endace
accelerated

dagfwddemo User Guide

EDM04-04

Protection Against Harmful Interference

When present on equipment this manual 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 manual, 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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Published by:

Endace Technology® Ltd
Level 9
85 Alexandra Street

PO Box 19246
Hamilton 3244
New Zealand

Phone: +64 7 839 0540
Fax: +64 7 839 0543
support@endace.com
http://www.endace.com

International Locations

New Zealand
Endace Technology Ltd
Building 7, Lambie Drive
PO Box 76802
Manukau City 2104
New Zealand
Phone: +64 9 262 7260
Fax: +64 9 262 7261

Americas
Endace Network Systems Inc
14425 Penrose Place
Suite 225
Chantilly, VA 20151
United States of America
Phone: +1 703 964 3740
Fax: +1 703 378 0602

Europe, Middle East & Africa
Endace Europe® Ltd
Sheraton House
Castle Park
Cambridge CB3 0AX
United Kingdom
Phone: +44 1223 370 176
Fax: +44 1223 370 040

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Contents

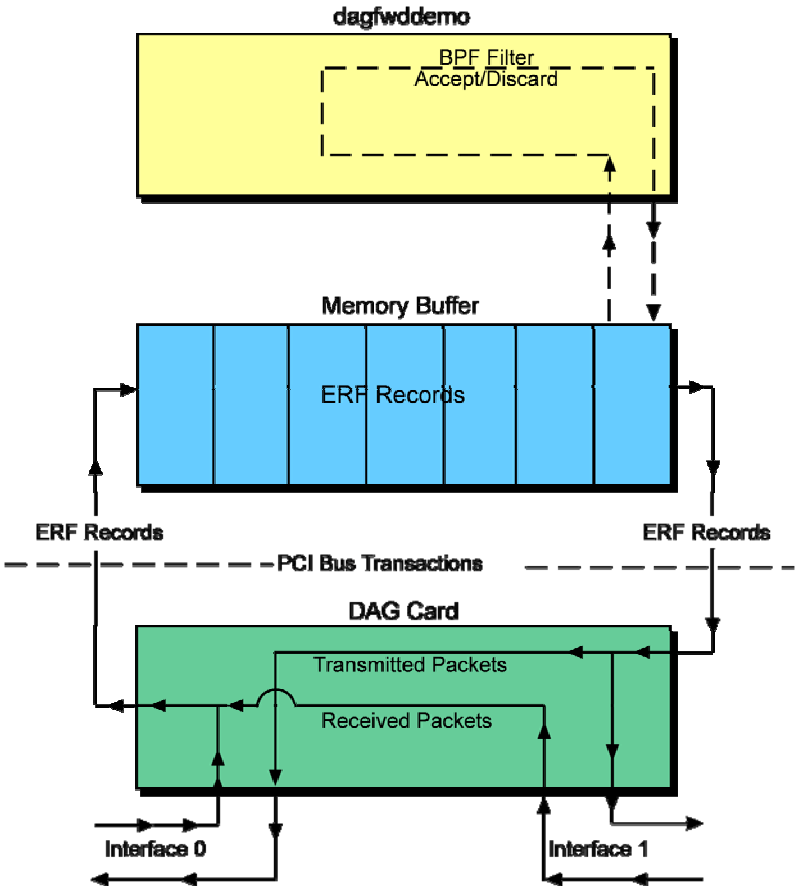
Overview

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 below:



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

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 `dagfwddemo` 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
  ```

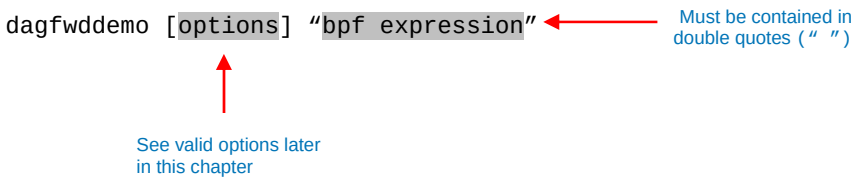
Restore Normal Configuration

When you have finished using `dagfwddemo` 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 `dagfwddemo` command with BPF expression is:



`dagfwddemo` 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:

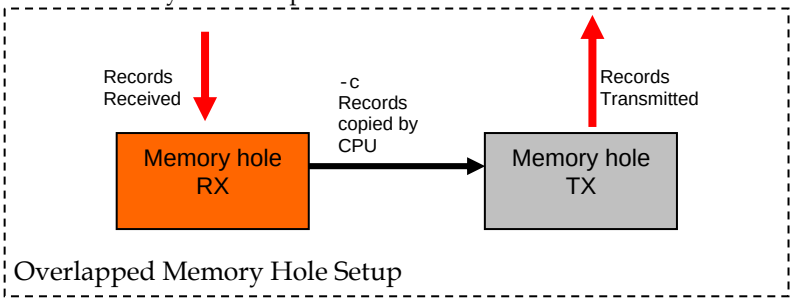
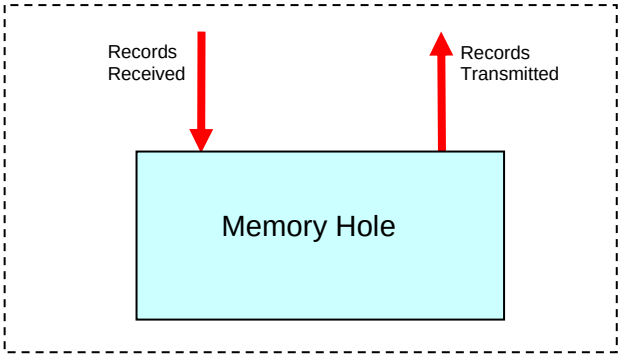
```
dagfwddemo –d0 “tcp and host www.example.com and port 80”
```

Don’t Pass TCP Packets by Port

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

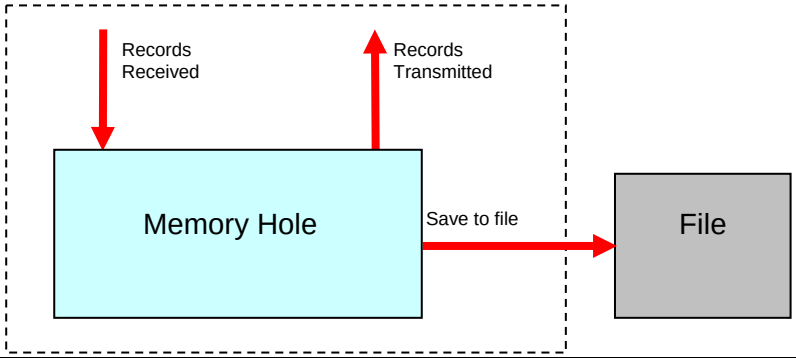
```
dagfwddemo –d0 “not tcp port 80”
```

Valid Options

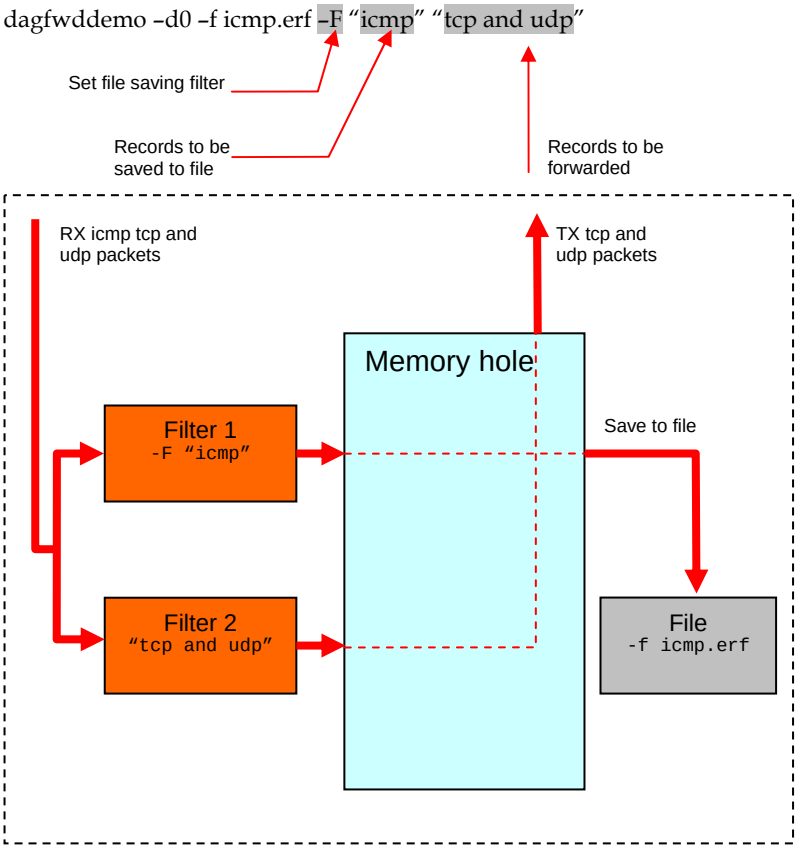
Option	Description
-d	The device identifier of the DAG card ie: `-d0` `dagfwddemo -d0` ← Select DAG card **Note:** If the `-d` option is not present in the command line, the default DAG card is assumed to be `-d0`.
-h -? --help --usage	Displays a help message and then exits `-h` Displays help information: dagfwddemo –d0 –h ← Show help message
-V --version	Displays `dagfwddemo` version information dagfwddemo –d0 –V ← Show version information
-c	Copies records from one memory hole to another for transmitting. This works on normal memory hole setup. dagfwddemo –d0 –c ← Enable file copying Normal Memory Hole Setup  Overlapped Memory Hole Setup 

<table>
<tr><th>Option</th><th>Description</th></tr>
