ADwin Installation

Manual for the Installation of *ADwin* Systems

ISA

PCI

PCMCIA

USB

Ethernet

ADwin Installation, manual version 2.1, December 2005

For any questions, please don't hesitate to contact us:

Hotline:	+49 6251 96320
Fax:	+49 6251 5 68 19
E-Mail:	info@ADwin.de
Internet	www.ADwin.de

JÄGER
Computergesteuerte
Messtechnik GmbH

Jäger Computergesteuerte
Messtechnik GmbH
Rheinstraße 2-4
D-64653 Lorsch
Germany

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Typographical Conventions

"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 have absolutely to be considered in order to guarantee an operation without any errors
– advice for efficient operation

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

<C:\ADwin\ …>

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

Program text

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

Var_1

ADbasic source code elements such as `INSTRUCTIONS`, *`variables`*, `comments` and `other text` are characterized by the font `Courier New` and are printed in color (see also the editor of the ***ADbasic*** development environment).

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 the drivers for Windows 9x, ME, NT, 2000 and XP.

  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.

Order of installation

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.

Please note:

To have your *ADwin* systems work properly, keep strictly to the information given in this documentation and in other mentioned manuals.

Qualified personnel

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 acivities, while recognizing and avoiding any possible dangers.*
> *(Definition of qualified personnel as per VDE 105 and ICE 364).*

Availability of the documents

This product documentation and all documents referred to, have always to be available and to be 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.

Legal instructions

OEM products are mentioned without referring to possible patent rights, whose existence is not to be excluded.

Subject to change.

Hotline address: see inner side of cover page.

Before installation of the *ADwin* CDROM

An important note:

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

This refers especially to the initialization of the hardware.

1. Installation or update of the *ADwin* CDROM: ⇒ chapter 2
2. Installation of the interface drivers (USB, Ethernet etc.), Initialization of the hardware, Functions check.
   Pay also attention to the notes for initialization in your hardware manual. ⇒ one of the chapters 3…9 (see table below)
3. First steps in *ADbasic*. ⇒ manual *ADbasic*
4. Introduction to *ADbasic* programming ⇒ tutorial *ADbasic*

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

ADwin system	chapter
– Systems with *ADlink* PC ISA board – *ADwin* boards – *ADwin-light* boards (not *ADwin-light-16*)	3: ADwin ISA link interface, page 5
– *ADlink* PCI adapter board	4: ADlink PCI adapter, page 22
– *ADpcmcia* linkadapter board	5: ADpcmcia adapter, page 25
– *ADwin-light-16* (PCI, EURO, cPCI, EXT) with USB interface	6: ADwin-light-16 system with USB interface, page 34
– *ADwin-Gold* • *ADwin-Gold-USB* • USB-link-adapter	7: ADwin-Gold system with USB interface, page 40
– *ADwin-Pro* modules • *Pro-CPU-T9-USB* • *Pro-USB*	8: ADwin-Pro module with USB interface, page 46
– *ADwin-light-16* • *EURO-ENET* • *EXT-ENET* – *ADwin-Gold* • *ADwin-Gold-ENET* • Ethernet-link-adapter – *ADwin-Pro* modules • *Pro-CPU-T9-ENET*, *Pro-CPU-T10-ENET* • *Pro-ENET*	9: ADwin System with Ethernet Interface, page 50

2 Installation of the *ADwin* CDROM

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

System requirements:

– Windows operating systems 9x, ME, NT, 2000, XP.
The latest Windows update should be installed.

– PC local RAM of at least 16MB RAM
The graphic card and monitor should support at least 256 colors.

– Free memory on the hard disk of min. 80 MB (both program packages).

– The *ADwin* CDROM (see `www.ADwin.de`, Support ▸ Downloads)

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

Update

For an update first uninstall all existing *ADwin* program packages (Windows start menu: `Settings` ▸ `Control Panel`). Install now the latest *ADwin* CDROM.

Pay attention to the version number of your *ADwin* CDROM. 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.

Installation

For installation under Windows NT, 2000 and XP 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. Insert the *ADwin* CDROM into the drive of your computer; the setup program starts automatically. If not, start the program `<setup.exe>` directly from the CDROM.
2. Under "`Show readme.txt`" you will find important installation information, helping you to install correctly.
3. Select "`Driver and ADbasic Setup`"; this program package is necessary for working with any *ADwin* system. Follow the notes in the installation program.

   We recommend to use the proposed destination file `<C:\ADwin\...>`, so that you can use all example programs without any changes.
4. The program package "`Developer Software setup`" contains the interfaces for the development environments (see "Contents of the CDROM" below). We recommend to install this package in any case.

   Use the drivers only when the *ADwin* system is working. How to use the drivers is described in the corresponding driver manual.
5. "`Show Features`" shows the changes of this CDROM compared to earlier versions.

6. 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.

   The license key is necessary to include processes written in *ADbasic* into your application program. Without license key it is also possible to generate programs in *ADbasic* and to transfer them to your *ADwin* system.
7. Continue with the installation of the interface drivers (page 2, installation step no. 2).

Contents of the CDROM

On the CDROM you will find:

– The drivers for communication between your PC and the *ADwin* system for the operating systems Windows 9x, ME, NT, 2000, XP.

– 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.

– 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, DIA*dem*, Matlab and the ActiveX interface.

– Examples for programming with *ADbasic*.

– *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*.

3 *ADwin* ISA link interface

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.

If you want to install under Windows 2000, you should use an *ADwin* CDROM version 3.00.2360 or higher and under Windows XP use the version 3.20.0101 or higher.

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 6
  - Windows 2000: page 7
  - Windows XP: page 13

– Checking or configurating DIP switches on the ISA link board (page 18).

– Installing the ISA link board in the PC and checking its function with *ADbasic* (page 20).

3.1 Installation of software and configuration of the PC

3.1.1 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.

Checking the I/O address assignment of the hardware

In any case it is recommended to check first which addresses are already allocated.

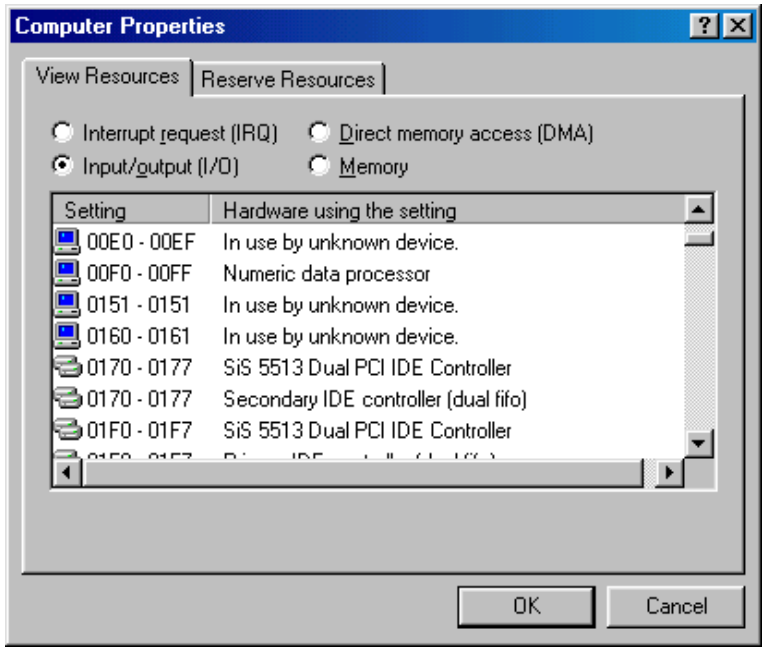
– Windows 9x, ME

  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.



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 18).

3.1.2 Windows 2000

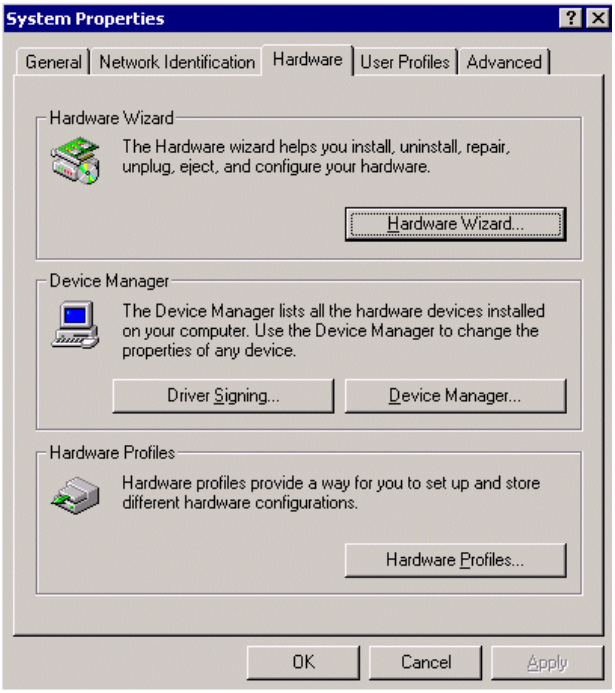
CDROM version

The following installation routine applies to the *ADwin* CDROM 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`.

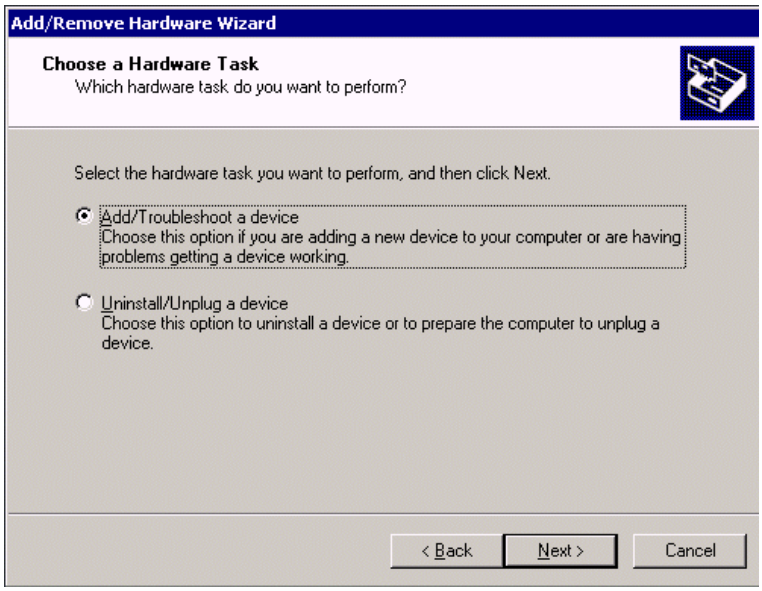
Start `Hardware wizard`

Continue according to the wizard instructions:



`Next`

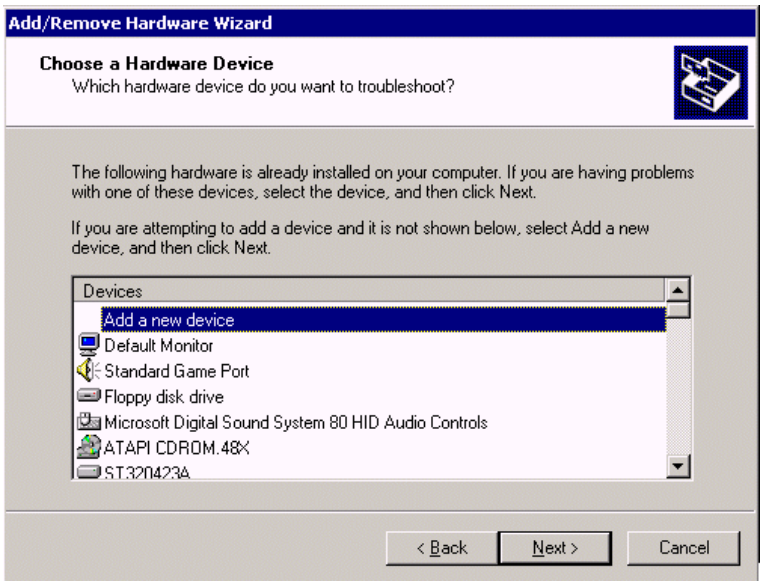
Next



The search for new hardware may take some moments.

