

ADwin Installation

Manual for the Installation of *ADwin* Systems

ISA / PCI / PCMCIA

USB

Ethernet

**ADwin
Software Package**
(replaces former ADwin-CD)

Version:

Please note:
Important notes for installation be found in
README.TXT

USB stick missing?
Download the current software kit
from www.ADwin.de

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Typographical Conventions



<C:\ADwin\ ...>

Program text

Var_1

"Warning" stands for information, which indicate damages of hardware or software, test setup or injury to persons caused by incorrect handling.

You find a "note" next to

- information, which absolutely have to be considered in order to guarantee an error free operation.
- advice for efficient operation.

"Information" refers to further information in this documentation or to other sources such as manuals, data sheets, literature, etc.

File names and paths are placed in <angle brackets> and characterized in the font *Courier New*.

Program commands and user inputs are characterized by the font *Courier New*.

Source code elements such as commands, variables, comments and other text are characterized by the font *Courier New* and are printed in color.

Bits in data (here: 16 bit) are referred to as follows:

Bit No.	15	14	13	...	01	00
Bit value	2^{15}	2^{14}	2^{13}	...	$2^1=2$	$2^0=1$
Synonym	MSB	-	-	-	-	LSB

1 Information about this manual

With this manual, you are starting the installation of your *ADwin* system:

- Software installation of drivers for Windows 9x, ME, NT, 2000, XP, Vista, 7, 8, 10, 11.

Depending on the Windows version, some discrepancy to the following descriptions (mostly formal) may occur. Knowledge in handling Windows and driver installation routines are assumed in this manual.

- Hardware installation: Installation (if necessary) and hardware initialization up to the first function test.

Please pay attention to the notes for initialization of the hardware and for the operating environment in your hardware manual.

Please pay attention to the order of installation steps given on the next page.

Install first the interface drivers so that the Windows operating system will be able to communicate with the *ADwin* system.

Take sufficient time for the driver installation and initialization, because this is the fastest solution. If you hurry and for instance do not install the right drivers, much more effort is necessary to correct the driver installation.



Order of installation

Qualified personnel

Please note:

For *ADwin* systems to function correctly, follow strictly the information provided in this documentation and in other mentioned manuals.

Programming, start-up and operation, as well as the modification of program parameters must be performed only by appropriately qualified personnel.

Qualified personnel are persons who, due to their education, experience and training as well as their knowledge of applicable technical standards, guidelines, accident prevention regulations and operating conditions, have been authorized by a quality assurance representative at the site to perform the necessary activities, while recognizing and avoiding any possible dangers.

(Definition of qualified personnel as per VDE 105 and ICE 364).

Availability of the documents



Legal information

This product documentation and all documents referred to, have always to be available and to be strictly observed. For damages caused by disregarding the information in this documentation or in all other additional documentations, no liability is assumed by the company *Jäger Computergesteuerte Messtechnik GmbH*, Lorsch, Germany.

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OEM products are mentioned without referring to possible patent rights, the existence of which may not be excluded.

Subject to change.

Hotline address: see inner side of cover page.



2 Before installation of ADwin software package

An important note:

Please, pay **absolutely** attention to the order of the installation steps.

This refers especially to the initialization of the hardware.

1. Updating from or installing the *ADwin* software package. ⇒ chapter 3
2. Installing the interface drivers (USB, Ethernet),
Initializing the hardware, Functions check. ⇒ one of the chapters 4...10
(see table below)
3. First steps in *ADbasic*. ⇒ manual *ADbasic*
4. Introduction to *ADbasic* programming ⇒ tutorial *ADbasic*

Pay also attention to the notes for initialization in your hardware manual.

For installation step 2 choose the suitable chapter for your *ADwin* system in the table:

ADwin system	chapter
<ul style="list-style-type: none"> – <i>ADwin-light-16</i> (EURO-ENET, EXT-ENET) – <i>ADwin-X-A20</i> – <i>ADwin-Gold</i> <ul style="list-style-type: none"> • <i>ADwin-Gold-ENET</i> • Ethernet-link-adapter – <i>ADwin-Gold II</i> – <i>ADwin-Pro</i> modules <ul style="list-style-type: none"> • <i>Pro-CPU-T11</i>, <i>Pro-CPU-T12</i> • <i>Pro-CPU-T9-ENET</i>, <i>Pro-CPU-T10-ENET</i> • <i>Pro-ENET</i> 	10: ADwin System with Ethernet Interface, page 50
<ul style="list-style-type: none"> – Systems with <i>ADlink</i> PC ISA board – <i>ADwin</i> boards – <i>ADwin-light</i> boards (not <i>ADwin-light-16</i>) 	4: ADwin ISA link interface, page 6
<ul style="list-style-type: none"> – <i>ADlink</i> PCI adapter board 	5: ADlink PCI adapter, page 23
<ul style="list-style-type: none"> – <i>ADpcmcia</i> linkadapter board 	6: ADpcmcia adapter, page 26
<ul style="list-style-type: none"> – <i>ADwin-light-16</i> (PCI, EURO, cPCI, EXT) with USB interface 	7: ADwin-light-16 system with USB interface, page 34
<ul style="list-style-type: none"> – <i>ADwin-Gold</i> <ul style="list-style-type: none"> • <i>ADwin-Gold-USB</i> • USB-link-adapter 	8: ADwin-Gold system with USB interface, page 40
<ul style="list-style-type: none"> – <i>ADwin-Pro</i> modules <ul style="list-style-type: none"> • <i>Pro-CPU-T9-USB</i> • Pro-USB 	9: ADwin-Pro module with USB interface, page 45

3 Installing the ADwin software package

Please, connect your ADwin system with your PC only if told to do so. The same applies for the connection of the inputs and outputs, in order to avoid damages at the ADwin system or at your device.

System requirements:

- Windows operating system:
 - 32 bit version : 9x, ME, NT, 2000, XP, Vista, 7, 8
 - 64 bit version: XP, Vista, 7, 8, 10, 11

The latest Windows update should be installed.

Please read the Notes about Windows Settings in the annex. Windows is a multi-purpose operating system developed for home users; therefore standard settings do not match the special requirements of measurement acquisition.

- PC local RAM of at least 16MiB RAM
The graphic card and monitor should support at least 256 colors.
- Free memory on the hard disk of min. 160 MiB (full installation).
- The current ADwin software package (see www.ADwin.de, Support ► Downloads)
Please note: Windows 98 / ME are only supported until package version 5.00.07.02, Windows 2000 / NT4 until version 5.00.29.00.

With a windows 64-bit operating system, the ADwin software package to be installed must have at least version 5.00.02.01.

If the package version is lower than 4.00, see the notes in the following chapters.

For an update first uninstall all existing ADwin program packages (Windows start menu: Settings ► Control Panel). Install now the latest version of the ADwin software package.

Pay attention to the version number of your ADwin software package. Older ADwin versions do not always have the necessary drivers.

If you do not have installed the right drivers, much more effort is necessary to correct a wrong driver installation.

After an update, you should not install an older ADwin version. The updates of the ADwin software are designed in such a manner that applications, programmed in ADbasic 3.0x, can be used without changes.

For installation under Windows NT, 2000, XP, Vista, 7, 8, 10, 11 you must be **member** of the **user group "Administrators"**. It is not sufficient to have full access rights on the PC. Ask your system administrator.

Install the program packages as follows:

1. Start the program <setup.exe> directly from the ADwin software package.
2. Select "Install".

We recommend using the proposed destination folder <C:\ADwin\...>, so that you can use all example programs without any changes.

The interfaces for development environments are installed, too (see "Contents of the ADwin software package" below). Use the drivers only when the ADwin system is working. How to use the drivers is described in the corresponding driver manual.

3. "Revision info" shows the changes of this package compared to earlier versions.



System requirements



Update



Installation

Contents of the ADwin software package

4. For new installations or for updating *ADbasic* from version 3 to version 4 only: Entering the license key:
 - Open *ADbasic* (Windows start menu: Programs ► ADwin ► *ADbasic*).
 - Open the menu ADwin ► About *ADbasic*.
 - Select the button *Change License*.
 - You find the license key on the cover of the *ADbasic* manual; now enter the license key.

Without valid license key, *ADbasic* will operate in demo mode. In this mode, the development environment only works for demonstration, test or evaluation purposes. For example, you cannot create binary files.

5. Continue with the installation of the interface drivers (page 2, installation step no. 2).

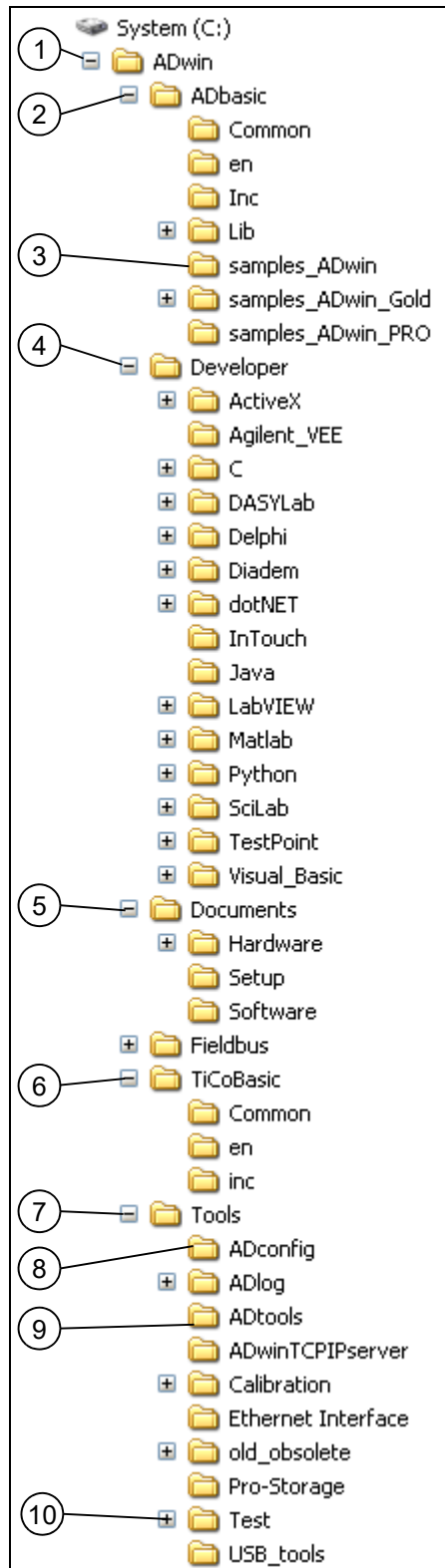
The *ADwin* software package contains:

- The drivers for communication between your PC and the *ADwin* system for the Windows operating systems.
- The real-time development environment *ADbasic*.
- The program *ADconfig* for configuration of the communication interface (Ethernet, USB, link-adapters such as ISA, PCI, PCMCIA).
- The program *ADwinTcpIpServer* for connecting the *ADwin* system via a network.
- *ADtools*: A tool collection, providing direct access to variables of the *ADwin* system, in order to display or to change them.
- The hardware and software manuals for your *ADwin* system as PDF files as well as the Online help for *ADbasic*.
- Interfaces for the development environments .NET, Visual-Basic, Visual-C, C/C++/C#, Delphi, VBA (Excel, Access, Word), TestPoint, HP-VEE, Agilent VEE, LabVIEW / LabWINDOWS, InTouch, DIAdem, Matlab and the ActiveX interface.
- Examples for programming with *ADbasic*.

After installation the destination folder contains the subdirectories shown to the right.

In the beginning, these are important files and programs:

1. Operating system files *.bat for *ADwin* processors.
2. Development environment *ADbasic* with documentation and online help.
3. *ADbasic* examples, sorted by *ADwin* systems.
4. Drivers and documentations for development environments.
5. Documentation (PDF) for installation (this document), hardware and software.
6. Development environment *TiCo-Basic* with documentation and online help.
7. Utilities for several purposes around *ADwin*.
8. The program *ADconfig*, which sets the device number for *ADwin* systems.
9. *ADtools*, a collection of utilities to develop and test *ADbasic* programs.
10. Function testing programs for *ADwin* systems.



After Installation

The first step



4 ADwin ISA link interface

The first step to install your *ADwin* system is **always** the installation of the *ADwin*-CDROM (chapter 3 of this manual).

Please pay attention to the version number of the CDROM, especially if you have an update. Depending on the interface, older versions do not always have the necessary drivers.

Installation is only possible with a 32 bit version of a windows operating system. For installation, an *ADwin* software package is required with the following version number:

- Windows 2000: 3.00.2360 ... 5.00.29.00
- Windows XP: 3.20.0101 (or higher)
- Windows Vista: 4.20.10.00 (or higher)
- Windows 7: 5.00.08.04 (or higher).
- Windows 8: 5.00.24.00 (or higher).

Please don't forget: After installation of the *ADwin* software package, you have to restart the PC if using a Windows operation system.

ADwin systems with ISA link

The following *ADwin* systems are operated via an ISA link interface:

- *ADwin* systems with *ADlink* PC ISA board
- *ADwin* boards
- *ADwin-light* boards (not *ADwin-light-16*)

I/O address assignment

The PC communicates with the *ADwin* systems via the link adapter. Each link adapter uses eight I/O registers in the PC.

For operating the *ADwin* system you only need the first of these register addresses: the base address (also link address). The other register addresses are defined in relation to the set base address.

Default setting

For *ADwin* systems with ISA interface, the default setting of the base address is 150h. If this address is occupied on your PC, you may select other addresses.

As an example, the table shows the register addresses, which are used by *ADwin* systems with the base address 150h or 190h.

Base address	150h	190h
Base address + 00h	150h	190h
Base address + 01h	151h	191h
Base address + 02h	152h	192h
Base address + 03h	153h	193h
Base address + 10h	160h	1A0h
Base address + 11h	161h	1A1h
Base address + 12h	162h	1A2h
Base address + 13h	163h	1A3h

In this chapter, the following installation steps are described (please consider the order of the steps):

- Installation of the software and configuration of the PC for the ISA link-adapter.
Depending on the Windows operation system the procedure is always different:

- Windows 9x, NT and ME: page 7
 - Windows 2000: page 8
 - Windows XP / Vista / 7 / 8: page 14
- Checking or configuring DIP switches on the ISA link board (page 19).
 - Installing the ISA link board in the PC and checking its function with *ADbasic* (page 21).

4.1 Installing software and configuring the PC

The installation differs for the following Windows operating systems:

- Windows 9x, NT and ME (below)
- Windows 2000 (page 8)
- Windows XP / Vista / 7 / 8 (page 14)

4.1.1 Windows 9x, NT and ME

For these operating systems you don't need additional software. You just have to choose a suitable base address and should reserve it on your PC.

In any case, it is recommended checking first, which addresses are already allocated.

- Windows 9x, ME

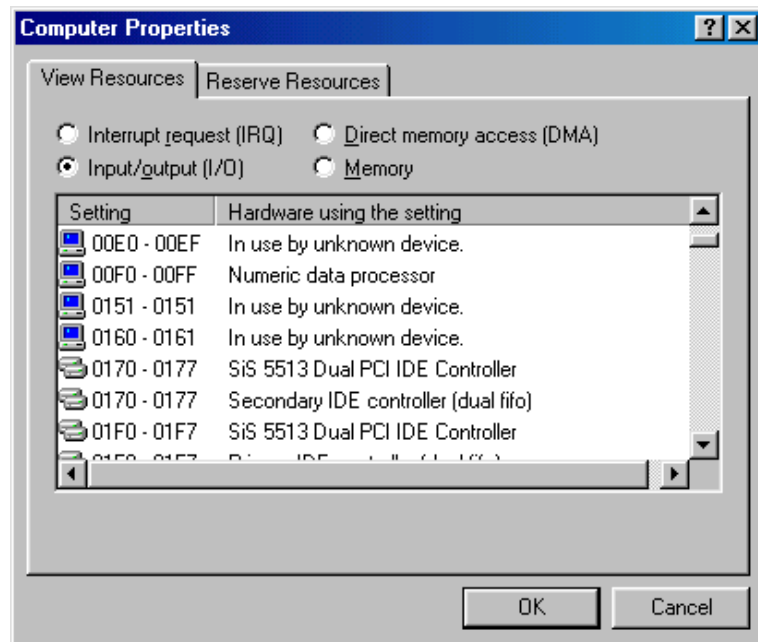
Call the device manager from the Windows start menu: Settings ▶ Control panel ▶ System. Double click the field "Computer" in the "Device Manager". Under "View Resources", set the display to "Input/Output (I/O)".

- Windows NT

Under Windows NT, call from the Windows start menu: Programs ▶ Administrative Tools (Common) ▶ Windows NT Diagnostics; choose the tab „Resources“ and then the button „I/O Port“.

Please pay attention to the fact, that devices using an ISA interface are not always recognized and registered by Windows. Even the display: "Used by unknown device" does only appear, if a communication has been effected via this address after start-up of the computer! If necessary, check the hardware manual of the device, which may cause address conflicts.

**Checking the I/O address
assignment of the
hardware**



Reserve base address (link address)

If you have found an address, which is not allocated (pay attention to addresses, which are allocated twice), you should reserve it in the device manager. Thus, you are avoiding any address conflicts with other devices, which allocate addresses automatically. Proceed by setting the display to "Input/Output (I/O)" under "Reserve Resources". Enter under "Add" the selected address ("Start value" = base address; "End value" = base address + 13h).

Note the base address

If you do not wish to set the base address (= link address) to the standard address 0150 (= 150h), as described in the example above, please make a note of it. You have to set this address on the *ADwin* board, *ADwin-light* board or *ADlink-PC-ISA* board per DIP switch.

Select for each *ADwin* system with ISA interface, which is to be installed, a separate address.

Now check the configuration of the DIP switches (page 19).

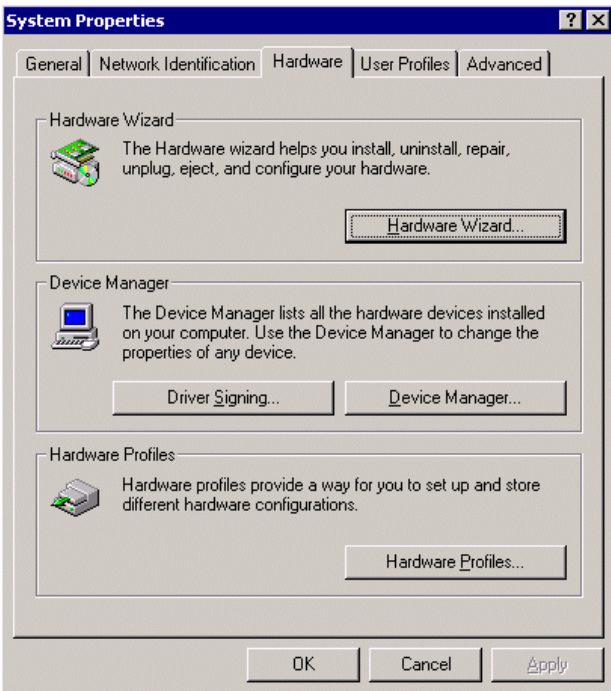
4.1.2 Windows 2000

The following installation routine applies to the *ADwin* software package version from 3.00.2360 onward. Install your *ADwin* board, *ADwin-light* board or your *ADlink-PC-ISA* board into the PC only after you are requested to do so.

Call the hardware wizard under the Windows start menu: Settings ► Control panel ► System ► Hardware ► Hardware wizard.

Continue according to the wizard instructions:

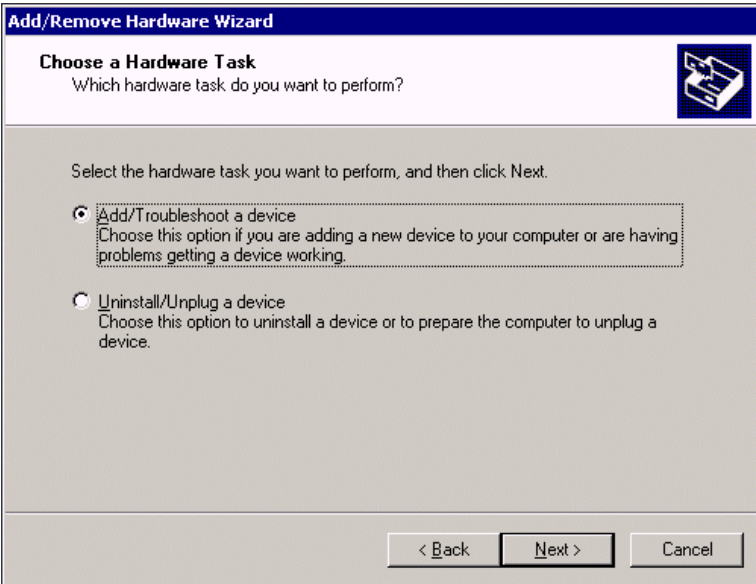
ADwin software package version



Start Hardware wizard



Next



Next

The search for new hardware may take some moments.

