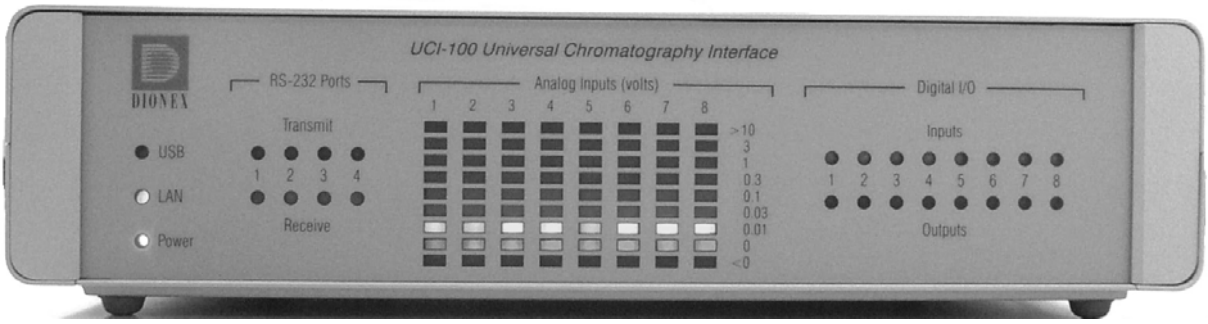
DIONEX

UCI-50 and UCI-100

Universal Chromatography Interfaces

Operating Instructions



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DIONEX

CE

Declaration of Conformity

Product: Universal Chromatography Interface
Type: UCI-50 and UCI-100

Dionex Softron GmbH herewith declares conformity of the above products with the respective requirements of the following regulations:

- Low-Voltage Equipment Directive 73/23/EEC
  changed by 93/68/EEC
- EMC Directive 89/336/EEC
  changed by 91/263/EEC; 92/31/EEC; 93/68/EEC

The electrical safety of the products was evaluated based on the following standard:

- EN 61010-1: 1993
  Safety requirements for electrical equipment for measurement, control and laboratory use
  Part 1: General Requirements

The Electromagnetic Compatibility (EMC) of the products was evaluated based on the following standards:

- EN 50081-1: 1992:
  Electromagnetic Compatibility (EMC) - Generic emissions standard
  Part 1: Residential, commercial and light industry
- EN 50082-1: 1992:
  Electromagnetic Compatibility (EMC) - Generic immunity standard
  Part 1: Residential, commercial and light industry
- EN 61000-3-2: 1998
  Electromagnetic Compatibility (EMC)
  Part 3 / Section 2: Limits for harmonic current emissions

This declaration is issued for the manufacturer

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by the President, Dr. Peter Jochum.

December 10, 2002

Introduction

1.1 How to Use the Manual

The layout of this manual is designed to provide quick reference to the sections of interest to the user. However, we recommend that you review the manual thoroughly before beginning operation of the chromatography interface in order to obtain a full understanding of the instrument.

Almost all descriptions in the manual apply to both the UCI-50 and the UCI-100. Therefore, the term "the UCI" is used throughout the manual. If some detail applies to only the UCI-50 or the UCI-100, the model is identified by name.

At various points throughout the manual message of particular importance are indicated by the following symbols whose relevance is as follows:

Please note: Indicates general information to help obtain optimum performance of the instrument.

Important: Indicates that failure to take note of the accompanying information may cause wrong results or damage to the system.

This manual is provided "as is." Every effort has been made to supply complete and accurate information and all technical specifications have been developed with the utmost care. However, Dionex assumes no responsibility and cannot be held liable for any errors, omissions, damage, or loss that might result from any use of this manual or the information contained therein. We appreciate your help in eliminating any errors that may appear in this document.

The information contained in this document is subject to change without notice.

1.2 Unpacking

All electrical and mechanical components of the UCI are carefully tested before the instrument is shipped. After unpacking, please check the instrument for any signs of damage, which might have occurred during shipment.

Please note: Immediately report any shipping damage to both, the incoming carrier and Dionex. The shipping insurance will compensate for the damage only if reported without delay.

Please note: Keep the original packing material, as it is the optimum packaging for shipping the unit (e.g., for repair). Using any other packaging automatically voids the warranty.

For information about the standard accessories, refer to page 41.

1.3 Warranty

The standard warranty coverage for the unit is in accordance with the terms of sale. Warranty is given for one year, starting from the invoice date, and covers materials and labor, ex-works.

The warranty coverage shall become invalid in any case identified as resulting from inappropriate use or service, operating errors, or the implementation of non-specified spare parts. Similarly, the warranty coverage shall be invalidated in the event of inappropriate shipment or packaging

1.4 Intended Use

The UCI is designed to be an interface between the Chromeleon Chromatography Management System and the modules of a chromatographic system.

Please note that the unit may be operated only using the accessories originally supplied with the unit and within its technical specifications (→ page 39). Also, observe the described connections and pin assignments described on page 5.

Dionex shall not be liable for any damage, material or otherwise, resulting from inappropriate or improper use of the instrument.

1.5 Information for the User

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his expense.

2 Unit Description

In chromatographic systems, the most different interface types are required for data acquisition and device control. The UCI provides these different interfaces and makes them available to the chromatography server. Use a USB or LAN connection to establish the communication to the chromatography data system of the server (→ USB Installation, page 14 or LAN Installation, page 15). The UCI provides the following interfaces:

2.1 Analog Inputs

Chromatographic detectors convert signals, e.g., absorption or conductivity, into electric voltage. However, a PC can process digital information only. That is why electric voltage must be converted into digital data. If the detector itself is not capable of performing this conversion, an analog/digital converter is required. Such a converter is integrated in the UCI.

2.2 Serial RS-232 Ports

The UCI-100 provides four independent RS-232 interfaces that allow the chromatography server to control the modules of a chromatography timebase.

2.3 Digital Inputs

Eight digital inputs are available for acquisition of binary events. TTL signal levels are processed.

2.4 Digital Outputs

The digital outputs of the UCI serve to transmit control signals to other devices. As these outputs are potential-free relay contacts, they do not depend on specific signal levels. Of course, the maximum capacity of the contacts needs to be considered (→ Technical Specification, page 39).

2.5 BCD Inputs

Use the BCD inputs of the UCI to record the sample position of an autosampler. These 16 digital inputs can process TTL signals.

3 Connections and Pin Assignments

3.1 Connections

The instrument is equipped with a primary clocked standard power unit offering a "wide range" input (auto-sensing). Thus, no adjustment is required to adapt the line voltage to local voltage requirements.

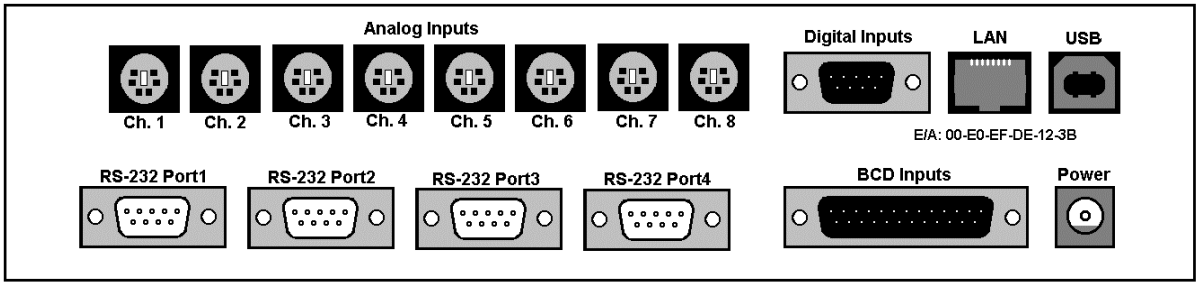

Fig. 1: Rear panel connections

On the rear panel, the UCI provides the following connectors:

- Analog inputs: eight analog inputs for the UCI-100 and 2 analog inputs for the UCI-50
- Eight digital inputs
- One LAN and one USB port each
- Eight digital outputs (relay outputs)
- 16 BCD inputs for the sample position
- One power socket

In addition to their analog inputs, the eight analog connectors provide one digital output (potential-free relay contact) and one digital input each. For the UCI-50, only Ch. 1 and Ch. 2 are equipped with analog inputs.

The eight digital inputs can be used to inform Chromeleon about external events such as the injection of a sample. These inputs distributed among the individual analog connectors but are also grouped in one separate connector.

The relay outputs allow potential-free switching of external signals. The sample position is available in standard BCD format. Control of external devices such as pumps, detectors, and autosamplers is via the RS-232 ports.

Please note: Control of GILSON instrumentation, which is equipped with the GSIOC/RS-232 adapter, model 605, via the RS-232 ports of the UCI-100 is not supported. Connect these instruments to the computer's multi-serial (8-fold) PCI interface board (Equinox 8-RS2332 Multi-COM board, Dionex part no. 5906.2095) instead.

Data transmission between the UCI and Chromeleon is performed via either the integrated USB or LAN interface (Ethernet).

3.2 Pin Assignment

3.2.1 General

For more information about the pin assignments of the analog, digital, and BCD inputs as well as the DC input and the RS-232 ports, refer to the sections below. The USB and the LAN ports correspond to their respective standards.

⚠ **Important:** Wrong polarity (digital inputs) and input voltages outside the valid range can cause damage to the unit.

