

DAG Software Installation Guide

EDM04-01



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These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction document, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

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<http://www.endace.com>

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Introduction

The DAG software package contains the latest device drivers for all current Endace accelerated network monitoring DAG cards. It also includes a suite of DAG tools and utilities which may be used for accessing additional functionality or developing custom applications.

Endace Software is supported on some versions of the following operating systems:

- Linux
- FreeBSD

For information on the specific operating system versions supported, please see the *Release Notes* for your software version.

If you are installing on a Windows based operating system see *EDM04-37 Windows DAG Software Installation Guide* for installation details.

Note:

For information on installing and working with any of these operating systems please refer to the distributor's documentation or the associated website.

The DAG software is distributed as a source tarball (for Linux or FreeBSD systems) and is shipped on the Endace Software Installation CD.

It is also available to download from the Support section of the Endace website at <https://support.endace.com/>.

This document is applicable to the DAG software release 4.2.0 or greater.

Purpose of this Guide

The purpose of this Installation Guide is to describe the process of installing, compiling and configuring the Endace DAG drivers and software.

For detailed information on installing and configuring the individual DAG cards please refer to the appropriate DAG Card User Guides which are included on the Documentation CD. The DAG Card User Guides may also be downloaded from the Support section of the Endace website at <http://www.endace.com>.

Custom Applications

The DAG software supports a programming environment which allows you to develop, test and run custom applications using the DAG API which is a native C language Application Programming Interface.

For further information on the DAG API and to obtain a copy of *EDM04-19 DAG Programming Guide* please contact Endace Support at support@endace.com.

Installing DAG software in an EndaceProbe virtual machine

When installing DAG software into an EndaceProbe virtual machine use the instructions specific to operating system. The operating system must already be installed into the virtual machine prior to installing the DAG software.

For details on configuring the virtual machine on the EndaceProbe refer to the applicable virtual machine installation guide.

Related documentation

The follow is a list of related documentation:

- *EDM01-18 DAG 4.5 G2/G4 Card User Guide*
- *EDM01-32 DAG 7.5G2 Card User Guide*
- *EDM01-33 DAG 7.5G4 Card User Guide*
- *EDM01-21 DAG 8.1SX Card User Guide*
- *EDM01-36 DAG 9.2X2 Card User Guide*
- *EDM01-38 DAG 9.2SX2 Card User Guide*
- *EDM01-37 vDAG Card User Guide*
- *EDM04-37 Windows DAG Software Installation Guide*
- *EDM04-19 DAG Programming Guide*

Installing on Linux

These instructions assume you do not have DAG software currently installed. If you do have DAG software currently installed, see [Uninstalling the software](#) (page 6).

Pre-requisites

Please read the following notes before installing the DAG software and complete any appropriate action:

- See the release notes for the DAG software you are installing for detail on what Linux Kernel versions are supported.
- In order to run the DAG software you must have these packages installed, as these are not part of the default Linux installation you may have to install these separately:

readline-dev	pkg-config
libxml2-dev	gcc
libxml2	make
libpcap-dev	g++
libpcap	

Note:

Names of some packages may differ. Refer to the documentation that came with your distribution of Linux for instructions on how to install these packages.

- To compile the DAG drivers you must either:
 - Use kernel headers for the running kernel.
Kernel headers may be an additional package to the Linux distribution.
 - Or, configure a set of kernel sources for the kernel being used.
The kernel sources consist of a minimum of an unpacked kernel source tree under `/usr/src/linux` that has been configured and `make dep` has been run.
- If using the 2.6.x Linux kernel, you should have a `Kbuild` system installed. The `Kbuild` system is either:
 - part of the kernel source, or
 - a separate package (usually if using Linux distribution kernel headers (i.e. Debian).
- On the computer you are to install the DAG software you must have a general C and C++ development environment. This environment must be based on `gcc` and include the standard headers of `libc` and the library header files of the packages listed above.

Note:

In some distributions of Linux the header files are obtained separately from the basic library.

Unpack the Tarball

The DAG software for Linux is supplied as a compressed tar file. It contains all the necessary source code except the firmware code which is proprietary to Endace Technology Limited.

1. Move to directory `/usr/local` and untar the tarball using the following command:

```
tar xfvz dag-<software version>.tar.gz
```
2. Create a symlink called `dag` to the unpacked source directory. For example:

```
ln -s dag-<software version> dag
```
3. Move to the `dag` directory to which you created the symlink using:

```
cd dag
```
4. Check it contains the following sub-directories:
 - `drv` Driver source code
 - `filtering` Hardware IP filtering utilities
 - `include` Header files for C and assembler code
 - `lib` Library to access DAG cards
 - `scripts` Example DAG initialization scripts
 - `tools` DAG capture tools and utilities
 - `xilinx` Loadable firmware images (.bit files)

Note:

DAG documentation is available on the DAG Documentation and Software CD and on the Endace support website <https://support.endace.com/>.