Add a new device

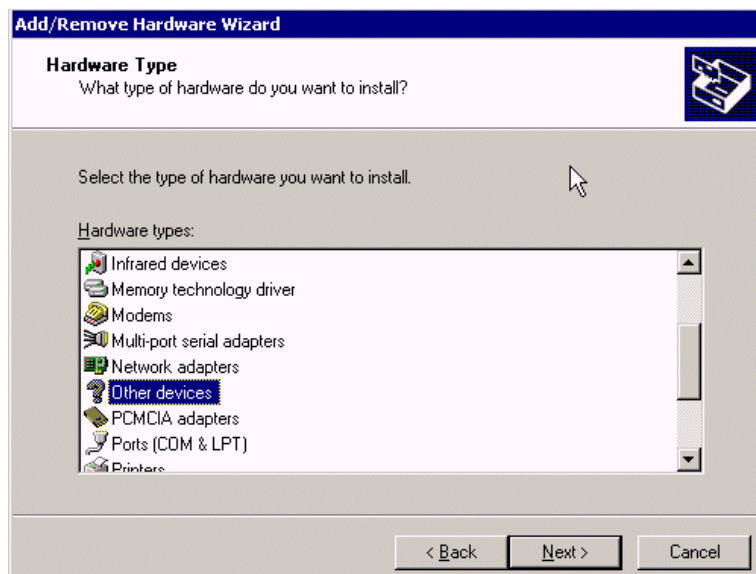
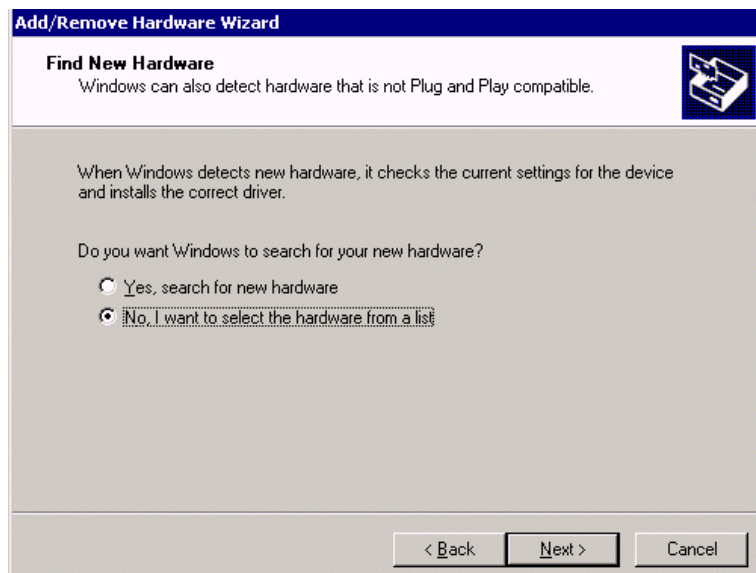
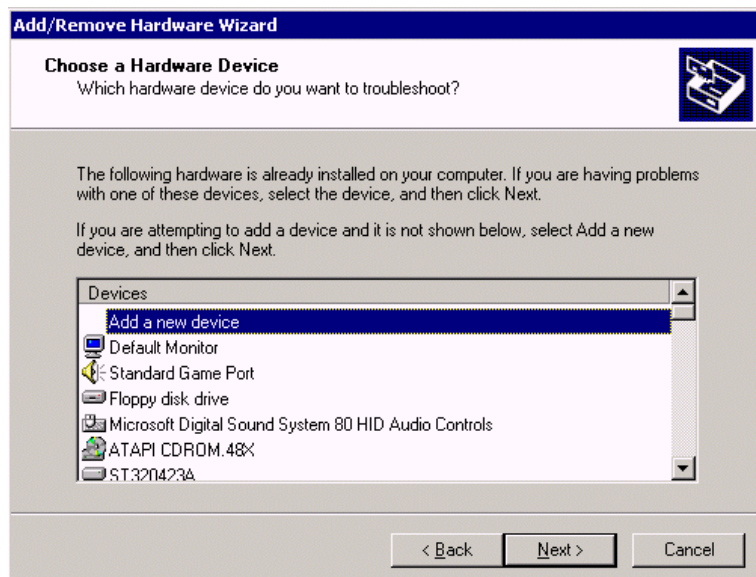
Next

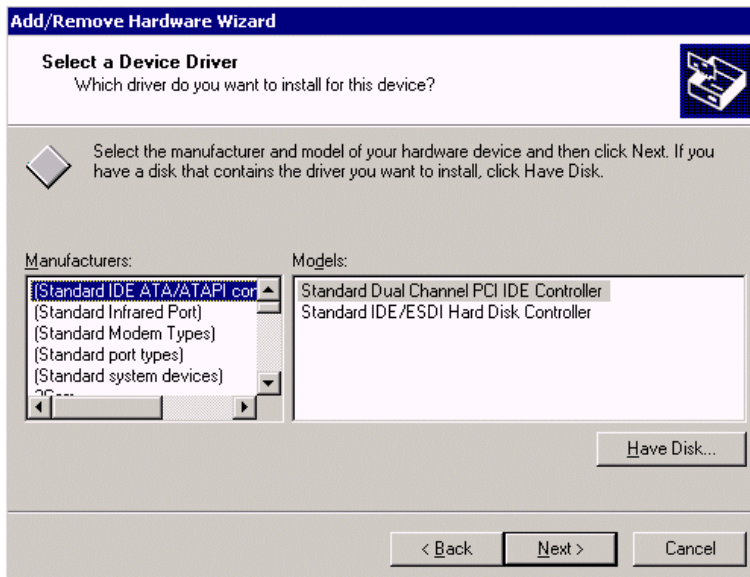
No: **select hardware from a list**

Next

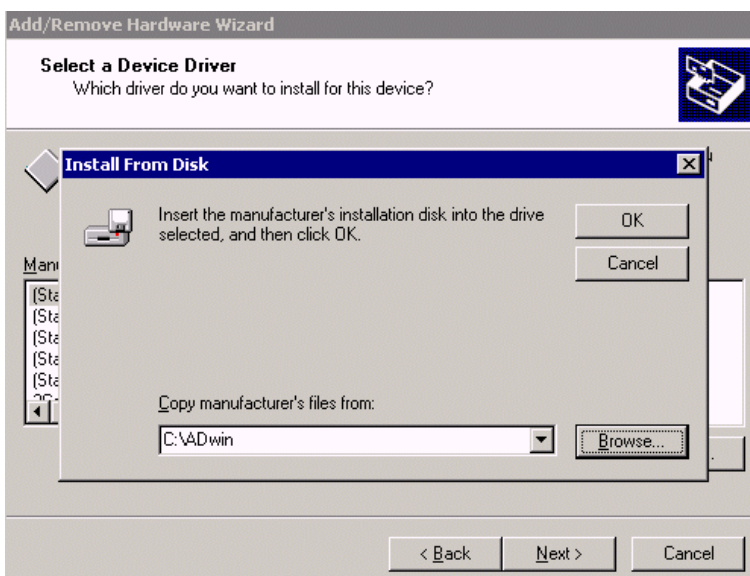
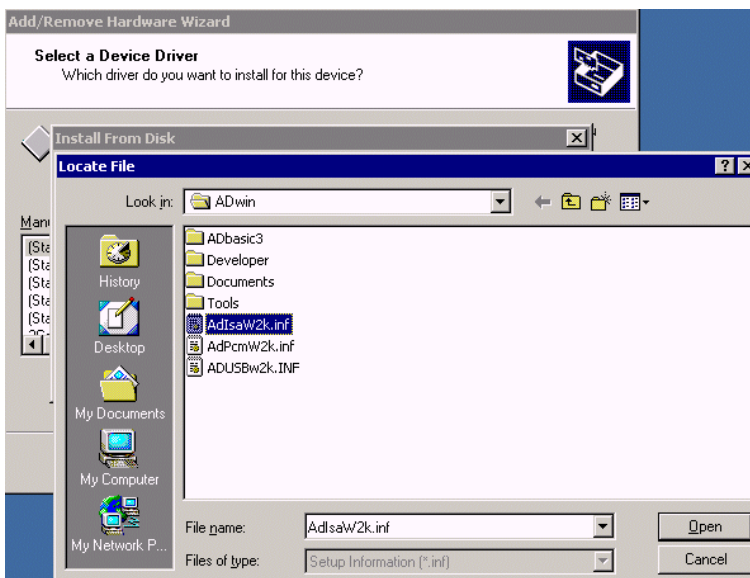
Other devices

Next





Select the path with "Browse" (or during standard installation enter "C:\ADwin" and skip one picture in this documentation.



Windows searches for all known drivers. A few minutes may pass until this window appears.

Continue with:
Have Disk...

Choose:
C:\ADwin\ADIsaW2K.inf

Continue with Open

OK

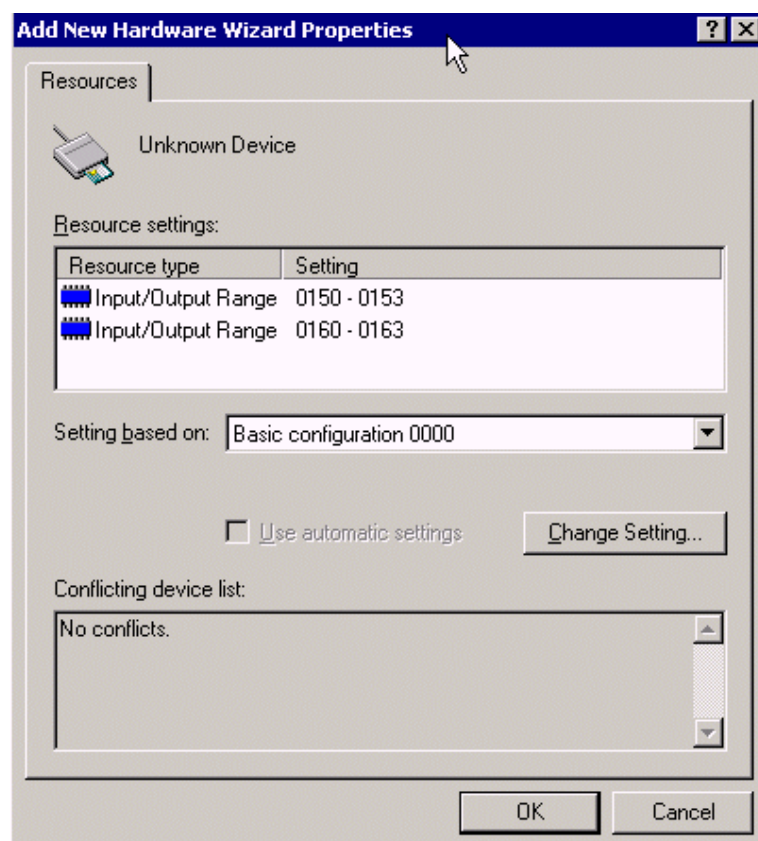
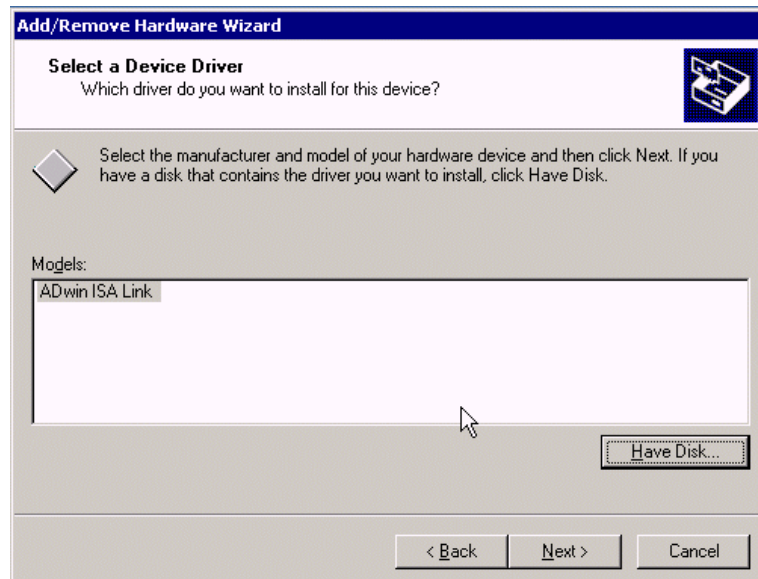
Next

OK

Base address /
link address

Choose basic
configuration

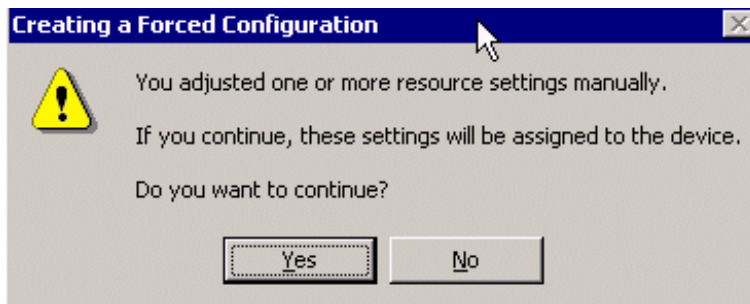
Note the link address



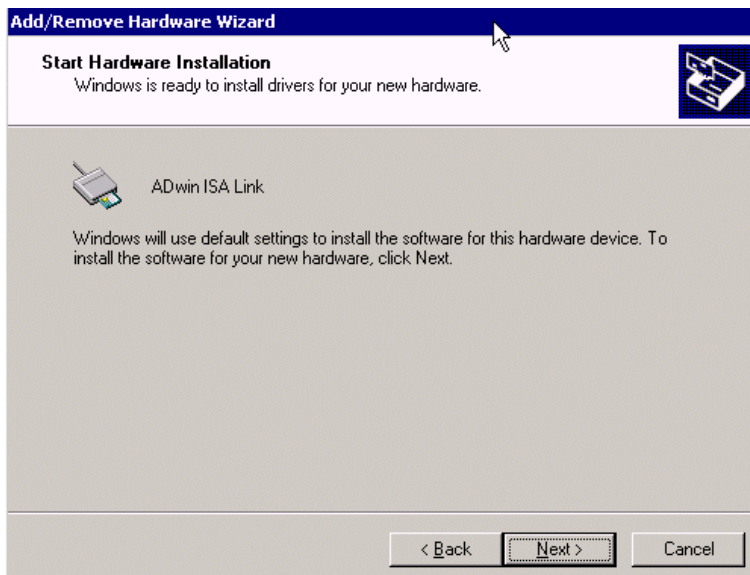
At "Settings based on" choose one of the given basic configurations, so that in the list "Conflicting Devices" no conflicting devices are displayed. In doing so, you set the base address of the link adapter.

If you don't use the standard base address 0150 (= 150h) as in the example above, please note this different base address (=link address). You have to set this address later with the DIP switches on the *ADwin* board, *ADwin-light* board or *ADlink-PC-ISA*.

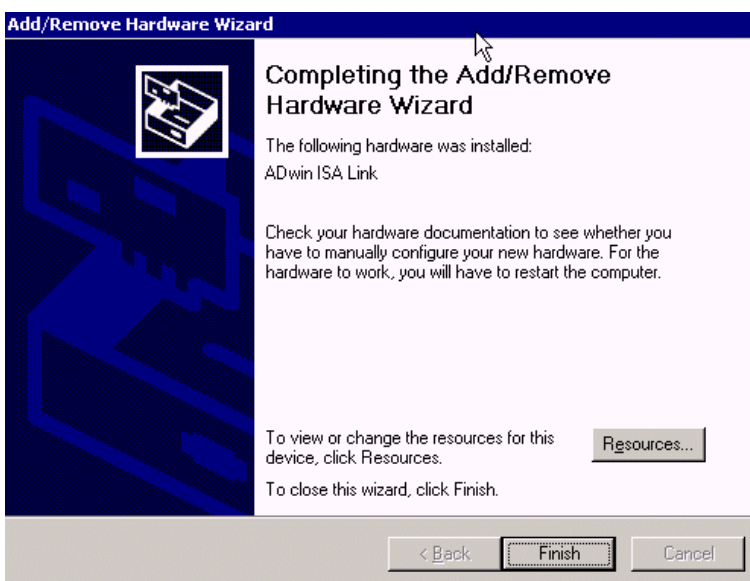
Choose a separate link address for each *ADwin* system.



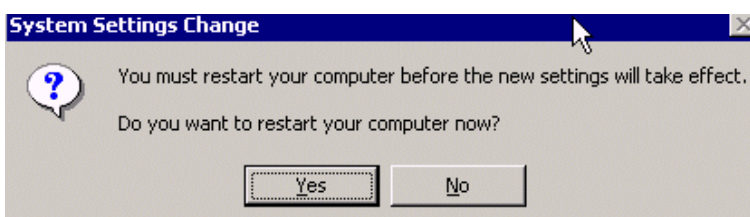
Yes



Next



Finish



No

Choose "No", because you have to restart your PC anyway for the hardware installation.

For the installation of another *ADwin* system with ISA interface repeat the instructions in this subsection.

Continue now with chapter 4.2 on page 19.

4.1.3 Windows XP / Vista / 7 / 8

The following installation routine applies to the *ADwin* software package version from 3.20.0101 onward. Install your *ADwin* board, *ADwin-light* board or your *ADlink-PC-ISA* board into the PC only after you are requested to do so.

Start the hardware wizard, for instance via the Windows start menu: Settings \ Control Panel \ Hardware.

Under Windows 7 / 8, you start the hardware wizard via the device manager:

- Start the device manager from the control panel.

A list of installed devices is displayed.

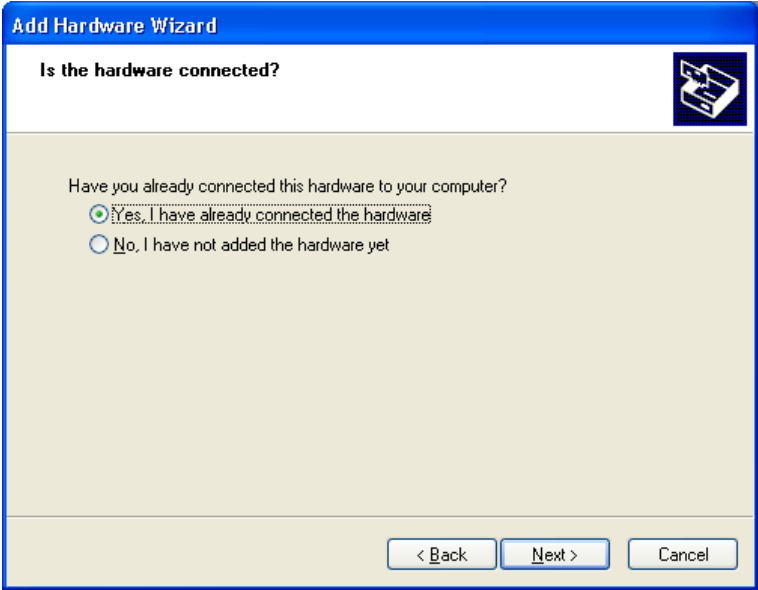
- Right-click on the top entry (PC) of the device manager list and select the menu entry "Add legacy hardware" from the context menu.

Continue according to the following instructions:



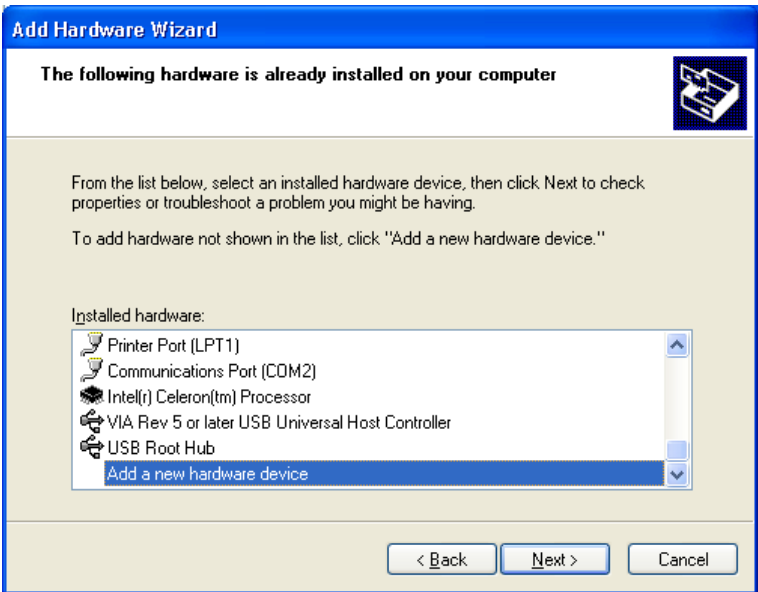
Next

Under Windows 7 / 8, the next two dialog windows do not exist, so you proceed with "Select hardware from list" on page 15.