3.2.2 RS-232 Ports

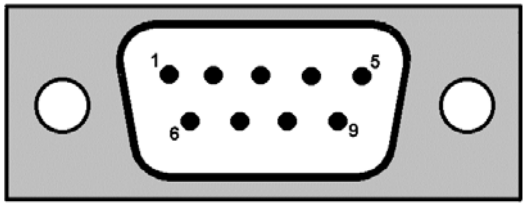

Fig. 2:RS-232 port - 9-pin D-SUB connector (male)

Pin	Signal Name	Signal Level	Remark
1	DCD		Not used
2	RX	RS-232	
3	TX	RS-232	
4	DTR	RS-232	Active (+10V (Ri = 2.7 kΩ)
5	GND	GND	
6	DSR		Not used
7	RTS	RS-232	Hardware handshake
8	CTS	RS-232	Hardware handshake
9	RI		Not used

3.2.3 Digital Inputs

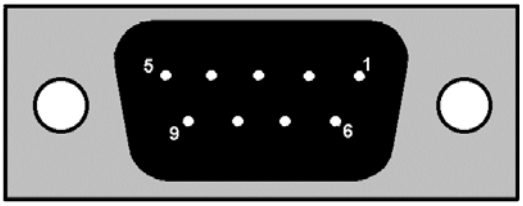

Fig. 3: Digital input - 9-pin D-SUB connector (female)

Pin	Port	Signal Level
1	Input-1	TTL
2	Input-2	TTL
3	Input-3	TTL
4	Input-4	TTL
5	Input-5	TTL
6	Input-6	TTL
7	Input-7	TTL
8	Input-8	TTL
9	Ground	GND

Please note: Internal device resistors keep the digital input level at + 5 V (pull-up resistance). Therefore, it is possible to use a contact closure relay, without an additional voltage source. This closure has to be installed between GND and the respective digital input. Once the relay is shut, the digital voltage is grounded.

The relay itself is under a low current of about 50 µA. If the signal source itself is active, i.e., emitting voltage, verify the correct polarization of the digital input: The ground of the signal source must be connected to the ground of the UCI; the digital output of the signal source must be connected to the digital input of the UCI.

3.2.4 BCD Inputs

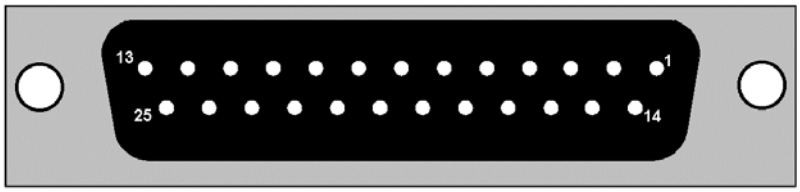

Fig. 4: BCD input - 25-pin D-Sub connector (female)

If the marked wire of a flat ribbon is connected to pin no. 1 of the female connector, the wires of the flat ribbon are numbered as follows:

Pin	Wire	Port	Signal Level
1	1	BCD-1A	TTL
2	3	BCD-1B	TTL
3	5	BCD-1C	TTL
4	7	BCD-1D	TTL
5	9	GND	GND
6	11	BCD-2A	TTL
7	13	BCD-2B	TTL
8	15	BCD-2C	TTL
9	17	BCD-2D	TTL
10	19	GND	GND
11	21	GND	GND
12	23	GND	GND
13	25	GND	GND
14	2	BCD-3A	TTL
15	4	BCD-3B	TTL
16	6	BCD-3C	TTL
17	8	BCD-3D	TTL
18	10	GND	GND
19	12	BCD-4A	TTL
20	14	BCD-4B	TTL
21	16	BCD-4C	TTL
22	18	BCD-4D	TTL
23	20	GND	GND
24	22	GND	GND
25	24	GND	GND

Please note: Internal device resistors keep the BCD input level at + 5 V (pull-up resistance). Therefore, it is possible to use a contact closure relay, without an additional voltage source. This closure has to be installed between GND and the respective BCD input. Once the relay is shut, the digital voltage is grounded.

The relay itself is under a low current of about 50 µA. If the signal source itself is active, i.e., emitting voltage, verify the correct polarization of the digital input: The ground of the signal source must be connected to the ground of the UCI; the digital output of the signal source must be connected to the digital input of the UCI.

3.2.5 Analog Inputs

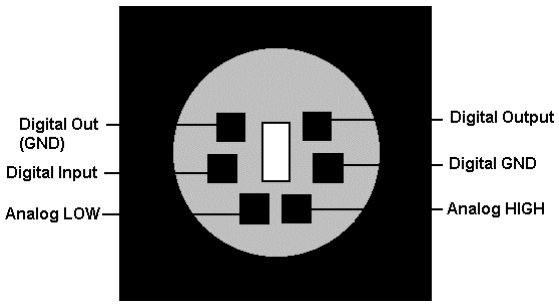

Fig. 5: Analog input - 6-pin connector (male)
(View from the device rear)

	Range
Analog LOW ↔ Analog HIGH	± 10 V (For the UCI-50, only Ch. 1 and Ch. 2 are available.)
Digital Input ↔ Digital GND	0 or +5 V
Digital Out (GND) ↔ Digital Output	Switching: 100V; switching current: 0,5 A limiting value of mean on-state current: 1,0 A; switching capacity: 10 W/10 VA volume resistance: max. 0.15 Ohm

Please note: If the UCI is connected to the Chromeleon server via a LAN connection, the equipment grounding of the UCI is potential free (contrary to a USB connection). With some detectors, this may affect the analog signal quality. To connect the UCI's equipment grounding to the detector grounding, connect the (green) **Digital GND** wire of the signal cable to the corresponding detector grounding.

3.2.6 Power Socket

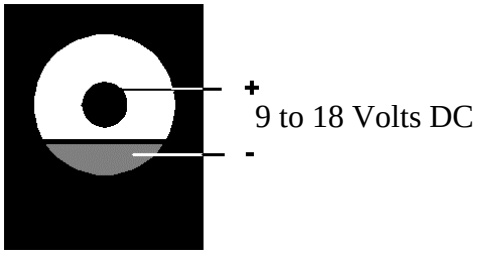

Fig. 6: Power socket (DC Input)

4 Front Panel

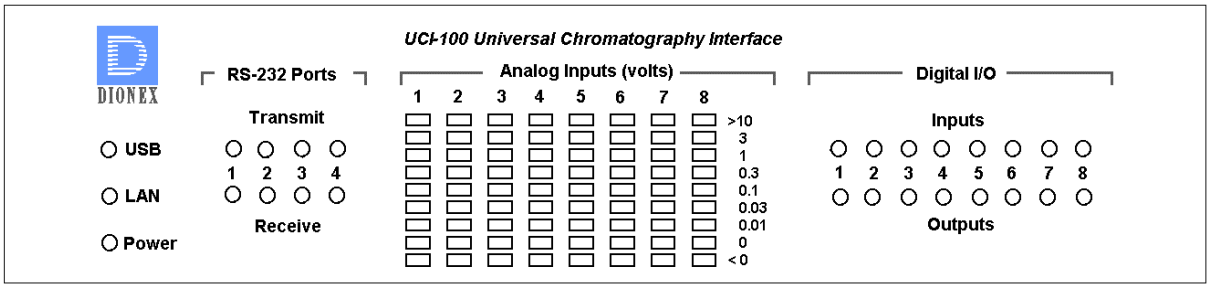

Fig. 7: Front Panel(here: UCI-100)

Front Panel Element	Description
USB	The LED is flashing when data is transmitted via the USB connection.
LAN	The LED lights if a LAN connection is established ("good link").
Power	The LED lights when the device is connected to the power supply unit.
RS-232 Ports	The red **Transmit** LEDs lights when data is sent via the corresponding RS-232 port. The green **Receive** LEDs lights when data is received via the corresponding RS-232 port.
Analog Inputs (Volts)	The LEDs visualize the detector signal, which currently applies to the corresponding analog input (voltage level). Indication is in volt according to the logarithmic scale on the right.
Digital I/O	The green **Input** LEDs lights when the corresponding signal line is connected to digital ground. The red **Output** LEDs lights when the corresponding potential-free relay contact is closed.

5 Installation

Bring the UCI to a moderate temperature for four hours to allow any condensation that might have occurred during shipping to evaporate. Do not connect the UCI to the mains yet. After four hours, check the UCI; if the condensation is still there, allow the instrument to continue to warm up (without connecting it to the mains) until the condensation is completely gone.

5.1 Location

Install the instrument in the laboratory on a stable surface that is free of vibration. Avoid locations with extreme changes in temperature, such as direct sunlight and drafts. Do not expose the unit to any corrosive, alkaline, or water vapors. Allow sufficient clearance behind the instrument for power connections and ventilation.

5.2 Automated Control by Chromeleon

5.2.1 General

The Chromeleon Chromatography Management System controls the UCI.

We generally recommend connecting the UCI to the Chromeleon server PC via USB (Universal Serial Bus). Almost all PCs provide at least one USB port. However, if this is not possible, use a network connection (LAN) for communication between the UCI-100 and the Chromeleon server. For example, Windows NT 4.0 does not support USB. If you are using a LAN connection, please observe the recommendations for network operation (→ page 25).

For information about how to install the UCI via USB and LAN, refer to USB Installation (→ page 14) and LAN Installation (→ page 15), respectively.

5.2.2 Hardware Installation

Connect the UCI to the mains using the power cord shipped with the instrument. Please observe the information about the facility requirements (→ page 13).

The two signal cables provided in the accessories kit can be used to send one analog and one digital signal each to the UCI. In addition, each of the eight relay contacts can be connected to an external device. Insert the 6-pin signal cable connector into one of the ports on the instrument' rear panel.

Observe the wire labels when connecting the individual wires to the desired components. Connect the ground wire to the corresponding detector connector in order to avoid errors in measuring. Additional signal cables (5 = part no. 8911.0001, 10 m = part no. 8911.005) are available from Dionex on request. Using a 10 m cable may slightly affect the signal quality as a result of the cable length. Use the cable labeling set provided in the accessories kit to label the connected signal cables as required.

Use common 9-pin interface cables to connect additional devices (e.g., a pump) to the RS-232 ports.

Please note: If the device to be connected is data terminal equipment (DTE), e.g., a Dionex P580 pump, a null-modem cable is required.

