

PervideoTM Software Manual

Pervideo Software Manual

Edition 1 Version 4

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1. INTRODUCTION

This document describes the installation and operating instructions for the PervideoTM software application.

Background

As the evolution of big data continues, gaps in data analysis capabilities continue to persist throughout multiple industries. While many data analysis solutions exist, they tend to be either very specialized or very customizable; both requiring significant resources (labor hours and/or money) to take a user's data from some packaged dataset (file or database) to something viewable and understandable.

Existing solutions vary from specialized custom software, open-source data analysis software languages, and spreadsheet applications. Specialized custom software have a significant cost associated with developing and maintaining the required software, defining the software needs to be, and reuse of the software within the same organization. Generally specialized custom software is develop by larger organizations, with large and/or complex data to process, and the significant initial investment in a custom software solution is determine a god return on investment. Open-source data analysis software languages, provide significant power to the user and small business and organizations, by simplifying the solution development process so that a larger consumer community can benefit from. The open-source approach has a similar initial investment obligation to it, though that initial investment is mainly in labor and reduced turn-around time, but is significantly limited in its scalability and reusability. Finally spreadsheets are the most recognizable solution to viewing and analyzing data but have significant size and calculations, to operate efficiently.

The PervideoTM software closes some of the gaps between spreadsheet style common solutions and the custom software solutions. The software provide a simple solution to basic time series data analysis problems. Built from Mathworks® Matlab® programming platform the software application provides numerical time series data analysis features including channel-to-channel math, signal filtering, and data set concatenation functions.

Features

The software application includes several features for file conversion, waveform modeling, signal conditioning, multiple display options, meta-data correction, data reduction and management tools.

File Conversion:

- Development of new file, for modeling of waveforms
- Saving as Continuous Numerical Time Series (NTSC) and Discrete Numerical Time Series (NTSD) files
- Import from MS Excel® (XLSX), Mathworks Matlab® (MAT) files, and Astronova DCR Files
- Export to XML file (file meta-data only), MS Excel® (XLSX), Mathworks Matlab® (MAT), and Comma Separated Value (CSV) files

Waveform Modeling and Signal Conditioning

- Modeling of sine waves, square waves, triangle waves, saw-tooth waves, and pulse trains
- Math operation of distinct channels (signals): add, subtract, multiply, and divide
- Polynomial conversion, conversion to Log base 10 and Log base 2
- Channel masking (used to emphasize signal feature or events)
- Event detection/identification on condition: greater than, less than, between range, outside of range
- Compression and smoothing of individual or all channels
- Channel ordering and meta-data editing: labels, units, channel names, etc.

Multiple-Display Options

- Up to 4 plot windows overlaid vertically
- All channels displayable from any of the 4 plot windows
- Line-style modification
- Smoothing and waveform magnification options (for improved viewing)

Data Reduction and Management Tools

• Split file into smaller size files

- Concatenate files into single file
- User control of application file size limits

System Requirements

The following are the minimum system requirements needed for the software to properly function:

- Operating System: Microsoft Windows 10 or 11
- Processor: 1.2 GHz or faster
- System Type: 64-bit
- RAM: 16 GB minimum, 32 GB or greater recommended (depending on size of user data)
- Storage: 1 GB
- Runtime Software: MATLAB® Runtime (included with software)

Installation Instructions

The following are the instructions to install PervideoTM software:

- 1. Unzip the "Pervideo-Setup.zip" contents
- 2. Run/Double-click on "PervideoAppInstaller.exe"
- 3. When the Windows software installation warning appears, click "yes"
- 4. In the "Pervideo Installer" prompt, click "Next"



5. In the "Installation Options" prompt check the "Add a shortcut to desktop" checkbox and click "Next"

Installation Options	-		×
Choose installation folder:			M
C:\Program Files\Byte Recon\Pervideo	Browse	X	XA
	Restore Default Folder		
Add a shortcut to the desktop			
< Back Next >	Cancel	1	

6. In the "Required Software" prompt click "Next"



7. In the "License Agreement" prompt click the "Yes" radial button then click "Next"

Z License Agreement	_		×
The MathWorks, Inc.			^
MATLAB RUNTIME LICENSE			
IMPORTANT NOTICE BY CLICKING THE "YES" BUTTON BELOW, YOU ACCEPT THE TERMS OF THIS LICENSE. IF YOU ARE NOT W SELECT THE "NO" BUTTON AND THE INSTALLATION WILL BE ABORTED.	/ILLING T	o do so,	
1. LICENSE GRANT. Subject to the restrictions below, The MathWorks, Inc. ("MathWorks") hereby grants to you are an individual or an entity, a license to install and use the MATLAB Runtime ("Runtime"), solely and purpose of running software created with the MATLAB Compiler (the "Application Software"), and for no This license is personal, nonexclusive, and nontransferable.	o you, wl express other pu	hether ly for the irpose.	
2. LICENSE RESTRICTIONS. You shall not modify or adapt the Runtime for any reason. You shall not disas decompile, or reverse engineer the Runtime. You shall not alter or remove any proprietary or other legal r copies of the Runtime. Unless used to run Application Software, you shall not rent, lease, or loan the Runt the Runtime, provide service bureau use, or use the Runtime for supporting any other party's use of the F not sublicense, sell, or otherwise transfer the Runtime to any third party. You shall not republish any documery be provided in connection with the Runtime. All rights not granted including without limitation right	semble, notices o time, tim Runtime. Imentatio	n or in le share You shall on which roduce	~
Do you accept the terms of the license agreement? $\textcircled{Ves} \cap N_{\underline{O}}$			
< Back Next > Cancel	1	MathW	orks [®]

8. In the "Confirmation Prompt" click "Install"

🕅 Confirmation	- <u> </u>	:
Pervideo will be installed in: C:\Program Files\Byte Recon\Pervideo Pervideo requires MATLAB Runtime R2021b. MATLAB Runtime R2021b is already installed in: C:\Program Files\MATLAB\MATLAB Runtime\v911		
< <u>B</u> ack I <u>n</u> stall >	Cancel	

9. Wait for the installation to complete

🕅 100% Complete			×
Performing post-installation tasks. This may take a few minutes			
100%			
		<u>[</u>	ause
	Cancel		

Reference installation Complete Successfully.	
	Fi <u>n</u> ish

10. When the "Installation Complete" prompt appears, click "Finish"

- 11. Installation completed!
- 12. As an additional step it is recommended the files contained in the "…\application\examples" folder be copied to your users folder "C:\Users\{User Name}\Documents\Pervideo". This step will allow for quick access of an example file to open in the application.
- 13. Finally, depending on the product license purchased, save your temporary license as "license.txt" to the app's license folder:"C:\Program Files\Byte Recon\Pervideo\application\license"
- 14. If applicable, repeat the last step once you receive your full license.

Finding the MAC Address of Your Computer

The following are the instructions on how to find the Media Access Control (MAC) address of your computer. The MAC address is used for all yearly and multi-year licenses.

- 1. Press the windows "Start" key on your computer and type "cmd" and press "Enter" in the search field.
- 2. In the "Command Window" type "getmac" and press "Enter"
- 3. The "Physical Address", highlighted below with a transport name, is your device's MAC address

C:\Users\username>getmac					
Physical Address	Transport Name				
9B-CD-3A-DE-31-4D 02-D1-4A-BE-DE-23	Media disconnected \Device\Tcpip_{1D252B68}				

- 4. If the "getmac" command did not return the MAC address, in the "Command Window" type "ipconfig /all" and press "Enter"
- 5. The "Physical Address", highlighted below, is your device's MAC address

2. QUICK START

Starting up the Application

- 1. On the desktop double-click the "Pervideo" icon
- 2. Wait for the initial start-up screen to finish.