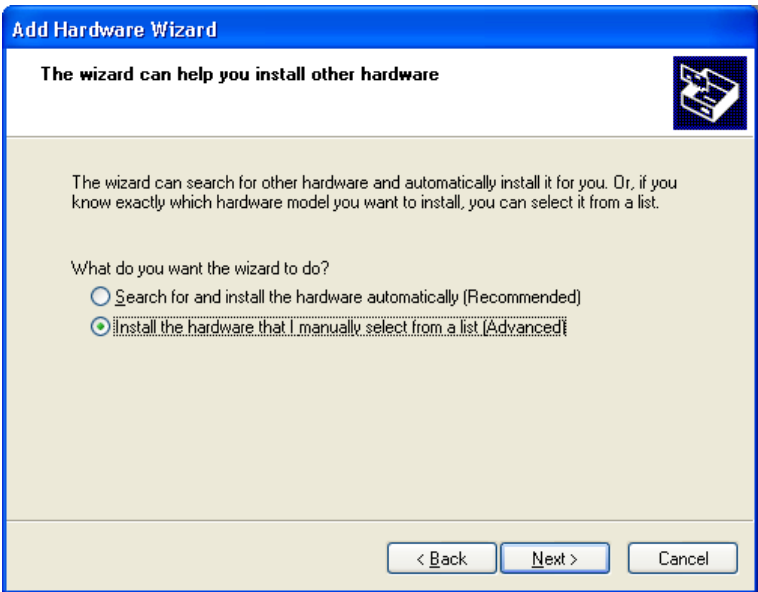
Yes

Next



Add a new device

Next

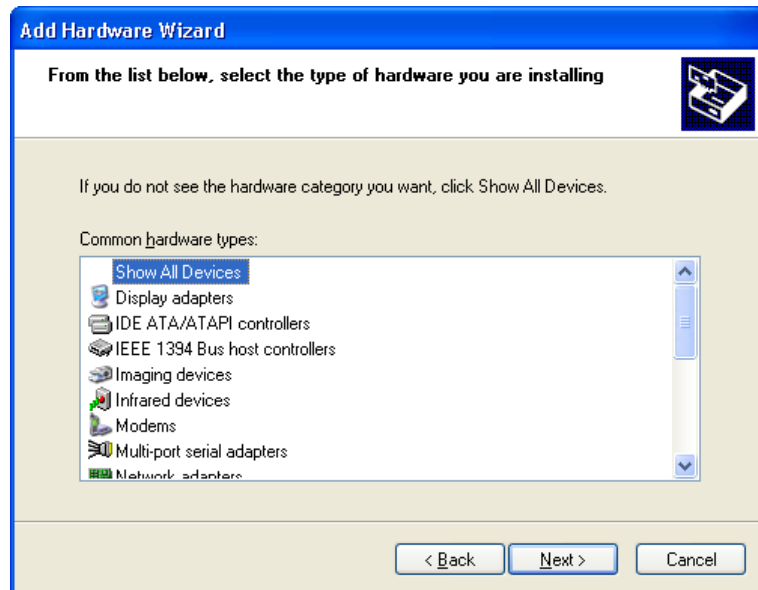


Select hardware from list

Next

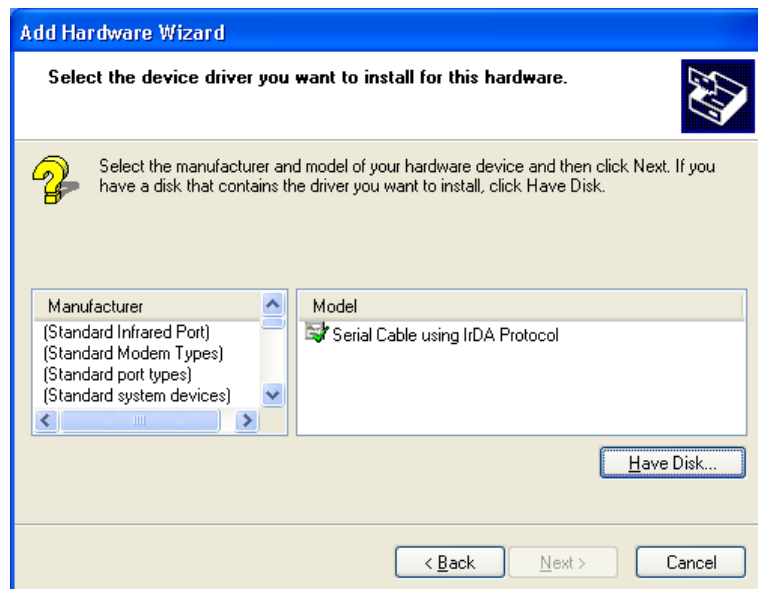
Show all devices

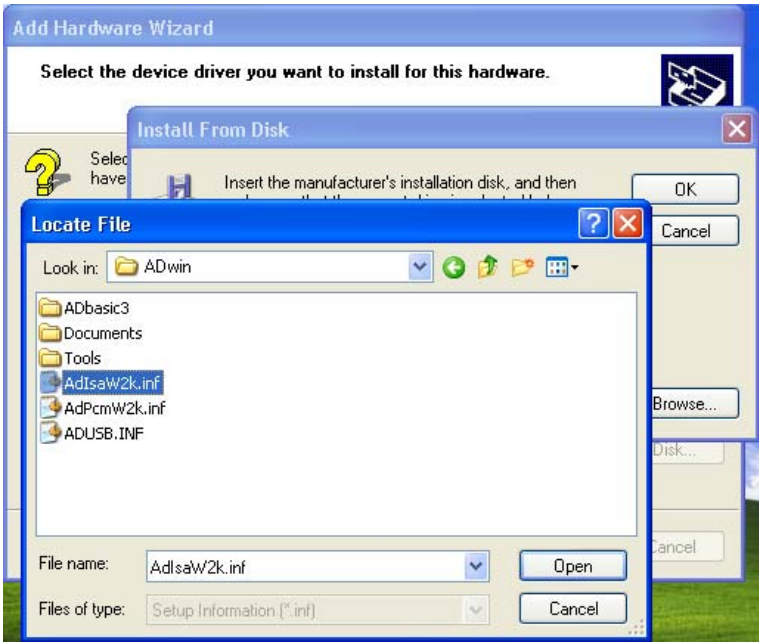
Next



Here you must wait a few minutes until Windows has found all existing drivers.

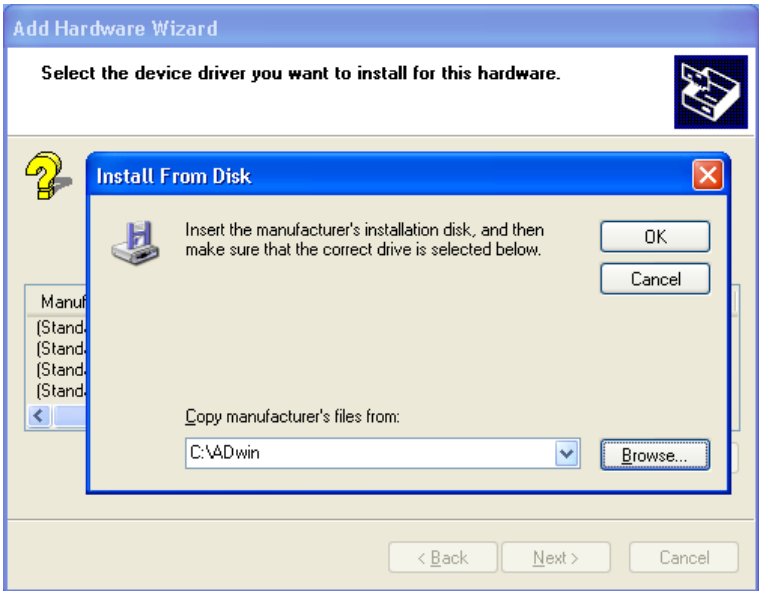
Have Disk



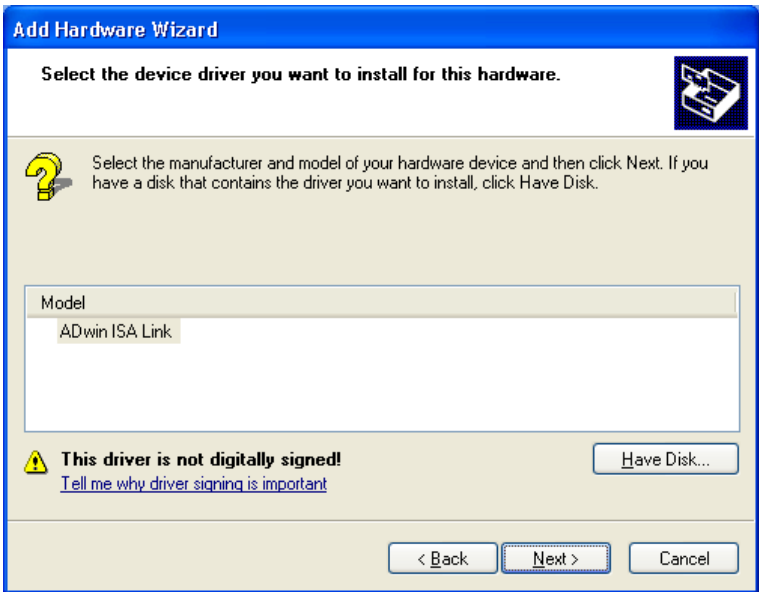


Select:
C:\ADwin\ADIsaW2K.inf

Open

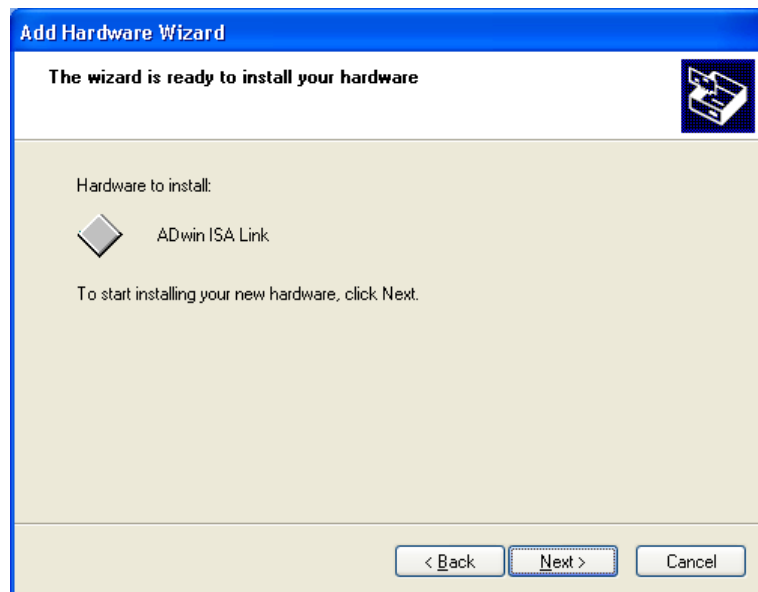


OK

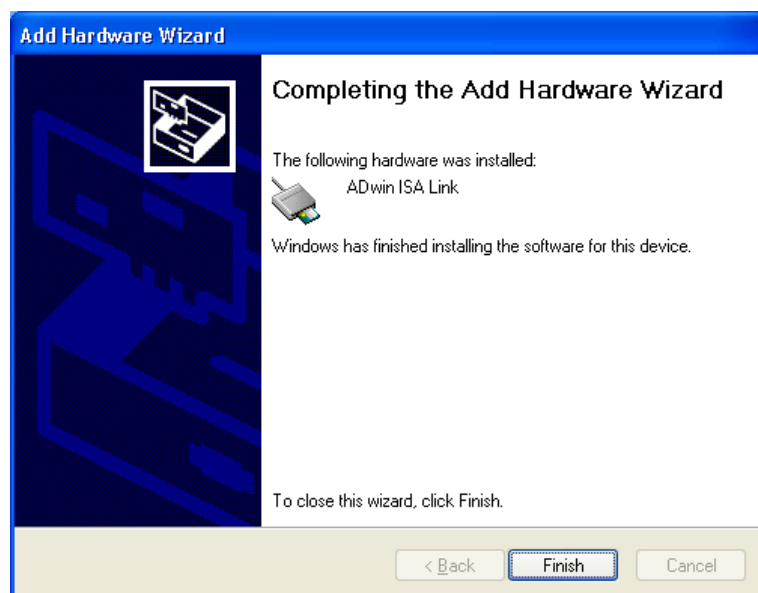


Next

Next




Finish

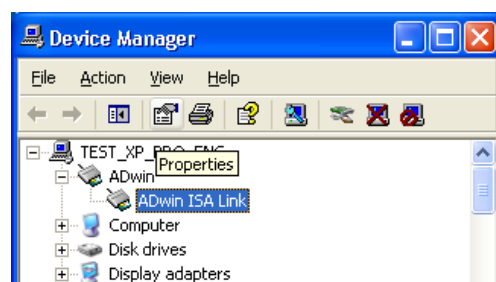


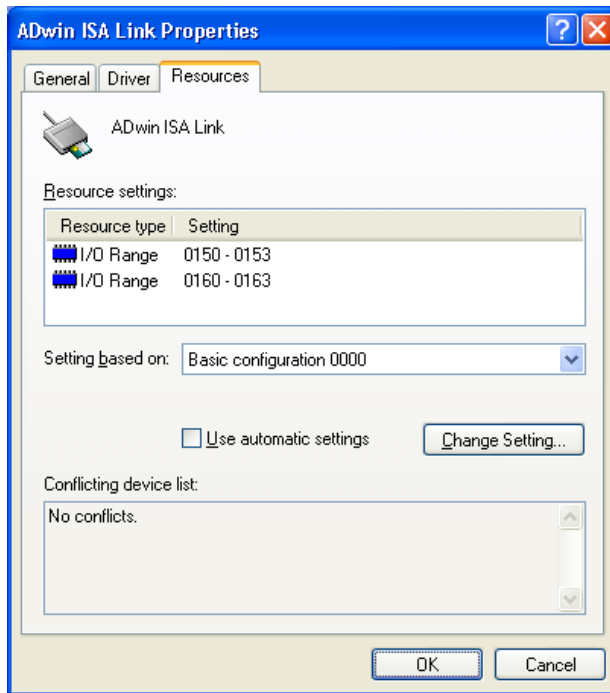
**Checking the settings in
the device manager**

Windows has automatically allocated a base address to the link adapter during the installation process. Check this setting and remember the base address. Then call the device manager under "Control Panel" (see first picture in this section).

Open the directory <ADwin> in the device manager, select the new ISA link and the symbol "Properties"  (or use the context menu, clicking the right mouse button).

**Select "ADwin ISALink",
then "Properties"**





**Base address /
link address**

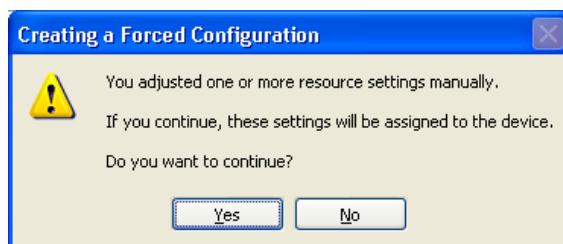
Deactivate first under "Resources" the setting "Use automatic settings" (if necessary Windows may otherwise change this setting, whereas the configuration of the DIP switches remains unchanged). Select under "Settings based on" one of the specified base configurations so that in the field "Conflicting device list" no device conflicts will be indicated. You have thus set the base address of the link adapter.

**Select basic
configuration**

Set a separate base address for each of the *ADwin* systems.

If you don't use the standard base address 0150 (= 150h) as in the example above, please take note of this different base address (=link address). You have to set this address later with the DIP switches on the *ADwin* board, *ADwin-light* board or *ADlink-PC-ISA*. Confirm with "OK".

Take note of base address



Yes

For the installation of another *ADwin* system with ISA interface repeat the instructions in this subsection.

Check now the settings of the DIP switches.

4.2 Setting the DIP switches

This section describes how you can set the base address via DIP switch on an *ADwin* system with ISA interface. Set a separate base address for each *ADwin* system, in order to avoid address conflicts.

The default setting is 0150h. If you want to use this default setting and do not wish to check it, continue with the paragraph "ADconfig".

Default setting 0150h

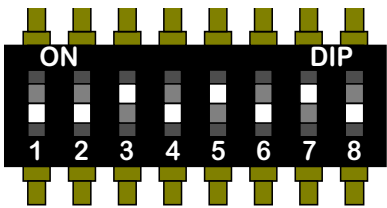
Now set the base address - you have taken note of before - via DIP switch for each *ADwin* system with ISA interface. The position of the DIP switches is described in your hardware manual.

Set base / link address

Settings

Switch numbers

ADconfig



The setting of the DIP switches can be derived from the base address. For this you need the binary address

- in binary notation
- in reverse order of the bits
- without considering the least significant bits A0 and A1 (that means: DIP switches 1 for bit A2)

On the ADwin-light board you can only set 4 DIP switches. Please read the hardware manual.

For example the base address 190h is in binary code 0110 0100 00. For setting the DIP switches note the number in opposite order (00) 0010 0110. For each 0, set the DIP switch to OFF, for each 1 to ON (except the two first digits in brackets).

Base address	DIP switch number (address bit)							
	1 (A2)	2 (A3)	3 (A4)	4 (A5)	5 (A6)	6 (A7)	7 (A8)	8 (A9)
150h	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
190h	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
200h	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
300h	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON

The table shows four examples for DIP switch settings.

Which base addresses you can use depends on the hardware and on the version of the ADwin-CDROM you are using (see table below).

	Version of the ADwin-CDROM	
	up to 3.00.22x	from 3.00.23x
ADwin-light card	150h, 190h, 210h, 310h	150h, 190h, 210h, 310h, 390h
ADwin card, ADlink-PC-ISA card	150h, 190h, 200h, 210h, 220h, 240h, 300h, 310h, 320h	150h, 190h, 200h, 210h, 220h, 240h, 260h, 280h, 2A0h, 2C0h, 2E0h, 300h, 310h, 320h, 340h, 360h, 380h, 390h

If you set a different base address than 150h with DIP switches, you have to indicate it in the ADbasic dialog window: "Compiler Options" at "ADwin Device No." (up to ADwin CDROM version 3.0.22.x "Link address") as well as in the objects of your PC development environment (e.g. TestPoint, Matlab, Visual Basic or C/C++).

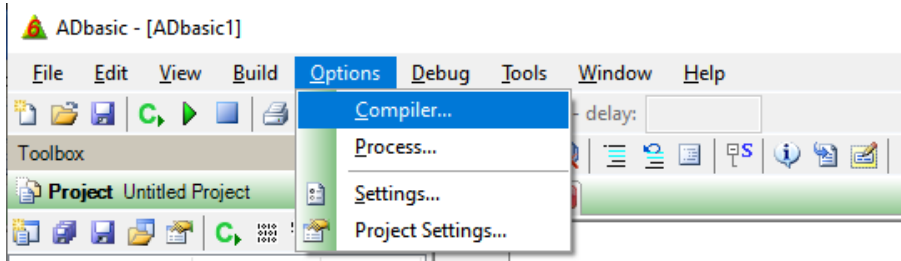
Now allocate with the help of the program ADconfig a base address as "Device No." to each of the system.

Now call the program ADconfig under the Windows start menu: Programs ▶ ADwin, in order to allocate a Device No. to your ADwin system. More detailed information about the program can be found in the online help of ADconfig.

4.3 Settings in *ADbasic* and hardware installation

4.3.1 Settings in *ADbasic*

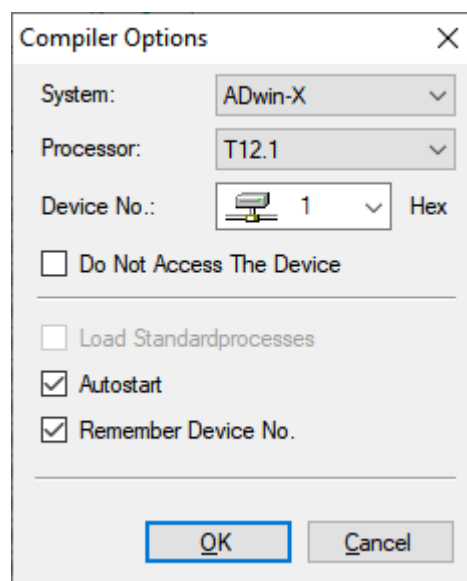
Open *ADbasic* (in the Windows start menu: Programs ► ADwin ► *ADbasic*) and check first the settings in the dialog window "Options\Compiler".



Set the options in the window: "Compiler Options" from top to bottom

- System: Choose the *ADwin* system, which is used.
- Processor: The processor type of the *ADwin* system used.
- Device No.: Check the base setting of this option (up to *ADwin* software package version 3.0.22.x: "Link address"). The number has to be identical to the base address set with the DIP switch.