<tr><td>-f</td><td>Saves records to a specified file while forwarding those same records.

dagfwddemo –d0 –f <filename>

 
</td></tr>
<tr><td>-F</td><td>Define the filter used to select recorded packets.

dagfwddemo –d0 –f icmp.erf –F “icmp” “tcp and udp”

Note: 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.</td></tr>
</table>

Option	Description
-t	Sets how long you want `dagfwddemo` to run. Time is specified in seconds. If no runtime is specified the default is *'run for ever'* `dagfwddemo –d0 –t <seconds>` Enable run time Actual time in seconds
-R	This forwards packets ASAP and sets low latency mode using 100% of CPU. `dagfwddemo –d0 -R` ← Enable Low latency receive mode **Note:** If `–R` mode is enabled `–B` is disabled.
-m	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 • `-m` Set the disk buffer size: `dagfwddemo –d0 –f <filename> –m <size in MB>` Enable the buffer size to be set Actual size of buffer in Mega Bytes
-B	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. `dagfwddemo –d0 –B <Size in kBs>` Enable bytes to be accumulated Actual size in kB
-i	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. `dagfwddemo –d0 –i` ← Enable DO NOT change interface number Note: The DAG 3.7G firmware automatically maps the interface number if `–i` is not enabled.

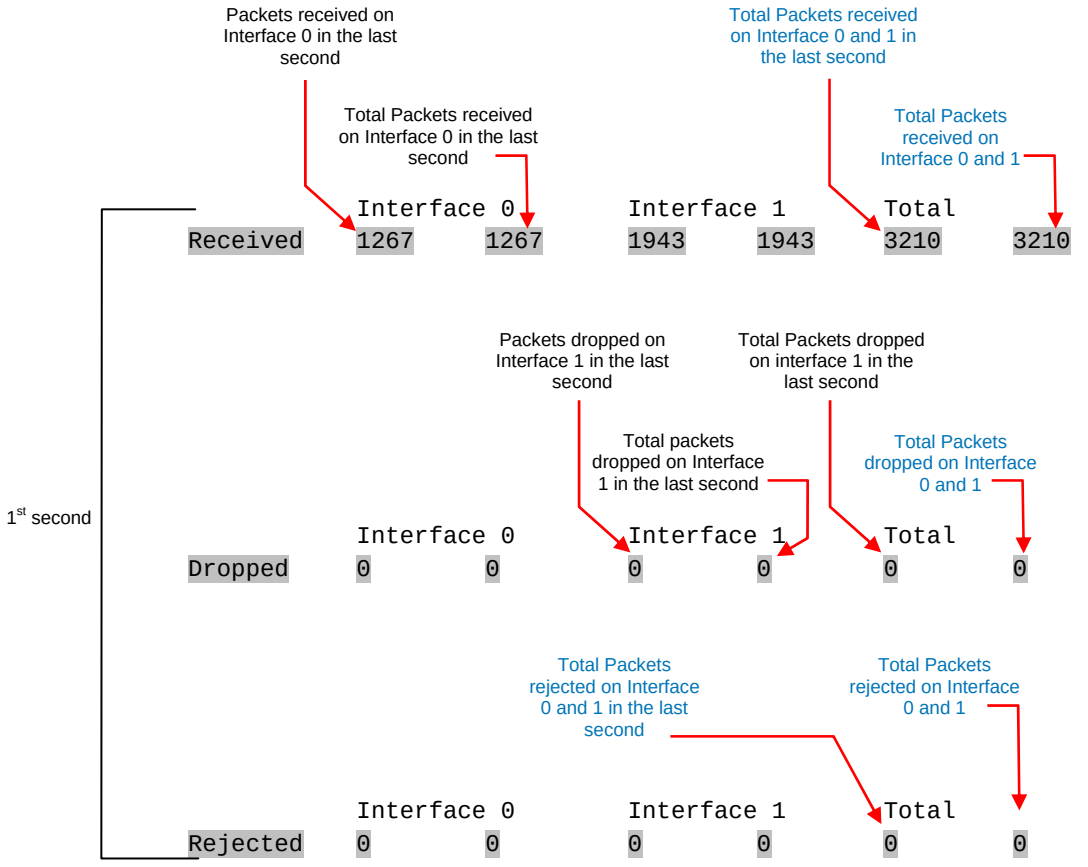
Example Output

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 below:

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



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: `dagthee -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 copyright information