



VDSL Xpert™  
Bonding Application  
User's Guide

Version 1.0



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VDSL Xpert™ Bonding Application User's Guide – July 2013

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# About This Guide

VDSL Xpert™ is a non-intrusive multi-layer analyzer for VDSL2 lines and equipment. The VDSL Xpert™ Bonding application allows troubleshooting of Ethernet-based bonding on VDSL2 lines by assembling the data captured from two lines in a bonded group.

This guide describes the operation and usage of the VDSL Xpert™ Bonding application and contains the following chapters:

- **Chapter 1, Introducing VDSL Xpert™ Bonding Application**, page 9, introduces the VDSL Xpert bonding application and describes its key features and benefits.
- **Chapter 2, VDSL Xpert™ Bonding Application Installation**, page 11, describes how to install the VDSL Xpert bonding application software.
- **Chapter 3, Deploying the VDSL Xpert™ Bonding Application**, page 15, describes how to use the VDSL Xpert bonding application.



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# Conventions Used in this Guide



**NOTE:**

This is a note.



**WARNING:**

May cause damage to equipment.



**TIP:**

This is a tip providing useful suggestions and information.



**IMPORTANT:**

Important Information.



## Contact Information

**Corporate Office:**

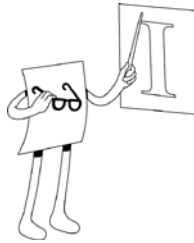
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# Glossary

Term	Description
Bonding	Use of multiple DSL lines to carry a single payload stream.
CPE	Customer Premises Equipment
CRC	Cyclic Redundancy Check – checks the data to make sure it was transmitted in full without errors.
Downstream	The direction of transmission from VTU-O to the VTU-R
DSLAM	Digital Subscriber Line Access Multiplexer
DTU	Data Transfer Unit
FEXT	Far End Crosstalk
Handshake	ITU-T standard G.994.1
INP	Impulse Noise Protection
IP	Internet Protocol – specifies the format of packets and its addressing scheme.
IP Address	Identifies the destination for IP Packets on the network using TCP/IP protocols.
LAN	Local Area Network – a network small in geographic boundaries and with high data rates.
MAC Address	Identifies the hardware address at the data link layer on the network.
OHS	Overhead Structure. A grouping of a number of data frames, modulated onto a varying number of DMT symbols.
PCAP	<b>P</b> acket <b>C</b> apture - file format used by network traffic capturing programs.
PSD	Power Spectral Density
QLN	Quiet Line Noise
Retraining	The process of disconnecting and reconnecting the CPE modem and DSLAM and their re-synchronization.

Term	Description
Signaling	The exchange of information between VDSL2 modems
SNR	Signal to noise ratio
SQL Server	<p>SQL (Structured Query Language) is a database computer language designed for managing data in relational database management systems (RDBMS).</p> <p>SQL Server refers to any database server that implements the Structured Query Language.</p> <p>Microsoft SQL Server is a specific implementation of a relational database server from Microsoft.</p>
Superframe	A grouping of 256 data frames with one sync frame, modulated onto a total of 257 DMT symbols, over a total of 64 ms.
TCP	Transmissions Control Protocol – an internet protocol, which provides a virtual circuit between two points for timely and accurate transmission.
TS	Time Stamp
UDP	User Datagram Protocol – an internet protocol, which sends short messages (datagrams) to many destinations without packet verification of the data.
Upstream	The direction of transmission from VTU-R to the VTU-O
VDSL	Very High Speed Digital Subscriber Line (ITU-T standard G.993.1)
VDSL2	Very High Speed Digital Subscriber Line (ITU-T standard G.993.2)
Vectoring	The coordinated transmission and/or coordinated reception of signals of multiple DSL transceivers using techniques to mitigate the adverse effects of crosstalk to improve performance.
VTU	VDSL Transceiver Unit
VTU-O	VTU at the central office end (i.e. Network operator)
VTU-R	VTU at the remote terminal end (i.e. CPE modem)
VTU-X	Any one of VTU-O or VTU-R
WAN	Wide Area Network – a network with larger geographic boundaries that requires a common or public carrier.