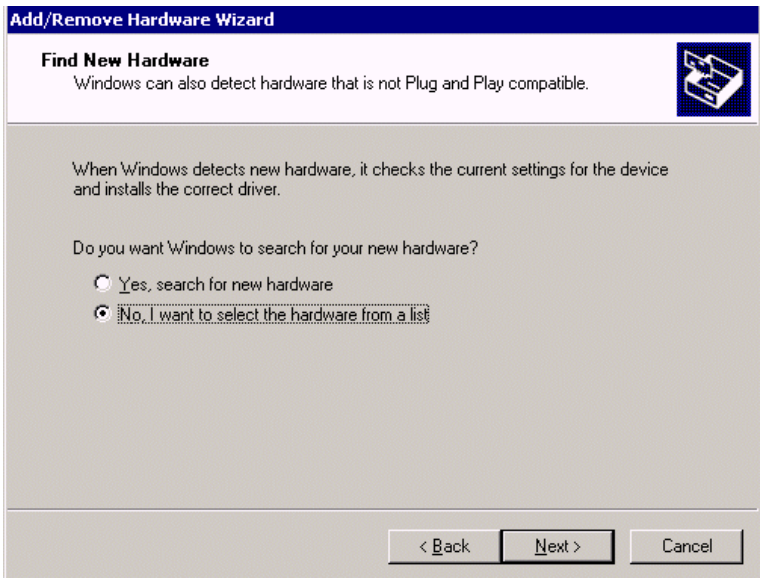
Add a new device

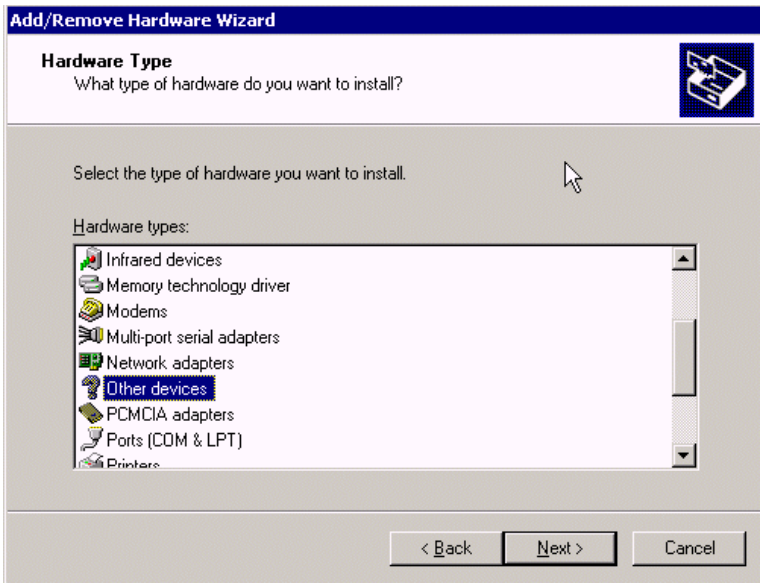
Next



No: select hardware from a list

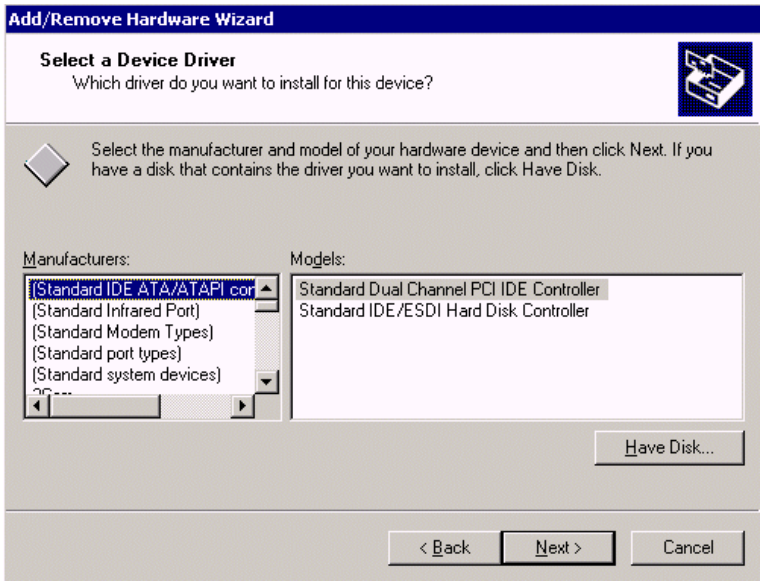
Next





Other devices

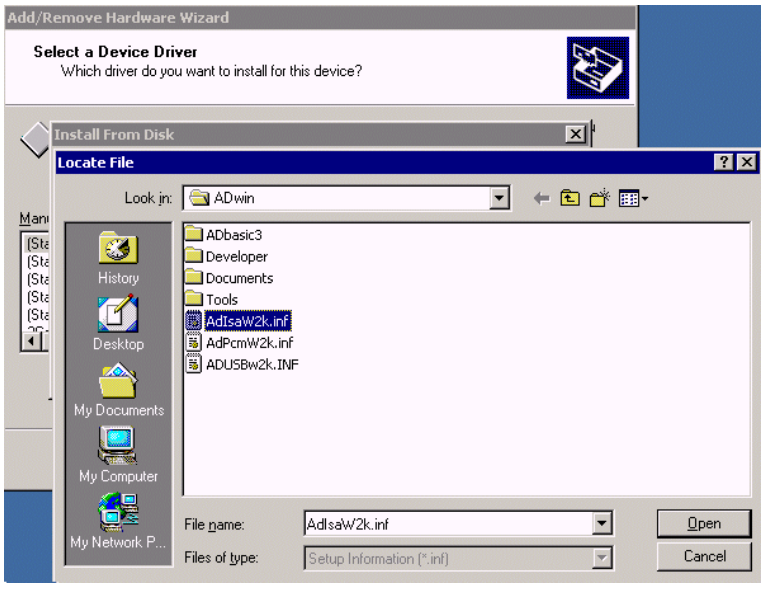
Next



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

Continue with:
Have Disk...

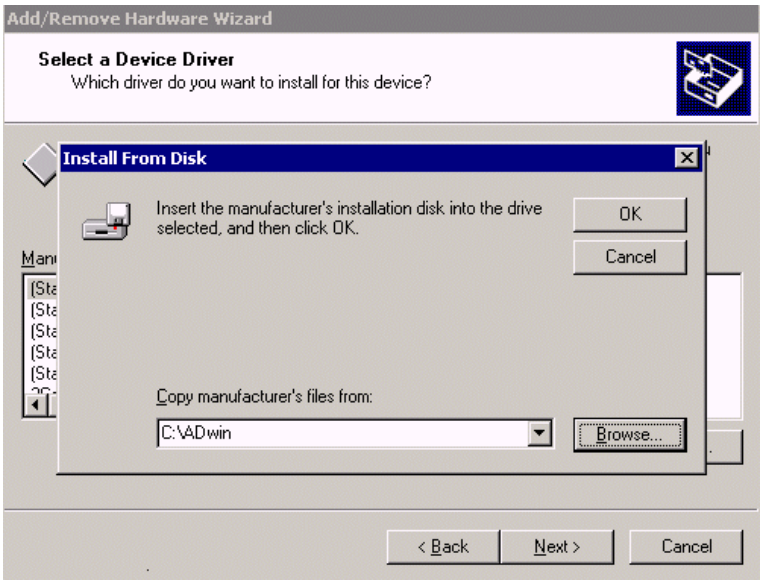
Select the path with "`Browse`" (or during standard installation enter "`C:\ADwin`" and skip one picture in this documentation.



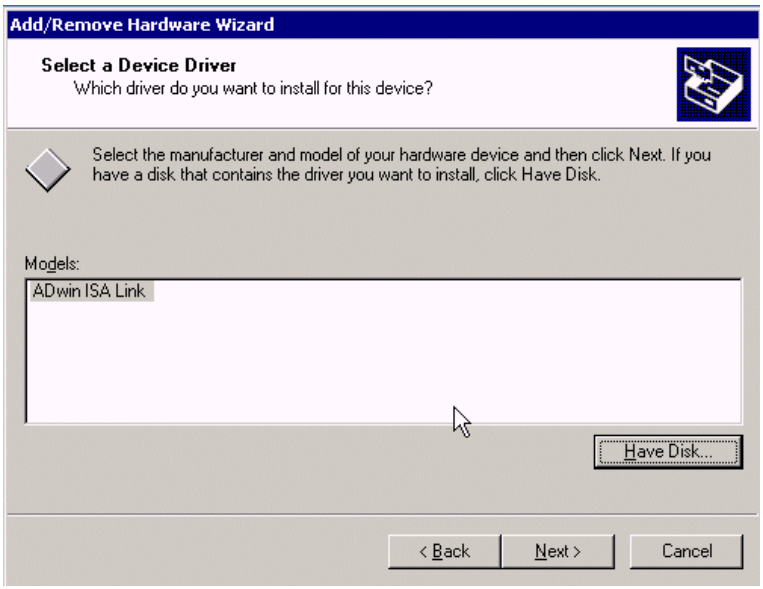
Choose:
C:\ADwin\ADIsaW2K.inf

Continue with `Open`

OK

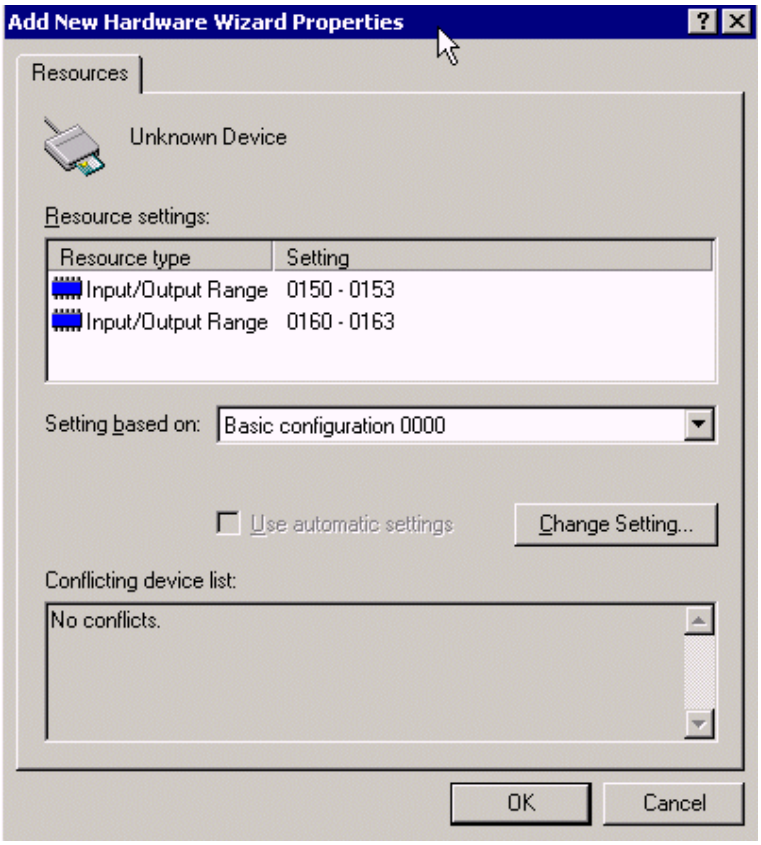

Add/Remove Hardware Wizard
Select a Device Driver
Which driver do you want to install for this device?
Install From Disk
Insert the manufacturer's installation disk into the drive selected, and then click OK.
OK
Cancel
Copy manufacturer's files from:
C:\ADwin
Browse...
< Back
Next >
Cancel

Next


Add/Remove Hardware Wizard
Select a Device Driver
Which driver do you want to install for this device?
Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.
Models:
ADwin ISA Link
Have Disk...
< Back
Next >
Cancel

OK


Add/Remove Hardware Wizard
Windows could not detect the settings of the device. To use this device, you must enter its hardware settings. Consult the documentation that came with this device for information.
OK



Base address / link address

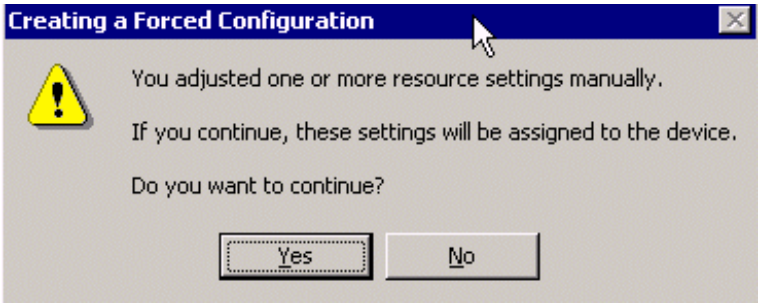
At "`Settings based on`" choose one of the given basic configurations, so that in the list "`Conflicting Devices`" no conflicting devices are displayed. In doing so, you set the base address of the link adapter.

Choose `basic configuration`

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.

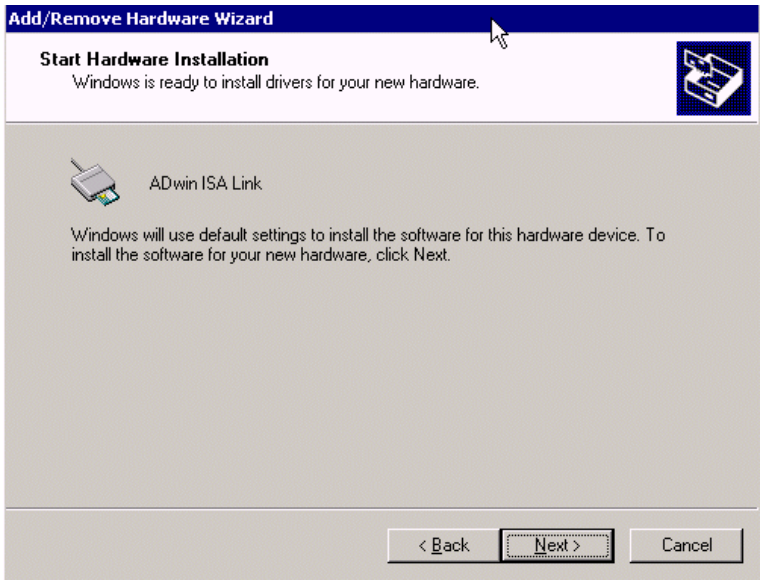
Note the link address

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



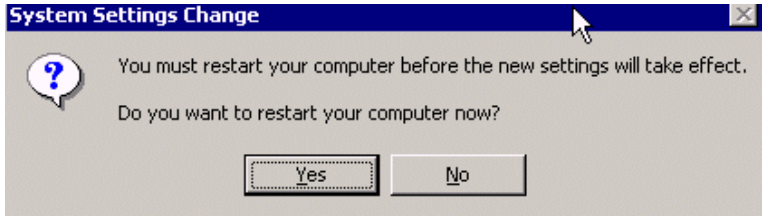
`Yes`

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 3.2 on page 18.

