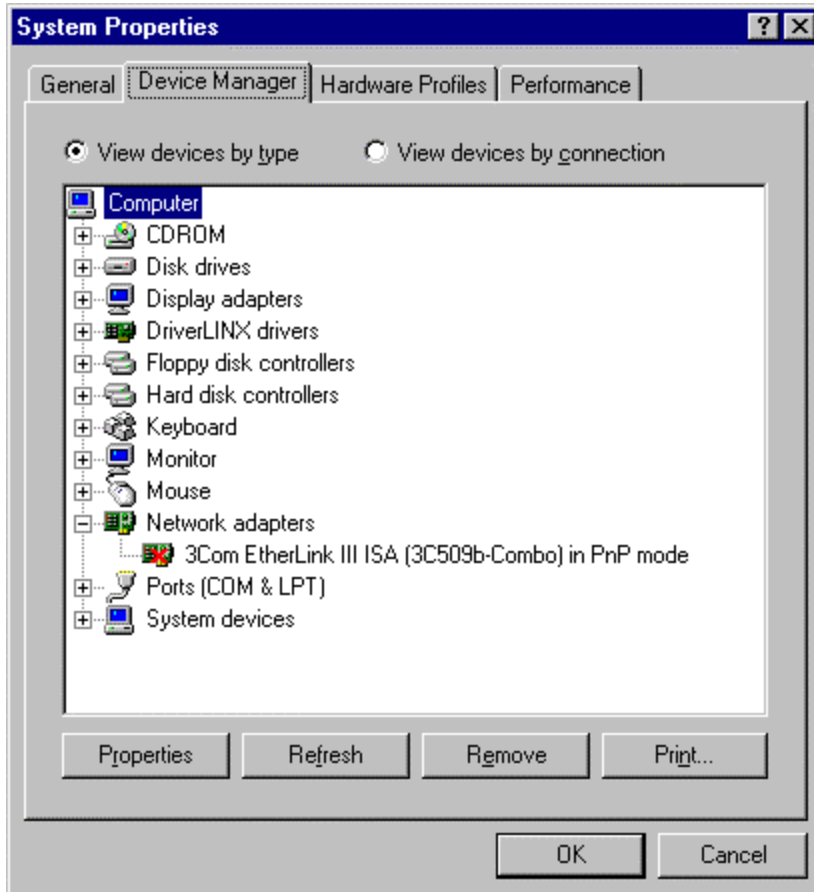


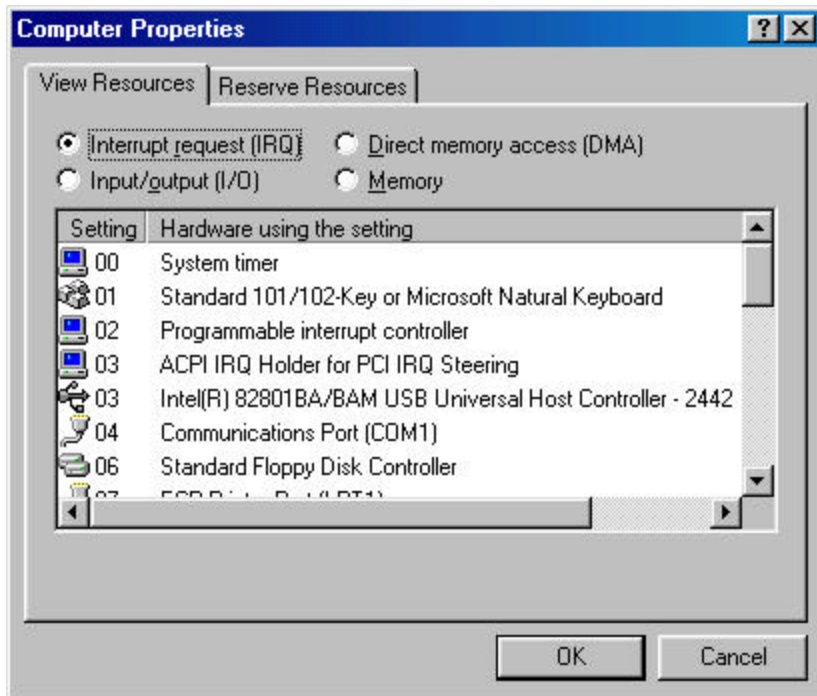
Using Device Manager to determine available resources for ISA cards