# Chapter 1

## Introducing The VDSL Xpert™ Bonding Application



### About This Chapter

This chapter introduces the VDSL Xpert Bonding application and describes its key features and benefits. It contains the following sections:

- **Overview**, page 9
- **Key Features and Benefits**, page 10

## Overview

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The VDSL Xpert bonding application can assemble the upper layer data from two captures taken simultaneously with two VDSL Xpert units on two bonded pairs.

To allow assembly of the bonded data, the Showtime upper layer data must be exported from the VDSL Xpert application to a PCAP file, including the PAF protocol information.

## Key Features and Benefits

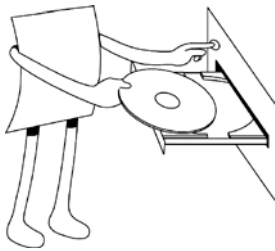
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The main features of the VDSL Xpert Bonding are the following:

- Assembly of the upper layer data from two captures taken simultaneously on two bonded pairs
- Detailed statistics and error message about the bonding process, including an accurate timestamp of any issues found during the upper layer assembly

## Chapter 2

# VDSL Xpert™ Bonding Application Installation



### About This Chapter

This chapter describes how to install the VDSL Xpert™ Bonding application.

## Software Installation

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### Computer Requirements

- 1 Before attempting to install VDSL Xpert Bonding application, make sure that the computer on which it is to be installed meets or exceeds the following specifications:
  - **Operating System:** Windows 7 Professional, 32 bit or 64 bit (English versions only)
  - **CPU:** Dual Core Intel® Processor 2.33GHz
  - **Memory:** 2 GB DDR2
  - **HDD:** One 120GB, 7,200rpm, SATA2 Hard Drive

## Installing the VDSL Xpert Bonding Software

The process of installing the VDSL Xpert Bonding software is described below.

**NOTE:**

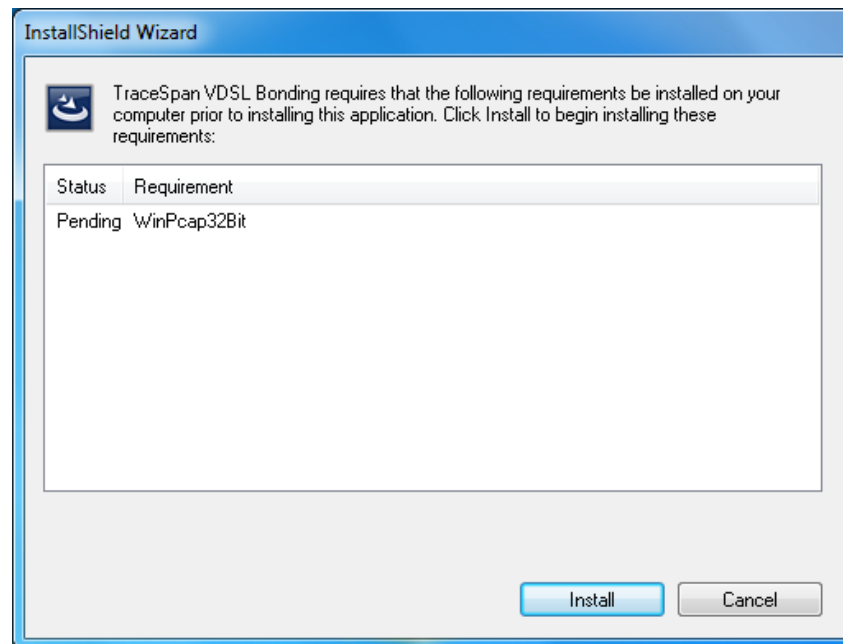
If the UAC (User Account Control) feature is enabled, a warning message is displayed each time you install any application. Click **Allow** to continue with the installation process.

**NOTE:**

If for any reason, such as power outage, the installation process is interrupted before it is complete, please uninstall the software and start the installation from the beginning.