- 3. Wait for the final start-up screen to finish. Please note there may be up to a minute between the two start-up screens
- 4. When completed you should the app open as shown below



Opening a File

NOTE: Example file(s) are included with the software. It is recommended that those files contained in the "C:\Program Files\Byte_Recon\Pervideo\application\examples" folder be copied to your users folder "C:\Users\{User Name}\Documents\Pervideo". This step will allow for quick access of an example file to open in the application

- 1. In the app click \rightarrow File \rightarrow Open
- 2. Navigate to the desired file location

elect File to Open	ren vide view folder view file_20210603_050100_wSChs_20210603_050100.ntsc 10//5/2021 9.28 PM NTSC File 741 K8 on * eo over 0; e_Docs				
Select File to Open × ← → → ↑ → This PC > Documents > Pervideo > ✓ Ø Search Pervideo Organize - New folder ■ • CmpWS Date modified Type Size Documents + ■ -tempWS 1/1/1/2021 2:09 PM Size Documents + ■ -tempWS 1/1/1/2021 2:09 PM NTSC File 890 K8 DA ■ Search Pervideo3.050100.ntsc 1/1/1/2021 2:09 PM NTSC File 890 K8 Pot/deo FiveChannelTestFile.20210603.050100.ntsc 10/5/2021 9:38 PM NTSC File 741 K8 myNewFile.20210603.050100_w3Chs.20210603.050100.ntsc 10/5/2021 9:28 PM NTSC File 741 K8 myNewFile.20210603.050100_w3Chs.20210603.050100.ntsc 10/5/2021 9:28 PM NTSC File 741 K8 myNewFile.20210603.050100_w5Chs.20210603.050100.ntsc 10/2/2021 7.01 AM </th					
Organize • New folde	r			≣• □	0
🛓 Downloads 🖈	Name	Date modified	Туре	Size	
Documents 🖈 📕	artempWS	1/3/2022 9:53 AM	File folder		
Pictures 🖈	BaseEventMath_20210603_050100.ntsc	11/14/2021 2:09 PM	NTSC File	890 KB	
	FiveChannelTestFile_20210603_050100.ntsc	10/15/2021 8:31 PM	NTSC File	741 KB	
iCloud Drive #	myNewFile_20210603_050100_w3Chs_20210603_050100.ntsc	10/5/2021 9:28 PM	NTSC File	444 KB	
🚞 ByteRecon 🖈	myNewFile_20210603_050100_w5Chs_20210603_050100.ntsc	11/2/2021 7:01 AM	NTSC File	741 KB	
app_funcs					
Pervideo					
Pervideo_ver_0;					
Contemporary Release_Docs					
File par	ne			(*.ntsc)	
				Qpen Cancel	

3. Select the desired file and click \rightarrow Open

Displaying a Channel

- 1. In the left panel, if needed, expand the Plot Selections \rightarrow Plot 1 selection tree
- 2. Expand the first Base Channel, i.e. "Base Ch 01..."
- 3. Click on the Show/Hide icon



Zooming and Adjusting Views

- 1. At the bottom of the plot window, click the Horizontal Zoom In Button
- 2. Place the mouse somewhere along the trace
- 3. Depress and hold the mouse's left click button → drag the mouse to the right → release the mouse's left click button
- 4. A zoomed in view of the trace should appear similar to the one below



Saving and Closing a File

- 1. In the app click \rightarrow File \rightarrow Close
- 2. If the save changes prompt appears, click "Yes" or "No" as desired



Exiting the Application

In the app click \rightarrow File \rightarrow Exit or alternatively click the "X" at the top-right corner of the app

3. OVERVIEW & FEATURES

Overview

The Pervideo[™] software application is composed of four major areas providing distinct file/data management operations.



- 1) Menu Bar
- 2) File Navigation Panel
- 3) Channel Display Panel
- 4) Channel Navigation Buttons
- 5) Application Status Window

The "Menu Bar" provides the major areas of operation including file type operations, file editing operations, channel viewing operations, and other special operations. The file type operations contained in the "File" menu include features to create, save, import/export, and close files. The file editing operations contained in the "Edit" menu include features to add, delete, smooth,

compress, and move channels. The "View" menu include feature to arrange the channel/trace display window and refresh the window display. The "Tools" menu include special features to manipulate files (merging/splitting) and arrange the application (preferences). Finally, the "Help" menu includes feature that opens the help file (this document) and general information about the software application.

The "File Navigation Panel" is the location where information of the file contents are displayed ("File Info" branch), where the channels contained in the file are added to the display window's plots ("Plot Selection" branch) and where the individual channel manipulation features are contained ("Plot Selection \rightarrow Plot N \rightarrow Base Ch N" branch).

The "Channel/Trace Display Panel" is the area where channels/traces are displayed in one more plots arranged vertically; up to 4 plots can be displayed.

The "Channel/Trace Navigation Buttons" is where the buttons used to zoom in/out and traverse a file. This area includes buttons to add and clear "data tips", text box containing X-Y information about the selected data point.

The "Application Status Window" is the area where text messages indicating the status of some operation are displayed. Text is displayed in this area when the application is performing some operation requested by the user including saving, smoothing, adding a channel, etc. When an operation is in progress a text message will be displayed and the background color will change to emphasize the operation is in progress.

Key Features

The PervideoTM software application is available in distinct product configurations, depending its product license, with the default configuration being the "Pervideo Viewer" configuration. Increasing features are available depending on product configuration licensed.

Application Feature	Pervideo Viewer	Pervideo Lite	Pervideo
Opening, creating and saving NTS Files	Х	Х	X
Importing files from MAT, XLSX and CSV	X	Х	X
Importing files from other file types (AN-DCR)			X
Exporting files to MAT, XLSX, and CSV		Х	X
Data Compression		Х	X
Channel Smoothing/Filtering		Х	X
Base channel creation	Х	Х	X
Event channel creation		Х	X
Math channel creation			X
Channel Conversion to Other Units			X
Up to dual (2x) plot layout	Х		
Up to quad (4x) plot layout		Х	X
Up to 250K Sample limit	X		
Up to 250M Sample limit		Х	X
File conversion from other data types			X
File splitting and concatenation			X
Partial file loading			X

4. FILE MENU

The File Menu is composed of several functions to open, close, or migrate to different file types. The menu items and corresponding functions are defined below:

- New: creates a new NTSC file type
- Open: opens an NTSC or NTSD file type
- Save: saves the open file
- Save As: saves the open file as a new file name. Note the software will automatically apply the timestamp of the file's start time to the end of the filename the user entered
- Close: Closes the file
- Import: Allows the user to import different supported file-types into the application. Supported file types include: MAT and XLSX
- Export: Allows the user to export to different supported file-types. Supported file types include: CSV, MAT and XLSX
- Exit: Closes the software application.

Create a New File

1. In the menu bar click File \rightarrow New



- 2. When the "New File Header Info" prompt appears, modify the fields to define the file name, file's start date and time, file's sample rate, and number of samples (sample count) contained in the file then click "OK"
- 3. When the new file is created the application will update similar to the figure below. Please note that while the "Plot Selection" tree branch contains "Plot N" branches, there are no branches contained within the "Plot N" branches because no channels have been added yet.



4. In the menu bar, click Edit → Add Base Channel → select desired waveform simulation option ("Simulate Square Wave" shown in this section).

Please note the following attributes updated in the application

- Right Arrows (triangles) and nested branches are contained in the "Plot Selections → Plot N" tree branch
- The "Base Ch Count" field of the "File Info \rightarrow Header" branch is incremented by one
- A right arrow (triangle) and nested information is contained in the "File Info → Base Channels" branch



5. In the "Plot Selections → Plot 1 → Base Ch 01" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.



Opening a File

1. In the menu bar click File \rightarrow Open

Select File to Open					×
\leftarrow \rightarrow \checkmark \uparrow This PC \Rightarrow Documents \Rightarrow Pervideo			~ C	,O Search Pervideo	
Organize • New folder				≣ •	• •
Name	Date modified	Туре	Size		
🐂 ~tempWS	1/16/2022 5:52 PM	File folder			
NewTimeSeries_20220116_170512.ntsc	1/16/2022 5:51 PM	NTSC File	144 KB		
File name:			~	(*.ntsc)	v
				Open	Cancel

- 2. In the "Select File to Open" window, navigate to the desired file, select the file and click "OK". Note: to open an NTSD file change the file type drop-down menu to "(.ntsd)".
- 3. Wait for the application to load the selected file. When the file opens the application should update similar to the figure below



Save a File

1. In the menu bar click File \rightarrow Save

Save a File As

1. In the menu bar click File \rightarrow Save As

Save File As				×
\leftrightarrow \rightarrow \checkmark \uparrow	🚬 > This PC > Documents > Pervideo		~ C	,
Organize • New f	older			≣ • 📀
V Desktop	Name	Date modified	Туре	Size
> 🐌 Creative Cloud	~tempWS	1/19/2022 6:34 AM	File folder	
> 🔷 OneDrive - Pers	NewTimeSeries_20220116_170513.ntsc	1/16/2022 5:51 PM	NTSC File	144 KB
> 📜 Ed Garcia	1			
> 💻 This PC				
> 📜 Libraries				
File name:	lewTimeSeries.ntsc			~
Save as type: ('	*.ntsc)			~
▲ Hide Folders				Save Cancel

2. In the "Save File As" window, navigate to the desired folder, enter the desired name in the "File name" field, and click "OK"

Note: the application will automatically append the entered file name with the timestamp of the file. The file timestamp is the start date and time shown in the file's header information in "yyyymmdd_HHMMSS" format.

