

SNAPPER Installation Guide

DataCell Limited

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Introduction

This section describes how to install the software, configure your computer and get your Snapper board running. All SDKs, platforms, and operating systems are covered here, therefore you probably only need to refer to the sections that are relevant to you.

There are four main sections: firstly, Hardware Installation, with sub-sections for each specific product; secondly Software Installation, with sub-sections for each supported operating system; thirdly System Requirements; and finally information on cables.

IMPORTANT: All electronic components including those on both Snapper and Bus Interface Boards can be damaged by static electricity, including that generated by clothes, carpets etc. Therefore when handling the boards always wear an earth grounding strap and handle the boards by their edges - do not touch the components, connector pins, or soldered joints, either on the board or inside the computer.

Hardware Installation

This section describes how to install Snapper hardware on the different supported platforms. This includes information for product specific link selection, ie TTL vs RS-422 I/O jumpering, RS-232 vs RS-422 serial port controls, etc

CONFIGURING MODULES

Some of the Snapper product range consist of separate Bus Interface Boards (BIBs) and individual camera interface boards (Modules); others have both implemented on a single PCB. Before installing the hardware, check the configuration settings for the particular product.

Snapper / Bus Interface Board Compatibility

This section is not relevant to combined Snapper and Bus Interface Boards such as SNP-PMC-xxx or SNP-PCI-xxx products.

Check the following table for compatibility issues between Snappers and Bus Interface Boards

Snapper	Bus Interface Board		
	ISA	PCI / PMC	SBus
Snapper-8	OK ¹	OK ²	OK
Snapper-16 ³	OK	OK ⁴	OK ⁵
Snapper-24	OK ¹	OK ²	OK
Snapper-DIG16 ⁶	Not compatible	OK ⁷	OK ⁷

Notes

1. With this combination the Snapper has 58 way connectors and Bus Interface Board 50 way connectors. This does not matter - simply line up the analogue and digital connectors and the mounting pillars.
2. The Snapper-PCI-8/24 products are enhanced replacements for the original Snapper-8/24 and PCI-BIB board combinations.
3. SNP-16 / SNP-16-5V: Recent Snapper-16s have printed label or a tick box on the back which is marked to show the selected option; older boards are SNP-16s unless marked otherwise.
4. With this combination the Snapper has 50 way connectors and Bus Interface Board 58 way connectors. This does not matter - simply line up the analogue and digital connectors and the mounting pillars. (However very early Snapper-16s marked "Video Snapper VS100" cannot be fitted to Bus Interface Boards with 58 way connectors).
5. SNP-16-5V does not use +12V to generate a stable +5V rail. This is necessary on the SBus BIB as no +12V rail is available.
6. Snapper-DIG16: This must be fitted with the appropriate end bracket for the particular Bus Interface Board.
7. When using a SNP-DIG16 module, the Bus Interface Board must be an NC version. These are standard Bus Interface Boards except that the analogue video connectors and end brackets are not fitted.

Removing and Refitting a Snapper Module

This section is not relevant to combined Snapper and Bus Interface Boards such as SNP-PMC-xxx or SNP-PCI-xxx products.

In order to remove a Module:

- First use a No.1 Pozidriv screwdriver to remove the four screws from the underside of the Bus Interface Board which line up with the pillars supporting the Snapper (Do not remove the four countersunk screws which connect these pillars to the Snapper itself. These pillars are retained with a thread-locking compound, and trying to remove them may damage the Snapper).
- Then very carefully and evenly apply pressure to remove the Snapper module. It is very important to apply even pressure, otherwise the connector pins are likely to become bent or damaged.

To replace the module:

- First check that the Snapper and the Bus Interface Board are compatible - see the table above.
- Correctly orientate both the Bus Interface Board and the Snapper. To indicate the orientation the two connectors between the boards are marked “DIGITAL” and “ANALOGUE” on both the Bus Interface Board and the Snapper. Also, note that pin 3 of the “DIGITAL” connector is a polarizing pin.
- Carefully align the connectors and apply gentle pressure to start seating them. If gentle pressure has no affect check that the connectors are aligned correctly, otherwise the connector pins are likely to become bent or damaged. Then apply firm pressure to fully seat the connectors.
- Finally fit the four screws supplied with the Snapper. If these have been lost the correct replacement type are 6mm long M3 pan head Pozidriv screws.

Snapper-8 and Snapper-24 Configuration

The Snapper-8 and Snapper-24 product families are similar; Snapper-8 is a single channel (and hence lower cost) version of the three channel Snapper-24. These instructions apply to products SNP-8, SNP-PCI-8, SNP-PMC-8, SNP-24, SNP-PCI-24 and SNP-PMC-24.

There are four jumpers which control whether the Pixel Clock, VSYNC, HSYNC and Trigger control lines are TTL level or RS-422. As default they are supplied as RS-422 on Pixel clock and TTL on the remainder. Most applications are unlikely to use these signals and even then they are likely to require the default settings, so it is unlikely that you will not need to modify these jumpers. However if you do, to access the jumpers on the SNP-8 and SNP-24 products you will need to remove the Module from the BIB. This is described in the above section, *Removing and Refitting a Snapper Module*.

The following table shows the settings. On the board there is a “T” at the bottom left of jumper J3 - this indicates TTL and applies to all four jumpers. There is also a “4” at the top left of J3 - indicating RS-422. In the table below “T” means that the jumper is placed at the “T” end and “4” means the jumper is placed at the other end. Two columns give the jumper number, one for separate Snapper modules, and one for those which are combined with a Bus Interface Board, ie SNP-PCI-8/24 and SNP-PMC-8/14.

Jumper (Separate Module)	Jumper (Combined Module)	Position	Interface Format
J3	J2	T	PCLK - TTL levels
J3	J2	4	PCLK - RS-422
J4	J3	T	VSYNC - TTL levels
J4	J3	4	VSYNC - RS-422
J5	J4	T	HSYNC - TTL levels
J5	J4	4	HSYNC - RS-422
J6	J5	T	Trigger - TTL levels
J6	J5	4	Trigger - RS-422

RS-422 signal levels are recommended (if available) especially if long cables are used.

Snapper-16 Configuration

There are no user configurable jumpers on *Snapper-16*.