When using the "Digital Input" and "BCD Input" connections, refer to the respective tables for information about the required pin assignments (→ pages 7 and 8).

5.2.3 USB Installation

Please note: **Install Chromeleon software before connecting the UCI to the USB port on the Chromeleon server PC.**

Use the USB cable from the UCI accessories kit (→ page 41) to connect the UCI to the USB port on the Chromeleon server PC.

Please note: The USB connection to the PC or the USB hub must not exceed 5 m. A special USB extension cable (Dionex part no. 8911.0004) is available if a longer connection is required. Up to five extension cables may be connected in series. For system reasons, the overall connection length must not exceed 30 m.

USB Installation from Chromeleon 6.40 on

From Chromeleon 6.40 on, USB installation of the UCI-100 is completely performed by the Chromeleon setup (instead of the UCI100.sys driver the CmWdmUsb.sys kernel mode driver is used). The user is not required to take any further action.

From Chromeleon 6.40 SP3 on, USB installation of the UCI-100 is completely performed by the Chromeleon setup. The user is not required to take any further action.

Please note: It is not possible to install the UCI-50 under Chromeleon ≤ 6.40 SP3.

USB Installation with Chromeleon 6.11, 6.20, and 6.30 (including all Service Packs)

If Chromeleon version 6.11, 6.20, or 6.30 is installed, the USB installation of the UCI-100 is via the Windows Hardware Wizard. The installation procedure described below refers to Windows 98. Installation of the instrument under Windows 2000 may be slightly different.

Connect the device to the mains and establish the USB connection between your PC and the UCI-100. As soon as the USB cable is plugged in, an on-screen message appears saying that the driver information has been loaded. Afterward, the "Hardware Wizard" guides you through the installation process. Click **Next** to have the wizard start searching for new drivers for the UCI-100. On the next page, click the recommended procedure: **Search for the best driver for your device**. Clicking **Next** takes you to the next page.

Fig. 8: Hardware wizard

If Chromeleon is already installed on your PC, the **UCI100.SYS** driver will be located in the \Chromel\bin directory by default (from version 6.10 on). If Chromeleon is not yet installed on your PC, you can obtain the **UCI100.SYS** driver from the Chromeleon CD in the **Drivers** folder. Click **Browse…** and then navigate to the desired directory. Clicking **Next** takes you to the next page. The previously selected driver position is displayed once again. Click **Next** to continue the installation.

Please note: If an error message appears saying that the **UCI100.SYS** file was not found, click **OK** to repeat the copy run. The driver will be installed correctly, nevertheless.

When the installation procedure is complete, the last wizard page informs you that Windows has finished installing the required software. Click **Finish** to exit the wizard. The USB LED on the instrument's front panel lights as soon as the installation is finished correctly.

Please note: If it is ever necessary to re-establish the USB connection to the UCI-100, you will not have to repeat the above installation procedure. Your computer will already "know" the UCI-100 and the corresponding driver.

5.2.4 LAN Installation

Please note: Install the LAN connection under Windows NT 4.0 only. For any other operating systems, we recommend installing a USB connection.

Use the LAN cable from the UCI accessories kit (→ page 41) to connect the UCI to the LAN port on the Chromeleon server PC.

To ensure robust communication between the UCI and the Chromeleon server with a LAN connection we recommend using a LAN connection that is independent of the office LAN, i.e., an instrument LAN, between the UCI and the Chromeleon server PC. This type of connection requires that you install a **second** 10Mbit network interface card in Chromeleon server PC and

assign unique IP addresses to all connected devices. For information about how the **second** network interface card is installed in the Chromeleon server PC, refer to page 17.

If your PC already contains a separate network interface card for operating Summit HPLC devices, the UCI can be connected to this card. For information about how the UCI is connected using an instrument LAN under Windows NT4, see below.

⚠ **Important:** Dionex cannot guarantee reliable communication when operating the UCI on an office LAN because the load of the office LAN is a decisive factor. Overload of the office LAN may result in timeouts and loss of data, and thus disturb automatic operation of the data system. Therefore, we advise against operating the UCI on an office LAN.

Connecting the UCI Interface via an instrument LAN under Windows NT4

If the Chromeleon server PC is running Windows NT4, the UCI must be connected to the server PC via a LAN. NT 4 does not support USB.

If you wish to connect no other instrument but a single UCI, you can connect the server PC and the interface via a **crossover** cable, a special network cable with crossed-over data lines. These lines are usually marked by colors (red, yellow) to distinguish the cable from standard network cables.

Thus, the structure of the instrument LAN is as follows (peer-to-peer connection):

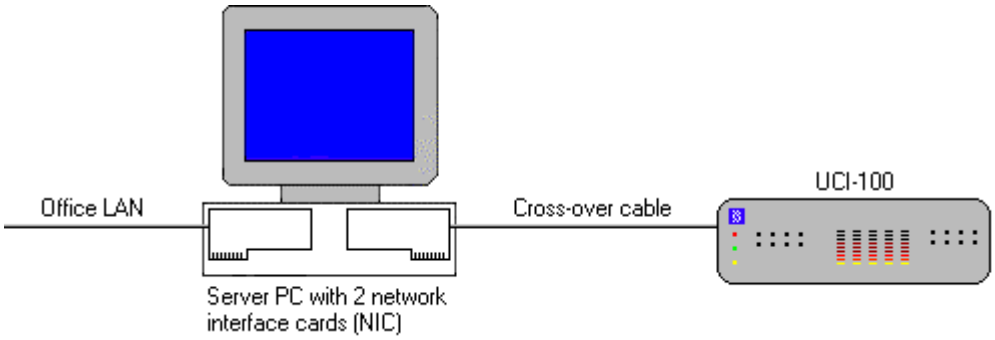

Fig. 9: Peer-to-peer connection

If you wish to connect several TCP/IP-enabled Summit HPLC devices to the server PC, you must use a hub (10 Mbit) to establish the connection to the instrument LAN. In this case, use standard network cables instead of the crossover cable. (One standard network cable, part no. 8906.2038, is provided in the accessories kit.)

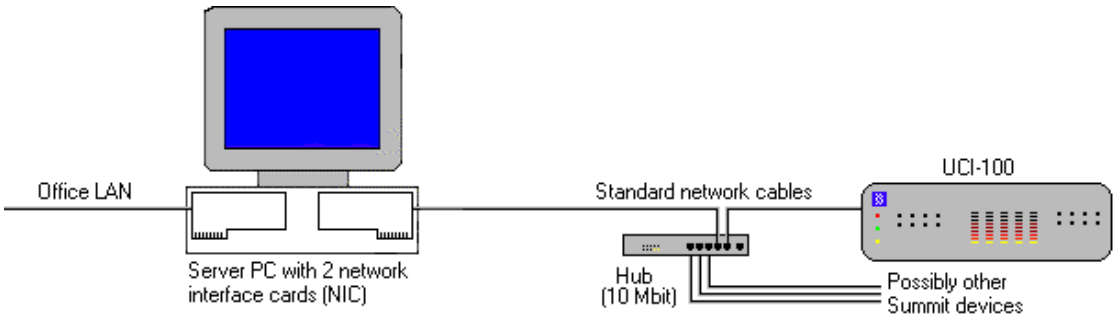

Fig. 10: Hub connection

Separate Network Interface Card (NIC)

A network connection that is independent of the office LAN is called an instrument LAN. This kind of connection between the UCI and Chromeleon server requires the installation of a separate network interface card (NIC, in the operating system = adapter) in the server PC.

Install the card, according to the manufacturer's instructions, via **Start → Settings → Control Panel → Network → Adapters → Add.**

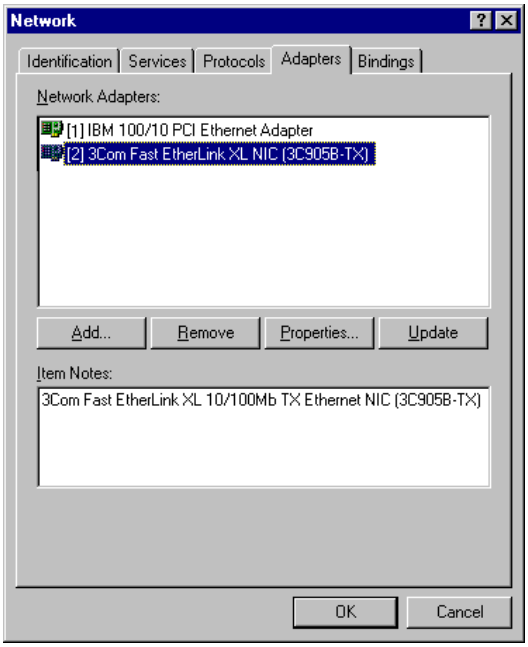

Fig. 11: Installing the separate network interface card

Configure the network adapter for the instrument LAN (here: [2] 3Com Fast EtherLink XL NIC (3C905B-TX)) on the **Bindings** tab page. First, select **all protocols** in the **Show Bindings for** field to verify that the TCP/IP protocol is installed. Install the TCP/IP protocol, if necessary:

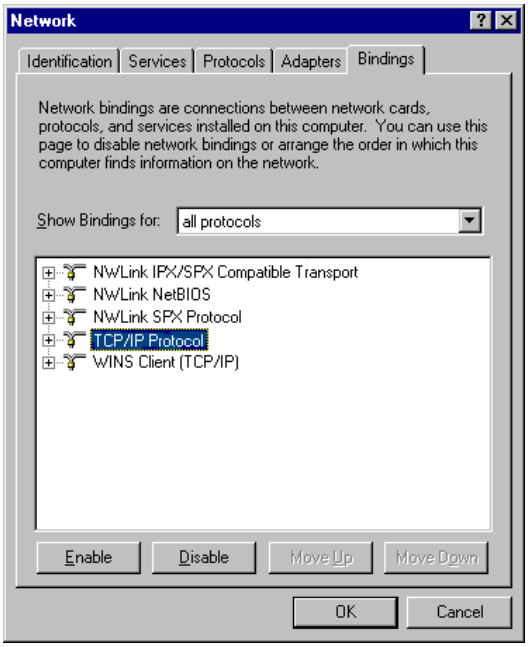

Fig. 12: Show bindings for all protocols

Then, select **all adapters** in the **Show Bindings for** field and disable all protocols for the adapter for the instrument LAN except the TCP/IP protocol:

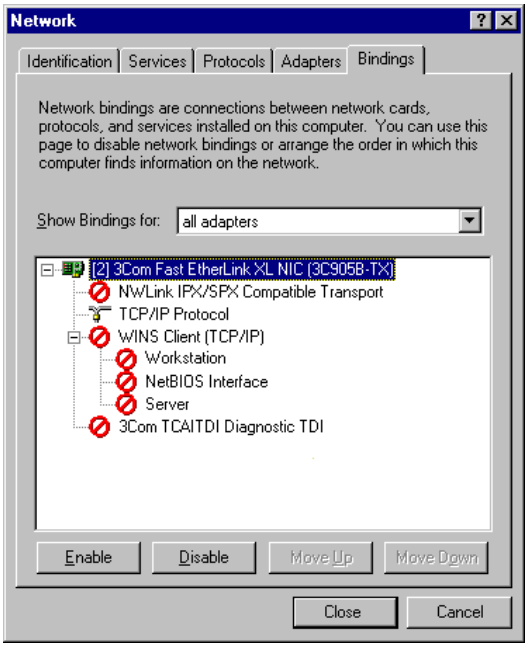

Fig. 13: Show bindings for all adapters

An IP address and a subnet mask are required for the separate network adapter because the TCP/IP protocol is used for the instrument LAN. The dialog box for entering the IP address and the subnet mask is opened automatically during installation.

Please note: You can reopen this dialog box later, if you need to change the IP address and the subnet mask. Select the properties of the TCP/IP protocol via **Start → Settings → Control Panel → Network → Protocols**. Then, select the TCP/IP protocol and open the **Properties of Microsoft TCP/IP** dialog box, using the **Properties** command on the context menu.

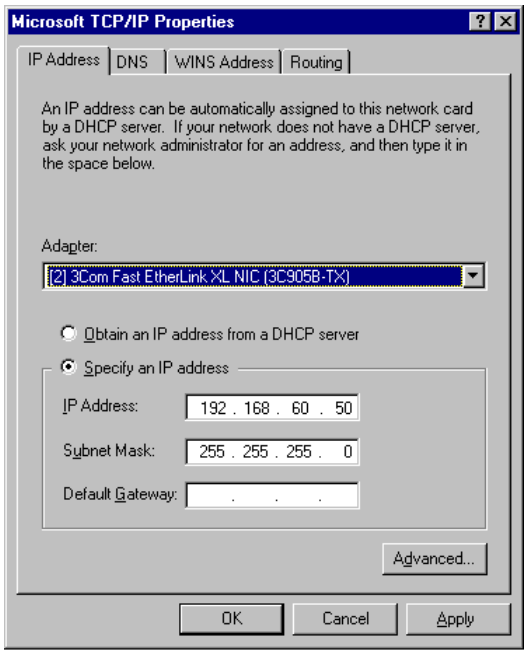

Fig. 14: Assigning the IP address and subnet mask

In the **Adapter** field, select the network adapter for the instrument LAN and enable the **Specify an IP address** option.

⚠ **Important:** Do not change the settings for the office LAN network interface card!

⚠ **Important:** For the adapter for the instrument LAN, disable all other network protocols and services (see above).

Assign a fixed IP address to the adapter for the instrument LAN.

First, identify which IP range is already used. To do so, open a DOS command box via Start → Programs → Command Prompt and enter: **ipconfig /all**. Differentiate between the two following cases:

Case A: Already used IP address ≠ 192.168.60.xxx
Case B: Already used IP address = 192.168.60.xxx

Note: The subnet mask determines which part of the IP address describes the network and which part defines the individual devices connected to the network. Independent LANs have different network addresses. Based on the subnet mask 255.255.255.0 in the above example, the term "192.168.60" describes the network, while "xxx" defines the individual modules connected to the network

Case A:

Select the address from the range given below and enter the subnet mask specified below:

IP Address: 192.168.60.xxx (xxx can be any number between 1 and 254)
Subnet Mask: 255.255.255.0

Do not enter a gateway address; no gateway is available for the instrument LAN and the above addresses cannot be routed. Communication between the UCI and the Chromeleon server is always direct.

Case B:

If the range 192.168.60.xxx is already used, use a different network range for the instrument LAN, e.g., use 192.168.61.

⚠ **Important:** In this case, make sure that the addresses assigned to the individual Summit HPLC modules also start with 192.168.61.

For information about the appropriate value for your individual configuration, contact your system administrator.

Do not enter a gateway address; no gateway is available for the instrument LAN and the above addresses cannot be routed. Communication between the UCI and the Chromeleon server is always direct.

Applies to both, case A and case B

It may happen that the UCI that you want to control via the separate 10Mbit network adapter may already have an IP address and subnet mask assigned. In this case, when selecting the IP address of the network adapter of the server PC, be sure that only the last digit differs from the IP address of the UCI. Otherwise, it may not be possible to address the connected Summit HPLC devices.

Example for a valid configuration for case A:

UCI:	IP address	192.168.60.**51**
	Subnet mask	255.255.255.0
Server:	IP address	192.168.60.**50**
	Subnet mask	255.255.255.0

Example for a valid configuration for case B:

UCI:	IP address	192.168.61.**51**
	Subnet mask	255.255.255.0
Server:	IP address	192.168.61.**50**
	Subnet mask	255.255.255.0

⚠ **Important:** Every device on the same network must have a unique IP address. Selecting duplicate IP addresses may cause conflicts on the network.

⚠ **Important:** Do not use 0 or 255 as the last numbers in IP addresses.

To check the selected settings, enter the following commands at the DOS level:

```
ipconfig /all
```

What it does: Lists the configuration of all network adapters. The newly installed 10Mbit network adapter has been configured successfully it this command also returns its IP address and subnet mask.

```
route print
```

What it does: Checks whether you can address the UCI with the network adapter used for the instrument LAN. The new network adapter is correctly configured if the indicated network (here, for example, 192.168.60.0) is given under **Target** and its subnet mask is given under **Net mask**.

```
ping 192.168.60.51
```

What it does: Checks the connection to the UCI with the IP address 192.168.60.51. If the installation is correct, the UCI will reply to the ping command.

5.2.4.1 Assigning IP Properties to the UCI (CmIPUtil)

In order to operate the UCI on an instrument LAN, an IP address, and subnet mask must be assigned, using the **CM IP Utility**.

It is only possible to program and change parameters when data are not being transferred between the UCI and the Chromeleon server. To stop the Chromeleon server, select **Start → Programs → Chromeleon → Server Monitor**. In addition, the PC on which the CmIPUtil utility is running must be connected to the same subnet as the UCI you are assigning IP properties.

You can use the CM IP Utility to program UCI modules with firmware version 2.0 or higher (LAN support). Make sure that the TCP/IP protocol is available on your computer.

Please note: To take advantage of the network capabilities of the UCI if you are using a module with a firmware version < 2.0, first download the latest firmware via USB to the module (→ Firmware Download, page 26), then configure the module as described below.

- If necessary, copy the **CmIPUtil** program from the supplied CD to a separate directory on your computer.
- Double-click the copied Setup.exe file to start installation. Follow the installation instructions as they appear on the screen.
- Open the program via **Start → Programs → Chromeleon → IP Utility → CmIPUtil**.

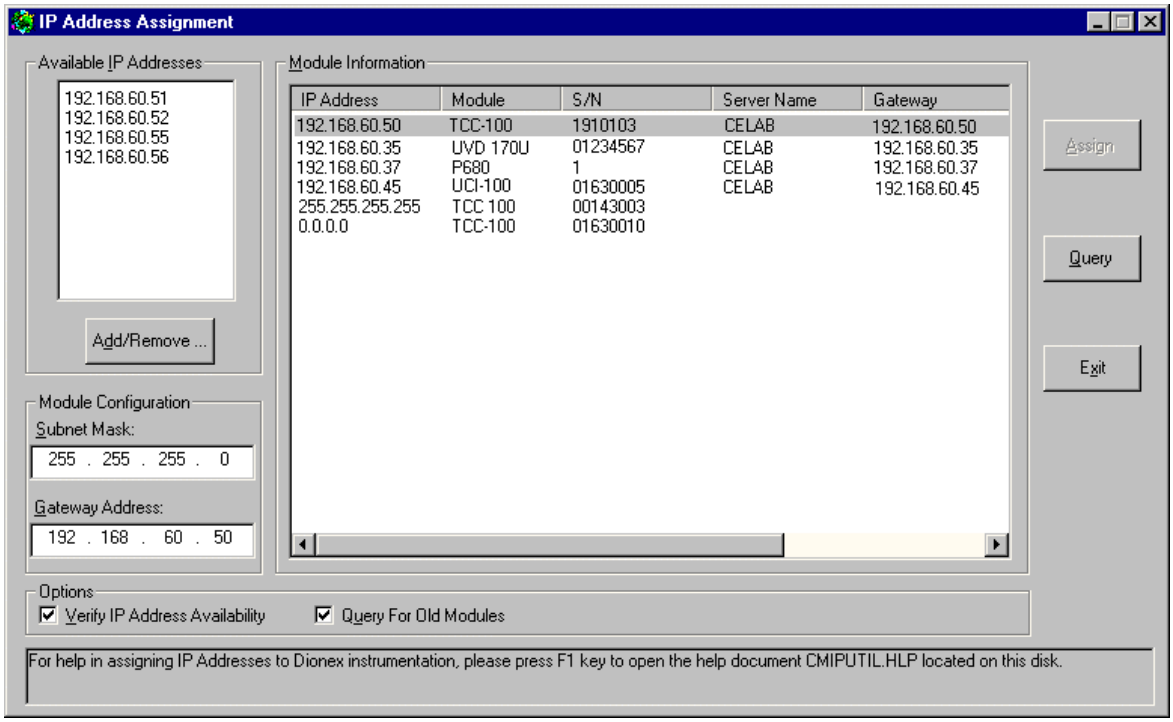

Fig. 15: Assigning IP properties (CmIPUtil)

The **Module Information** window of the **IP Address Assignment** dialog box lists all modules that are active on the network, together with their IP address, serial number (S/N), server name (the name or IP address of that server is given with which data are currently exchanged), gateway address, subnet mask, and Ethernet address. The IP address for modules that have not yet been configured is 0.0.0.0 or 255.255.255.255 (→ Fig. 15).

