

**SEGA™**

*Getting Started  
with Katana  
Release 2*





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# *Getting Started with Katana Release 2*

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The following document contains material for programmers that are getting started with the Katana development system.

## **Hardware and Software Requirements**

### **Programming environment:**

- IBM PC compatible running Windows 95
- P200 or greater
- 32 MB of memory
- 1 PCI slot free (with additional room to accommodate a tall on-board fan)
- A second VGA monitor and/or a composite TV monitor
- CD-ROM
- Microsoft Visual C++ v.5.0

### **Supported art packages:**

- SoftImage v.3.51 & 3.7 for SGI or Windows NT
- Alias for SGI
- 3D Studio Max R2
- Lightwave 3D



**Note:**

- Windows NT can NOT be used for execution of Katana applications.
  - Windows 98 is not recommended for use with the Katana development system.
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## Katana System Components

You should have received the following components as part of the Katana development system:

- Ninja and Kamui documentation
- Set 2.1 development board
- VGA terminator
- Katana Development CD, Release 2

## Installing the Hardware

Before installing the Set 2.1 Katana development board, make sure your computer has been properly shut-down and that the power cord has been disconnected from the wall outlet.

- 1) Remove the outer case from the computer as described in the owner's manual.
- 2) Locate an open PCI slot with enough clearance for the tall fan on the Set 2.1 board. On most tower PCs, when the card is installed, the fan will face down, so you may wish to choose the last/bottom PCI slot.
- 3) Unscrew the protective plate on the back of the computer covering the selected PCI slot. This is where the Set 2.1 board's VGA and composite video outputs will be located.
- 4) Ground yourself by touching a bare metal surface before removing the Set 2.1 board from its protective anti-static bag. Handle the card by the edges and be careful not to touch any exposed pins to minimize the risk of static electricity discharge.
- 5) Insert the development card into the open PCI slot. Make sure that the board fits snugly into place and that the screw tab aligns flush with the slot opening on the back of the computer.
- 6) Screw the Set 2.1 board into place. Do not skip this step, since the weight of VGA and composite video cables has a tendency to pull the board loose if not fastened down.
- 7) Connect a TV monitor (NTSC only) to the composite video jack on the back of the Set 2.1 board.
- 8) If a second VGA monitor is available, connect this to the VGA port on the back of the Set 2.1 board. Otherwise, plug the VGA terminator into the open port. Use of the terminator will greatly increase the quality of the composite video output.
- 9) Replace the computer case and turn on the power.

## Installing the Development Software

- 1) Insert the Katana Development Software CD into your CD-ROM drive.  
Run the SETUP.EXE program which is in the root directory of the CD, and follow the on-screen prompts.
- 2) After installing the development software, you will need to manually install the Set 2.1 video drivers. Go to the *"Installing the Drivers"* section of this document.

## Manual Installation of the Development Software

- 1) Copy the contents of the CD to the PC that will be used for compilation and debugging. If your CD drive is located at D:, and your hard drive is located at C:, the DOS command which does this is:

```
XCOPY D:\ C:\KATANA\ /S
```

The development system requires approximately 100 MB of free space to install.

- 2) Set the attributes of the recently copied files. In order to make all the files you just copied readable and writable, use the following command:

```
ATTRIB -R -A C:\KATANA\*.* /S
```

## Installing the Drivers

The following section contains two sets of instructions for installing the Set 2.1 drivers for Windows 95. The first set is for first-time users of the Katana development system. If you have already installed and used a previous ARC1-based development board, please refer to the second set of instructions for updating drivers.

For a more detailed description of the ARC1A drivers, see Appendix A.

### First Time Installation

- 1) After installing the Set 2.1 development board, turn on the computer and boot Windows 95. If a message window appears stating `PCI Multimedia Device Found` followed by a list of installation options, select `Driver from disk provided by hardware manufacturer` and skip to step 8).
- 2) If auto-detection did not occur, let the system finish loading, then go to the Windows 95 Control Panel window.
- 3) From the Windows 95 Control Panel, double-click the `Add New Hardware` icon.
- 4) Select `Next` to begin the installation.
- 5) Select `No` when prompted to auto-detect new hardware and click `Next` to continue.
- 6) From the hardware list, highlight `Sound, video and game controllers`, then click `Next` to continue.
- 7) Press the `Have Disk` button.
- 8) When prompted to enter a path for the manufacturer's files, choose the `Browse` button.
- 9) From the file window, locate the `LIB/Drv` folder on the CD-ROM drive.
- 10) The file `Arc1AKam.inf` file should be highlighted. Select `OK` to choose this driver.
- 11) Select `OK` again. When prompted to choose the model, the `ARC1A(KAMUI)` driver should be highlighted. Press `OK` to install the driver.
- 12) Select `Next` to proceed with the plug-and-play installation.
- 13) Choose `Finish` to reboot Windows 95 and complete the installation.
- 14) Attach a second VGA monitor to the VGA port and/or TV monitor to the composite video port of the Set 2.1 card. The default output is VGA. See the section labeled `Video Output` for more information.
- 15) Test the board by running one of the Ninja demos in the `Samples` directory.