Close a File

- 1. In the menu bar click File \rightarrow Close
- 2. When the "Do you want to save your changes" prompt appears click "Yes" or "No"



Note: The "Do you want to save your changes" appears even if the file was recently saved.

Import a File

1. In the menu bar click File \rightarrow Import \rightarrow From CSV (or ...)

Select CSV File				×
\leftarrow \rightarrow \checkmark \uparrow ${\frown}$ > Documents > Pervideo	> examples	\sim	C Search examples	م
Organize • New folder				≣• 1 😗
Desktop	Name	Date modified	Туре	Size
	Base_Event_Math_Ch_Wvfs_20220709_085819.csv	4/16/2023 10:39 AM	Microsoft Excel Com	3,593 KB
File name:			< (*.csv)	~
			Ωpen	Cancel

2. In the "Select CSV File" window, navigate to the desired folder, select the desired file name, and click "OK"

NOTE:

- 1. Though not required, to best import an XLSX or CSV file, the file should be formatted as shown in the following figure. It is recommended that the user export an existing NTSC/NTSD file to XLSX to use as the basis for modifying an XLSX (or CSV) file that can be easily imported to Pervideo. Similar conditions and recommendations exist for the MAT files.
- 2. CSV and XLSX files formatted in a manner other than shown below, will be imported if a distinct contiguous numeric table/matrix is detected. If header information is not detected, default header information will be applied which can be changed within the app, and your files header information will be saved to the app's "File Notes".
- 3. To import Custom Instrument files, click File → Import → Other Files → {desired file type}



Export a File

1. In the menu bar click File \rightarrow Export \rightarrow To XLSX (or ...)

	/ marc / bocanana / remato		• 0	>= Search Per	naeo
rganize * New fold	er				≣ •
📮 This PC	Name	Date modified	Туре	Size	
Desktop	logs	7/8/2022 12:36 PM	File folder		
Documents	Merge Examples	6/2/2022 8:44 AM	File folder		
🛓 Downloads	Conter Examples	7/8/2022 1:24 PM	File folder		
6 Music	BaseEventMath_20210603_050100.xlsx	7/5/2022 2:38 PM	Microsoft Excel Work	1,929 KB	
🗠 Norton Backup 🔔	BaseEventMathExpTest_20210603_050100.xlsx	7/5/2022 6:39 PM	Microsoft Excel Work	2,083 KB	
Pictures	BaseEventMathExpTest2_20210603_050100.xlsx	7/5/2022 6:41 PM	Microsoft Excel Work	1,858 KB	
Videos	UnComp_Merged_File_20210603_050100.xlsx	7/5/2022 8:55 AM	Microsoft Excel Work	10,842 KB	
S (C)					
Libraries					
File name: Base	EventMathExpTest2.xlsx				
Save as type: (*.xls	x)				

1. In the "Save File As" window, navigate to the desired folder, enter the desired name in the "File name" field, and click "OK"

Exit the Application

- 1. In the menu bar click File \rightarrow Exit
- 2. If the "File Save Warning" prompt appears click "Continue" or "Cancel"



5. EDIT MENU

The Edit Menu is composed of several functions to add, modify, and condition channel data. The menu items and corresponding functions are defined below:

- Compress Data: compresses the open file's data channels
- Smooth Channels: smooths the open file's data channels
- Add Base Channel: adds a channel to the file by simulating a continuous waveform: sine wave, square wave, etc.
- Add Event Channel: adds a channel to the file that indicates some stated of another channel: channel greater than a value, less than a value, etc.
- Add Math Channel: adds a channel to the file that performs some mathematical operation on a single file or multiple files
- Move Channel: moves a channel's position within a channel group
- Delete Channel(s): deletes one or more channels from a file
- Rename Channel(s): renames one or more channels in a file
- Edit Channel Info: modifies channel information within a file
- Edit Start Time: modifies that files start date and time

Compress Data

The "Compress Data" function compresses all channels of the open file using the desired compression option

- 1. In the menu bar click Edit \rightarrow Compress Data
- 2. Select the "Compression Factor" and "Compression Type" and click "OK"

🕅 Compression Factor Selecti — 🗌 🗙			
Enter data compression selections.			
Compression Factor: 10			
Compression Type: Compression			
Note: Compression selections will overwrite current compression settings. Click OK to continue.			
OK Cancel			

Smooth Channels

The "Smooth Channels" function all or select number of channels. This smoothing functions is done on the underlying channel data in memory and cannot be undone (without closing the file without saving).

- 1. In the menu bar click Edit \rightarrow Smooth Channels \rightarrow Select Channels (or All Channels)
- 2. Select the "Channel Smoothing" prompt, select the "Filter Type", "Sample Width" and desired "Channels" and click "OK".

🞊 Select Channel Smoothir	ng Selecti — 🗆 🗙
Make channel smooth	ing selections.
Filter Type:	Square
Sample Width:	20
Selected Channel(s):	BC 01: Temperature (linear) BC 02: Power (log10) BC 03: 1x Sine Wave (linear C 04: 3x Sine Wave (linear
WARNING! Smoothi channel data and ch Also sample width >	ng is applied to underlying anges cannot be undone !! 500 may take several minutes.

Add Base Channel

The "Add Base Channel" function adds a channel to the file's base channels using the desired simulation or channel operation function.

Mask Existing Channel

The "Mask Existing Channel" function adds a channel to the "Base Channels" by copying an existing channel and hiding the portions of the channel that are not classified as an "event" based on the event channel selected or occur within the time range selected.

- 1. In the menu bar click Edit \rightarrow Add Base Channel \rightarrow Mask Existing Channel
- 2. Select the "Mask Channel" and "Event Channel" and click "OK"

🕅 Channel Mask Selections —		_		×
Make event cha	nnel masking selections.			
Mask Channel:	BC 01: Temperature (line	ar)	•	•
Event Channel: EC 01: Event Channel				•
	OK Cancel			

Simulate Sine Wave

The "Simulate Sine Wave" function adds a channel to the "Base Channels" by simulating a sine wave.

- 1. In the menu bar click Edit \rightarrow Add Base Channel \rightarrow Simulate Sine Wave
- 2. When the "Sine Waveform Selections" prompt appears, make the desired entries and selections and click "OK"

🕅 Sine Waveform Selections —	
Make sine waveform selections.	
Channel Name: Sine Wave	
Channel Units: Volts	
Channel Scale: Linear	▼
Frequency (Hz):	1 🔹
Amplitude:	1 🔹
Vertical Offset:	0
Peak-to-Peak Noise:	0.2
Phase Offset (deg):	0
Time Offset (sec):	0
ОК	Cancel

3. In the "Plot Selections → Plot N → Base Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.

Note: Sine wave, shown below, was added to Base Channel 2 and displayed on Plot 2.



Simulate Square Wave

The "Simulate Square Wave" function adds a channel to the "Base Channels" by simulating a square wave.

- 1. In the menu bar click Edit \rightarrow Add Base Channel \rightarrow Simulate Square Wave
- 2. When the "Square Waveform Selections" prompt appears, make the desired entries and selections and click "OK"



3. In the "Plot Selections → Plot N → Base Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.



Note: Square wave, shown below, was added to Base Channel 1 and displayed on Plot 1.

Simulate Triangle Wave

The "Simulate Triangle Wave" function adds a channel to the "Base Channels" by simulating a square wave.

- 1. In the menu bar click Edit \rightarrow Add Base Channel \rightarrow Simulate Triangle Wave
- 2. When the "Triangle Waveform Selections" prompt appears, make the desired entries and selections and click "OK"

🧖 Triangle Waveform Selec	tio – 🗆 🗙				
Make triangle waveform selections.					
Channel Name:	Triangle Wave				
Channel Units:	Volts				
Channel Scale:	Linear				
Frequency (Hz):	1 🛓				
Amplitude:	1 📥				
Vertical Offset:	0				
Peak-to-Peak Noise:	0.2 🖨				
Time Offset (sec):	0				
ОК	Cancel				

3. In the "Plot Selections → Plot N → Base Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.

Note: Triangle wave, shown below, was added to Base Channel 3 and displayed on Plot 3.



Simulate Sawtooth Wave

The "Simulate Sawtooth Wave" function adds a channel to the "Base Channels" by simulating a square wave.

- 1. In the menu bar click Edit \rightarrow Add Base Channel \rightarrow Simulate Sawtooth Wave
- 2. When the "Sawtooth Waveform Selections" prompt appears, make the desired entries and selections and click "OK"

🞊 Sawtooth Waveform Select — 🗆 🗙				
Make sawtooth waveform selections.				
Channel Name:	Sawtooth Wave			
Channel Units:	Volts			
Channel Scale:	Linear v			
Frequency (Hz):	1			
Amplitude:	1			
Vertical Offset:				
Peak-to-Peak Noise:	0.2			
Time Offset (sec):				
ОК	Cancel			

3. In the "Plot Selections → Plot N → Base Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.

Note: Square wave, shown below, was added to Base Channel 4 and displayed on Plot 4.