The setting "Do not access Device" is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.



- Set the options "Load Standardprocesses", "Autostart" and "Remember Device No." later, when programming with *ADbasic*.

Confirm with "OK" in order to return to *ADbasic*. The driver installation and the main settings in *ADbasic* are now finished.

4.3.2 Installing the hardware

Before you connect your PC with the *ADwin* system, please read your hardware manual including the chapter "Initialization of the hardware". Do not yet connect any inputs or outputs.

- Shut down Windows and the PC, and remove the power supply connector.
- Open the PC enclosure according to the instruction of the manufacturer.
- Select a slot which has enough room for the board. Remove the PC slot metal plate, plug in the board and screw the slot metal plate of the board to the PC enclosure.
- Close the PC, connect it to the power supply and start Windows.

Checking the settings in *ADbasic*

Device No.

Hardware initialization



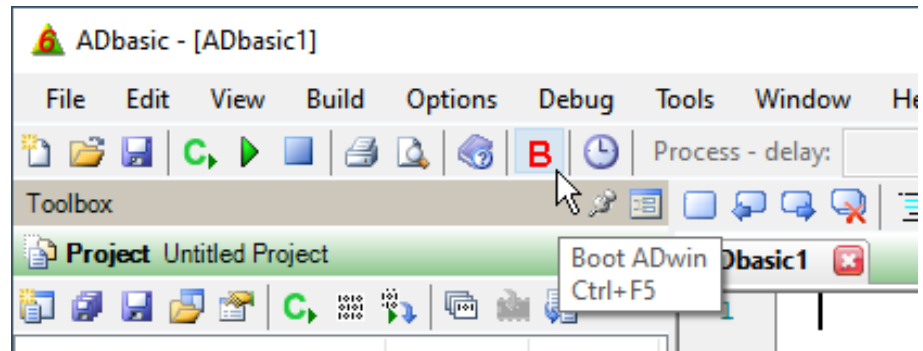
Installation into the PC

Connecting

Booting

When using *ADwin* systems with an ADlink-PC-ISA board, do now connect the *ADlink* cable and the power supply cable, and power up your *ADwin* system.

Start *ADbasic* and boot the *ADwin* system by clicking on the boot button **B**.



The blinking of the green LED on the *ADwin-Gold* system or on the CPU module of the *ADwin-Pro* system as well as the display in the status line: "ADwin is booted" shows that the operating system has been loaded properly and that *ADbasic* can access the *ADwin* system (if not, first check the connections).

Finishing the installation

For the further installation please keep to the order of installation instructions in chapter 2 of this manual:

- For the details about the initialization of your *ADwin* system, please see your hardware manual.
- The programming of your *ADwin* system is described in detail in the *ADbasic* manual.
- Start programming with the examples in the *ADbasic* tutorial.



Programming with *ADbasic*

5 ADlink PCI adapter

The first step to install your *ADwin* system is **always** the installation of the *ADwin*-CDROM (chapter 3 of this manual).

Please pay attention to the version number of the CDROM, especially if you have an update. Depending on the interface, older versions do not always have the necessary drivers.

Installation is only possible with a 32 bit version of a windows operating system. For installation, an *ADwin* software package is required with the following version number or higher:

- Windows 2000: 3.00.2360 ... 5.00.29.00
- Windows XP: 3.20.0101 (or higher)
- Windows Vista: 4.20.10.00 (or higher)
- Windows 7: 5.00.08.04 (or higher).
- Windows 8: 5.00.24.00 (or higher).

The requirements for the installation are as follows:

- 1 empty PCI slot in the PC
- *ADwin-Gold* only: 1 empty slot metal plate in addition
- The PC BIOS must be PCI 2.2 compatible (or higher) and recognize PCI header type 2 devices. This is not always guaranteed when using older PCs.

If the adapter does not start working, a BIOS update may solve the problem.

The *ADlink* PCI adapter is used as an adapter for an *ADpcmcia* board, for which the PC - unlike a notebook - has no interface. It is available for all standard Windows computers and operating systems.

With the adapter, you can operate (one or two) *ADwin* systems in a PC, even if the PC has no more ISA interfaces and you cannot or do not want to use an USB or Ethernet interface.

Standard delivery of the *ADlink* PCI adapter:

- *ADlink*-PCI adapter (plug-in board) with *ADwin* software package (for Windows 95 and NT).
- *ADpcmcia* link adapter board
- PCMCIA connecting cable to the *ADlink* cable
- *ADlink* cable (length two meters)

Data transfer from the *ADwin* system to the PC is made via *ADlink* cable to the *ADpcmcia* linkadapter board, which is plugged into the PCMCIA slot of the *ADlink* PCI adapter.

- *ADwin-Gold* only:

Three-pole power supply cable with one power supply plug, length 2.0 meters. Please read the Notes about Power Supply Cable (annex A.3).

The first step



System requirements

Function

Standard delivery

Continue

Continue with the following installation steps (please pay attention to the order of the installation):

- Installation of the *ADlink*-PCI adapter
- Installation of the drivers
- Installation of the *ADpcmcia* adapter (chapter 6)
- Operation of several *ADwin* systems with an ISA and PCI interface (see chapter 6.3 on page 29). Here information is given to avoid a double allocation of the I/O addresses.

Protection against ESD



Installation of the *ADlink* PCI adapter

5.1 Installing the *ADlink*-PCI adapter

In order to avoid damages at the *ADlink* PCI adapter, installation into the PC has to be made in an environment without any electro-statical discharges.

Do not make a connection to the *ADwin* system. Wait until you read the corresponding information in this manual.

Installation of the *ADlink* PCI adapter:

- Shut down Windows and your PC and remove the power supply connector.
- If you have already installed an *ADlink*-ISA board, which you do not need any longer, you should remove this board in order to avoid that I/O addresses will be allocated twice.
- Select an empty slot where enough room is available for the installation of the board.

Remove the slot metal sheet of the selected slot on the rear of the PC.

- Plug-in the *ADlink*-PCI board carefully into the selected slot and screw the metal sheet with the board to the PC enclosure.
- For *ADwin-Gold* only: You require an external power supply. Please read annex A.3, Notes about Power Supply Cable.
- Close the PC enclosure and connect the power supply cable to the PC.

5.2 Installing the drivers

Depending on the operating system, the driver installation is always different:

- The operating systems Windows ME, 2000, XP, Vista, 7, 8 recognize the *ADlink* PCI adapter and start the device manager for installing the drivers. If not, restart Windows.

The operating system automatically installs a Windows-inherent standard driver for the PCI board.

- The operating system Windows 98 recognizes the *ADlink* PCI adapter and starts the device manager for installing the drivers. If not, restart Windows.

Windows 98 is searching for the best driver (default setting) and asks for a source directory. Install the drivers from one of the following sources:

- from your Windows installation CDROM (see next picture) or
- from your hard disk, if you have made a copy of the installation files.

**Windows ME, 2000, XP,
Vista, 7, 8**

Windows 98



- Under Windows 95 and NT, install the drivers from the supplied CDROM of the PCI device manufacturer (e.g. SCM). Please follow the advice in the `<readme.txt>` file.

The installation of the *ADlink* PCI adapter is now finished.

Continue with the installation of the *ADpcmcia* adapter described in chapter 6.

Windows 95 and NT



6 ADpcmcia adapter

The first step



The first step to install your *ADwin* system is **always** the installation of the *ADwin*-CDROM (chapter 3 of this manual).

Please pay attention to the version number of the CDROM, especially if you have an update. Depending on the interface, older versions do not always have the necessary drivers.

Installation is only possible with a 32 bit version of a windows operating system. For installation, an *ADwin* software package is required with the following version number or higher:

- Windows 2000 / NT: 3.00.2360 ... 5.00.29.00
- Windows XP: 3.20.0101 (or higher)
- Windows Vista: 4.20.10.00 (or higher)
- Windows 7: 5.00.08.04 (or higher).
- Windows 8: 5.00.24.00 (or higher).

System requirements

For the operation in a PC (not notebook) you need an *ADlink*-PCI adapter installed (see also the previous chapter "ADlink PCI adapter").

Function

With the *ADpcmcia* adapter, a fast connection from your *ADwin* system to the notebook is possible via the Windows plug & play feature. The adapter board is retrofit for all Windows operating systems, notebooks and for most of the Windows PC.

With the *ADpcmcia* adapter, you can operate one or two *ADwin* systems. The board is only used for data exchange between an *ADwin* system and the PC or notebook.

The board is compatible to the PCMCIA standard 2.1, type II. The data transfer rate is 10 MBit/sec physically or up to 250 KiB/sec net.

Standard delivery

The standard delivery of the *ADpcmcia* adapter consists of:

- *ADpcmcia* linkadapter board (in short: *ADpcmcia* adapter)
- *ADlink* cable (Link - PCMCIA, length about 2.0 meters)
for notebooks only:
Data transfer between the *ADwin* system and the notebook is made via *ADlink* cable to the *ADpcmcia* adapter.
- for *ADwin-Gold* only:
The *ADwin-Gold* system requires a power supply unit. Please read annex A.3, Notes about Power Supply Cable.

Continue

Continue with the following installation steps (please, pay attention to the order of the installation):

- Driver installation
- Initialization of the hardware
- See also chapter 6.3 on page 29 if you want to operate several *ADwin* systems with an ISA or PCI interface.

6.1 Installing the drivers

The installation is different, depending on the Windows operating system:

Windows NT

- Shut down your PC.
Under Windows NT, the *ADpcmcia* adapter must be installed or removed only when the computer is shut down.
- Insert the *ADpcmcia* adapter into the PCMCIA slot. Do not yet connect the *ADwin* system.
- Start your computer. Because the *ADwin* software package has already been installed, the adapter will automatically be recognized and can be used.

Skip some paragraphs and continue reading with the paragraph: ADconfig (see below).

Windows 9x, ME, 2000, XP, Vista, 7, 8

Insert the *ADpcmcia* board into the PCMCIA slot. Do not yet connect the *ADwin* system.

The operating systems Windows 9x, ME, 2000, XP, Vista, 7, 8, 10 recognize the new hardware automatically and look for the best driver. If the operating system does not react, restart Windows.

Windows XP, Vista, and Windows 7, 8, 10 install the driver without interaction. Please continue with paragraph *ADconfig*.

The operating systems Windows 9x, ME, and 2000 start the device manager in order to install the drivers and ask for a source directory. With standard installation starting from the *ADwin* CDROM version 3.00.2300, enter <C:\ADwin> (else <C:\ADbasic3> with older versions). Confirm your input with „Next“.



The device manager automatically finds the driver file fitting for the operating system

- Windows 9x, ME: <ADwin.inf>. It doesn't matter, if the file selection dialog shows a different file name.
- Windows 2000, XP, Vista, 7, 8: <ADpcmW2K.inf>.

If the driver installation has not been successful, you can activate the driver later in the Windows startmenu: Settings ► Control panel ► System. Start the "Device Manager" under the tab "Hardware".



**Driver installation from
standard directory**

Driver update

ADconfig

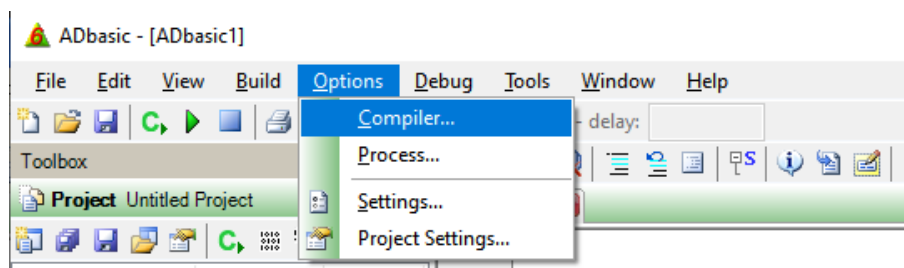
Checking the settings in ADbasic

Device No. (all systems)

The device manager marks every device, which is recognized, but not installed properly with a question mark or a prohibitory sign. Select the corresponding ADwin hardware. In the next screen "Properties...", select: "Driver" and then: "Update driver". Continue as is described above.

Now call the program *ADconfig* under the Windows start menu: Programs ▶ ADwin, in order to allocate a Device No. to your ADwin system. More detailed information about the program can be found in the online help of *ADconfig*.

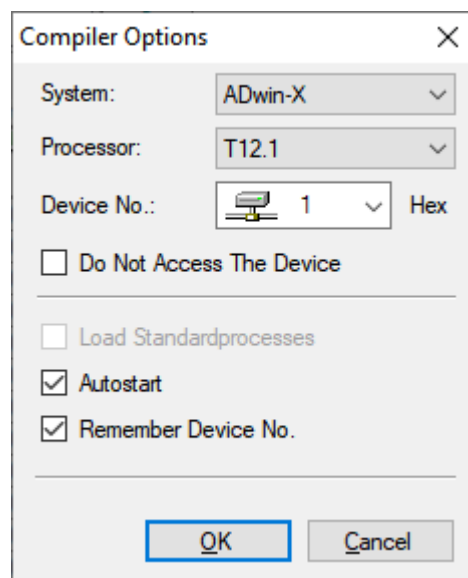
Open *ADbasic* (in the Windows start menu: Programs ▶ ADwin ▶ ADbasic) and check first the settings in the dialog window "Options\Compiler".



Set the options in the window: "Compiler Options" from top to bottom

- System: The used ADwin system.
- Processor: The processor type of the ADwin system used.
- Device No. (former: linkaddress): Check the base setting of this option to be identical with the base address set in the PC (see text box on page 29). The number is the base address in hexadecimal notation.

The setting "Do not access Device" is only necessary to compile ADbasic programs for test purposes, when no ADwin system is connected.



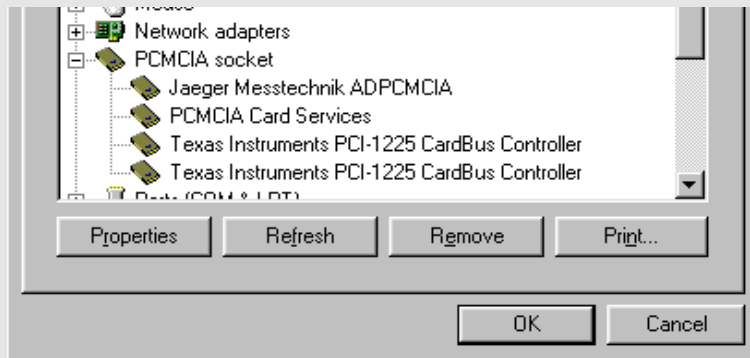
- Set the options "Load Standardprocesses", "Autostart" and "Remember Device No." later, when programming with ADbasic.

Confirm with "OK" and return to ADbasic. The driver installation is now finished and the main settings in ADbasic are made.

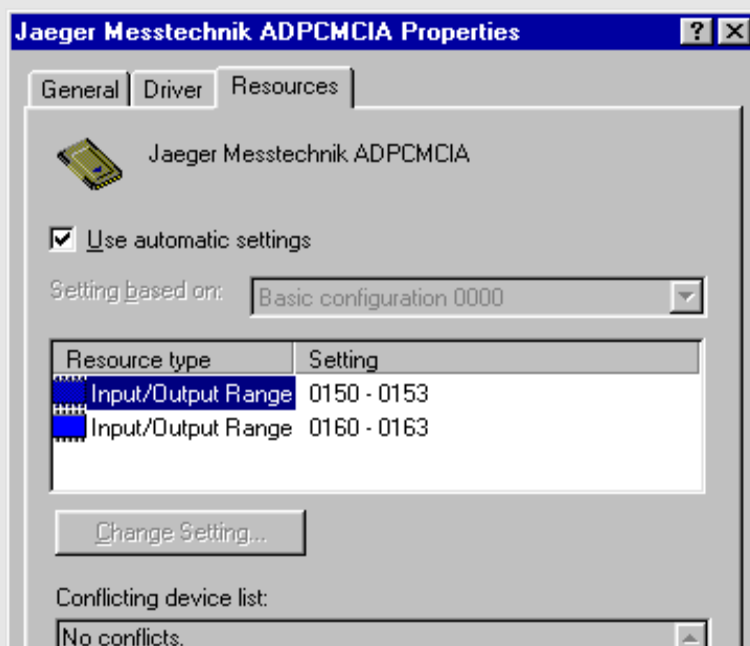
How to find the base address:

Call the device manager in the Windows start menu: Settings ► Control panel ► System.

The device manager displays the ADPCMCI board of Jäger Messtechnik at "PCMCIA socket" (under Windows 2000, XP, Vista, 7, 8 in the newly created directory: Computer\ADwin). Select it by double-clicking.



Under the tab "Resources", the base address of the *ADpcmcia* card is displayed as first number.



If in the window above you found the address 0190 (equals 190h) instead of address 0150, it would be the valid base address you have to set as "Device No." in *ADbasic* and in the objects of your development environment, e.g. TestPoint, Matlab, Visual Basic or C/C++.

Now return to the *ADbasic* window: "Compiler Options" and correct the "Device No.", if necessary.

If you work with two *ADpcmcia* adapters you have to pay attention to the fact, that Windows automatically allocates the address 190h to one of the cards. Which card it is, you have to check as is described in the previous paragraph.

While working with *ADbasic*, you have to indicate this address under "Options\ Compiler" as "Device No." and also in all other applications with *ADwin* systems.

Operation with two ADpcmcia adapters



Connecting

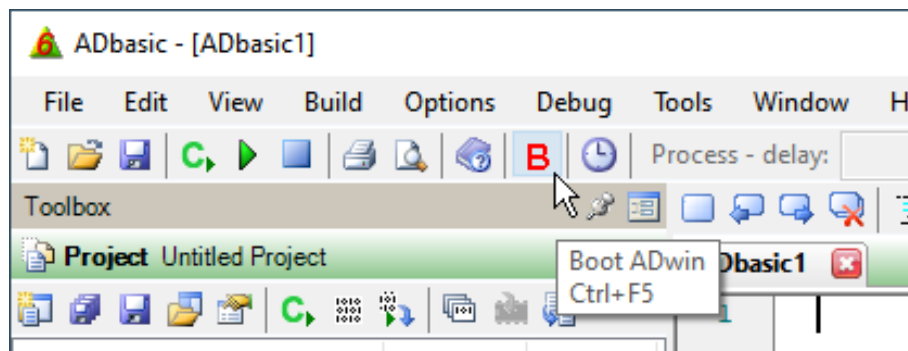
Booting

6.2 Initializing the hardware

Before you connect your PC to the *ADwin* system, please read your hardware manual including the chapter "Initialization of the hardware". Do not connect any inputs or outputs yet.

After you have installed the *ADwin* system according to the notes in your hardware manual, connect the *ADlink* cable and power on the *ADwin* system.

Start *ADbasic* and boot the *ADwin* system by clicking on the boot button **B**.



The blinking of the green LED on the *ADwin-Gold* system or on the CPU module of the *ADwin-Pro* system as well as the display in the status line: "ADwin is booted" shows that the operating system has been loaded properly and that *ADbasic* can access the *ADwin* system (if not, first check the connections).

Finishing the installation

Programming with
ADbasic

For the further installation please keep to the order of installation instructions in chapter 2 of this manual:

- For the details about the initialization of your *ADwin* system, please see your hardware manual.
- The programming of your *ADwin* system is described in detail in the *ADbasic* manual.
- Start programming with the examples in the *ADbasic* tutorial.

6.3 Connecting several *ADwin* systems to ISA and PCI

If you want to work only with one *ADwin* system and the standard base addresses 150h or 190h, you need not read this chapter.

If you work under the following conditions you should set the hardware addresses manually to avoid address conflicts:

- Working with several *ADwin* systems
- Operating systems with ISA and / or PCI interfaces simultaneously
- Operating at least one of the systems with a PCMCIA adapter

An exception is if two *ADwin* systems are operated with one PCI board, which has two slots for PCMCIA boards. Here Windows automatically allocates the address 190h to one of the two boards. Which board it is, you can check in the text box described above (page 29).

In any case, it is recommended checking first, which addresses are already allocated.

- Windows 9x, ME

Call the device manager from the Windows start menu: Settings ▶ Control panel ▶ System. Double click the field "Computer" in the

Operating several *ADwin*
systemsChecking the I/O address
assignment of the
hardware

"Device Manager". Under "View Resources", set the display to "Input/Output (I/O)".