Relative to Plug-and-Play PCI cards, use of ISA cards requires some familiarity with resource assignment. Typical resources required by an ISA card will be: a range of I/O addresses, an Interrupt (IRQ), and sometimes a DMA channel as well. Use of Windows' Device Manager can greatly help in determination of what resources are available for your ISA plug-in card.

Step 1: Reboot your computer and then, from the System Icon in the Control Panel, display Windows' Device Manager. Highlight the Computer at the top of the structure (as shown), and then click the Properties button near the bottom-left of the dialog.



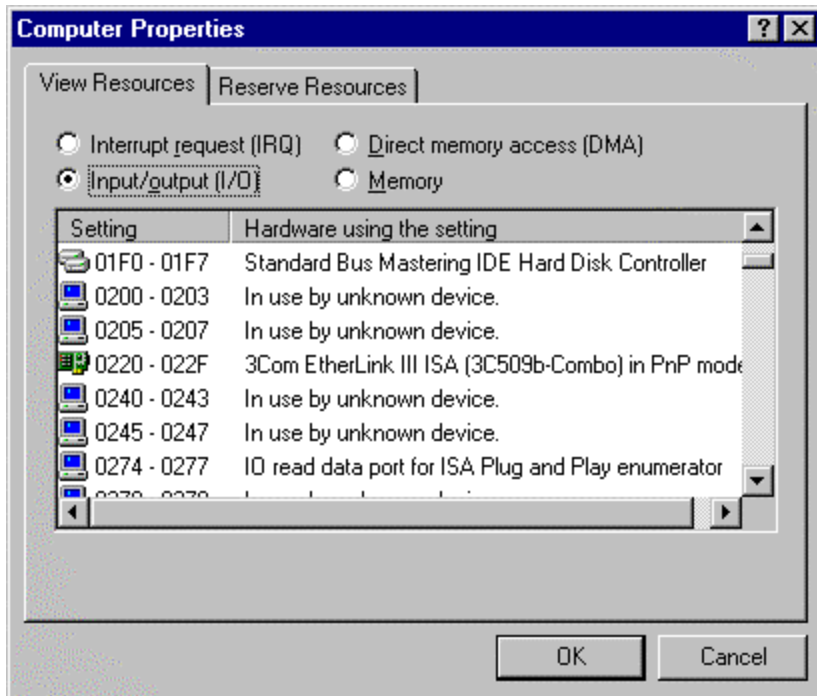
This should bring up the following screen:



Notice the 4 radio buttons to select display of Interrupts, I/O, DMA and Memory. ISA boards can make use of more than one of these types of resources. NOTE: Device Manager can report as in use only those resources reserved by a Windows device driver. DOS drivers or ASO drivers for Keithley/Metrabyte cards do not report resources used by the card to Windows' Device Manager. In this case, manual resource assignment to legacy ISA cards must take into account all non-plug-and-play cards in the system such as other A/D, DIO, GPIB or even sound card, or modem.

Step 2: Interrupts. In the above screen shot, we can see that some interrupts are reported as in use. Since they are in use, they are NOT available for use by a non-plug and play device such as a Keithley/Metrabyte ISA card. Interrupt 5 is not reported as in use, so it would be available.

Step 3: Look at I/O. Click the radio button for Input/Output (I/O). The screen should now look like below:



In this case, the scroll bar has been used to move down the list to display the approximate range of 01F0 through 0277. These values are hexadecimal numbers. The 4 digit hex number corresponds to 16bit addressing. I/O space resources are in the range of 0000 through FFFF.

