

Cambridge Electronic Design Limited

Changing the links on ISA interface cards, 1401-10 or 50

The ISA interface cards are set at the factory to interrupt vector 5, DMA channel 1 and base address 300. Many systems will work correctly with these standard settings. You only need to read the following notes if you suspect these settings have caused a hardware resources clash. If you have to change the address via these links, you must also change the software settings to match, which is covered below, for Windows 9x, Windows NT 2000 and Windows NT 4. The software settings sections will tell you if there is a clash.

If you are moving the 1401 to a fresh computer, you will need the *1401 support for Windows* disk. If you do not have this disk, go to the CED web site, Updates chapter, and down-load the *Standard Windows Installer* file. This is a self-expander; run it and copy the results to a floppy disk.

The standard interface for the ISA bus is the 1401-10; for faster ISA performance the quad rate 1401-50 may be used.

The standard 1401-10 ISA interface card is currently at issue L. It is compatible with all PCs including Pentiums. There have been significantly slower earlier issues. If you 'inherit' one from an older system it is likely to fail to work correctly with a fast modern computer.

Interrupt vector

The 1401 software uses a hardware interrupt to make servicing the 1401 both fast and efficient. There are four vectors that can be used, numbered 2, 3, 4 and 5. The preferred vector is 5. Note that, for historical reasons, interrupt 2 is mapped onto and will be displayed as interrupt *request 9*.

Vector	Other users of this vector
2	May conflict with VGA frame interrupt on AT or above. VGA interrupt can usually be disabled without any performance penalty; see your VGA controller manual.
3	Serial port 2 (COM2). Will only conflict if you are using serial line software that uses interrupts on COM2.
4	Serial port 1 (COM1). Will only conflict if you are using serial line software that uses interrupts on COM1.
5	Parallel port 2 (LPT2) and some mice. It is extremely rare for the parallel port interrupt to be used.

DMA channel

The 1401 device driver uses DMA transfers (Direct Memory Access) to move large blocks of data between 1401 and the computer efficiently. You can disable DMA if you do not have a free DMA channel. However, some CED applications, for example CHART and Patch continuous sampling, will not work without DMA. Other applications, including Spike2, work more efficiently with DMA. You can disable DMA by moving a card jumper.

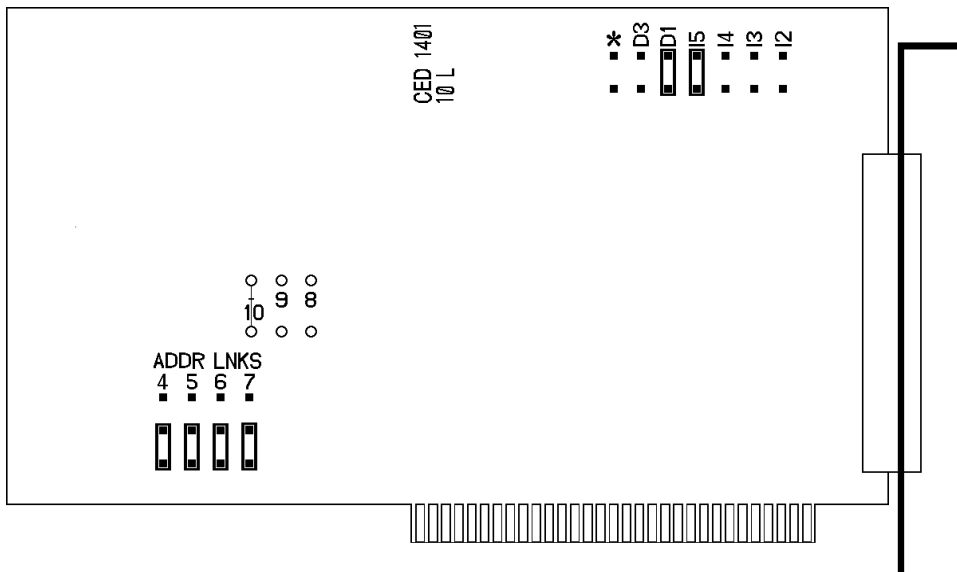
You can use DMA channel 1 or 3. No standard hardware uses either of these. If you have special hardware in your computer (for example a tape streamer), check if it uses DMA. It is possible for two devices to share DMA channels so long as they do not use the same channel at the same time.

The 1401 only connects itself to the DMA logic in your computer when it transfers data, so it can share a DMA channel with the tape streamer so long as the tape streamer is also well-behaved. Ideally you should have a separate DMA channel for each device.