Simulate Pulse Train

The "Simulate Pulse Train" function adds a channel to the "Base Channels" by simulating a square wave.

1. In the menu bar click Edit \rightarrow Add Base Channel \rightarrow Simulate Pulse Train

2. When the "Pulse Train Selections" prompt appears, make the desired entries and selections and click "OK"

🕅 Pulse Train Selections	– 🗆 X
Make pulse train selec	ctions.
Channel Name:	Pulse Train
Channel Units:	Volts
Channel Type:	Linear
Pulse Width (sec):	0.1
PRI (sec):	0.5
Amplitude:	2
Vertical Offset:	-2
Peak-to-Peak Noise:	0.2
Time Offset (sec):	0
OK	Cancel

3. In the "Plot Selections → Plot N → Base Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.

Note: Pulse train, shown below, was added to Base Channel 5 and displayed on Plot 2.



Add Event Channel

The "Add Event Channel" function adds a channel to the file's event channels using the desired event flag triggering selections.

Greater Than Value

The "Greater Than Value" function adds a channel to the "Event Channels" by simulating an event waveform whose value equals "1" when the event is occurring and value equals "0" when it does not.

- 1. In the menu bar click Edit \rightarrow Add Event Channel \rightarrow Greater Than Value
- 2. When the "Greater Than Event Settings" prompt appears, make the desired entries and selections and click "OK"

🞊 Greater Than Event Setti	ngs	-		×	
Make desired channel entries and selections.					
Event Channel Name:	Sawtooth Event 1				
Source Ch. Name:	BC 04: Sawtooth W	/ave (line	ear) •	•	
Greater Than Type					
● Ch > [X] ○ Cł	n >= [X] X =		0.5		
Pre/Post Event Padding (samples): 5d					
Note: Events are detected from underlying channel data.					
ОК	Cancel			Ξ	

3. In the "Plot Selections → Plot N → Event Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.

Note: notice the event flag overlap created by the "Pre/Post Event Padding" this is helpful to prevent erroneous event identification due to noisy signals



Less Than Value

The "Less Than Value" function adds a channel to the "Event Channels" by simulating an event waveform whose value equals "1" when the event is occurring and value equals "0" when it does not.

- 1. In the menu bar click Edit \rightarrow Add Event Channel \rightarrow Less Than Value
- 2. When the "Less Than Event Settings" prompt appears, make the desired entries and selections and click "OK"

	-		×		
el entries and sele	ctions.				
Sawtooth Event 2]		
BC 01: Sine Wave	(linear)	•)		
<= [X] X =		-0.5			
(samples): 00 msecs		50 🜩			
Note: Events are detected from underlying channel data.					
Cancel					
	al entries and sele Sawtooth Event 2 BC 01: Sine Wave (a <= [X]	al entries and selections. Sawtooth Event 2 BC 01: Sine Wave (linear) a <= [X] X = (samples): 00 msecs ceted from underlying chann Cancel	→ → el entries and selections. Sawtooth Event 2 BC 01: Sine Wave (linear) ↓ <= [X]		

3. In the "Plot Selections → Plot N → Event Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.
Note: notice the event flag overlap created by the "Pre/Post Event Padding" this is helpful to prevent erroneous event identification due to noisy signals



Between Values

The "Between Values" function adds a channel to the "Event Channels" by simulating an event waveform whose value equals "1" when the event is occurring and value equals "0" when it does not.

- 1. In the menu bar click Edit \rightarrow Add Event Channel \rightarrow Between Values
- 2. When the "Between Values Event Settings" prompt appears, make the desired entries and selections and click "OK"

🕅 Between Values Event Se	ttings	-		×
Make desired channe	el entries an	d selections		
Event Channel Name:	Sine WVF E	vent 1		
Source Ch. Name:	BC 01: Sine	Wave (linear)	•	-
Less Than Type				
● Ch < [X] ○ Ch	<= [X]	× =	0.5 🚔	9
Greater Than Type	AND			
● Ch > [Y] ○ Ch	>= [Y]	Y =	-0.5	Э
Pre/Post Event Padding One sample equals 1.0	(samples): 00 msecs		20 🌲	Э
Note: Events are dete	cted from ur	nderlying char	nnel data.	
ОК	c	ancel		

3. In the "Plot Selections → Plot N → Event Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.

Note: notice the event flag overlap created by the "Pre/Post Event Padding" this is helpful to prevent erroneous event identification due to noisy signals



Outside of Values

The "Outside of Values" function adds a channel to the "Event Channels" by simulating an event waveform whose value equals "1" when the event is occurring and value equals "0" when it does not.

- 1. In the menu bar click Edit \rightarrow Add Event Channel \rightarrow Outside of Values
- 2. When the "Outside Values Event Settings" prompt appears, make the desired entries and selections and click "OK"

🕅 Outside Values Event Settings		-		×
Make desired channel ent	ries and se	elections.		
Event Channel Name: Sine	WVF Event	2]
Source Ch. Name: BC 0	1: Sine Wav	e (linear)	•)
Greater Than Type				
● Ch > [X] ○ Ch >=	X] X	=	0.5 🜩	
Less Than Type	DR			
● Ch < [Y] ○ Ch <=	Y] Y	=	-0.5	
Pre/Post Event Padding (samp One sample equals 1.00 ms	ecs		20	
Note: Events are detected	rom underl	ying chann	el data.	
ОК	Cance	1		

3. In the "Plot Selections → Plot N → Event Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.

Note: notice the event flag overlap created by the "Pre/Post Event Padding" this is helpful to prevent erroneous event identification due to noisy signals



Add Math Channel

The "Add Math Channel" function adds a channel to the file's math (or base) channels using the desired math calculation selections.

Add Channels

The "Add Channels" function adds a channel to the "Math Channels" group by adding two channels to each other.

- 1. In the menu bar click Edit \rightarrow Add Math Channel \rightarrow Add Channels
- 2. When the "Add Channel Settings" prompt appears, make the desired entries and selections and click "OK"

Note: (1) a scaling factor can be applied to either channel; (2) the resulting channel can be applied to the "base" channels group or "math" channels group. Channel math information is kept with the corresponding channel information in the "math" channel group. If "base" channels is selected, this channel math information is lost, see FILE NAVIGATION for more information.

🕅 Add Channel Settings	- 🗆 X
Make desired chanr	nel entries and selections.
New Channel Name:	Sine + Triangle
New Channel Units:	Volts
New Channel Scale:	Linear 🔻
1 ≑ X	BC 01: Sine Wave (linear)
1 ≑ X	BC 03: Triangle Wave (linear)
Add to	
Math Char	nnels OBase Channels
Note: Channel Math is	applied from underlying channel data.
ОК	Cancel



Subtract Channels

The "Subtract Channels" function adds a channel to the "Math Channels" group by subtracting two channels from each other.

- 1. In the menu bar click Edit \rightarrow Add Math Channel \rightarrow Subtract Channels
- 2. When the "Subtract Channel Settings" prompt appears, make the desired entries and selections and click "OK"

Note: (1) a scaling factor can be applied to either channel; (2) the resulting channel can be applied to the "base" channels group or "math" channels group. Channel math information is kept with the corresponding channel information in the "math" channel group. If "base" channels is selected, this channel math information is lost, see FILE NAVIGATION for more information.

🕅 Subtract Channel Setting	js	-		×
Make desired chann	el entries and sele	ections.		
New Channel Name:	(Sine + Triangle) -	Triangle		
New Channel Units:	Volts			
New Channel Scale:	Linear		•	·
1 * X	MC 01: Sine + Tria	ngle (line	ear) ▼	•
Add to	BC 03: Triangle Wa	ave (linea	ar) 🔻	-
Math Chan	nels 📀 Base C	hannels		
Note: Channel Math is	applied from under	lying ch	annel da	ta.
ОК	Cancel			



Multiply Channels

The "Multiply Channels" function adds a channel to the "Math Channels" group by multiplying two channels to each other.

- 1. In the menu bar click Edit \rightarrow Add Math Channel \rightarrow Multiply Channels
- 2. When the "Multiply Channel Settings" prompt appears, make the desired entries and selections and click "OK"

Note: (1) a scaling factor can be applied to either channel; (2) the resulting channel can be applied to the "base" channels group or "math" channels group. Channel math information is kept with the corresponding channel information in the "math" channel group. If "base" channels is selected, this channel math information is lost, see FILE NAVIGATION for more information.