Compile the Software

The DAG software for Linux is supplied with a `configure` script which accepts the following arguments:

<code>--prefix=PREFIX</code>	Architecture independent install path prefix Default is <code>/usr/local</code>
<code>--exec-prefix=EPREFIX</code>	Architecture specific install pathprefix.
<code>--with-kern=DIR</code>	override automatic kernel source detection
<code>--with-config=FILE</code>	override automatic kernel <code>.config</code> file detection
<code>--with-pcap-DIR</code>	override automatic pcap header detection
<code>--disable-gcc-detect</code>	override automatic gcc kernel compiler detection

Based upon the kernel version currently running, the `configure` script attempts to find a kernel source tree and `.config` file first. The detected version is always displayed in the output of `configure`.

1. To compile the DAG software on Linux, type the following script:

```
./configure
make
make install
```
2. By default the `libdag` library installs into `/usr/local/lib`. However on some Linux distributions this directory is not scanned as part of the default library path. This can cause problems for programs using a shared version of `libdag`. There are two methods for resolving this. They are:
 - Make the library available to all users by editing the `/etc/ld.so.conf` file to add `usr/local/lib` to the system library path.
In this case, you must run `ldconfig` to update the library cache.
 - In `bash`, set the environment variable to:

```
LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib
```

For automation purposes this can be added to the user's login file.

Install the Drivers

The DAG software uses the memory in the host computer for the DAG card's capture buffer.

`dagmem` is a driver used to detect the number of DAG cards installed and allocate memory for each DAG card. Each card must be allocated a minimum of 8MB of memory.

Your system needs to be configured to load `dagmem` at boot time.

Note:

- `dagmem` controls the amount of memory assigned to each DAG card. To change the memory assignments `dagmem` must be reloaded, which may require a reboot. For more information on `dagmem`, see EDM04-32 `dagmem` Software Guide.
- For details on advance memory allocation and 64-bit support refer to the EDM04-32 `dagmem` Software Guide.

1. Add an entry to the appropriate file to load `dagmem` at boot time. The procedure differs depending on which version of Linux you are installing on. For example:
 - For **Debian Linux, Ubuntu and Debian based Linux distributions** edit the file `/etc/modules` to add an entry for `dagmem` as follows:


```
dagmem dsize=128M
```
 - For **Redhat, Fedora Core and similar** edit the file `/etc/rc.local` to add an entry for `dagmem` as follows:


```
modprobe dagmem dsize=128M
```
 - Or, for **any Linux distribution** you can add an entry to the startup script to load the `dagmem` driver:


```
modprobe dagmem dsize=128M or
insmod dagmem dsize=128M
```

2. Reboot the host computer.

During the boot process, a `dagmem` message displays reporting the number of DAG cards installed, their interrupt and I/O address assignments and the amount of memory reserved for each card.

An example message from `dmesg` for two DAG 4.3GE cards is shown below:

```
dagmem: module license 'Proprietary Endace Measurement Systems Ltd'
taints kernel.
dagmem: memory of size 134217728 for dag #0 at 0x100b7c00000
dagmem: memory of size 134217728 for dag #0 at 0xb7c00000
dagmem: memory of size 134217728 for dag #1 at 0x100afc00000
dagmem: memory of size 134217728 for dag #1 at 0xafc00000
dag: Version 3.4.2
ACPI: PCI interrupt 0000:02:03.0[A] -> GSI 28 (level, low) -> IRQ 209
dag0: Setting latency timer to 64
dag0: DAG 4.3GE Rev 1 at 0x00000000dd200000 irq 209 buf 128MB
dag0: starting clock at 1169518202.000000 (1169518202)
ACPI: PCI interrupt 0000:07:01.0[A] -> GSI 96 (level, low) -> IRQ 233
dag1: Setting latency timer to 64
dag1: DAG 4.3GE Rev 1 at 0x00000000dd500000 irq 233 buf 128MB
dag1: starting clock at 1169518203.000000 (1169518203)
```

3. Once you have loaded `dagmem` you must load the DAG drivers using:

```
dagload
```

Note:

Because the DAG driver uses a dynamic major number, you should use `dagload` rather than `insmod` or `modprobe`.