Card address

It is unusual to need to change the address from the standard value of 300. Occasionally, an address clash with a different card can occur: beware of network cards and proprietary input cards.

1401-10L



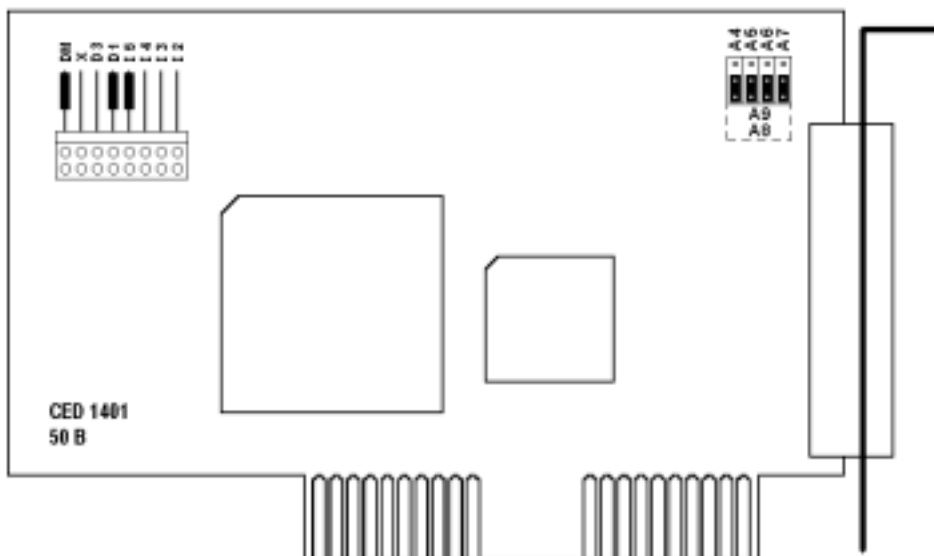
The interrupt and DMA channel are selected by jumpers at the top right of the card. A jumper in one of I2, I3, I4 or I5 selects an interrupt vector from 2 to 5. Similarly a jumper in one of D1, D3 or * selects DMA channel 1, channel 3 or no DMA.

Bits 4 to 7 of the card address are set by jumpers on the ADDR LNKS field at lower left. The diagram shows jumpers set for base address 300 (hex), with all jumpers in position 0 (lower).

address	300	310	320	330	340	350	360	370	380	390	3A0	3B0	3C0	3D0	3E0	3F0
links	... .	... 4	.. 5.	.. 54	. 6..	. 6. 4	. 65.	. 654	7... .	7.. 4	7. 5.	7. 54	76.. .	76. 4	765. .	7654

1401-50

The 1401-50 is a high-speed ISA interface card that can be used in place of the 1401-10. It makes use of the burst transfer Demand Mode available on the ISA bus.



The interrupt vector and the DMA channel are set by jumpers at the top left of the card. A jumper in one of I2, I3, I4 or I5 selects a vector from 2 to 5. A jumper in one of D1, D3 or X selects DMA channel 1, channel 3 or no DMA.

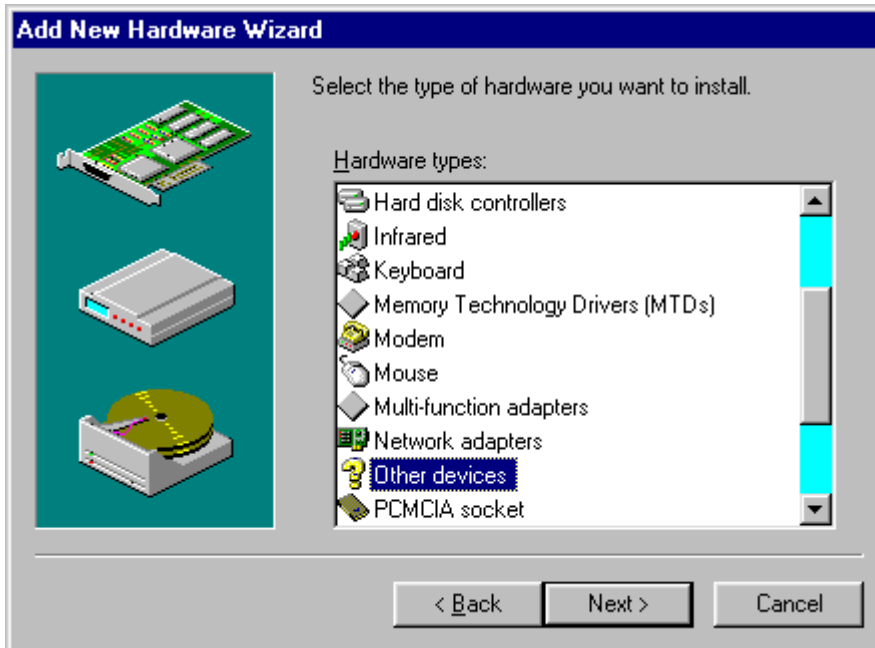
The DM jumper, when inserted, selects the high-speed Demand Mode on the ISA bus. The jumper should be left in, unless there are problems with the high-speed mode on your PC.