Multiply Channel Setting	Js — □ ×
Make desired chann	el entries and selections.
New Channel Name:	Sawtooth * Sawtooth Event 1
New Channel Units:	Volts
New Channel Scale:	Linear V
1 ≑ X	BC 04: Sawtooth Wave (linear)
1 ★ X	EC 01: Sawtooth Event 1
Add to Math Chan	nels OBase Channels
Note: Channel Math is	applied from underlying channel data.



Divide Channels

The "Divide Channels" function adds a channel to the "Math Channels" group by dividing two channels to each other. *Note: be mindful of divide zero responses; when dividing waveforms zero is defined as 1e-6.*

- 1. In the menu bar click Edit \rightarrow Add Math Channel \rightarrow Divide Channels
- 2. When the "Divide Channel Settings" prompt appears, make the desired entries and selections and click "OK"

Note: (1) a scaling factor can be applied to either channel; (2) the resulting channel can be applied to the "base" channels group or "math" channels group. Channel math information is kept with the corresponding channel information in the "math" channel group. If "base"

channels is selected, this channel math information is lost, see FILE NAVIGATION for more information.

🐼 Divide Channel Settings	- 🗆 X
Make desired chann	el entries and selections.
New Channel Name:	Sine WVF / Offset Square Wave
New Channel Units:	Volts
New Channel Scale:	Linear
1 🗢 X	BC 01: Sine Wave (linear)
Add to	BC 06: Offset Square Wave (II
Math Chan	nels OBase Channels
Note: Channel Math is	applied from underlying channel data.

3. In the "Plot Selections → Plot N → Math Ch 0X" tree branch click the "Show/Hide" icon. Once clicked, the channels trace is shown on the screen.



Polynomial Convert Channels

The "Poly Convert Ch" function adds a channel to the "Math Channels" group by performing polynomial conversion on the selected channel.

- 1. In the menu bar click Edit \rightarrow Add Math Channel \rightarrow Poly Convert Ch \rightarrow X Order Poly Conv
- 2. When the "X Order Poly Coeff Selections" prompt appears, make the desired entries and selections and click "OK"

🞊 1st Order Poly Coeff Selections	-		×
Make polynomial selection	ons.		
New Channel Name:	1st Order Poly Conv		
New Channel Units:	Volts		
Source Channel:	BC 01: Sine Wave (linear)	•	
a ₁	$Y = \mathbf{a}_1 X^1 + \mathbf{a}_0 X^0$		
Add to Math C	Channels OBase Channels		
Note: Channel Mati	h is applied from underlying channel da	ta.	
	DK Cancel		



Convert to Log Base 10 Channel

The "Convert to Log 10 Ch" function adds a channel to the "Math Channels" group by performing polynomial conversion on the selected channel.

- 1. In the menu bar click Edit \rightarrow Add Math Channel \rightarrow Convert to Log 10 Ch
- 2. When the "Log 10 Conv Coeff Selections" prompt appears, make the desired entries and selections and click "OK"

🞊 Log10 Conv Coeff Selections		-		×
Make channel conversion	n selections.			
New Channel Name:	Conv to dB			
New Channel Units:	dBV			
Source Channel:	BC 06: Offset Square Wave (linear)	•	•	
	$\mathbf{Y} = \mathbf{m} \text{Log}_{10}(\mathbf{X}) + \mathbf{n}$			
m	10 n 0 x			
Add to Math	Channels O Base Channels			
Note: Channel Mat	h is applied from underlying chann	el data		
	OK Cancel			



Convert to Log Base 2 Channel

The "Convert to Log 2 Ch" function adds a channel to the "Math Channels" group by performing polynomial conversion on the selected channel.

- 1. In the menu bar click Edit \rightarrow Add Math Channel \rightarrow Convert to Log 2 Ch
- 2. When the "Log 2 Conv Coeff Selections" prompt appears, make the desired entries and selections and click "OK"

Log2 Conv Coeff Selections	- 0 X
Make channel conversio	n selections.
New Channel Name:	Conv to Log 2
New Channel Units:	Volts
Source Channel:	BC 06: Offset Square Wave (linear)
	$\mathbf{Y} = \mathbf{m} \mathbf{Log}_2(\mathbf{X}) + \mathbf{n}$
m	
Add to	
 Math 	Channels O Base Channels
Note: Channel Mat	th is applied from underlying channel data.
	OK Cancel



Move Channel

The "Move Channel" function moves a channel to the within its channel group. This allows for reordering of channels as desired by the user.

- 1. In the menu bar click Edit \rightarrow Move Channel \rightarrow {Base, Event, or Math} Channel
- 2. When the "Move Channel Selections" prompt appears, make the desired entries and selections and click "OK". Note: this step will clear the Channel Display Panel, but no data will be lost, other than what was selected to delete.

Move Channel Selections	_		X
Make move channel sele	ections.		
Put (channel):	C 04: Sine WVF Event 2	•)
Before (channel):	C 01: Sawtooth Event 1	•)
Warning! Moving chan from plot view	nels will clear displayed cha w(s). Click OK to continue.	annels	

3. When the Channel Display Panel clears (shown below), change the desired plots and channels "Show/Hide" feature accordingly to show the desired channels in the Channel Display Window.



Delete Channel(s)

The "Delete Channel(s)" function deletes a desired channel or channels

- 1. In the menu bar click Edit \rightarrow Delete Channel(s)
- 2. When the "Delete Channel Selections" prompt appears, make the desired selections and click "OK". Note: this step will clear the Channel Display Panel, but no data will be lost, other than what was selected to delete.

🕅 Delete Channel Selectio	ons	_		×
Make delete channel	selections.			
Delete Channel(s):	BC 01: Square Wave (linear)			
	BC 02: Sine Wave (linear)			
	BC 03: Triangle Wave (linear)			
	BC 04: Sawtooth Wave (linear)			
	BC 05: Pulse Train (linear)			
	EC 01: Sawtooth Event 1			
	EC 02: Sawtooth Event 2			
	EC 03: Sine WVF Event 1			
	EC 04: SIne WVF Event 2		•	
Warning! Deleting plot view	channels will clear displayed cha (s). Click OK to continue.	nnels fror	n	
	OK Cancel			

3. When the Channel Display Panel clears (shown below), change the desired plots and channels "Show/Hide" feature accordingly to show the desired channels in the Channel Display Window.



Rename Channel(s)

The "Rename Channel(s)" function renames a desired channel or channels

- 1. In the menu bar click Edit \rightarrow Rename Channel(s)
- 2. When the "Rename Channel Selections" prompt appears, make the desired selections and click "OK". Note: (1) multiple channels can be renamed at a time; (2) this step will clear the Channel Display Panel, but no data will be lost.

	_
🕅 Rename Channel Selections — 🗆 🗙	[
Make channel renaming selections.	
Channel Name: BC 02: Sine Wave	
Original Channel Name: BC 02: Sine Wave	
New Channel Name: BC 02: Sine Wave	
Warning! Renaming channels will clear displayed channels from plot view(s). Click OK to continue.	
OK Cancel	

3. When the Channel Display Panel clears (shown below), change the desired plots and channels "Show/Hide" feature accordingly to show the desired channels in the Channel Display Window.



Edit Channel Info

The "Edit Channel Info" function modifies the name, unit, and/or scale of the desired channel or channels

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- 1. In the menu bar click Edit \rightarrow Edit Channel Info
- 2. When the "Channel Info Modifications" prompt appears, make the desired selections and click "OK". Note: (1) multiple channels can be edited at a time; (2) this step will clear the Channel Display Panel, but no data will be lost.

🞊 Channel Info Mo	odifications		-	×
Make channel	I modification selections.	Channel Comments:		
Channel Name:	BC 01: Square Wave			
Name: Square	Wave			
Unit: Volts	Scale: Linear			
0	riginal Channel Info: Square Wave			
Type: base	e Number: 1 Scale: linear Unit: Volts			
Warning! M	odifying channels will clear displayed channels om plot view(s). Click OK to continue.			
	OK Cancel			

3. When the Channel Display Panel clears (shown below), change the desired plots and channels "Show/Hide" feature accordingly to show the desired channels in the Channel Display Window.



Edit Channel Comments

The "Edit Channel Comments" function allows user to add/edit notes to individual channels. This is a useful feature that allows users to enter information about the respective channels in plain text.

1. In the menu bar click Edit \rightarrow Edit Channel Comments

2. When the "Channel Comment Updates" prompt appears, make the desired entries/edits and click OK.

Note: multiple channels can be edited at a time, with no impact to displayed channels.