Snapper-DIG16 Configuration

These instructions apply to products SNP-DIG16 and SNP-PMC-DIG16.

There is one jumper which controls whether the serial communication lines are RS-422 or RS-232 level. As default it is supplied set to RS-422. Many cameras do not use these signals and even if they do then they are likely to require the default settings, so it is unlikely that you will not need to modify this jumper. Check the Camera Specific Release Notes for the camera you are using to see what setting is required. However if you do, to access the jumpers on the DIG-16 product you will need to remove the Module from the BIB. This is described in the above section, *Removing and Refitting a Snapper Module*

The following table shows the settings. Two columns give the jumper number, one for separate Snapper modules, and one for those (such as PMC) which are combined with a Bus Interface Board.

Jumper (Separate Module)	Jumper (Combined Module)	Position	Interface Format
J4	J2	422	RS-422 levels
J4	J2	232	RS-232 levels

Snapper-DIG16 is fitted with an end bracket suitable for the Bus Interface Board it is supplied with. If it is moved to a different Bus Interface Board the end bracket may need changing. To do this remove the two screws holding the bracket to the connector, and then fit the new bracket using the same screws.

ISA BUS INTERFACE BOARDS - INSTALLATION

ISA Bus Interface Boards include *Crunch-ISA*, part number *ISA-JPG*, and the standard ISA Bus Interface Board, part number *ISA-BIB*.

Step One - Configure your Snapper

Before installation of your hardware you may need to configure your Snapper module – see the section *Configuring Modules*.

Step Two - Set the Base Address

The ISA card requires you to set the base address using three jumpers on the board labelled J10, J11 and J12. These are located towards the bottom left of the card next to the ISA connector. The card supports hex base addresses 300 to 3E0 and uses 32 locations. The jumper positions are as follows:

J12	J11	J10	Address
2-3	2-3	2-3	300 hex (default as supplied)
2-3	2-3	1-2	320 hex
2-3	1-2	2-3	340 hex
2-3	1-2	1-2	360 hex
1-2	2-3	2-3	380 hex
1-2	2-3	1-2	3A0 hex
1-2	1-2	2-3	3C0 hex

1-2	1-2	1-2	3E0 hex
-----	-----	-----	---------

Select an address that does not conflict with any other ISA boards in the system. Usually the default address of 300 hex is OK, but watch out for any network card - some also default to address 300. If installing more than one card, each card must have a unique address.

Step Three - Set the Remaining Jumpers

The interrupt selector J13 is not used in the current release of software and can be ignored.

J5, J6 and J7 should be linked 2-3 (default as supplied). J9 should be linked 1-2 (default as supplied) for an 8K strip buffer and 2-3 for a 32K strip buffer. The jumpers, J5, J6, J7 and J9, are only relevant to **Crunch-ISA** (Part number **ISA-JPG**).

Step Four - Install the Card

- Switch off the computer and disconnect its mains supply.
- Install the card according to the PC manufacturer's instructions.
- The computer can now be powered up and the software installed. The PC should boot up as usual. If it does not, it is likely that the board is clashing with another ISA card in the system. In this instance chose another address for the card. Very rarely, some PCs have trouble booting with certain combinations of ISA and PCI slots in use, so it may be worth trying a different slot.

Step Five - Install the Software

Please refer to the "Software Installation" procedure for the appropriate operating system.

PCI BUS INTERFACE BOARDS - INSTALLATION

This section applies to the PCI-BIB-NC and SNP-PCI-xxx products. There is a later section which deals with the SNP-PMC-xxx products.

Step One - Configure your Snapper

Before installation of your hardware you may need to configure your Snapper module – see the section *Configuring Modules*.

Step Two - Check the PCI BIOS

This section only applies to PCs, and can be ignored for Apple Mac computers.

Very occasionally, depending on the PC's motherboard BIOS, there is a small chance that the PC's "Setup Utility" may have the PCI slots disabled by default. If this is the case, then any Snapper application software will generate the error message "No PCI Bus Interface Board found". Please refer to your PC's manual on its "Setup Utility" and enable the PCI slots. Note that if you are already using a PCI graphics card this does not necessarily mean that the slots are enabled - some graphics cards appear to bypass the PCI BIOS.

Step Three - Install the Card

- Switch off the computer and disconnect its mains supply.
- Install the card according to the PC manufacturer's instructions.
- The computer can now be powered up and the software installed. The PC should boot up as usual (see Windows 95 note below). Very rarely, some PCs have trouble booting with certain combinations of ISA and PCI slots in use. So it may be worth trying a different slot or moving the position of the graphics card etc.

Special Note for Windows 95

Under Windows 95 (and Windows 98), a Snapper PCI card will be detected by the operating system and the “New Hardware” prompt will appear after the PC has booted up. You should select “Driver from disk provided by manufacturer” and select the file “snapper.inf” on the Snapper Software CDROM, in the “<CdDrive>:\Win95\i386\SDK\Disk1” directory. Note that this driver information is stored in the registry on a per slot basis and therefore if the PCI card is moved to a new slot, the “New Hardware” prompt will re-appear (the old slot position registry entry may be manually deleted). This information may be viewed in the Registry (use “windows\regedit.exe”) under HKEY_LOCAL_MACHINE\Enum\PCI\VEN_5341&DEV_0040. The Snapper driver is installed by the installation script (and allows deinstallation using “Add/Remove Programs”). See the “Software Installation” procedure for Windows 95 for more information.

Step Four - Install the Software

Please refer to the “Software Installation” procedure for the appropriate operating system.

PMC BASED SNAPPER BOARDS - INSTALLATION

This section applies to the SNP-PMC-xxx products.

Step One - Configure your Snapper

Before installation of your hardware you may need to configure your Snapper module – see the section *Configuring Modules*.

Step Two - Install the Board

- Switch off the computer and disconnect its mains supply.
- Install the card according to the computer manufacturer’s instructions. Note that the PMC board is supplied with four 6mm M2.5 Pozidrive screws to attach it to the computer motherboard. These should be fitted to avoid straining the PMC connectors.
- The computer can now be powered up and the software installed.

Step Three - Install the Software

Please refer to the “Software Installation” procedure for the appropriate operating system.

