LYNX GigE Vision
Advanced Driver Configuration
Reference Guide

Revision History

1.0	05/21/07	J. Egri	Initial Release

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1 The Scope of this Reference Manual

This reference guide describes how to configure advanced driver settings for your eBUS, iPORT and Intel drivers. For an overview of the entire setup procedure, including a simplified driver installation procedure, see the eBUS Quick Start Guide.

If your image-capture application is memory intensive, you may want to also use the iPORT High-Memory Driver. The iPORT High-Memory Driver works with the iPORT High-Performance IP Device Driver and lets you access more memory than would otherwise be possible with Windows.

2 Fine tuning your driver

Some drivers have configuration settings that let you modify the behavior of your driver.

2.1 Accessing the configuration settings

Some drivers include a DLL that adds one or more tabs to the Windows Properties dialog.

**To access the configuration settings using Windows XP:**
1. From the Windows Start menu, select **Start** > **Control Panel**.
   The **Control Panel** folder appears.
2. Open the **System** shortcut.
   The **System Properties** dialog appears.
3. Select the **Hardware** tab.
4. In the **Device Manager** pane, click **Device Manager**.
   The **Device Manager** dialog appears.
5. Right-click your adapter and select Properties. (Your adapter may be listed under **PRO/1000 Grabber Devices** or **Network adapters**.)
   The **Intel PRO/1000 Adapter Properties** dialog appears. Your driver may include a **Settings** tab and/or an **Advanced** tab.

2.2 Configuring your Intel PRO/1000 driver

Intel PRO/1000 network drivers can be configured, but the parameters differ by model. To see the parameter descriptions for your particular model of network adapter, go to Intel's website at www.intel.com/support/network/adapter/.

2.3 Configuring the iPORT High-Performance IP Device Driver

You can configure a variety of settings for your iPORT High-Performance IP Device Driver using the **Settings** tab and **Advanced** tab.
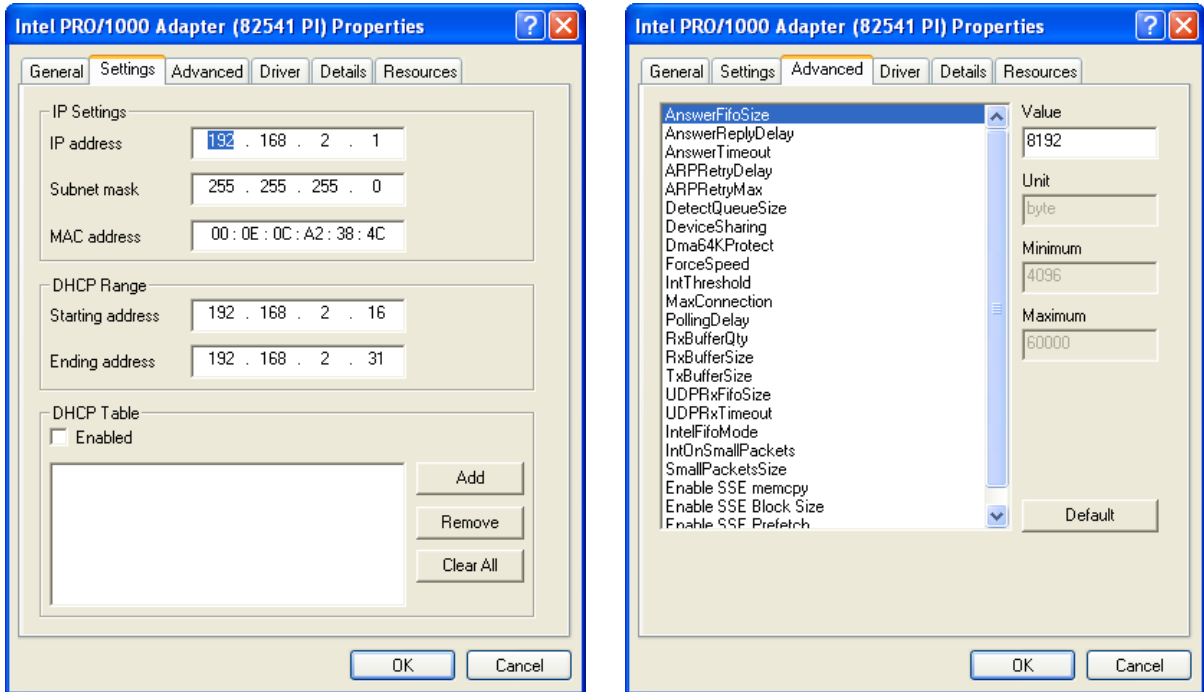
The dialog for changing the settings includes the maximum, minimum, and default values, as well as the units of each parameter.

