

dagfwddemo User Guide

EDM04-04



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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.

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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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Introduction

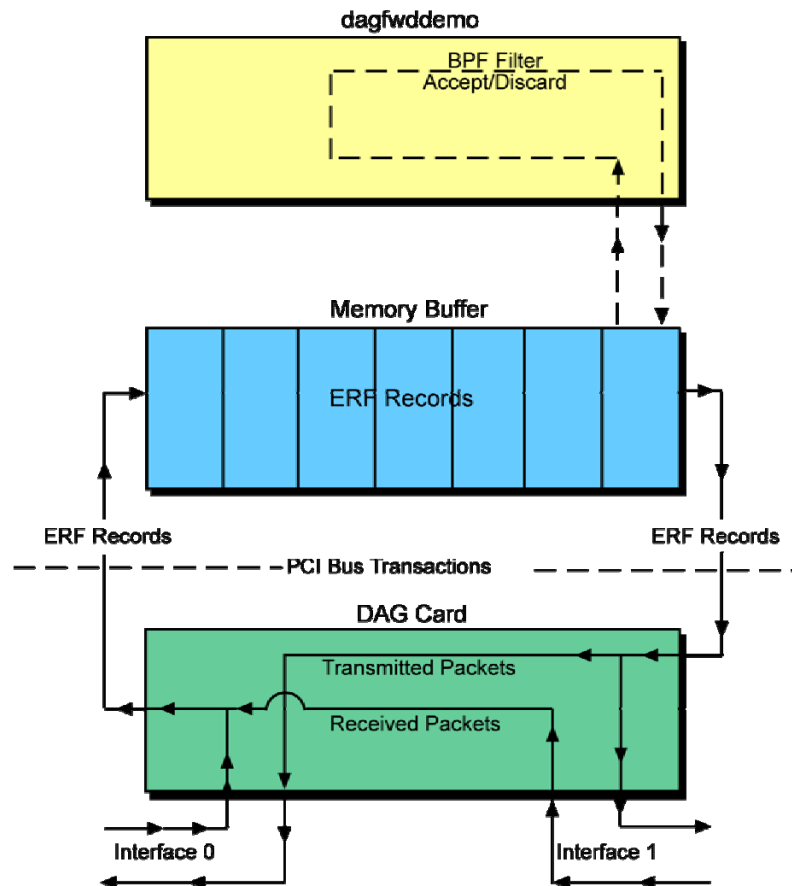
Overview

Some Endace DAG cards are able to receive and transmit packets directly from a single memory buffer. This allows you to forward packets from one interface to the other without the requirement to copy them. This mode of operation is sometimes referred to as “zero copy” mode.

dagfwddemo is an Endace supplied tool that demonstrates how you can apply a filter to the traffic forwarded by the DAG card. The filter is a BSD Packet Filter (BPF) expression specified in the command line.

Within the architecture packets received on interface 0 will be transmitted on interface 1 and vice versa.

The dagfwddemo architecture is shown:



Note:

dagfwddemo drops packets received with layer 2 errors, e.g. Ethernet TCS failures. All packets are bridged between interfaces at layer 2, IP TTL is not decremented. The DAG Card does respond to ARP, see user guide. While forwarding the card cannot be used for normal packet capture / transmission.

Supported DAG Cards

dagfwddemo is supported on all DAG cards which have a transmit option.

Note:

Whilst a DAG Card may support transmit the appropriate firmware must be installed to use dagfwddemo.

Prerequisites

To use dagfwddemo you must have the following installed on the PC from which you intend to run the program:

- One of the DAG cards which supports dagfwddemo.
- Version 0.8.3 or higher of libpcap.