Uninstalling the software

When installing a new version of DAG software, Endace recommends taking these steps to uninstall the current DAG software if:

- you have DAG software version 3.0.x or earlier,
- you have DAG software version 3.0.x or greater and you encounter difficulties installing a new software version, or
- you are 'rolling-back' to an old DAG software version.

To uninstall the DAG software, complete the following steps:

Note:

These commands are applicable to a standard DAG software install.

1. Remove the old DAG drivers:

```
cd /lib/modules/<kernel-version>/extra/  
rm -f *dag*.ko  
cd /lib/modules/<kernel-version>/endace/  
rm -f *dag*.ko
```

2. Perform a `make uninstall` from the source file location:

```
cd /usr/local/dag  
make uninstall
```

Note: *The `make uninstall` command may not work for older versions of DAG software.*

3. Reboot the host computer.

Please contact Endace Support at support@endace.com for further information.

Installing on FreeBSD

Pre-requisites

Before beginning to install the DAG software you should note the following:

- See the release notes for the DAG software you are installing for detail on what FreeBSD Kernel versions are supported.
- Endace recommends that you use the latest available kernel.
- Although you do not need to compile a kernel specifically for the DAG drivers it may be best practice to do so.
- You must have available on the computer on which you are installing the software a C development environment i.e. `tar`, `gcc`, `make` and header files.

Unpack the Tarball

The DAG software for FreeBSD is supplied as a compressed `tar` file. It contains all the necessary source code except the firmware code which is proprietary to Endace Limited.

1. Move to directory `/usr/local` and untar the tarball using:

```
tar xfvz dag-<software version>.tar.gz
```
2. Create a symlink called `dag` to the unpacked source directory using for example:

```
ln -s dag-<software version> dag
```
3. Move to the `dag` directory to which you created the symlink using:

```
cd dag
```
4. Check that it contains the following sub-directories:

<code>drv</code>	Driver source code
<code>filtering</code>	Hardware IP filtering utilities
<code>include</code>	Header files for C and assembler code
<code>lib</code>	Library to access DAG cards
<code>scripts</code>	Example DAG initialization scripts
<code>tools</code>	DAG capture tools and utilities
<code>xilinx</code>	Loadable firmware images (.bit files)

Note:

DAG documentation is available on the DAG Documentation and Software CD and on the Endace support website <https://support.endace.com/>.

Compile the Software

The DAG software for FreeBSD is supplied with a `configure` script which accepts the following arguments:

<code>--prefix=PREFIX</code>	Architecture independent install path prefix. Default is <code>/usr/local</code>
<code>--exec-prefix=PREFIX</code>	Architecture specific install path prefix Default is <code>PREFIX</code> .
<code>--with-sysmod=DIR</code>	location of kmod sources. Default is <code>/sys/modules</code> .
<code>--with-pcap=DIR</code>	override automatic pcap header detection

Based upon the the kernel version currently running, the `configure` script attempts to find a kernel source tree and `.config` file first. The detected version is always displayed in the output of `configure`.

1. Type the following script:

```
./configure
gmake
gmake install
cd /sys/modules/dagmem
make
make install
cd /sys/modules/dag
make
make install
make nodes
```

Note:

You can execute the `/configure` and `gmake` commands as a normal user. To execute the remaining commands you must be a superuser.

In some versions of FreeBSD, `make nodes` may not be necessary.

2. The `make install` target install files in the following locations:

```
Firmware:          PREFIX/share/dag/xilinx
Binaries:          PREFIX/bin
Libraries:         PREFIX/lib
Headers:           PREFIX/include
Drivers:           /sys/modules/dag
                  /sys/modules/dagmem
```

Install the Drivers

The DAG software uses the memory in the host computer for the DAG card's capture buffer.

A driver called `dagmem` loads when the kernel is booted, detects the number of DAG cards installed and reserves memory for each accordingly. Each card is allocated the same amount of memory and must be a minimum of 8MB. After it is compiled, `dagmem` is installed in the `modules` directory of the running kernel.

Note:

- `dagmem` controls the amount of memory assigned to each DAG card. To change the memory assignments `dagmem` must be reloaded, which may require a reboot. For more information on `dagmem`, see EDM04-32 `dagmem` Software Guide.
- For details on advance memory allocation and 64-bit support refer to the EDM04-32 `dagmem` Software Guide.

1. Edit the file `/boot/loader.conf` to add an entry for `dagmem` as follows:

```
dagmem_size="134217728"
dagmem_load="YES"
```

This allows you to change the amount of memory reserved per card to 128 MB.