## Updating Drivers

- 1) After replacing the Set 2.1 development board, turn on the computer and boot Windows 95.
- 2) From the Windows 95 Control Panel, double-click the System icon.
- 3) Click on the Device Manager tab and select View devices by type.
- 4) Expand the Sound, video and game controllers category to reveal the ARC1A (KAMUI) driver.
- 5) Select the Properties button.
- 6) Click on the Driver tab and choose the Change Driver button.
- 7) A window labeled Select Driver should appear with the current ARC1A (KAMUI) selection highlighted.
- 8) Press the Have Disk button.
- 9) When prompted to enter a path for the manufacturer's files, choose the Browse button.
- 10) From the file window, locate the Driver folder on the CD-ROM drive.
- 11) The file Arc1AKam.inf file should be highlighted. Select OK to choose this driver.
- 12) Select OK again. When prompted to choose the model, the ARC1A (KAMUI) driver should be highlighted. Press OK to install the driver.
- 13) Select Next to proceed with the plug-and-play installation.
- 14) Choose Finish to reboot Windows 95 and complete the installation.
- 15) Test the board by running one of the Ninja demos in the Samples directory. The default output should be VGA 640x480.

## Troubleshooting

- 1) Check the properties of the Set 2.1 board in Win95 and make sure it is not sharing an IRQ with another card. The fastest way is to open the device manager, highlight the root Computer icon, and get Properties. This will display all the devices on the system in IRQ order.
- 2) Free up IRQ 9, 10, or 11 if possible. The ARC1A drivers tend to favor these settings. The Set 2.1 board has also been known to grab IRQ 3 or 7. Try manually adjusting any conflicting driver's IRQ settings.
- 3) If you can not free up these resources, try removing the drivers for both ARC1A (Kamui) and the card causing the conflict (most commonly a network card). Do not reboot the system until both drivers have been removed.

The goal is to allow the Kamui driver to install first, before the other card. Most plug-and-play cards will identify the Kamui driver and relocate to a free resource.

- 4) If a device on the system continues to conflict with the Set 2.1 board, try removing the card completely. First remove the card's drivers, then power down and physically unplug the card.
- 5) Repeat the installation procedure for the Set 2.1 board and verify that the Ninja demos run properly.
- 6) Once the Set 2.1 board has been tested, try re-installing the network or other conflicting card that was removed in step 4.
- 7) A final option, for conflicts that can not be remedied using the above method is to remove all non-essential PCI drivers (i.e. not the video card:). Power-down and remove the corresponding PCI cards.

Try re-installing the Set2.1 board first, then follow up by re-installing the other cards one-by-one.

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 **Note:** The physical PCI slot can determine which IRQ is assigned to a card based on a computer's BIOS settings. Try changing the card order. Only at last resort should you attempt to change BIOS settings manually - they usually make little difference.

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## Video Output

The Set 2.1 development board is capable of generating standard VGA or composite NTSC/PAL output signals, but not both at the same time.

- When using composite output, insert the VGA terminator into the card (or leave a VGA monitor connected - no signal will be present). Without the terminator, the composite video appears greatly oversaturated.
- When using VGA output, an unsynced signal is present on the composite video port, so you may wish to disconnect any television monitors.

## Video Modes

Switching output from composite video to VGA is controlled via software. The ARC1 driver found on the current release of Ninja forces the default output to VGA 640x480. However, you may change the defaults using the following procedure:

Locate the file labeled `KAMUI . INI` in the `C : \WINDOWS\` directory and open it in a text editor. Within the `.INI` file, the editable sections are delineated by a wavy section marker.