🕅 Channel Comment Updates	- 🗆 X
Edit channel comments.	Original Channel Info: Sine Wave
Channel Name: BC 01: Sine Wave	Type: base Number: 1 Scale: linear Unit: Volts
ОК	Cancel

Edit Start Time

The "Edit Start Time" function modifies the start time of the file. This is used to correct any absolute timing issues of the data source.

- 1. In the menu bar click Edit \rightarrow Edit Start Time
- 2. When the "File Start Update" prompt appears, make the desired selections and click "OK". Note: modifying the file start date/time requires the file to be saved as a new file.

<i>c</i>			
🕅 File Start Update	-		\times
Make file start date and tin	ne modific	ations.	
Start Date:	07/09/20	22 💌	
Start Time (24-hr): 08	: 58 :	19	
Start Nanoseconds:		0	
Note: Modifying the file sta will require the file to be sa Click OK to continue.	art date an aved as a	d time new file.	
ОК	Cance		
			_

Edit File Notes

The "Edit File Notes" function allows user to add/edit notes to the open file. This is a useful feature that allows users to enter information about the file in plain text.

- 1. In the menu bar click Edit \rightarrow Edit File Notes
- 2. When the "Edit File Notes" prompt appears, make the desired entry/edit and click OK.

🞊 Edit File Notes	—	×
Enter/Edit file notes:		
OK Cancel		

6. VIEW MENU

The View Menu is composed of functions to modify and refresh the channel display panel. The menu items and corresponding functions are defined below:

- Refresh Layout: refreshes the channel display panel
- Arrange Layout: changes the number of plots shown in the channel display panel

Refresh Layout

The "Refresh Layout" function, refreshes the "Channel Display Panel". This function should be used if the window did not resize or refresh correctly after moving or resizing the application.

1. In the menu bar click View \rightarrow Refresh Layout

Arrange Layout

The "Arrange Layout" changes the number of plots shown in the "Channel/Trace Display Window". Up to 4 plots can be displayed at the same time.

- 1. In the menu bar click View → Arrange Layout → desired layout (1x View, 2x View, 3x View, 4x View)
- 2. The application window will update to show selected layout; "4x View" shown here.



7. TOOLS MENU

The Tools Menu is composed of special application functions available to the user. The menu items and corresponding functions are defined below:

- Preferences: allows the user to modify special application settings
- Split File(s): splits an individual file(s) into smaller files
- Concatenate Files: concatenates multiple files into a single file; files must be of the same channels structure but sampled over non-overlapping time periods
- Recalc Ch Stats: recalculates the channel statistics and updates the channel metadata information
- Get App Logs: opens the log files folder in the windows file explorer

Preferences

The "Preferences" function allows the user to change the modifiable application defaults and constants. The available items are default sample rate, default sample count, and min/max sample count.

Note the "Maximum Sample Count" is the parameter the application uses to limit the file size that the application will open without requiring some level of compression. When set correctly this feature prevents application instability due to large file sizes and available computing resources (RAM, virtual memory, etc.).

- 1. In the menu bar click Tools \rightarrow Preferences
- 2. When the "Preferences" prompt appears, make the desired selections and click "OK".

🕅 Preferences	—		×
Default Sample Rate (Hz):		1000 🜩	
Default Sample Count (kSa):		20	
Minimum Sample Count (kSa):		10 🔷	
Maximum Sample Count (kSa):		250	
ОК	Cancel		

Split File(s)

The "Split File(s)" function will split large files into smaller files to allow for reading into the application without the need of compression. This feature can also be used to reduce the file down to a specific area of interest, to be used with other user applications by exporting to MS Excel®, Matlab®, and/or CSV.

- 1. In the menu bar click Tools \rightarrow Split File(s)
- 2. When the "Select NTS Files" prompt appears, select the desired file(s) and click "Open".

\rightarrow \checkmark \uparrow ${=}$ \Rightarrow This	PC > Documents > Pervideo		~ C	.○ Search Pervideo
ganize * New folder				≣ • □
Project_Info	Name	Date modified	Туре	Size
📜 Ed Garcia	iogs	7/10/2022 7:23 PM	File folder	
💶 This PC	Merge Examples	6/2/2022 8:44 AM	File folder	
Desktop	Other Examples	7/8/2022 1:24 PM	File folder	
Documents	SW Manual Files	7/9/2022 11:43 AM	File folder	
↓ Downloads	BaseEventMath_20210603_050100.ntsc	7/5/2022 2:34 PM	NTSC File	890 KB
A Murie	BaseEventMathExpTest_20210603_050100.ntsc	7/5/2022 2:41 PM	NTSC File	891 KB
Alexter Dealers Drive	Example_01_Filtered_20220603_094715.ntsc	6/3/2022 12:27 PM	NTSC File	648 KB
Solution Backup Drive	Example_01_Filtered_20220603_094717.ntsc	6/3/2022 12:30 PM	NTSC File	648 KB
Pictures	Example_01_Unfiltered_20220603_094715.ntsc	6/3/2022 12:36 PM	NTSC File	654 KB
Videos	LargeFileExample_20220410_180857.ntsc	4/10/2022 6:17 PM	NTSC File	3,658 KB
🔤 OS (C:)	NewTimeSeries_20220116_170513.ntsc	1/16/2022 5:51 PM	NTSC File	144 KB
1 librariae	NewTimeSeries x01 20220116 170513.ntsc	5/25/2022 3:38 PM	NTSC File	144 KB
File name: Larg	eFileExample 20220410 180857.ntsc		~	(*.ntsc)

3. When the "File Split Settings" prompt appears make the desired selections and click "OK" Warning: sample counts greater than the "App Max Sample Count" may cause application instability and unresponsiveness.

🞊 File Split Settings	-		×
O Default Sample Count:	20	kSa	
App Min Sample Count:	1	kSa	
App Max Sample Count:	250000	kSa	
Other Sample Count:	100		kSa
Warning: Sample Counts greater than 10x the may cause application instability an	"App Max S d unrespon	ample sivene	Count" ss.
ОК	Car	cel	

4. Wait for the application to complete the file operations. A progress bar will appear indicating the progress of the individual file split.

Note: if more than one file is being split from a single operation, the progress bar will reappear; one per file to split.

承 File Split Status	-	
Splitting LargeFileExample_20220410_1	80857.ntsc Plea	ase wait

5. When completed the prompt will appear indicating the file operation is complete.

	—	\times
File split	completed	
	ОК	

6. The new files will be located in the same directory as the original files, and will carry the same base file name, but will have a sequential number included in the file name along with update time stamps indicating the start of the individual files

Pervideo					-		\times
⊕ New × 👗 🔲 🛅		\aleph Sort \checkmark \equiv View \checkmark					
\leftarrow \rightarrow \checkmark \uparrow \blacksquare \rightarrow This PC \rightarrow	Documents > Pervideo		ン C シ Search Pervideo				
🚖 Quick access		Name	Date modified	Туре	Size		
📒 Desktop	*	Example_01_Unfiltered_20220603_094715.ntsc	6/3/2022 12:36 PM	NTSC File		654 KB	
🚽 Downloads	*	LargeFileExample_20220410_180857.ntsc	4/10/2022 6:17 PM	NTSC File	3,	658 KB	
Documents	*	LargeFileExample_x01_20220410_180857.ntsc	7/10/2022 7:41 PM	NTSC File		733 KB	
Pictures	*	LargeFileExample_x02_20220410_181717.ntsc	7/10/2022 7:41 PM	NTSC File		733 KB	- 1
iClaud Photos		LargeFileExample_x03_20220410_182537.ntsc	7/10/2022 7:41 PM	NTSC File		733 KB	- 1
		LargeFileExample_x04_20220410_183357.ntsc	7/10/2022 7:41 PM	NTSC File		733 KB	
	<i>*</i>	LargeFileExample_x05_20220410_184217.ntsc	7/10/2022 7:41 PM	NTSC File		733 KB	
ICloud Drive	*	NewTimeSeries_20220116_170513.ntsc	1/16/2022 5:51 PM	NTSC File		144 KB	
47 items							

Concatenate Files

The "Concatenate Files" function will concatenate files into a larger file to allow for reading multiple files as a single file. This feature is typically used to see a data trend collected over multiple data files. Additionally, compression may be needed to view the resulting file.