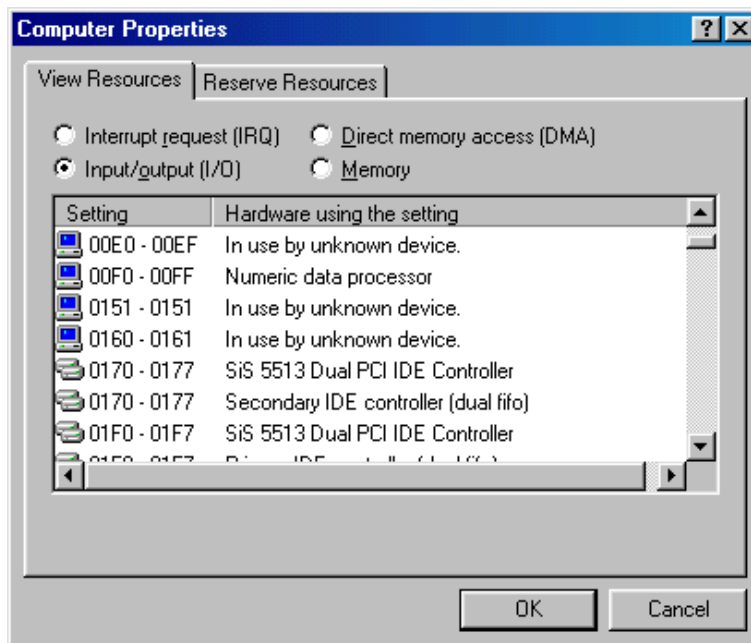
– Windows NT

Under Windows NT, call from the Windows start menu: Programs ► Administrative Tools (Common) ► Windows NT Diagnostics; choose the tab „Resources“ and then the button „I/O Port“.

– Windows 2000, XP

Call the device manager from the Windows start menu: Settings ► Control panel ► System, tab "Hardware". Select the display ViewPanel ► Resources by type and then "Input/Output (I/O)".

Please pay attention to the fact, that devices using an ISA interface are not always recognized and registered by Windows. Even the display: "Used by unknown device" does only appear, if a communication has been effected via this address after start-up of the computer! If necessary, check the hardware manual of the device, which may cause address conflicts.



Under Windows 2000, XP, Vista, 7, 8, you should install your *ADlink* PC ISA board, *ADwin* board or *ADwin-light* board by using the hardware wizard, see chapter 4.1.2 and 4.1.3.

In order not to have conflicts with an already existing *ADwin* system that has an ISA slot using the link address 150h, there are two possibilities to change the hardware addresses:

1. Changing the address in the operating system
2. Changing the address via DIP switch

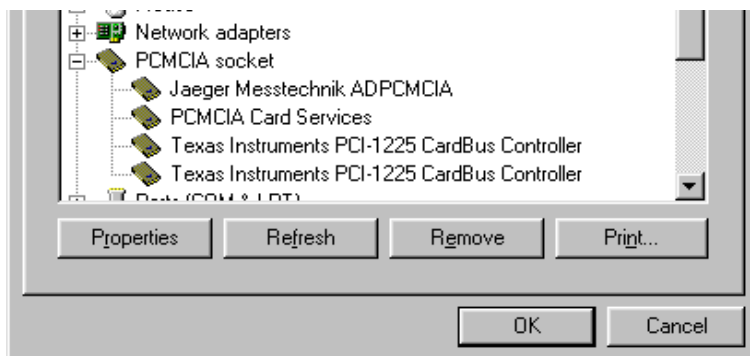
Changing the address in the operating system

The fast possibility is to set the link address of the *ADpcmcia* board per software to 190h. The disadvantage is the loss of the plug & play functionality, because this address is reserved by Windows as long as you cancel the reservation in the same way.

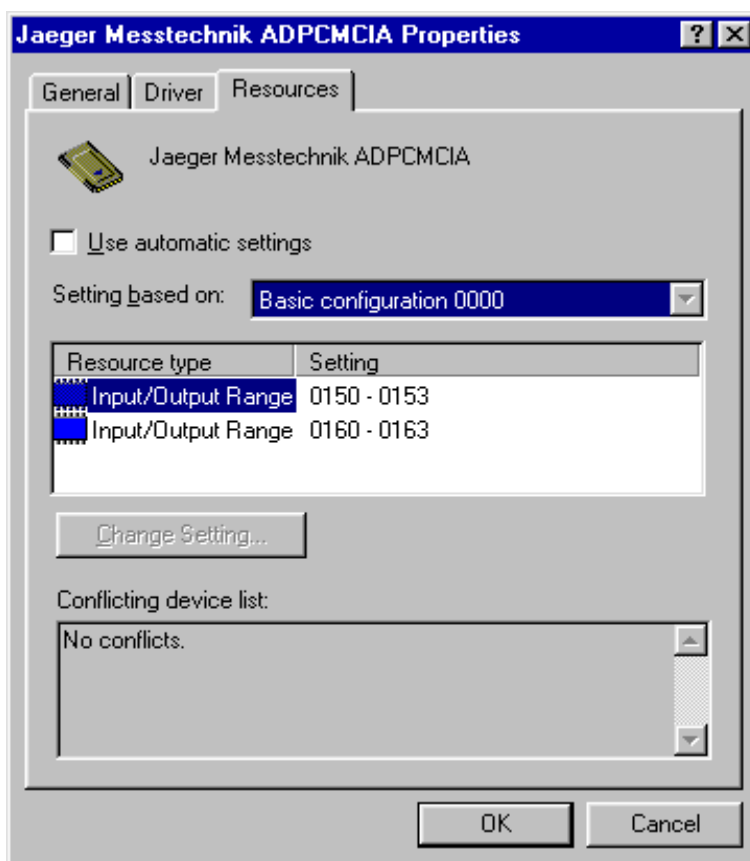
Call the device manager from the Windows start menu: Settings ► Control panel ► System.

Checking the address assignment

The device manager displays under "PCMCIA connector" (under Windows 2000 in the newly made directory Computer\ADwin) the *ADpcmcia* board of Jäger Messtechnik. Select it by double-clicking.



Under the tab "Resources", you find the settings of the *ADpcmcia* card. The first number shown is the base address of the card.



Deactivate the option "Use automatic settings" and select: "Settings based on". If you change the base configuration in the pull-down list from 0000 to 0001, the base address will then be changed to 190h.

Confirm the hardware address with OK and continue with the paragraph „ADconfig“.

Changing the address via DIP switch

The second, more complicated possibility is to change the link address on your *ADlink* PC ISA, *ADwin* or *ADwin-light* board manually via DIP switch. For this you have to open the PC and pull out the board. Advantages: Depending on the *ADwin* system, there are four or more addresses available and moreover, the advantages of plug & play of the PCMCIA interface remain.

In chapter 4 "ADwin ISA link interface" in this manual (page 19) or in your hardware manual, there is a list of addresses and a description of how the DIP switch is set to the corresponding address.

Now call the program *ADconfig* under the Windows start menu: Programs ► ADwin, in order to allocate a "Device No." to your *ADwin* system. You find more detailed information in the online help of *ADconfig*.

ADconfig

The first step



System requirements

7 ADwin-light-16 system with USB interface

The first step to install your *ADwin* system is **always** the installation of the *ADwin*-CDROM (chapter 3 of this manual).

Please pay attention to the version number of the CDROM, especially if you have an update. Depending on the interface, older versions do not always have the necessary drivers.

For the installation you need an *ADwin* software package, version 3.00.2735 or higher.

The requirements for the installation are:

- Windows operating system 98, ME, NT, 2000, XP, Vista, 7, 8, 10, 11. The latest Windows update should be installed.
- Enough room to install the system, depending on the type:
 - *L16-PCI*: one empty PCI slot
 - *L16-EURO*, *L16-cPCI*: an empty slot in the 19" enclosure
- Deactivate all energy saving functions of your PC operating system and mainboards (BIOS); this is not necessary for the monitor and the hard disk.

This configuration guarantees a correct function of the *ADwin* drivers and also of your PC applications (e. g. test stand programs).

You make the configuration in the Windows start menu **Settings** ▶ **Control Panel** ▶ **Power Option**

System standby: Option „Never“

Hibernate: Deactivate the option „Enable hibernate support“.

Power buttons: Set this option so that the PC *does not* change to standby mode after pressing the power button.

For monitor and hard disk we recommend also disabling energy saving functions (more details see annex, chapter A.2).

- Under Windows 10 / 11, deactivate the safety function Core isolation (Memory integrity). This configuration guarantess the correct function of the *ADwin* USB driver.

Deactivate the option here: Windows start menu, **Settings** ▶ **Windows security** ▶ **Device security** ▶ **Core isolation**:

Memory integrity: Option "Off"

- Functions

The design and power supply of the *ADwin-light-16* systems are different:

- *L16-PCI*: The PC plug-in board gets the power via PCI connector.
- *L16-EURO/cPCI*: The Euroboard module for 19" slots gets its power via ground and +5 Volt at the rear panel.
- *L16-EXT*: the hardware is installed in an aluminum enclosure. An external power supply is required. Please read annex A.3, Notes about Power Supply Cable.

With the USB interface, you can use the "plug & play" feature of the Windows operating system, such as the fast and easy installation even when using several *ADwin* systems.

The interface has the following features:

Supported USB standards:	USB 1.1 and USB 2.0
Physical data transfer rate:	12 Mbps (full speed)
Number of <i>ADwin</i> systems connected to a PC:	max. 8

After the installation of an update from the *ADwin* CDROM you have to restart Windows and to switch off the *ADwin* system. If the *ADwin* system gets the power from the PC, you must switch the PC off and on again - do not only restart it.

If you switch off an *ADwin* system with USB interface, you must at least wait 5 seconds before you power it up again.

Standard delivery items of the *ADwin-light-16* system:

- *ADwin-light-16* device
- When using an *L16-EXT*:
Three-pole power supply cable with one power supply plug, length 2.0 meters. Please read the Notes about Power Supply Cable (annex A.3).
- USB cable (length 1.8 m)
If there is a great distance between the *ADwin* system and the PC, we recommend using an *ADwin-light-16* system with Ethernet interface.

Follow the installation (in this order):

- Installing the hardware
- Installing the drivers

7.1 Installing the hardware

Before you connect your PC with the *ADwin* system, please read your hardware manual including the chapter "Initialization of the hardware". Do not yet connect any inputs or outputs.

Installing *L16-PCI*

In order to avoid damages to your PC, initialize the hardware in an environment where no electro-static discharges may occur.

- Close Windows, shut down the PC and remove the power supply cable.
- Open the PC according to the manufacturer's instructions.
- Select a slot, where enough room is available. Remove the corresponding PC slot metal sheet
- Plug-in the *L16-PCI* board carefully into the slot and screw the slot metal sheet of the board to the PC enclosure.
- Close the PC, connect it to the power supply and connect the *L16-PCI* board via the USB cable with the PC.

To ensure USB communication be as failure-free as possible, we recommend establishing a low-impedance (short, very thick) ground connection between PC-casing and the *ADwin* USB-device.

The ground connection may also – contrary to the inept USB cable – equalize existing differences in potential very well.

Installing *L16-EURO* / *L16-cPCI*

- Install the *L16-EURO* (or *L16-cPCI*) according to the instructions of your operating environment.



Standard delivery

Hardware initialization





The default setting for the power supply is: +5 Volt on pins 1a, 1b, 1c and ground (GND) on pins 32a, 32b, 32c. (see also the pin assignment in the hardware manual).

If you need a different pin assignment, please call our sales department.

Please pay attention to the voltage drop from the power supply unit up to the VG edge connector of the board. Please make sure that the pins have exactly +5 Volt and that there are no interferences at the power supply.

- Connect the power supply with the VG edge connector.
- Connect the *ADwin* board via USB cable with the PC.



To ensure USB communication be as failure-free as possible, we recommend establishing a low-impedance (short, very thick) ground connection between PC-casing and the *ADwin* USB-device.

The ground connection may also – contrary to the inept USB cable – equalize existing differences in potential very well.



Power Supply for L16-EXT

An external power supply is required, e.g. *ADwin-light-16-Pow* or a car battery. Please read annex A.3, Notes about Power Supply Cable.

With an external power supply, the *L16-EXT* will not be connected to earth! Connect the GND socket with the central earth connection point of your device and pay attention to corresponding notes in your hardware manual.

To ensure USB communication be as failure-free as possible, we recommend establishing a low-impedance (short, very thick) ground connection between PC-casing and the *ADwin* USB-device.

The ground connection may also – contrary to the inept USB cable – equalize existing differences in potential very well.

7.2 Installing the drivers

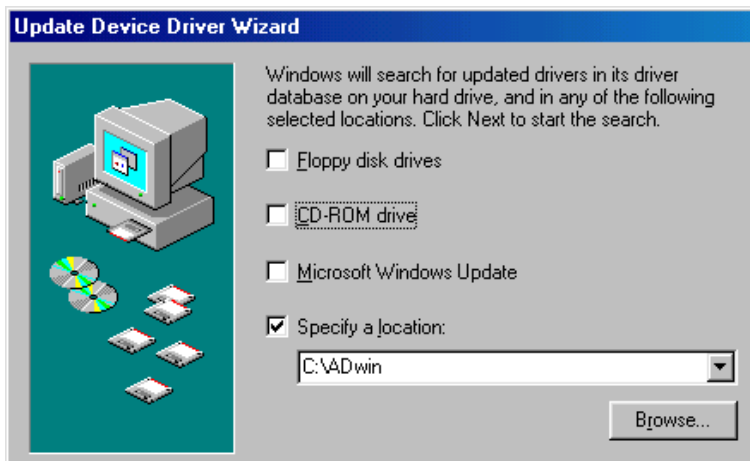
Start your PC.

The operating systems Windows 9x, ME, 2000, XP, Vista, 7, 8, 10 recognize the new hardware automatically and look for the best driver. If the operating system does not react, restart Windows.

Windows XP, Vista, and Windows 7, 8, 10 install the driver without interaction. Please continue with paragraph *ADconfig*.

The operating systems Windows 9x, ME, and 2000 start the device manager in order to install the drivers and ask for a source directory. With standard installation starting from the *ADwin* CDROM version 3.00.2300, enter <C:\ADwin> (else <C:\ADbasic3> with older versions). Confirm your input with „Next“.

Driver installation from standard directory



There the device manager will find the file <ADUSB.INF>. You can connect up to 8 ADwin systems with USB interface to the PC.

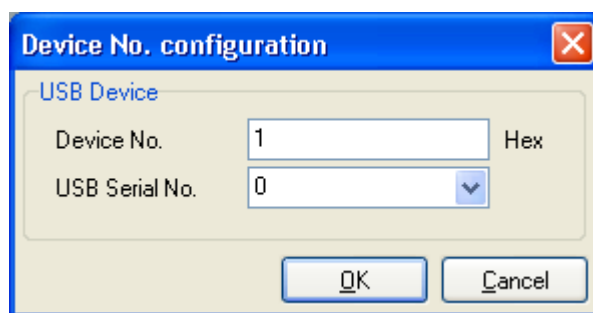
If the driver installation has not been successful, you can activate the driver later in the Windows start menu: Settings ► Control panel ► System. Start the "Device Manager" under the tab "Hardware".

The device manager marks every device, which is recognized, but not installed properly with a question mark or a prohibitory sign. Select the corresponding ADwin hardware. In the next screen "Properties...", select: "Driver" and then: "Update driver". Continue as is described above.

Now call the program ADconfig under the Windows start menu: Programs ► ADwin, in order to allocate a Device No. to your ADwin system. More detailed information about the program can be found in the online help of ADconfig.

Open the window "Edit/Properties", and then the pull-down list at "USB-Serial No.". The serial numbers of all connected ADwin USB systems are listed there.

Select the number of the ADwin system you want to work with. You find the serial number on a label on every ADwin USB adapter or ADwin USB system. The serial number can also be entered manually, if for instance the ADwin system is not connected.



Choose a "Device No.". A Device No. is a unique identifier for an ADwin system on a PC. The recommended Device No. 1h should be used to easily use all example programs.

Your ADwin-light-16 system is now ready for operation.

Open ADbasic (in the Windows start menu: Programs ► ADwin ► ADbasic) and check first the settings in the dialog window "Options\Compiler".

Driver update

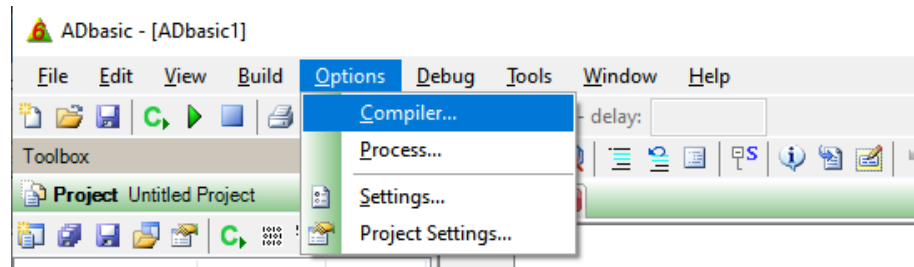
ADconfig

USB-Serial No.

Device No.

Checking the settings in ADbasic

Device No.

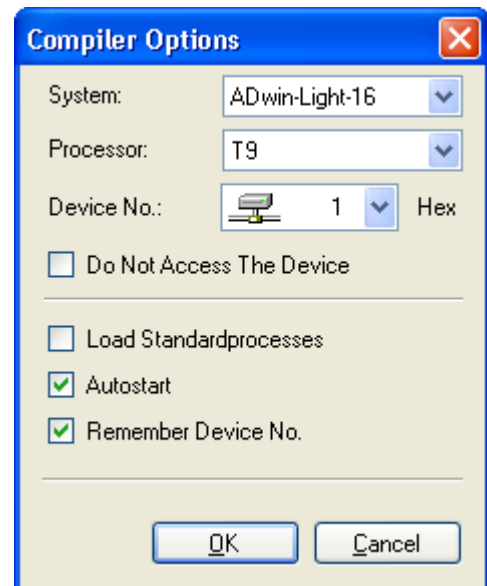


Set the options in the window: "Compiler Options" from top to bottom

- System: Choose the option "ADwin-Light16".
- Processor: The processor type "T9" of the system.
- Device No.: Set to the Device No. you have used in the programm *ADconfig*.

The setting "Do not access Device" is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.

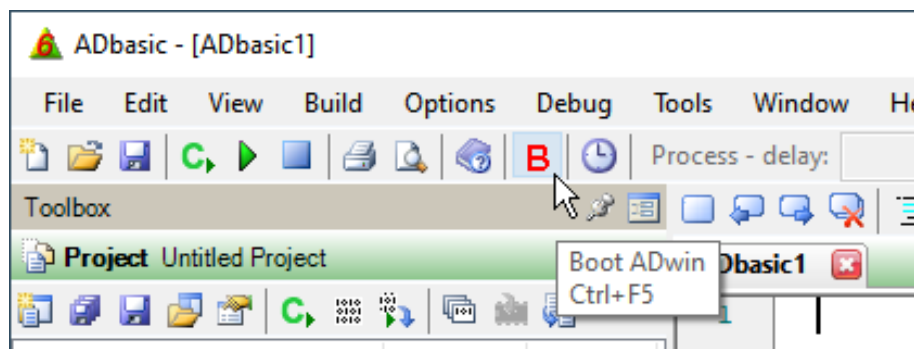
- Set the options "Load Standardprocesses", "Autostart" and "Remember Device No." later, when working with *ADbasic*.



Confirm with "OK" in order to return to *ADbasic*. The driver installation and the main settings in *ADbasic* are now finished.

Booting

Start *ADbasic* and boot the *ADwin* system by clicking on the boot button **B**.



The display in the status line: "ADwin is booted" shows that the operating system has been loaded properly and that *ADbasic* can access the *ADwin* system (if not, first check the connections).

Finishing the installation



For the further installation please keep to the order of installation instructions in chapter 2 of this manual:

- For the details about the initialization of your *ADwin* system, please see your hardware manual *ADwin-light-16*.

- The programming of your *ADwin* system is described in detail in the *ADbasic* manual.
- Start programming with the examples in the *ADbasic* tutorial.

Programming with *ADbasic*

The first step



System requirements

8 ADwin-Gold system with USB interface

The first step to install your *ADwin* system is **always** the installation of the *ADwin*-CDROM (chapter 3 of this manual).

Please pay attention to the version number of the CDROM, especially if you have an update. Depending on the interface, older versions do not always have the necessary drivers.

For the installation you need an *ADwin* software package, version 3.00.2332 or higher. (Recommended: 3.00.2400 or higher).

The requirements for the installation are:

- Windows operating system 98, ME, NT, 2000, XP, Vista, 7, 8, 10, 11. The latest Windows update should be installed.
- Deactivate all energy saving functions of your PC operating system and mainboards (BIOS); this is not necessary for the monitor and the hard disk.

This configuration guarantees a correct function of the *ADwin* drivers and also of your PC applications (e. g. test stand programs).

You make the configuration in the Windows start menu *Settings* ▶ *Control Panel* ▶ *Power Option*

System standby: Option „Never“

Hibernate: Deactivate the option „Enable hibernate support“.

Power buttons: Set this option so that the PC *does not* change to standby mode after pressing the power button.

For monitor and hard disk we recommend also disabling energy saving functions (more details see annex, chapter A.2).