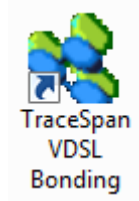
- ▶ To install the VDSL Xpert Bonding software:
  - 1 Run or double-click on the **Setup** file to start the installation process.

The following window is displayed:



- 2 Click the **Install** button.
- 3 Follow the instructions in the InstallShield Wizard to complete the various steps of the installation.

- 4 The following icon is displayed on the desktop, which you can double-click to start the VDSL Xpert Bonding application.

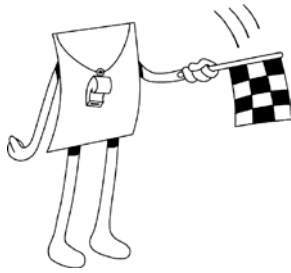


You can also start VDSL Xpert Bonding application by selecting **Start → All Programs → TraceSpan → VDSL Bonding (folder) → VDSL Bonding (application)**.



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## Chapter 3



# Deploying The VDSL Xpert™ Bonding Application



### About This Chapter

This chapter describes how to launch the Phantom Viewer application and how to use it for viewing the data.

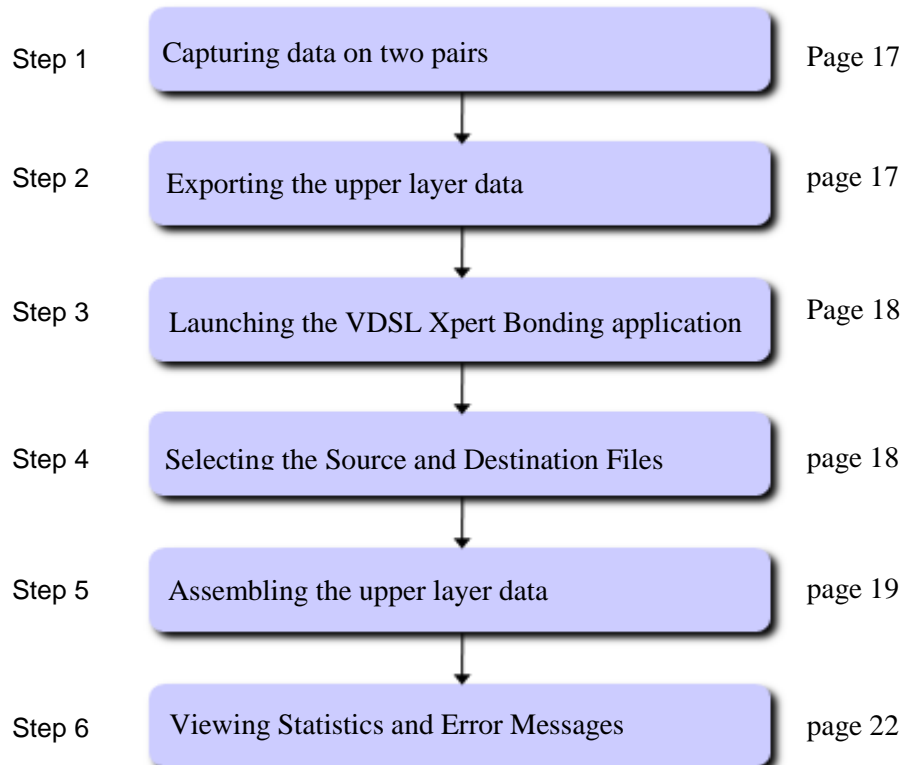
It contains the following sections:

- **VDSL Xpert Bonding application - Workflow**, page 16
- **Capturing Data on Two Pairs**, page 17
- **Exporting the Upper Layer Data**, page 17
- **Launching the VDSL Xpert Bonding application**, page 18
- **Selecting the Source and Destination Files**, page 18
- **Assembling the Upper Layer Data**, page 19
- **Viewing Statistics and Errors**, page 22