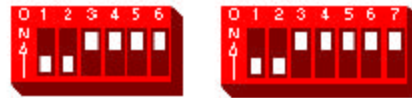
I/O addresses are related to the base address setting of the ISA board. ISA boards shipped from the Keithley factory are at a base address (hex) of 300. Base address implies starting address. All boards use more than one address. How many addresses depend on the type of board but are usually not more than 16 total address spaces (a PIO-12 or PIO-24 uses 4 total addresses, DAS-8 uses 8 total addresses; DAS-1600; DAS-1700; DAS-1800 uses 16). A board which uses 16 total address spaces and has the base address at hex 300 will need the range of 0300-030F to be available for that board to operate without conflict with another device.

Since the range of 0220 to 022F is shown as in use by the 3Com network card, we cannot place our Keithley/Metrabyte card anywhere in this range. Scroll the list to determine an available range of addresses for your ISA card and then change the base address setting on that card to agree with the starting address determined to be available.

Another example: A DAS-800 series board at base address of 240. DAS-800 series use a total of 8 address. The range 0240 – 0247 needs to be available in order for the DAS-800 series board to operate without conflict with another device.

NOTE: On the computer on which these screen shots were obtained, a DAS-802 has been operated with the ASO driver (not Plug-and-Play). The DAS-802 is at an address of 240. The screen shot does display that two ranges, 0240-0243 and 0245-0247, are in use by unknown device. This is normal reporting when a non-plug-and-play device is operated. Windows knows only that some I/O reads/writes have taken place at these I/O addresses. A reboot of the computer will remove these 'in use by unknown device' entries until the next time the card is operated.

Below is an image of how the base address switch settings correspond to a selected I/O address:

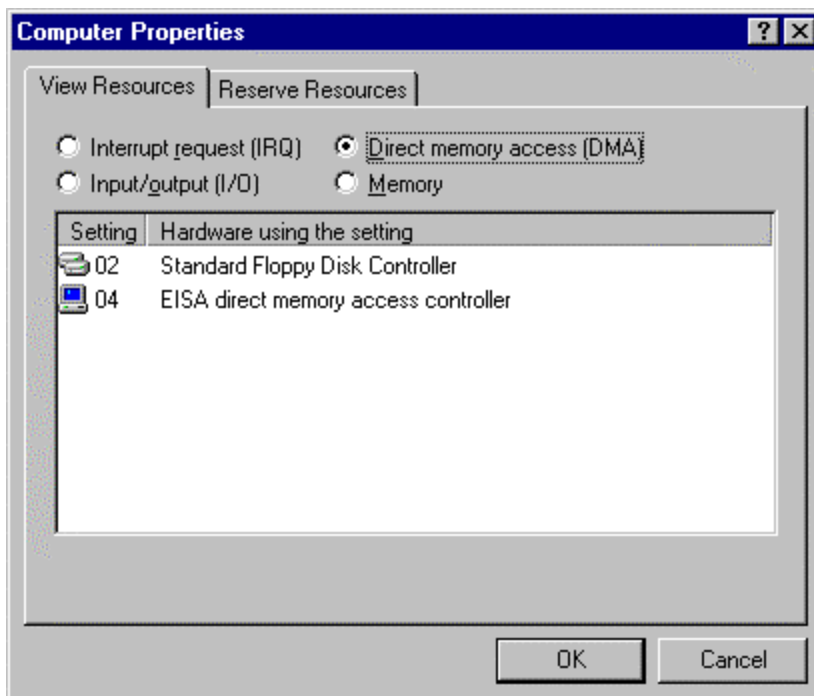


Both images show default address of 300 (hex)

| Switch | Value (hex) |
|--------|-------------|
| 1 | 200 |
| 2 | 100 |
| 3 | 80 |
| 4 | 40 |
| 5 | 20 |
| 6 | 10 |
| 7 | 8 |