Note:

dagfwddemo uses libpcap to perform BPF filtering which is available from the support section of the Endace website at www.endace.com

References

- For further information on BPF expressions please refer to the tcpdump website at www.tcpdump.org
- The following is a source reference for this document:
 - Steven McCanne and Van Jacobson. The BSD Packet Filter: A New Architecture for User-level Packet Capture. In Proceedings of Winter 1993 USENIX Conference, pages 259 – 269. USENIX Association, January 1993.
Also available online at: <http://citeseer.ist.psu.edu/mccanne92bsd.html>

Configuring the Card

Standard Configuration

To configuring a DAG card for data capture do the following:

- Load the DAG device driver
- Load the images and program the FPGAs
- Set the link
- Check the link
- Configuring the connections

This process is detailed in the *Installation* and *Configuring the Card* chapters of the appropriate Card User Guide for the DAG card you are configuring.

Note:

The DAG Card User Guides are included on the CD shipped with the DAG card and are also available from the support section of the Endace website at www.endace.com

Inline Configuration

To use dagfwdemo you must configure the DAG card for inline operation.

- For DAG 3.7G and DAG 3.8S cards use:
`dagthree -d0 default overlap`
- For the DAG 4.3GE card use:
`dagfour -d0 default overlap`
- For all other DAG cards use:
`dagconfig -d0 default overlap`

Restore Normal Configuration

When you have finished using dagfwdemo you must restore the card to normal operation to allow you to resume standard packet capture or transmission.

- For DAG 3.7G and DAG 3.8S cards use:
`dagthree -d0 default rxtx`
- For the DAG 4.3GE card use:
`dagfour -d0 default rxtx`
- For all other DAG cards use:
`dagconfig -d0 default rxtx`

Commands

The form of a dagfwdemo command with BPF expression is:

```
dagfwdemo [options] "bpf expression"
```

where

"options" are the available parameters. See [Valid options](#) (page 6) for details.

"bpf expression" must be enclosed in double quotes ("").

dagfwdemo allows packets matching the user defined BPF filter to pass interface 0 and interface 1 bi-directionally. Any packets that do not match the filter are dropped. Specifying an empty filter i.e. "" allows all packets to be forwarded.

Example Expressions

The example BPF expressions described below are available in dagfwddemo.

Pass ICMP Packets

The following BPF expression will allow only ICMP packets to pass between the two interfaces:

```
dagfwddemo -d0 "icmp"
```

Pass TCP and ICMP Packets

The following BPF expression will allow only TCP and ICMP packets to pass between the two interfaces:

```
dagfwddemo -d0 "tcp and icmp"
```

Pass TCP Packets by Host and Port

The following BPF expression will allow only TCP packets on port 80 (http) with the host www.example.com as the source or destination to pass between the two interfaces:

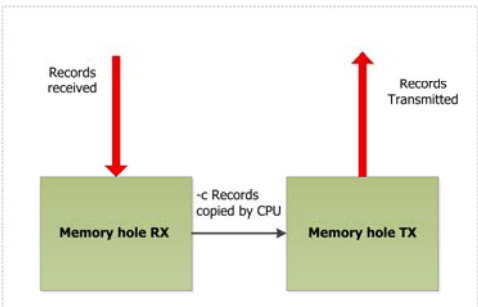
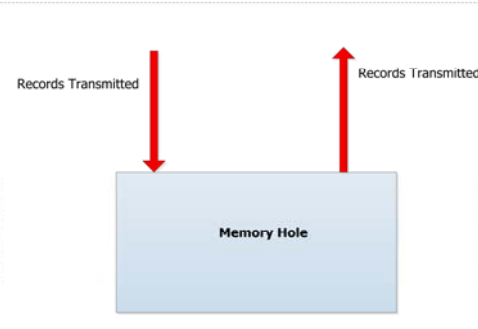
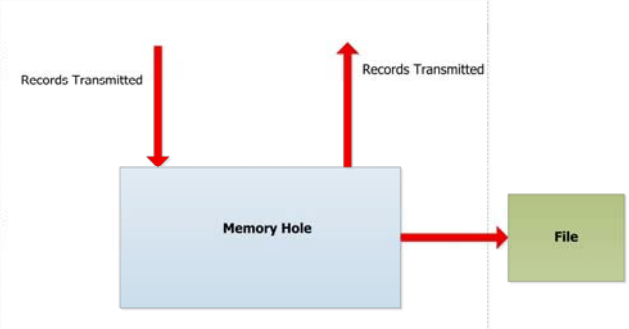
```
dagfwddemo -d0 "tcp and host www.example.com and port 80"
```