Note: Some of the parameters can dramatically change the behavior of your iPORT High Performance IP Device Driver. The default values typically work well for most systems.

iPORT High-Performance IP Device Driver parameters

AnswerFifoSize (Bytes)
> The size of an internal answer buffer.

AnswerReplyDelay (Milliseconds)
> The wait time between sending a command and trying to retrieve a reply.

AnswerTimeout (Milliseconds)
> The time to wait for a command reply.

ARPRetryDelay (Milliseconds)
> The time between two ARP requests.

ARPRetryMax (Numeric)
> The maximum number of ARP requests.

DetectQueueSize (Numeric)
> The maximum number of detection requests that the iPORT High-Performance IP Device Driver can buffer.

DeviceSharing (Boolean)

When enabled (value of **1**), the IP Engine can be shared by more than one application.

Dma64Kprotect (Boolean)

When enabled (value of **1**), the iPORT High-Performance IP Device Driver stores buffers larger than 4K in contiguous memory pages of 4K each. This parameter is useful for motherboards with chipsets that have trouble with direct memory access (DMA) to the second 4K page. Enabling this mode may correct problems with corrupted images or Windows crashes.

ForceSpeed

The link speed between the network adapter and IP Engine. The possible values are:

- **0** Auto-detect
- **1** 10 Mb/s
- **2** 100 Mb/s
- **3** 1,000 Mb/s

IntThreshold

The level of fullness of the buffer that causes the network adapter to send an interrupt to the PC.

- **0** Interrupt when buffer hits 50%. Best for legacy PCs or embedded computers with limited resources.
- **1** Interrupt when buffer hits 75%.
- **2** Interrupt when buffer hits 87.5%. Best for medium and high-end PCs.

MaxConnection (Numeric)

The maximum number of simultaneous connections to IP engines.

PollingDelay (Milliseconds)

The time to wait between polling. When the host PC is monitoring for a change, it polls the IP Engine. However, most of the time, the IP Engine sends changes in the form of an interrupt packet. See **IntOnSmallPackets**.

RxBufferQty (Numeric)

The number of reception buffers.

RxBufferSize (Bytes)

The size of a reception buffer. For example, if a packet is 3000 bytes long and **RxBufferSize** is smaller, the packet will be discarded.

TxBufferSize (Bytes)

The size of a transmission buffer. See **RxBufferSize**.

UDPRxFifoSize (Bytes)

The size of the internal buffer for receiving packets when using the iPORT SDK CySocketUDP class.

UDPRxTimeout (Milliseconds)

The maximum time that the iPORT High-Performance IP Device Driver waits for a packet when using the iPORT SDK CySocketUDP class.

IntelFifoMode

An iPORT Hydra-specific parameter that specifies how the PRO/1000's internal FIFO is configured. Available values include:

0 Most of the FIFO is assigned to the incoming data.

1 The FIFO is configured equally for both outgoing and incoming data.

2 Most of the FIFO is assigned to the outgoing data.

IntOnSmallPackets (Boolean)

When enabled (value of **1**), the network adapter generates an interrupt if it receives a packet of a size equal to or smaller than the **SmallPacketSize** parameter. Enabling this parameter is useful for optimizing serial data communications.

When disabled (value of **0**), the iPORT High-Performance IP Device Driver waits until a timeout occurs before handling the packet (reducing CPU usage but slowing serial communications).

Note: Intel PRO/1000 network adapters with the 82544 chipset don't support small packet interrupts.

SmallPacketsSize (Bytes)

The maximum size of a small packet (used in conjunction with the **IntOnSmallPackets** parameter).

Packets that are smaller than this setting cause the network adapter to generate an interrupt to ensure that small packets don't sit indefinitely in the queue. Small packets typically contain command acknowledgements and interrupt requests from the IP Engine.