- 1. In the menu bar click Tools \rightarrow Concatenate Files
- 2. When the "Select NTS Files" prompt appears, select the desired files and click "Open".

anize * New folder						≣ • 💶
Project_Info		Name	Date modified	Туре	Size	
Ed Garcia		BaseEventMath_20210603_050100.ntsc	4/6/2022 5:53 PM	NTSC File	890 KB	
This PC		BaseEventMath_20210603_050102.ntsc	5/27/2022 10:43 PM	NTSC File	890 KB	
Desktop		BaseEventMath_20210603_050104.ntsc	5/27/2022 10:47 PM	NTSC File	890 KB	
Documents		BaseEventMath_20210603_050106.ntsc	5/27/2022 10:49 PM	NTSC File	890 KB	
↓ Downloads		BaseEventMath_20210603_050108.ntsc	5/27/2022 10:49 PM	NTSC File	890 KB	
Music	н.	BaseEventMath_20210603_050110.ntsc	5/27/2022 10:50 PM	NTSC File	890 KB	
Solution Backup Drive						
Pictures						
Videos						
S (C)						
- 00 (0)						

3. You will be prompted to export the files' metadata. When the "Export consolidated meta data?" prompt appears make the desired selection.

Note: if the files to be concatenated are not of the same channel count, type, etc. a "File concatenation validation failed" error message will appear, indicating the file mismatch. If this error is encountered you will be prompted to export the files' metadata before this process is aborted.



- 4. If you select to export the metadata, you will be prompted to determine where to save the file. When the "Save File As" prompt appears, select the desired directory and file name and click "Save"
- 5. If the "Compression Factor Selections" prompt appears select the desired compression options and click "OK".

Note: If you determine you do not want to have the resulting file compressed, click cancel and update the application preferences accordingly (application maximum limitations apply, see preferences section for more information.)

🕅 Compression Factor Selecti 🗆 🗙	
Enter data compression selections.	
Compression Factor: 10	
Compression Type: Compression	
Note: Compression selections will overwrite current compression settings. Click OK to continue.	
OK Cancel	

6. Wait for the file concatenation process to complete. Multiple progress bars may appear depending on the data in the files.



7. In the "Save File As" window, navigate to the desired folder, enter the desired name in the "File name" field, and click "OK"

Note: the application will automatically append the entered file name with the timestamp of the file. The file timestamp is the start date and time shown in the file's header information in "yyyymmdd_HHMMSS" format. Additionally concatenated files are saved as NTSD files, because the files selected may not represent a continuous time samples.

\rightarrow \wedge \uparrow	> This PC > Documents > Pervideo > Merge Ex	amples > Clean_Example	~ C		n_Example
organize • Nev	v folder				≣ •
📒 Ed Garcia	Name	Date modified	Туре	Size	
This PC	Concat File2 20210603 050100.ntsd	7/10/2022 9:17 PM	NTSD File	129 KB	
E Desktop	Concat_File3_20210603_050100.ntsd	7/10/2022 9:19 PM	NTSD File	5,653 KB	
Documents	Concat_File4_20210603_050100.ntsd	7/10/2022 9:20 PM	NTSD File	122 KB	
↓ Downloads	Merged_File_20210603_050100.ntsd	5/29/2022 6:03 PM	NTSD File	129 KB	
Music	Merged_File_x01_20210603_050100.ntsd	6/25/2022 9:31 AM	NTSD File	110 KB	
- T	□ Meraed File x02 20210603 050106.ntsd	6/25/2022 9:31 AM	NTSD File	111 KB	
File name:	Concat_File.ntsd				
Save as type:	(*.ntsd)				

8. When completed a prompt will appear indicating the file operation is complete.



Recalc Ch Stats

The "Recalc Ch Stats" function recalculates the channel statistics and updates the channel metadata information contained in the file navigation tree's file information branches. Execute this function if you believe the channels statistics contained with the metadata are incorrect.

- 1. In the menu bar click Tools \rightarrow Recale Ch Stats
- 2. Depending on the file size and number of channels this process will complete very quickly. The application status window will show a change in status accordingly.

Get App Logs

The "Get App Logs" function opens the log files folder in the windows file explorer application.

Note there are 2 logs generated every time the application opens: a Pervideo Application Log (PAL) and Pervideo Error Log (PEL). The activity log is to help the user track what the application was tasked to do. The error log is to provide feedback to the developer on errors encountered. Please note, the app only generates an error log and logs error messages; communicating the errors back to the developer is at the discretion of the application's user.

- 1. In the menu bar click Tools \rightarrow Get App Logs
- 2. A File Explorer window will appear, similar to the one below.

logs				- 0	×
⊕ New - 👗 🔲 🛅 🖻	III ↑ Sort ~ ■ View ~				
\leftarrow \rightarrow \checkmark \uparrow \blacksquare > This PC > Documents >	Pervideo > logs				
📮 This PC	Name	Date modified	Туре	Size	
📒 Desktop	PAL 20220715 111228.txt	7/15/2022 2:54 PM	Text Document	1 K	3
Documents	FEL 20220715 111228.txt	7/15/2022 2:14 PM	Text Document	1 K	3
↓ Downloads	PAL_20220715_104400.txt	7/15/2022 11:12 AM	Text Document	1 K	3
🏶 iCloud Photos	PEL_20220715_104400.txt	7/15/2022 11:12 AM	Text Document	1 K	3
🚱 Music	🚽 PAL_20220715_082122.txt	7/15/2022 9:58 AM	Text Document	1 K	3
end of the second s	PEL_20220715_082122.txt	7/15/2022 9:58 AM	Text Document	1 K	3
Pictures	PAL_20220715_080822.txt	7/15/2022 8:21 AM	Text Document	1 K	3
	PEL 20220715 080822.txt	7/15/2022 8:21 AM	Text Document	1 K	
56 items					

8. HELP MENU

The Help Menu is composed of functions to provide application instructions and development information to the user. The menu items and corresponding functions are defined below:

- Help: opens this help file using the computer's Portable Document Format (PDF) reader
- About: opens a prompt showing the application's version and legal information

<u>Help</u>

The "Help" function opens this help file using the computer's Portable Document Format (PDF) reader.

- 1. In the menu bar click Help \rightarrow Help
- 2. Wait for the PDF to open.

About

The "About" function opens a prompt showing the application's version and legal information.

- 1. In the menu bar click Help \rightarrow About
- 2. A prompt similar to the one below should appear.



3. Click either of the available buttons to view their respective documents or click the "X" at the top right-hand corner to close the prompt.

9. FILE NAVIGATION PANEL

The File Navigation Panel is an application navigation tree used to configure the channels to view and view the file and channel information. The branches and corresponding functions are defined below:

- Plot Selections Branch: configures the various plots with the channels to be viewed and modifies the viewed trace(s) and conditions the viewed channels
- File Info Branch: provides basic file metadata and unique channel metadata

Plot Selections Branch

The "Plot Selections" branch provides the functionality to view and condition displayed channels. The "Plot Selections" branch consists of four "Plot N" branches that consist of the branches of channels contained in the data.



The individual "plot/channel" branches contain the following functions to show, modify, and condition individual channels.

- Show/Hide: adds/removes the respective channel from the plot. The function also updates the "Visible" state field accordingly.
- Magnify: presents the user with the magnification prompt below to scale the respective channel accordingly. This function does not affect the underlying data and allows the user to compare waveforms of dissimilar scales to each other to better compare waveform

similarities and differences. The function also updates the "Magnification" state field accordingly.

🞊 Trace Magnification Sele	cti	-		×
Enter trace magnificati	on fact	or.		
Magnification:			2 📥	
ОК			Cancel	

• Smooth: presents the user with the smoothing prompt below to smooth the respective channel accordingly. This function does not affect the underlying data and allows the user to remove the noise from the channel without affecting the actual channel data. The function also updates the "Smooth Window" state field accordingly.

🞊 Trace Smoothing Selecti	ons —	- 🗆	×
Make trace smoothing	selection	s.	
Filter Type:	Square	▼	
Sample Width:		20 🜲	
ОК		Cancel	

• Line Style: presents the user with the line selections prompt below to modify the respective channel accordingly.

🞊 Line Style Selections	- 🗆 🗙
Make line style select	ons.
Line Color:	Red
Line Type:	Dashed •
Line Width:	1.5 🜩
ОК	Cancel

• Plot Expand/Collapse Options: allows the user to expand/collapse individual plot branches. To exercise them, right-click on "Plot Selections" or any of the "Plot N" branches and click on the desired option



File Info Branch

The "File Info" branch provides the functionality to the file and channels' metadata. The "File Indo" branch consists of four sub-branches that contain the metadata of the respective file data.



