

Graphical SpaceWire Capture

Overview

We provide software that provides an easy way to capture SpaceWire traffic and events, and to generate capture configurations for the command line capture program for scripted and headless systems.

Installation

Linux CentOS 7

You need to install the **4links-gui** RPM and the gtk-3 environment

Linux Ubuntu-1804

You need to install the **4links-gui** RPM (using **alien**) and the gtk-3 environment

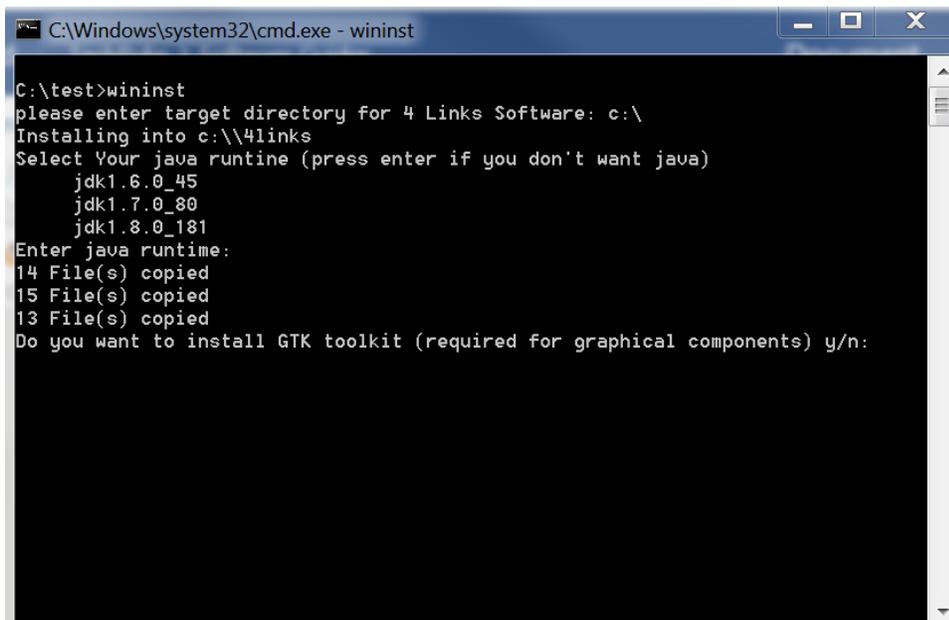
Linux Ubuntu-1604

You need to install the **4links-gui** RPM (using **alien**) and the gtk-3 environment

Window x64

We provide the graphical capture software only on windows 64bit platforms, by default it is installed however it requires the gtk runtime to be installed if it has not been already.

Whilst running the installation script you will be asked if you wish to install the GTK toolkit as shown



```
C:\Windows\system32\cmd.exe - wininst
C:\test>wininst
please enter target directory for 4 Links Software: c:\
Installing into c:\4links
Select Your java runtime (press enter if you don't want java)
  jdk1.6.0_45
  jdk1.7.0_80
  jdk1.8.0_181
Enter java runtime:
14 File(s) copied
15 File(s) copied
13 File(s) copied
Do you want to install GTK toolkit (required for graphical components) y/n:
```

If you want to use the graphical capture program you must answer y to the question and press the return key