3 Manually installing your drivers

In some cases, you may want to manually install your drivers. Generally, using the eBUS Driver Installation Tool is faster, easier, and more reliable. To automatically install your drivers using the eBUS Driver Installation Tool, see the eBUS Quick Start Guide.

The procedure described below is for a Windows XP and is as generic as possible. However, Windows has many variants and the exact procedure for accomplishing various system-level tasks can vary dramatically. In some cases, subtle Windows settings may prevent installation or cause Windows to proceed automatically. If you encounter difficulty, consult your IT department.

Some drivers work in conjunction with the regular NIC driver; some don't. If you require both drivers, you must install them sequentially. To learn which drivers use a regular NIC driver, see the eBUS Quick Start Guide. Before uninstalling any drivers, you should find and choose the driver(s) you wish to install.

3.1 Finding available drivers

Imperx's drivers have an inf extension and are located in the subdirectories within the Imperx Inc directory. The following procedure finds and lists all the drivers. For details about these files, see the iPORT Run-Time Library Distribution reference guide.

To manually find available drivers:
1. Using an instance of Windows Explorer (not Internet Explorer) open the default Imperx directory. Typically, the directory is located at C:\Program Files\Imperx Inc.
2. Right-click the directory and select **Search**.
   The **Search Results** dialog appears.
3. In left-hand pane, type *.inf in the **All of part of the file name** box, and click **Search**.
   The list of available drivers appears in the right hand pane.
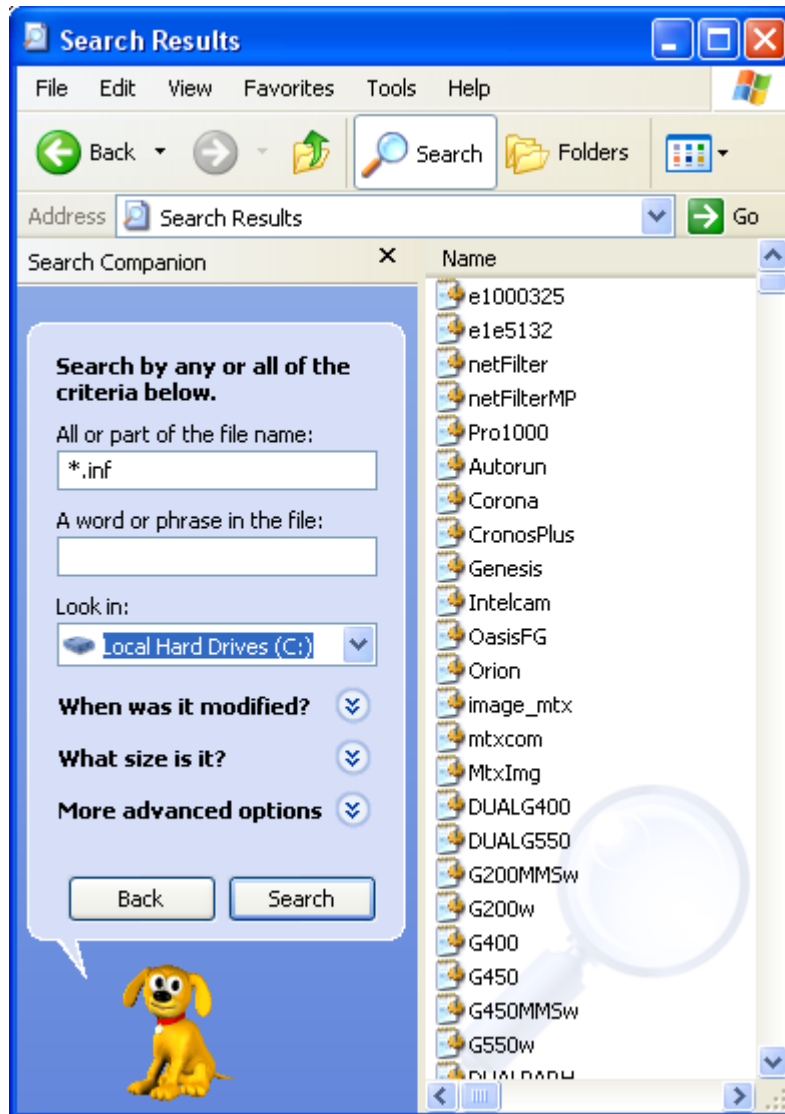
3.2 Installing drivers
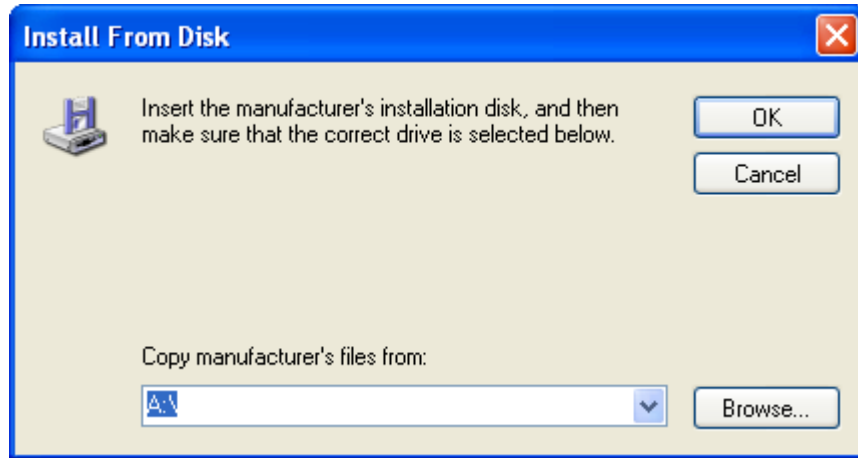
To manually install your drivers:
1. From the Windows Start menu, select **Start** > **Control Panel** > **System** icon > **Hardware** tab. In the **Device Manager** pane, click **Device Manager**.
   The Device Manager dialog appears.
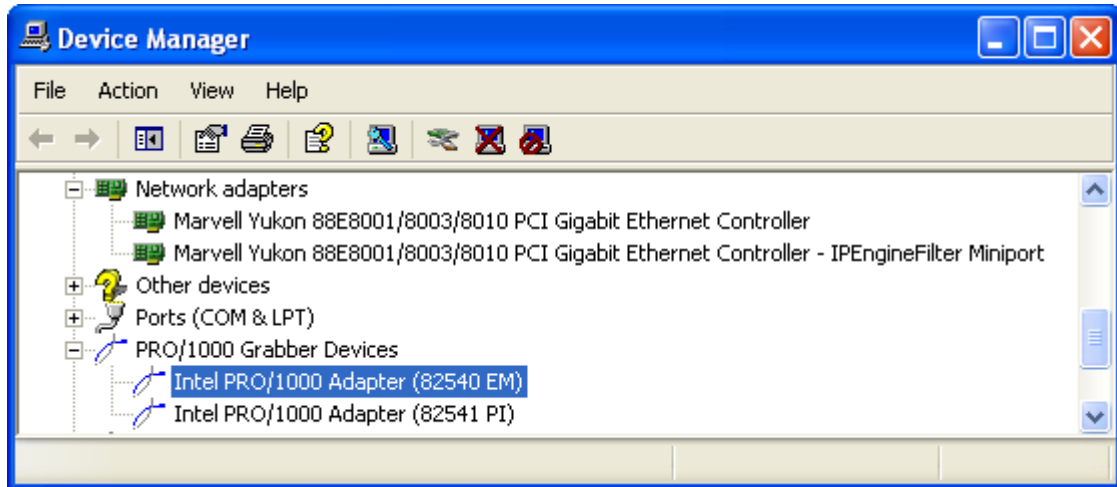
2. Right-click any icon and select **Scan for hardware changes**.
3. The **Found New Hardware Wizard** appears.

1. Select **Install from a list or specific location (Advanced)** and click **Next**.
2. Select **Don't search. I will choose the driver to install.** and click **Next**.
3. Click **Have Disk**.
   The **Install From Disk** dialog appears.

4. Click **Browse**.
    The **Locate File** dialog appears.
5. Select your file from among the drivers you found in "Finding available drivers" and click **Open**.
6. Proceed with the installation, accepting warnings as required.
    Your driver is now installed.

3.3 Uninstalling drivers

If your network adapter has any drivers attached to it, you must uninstall them. The Windows Device Manager may display multiple entries for the same adapter; discerning multiple adapters can be confusing.

