack mount chassis
- Passive ISA/PCI bus backplane with different slots
- Positive pressure filtration system (with 1 fan)
- Removable filter
- Lockable front panel

*Power supply*

- 230 V~, 115 V~, 48 V=, 24 V=, 12 V= or 85 - 265 VAC autorange
- CE/VDE certified

*CPU-Card*

- Processor speed up to 1100 MHz
- Up to 256 MB SDRAM
- EIDE hard disk and flash disk drive interface
- Floppy disk drive interface
- Two high speed serial ports, one bi-directional parallel port
- Real-time clock/calendar

*Serial card*

- Up to 32 serial RS232 ports
- RS-232C ports with RJ45/EIA561 connectors
- Baud rate up to 115 kBaud
- Protected against transient overvoltage

*Mass storage*

- Removable Flash Card
- SanDisk CompactFlash with up to 4 GB
- Vibration: 15 G peak to peak max, Shock: 2000 G max.
- MTBF ≥1.000.000 hours

*Floppy*

- 3 ½" 1,44MB floppy drive

*Video*

- Standard VGA graphic adapter

*General*

- All components are CE certified
- Height: 4 HE
- Depth: 430 mm (optional 370 mm)
- Weight: 15 kg

*Operating Environment*

- Ambient Temperature Range : 0°C to 55°C
- Relative Humidity (non condensing): 5% to 90%

Subject to alterations

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