Running Graphical Capture Tool

Preparing your environment

Once installed you need to set up the environment to run the tool

Linux

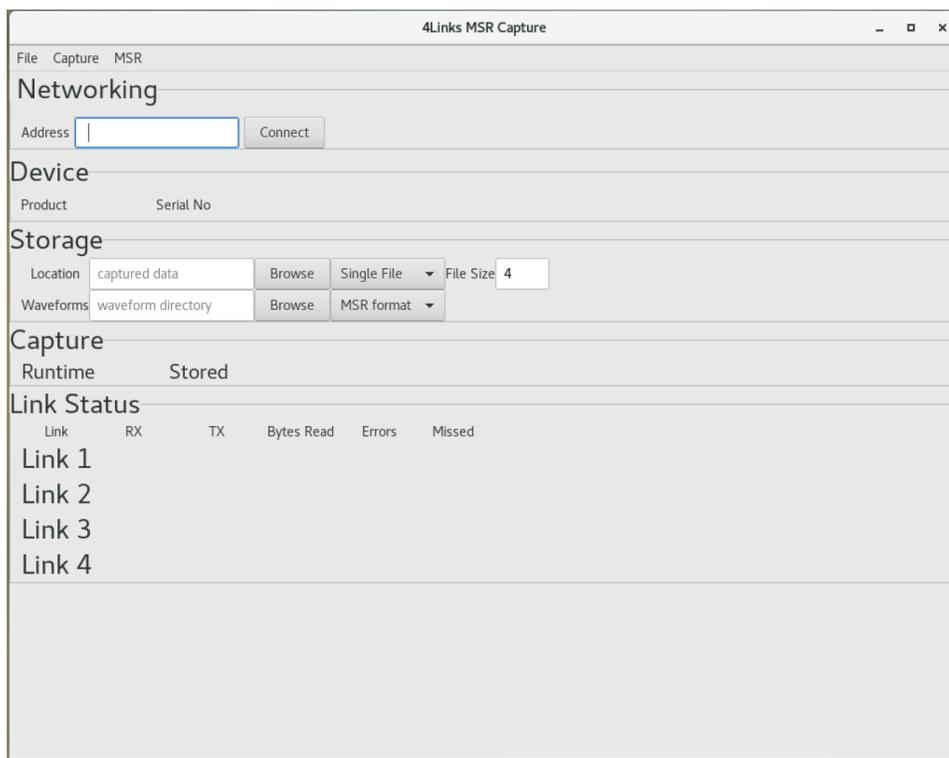
You prepare your environment by “dotting in” the script **/opt/4links/env**

Windows

You prepare your environment by running the batch file **4linksvars.bat**

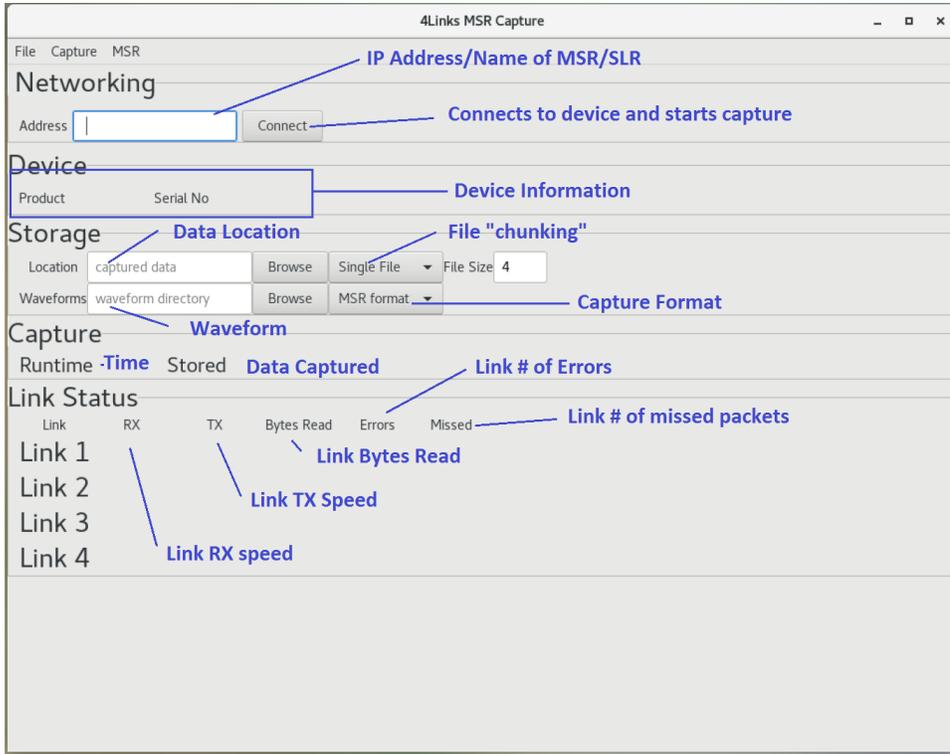
Running the program

Once your environment has been prepared you can run the Graphical Capture Program by typing **msrg** on the command line, you will be presented with the following window



Capture Program Layout

The following diagram shows the components of the graphical capture tool



Each section is documented below.