To manually uninstall your drivers:
2. From the Windows Start menu, select **Start** > **Control Panel** > **System** icon > **Hardware** tab. In the **Device Manager** pane, click **Device Manager**.
    The Device Manager dialog appears.
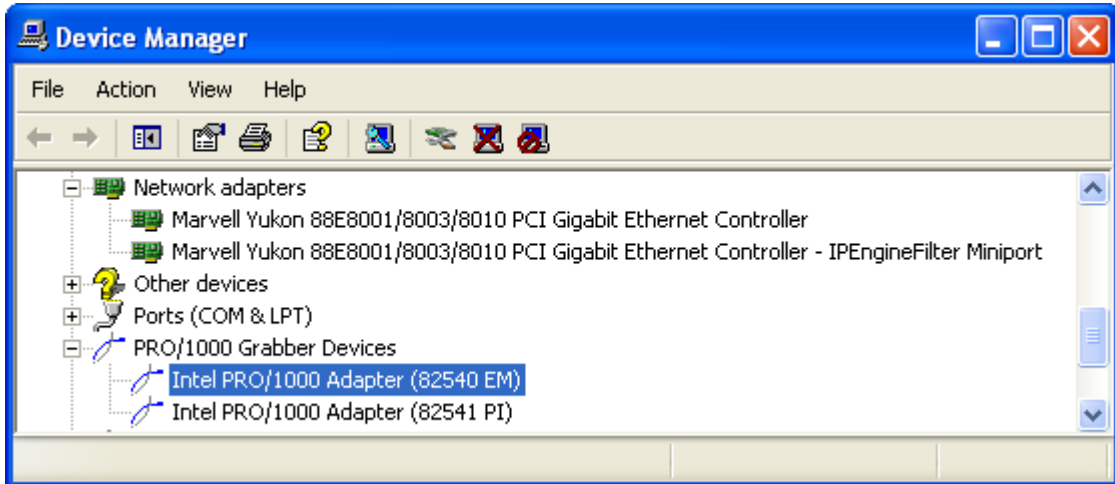
3. Right-click your network adapter and select **Uninstall**. Your network adapters may be listed under **Network adapters** or **PRO/1000 Grabber Devices**.
4. If warnings appear, allow the uninstall to proceed (i.e. click **OK**).
   Your driver is now uninstalled.

4 Increasing available PC memory

The iPORT High-Memory Driver gives your Lynx GEV NIC drivers access to much larger sections of PC memory than would otherwise be available using a 32-bit Windows system.

4.1 Understanding the iPORT High-Memory Driver

Without the iPORT High-Memory Driver

A 32-bit Windows system allows a maximum 2 GB of memory per application. The allocation includes memory required for storing images.

PC memory

Another application
Yet another application
image01
image02
Image capture application

2 GB max
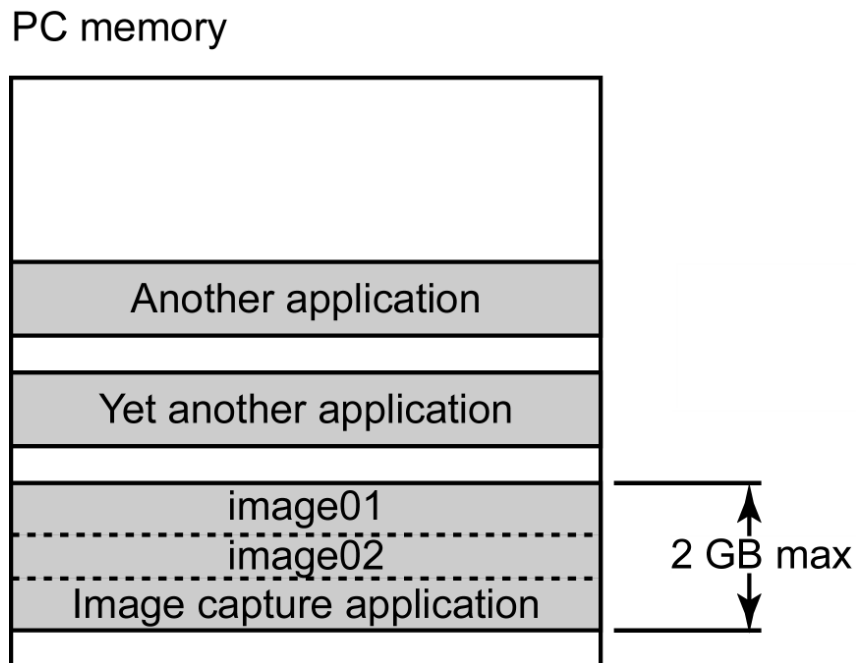
Should your application crash, any images remaining in PC memory would be lost.