SBUS BUS INTERFACE BOARDS - INSTALLATION

Currently there is only one SBus Bus Interface Board, part number **SBUS-BIB**.

Step One - Configure your Snapper

Before installation of your hardware you may need to configure your Snapper module – see the section *Configuring Modules*.

Step Two - Install the Board

- Switch off the computer and disconnect its mains supply at the wall socket.
- Remove the system cover from the computer.
- Choose a free SBus slot, and remove the blanking plate (“protector” or “filler panel”) for that slot from the back panel.
- The metal “mounting plate” at the end of the board has an “adapter” with two lugs at the top. For most recent SPARCstations this adapter must be removed - check with the computer’s manual. To do

this use a No.0 Phillips screwdriver to remove the two M2 screws which fix the adapter to the mounting plate, but save the adapter and screws in case they need to be re-fitted in future.

- Similarly, the black plastic “retainer” must be removed for some computers. To do this unclip the retainer from the board, again saving it for future use.
- If the adapter was left fitted, engage its lugs into the slots in the computer’s back panel (this can be awkward on some computers, but do not apply great force). Next align the 96 way plug with the socket on the motherboard and carefully press it home by pressing only on the corners of the board. If the adapter was removed the board will be held in place by two M2.5 screws (supplied with the computer) which screw into the threaded holes in the mounting plate. Align the mounting plate with the computer’s back panel, then align the 96 way plug with the socket on the motherboard and carefully press it home by pressing only on the corners of the board. Then fit the two screws. If the “retainer” was removed check that any retaining clips which hold the board in the SPARCstation are secure.
IMPORTANT: The black plastic “retainer” above the plug is designed to prevent the board from vibrating free from the socket, and is easily broken if used as a handle to pull on or press on.
- Repeat this for each SBus Bus Interface Board required.
- Replace the computer’s system cover. The computer can now be powered up and the software installed.

Step Three - Install the Software

Please refer to the “Software Installation” procedure for the appropriate operating system.

Moving or Replacing SBus Boards

If an existing SBus Bus Interface Board is moved from one SBus slot to another, or additional boards are added, a configuration reboot is necessary. This can be done before the SPARCstation boots by typing the following command at the ‘ok’ prompt:

```
ok boot -r
```

If the machine has already booted you must exit from your windows environment (if running), login in as root and type the following shutdown command:

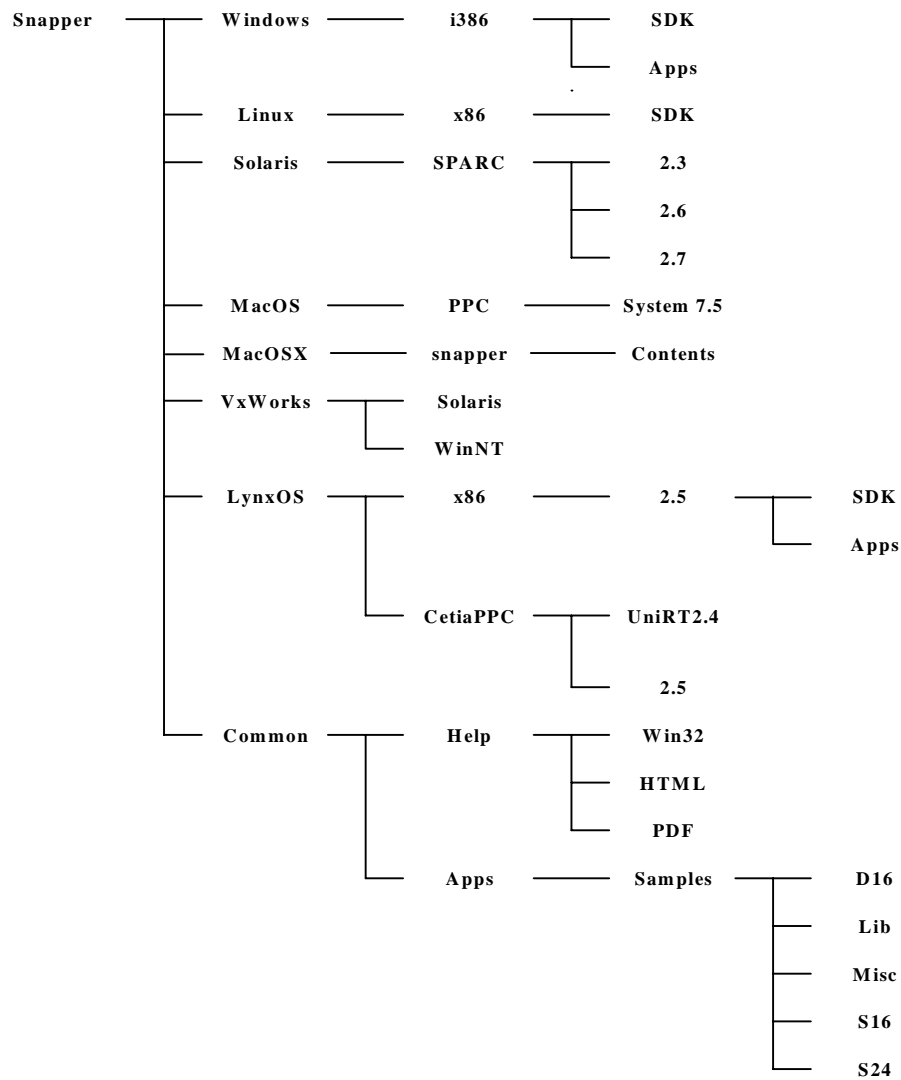
```
sun# shutdown -y -i6 -g0
```

Alternatively the SNAPsbus package can be de-installed then re-installed to avoid rebooting.

Software Installation

SDK software for multiple operating systems is supplied on CD. Part number SNP-SDK-RT-CD contains all operating systems, whereas SNP-SDK-CD contains all except VxWorks and LynxOS. Part number SNP-APPS-CD only contains the applications.

The CDs have the following directory structure:



LINUX SOFTWARE INSTALLATION

Requirements

- RedHat Linux versions 7.2, 7.3 or 8.0 for X86, or
- SuSE Linux versions 7.3 and 8.0 for X86
- PMC or PCI based Snapper.