IP Address/Name of MSR/SLR

This field is the IP address or DNS name of the device to which you want to connect. We only support IPV4 addresses.

Connect

This button connects to the DSR/MSR and starts capturing data.

Device Information

The device information consists of the product to which you have connected and its serial number

Data Location

Location is where the data is recorded to, it may be a single file, or if you have chunking enabled (see below) the directory where you wish to store the data chunks.

The “Browse” button allows you to interactively select the file or directory where you want to store data.

File Chunking

Managing large capture files is somewhat difficult, to make life easier we allow data to be captured into smaller files for aggregation and or analysis later We have three types of File Chunking

- **Single File** : data is captured into single file
- **Multiple Files**: data is captured into multiple files
- **Null Capture**: no data is captured, only error waveform and error events are captured.
- **Wireshark**: data is streamed directly into wireshark

The “File Size” box is the amount of data captured into each file when capturing into **Multiple Files** is enabled.

Waveform

Waveform is where the waveform data is stored if you are capturing waveform data.

We save waveform data in swf (the proprietary format to 4Links), vcd (Variable Change Data) used by various analysis tools and finally SVG for viewing in a web browser.

The “Browse” button allows you to interactively select the file or directory where you want to waveform store data.

Capture Format

There are two capture formats available

- MSR the proprietary 4 Links format
- PCAP industry standard capture format for use by tools such as Wireshark

Time

This is how long the capture has been running

Data Captured

This is how much data has been captured.

Link Information

We display the state of each link.

Link RX Speed

This is the speed of the RX side of the link (each link has two ports an RX and a TX)

Link TX Speed

This is the speed of the TX side of the link

Link Bytes Read

Number of Bytes Read on both links

Link # of Errors

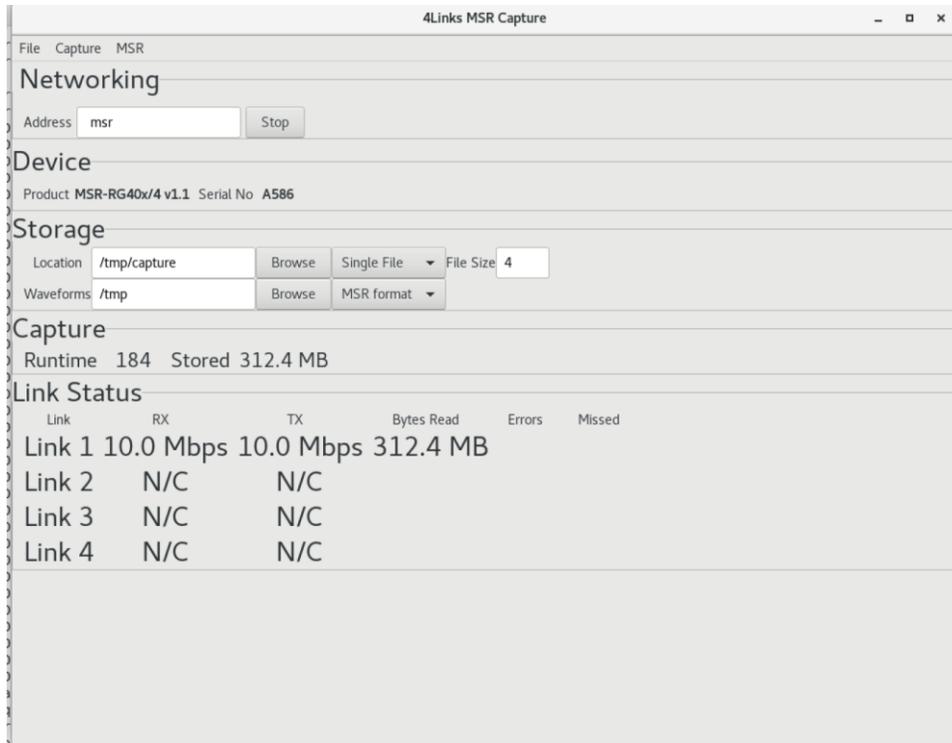
Number of errors seen on the link

Link # of missed packets

Number of missed packets where the device has not been able to report captured data.