PC memory

Another application
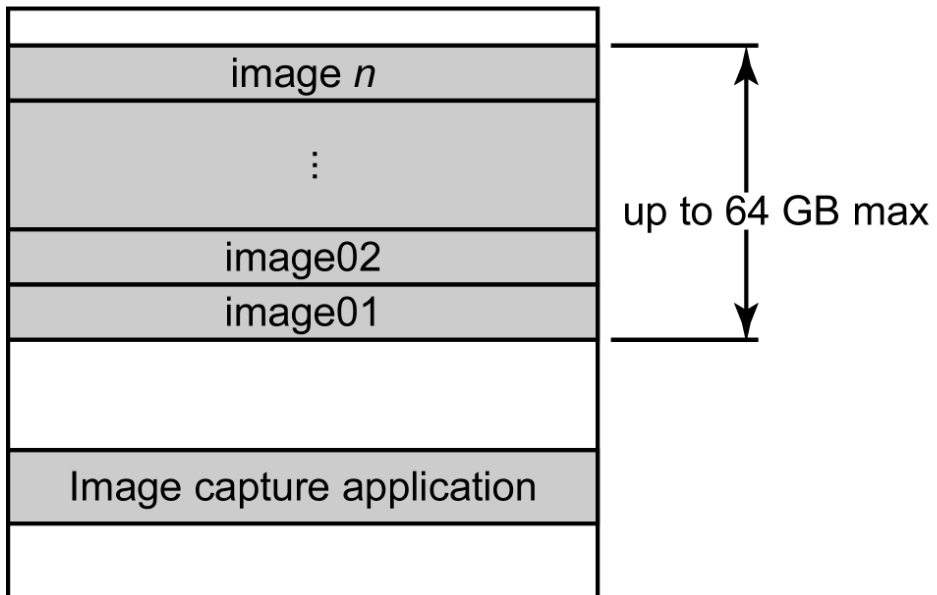
Yet another application

CRASH!

Image capture application
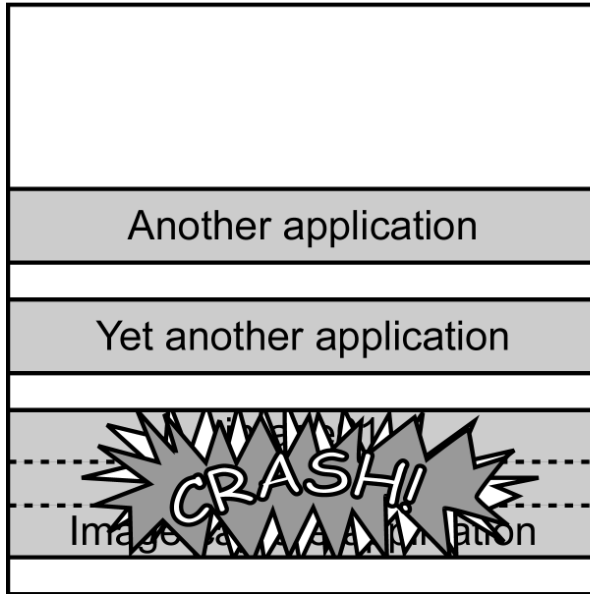
With the iPORT High-Memory Driver

The iPORT High-Memory Driver lets you store up to 64 GB of images separately from your application memory (see "Increasing physical memory with Intel processors" on page 16).

PC memory

image *n*

⋮

image02

image01

up to 64 GB max

Image capture application

With the iPORT High-Memory Driver, your images remain safely in memory even if your image-capture application crashes. You can access the images with a second application or by restarting the first.