Installing the Software

The software is supplied as a single compressed tar file ('tarball') which contains: the device driver for the Snapper card; the SDK libraries; example applications and an installation routine.

The CDROM also contains Adobe Portable Document Format ('PDF') documentation on the Snapper card and on the SDK libraries. These can be viewed directly from the CDROM (using Adobe Acrobat for Linux, xpdf or GhostView), or can be copied to a directory of your choice.

To install the device driver, SDK libraries and example applications, mount the CD-ROM. Then copy the "Snapper-SDK-linux.tgz" file from the CD-ROM to a directory of your choice (suitable locations might be /usr/src/local, /opt or /tmp). Extract the files using the 'tar' and 'gzip' utilities.

For example:

```
user@linux:> mount /dev/cdrom /mnt/cdrom -o ro
user@linux:> cp /mnt/cdrom/Snapper-sdk-linux.tgz /usr/src/local/
user@linux:> umount /mnt/cdrom
user@linux:> cd /usr/src/local
user@linux:> tar xvfz Snapper-sdk-linux.tgz
```

This will create a new directory called 'Snapper-sdk-linux'. The installation routine is in the top level of this new directory and is called 'install.sh'. Because this installation routine will need to install device drivers and create file nodes it must be run by the root user. For example:

```
user@linux:> su {and respond to password prompt}
root@linux:> cd Snapper-sdk-linux
root@linux:> ./install.sh
```

The installer routine is a menu based graphical installer that will allow you to view late-breaking documentation, install the device driver kernel module for the Snapper card and execute some test applications to check that your card is functioning correctly. A complete installation log will be stored in a file /tmp/asl-install.log for your later review.

You can then delete the file 'Snapper-sdk-linux.tgz' from your system if you wish.

De-Installing the Software

The software installation will have installed a kernel module file to your /lib/modules/{kernel-version}/misc directory during installation, and may have modified your /etc/modules.conf file (depending on what options you selected whilst running the installer routine). Any such changes will have been logged in the file /tmp/asl-install.log. To deinstall the software, reverse these changes and simply delete the directory Snapper-sdk-linux.

LYNXOS SOFTWARE INSTALLATION

Requirements

- LynxOS version 2.5 for X86, or
- LynxOS version 2.4 (Uni/Rt 5.4e.0) or version 2.5 for Ceta CVME60X series.
- PMC or PCI based Snapper.

Installing the Software

The software is supplied as several compressed tar files, one for the SDK and libraries, one for the apps and help files. To install the object libraries, mount the CD-ROM as a remote file system on a suitable directory stub. Copy the “instlib.taz” file on the cd to a directory of your choice using ‘mv’. This directory will be the root of your installation tree. Extract the files by running “uncompress” followed by “tar -xf”.

For example:

```
mount /dev/cd_rom /mnt/cd -o ro
mv /mnt/cd/instlib.taz <installation root>/install_libs.tar.Z
uncompress install_libs.tar.Z
tar -xf install_libs.tar
umount /mnt/cd
```

Follow a similar process for the application code examples file “instapps.taz”. This should be installed from the same installation root directory so that the makefiles point to the correct library directories.

The online help files are installed in exactly the same way to a directory of your choice.

Please read the “Read Me” file for any last minute information - this file is found in the installation root directory.

To install the device driver object file into the kernel, follow the instructions in the file “<installation root>/lib/lib/rel/Readme.txt”. This file also contains instructions for installing the dynamically loaded driver. For additional information on device driver and kernel configuration, please refer to the LynxOS Device Driver and the Kernel Configuration manuals.

Installing Software Upgrades

The software installation makes no changes to the system outside of the installation directories. A new release may be copied over the old one, although it may be preferable to create a new directory, thus preserving the old code - should need arise to use it.

If the statically-linked kernel device driver is to be used, copy the static object file into the “/sys/devices” directory and rebuild the kernel to incorporate the new file in place of the old. Make a new boot file and reboot using the “-aN” switches.

De-Installing the Software

The software installation makes no changes to the system outside of the installation directories. To remove, recursively delete the installation directory and all its contents.

If the statically-linked device driver is being used, edit the “CONFIG.TBL” file in “/sys/lynx.os” to remove your snapper driver entry and rebuild the kernel. Delete the static object file from the “/sys/devices” directory. Make a new boot file and reboot using the “-aN” switches.

MACOS X SOFTWARE INSTALLATION

Requirements

- Mac OS X 10.1 or above.
- PCI based Snapper.

Development Tools

Mac OS project builder version 1.1.1 (December 2001).

Installing the Software

Insert the Snapper SDK CD and wait until the CD icon appears on the desktop. Double click the CD icon, which will open up a *Finder* window. Inside the *MacOSX* folder there is a *snapper.pkg* object. Double click this object to start the installation, and then proceed as instructed.

The Snapper kernel extension (*snappci.kext*) is installed in to the */System/Library/Extensions* folder, and the Snapper framework (*ASLsnapper.framework*) which must be included in all Snapper applications is installed in the */System/Library/Frameworks* folder.

Upgrading the Software

Upgrading the software to the latest release is identical to installing the SDK on a new machine; see the above instructions.

POWER MACINTOSH CLASSIC SOFTWARE INSTALLATION

Requirements

- Macintosh System 7.5.2 or above.
- PCI based Snapper.

Compiler Support

Metrowerks CodeWarrior Professional 3 is recommended for use with the Snapper SDK. For details on how to compile Snapper application programs, please see the “readme” file provided on the release CD and the application source code.

Installing the Software

The software is supplied MacBinary encoded, and must first be decoded. Drag the file onto the desktop or preferably a new folder named with the SDK revision, ie SnapperV4.0.0. Double click the file to decode it and then run the decoded file to create the necessary files and sub folders.

There are five folders on the Mac SDK disk – *DropOntoSystemFolder*, *StaticLibs*, *Headers*, *Source* and *Applications*. To install the libraries and driver, simply drag the *DropOntoSystemFolder* to the Mac’s system folder. This will automatically copy the Snapper dynamic libraries and driver into the extensions folder. (Static versions of the libraries are also supplied in the *StaticLibs* folder). The machine must now be rebooted to complete installation.