Don't Pass Packets by Port

The following BPF expression will forward all traffic except port 80 TCP traffic.

```
dagfwddemo -d0 "not tcp port 80"
```


Valid Options

Option	Description
<p>-d</p>	<p>The device identifier of the DAG card ie: -d0 <code>dagfwddemo -d0</code> This parameter selects the DAG card. <i>Note:</i> If the -d option is not present in the command line, the default DAG card is assumed to be -d0 .</p>
<p>-h -? --help --usage</p>	<p>Displays a help message and then exits. -h displays help information: <code>dagfwddemo -d0 -h</code> This parameter shows the help message.</p>
<p>-V --version</p>	<p>Displays dagfwddemo version information <code>dagfwddemo -d0 -V</code>, shows the version information.</p>
<p>-c</p>	<p>Copies records from one memory hole to another for transmitting. This works on normal memory hole setup. <code>dagfwddemo -d0 -c</code> The -c enables file copying.</p> <div style="text-align: center;"> <p>Normal Memory hole Setup</p>  <p>Overlapped Memory hole Setup</p>  </div>
<p>-f</p>	<p>Saves records to a specified file while forwarding those same records. <code>dagfwddemo -d0 -f <filename></code> The -f enables the file to save; <filename> specifies the filename.</p> <div style="text-align: center;">  </div>

Option	Description
<p>-F</p>	<p>Define the filter used to select recorded packets.</p> <pre>dagfwddemo -d0 -f icmp.erf -F "icmp" "tcp and udp"</pre> <p>-F sets the file saving filter; "icmp"- records to be saved to file; "tcp and udp" records to be forwarded.</p> <div data-bbox="576 315 1142 689" style="border: 1px dashed gray; padding: 10px; margin: 10px auto; width: fit-content;"> <p>The diagram illustrates the packet processing flow. On the left, 'RX icmp tcp and udp packets' enter from a red arrow. These packets pass through two filter boxes: 'Filter 1 -F "icmp"' and 'Filter 2 "tcp and udp"'. Both filters have arrows pointing to a central 'Memory Hole' box. From the Memory Hole, a red arrow points upwards to 'Tx tcp and udp packets', and another red arrow points to the right to a 'File -f icmp.erf' box, labeled 'Save to file'.</p> </div> <p>Note: <i>You must use the -F option with the -f option. This is independent of the packet forwarding filter. If -F is not used "tcp and udp" will be the filter used for records saved to file.</i></p>
<p>-t</p>	<p>Sets how long you want dagfwddemo to run. Time is specified in seconds. If no runtime is specified the default is 'run for ever'</p> <pre>dagfwddemo -d0 -t <seconds></pre> <p>-t enables run time; <seconds> contains the actual time in seconds.</p>
<p>-R</p>	<p>This forwards packets ASAP and sets low latency mode using 100% of CPU.</p> <pre>dagfwddemo -d0 -R</pre> <p>-R enables Low latency receive mode</p> <p>Note: <i>If -R mode is enabled -B is disabled.</i></p>
<p>-m</p>	<p>Minimizes the risk of lost records in the file by varying the size of the buffer to accommodate line rate. 256MB is the default buffer size. You must use the -m option with the -f option.</p> <p>-m, set the disk buffer size:</p> <pre>dagfwddemo -d0 -f <filename> -m <size in MB></pre> <p>-m, enables the buffer size to set. <size in MB> is the actual size in Mega Bytes.</p>
<p>-B</p>	<p>Decreases the amount of CPU time required by buffering packets before they are transmitted. This is achieved by setting the maximum number of kilo bytes accumulated before transmission.</p> <pre>dagfwddemo -d0 -B <Size in kB></pre> <p>-B; enables bytes to be accumulated.<Size in kB> is the actual size in kB.</p>
<p>-i</p>	<p>DO NOT change the interface number when forwarding. You must use this option if you wish to retransmit packets on the port you receive on.</p> <pre>dagfwddemo -d0 -i</pre> <p>-i, enables DO NOT change interface number.</p> <p>Note: <i>The DAG 3.7G firmware automatically maps the interface number if -i is not enabled.</i></p>