- Enter the IP address and the subnet mask for the modules to be configured. The values depend on the settings for the adapter for the instrument LAN (→ page 20).
- Select the module to be configured by its serial number.
- In the **Available IP Addresses** window, select the IP address to be assigned to the UCI. If it is not listed, click **Add/Remove** to enter the desired address.
- Enter the required subnet mask. Select the same subnet mask as used for the Chromeleon server PC.

  When selecting the IP address of the network adapter of the server PC, be sure that only the last digit differs from the IP address of the UCI. Otherwise, it may not be possible to address the connected Summit HPLC devices.

  Example for a valid configuration:

UCI:	IP address	192.168.60.**51**
	Subnet mask	255.255.255.0
Server:	IP address	192.168.60.**50**
	Subnet mask	255.255.255.0

  ⚠ **Important:** Every device on the same network must have a unique IP address. Selecting duplicate IP addresses may cause conflicts on the network.

  ⚠ **Important:** Do not use 0 or 255 as the last numbers in IP addresses.

  To configure several TCP/IP-enabled Summit HPLC devices, make sure that every device has its own IP address. In this example, the following entries would be possible:

2. TCP/IP-enabled device:	IP address	192.168.60.**52**
	Subnet mask	255.255.255.0
3. TCP/IP-enabled device:	IP address	192.168.60.**53**
	Subnet mask	255.255.255.0

- The **Gateway Address** field must not be empty, although no gateway is available for the instrument LAN. Therefore, enter the IP address of the device to be configured in this field to prevent a gateway from being used.
- After making necessary entries, assign them to the module by clicking **Assign**. After about 1 second, the instrument's new parameters will be displayed in the Module Information window.

- Click the **Query** button to check the settings.
- Click **Exit** to close the program.

⚠ **Important:** Verify that a unique IP address has been assigned to all Summit HPLC devices that are connected to the Chromeleon server PC.

For more information, please refer to the *CmIPUtil online Help*.

5.2.4.2 Network Operation

5.2.4.2.1 Network Traffic

The TCP/IP protocol, which is known from the Internet, is used for the LAN communication between the UCI and Chromeleon. The network traffic, which depends on the amount of raw data to be transported, (number of active analog channels) is as follows:

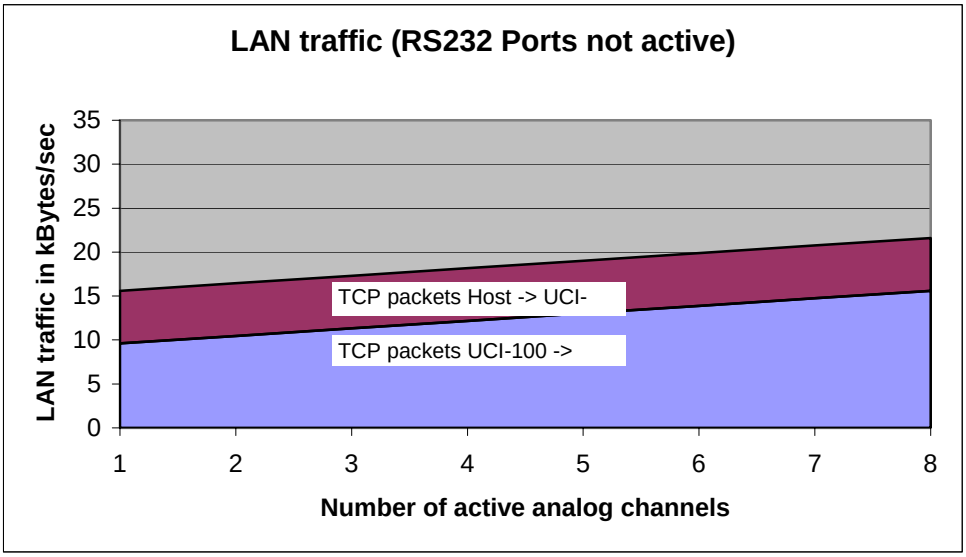

Fig. 16: LAN traffic without active RS-232 ports

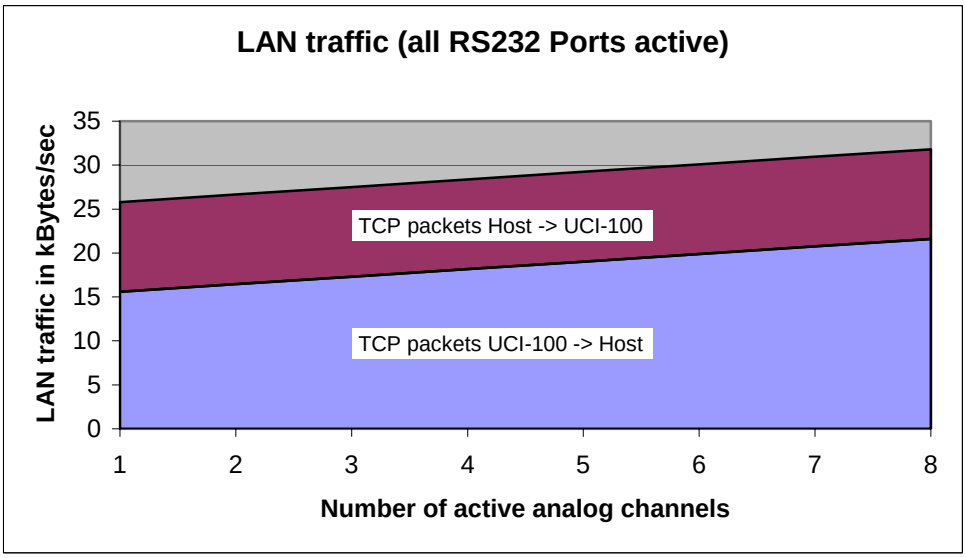

Fig. 17: LAN traffic with all RS-232 ports active

5.2.4.2.2 Buffer Time

Operating the UCI via an LAN connection in case of high network traffic may lead to transmission failures. Thus, the raw data are temporarily stored in the UCI module. However, the available memory capacity depends on the amount of raw data to be transported (→ Fig. 3) and thus, is limited.

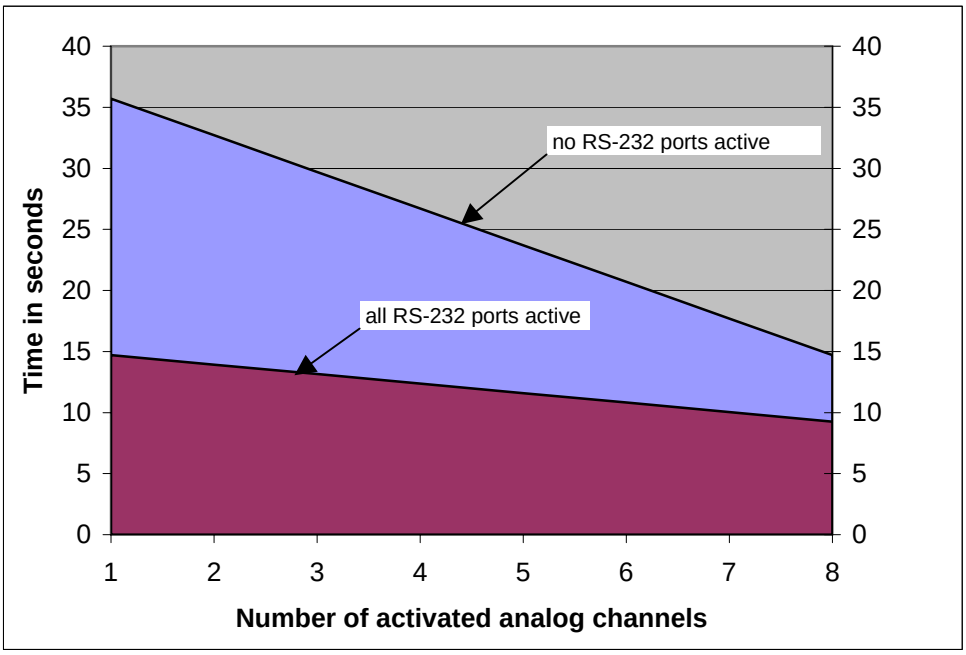

Fig. 18: Max. buffer time in case of network overload

Please note: If the network failure exceeds the buffer time described above, analog data may be lost.

If you notice these effects, we recommend establishing a USB connection between the UCI and the Chromeleon server. As the USB bus is capable of performing real-time operations, overloading effects will not occur. If a USB connection cannot be established, take appropriate measures to avoid interruptions of the network communication between the Chromeleon server and the UCI (→ Recommendations for Network Operation, page 25).