- Under Windows 10 / 11, deactivate the safety function Core isolation (Memory integrity). This configuration guarantess the correct function of the *ADwin* USB driver.

Deactivate the option here: Windows start menu, *Settings* ▶ *Windows security* ▶ *Device security* ▶ *Core isolation*:

Memory integrity: Option "Off"

- Functions

The following *ADwin-Gold* systems with USB interface are available:

- *ADwin-Gold* with built-in USB interface
- *ADwin-Gold* -USB-Conv, an external USB-link-adapter in an aluminum enclosure; all *ADwin* systems can be upgraded with the USB-link-adapter.

With the USB interface, you can use the "plug & play" feature of the Windows operating system, such as the fast and easy installation even when using several *ADwin* systems.

The interface has the following features:

Supported USB standards:	USB 1.1 and USB 2.0
Physical data transfer rate:	12 Mbps (full speed)
Number of <i>ADwin</i> systems connected to a PC:	max. 8

After the installation of an update from the *ADwin* CDROM you have to restart Windows and to switch off the *ADwin* system. If the *ADwin* system gets the power from the PC, you must switch the PC off and on again - do not only restart it.

If you switch off an *ADwin* system with USB interface, you must at least wait 5 seconds before you power it up again.

To ensure USB communication be as failure-free as possible, we recommend establishing a low-impedance (short, very thick) ground connection between PC-casing and the *ADwin* USB-device.

The ground connection may also – contrary to the inept USB cable – equalize existing differences in potential very well.

The standard delivery items of the *ADwin-Gold* system:

- *ADwin-Gold* or *ADwin-Gold-D*
- Three-pole power supply cable with one power supply plug, length 2.0 meters. Please read the Notes about Power Supply Cable (annex A.3).
- USB cable (length 1.8 m)

If there is a great distance between the *ADwin* system and the PC, we recommend using an *ADwin-Gold* system with Ethernet interface.

- When you are using an external USB-link-adapter:
 - *ADwin-Gold-USB-Conv*
 - Power supply cable (length approx. 0.5 m)
 - *ADlink* cable with two micro connectors (length approx. 0.5 m)

Follow the installation (in this order):

- Setting up the data connection
- Installing the drivers

8.1 Setting up the power supply

- Use one of these sources as power supply:
 - External power supply unit. Please read the Notes about Power Supply Cable (annex A.3).
 - An *ADlink-PC-ISA* board, installed in the PC
- Connect the power supply to the *ADwin-Gold* system:
 - If you don't use a USB-link-adapter:
Connect the power source and *ADwin-Gold* system with the power supply cable (2m length).
 - If you use a USB-link-adapter:
Connect the power source and the USB adapter with the 2 m power supply cable.
Connect the USB adapter and the *ADwin-Gold* system with the 0.5 m power supply cable.
 - Do not yet power on the *ADwin-Gold* system.
- The *ADwin-Gold* system is not or unsufficiently connected to earth via power supply.

Connect the GND socket with the central earth connection point of your device and read the information in your hardware manual.

Now the power supply is installed successfully. Do not yet power up your *ADwin* system.



Standard delivery



Connecting

Driver installation from standard directory

Driver update

8.2 Setting up the data connection

Direct connection

Connect the PC and *ADwin-Gold* system with the USB cable.

Connection via USB-link-adapter

- Connect USB adapter and *ADwin-Gold* system via *ADlink* cable.
- Connect PC and USB adapter with the USB cable.

The data are transferred via USB cable from the PC to the USB adapter; here an *ADlink* cable transfers the data to the *ADwin-Gold* system (and vice versa).

8.3 Installing the drivers

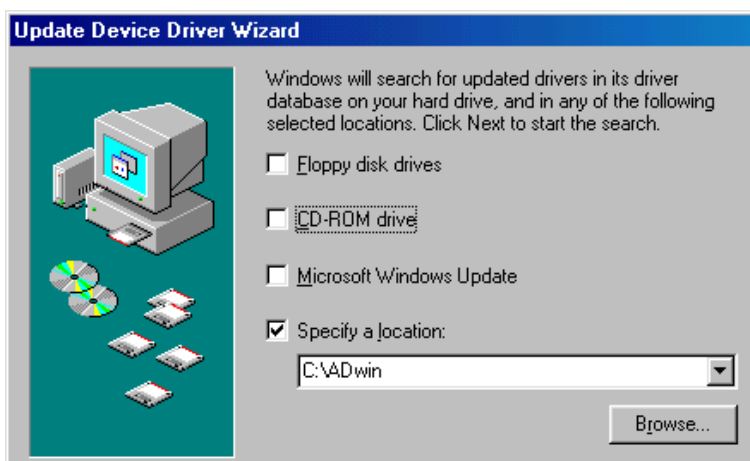
Before you connect data cables to the *ADwin-Gold* system, please read your hardware manual including the chapter "Initialization of the hardware". Do not yet connect any inputs or outputs.

If you have installed your *ADwin* system according to the notes in your hardware manual, you can switch on the system.

The operating systems Windows 9x, ME, 2000, XP, Vista, 7, 8, 10 recognize the new hardware automatically and look for the best driver. If the operating system does not react, restart Windows.

Windows XP, Vista, and Windows 7, 8, 10 install the driver without interaction. Please continue with paragraph *ADconfig*.

The operating systems Windows 9x, ME, and 2000 start the device manager in order to install the drivers and ask for a source directory. With standard installation starting from the *ADwin* CDROM version 3.00.2300, enter <C:\ADwin> (else <C:\ADbasic3> with older versions). Confirm your input with „Next“.



There the device manager will find the file <ADUSB.INF>. You can connect up to 8 *ADwin* systems with USB interface to the PC.

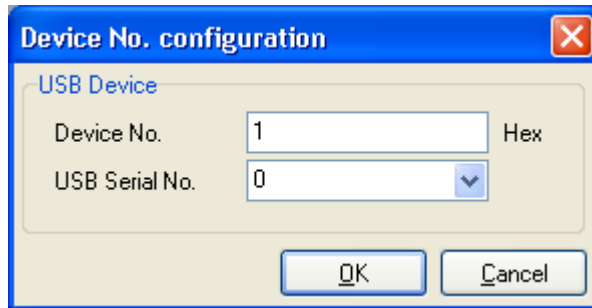
If the driver installation has not been successful, you can activate the driver later in the Windows startmenu: Settings ▶ Control panel ▶ System. Start the "Device Manager" under the tab "Hardware".

The device manager marks every device, which is recognized, but not installed properly with a question mark or a prohibitory sign. Select the corresponding *ADwin* hardware. In the next screen "Properties...", select: "Driver" and then: "Update driver". Continue as is described above.

Now call the program *ADconfig* under the Windows start menu: Programs ► ADwin, in order to allocate a Device No. to your ADwin system. More detailed information about the program can be found in the online help of *ADconfig*.

Open the window "Edit/Properties", and then the pull-down list at "USB-Serial No.". The serial numbers of all connected ADwin USB systems are listed there.

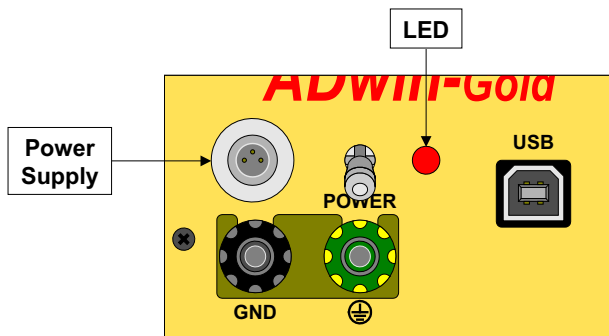
Select the number of the ADwin system you want to work with. You find the serial number on a label on every ADwin USB adapter or ADwin USB system. The serial number can also be entered manually, if for instance the ADwin system is not connected.



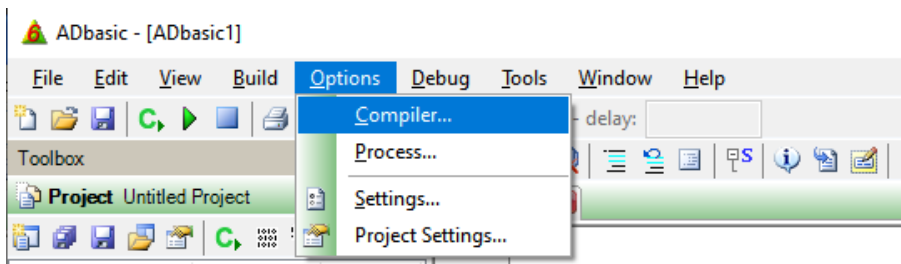
Choose a "Device No.". A Device No. is a unique identifier for an ADwin system on a PC. The recommended Device No. 1h should be used to easily use all example programs.

Your ADwin-Gold system and the USB linkadapter are now ready for operation. Switch on the system with the POWER switch (lifti the switch a little).

After power-up, the green LED is blinking (with USB linkadapter) or the red LED is blinking (with integrated USB-interface); if neither LED is blinking, check the connections.



Open *ADbasic* (in the Windows start menu: Programs ► ADwin ► ADbasic) and check first the settings in the dialog window "Options\Compiler".



Set the options in the window: "Compiler Options" from top to bottom

ADconfig

USB-Serial No.

Device No.

Power up

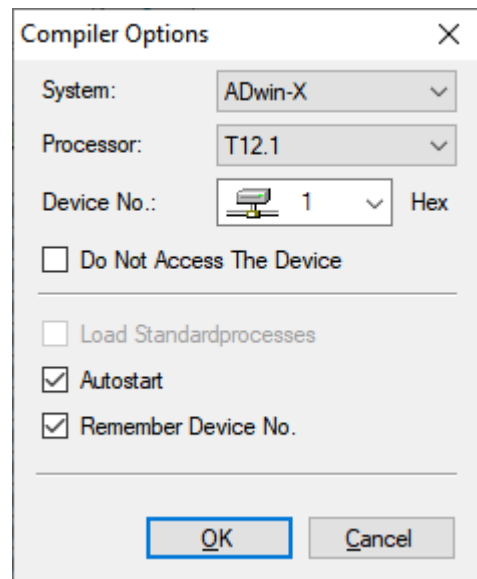
Checking the settings in ADbasic

Device No.

- System: Choose the option "ADwin-Gold".
- Processor: The processor type "T9" of the system.
- Device No.: Set to the Device No. you have used in the programm *ADconfig*.

The setting "Do not access Device" is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.

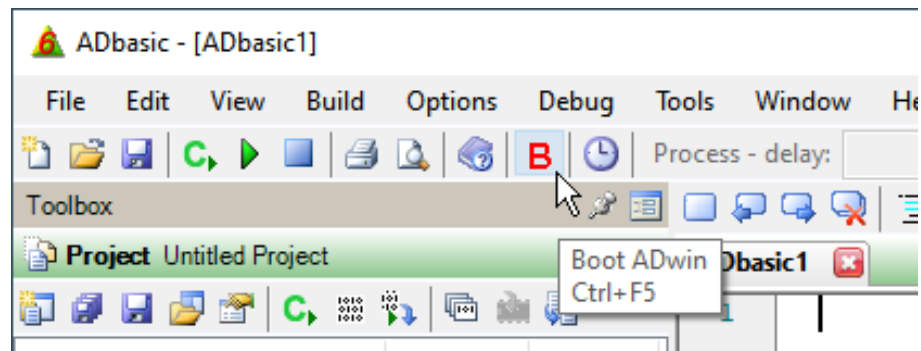
- Set the options "Load Standardprocesses", "Autostart" and "Remember Device No." later, when working with *ADbasic*.



Confirm with "OK" in order to return to *ADbasic*. The driver installation and the main settings in *ADbasic* are now finished.

Bootling

Start *ADbasic* and boot the *ADwin* system by clicking on the boot button **B**.



The blinking of the green LED next to the "POWER" switch as well as the display in the status line: "ADwin is booted" shows that the operating system has been loaded properly and that *ADbasic* can access the *ADwin* system (if not, first check the connections).

Finishing the installation

For the further installation please keep to the order of installation instructions in chapter 2 of this manual:

- For the details about the initialization of your *ADwin* system, please see your hardware manual *ADwin-Gold- USB / -ENET*.
- The programming of your *ADwin* system is described in detail in the *ADbasic* manual.
- Start programming with the examples in the *ADbasic* tutorial.



Programming with *ADbasic*

9 ADwin-Pro module with USB interface

The first step to install your *ADwin* system is **always** the installation of the *ADwin*-CDROM (chapter 3 of this manual).

Please pay attention to the version number of the CDROM, especially if you have an update. Depending on the interface, older versions do not always have the necessary drivers.

For the installation you need an *ADwin* software package, version 3.00.2332 or higher. (Recommended: 3.00.2400 or higher).

- The requirements for the installation are:
- Windows operating system 98, ME, NT, 2000, XP, Vista, 7, 8, 10, 11. The latest Windows update should be installed.
- Deactivate all energy saving functions of your PC operating system and mainboards (BIOS); this is not necessary for the monitor and the hard disk.

This configuration guarantees a correct function of the *ADwin* drivers and also of your PC applications (e. g. test stand programs).

You make the configuration in the Windows start menu **Settings** ▶ **Control Panel** ▶ **Power Option**

System standby: Option „Never“

Hibernate: Deactivate the option „Enable hibernate support“.

Power buttons: Set this option so that the PC *does not* change to standby mode after pressing the power button.

For monitor and hard disk we recommend also disabling energy saving functions (more details see annex, chapter A.2).

- Under Windows 10 / 11, deactivate the safety function Core isolation (Memory integrity). This configuration guarantess the correct function of the *ADwin* USB driver.

Deactivate the option here: Windows start menu, **Settings** ▶ **Windows security** ▶ **Device security** ▶ **Core isolation**:

Memory integrity: Option "Off"

- Functions

The following *ADwin-Pro* modules with USB interface are available:

- The *Pro-USB* extra module for the *Pro-CPU-T9* (and other ADSP processor modules).
- *Pro-CPU-T9-USB* with integrated USB interface.

With the USB interface, you can use the "plug & play" feature of the Windows operating system, such as the fast and easy installation even when using several *ADwin* systems.

The interface has the following features:

Supported USB standards:	USB 1.1 and USB 2.0
Physical data transfer rate:	12 Mbps (full speed)
Number of <i>ADwin</i> systems connected to a PC:	max. 8

After the installation of an update from the *ADwin* CDROM you have to restart Windows and to switch off the *ADwin* system. If the *ADwin* system gets the

The first step



System requirements



Standard delivery

power from the PC, you must switch the PC off and on again - do not only restart it.

If you switch off an *ADwin* system with USB interface, you must at least wait 5 seconds before you power it up again.

The standard delivery items are:

- One of the *Pro-USB* or *Pro-CPU-T9-USB* modules
- USB cable from the PC to the *Pro-USB* module (length approx. 1.8 m)
If there is a great distance between the *ADwin* system and the PC, we recommend using an *Pro-CPU* module with Ethernet interface.
- When you are using a *Pro-USB* module:
Link cable with two micro connectors (length approx. 0.2 m) from the *Pro-USB* module to the *Pro-CPU-T9* module.

Follow the installation (in this order):

- Installing the *Pro-USB* module
- Installing the drivers

9.1 Installing the *Pro-USB* module

Before connecting the PC to the *ADwin-Pro* system, read the *ADwin-Pro* hardware manual, including the chapter "Initialization of the hardware". Configure your *ADwin* system according to the information given in the manual.

Do not yet connect any inputs and outputs.

Install the module:

- Select a free plug-in slot near the CPU module
The link cable is kept short intentionally.
Remove the cover plate from an empty plug-in slot or remove the module from this slot.
- Plug-in the *Pro-USB* module and connect the *ADlink* cable with the *Pro-CPU-T9* module
- Connect the *Pro-USB* module and the PC with the USB cable.

To ensure USB communication be as failure-free as possible, we recommend establishing a low-impedance (short, very thick) ground connection between PC-casing and the *ADwin* USB-device.

The ground connection may also – contrary to the inept USB cable – equalize existing differences in potential very well.

9.2 Installing the drivers

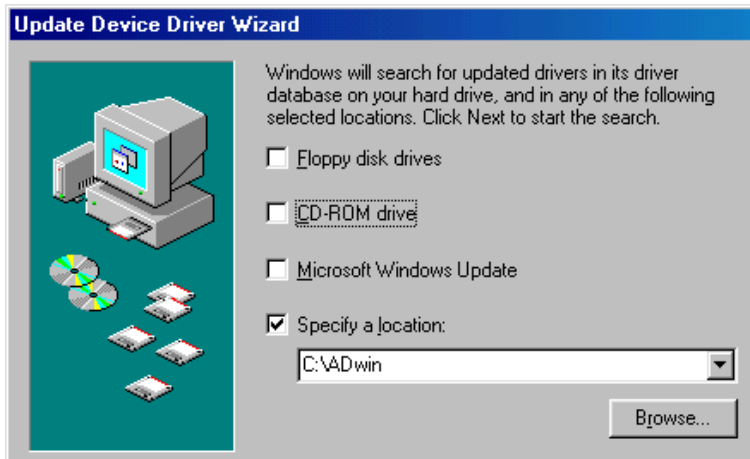
The operating systems Windows 9x, ME, 2000, XP, Vista, 7, 8, 10 recognize the new hardware automatically and look for the best driver. If the operating system does not react, restart Windows.

Windows XP, Vista, and Windows 7, 8, 10 install the driver without interaction. Please continue with paragraph *ADconfig*.

The operating systems Windows 9x, ME, and 2000 start the device manager in order to install the drivers and ask for a source directory. With standard installation starting from the *ADwin* CDROM version 3.00.2300, enter <C:\ADwin> (else <C:\ADbasic3> with older versions). Confirm your input with „Next“.

Driver installation from standard directory





Here the device manager finds the file <ADUSB.INF>. You can connect up to 8 ADwin systems with USB interface to the PC.

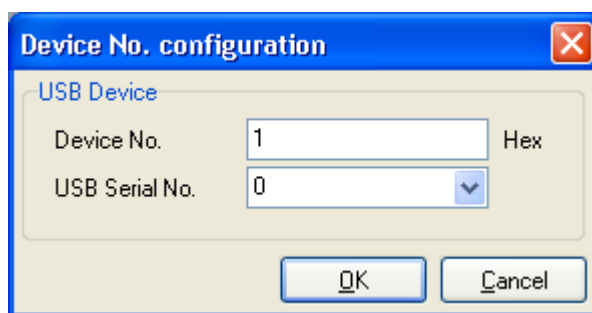
If the driver installation has not been successful, you can activate the driver later in the Windows start menu: Settings ► Control panel ► System. Start the "Device Manager" under the tab "Hardware".

The device manager marks every device, which is recognized, but not installed properly with a question mark or a prohibitory sign. Select the corresponding ADwin hardware. In the next screen "Properties...", select: "Driver" and then: "Update driver". Continue as is described above.

Now call the program ADconfig under the Windows start menu: Programs ► ADwin, in order to allocate a Device No. to your ADwin system. More detailed information about the program can be found in the online help of ADconfig.

Open the window "Edit/Properties", and then the pull-down list at "USB-Serial No.". The serial numbers of all connected ADwin USB systems are listed there.

Select the number of the ADwin system you want to work with. You find the serial number on a label on every ADwin USB adapter or ADwin USB system. The serial number can also be entered manually, if for instance the ADwin system is not connected.



Choose a "Device No.". A Device No. is a unique identifier for an ADwin system on a PC. The recommended Device No. 1h should be used to easily use all example programs.

After power-up the green LED is blinking (if not, please check the connections).

Open ADbasic (in the Windows start menu: Programs ► ADwin ► ADbasic) and check first the settings in the dialog window "Options\Compiler".

Driver update

ADconfig

USB-Serial No.

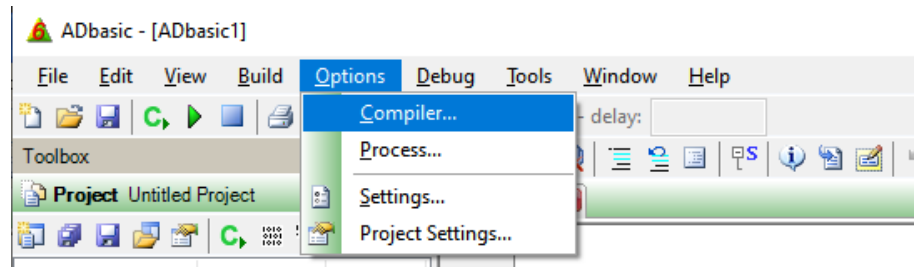
Device No.

**Your ADwin-Pro system
is now ready for
operation.**

Power-up

Checking the settings in ADbasic

Device No.