The *Headers* folder contains two sub folders; *SnapperHeaders* and *MacOsHeaders*. The *SnapperHeaders* folder contains all the library include files which are specific to the Snapper software, whereas the *MacOsHeaders* folder contains header files supplied by Apple for extended filename support.

The *Source* folder contains the initialisation code for the Snapper-24 and Snapper-Dig16 libraries. This is supplied as an example of how to initialise the hardware for specific cameras, and can be used as a basis for custom camera support within a user’s application.

Finally the *Applications* folder contains sub-folders which contain simple example programs; one for each Snapper family. These include full source code and executables.

De-Installing the Software

To de-install the software move all of the above folders to the trash can. Also move *SnapperLib*, *TmgLib* and *SnapperDriver* from the *Extensions* folder to the trash can. Finally re-boot the computer.

MS-DOS SOFTWARE INSTALLATION

Requirements

- MS-DOS version 3 or above.
- ISA, PCI or PMC based Snapper.

Installing the Software

The Snapper MS-DOS applications and SDK software are supplied on the SDK CD. They are un-encoded and in the full directory tree structure.

To install the software run the following xcopy command:

```
xcopy <CdDrive>:\ MsDos\x86\SDK\*. * <TargetDirectory> /s /e /v
```

The expected target directory is C:\SnapDos. If a different target directory is chosen, then the SDK example makefiles will need to be modified to reflect the actual target directory chosen.

To run the MS-DOS example applications requires no further setting up, unless your graphics card requires a VESA driver installed before it can support VESA modes. A utility, "fgmodes", in the "\Utils" directory will show what VESA modes your graphics card supports.

Flash Graphics and DOS Extender Libraries

Also included on the CDROM are "Flash Graphics" (a graphics library) and "X-32VM" (a DOS extender) which are licensed by FlashTek. Both these products are encrypted and require an authorisation code to install. Consult DataCell for more information regarding these products.

Installing Software Upgrades

The procedure is the same as the standard installation, but the current Snapper directory should be renamed first (e.g. "move snapdos snapdv3").

De-Installing the Software

To remove the software simply delete all files and sub-directories from within the Snapper directory (e.g. C:\SnapDos) and then delete the Snapper directory itself.

SOLARIS SOFTWARE INSTALLATION

Requirements

- Solaris 2.6 or above.
- OpenWindows 3.3 or above.
- SBus or PCI based Snapper.

Installing the Software

Note: If you are running your Snapper on a client machine that boots across the network, you will need to install the snapper driver package(s) on each client machine.

The Packages

The complete software is supplied as six packages on a CD.

SNPlib	This is the Snapper library shared object files. It must be accessible from every machine that will be running Snapper code. In networked systems, this is usually installed on the file server's /opt file system.
SNPapp	These are simple executable demo applications, with source and makefiles. It is recommended that this package is installed, if only to run an application to check that the installation is successful.
SNPsdm	This is the header and source files required to compile a user application. This need not be installed if it is only required to run a pre-compiled application..
SNPsbm	This is the SBUS-BIB device driver or Solaris 2.6. It must be installed on every machine which contains an SBus Snapper card.
SNPpci	This is the PCI-BIB device driver for Solaris 2.6. It must be installed on every machine which contains a PCI Snapper card.

Package Installation

Software installation begins by logging in as superuser (root). The bold font shows what you need to type in response to system prompts:

```
sun% su
Password: <Enter the root password>
sun#
```

Now insert the CDROM for the package(s) you want to add in the SPARCstation's CDROM drive. If you do not have local CDROM drive, you can install the package remotely from the server (assuming it or at least one of its clients has a CDROM drive). Follow the instructions in the section "Installing Packages Remotely", then return to this point.

Now install the software using "pkgadd", following the prompts on the screen.

Note that there is a long delay (over one minute for the larger packages) before the "Copyright" line appears.

When you are installing SNPpci you will get the following additional messages:

```
## Executing postinstall script.
Installing driver into kernel

Installation of <SNPpci> was successful.

*** IMPORTANT NOTICE ***
This machine must now be rebooted in order to ensure sane operation. Execute
shutdown -y -i6 -g0
and wait for the "Console Login:" prompt.
#
```

In this case you must exit from your windows environment (if running), log in as root and type the shutdown command shown above:

```
sun# shutdown -y -i6 -g0
```

This will cause the machine to do a configuration reboot.

NOTE: When SNPPci is installed on a server which does not have a PCI Bus Interface Board fitted the post install script shown above will fail. This is normal - providing that the pkgadd completed successfully as far as “## Executing postinstall script.” the server installation is correct. If the post install script fails when an PCI Bus Interface Board is fitted then remove the package, shut down the machine, check that the board is installed correctly and try again.

The above note also applies to the SNPsbus package with the SBus Bus Interface Board.

User Setup

The path must be changed:

If you are using the Bourne shell, you should add the following lines to your \$HOME/.profile file:

```
PATH=/opt/ASLsnap/apps/bin/solaris/sparc:$PATH
export PATH
```

If you are using the C shell, you should add the following lines to your ~/.cshrc file:

```
set path = (/opt/ASLsnap/apps/bin/solaris/sparc $path)
```

If are using a display capable of running in 24 bit mode (e.g. the Sun SX) this should be switched into 24 bit mode (as default CDE runs in 8 bit mode even if the display board can run in 24 bit mode). To do this, it is necessary to edit the file /etc/dt/config/Xservers, substituting the configuration line beginning :0 (the local display) with:-

```
:0 Local local_uid@console root /usr/openwin/bin/Xsun :0 -nobanner -dev /dev/fb defdepth 24
```

If the file /etc/dt/config/Xservers does not exist, it should be created by copying the file /usr/dt/config/Xservers.

Installing the Software Remotely

The following procedure summarizes how to install a package remotely. This is necessary if you need to install a SBus Bus Interface Board on a machine that does not have a CDROM drive.

Step One - On the “CDROM Server”

First insert the CDROM,

```
sun# share -F nfs -o ro /cdrom/snapper/solaris/sparc/2.6
```

Step Two - On the Target Machine.