5.2.4.2.3 Recommendations for Network Operation

Unlike USB connections, Ethernet LAN connections have limited real-time capabilities. Data transmission can occur only when no other connected user is using the network. In order to take full advantage of the real-time capabilities of the UCI, select the instrument LAN connection (→ page 16). This ensures that other network users do not delay the server communication.

If the UCI module is connected to Chromeleon via a LAN, it is not advisable to use the digital inputs for remote inject synchronization. This is because the timing of LAN communication varies, depending on the current LAN traffic.

If the UCI module is connected to Chromeleon via USB, all remote inputs are polled after 0.1 seconds and they can be used without restrictions.

Please note: Dionex cannot guarantee reliable communication when operating the detector on an office LAN because the load of the office LAN will be a decisive factor. Overload of the office LAN may result in timeouts and loss of data, and thus disturb automatic operation of the data system. We therefore advise against operating the detector on an office LAN.

5.2.5 Installing the UCI in Chromeleon

Follow the steps below to install the UCI in the Server Configuration program:

1. Start the Server Monitor program by selecting **Server Monitor** on the **Start → Programs → Chromeleon** menu on the task bar. **Start** the server and **close** the Server Monitor window. The Server Monitor icon appears on the task bar.

   Please note: Clicking the **Quit Monitor** button quits (exits) the Server Monitor program, but it does not stop the server. To stop the server, click the **Stop** button.

2. Start the Server Configuration program by selecting **Server Configuration** on the **Start → Programs → Chromeleon** menu on the taskbar.

3. If necessary, click the + character beside the server name to show the items under the server.

4. Select **Sharable Devices** in the left window section, and then select **Add Sharable Devices** on the **Edit** or context menu.

5. Select **Dionex UCI-100 Interface** (or **Dionex UCI-50 Interface**) from the list and click **OK**. The UCI will be installed and displayed under **Sharable Devices** in the left window section.

The tabbed pages show the current configuration of the instrument

General Tab Page

Use the **General** tab page to define the general instrument parameters:

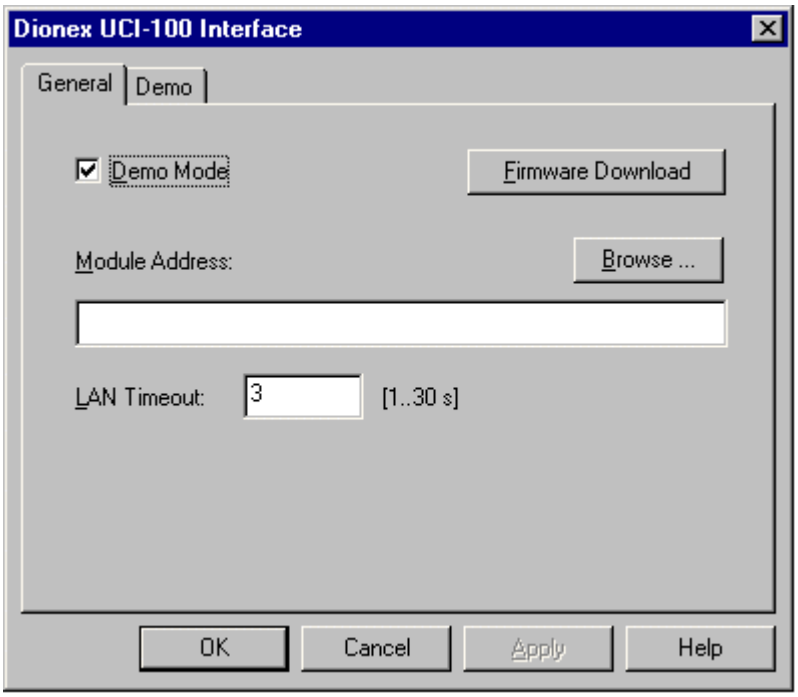

Fig. 19: General tab page

- The **Demo Mode** check box is selected by default. Accept this setting to read out and display a demo chromatogram instead of real data. Use the **Demo** tab page (→ page 28) to specify the demo chromatogram.
- You can download the current firmware version of the UCI driver from Chromeleon to the instrument as required. To do so, click the **Firmware Download** button. However, note the indicated firmware version! If the firmware version installed on the UCI is higher than the version available with Chromeleon, a "downgrade" will be performed.

  Please note: If the version number of the currently installed firmware is < 2.0, the download is possible via USB only. To use the LAN capabilities of the UCI after the download, configure the unit for network operation in the Cm IP Utility (→ page 21).

  Important: Before loading down the firmware, disconnect the Chromeleon server from any instruments that are controlled via the RS-232 ports of the UCI. This connection must be interrupted during the firmware download. Terminating the connection by starting the download may result in various error messages (→ Troubleshooting, page 35) in the Audit Trail.

- Click **Browse** to select the **Module Address** of the desired UCI. The Device List is opened providing information about all available UCI modules.

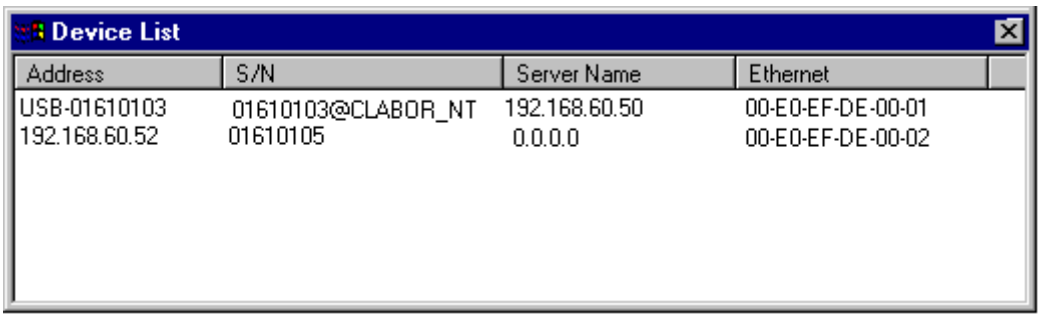

Fig. 20: Device list

In the **Address** column,

- All UCI modules that are available via Ethernet (TCP/IP) are listed with their IP address.
- All UCI modules that are available via USB are listed with the prefix "USB" and their Ethernet address or serial number (from Chromeleon 6.40 on).

If a listed UCI module is already connected to a Chromeleon server, the server name appears in the **Server Name** column. If a module is available for connection, the column shows 0.0.0.0 or is empty (see the image above.) The **S/N** column lists the module's serial numbers. The **Ethernet** column shows the module's Ethernet address.

Select the desired UCI and click Enter to confirm your selection (or double-click the module). Click **OK** to establish the connection to the module. This process may take some seconds. As soon as the connection has been established successfully, the corresponding "connect" message including the firmware version is displayed in the audit trail.

Please note: While the UCI can be connected to **one** chromatography server only, its interfaces and signals (→ Unit Description, page 3) can be shared among several timebases ("sharable device").

- From Chromeleon 6.40 on, you can specify a LAN Timeout (1...30 sec.) on the **General** tab. For LAN connections with high network traffic, the LAN Timeout setting allows prolonging the timeout for the communication of the Chromeleon server with instruments via the RS-232 port of the UCI-100.

Demo Tab Page

Use the **Demo** tab page to define the demo chromatogram

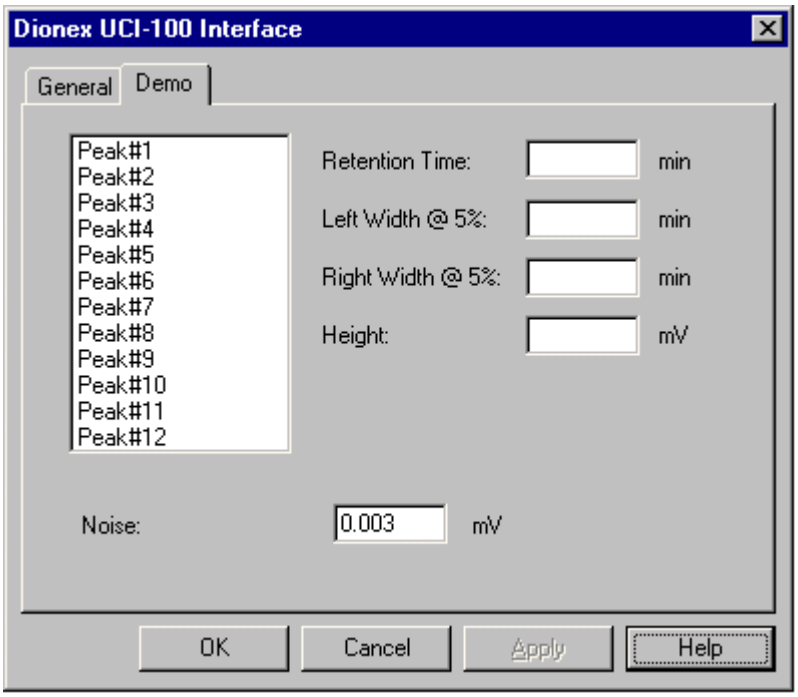

Fig. 21: Demo tab page

If the **Demo Mode** check box is selected on the **General** tab page, data acquisition is simulated, i.e., a demo chromatogram is read out and displayed instead of real data.

Contrary to the usual procedure, no previously recorded signal courses are used in the demo mode. Instead, the UCI driver includes a "Software Peak Generator." Use the **Demo** tab page to determine the signal courses of the generated chromatograms.

If you want to use the demo chromatogram, you are not required to make any input on this tab page. Otherwise, select the 12 peaks in succession and make the following settings:

Retention Time: Enter the desired retention time in minutes.

Left Width@5%: **E**nter the left peak width at 5% of the peak height.

Right Width@5%: Enter the right peak width at 5% of the peak height.

Height: Enter the peak height.

The demo chromatogram can include up to twelve peaks. Set the peak height to 0 to exclude the respective peak from the chromatogram. Use the Left and Right Peak Width settings to create overlapping peaks.