Bits 4 to 7 of the card address are selected by the jumpers at the top right. When the jumpers are in the lower position, as in the diagram above, the card is set for address 300. To set 310 (hex), move jumper 4 to the upper position, as above.

Software settings with Windows 9x

After a 1401 ISA interface card has been fitted into a fresh computer, switch the PC on. Windows 9x will not detect the new hardware because ISA devices are not Plug'n'Play. You should therefore proceed as follows:

Select *Start, Settings, Control Panel*. Double-click on the *Add New Hardware* icon. Windows 9x will offer to search for the new hardware, but press *No* (and press the *Next* button as required.) A list of device types is displayed. Select *Other Devices*. A list of specific devices is displayed, but ignore it. Insert the *1401 support for Windows* disk and press the *Have Disk* button.



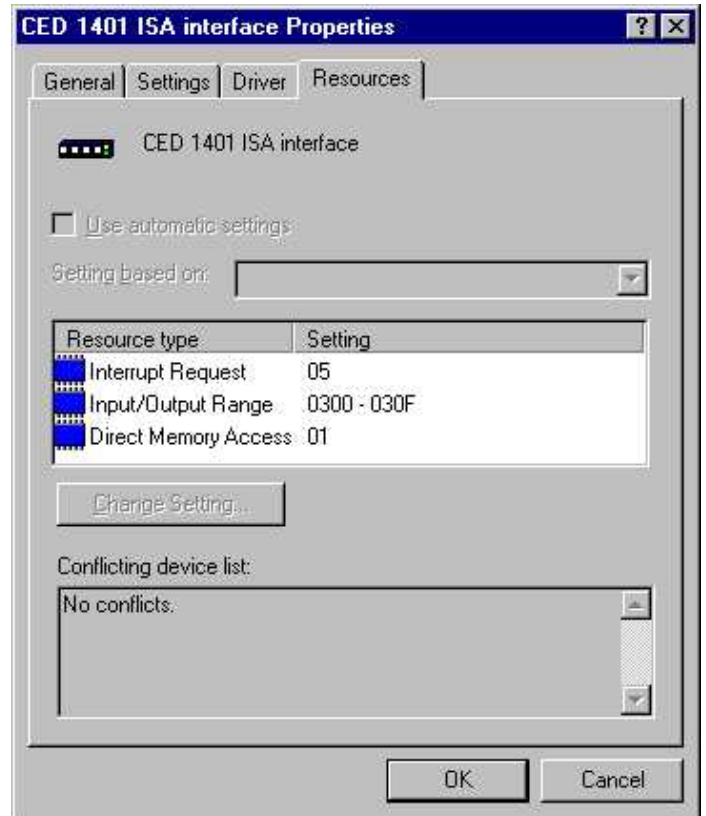
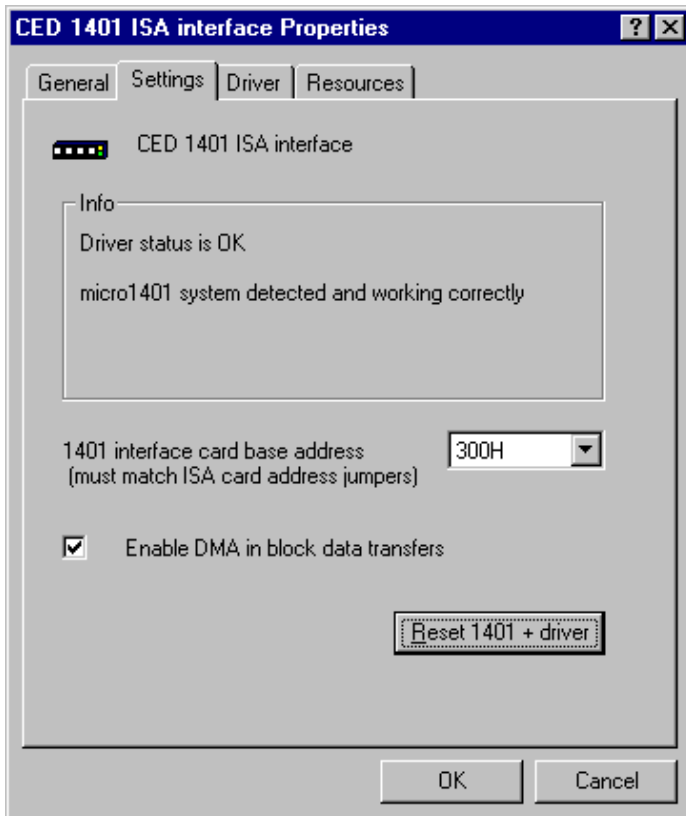
Select the ISA device driver and press *Finish*.