Mount the remote filesystem, install the package, then unmount and remove the temporary directory.

```
sun# mkdir /cdrom
sun# mount -o ro servername:/cdrom/snapper/solaris/sparc/2.6 /cdrom
sun# pkdadd -d /cdrom/SNPlib.pkg all

<... installs as usual ...>

sun# umount /cdrom
```

Where *servername* is the hostname of the “CDROM server”.

Step Three - On the “CDROM Server”

Unshare the pkg directory.

```
sun# unshare /cdrom/snapper/solaris/sparc/2.6
sun# eject cdrom
```

Check the Installed Hardware and Software

To check that the Bus Interface Board has been recognised by the system, and that the driver has installed correctly use the ‘prtconf’ command:

```
sun% /etc/prtconf | grep sbusbib
      sbusbib, instance #0
sun% /etc/prtconf | grep pcibib
      pcibib, instance #0
```

If more than one SBus Bus Interface Board is fitted they will be listed separately, e.g. if three boards are fitted:

```
sun% /etc/prtconf | grep sbusbib
      sbusbib, instance #0
      sbusbib, instance #1
      sbusbib, instance #2
sun%
```

If the board is recognised by the system but the driver has not yet been loaded, failed to install, or has not yet been installed, the following message will result:

```
sun% /etc/prtconf | grep sbusbib
      sbusbib (driver not attached)
sun%
```

If this message appears run an application to try to load the driver.

To check which Snapper packages are installed use the ‘pkginfo’ command and check that the packages listed match those which were installed:

```
sun% pkginfo | grep SNP
application      SNPapp Snapper! Demo Applications
system          SNPlib  Snapper! Libraries
system          SNPpci  Snapper! PCI driver
sun%
```

To check the version of a specific package also use the 'pkginfo' command, e.g. for SNPLIB:

```
sun% pkginfo -x SNPlib
SNAPlib          Snapper! Libraries
                  (sparc) 4.00.00
sun%
```

If the package SNPapp has been installed try running an application. The snp_scan application is recommended, as this prints out the current hardware configuration and revision level of each installed Snapper card

Installing Software Upgrades

To upgrade to a new version of the software first de-install the existing version, then install the new version. Unless clearly stated in the release notes, always install matching versions of the packages - that is don't try to run SNAPapp version 3.10.33 with SNPlib version 3.10.43.

De-Installing the Software

Step One - De-Install the Software

De-installing the package is very simple using "pkgrm" for each package in turn, as root, e.g.:

```
sun# pkgrm SNAPlib

The following package is currently installed:

SNPlib  Snapper! Libraries
        (sparc) 4.00.00

Do you want to remove this package [y,n,?,q] y
## Removing installed package instance <SNPlib>

This package contains scripts which will be executed with super-user
permission during the process of removing this package.

Do you want to continue with the removal of this package [y,n,?,q] y
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.
... list of files being deleted or changed appears here ...
## Updating system information.

Removal of <SNPlib> was successful.
sun#
```

If you were running on a client machine which booted across the network from a server, you should remove the package SNPlib from the server after removing it from all client machines.

Remove the Snapper software from the path.

Step Two - Remove the Board

Removing the board is the reverse of installing it (see *Installation Procedure - SBus Bus Interface Board* above), but resist the temptation to use the “retainer” to pull the board out (it is easy to break). Instead grip the edges of the board at opposite ends of the 96 way plug and gently pull until the board comes free. Then check that adjacent SBus boards have not been accidentally partially unplugged in the process.

VXWORKS SOFTWARE INSTALLATION

Requirements

- VxWorks version 5.3 / Tornado 1.0.1 or above.
- Power PC based target.
- PMC or PCI based Snapper.
- File system support for long filenames.

Installing the Software - NT 4 Host

The software is supplied on a CD. To install, run “<CdDrive>:\vxworks\ppc\nt\disk1\setup” from the ‘Start - Run’ menu option and follow the installation instructions. If you change the installation directory, you must select a location that supports long filenames.

Please read the “Read Me” file - this may be viewed from the Start Menu, selecting “Programs” and then “Snapper VxWorks SDK”.

Online help is available in the Help directory on the CD in Win32, PDF and HTML file formats.

Installing the Software - Solaris 2.x

The Packages

The complete software is supplied as six packages on a CD.

SNPvx603	This package contains the libraries and pre-compiled example programs for a PowerPC 603 based processor.
SNPvx604	This package contains the libraries and pre-compiled example programs for a PowerPC 604 based processor.
SNPvxsdk	This package contains the include files for the Software Development Kit, and the source & makefiles for the example programs.

Package Installation

Software installation begins by logging in as superuser (root). The bold font shows what you need to type in response to system prompts:

```
sun% su
Password: <Enter the root password>
sun#
```

Now insert the CDROM for the package(s) you want to add in the SPARCstation's CDROM drive. If you do not have local CDROM drive, you can install the package remotely from the server (assuming it or at least one of its clients has a CDROM drive). Follow the instructions in the section "Installing Packages Remotely", then return to this point.

Now install the software using "pkgadd", following the prompts on the screen. Note that there is a long delay (over one minute for the larger packages) before the "Copyright" line appears.

Installing the Software Remotely

The following procedure summarizes how to install a package remotely.

Step One - On the "CDROM Server"

First insert the CDROM,

```
sun# share -F nfs -o ro /cdrom/snapper/vxworks/ppc/solaris
```

Step Two - On the Target Machine.

Mount the remote filesystem, install the package, then unmount and remove the temporary directory.

```
sun# mkdir /cdrom
sun# mount -o ro servername:/cdrom/snapper/vxworks/ppc/solaris /cdrom
sun# pkgadd -d /cdrom/SNAPvxsdk.pkg all

<... installs as usual ...>

sun# umount /cdrom
```

Where *servername* is the hostname of the "CDROM server".

Step Three - On the "CDROM Server"

Unshare the pkg directory.

```
sun# unshare /cdrom/snapper/vxworks/ppc/solaris
sun# eject cdrom
```

Installing Software Upgrades

The software makes no changes to the system outside of the installation directory. A new release may be copied over the old one, although it may be preferable to create a new directory, thus preserving the old code - should be need arise to use it.

De-Installing the Software

The software makes no changes to the system outside of the installation directory. To remove, simply recursively delete the installation directory and all its contents.