In the **Noise** field, determine the signal noise for the demo chromatogram.

For more information, refer to the *Chromeleon online Help*.

5.2.6 Adding more than one UCI to the Server Configuration

If you already have a UCI installed and wish to add another instance to your server configuration (→ section 5.2.5, page 25), a message appears indicating that a driver of this type has already been installed:

Fig. 22: Message that a UCI driver is already loaded

Confirm to load another instance by clicking **Yes**. Continue installation as described in section 5.2.5, page 25.

When the installation is complete, the newly installed UCI is displayed in the Server Configuration program together with the corresponding instance number.

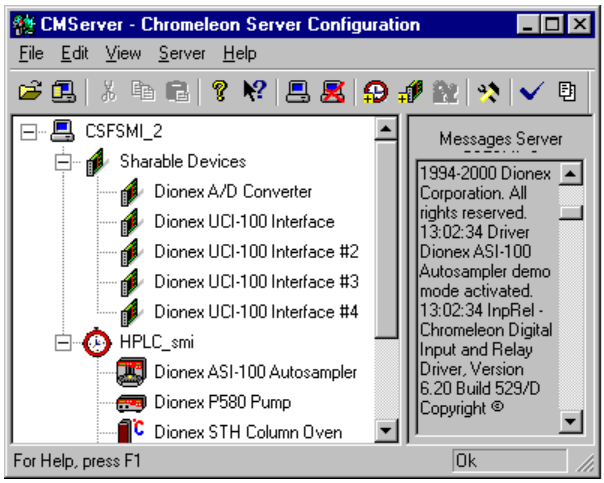

Fig. 23: Server configuration with several UCIs

One Chromeleon server can control up to four UCI modules.

For more information, refer to the *Chromeleon online Help*.

5.2.7 Analog Inputs

To use the analog inputs of the UCI under Chromeleon, the **Integrator Driver** or the respective device driver for a third-party analog detector must be available for the corresponding timebase. To install the **Integrator Driver** proceed as follows (installing other third-party device drivers is similar):

- Select the desired timebase in the Server Configuration program. Select **Add Device...** on the context menu.

- For Chromeleon ≥ 6.50: In the Add device to timebase dialog box, select **General** from the left list box, and then select **Integrator Driver** from the right list box. Confirm your selecting by clicking **OK**.
  For Chromeleon < 6.50: Select **Integrator Driver** from the driver list and confirm your selection by clicking **OK**.

- The **Integrator Driver** dialog box is opened. On the **Signals** tab page, specify the signals to be used. Select the corresponding check box to enable the respective channel (☑).

- To configure the signals to be used, select the corresponding signal and click **Change**.

  The **Signal Configuration** dialog is opened providing the following options:

Option	Description
Signal Name:	Enter a signal name for future identification of the signal. Avoid changing names you have previously assigned, as conflicts could result when using older PGM Files or panels. Any raw data recorded for this signal are directly linked to the signal name.
ADC Port:	Select the channel that to be used for signal recording via the UCI. Make sure that the selected channel corresponds to the actual pin assignment. Please note that identical ADC ports for several UCIs in the Server Configuration distinguish by the appended number only.
Unit:	Enter the signal unit (e.g., mV or mAU).
Factor:	Conversion factor between mV and the signal unit of the connected detector. If the signal value at the detector output is, e.g., 1000 mV, and if the signal shall be represented in mAU instead of mV, enter mAU as the unit and 1 as the factor.
Offset [mV]:	Each A/D-channel can receive a signal offset. The value is added to the actual signal. This can be used to balance pressure or temperature readings. If a thermometer supplies a voltage of 1V at 0°C, this can be compensated by entering an offset value of -1000 mV.

- Click **OK** to accept the changes and to exit the **Signal Configuration** dialog box. The **Integrator Driver** is now installed; the selected signals are available in Chromeleon.

For more information, refer to the *Chromeleon online Help*.

5.2.8 Digital Inputs, BCD Inputs, and Relay Outputs

The available relays and remote inputs are **Shared Devices**, i.e., they can be used independently from timebases. To use them, the **Shared Relays and Inputs** driver is required. Follow the steps below to install the relays and digital inputs:

- Select the desired timebase in the **Server Configuration** program, then and click **Add Device...** on the context menu.
- For Chromeleon ≥ 6.50: In the Add device to timebase dialog box, select **General** from the left list box, and then select **Shared Relays and Inputs** from the right list box. Confirm your selecting by clicking **OK**.
  For Chromeleon < 6.50: Select **Shared Relays and Inputs** from the driver list and confirm your selection by clicking **OK**.
- On the **Relays / TLL Outputs** tab page, click **Add**, and then assign the desired ports to the relays and TTL outputs. In the **Port Assignment** dialog box, enter a unique name for future identification of the signal in the **Name** input field. Select the desired UCI port (UCI100_Relay1 to UCI100_Relay8) from the **Ports** drop-down list. The relay numbers on the list correspond to the channel numbers (Ch. 1 to Ch. 8) on the instrument's rear panel. Click **OK** to confirm the assignment.
- On the **TTL Inputs** tab page, click **Add**, and then assign the desired ports to the TTL inputs. In the **Port Assignment** dialog box, enter a unique name for future identification of the TTL input in the **Name** field. Select the desired port (UCI100_Input1 to UCI100_Input8, UCI100_BCD-1A, UCI100_BCD-1B, etc.) from the **Port** drop-down list. The input numbers on the list correspond to the ports according to the tables on pages 7 and 8. Click **OK** to confirm the assignment. The **Shared Relays and Inputs** driver is now installed; the selected signals are available in Chromeleon.

  Please note: Please note that identical **Relays** and **TTL Inputs** for several UCI modules in the server configuration only distinguish by number appended to the UCI module.

  Please note: For controlled chromatographic systems, the autosampler communicates the time of injection to Chromeleon via an RS-232 cable. This is not possible for non-controlled injection units. In this case, the **Remote Inject** driver is required to communicate the time of injection from the autosampler or a manual injection unit to Chromeleon and thus, to synchronize the start of data acquisition with the injection.

If necessary, install the **Remote Inject** driver in the **Server Configuration** program and connect the **Digital Inp**. and **Digital GND** cables to the injection unit as appropriate.

- Select the desired timebase in the **Server Configuration** program, then and click **Add Device...** on the context menu.
- For Chromeleon ≥ 6.50: In the Add device to timebase dialog box, select **General** from the left list box, and then select **Remote Inject** from the right list box. Confirm your selecting by clicking **OK**.
  For Chromeleon < 6.50: Select **Remote Inject** from the driver list and confirm your selection by clicking **OK**.

- On the **General** tab page, assign a name to the remote inject unit and select the Inject Port (= the desired UCI port). Use the **BCD Position Inputs** tab page to configure BCD-capable autosamplers. Autosamplers supporting this functionality can communicate the position from which the injection was performed to the data system. To enable this communication, connect the autosampler's outputs to the BCD inputs of the UCI. For more information, refer to the *Chromeleon online Help*.

5.2.9 RS-232 Ports

To control a device via an RS-232 port, make sure that the corresponding serial communication port is assigned in the device's configuration:

- In the Server Configuration program, right-click the desired device, and then select **Properties...** on the context menu.
- On the **General** tab page, select the corresponding port from **Port** drop-down list. The port numbers on the list correspond to the port numbering on the instrument's rear panel.

Please note: We generally recommend using the USB connection to control devices via the RS-232 ports (→ Buffer Time, page 24).

Please note: Please note that identical **Ports** for several UCIs in the server configuration only distinguish by number appended to the UCI module.

5.2.10 Commands and Properties under Chromeleon

Upon completion of the installation procedure, the installed components are available in Chromeleon under the names that you have previously assigned. To display their commands and properties, select **Command...** on the **Control** menu of a control panel.

The following commands and properties are available for the analog inputs:

Command/Property	Description
Delta	The signal's slope, useful for triggers (difference between the current value and the value one second ago).
Retention	The signal's retention time (range 0.00 to 10000000.00 min).
Signal	The current signal value (range -10000.00 to 10000.00 mV). Click the '+' character beside Signal to display the items underneath: **Value** (current value), **UpperLimit** and **LowerLimit**. The system aborts the sample batch and starts emergency handling if the value is exceeds the upper and lower limits.
AcqOff	Stops data acquisition.
AcqOn	Starts data acquisition.
MaxAutoStep	Maximum step rate for Auto Step mode (default: 5.1 seconds).
Step	Rate at which data points are recorded (range 0.01 to 5.20 sec.) AUTO sets the best step rate dynamically (recommended).
Average	Available options: **On** and **Off**. Select **On** to integrate the sampled values over the step interval (recommended); select **Off** to record only the last measured value of every step.

The following commands/properties are available for the relays:

Command/Property	Description
State	Indicates (or sets) the relay's state. Available options: **On** and **Off**.
Duration	If set, the relay will toggle after the specified time (range: 0.00 to 59999.90 sec.).
On	Turns the relay on.
Off	Turns the relay off.

The following commands/properties are available for the TTL inputs:

Command/Property	Description
State	Indicates the input's state (**On** or **Off**).

For more information, refer to *Chromeleon online Help*.

6 Troubleshooting

⚠ **Important:** If the server configuration is changed in any way, messages referring to the previous configuration may continue to appear for up to 30 seconds after the change. These messages can be ignored. Thus, always note the device name (UCI-100 @... or UCI-50@…) referenced in the message.

Please note: Before loading down the firmware, disconnect the Chromeleon server from any instruments that are controlled via the RS-232 ports of the UCI. The connection must be interrupted during the firmware download. Terminating the connection during the download may result in various error messages in the Audit Trail.