The individual sub-branches contain the following information about the file

- Header: contains generic file metadata not specific to any channel: file name, file type, start data/time, sampling info, compression info, and channel counts
- Base Channels: contains the metadata of individual base channels: channel name and number, units, scale, smoothing, event info, and waveform statistics



• Event Channels: contains the metadata of individual event channels: channel name and number, source channel info, and event characteristics and statistics



• Math Channels: contains the metadata of individual math channels: channel name and number, units, scale, smoothing, math info, and event info



• File Info Expand/Collapse Options: allows the user to expand/collapse file information branches. To exercise them, right-click on any of the file information branches: "File Info", "Header", "Base Channels", "Event Channels", or "Math Channels"

File Edit View Tools	Help	
File Edit View Tools	Help Collapse All File Info Expand All File Info Expand Headers Expand Base Channels Expand Event Channels Expand Math Channels	
		0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 Relative Time (secs)
		0 0.1 0.2 0.3 0.4 0.5 0.7 0.6 0.9 RQ HQ HQ VQ *Ø+ +dt C dt

Plot Navigation Panel Resizing

The "File Navigation Panel" can be resized to allow for increased visibility to the plot and file information. To expand/reduce the panel simply click and drag the panel resizing handle (circled in the image below) and drag right or left to increase or decrease the panel width respectively.



10. CHANNEL DISPLAY PANEL

The Channel Display Panel is the right side of the application where channel data is viewed and navigated through. The major features of the Channel Display Panel are defined below:

- Channel Display Area: the area where channels/traces are displayed in one more plots arranged vertically
- Channel Navigation: the area where the buttons used to zoom in/out and traverse a file
- Data Tips: the buttons that enable the displaying of text boxes containing X-Y information about a selected data point



Zooming In & Out

The "Channel Navigation Buttons" allow the user to zoom in/out and traverse a file.

- 1. To "zoom in" horizontally, click the "Horizontal Zoom In" button (in green below)
- 2. Using your mouse, click and hold the left-click mouse button, drag the mouse to the right or left, and release the left-click button.

Additionally you may place the mouse pointer over one of the plots and press the mouse's left-click button one or more times to zoom in horizontally



3. The "Channel Display" panel should now appear similar to the one shown below



- 4. To "zoom out" horizontally, place the mouse pointer over one of the plots and press the mouse's left-click button one or more times to zoom out horizontally.
- 5. To zoom in/out vertically, repeat these steps using the vertical zoom buttons
- 6. To reset the displayed channels in all directions horizontally and vertically, click the "Zoom Reset" button: RQ
- 7. To move across the channels horizontally, click the "move left/right" button (***), place the mouse pointer over one of the plots, and press and the mouse's left-click button while moving the mouse to the left or right.

<u>Data Tips</u>

Data Tips enable the displaying of text boxes containing X-Y information about a selected data point.

- 1. To enable a data tip, click the "Enable Data Tips" button (in green below)
- 2. Using your mouse, left-click at a point along an individual channel. A data tips containing the absolute and relative position of the data point selected should appear.



- 3. To display more than on data tip, hold the {Shift} key and left-click at another point along an individual channel.
- 4. To delete an individual data tip, left-click on the desired data tip and press the {DELETE} key
- 5. To delete all data tips click the "Clear Data Tips" button: C dt

Partial File Loading

Partial File loading allows the user to load parts of very large files that will not load in the application without compressing them to reduce their sample size. On-load compression and partial file loading work with user preferences and are essential for stable application performance for extremely large files. The default user sample limit preferences are chosen for most efficient application performance.

Note: users are strongly encouraged to modify the sample preferences and use the "on-load compression" and "partial file loading" to best enable them to best work within the constraints of their data sets. Finally, it make take some experimentation to determine the sample limit preferences that works best with you and your machine.

- 1. To enable partial file loading, click the "File Load Mode" button, such that the shortened trace view is shown:
- 2. Click on the "File Reload" button:
- 3. When the "Partial File Load Settings" prompt appears, make the desired file load start/stop settings and click "OK".

🕅 Partial File Load Settings	- 🗆 X			
Select partial file load start/stop s	settings:			
Relative Start Time (secs)): 1.95 🜩			
Relative Stop Time (secs)): 11.95			
File Time Length (secs):	20.00			
Start Time Slider (secs):				
0.0 2.0 4.0	6.0 8.0 10.0			
ſ				

4. Show/Hide the desired channels. Notice samples loaded will be less than the total file length time, displayed in the Header information.



 To return to normal file loading (on-load compression), click the "File Load Mode" button, such that the long trace view is shown:
11. ACRONYMS & ABBREVIATIONS

The following defines	s key acronyms	s used in this	document:
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Acronym	Definition
CSV	Comma Separated Variables
HHMMSS	Time of Day Time Stamp in hour, minute, seconds format
hrs	Hours
МАТ	Mathworks MATLAB® File Type
min	Minutes
NTSC	Numeric Time Series, Continuous
NTSD	Numeric Time Series, Discrete
msec	Milli-seconds
nsec	Nano-seconds
Sec	Seconds
usec	Micro-seconds
XLSX	Microsoft® Excel File Type
yyyymmdd	Date Time Stamp in year, month, day format

12. DEFINITIONS

The following defines key term used in this document:

Term	Definition	
Base Channel	Channel/Trace the represents some recorded, simulated or acquired data.	
Compression	Compression method where the file size is reduced by removing "N" number of samples and replacing the "Nth" sample with the average of the "N" samples removed; e.g. for a compression factor of 10, samples 1-10 are deleted and sample 10 is replaced with the average value of samples 1-10.	
Compression Factor	The number of samples to reduce a file size by; e.g. for a compression factor of "10", "9" samples are removed and "1" sample remains reducing the data set (and file size) by a factor of "10"	
Compression Method	Method that reduces the file size by removing and replacing the sample data in some specified manner: compression or decimation	
Data Tip	Text box containing X-Y information about a selected data point.	
Decimation	Compression method where the file size is reduced by removing "N-1" number of samples and leaving the Nth sample behind; e.g. for a compression factor of 10 samples 1-9 are deleted and sample 10 is left behind.	
Event Channel	Channel/Trace the represents some user defined condition occurring. The channel level is equal to "1" (true) during the time period when the event occurs, and is equal to "0" (false) all other times.	
Math Channel	Channel/Trace created by an algebraic operation between one or more channels. Channel may be made of nesting multiple math channel operations.	
NTSC File	Continuous Numeric Time Series file type, whose samples are a continuous sequence of samples separated in time by a fixed sample rate/period.	
	For these file types, the sample rate included in the "Header \rightarrow Sample Rate" field is the sample rate of the data within the file. This file type does not contain a time axis vector included in the file.	

Term	Definition
NTSD File	Discrete Numeric Time Series file type, whose samples are a discrete sequence of samples separated in time by a one or more sample rates/periods, corresponding to distinct sampled data files.
	This file type is generally created when files are merged, and may include significant gaps in time samples corresponding to gaps in time between start and end of neighboring files.
	For these file types, the sample rate included in the "Header \rightarrow Sample Rate" field is irrelevant.
Smoothing	Statistical/Mathematical method to reduce the noise contained in the channel/trace data
Smoothing Factor	The "N" number of samples to perform the smoothing operation on, e.g. for a smoothing factor of "10" every sample along the channel is replaced with the average (smoothing operation) value of the 10 points neighboring the sample
Smoothing Filter	Statistical/Mathematical method, sample weighting method, to apply the smoothing operation. Smoothing Filter options include: rectangle, triangle, and Gaussian
yyyymmdd_HHMMSS	Time Stamp used in this application which follows the year, month, day, underscore ("_"), hour, minute, second format

13. ICONS

The icons used in the software application are listed below

Icon	Icon Name	Button Function
Pervideo_A	Startup Shortcut	Pervideo TM Startup icon
	Taskbar Icon	App taskbar icon
RQ	Refresh Zoom	Zooms out to view the entire trace/channels in both X and Y axes
H	Horizontal Zoom In	Enables/Disables the user to zoom in along the X-axis
HQ	Horizontal Zoom Out	Enables/Disables the user to zoom out along the X-axis
VÐ	Vertical Zoom In	Enables/Disables the user to zoom in along the Y-axis
VQ	Vertical Zoom Out	Enables/Disables the user to zoom out along the Y-axis
(←∅→	Move left/right	Enables/Disables the user to move/drag the traces along the X-axis
+dt	Enable data tips	Enables/Disables the add data tip feature, which places an information block of the point along the trace that was clicked
C dt	Clear data tips	Clears all data tips
	Reload Open File	Reloads open file to application
	File Load Mode	Enables/Disables file load mode: full file or partial file
	Edit Channel Comments	Allows user to apply plain text comments to channels. Usually present when adding event and math channels

14. KEYBOARD SHORTCUTS

The keyboard shortcuts available in the software application are listed below

Keyboard Shortcut	Action
<ctrl> + <s></s></ctrl>	Save current file
<ctrl> + <o></o></ctrl>	Open file
<ctrl> + <r></r></ctrl>	Reload current file
<ctrl> + <n></n></ctrl>	Create new file
<ctrl> + <shift> +</shift></ctrl>	
<a>	Save current file as new file
<ctrl> + <w></w></ctrl>	Close current file