## VDSL Xpert Bonding Application - Workflow

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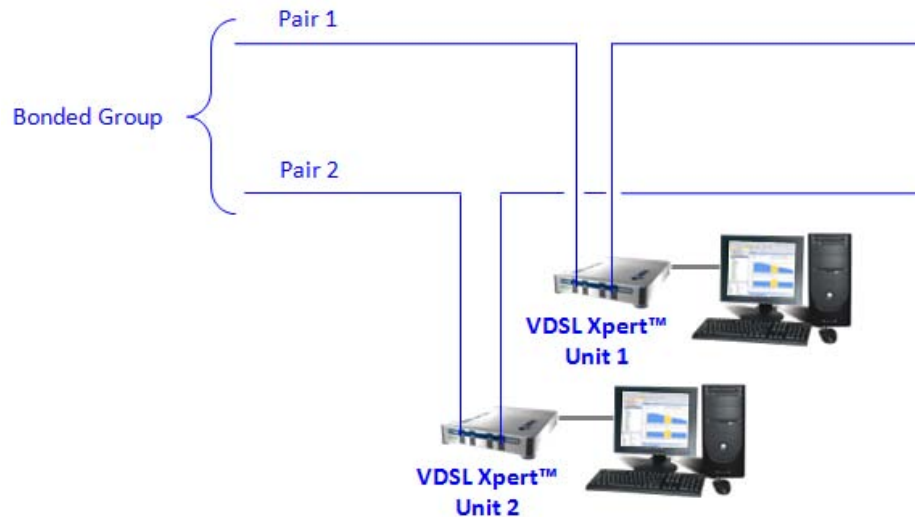
The following provides an overview of the workflow for using a VDSL Xpert Bonding solution.





## Capturing Data on Two Pairs

Before attempting to view the bonded upper layer data, capture data simultaneously on two bonded pairs using two VDSL Xpert units. Connect the two units on the two pairs, as shown in the following diagram:



Start the capture with the first VDSL Xpert unit, and then start the capture on the second VDSL Xpert unit before the first modem reaches Showtime.



### NOTE:

You may start the capture with any of the two VDSL Xpert units first, and then proceed to capture with the other unit.

## Exporting the Upper Layer Data

Before attempting to use the VDSL Xpert Bonding application, you must first create an individual PCAP file by exporting the upper layer data from each of the two pairs forming the bonded group.



### NOTE:

If your VDSL Xpert licenses support Real-time Analysis, you may create the PCAP files during the capture.

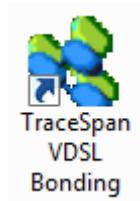
Export the upper layer data using the **Export Showtime Information** menu in the VDSL Xpert application and select the **Export PAF Information** option. For more details please refer to the VDSL Xpert User's Guide.

## Launching the VDSL Xpert Bonding Application

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▶ To launch the VDSL Xpert Bonding application:

- From the Windows desktop, click the TraceSpan VDSL Bonding icon



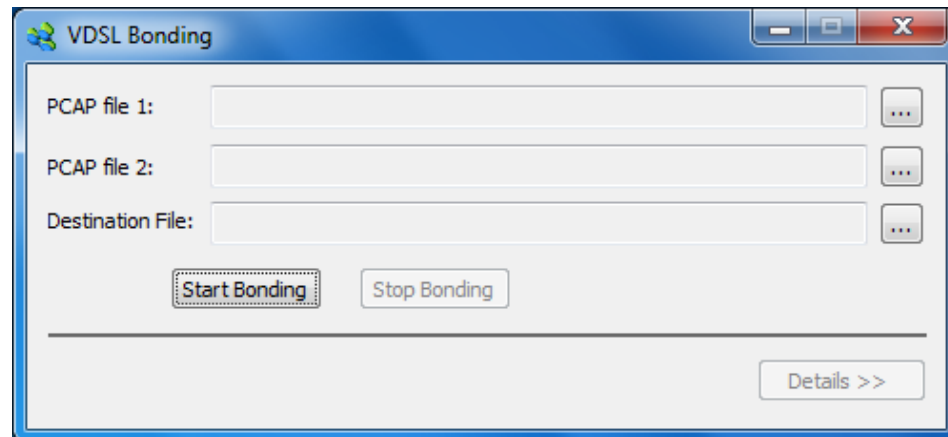
Or

- Select **Start** → **All Programs** → **TraceSpan** → **VDSL Bonding** (folder) → **VDSL Bonding** (application).