Please note: Error messages will vary slightly, depending on the connection type (USB or LAN) specified for the UCI in the Server Configuration program. Thus, the error messages below may also read **UCI-100 @ USB-00-E0-EF-DE-XX-XX** (for XX-XX see the instrument's rear panel), **UCI-100 @** + **IP address** (e.g., UCI-100 @ 192.168.50.1), or **UCI-100@ + serial number** (e.g., UCI-100@USB-01610103) instead of just UCI-100. This applies in the same way to the UCI-50.

The following table contains a summary of the most commonly observed error messages, lists probable causes, and suggests appropriate remedial actions.

Problem	Probable Cause	Remedial Action
No response from UCI for 5 seconds. The network may be broken or overloaded.	The network load is too high.	Reduce the network load. The network connection between the Chromeleon server and the UCI might be inappropriate (→ sec. 5.2.4.2.3, page 25) (Contact your network administrator.)
No response from UCI for 30 seconds. Device disconnected.	The connection between the UCI and the Chromeleon server is interrupted.	Check the network connection.
	The network load is too high.	Reduce the network load. The network connection between the Chromeleon server and the UCI might be inappropriate (→ sec. 5.2.4.2.3, page 25) (Contact your network administrator.)
	The power supply to the UCI is interrupted.	Check the connection to the UCI power supply unit.
No response from UCI-100 @ USB-00-E0-EF-DE-XX-XX for 5 seconds. The network may be broken or overloaded.	The type of connection between the Chromeleon server changed from LAN to USB.	The message can be ignored.

Problem	Probable Cause	Remedial Action
Error opening UCI - Connection refused.	Another Chromeleon server already uses the indicated UCI.	Check whether the correct UCI has been selected or terminate the UCI's communication with the other Chromeleon server.
	The existing connection is not yet cleared completely.	Wait for 30 seconds and repeat the procedure.
	The UCI's subnet mask and gateway address are configured incorrectly.	Via CmIPUtil, make sure that the correct the parameters are specified (→ page 21).
	A gateway may maintain an unintended connection to the UCI as soon as the Chromeleon server is stopped in an uncontrolled way (e.g., power-failure, system hung-up).	Restart the UCI.
Error opening UCI - Connection timed out.	The Chromeleon server failed to connect to the indicated UCI.	Check that the UCI is turned on and that the network connection is working. Note the name of the indicated UCI. The error message might refer to a UCI, which is no longer part of the current server configuration. However, the Chromeleon server still tries to connect to this instrument. Check and change the module address as necessary. Then, retry.
	The network connection is interrupted during firmware download.	Check the network connection.
	The power supply to the UCI is interrupted during the firmware download.	Check the mains connection of the UCI.
UCI - Connection reset by peer.	The network load is too high.	Reduce the network load (→ sec. 5.2.4.2.3, page 25).
	The power supply to the UCI is interrupted for a short period.	Check the mains connection of the UCI.
UCI - Host not found. UCI - Permission denied. UCI - Network is unreachable. UCI - No route to host.	Network problems: No connection to the UCI.	Check network settings for UCI and network board. The network connection between the Chromeleon server and the UCI might be inappropriate (→ sec. 5.2.4.2.3, page 25) (Contact your network administrator.)
UCI - Lost XXX data packets.	The network load is overloaded.	Reduce the network load (→ sec. 5.2.4.2.3, page 25).
	The connection between the UCI and the Chromeleon server is interrupted for a longer period.	Check the network connection.
The device couldn't be queried for its firmware version. The new version is x.xx Download anyway?	When the firmware download is started, there is no connection between the Chromeleon server and the UCI specified in the server configuration under Sharable Device/Properties/Module Address. Thus, the current firmware version of the UCI cannot be established.	If you want to download the firmware without checking the current firmware version of the UCI, confirm the message. As soon as the connection to the UCI specified in the server configuration is established, its firmware is replaced by the version indicated in the message. If you want to check the current firmware version before the download, make sure that the connection to the respective UCI is established before the download is started (→ page 26).

Problem	Probable Cause	Remedial Action
UCI. The amplifiers are not working in the specified gain range. The deviation can still be compensated but maintenance is recommended.	The electronics of the specified UCI works near the limits specified for operation.	The user can continue working, however, we recommend contacting the Dionex service.
UCI. The amplifiers are not working in the specified gain range.	The electronics of the specified UCI does not work within the limits specified for operation.	Contact the Dionex service.
UCI - Error erasing flash memory.	The connection between the UCI and the Chromeleon server is interrupted during firmware download. UCI power supply interrupted.	Check the USB and LAN connection respectively. Check the mains connection of the UCI. Restart the instrument and repeat the firmware download. Contact the Dionex service if the message is displayed again.
UCI - Error programming flash memory.	The connection between the UCI and the Chromeleon server is interrupted during firmware download. UCI power supply interrupted.	Check the USB and LAN connection respectively. Check the mains connection of the UCI. Restart the instrument and repeat the firmware download. Contact the Dionex service if the message is displayed again.
UCI - Error finishing download.	The connection between the UCI and the Chromeleon server is interrupted during firmware download. UCI power supply interrupted.	Check the USB and LAN connection respectively. Check the mains connection of the UCI. Restart the instrument and repeat the firmware download. Contact the Dionex service if the message is displayed again.
UCI - Firmware download failed.	The firmware download failed several times. The message appears together with other messages (e.g., UCI - Error erasing flash memory, - Error programming flash memory, - Error finishing download) describing the cause.	Perform the remedial actions for those messages that are given in the Audit Trail before this message.
UCI-100 @ USB-00-E0-EF-DE-XX-XX - Device not found on the USB.	The USB connection between the UCI and the Chromeleon server is interrupted. UCI power supply interrupted.	Check the USB connection. Check the mains connection of the UCI.

Problem	Probable Cause	Remedial Action
Error opening UCI-100 @ USB-00-E0-EF-DE-XX-XX – The System cannot find the file specified	The USB connection between the UCI and the Chromeleon server is interrupted. UCI power supply interrupted.	Check the USB connection. Check the mains connection of the UCI.
Error issuing control request to UCI-100 @ USB-00-E0-EF-DE-XX-XX – The selected configuration does not exist. A firmware download may be necessary	The firmware download is not finished correctly due to termination of the USB connection.	Check the USB connection. Perform/repeat the firmware download. Check the mains connection of the UCI.
Error issuing control request to UCI	The Chromeleon server cannot connect to the specified UCI.	Check the USB and LAN connection respectively. Check the mains connection of the UCI. Remove the UCI specified in the message from the server configuration or else select a different UCI from the list of available UCI modules in the Server Configuration program (via Properties/Browse).
Error reading from UCI-100 @ USB-00-E0-EF-DE-XX-XX Data error (cyclic redundancy check)	There is a transmission error between the UCI and the Chromeleon server.	Check the USB connection. The connection length must not exceed 5 m to the next hub. The overall connection length including the hub connections must not exceed 30 m (→ page 14). If necessary, replace any defective USB cable or hub.
Error reading from UCI-100 @ USB-00-E0-EF-DE-XX-XX	The connection between the UCI and the Chromeleon server interrupted. UCI power supply interrupted.	Check the USB connection. Check the mains connection of the UCI.

7 Technical Specification

Environmental conditions:	Range of use: Indoor use Temperature: 10°C to 35°C (50°F to 95°F) Air humidity: 40 to 85% relative humidity, non-condensing Overvoltage category: II Pollution degree: 2
Analog inputs:	
Number	UCI-100: 8 (differential) UCI-50: 2 (differential)
Max. input voltage	± 10 Volt (bipolar)
Input impedance (analog)	$> 10^7$ Ω (static)
Dynamic resolution	25 Bit
Number of input ranges	8 (with auto-ranging)
Resolution	< ± 1µV
Voltage noise	< 2 µVpp
Offset (absolute)	< ± 10 µV
Voltage drift	≤ 20 ppm/°C (on each range)
Sampling rate (analog)	100 Hz per channel
Linearity (0-5000 mV)	Correlation coefficient > 99.9999%, RSD>0.15%
Digital inputs	
Number	8 (TTL compatible)
Input voltage (digital)	0–5 Volts
Relay outputs	
Number of relay outputs	8
Functionality	Default open
Switching capabilities	100V, 0.5A, 10W max. / potential free
RS-232 ports	
Number of independent ports	4
Baud rate	Up to 9600 baud (all channels) Up to 19200 baud (two channels) Up to 38400 baud (one channel)
Handshake	RTS/CTS hardware and Xon / Xoff software

PC interfaces	
USB	Version 1.1
Ethernet LAN	10BASET (RJ45 connector)
Physical properties	
Weight	1950 g (4.298 lbs)
Dimensions (h x w x d)	285 x 220 x 71 mm

Technical specification subject to alterations without notice. Date: December 2002

8 Accessories

Spare parts and accessories are always maintained at the latest technical standard. Therefore, part numbers are subject to alteration. However, updated parts will always be compatible with the parts they replace.

8.1 Standard Accessories (included in shipment)

The following standard accessories (part no. 5911.9010) are part of the shipment:

Part No.	Description	Qty/Pcs
	Power cable 1310.7031 Power cable, 220V, 2m or 1310.7032 Power cable, 125V, 2m	1
8911.0001	Mini-DIN signal cable, 6-pin, 5m	2
8911.0002	USB cable, 5m, Type A to Type B	1
8906.2038	RJ45 cable for Ethernet connection, 3m	1
1510.0002A	Power unit 12 V DC, 1,25A ("wide range")	1
5911.9011	Cable labeling set 1-8 Dmax 4,7	1
2309.1100	Assortment box for accessories	1
4829.1151 4829.1101	Operating Instructions, English *or* Operating Instructions, German	1

8.2 Optional Accessories

Part no.	Description
8911.0004	USB extension with signal amplifier, 5m
8911.0005	UCI signal cable, 10m

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