dagmem Software Guide

EDM04-32

Protection Against Harmful Interference

When present on equipment this document pertains to, the statement "This device complies with part 15 of the FCC rules" specifies the equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission [FCC] Rules.

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.

Extra Components and Materials

The product that this manual pertains to may include extra components and materials that are not essential to its basic operation, but are necessary to ensure compliance to the product standards required by the United States Federal Communications Commission, and the European EMC Directive. Modification or removal of these components and/or materials, is liable to cause non compliance to these standards, and in doing so invalidate the user's right to operate this equipment in a Class A industrial environment.

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Website

http://www.endace.com

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dagmem

`dagmem` controls the amount of memory assigned to each DAG card. It is part of the DAG software and performs the following tasks:

- detects the number of DAG cards installed, and
- reserves memory for each DAG card.

After it is compiled, `dagmem` is installed in the `modules` directory of the running kernel. Your system needs to be configured to load `dagmem` at boot time. Each DAG card must be allocated a minimum of 8MB of memory.

Note:
Only applicable to Linux operating systems.

For details on how to allocate memory to DAG cards in the **Windows environment see** *EDM04-37 Windows DAG Software Installation Guide*.

dagmem features

The following features are available on the `dagmem` driver in the Linux environment:

- Memory allocation per DAG card
- Memory allocation per device id
- Assigning memory from specific CPU NUMA (Non-Uniform Memory Access) nodes on systems supporting it
- 64-bit physical addressing
  This is only applicable to DAG cards that support the EPP v2 feature and have it loaded in the current firmware. Currently the following DAG cards have firmware images with that support this feature: DAG 7.4S, 7.5G4, 8.1SX, 9.2SX2 and 9.2X2.

`dagmem` has a set of parameters to specify memory allocation options and manage the above features, see `dagmem` parameters (page 2).

Requirements

The requirements for using `dagmem` are:

- A DAG card.
- DAG software (4.7.0 or greater).
  Customers with a current support contract can download this from the secure Endace website: https://support.endace.com/
  Refer to *EDM04-01 DAG Software Installation Guide* or *EDM04-37 Windows DAG Software Installation Guide* for details on how to install and configure the DAG software.

Limitations

The maximum possible size of memory allocation per DAG card is limited by the Operating System Configuration and the type of DAG card which you are using.

System Configuration		Maximum possible size of memory allocation		
OS Configuration	**DAG card**	**Total for all DAG cards in the system**	**Per DAG card**	**Per Stream**
Linux 64-bit	DAG cards with 64-bit firmware	Limited by available RAM	4088 MB*	2047 MB*
Linux 64-bit	DAG cards without 64-bit firmware	3072 MB*	3072 MB*	2047 MB*
Linux 32-bit	All DAG cards	3072 MB*	3072 MB*	1500 to 2047 MB**

Note:

- **Maximum possible value, real value depends on free contiguous RAM available in system.*
- ***Maximum allocation per stream on 32-bit system. Depends on the available virtual memory for applications (this is normally 3072 MB) and on how much of the memory is double mapped by the user application (extra window size parameter in DAG API). For example, `dagtools` requires full double mapping which limits the maximum memory per stream to 1500 MB.*

dagmem parameters

The `dagmem` parameters are:

<table>
<tr><th>Parameter</th><th>Description</th><th>Default value</th></tr>
<tr><td>align</td><td>Buffer alignment. K (KB) and M (MB) suffixes are supported.</td><td>1 MB</td></tr>
<tr><td>csize</td><td>Specifies amount of memory to allocate for each DAG card individually. Values should be colon separated. K (KB) and M (MB) suffixes are supported. You may specify zero values for a DAG card and memory will be allocated to that DAG card. See dagmem examples (page 3).</td><td>32 MB</td></tr>
<tr><td>dag64</td><td>Enables/disables 64-bit physical addressing for each DAG card individually. Only supported on DAG cards with 64-bit firmware images.
Note:
Only DAG cards with 64-bit firmware support 64-bit physical addressing.<table><tr><th>DAG card</th><th>dag64 option setting</th></tr><tr><td>DAG cards with 64-bit firmware</td><td>Can be set to '1' or to '0'</td></tr><tr><td>DAG cards without 64-bit firmware</td><td>Must be set to '0' (default value is '0')</td></tr></table></td><td>0 (disabled)</td></tr>
<tr><td>device_id_map</td><td>Specifies desired size of memory allocation for each device type in the system. See dagmem examples (page 3).
Specification is listed by device id. Device id is displayed under device in the output of the following command:
daginf -dX
Where X is the device number of the DAG card you want to configure.</td><td>N/A</td></tr>
<tr><td>dsize</td><td>Memory to allocate for eachDAG card. K (KB) and M (MB) suffixes are supported.</td><td>32 MB</td></tr>
<tr><td>ndags</td><td>Number of DAG cards present. Default is 0, which indicates auto detect mode.</td><td>0 (auto detect)</td></tr>
<tr><td>nid</td><td>Specifies desired memory node on NUMA (Non Uniform Memory Access) systems for each DAG card individually. Supported on Linux 2.6.14 or newer, with NUMA enabled. See dagmem examples (page 3).
Only applicable when dag64 is set.<table><tr><th>OS version</th><th>nid</th></tr><tr><td>Linux 2.6.14 or newer with NUMA enabled</td><td>supported</td></tr><tr><td>Linux 2.6.14 or newer with NUMA disabled</td><td>ignored</td></tr><tr><td>Older than 2.6.14</td><td>ignored</td></tr></table></td><td>0</td></tr>
<tr><td>verbose</td><td>Increase driver verbosity.</td><td>N/A</td></tr>
</table>

Return values

`dagmem` outputs information to the `dmesg` logs during load. During a successfully load, an output similar to the following is written to the `dmesg` logs:

```
dagmem requested memory for 4 cards
        dag0 size=33554432 node=0 64bit=0
        dag1 size=33554432 node=0 64bit=0
        dag2 size=33554432 node=0 64bit=0
        dag3 size=33554432 node=0 64bit=0
dagmem allocated memory for 4 cards
        dag0 size=33554432 at c7c00000
        dag1 size=33554432 at c9c00000
        dag2 size=33554432 at cbc00000
        dag3 size=33554432 at cdc00000
```

If there is not enough contiguous memory for all DAG cards, only the DAG that have been allocated memory are listed.

dagmem examples

Here are some examples on the use of `dagmem` parameters.

Note:
All required options must be passed to `modprobe` in a single command.

- To specify 128 MB for all cards in the system, use the following command:
  `modprobe dagmem dsize=128M`
- To specify memory allocation for individual devices, use the `csize` parameter. The following command assigns 64 MB to dag0, and 128 MB to dag1:
  `modprobe dagmem csize=64M:128M`
- To specify memory allocation by device type, use the `device_id_map` parameter. The following command assigns 128 MB to all 7.5G4GEs and 64 MB to all 8.1SXs:
  `modprobe dagmem device_id_map="754e:128M,8101:64M"`
- To specify 64-bit physical addressing, use the `dag64` parameter. The following command enables 64-bit physical addressing for dag0 and dag2, disables 64-bit physical addressing for dag1 and sets 2000 MB memory per DAG card:
  `modprobe dagmem dag64=1:0:1 dsize=2000M`
- To specify card memory allocation to NUMA nodes, use the `nid` parameter. This requires 64-bit firmware. The following command assigns the memory allocation of:
  - dag0 and dag2 to NUMA node 1 (dag0 and dag2 are 64-bit DAG cards), and
  - dag1 to NUMA node 0 (as dag1 is a non 64-bit DAG card):

  `modprobe dagmem nid=1:0:1 dag64=1:0:1`

Loading dagmem at boot time

The procedure to load `dagmem` at boot time differs depending on which version of Linux you are installing on.

Note:
Memory allocation to DAG cards should be done as early as possible during the boot process to ensure contiguous memory is available. Endace recommends the use of init scripts. Once the init script is created you need to reboot for it to take effect.

For **Debian Linux, Ubuntu and Debian based Linux distributions** edit the `/etc/modules` file 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
```

Also, 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
```

Version History

Version	Date	Reason
1	August 2009	First release.
2	December 2009	Updated `dagmem` parameters. Minor changes.
3	August 2011	Updated dagmem parameters. Updated limitations, dagmem examples and detail on loading dagmem at boot time.
4	December 2011	DAG 4.7.0 Added cross reference to EMD04-37.

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