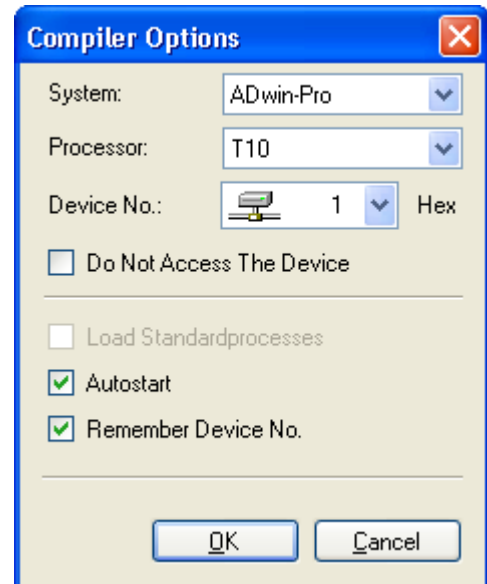


Set the options in the window: "Compiler Options" from top to bottom

- System: Choose the option "ADwin-Pro".
- Processor: The processor type of the *ADwin-Pro* system.
- Device No.: Set to the Device No. you have used in the program *ADconfig*.

The setting "Do not access Device" is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.

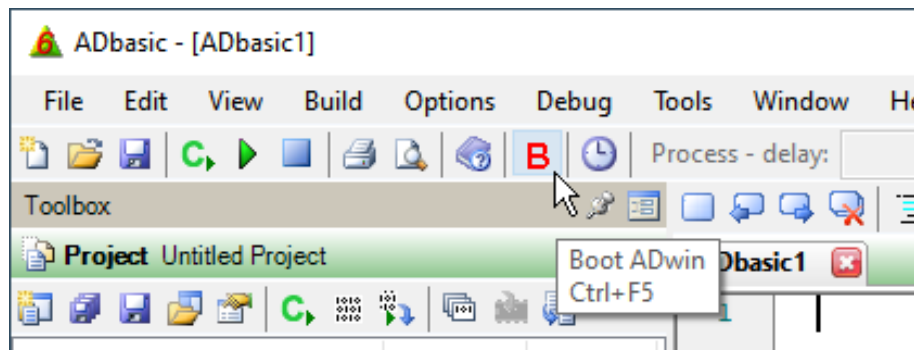
- Set the options "Load Standardprocesses", "Autostart" and "Remember Device No." later, when working with *ADbasic*.



Confirm with "OK" in order to return to *ADbasic*. The driver installation and the main settings in *ADbasic* are now finished.

Booting

Start *ADbasic* and boot the *ADwin* system by clicking on the boot button **B**.



The blinking of the green LED on the CPU module as well as the display in the status line: "ADwin is booted" shows that the operating system has been loaded properly and that *ADbasic* can access the *ADwin* system (if not, first check the connections).

Finishing the installation



For the further installation please keep to the order of installation instructions in chapter 2 of this manual:

- For the details about the initialization of your *ADwin* system, please see your hardware manual *ADwin-Pro I*.

- The programming of your *ADwin* system is described in detail in the *ADbasic* manual.
- Start programming with the examples in the *ADbasic* tutorial.
- The software instructions developed especially for *ADwin-Pro* systems can be found in the manual "*ADwin-Pro* system specifications - Programming in *ADbasic*".

Programming with *ADbasic*

ADwin-Pro programming

The first step



System requirements

ADwin systems with Ethernet interface

10 ADwin System with Ethernet Interface

The first step to install your *ADwin* system is **always** the installation of the *ADwin*-CDROM (chapter 3 of this manual).

Please pay attention to the version number of the CDROM, especially if you have an update. Depending on the interface, older versions do not always have the necessary drivers.

These are conditions for correct operation:

- When working with the operating system Windows 95, <Winsock2> must be installed. Please pay attention to the notes during the installation of the *ADwin* software package. When using other Windows operating systems, this step is not necessary.
- For Windows operating systems 98, ME, NT, 2000, XP, Vista, 7, 8, 10, 11 the newest Windows update should be installed.
- Deactivate all energy saving functions of your PC operating system and mainboards (BIOS); this is not necessary for the monitor and the hard disk.

This configuration guarantees a correct function of the *ADwin* drivers and also of your PC applications (e. g. test stand programs).

You make the configuration in the Windows start menu **Settings** ▶ **Control Panel** ▶ **Power Option**

System standby: Option „Never“

Hibernate: Deactivate the option „Enable hibernate support“.

Power buttons: Set this option so that the PC *does not* change to standby mode after pressing the power button.

For monitor and hard disk we recommend also disabling energy saving functions (more details see annex, chapter A.2).

The following *ADwin* systems are available with an *ADwin* Ethernet interface. The interface exists as version ENET-1...ENET-3.

- *ADwin-light-16* with ENET-2 (up to rev. B9) or ENET-3 (since rev. B20):
 - *L16-EURO-ENET*
 - *L16-EXT-ENET*
- *ADwin-X-A20* with integrated Ethernet interface (mostly equal to ENET-3)
- *ADwin-Gold*:
 - *ADwin-Gold-ENET*, *ADwin-Gold-D-ENET* with ENET-2 (up to rev. B13) or ENET-3 (since rev. B20)
 - *Gold-ENET-Conv* (external Ethernet link adapter) with ENET-1
- *ADwin-Gold II* with ENET-2 (until Rev. A9) or ENET-3 (since Rev. A10)
- *ADwin-Pro Modules*:
 - *Pro-CPU-T12* with ENET-3
 - *Pro-CPU-T11* with ENET-2 (until Rev. E9) or ENET-3 (since Rev. E10)
 - *Pro-CPU-T10-ENET* with ENET-1 (up to Rev. A7), with ENET-2 (up to rev. B9), or ENET-3 (since rev. C1)
 - *Pro-CPU-T9-ENET* with ENET-2 (up to rev. C4) or ENET-3 (since rev. C20)
 - *Pro-ENET*, additional Ethernet module (ENET-1) for ADSP processor modules

With the "bootloader" option, you can boot an *ADwin* system automatically when starting the *ADwin* Ethernet interface, as well as automatically loading and starting processes.

With the *ADwin* Ethernet interface, you can access one or more *ADwin* systems from one or more PCs. The connection between PC and *ADwin* Ethernet interface can be made via:

- a "cross-over" cable (standard delivery)
- a separate network (network cables not part of the standard delivery)
- an intranet (network cables not part of the standard delivery)
- possibly even by internet

Pay attention to the following notes when using an *ADwin* Ethernet interface:

Supported standards:	10MBit/s, 100MBit/s, 1000MBit/s (ENET-3 only) automatic recognition
Required cable quality	Category 5e or better
Max. cable length from the <i>ADwin</i> system to the next switch / hub	100 m

There are no restrictions for selecting a router, switch, hub or network card.

The standard delivery items are:

- One of the *ADwin* systems with Ethernet interface, as mentioned above
- "Cross-over" cable from the PC to the *ADwin* system (length approx. 1.8m)
- For *X-A20*, *L16-EXT-ENET*, *Gold-ENET*, *Gold-D-ENET* or *Gold II*:
A 3-pole cable for power supply (length approx. 2 m), one side with inverse-polarity protected connector, one side open for self-assembly. Please read the Notes about Power Supply Cable (annex A.3).
- For *Gold-ENET-Conv* only:
 - Power supply cable (length approx. 0.5 m)
 - *ADlink* cable with two micro connectors (length approx. 0.5 m)
- For the *Pro-ENET* module only:
Link cable with two micro connectors (length approx. 0.5 m)

At first set up the power supply of the *ADwin* system (chapter 10.1), connect to the PC, then configure the Ethernet interface with *ADconfig* (page 57).

The following paragraphs contain information about the configuration of your Ethernet interface. Proceed according to the order of the paragraphs:

- Setting up the power supply (page 52)
- Basic information about Ethernet operation (page 52)
- Configure with *ADconfig* (page 57)
- Do settings in *ADbasic* (page 59)
- Displaying the operation mode of ENET (page 60)
- Updating the firmware version (page 61)
- Application-specific features (page 61)
- Bootloader option for the *ADwin* Ethernet interface (page 62)

Functions

Standard delivery

Continue here

10.1 Setting up the power supply

The position and pin assignment of the power supply connector is described in the hardware manual.

- *X-A20, L16-EXT-ENET, Gold-ENET, Gold-D-ENET, Gold II*: You require an external power supply. Please read the Notes about Power Supply Cable (annex A.3).
- Connect the power supply cable to the *ADwin* device.

Pay attention to a reliable power supply via the external power supply, or (in a car) the battery voltage.



Via power supply, the *ADwin* system is not or unsufficiently connected to earth! Connect the GND socket with the central earth connection point of your device and read the information in your hardware manual.

You now have successfully established the power supply. Please do not yet switch on the *ADwin* device.

Before you can configure the *ADwin* Ethernet Interface, you have to connect it to the PC. In chapter 10.2.2, you find examples for connections with the network interface card of the PC.

10.2 Basic information about Ethernet operation

For the configuration of the *ADwin* Ethernet interface the instructions, described in the following chapters are necessary:

- MAC address, page 52
- IP Address and Subnet Mask, page 53
- Default Gateway (optional), page 56
- DHCP, page 56
- Port number, page 56
- Password, page 56
- Timeout, page 57

10.2.1 MAC address

Each interface on each Ethernet device has a worldwide individual MAC address (Media Access Control Address). The MAC address (6 bytes) is allocated only once during the manufacturing of the *ADwin* Ethernet interface and cannot be changed later.

This address is only necessary during installation of the program *ADconfig* for precise identification. The address is to be found on a label on the *ADwin* Ethernet interface.

On devices with 2 interfaces you also find only one MAC address on the label. To get the second MAC address, add 1 to the address on the label.

Example: The second address to 00-22-71-07-9A would be 00-22-71-07-9B.

MAC address

10.2.2 IP Address and Subnet Mask

ADwin systems with Ethernet interface use the network protocol TCP and UDP via IP. Each device participating in the network, the host, is identified by a unique logic IP address—which is also true for the ADwin Ethernet Interface. You set the IP address of the ADwin system with the program *ADconfig* (page 57).

The used IP address has the size of 4 bytes. Each IP address consists of 2 parts: the network identification and the host identification. All TCP/IP devices in a normal network, which want to communicate with each other, must have the same network identification and different host identifications. The subnet mask (4 bytes) determines, which part of the IP address is the network identification and which part is the host identification.

If you want to know the IP address of your own PC, start a DOS shell and call the program *ipconfig*. You can as well ask your system administrator for your IP address.

IP address and subnet mask are mostly displayed in decimal code, separated by a dot, for example:

IP address: 192.168.0.1
Subnet mask: 255.255.255.0

Each digit, separated by a dot may have the values 0 to 255.

If you look at the subnet mask and IP address in binary code, the relation is more clearly seen:

IP address	11000000.10101000.00000000	. 00000001
Subnet Mask	11111111.11111111.11111111	. 00000000
	<div style="text-align: center;"> } network identification </div>	<div style="text-align: center;"> } host- identifica- tion </div>

In the subnet mask, "1" determines that this place in the IP address is the network identification. Any "0" digit is the host identification. Usually, the "1" and "0" digits are set consecutively and in groups of 8. Discrepancies are possible (e.g. in a private network).

In the example above, "192.168.0" is the network identification and "1" the host identification.

The subnet mask also determines the maximum number of the TCP/IP devices in a network, in this example 255.

- The host identification 0 and the highest possible host identification are reserved and must not be allocated.
- The size of the host identification can vary between 2 bits and 32 bits depending on the subnet mask.

10.2.3 Examples of Ethernet Connections

The following 4 examples show how to access an ADwin Ethernet Interface from the PC.

We recommend connecting the AEI via a second network card directly to the PC, see Example 1. The advantage is a reliably high data transfer rate and the clear documentation of accesses to the ADwin hardware.

According to the connection between PC and AEI the setting of IP address and subnet mask are different.

IP Address

IP address of my PC

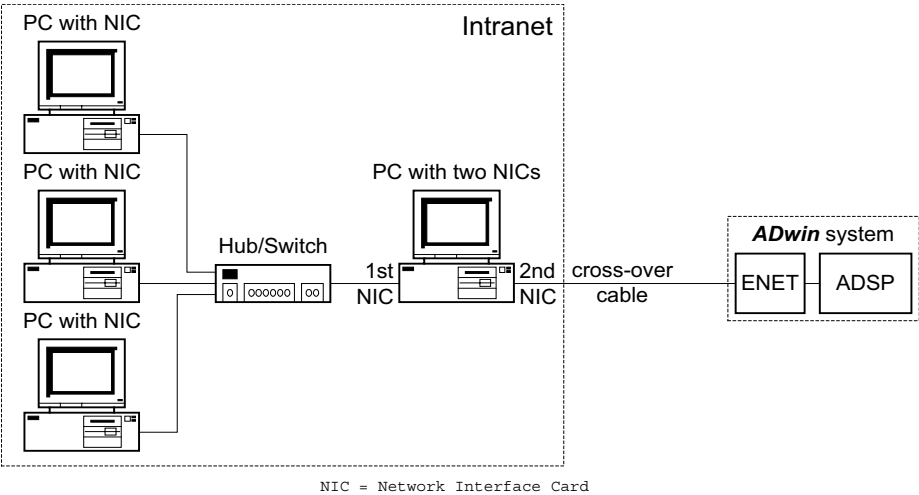
IP and subnet mask



Intranet network card and
own network card

Example 1

If your PC is connected via network card to an intranet and you would like to operate several *ADwin* Ethernet interfaces independent of the intranet, you can do so without any problems with a second network card in the PC and a connection with a cross-over cable (standard delivery).



Since version ENET-3 of the *ADwin* Ethernet interface, you can either use a "cross-over" or a "straight" cable, since the *ADwin* Ethernet interface automatically adapts to the given cable.

You can configure the second network card according to the examples described above.

If it happens that the proposed network identification is already occupied by the intranet network card, then choose the next higher value. In the example above, this would be 192.168.1.

Device	Subnet Mask	IP address	Identification	
			network	host
PC 1st NIC	255.255.255.0	192.168.0.1	192.168.0	1
PC 2nd NIC	255.255.255.0	192.168.1.1	192.168.1	1
ADwin ENET	255.255.255.0	192.168.1.2	192.168.1	2



The network identification of the intranet network card and the network identification of the network card to the *ADwin* system must not be identical.

Example 2

If you want to operate the *ADwin* Ethernet interface in an intranet, ask your system administrator for the subnet mask and a free IP address for your module.

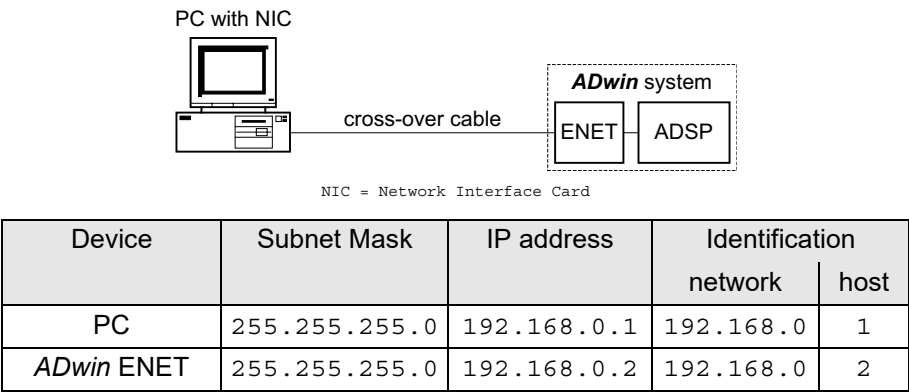
Example 3

If you connect the *ADwin* Ethernet interface with a network card in your PC via a so-called "cross-over" cable (standard delivery), you can make the following configurations.

Since version ENET-3 of the *ADwin* Ethernet interface, you can either use a "cross-over" or a "straight" cable, since the *ADwin* Ethernet interface automatically adapts to the given cable.

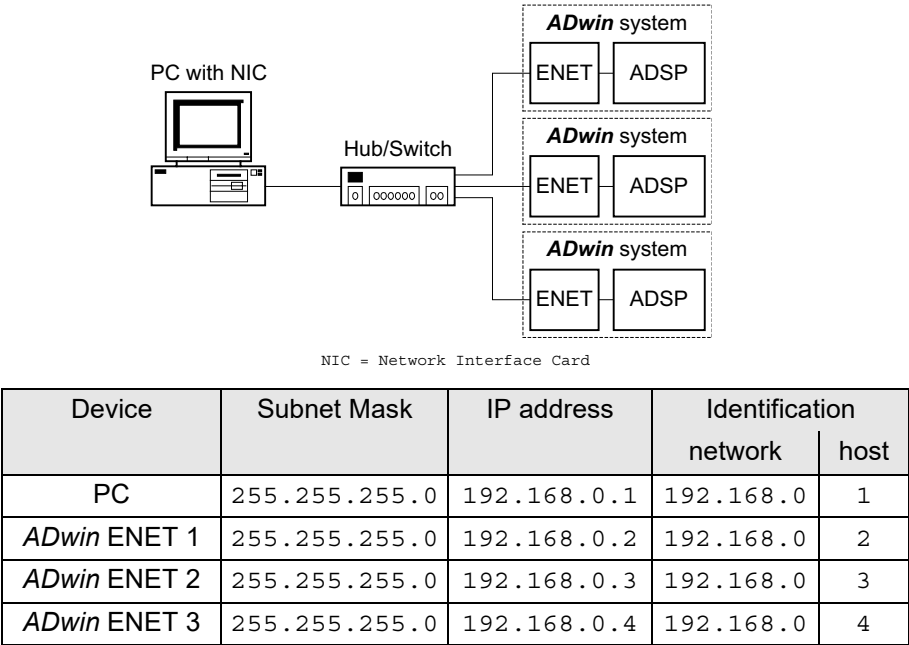
Intranet

Own network card

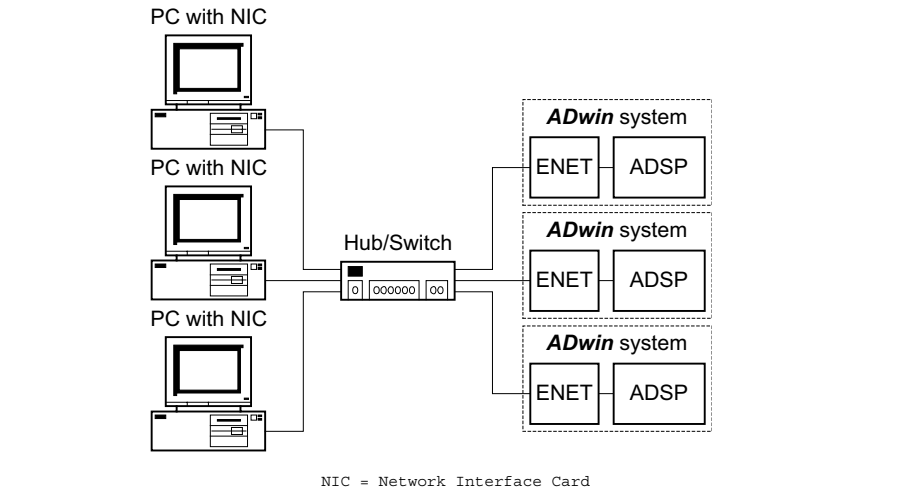


Example 4

If you connect several ADwin Ethernet interfaces with your network card via a hub/switch (the network cable is not part of the standard delivery), you can use the following configurations:



For more PCs or ADwin Ethernet interfaces you can simply use the same subnet mask and the same network identification. For the host identification you choose the next higher value.



Hub/Switch

Default Gateway

10.2.4 Default Gateway

If several networks with different network identifications are connected with each other by a router (gateway) and if the *ADwin* Ethernet system is to be accessed by a different network, then you have to indicate the "default gateway".

If the *ADwin* Ethernet interface is accessed by an IP address, which has a network identification different from the *ADwin* Ethernet interface, then the response is sent to the "default gateway". The default gateway is responsible for the correct transfer of the response. The IP address of the default gateway must have the same net identification as the *ADwin* Ethernet interface.

Ask your network administrator for the IP address of the default gateway. If working with simple networks, indicating the default gateway is not necessary.

DHCP

10.2.5 DHCP

With DHCP (Dynamic Host Configuration Protocol), the IP addresses of the hosts (TCP/IP devices) are allocated and managed dynamically by the DHCP server. In this case, the involved hosts have to support DHCP.

With an *ADwin* Ethernet interface, this support can be enabled or disabled. But to use DHCP with the *ADwin* Ethernet interface cannot be recommended, because as a consequence, the IP address of the *ADwin* Ethernet interface can be changed by the DHCP server.

This occurs for instance, when the communication of the *ADwin* Ethernet interface to the network is interrupted for a certain time. Since the *ADwin* Ethernet interface is accessed via its IP address and this address is now no longer identical to the address you entered in *ADconfig*, the *ADwin* Ethernet interface cannot be accessed any more.