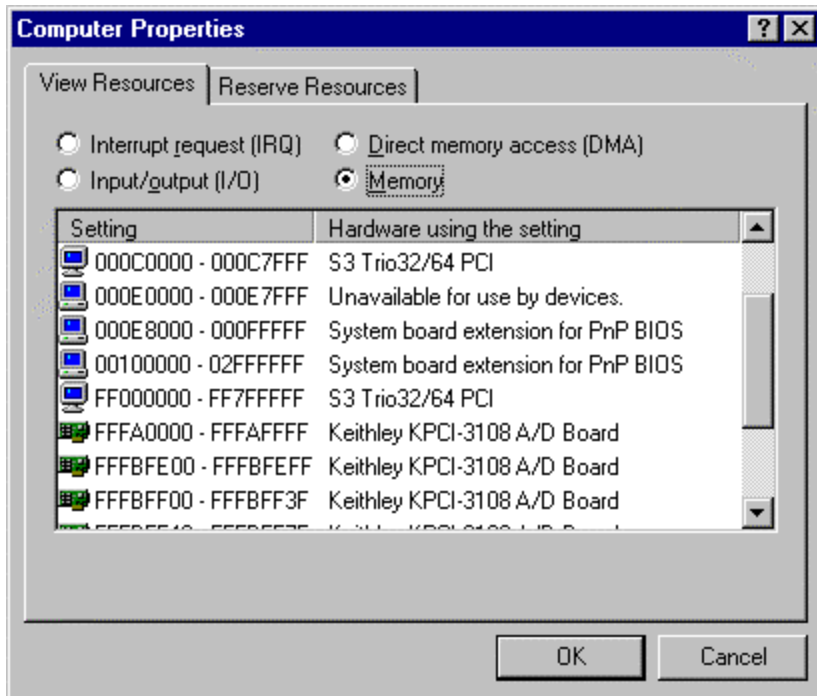
When switch is down (OFF), it contributes a value

Step4: Look at DMA. Click the radio button for display of DMA resources.



In the above screen capture, only two DMA channels are in use. Keithley/Metrabyte ISA cards that use DMA typically can make use of channels 1 or 3 (DAS-16,DAS-1600 Series) or channels 5, 6 or 7 (DAS-1700 and DAS-1800 series). If, however, a sound card was installed then the sound card will often use DMA channel 5. In this case, DMA channel 5 would not be available for the DAS-1800 series board to use.

Step 5: View Memory. Click the radio button for display of memory resources.



Notice that an 8 digit hex number is used to report memory ranges in use by devices. This reflects the 32bit memory addressing used by Win95 and higher.

ISA cards do not typically make use of Memory, however there are exceptions: some GPIB cards, IBIN-A, DAS-4000 Series, etc. For most of the DAS or PIO series of boards from Keithley/Metrabyte, use of memory is not a consideration.

Most PCI cards make use of memory rather than I/O addressing. However, there are exceptions such as the KPCI-3160, KPCI-PDISO8A, and KPCI-PIO32IOA. Addressing 32bit memory space from DOS compilers such as QuickBasic or C is not routine. For this reason, memory mapped PCI cards are not recommended for applications written with DOS compilers.

The DriverLINX driver for ISA boards can relieve you of this manual resource assignment burden. DriverLINX gives a plug-n-play feel to DAS-800, DAS-1700, DAS-1800, DAS-TC/B, DDA-08/16, CTM-05/A, CTM-10 and PIO cards and will report resources used by the board to Device Manager. DriverLINX for these boards operates in Win95/98/NT and Win2000. Furthermore, application software written using DriverLINX for these boards will work with our PCI product line; time invested in code development can be preserved during migration to a different version of Windows or to PCI form factor cards. Consult the web site or contact Keithley at 1-888-534-8453 to inquire about a DriverLINX upgrade for your ISA board.