ISA interface settings

You can view the 1401 ISA interface settings by selecting *Start, Settings, Control Panel, System*.

A window opens with four tabs; select *Device Manager*. The *1401* icon will be seen among the installed-devices tree. The boxed + on the 1401 node means a device is present: click on it to reveal *CED 1401 ISA interface*. Select this, then click on the *Properties* button at the bottom of the window.

A new window opens, with more tabs; select *Resources* to view interrupt settings and I/O block usage. The *Settings* tab provides for editing the base address in case you have altered the interface-card address jumpers. There is no provision for manual editing of clashes in *Resources*.



Windows NT 2000 and XP

After the 1401 ISA interface card has been fitted, switch the PC on. Windows NT 2000 will not automatically detect the 1401 ISA card. This is how you proceed:

Select *Start, Settings, Control panel*, and double-click on the *Add New Hardware* icon. Select the *Add/troubleshoot device* button on the window that opens. Windows NT 2000 will now insist on searching for Plug'n'Play hardware, which the 1401 ISA interface is not. Press *Next* to start the search anyway. Having failed to find it, it will now give you the choice of its searching for "legacy hardware" or your choosing hardware from a list. Choose the list. From the list, select "Other devices", and press *Next*. Ignore the new list that opens, and press the *Have Disk* button.

Device drivers for CED hardware are stored in the 1401 support for Windows disk. Browse to an appropriate directory and press *Next*. Chose *CED 1401 ISA interface* from the list that is displayed. The software will now be installed.



In case of failure

If the device driver fails to install, it may be that there is a resource conflict, i.e. the resources assigned in software do not match the hardware, or else the hardware settings are already in use. You will need to check the link settings on your hardware and your system resource settings, before adjusting the jumpers and changing the Input/Output address range as required.

Viewing resource settings in Windows NT 2000

You can view the 1401 ISA interface settings by selecting *Start, Settings, Control panel*, and clicking on the *System* icon. Select the *Hardware* tab and click on the *Device manager* button. This reveals the hardware devices tree. The "1401 interface" icon will be on a node with a boxed +, indicating that a device is present. Click on this to display the "CED 1401 ISA interface" icon. If the installation has failed, this icon will be marked with a yellow warning spot. Opening the icon reveals the four tabs of the properties window, one of which is *Resources*.

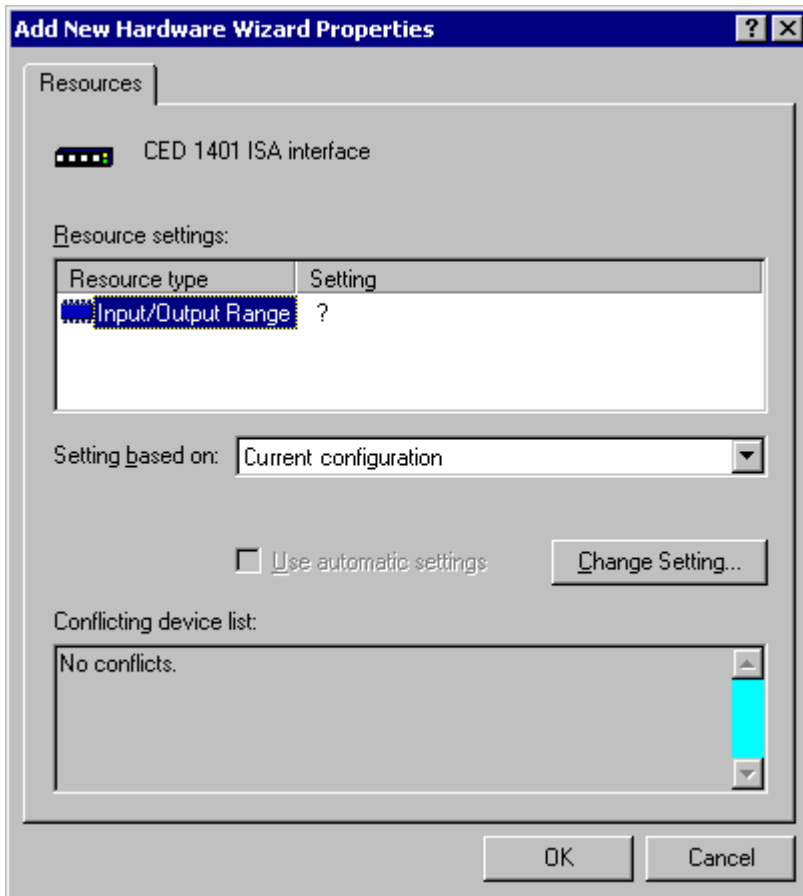
If this tab is empty, or displaying an error message, it may mean that there is a resource clash! You should inspect the resource usage of other devices, especially other ISA devices, and figure out a base address and interrupt that do not clash.