Running Capture Example

The image below shows the capture program



Capture Menu Options

File

The File menu controls the configuration options for the program

Open

Opens a file containing a specific capture configuration

Save

Saves the current capture configuration to the current configuration file.

Save As

Saves the current capture configuration to the specified configuration file.

Quit

Causes the program to terminate and to stop any capture in progress

Capture

Controls the capture configuration.

Reset

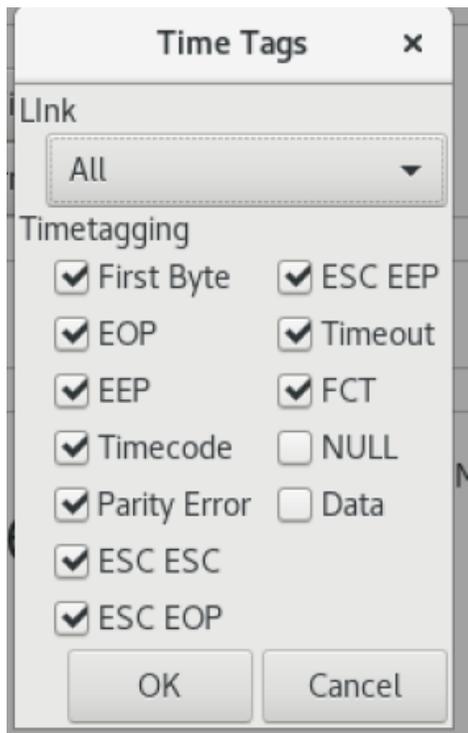
Resets the capture configuration to default.

Reset FCTS

Resets the capture configuration to default but enabling FCTS capture

TimeTag

Controls when a timetag is sent in the data stream



Link selects the timetag options for a specific link, a timetag is recorded when

First Byte the first byte of a packet is seen

EOP an **End Of Packet** is seen

EEP an **Error End Of Packet** is seen

Timecode a SpaceWire TimeCode is received

Parity Error a parity error is seen

ESC ESC is seen on the wire as it is an illegal SpaceWire sequence

ESC EOP is seen on the wire as it is an illegal SpaceWire sequence

ESC EEP is seen on the wire as it is an illegal SpaceWire sequence

Timeout the link stops running SpaceWire

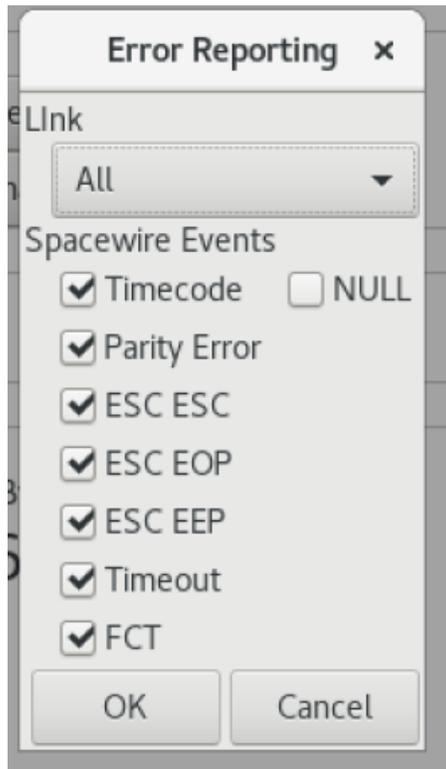
FCT is seen on spacewire

NULL is seen (lots of NULL's are present on SpaceWire links, so be careful using this option)

Data SpaceWire data is timetagged (be careful using this option as lots of data is transmitted)

Note that timetags do not operate in isolation, the relevant event or waveform has to be enabled too.