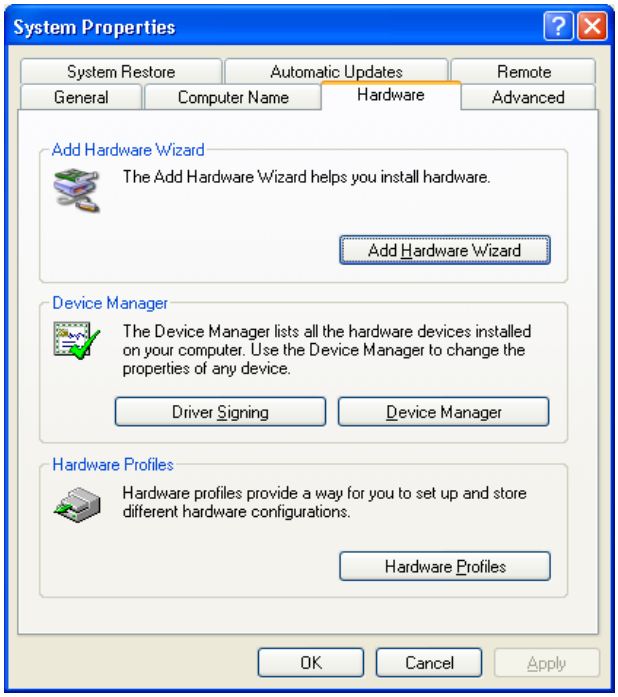
3.1.3 Windows XP

ADwin-CD Version

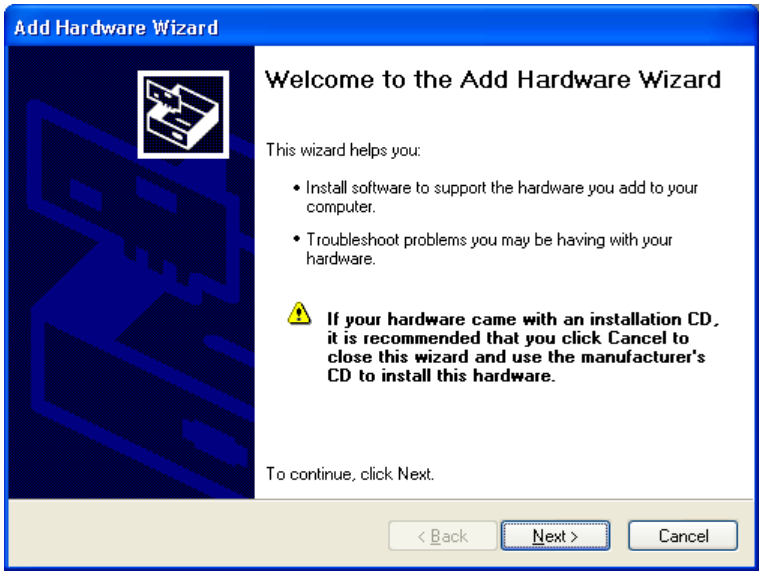
The following installation routine applies to the *ADwin* CDROM version from 3.20.0101 onward. Install your *ADwin* board, *ADwin-light* board or your *ADlink*-PC-ISA board into the PC only after you are requested to do so.

Start the hardware wizard as follows: Call the control panel (for instance via the XP start menu: `Control Panel`). Switch to the display `"Classic View"`, select `"System"` and start the hardware wizard under the tab `"Hardware"`.

Continue according to the following instructions:



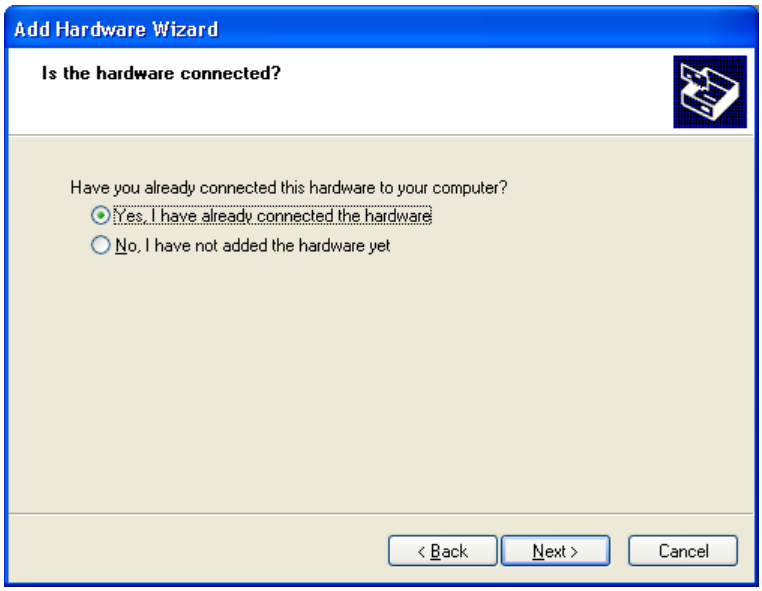
Add hardware wizard



Next

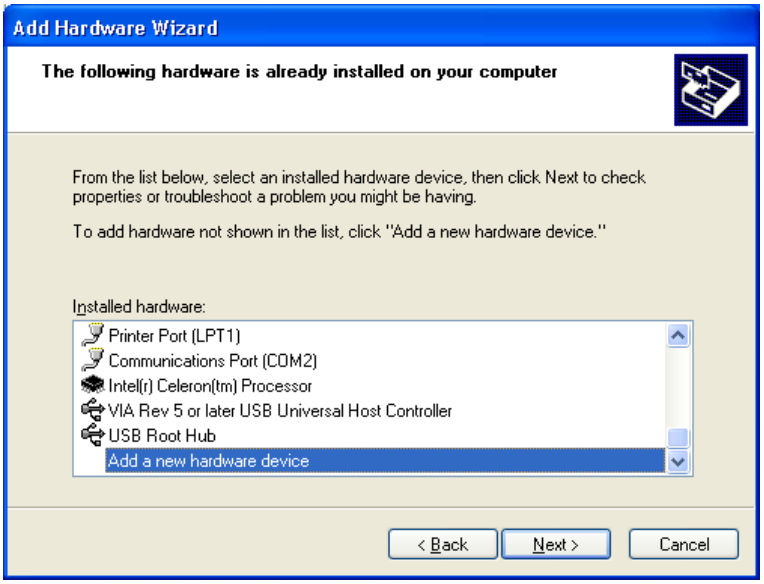
Yes

Next



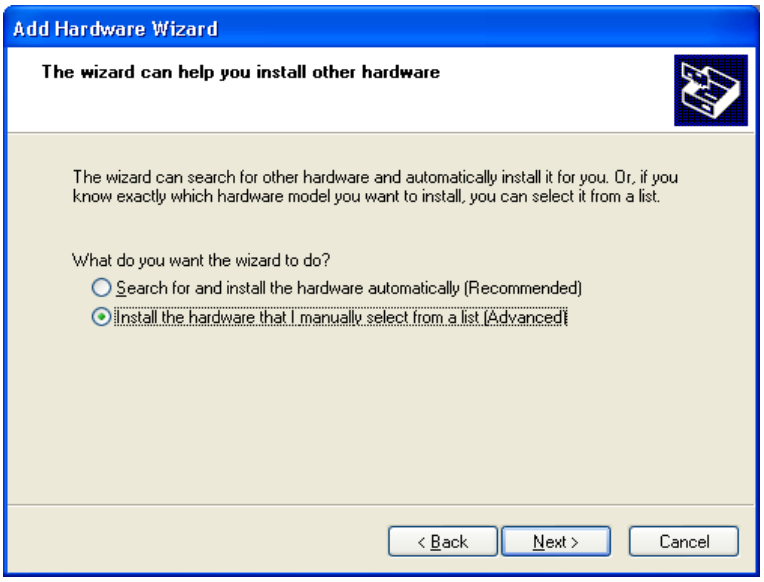
Add a new device

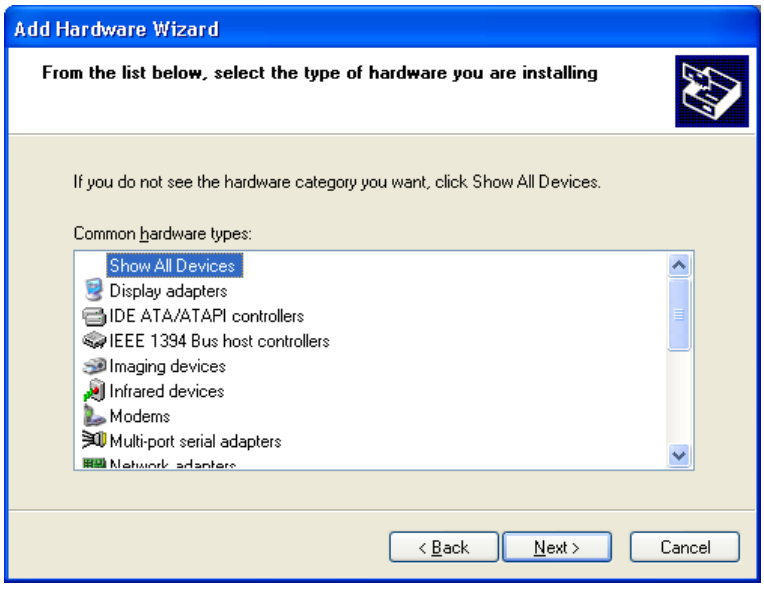
Next



Select hardware from list

Next

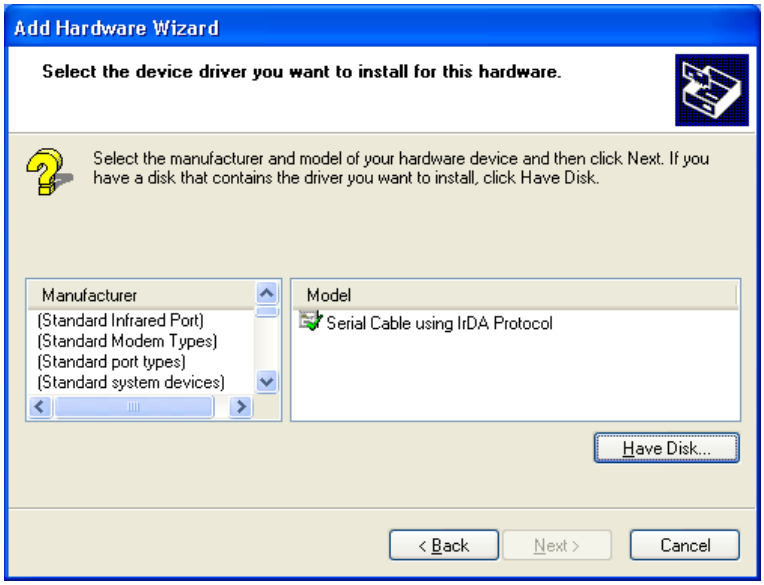




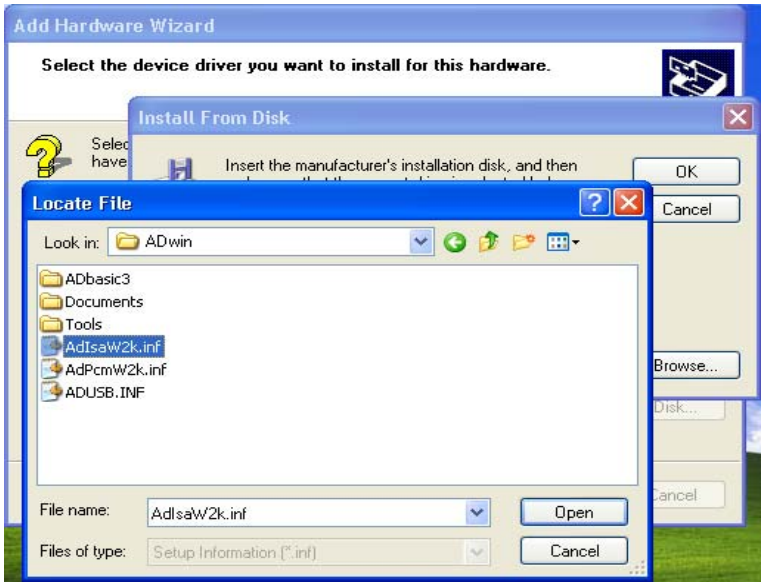
Show all devices

Next

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



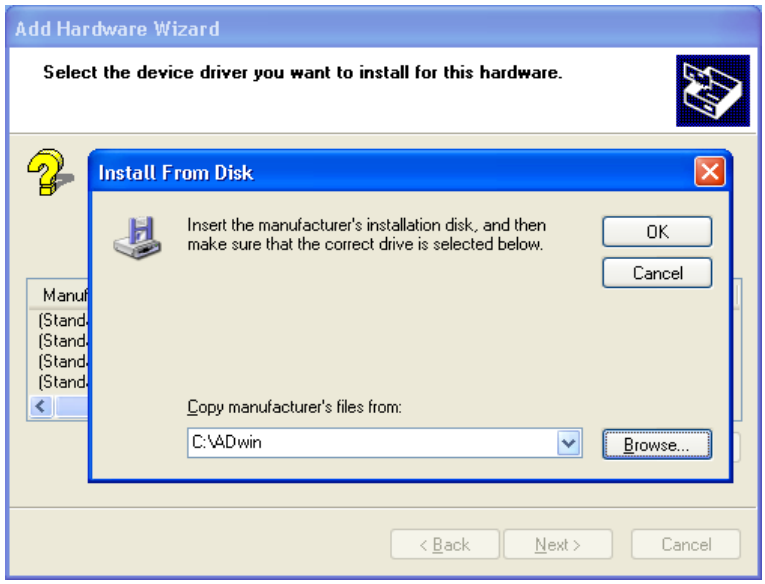
Have Disk



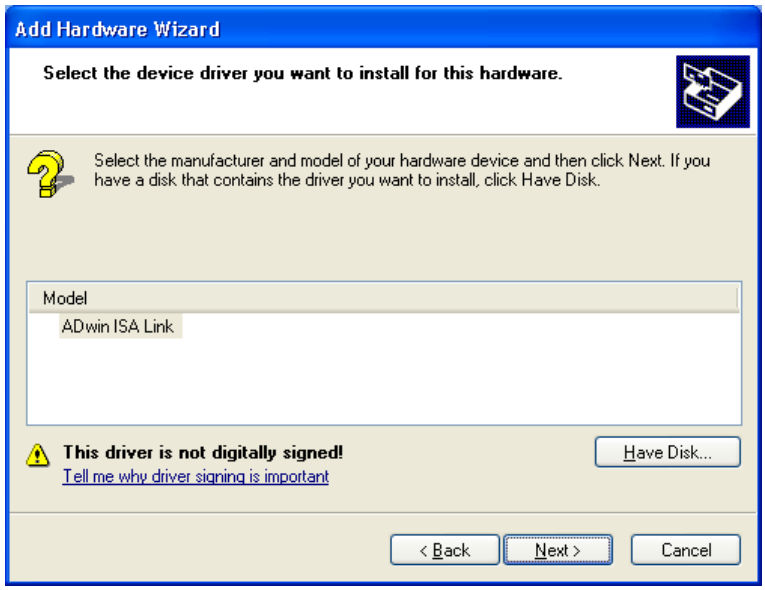
Select: C:\ADwin\ADIsaW2K.inf

Open

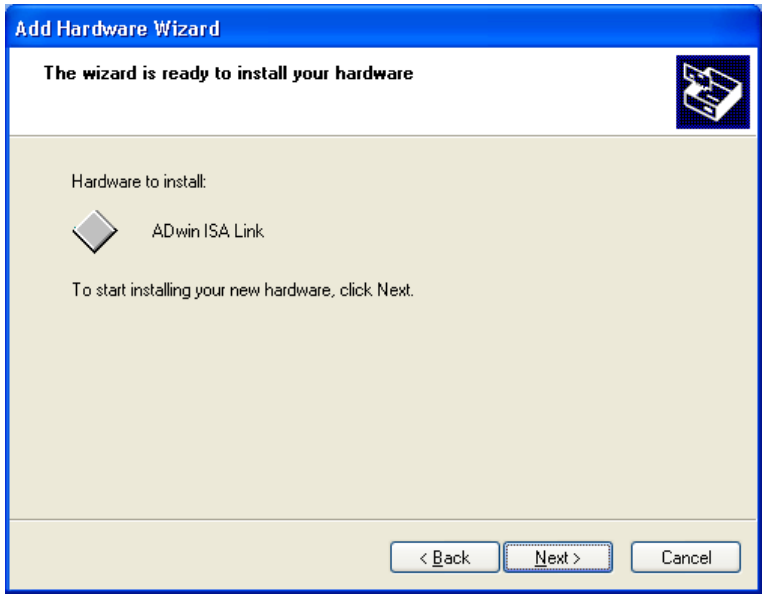
OK

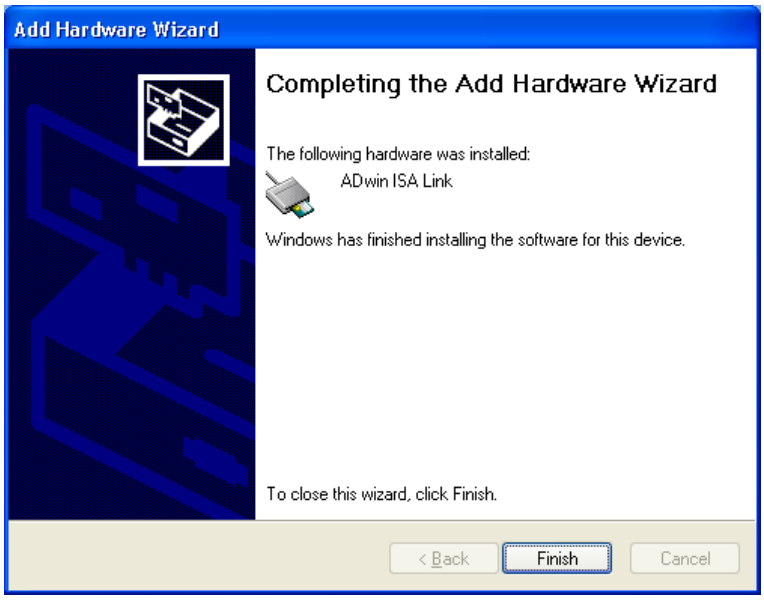

Add Hardware Wizard
Select the device driver you want to install for this hardware.
Install From Disk
Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.
OK
Cancel
Copy manufacturer's files from:
C:\ADwin
Browse...
< Back
Next >
Cancel

Next


Add Hardware Wizard
Select the device driver you want to install for this hardware.
Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.
Model
ADwin ISA Link
This driver is not digitally signed!
Tell me why driver signing is important
Have Disk...
< Back
Next >
Cancel

Next


Add Hardware Wizard
The wizard is ready to install your hardware
Hardware to install:
ADwin ISA Link
To start installing your new hardware, click Next.
< Back
Next >
Cancel

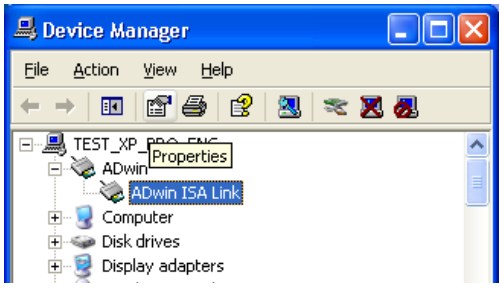


`Finish`

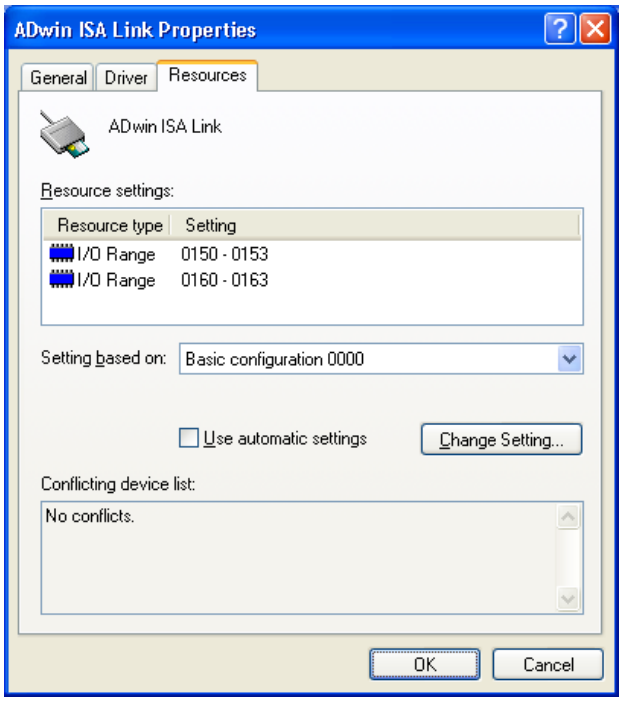
Windows XP has automatically allocated a base address to the link adapter during the installation process. Check this setting and remember the base address. Then call the device manager under "Control Panel" (see first picture in this section).

Checking the settings in the device manager

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

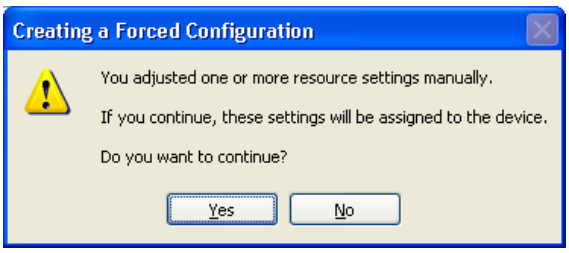
Select basic configuration

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.

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

Take note of base address

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".



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.

3.2 Setting the DIP switches

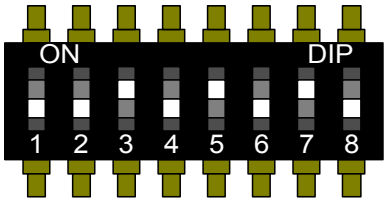
This section describes how you can set the base address via DIP switch on an *ADwin* system with ISA interface. Set a separate base address for each *ADwin* system, in order to avoid address conflicts.

Default setting 0150h

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".

Set base / link address

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.



Settings

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.

Switch numbers

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 adress	DIP switch number (adress 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 *Dwin*-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 adress") 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*.

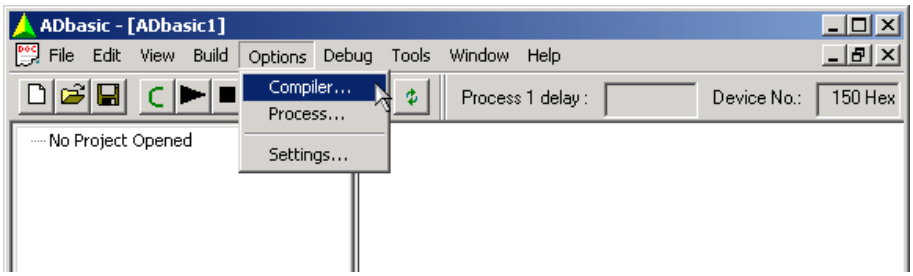
ADconfig

3.3 Settings in *ADbasic* and hardware installation

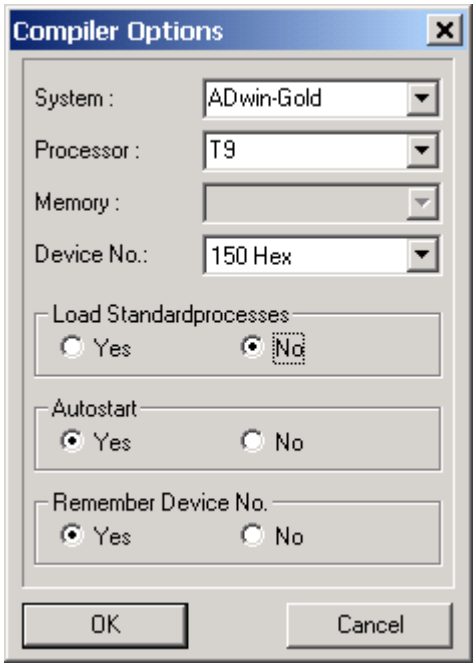
3.3.1 Settings in *ADbasic*

Checking the 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.
- `Memory`: This option is only available for *ADwin* cards, *ADwin-light* cards or *ADwin-Pro* systems with a T4…T8 processor.
  Set the memory size of your *ADwin* system.
- `Device No.`: Check the base setting of this option (up to *ADwin* CDROM version 3.0.22.x: "`Link address`"). The number has to be identical to the base address set with the DIP switch.

  Device No.

  The setting "`None`" in the pull-down list 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.

3.3.2 Installation of the hardware

Hardware initialization

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.

Installation into the PC

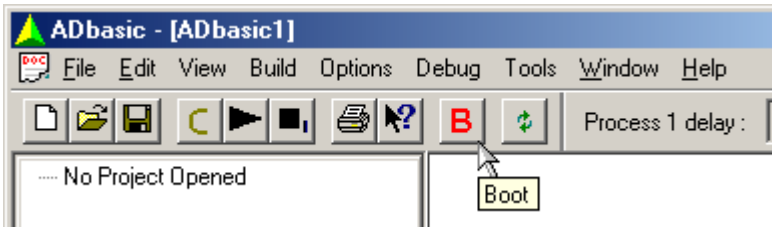
– Shut down Windows and the PC, and remove the power supply connector.
– Open the PC enclosure according to the instruction of the manufacturer.
– Select a slot which has enough room for the board. Remove the PC slot metal plate, plug in the board and screw the slot metal plate of the board to the PC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

Connecting

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.

Booting

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.

Programming with *ADbasic*

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

4 *ADlink* PCI 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.

For the installation under Windows 2000 an *ADwin* CDROM version 3.00.2360 or higher should be used, for Windows XP version 3.20.0101 or higher.

System requirements

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.

Function

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

Standard delivery of the *ADlink* PCI adapter:

– *ADlink*-PCI adapter (plug-in board)
with installation CDROM (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:
  - Power adapter: slot metal sheet with socket and 3-pin, inverse-polarity protected cable for power supply from the PC power supply unit. The power adapter is required, because the PCMCIA interface has no power supply.
  - Power supply cable from the power adapter to the *ADwin-Gold* system.

Continue

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

– Installation of the *ADlink*-PCI adapter

– Installlation 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.

4.1 Installation of the *ADlink-PCI* adapter

Protection against ESD

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

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.

Installation of the power adapter

– For *ADwin-Gold* only:
  If you do not work with an external power supply (optionally available), you must now also install the power adapter:
  - Remove an unused slot metal sheet and install the power adapter here.
  - Connect the adapter's cable with a free connector of the power supply cable of the PC power supply unit.

– Close the PC enclosure and connect the power supply cable to the PC.

4.2 Installation of the drivers

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

Windows ME, 2000, XP

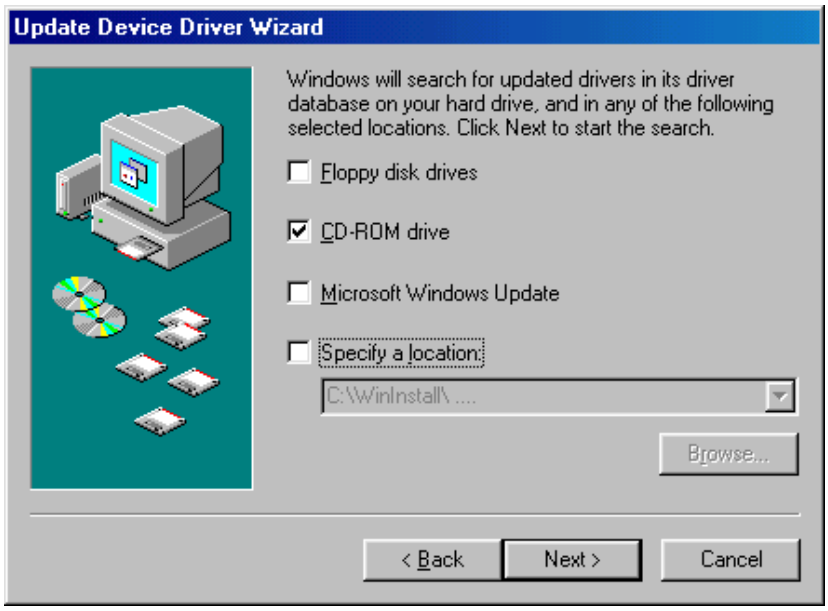
– The operating systems Windows ME, 2000 and XP recognize the *ADlink* PCI adapter and start the device manager for installing the drivers. If not, restart Windows.

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

Windows 98

– 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 95 and NT

– 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 he installation of the *ADpcmcia* adapter described in chapter 5.

5 *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.

System requirements

For the installation under Windows NT and 2000 you need an *ADwin* CDROM, version 3.00.2400 or higher, for Windows XP the version 3.20.0101 or higher.

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 kB/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 notebook operation with an *ADwin-Gold* only:
  The *ADwin-Gold* system requires an additional power supply unit, because neither the notebook nor the PCMCIA interface have a power supply.

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.