Note:

Depending on the kernel version, the size of allocated contiguous memory may be limited to 256MB. This is because FreeBSD attempts to allocate memory up to the first 256MB of physical memory by default.

This can be overridden by editing the `/boot/loader.conf` file and adding the entry:

```
dagmem_maxphys="n"
```

where `n` (in bytes) is the maximum physical address to which the dag driver attempts to allocate memory.

This amount should be more than the total memory to be allocated for all cards combined, but should be significantly less than the total physical memory available on the system.

2. Reboot the host computer.

During the boot process a `dagmem` message displays reporting the number of DAG cards installed, their interrupt and I/O address assignments and the amount of memory reserved for each card.

An example message from `dmesg` for two DAG 4.3GE cards is shown below:

```
dag0: <Endace DAG 4.3GE> mem 0xfccb0000-0xfccbffff irq 24 at device 3.0 on pci2
dag0: [GIANT-LOCKED]
dag0: starting clock at 1170814891.000004 (1170814891)
dag1: <Endace DAG 4.3GE> mem 0xfcef0000-0xfceffffff irq 72 at device 1.0 on pci5
dag1: [GIANT-LOCKED]
dag0: starting clock at 1170814892.000004 (1170814892)
dag1: starting clock at 1170814893.000003 (1170814893)
```

3. Once the drivers are installed and the computer has been rebooted, the `dagmem` and `dag` drivers need to be loaded:

```
cd /sys/modules/dagmem
make load
cd /sys/modules/dag
make load
```

Or

```
sync ; sync
kldload dagmem.ko
kldload dag.ko
```

If you wish to unload the drivers, this can be done with the following script:

```
cd /sys/modules/dag
make unload
cd /sys/modules/dagmem
make unload
```

Or

```
sync ; sync
kldunload dag.ko
kldunload dagmem.ko
```

4. Edit the environment script (`.bashrc`) to include the following path:

```
PREFIX/bin
```

Updating the Software

From time to time Endace may release updates to the DAG software.

For details the new release read the accompanying release notes and documentation prior to installing.

If you have a support contract with Endace you can access updates using your Support account login at <http://www.endace.com>.

Updating Linux and FreeBSD

The initial procedure for updating the DAG software is the same for Linux and FreeBSD operating systems.

1. Ensure there is a configured set of kernel sources for the kernel being used. This consists of a minimum of an unpacked kernel source tree under `/usr/src/linux` that has been configured and `make dep` has been run.
2. Move to the directory to which the tarball for the previous version of software was untarred. This is commonly `/usr/local`.
3. Untar the update tarball using:

```
tar xfvr dag-<new version number>.tar.gz
```

This creates a new directory called:
`dag-<new version number>`
4. Edit the existing `dag` symlink which was created at the time of the previous installation using for example:

```
ln -s dag-<new version number>
```
5. Move to the `dag` directory to which you created the symlink using:

```
cd dag
```
6. Follow the steps described in [Installing on Linux](#) (page 3), or [Installing on FreeBSD](#) (page 7) as appropriate to compile the new software and complete the installation.

Troubleshooting

The following are some common problems with suggested solutions.

Problem

FreeBSD Configure Script fails

Possible Cause

The default version (2.95.3) of `gcc` is being used or the directory `usr/local/include` is not in the compiler header file search path

Solution

If this occurs, a message similar to the following will be displayed:

```
checking for iconv.h... no
configure: error:
cannot find iconv.h header file.
```

If this file is present then add the path to the directory containing `iconv.h` to the `CFLAGS` environment variable, e.g:

```
CFLAGS="-I/usr/local/include" ./configure
```

Otherwise download and install `libiconv` from:

<http://www.gnu.org/software/libiconv/> or via the usual system software update mechanism.

Problem

DAG driver fails to load on Linux

Possible Cause

When the host computer boots up it may perform a file system check or `fsck`. This occurs before the `dagmem` driver is loaded and can fragment memory to the extent that there is insufficient contiguous memory available

Solution

Reboot the Linux host computer again. With no file system error the `fsck` will not reoccur and the `dagmem` driver will load normally.

This section describes how to access Endace Support for your Endace product.

Existing support documentation

To start, we recommend you visit the Endace Support website at <https://support.endace.com/>.

If you have a support contract with Endace you can login using your support username and password which provides access to the secure area of the website. The website contains the latest versions of software, user manuals, and release notes.

For more information about the Endace Support Package, or how to obtain (or change) your secure support website login details, please contact support@endace.com.

Endace Support is available 24 hours, 7 days.

Updates

Many problems can be resolved by updating your software or firmware. Updates are also available on a regular basis from the Endace Support website at <https://support.endace.com/>.