## Selecting the Source and Destination Files

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After launching the VDSL Xpert Bonding application, the following screen appears.

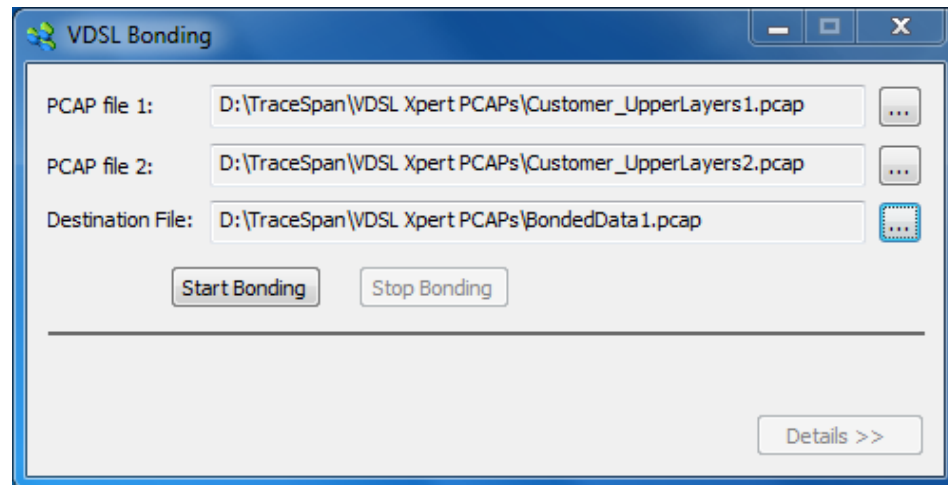


### NOTE:

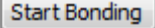
Click the  icon at the top left of the screen to open an actions menu.  
Click F1 to open this User's Guide.

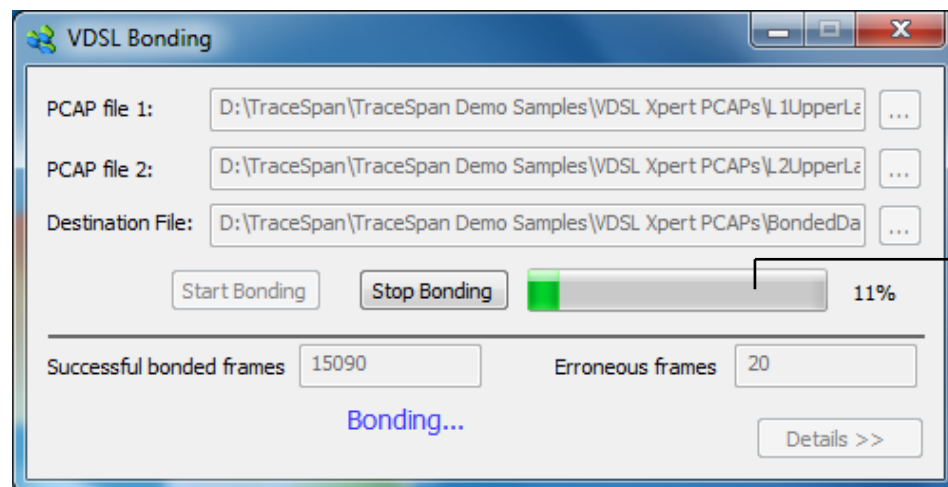
Select two PCAP files, which were exported from VDSL Xpert capture files taken simultaneously on the two pairs forming a bonded group.

Select the destination PCAP file, which will be created by the application and contain the assembled upper layer data from the two separate files.