5.1 Initialization of 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* CDROM 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).

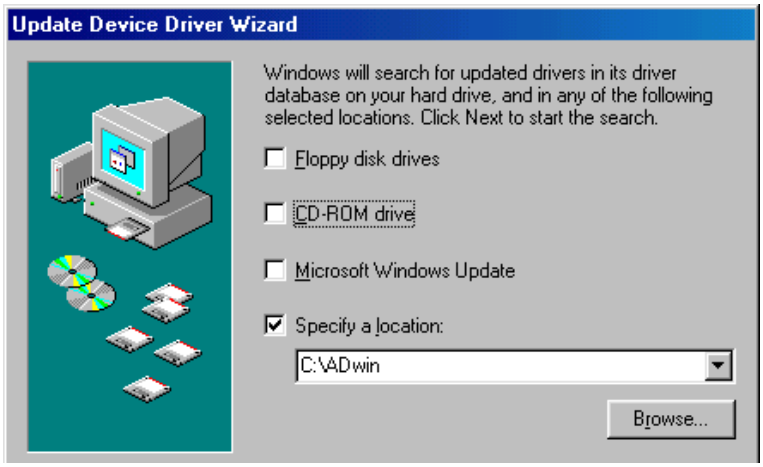
Windows 9x, ME, 2000, XP

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

The operating systems Windows 9x, ME, 2000 and XP recognize the new hardware and start the device manager in order to install the drivers. If the operating system does not react, restart Windows.

Driver installation from standard directory

Windows looks for the best driver (default) and asks 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: `<ADpcmW2K.inf>`.

Driver update

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`".

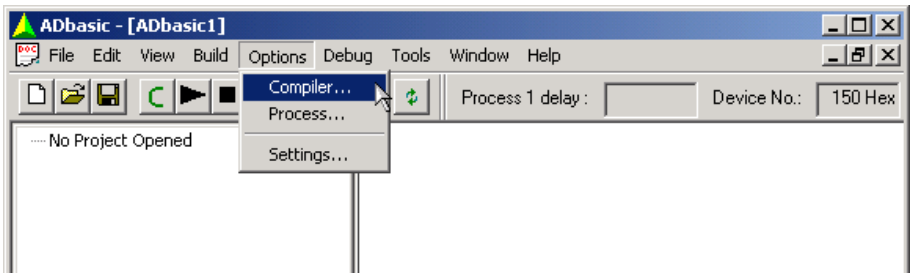
The device manager marks every device which is recognized, but not installed properly with a question mark or a prohibitory sign. Select the corresponding *ADwin* hardware. In the next screen: "`Properties...`“ select: "`Driver`" and then: "`Update driver`“. Continue as is described above.

ADconfig

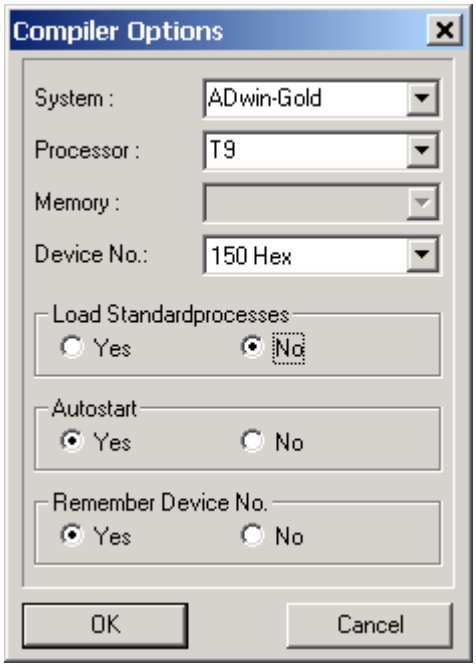
Now call the program *ADconfig* under the Windows start menu: `Programs` ▸ `ADwin`, in order to allocate a Device No. to your *ADwin* system. More detailed information about the program can be found in the online help of *ADconfig*.

Checking the 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



– `Processor`: The processor type of the *ADwin* system used.

– `Memory`: This option is only available for *ADwin* boards, *ADwin-light* boards or *ADwin-Pro* systems with a processor T4…T8.
Set the memory size of your *ADwin* system.

Device No. (all systems)

– `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.

Device No. "`None`"

The setting "`None`" in the pull-down list for the "`Device No.`" is only necessary to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.

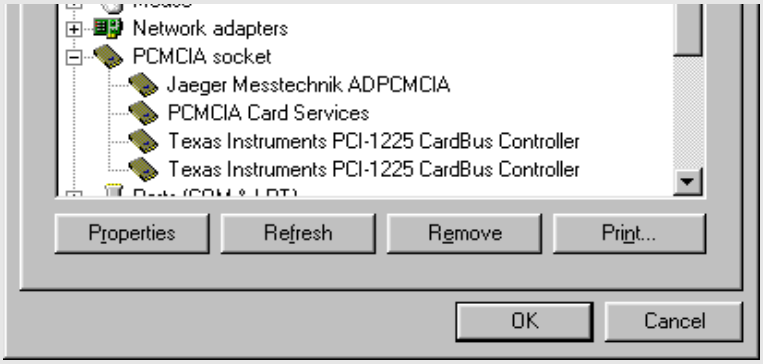
– Set the options "`Load Standardprocesses`", "`Autostart`" and "`Remember Device No.`" later, when programming with *ADbasic*.

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 ADPCMCIA board of Jäger Messtechnik at "`PCMCIA socket`" (under Windows 2000 and XP 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.

Operation with two *ADpcmcia* adapters

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.

5.2 Initialization of the hardware

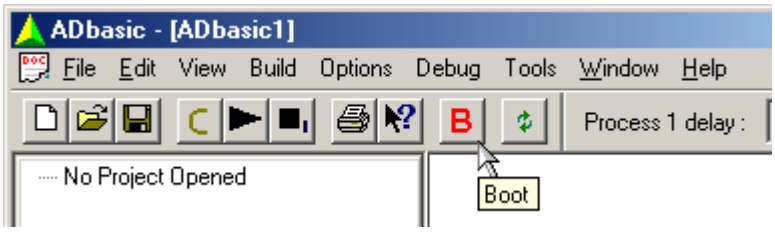
Before you connect your PC to the *ADwin* system, please read your hardware manual including the chapter "Initialization of the hardware". Do not connect any inputs or outputs.

Connecting

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.

Booting

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.

Programming with *ADbasic*

– The programming of your *ADwin* system is described in detail in the *ADbasic* manual.

– Start programming with the examples in the *ADbasic* tutorial.

5.3 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.

Operating several *ADwin* systems

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).

Checking the I/O address assignment of the hardware

In any case it is recommended to check 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)`".

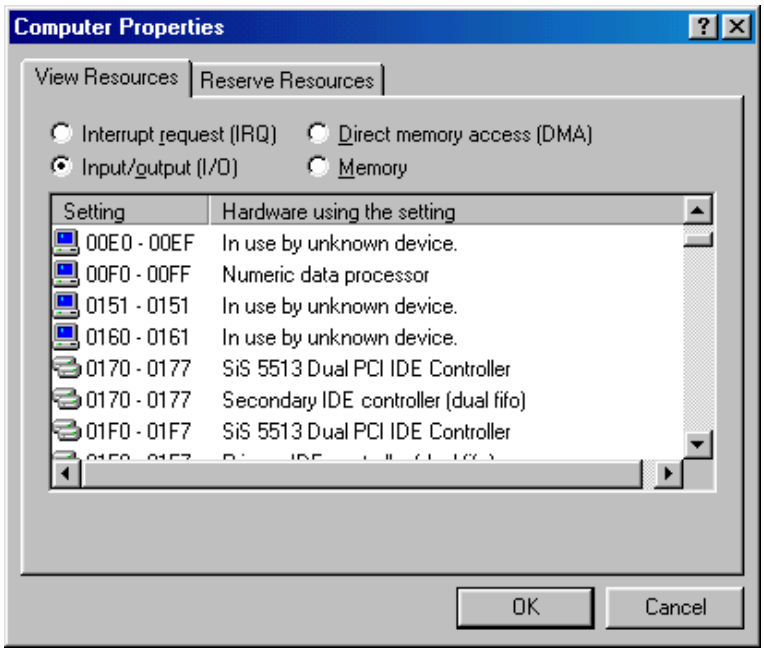
– Windows NT

  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“.

– Windows 2000, XP

  Call the device manager from the Windows start menu: Settings ▸ Control panel ▸ System, tab "Hardware". Select the display View-Panel ▸ 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 and XP you should install your *ADlink* PC ISA board, *ADwin* board or *ADwin-light* board by using the hardware wizard, see chapter 3.1.2 and 3.1.3.

Checking the address assignment

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:

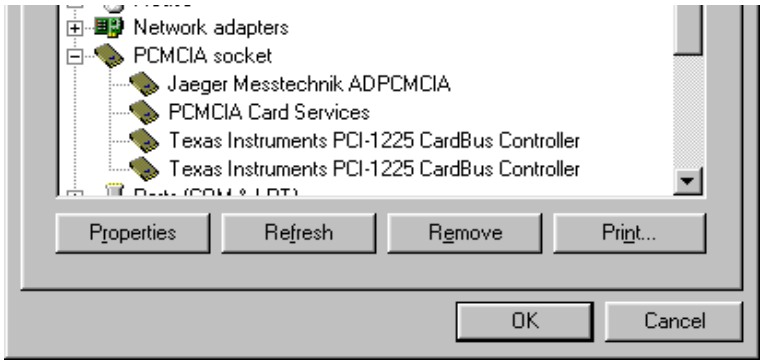
1. Changing the address in the operating system
2. Changing the address via DIP switch

Changing the address in the operating system

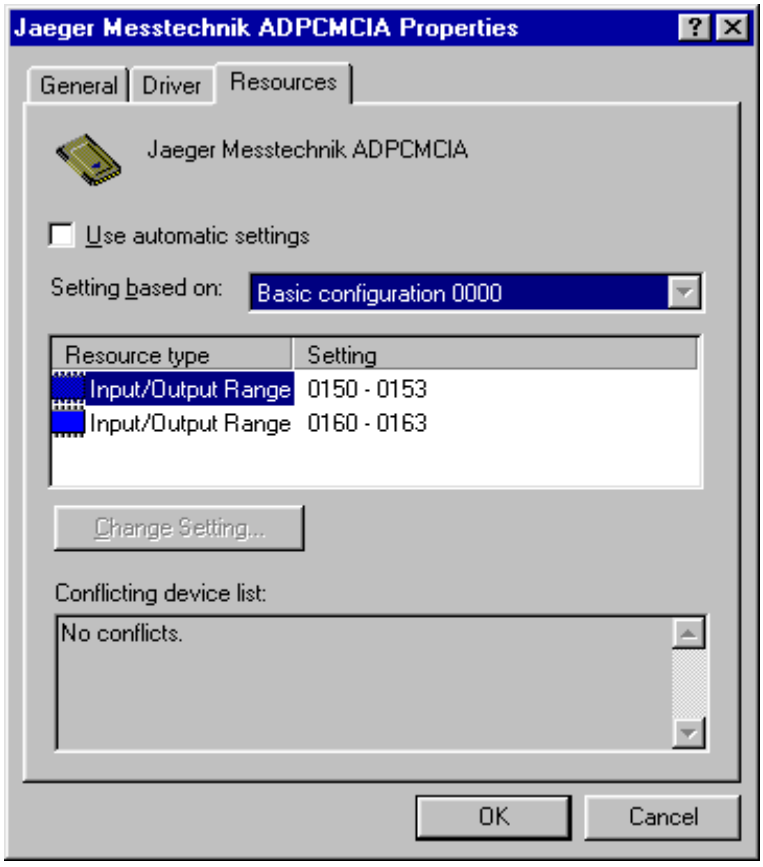
The fast possibility is to set the link address of the *ADpcmcia* board per software to 190h. The disadvantage is the loss of the plug & play functionality, because this address is reserved by Windows as long as you cancel the reservation in the same way.

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

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 settigs`" 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 3 "ADwin ISA link interface" in this manual (page 18) 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.

ADconfig

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*.

6 *ADwin-light-16* system with USB interface

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.

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

System requirements

The requirements for the installation are:

– Windows operating system 98, ME, NT, 2000, XP
  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
  - *L-16-EXT*: an empty slot metal sheet for the power adapter

– 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.

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. For the power suppy a power adapter is delivered.

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 *ADwin* 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

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

– *ADwin-light-16* device

– When using an *L16-EXT:*
  • Power adapter: A slot metal plate with socket, 3-pin, inverse-polarity protected cable for power supply.
    The power adapter is necessary because the PCMCIA interface has no power supply.
  • Power supply cable from power adapter to *L16-EXT.*

  An external power supply unit, e.g. *ADwin-llight-16-Pow* or a car battery can also be used as power supply.

  If you use 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.

– USB cable (length 1.8 m)

  If there is a great distance between the *ADwin* system and the PC, we recommend that you use an *ADwin-light-16* system with Ethernet interface.

Follow the installation (in this order):

– Installation of the hardware

– Installation of the drivers

6.1 Installation of the hardware

Hardware initialization

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.

Installation of the *L16-PCI*

In order to avoid damages to your PC, initialize the hardware in an environment where no electro-statical 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 to establish 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.

Installation of the *L16-EURO* / *L16-cPCI*

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

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 to establish 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.

Installation of the power adapter for *L16-EXT*

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.

  Connect the power adapter's 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.
– Connect the power supply cable of the *L16-EXT* system to the power adapter.

– The *L16-EXT* system is not connected to earth via power adapter! Connect the GND socket with the central earth connection point of your device and pay attention to corresponding notes in your hardware manual.
– Connect the PC and *L16-EXT* with the USB cable. Power up your PC.