Error Reporting



Link selects the error reporting options for each specific link. An Error Report is sent when

Timecode a SpaceWire TimeCode is received

Parity Error a parity error is seen

ESC ESC is seen on the wire as it is an illegal SpaceWire sequence

ESC EOP is seen on the wire as it is an illegal SpaceWire sequence

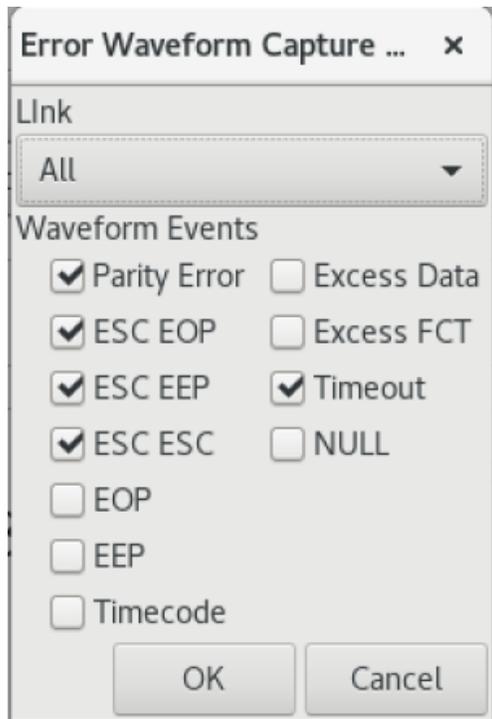
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Timeout the link stops running SpaceWire

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Waveform Events



Waveform Events are situations which mark the specific port has being in a triggered state for a waveform capture on another port, I.e. when a waveform event occurs on a specific port it can be used as a trigger to capture data on another port

Link selects the waveform events error sfor each specific link. A Waveform Event is marked when:-

Parity Error a parity error is seen

ESC ESC is seen on the wire as it is an illegal SpaceWire sequence

ESC EOP is seen on the wire as it is an illegal SpaceWire sequence

ESC EEP is seen on the wire as it is an illegal SpaceWire sequen

EOP is seen (note that there may be lots of EOP packets and enabling waveform capture for EOP for high traffic links is not recommended)

EEP is seen

Timecode a SpaceWire TimeCode is received

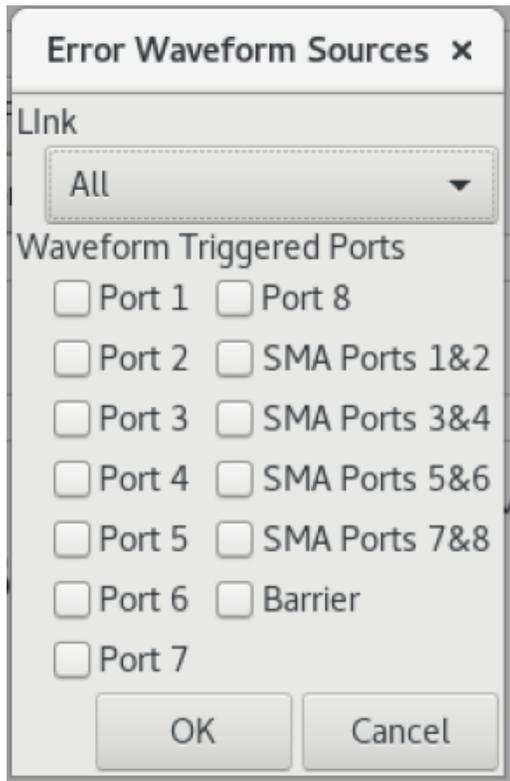
Excess Data SpaceWire is flow controlled using the FCT frame, and should there be an excess amount of data transmitted for the number of FCT's seen then this condition is set

Excess FCT SpaceWire is flow controlled using the FCT frame, and should there be an excess of FCT's for the amount of data seen then this condition is set

Timeout the link stops running SpaceWire

NULL is seen (lots of NULL's are present on SpaceWire links, so be careful using this option)

Waveform Triggers



This menu controls when a waveform is gathered on the link, if any of the selected links are in a triggered state then the waveform is captured.

Using with the command line msr

The saved capture configuration files (see File/Save, File/SaveAs) can be used with the command line msr program. This enables complex capture settings to be created without having to resort to complicated command line options.

The usage of the msr program with a saved capture configuration is :-

Windows msr <device> <outputfile> /c <configurationfile>

Linux msr <device> <outputfile> -c <configurationfile>