Example Output

When dagfwddemo begins it displays the receive (stream 0) and transmit (stream1) poll parameters.

When running it prints three lines of traffic statistics to the screen every second as shown:

```
# dagfwddemo -d0 ""
stream 0, mindata: 16, maxwait: 0.0, poll: 0.0
stream 1, mindata: 16, maxwait: 0.0, poll: 0.0
```

		Interface 0		Interface 1		Total	
1 st second	Received	1267	1267	1943	1943	3210	3210
	Dropped	0	0	0	0	0	0
	Rejected	0	0	0	0	0	0
2 nd second	Received	1001	2268	1286	3229	2287	5497
	Dropped	0	0	0	0	0	0
	Rejected	0	0	0	0	0	0
3 rd second	Received	969	3237	1329	4558	2298	7795
	Dropped	0	0	0	0	0	0
	Rejected	0	0	0	0	0	0
4 th second	Received	1273	4510	1440	5998	2713	10508
	Dropped	0	0	0	0	0	0
	Rejected	0	0	0	0	0	0

		Interface 0		Interface 1		Total	
1 st second	Received	1267	1267	1943	1943	3210	3210
	Dropped	0	0	0	0	0	0
	Rejected	0	0	0	0	0	0

In the Received row, the shaded column "1267" is the Total Packets received on Interface 0 in the last second. The Total is the Total Packets received on Interface 0 and 1 in last second.

In the Dropped row, under the Interface 1 is the Packets dropped on Interface 1 in the last second. On the right is the Total packets dropped on Interface 1 in the last second.

In the Rejected row, in the Total column is the Total Packets rejected on Interface 0 and 1 in the last second. To the right of that is the overall total packets rejected on Interface 0 and 1.

Reporting Problems

If you have problems with a DAG card or Endace supplied software which you are unable to resolve, please contact Endace Customer Support at support@endace.com.

Supplying as much information as possible enables Endace Customer Support to be more effective in their response to you. The exact information available to you for troubleshooting and analysis may be limited by nature of the problem. However the following items will assist a quick resolution:

- DAG card[s] model and serial number.
- Host PC type and configuration.
- Host PC operating system version
- DAG software version package in use
- Any compiler errors or warnings when building DAG driver or tools
- For Linux and FreeBSD, messages generated when DAG device driver is loaded. These can be collected from command `dmesg`, or from log file `/var/log/syslog`.
- Output of `daginf`.
- Firmware versions from `dagrom -x`.
- Physical layer status reported by: `dagthree`, `dagfour`, `dagconfig`
- Network link statistics reported by: `dagthree -si`, `dagfour -si`, `dagconfig -si`
- Network link configuration from the router where available.
- Contents of any scripts in use.
- Complete output of session where error occurred including any error messages from DAG tools. The `typescript` Unix utility may be useful for recording this information.
- A small section of captured packets trace illustrating the problem.

Version History

Version	Date	Reason
1-2	Pre 2006	Old versions
3	August 2006	Added version history. Added new options. Added tables, descriptions and examples. General revision and expansion of content.
4	September 2007	New template and general revision of content
5	June 2008	Updated new copyright information
6	December 2011	Updated branding; removed some graphics to simplify information; updated copyright information.



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