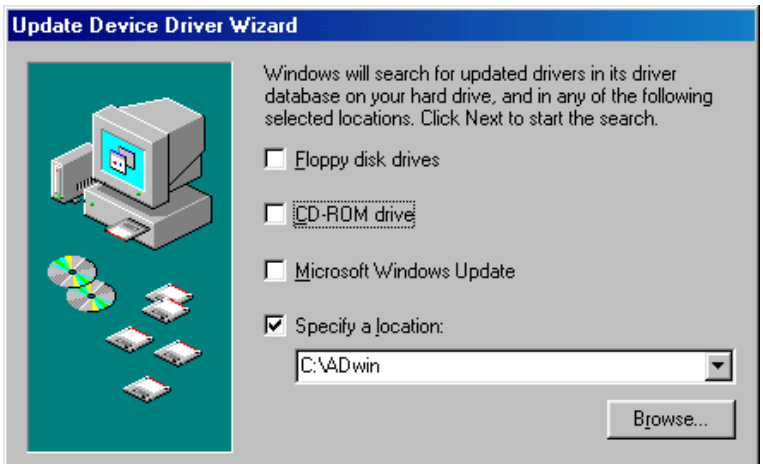
To ensure USB communication be as failure-free as possible, we recommend to establish a low-impedance (short, very thick) ground connection between PC-casing and the *ADwin* USB-device.
The ground connection may also – contrary to the inept USB cable – equalize existing differences in potential very well.

6.2 Installation of the drivers

Start your PC.
The operating systems Windows 9x, ME, 2000 and XP recognize the new hardware and start the device manager in order to install the drivers. If the operating system does not react, restart Windows.

Driver installation from standard directory

Windows looks for the best driver (default) and asks 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.

Driver update

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".

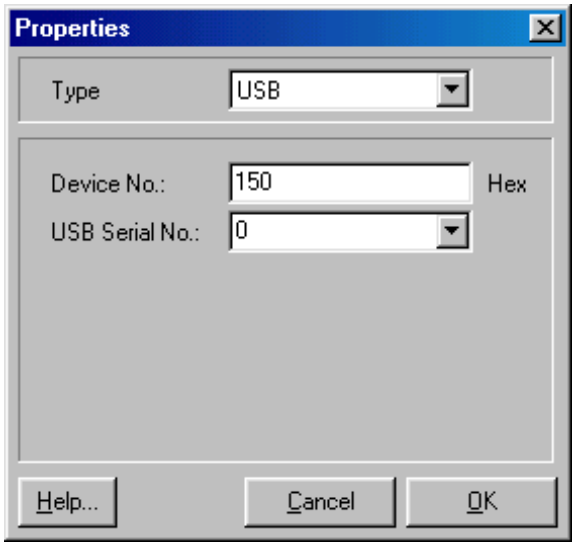
The device manager marks every device which is recognized, but not installed properly with a question mark or a prohibitory sign. Select the corresponding *ADwin* hardware. In the next screen: "Properties…" select: "Driver" and then: "Update driver". Continue as is described above.

ADconfig

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*.

USB-Serial No.

Open the pull-down list on the screen "Edit/Properties" 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 on every *ADwin* USB system. The serial number can also be entered manually, if for instance the *ADwin* system is not connected.



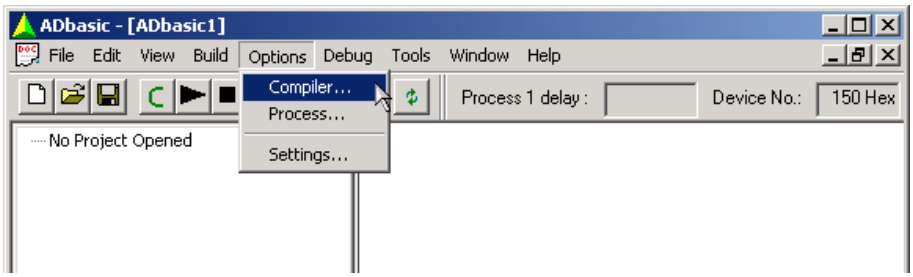
Device No.

Choose a "Device No.". The recommended Device No. 150h should be used to easily use all example programs.

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

Checking the settings in *ADbasic*

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

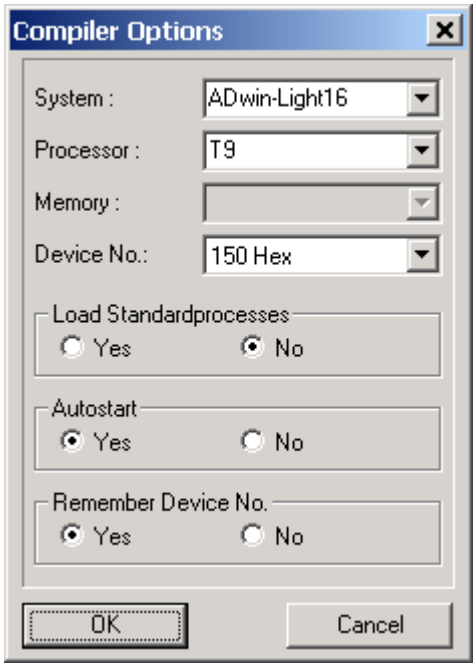


Set the options in the window: "`Compiler Options`" from top to bottom

Device No.

- `System`: Choose the option "`ADwin-Light16`".
- `Processor`: The processor type "`T9`"of the system.
- `Memory`: This option is not available for this system.
- `Device No.`: Set to the Device No. you have used in the programm *ADconfig*.

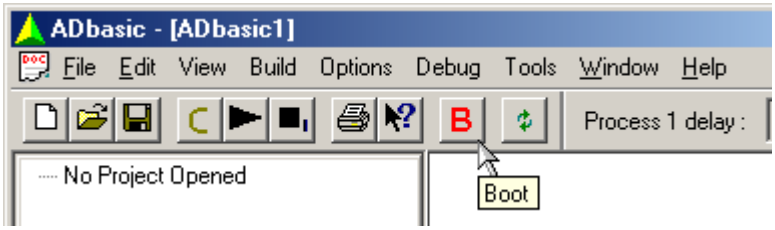
  The setting "`None`" in the pull-down list is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.
- Set the options "`Load Standardprocesses`", "`Autostart`" and "`Remember Device No.`" later, when working with *ADbasic*.



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.

Programming with *ADbasic*

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

7 *ADwin-Gold* system with USB interface

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.

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

System requirements

– The requirements for the installation are:

– Windows operating system 98, ME, NT, 2000, XP
The latest Windows update should be installed.

– A PC slot metal sheet when the power adapter is used as power supply.

– 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.

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 *ADwin* 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 to establish 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.

Standard delivery

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

– *ADwin-Gold* device

– Power adapter: A slot metal plate with socket, 3-pin, inverse-polarity protected cable for power supply.

– Power supply cable (length approx. 2 m)

– USB cable (length 1.8 m)

  If there is a great distance between the *ADwin* system and the PC, we recommend that you use 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):

– Installation of the USB linkadapter

– Installation of the drivers

7.1 Installation of the USB linkadapter

For the installation of the USB linkadapter you must proceed in the order as follows:

– provide a power supply for the adapter and the *ADwin-Gold* system

– build a data connection between PC and *ADwin-Gold* system

Provide a power supply

There are 3 sources for the power supply:

1. Power adapter (is to be installed in the PC)
   For the installation see the box below.

2. External power supply unit.

   If you use an external power supply the *ADwin-Gold* system is notconnected to earth!
   Connect the GND socket of the *ADwin Gold* with the central earth connection point of your device.

3. An *ADlink*-PC-ISA board, installed in the PC

Use the shorter power supply cable (approx. 0.5 m) for the power supply between USB adapter and *ADwin-Gold* system, and the longer cable for the power supply of the USB adapter.

Build a data connection

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 back).

– Connect USB adapter and *ADwin-Gold* system via *ADlink* cable.

– Connect PC and USB adapter with the USB cable.

Power supply with the power adapter

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.

– Establish the connection between power adapter, USB adapter and *ADwin-Gold* system:
  - Connect the power adapter 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 switch on the *ADwin-Gold* system.

  The *ADwin-Gold* system is not connected to earth via the power adapter. Connect the GND socket with the central earth connection point of your device and read the information in your hardware manual.

– Connect the PC and USB adapter with the USB cable.

Now the power supply is installed successfully.

7.2 Installation of 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.

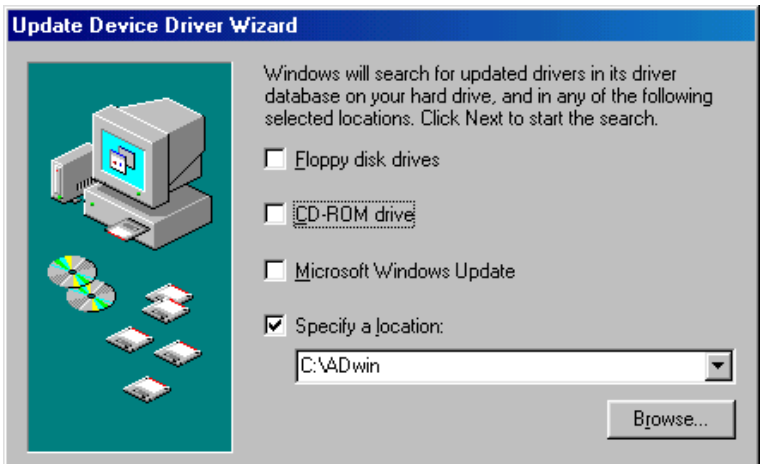
Connecting

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 and XP recognize the new hardware and start the device manager in order to install the drivers. If the operating system does not react, restart Windows.

Driver installation from standard directory

Windows looks for the best driver (default) and asks 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.

Driver update

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".

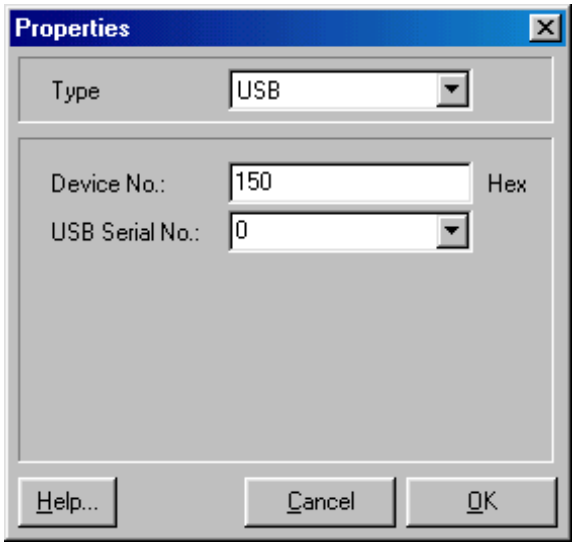
The device manager marks every device which is recognized, but not installed properly with a question mark or a prohibitory sign. Select the corresponding *ADwin* hardware. In the next screen: "Properties…" select: "Driver" and then: "Update driver". Continue as is described above.

ADconfig

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*.

USB-Serial No.

Open the pull-down list on the screen "Edit/Properties" 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 on every *ADwin* USB system. The serial number can also be entered manually, if for instance the *ADwin* system is not connected.



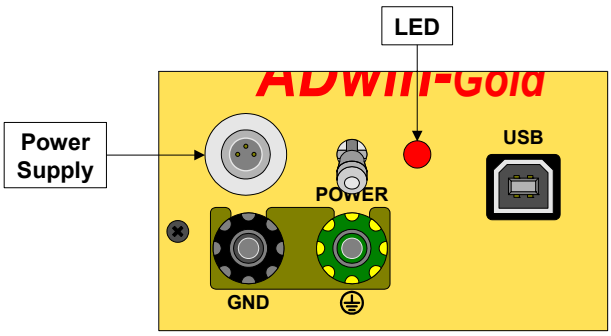
Device No.

Choose a "Device No.". The recommended Device No. 150h should be used to easily use all example programs.

Power up

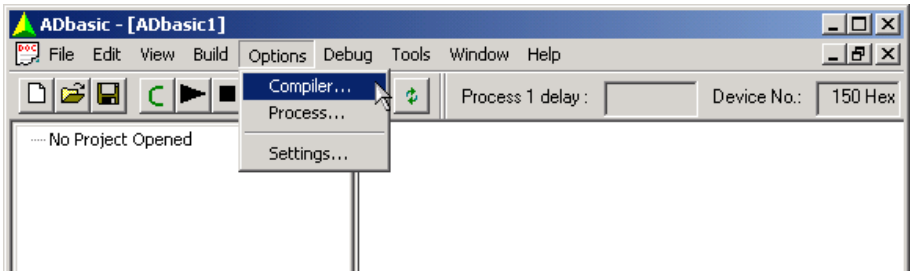
Your *ADwin-Gold* system and th USB linkadapter are now ready for operation. Switch on the system. After power-up, the green LED is blinking (with USB link-

adapter) or the red LED is blinking (with integrated USB-interface); if neither LED is blinking, check the connections.



Checking the settings in *ADbasic*

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

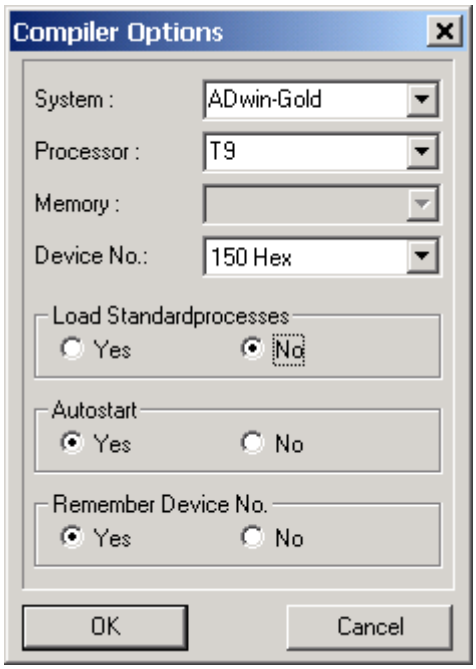


Set the options in the window: "`Compiler Options`" from top to bottom

Device No.

- `System`: Choose the option "`ADwin-Gold`".
- `Processor`: The processor type "`T9`" of the system.
- `Memory`: This option is not relevant for this system.
- `Device No.`: Set to the Device No. you have used in the programm *ADconfig*.