`KAMUI . INI` contains a number of command lines directing the driver to output specific video modes and sync rates. Whenever a `kmSetDisplayMode()` or `njInitsystem()` call is made in a user application, the driver first checks this `.INI` file and overrides any user-specified settings. If you want to be able to supply the video and display modes from within your application, comment out the following lines (using a semi-colon):

```
; Force VGA 640x480
VideoMode=1
DisplayMode=0x1
```

If, however, you wish to modify the default settings to force all Ninja or Kamui applications to use a specific display mode, here are the valid mode numbers to change in `KAMUI . INI`:

### For NTSC (60 Hz):

- VideoMode=0
- NTSC 320x240 Interlaced: DisplayMode=0x4
- NTSC 640x240 Interlaced: DisplayMode=0x14
- NTSC 640x480 Interlaced: DisplayMode=0x34

### For PAL (50 Hz):<sup>1</sup>

- VideoMode=2
- PAL 320x240 Interlaced: DisplayMode=0x6
- PAL 640x240 Interlaced: DisplayMode=0x16
- PAL 640x480 Interlaced: DisplayMode=0x36

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 **Note:** Currently, non-interlaced display modes do not work.

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### For VGA:

If you want to send out a VGA signal, you will need to change the hardware clock rate as well as the video and display modes.

*Look for the line:*

```
;Clock 13.5MHz (for TV)
SPGClockMode=2
```

Change SPGClockMode=1 for a proper VGA sync rate.

*Also, set:*

- VideoMode=1
- DisplayMode=1.

Do not try to mix and match VGA, NTSC, or PAL video modes with different display modes. This will cause Ninja applications to freeze and possibly crash Windows 95.

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1. This is not a true PAL signal. It is NTSC running at 50 Hz.

## Building the Samples

The Katana release includes sample programs for both Ninja and Kamui. The following sections describe how to compile and execute these programs.

### Compiling via a DOS window

If the video drivers and Visual C++ 5.0 are installed, the Ninja and Kamui sample applications can be built and executed. The sample applications are available at:

```
\KATANA\LIB\NINJA\SAMPLES  
\KATANA\LIB\KAMUI\SAMPLES
```

To build either set of examples, enter the appropriate directory and run the MAKE.BAT batch file. This will compile all the examples in each of the sub-folders.

### Compiling within Microsoft Developer Studio

If you prefer to manage your projects using Microsoft Developer Studio, it is necessary to tell Developer Studio where to find the Kamui and Ninja include files and linkable libraries. To allow Developer Studio to find these files:

- 1) Change the Include file search path. In the Tools menu of Developer Studio, select Options. Select the Directories tab. Make certain the Show directories for: listbox is set to Include files. Then, add the following directories to the Include files search path:

```
C:\KATANA\LIB\NINJA\INCLUDE  
C:\KATANA\LIB\KAMUI\INCLUDE
```

- 2) Change the Library file search path. Set the Show directories for: listbox to Libraries. Then, add the following directories to the Library files search path:

```
C:\KATANA\LIB\NINJA\LIB  
C:\KATANA\LIB\KAMUI\LIB
```

- 3) Add the correct link libraries to the standard link. In the Project menu, select Settings. Select the Link tab. In the Object/library modules text box, add the following library names at the end of the list. (You may need to use the End key to get to the end of the list.)

```
kamui.lib kmutil.lib ninja.lib nindows.lib njwin.lib
```

- 4) Create a new project, and add source files as usual.

## Appendix A - ARC1A Drivers

Kamui is a hardware control library written by NEC for ARC1 based development boards. The Kamui package includes the following set of Windows 95 driver files:

<b>ARC1Dev.dll</b>	ARC1 hardware device module
<b>ARC1Dev.vxd</b>	ARC1 virtual device driver for Windows 95
<b>Kamui.ini</b>	Driver configuration
<b>Kamui.dll</b>	Kamui hardware control library run-time DLL
<b>Kmimem.ini</b>	Memory configuration
<b>Kmimem.dll</b>	Kamui internal memory management DLL
<b>Msvcrt.dll</b>	Microsoft Visual C++ run-time module
<b>Pcutil.dll</b>	PC interface for Kamui, provides memory-mapped address, etc.
<b>Kmsrv.exe</b>	Kamui device monitor (launched whenever a Ninja/Kamui app. is executed)

Ninja uses Kamui to communicate with the Set 2.1 board and requires the installation of the Kamui drivers in order to run.