WINDOWS 3.1X SOFTWARE INSTALLATION

Requirements

- MS Windows version 3.1 or 3.11.
- ISA, PCI or PMC based Snapper.

Installing the Software

To install the Snapper Windows 3.1x software, insert the CD, run up Windows and from Program Manager select *File, Run* and type "<CdDrive>:\Win31\x86\sdk\setup". You will be prompted for a destination directory on your hard drive. The "setup" program will copy all the relevant files to your local driver, copy the DLLs to your "Windows\System" directory and make a new Windows program group for the demonstration applications.

Installing Software Upgrades

The procedure is the same as for the standard installation, but the current Snapper directory should be renamed first (e.g. "move snapw31 snapwv3"). Existing DLLs in the "Windows\System" directory will be overwritten.

De-Installing the Software

To remove the software simply delete all files and sub-directories from within the Snapper directory (e.g. c:\Snapsdk), delete the Snapper directory itself and delete the program icons and group. Finally delete the following files from your "Windows\System" directory: snapw31.dll, fpgaw31.dll and tmgw31.dll.

WINDOWS 95/98 SOFTWARE INSTALLATION

Requirements

- MS Windows 95, or Windows 98.
- ISA, PCI or PMC based Snapper.

Installing the Software

First of all please refer to the "Special Note for Windows 95" under the PCI Hardware Installation procedure. The Snapper Windows 95 applications and SDK software are supplied on CD. To install these packages, run "<CdDrive>:\Win95\x86\sdk\Setup" or "<CdDrive>:\Win95\x86\apps\Setup" as appropriate, from the Start - Run menu option and follow the installation instructions.

The Snapper software uses DirectDraw for display and requires the DirectDraw drivers to be installed even if your graphics card does not support DirectDraw. DirectDraw allows fast image display and is strongly recommended. The Microsoft (redistributable) DirectX drivers are supplied on the CD in "<CdDrive>:\Win95\x86\DirectX". If necessary, install by running "setup" from the DirectX directory - this will copy the driver files to your hard drive.

Finally please read the "Read Me" file - this may be selected from the Start Menu, selecting "Programs" and then Snapper Applications or Snapper SDK depending on which Snapper software you have installed.

The Snapper applications may now be run, although you may want to check that your graphics card driver supports DirectDraw and if it does not, obtain (if possible) the latest driver from your graphics card vendor that does. To see if DirectDraw is supported, run either "s16", "s24" or "d16" and select Help - Snapper Information and look at the entry for "DirectDraw/DCI Support". Note that some graphics cards may only support DirectDraw in certain modes - for example in 16 bit but not in 32 bit.

Installing Software Upgrades

The procedure is the same as for the standard installation. Each Snapper release has an individual version number and automatically gets installed into a separate directory to reflect this. Therefore it is not vital to deinstall earlier versions (although they can be if required - see next section). However the driver file "snapper.vxd" will get overwritten in the "Windows\System" directory by the most recent installation. If you need to return to an earlier release, simply copy the driver file from the system directory of the particular release you want go back to, into your "Windows\System" directory. This will not effect the automatic deinstallation procedures described next.

De-Installing the Software

The Snapper installation process takes full advantage of the deinstallation options built into Windows 95. To remove a Snapper installation, simply double click on the "Add/Remove Programs" icon in the control panel folder (accessed from Start - Settings) and select the particular Snapper installation you want to deinstall. The driver file, "snapper.vxd", and the DLLs used by the on-line Snapper manual are only removed when all other Snapper installations are removed.

The DirectX drivers can be removed using "Add/Remove Programs" by selecting "DirectX Drivers" and clicking OK.

WINDOWS NT SOFTWARE INSTALLATION

Requirements

- MS Windows NT version 4 or above.
- Graphics card with DirectDraw support.
- ISA, PCI or PMC based Snapper.

Installing the Software

The Snapper Windows NT applications and SDK software are supplied as separate packages on the CD. To install these packages, run "<CdDrive>:\WinNT\x86\sdk\Setup" or "<CdDrive>:\WinNT\x86\Apps\Setup", as appropriate", from the 'Start - Run' menu option and follow the installation instructions.

Please read the "Read Me" file - this may be viewed from the Start Menu, selecting "Programs" and then Snapper Applications or Snapper SDK depending on which Snapper software you have installed.

Note that some graphics cards may only support DirectDraw in certain modes - for example in 16 bit but not in 32 bit. To see if DirectDraw is supported, run either "s16", "s24" or "d16" and select 'Help - Snapper Information' and look at the entry for "DirectDraw/DCI Support".

Installing Software Upgrades

The procedure is the same as for the standard installation. Each Snapper release has an individual version number and automatically gets installed into a separate directory to reflect this. Therefore it is not vital to deinstall earlier versions (although they can be if required - see next section). However the driver file "Snapper.sys" will get overwritten in the "Winnt\System32\Drivers" directory by the most recent installation. If you need to return to an earlier release, simply copy the driver file from the system directory of the particular release you want go back to, into your "Winnt\System32\Drivers" directory (and reboot). This will not effect the automatic deinstallation procedures described next.

De-Installing the Software

The Snapper installation process takes full advantage of the deinstallation options built into Windows NT. To remove a Snapper installation, simply double click on the "Add/Remove Programs" icon in the control panel folder (accessed from Start - Settings) and select the particular Snapper installation you want to deinstall. The driver file, "Snapper.sys" is only removed when all other Snapper installations are removed.

System Requirements

This section outlines the system requirements for each hardware platform.

It is intended as an indication of what is required rather than necessarily the most appropriate system. For example, a PCI Snapper will run on a 386 machine, but in order to do achieve real time acquisition and processing, it may be necessary to use a Pentium processor.

MAC HARDWARE REQUIREMENTS

- Snapper is supported on all Mac PCI hardware platforms, running MacOS 7.5.2 or above.
- CDROM drive.
- At least 32 Mbytes of system memory, preferably 64 Mbytes or more for optimum speed.
- At least 10MByte of free hard disk space.
- A free 32 bit 33MHz 5V signalling PCI slot.