The I/O base address

The installer sets a default I/O base address of 300. This matches the default address set by links on the interface card. If you are using this default address, simply press *Finish* to complete the installation. If your card's address has been altered, e.g. to avoid clashes, the software I/O address must be set to the correct range before installation. Changes to interrupt and DMA channel are dealt with automatically.

Editing I/O base address on installation

If you have altered the I/O base address on the card, press the *Resources* button to inspect the base address. Now click on *Set configuration manually*. Select *Current configuration* from the drop-down list. This initially is empty; select *Input/Output range* and then press *Change Settings*. Using the scroll buttons, step the address range to the value set by the jumpers. Press *OK* as required, and *Finish* to complete the installation.

**Resolving clashes**

Switch the computer off, and adjust the ISA interface hardware. As mentioned above, interrupt and DMA hardware settings are accommodated automatically, but alterations to the base address have to be set manually in *Current configuration*. Go to Hardware Device Manager, 1401 Resources, and then proceed to *Set configuration manually* as described above. All being well, the interface should immediately spring into life!

Windows NT 4

After a 1401 interface card has been fitted, switch the PC on. Windows NT 4 will not detect the new hardware. You should therefore proceed as follows:

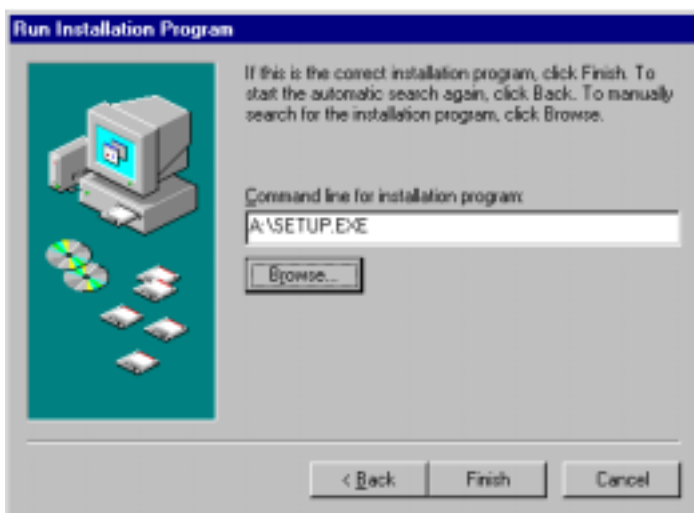
Select *Start, Settings, Control Panel*. Double-click on the *Add/Remove Programs* icon.

Press the *Install...* button and select the *Install/Uninstall* tab. Windows NT 4 will invite you to insert a disk with the new software. Insert the 1401 support for Windows disk and press the *Next* button.

Select *setup.exe*, browsing if necessary, then press *Finish*. If you prefer, you can install by selecting *Start, Run*, and typing

a:\setup.exe or d:\setup.exe

depending on which drive you are installing from.



1401 control panel

Setup will install the 1401 driver and any application software, and a Control Panel applet that is automatically run on installation.

You must now tell the system that your 1401 interface is an ISA card: check the *User sets card type* box, then press the appropriate button.

You can also set the base address if the address has been altered on the hardware. You can reset the Micro1401 from the Control Panel.



To view the 1401 interface hardware settings, select

Start, Programs, Administrative Tools, Windows NT Diagnostics.

A window opens with nine tabs; select *Resources*. This displays the I/O usage, DMA, interrupts etc. grouped in various ways. Press the *Devices* button at the bottom of the window. Select *ced1401* from the list that is displayed, then press the *Properties* button, also at the bottom of the window. The resource usage of the 1401 interface card is displayed.