If the *ADwin* Ethernet interface is used in a network with a DHCP server, although the DHCP support is not activated on the *ADwin* Ethernet module, the IP address of the *ADwin* Ethernet interface has to be entered/indicated in the DHCP server. Thus, the DHCP server gets the information that this address must no longer be used for a dynamic allocation.

Services

10.2.6 Port number

Since for each network device there are different services available, so-called unique "port numbers" are allocated to these services. Such services are for instance FTP (File Transfer Protocol), Telnet (Telecommunication Network) or HTTP (Hypertext Transfer Protocol). The communication between an application on a PC and an *ADwin* system via the *ADwin* Ethernet interface is such a service, too.

Port number

The port number for the service of *ADwin* communication is configurable and the default setting is 6543. Normally this setting remains unchanged, except if conflicts with other devices in the same network occur.



- The port numbers up to 1024 are "known ports" and should not be allocated to other services.
- The port number 7000 is used in an *ADwin* Ethernet interface for the configuration and must therefore not be used.

Password

10.2.7 Password

An unauthorized access to the *ADwin* Ethernet interface can be prevented by using a password, e.g. if several *ADwin* Ethernet interfaces in one network are used by different users.

The password is independent of TCP/IP.

The password is case-sensitive and has up to 10 characters.

The password protection can be bypassed. If you forget the password, you can reconfigure a protected Ethernet interface with a new password under the following circumstances:

- Version ENET-3: The Ethernet interface can be reconfigured with a new password within one minute after power-up.
- Prozessor T12.1 (ADwin-X): There are two states where you can reconfigure the Ethernet interface with a new password.
 - The hardware was powered-up but not yet booted.
 - The hardware can be reconfigured within one minute after booting.

10.2.8 Timeout

The PC communicates with the ADwin Ethernet interface via UDP protocols (User Datagram Protocol).

The timeout determines the maximum expected response time for a protocol from the PC to the ethernet module and back. This time is characterized by the connection type and the quality of connection (direct connection, intranet, internet). The standard value of one second means a short, safe connection.

If the connection is made via internet, it may be necessary to essentially increase the time for the timeout.

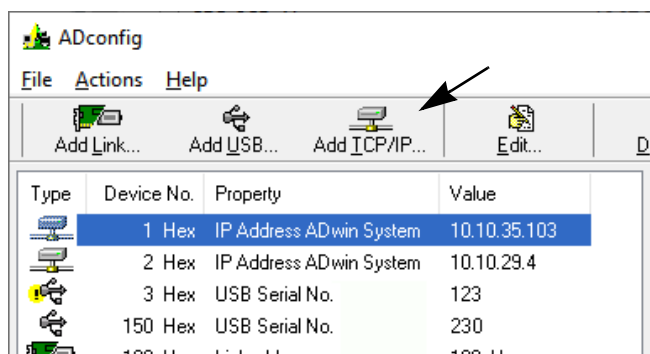
10.3 Configure with ADconfig

First, configure the settings in the PC, then the Ethernet interface using the program ADconfig.

10.3.1 Configure the PC

Configure the connection to the ADwin Ethernet interface with the program ADconfig as follows:

Configure the connection to the ADwin Ethernet interface with the program ADconfig as follows: (See also chapter 10.3.2). For more information about the program see the online help of ADconfig (button F1).



Quality of connection

PC configuration



Add TCP/IP

IP Address see page 53

Advanced...

see page 56f

OK

The difference



Non-volatile memory

ADconfig



Configure Ethernet Interface

MAC address: page 52f

Default Gateway: page 56

Port number: page 56

Password: page 56

Send configuration + Close

Checking the configuration

The Advanced settings will normally stay unchanged.

The "Device No." has no effect during the configuration of the *ADwin* Ethernet interface and should be left on the standard (default) value. A Device No. is a unique identifier for an *ADwin* system on a PC.

Do not mix up the allocation of the "Device No." to the *ADwin* Ethernet interface with the configuration of the *ADwin* Ethernet interface itself!

The configurations made in this menu are saved on the PC and these settings are transferred to the *ADwin* driver (*ADwin32.dll*) saying, which "Device No." and which configurations are necessary to access the *ADwin* Ethernet interface.

10.3.2 Configuration of the *ADwin* Ethernet interface

When configuring the *ADwin* Ethernet interface (ENET) the settings described above are transferred to the ENET and stored in a non-volatile memory (independent of power supply). For the first connection to the ENET the MAC address will be used for identification.

Execute the configuration by using the program *ADconfig* (under the Windows start menu: Programs ► *ADwin*). More detailed information on the program can be found in the online help of *ADconfig* (button F1).

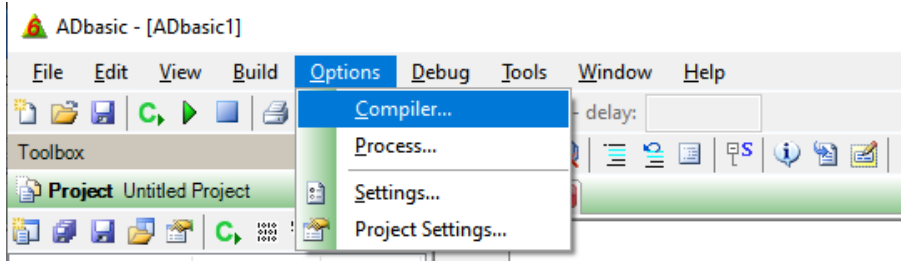
The LED "ST" and "BU" show that the configuration of the *ADwin* Ethernet interface has been successful (see also chapter 10.5).

Is is possible that configuration is disabled via DIL switches. With *ADwin-Pro* hardware, you can change the DIL settings on yourown, see annex A.3.

10.4 Do settings in ADbasic

Now connect your *ADwin* system according to the instructions in your hardware manual.

Open *ADbasic* (in the Windows start menu: Programs ► *ADwin* ► *ADbasic*) and check first the settings in the dialog window "Options\Compiler".

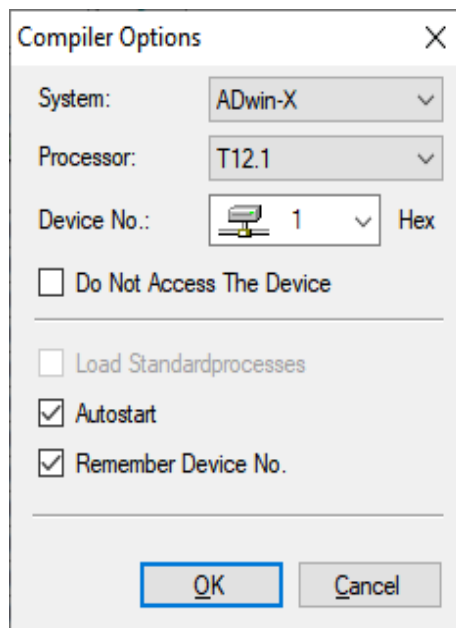


Set the options in the window: "Compiler Options" from top to bottom

- System: Select the *ADwin* system, which is used.
- Processor: Select the processor type of the *ADwin* system.
- Device No.: Select the Device No. you have used in the program *ADconfig*.

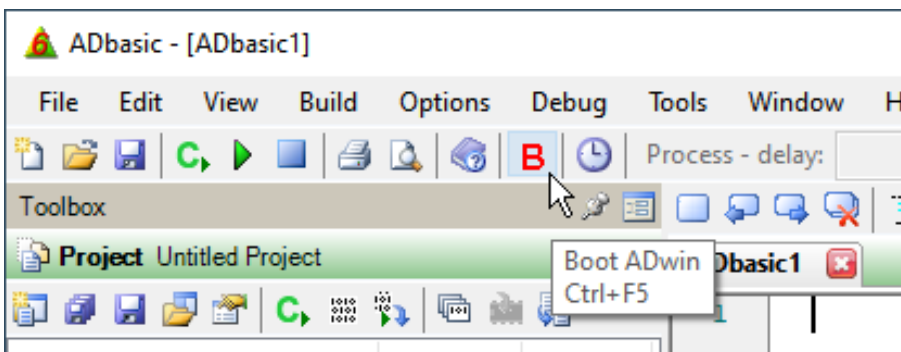
The setting "Do not Access the Device" is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.

- Set the options "Load Standardprocesses", "Autostart" and "Remember Device No." later, when working with *ADbasic*.



Confirm with "OK" in order to return to *ADbasic*. The driver installation and the main settings in *ADbasic* are now finished.

Start *ADbasic* and boot the *ADwin* system by clicking on the boot button **B**.



The blinking of the green LED on the *ADwin-Gold* system or the CPU module of the *ADwin-Pro* system as well as the display in the status line: "ADwin is booted" shows that the operating system has been loaded properly and that *ADbasic* can access the *ADwin* system (if not, first check the connections).

Checking the settings in ADbasic

Device No.

Booting

Finishing the installation



Programming with ADbasic

ADwin-Pro only

For the further installation please keep to the order of installation instructions in chapter 2 of this manual:

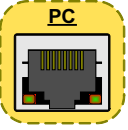
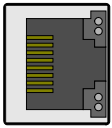
For the details about the initialization of your ADwin system, please see your hardware manual:

- ADwin-light-16
 - ADwin-X-A20
 - ADwin-Gold- USB / -ENET
 - ADwin-Gold II
 - ADwin-Pro I
 - ADwin-Pro II
- The programming of your ADwin system is described in detail in the ADbasic manual.
 - Start programming with the examples in the ADbasic tutorial.
 - Set the addresses of the ADwin-Pro modules. The setting of module addresses is described in the ADwin-Pro hardware manual.
 - The software instructions developed especially for ADwin-Pro systems can be found in the manual "ADwin-Pro system specifications - Programming in ADbasic".

10.5 Displaying the operation mode of ENET

The ADwin Ethernet module displays its mode of operation with LEDs, the signals are ST (status), BU (busy), AC (activity), LI (link), and EN (ethernet).

Position and colour of the LEDs are different according to the hardware.

Hardware	LED position
ADwin-Gold-ENET ADwin-Gold-D-ENET ADwin-Gold II with ENET-2 / ENET-3	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> orange: AC+LI red: AC green: LI </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> orange: BU+ST red: BU green: ST </div> </div> <p>Two multi-colour LEDs in the Ethernet connector.</p>
Light16 Gold-ENET-Conv Pro-CPU-T11 with ENET-2 Pro-CPU-T10-ENET Pro-CPU-T9-ENET Pro-ENET	<p>Four LEDs near the Ethernet connector for the signals AC (activity), LI (link), ST (status), BU (busy).</p> <div style="display: flex; justify-content: flex-end; align-items: center;"> AC ● ● LI ST ● ● BU </div>
Light16 with ENET-3 X-A20 Pro-CPU-T12 Pro-CPU-T11 with ENET-3 Pro-CPU-T9-ENET with ENET-3	<p>Two multi-colour LEDs near to the Ethernet connector for the signals ST (status) and BU (busy)</p> <div style="display: flex; justify-content: flex-end; align-items: center;"> ST ● ● BU </div> <p>Two double-LEDs in the Ethernet connector for the signals EN (both upper LEDs), AC (lower yellow LED), and LI (lower green LED).</p> 

Mode of operation	LED display
Ethernet Interface is sending	LED AC is lighted.
Physical connection recognized	LED LI is lighted.
Restart (the Ethernet interface)	LED ST is off. LED BU is lighted for approx. 5 seconds and then is switched off. The LED ST is now switched on and off quickly, i.e. you see a more glowing light. Now the Ethernet interface is ready for operation.
Access	The LED BU is lighted as long as the ADwin system is accessed via the Ethernet interface. In parallel, the LED ST changes its blinking rhythm.
Configuration	If a configuration is successfully accepted, the LED ST starts blinking several times before the module executes a restart with the new configuration.
Ready for operation (no communication)	LEDs LI and ST are lighted.
Ethernet standard, ENET-3 only	Two LED colours display the Ethernet standard: yellow: 10 MBit/s green: 100 MBit/s yellow+green: 1000 MBit/s

AC

LI

ST / BU

BU

ST

LI / ST

10.6 Updating the firmware version

Sometimes it is necessary to update the firmware of the ADwin Ethernet Interface. In this case, Jäger Computergesteuerte Messtechnik GmbH or the corresponding representative in your country will inform you.

You will receive the required materials and a description how to do the update from us.

Please note: There is a different hardware for each ENET version ENET-1 ... ENET-3. Therefore, an upgrade of the ENET version requires a hardware replacement; a firmware update cannot be used here.

10.7 Application-specific features

Basically there is no difference whether your application communicates with an ADwin system via ADwin Ethernet interface or another interface. All programs access the ADwin system via the ADwin driver (ADwin32.dll).

Configuring the system with the program ADconfig tells the DLL via, which interface the ADwin system is accessed.

If the communication to the ADwin system is made via ethernet (i.e. via ADwin Ethernet interface), the following items have to be considered:

- If the ADwin Ethernet interface is operated with a "cross-over" cable or an individual network, you will get the highest data integrity and the highest data transfer rates.
- The ADwin Ethernet drivers are designed for high data integrity. Nevertheless a loss of data packages may rarely occur on the network caused by multiple collisions (ethernet is a collision bus) or by multiple retries. Therefore, your program should check each time if the communication with the ADwin system was successful and respond perhaps with a retry (see also the instruction "Get_Last_Error" in the ADwin driver manual for your development environment).

Data integrity

Collision bus

Response times



- The data transfer rates via ethernet can be very high, but the response times are longer than those of other interfaces. If you have to query many *ADbasic* parameters in your program, you definitely ought to use the following instructions (see also the descriptions in the *ADwin* driver manual for your development environment):

`Get_Par_All`, `Get_FPar_All`, `Get_Par_Block`,
`Get_FPar_Block`

These instructions allow the reading of a block of or even all pre-defined variables from the *ADwin* system with only one instruction at all.

This means for the communication via Ethernet that you can get a lot of *ADwin* variables in approximately the same time as a single *ADwin* variable.

10.8 Bootloader option for the *ADwin* Ethernet interface

The *ADwin* bootloader is an ordering option of the *ADwin* Ethernet interface. In addition to the bootloader, there are interfaces to the EEPROM and external storage devices as well as a Simatic interface.

You find all information about the usage of the bootloader and the interfaces in the "Bootloader" manual.

The bootloader option offers the following functions:

- Automatical booting of the connected *ADwin* system
- Transfer of up to 10 processes from the flash memory to the *ADwin* system
- Start of the process 10 (if programmed)

You can reprogram the bootloader during operation. The bootloader can be deactivated by software or by DIL switch.

Programming with *ADethflash*



You program the bootloader of the *ADwin* Ethernet interface during normal operation using the program *ADethflash*. The operating system of the *ADwin* system and up to 10 processes can be programmed into the bootloader. The reprogramming is only effective at the next power-up of the *ADwin* Ethernet interface.

For further information, please see the notes in the program *ADethflash* (in the Windows start menu Programs ▶ *ADwin*).

Annex

A.1 List of Abbreviations

A/D	Analog to Digital	IRQ	Interrupt ReQuest
ADC	Analog to Digital Converter	KiB	kilo Byte (= 1024 Byte)
ADSP	Analog Devices Signal Processor	kByte	seeKiB
b	Binary number	LED	Light Emitting Diode
CLK	CLock	LSB	Least Significant bit
CLR	CLear	MiB	Mega-Byte (= 1024 KiB)
CMOS	Complementary Metal Oxide Semiconductor	MByte	seeMiB
CMRR	Common Mode Rejection Ratio	MSB	Most Significant bit
D/A	Digital to Analog	MUX	Multiplexer
DAC	Digital to Analog Converter	OpAmp	Operational Amplifier
DIL	Dual InLine	PC	Personal Computer
DIO	Digital Input / Output	PGA	Programmable Gain Amplifier
DIR	DIRection	S&H	Sample & Hold
DMA	Direct Memory Access	SRAM	Static Random Access Memory
DMM	Digital Multi-Meter	TTL	Transistor-Transistor Logic
DNL	Differential Non-Linearity	V _{cc}	Voltage collector-collector
DRAM	Dynamic Random Access Memory	V _{ee}	Voltage emitter-emitter
DSP	Digital Signal Processor		
EOC	End Of Conversion		
EMC	Electro-Magnetic Compatibility		
ESD	Electro-Static Discharge		
FPGA	Field Programmable Gate Array		
FSR	Full Scale Range		
GND	GrouND		
h / Hex	Hexadecimal number		
I/O	Input / Output		
IC	Integrated Circuit		
InAmp	Instrumentation Amplifier		
INL	Integral Non-Linearity		
Manufacturer			
AD	Analog Devices		
BB	Burr-Brown		
LT	Linear Technology		
TI	Texas Instruments		

A.2 Notes about Windows Settings

Windows is a multi-purpose operating system developed for home users; therefore standard settings do not match the special requirements of measurement acquisition.

We recommend the following settings:

- Deactivate all energy saving functions, e.g. for operating system, main-board (BIOS), hard disk and monitor.

Switching devices on or off may delay data transfer of measurement acquisition in short-term, permanently or even may even interrupt data transfer.

- Deactivate automatic software update via internet connections.

Any data traffic such as updates is transferred via ethernet and may delay data transfer between *ADwin* and PC. Furthermore, the Windows operating system can restart the PC during an automatic updates without warning. In this case, Windows is irrespective of any running programs with access to *ADwin* systems.

Since Windows 10 automatic updates can only be limited or paused but not be disabled permanently. If you want to ensure an unhindered access to *ADwin* systems, a workaround is to interrupt the internet connection of your PC in a suitable way.



A.3 Notes about Power Supply Cable

The power supply cable serves to supply the *ADwin* hardware from an external power source.

Please read the notes about power supply in the manual of your *ADwin* hardware.



The three-pole DC power supply cable (length 2.0 m) has a power supply plug (protected against polarity reversal) on the one side, the other side is open for self-assembly. The PE and GND wires on the open side are connected.

The three wires in the plug are connected as follows:

- red: Pin 1, +10...35V
- black: Pin 2, GND
- brown: Pin 3, PE

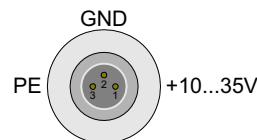


Fig. 1 – Power supply plug (male) in the *ADwin* hardware

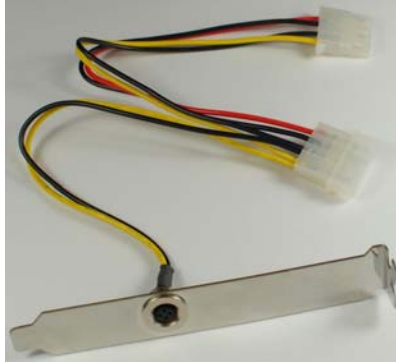
Fig. 2 –

A.4 Installing the power adapter

The power adapter serves as power supply of the *ADwin* hardware via the PC. Alternatively an external power supply can be used.

In order to avoid damages to your PC, the installation has to be made in an environment without any electro-static discharges.

- Close Windows, shut down the PC and remove the power supply cable.
- Open the PC according to the manufacturer's instructions.
- Remove an unused slot metal sheet and install the power adapter here.
- Connect the adapter cable with a free connector of the internal power supply cable of the PC power supply unit.
- Close the PC enclosure and connect the power supply cable.
- Now the *ADwin* hardware can be connected to the power adapter as power supply.



A.5 ADwin-Pro: Setting write protection with DIL switches

On an *ADwin-Pro* system with *ADwin* Ethernet Interface, you can do the following settings via DIL switches: write-protection for bootloader, write-protection for configuration, and deactivation of the bootloader.

According to the interface version (ENET-1...ENET-3) different functions are adjustable. The most convenient way to get the interface version is check the firmware version with the *ADethflash* program. The assignment of firmware version to ENET version is:

Firmware version	ENET version
2.5 or less	ENET-1
2.6...2.9	ENET-2
3.0 or greater	ENET-3

In order to set the DIL switches, you withdraw the processor module, set the switches, and insert the module again:

- Switch off the *ADwin-Pro* system.
- Withdraw the processor module: open the attachment screws of the front cover at the top and at the bottom and pull out the module.
- Place the module with the front plate to the left side, so that the handle is closer to you.
- Set the DIL switches according to the required function.

The position of the DIL switch block on the ENET board is different according to the ENET version:

ENET version	Position DIL switch block	orientation switch 1	position OFF
ENET-1	bottom right	left	down
ENET-2	top	right	up
ENET-3	top center	right	up

You can set the following functions:

DIL no.	ENET-1	ENET-2	ENET-3
2	Bootloader write-protected	Bootloader write-protected + Configuration write-protected	
3	Bootloader deactivated	reserved	
4	Configuration write-protected	reserved	
1, 5...8	reserved		

In position ON, the function is enabled. Upon delivery, all switches are set to position OFF.

Keep reserved switches unchanged in any case.

- Insert the module again. The changes become effective after the next power-up of the *ADwin* Ethernet Interface.