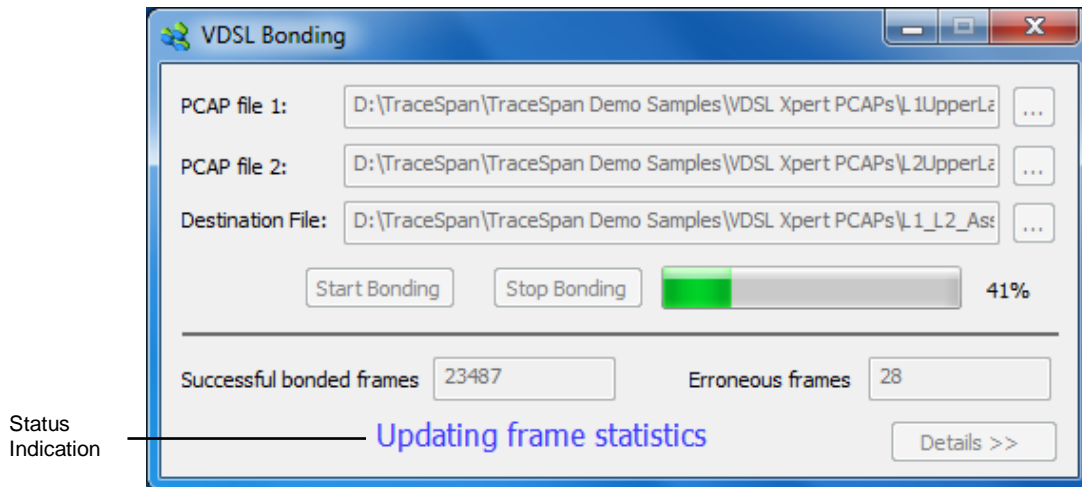
## Assembling the Upper Layer Data

After selecting the source and destination PCAP files, click the  button to start the upper layer data assembly. The bonding process will start, and the progress bar will indicate its progress.



## Bonding Application Status and Error Reporting

While the application is running, a status indication appears at the bottom of the screen

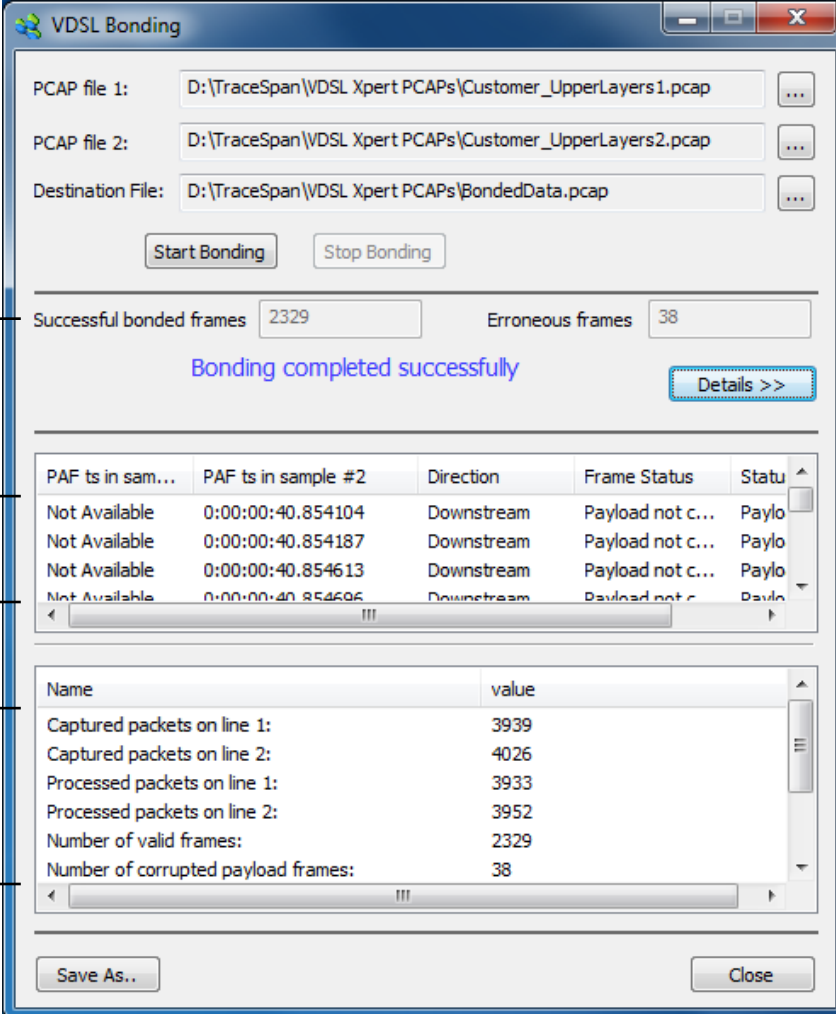


The following Status Indication options are available:

Term	Description
Bonding...	The VDSL Xpert Bonding application is assembling the upper layer data from both source PCAP files.
Bonding failed: system error	A system failure has occurred and prevented the application from completing the bonding operation.
Bonding completed successfully	The bonding operation completed successfully and created a new PCAP file containing the bonded upper layer data.
Bonding operation stopped	The operation was stopped by the user.
Calibrating...	The application is performing a calibration process, which is intended to align the timing of the two source files.
Incompatible PCAP bonding files	The source files do not contain the PAF headers.
Many invalid frames - only the first ones are shown	Many of the frames in one of the source files have missing or incompatible PAF data or have CRC errors at the Ethernet layer. The application will display the details of the first 7000 frames.
PCAP read file is corrupted. Please choose another file instead of PCAP file [ <i>File number</i> ]	One of the two source PCAP files is corrupted.
PCAP write file is corrupted. Please choose another file	The destination file is corrupted.
Stopping current operation	The upper layer assembly operation is stopping.
Updating frame statistics	The statistics list is being populated.

## Viewing Statistics and Errors

While assembling the upper layer data, the VDSL Xpert Bonding application provides indications of the number of successful bonded frames and the number of erroneous frames. To view more details about the errors and additional statistics of the bonding process click the **Details >>** button.



The screenshot shows the VDSL Bonding application window with the following sections:

- File Selection:** PCAP file 1, PCAP file 2, and Destination File, each with a file path and a browse button.
- Buttons:** Start Bonding and Stop Bonding.
- Summary:** Successful bonded frames (2329) and Erroneous frames (38).
- Status:** Bonding completed successfully with a Details >> button.
- Bonding Error Details Table:**

PAF ts in sam...	PAF ts in sample #2	Direction	Frame Status	Statu
Not Available	0:00:00:40.854104	Downstream	Payload not c...	Paylo
Not Available	0:00:00:40.854187	Downstream	Payload not c...	Paylo
Not Available	0:00:00:40.854613	Downstream	Payload not c...	Paylo
Not Available	0:00:00:40.854696	Downstream	Payload not c...	Paylo
- Statistics Table:**

Name	value
Captured packets on line 1:	3939
Captured packets on line 2:	4026
Processed packets on line 1:	3933
Processed packets on line 2:	3952
Number of valid frames:	2329
Number of corrupted payload frames:	38
- Buttons:** Save As.. and Close.

Annotations on the left side of the screenshot:

- Successful and erroneous bonded frame numbers (points to the summary section)
- Bonding error details (points to the error table)
- Statistics (points to the statistics table)



### NOTE:

The number of lines shown in the bonding error details section of the screen is limited to 7000.