PC HARDWARE REQUIREMENTS

- **PC** - A minimum of a 386, but preferably a 486 or Pentium. For ISA board applications a free ISA slot is needed, and for PCI applications a free PCI slot is needed. For users requiring live/fast screen update, a Pentium is the preferred option, although the speed increase between a 386-33 and a 486-66 may not be that significant depending on the application. e.g. for grayscale imaging with an *ISA-BIB* the ISA bus speed and the graphics card speed are the main factors that influence speed. A PCI graphics card is strongly recommended.
- **RAM** - 8 Mbytes of RAM is the minimum recommended for MS-DOS and Windows 3.1x, although 16 Mbytes is better. For Windows 95/98, a minimum of 16 Mbytes is recommended. For Windows NT a minimum of 32 Mbytes is recommended. Generally the more the better (there is no limitation). For 32 bit applications with large images, more memory can potentially increase performance. Another benefit of more RAM is that some can be allocated as a RAM disk - this can significantly increase performance in some applications.
- **BIOS** - For the ultimate speed in 32 bit ISA based applications, a BIOS that allows the "ISA Cycle Recovery Time" to be trimmed to zero can result in up to 4 Mbytes per second transfer on the ISA bus, rather than the usual 1 to 2 Mbytes per second. For PCI machines a BIOS that supports the necessary PCI BIOS calls is required (for that particular operating system - e.g. a BIOS that works for Windows 3.1 may not necessarily work for Windows NT). Some early BIOS versions have bugs which may prevent the PCI card installing properly. Generally speaking make sure the latest manufacturer's BIOS is installed.
- **GRAPHICS CARD** - For Windows applications, most graphics cards (with a Windows driver) are suitable. For grayscale/monochrome applications, the screen mode should support a minimum of 256 colours. For colour applications, the screen mode should support a minimum of 32K colours (but preferably 64K colours or above). 256 colour modes will work in colour, but colour quality is likely to be compromised. For typical colour video imaging applications a screen mode of 800 x 600 x 64K colours is the minimum. This requires a 1 Mbyte SVGA card.

For the best graphics performance under Windows 3.1, a graphics card driver that supports DCI (Display Control Interface) is required. For Windows 95/98/NT, a driver with DirectDraw support will provide the best performance. Most standard graphics cards have drivers that support DCI and DirectDraw. Note that part of the DCI drivers are often supplied with "Video For Windows runtime". This should be available as part of the Windows driver disks from the graphics card manufacturer. For DirectDraw to work, the Microsoft DirectX drivers are required as well as a suitable graphics card driver. Note that obtaining the latest driver disks from the graphics card manufacturer may give a noticeable speedup over drivers which are several months old.

For MS-DOS applications, the SVGA card must support the VESA protocol - most do, but some may need a VESA driver installed. See the release notes on the disks supplied with your graphics card (or computer). The memory requirements and screen modes are the same as for Windows - that is grayscale applications require a minimum of 800 x 600 x 256 colours (VESA Mode 0x103) and colour applications require a minimum of 800 x 600 x 32K colours (VESA Mode 0x113). See also the section on software requirements below.

PCI SPARCSTATION HARDWARE REQUIREMENTS

- Access to CDROM drive, either locally or via a network.
- At least 32 Mbytes of system memory, preferably 64 Mbytes or more for optimum speed.
- At least 10MByte of free hard disk space.
- Minimum of Solaris 2.6.
- Any PCI ULTRAsparc machine with a free 32 bit 33MHz 5V signalling PCI slot.

SBUS SPARCSTATION HARDWARE REQUIREMENTS

- Sun-4c or Sun-4m SPARCstation.
- Access to CDROM drive, either locally or via a network.
- At least 32 Mbytes of system memory, preferably 64 Mbytes or more for optimum speed.
- 8 bit plane or 24 bit plane colour display. A 24 bit plane display will give much better displayed image quality for colour images and is therefore recommended for colour work.
- At least 1 free SBus slot per Bus Interface Board.
Note: The SBus Bus Interface Board uses DMA to achieve high performance. The SBus specification requires that all SBus slots support DMA, but some early SPARCstations do not support DMA on some slots, and SBus expansion units often do not support DMA at all. Check with the manual for your SPARCstation or expansion unit. If you use a non-DMA ("slave-only") slot, the device driver will warn of this on installation, although the board will still work but at a much reduced speed. Even if an expansion unit supports DMA you may get better performance by using a slot in the computer itself.
- The performance achieved by a Snapper system depends on that of the computer, both the CPU and graphics performance (always quoted in manufacturer's datasheets) and the SBus performance (rarely quoted in manufacturer's datasheets). Two major factors affecting SBus performance are; the bus clock rate and the DMA burst size. The faster the SBus clock rate the better, ideally 25MHz, and the larger the burst size the better, ideally 16 word bursts. Unfortunately many lower cost SPARCstations only support 4 word bursts which gives a factor of four speed penalty in SBus transfer rate compared to a 16 word burst machine.
- For SBus performance a general rule is that within any price range a more recent machine is faster than an older one, and that more expensive machines are much faster than cheaper ones.

Cables

This section outlines the currently available cables.

ANALOGUE CABLES

If you ordered cables with your Bus Interface Board, the relevant datasheet for that board explains what signals are connected up to which Snapper inputs. The standard cables are colour coded as follows:

Colour	Generic Name	Snapper-8	Snapper-16	Snapper-24
Red	Analogue 1	Monochrome 1	Mono 1 or Composite 1	Red input or Mono 1.
Green	Analogue 2	-	Mono 2 or Composite 2	Green input or Mono 4.
Blue	Analogue 3	-	Mono 3 or Composite 3	Blue input or Mono 7.
Yellow	CSYNC	CSYNC	-	CSYNC
Orange	Trigger	Trigger	Trigger	Trigger.

Notes

1. The above cable functionality applies only to the standard cables, part numbers CBL-25D-SNP and CBL-50MD-SNP.
2. CSYNC means composite sync at 0.3V (black level) into 75 Ohm.
3. The S-Video connector connects to Monochrome channel 1 and Chroma channel 1 on **Snapper-16**.
4. The BNC connector on the Bus Interface Board connects to Analogue 1.

DIGITAL CABLES

Cables for **Snapper-DIG16** are camera specific and are described in the *Camera Specific Release Notes* for each camera.