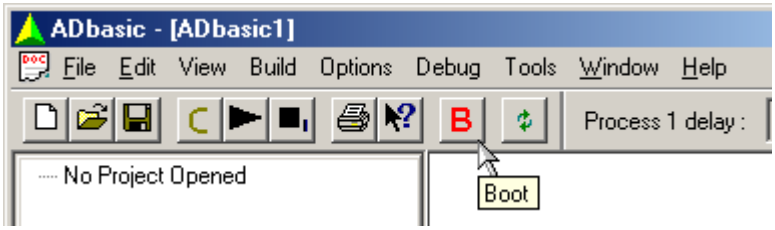
  The setting "`None`" in the pull-down list is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.
- Set the options "`Load Standardprocesses`", "`Autostart`" and "`Remember Device No.`" later, when working with *ADbasic*.



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 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).

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

Finishing the installation

– 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*

8 *ADwin-Pro* module with USB interface

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.

System requirements

For the installation you need an *ADwin* CDROM, 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
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.

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 *ADwin* 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

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 that you use 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):

– Installation of the Pro-USB module

– Installation of the drivers

8.1 Installation of 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 to establish 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.

8.2 Installation of the drivers

The operating systems Windows 9x, ME, 2000 and XP recognize the new hardware and start the device manager in order to install the drivers. If the operating system does not react, restart Windows.

Driver installation from standard directory

Windows looks for the best driver (default) and asks 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`“.

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

Driver update

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".

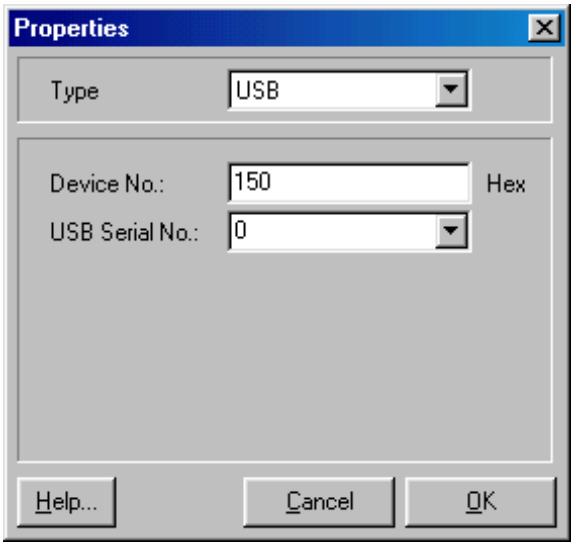
The device manager marks every device which is recognized, but not installed properly with a question mark or a prohibitory sign. Select the corresponding *ADwin* hardware. In the next screen: "Properties…" select: "Driver" and then: "Update driver". Continue as is described above.

ADconfig

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*.

USB-Serial No.

Open the pull-down list on the screen "Edit/Properties" 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 on every *ADwin* USB system. The serial number can also be entered manually, if for instance the *ADwin* system is not connected.



Device No.

Choose a "Device No.". The recommended Device No. 150h should be used to easily use all example programs.

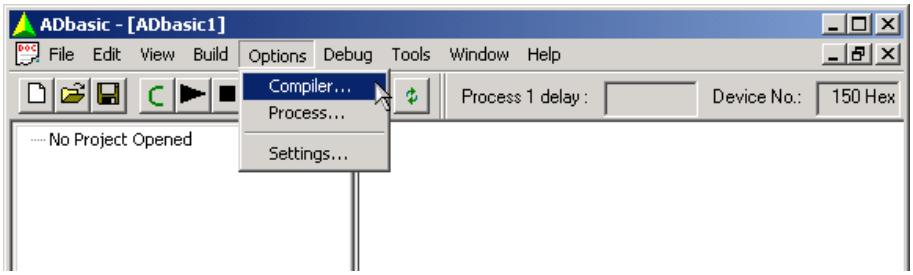
Your *ADwin-Pro* system is now ready for operation.

Power-up

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

Checking the settings in *ADbasic*

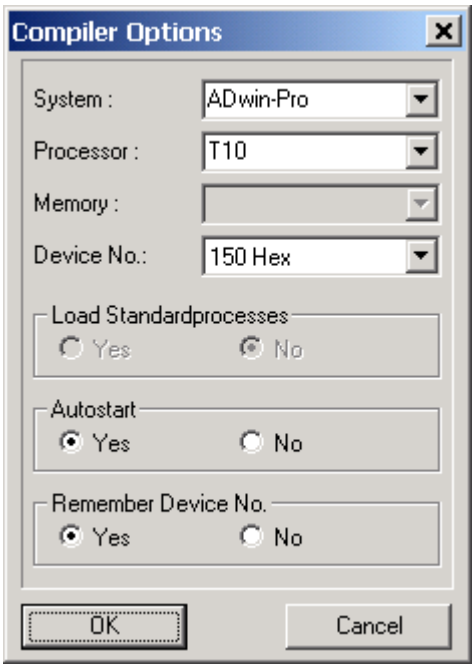
Open *ADbasic* (in the Windows start menu: Programs ▸ ADwin ▸ ADbasic) and check first the settings in the dialog window "Options\Compiler".



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

– `System`: Choose the option "`ADwin-Pro`".
– `Processor`: The processor type of the *ADwin-Pro* system.
– `Memory`: This option is only available for *ADwin-Pro* systems with a processor T4…T8.
Set the memory size of your *ADwin* system.
– `Device No.`: Set to the Device No. you have used in the programm *ADconfig*.

The setting "`None`" in the pull-down list is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.



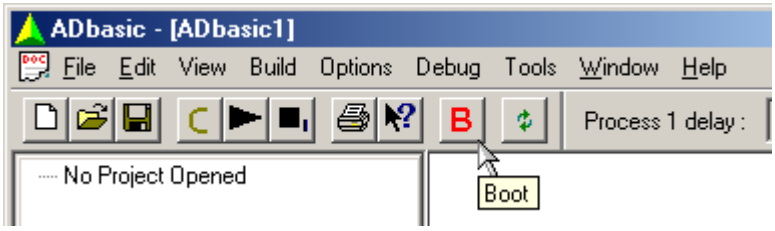
Device No.

– 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.

Booting



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).

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

Finishing the installation

– 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.

Programming with *ADbasic*

– 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*".

***ADwin-Pro* programming**

9 *ADwin* System with Ethernet Interface

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.

System requirements

When working with the operating system Windows 95, `<Winsock2>` must be installed. Please pay attention to the notes during the installation of the *ADwin* CDROM. When using other Windows operating systems, this step is not necessary.

Functions

The following *ADwin* systems are available with an *ADwin* Ethernet interface:

– *ADwin-light-16* with integrated Ethernet interface in the design *L16-EURO-ENET* and *L16-EXT-ENET*

– *ADwin-Gold*:
  - *ADwin-Gold-ENET* with integrated Ethernet interface
  - *Gold-ENET-Conv* (external Ethernet link adapter)

– *ADwin-Pro* Modules:
  - *Pro-CPU-T10-ENET* with integrated Ethernet interface
  - *Pro-CPU-T9-ENET* with integrated Ethernet interface
  - *Pro-ENET* - additional module 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:	10 MBit/s and 100 MBit/s (automatic recognition)
Required cable quality	Category 5
Max. cable length from the *ADwin* system to the next switch / hub	100 m

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

Standard delivery

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. 1.8 m)

– For *Gold-ENET-Conv* only:
  - Power adapter: A slot metal plate with socket, 3-pin, inverse-polarity protected cable for power supply.
  - 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)

Continue here

For *Gold-ENET-Conv* only: Install the power adapter as described on page 42 in the text box. Of course, replace the word "USB" by "Ethernet".

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

9.1 Basic information about Ethernet operation

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

– MAC address

– Host-IP and Subnet Mask

– Default Gateway (optional)

– DHCP

– Host TCP/IP Port (optional)

– Password

– Timeout

9.1.1 MAC address

MAC address

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. It is to be found on a label on the *ADwin* Ethernet interface.

9.1.2 Host-IP and Subnet Mask

Host-IP

Each TCP/IP host (the *ADwin* Ethernet interface is a TCP/IP host) is marked by a unique logic IP address.

The 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.

My own Host-IP

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

IP and subnet mask

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`
	network identification	host-identification

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.

The following examples show the configuration of the host IP and subnet mask when working with different applications.

Example 1:

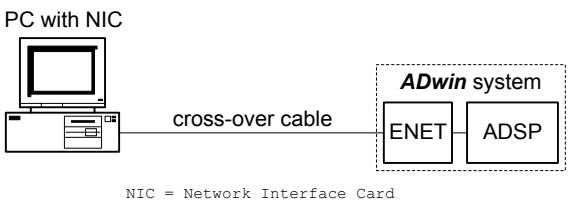
Intranet

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 2:

Own network card

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:



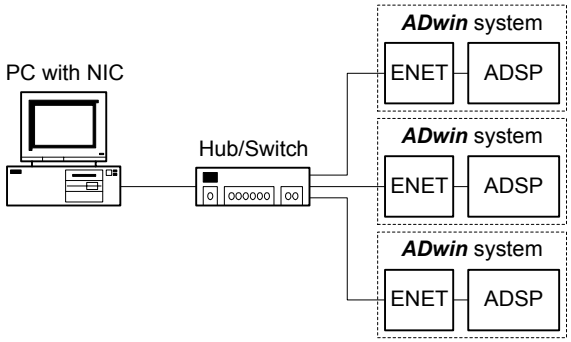
NIC = Network Interface Card

Device	Subnet Mask	IP address	Identification	
			network	host
PC	255.255.255.0	192.168.0.1	192.168.0	1
ADwin ENET	255.255.255.0	192.168.0.2	192.168.0	2

Example 3:

Hub/Switch

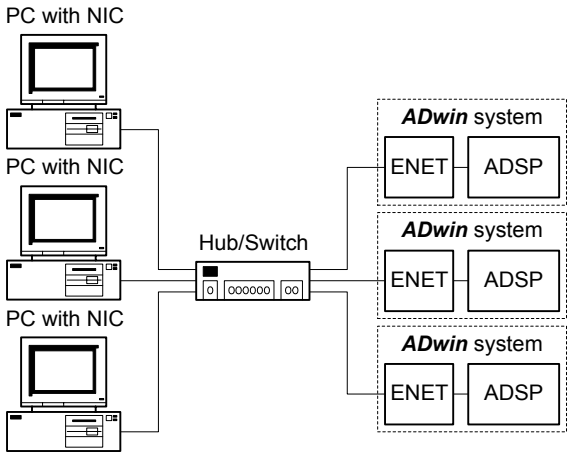
If you connect several *ADwin* Ethernet interfaces with your network card via a hub/switch (the network cable is not part of the standard delivery), you can use the following configurations:



NIC = Network Interface Card

Device	Subnet Mask	IP address	Identification	
			network	host
PC	255.255.255.0	192.168.0.1	192.168.0	1
ADwin ENET 1	255.255.255.0	192.168.0.2	192.168.0	2
ADwin ENET 2	255.255.255.0	192.168.0.3	192.168.0	3
ADwin ENET 3	255.255.255.0	192.168.0.4	192.168.0	4

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.

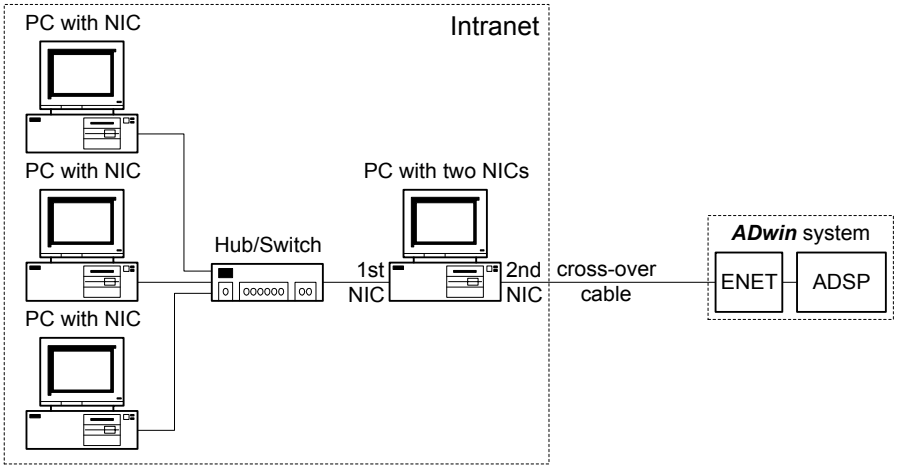


NIC = Network Interface Card

Example 4:

Intranet network card and own network card

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 (the network cable is not part of the standard delivery).



NIC = Network Interface Card

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.

9.1.3 Default Gateway

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.

9.1.4 DHCP

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 iden-

tical 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.

9.1.5 Host TCP/IP Port

Services

Since for each host there are different services available, so-called unique "port numbers" are allocated to these services. Such services are fore instance FTP, Telnet or HTTP. 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 this service 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 as "Host TCP/IP Port".

9.1.6 Password

If several *ADwin* Ethernet interfaces in one network are used by different users, a not authorized access to the *ADwin* Ethernet interface can be prevented by using a password.

Password

The password is independent of TCP/IP.
The password is case-sensitive and has up to 10 characters.

9.1.7 Timeout

The PC communicates with the *ADwin* Ethernet interface via UDP proctocols (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.

Quality of connection

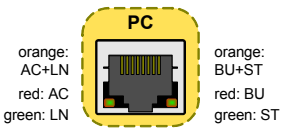
If the connection is made via internet, it may be necessary to essentially increase the time for the timeout.

9.2 Hardware configurations and displays

9.2.1 Function of the LED displays

The *ADwin* Ethernet module shows its mode of operation with the LEDs `ST` (status), `BU` (busy), `AC (activity)` and `LI` (link).

The LEDs on an *ADwin-Gold-ENET* are shown at right.



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.

AC

LI

ST / BU

BU

ST

LI / ST

9.2.2 The DIL switches

***ADwin-Pro* only**

The settings of the DIL switches are part of the specified features of *ADwin-Pro* systems only and can there be changed by the user.

For all other *ADwin* systems please refer to Jäger Computergesteuerte Messtechnik GmbH or the corresponding representative in your country.