PC memory
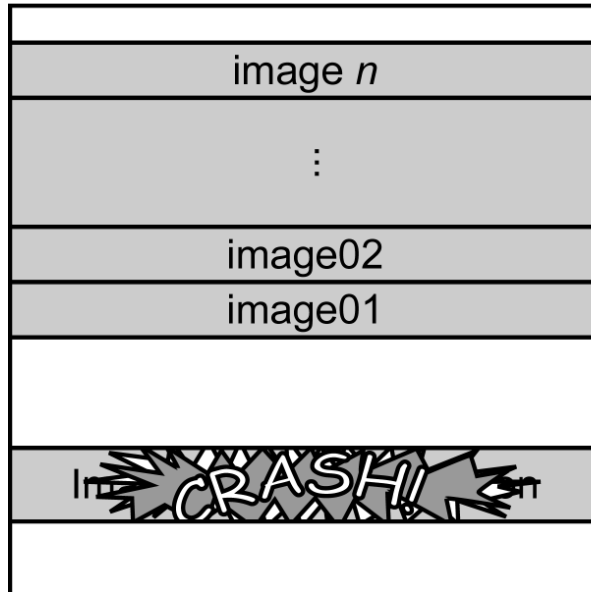
4.2 Increasing physical memory with Intel processors

If your PC uses an Intel CPU, you may be able to significantly increase the maximum amount of physical memory on your PC. Intel CPUs with IA-32 architecture can use Physical Addressing Extensions (PAE) to support up to 64 GB of physical memory
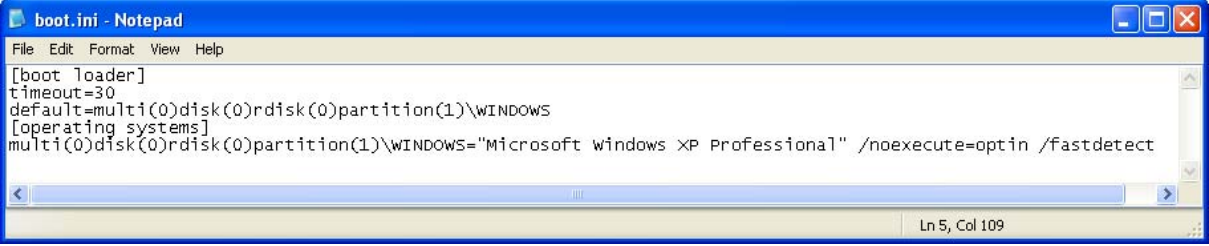
Maximum memory size using the iPORT High-Memory Driver

Operating system	Maximum physical	memory size
	Without PAE	With PAE
Windows 2000	4 GB	Not supported
Windows 2000 Advanced server	4 GB	8 GB
Windows 2000 Datacenter server	4 GB	32 GB
Windows Server 2003, Enterprise Edition	4 GB	32 GB
Windows Server 2003, Datacenter Edition	4 GB	64 GB
Windows XP Professional	4 GB	Not supported

To enable PAE on an Intel CPU:
1. Using Windows Notepad (or another text editor), open C:\boot.ini. If your boot files are in a location other than the C: drive, use that path.

Notepad opens the boot.ini file. (A sample boot.ini file for a Windows XP machine is shown below.)

2. Append the **/PAE** option to the line of code below **[operating systems]**.
3. Save the file.
4. Reboot your PC.

4.3 Allocating buffers with the SDK

To use the iPORT High-Memory Driver through the iPORT SDK, see the CyBuffer and CyHighMemoryManager classes in the iPORT C++ SDK reference guide.

The maximum buffer size depends on your OS kernel and the fragmentation of your PCs virtual address space. The PC can usually allocate a buffer size of 100 Mb or less without difficulty. However, Windows has a **/3GB** boot option that reduces the kernel's virtual space and decreases the maximum buffer size. If the option is enabled on your PC, you may have trouble allocating buffers.

To disable the /3GB boot option:
Follow the directions for enabling PAE, however, instead of adding **/PAE**, remove the **/3GB** option.

5 Technical support

If you've having any problems using the eBUS Driver Suite, the first place to look is in the documentation. You can also find additional information on the Imperx website. If you need help beyond that, email and phone support is available.

Documentation

The eBUS Driver Suite documentation includes step-by-step instructions for most of the driver-related issues you might have.

To view the eBUS Driver Suite documentation:

From the Windows Start menu, select:

Start > **All Programs** > **Imperx** > **eBUS Software** > **Documentation**.

By default, the documentation files are located in:

C:\Program Files\Imperx\eBUS Software\Documentation.

Website

To get software updates, view online documentation, and more, visit **www.imperx.com**.

Email support

Additional technical support can be obtained by contacting Applications Support at +1 (561) 989-0006 or via email at support@imperx.com.