### NOTE:

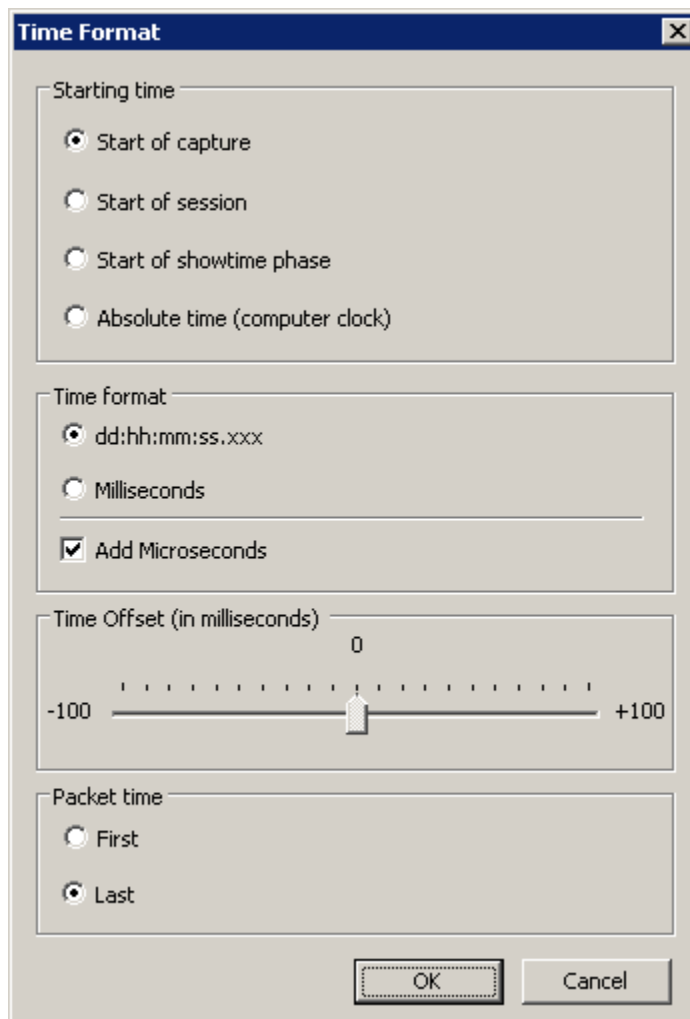
The statistics and errors may be saved to a \*.csv file by clicking the **Save As..** button. The bonding error details in the exported file will include up to 500 lines, starting from the line shown at the top of the window when the **Save As..** button is clicked.

## Troubleshooting Errors

For troubleshooting errors, you may use the VDSL Xpert application to view the two original capture files and find the source of the problems.

Each of the bonding errors has a timestamp indication. These timestamps may be used to correlate the errors with the Showtime messages shown in VDSL Xpert. For this purpose, the VDSL Xpert time format should be set as follows:

- **Starting time:** Start of capture
- **Time format:** dd:hh:mm:ss.xxx
- The **Add Microseconds** checkbox is checked



These timestamps appear in the Showtime analysis for the relevant messages, as in the example shown below. For more details, please refer to the VDSL Xpert User's Guide.

Ethernet Data On Up [Icons] All virtual channels

Session: Session <1> Protocol: VDSL 2 (993.2) Phase: [Clock]

DownStream

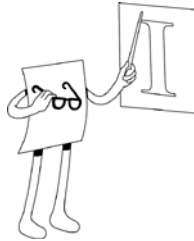
Line #	Frame #	Time	Destination MAC Add...	Source M	Line #	Frame #	Time	Destination MAC Add...	Source M
992	848	0:00:00:40.904461	89:4C:90:61:F2:08	F1:70:A5:...	992				
993	849	0:00:00:40.904471	A8:39:44:60:0F:81	00:24:C4:...	993				
994	850	0:00:00:40.904481	78:71:7A:32:70:4C	C3:43:6E:...	994				
995	851	0:00:00:40.904544	3E:4C:26:8E:C0:F0	76:30:CD:...	995				
996	852	0:00:00:40.904565	A8:39:44:60:0F:81	00:24:C4:...	996				
997	853	0:00:00:40.904575	85:45:E5:4E:E3:33	EE:69:E3:...	997				
998	854	0:00:00:40.904637	F3:36:67:B3:24:72	A5:58:87:...	998				

Details View Events View

Name	Value	Description
Destination MAC Address	A8:39:44:60:0F:81	
Source MAC Address	00:24:C4:C0:AD:C0	
Vlan Tag Type	0x8100	VLAN 802.1Q Tag Type
PCP	0	VLAN Priority Code Point
CFI	0	VLAN Canonical Format Iden...
VID	201	VLAN Identifier
Type	IPv4 (0x0800)	
FCS	0x6DB5F93D	Frame Check Sequence

Details No Details





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