Further support

If your query is not answered by the existing documentation, or if the issue is not resolved by an update, feel free to raise a Support Case via the Endace Support website <https://support.endace.com/>.

If you have a **critical issue**, please call. See [Contact Details](#) (page 15).

Requesting assistance

To request assistance from Endace support, complete one of the following:

- If you have successfully installed the DAG software on a Linux based system (except FreeBSD):
 - a. Run the [Support Script](#) (page 14) to gather system and DAG Card setting information.
 - b. Attach the output file to an email containing the [Required information](#) (page 14) and a [Severity level](#) (page 15).
 - c. Send the email to support@endace.com.
- If you have an alternative operating system or your DAG software has not been installed successfully:
 - a. Fill out the [Support Request Form](#) (page 15).
 - b. Submit the form.

Support script

To help gather important information on your system and DAG Card configuration, a tool is included in your DAG software. This tool can only be used on Linux based systems (except FreeBSD) and collects the following information:

- Installed DAG card(s)
- DAG card configuration(s)
- Operating system/kernel version
- Motherboard/RAM

To run this tool, use this command from the install location:

```
sh dag-stats.sh
```

This tool outputs a file called `dag-test.log` to the current directory.

Note:

Please check the contents of `dag-test.log` and remove any information which you feel is sensitive.

Required Information

The following information is always required by Endace Support when creating a Support Case:

1. Product description and serial number.
2. Your name.
3. Your email address.
4. Your phone number(s).
5. Your organization.
6. Your organization's full address, including physical and postal information, courier delivery information, region and country.
7. Detailed description of the query / issue.
8. Detailed description of your product environment.
9. System dump or logfile.
10. Severity level.

Severity levels described

A severity level is always required by Endace Support when submitting a Support Request. Please remember to add a severity level to every Support Request. The following list describes each of the severity levels.

Severity 1: Critical

Short Description: **Service completely unavailable (production networks only).**

Full Description: The Endace product is completely unavailable and there is no workaround. Service needs to be restored immediately.

Severity 2: High

Short Description: **Severely degraded service.**

Full Description: The Endace product is severely degraded and there is no workaround, the product performance is at unacceptable levels.

Severity 3: Medium

Short Description: **Performance impaired.**

Full Description: System performance is degraded, with a workaround in place. Operational performance of the product is impaired but acceptable.

Severity 4: Low

Short Description: **General assistance.**

Full Description: The customer requires assistance on the use of the Endace product, but the issue does not affect service.

This severity level is appropriate if the customer requires assistance on installation, configuration, feature requests, general capability and product questions.

Endace Support will endeavor to resolve the problem as quickly as possible. If a workaround can be achieved in a short time, it will be applied, and the priority of the case lowered while Endace Support works on implementing a more permanent solution.

Note:

*Reports subsequently made available about the case will reflect the priority of the case at the time of **closing**, and not the priority of the case when it was raised.*

Support request form

Endace has an on-line form that assists in gathering information for your support request.

The URL is: <https://support.endace.com/RequestAssistance.aspx>

Contact details

Endace contact details:

Email:	support@endace.com
USA:	1866 558 4936
UK:	0800 028 9321
Australia:	1800 144 708
New Zealand:	+64 9 366 3442
Website:	https://support.endace.com/

Version History

Version	Date	Reason
1-7		Early versions
8	March 2006	Minor layout changes
9	February 2007	Merged with EDM04-02 Windows Software Installation Guide and renamed to DAG Software Installation Guide. Major layout and formatting changes. Rationalization and update of content.
10	September 2007	New template and corrected some sections.
10.1	September 2007	Corrected installation section.
11	June 2008	Correct information in the Install the drivers section for Red hat (Bugzilla 344)
12	November 2008	Revised majority of document. Configuring memory in Windows added.
13	November 2008	Changed front matter. Noted dagload options.
14	August 2009	Updated for DAG software release 3.4.1. Updated installing on Linux to incorporate Red Hat support. Added note for allocating memory to dagmem on FreeBSD.
15	December 2009	Updated Installing on Windows prerequisites. Added Installing on Windows Step 6. Updated Windows graphics. Moved into AuthorIT. Added Uninstalling Linux.
16	June 2010	Rebranded. Added vDAG information. General updates.
17	August 2011	Added info about dagmem. Added reference to DAG Documentation on CD. Removed reference to MSI. Removed Configure section from Linux, FreeBSD and Windows installs. Removed all reference to Windows as not supported in this release.
18	December 2011	Added details for DAG 4.7.0 Windows release.



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