For Pro modules there are 2 types of Ethernet interfaces, where the DIL switches are set differently.
You can differentiate between the 2 types by their firmware version:

– Up to firmware version 2.5: ENET-1

– From firmware version 2.6 onwards: ENET-2

To do a version check start the program <ADethflash> (from Windows start menu: Programs ▸ ADwin). Choose the appropriate module and the option "Display the status ..." and confirm with "Next". The next window shows the software version of the module.

ENET-1

Now change the DIL switches. (For the allocations and functions, see below). The change of the DIL switches will only become active at the next power-up of the *ADwin* Ethernet interface.

Place the module with the front plate to the left side, so that the handle is closer to you.

This description refers to the DIL switch block at the lower right of the *ADwin* Ethernet interface printed circuit board (only with the older Pro module T9+ENET: the DIL switch block at the upper right must not be changed).

DIL no.	Description	Meaning	Default setting
1	Reprogramming the firm ware	ON = active	OFF
2	Bootloader write-protected	ON = yes	OFF
3	Bootloader deactivated	ON = yes	OFF
4	Configuration blocked	ON = yes	OFF
5…8	No function	–	OFF

Abb. 1 – DIP switch numbers ENET-1

ENET-2

Place the module with the front plate to the left side, so that the handle is closer to you.

This description refers to the DIL switch block at the top of the *ADwin* Ethernet interface printed circuit board. The DIL switch number 1 is at right, the position OFF is upwards.

DIL no.	Description	Meaning	Default setting
1	Reprogramming the firm ware	ON = active	OFF
2	Bootloader write-protected + configuration blocked	ON = yes	OFF

Abb. 2 – DIP switch numbers ENET-2

Description of DIL switches

Switch "Reprogramming the firm ware"

With an *ADwin* Ethernet interface the firm ware can be reprogrammed with the program *ADethflash* (under Windows start menu `Programs\ADwin`). In order to reprogram, this DIL switch has to be set to "ON". At the next power-up the *ADwin* Ethernet interface is operating in a special mode, so that you can program the firm ware with *ADethflash*.

Switch "Bootloader is write-protected"

If your *ADwin* Ethernet interface has the bootloader option (see the following chapter 9.6), you may prevent the reprogramming of the bootloader with this DIL switch. In the position "ON", reprogramming the bootloader is not possible.

When working with an *ADwin* Ethernet interface without bootloader option the DIL switch is ignored.

Switch "Bootloader is not active" (ENET-1 only)

If your *ADwin* Ethernet interface has the bootloader option, you can deactivate the bootloader with this DIL switch. In the position "ON" the bootloader is not executed.

When working with an *ADwin* Ethernet interface without bootloader option the DIL switch is ignored.

Switch "Configuration blocked"

With the program *ADconfig* you configure the *ADwin* Ethernet interface (see chapter 9.3). In order to avoid an unintentional configuration, you can block the configuration with this DIL switch. In the position "ON" the configuration of the *ADwin* Ethernet interface cannot be changed.

9.2.3 Initializing the hardware

Initializing the hardware

Before you can configure your *ADwin* Ethernet you have to connect it with the PC. Connect the power supply cables and the network card, too (see also the previous examples in this chapter).

9.3 Configuration with *ADconfig*

Configure first the settings in the PC then the Ethenet interface by using the program *ADconfig.*

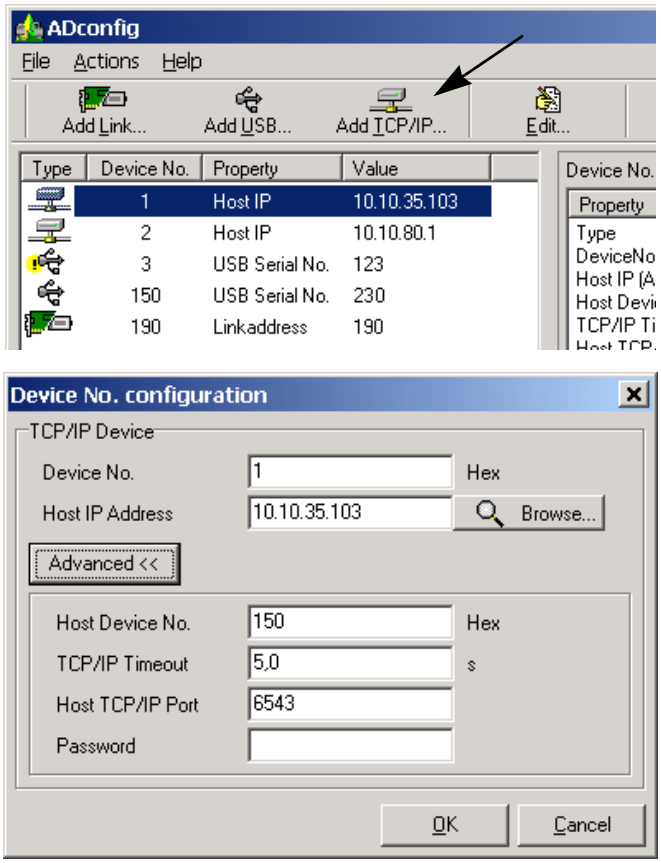
9.3.1 Configuration of the PC

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

PC configuration

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).

Add TCP/IP



Host IP see page 51

Advanced…

see page 55f

The `Advanced` settings will normally stay unchanged.

OK

The "`Host Device No.`" has no effect during the configuration of the *ADwin* Ethernet interface and should be left on the standard (default) value `150h`.

The difference

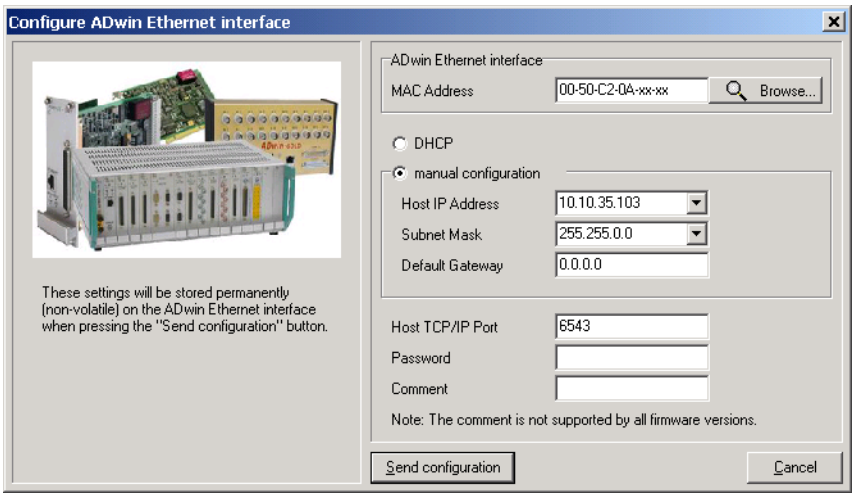
Do not mix up the allocation of the "Device No." to the *ADwin* Ethernet interface with the configuration of the *ADwin* Ethernet interface itself!

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.

9.3.2 Configuration of the *ADwin* Ethernet interface

When configuring the *ADwin* Ethernet interface (AEI) the settings described above are transferred to the AEI and stored in a non-volatile memory (independent of power supply). For the first connection to the AEI 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 9.2.1).

Non-volatile memory

ADconfig

Configure Ethernet Interface

MAC address: page 51f

Default Gateway: page 54

Host TCP/IP Port: page 55
Password: page 55

Send configuration + Close

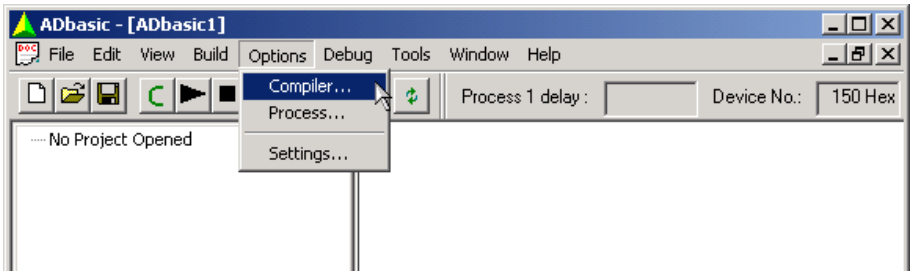
Checking the configuration

9.4 Settings in *ADbasic*

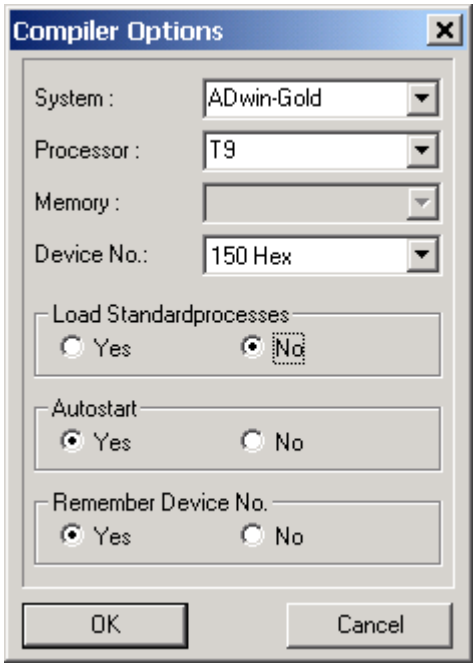
Now connect your *ADwin* system according to the instructions in your hardware manual.

Checking the 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`: Select the *ADwin* system which is used.
- `Processor`: Select the processor type of the *ADwin* system.
- `Memory`: This option is not relevant here.

Device No.

- `Device No.`: Select the Device No. you have used in the programm *ADconfig*.

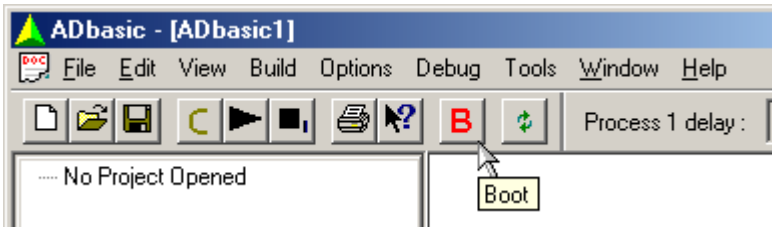
  The setting "`None`" in the pull-down list is only necessary in order to compile *ADbasic* programs for test purposes, when no *ADwin* system is connected.

- 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 *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).

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.

ADwin-Pro programming

– 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*

9.5 Application-specific features

Basically there is no difference wether 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`).

Configurating 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:

Data integrity

– 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.

Collision bus

– 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).

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.

9.6 Bootloader option for the *ADwin* Ethernet interface

The option "bootloader" of the *ADwin* Ethernet interface offers the following functions:

Functions

– Automatical booting of the connected *ADwin* system
– Transfer of up to 10 processes to the *ADwin* system
– Start of the process 10 (if programmed)

You can reprogram the bootloader during operation and deactivate it by DIL switch or software.

Programming with *ADethflash*

You reprogram the bootloader by using the program *ADethflash*. The operating system of the *ADwin* system (`<ADwin9.BTL>`) and up to 10 processes can be programmed into the bootloader.

Reprogramming can be made in the normal operating mode of the *ADwin* Ethernet interface. 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 `Programme ▸ ADwin`).

Booting the *ADwin* system

Program the bootloader and the operating system `<ADwin9.BTL>` of the *ADwin* system. Activate the bootloader option by using the DIL switch no. 2 (see chapter 9.2.2). At the next power-up the following steps are executed:

– The *ADwin* Ethernet interface starts operating, the existence of the boot file `<ADwin9.BTL>` is checked. Then the connected *ADwin* system is booted and the possibly programmed processes (max. 10) are transferred to the *ADwin* system.
– If process 10 is available it will be started by the bootloader. If other processes are also to be started, you have to insert the starting instructions into the program code of process 10.
– Afterwards the *ADwin* Ethernet interface operates in the normal communication mode.

If no operating system of the *ADwin* system `<ADwin9.BTL>` is programmed in the program *ADethflash*, it is the same as deactivating the bootloader. In this case no processes are loaded and started.

Deactivating the bootloader

Deactivating the bootloader is either made by using the DIL switch (see chapter 9.2.2: Switch "Bootloader is not active" (ENET-1 only)) or by software. In the latter case the bootloader is programmed without operating system (`ADwin9.BTL/ADwin10.BTL`).

Annex

A.1 List of Abbreviations

A/D	Analog to Digital
ADC	Analog to Digital Converter
ADSP	Analog Devices Signal Processor
b	Binary number
CLK	CLocK
CLR	CLeaR
CMOS	Complementary Metal Oxide Semiconductor
CMRR	Common Mode Rejection Ratio
D/A	Digital to Analog
DAC	Digital to Analog Converter
DIL	Dual InLine
DIO	Digital Input / Output
DIR	DIRection
DMA	Direct Memory Access
DMM	Digital Multi-Meter
DNL	Differential Non-Linearity
DRAM	Dynamic Random Access Memory
DSP	Digital Signal Processor
EOC	End Of Conversion
EMC	Electro-Magnectic Compatibility
ESD	Electro-Static Discharge
FPGA	Field Programmable Gate Array
FSR	Full Scale Range
GND	GrouND

Manufacturer

AD	Analog Devices
BB	Burr-Brown
LT	Linear Technology
TI	Texas Instruments

h / Hex	Hexadecimal number
I/O	Input / Output
IC	Integrated Circuit
InAmp	Instrumentation Amplifier
INL	Integral Non-Linearity
IRQ	Interrupt ReQuest
kB	kilo Byte (= 1024 Byte)
kByte	see kB
LED	Light Emitting Diode
LSB	Least Significant bit
MB	Mega-Byte (= 1024 kB)
MByte	see MB
MSB	Most Significant bit
MUX	Multiplexer
OpAmp	Operational Amplifier
PC	Personal Computer
PGA	Programmable Gain Amplifier
S&H	Sample & Hold
SRAM	Static Random Access Memory
TTL	Transistor-Transistor Logic
V_{cc}	Voltage collector-collector
V_{ee}	Voltage emitter-emitter

A.2